TOWN OF ATHERTON

STATEMENT OF QUALIFICATIONS FOR THE

Atherton Water Capture Project

Town of Atherton
91 Ashfield Road
Atherton, CA 94027

TETRA TECH

October 5, 2017

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Marty Hanneman, P.E.
City Engineer/Project Manager
Town of Atherton
91 Ashfield Road
Atherton, CA 94027

Reference: **Request for Qualifications (RFQ) from Engineering Design Consultants for the Atherton Water Capture Project**

Dear Mr. Hanneman,

Tetra Tech appreciates the opportunity to submit our statement of qualifications (SOQ) to provide Professional Engineering Design Services for the Atherton Water Capture Project at Holbrook-Palmer Park in the Town of Atherton, California (Town). We understand that the Town requires an engineering consulting firm to provide continued professional services for the preparation of plans, specifications, and estimates (PS&E) through construction management for a stormwater capture facility to divert water from a major flood control storm drain (Atherton Channel), convey it to an underground infiltration/detention system, and evaluate the potential end points of reuse, irrigation, infiltration, and/or filtration.

The Tetra Tech team has successfully planned and designed more MS4 Permit compliance-driven regional stormwater projects than any other team in Southern California. Over the course of our tenure designing these types of projects, we have found it challenging and rewarding to help our clients create stormwater infrastructure that (1) cost-effectively meets the requirements of local water quality, water harvesting, and flood control regulations and (2) seamlessly integrates with existing infrastructure systems and operational practices. Our team of seasoned professionals is ideally suited to execute this job for the Town. We have assembled a group of nationally-recognized experts in stormwater and water quality analysis, regional storm water project design, stormwater harvesting/irrigation, and flood control drainage systems. Our management team is led by **Chad Helmle, PE**, Principal-in-Charge and Project Manager and **Jason Fussel, PE,** Deputy Project manager. Under their leadership, the engineering design team will be led by **Jeremy Hohnbaum, PE** and the water resources team will be led by **Oliver Galang, PE**. This group of individuals has a long history of teaming together to deliver unique design solutions to challenging stormwater problems. Their collective portfolio of projects includes a long list of regional stormwater facilities designed to simultaneously achieve multiple benefits, including flood control management, water quality improvement, and water harvesting. ***To date, this team is the only team to have been selected to design the five projects funded by Caltrans Cooperative Implementation Agreements (CIAs)*** in the Cities of Lakewood, Signal Hill, Bellflower and Carson**.** We are particularly proud to report that this team's recent design of the facility at Bolivar Park in Lakewood (which is nearly completely constructed) was featured in the February 2017 issue of *Civil Engineering Magazine*.

Tetra Tech leads the industry in developing robust analytical approaches and tools that are specifically tailored to achieve the principal objectives (permit compliance, meeting accelerated schedules, effective and affordable management practices, flood risk management, water quality enhancement, water reuse applications, minimization of operational costs) and tackle the technical challenges (storm drain diversions, pretreatment, runoff infiltration systems, storm water irrigation, and ease of operations and maintenance) that will be required to support the needs of the Town.

Our unique approach will include the following key elements:

Tetra Tech, Inc.
3475 East Foothill Boulevard, Pasadena, CA 91107
Tel 626.351.4664 www.tetratech.com

- **Unequaled Stormwater Capture Experience.** Our team approaches the design of regional facilities with a unique perspective that is founded in our extensive experience with both developing compliance plans and designing the recommended stormwater projects. The lessons learned from the vast number of stormwater capture system designs we've completed reflects our breadth of knowledge across diverse regulatory environments and site-specific conditions. A key byproduct of this experience is that our team possesses a unique and deep understanding of the complexities and challenges associated with successfully designing, building, and maintaining these new structures – structures that are very different from any that have ever been implemented and operated on a large scale by local agencies. Our team has developed a number of innovative tools that analyze each of the key design variables (diversion, storage, and outflow) and communicate their importance to you, the client, as well as local regulators.
- **Skilled Project Personnel.** The wide-scale implementation of large, underground regional stormwater capture projects, such as those proposed in the San Mateo County Stormwater Resource Plan (SRP), represents an unprecedented deployment of stormwater infrastructure – systems that are quite new to the Bay Area and that bring unfamiliar challenges. Our Project Manager, Chad Helmle, is a proven leader in planning, design, construction, and management of municipal projects, and has personally led the successful completion of numerous Caltrans-funded regional stormwater projects. The supporting project team has continuously demonstrated their collective unparalleled expertise through the design and implementation of the most regional stormwater capture projects in California.
- **Robust Project Understanding and Approach.** Our team's extensive experience designing regional stormwater projects has equipped us with the ability to critically assess the opportunities and constraints at Holbrook-Palmer Park, including the dynamics of diverting from a major channel, infiltration limitations (e.g., perched groundwater and potential contamination concerns), restricted site access and maintenance, and the unique fate and transport of the pollutants of concern. The robust project approach included in this SOQ accounts for the numerous design considerations facing the Town by identifying specific, actionable tasks that will adhere to the preliminary timeline and Caltrans CIA needs.

As a Vice President, Mr. Helmle has the authority to negotiate a contract with the Town. We confirm that we have read and understand the RFQ in its entirety and that we take no exception to the materials provided, including the Sample Consultant Agreement. We confirm that the insurance requirements described in the RFQ are presently part of Tetra Tech's coverage, and we guarantee to provide a certificate of insurance naming the Town of Atherton and its employees, officers, and agents as additionally named insured, prior to execution of a contract, if awarded.

Thank you for the opportunity to provide the Town of Atherton with professional engineering design services for this unique and exciting project. Please contact our project manager, Mr. Chad Helmle if you have further questions or requests for additional information at 9444 Balboa Ave Suite 215, San Diego, CA 92123, (858) 609-1626, or at chad.helmle@tetratech.com.

Sincerely,

Chad S. Helmle, PE
Vice President

FIRM DESCRIPTION

Tetra Tech, Inc., established in 1966 and headquartered in Pasadena, California, is a leading full-service provider of consulting, engineering, program management, construction management, and technical services focusing on resource management, infrastructure, and the environment.

Our firm offers a wide range of services provided by our 16,000 employees in more than 400 offices around the world, including 20 offices throughout California. We typically begin at the earliest stage of a project, bringing a scientific perspective to evaluate problems and developing engineering solutions tailored to our clients' needs and resources. Our solutions can span the entire life-cycle of the project and include applied science, research and technology, environmental compliance, engineering, design, construction management, construction, operations and maintenance, and information technology.

Our firm consistently ranks among the top engineering firms annually according to *Engineering News-Record* (ENR), a highly regarded industry news magazine. Tetra Tech has been ranked by ENR as ***№ 1 in Water for 14 years in a row and the № 5 Design Firm*** (among Top 500 Design Firms). We have achieved our success by being selective with the projects we pursue and ensuring that our team capabilities meet or exceed the project's requirements.

As demonstrated throughout the remainder of this proposal, the Tetra Tech team has the technical skills, proven experience, and staff capacity to successfully complete the proposed project for the Town of Atherton (Town). Our proposed approach further demonstrates our capabilities, understanding of the project support needs, and our commitment to supporting the Town in this important endeavor. The Tetra Tech team has no learning curve and is ready to support the Town immediately. We are ready and able to mobilize our staff quickly and help the Town continue to move forward to meet pressing deadlines.

FINANCIAL CAPACITY

Tetra Tech's annual revenues exceed $2.7 billion (2016). As one of the largest engineering consulting firms in the United States, we have built a solid financial position in the industry. Additionally, Tetra Tech carries no debt. Thus, we are in an excellent financial position and can provide necessary resources to rapidly deploy and meet aggressive project schedules.

INSURANCE

We confirm that the insurance requirements described in the Request for Qualifications are presently part of Tetra Tech's coverage, and we guarantee to provide a certificate of insurance naming the Town of Atherton, its elected and appointed officials, employees and agents as additionally named insured after a Notice to Proceed is issued. Each certificate of insurance provided to the Town will be maintained in full force and effect for the duration of each contract and three (3) years thereafter and will be in an amount and format satisfactory to the Town.

Select Client References for Tetra Tech

Client	Contact Name, Phone, Email	Key Similarities to Atherton
City of Lakewood	Lisa Rapp, Director of Public Works Phone: 562.866.9771 x2500 Email: lrapp@lakewoodcity.org	City Project Manager for Bolivar Park and Mayfair Park Water Capture Projects Caltrans-funded projects through the Cooperative Implementation Agreement Time-constrained projects that required close coordination with the LA County Flood Control District
Sanitation Districts of Los Angeles County	Kristen Ruffel, Tech Services/Water Quality Manager Phone: 562.908.4288 x2826 Email: kruffell@lacsd.org	Project Lead for the Carson Carriage Crest Park Stormwater Capture Project Coordinator for stormwater and sanitary sewer discharge by municipal clients per AB 485 Time-constrained project
City of Santa Monica	Selim Eren, Project Manager Phone: 310.458.2200 Email: Selim.Eren@smgov.net	Project Manager for the State-funded CBI Project at the Pier and Pico-Kenter Watersheds Time-constrained project that Tetra Tech accelerated delivery
City of Commerce	Gina Nila, Stormwater Program Manager Phone: 323. 722-4805 x2839 Email: GinaN@ci.commerce.ca.us	Project Manager for the Gateway Cities Watershed Authority Developed five individual stormwater concepts for the LA River Watershed
City of Bellflower	Bernardo Iniguez, Public Works Manager Phone: 562.804.1424 x2233 Email: biniguez@bellflower.org	Caltrans-funded projects through the Cooperative Implementation Agreement Project included diversion from flood control channel, pretreatment, and underground storage/infiltration Time-constrained project that Tetra Tech accelerated delivery

FIRM EXPERIENCE

The Tetra Tech team includes highly skilled technical and professional personnel that are qualified and available to assist the Town of Atherton with the water capture project at Holbrook-Palmer Park. Our team has extensive experience working together and has accumulated unparalleled knowledge of how to be successful designing regional multi-benefit stormwater capture and use projects. Our team has produced effective and practical designs for regional projects that have a diverse range of site constraints (e.g., diversion dynamics, pumping to connect to existing infrastructure, infiltration capacity) and innovative project components (e.g., real time controls, integration with water reclamation facilities, various water harvesting scenarios).

Our team appreciates how each individual design component needs to be considered in the overall context of the project to ensure that a truly comprehensive and cost-effective solution is developed. For example, achieving a balance between maximizing stormwater capture benefits and minimizing long term O&M costs and frequencies requires thoughtful preparation and planning. Similarly, failing to understand the dynamics between diversion (inflow), storage volume and endpoint uses (outflow) can result in the unintentional restriction of overall system capacity and efficiency. By accumulating ***actual experience*** with how regional stormwater projects fail and what elements are paramount for success, our project team is uniquely equipped to support the Town with developing a robust and effective project solution.

The early part of this section highlights how are team has addressed each of the twelve specific issues that are listed in the RFQ. These paragraphs outline the importance of each issue, provide several examples where our team encountered these individual issues, and then briefly outlines our team's approach to address the issue. The latter half of this section provides several one-page descriptions of each project, including a table that illustrates our team's experience relative to the twelve individual focus areas.

Examples of Regional Water Quality Concepts and Designs Completed by Tetra Tech in California

Pretreatment (trash, debris, and sediment)

Effective pretreatment for water capture facilities is critical for the design and longevity of the BMP as these devices remove a significant majority of trash, debris, and sediment that can foul the facility if not removed. Efficient pretreatment units must be designed to manage a challenging range of diversion flow rates and pollutant loading scenarios often experienced at large regional water capture facilities. Pretreatment units will require the most ongoing maintenance out of the entire stormwater capture system and should be sited and sized to reduce the required number of cleaning trips. Tetra Tech has designed and installed effective pretreatment devices that manage inflow rates ranging from a 20 cfs Nutrient Separating Baffle Box (BioClean) at ***Bolivar Park in the City of Lakewood*** up to a 165 cfs Hydrodynamic Separator (CDS) for the ***Los Cerritos Channel sub-basin 4*** through single installations and multiple units in parallel. The design and selection of the units took into consideration the watershed target pollutant, runoff endpoint (e.g. irrigation and infiltration), and anticipated trash and sediment loading and were sized to minimize maintenance frequencies, while ensuring that functionality is maintained. This is especially critical after each storm event in order to ensure that the pretreatment device is functional for the next storm event. Tetra Tech will work collaboratively with the Town to best identify the pretreatment methods and flow rates while minimizing operations and maintenance requirements thus providing the most effective pretreatment unit for the regional capture facility.

Design of Water Capture Projects

Regional water capture projects provide the Town an opportunity to increase flood resiliency, provide a meaningful improvement to water quality, and potentially creating an alternate source of usable water. This improvement is only realized through the design and installation of an optimally sized storage structure that balances the inflow, storage, and outflow. The sheer size of these structures requires careful engineering to ensure seismic requirements are met while providing maximum storage volumes. Tetra Tech is the leader in innovative regional water capture project design with the expertise needed to evaluate project alternatives and develop the optimal design to maximize the flood control and water quality benefits while providing a structurally safe solution. Our team has developed a suite of tools that provide a state-of-the-science system for hydrologic, hydraulic, and pollutant load assessments to support BMP design. We have worked with multiple vendors and toured manufacturing facilities to ensure volume and seismic requirements are adequate. A sample of our portfolio of underground storage selections include Oldcastle at the ***City of Santa Monica Pier Clean Beaches*** project, StormTrap at ***Bolivar Park in the City of Lakewood***, and Oldcastle, PreCon, StormTrap, and Jensen for ***Carriage Crest Park in the City of Carson***.

The regional water capture projects require significant excavation which can necessitate shoring or other geotechnical design analyses to ensure site safety. Tetra Tech geotechnical engineers have been involved in multiple large and deep excavation projects including each of the previously identified water capture projects. Our geotechnical team provided shoring and excavation recommendations that were incorporated into each of the designs.

Design to Minimize Ongoing O&M Cost

Tetra Tech understands that while capital funding for the design and construction of the project is provided through Caltrans, that ultimately the Town of Atherton (and its potential watershed partners) will be responsible for ongoing operations and maintenance costs. These costs can be a burden on municipal budgets and must be minimized while ensuring continued function of the facilities. Tetra Tech has worked with multiple cities and agencies on similar water capture projects, and has strived to design each of these facilities in a manner that allows for efficient, cost effective operations and maintenance and developed cost sharing strategies where multiple agencies benefit from the project. At ***Mayfair Park in the City of Lakewood***, the pretreatment system is located within an existing sidewalk to allow for vacuum trucks to be operated adjacent while a settling forebay is installed prior to the water spreading

into the 1.4 ac facility. This concentrates the maintenance efforts to these two locations rather than spreading it across the entire footprint. The pretreatment is sized to allow for continued operations through multiple storms before requiring cleaning thus reducing the required trips and associated costs.

Tetra Tech understands that O&M efforts must be within the capabilities of Town's maintenance staff, who may or may not have an engineering background. Tetra Tech has developed operations and maintenance plans to educate the existing staff on the most cost effective techniques and intervals. For the ***Alondra Park and Adventure Park Projects for the County of Los Angeles***, an Operations and Maintenance Plan is being prepared that outlines the procedures, equipment, and system diagrams in addition to the estimated annual costs for the project site.

Post-Capture Treatment and Use

Utilizing captured runoff for use provides the Town an opportunity to lower its dependence on potable water supplies while also potentially reducing water use costs. To effectively offset potable water supplies, two important considerations must be evaluated; (1) toxicity of stormwater in water reclamation and (2) reliability of water supply to meet existing and future demands. Stormwater conveys a number of pollutants including bacteria and other agents that are harmful to human and animals alike. These constituents require treatment to ensure that water used for irrigation, toilet flushing, or other low contact uses will not cause illness. Ensuring a reliable long-term water supply requires assessment of existing dry-weather flows in conjunction with average annual wet-weather flows. Dry-weather flows provide water during the most needed periods of the year and a deep understanding of these rates and patterns help dictate the required water tight tank size. The evaluation compares the existing and future demands to the supply to establish a required tank size to balance the irrigation needs with the water quality impacts. Tetra Tech has been instrumental in sizing and siting stormwater harvesting projects throughout California. The multiple projects undertaken by our team vary in size and sophistication from single parcel cisterns to regional storm water capture and treatment units. For ***Bolivar Park and Mayfair Park in the City of Lakewood***, we balanced the portion of the facility that would remain water tight versus infiltrating/filtrating to ensure a reliable water supply through the year. To reclaim the water to usable standards, we worked with a specialized water treatment vendor (Wahaso) to install treatment units that will provide treatment to the NSF/ANSI 350 level, which is required to allow for spray irrigation throughout the parks and nearby right-of-ways.

Caltrans-Funded CIA Projects

The Town entered into a CIA Caltrans in May 2017. Tetra Tech is the most experienced firm with managing projects funded through a Caltrans CIA. Our team has led the design for all of the CIA water capture projects in Southern California.

As a result, we have a firm understanding of the funding milestones and have applied strategic approaches to meet the required schedule, while ensuring that the project cash flow does not result in a significant burden on the Town of Atherton. The following example approaches have been applied by our team.

- **Design-Bid-Build for the City of Lakewood.** Tetra Tech provided design services and also assisted the City with developing an agreement with the LACFCD to allow for the installation of the diversion system and the use of adjacent property for the pump station. The collaboration with the LACFCD allowed the City of Lakewood to accelerate the construction of the pump station and meet the April 2017 $3.5 Million expenditure milestone for Fiscal Year 2014-15 funding.
- **Design-Build for the City of Signal Hill.** Tetra Tech provided 30% design documents to allow the City of Signal Hill to issue a design-build contract with their contractor and meet the expenditure milestone of $6 Million for the Fiscal Year 2014-15 funding allocation.
- **Owner-Supplied Materials for the City of Carson.** Tetra Tech prepared the Procurement documents for the City of Carson to purchase

the pre-cast storage structures and for on-site delivery during the subsequent construction. The specifications include provisions for storage and performance requirements by the materials supplier to meet the initial $3 Million expenditure milestone for the Fiscal Year 2015-16 funding allocation.

Time Constrained Projects

Funding and grants are often tied to specific timelines thus creating milestones that their associated projects must meet. These milestones can be difficult to meet as significant expenditures do not occur until the construction phase at which point the majority of the money is spent. As shown in our experience with the Caltrans Funded Projects, we have ensured that all of our clients have meet the expenditure amounts by the required dates through diverse approaches. Due to our extensive experience with working on the timelines associated with Caltrans projects, our team was selected to design ***Caruthers Park in the City of Bellflower*** which required that the preliminary engineering design be completed within 2 months of the notice to proceed. Our team successfully met the deadlines for this and all projects that we have participated on.

Experience Working with San Mateo County, Department of Public Works, Flood Resilience Program

Members of the Tetra Tech team have a history working with various departments within San Mateo County, including the Public Works Department. Schaaf and Wheeler has recently completed a number of projects related to flood risk and remediation for the City of San Mateo that involved close coordination with the San Mateo County, Department of Public Works, Flood Resilience Program, including the San Mateo Bayfront Levee Project.

In addition, our project team does bring significant experience working with local flood control agencies (including county governments and the Army Corps of Engineers) to ensure local standards are met, existing levels of service are maintained, and flood resiliency impacts are communicated. Tetra Tech is currently developing a ***Revitalization Plan for the Los Angeles River,*** where our team is working with the County to ensure that project recommendations meet the County standards. Designing water capture projects requires close coordination with the local flood control district to demonstrate that diversion systems have minimal impacts to the conveyance capacity of the flood control channel.

Designing Water-Tight Water Capture Facilities for Future Irrigation

Water-tight capture facilities protect the subgrade (due to expansive or contaminated soils and high groundwater) while providing the opportunity for water use to occur within the area surrounding the project. Care must be exercised to ensure a water-tight seal during construction. The creation of an impermeable system stores water which can subject it to laws and regulations pertaining to standing water due to safety and the potential for vectors. Tetra Tech has implemented water-tight capture facilities at each of the aforementioned projects in this section. In these facilities, the structure is made of concrete and coated with waterproofing and impermeable liner materials. These projects incorporate irrigation pumps and treatment systems in addition to release valves and pumps to allow for capture of future events to help maximize the water quality performance while maintaining a steady water supply for use.

Design of Enhanced Infiltration Structures

Surface soils are not always conducive to infiltration while soil layers below grade are capable of moving water at a significant rate. Breaking through these top layers of non-infiltrating soils to reach the subgrade requires careful geotechnical evaluations. Tetra Tech has investigated a number of creative solutions for delivering water to deeper soil beds with higher permeability and hydraulic conductivity to accelerate the rate of exfiltration from the BMP, which would ultimately enhance the system's performance. Example systems include dry wells below the water capture facilities to encourage additional exfiltration from the unit while providing groundwater recharge benefits; deep well injection directly into the aquifer hundreds of feet below ground surface; and narrow and permeable plastic tubes extending dozens of feet

below the bottom of the BMP. Oftentimes, these analyses yield undesirable answers due to their cost and limited benefits. Deep geotechnical borings were performed at ***Alondra Park and Adventure Park for the County of Los Angeles*** to investigate the feasibility of deep infiltration through dry wells. ***Mayfair Park in the City of Lakewood*** was underlain with poor soils and high groundwater and the possibility of installing injection wells was evaluated. ***The City of Signal Hill*** project included an in-depth analysis on the feasibility of forcing water into a narrow, yet highly permeable lens of soil using dry wells.

Design of Storm Drains or Open Channel Diversion Structures

Diversion structures are the most critical feature of the design because it dictates the total water and pollutant load delivered. It is imperative that diversion structure design is carefully considered to ensure that (1) flow rates are timed to match the flood control performance needs (and potentially align with high pollutant loading events) and (2) that the delivery system itself is redundant, energy efficient, and proven to work. Our team has designed and implemented various types of storm drain or channel diversion structure designs. We have worked with the local flood control agencies to determine the appropriate diversion structures while maximizing pollutant load reduction. Our unique capabilities have been demonstrated by our ability to successfully design and permit with the LACFCD the first City-operated and maintained rubber dam diversion for the ***Bolivar Park Project in the City of Lakewood***. For the ***Los Cerritos Channel sub-basin 4***, a drop inlet was installed to lower the floor of the channel to capture the design flow of 165 cfs. These unique applications for a diversion system enabled the cities to divert and detain even more pollutants. Our team has developed a series of analytical tools that can rapidly assess the benefits and costs of each scenario relative to its ability to meet flood control needs and maximize pollutant delivery to the regional BMP.

Design of Landscape and Park Restoration

Construction of large regional water capture facilities can result in significant impacts to the existing surface improvements. The community generally expects the park to return to the same level of service or better when the projects are complete. Tetra Tech has been the landscape architect and designer of all of the Caltrans funded projects listed herein, as well as the ***Santa Monica Pier Clean Beaches Initiative Project*** and ***Aliso Creek-Limekiln Creek for the City of Los Angeles***. The projects have varied from simple restoration design to match previous park configurations to new layouts and amenities including tennis courts, covered picnic areas, enhanced native vegetation, and upgraded playground and water splash pads. Our experience with the Caltrans CIA has afforded us the deep understanding of restoration options that are reimbursable through the program.

Minimizing Impacts to Park Users

Parks often serve as a gathering point or locale for recreational sports for the community and interruptions to park activities can significantly impact people's everyday activities. It is understood that the Town would like to ensure that the park is open during construction and that baseball little league play can be maintained with no impacts. With the continued use of the park, providing personal safety to the public will be a critical component. Construction projects can be wrought with hazards and deep excavations can impact surrounding structures and uses. Safety is of the upmost importance to the Tetra Tech team. During the conceptual and design phase of ***Caruthers Park in the City of Bellflower***, similar restrictions were put in place to continue operations of the baseball fields and minimize the impacts to existing trees. Our staff met with the park operations to coordinate and layout where each project component would be best installed and discussed project phasing to allow for portions of the open space to remain open. The ingress and egress of the facility is laid out while construction fencing will be installed around the work perimeter to allow continued use of the park. Tetra Tech will build on lessons learned from our regional water capture projects and advise the Town on potential concerns.

PROJECT EXAMPLES

Our experience encompasses all aspects of stormwater management, from development of guidance and standards to planning through design, construction, and post-construction evaluations. We work closely with our clients to prepare practical and achievable strategies for BMP implementation—strategies that are scientifically defensible and accurately evaluate the technical, economic, institutional, and regulatory feasibility. To date, Tetra Tech has designed more EWMP and WMP regional projects than any other engineering firm in the region and understands the challenges associated with design and construction. Our national network of stormwater engineers allows us to provide the best of local experience and understanding combined with the lessons learned and practical experience from working with national leaders and practitioners.

The table below outlines a few examples of our relevant experience designing regional stormwater projects similar to the Atherton Water Capture Project. Complete project descriptions are included in the following pages, highlighting the depth of our team's expertise in the range of engineering disciplines associated with this project

HISTORY OF COMPARABLE WORK	PRETREATMENT (TRASH, DEBRIS, AND SEDIMENT)	DESIGN OF WATER CAPTURE PROJECTS	DESIGNING SYSTEMS TO MINIMIZE ONGOING OPERATIONS AND MAINTENANCE COSTS	POST-CAPTURE TREATMENT AND USE	CALTRANS-FUNDED COOP IMPLEMENTATION AGREEMENT PROJECTS	TIME CONSTRAINED PROJECTS	EXPERIENCE WORKING WITH SAN MATEO COUNTY, DEPARTMENT OF PUBLIC WORKS, FLOOD RESILIENCE PROGRAM	DESIGNING WATER-TIGHT WATER CAPTURE FACILITIES FOR FUTURE IRRIGATION	DESIGN OF STORM DRAINS OR OPEN CHANNEL DIVERSION STRUCTURES	LANDSCAPE AND PARK RESTORATION AS PART OF A STORMWATER CAPTURE PROJECT
Bolivar Park Stormwater and Runoff Capture City of Lakewood	◆	◆	◆	◆	◆	◆		◆	◆	◆
Mayfair Park Stormwater and Runoff Capture City of Lakewood	◆	◆	◆	◆	◆	◆		◆	◆	◆
Albion Riverside Park City of Los Angeles	◆	◆	◆			◆			◆	
Santa Monica Clean Beaches City of Santa Monica	◆	◆	◆	◆		◆		◆	◆	◆
Upper Los Angeles River Reach 2 (5 Sites) Gateway Water Management Authority	◆	◆	◆						◆	
Aliso-Limekiln Creek Restoration City of Los Angeles	◆	◆	◆	◆					◆	◆
Carriage Crest Stormwater Capture City of Carson	◆	◆	◆		◆	◆		◆	◆	◆
Caruthers Park Stormwater Capture City of Bellflower	◆	◆	◆	◆	◆	◆		◆	◆	◆
TMDL Compliance for LCC Sub-Basin 4 City of Signal Hill	◆	◆	◆		◆					
Flood Risk and Remediation Projects City of San Mateo							◆			

Bolivar Park Stormwater Capture Project

CLIENT
City of Lakewood
Ms. Lisa Rapp, PE
(562) 866-9771

LOCATION
Lakewood, California

DATE OF COMPLETION
Winter 2017

PROJECT HIGHLIGHTS
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Pre-Treatment Systems
- Post-Treatment NSF 350 Standards for Irrigation
- Active Controls Design
- Park Restoration

Tetra Tech was contracted by the City of Lakewood to evaluate and design a Caltrans funded Stormwater and Runoff Capture Project at Bolivar Park in Lakewood.

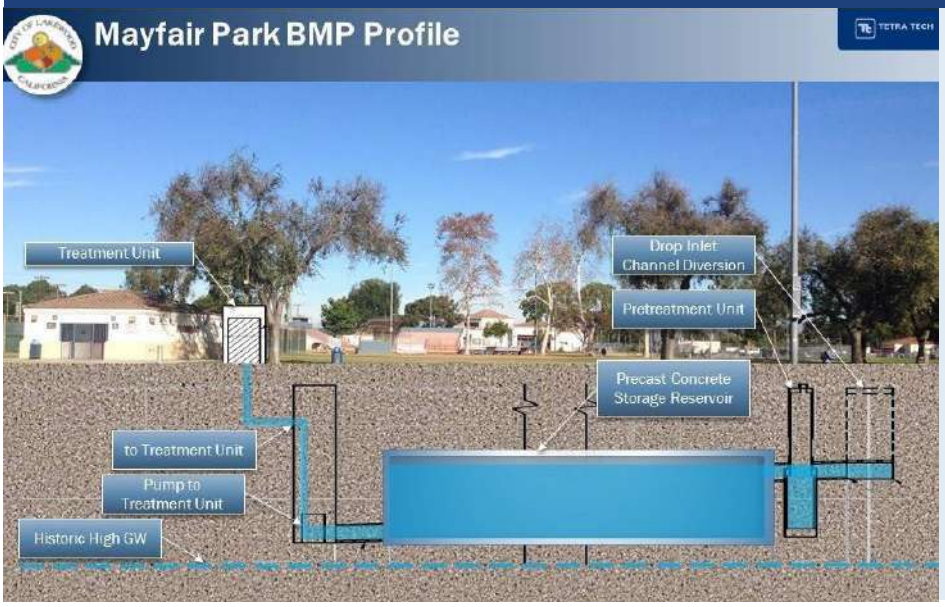
Tetra Tech provided a Project Engineering Study Report (PESR) that included all necessary site investigation, hydrology and hydraulic, and water quality data and analyses to provide a recommendation for treatment train selection and implementation.

The Bolivar Park project consists of an air-inflated rubber dam diversion system to redirect all urban runoff and stormwater runoff from the Del Amo Channel through a pre-treatment system to remove trash, debris, and sediment. A pump station and drainage pipeline will convey the water into a large, buried multi-chambered storage/infiltration facility. The stormwater collected in the underground reservoir will be treated and used to irrigate the park's landscaped areas. The system will monitor the weather conditions and the facility through a secured cloud-based system.

The goal of the project is to not only help the City comply with the metals Total Maximum Daily Loads (TMDLs), as presented in the Los Cerritos Channel Watershed Management Program, but also provide additional benefits, such as revitalized park infrastructure and augmentation of local water supplies. As one of the first cities to receive stormwater funding to support Caltrans with stormwater compliance units, the success of this project will be a model for other agencies to follow.

Project Component	Project Fact
Project Status	Construction Phase
Drainage Area	3,018 acres
Pollutant of Concern (TMDL)	Bacteria & Metals
Pre-treatment Method	NSBB & Forebay
Stormwater Capture Type	Underground Stormtrap Storage
Post Capture Use	Irrigation/Infiltration
Advanced Infiltration Options	Considered
Diversion Type	Rubber dam, drop inlet (20 CFS)
Active Controls	Designed
Pump	Inflow (20 CFS), Evacuate (5 CFS)
Landscape Design and LID	Yes
Schedule Constraints	Constrained (CIA)
Funding Source	Caltrans
Flood Control Coordination	YES
O&M Considerations	Pump/vactor trucks, confined space, pump bearing & seal, filter replacement

Mayfair Park Stormwater Capture Project



CLIENT
City of Lakewood
Ms. Lisa Rapp, PE
(562) 866-9771

LOCATION
Lakewood, California

DATE OF COMPLETION
Spring 2018

PROJECT HIGHLIGHTS
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Pre-Treatment Systems
- Post-Treatment NSF 350
- Standards for Irrigation
- Active Controls Design

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Tetra Tech provided a Project Engineering Study Report (PESR) that included all necessary site investigation, hydrology and hydraulic, water quality data and analyses and geotechnical investigation for deep infiltration to provide a recommendation for treatment train selection and implementation.

The Bolivar Park project consists of an air-inflated rubber dam diversion system to redirect all urban runoff and stormwater runoff from the Del Amo Channel through a pre-treatment system to remove trash, debris, and sediment. A pump station and drainage pipeline will convey the water into a large, buried multi-chambered storage/infiltration facility. The stormwater collected in the underground reservoir will be treated and used to irrigate the park's landscaped areas, discharge to the sanitary sewer and additional filtration for discharge back to the channel. The system will monitor the weather conditions and the facility through a secured cloud-based system.

The goal of the project is to not only help the City comply with the metals Total Maximum Daily Loads (TMDLs), as presented in the Los Cerritos Channel Watershed Management Program, but also provide additional benefits, such as revitalized park infrastructure and augmentation of local water supplies. As one of the first cities to receive stormwater funding to support Caltrans with stormwater compliance units, the success of this project will be a model for other agencies to follow.

Project Component	Project Fact
Project Status	Design Phase
Drainage Area	2,383 acres
Pollutant of Concern (TMDL)	Bacteria & Metals
Pre-treatment Method	NSBB Unit
Stormwater Capture Type	Underground Storage
Post Capture Use	Irrigation/Sanitary Sewer/Filtration
Advanced Infiltration Options	Considered
Diversion Type	Rubber Dam, Drop Inlet (30 CFS)
Active Controls	Yes
Pump	Evacuate (Irrigation, Sewer, Channel)
Landscape Design and LID	Yes
Schedule Constraints	Constrained (CIA)
Funding Source	Caltrans
Flood Control Coordination	Yes
O&M Considerations	Pump/vactor trucks, confined entry, filter replacement

Albion Riverside Park Project

CLIENT
City of Los Angeles, BOE
Mr. Iftekhar Ahmed
(213) 485-5875

LOCATION
Los Angeles, California

DATE OF COMPLETION
Spring 2019

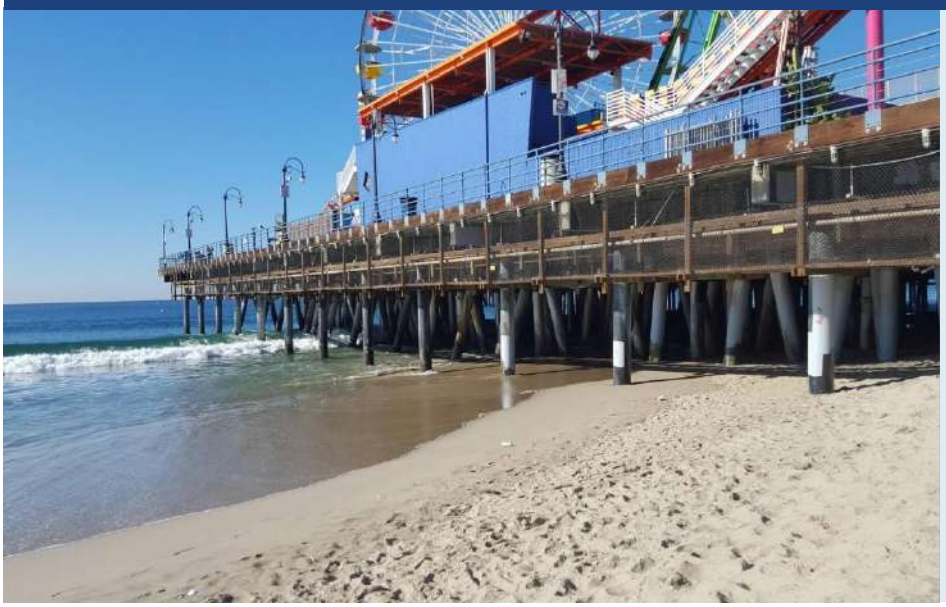
PROJECT HIGHLIGHTS
- Green Infrastructure/LID
- Design for Trash, Debris, and Sediment
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Infiltration, Use, or Water Treatment
- Landscape and Park Restoration

The City of Los Angeles (LA) selected Tetra Tech to provide pre-design, design, and construction support services for the Albion Riverside Park Project, along the LA River. The project involves transforming a six acre site, previously used for dairy warehousing and distribution, into a riverfront park and recreational facility that will benefit nearby disadvantaged low income neighborhoods. This project is part of the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to receiving waters in the LA area.

The overall objective of this project is to develop the project site with LID, GI, and BMP features to improve water quality. The project will capture and infiltrate both on-site runoff, as well as divert stormwater and dry weather flows from an existing storm drain. The BMPs installed will include infiltration –based bioretention, bioswales, and pervious pavement. The remainder of the park will be developed for recreational uses (athletic fields fitness zones, playgrounds, and picnic areas), improved access along the river (walking paths, parking lots), educational purposes, and site landscaping. These improvements demonstrate that the benefits of this project are not exclusive to water quality. Although the pollutant loads are expected to decrease dramatically and exceed the goals of Proposition O, this project will also provide multiple benefits to the neighborhood by creating visual linkages to the LA River and to other projects in the LA River Revitalization Master Plan.

Project Component	Project Fact
Project Status	Construction Phase
Drainage Area	300 acres
Pollutant of Concern (TMDL)	Bacteria & Metals
Pre-treatment Method	CDS Unit
Stormwater Capture Type	Underground Storage
Post Capture Use	Infiltration
Advanced Infiltration Options	Not considered
Diversion Type	Drop Inlet (27.5 CFS)
Active Controls	No
Pump	None
Landscape Design and LID	Yes
Schedule Constraints	Not Constrained
Funding Source	Props O, K, and 84
Flood Control Coordination	Yes
O&M Considerations	Pump/Vactor trucks, confined entry

Santa Monica Clean Beaches Project



CLIENT
City of Santa Monica
Mr. Selim Eren, PE
(310) 458-2200 Ext 5107

LOCATION
Santa Monica, California

DATE OF COMPLETION
Fall 2018

PROJECT HIGHLIGHTS
- Green Infrastructure
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Post-Treatment NSF 350
- Pre-Treatment Systems
- Active Controls Design
- Park Restoration

Tetra Tech is designing the Clean Beaches Initiative Project for two separate drainage basins at the Santa Monica Pier and Pico-Kenter Drainage Basins. This project is a major effort to improve beach water quality from storm water runoff and increase the City's drought resiliency. Wet-weather flows would be treated and diverted from the Pier watershed to the Santa Monica Urban Runoff Recycling Facility (SMURRF) or the sanitary sewer.

The Santa Monica Pier watershed improvements will include a flow diversion structure that will direct stormwater from the 106-acre Pier watershed into a subsurface storage facility with a storage capacity of 1.6 million gallons. The stored water will be pumped to SMURRF and distributed for non-potable uses or to the sanitary sewer. The surface will be improved with a new parking lot that will be consistent with the City's Zoning and Municipal Code, which may include improvements for parking lot lighting, permeable pavement, and/or landscaping features.

The Pico-Kenter project components consist of a diversion structure to divert 80,000 gallons of the "first flush" of urban runoff for treatment at SMURRF and ultimately distributed for non-potable uses. A portable pump will also be provided to drain the post-storm pond that forms downstream of the outfall at the beach.

The total cost for design and construction of the regional project components is estimated at $8 million. This project is funded by the Proposition 40 Clean Beaches Program, with a local match from the City Clean Beaches and Oceans Parcel Tax Fund.

Project Component	Project Fact
Project Status	Construction Phase
Drainage Area	106 acres
Pollutant of Concern (TMDL)	Bacteria
Pre-treatment Method	CDS Unit
Stormwater Capture Type	Underground Oldcastle Storage
Post Capture Use	SMURRF
Advanced Infiltration Options	Not considered
Diversion Type	Drop Inlet (20 CFS)
Active Controls	Yes
Pump	Evacuate (550 gpm)
Landscape Design and LID	Yes
Schedule Constraints	Not Constrained
Funding Source	SWRCB Prop 40
Flood Control Coordination	No
O&M Considerations	Pump/Vactor trucks, pump seals & bearing, confined entry

Los Angeles River Upper Reach 2

CLIENT
Gateway Water Management Authority

LOCATION
Various Locations, Southern California

DATE OF COMPLETION
TBD (Funding Being Sought)

PROJECT HIGHLIGHTS
- Regional Planning/Routing
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Green Infrastructure

The LAR UR2 watershed management area (WMA), consisting of the Los Angeles County Flood Control District (LACFCD) and the Cities of Bell Gardens, Commerce, Cudahy, Huntington Park, Maywood and Vernon, is a highly urbanized area within the watershed consisting of a total of an urbanized watershed of 14,216 acres. The LAR UR2 WMA cities lie exclusively within the Los Angeles River Watershed and each agency discharges to Reach 2 of the Los Angeles River, a concrete-lined river channel with year-round flows comprised primarily of treated wastewater.

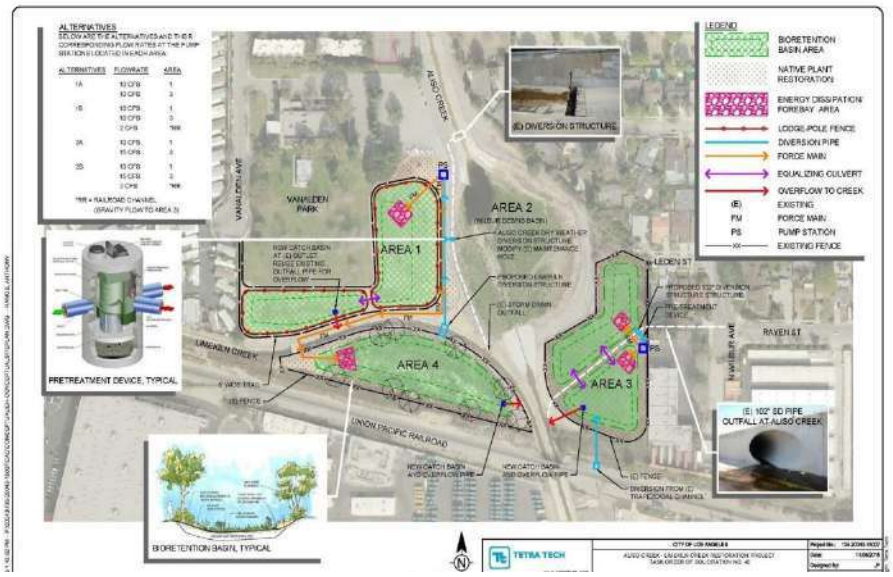
The LAR UR2 WMP and RAA identified six regional BMP projects, estimated to cost a total of $210 million, and an additional $90 million in residential and commercial LID street renovations that may need to be implemented, over the next two decades, to achieve local water quality objectives.

Tetra Tech conducted a feasibility study for the six (6) structural regional BMP projects in order to address these water quality limits. The project feasibility study consolidates the evaluation and analysis of each site with all site investigation, hydrology and water quality analysis, and provides summary of the process for project implementation.

The six (6) projects locations are: (1) John Anson Ford Park, Bell Gardens; (2) Randolph Street Green Trail, Huntington Park, Maywood, and Bell; (3) LADWP Transmission Easement, Vernon; (4) Rosewood Park, Commerce; (5) Lugo Park, Cudahy; (6) Salt Lake Park, Huntington Park.

Project Component	Project Fact
Project Status	Planning Phase
Drainage Area	8,321 acres
Pollutant of Concern (TMDL)	Bacteria & Metals
Pre-treatment Method	TBD
Stormwater Capture Type	Underground Storage
Post Capture Use	Filtration/Irrigation
Advanced Infiltration Options	Considered
Diversion Type	Drop Inlet (>20 CFS Each)
Active Controls	TBD
Pump	TBD
Landscape Design and LID	Yes
Schedule Constraints	None
Funding Source	TBD
Flood Control Coordination	YES
O&M Considerations	Pump/vactor trucks

Aliso Creek-Limekiln Creek Restoration Project



CLIENT
City of Los Angeles
Bureau of Engineering
Mr. Andy Flores
(213) 485-4496

LOCATION
Los Angeles, California

DATE OF COMPLETION
Fall 2019

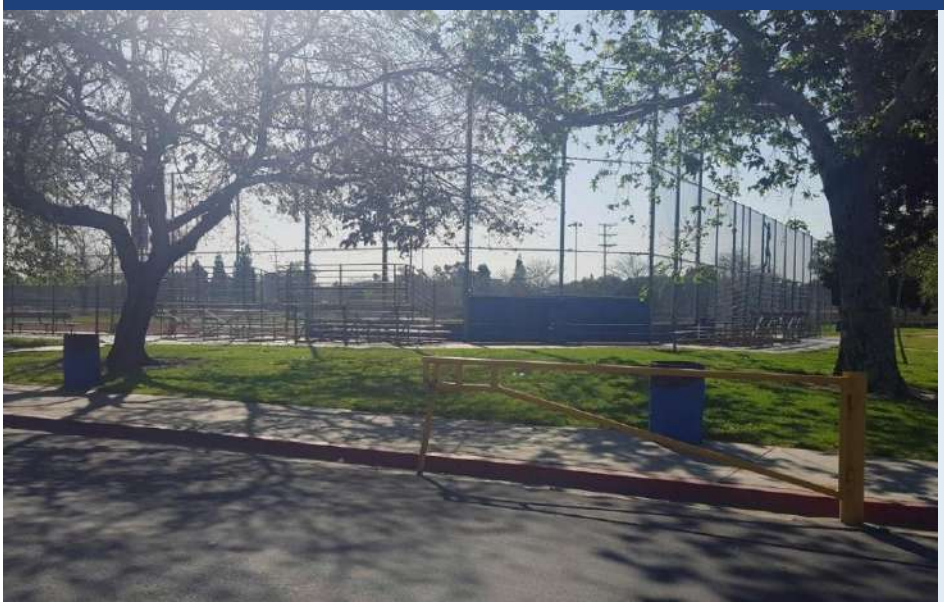
PROJECT HIGHLIGHTS
- Green Infrastructure and LID Design
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Pre-Treatment Systems
- Park Restoration

The City of Los Angeles (LA) selected Tetra Tech to provide pre- design and design services for the Aliso Creek – Limekiln Creek Restoration Project, located adjacent to the LA River. The project is located at the confluence of the concrete lined Aliso and Limekiln Creek flood channels, which merge together in the southern portion of the project site. The project improvements involve constructing several stormwater Best Management Practices (BMPs) intended to divert, capture, filter and use on-site and off-site runoff from the creeks in order to reduce contamination in Aliso Creek, Limekiln Creek, and the Los Angeles River. The proposed BMPs include low flow channel diversions, pre-screening treatment devices, stormwater pump stations, bioswales, vegetated detention/retention basins, the restoration of upland and riparian habitats, and BMP educational signage. A passive trail system is included to expand the existing park facilities.

The goal of the project is to significantly reduce the pollutant loads, as well as transform a specifically built flood control facility into a multi-function green infrastructure facility. The project will also be designed to achieve a Platinum Envision Rating. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to the rivers, lakes, and oceans within the greater Los Angeles area.

Project Component	Project Fact
Project Status	Design Phase
Drainage Area	12,484 acres
Pollutant of Concern (TMDL)	Metals
Pre-treatment Method	CDS Unit
Stormwater Capture Type	Surface Storage
Post Capture Use	Filtration/Irrigation
Advanced Infiltration Options	Not Considered
Diversion Type	Drop Inlet (10 CFS)
Active Controls	Yes
Pump	Inflow (10 CFS)
Landscape Design and LID	Yes
Schedule Constraints	None
Funding Source	Proposition O
Flood Control Coordination	YES
O&M Considerations	Pump/Vactor Trucks, Sediment removal

Carriage Crest Stormwater Capture Project



CLIENT
Sanitation Districts of Los Angeles County
Ms. Kristen Ruffell, PE
(562) 908-4288 Ext 2826

LOCATION
Carson, California

DATE OF COMPLETION
Spring 2019

PROJECT HIGHLIGHTS
- Green Infrastructure
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Pre-Treatment Systems
- Caltrans Funded Project

Carriage Crest Park was identified in the Dominguez Channel Watershed Management Group EWMP as a high priority site for a regional stormwater capture project due to its proximity to two large storm drains with a total drainage area exceeding 1,100 acres. The overarching objective of the project is to improve the quality of Machado Lake by eliminating dry-weather runoff and reducing wet-weather pollutant loading.

The City of Carson entered into a Cooperative Implementation Agreement (CIA) with Caltrans to fund the Carson Water Capture Project at Carriage Crest Park. The City of Carson entered into a subsequent agreement with the Sanitation Districts of Los Angeles County (LACSD) to manage the project.

Tetra Tech developed the preliminary engineering design report which included the analysis and developed innovative water use and treatment scenarios including (1) diversion to the sanitary sewer for treatment at the adjacent Joint Water Pollutant Control Plant (JWPCP), (2) onsite non-potable use to offset potable water demand, and (3) onsite filtration using a subsurface filter media bed. The project consists of the following components:

Tetra Tech is also preparing the detailed design drawings, cost estimates, and specifications for the pre-cast structures package and for the construction of the regional stormwater BMP facility.

Project Component	Project Fact
Project Status	Construction Phase
Drainage Area	1,146 acres
Pollutant of Concern (TMDL)	Bacteria & Metals
Pre-treatment Method	CDS Unit
Stormwater Capture Type	Underground Storage
Post Capture Use	Sanitary Sewer
Advanced Infiltration Options	Not Considered
Diversion Type	Rubber Dam, Drop Inlet (45 CFS)
Active Controls	Yes
Pump	Evacuate to Sewer (34 CFS)
Landscape Design and LID	Yes
Schedule Constraints	Constrained (CIA)
Funding Source	Caltrans
Flood Control Coordination	YES
O&M Considerations	Pump/Vactor Trucks, pump seals & bearing, confined entry, sampling

Caruthers Park Water Capture Project

CLIENT
City of Bellflower
Mr. Bernardo Iniguez
(562) 804-1424 ext. 2233

LOCATION
Bellflower, California

DATE OF COMPLETION
Spring 2020

PROJECT HIGHLIGHTS
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Pre-Treatment Systems
- Post-Treatment NSF 350
- Standards for Irrigation
- Active Controls Design

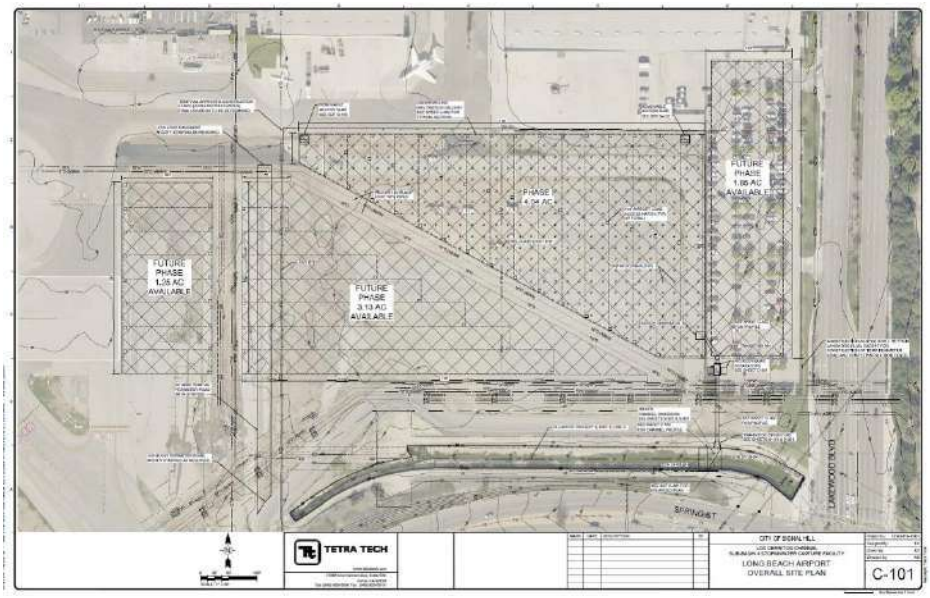
The City of Bellflower contracted with Tetra Tech to provide pre-design, design, and construction support services of a Caltrans funded stormwater capture project at Caruthers Park in Bellflower, CA.

Tetra Tech is providing a Project Engineering Study Report (PESR) that includes all necessary analyses to provide a recommendation for regional stormwater capture treatment and implementation. The analysis identifies the existing site hydrology, water quality, and hydraulics to determine an optimal combination of the inflow rate, storage volume, and outflow.

The Caruthers Park Project consists of a gravity diversion from two separate Los Angeles County Flood Control District storm drain lines; a 72" RCP line that drains 261 acres of the Los Cerritos Channel, and a 38' wide rectangular concrete channel that drains 2,995 acres of the Lower San Gabriel River. The diverted flows pass through a pretreatment system to remove trash, debris, and sediment. The runoff is then passed into a large buried multi-chambered storage/infiltration facility that will be treated and used to irrigate the park. Flows in excess of the required irrigation demands will pass into the infiltration gallery to be exfiltrated through the soil to eventually combine with the ground water. It is anticipated that the system will use active controls to monitor the weather conditions and empty the facility through a secured cloud-based system. This project will help the City comply with their bacteria and metals TMDL, while providing additional benefits of potable water offset and park revitalization.

Project Component	Project Fact
Project Status	Design Phase
Drainage Area	3,256 acres
Pollutant of Concern (TMDL)	Bacteria & Metals
Pre-treatment Method	Hydrodynamic Separator
Stormwater Capture Type	Underground Infiltration
Post Capture Use	On-site irrigation & infiltration
Advanced Infiltration Options	Considered
Diversion Type	Rubber Dam, Drop Inlet (50 and 20 CFS)
Active Controls	Yes
Pump	Irrigation/Evacuate
Landscape Design and LID	Yes
Schedule Constraints	Constrained (CIA)
Funding Source	Caltrans
Flood Control Coordination	YES
O&M Considerations	Pump/Vactor trucks, filter replacements

TMDL Compliance Plan for LCC Sub-Basin 4



CLIENT
City of Signal Hill
Mr. Steve Myrter, PE
(562) 989-7356

LOCATION
Long Beach, California

DATE OF COMPLETION
Spring 2018

PROJECT HIGHLIGHTS
- Stormwater/Urban Runoff Capture
- Storm Drain/Channel Diversion
- Pre-Treatment Systems
- 85th Percentile Sizing
- Infiltration Gallery
- Design-Build Package Preparation

Tetra Tech is providing design-built package services to the City of Signal Hill for a Caltrans funded project at the Long Beach Airport in Long Beach, CA.

Tetra Tech provided a Design-Build package that included a preliminary engineering report and 30% design plans that encompassed all necessary analyses to provide a recommendation for regional stormwater capture treatment train selection and implementation. The analysis identifies the existing site hydrology, water quality, and hydraulics to determine an optimal combination of the inflow rate, storage volume, and outflow methodology.

The TMDL Compliance Plan for LCC Sub-basin 4 consists of a gravity diversion from a Los Angeles County Flood Control District storm drain channel that drains 1,925 acres of the Los Cerritos Channel. The diverted flows pass through a pretreatment system to remove trash, debris, and sediment. The runoff is then passed into a large buried multi-chambered infiltration facility. The facility is sized to capture the peak flow and volume from the 85th percentile, 24 hour rain event (165 cfs and 126.7 ac-ft.). The project is being design-built in phases as the current project funding is sufficient to only build a facility with a 20 ac-ft. capacity.

The goal of the project is to help the City comply with their bacteria and metals TMDL, as presented in the Los Cerritos Channel Watershed Management Program through the implementation of a single large regional storm capture project.

Project Component	Project Fact
Project Status	Construction Phase
Drainage Area	1,925 acres
Pollutant of Concern (TMDL)	Bacteria & Metals
Pre-treatment Method	CDS Unit
Stormwater Capture Type	Underground Infiltration
Post Capture Use	Infiltration
Advanced Infiltration Options	Considered
Diversion Type	At Grade Diversion (165 CFS)
Active Controls	No
Pump	None
Landscape Design and LID	No
Schedule Constraints	Constrained (CIA)
Funding Source	Caltrans
Flood Control Coordination	YES
O&M Considerations	Pump/Vactor Trucks, confined entry

Flood Risk Assessment and Remediation Projects

CLIENT
City of San Mateo
Mr. Jimmy Vo, PE
(650) 522-7319

LOCATION
San Mateo, California

DATE OF COMPLETION
2002 – ongoing (on call services)

PROJECT HIGHLIGHTS
- Coordination with San Mateo County, Department of Public Works, Flood Resilience Program
- Flood Risk Assessment

The Flood Insurance Rate Map (FIRM) for the County of San Mateo that became effective in 2001 indicated that levees along San Mateo Creek and San Francisco Bay did not meet NFIP criteria for certification. Schaaf & Wheeler prepared a comprehensive evaluation of the levee systems protecting San Mateo (and concurrently Foster City and parts of Belmont) including freeboard elevations for storm surge, wind-waves and wave run-up, and produced interior runoff floodplain maps for the four major tributaries and Marina Lagoon. Several deficiencies were identified that prevented levee accreditation.

The initial flood risk mitigation plan prepared in 2002 lead to the following related projects completed by Schaaf & Wheeler and currently underway:

1. Detailed Coastal Flood Hazard Remediation Plan and Conditional Letter of Map Revision (2003)
2. Comprehensive Storm Drain Master Plan (2004)
3. O'Neill Slough Tide Gate Structure and Levee Improvements (2006)
4. Storm Drain Improvements at Greenwood Avenue and Barroihlet Avenue (2006)
5. On-Call Storm Drain Improvement Design (2007-)
6. On-Call FEMA Coordination (2008-)
7. Bayfront Levee Improvements and Accreditation (2012)
8. Sea Level Rise Assessment (2013)
9. Annual Levee Inspections (2013-)
10. North Shoreview Flood Hazard Mitigation Plan (2015)
11. Coyote Point and Poplar Avenue Storm Water Pump Station Replacement Projects (2015)

Project tasks generally include hydrologic and hydraulic analyses, the preparation of contract documents, obtaining environmental clearance and regulatory approval, coordination with San Mateo County Flood Resilience Program, San Mateo County Parks and Recreation and providing construction support for the various projects needed to improve storm drain system performance and remove regulatory flood hazards in San Mateo.

PROJECT UNDERSTANDING

Tetra Tech understands that the Town of Atherton has multiple drivers for developing a strategic stormwater project at Holbrook-Palmer Park, including water quality, flood management, and water supply resiliency. Designing a truly multi-benefit solution requires expertise in each of these stormwater management areas, as well as a comprehensive understanding for how progress in each of these areas can be effectively communicated with regulators and stakeholders. The Tetra Tech team will provide a comprehensive suite of professional services to assist the Town with effectively addressing each of these critical project components, from engineering and geotechnical investigations, to environmental clearance, permitting, design, and through construction management for the proposed water capture facility located at Holbrook-Palmer Park.

This project site was identified as a regional water quality project in the San Mateo County Storm Water Resource Plan (SWRP), as well as a recommended detention facility in the 2015 Townwide Drainage Study Update. The optimal location of the Park in the watershed, its proximity to a key drainage channel, and the available space to build underground storage has resulted in the prioritization of the site for both water quality and flood risk management. Our team understands that the preliminary sizing, load reduction estimates, and flow attenuation provide a basis for this effort; however, significant improvements to the characterization of flows and proposed project specifications are needed to achieve a truly cost-effective solution.

The SWRP estimated load reductions based on design storm (85th percentile, 24-hour storm) conditions. Our team understands that developing the linkage between planning level assessments and in-the-ground projects requires an enhanced understanding of the watershed (e.g., hydrologic and water quality dynamics) and engineering components of the stormwater treatment project (e.g., diversion rate, infiltration, storage capacity). Ultimately, the water quality benefits achieved by the Holbrook-Palmer Project will need to translate into progress by the Town and its copermittees towards the MRP requirements and TMDL targets. A GI Plan for the San Mateo County Permittees is not yet finalized, so the quantification of progress towards water quality compliance must be consistent with the Interim Accounting Method as required during the current Permit term. It is understood that this land use-based credit system will need to be transitioned into a reasonable assurance analysis (RAA) demonstration once the GI Plan is implemented.

In addition to the water quality issues, the Townwide Drainage Study Update proposed a detention basin that would provide peak flow attenuation for the 10-year storm event. The detention basin would divert and provide storage volume to limit flows in the Atherton Channel to the current conveyance capacity of 900 cfs. Our team will evaluate the Holbrook-Palmer Park to determine the best combination of inflow rates, storage volume and discharge rates to address both the water quality and flood protection goals for this facility. The analysis will be performed to be consistent with calculations provided in the Townwide Drainage Study Update and will meet local standards. Our team understands that an accurate analysis of these project components will allow the Town to effectively manage the facility to provide the optimum project benefits.

Our team understands that water supply resiliency is important to the Town and that a number of proposed retention and reuse opportunities need to be considered. If an investment in storage is made to address water quality and flood control needs, it is imperative that reasonable harvesting options be evaluated. These potential pathways include retention of the captured stormwater volume for groundwater recharge, reuse for irrigation, and conveyance to nearby water treatment facilities (e.g., the Sharon Heights Golf and Country Club Treatment Facility).

Our team understands that the overarching purpose of the project is to strategically capture urban runoff to address both water quality targets and flood risk management concerns. Engineered components (e.g., diversion rate, water quality media, pre-treatment, infiltration capacity) of the project will be carefully designed to reduce debris and pollutants transported to San Francisco Bay, divert potential flood flows from the Atherton Channel, minimize ongoing operations and maintenance costs, and reuse stormwater for park irrigation.

One additional element that this project may consider is leveraging a real-time control platform to assist in managing the oftentimes competing objectives of flood control management, water quality improvement, and water supply augmentation. Our team understands the potential value of such a system and we outline how a real time control system may benefit the Town in the Approach section of this SOQ.

KEY ISSUES

Based on our analysis of the project needs and components, project site location and condition, our understanding of local and regional permitting requirements, and our numerous similar project experience, we noted several key issues that we feel are important for the Town to consider during the design development of this project.

Access/Proximity to Residential Areas

Holbrook - Palmer Park has a one ingress and one egress point, and is bounded by Caltrain, residential homes, and the Atherton channel. This creates a challenge in terms of construction access as well as future maintenance access. During construction, traffic could build up along Watkins Avenue due to construction vehicles, hauling/delivery trucks, and worker trucks. During maintenance periods, space is limited for maintenance truck access to the pretreatment structure(s) and underground storage reservoir. In our design, we will consider not only BMP performance but constructability as well. A construction sequencing plan will be developed to address this limitation. An option of implementing a temporary bridge, permanent structure, or conveyor belt will be considered as well.

Water Quality Treatment

The Town has multiple pollutants of concern that will need to be addressed as part of this Project: trash, PCBs and mercury. The sources, loading, and fate of these pollutants are distinctive, requiring strategic design of different project components.

- Trash Management: Capture of trash through pre-treatment devices will assist with the achievement of upcoming load reduction targets (70% by 2017 and 80% by 2019), as well as prevent debris from clogging the primary stormwater capture BMP.
- PCBs and Mercury Management: Management of PCBs and mercury will be achieved through the capture and filtration, treatment, or infiltration of diverted flows. Our team understands that the highest PCB generating land uses are those classified as Old Industrial and Old Urban and will develop an approach that strategically prioritizes runoff from those areas.

Flood Control

The Town has recently completed the Townwide Drainage Study Update in 2015, which identified Holbrook-Palmer Park as a viable location for a detention facility that would provide peak flow attenuation for the 10-year design flood. Our team understands that providing flood relief for the constrained downstream infrastructure and reducing peak flows to the design conveyance capacity of 900 cfs is a priority for the Town and will work closely to achieve the maximum flood benefit feasible.

Soil Conditions

Historical geotechnical reports and investigations have indicated that the soils beneath the proposed capture facility are clay-based and may also have a high groundwater that could make infiltration of captured stormwater infeasible. If infiltration is found to be infeasible, stored

stormwater could be used for on-site irrigation after it has been treated to meet regulatory requirements.

We plan on engaging with the Town to develop creative solutions to the challenges presented by the underlying soil and groundwater conditions in order to maximize potential retention and reuse opportunities.

Funding and Schedule

The Tetra Tech team is the only firm currently designing and implementing regional stormwater projects that are funded by a Caltrans CIA. We fully understand, and have a proven track record of executing, the spending requirements and expedited schedule expectations. Our project leaders will ensure that all scheduling and financial milestones are met and will maintain open communication channels with the Town to demonstrate continual progress.

BMP/Park Integration

The Holbrook-Palmer Park Master Plan that was finalized in 2015 incorporated elements that are essential for maintaining the Park's functionality as both a community space and natural escape. Our team will work with the Town, Park managers, and local stakeholders to ensure that the proposed regional stormwater project minimizes impacts to the ongoing park uses and existing layout.

PROJECT APPROACH

The stormwater capture project at Holbrook-Palmer Park needs to be strategically designed to achieve progress towards each of the multiple competing objectives facing the Town: water quality improvement, flood risk management, and water supply augmentation. Striking a balance between the primary project goals requires an approach that can simultaneously assess the key design elements through a multi-benefit lens. Our project team has developed a comprehensive, yet streamlined process, for designing regional stormwater capture projects to meet a diverse range of drivers. This analysis system is founded in our keen understanding of the key issues and challenges associated with the successful and cost-effective implementation of multi-benefit stormwater projects at the scale of Holbrook-Palmer Park. To execute this approach, our team has developed a number of data analysis, design, and visualization tools to help the team (and our clients) understand the important site-specific design elements that drive project effectiveness and costs.

The following sections provide an overview of the important project elements and our team's unique and innovative approach to address each of these elements for the Town of Atherton within the accelerated timeline needed. An additional, detailed example scope of work is provided as an appendix to the SOQ.

Watershed Characterization

Accurate characterization of the watershed using available GIS and monitoring data, as well as previous modeling assessments, will be used to characterize expected flow rates and associated pollutant loads from the drainage area during both wet- and dry-weather conditions. This information is critical because it sets the foundation for all future analytical steps, including providing the basis for both (1) determining the best size and configuration of the BMP for the watershed and pollutants of concern and (2) quantifying the extent to which wet-weather flows can be cost-effectively diverted for treatment.

Land use based assessments and available monitoring data will be used to calibrate the extent that the pollutants of concern can be managed by the project using regionally calibrated watershed models. All modeling efforts will leverage previous analyses, including the water quality models developed as part of the SWRP and the flood management assessments in the Townwide Drainage Study Update.

Stormwater Capture Project Analysis

The hydrology, hydraulics and water quality foundation established as part of the watershed characterization will inform the engineering concepts and design components proposed for the stormwater capture facility. Tetra Tech has developed a systematic approach that will be used to quantify the water quality, flood control, and water supply augmentation benefits that may be realized simultaneously. Our team will perform these analyses to be consistent with MRP and TMDL requirements to ensure that the results can easily be tied back to existing water quality (SWRP) and flood management plans.

Critical components of the capture analysis include understanding and accurately characterizing the three fundamental project components: (1) inflow, (2) BMP capacity, and (3) outflow. While these concepts may seem straightforward, our team realizes that specific nuances and dynamics can significantly impact the ultimate project design. Strategically targeting the first flush (water quality) and peak flow rates (flood control) requires an understanding of how to divert those flows from the Atherton Channel into the capture facility at the right time. Our team will develop a diversion strategy, as well as assess the benefits of incorporating actuated valves/sensors, to ensure that an effective inflow method is utilized.

The inflow and BMP capacity are directly connected; the rate at which stormwater can be diverted defines the extent of storage that is needed. The Tetra Tech team will quantify the dynamics between these two design variables to develop preliminary capture concepts with a range of diversion rates and BMP sizes. This concept “matrix” will assess multiple combinations of potential inflow and capacity configurations to inform on the most cost-effective and feasible solution.

Additionally, our project team will analyze what outflow methods can be explored at the park. Geotechnical investigations will dictate whether underlying soils are conducive for infiltration, as well as whether captured stormwater has the potential to negatively impact local groundwater. Other outflow methods that can be systematically assessed and enhanced including the design of a water tight system that can facilitate on-site irrigation, coordination with other water resource agencies for reuse/reclamation, and strategic detention and release for attenuation of localized flooding.

The stormwater capture analysis approach recommended by our team will provide the Town with a solution that both addresses the primary project objectives and incorporates specific design components at a level of detail needed to make informed implementation decisions.

Outlining the Diversion Strategy

Once a preliminary capture concepts have been identified, the next step is to assess the optimal method for diverting the runoff and conveying it into the proposed BMP. The diversion strategy is the most critical feature of BMP design because it determines the total inflow and load that will be delivered to the system. It is imperative that the design of this feature be carefully considered to ensure that diversion flow rates are timed to match the high pollutant loading events and that the delivery system itself is redundant, energy efficient, and easy to maintain.

A gravity diversion system will be prioritized; however, given the vertical constraints common to regional scale projects (e.g., invert elevations, depth to groundwater), pumping options will also be considered.

Our team has developed a series of analytical tools that can rapidly assess the benefits and costs of each diversion rate scenario relative to its ability to maximize the delivery of pollutants to the BMP while the BMP has remaining capacity.

Tetra Tech will consider a grated drop inlet structure and rubber dam to provide intake capacity for both dry-weather and wet-weather diversion.

The tools account for the hydraulic design of the diversion system to analyze the dynamic water quality and flood control benefits associated with low flow diversions in both dry and wet weather conditions. Careful development of the tools allows for simultaneous optimization of the volumetric capacity and configuration of the BMP itself with diversion dynamics to facilitate full-system optimization. In the event that preliminary diversion rate and capacity combinations are infeasible, an iterative process will be executed that will update design assumptions until an optimal solution is reached.

Select Pretreatment System

Stormwater runoff transports sediment, trash, and debris that can compromise the performance of stormwater facilities. Pretreatment will be an integral component of the treatment strategies recommended to extend the life of the capture system. It will be prescribed in order to reduce the maintenance frequency of the stormwater facilities, focus maintenance efforts to a concentrated area, and bolster compliance through extended performance.

The diversion flow rate will inform the placement and sizing of the pretreatment device. Based on the site characteristics and optimal diversion rate, a number of pretreatment unit configurations will be assessed (e.g., hydrodynamic separators, baffle boxes, etc.) Ultimately, Tetra Tech will identify the preferred placement, sizing, and vendor for the pretreatment devices in order to minimize the O&M burden and associated costs.

Establish the BMP Configuration

The next most critical element of this design is the size and configuration of the subsurface BMPs that are to be integrated into the park. The storage and infiltration capacities of the system (in combination with the diversion flow rates) will determine the extent to which runoff can be infiltrated into the ground and pollutants settled or filtered out. Operational parameters (e.g., overflow conditions, underdrain alternatives, varying infiltration rates, and return flow structures) must be outlined and the system must be designed with resiliency and data monitoring in mind. Tetra Tech will assist with the identification and selection of specific BMP components and vendors as part of this process.

We will work closely with the Town and their stakeholders to identify the design constraints and then use the optimization algorithms developed by the U.S. Environmental Protection Agency (EPA) to guide the sizing and configuration decision making, balancing on-the-ground realities with BMP performance needs. Tetra Tech will use these proven modeling tools to help the Town visualize and quantify the value of different potential combinations of BMP size, diversion systems, and active controls. Our modeling process is recognized as the state-of-the-science, and has been utilized successfully for numerous regional stormwater projects of a similar scale to Holbrook-Palmer Park, including Bolivar and Mayfair Parks in the City of Lakewood and Carriage Crest Park in the City of Carson (see Project Examples).

Water Use Approach

Our team understands that water supply augmentation and resiliency is a priority for the Town. We are prepared to perform a detailed assessment of the site-specific opportunities and constraints related to the fate of the captured stormwater in order to optimize the benefits that can be realized.

If full infiltration of the diverted volume is infeasible, the filtered water may be used for on-site irrigation. Stored water will be pumped into an on-site treatment system, which will treat the water in compliance with regulatory levels for non-potable water use.

The Sharon Heights Golf & Country Club (SHGCC) is located approximately 4 miles southwest of Holbrook-Palmer Park and is proposed to have a recycled water project implemented by West Bay Sanitary District (WBSD). Our team has successfully linked regional water quality projects to recycled water systems, such as the Clean Beaches Initiative Project at Pier and Pico-Kenter in Santa Monica, CA. A feasibility and cost-benefit analysis will be conducted to determine whether conveying water to the proposed SHGCC facility via existing infrastructure would be feasible or recommended. Key factors, such as capacity of the SHGCC facility, infrastructure needed to connect the projects, and extent of water supply augmentation, will be assessed.

Real-time Controls Strategy

Tetra Tech has the unique ability to quantify the benefits of active, real-time controls on the capture of urban runoff and the pollutants of concern. Actively controlled systems for stormwater BMPs utilize predictive modeling and simple actuated movable parts (e.g., valves, rubber dams, orifices) to drastically increase the pollutant load removal efficiency relative to equivalently sized passive structures. These "smart" controls can be integrated by linking weather-prediction services to predict inflows and storage demands for the system. In some environments, the strategically controlled performance of the BMP can be increased by up to 90%. Additional benefits of real-time controls can be realized by considering flood management needs simultaneously (e.g., using the predictive logic to capture peak flows in addition to first flush), as well as assessing the potential to augment water supply to meet current or future demands in the Park. If this technology is successfully demonstrated as part of this project, it could greatly increase the load reduction achieved, as well as meet other Town stormwater management objectives.

Operations and Maintenance Ease & Cost

Tetra Tech acknowledges that the responsibility for the continuing operations and maintenance for the proposed Holbrook-Palmer Park Project will primarily reside with the Town. Our team will prioritize design techniques and O&M strategies that will minimize the burden on the Town. A primary consideration will be the identification of strategic maintenance access and exit points for both the pretreatment devices and underground storage facility.

Additionally, our team has compared the performance of a regional BMP with the filtration material consolidated in a portion of the storage footprint rather than covering the entire footprint and observed a marginal reduction in water quality potential. We will coordinate closely with the Town to understand the tradeoffs between different design options to identify a solution that best fits the Town's long term needs.

Our team will also assist the Town with identifying strategies for cost sharing or development of a memorandum of understanding (MOU) for O&M in the future.

Minimize Park Impacts

Tetra Tech understands that the recently completed Master Plan for Holbrook-Palmer Park highlights the important community benefits and

An underground infiltration and/or storage gallery will be implemented based on geotechnical findings and other site constraints

uses that are generated by the park features. Our team will engage with the Town to determine

which activities and components of the park are critical to maintain (e.g., recreational fields, mature trees, pedestrian trails, etc.). We will also proposed design components and construction methods that will minimize both temporary and permanent impacts on the park. For example, the hauling of excavated soil via either a temporary bridge, permanent structure, or conveyor belt will be evaluated to reduce impacts to the park and increase public safety.

Funding, Project Milestones and Scheduling

Our team understands that the Town of Atherton entered into a Cooperative Implementation Agreement (CIA) with Caltrans to fund the design and implementation of a water capture project at Holbrook - Palmer Park. Caltrans has allocated funding for Fiscal Years 2017-2018, 2018-2019, and 2019-2020. As a result, the expenditures must be tracked and invoiced to Caltrans within three years of the funding allocation date. Tetra Tech's project team is fully aware of these challenges, having worked on nearly all of the Caltrans funded projects in southern California. As a result, we have incorporated accelerated project delivery strategies including Owner-Provided materials, Design-Build, and contractor expenditure requirements for a Design-Bid Build Project. For Carson's Carriage Crest Park Project, Tetra Tech developed the technical documentation for the City to procure an 11-acre foot underground pre-cast storage facility in advance of the construction phase. Once procured and delivered, this ensures that the City of Carson has met its funding allocation with Caltrans. Inspection, delivery, and storage requirements were agreed upon by the City. A similar agreement can be applied to this project in order to meet the Caltrans funding allocation date.

Leveraging our Relationships

It is unlikely that the advantages of active controls as described above could be rapidly and successfully vetted to reduce BMP requirements with the Water Board without a firm grasp of the water quality modeling analysis and a strong relationship with the regulators. We have an exceptional relationship and reputation with the San Francisco Regional Water Quality Control Board (RWQCB) and the State Water Resources Control Board. In fact, members of the proposed Tetra Tech team for this project were personally invited by the SWRCB in 2016 and the San Francisco RWQCB in 2017 to educate board staff on the nuances of real time controls' potential impact on compliance efforts.

Our team's approach is to carefully engage the regulators by documenting the entire analysis described above and repeatedly drawing tangible and quantifiable tie-backs to the RAA guidelines and regulatory standards. Basing the analyses on existing, Board-approved tools is critical to maintaining analytical credibility; this sets the stage for an easily-followed approach to accurately quantify the appropriate level of pollutant load reduction credit that this design will yield.

Additionally, members of our project team have extensive experience working on flood risk management and flood resiliency projects that require coordination with the San Mateo County Department of Public Works. We will leverage our existing relationships to ensure that effective lines of communication are maintained.

Detailed Work Plan and Scope of Services

The Tetra Tech team clearly understands that the success of a multi-benefit stormwater capture project riddled with numerous complexities hinges on understanding the Town's support needs, project's goals, applying innovative concepts, developing successful solutions with viable alternatives, and laying out a plan for its implementation. While the preceding paragraphs outline our overarching approach, the objective of this project is to deliver a high quality set of engineering plans. To this end, we have prepared a detailed work plan and scope of services that are provided as an attachment to this SOQ.

The following are the objectives of this project, based on the following phases of the project.

Phase 1. Preliminary Engineering Concept Design Report

- Preparation of the feasibility study report that represents a 20% level of design development.

Phase 2. Construction Documents, CEQA, and Bid and Award

- Phase 2 consists of the development of design documents consisting of 60/90/100 Percent design details. This phase includes CEQA documentation and permitting, and Bid and Award Support. In addition, this phase also includes the development of procurement documents to meet the Caltrans funding milestone in April 2019.

Phase 3. Construction Support

- Phase 3 consists of providing design support services to assist the Town with the construction of the proposed facility.

The key aspects that will be addressed in our Scope of Services include:

- **Verify the drainage areas** along with hydraulic and hydrology opportunities and constraints of the Holbrook - Palmer Park as a regional BMP site
- **Verify the stormwater quality**, including TMDL, **requirements** as well as the regulatory basis
- **Understand the site characteristics**, which include site location, potentials for the purpose, existing utilities around the site, design limitations and construction accessibility, that are all required for an fruitful and cost effective design
- **Leverage our Caltrans funding knowledge**, which may include expediting the detailed design schedule, procurement options, etc., to ensure spending requirements are met
- **Best Management Practice (BMP) and stormwater treatment systems** to meet the project's goals as well as overcoming its potential constraints
- Identification and evaluation of **potential beneficial uses of stormwater**
- **Post-construction restoration of the site** and landscape, including re-construction of field areas
- **Permitting requirements** of the project and regulatory coordination
- **Define and design of recommended system** for the project
- Evaluate the system's **operation and maintenance needs**
- **Cost estimate for construction**, set up, and long term maintenance of the recommended system

Phase 1. Preliminary Engineering Concept Design Report (20% Design)

Task 101. Project Management, Coordination, and Meetings

Tetra Tech is committed to ensuring that the Town is fully informed of all day-to-day design activities and progress. Project Management will consist of coordination with the Town Project Manager, scheduling, budgeting, progress reporting, and invoicing. The Tetra Tech Project Team will work closely with the Town and ensure that project milestones are met and information is readily available.

- *101.1 Project Schedule*

  Tetra Tech will develop a Critical Path Method (CPM) schedule that is consistent with the tasks in the scope of work. The schedule will be developed in Microsoft Project, and the degree of activity detail will cover the major tasks of the project. Task predecessors, float time, and task dependency will be indicated, as well as a highlighted critical path for the project. The schedule will serve as a planning tool and will be updated monthly to measure actual progress.

- *101.2 Project Coordination*

  The Tetra Tech Project Manager will be the primary point of contact for the Town Project Manager, and will be responsible for the overall conduct, coordination, and completion of services. Tetra Tech is committed to ensuring that the City Project Manager is fully informed of all day-to-day design activities and progress. This will be achieved through project coordination efforts, correspondence, and monthly progress meetings. The Tetra Tech Project Manager will also establish an OneDrive site to share information, such as deliverables, research materials, site photos and schedule with the Town. It is a location to maintain communication with all stakeholders on key issues and action items.

- *101.3 Kick-Off Meeting*

  The project will be initiated with a Project Kick-Off Meeting with the City Project Manager, and other key stakeholders that the Town would like to include. The primary objective of the kick-off meeting is to discuss the project approach, identify critical success factors, and obtain project specific goals from the Town and their agency clients. The Kick-off Meeting will be held within two weeks following receipt of the Notice to Proceed from the Town. Tetra Tech will prepare an agenda, meeting materials and schedule for the Kick-Off Meeting. Meeting summary notes will be prepared and provided by Tetra Tech.

Task 101 Deliverables

- Project schedule, updated monthly
- Kick-Off Meeting and Project meetings agendas, meeting handouts/materials and meeting summary notes.

Task 102. Site Investigation

This task involves researching and evaluating the available project site information, planning documents and review of as-builts for the flood control drainage infrastructure, existing water mains, existing sanitary sewer mains, existing irrigation lines and other utilities. In addition, field investigations will be conducted to establish the site maps and evaluate the dry-weather flows in the storm drains.

- *102.1 Document Review and Research*

  This task also involves preliminary research of the available project site information, planning documents, and as-builts for the flood control drainage infrastructure.

  The following project documents will also be reviewed under this task:

  - Holbrook - Palmer Park Master Plan
  - Municipal Regional Permit
  - San Mateo Stormwater Resource Plan
  - Townwide Drainage Study Update, April 2015
  - Town of Atherton Holbrook - Palmer Park Facility As-Built Plans (Grading Plans and Irrigation Plans)

- *102.2 Site Investigation*

  Tetra Tech will conduct a field reconnaissance of the project site with the City Project Manager and representatives from the Town of Atherton and other stakeholders. The objective of this task is to review the field conditions and discuss the preliminary site layout. The site walk will evaluate potential locations for the diversion structures, pretreatment units, possible pump station location(s), storage facilities, and possible location of water quality treatment system in the event a use option is necessary. In addition, the site investigation will be an opportunity to discuss agency specific goals and requirements for the site, such as drainage, diversion, and the operation and

maintenance requirements required by the Town of Atherton.

- *102.3 Topographic Aerial Survey*

  Tetra Tech will conduct a topographic survey and perform detailed investigations of the site in order to allow the design team to understand above ground and potentially subsurface constraints that may limit the project foot print. These items may include, but are not limited to, tree canopies, above ground infrastructure, channel and storm drain invert elevations, street centerlines, sidewalks and existing utilities.

  The topographic survey will be comprised of two major portions; ground survey and aerial photogrammetry. Two days of survey have been assumed to obtain supplemental survey data that is obscured, as well as collect field invert data available. Tetra Tech will coordinate with the Town of Atherton for access within the channel to collect the channel inverts. Our team will require six (6) aerial targets. The establishment, targeting, and survey of these points are assumed to be the responsibility of the Town.

  Tetra Tech will provide the following products and services:

  - Research existing record data consisting of record of surveys, parcel maps, tract maps and other recorded documents made available to the design team.
  - Request and review existing Geographic Information System (GIS), ground survey, aerial photogrammetry, and other electronic information available from the County.
  - Establish horizontal project control for the project moving forward based on the California State Plane Coordinate System, Zone 3 (NAD 83), and vertical control based on the San Mateo County benchmark system. Additionally, a basis of bearing and local site control will be established for future use.

  Field survey of the site will include invert elevation, pipe diameter and direction of flow for underground utilities, and tree trunk location and size.

Task 102 Deliverables

- Field Notes and Site Photos.
- A topographic map will be provided based on the aerial and ground survey for the project site location. The map will be developed in AutoCAD. The survey will be used as a base map for the development of the 20% Design Documents and the future detailed design phase.

Task 103. Utility Research

Utilizing USA North 811's website, a comprehensive utility matrix will be developed, which Tetra Tech will use to request utility atlas information. The atlas information will be used to prepare an existing utility index map for the project area.

Once the site investigations and project information review component are complete, Tetra Tech will perform a site visit to verify the accuracy of data obtained and the locations of the utilities based on the utility atlases received. Tetra Tech will also verify the appropriate right-of-way, and incorporate the utility investigation into the topographic base maps. This information will be used in verifying the preliminary design layouts and minimizes utility conflicts.

Task 103 Deliverables

- Utility search incorporated into the topographic base map

Task 104. Geotechnical Investigation

The Geotechnical Investigation consists of design-level geotechnical exploration, design consultation and plan reviews, and testing and observation services during construction.

Based on preliminary review, the site is characterized as being underlain by Holocene-aged alluvial fan and fluvial deposits. Per previous exploration locations within one mile of the site, it is anticipated that the site is underlain by native soil deposits comprised of stiff to hard lean clay with varying amounts of fine-grain sand. Beneath the upper clay deposits, exploration locations in the general site vicinity encountered medium

dense to very dense sand to silty sand deposits with varying amounts of gravel. Actual subsurface soil conditions at the site will be confirmed with site-specific field exploration.

The Seismic Hazard Zone Report for the Palo Alto Quadrangle (2006) maps the highest historical groundwater across the site at depths of approximately 25 to 30 feet below existing grade.

- *104.1 Geotechnical Exploration*

  The primary goals of the geotechnical exploration are:
  - To evaluate the feasibility of stormwater infiltration into subsurface soils and
  - To provide geotechnical design and construction recommendations for the project improvements.

  All aspects of field exploration will be coordinated with the Town staff. USA North 811 will also be contacted to located existing utilities at the site. A licensed Certified Engineering Geologist or Geotechnical Engineer will log all soil borings. The geotechnical investigation will consist of 3 to 4 cone penetration test (CPT) probes to a depth of 50 feet. The CPT provides a continuous empirical profile of subsurface soil conditions and empirical measurements of groundwater depth. The geotechnical investigation will also include 3 to 4 geotechnical borings to depths of 10 to 30 feet and one boring to a depth of 50 feet. The borings will be used to define stratigraphy at the site to verify the feasibility of infiltration at the site and to obtain soil parameters for the design of the storage/infiltration underground BMP facilities at the site, the diversion structure, the pretreatment facilities, and to provide soil parameters for the design of the shoring system, if required. During the field exploration, the groundwater depth will be measured. This work will be performed during one mobilization.

  All explorations locations will be backfilled per San Mateo County recommendations. Soil cuttings from the borings will be drummed in 55-gallon steel drums and hauled away from the site.

  Borehole infiltration testing is proposed at each of the shallow geotechnical borings at anticipated depths of 10 to 25 feet. A 2-inch to 4-inch diameter PVC pipe will be inserted into each borehole. The lowermost 5 feet of the pipe will consist of a bottom cap and slotted screen, and blank pipe will be added until just above the ground surface. The annulus along the screen interval will be filled with gravel; the rest of the annulus will be left open to permit removal of pipe upon completion of testing. The holes will be presoaked with water up to the top of the boreholes on the day of drilling, and percolation testing will be subsequently performed later in the day. A vibrating wire piezometer will be lowered to within 6 inches of the bottom of the pipe, and an automated datalogger will be used to collect piezometric measurements at regular intervals.

  Laboratory testing will be performed on the collected soil samples to better characterize the subsurface soil conditions. Testing will include strength testing, Atterberg limits, sieve analysis, moisture/density, sulfate testing, and other testing determined based on the collected soil samples.

- *104.2 Geotechnical Exploratory Report*

  The geotechnical exploratory borings and infiltration testing results will be compiled into a Draft Geotechnical Exploration Report. Following receipt of comments on the report, a Final Geotechnical Exploration Report will be prepared and submitted.

Task 104 Deliverables

- Draft and Final Geotechnical Exploration Report

Task 105. Develop Stormwater Capture Strategy

- *105.1 Preliminary Site Layout*

  Based on review of the available San Mateo County Stormwater Resource Plan (SMCSRP) documentation, Holbrook - Palmer Park Master Plan, Townwide Drainage Study Update, park as-builts, and storm drain as-builts, Tetra Tech will develop a preliminary site layout sketch showing the location of the

diversion, pretreatment unit(s), pump station, storage structures, and overflow/return line. The preliminary elevations will be included as a basis for determining pumping and earthwork requirements. The preliminary site layout will be submitted to the City Project Manager for review and preliminary comments.

The site layout will be used as the basis for conducting the BMP Optimization, Diversion recommendations, and water quality pollutant load reduction.

- *105.2 Water Quality and Flood Control Analysis*

  This task will consist of the development of recommendations for the BMP location and features pertaining to water quality and flood risk management. Tetra Tech will use any available GIS/LiDAR data to determine the drainage area for the project site. Tetra Tech will conduct the water quality hydrology based on available GIS shapefiles and LiDAR data. In addition, the Town will provide any available water quality monitoring data collected within the vicinity of the project site by the San Mateo Resource Conservation District or other local entities. Tetra Tech has developed a suite of tools that provide a state-of-the-science system for hydrologic and pollutant load assessments to support BMP design. Hydrologic modeling for flood control will use local design storm metrics and be consistent in methodology with the Townwide Drainage Study. Water Quality Pollutant Load modeling will be conducted in Loading Simulation Program in C++ (LSPC) to develop recommendations for BMP sizing and pollutant reduction.

  These analyses provide the foundation for executing the BMP design work for the site. Moreover, this system of modeling tools is specifically designed to be consistent with methods used by regulators to quantify the benefit of BMPs for TMDL compliance. As a result, these tools are ideal for sizing BMP features, and can also be used to demonstrate compliance progress with regulatory requirements such as those outlined in the Municipal Regional Permit for both water quality and flood control.

  The hydraulic analysis will primarily focus on the physics of designing a resilient, cost-effective, and minimally disruptive diversion structure for the project site. Tetra Tech is proposing to continue our innovative approach for regional BMP design by again linking the water quality analysis with the hydraulic analysis.

  For this effort, we will calculate the diversion point hydraulics along the storm drain using the EPA Storm Water Management Model (SWMM) to determine the water surface elevation and System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) to determine the water surface elevation and sizing requirements for several configurations of the inlet system. Simultaneously, we will use the TMDL and BMP models to analyze the water quality benefits achieved by combining the diversion configurations with BMP sizes to establish a relationship between storm drain disruptions and achieved water quality. Low flows will be modeled to determine the weir height and the water surface's relation to the inlet elevation leading to the low flow diversion system.

- *105.3 Active Controls Analysis*

  Of critical importance to this project is the potential introduction of active, real-time controls to the design process. Integrating "smart" controls on a project that are linked to weather-prediction services and are able to predict flows and/or demands can greatly increase the capacity of a BMP to capture, store, and use water. In some environments, the performance of the subject BMP can be increased by up to 90 percent. If this technology is successfully demonstrated as part of this project, it could greatly reduce the overall number of BMPs ultimately required to achieve compliance with the TMDLs as outlined in the SMCSRP.

  Our team proposes continuing this innovative approach to assess the load reduction

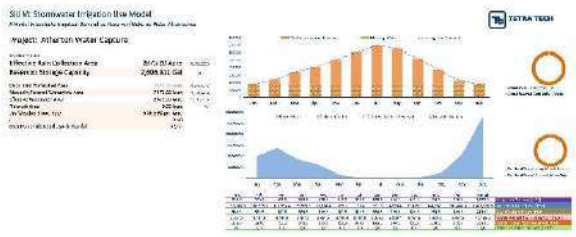
potential at the Holbrook - Palmer Park site. The modeling results will include the quantification of expected pollutant load reductions for dry- and wet-weather flows providing an estimated target for BMP performance.

- *105.4 Treatment and Use Alternatives*

  Tetra Tech will evaluate the potential for post treatment and use opportunities for the Holbrook - Palmer Park Project. Use Alternatives may consist of the following options for this project.

  Landscape Irrigation. The stormwater collected in the storage reservoir will be evaluated to determine the potential to offset the irrigation demand for Holbrook - Palmer Park. The park irrigation demand will be analyzed and compared with available water from stormwater and dry-weather urban runoff.

  To best understand the potential to augment this potable water at the Park, Tetra Tech will request current and historical demand information from the Town of Atherton. Tetra Tech will estimate the dry-weather flow rates from the adjacent storm drains, unless the Town of Atherton has access to dry-weather flow monitoring data from the County of San Mateo and/or another consultant. An irrigation demand and water availability analysis will be conducted to determine the potential for providing treated stormwater for park irrigation. If feasible, Tetra Tech will



Tetra Tech developed a stormwater irrigation use model to determine the minimum storage capacity necessary to fulfill the irrigation demand of the project site

  propose a post treatment and use system that will meet the requirements set by the San Mateo County Environmental Health Department.

Task 105 Deliverables

- Preliminary Site Layout Plan
- Water Quality Pollutant Load Reduction Estimates; Flood Control Evaluation; and Treatment and Use Alternatives Technical Memorandum

Task 106. Alternatives Workshop

Tetra Tech will conduct an Alternatives Workshop with the Town and other project stakeholders. The objective of this workshop is to present the recommended approach for the Holbrook - Palmer Park Project, recommended diversion rates, pumping options, storage volume, and operational strategy.

The ultimate goal of this workshop will be to come to an agreement on the proposed BMP configuration for development of the 20% design documents.

Task 106 Deliverables

- Alternatives Workshop, Agenda, Handouts, Workshop Summary and Workshop Minutes will be submitted electronically.

Task 107. Landscaping and Park Improvements

Tetra Tech will work with the Town to develop landscape concept plans to restore vegetation impacted by the proposed water quality improvement projects. The concept will incorporate improvements identified in the Holbrook - Palmer Park Master Plan within the project limits. Tetra Tech will conduct a design workshop to discuss the existing site conditions and potential surface restoration alternatives. It is recommended that the Town of Atherton Holbrook - Palmer Park's Director and Superintendent be included in this meeting in order to obtain input regarding maintenance concerns and operational needs. Low Impact Development (LID) features may be incorporated into the site design efforts. Interpretive signage and other park enhancements will be discussed in this workshop. Tetra Tech will develop the plan, perspective, and section views and identify the plant species proposed.

Task 107 Deliverables

- Landscape Design Workshop
- Landscape renderings in Photoshop format
- Landscape and Park Improvements Concept in AutoCAD format

Task 108. Preliminary Engineering Design Report

Tetra Tech will prepare a Preliminary Engineering Concept Design Report (PECDR) that clearly outlines the future implementation measures, as well as setting the guidelines for Phase 2 - Detailed Design Phase. The PECDR will clearly detail the concept of the project site and represent a 20% level of design completion.

The final deliverable will provide the opportunity for Tetra Tech to synthesize the relevant issues such as scientific findings, physical opportunities and constraints, Town objectives, and project issues obtained during the development of the conceptual design. Tetra Tech will prepare draft PECDR for review by the Town.

The draft deliverable will contain the following items:

- Executive Summary
  - Geotechnical Findings
  - Environmental Findings
  - Electrical Availability
- Existing Conditions
  - Field Work
  - Topographic Survey
  - Utilities
  - Storm Drains and Channels, including existing flood capacity and conveyance restrictions
- Hydrology, Hydraulics, and Water Quality Analysis
  - Watershed Hydrology
  - Hydrology including the 85th percentile 24-hour storm event
  - Evaluation of water quality characteristics, TMDLs and compliance with the MS4 permit
  - Water diversion from the adjacent flood control storm drains
  - Pre-treatment of the runoff and stormwater for storage and/or infiltration
  - Post-treatment alternatives of the runoff and stormwater for beneficial reuse or irrigation
  - Underground storage structure and other civil infrastructure
  - Quantification of benefits towards flood risk management (design storms)
- Treatment and Use Alternatives
  - Potential irrigation uses in the parks
  - Landscape and irrigation systems related to beneficial reuse of the water
- Preliminary Design Documents
  - The 20% design documents will be developed for the site.
- Operations and Maintenance
  - Startup operations
  - Maintenance requirements
  - Analysis of operations and maintenance including long-term costs
- Environmental Documents and Permits
  - Environmental documentation under CEQA
  - Listing of all needed permits
  - Coordination with outside regulatory agencies
  - Any other regulatory requirements anticipated
- Preliminary Cost Estimate
  - Construction costs
  - Operations and maintenance costs, including long-term costs
  - Monitoring costs
  - Water Quality and Flow Monitoring
- Implementation Schedule
  - Project implementation schedule through completion and startup

Task 108 Deliverables

- Draft and Final Preliminary Engineering Concept Design Report
- The preliminary cost estimate will be provided for the purpose of establishing a budgetary estimate.

Phase 2. Detailed Engineering Design

Task 201. Project Management, Coordination, and Meetings

- *201.1 Project Management and Scheduling*

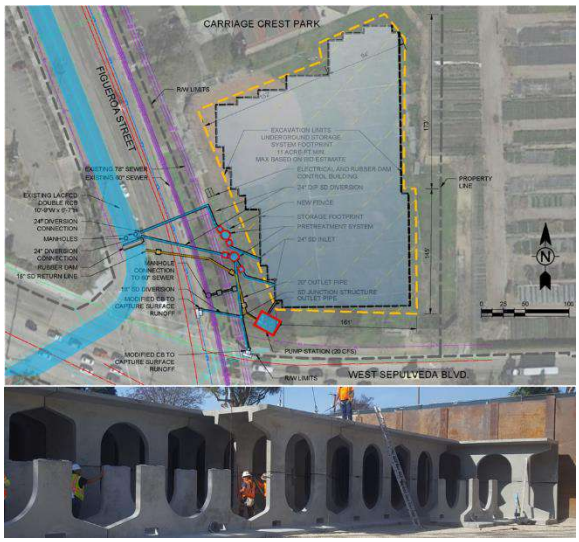
  Tetra Tech is committed to ensuring that the Town is informed of the progress of the design activities. Project Management includes project coordination and management, management of subconsultants, quality assurance/ quality control, scheduling, budget control, progress reporting, invoicing and coordination with the stakeholders. Tetra Tech will work closely with the Town to ensure that the Caltrans Cooperative Implementation Agreement (CIA) requirements and project milestones are met.

  Also, Tetra Tech will complete internal and external tasks associated with successful management of the project from the beginning to its completion and acceptance by the Town. This includes internal monitoring and tracking of the project budget to complete the work and making course corrections when required.

- *201.2 Kick-Off Meeting and Monthly Meetings*

  Design Phase Kick-Off Meeting. The project will be initiated with a kick-off meeting to present and agree on the final details of a schedule and work plan. Tetra Tech will be ready to initiate the kick-off meeting following receipt of a Notice to Proceed from the City Project Manager. Tetra Tech will coordinate and conduct the project kick-off meeting with the Town and Town staff. The Tetra Tech Project Manager will prepare a project schedule, project work plan, meeting agenda, and meeting summary for the kick-off meeting.

  Monthly Project Team Coordination Meetings. Monthly Project Team Meetings will be conducted to review project status and ensure that the contract objectives and milestones are being achieved. The project specific alternatives, necessary requirements, and information required for the development of design documents will be discussed. Anticipated items for discussion include data availability and data needs, standards related to design plans, and Town requirements regarding materials and installation methods. To supplement these meetings, Tetra Tech will maintain ongoing communication with the City Project Manager.



The Precast Concrete Modular Units Bid Package will be developed to accelerate the procurement of the precast storage structures, while address the Town's expenditure milestone under the Caltrans Cooperative Implementation Agreement

Task 201 Deliverables

- A detailed project CPM baseline schedule in Microsoft Project. The schedule will be updated monthly.
- Kick-Off Meeting agenda and meeting summaries
- Monthly Project Team Meeting agendas, handouts, and meeting summaries.

Task 202. Geotechnical Support Services

Our team will provide geotechnical engineering support for the design of the Holbrook - Palmer Park subsurface storage reservoir and associated facilities. Services will include responses to clarifications requests, provision of geotechnical parameters for design alternatives, geotechnical review of design plans and specifications, and stamping the relevant pages of the design plans.

Task 203. Additional Site Investigation

The Tetra Tech survey crew will perform one (1) additional topographic services in order to increase the density of existing survey data that was previously collected and gather more detailed information of the selected site.

Tetra Tech will also conduct a site visit to verify the project area and components and to develop the final design with Town staff. Field investigations will be conducted by the Tetra Tech discipline leads (Civil, Structural, Electrical, and Mechanical) at various stages of the final design phase.

Task 204. Active Controls (Optional Task)

Tetra Tech will develop plans to provide civil and electrical support for design details of associated hardware where appropriate, develop specification of equipment, and provide technical guidance on the hardware and control aspects of the design.

Site Specific Control Logic will be developed to provide the site specific local and cloud logic needed to achieve optimal performance of the selected BMP. Tetra Tech will work with the pump station, and other controls to integrate intelligent logic into standard control logic.

Task 204 Deliverable

- Site Specific Control Logic Diagram for Atherton Water Capture Project

Task 205. Plans, Specifications, and Estimates (PS&E)

Tetra Tech will provide contract documents suitable for bidding including plans, specifications and engineer's estimate of probable costs, as well as supporting documents such as calculations and construction schedule. In addition to final 100% documents, the PS&Es will be submitted at 60% and 90% design levels. The Tetra Tech team will attend design review workshops after each design submittal. Documents to be reviewed shall be submitted a minimum of one (1) week prior to each meeting.

- *205.1 Precast Concrete Modular Units Procurement Bid Package*

  As part of Phase II Design, Tetra Tech will prepare a Precast Concrete Modular Units Procurement Bid Package for the Town of Atherton. Following completion of the Preliminary Engineering Design Report, a procurement bid package will be prepared to allow the Town to purchase the precast structures and require that the manufacturer store the structures at an off-site location for subsequent delivery as owner-provided materials to the project construction site. The bid package will be based on the Town's procurement methods. Tetra Tech will provide the Technical documents, including performance standards, inspection and QA/QC requirements, and preliminary cost estimates for the Town.

- *205.2 60% Design Development*

  For the 60% design submittal, the project team will develop plans to the 60% level overall. Approximately 90% of the final design drawings will be developed to some degree and many will be nearly complete. Outline specifications and cost estimates will be prepared.

  The 60% submittal will mostly consist of plan sheets to provide more detail than was originally included in the Preliminary Engineering Concept Design Report, and address comments from the Town of Atherton. The structural, mechanical and electrical design features will be further refined to verify pump station sizing, piping layout and initial consultation with Pacific Gas and Electric Company (PGE).

  The cost estimate from the Preliminary Engineering Concept Design Report will be updated.

Four (4) 11”x17” sets of 60% Plans, Specifications and Cost Estimate will be submitted.

A 60% Design Workshop will be held at a location to be determined by the Town, approximately two (2) weeks following receipt of the 60% Design Submittal. A review comment matrix will be prepared to capture review comments and responses to all comments. The responses will be meaningful and descriptive enough to allow for the Town’s Project Manager to fully understand the nature of the comment and how the comment was closed.

Most plan sheets will be at 1” = 20’ scale. We anticipate including a few plan sheets that will show overall layouts, and these may be at 1” = 100’ scale. In addition, it may be necessary for us to include a few detailed plans, such as an entry area, at a larger scale such as 1” = 10’. The hydraulic profile of the system will be shown where applicable.

Tetra Tech has estimated that 66 sheets will be developed, in AutoCAD format, as described below.

DRAWING NO.	TITLE
G-1 to G-8	Title Sheet, Index, General Notes, Notices, Boring Logs, Construction Sequence, and Erosion Control Plan
C-1 to C-21	Civil Plans (Demolition, Site Plan, Demolition, Plan and Profile, BMP Schematic, Grading Plan, and Details)
L-1 to L-6	Landscaping Plans (Irrigation, Planting and Details)
S-1 to S-10	Structural Plans, Notes, and Details
M-1 to M-5	Mechanical Plans, Notes, Section, and Details
E-1 to E-12	Electrical Plans, Notes, Single Line Diagram, and Details
I-1 to I-4	Instrumentation, P&ID, and Instrument List

- *205.3 90% DESIGN DEVELOPMENT*

  For the 90% design submittal, the Tetra Tech team will develop plans with all elements shown and checked within disciplines. All specification sections will be drafted and checked by the discipline lead checker. Specifications will be prepared in accordance with the Town of Atherton Standard Specifications. The 60% Town review comments agreed upon will be incorporated. Prior to submission, an internal QA/QC review will be conducted.

  Four (4) 11”x17” sets of 90% plans, specifications and cost estimate will be submitted.

  A 90% Design Workshop will be held at a location to be determined by the Town, approximately two (2) weeks following receipt of the 90% Design Submittal. A review and comment matrix will be compiled, as described above.

- *205.4 100% Design Development*

  For the 100% (final) design submittal, the project team will incorporate review comments from the Town and from the interdisciplinary check, QA/QC review, constructability review and provide a complete set of plans and specifications suitable for the bid phase of the project. Drawings will conform to the Town’s Standards and will be stamped by a registered civil, structural and/or electrical engineer in the State of California, as needed. Project specifications and cost estimates will be stamped with the original signature and stamped by a registered civil engineer.

  In addition to one (1) final full-size 24”x36” plan set plotted on bond or mylar, the project team will provide the Town with the following: electronic AutoCAD files on CD;

Specifications – two (2) hardcopies (one bound and one loose) with signed and sealed cover; CD with specification Microsoft (MS) Word files and PDFs; and a construction cost estimate in MS Excel format. Final deliverables can be modified at the discretion of the Town.

Calculations

Our team will develop calculations for dry- and wet-weather storm flow and sizing of hydraulic structures to accommodate up to 50-year flood conditions. Other calculations are listed below by category:

- Hydrology and hydraulics
- BMP analysis
- Structural analysis
- Earthworks
- Pump design
- Pipe distribution sizing
- Electrical engineering and instrumentation

Task 205 Deliverables

- Draft and Final Precast Modular Units Procurement Package
- 60% Design PS&E Documents
- 60% Design Workshop
- 90% Design PS&E Documents
- 90% Design Workshop
- 100% Design PS&E Documents
- 100% Design Calculations
- Final Bid Package

Task 206. Environmental Document Processing (CEQA) and Permitting Support

- *206.1 CEQA Environmental Documentation*

  Air Quality. An air quality analysis will assess the potential air quality impacts that may arise from the implementation of the project. The analysis will be performed in compliance with the Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines. Our team will use the BAAQMD-approved California Emissions Estimator Model (CalEEMod) to quantify emissions generated by construction and operations activities. The team will also evaluate potential toxic are contaminant and odor impacts. The team will review the project against the Clean Air Plan for the San Francisco Bay Area Air Basin (SFBAAB).

  Biological Resources. Our team will review relevant documentation and data regarding sensitive habitats and special-status species to determine if those protected resources occur or have the potential to occur within the project site. Documentation and data include the California Department of Fish and Wildlife (CDFW) Natural Diversity Data Base (CNDDB) and the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants. The team will also review the Holbrook - Palmer Park Master Plan. A biologist will perform a general biological inventory to assess habitat and biological resources.

  A wetland specialist will perform a wetland delineation to determine the extents of the waters of the US and State within the project area and prepare a report for submittal to the Army Corps of Engineers for verification in support of federal and State permitting. The boundaries of wetlands and other waters of the US will be delineated, mapped, and documented using GPS.

  Cultural Resources. A Phase I cultural resource assessment will be conducted in compliance with CEQA requirements. The assessment will include:

  - A background cultural resources records search
  - Correspondence with the California Native American Heritage Commission, including a request for a Sacred Lands File search
  - A paleontological resources records search
  - A pedestrian survey of the project site
  - A Cultural Resources Inventory Report (CRIR)

  Greenhouse Gas Emissions. Greenhouse Gas Emissions (GHGs) from construction and operations activities will be estimated using CalEEMod and analyzed in compliance with the BAAQMD CEQA Air Quality Guidelines.

The GHG emissions will be compared to the goals and recommended actions of the State's Climate Change Scoping Plan and other applicable State regulations.

Noise. Potential noise and vibration impacts associated with the construction and operations activities of the project will be assessed. Noise monitoring will be conducted at up to three (3) locations for 15 minutes to establish ambient noise levels.

Draft/Final IS/MND. An Initial Study/Mitigated Negative Declaration (IS/MND) will be prepared based on CEQA requirements and the State CEQA Guidelines, and any applicable guidance and procedures set by the Town. The IS/MND will include the following:

- An introduction comprising the statutory authority and purpose of the environmental document
- The project description including location, project features, construction activities, and project approvals
- The environmental checklist and evaluation including a discussion of each environmental impact category supported by adequate documentation

An Administrative Draft IS/MND, a Draft Notice of Intent to Adopt a Mitigated Negative Declaration (NOI), a Draft Notice of Completion/Environmental Document Transmittal (NOC/EDT), a Draft Mitigation Monitoring and Reporting Program (MMRP), and a public agency distribution list will be prepared and submitted for review by the Town. After Town review and receipt of comments, the Draft IS/MND will be released for public review.

After the public review period, the team will prepare the Final IS/MND. The Final IS/MND will include recommendations received from staff, the public, and agencies during public review of the Draft document.

Public Meetings and Public Notices. Our team will attend one City Council hearing to respond to questions regarding the MND. The team will prepare the Notice of Determination (NOD) and conduct required filings with the County Clerk.

- *206.5 Stormwater Pollution Prevention Plan*

  The Tetra Tech team will prepare a Stormwater Pollution Prevention Plan (SWPPP) for the project to meet the requirements of the State Water Resources Control Board (SWRCB) for compliance with construction general permit. The SWPPP will be prepared under the direct supervision of a Qualified Stormwater Developer (QSD). The SWPPP would be submitted at Draft and Final completion levels for Town review and concurrence. Tetra Tech will provide one (1) amendment to include the Qualified Stormwater Practitioner's (QSP) and Contractor's contact information. Tetra Tech will assist the Town with the filing of the Notice of Intent (NOI) to the SWRCB.

Task 206 Deliverables

- Cultural Resources Inventory Report
- Wetland Delineation Report
- Draft and Final IS/MND
- Notice of Intent (NOI)
- Notice of Completion (NOC)
- Notice of Determination (NOD)
- Notice of Completion/Environmental Document Transmittal (NOC/EDT)
- Mitigation Monitoring and Reporting Program (MMRP)
- Public Agency Distribution List
- Holbrook - Palmer Park SW BMP Project SWPPP

Task 207. Bid and Award

- *207.1 Attend Pre-bid Meeting/Job Walk*

  The Tetra Tech team will attend the pre-bid conference/job walk to be held with interested bidders during the bid phase. Our team will take notes and produce meeting minutes, as appropriate, to be included in an addendum. We will prepare up to two (2) addenda to respond to questions and comments raised during the bid phase.

- *207.2 Assist the Town with Bid Evaluation*

  The team will review the three (3) apparent lowest bidders to verify that the bidder has satisfied the bid requirements and make an award recommendation to the Town.

- *207.3 Prepare "As-Bid" Documents*

  Our team will incorporate all changes to plans and specifications as documented in the addenda to the bid documents, and prepare a set for Town review. Changes to the specifications will be noted using distinctive typeface and other means, as defined by the Town, to denote changes made to the specifications.

Phase 3. Construction Support Services

Tetra Tech will provide design support services during the construction phase of the Atherton Water Capture Project and will be on hand to assist the Town with office support, including: shop drawing submittal review, assisting with Requests for Information (RFI), making changes to the plans in the event a change order is processed or a change in the design is desired, and providing inspection support as needed.

Task 301. Project Management, Meetings and Coordination during Construction

- *301.1 Project Management*

  Tetra Tech will provide a Design Support during Construction Technical Task Leader who will coordinate with the Project Manager to ensure he is up to date on all construction activities. Monthly progress reports, including Expenditure Report, will be prepared for the duration of construction.

- *301.2 Attend Pre-Construction Meeting*

  Our team will attend a one-day pre-construction conference to be held with the successful construction Contractor, Town personnel, and other relevant personnel. Tetra Tech will take notes and produce meeting minutes, as appropriate, to be provided to the Town for distribution.

- *301.3 Attend Weekly Construction Meetings*

  Tetra Tech will attend weekly construction meetings with the construction field team and Contractor, and as requested by the Town for the duration of construction for approximately 18 months.

Task 302. Project Engineer Design Support

This task involves engineering support during construction and startup. Construction management, construction contract administration, inspection, and testing will be performed by others. Services will be provided to support the plans and specifications prepared by the Tetra Tech.

The Tetra Tech Team will provide design support services during construction of the Atherton water capture facility

- *302.1 Shop Drawing Submittal Review*

  Tetra Tech will review shop and work drawings of fabricated and manufactured equipment forwarded to us by the Town, for substantial conformity with the intent of the contract documents. Ten (10) to fifteen (15) calendar days is scheduled from receipt by the team to date of return of the reviewed submittal copies. The level of effort required for this task depends on the number of submittals to be reviewed, the quality of those submittals, and the number of resubmittals required.

- *302.2 Assist with RFIs and Technical Related Issues*

  Contractor-generated Requests for Information (RFIs) will be submitted to the RPR. Tetra Tech will review and respond to RFIs submitted to it by the RPR.

- *302.3 Assist with Change Orders and Plan Clarifications*

  Our team will assist the Town with the preparation of change orders and plan clarifications.

Task 303. Construction Staking

Tetra Tech will provide construction staking support for the duration of the project. The construction staking task will consist of three main components; Office Support, Construction Staking and Contractor Coordination. Office Support will consist of calculating the locations of all the improvements shown on the construction documents, as well as supplemental stakes to support the Contractor's operations. Construction Staking will include all time required for travel and to set the requested stake points. Staking material cost has been included in the overall fee. Tetra Tech's construction staking requires a minimum of 48 hours' (2 business days) notice to be onsite to verify crew availability and allow time to calculate necessary stake points. Once the points have been staked, the crew will provide staking cut sheets to the Contractor. Construction staking will be provided for the following items:

- Diversion Structure (Channel Area)
- Pretreatment and Pump Station Area
- Force Main
- Storage/Infiltration Gallery Excavation Limits
- Storage/Infiltration Gallery Bottom
- Water Treatment Building
- Pump Station Area (Surface Improvements)
- Final Grade

Additionally, while onsite and while shoring is in place, check shots will verify that the shoring system does not shift laterally or vertically during construction. Existing project control set during the preliminary and detailed design phase of the project will be utilized to ensure the constructed project meets the requirements of the construction documents. Shoring will be monitored only when the survey crew is onsite. Additional trips and monitoring can be provided at an additional cost. Movement will be compared to industry standards for allowable values and/or shoring specifications.

It is expected that field crews will be able to work a minimum of four (4) hours when services are requested. Additional mobilizations required by excessive fragmentation of work will result in additional charges for travel time. Tetra Tech will place one set of initial grade stakes for each of the above mentioned items. All other field work or any re-staking that may be required will come at an additional expense to the Contractor or Town, as applicable.

Field verification of as-built conditions and preparation of any certifications is not included with this estimate. Price and scoping for these services can be provided as needed. The hourly rate for a two-man survey crew is $250 per hour with a four (4) hour minimum.

Task 304. Geotechnical Support

- As-needed observation during excavation and shoring installation for subsurface reservoir.
- Testing and observation during:
  - Grading, subgrade, and subsurface drainage preparation for subsurface reservoir and water quality treatment building,
  - Subsurface reservoir backfill, and
  - Utility trench backfill placement.
- Testing and observation of roadway and sidewalk subgrade preparation and aggregate base placement.
- Testing and observation of Hot Mix Asphalt (HMA) placement.
- Laboratory testing for compaction curves and miscellaneous additional testing during construction.
- Meetings, consultation, and preparation of letters documenting our reviews, observations, and testing.

Task 305. Structural Observation

Onsite structural observations will be performed by a registered design professional for general conformance to the approved construction documents at significant stages and at completion of each structural system as required by the building code. An anticipated three (3) site visits will be required for the diversion structure. An anticipated four (4) site visits will be required for each of the following structures: pump station and water treatment building. An additional observation for drop inlet structural is also anticipated during the construction stage. Foundation, wall, roof and connection elements will be visually inspected for conformance and discrepancies will be noted and resolved accordingly. At the end of each visual inspection, the structural observer shall prepare a report noting any deficiencies. The report shall be stamped and signed by the responsible structural observer and sent to the appropriate authority. A total of 12 inspections are anticipated at various stages of construction for the diversion structure, pump station, water treatment building and inlet structure.

Task 306. Stormwater Compliance Support

Tetra Tech will provide Qualified SWPPP Practitioner (QSP) services. These services include eight (8) storm event monitoring trips to the project site during a qualifying rain event that produces runoff. The QSP, or the QSP delegate, will sample for pH and turbidity only. The QSP, or QSP delegate, will document all observations, including field measurements, and summarize the findings in a concise inspection report. These services exclude the permit required quarterly inspections (we recommend these be completed concurrently with weekly inspections), weekly inspections, pre- and post-storm inspections, and preparing any post rain event reports. QSP services also include preparing two (2) annual compliance reports and one (1) Notice of Termination. In the event the Town requests additional services such as site visits/inspections, annual compliance reports, etc., a Tetra Tech QSP, or QSP delegate, is available to perform the services for an additional fee as outlined below

Task 307. Site Inspections

Throughout the duration of construction, Tetra Tech will perform site inspections of the improvements. It is assumed that a total of twelve (12) inspections will be performed. Two (2) inspections of the pump station and water treatment building will be performed by the structural and mechanical team members, four (4) inspections for the electrical and instrumentation components by the electrical team and approximately six (6) inspections from the civil team to inspect the diversion structure, rubber dam, pretreatment device(s), underground storage, and all other areas not covered by the structural, mechanical and electrical team members

Task 308. Final Inspection and Commissioning

Following completion of construction, Tetra Tech will perform final inspections of the completed or nearly completed site and infrastructure. Our team will advise the Town as to the acceptability of the work. Tetra Tech members from each design discipline will perform the inspections.

Task 309. As-Built Drawings

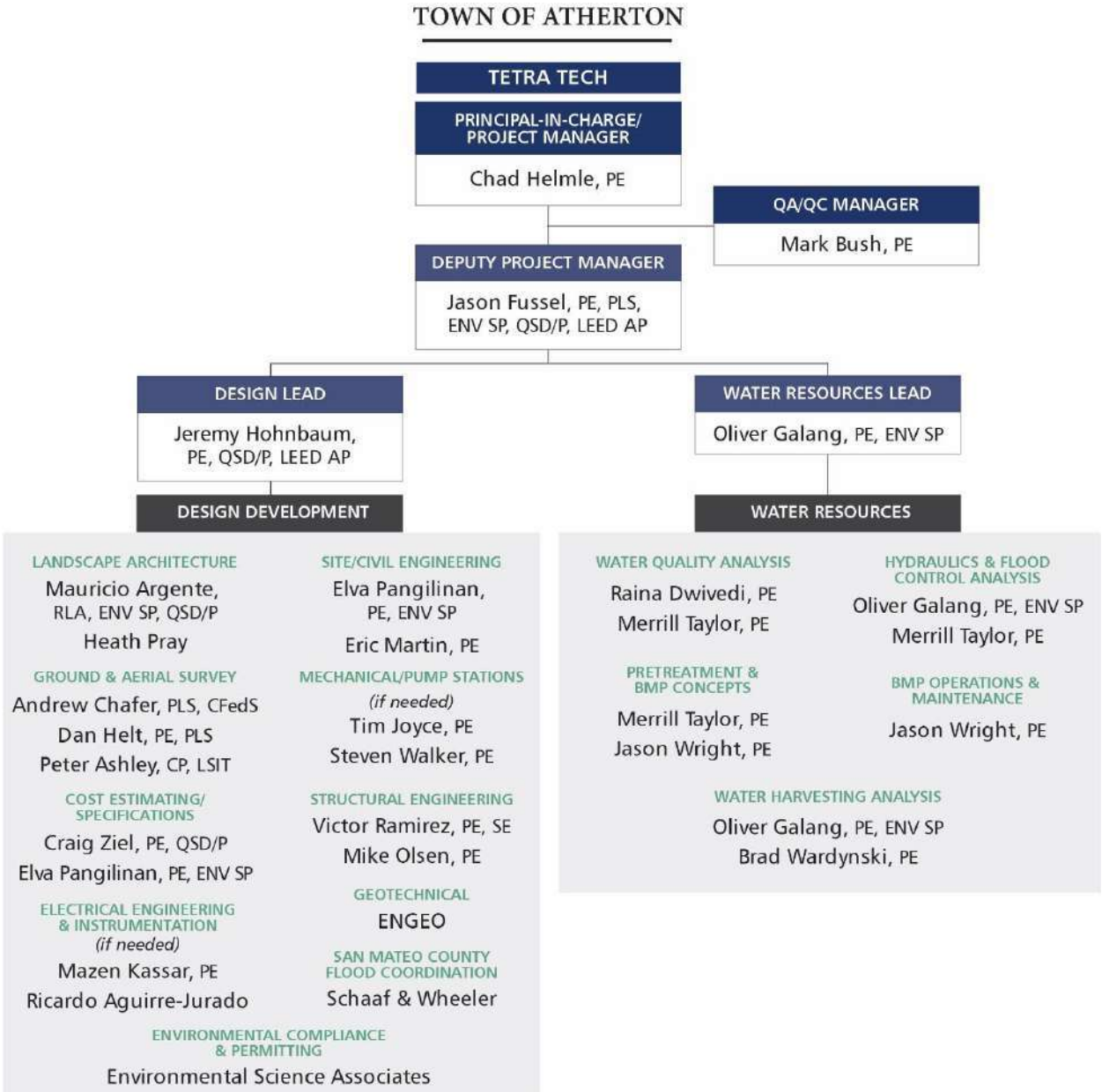
Following receipt by of the Town-approved marked set of drawings from the Contractor after construction is complete, our team will incorporate all changes noted on the marked set within 60 days following receipt of the Contractor's marked set.

Task 310. Operations and Maintenance Manual

This task consists of the development of an Operation and Maintenance (O&M) Manual for the Atherton Water Capture Project. The O&M Plan will include the operational procedures, available equipment manufacturer data sheets, sensor calibration data, commissioning information, and system diagrams, as part of the O&M Plan. As applicable, the plan will be a comprehensive plan that will incorporate the pump stations, rubber dam, storage/infiltration chambers, OptiRTC controls, and the Wahaso Treatment Unit.

VARIOUS DISCIPLINES

Tetra Tech will lead the project and will serve as the overall project management entity. Tetra Tech will additionally lead the hydrology/ hydraulic analyses, water quality specifications, surveying and design documents. Tetra Tech has teamed with ESA to provide CEQA compliance services and environmental permitting, Schaaf and Wheeler to provide coordination with the San Mateo County, Department of Public Works, Flood Resilience Program, and ENGEO to provide geotechnical engineering services during design and construction. A team organizational chart is provided below to show the breakdown of how the various services associated with this project will be divided among Tetra Tech and subcontractors.



CAPACITY AND PROJECT SCHEDULE

The Tetra Tech team is committed to open communication, joint problem solving, partnering, and teamwork to accomplish the goals of the assignment. In addition to our team's availability to provide sufficient capability and capacity to complete this project, we offer the availability of staff who have already successfully completed similar projects and know what needs to be done for the Town of Atherton to meets to goals. As demonstrated in this statement of qualifications, our team has a plan to complete the stormwater capture project and fully understands the technical needs as well as the challenges associated with a project such as this. Therefore, not only are we providing the Town of Atherton with staff who are available for and committed to this project, we are offering the right staff who have worked together on many similar projects in the past. The ideal mix of technical capability, subject-matter expertise, project understanding, proven experience, and availability. We have reviewed the provided schedule and are committed to providing the follow level of commitment for the duration of the project.

Role	Personnel	Home Office Location	Availability
Principal-In-Charge, Project Manager	Chad Helmle, PE	San Diego, CA	40%
Deputy Project Manager	Jason Fussel, PE, PLS, QSD/P, LEED AP, ENV SP	San Luis Obispo, CA	50%
Quality Assurance and Quality Control	Mark Bush, PE	Irvine, CA	10%
Design Lead	Jeremy Hohnbaum, PE, QSD/P, LEED AP	Irvine, CA	50%
Water Resources Lead, Hydraulics and Flood Control Analysis, Water Harvesting Analysis	Oliver Galang, PE, ENV SP, QSD/P, QISP	Pasadena, CA	50%
Pre-treatment and BMP Concepts, Hydrology and Hydraulics	Merrill Taylor, PE	San Diego, CA	50%
Water Quality Analysis	Raina Dwivedi, PE	San Diego, CA	50%
BMP Operations and Maintenance	Jason Wright, PE	Research Triangle, NC	50%
Landscape Architecture	Mauricio Argente, RLA, ENV SP, QSD/P	San Luis Obispo, CA	20%
Site/Civil Engineering	Elva Pangalinan, PE, ENV SP	San Luis Obispo, CA	50%
Ground and Aerial Survey	Andrew Chaffer	San Jose, CA	50%
Mechanical Engineering/Pump Stations	Tim Joyce, PE	Irvine, CA	30%
Structural Engineering	Victor Ramirez, PE, SE	San Dimas, CA	50%
Electrical Engineering and Instrumentation	Mazen Kassar, PE	Irvine, CA	50%
Cost Estimation	Craig Ziel, PE, QSD/P	San Luis Obispo, CA	50%

PRIMARY LOCATION

This contract will be managed out of our San Diego office; however, given the magnitude of the project and diverse areas of expertise required we will be leveraging the skill set of several different Tetra Tech offices. Listed below are the Tetra Tech offices included on the project team that will be supporting the Town of Atherton on this important project. Each office listed has provided similar services on the Caltrans CIA projects for the cities of Lakewood, Bellflower and Carson.

San Diego Office
9444 Balboa Avenue, Suite 215
San Diego, CA 92123
Phone: (858) 268-5746
Fax: (858) 268-5809

San Jose Office
152 North Thirst Street, Suite 201
San Jose, CA 95112
Phone: (408) 346-4537

Irvine Office
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Phone: (949) 809-5000
Fax: (949) 809-5006

San Luis Obispo Office
711 Tank Farm Road, Suite 110
San Luis Obispo, CA 93401
Phone: (805) 542-9052
Fax: (805) 542-9254

Pasadena Office
3475 E. Foothill Boulevard
Pasadena, CA 91107
Phone: (626) 351-4664
Fax: (626) 351-5291

Lafayette Office
3746 Mt. Diablo Boulevard, Suite 300
Lafayette, CA 94549
Phone: (925) 280-7411
Fax: (925) 283-0780

CALIFORNIA TETRA TECH OFFICE LOCATIONS

KEY STAFF

Although overall firm credentials and experience are important, the key to a successful project is the caliber and depth of experience of the specific individuals assigned to execute the Holbrook-Palmer Park project from the Tetra Tech team. Delivering a quality stormwater management and design project starts with finding a strong team with diverse capabilities to successfully deliver on each of the Town's objectives.

The organization of Tetra Tech's proposed team is shown below, highlighting the disciplines needed to complete the project and identifying our proposed team members. Each member of our team has been carefully selected to add strength in their unique area of expertise. The proposed team members are available and we commit the necessary time and effort needed to successfully complete the project. Key team member resumes are included at the end of this section and the organization chart can be referenced in the disciplines section of this SOQ.

Description of Roles and Bios of Management Team

The following presents the Management Team positions followed by a biographical sketch that introduces the background and unique skill set of each of the talented professionals the Tetra Tech team commits to the Atherton Water Capture Project.

Principal-in-Charge/Project Manager, Chad Helmle, PE – Mr. Helmle will be ultimately responsible for assuring the Town's satisfaction with the Tetra Tech team's work. He will be responsible for the direction of the design effort, staffing to meet the Town's needs, and dedicating the resources necessary to see that the design objectives, schedule, and budget goals are met. In addition, he will assist our Deputy Project Manager with client and agency coordination.

As the national lead for green infrastructure at Tetra Tech, Mr. Helmle has overseen numerous large and small water resources projects and programs across the country and in Southern California. His ongoing role as program manager or principal-in-charge of several large municipal on-call contracts has afforded him the unique opportunity to explore a broad spectrum of stormwater-related issues, ranging from strategic planning to design and implementation. Examples of his project leadership include over 50 different green infrastructure or regional stormwater project retrofit design efforts, including all of Tetra Tech's projects referenced in this RFQ. He is especially passionate about finding innovative solutions to the challenging prospect of retrofitting existing urban landscapes and infrastructure to meet the compliance or runoff management needs of municipal agencies. Over the course of managing these projects, he has continually pushed the envelope to improve his team's methods by innovating new processes, templates, and tools for creating effective and robust design concepts and modeling approaches for green infrastructure retrofits. This constant push for new approaches has yielded a number of key innovations, such as integrating real-time control elements to BMPs to facilitate boosted BMP performance or meeting the integrated needs of watershed managers. Mr. Helmle's role in this project is expected to pay dividends by ensuring that the Atherton Water Capture Project design concepts strike the proper balance between form, function, and simplicity of operation.

Deputy Project Manager, Jason Fussel, PE, PLS, QSD/P, LEED AP, ENV SP – Mr. Fussel will oversee each task of the project from beginning to end to ensure that all tasks are completed correctly, on time and within budget. His role in this project involves coordination with the project manager and directing the project team in achieving the project goals. Mr. Fussel has more than 13 years of experience in the stormwater and BMP arena, which includes successful implementation of sustainable design practices for a vast array of improvement projects. Mr. Fussel's significant involvement in LID and Stormwater Pollution Prevention and reduction projects in Southern California includes his current role as Engineer of Record for the Albion Riverside Park Project, Bolivar Park and Mayfair Park Stormwater and Runoff Capture Projects, Carriage Crest Stormwater and Runoff Capture Project, and

Santa Monica Clean Beaches Initiative. Mr. Fussel continues to improve upon his expertise through attending various LID conferences and presenting the fundamentals and approach to BMP design to colleagues and the public through engagement seminars and discussions. As a Qualified SWPPP Practitioner (QSP) and Qualified SWPPP Developer (QSD), Mr. Fussel has ample experience with providing Stormwater Pollution Prevention Plans (SWPPP) for construction activities and Water Quality Management Plans (WQMP). Additionally, Mr. Fussel is an Envision™ Sustainability Professional and LEED Accredited Professional.

Water Resources Lead/ Hydraulics & Flood Control Analysis/Water Harvesting Analysis, Oliver Galang, PE, ENV SP – Mr. Galang will be responsible for leading the water resources efforts for this project, including water quality analysis, flood control assessments, and water harvesting opportunities. His experience encompasses more than 23 years of planning, design, construction and program management of multi-million dollar municipal capital improvement projects and programs, specifically in water resources and stormwater infrastructure throughout California.

Mr. Galang has been responsible for or personally led the development of numerous major regional stormwater BMPs, including Lakewood Stormwater Capture Projects at Bolivar and Mayfair Parks, Santa Monica CBI Project at the Pier and Pico Kenter Basins, Signal Hill Total Maximum Daily Load (TMDL) Implementation, Aliso Creek and Limekiln Creek Restoration, Caruthers Park, and Adventure Park. Mr. Galang's career also includes service as the Head of the Los Angeles River Watershed Section of the Los Angeles County Department of Public Works' Watershed Management Division. His responsibilities included staff management and direction for the planning of multi-use, multi-benefit projects, with an estimated construction value of more than $60 million, along the Los Angeles River. Mr. Galang was also responsible for managing the operations of the Los Angeles County Flood Control District (LACFCD's) flood control and water conservation system, which consisted of 14 reservoirs, 500 miles of conveyance channels, and 27 groundwater recharge facilities.

Design Lead, Jeremy Hohnbaum, PE – Mr. Hohnbaum has more than 11 years of experience in soils analysis, street design, utility design, water quality regulatory compliance, and land development in both the public and private sectors. Mr. Hohnbaum has been involved with various phases of regional stormwater capture project design including grant application preparation, MS4 program management, field reconnaissance, preliminary design, final design, report preparation, and construction inspection. He has design experience with non-structural and structural BMP inspection and inventory management.

Mr. Hohnbaum specializes in the flood control and water quality branches of stormwater management and has prepared plans, specifications, quantity and cost estimate worksheets, technical reports, and is very experienced with hydraulic/hydrologic modeling. Mr. Hohnbaum has prepared plans related to flood control facilities, roadway design, green street improvements, residential and highway storm drain improvements, Water Quality Management Plans (WQMP's), Stormwater Pollution Prevention Plans (SWPPP's), and erosion control plans. Mr. Hohnbaum is currently serving as Project Engineer for the Bolivar Park Stormwater and Runoff Capture Projects, and the Carriage Crest Stormwater Capture Project.

QA/QC Manager, Mr. Mark Bush, PE - Mr. Bush will serve as the lead Quality Management expert, and is tasked with ensuring the complete satisfaction of the Town with the work efforts of the team and the intent of the proposed project. Mr. Bush has more than 21 years of professional experience in water-related engineering. He has been responsible for the completion of over 100 miles of potable water, recycled water and sewer mains, 20 potable water and recycled water pump station and well projects and 14 potable and recycled water reservoirs. Mr. Bush is an integral part of the Water/Wastewater Department and brings leadership, strong work ethic, technical knowledge and dedication to overall client satisfaction on each and every project. His depth

of project design experience provides an unmatched level of quality for the Town.

Experience of Tetra Tech Team Members and Applicable Technical Discipline

Our Management Team introduced above is supported by a deep bench of more than 16,000 professional staff. The Technical Support Team selected for the Atherton Water Capture Project has been "hand-picked" based on their technical areas of expertise and experience on similar projects. The following section summarizes the education and experience of each member of the talented team we commit to the Town.

Pretreatment and BMP Concepts, Merrill Taylor, PE – Mr. Taylor is a water resources engineer providing support to federal, state, and municipal clients in the areas of watershed management, hydrologic and water quality studies, point and nonpoint source pollution characterization and assessment, and BMP modeling and design, currently focusing on watershed planning and BMP projects in Southern California. He has served as technical lead and support for the research and development of watershed models to support multiple planning and design efforts for regional stormwater capture projects, including Bolivar Park, Albion Riverside Park, Mayfair Park, Caruthers Park, Adventure Park, and Alondra Park. Mr. Taylor has developed innovative modeling tools that account for real world design challenges pertaining to pretreatment and BMP design. He also provides engineering support to municipal clients for the development of watershed management plans and hydromodification management plans to support BMP/LID implementation. He has practical experience in many facets of water resource engineering, with an in-depth understanding of the relationship between hydrology, water quality, watershed management, and regulations.

Water Quality Analysis, Raina Dwivedi, PE – Dwivedi has over six years of experience in stormwater planning, BMP optimization and design, and water quality permit compliance. She has four years of experience in the Bay Area, where she identified high risk areas for PCB and mercury generation, as well as identified feasible locations for mitigation of these pollutants of concern. She has extensive experience modeling the benefits of stormwater BMPs in the urban environment and has recently led an effort to quantify the benefits of combined flood control and water quality BMPs as part of the Chollas Creek Watershed Master Plan. Ms. Dwivedi is the team expert in SWMM modeling and will provide as the technical lead for the water quality analyses performed for the Town. She will leverage her effective communication skills to demonstrate progress towards compliance to the Regional Board and other stakeholders.

BMP Operations and Maintenance, Jason Wright, PE – Mr. Wright has 11 years of experience in watershed restoration, BMP implementation and development of standards for BMP design and construction. He has led numerous efforts to identify, prioritize, and select BMP sites, reviewed and revised codes and ordinances for integration of GI, and developed conceptual and full designs that present regional and distributed solutions to meet a variety of water quality and quantity goals. Prior to joining Tetra Tech, he was a faculty member at North Carolina State University for 4 years where he gained experience designing and implementing stormwater BMPs working under nationally recognized expert Dr. William Hunt. Mr. Wright has experience in all aspects of the BMP implementation process, specifically streamlining processes related to operations and maintenance, and has designed several GI practices throughout the country.

Landscape Architecture, Mauricio Argente, RLA, ENV SP, QSD/P – Mr. Argente has more than 25 years of combined planning and engineering experience in both the public and private sectors. Mr. Argente has ample experience designing and supporting the construction of various LID projects. Namely, Mr. Argente has served as Project Director for major municipal projects for the City of Los Angeles, Bureau of Engineering, including: Albion Riverside Park Project; Los Angeles Zoo Parking Lot Project; Peck Park Canyon Enhancement Project; Elmer Avenue Phase II Project; and Elmer Paseo LID Project. Mr. Argente possesses unique qualifications to integrate engineering science with equal attention to

environmental and aesthetic concerns. In essence, he is a landscape architect that has a solid understanding of hydrology, hydraulics, earthworks, infrastructure, and construction. He is a certified Envision™ Sustainability Professional.

Site/Civil Engineering, Elva Pangilinan, PE – Ms. Pangilinan has been a member of the Tetra Tech team for eight years and has extensive and relevant experience in designing and preparing improvement plans for private, municipal and federal projects. Ms. Pangilinan is experienced with performing various hydrology studies and reports. She has gained knowledge in Best Management Practices (BMP) and Low Impact Development (LID) implementation through her significant involvement in several important Proposition "O" projects for the City of Los Angeles, including the Los Angeles Zoo Parking Lot Low Impact Development Project, and the Peck Park Canyon Stormwater Quality Enhancement Project. Ms. Pangilinan's relevant design experience includes her work providing design services for the Bolivar Park and Mayfair Park Runoff Capture Projects, the Albion Riverside Park Project, and the Aliso Creek-Limekiln Creek Restoration Project.

Mechanical/Pump Stations, Tim Joyce, PE – Mr. Joyce has extensive experience in many facets of water/wastewater engineering with more than 25 years of experience in planning, conceptual design, final design, and construction management of municipal, environmental, and civil engineering projects. Throughout his career, he has been directly involved in the design and construction of collection systems, stormwater treatment systems, and roadway/freeway systems. He has designed stormwater conveyance and treatment facilities for flow rates ranging from 0.1 cfs up to 175 cfs. Mr. Joyce has specific regional BMP experience on several projects including the Santa Monica Clean Beaches Project and the Bolivar Park Water Capture Project.

Structural Engineering, Victor Ramirez, PE, SE – Mr. Ramirez has more than 27 years of structural engineering design experience with special emphasis in the design of water storage/water containment and water conveyance related structures. This includes reservoirs, water/wastewater treatment plants, booster pump stations, flow control facilities, pressure reducing stations and pipelines. His experience also includes the design of a wide variety of other types of structures, including buildings, bridges and storm drainage related structures. He is thoroughly knowledgeable in all types of construction, including reinforced concrete, masonry, structural steel, and timber.

Structural Engineering, Mike Olsen, PE – Mr. Olsen has more than five years of experience in the design, analysis and detailing in structural engineering. He is knowledgeable in reinforced concrete, pre- and post-tensioned concrete, reinforced masonry, steel and wood frame design and construction for a variety of building and infrastructure projects including reservoirs, water/wastewater treatment facilities, pump stations, bridge, buried concrete vaults and pipeline structures, as well as seismic retrofit of existing structures. Mr. Olsen's project experience includes his role as Structural Design Engineer for the Bolivar and Mayfair Park Stormwater Capture Projects, the Albion Riverside Park Project, and the Aliso Creek- Limekiln Creek Restoration Project.

Electrical Engineering and Instrumentation, Mazen Kassar, PE – Mr. Kassar has more than 25 years of experience in electrical engineering and industry standard that include electrical engineering staff management, project management, construction management and supervision, water and wastewater treatment, petro-chemical design, and environmental soil and groundwater treatment. His background includes designing medium and low voltage power distribution, designing instrumentation, control systems and SCADA systems for a wide-variety of projects, and the installation of electrical systems for remediation projects, including soil vapor extraction systems and groundwater pump-and-treat systems. Other experience includes, working with utility companies to provide new electrical service to new projects, working with local Building and Safety Departments to obtain Plan Check and construction permits, field trouble shooting of electrical and mechanical systems, system commissioning and startup, problem

solving, and managing an operation and maintenance department.

Surveying and Mapping, Andrew Chafer, PLS, CFedS – Mr. Chafer has 19 years of experience surveying in the Bay Area. He is experienced in all aspects of land surveying for design, monitoring and construction of municipal and land development projects. He has managed contracts for both small and large municipal, commercial, and residential projects, and has considerable experience researching boundary and chain of title information, and preparing legal descriptions. Mr. Chafer has extensive knowledge in current technology, 3D scanning and BIM modeling, UAV & conventional aerial mapping, and in the use of Autodesk's Civil 3D software for both topographic and boundary mapping, as well as the production of construction plan sets. In his capacity as a senior surveyor overseeing construction staking, Mr. Chafer performs a constructability review for quality assurance on a diverse array of engineering projects.

Aerial Survey, Peter Ashley, CP, LSIT – Mr. Ashley is a senior level professional with more than 30 years of project experience supplemented with a strong academic background in surveying and photogrammetry. Mr. Ashley's practice encompasses every aspect of the mapping process, from aerotriangulation design and computation, to digital map translation. Because of the breadth of his capabilities, he is a vital consultant for our clients on project design and best technical approach for photogrammetry, orthophotography and Airborne LiDAR. In the course of his career, Mr. Ashley has managed major mapping projects for public agencies including the U.S. Forestry Service, the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, the Bureau of Land Management, the Los Angeles Department of Water and Power, the Santa Clara Valley Water District, the San Francisco Public Utilities Commission, Pacific Gas and Electric, the Alameda County Flood District and Water Conservation, the City/County of San Francisco, the Napa County Flood Control District, and Vandenberg Air Force Base. Mr. Ashley's key areas of experience include photogrammetry, aerotriangulation, orthophotography, historical aerial photography interpretation, airborne LiDAR surveys, AutoCAD, Microstation, and ArcGIS.

TOWN OF ATHERTON

Attachment A: Resumes

STATEMENT OF QUALIFICATIONS FOR THE

Atherton Water Capture Plan

TETRA TECH

TETRA TECH

Chad S. Helmle, P.E.

As the national lead for green infrastructure at Tetra Tech, Mr. Helmle has overseen numerous large and small water resources projects and programs across the country and in Southern California. His ongoing role as program manager or principal-in-charge of several large municipal on-call contracts has afforded him the unique opportunity to explore a broad spectrum of stormwater-related issues, ranging from strategic planning to design and implementation. Examples of his project leadership include numerous green infrastructure master planning efforts, over 50 different neighborhood-scale green infrastructure retrofit design efforts in parks and public parcels, and watershed and BMP modeling analyses. He is especially passionate about finding innovative solutions to the challenging prospect of retrofitting existing urban landscapes and infrastructure to meet the compliance or runoff management needs of municipal agencies. Over the course of managing these projects, he has continually pushed the envelope to improve his team's methods by innovating new processes, templates, and tools for creating effective and robust design concepts and modeling approaches for green infrastructure retrofits. This constant push for new approaches has yielded a number of key innovations, such as integrating real-time control elements to BMPs to facilitate boosted BMP performance or meeting the integrated needs of watershed managers. As a former Air Force civil engineering officer, Mr. Helmle has brought the lessons learned developing cost-effective green infrastructure retrofit concepts for municipalities to numerous military installations, where his efforts have resulted in cost savings into the tens of millions of dollars and have streamlined implementation. Mr. Helmle strives to strike the proper balance between form, function, and simplicity of operation.

Project Role:

Principal-in-Charge

Project Manager

Education:

M.S., Civil Engineering, Environmental Fluid Mechanics/Hydrology, Cornell University, 2005

B.S., Engineering and Environmental Science, University of Notre Dame, 1997

Registrations/Certifications:

Professional Engineer (Civil), State of California (69525), 2006

Office:

San Diego, CA

Years of Experience:

19

Years with Tetra Tech:

12

EXPERIENCE

Lakewood Stormwater Capture Project at Bolivar Park, Phase I, II, and III, City of Lakewood, CA. Principal in Charge. Phase I of this project consists of the development of two project concepts that will divert wet-weather and dry-weather urban runoff from the Los Cerritos Channel to an underground infiltration gallery or storage system at two City Parks, resulting in the development of 10% design documents for two City Park Regional BMPs. Phase II consisted of the development of the final design documents for an innovative regional BMP at Bolivar Park. Phase III includes the design support services during construction of the regional BMP.

Carson Water Capture Project at Carriage Crest Park, Phase I and II, Sanitation Districts of Los Angeles County. Principal in Charge. This project consists of the design and construction of a regional stormwater BMP Project at the City of Caron Carriage Crest Park. The project consists of a storm drain diversion structure, 11 acre-foot underground storage facility, and pump station to the sewer and return flow to the storm drain. The project is intended to address the City of Carson's water quality actions stated under the Dominguez Channel Watershed Management Area Group's EWMP.

As-needed Stormwater Engineering and Consulting Services, City of San Diego, CA. Program Manager for current $21.5M, 5-year as-needed contract to provide the full spectrum of stormwater program support, including all of the City's Water Quality Improvement Plans, stormwater capital project design, special scientific studies, BMP research and development, compliance reporting, and general permit support. Managing one of the largest stormwater contracts of

its kind, Tetra Tech's leadership in these areas has helped the City gain attention on a national stage, especially with regard to the cutting-edge BMP master planning, design, and innovative permit compliance strategies. Now on our eighth consecutive year working with the City in this role (including a second 5-year contract term), we have managed over 100 task orders worth nearly $25 million. Signature projects recently completed as part of this contract include: (1) a comprehensive green infrastructure master plan that utilized first-of-their-kind analytical approaches to strategically identify and prioritize regional and green infrastructure project opportunities; (2) an innovative regional stormwater harvesting analysis that demonstrated the degree to which local stormwater capture can feasibly and realistically augment water supplies by upwards of 25%; and (3) regionally-critical re-negotiation of bacteria TMDL requirements that will set the stage for reducing municipal bacteria mitigation requirements across the state.

Watershed Engineering On-Call Contract, County of Los Angeles, CA. Principal in Charge for current $6M, 3-year as-needed contract to support the county with wide-ranging watershed services, including the design of regional BMPs in parks, regional master planning work, and piloting of innovative regional stormwater capture programs. Tetra Tech's work for the County has been recognized at the national and regional level as precedent-setting, especially in terms of applying technical innovation to solve emerging stormwater problems. Signature projects that Mr. Helmle has personally led include (1) the Multi-Agency Collaborative Stormcatcher Project, which demonstrated the feasibility of leveraging parcel-based real time control systems to capture runoff and augment water supplies; (2) the Lower Los Angeles River Revitalization Plan, which emphasizes a watershed-based approach to revitalizing a 19-mile long, two-mile wide reach of the LA River corridor; and (3) multiple park-based regional stormwater capture BMP designs intended to meet pressing TMDL compliance needs.

Albion Riverside Park Project, City of Los Angeles, CA. Principal in Charge for full design of a multi-BMP system to treat runoff generated in the Albion Riverside Park and the 300-acre watershed draining to the adjacent storm drain. The project included modeling runoff hydrology and water quality and design of a multiple BMP system, including permeable pavement and bioretention areas, to treat 100 percent of the runoff from the park and a series of subsurface infiltration galleries sized to eliminate dry-weather flows and reduce the zinc load from the stormwater runoff entering the LA River. The project transforms a 6-acre site previously used for dairy warehousing and distribution into a riverfront park and recreational facility that will benefit nearby disadvantaged low-income neighborhoods.

Development of a TMDL Compliance Plan for the Los Cerritos Channel Sub-Basin 4 Drainage Area, City of Signal Hill, CA. Provided technical lead assistance in water quality, hydrology, and hydraulic modeling to develop a conceptual design for a regional BMP opportunity within the Los Cerritos Channel sub-basin 4 drainage area and identifying additional BMP opportunities throughout the watershed. Supporting innovative BMP diversion, footprint, and drainage area comparisons to optimize the compliance with water quality targets outlined in the Watershed Management Program while minimizing costs.

CBI Project at Pier and Pico-Kenter Watershed, City of Santa Monica, CA. Principal in Charge. This project consists of the design and construction of a stormwater diversion at the Santa Monica Pier drain and a 1.6 MG regional stormwater BMP storage structure. Water stored in the reservoir will be pumped and treated at the SMURRF for recycled water service. In addition an 80,000 gallon first-flush storage facility will be integrated into the Pico-Kenter storm drain. Flows from this reservoir will also be pumped to the SMURRF facility. Oliver is leading the project development team and coordinating these efforts with the City Project Team.

Multi-Agency Collaborative Phase II – Pilot-to-Scale Residential Green Infrastructure Program, Los Angeles, CA. Project Manager of a first-of-its-kind project to test a collaboration between LA County Department of Public Works, City of LA Sanitation, and LA Department of Water and Power as part of a $1.1M pilot project to install rainfall capture systems on private residential properties. This project is designed to achieve two primary objectives: (1) facilitate collaboration among partner agencies to uncover and overcome barriers to integrated water management and (2) demonstrate this collaboration via a pilot installation and analysis of actively controlled distributed rainwater capture systems. In addition to the physical installation, a detailed scaling analysis will be completed to assess the viability of scaling such a program up to County-wide implementation. The analysis will define the potential bounds of costs and benefits, quantify the value of the project relative to each individual agency's needs, evaluate the synergy achieved via the collaboration, and establish the basis for potential future program expansion.

Jason Fussel, PE, PLS
LEED® AP, QSD/P, ENV SP

Mr. Fussel has been a member of the Tetra Tech team for more than thirteen years and has a broad knowledge of civil engineering stemming from his involvement in a variety of residential, educational and federal projects. His experience includes work on both public and private sector jobs of varying size and construction material types including the design of sewer transmission systems, water distribution systems, street and storm drain improvements and grading activities varying from mass grading to final precise grading plans. Mr. Fussel's strengths include stormwater analysis and studies, design, preparation of specifications, bid documents and cost estimates, and construction support services.

Mr. Fussel has extensive and relevant experience in the stormwater and Best Management Practice (BMP) arena, which includes successful implementation of sustainable design practices for a vast array of improvement projects. Mr. Fussel's significant involvement in Low Impact Development (LID) and Stormwater Pollution Prevention and reduction projects in Southern California, specifically as Engineer of Record for several important Proposition "O" projects for the City of Los Angeles, provide the foundation for his continued leadership in the industry. Mr. Fussel continues to improve upon his expertise through attending various LID conferences and presenting the fundamentals and approach to BMP design to colleagues and the public through engagement seminars and discussions. As a Qualified SWPPP Practitioner (QSP) and Qualified SWPPP Developer (QSD), Mr. Fussel has ample experience with providing Stormwater Pollution Prevention Plans (SWPPP) for construction activities and Water Quality Management Plans (WQMP). Additionally, Mr. Fussel is an Envision™ Sustainability Professional and LEED Accredited Professional.

EXPERIENCE

Santa Monica Clean Beaches Initiative, City of Santa Monica, Santa Monica, CA, Ongoing – Engineering Design Lead and Engineer of Record responsible for the design of the site improvements, diversion structure, pretreatment, underground storage reservoirs, and piping systems. The project objective is to improve Santa Monica Beach water quality by increasing the diversion capacity at the Santa Monica Pier and Pico-Kenter storm drain outfalls. The 85th percentile storm event volume would be treated and diverted from the Pier watershed to the Santa Monica Urban Runoff Recycling Facility (SMURRF) or the sanitary sewer. The project proposes storm drain diversion and runoff storage systems at two separate storm drain outfalls, routed to two subsurface storage areas. 1.6 million gallons will be stored at the historical Deauville Beach Club site and an additional 80,000 gallons will be stored at the Pico-Kentor storm drain outfall.

Carriage Crest Stormwater and Runoff Capture Project, Sanitation Districts of Los Angeles County, Carson, CA, Ongoing – Engineering Design Lead and Engineer of Record responsible for utility research and review of the preliminary design report. Carriage Crest Park was identified in the Enhanced Watershed Management Program (EWMP) as a high-priority site for a regional stormwater capture project due to its proximity to two large storm drains with a total drainage area exceeding 1,100 acres. The project components include a diversion structure to divert water from an existing storm drain system, a pretreatment structure to remove debris from the runoff, an underground structure to capture and store the stormwater prior to being discharged back into the existing storm drain system, and a rehabilitated park

Project Role:

Deputy Project Manager

Education:

California Polytechnic State University, San Luis Obispo.
B.S. Civil Engineering, 2003

Registrations/Certifications:

Registered Professional Engineer
California No. 70879

Registered Professional Engineer
Hawaii No. 15600

Registered Professional Land Surveyor
California No. 9006

Qualified SWPPP Developer (QSD) and Qualified SWPPP Practitioner (QSP)
Certificate # 20231

Envision™ Sustainability Professional

LEED® Accredited Professional

Professional Affiliations:

American Society of Civil Engineers

California Land Surveyors Association

Office:

San Luis Obispo, California

Years of Experience:

13

Years with Tetra Tech:

13

surface. Design objectives are to eliminate dry-weather flow from the adjacent channel and to maximize wet-weather pollutant capture.

Lakewood Stormwater and Runoff Capture Project, City of Lakewood, Lakewood, CA, Ongoing – Engineering Design Lead and Engineer of Record for feasibility, conceptual and detailed design services to prepare final plans, specifications and estimates. Tetra Tech was contracted to evaluate two potential site locations for the development of the Lakewood Stormwater and Runoff Capture Project: Mayfair Park site and the Bolivar Park site. Tetra Tech provided a Project Engineering Study Report (PESR) that represents 10% design completion level and describes the evaluation of the two sites with all site investigation, hydrology and hydraulic, and water quality data and analyses to provide a recommendation for site selection. The project components will include a diversion structure to divert water from one of the major flood control channels, a pretreatment structure to remove debris from the runoff, an underground structure to infiltrate or capture the water that will be treated for landscape irrigation use, and a rehabilitated park surface with new picnic areas. The goal of the project is to not only help the City comply with the metals Total Maximum Daily Loads (TMDLs), as presented in the Los Cerritos Channel Watershed Management Program (WMP), but also provide additional benefits, such as revitalized park infrastructure and augmentation of local water supplies. As one of the first cities to receive stormwater funding to support Caltrans with stormwater compliance units, the success of this project will be a model for other agencies to follow. Tetra Tech completed the detailed design and bid & award portions of The Bolivar Park site is currently under construction with a completion date of late 2017. The detailed design phase for Mayfair Park has commenced and has an anticipated project completion date of late 2018.

Aliso Creek – Limekiln Creek Restoration Project, City of Los Angeles Bureau of Engineering, Los Angeles, CA, Ongoing – Project Engineer and Assistant Project Manager responsible for overseeing pre-design and design services. The project is located at the confluence of the concrete lined Aliso and Limekiln Creek flood channels, which merge together in the southern portion of the project site. The project improvements involve constructing several stormwater Best Management Practices (BMPs) intended to treat on-site and off-site runoff and reduce contamination in Aliso Creek, Limekiln Creek, and the Los Angeles River. The proposed BMPs include low flow channel diversions, stormwater pump stations, stormwater pre-screening devices, bioswales, vegetated detention/retention basin, the restoration of upland, riparian habitat, and BMP educational signage. The goal of the project is to significantly reduce the pollutant loads, as well as transform a specifically built flood control facility into a multi-function green infrastructure facility. The project will also be designed to achieve a Platinum Envision Rating. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to the rivers, lakes, and oceans within the greater Los Angeles area.

Albion Riverside Park Project, City of Los Angeles Bureau of Engineering, Los Angeles, CA, Ongoing – Project Engineer and Assistant Project Manager responsible for overseeing the pre-design services for the Albion Riverside Park Project. Tetra Tech will also be providing design and construction support services. The project, located adjacent to the Los Angeles River, involves transforming a six-acre site, previously used for dairy warehousing and distribution, into a riverfront park and recreational facility that will benefit nearby disadvantaged low income neighborhoods. In addition, the City is using the redeveloped property to increase the current capacity for managing stormwater runoff. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to the rivers, lakes, and oceans within the greater Los Angeles area. In addition, the project is being designed to achieve a Platinum Envision™ rating.

Low Impact Development (LID) Planning, Design, and Construction Support for Compressed Natural Gas (CNG) Fueling Station Project, Los Angeles Department of Water and Power, Los Angeles, CA, Ongoing – Project Manager and Engineer of Record responsible for hydrology calculations and civil design of LID elements to be implemented at the LADWP Western District Yard and LADWP West Valley District Yard. The objective of the project is to assist LADWP comply with the City of Los Angeles' LID Ordinance and obtain Los Angeles Bureau of Sanitation approval and clearance.

TETRA TECH

Oliver D. Galang, PE, ENV SP, QSD/P, QISP

Mr. Galang's experience encompasses over 23 years of planning, design, construction and program management of multi-million dollar municipal capital improvement projects, specifically in water resources and stormwater infrastructure throughout Los Angeles County. Highlights of Oliver's career also include service as the Head of the Los Angeles River Watershed Section of the Los Angeles County Department of Public Works' Watershed Management Division. His responsibilities included staff management and direction for the planning of multi-use, multi-benefit projects, with an estimated construction value of more than $60 million, along the Los Angeles River. He served as the Head of the Data Management Section of the Watershed Management Division, and was responsible for an annual budget of more than $10 million in urban runoff and stormwater quality monitoring programs, including Los Angeles County Flood Control District (LACFCD's) National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Monitoring Program. He was also responsible for managing the operations of the LACFCD flood control and water conservation system, which consisted of 14 reservoirs, 500 miles of conveyance channels, and 27 groundwater recharge facilities.

EXPERIENCE

Lakewood Stormwater Capture Project at Bolivar Park, Phase I, II, and III, City of Lakewood Public Works Department, CA. Project Manager. Phase I of this project consists of the development of two project concepts that will divert wet-weather and dry-weather urban runoff from the Los Cerritos Channel to an underground infiltration gallery or storage system at two City Parks, resulting in the development of 10% design documents for two City Park Regional BMPs. Phase II consisted of the development of the final design documents for an innovative regional BMP at Bolivar Park. Phase III includes the design support services during construction of the regional BMP. Oliver is leading the project development team and coordinating these efforts with the City Project Team.

Carson Water Capture Project at Carriage Crest Park, Phase I and II, Sanitation Districts of Los Angeles County. Project Manager. This project consists of the design and construction of a regional stormwater BMP Project at the City of Caron Carriage Crest Park. The project consists of a storm drain diversion structure, 11 acre-foot underground storage facility, and pump station to the sewer and return flow to the storm drain. The project is intended to address the City of Carson's water quality actions stated under the Dominguez Channel Watershed Management Area Group's Enhanced Watershed Management Program. Oliver is leading the project development team and coordinating these efforts with the County Sanitation Districts and the City Project Team.

CBI Project at Pier and Pico-Kenter Watershed, City of Santa Monica Civil Engineering Division, CA. Project Manager. This project consists of the design and construction of a stormwater diversion at the Santa Monica Pier drain and a 1.6 MG regional stormwater BMP storage structure. Water stored in the reservoir will be pumped and treated at the SMURRF for recycled water service. In addition an 80,000 gallon first-flush storage facility will be integrated into the Pico-Kenter storm drain. Flows from this reservoir will also be pumped to the SMURRF facility. Oliver is leading the project development team and coordinating these efforts with the City Project Team.

Project Role:

Water Resources Lead

Water Harvesting and Analysis

Education:

B.S., Civil Engineering, California State University, Fullerton, 1993

Engineering Management Graduate Studies, California State Polytechnic University, Pomona, 2005

Registrations/Certifications:

Registered Professional Civil Engineer, 56558, California, 1997

Envision Sustainability Professional, November 2014

Qualified SWPPP Developer (QSD/P)

Qualified Industrial Storm Water Practitioner (QISP)

Office:

Pasadena, CA

Years of Experience:

23

Years with Tetra Tech:

2

Los Angeles River, Upper Reach 2 Feasibility Study, Gateway Watershed Management Authority, Paramount, CA. Project Manager. This project consists of the development of six project concepts that will divert wet-weather and dry-weather urban runoff from various storm drains to an underground infiltration gallery or storage system at four local city parks, an LADWP Easement, and a railroad right-of-way facility. The project concepts will result in the development of 10% design documents for six Regional BMPs in the watershed. Oliver is leading the project development team and coordinating these efforts with a stakeholder team from the Cities of Bell, Bell Gardens, Commerce, Cudahy, Huntington Park, Maywood, and Vernon.

AB 530 Lower Los Angeles River Revitalization Plan, Vernon to Long Beach, Los Angeles County Department of Public Works. Project Manager. This project consists of the development of a visionary, community-based revitalization plan for the 19-miles of the Los Angeles River, from Vernon to Long Beach. The project is being developed in response to Assembly Bill 430, which requires the development of the Lower Los Angeles River Working Group and the development of a revitalization plan that addresses the unique and diverse needs of the Lower Los Angeles River. Oliver is managing the direction of the technical documentation for the Working Group, the technical teams in assessing the multiple facets of the revitalization plan, which includes a robust Community Engagement Program, assessment of the Community Economics, Public Recreation needs, sustainable water resources, and environmental enhancement opportunities.

Multi-Agency Collaborative, Phase 2 – Pilot-to-Scale Stormwater Capture Initiative, Los Angeles, CA. Technical Lead. This project consists of the develop of a multi-agency governance structure with the City of Los Angeles Department of Water and Power, Bureau of Sanitation, and the Los Angeles County Flood Control District. In addition, this project includes the demonstration of a pilot-to-scale project consisting of rainwater harvesting retrofits (including cisterns, infiltration practices, and landscape transformation). Each system will be outfitted with remote monitoring sensors and real-time controls to test a range of water management scenarios. Oliver is providing technical support with the water resource opportunities and guiding the contract management with the multiple agency funding sources.

Aliso-Limekiln Creek Restoration Project, City of Los Angeles, Bureau of Engineering, CA. Technical Lead. This project consists of the development of a regional stormwater BMP under the City's Proposition O Program. The project consists of diverting dry-weather urban runoff from Aliso Canyon Creek and Limekiln Creek to an adjacent undeveloped property in the Northridge community. He is responsible for leading the development of the watershed hydrology, hydraulic analysis, and the BMP sizing effort for this project.

Dominguez Channel Watershed Management Area Group Coordinated Integrated Monitoring Program, City of Lawndale and Carson Public Works Department, CA. Project Manager and Technical Lead. This project consists of technical revision of the Coordinated Integrated Monitoring Plan for the Dominguez Channel Watershed as required under the 2012 NPDES MS4 Permit for the Los Angeles County. Oliver led the effort to reconfigure the monitoring program, landuse analysis, and identification of additional monitoring locations in order to include the Cities of Carson and Lawndale into the program. Oliver was responsible for leading the project development team and coordinating these efforts with the stakeholder team, consisting of the Los Angeles County Flood Control District, the County Unincorporated Areas, and the Cities of Los Angeles, El Segundo, Inglewood, and Hawthorne.

Penmar Water Quality Improvement Project Phase 1, City of Los Angeles Bureau of Engineering. Managed construction phase, including reviewing contractor submittals, responding to requests for information, and preparing weekly reports. The project, funded by the City's Proposition O Clean Water Bond, aims to improve water quality by reducing pollutants from urban runoff that flows through the existing Rose Avenue storm drain and out to Venice Beach.

Echo Park Lake Rehabilitation Project, City of Los Angeles Bureau of Engineering. Managed construction phase of this $50 million project, including reviewing contractor submittals, responding to requests for information, and preparing weekly reports. This rehabilitation project was funded by the City's Proposition O Clean Water Bond. Project goals were to characterize the sediments of the existing lake bed, quantify contaminated soils, design in-lake improvements, design surrounding parkland BMPs, and provide vegetation, habitat, and parkland improvements.

Jeremy Hohnbaum, P.E., LEED AP, QSD/QSP

Mr. Hohnbaum has more than 11 years of experience in soils analysis, street design, utility design, water quality regulatory compliance, and land development in both the public and private sectors. Mr. Hohnbaum has been involved with various phases of project design including grant application preparation, municipal separate storm sewer system (MS4) program management, field reconnaissance, preliminary design, final design, report preparation, and construction inspection. He has design experience with non-structural and structural Best Management Practices (BMP's) inspection and inventory management.

Mr. Hohnbaum specializes in the flood control and water quality branches of stormwater management and has prepared plans, specifications, quantity and cost estimate worksheets, technical reports, and is very experienced with hydraulic/hydrologic modeling. Mr. Hohnbaum has prepared plans related to flood control facilities, roadway design, green street improvements, residential and highway storm drain improvements, Water Quality Management Plans (WQMP's), Stormwater Pollution Prevention Plans (SWPPP's), and erosion control plans.

Mr. Hohnbaum's computer modeling background includes the application of the Army Corps of Engineers Flood Hydrograph HEC-1, Water Surface Profiles HEC-2, HEC-RAS (River Analysis System), Water Surface Pressure Gradient (WSPG), Advanced Engineering Software for hydrologic/hydraulic analysis in Southern California AES, South Orange County and San Diego Hydrology Management hydromodification models (SOHM and SDHM), and Pollutant Load Reduction Modeling (PLRM).

EXPERIENCE

Water Quality Management Plans (WQMP's) and Standard Urban Stormwater Mitigation Plan's (SUSMP's) throughout Southern California, 2011-2016 – Lead Project Engineer and Project Manager responsible for providing technical and management services for dozens of WQMP's and SUSMP's throughout Southern California. The projects included the development of roadways, parking structures, intermodal facilities, large scale low density residential neighborhoods, high density residential infill projects, large master plans involving all land use types, parks, schools, industrial sites, transit centers, and international airports. One major project included a large development encompassing over a hundred acres containing over 12,000 homes, commercial areas, and other amenities being constructed over years within the same legacy located in Rancho Santa Margarita and Ladera Ranch. Depending on the project, these reports involved the preparation of water quality, hydromodification, and flood control designs. The hydrologic and hydraulic design for the storm water drainage systems and detention facilities associated with each project were completed. Mr. Hohnbaum was also involved with the preparation and design of drainage and grading plans, details, sections, specifications and cost estimates for most of these projects.

Los Angeles Community College Zero Discharge and Harvest and Use Studies, Los Angeles Community College District, Los Angeles, CA, 2012-2016 – Lead Civil Engineer responsible for water quality analysis, municipal separate storm sewer system (MS4) permit compliance, harvest and use

Project Role:

Design Lead

Education:

B.S., Civil Engineering, California State University at Fullerton, 2006

Registrations/Certifications:

Professional Engineer, Civil, California, 2010, No. 75716

Qualified SWPPP Developer (QSD), California, 2011, No. 21212

Qualified SWPPP Practitioner (QSP), California, 2011, No. 21212

LEED Accredited Professional

Professional Affiliations:

American Society of Civil Engineers (ASCE), Orange County

Office:

Irvine, California

Years of Experience:

11

Years with Tetra Tech:

One

feasibility, and campus wide drainage facility analysis to improve deficient drainage facilities. Mr. Hohnbaum also provided preliminary design for the use of on-site runoff required for various applications including ground water recharge and industrial use, as well as irrigation methods ranging from subsurface geoflow to standard above ground systems for the East, West, Pierce, Harbor and Los Angeles City Colleges. The cost estimates, quantities, and technical reports prepared for the Colleges discussed the potential opportunities and requirements for the upcoming MS4 permit regulations and Los Angeles County Public Health and Safety treatment standards. Mr. Hohnbaum also provided inspections and recommendations for construction activities regarding stormwater and the Construction General Permit.

Orange County Watershed Planning and Engineering Contract, County of Orange, CA, 2015-2016 – Task Lead for post-construction best management practice (BMP) inspection and training for the County of Orange Watershed Planning and Engineering Contract. Mr. Hohnbaum's responsibilities included the staffing and management of assistant engineers for the annual Post Construction BMP inspections program involving coordination with local residents and business owners throughout the County to schedule and perform site inspections for over 100 properties. Mr. Hohnbaum also provided training presentations for BMP inspection and necessary BMP corrective actions for all of the North and South Orange County stakeholders.

Southgate Neighborhood Storm Drain Improvement and Green Street Project, City of Palo Alto, CA, 2014 – Civil Engineer responsible for providing the identification and evaluation of optimal best management practice (BMP) locations, hydrologic and hydraulic analysis, utility conflict evaluation, development of final plans, specifications, and cost estimates for green street elements and public involvement.

Sustainable Water Master Plan (SWMP), City of Santa Monica, Water Resources Division, CA, 2013-2014 – Project Engineer and Task Lead responsibilities included water quality evaluation, water harvest and use analysis, gray water supply and demand analysis, and regional stormwater capture planning and feasibility anaylsis. Mr. Hohnbaum assisted the City with the rainwater, gray water, and stormwater sections of the City's sustainable water master plan. Engineering design included geographic information system (GIS) rainfall analysis and gray water demand analysis, identification of potential stormwater capture locations at a local and regional level which included public parks, and evaluation of the feasibility of stormwater reuse. Mr Hohnbaum coordinated with Kennedy/Jenks Consultants on a feasibility assessment for water harvest and use in the City of Santa Monica. The study focused on a site-by-site feasibility assessment, local and regional regulatory requirements, and existing projects in the state of New Mexico. The scope of work involved the assessment of multiple water sources for harvest and use, including, but not limited to stormwater, rain water, gray water, cooling tower waste water, and industrial waste water. The captured water from each of these sources were quantified and assessed for use in irrigation, toilet flushing, and air conditioning demand. A technical memorandum was prepared summarizing the findings from the study and briefly discussed current programs taking place in Albuquerque, New Mexico.

Watershed Action Plan for the Santa Ana River Watershed, County of Riverside, CA, 2014 – Lead Project Engineer assisted with developing the Watershed Action Plan (WAP) to assist Riverside County and all of the Permittees within the Santa Ana River Watershed to comply with the municipal separate storm sewer system (MS4) Permit Order No. R8-2010-0033 (2010 MS4 Permit). This plan used a coordinated watershed approach to address water quality and hydromodification impacts resulting from urbanization within the watershed and existing programs relating to the integration of water quality, stream protection, stormwater management, and re-use strategies with land planning policies, ordinances, and plans within each jurisdiction to the maximum extent practicable (MEP). The plans for each jurisdiction addressed cumulative impacts of development on vulnerable streams; preserve or restore, consistent with the MEP standard, the structure and function of streams; and protect surface water and groundwater quality. The WAP was developed through a collaborative process with the Riverside County Flood Control and Water Conservation District (District), the County of Riverside (County) and Cities in the SAR (Co-Permittees) (District and Co-Permittees collectively are the Permittees), and other watershed stakeholders. The WAP was structured to help the Permittees and stakeholders collaborate with existing programs to take a holistic approach toward watershed management within the Santa Ana River Watershed.

TETRA TECH

Merrill Taylor, P.E.

Mr. Taylor is a water resources engineer providing support to federal, state, and municipal clients in the areas of watershed management, hydrologic and water quality studies, point and nonpoint source pollution characterization and assessment, and BMP modeling and design, currently focusing on watershed planning and BMP projects in Southern California. Specifically, he serves as technical lead and support for the research and development of watershed models to support multiple planning and implementation efforts in Southern California, including multiple watersheds in Los Angeles County and numerous watersheds in the San Diego Region. He also provides engineering support to municipal clients for the development of watershed management plans and hydromodification management plans to support BMP/LID implementation. Mr. Taylor is proficient in Spanish and has collaborated studies and delivered presentations in Zacatecas, Mexico, highlighting culvert and storm drain watershed analyses. He has practical experience in many facets of water resource engineering, with an in-depth understanding of the relationship between hydrology, water quality, watershed management, and regulations.

EXPERIENCE

Lakewood Stormwater and Runoff Capture Project, City of Lakewood, CA. Providing technical lead assistance in water quality, hydrology, and hydraulic modeling to develop two conceptual designs for the City of Lakewood to assist in compliance with the Los Cerritos Channel Watershed Management Program requirements. Evaluating multiple BMP diversions, footprints, and real time inlet and outlet controls to optimize the compliance with the water quality targets while minimizing costs. Evaluating the irrigation requirements and potable water offset through use of dry and wet-weather flows. Supporting the development of the 100% design plans for implementation.

Chollas Creek Watershed Master Plan Phase I and II, City of San Diego, CA. Modeling technical lead for the first dynamic, web-based Watershed Master Plan within the City of San Diego that builds upon the recommendations of the Water Quality Improvement Plans (WQIPs) and identify project-by-project priorities that will contribute towards compliance with the MS4 permit and TMDLs. Led the distributed BMP identification, characterization, and analysis to compare performance between multiple implementation options. Led the regional BMP identification, characterization, and analysis to optimize diversion, BMP footprints, and drainage areas to maximize pollutant removal while minimizing costs. Evaluated multiple BMP profiles to minimize maintenance requirements and identify potential cost savings.

Development of a TMDL Compliance Plan for the Los Cerritos Channel Sub-Basin 4 Drainage Area, City of Signal Hill, CA. Provided technical lead assistance in water quality, hydrology, and hydraulic modeling to develop a conceptual design for a regional BMP opportunity within the Los Cerritos Channel sub-basin 4 drainage area and identifying additional BMP opportunities throughout the watershed. Supporting innovative BMP diversion, footprint, and drainage area comparisons to optimize the compliance with water quality targets outlined in the Watershed Management Program while minimizing costs.

Albion Riverside Park, City of Los Angeles. Provided engineering support in the full design of a regional BMP project to reduce pollutant loads and runoff

Project Role:

Deputy Project Manager

Water Quality Analysis

Pretreatment & BMP Concepts

Hydraulics & Flood Control Analysis

Education:

M.S., Civil and Environmental Engineering (Water Resources), Brigham Young University, 2010

B.S., Civil and Environmental Engineering, Brigham Young University, 2008

Registrations/Certifications:

Professional Engineer, California No. 81590, 2013

Professional Affiliations:

American Society of Civil Engineers

Office:

San Diego, CA

Years of Experience:

8

Years with Tetra Tech:

6

volume for a 300-acre mixed residential and commercial watershed. Work included modeling the impacts of different diversion rates on the overall water quality and associated pollutant reduction. The design involved multiple BMPs and BMP types, including bioretention, permeable pavement, and subterranean infiltration basins. Full design plans will include details for multiple BMP configurations to serve as an example project to investigate the impacts of various components of BMPs implemented in a regional setting. A full geotechnical investigation, architectural renderings, and full construction cost estimates were included in the project.

Bannock Avenue Green Street Design, City of San Diego. Providing engineering support in the full design of a green street enhancement project to reduce pollutant loads and runoff volume for a 65-acre mixed residential and commercial watershed. The design involved multiple BMPs and BMP types, including bioretention and permeable pavement. Full design plans included details for multiple BMP configurations, designed as retrofits, to serve as a pilot project to investigate the impacts of various components of BMPs implemented in the right-of-way. A full geotechnical investigation, architectural renderings, and full construction cost estimates were included in the project.

Elmer Avenue Paseo Retrofit, City of Los Angeles. Provided engineering and modeling support to develop project retrofits to the existing BMP configuration and design of BMP implementation along the Elmer's Paseo in Los Angeles, CA. The recently completed Elmer Avenue BMP retrofit project is experiencing high sediment loads creating fouling within the newly constructed infiltration galleries and bioretention areas. The Phase II efforts require additional retrofit design to prevent fouling and allow for the BMPs to function properly. A SWMM model illustrated the current conditions and potential future designs with their expected impact. The Paseo design requires the consideration of the upstream adjustments while providing for a removal goal of 4 acre feet per year. The design configuration is optimized using the SUSTAIN model and illustrates potential construction solutions.

Cottonwood Creek Watershed LID Retrofit Plan. City of Encinitas, CA. Provided SUSTAIN modeling support in a collaborative effort to develop a cutting-edge plan for the strategic implementation of green infrastructure to improve storm water quality and reduce frequent flooding. Provided comprehensive summary of watershed conditions to characterize pollutant loading issues, locate nuisance flooding areas, and identify feasible locations for green infrastructure retrofits. Applied a comprehensive prioritization methodology to identify and rank potential sites for green infrastructure implementation. Applied a BMP optimization model to determine the most cost-effective solution at each site and to evaluate which sites provide the greatest water quality benefit and volume reduction. Supported development of conceptual designs and cost estimates for the highest priority sites.

Development of Enhanced Watershed Management Programs (EWMPs), Upper LA River, Upper Santa Clara River, Upper San Gabriel River Watershed Management Groups. Supported project to develop collaborative strategy for compliance with multiple TMDLs while also identifying opportunities for enhanced, interagency projects promoting water quality improvement, water supply augmentation, and community services/co-benefits in four watershed management groups and 29 jurisdictions across greater Los Angeles County. Supported BMP characterization, conceptual BMP design, and modeling, and optimization of potential institutional, regional, and green infrastructure projects.

Site Selection and Development of Conceptual Designs, City of Los Angeles Bureau of Sanitation. Provided engineering and modeling support to identify and develop conceptual designs in downtown Los Angeles. Developed a GIS screening process, conducted field investigations for implementation feasibility, and provided analysis and modeling to determine the optimal BMP type, configuration, and sizing. The conceptual designs are being done in conjunction with low flow diversion structures proposed by the Bureau of Sanitation to help meet the water quality standards set for the Los Angeles River.

Development of Conceptual Designs, County of Los Angeles. Provided engineering support to develop conceptual designs for multiple centralized BMPs identified in TMDL Implementation Plans. Field investigations were conducted to confirm the potential BMP configuration and detailed analysis was performed to determine the BMP size and treatment capacity. The conceptual designs included the geotechnical conditions, performance specifications for each centralized BMP, approximate size and configuration, operation and maintenance requirements, recommended plant selection, conceptual drawings, architectural renderings, and cost estimates.

TETRA TECH

Jason Wright, P.E.

Mr. Wright has 11 years of experience in stormwater BMP implementation, focusing on LID and green infrastructure implementation including developing standards and technical manuals for BMP design; identifying, prioritizing, and selecting potential BMP implementation sites; developing conceptual designs; construction oversight; public outreach and education; and plans to meet TMDLs, MS4 permit requirements and other regulatory compliance. Prior to joining Tetra Tech Mr. Wright was a faculty member at North Carolina State University (NCSU) for 4 years where he gained experience designing and implementing stormwater BMPs working under Dr. William Hunt, a nationally recognized expert in stormwater management. In addition to his design experience, he has organized and assisted with numerous educational and training workshops to inform and certify the public and design community on the impact of stormwater and implementation of stormwater practices, including BMP Construction, Inspection and Maintenance Certification, and Residential Rain Garden Certification.

EXPERIENCE

Albion Riverside Park Project, City of Los Angeles, CA. Technical lead for design of a multi-BMP system to treat runoff generated in Albion Riverside Park and the 300-acre watershed draining to the storm drain adjacent to the park. Assisted in developing the model to evaluate hydrology and water quality of the runoff in the park and larger watershed. Led design of a multiple BMP system, including permeable pavement and bioretention areas, to treat 100 percent of the runoff from the park as well as a series of subsurface infiltration galleries sized to eliminate dry-weather flows and reduce the zinc load from the stormwater runoff entering the LA River by 34%. The project involves transforming a six acre site, previously used for dairy warehousing and distribution, into a riverfront park and recreational facility that will benefit nearby disadvantaged low-income neighborhoods. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads to the rivers, lakes, and oceans in the Los Angeles area.

Green Infrastructure Implementation for Alley Enhancement, City of Los Angeles, CA. Technical lead and project liaison for the Elmer Avenue Phase II design applying green infrastructure concepts to retrofit of an alley in a Los Angeles neighborhood. The design both beautified and enhanced the aesthetics of the alley while providing for water quality and quantity treatment. The design involved multiple BMPs including a bioswale with native vegetation and pervious concrete to reduce pollutant loads and enhance infiltration using multiple integrated water resource solutions to benefit water quality goals while addressing water supply issues through ground water recharge. The design included a full analysis of multiple BMP configurations to optimize implementation costs versus treatment. Also served as the technical advisor for the community outreach effort incorporating resident feedback into multiple aspects of the design.

Los Angeles River Upper Reach 2 Watershed Feasibility Study, Gateway Management Association. Technical lead for conceptual design of six regional water quality projects. Performed field investigations to evaluate each site. Guided a regulatory analysis that optimizes pollutant load reduction to schedule and attain least-cost compliance solutions to meet compliance targets in the LA River. Coordinated the development of a conceptual plan for each site.

Project Role:

Pretreatment & BMP Concepts

BMP Operations & Maintenance

Education:

M.S., North Carolina State University, Biological and Agricultural Engineering, 2005

B.S., North Carolina State University, Environmental Engineering, 2002

Registrations/Certifications:

Professional Engineer, California, C77922

Professional Engineer, North Carolina, 034961

Professional Engineer, New York, 093590

Professional Affiliations:

American Society of Civil Engineers (ASCE)

Environment and Water Resources Institute (EWRI)

California Stormwater Quality Association (CASQA)

Office:

San Diego, CA

Years of Experience:

12

Years with Tetra Tech:

8

Conceptual Plans to Upgrade Pump Plants and Utilize Green Infrastructure to Provide Resiliency and Treat Stormwater in the Upper Los Angeles River Watershed, City of Los Angeles, CA. Task lead to identify opportunities to incorporate green infrastructure concepts into upgrades of aging pump stations to address wet and dry weather flow as part of development of Load Reduction Strategies for the LA River Bacteria TMDL. Led development of conceptual designs for each pump plant, including recommendations to upgrade or repair existing infrastructure, details for design and implementation of the green infrastructure practices, and discussion on benefits of green infrastructure. Provided geotechnical conditions, performance specifications for each BMP type, approximate size and configuration, operation and maintenance requirements, recommended plant selection, conceptual drawings, architectural renderings, and cost estimates.

Green Street Design for Watershed Protection, City of San Diego, CA. Project manager in the full design of a green street enhancement project in San Diego. The design involved multiple BMPs and BMP types, including bioretention and permeable pavement, to reduce pollutant loads and runoff volume for a 65-acre mixed residential and commercial watershed. Developed full design plans with details for multiple BMP configurations, designed as retrofits, to serve as a pilot project to investigate the impacts of various components of BMPs implemented in the right-of-way. Coordinated a full geotechnical investigation, architectural renderings, and full construction cost estimates. Also served as the technical liaison for the extensive community outreach associated with implementing the street enhancements in the residential area.

Alamo, Salvation, and 68th Street Basins LID Retrofit, City of San Diego, CA. Project manager for the full design of a green street project to reduce pollutant loads and runoff volume for a 10-acre commercial watershed. The design involved filtration of stormwater in a suspended pavement system under the sidewalk. Design plans included details for multiple BMP configurations, designed as retrofits, to serve as a pilot project to investigate the impacts of various components of BMPs implemented in the right-of-way. A full geotechnical investigation and construction cost estimates are included in the project.

Cottonwood Creek Watershed LID Retrofit Plan, City of Encinitas, CA. Technical lead to develop cutting-edge plan for strategic implementation of green infrastructure to improve storm water quality and reduce impacts of flooding in the watershed. Assessed pollutant loading issues, located nuisance flooding areas, and identified and prioritized feasible locations for green infrastructure retrofits. Conducted field investigations to prioritize retrofit possibilities and support SUSTAIN optimization modeling. Used optimization results to support prioritization of the candidate projects. Developed conceptual designs and cost estimates for the highest priority sites. Supported a training program to inform City CIP and land development staff and private consulting staff of the purpose and implementation of the final plan and to describe screening processes for identifying LID feasibility and LID selection.

EPA Green Infrastructure Community Partners Program. Project manager and technical lead in support of EPA's green infrastructure initiative providing technical assistance to communities across the country. Provided direct assistance to three communities for a range of objectives, including code review, green infrastructure design, and cost-benefit assessments. Project manager for development of conceptual designs for the City of Beaufort, SC, and the Urban Land Conservancy in Denver, CO, to provide site-specific details and considerations to evaluate options for implementing combinations of stormwater control measures to provide treatment and meet regulatory requirements in each area. Multiple sketches and renderings were developed to show additional details including the appropriate depths, materials and approximate square footage of each control measure type required to meet multiple treatment goals. Technical details provided for bioretention areas and permeable pavement will be used as a tool for implementing control measures in each area. Technical lead for a code review and regulatory audit for the City of Phoenix to identify barriers to green infrastructure implementation, propose solutions, and educate decision-makers in the arid southwest on the barriers posed by local codes.

TETRA TECH

Raina Dwivedi, P.E.

Ms. Dwivedi has 6 years of experience in stormwater permit compliance and BMP implementation and design. She has successfully served as the deputy project manager for a number of high-profile, innovative watershed management projects, as well as provided technical assistance through development of BMP implementation standards and guidance, conceptual and project-level BMP opportunity identification and prioritization, and quantification of stormwater retention and water quality impacts in order to demonstrate compliance with TMDLs, water quality and hydromodification based MS4 permit requirements and other regulatory conditions. Prior to joining Tetra Tech, Ms. Dwivedi was a water resources engineer at Geosyntec Consultants in Oakland, California, where she focused primarily on identification and design of BMP retrofit opportunities, demonstrating compliance with new and redevelopment stormwater criteria, and support for technical guidance documents. She is an excellent written and oral communicator, accustomed to working on multi-disciplinary teams for high profile projects in the public, private, and research sectors. She is an experienced researcher and author, including a number of publications and major guidance manuals.

EXPERIENCE

Lakewood Stormwater and Runoff Capture Project, City of Lakewood, CA. Regulatory compliance lead for linking project-specific BMP optimization and design with MS4 Permit and watershed management plan (WMP) requirements. Development of a water quality technical memorandum demonstrating the quantification of water quality benefits attributed to the Lakewood Project when different numeric regulatory criteria are used.

Chollas Creek Watershed Master Plan Phase I and II, City of San Diego, CA. Deputy project manager for first dynamic, web-based Watershed Master Plan within the City of San Diego that build off of the recommendations made by the approved Water Quality Improvement Plans (WQIPs) and identify project-by-project priorities that will contribute towards compliance with the MS4 permit and TMDLs. The project will provide a comprehensive and adaptive plan containing specific projects and identifying synergies with other programs (i.e, CIPs, flood control, hydromodification, stream restoration) and eliminate the inefficiencies of incremental and opportunistic project conceptualization.

Master Plan of Drainage, City of Huntington Beach, CA. Deputy project manager and technical lead for the Master Plan of Drainage (MPD), including updating storm drain geospatial data, rapid development and execution of hydrology and hydraulics (H&H) models, assessment of system deficiencies, and prioritization of proposed improvements. Modeling was completed using customized PCSWMM models that account for the low lying topography within the watershed, as well as pump station boundary conditions.

Standard Operating Procedure for Asset Management Updates, City of San Diego, CA. Project manager for the development of standard operating procedures (SOPs) and templates for the City's asset management system. The SOPs were focused on the integration of geospatial information and field data collected by program specific personnel (e.g., catch basin cleaning crews) to ensure that updated asset information are incorporated into the backbone asset

Project Role:

Water Quality Analysis

Education:

M.S., Environmental Engineering and Sciences, Stanford University, 2011

B.S., Civil and Environmental Engineering, University of Maryland, 2010

Registrations/Certifications:

Professional Engineer, California No. 82245

Professional Affiliations:

American Society of Civil Engineers

California Stormwater Quality Association

Office:

San Diego, CA

Years of Experience:

6

Years with Tetra Tech:

2

management system in a timely manner. Training materials and templates for collection via mobile devices were presented to City staff.

Dominguez Channel Watershed Management Group Report of Waste Discharge (ROWD), South Bay Cities Council of Governments, CA. Project lead for the development of the ROWD for the Dominguez Channel Watershed Management Group (DC WMG), which has pioneered innovative regulatory reporting in the Los Angeles Region. The DC WMG requested an overhaul to the traditional MS4 documentation method in order to reflect the challenging conditions within the watershed, as well as the unique compliance approaches that are being implemented. Tetra Tech developed a comprehensive "watershed story" that showcased the progressive vantage point of the DC WMG, while also serving as the requisite MS4 Permit reapplication and initial iteration of the adaptive management process.

New Development and Redevelopment Handbook and Industrial Handbook, California Stormwater Quality Association (CASQA). Technical contributor to updating the CASQA New Development and Redevelopment Handbook and the Industrial Handbook to reflect changes to California regulatory requirements and advancement in the design of BMPs for stormwater quality and hydromodification control. The Handbook updates include incorporating state-of-the-science information and providing guidance for selecting appropriate BMPs for a particular regulatory environment.

City of Redwood City Watershed Improvement Plan, Redwood City, CA. Technical assistance for the City Watershed Improvement Plan. The project involved obtaining and screening spatial data within the Bayfront Canal/Atherton Channel watershed to identify parcels that could feasibly contain LID retrofit opportunities. A prioritization methodology was developed to assess parcels based on tributary pollutant loads and site level constraints. The finalized watershed plan presents reductions in stormwater runoff and pollutant loading to the Bayfront Canal/Atherton Channel, costs of different project alternatives, an analysis of funding sources, and recommended project selection going forwards.

BASMAA Green Streets Assessment and Reporting Project, Alameda County, CA. Technical lead for the BASMAA Green Streets Assessment and Reporting Project, which tracks and reports on 10 pilot green streets retrofit projects that incorporate site design and stormwater treatment BMPs, as required by the local MS4 permit. The project involved site specific information compilation, identification of relevant local pollutant of concern concentrations, and development of a spreadsheet model for determining effectiveness of planned BMPs to reduce the pollutants of concern. The final deliverable was a report documenting project locations, BMP size, drainage areas, type of green infrastructure features, costs, funding sources, and operations and maintenance costs and procedures.

Regulatory Support, City of La Verne, CA. Provided regulatory support for the City of La Verne regarding MS4 Permit compliance, including review of the City's adaptive management process and the development of the City's illicit connection and illicit discharge (IC/ID) program.

Regulatory Compliance Review, City of San Diego, CA. Regulatory and technical lead for the review of compliance and permit documentation for the San Diego Region. Efforts have included comprehensive review of the California Statewide Trash Amendments and the Water Quality Equivalency Guidance for Region 9.

Stormwater Optimization Toolbox, ESTCP, Alexandria, VA. Technical lead for development and implementation of a multi-part Stormwater Optimization Toolbox that estimates BMP sizes required to meet EISA section 438 regulations and state and local regulations for DoD bases throughout the country. The Toolbox includes a model selection tool, BMP sizing tool, and a BMP tracking tool that allows for a comprehensive approach to stormwater design and management. The model selection tool evaluates site-specific characteristics and recommends the appropriate modeling platform (i.e., discrete design storm model, continuous simulation, and continuous simulation with spatial optimization) that can be used to meet all applicable stormwater regulations. The Toolbox provides a user-friendly suite that can be applied across all DoD installations and will allow for significant cost and materials savings.

Brad Wardynski, P.E.

Mr. Brad Wardynski is a Water Resources Engineer with seven years of experience in the fields of urban hydrology and green infrastructure. Mr. Wardynski has worked with industry experts on a variety of stormwater practice design, monitoring, modeling, and guidance projects. His research has directly impacted stormwater control measure design guidance and he has collaborated with academics to present these findings nationwide to the design and regulatory community, including green infrastructure design, construction, and maintenance trainings offered at international conferences and symposia. His specific areas of expertise include current knowledge of stormwater control measure system performance and unit processes, formulation and adaptation of stormwater design guidance for specific climates and physiographic regions, targeted stormwater control measure design and optimization for regulatory compliance (including real-time control systems), and development of web-based applications for data management and decision support. He recently worked with a team of multiple agencies and non-government organizations to evaluate high-performance, actively controlled distributed BMPs throughout Los Angeles County and is currently analyzing and designing improvements to the Lower Los Angeles River.

Project Role:
Water Harvesting Analysis

Education:
M.S., Biological and Agricultural Engineering, North Carolina State University, 2012

B.S., Biosystems Engineering, Michigan State University, 2010

Registrations/Certifications:
Professional Engineer, California No. 84989

Professional Affiliations:
American Society of Civil Engineers, Member

Office:
San Diego, CA

Years of Experience:
7

Years with Tetra Tech:
5

EXPERIENCE

Stormwater Harvesting Augmentation Analysis, City of San Diego, CA. Assessed potential water supply augmentation benefits, costs, and savings of routing regionally harvested stormwater to a planned potable reuse program. Evaluated wastewater treatment plant boundary conditions on basis of stormwater quantity and quality to determine load of harvested stormwater that could be harvested. Led development of advanced modeling system with predictive logic to simulate intelligent, real-time control of a stormwater harvesting and diversion network. Guided planning-level review of existing integrated projects and regulatory barriers to linking stormwater with potable reuse programs. This project won an outstanding achievement award for innovation.

Multi-Agency Collaborative, Pilot-to-Scale Smart Rainwater Harvesting Initiative. City of Los Angeles Bureau of Sanitation, Los Angeles Department of Water and Power, Los Angeles County Flood Control District, CA. Led planning, implementation, and monitoring of six pilot residential rainwater harvesting projects instrumented with real-time controls. Conducted regional scaling analysis to quantify potential benefits of intelligent rainwater harvesting at scale to inform programmatic decision making. Crafted innovative strategy to (1) perform parcel-scale geomatic assessment to rapidly create a database of countywide capture opportunities using high-resolution LiDAR and aerial imagery, (2) develop real-time control model simulation system linked to calibrated land simulation models to evaluate performance of identified opportunities, and (3) synthesize results to programmatic context and benchmarks. Led the development of a public-facing web dashboard for real-time communication of monitoring results. Facilitated collaborative workshops between partner agencies to present results and solicit multi-agency feedback.

Mission Valley Integrated Regional Stormwater Capture Concept, City of San Diego, CA. Led feasibility study for flood control, water supply

augmentation, and water quality improvement project. Developed conceptual design recommendations for multi-purpose, intelligently controlled infrastructure to meet specific water quality compliance targets during wet weather while maximizing groundwater recharge during dry weather. Analysis included identification and simulation of upstream detention facilities to throttle discharge of stormwater to the project and manage flood risk.

Integrated Runoff Capture Design at Carriage Crest Park, City of Carson, CA. Developed and executed strategic compliance analysis to support full design of 13 acre-foot, subsurface stormwater capture facility that manages runoff via controlled discharge to the water reclamation collection system. Analysis included watershed and sewer modeling to predict stormwater capture for demonstrating compliance equivalency and for budgeting long-term reclamation plant treatment costs. Maximized return on investment for three partner agencies by optimizing facility intake capacity, storage volume, and discharge rate to reduce costs and maximize pollutant capture.

Progress Park Stormwater BMP Facility Concept, City of Paramount, CA. Facilitated conceptual design, modeling, and compliance analysis for regional stormwater capture project. Optimized diversion rate to maximize receiving water quality and recommended coordinated approach to leverage planned, downstream stormwater facilities.

Development of Enhanced Watershed Management Programs (EWMPs), Upper LA River, Upper Santa Clara River, Upper San Gabriel River Watershed Management Groups, Los Angeles County, CA. Played a key role in developing the EWMPs for four watershed management groups and 30 jurisdictions across greater Los Angeles County. The EWMPs provide a collaborative and prescriptive strategy for compliance with multiple TMDLs while also identifying opportunities for enhanced, interagency projects promoting water quality improvement, water supply augmentation, and community services/co-benefits. Specific efforts included composition of fact sheets and presentations with conceptual BMP diagrams for a general audience; identification, realistic characterization, modeling, and optimization of potential network of institutional, regional, and green infrastructure projects; prioritization, geotechnical investigation, and conceptual design of multi-benefit regional stormwater projects, including options for local water supply augmentation through capture and use; targeted project scheduling to meet specific compliance milestones; development of life-cycle cost estimates for program implementation; and communication of findings to City and County managers and Regional Board staff.

Site Selection and Development of Conceptual Designs, City of Los Angeles Bureau of Sanitation. Provided engineering and modeling support to identify and develop conceptual designs in downtown Los Angeles. Developed a GIS screening process, conducted field investigations for implementation feasibility, and provided analysis and modeling to determine the optimal BMP type, configuration, and sizing. The conceptual designs are being done in conjunction with low flow diversion structures proposed by the Bureau of Sanitation to help meet the water quality standards set for the Los Angeles River.

Headquarters LID Retrofit Project, San Antonio River Authority, San Antonio, Texas. Evaluated best-value LID configuration to address water quality on public parcel in downtown San Antonio. Efforts included site visits, BMP opportunity characterization, and optimization modeling using SUSTAIN software. Modeling incorporated specific design recommendations provided in the SARA LID Manual. Results were translated into construction plan sets, and the project is currently under construction.

Green Infrastructure Conceptual Design for Zhuanghe, China, Orient Landscape Ltd., Beijing, China. Provided technical support for a project integrating green infrastructure concepts into the design of a new retirement community in Zhuanghe in northeast China. Site plans illustrating how green infrastructure concepts, including bioretention, permeable pavement, constructed stormwater wetlands, and water harvesting, can be integrated into multiple land uses to manage and treat stormwater runoff were developed. Directed development of presentation boards for each land use type, including residential, commercial, transportation, and multi-use, that included a brief description of each green infrastructure practice, a site overview showing the approximate size and location of suitable practices, typical design cross sections, and multiple photos and renderings illustrating the typical configuration. The concepts will be incorporated into the final site plans to prevent the degradation of water quality in surrounding surface waters.

Mauricio Argente, R.L.A, QSD, QSP, ENV SP

Mr. Argente has more than 24 years of combined planning and engineering experience in both the public and private sectors. Mr. Argente's main strength is leading complex multi-disciplinary projects given his previous experience as a city planner, a landscape architect, and project manager of teams of engineers and scientists. Mr. Argente possesses unique qualifications to integrate engineering science with equal attention to environmental and aesthetic concerns. In essence, Mr. Argente is a landscape architect that has a solid understanding of hydrology, hydraulics, earthworks, infrastructure, and construction. As increased urban development affects our environment, Mr. Argente has evaluated and implemented solutions that lessen the environmental impacts of projects or turn them into environmental assets for the communities. Many of the project designs managed by Mr. Argente at Travis Air Force Base received a LEED certification. As a Qualified Stormwater Practitioner and Qualified Stormwater Designer, Mr. Argente has current relevant experience with modern water and storm water management practices that are now required by many governmental entities, including: bioswales, porous concrete, underground reservoirs, recharge systems and "smart" irrigation systems. Mr. Argente is also an Envision™ Sustainability Professional.

Mr. Argente has served as Project Manager for several major municipal projects for the City of Los Angeles, Bureau of Engineering—Los Angeles Zoo Parking Lot Low Impact Development, Peck Park Canyon Stormwater Quality Enhancement, Albion Riverside Park, and Aliso Creek Limekiln Creek Restoration—the designs of which demonstrated that water quality improvement and sustainable design could be implemented as part of a municipality's planning and development efforts, while providing water quality benefits to the Los Angeles River and the San Pedro Bay.

EXPERIENCE

Lakewood Stormwater and Runoff Capture Project, City of Lakewood, Lakewood, CA, Ongoing – Principal-in-Charge responsible for overseeing design services to prepare final plans, specifications and estimates. Tetra Tech was contracted by the City of Lakewood to evaluate two potential site locations for the development of the Lakewood Stormwater and Runoff Capture Project: Mayfair Park site and the Bolivar Park site. Tetra Tech provided a Project Engineering Study Report (PESR) that represents 10% design completion level and describes the evaluation of the two sites with all site investigation, hydrology and hydraulic, and water quality data and analyses to provide a recommendation for site selection. The project components will include a diversion structure to divert water from one of the major flood control channels, a pretreatment structure to remove debris from the runoff, an underground structure to infiltrate or capture the water that will be treated for landscape irrigation use, and a rehabilitated park surface with new picnic areas. The goal of the project is to not only help the City comply with the metals Total Maximum Daily Loads (TMDLs), as presented in the Los Cerritos Channel Watershed Management Program, but also provide additional benefits, such as revitalized park infrastructure and augmentation of local water supplies. As one of the first cities to receive stormwater funding to support Caltrans with stormwater compliance units, the success of this project will be a model for other agencies to follow.

Aliso Creek – Limekiln Creek Restoration Project, City of Los Angeles Bureau of Engineering, Los Angeles, CA, Ongoing – Project Manager responsible for overseeing pre-design and design services for this important Proposition O project. The project is located at the confluence of the concrete lined Aliso and Limekiln Creek

Project Role:

Landscape Architecture

Education:

Cal Poly San Luis Obispo
B.S. Landscape Architecture, 1991

Cal Poly San Luis Obispo
Master Architecture Studies, 1994-1996

Registrations/Certifications:

Professional Landscape Architect California No. 4129

Qualified SWPPP Developer (QSD) and Qualified SWPPP Practitioner (QSP)
Certificate # 21105

Envision™ Sustainability Accredited Professional

USGBC – LEED Certification Workshops

Project Management:
PSMJ – PM Workshop

Tetra Tech Project Management Series:
- Completed all levels
- Conducts Module Seminars for Staff

Professional Affiliations:

ASLA - American Society of Landscape Architects

CELSOC – Consulting Engineers and Land Surveyors of California

Office:

San Luis Obispo, CA

Years of Experience:

25

Years with Tetra Tech:

16

flood channels, which merge together in the southern portion of the project site. The project improvements involve constructing several stormwater Best Management Practices (BMPs) intended to treat on-site and off-site runoff and reduce contamination in Aliso Creek, Limekiln Creek, and the Los Angeles River. The proposed BMPs include low flow channel diversions, stormwater pump stations, stormwater pre-screening devices, bioswales, vegetated detention/retention basin, the restoration of upland, riparian habitat, and BMP educational signage. The goal of the project is to significantly reduce the pollutant loads, as well as transform a specifically built flood control facility into a multi-function green infrastructure facility. The project will also be designed to achieve a Platinum Envision Rating. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to the rivers, lakes, and oceans within the greater Los Angeles area.

Albion Riverside Park Project, City of Los Angeles Bureau of Engineering, Los Angeles, CA, Ongoing – Project Manager responsible for overseeing the pre-design services, including the Envision certification process, for the Albion Riverside Park project. Tetra Tech is providing design and construction support services. The project, located adjacent to the Los Angeles River, involves transforming a six-acre site, previously used for dairy warehousing and distribution, into a riverfront park and recreational facility that will benefit nearby disadvantaged low income neighborhoods. In addition, the City is using the redeveloped property to increase the current capacity for managing storm water runoff. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to the rivers, lakes, and oceans within the greater Los Angeles area.

Carriage Crest Stormwater and Runoff Capture Project, Sanitation Districts of Los Angeles County, Carson, CA, Ongoing – Landscape Architect for this stomrwater and runoff capture project. Carriage Crest Park was identified in the Enhanced Watershed Management Program (EWMP) as a high-priority site for a regional stormwater capture project due to its proximity to two large storm drains with a total drainage area exceeding 1,100 acres. The project components include a diversion structure to divert water from an existing storm drain system, a pretreatment structure to remove debris from the runoff, an underground structure to capture and store the stormwater prior to being discharged back into the existing storm drain system, and a rehabilitated park surface. Design objectives are to eliminate dry-weather flow from the adjacent channel and to maximize wet-weather pollutant capture.

Valencia Glen Low Impact Development Parking Lot, City of Santa Clarita, Valencia, CA, 2015 – Project Director responsible for overseeing preparation of conceptual design and a complete plans, specifications and estimate (PS&E) package for the construction of new Low Impact Development (LID) improvements within the existing parking lot. The LID elements included in the project design consisted of new permeable interlocking concrete pavers and a bioretention area. Tetra Tech performed a topographic survey of the existing parking lot and tennis court areas. New landscape plantings and mulch were included to improve the aesthetics of the project. The parking lot was designed to capture the greatest amount of stormwater possible, given the available construction budget and site constraints. The volume of stormwater captured, far exceeds the design goal, being the 85th percentile storm for the area.

Los Angeles Zoo Parking Lot Low Impact Development Project, City of Los Angeles Bureau of Engineering, Los Angeles, California, 2011 – Project Director and Landscape Architect for this important Low Impact Development (LID) demonstration project for the City of Los Angeles, Bureau of Engineering. Mr. Argente was responsible for the redesign and repair of the Los Angeles Zoo's asphalt concrete parking area, and its replacement with pervious pavement. The project included a hydrology model of the watershed so Best Management Practices (BMPs) were optimized. Additional services provided under his supervision include landscape architecture, public outreach, permitting support, interpretive design, cost analysis and value engineering. The project incorporated the latest design strategies for LID and a cross review of Leadership in Energy and Environmental (LEED) design requirements. The project's goal of improving water quality in the Los Angeles River will be achieved through the innovative design managed by Mr. Argente. The project was completed within the scope and budget designated at its onset.

Santa Monica Clean Beaches Initiative, City of Santa Monica, Santa Monica, CA, Ongoing – Landscape Architect for the design of the site improvements, diversion structure, pretreatment, underground storage reservoirs, and piping systems.

Andrew Chafer, PLS, CFedS

Mr. Chafer is experienced in all aspects of land surveying for design, monitoring and construction of municipal and land development projects. He has managed contracts for both small and large municipal, commercial, and residential projects.

Mr. Chafer has performed field boundary and topographic surveys, as well as construction staking, certification and monitoring, and ALTA/ACSM surveys. He has considerable experience researching boundary and chain of title information, and preparing legal descriptions.

Mr. Chafer has extensive knowledge in the use of Autodesk's Civil 3D software for both topographic and boundary mapping, as well as the production of construction plan sets.

EXPERIENCE

San Mateo Substation Survey, Pacific Gas and Electric, San Mateo, CA, 2017 Senior Survey Project Manager responsible for scanning and mapping of the existing substation on East Poplar Avenue in San Mateo. PG&E is currently experiencing drainage issues in and around the substation and needed topographic mapping in order to perform the drainage design. Tetra Tech staff adhered to an aggressive three week schedule for completion of deliverables.

Boundary Surveys for Conservation Easements (FY12, FY13, FY14), Natural Resources Conservation Services, CA 2012 - Ongoing – QA/QC Surveyor responsible for providing boundary surveys for the Natural Resources Conservation Services (NRCS) Wetland Restoration and Protection (WRP) Easement Program. Tetra Tech was contracted by the NRCS in Fiscal Year 2012 and again in 2013 and 2014 to provide boundary surveys, legal descriptions and exhibits, and GIS data for a total of 53 separate sites in 23 California counties. Project sites range in size from 11 to 4,800 acres and are mostly located in agricultural crop or grazing land. The survey work consists of performing field boundary surveys to define the parent parcel, and topographic surveys to define the WRP easement boundary. Once the boundaries are defined, legal descriptions and plats are produced to accompany warranty deeds, thus creating the easements. The final stage of the project includes monumenting the angle points of the easement. Tetra Tech also installs easement witness posts at 500 foot intervals along the boundary of the easement. Once these tasks are completed, Tetra Tech files Records of Survey for the boundaries in the county in which the WRP easement is located. Critical to this project is adherence to an aggressive schedule of 90 days for completion of each site's survey tasks.

Military Ocean Terminal (MOTCO) General Purpose Maintenance Shop, Concord, US Army Corps of Engineers, CA, Ongoing – Project Surveyor responsible for performing topographic survey in support of preparation of construction documents and specifications for the renovation of an existing building and construction of a new military operations building in Concord. The new building will replace an existing paved driveway and include the construction of a parking lot, driveway, and an 11,765 square-foot maintenance facility to perform general maintenance.

Alameda County Water District, On-Call Contract 2014-2017, Alameda County, CA, - Supervising Land Surveyor responsible for management of a

Project Role:
Ground & Aerial Survey

Education:
Civil Engineering, San Jose State University

Registrations/Certifications:
Professional Land Surveyor, California, No.8005

Professional Land Surveyor, Nevada, No.23918

Certified Federal Surveyor, U.S. Dept. of Interior, No. 1208

Professional Affiliations:
California Land Surveyors Association

Office:
San Jose, CA

Years of Experience:
19

Years with Tetra Tech:
<1

ground monitoring and on-call survey contract. Task orders under this contract included quarterly, bi-annual and annual monitoring surveys and annual benchmark level loops as well as District Boundary analysis and mapping for dispute resolution with an adjacent jurisdiction and topographic mapping for 6.5 miles of pipeline replacement through Union City, CA.

Apple Campus 2, 2014-2017, Cupertino, CA, - Senior Land Surveyor for development of site control network for construction. Directed field crews to collect GNSS data, perform traverse and run digital levels. Processed data through Star*Net and prepared master control network for construction of the 'Spaceship', a circular building over 2 million square feet designed to house 12,000 employees. The campus constructed on 176 acres also hosts a theater, fitness center and two parking garages. Provided boundary resolution and easement mapping for right-of-way and easement vacations and dedications. Managed a team of Project Surveyors for control, topographic and right-of-way surveys for offsite improvements at 9 intersections around the City of Cupertino for traffic mitigation measures.

Santa Clara Valley Water District, On-Call Contract 2013-2017, Santa Clara County, CA - Supervising Land Surveyor responsible for management of multiple on-call contracts totaling $1.25m. Task orders under these contracts included over 300 miles of digital levels, 140 miles of channel cross-sections, control for aerial LiDAR surveys, coordination of bathymetric surveys, underground utility locating & potholing. As head of the Mapping Department, prepared estimates for each Task Order, reviewed contracts and monthly invoicing, coordinated directly with District staff and managed sub-consultants and internal staff.

North Coast Pipeline, 2012-2015, Santa Cruz, CA - Consulting Land Surveyor responsible for right-of-way & topographic mapping for a 3-mile pipeline replacement project in Santa Cruz County, CA. Performed extensive boundary, easement and State right-of-way research and calculations, coordinated aerial and supplemental ground topographic surveys, prepared plats and legal descriptions for easement realignment through private and public lands.

Hecker Pass Specific Plan Area, 2008-2010, Gilroy, CA - Senior Land Surveyor for a master planned, rural Gilroy community. The goal for this area in the City's General Plan was driven by the desire to preserve the rural, farming history of the area, while providing for housing, agriculture, and highway tourist commercial uses. Working closely with the City, Caltrans, Santa Clara Valley Water District, Department of Fish and Game, and the environmental consultants, Mr. Chafer provided the boundary, right-of-way and topographic base mapping along State Route 152 with specific note to historical trees, gardens, and buildings to be preserved from impact.

Lower Silver Creek Flood Protection Project, 2009 – 2012, San Jose, CA - Established a GPS control network encompassing three reaches of Lower Silver Creek, incorporating City monuments, Santa Clara Valley Water District benchmarks & right-of-way monuments, and flight markers set for aerial surveys.
Supplemental ground surveys provided detailed utility and conform data to augment the 20-scale aerial topographic mapping, providing the design team a quality digital terrain model of the existing site conditions. Coordinated with PG&E for potholing to obtain horizontal & vertical locations of gas transmission mains; Developed a land-net using the District's existing right-of-way maps, surrounding tracts, and easement documents to generate an accurate base map of existing boundaries and property rights. Provided Plats & Legal Descriptions for acquisition of new right-of-way.

Camp Saratoga ALTA Survey, 2010, Saratoga, CA - Boundary research included easement and right-of-way deeds, Recorded County Maps, County Surveyor's transit books, original GLO notes and plats, Dependent Resurveys filed with the BLM, Flood Control right-of-way maps, State Highway right-of-way maps, PG&E and local telecommunications right-of-way records. Survey included recovery of existing section corners and restoration of lost corners, coordination of aerial ortho-rectified photography, quantity measurements, calculation of impervious surfaces, and topographic mapping to meet or exceed ALTA/ACSM standards for Land Title Surveys.

Elva Pangilinan, P.E., ENV SP

Elva Pangilinan has been a member of the Tetra Tech team for nine years and has extensive and relevant experience in designing and preparing improvement plans for both municipal and federal projects. Ms. Pangilinan is also experienced with performing various hydrology studies and reports. She has gained knowledge in Best Management Practices (BMP) and Low Impact Development (LID) implementation through her significant involvement in several important Proposition "O" projects for the City of Los Angeles.

Ms. Pangilinan has comprehensive knowledge in the use of AutoCAD Civil 3D, Bentley FlowMaster, HY-8 by the Federal Highway Administration, and Water Surface Profile Computation Program (WSPG) by the Los Angeles County Flood Control District.

Additionally, Elva is an Envision™ Sustainability Professional.

EXPERIENCE

Santa Monica Clean Beaches Project for Pier and Pico-Kenter Watersheds, City of Santa Monica, Santa Monica, CA, Ongoing – Civil Engineer responsible for the design of the site improvements, diversion structure, pretreatment, underground storage reservoirs, and piping systems. The objective of the project is to improve Santa Monica beach water quality by increasing the diversion capacity at the Santa Monica Pier and Pico-Kenter storm drain outfalls. The 85th percentile storm event volume would be treated and diverted from the Pier watershed to the Santa Monica Urban Runoff Recycling Facility (SMURRF) or the sanitary sewer. The project proposes storm drain diversion and runoff storage systems at two separate storm drain outfalls.

Lakewood Stormwater and Runoff Capture Project, City of Lakewood, Lakewood, CA, Ongoing – Civil Engineer responsible for the design of the site improvements, diversion structure, pretreatment, infiltration gallery, piping system and irrigation treatment. Tetra Tech was contracted by the City of Lakewood to evaluate two potential site locations for the development of the Lakewood Stormwater and Runoff Capture Project: Mayfair Park site and the Bolivar Park site. Tetra Tech provided a Project Engineering Study Report (PESR) that represents 10% design completion level and describes the evaluation of the two sites with all site investigation, hydrology and hydraulic, and water quality data and analyses to provide a recommendation for site selection. The project components will include a diversion structure to divert water from one of the major flood control channels, a pretreatment structure to remove debris from the runoff, an underground structure to infiltrate or capture the water that will be treated for landscape irrigation use, and a rehabilitated park surface with new picnic areas. The goal of the project is to not only help the City comply with the metals Total Maximum Daily Loads (TMDLs), as presented in the Los Cerritos Channel Watershed Management Program, but also provide additional benefits, such as revitalized park infrastructure and augmentation of local water supplies. As one of the first cities to receive stormwater funding to support Caltrans with stormwater compliance units, the success of this project will be a model for other agencies to follow. Currently, Tetra Tech is providing design services to prepare final plans, specifications and estimates for the City.

Carson Stormwater and Runoff Capture Project – Carriage Crest Park, City of Carson, Carson, CA, Ongoing – Civil Engineer responsible for utility research and review of the preliminary design report. Carriage Crest Park was identified in the Enhanced Watershed Management Program (EWMP) as a high-priority site for a

Project Role:

Cost Estimating/Specifications

Education:

California Polytechnic State University, San Luis Obispo.
B.S. Civil Engineering, 2007

Registrations/Certifications:

Registered Professional Engineer
California No. 81113

Envision™ Sustainability Professional

Office:

San Luis Obispo, CA

Years of Experience:

Nine

Years with Tetra Tech:

Nine

regional stormwater capture project due to its proximity to two large storm drains with a total drainage area exceeding 1,100 acres. The project components include a diversion structure to divert water from an existing storm drain system, a pretreatment structure to remove debris from the runoff, an underground structure to capture and store the stormwater prior to being discharged back into the existing storm drain system, and a rehabilitated park surface. Design objectives are to eliminate dry-weather flow from the adjacent channel and to maximize wet-weather pollutant capture.

Albion Riverside Park Project, City of Los Angeles Bureau of Engineering, Los Angeles, CA, 2014 – Ongoing – Design Engineer responsible for utility research and coordination, preparation of Pre-Design Report, and researching information for preparation of Envision certification. Tetra Tech was contracted to provide pre-design, design, and construction support services for improvements to the Albion Riverside Park, located adjacent to the Los Angeles River. The project involves transforming a six-acre site, previously used for dairy warehousing and distribution, into a riverfront park and recreational facility that will benefit nearby disadvantaged low income neighborhoods. In addition, the City is using the redeveloped property to increase the current capacity for managing storm water runoff. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to the rivers, lakes, and oceans within the greater Los Angeles area.

Aliso Creek – Limekiln Creek Restoration Project, City of Los Angeles Bureau of Engineering, Los Angeles, CA, Ongoing – Project Engineer responsible for providing pre-design and design services, as well as coordination of Envision documents in order to attain the desired level of Envision rating. The project is located at the confluence of the concrete lined Aliso and Limekiln Creek flood channels, which merge together in the southern portion of the project site. The project improvements involve constructing several stormwater Best Management Practices (BMPs) intended to treat on-site and off-site runoff and reduce contamination in Aliso Creek, Limekiln Creek, and the Los Angeles River. The proposed BMPs include low flow channel diversions, stormwater pump stations, stormwater pre-screening devices, bioswales, vegetated detention/retention basin, the restoration of upland, riparian habitat, and BMP educational signage. The goal of the project is to significantly reduce the pollutant loads, as well as transform a specifically built flood control facility into a multi-function green infrastructure facility. The project will also be designed to achieve a Platinum Envision Rating. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to the rivers, lakes, and oceans within the greater Los Angeles area

Valencia Glen Low Impact Development Parking Lot, City of Santa Clarita, Valencia, CA, 2014 – Design Engineer responsible for utility research and coordination, and preparation of Special Provisions. Tetra Tech was contracted to provide plans, specifications and estimate (PS&E), and construction support services for the Low Impact Development (LID) design aimed at reducing stormwater runoff generated from the existing parking lot and tennis court areas.

Stormwater and Safety Improvement Project at Central Los Angeles Recycling and Transfer Station (CLARTS), MWH Americas, Los Angeles, CA, 2013 – Design Engineer responsible for performing stormwater drainage and hydrology computations. Project improvements included Low Impact Development (LID) features, new storm drain infrastructure, stormwater diversion and underground storage. To meet Total Maximum Daily Load (TMDL) and the City's LID requirements, the project was approved to divert the "first flush" to the sewer system. An underground storage system was designed to capture the water quality inflows, detain the flow and release it at an approved flowrate allowable to be released to the sanitary sewer. Peak storm flows were routed to the existing storm drain system. Bioswales and raised planter areas were sited to prevent conflict with existing truck circulation patterns and facility operations. Drop inlet filters were proposed at all new inlets in order to reduce the total suspended solids, heavy metals and other debris from entering the storm drain system and being conveyed to the Los Angeles River. The proposed drainage design adhered to the City of Los Angeles' LID Ordinance and the City's Standard Urban Stormwater Management Plan (SUSMP) requirements for a large-volume recycling facility and transfer station built over an old inert landfill. A SUSMP report was prepared to document compliance with the project requirements.

TETRA TECH

Mazen Kassar, P.E.

Mr. Mazen Kassar has more than 25 years of experience in electrical engineering and industry standard that include electrical engineering staff management, project management, construction management and supervision, water and wastewater treatment, petro-chemical design, and environmental soil and groundwater treatment. His background includes designing medium and low voltage power distribution, designing instrumentation, control systems and SCADA systems for a wide-variety of projects, and the installation of electrical systems for remediation projects, including soil vapor extraction systems and groundwater pump-and-treat systems. Other experience includes, working with utility companies to provide new electrical service to new projects, working with local Building and Safety Departments to obtain Plan Check and construction permits, field trouble shooting of electrical and mechanical systems, system commissioning and startup, problem solving, and managing an operation and maintenance department. He has strong knowledge in MS Office and AutoCAD.

EXPERIENCE

Carriage Crest Stormwater and Runoff Capture Project, Sanitation Districts of Los Angeles County, Carson, CA, Ongoing – Carriage Crest Park was identified in the Enhanced Watershed Management Program (EWMP) as a high-priority site for a regional stormwater capture project due to its proximity to two large storm drains with a total drainage area exceeding 1,100 acres. The project components include a diversion structure to divert water from an existing storm drain system, a pretreatment structure to remove debris from the runoff, an underground structure to capture and store the stormwater prior to being discharged back into the existing storm drain system, and a rehabilitated park surface. Design objectives are to eliminate dry-weather flow from the adjacent channel and to maximize wet-weather pollutant capture.

Burris Pump Station, Orange County Water District, Fountain Valley, CA, 2013 – Electrical Engineer for the design of the new Burris Pump Station which consists of four 1,750 horsepower vertical turbine pumps delivering a maximum flow rate of 200 cfs to the Santiago Basins from Burris Basin. Work consists of reviewing the Burris Pump Station construction phase shop drawings, performing design revision, and providing answers to RFIs.

Elizabeth Reservoir, Booster Pump Station and Well No. 29, City of South Gate, South Gate, CA, 2014 – Engineering design services for a water storage tank and booster pump station and a water well with disinfection equipment. Electrical engineering services included three new 125 horsepower booster pumps and adding and installing new conduits and wires to the new pumps. Responsible for preparing plans, specifications, and load calculation to modify the facility's extensive distribution system. Site investigations were conducted to verify ratings, settings, and locations of equipment. Working with utility company to provide new service to the project.

Carlsbad Seawater Desalter Conveyance Pipeline, Poseidon Resources Corporation, Carlsbad, CA, Ongoing – Managed electrical design for 52,000 linear feet of pipeline that serves the product water from the planned 50 mgd desalination plant in the City of Carlsbad. Pipeline diameter is 54-inch welded steel pipeline operating at a maximum pressure of 500 psi. The pipeline is routed through the cities of Carlsbad, San Marcos, and Vista. The electrical design included designing power for cathodic protection system at multiple locations,

Project Role:

Electrical Engineering & Instrumentation

Education:

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

Registrations/Certifications:

Professional Electrical Engineer California, 1998, No. 15809

General Construction, Class B California, 2008, No. 777845

Contractor - C-10 Electrical, California Class C – Specialty 2000, No. 777845

Training and Certifications:

ETAP Electrical Power Modeling

Project Management I & II

Auto CAD 2005

GE and Allen Bradley PLC programming

GE/Intellution and Wonderware SCADA programming

Vapor e\extraction and Groundwater Treatment

OSHA 8-hour Hazardous Waste Operations Annual Refresher Training, 2016

OSHA 8-hour Hazardous Waste Operations Site Supervisor Training, 1992

OSHA 40-hour Hazardous Waste Operations Training, 1989

Professional Affiliations:

Institute of Electrical and Electronics Engineers IEEE

Office:

Irvine, California

Years of Experience:

25

Years with Tetra Tech:

Six

designing power, control and instrumentation for large flow control facility and underground turnouts.

Donald C. Tillman Water Reclamation Plant Electrical Modifications, City of Los Angeles, Bureau of Engineering, Van Nuys, CA, Ongoing – Project Manager responsible for preparing electrical engineering design that include plans, specifications, and cost estimate to modify the facility's medium voltage power distribution system. The project consists of upgrading old medium voltage switchgears with two new 4160V, 2000A ones and converting loop system to dual radial system and providing power redundancy for the whole plant. The project also included site investigations to verify ratings, settings, and locations of equipment and performing electrical power system studies that include load flow, short circuit and arc flash calculation using ETAP software.

Carson Regional Water Reclamation Facility, West Basin Municipal Water District, Carson, CA, 2013 – The Carson Regional Water Reclamation Facility was originally constructed to provide both MF/RO treated water at 3.2 mgd and nitrified Title 22 water for industrial purposes. Tetra Tech was part of the 30% design team for an expansion of the facility to add 2.5 mgd of microfiltration (MF) using pressurized membrane system along with a 2.0 mgd tertiary MBR facility to produce nitrified water. Mr. Kassar served as Electrical Engineer.

Spreading Grounds Telemetry System Upgrade Services Project, County of Los Angeles, Department of Public Works; Water Resources Division; Operations Section; Alhambra, CA, 2012-Ongoing – Managing the Design / Build project, coordinated the design and field installation with the client, supervised field panels upgrade and PLC/HMI programming. Coordinated workshops, system startup, and generated the final testing and discrepancy report for the whole project.

Lakewood Plant 13 Project, Lakewood, CA, 2013 – Managing the electrical design for Plant 13 pump station upgrade. The design consists of replacing the plant old MCC with new outdoor NEMA 3R MCC, installing new conduits and wires to the new pumps, and reinstalling the existing control and telemetry system. This replacement upgrade requires interfacing with Southern California Edison (SCE) and relocating the existing ATS.

Lakewood Well No. 22 Project, Lakewood, CA, 2013 – Managing the electrical design for well no. 22 pump upgrade. The design consists of replacing the old well pump VFD with new one and rewiring the new well pump.

Well 21&22 Desalter Plant, Irvine Ranch Water District, Irvine, CA, 2012 – Wells 21 and 22 Reverse Osmosis (RO) Treatment Plant is designed to remove solids from well water and provide potable water source. The design consisted of providing all design-build services to construct a fully operational reverse osmosis water treatment plant including, but not limited to: Pretreatment chemical systems, high pressure feed pumps, reverse osmosis treatment trains, membrane clean-in-place system, decarbonators, post treatment chemical systems, supervisory control and data acquisition, product water pump station, treatment plant building and electrical and instrumentation system. The RO Plant was sized to produce 6.27 mgd of water. Water will be treated to remove salts (TDS) and nitrates. Managed the electrical design of the electrical power and control system, preparing technical specifications, preparing engineer's cost estimate, preforming electrical power system studies that included load flow, short circuit and arc flash calculations, and integration with the city's SCADA system.

Santa Ana River Interceptor Relocation Project, Orange County Flood Control District, Santa Ana, CA, 2012 – Provided preliminary and final electrical design services for relocation of 19,500 linear feet segment of 54-inch trunk interceptor, 6,000 linear feet of 15- and 18-inch sewer mains, flow metering station and the decommissioning of the existing trunk interceptor segment. The project included the installation of two separate siphons below the Santa Ana River using microtunneling construction method while complying with multiple environmental and permitting constraints.

Pyrite Canyon Treatment Facility, State of California, Department of Toxic Substances Control, Glen Avon, CA, 2009-2014 – Performed design of electrical power and distribution system for a new treatment facility. The design included sizing solar system to feed the new plant, sizing power equipment like inverters, step up and step down transformers, overhead and underground distribution, switchboard, MCC and cable trays, performing load flow and short circuit studies using ETAP power modeling software.

Victor M. Ramirez, P.E., S.E.

Mr. Ramirez has more than 27 years of structural engineering design experience with special emphasis in the design of water storage/water containment and water conveyance related structures. This includes reservoirs, water/wastewater treatment plants, booster pump stations, flow control facilities, pressure reducing stations and pipelines. His experience also includes the design of a wide variety of other types of structures, including buildings, bridges and storm drainage related structures. He is thoroughly knowledgeable in all types of construction, including reinforced concrete, masonry, structural steel, and timber.

Mr. Ramirez has recent experience in the design of underwater structures having recently completed the concept structural engineering design for the removal and replacement of two river locks along the Ohio River outside of Pittsburgh, Pennsylvania, with two new wider and larger ones, a project performed for the U.S. Army Corps of Engineers.

EXPERIENCE

As-Needed Structural Engineering Services, San Diego County Water Authority, San Diego, CA, 2013-2016 –Task Orders Mr. Ramirez has served as Project Engineer include: 01 - Carlsbad 1 FCF: Condition Assessment Memo and Recommendations; 02 - Fallbrook 4/Rainbow 5/Rainbow 7 FCFs: Condition Assessment Memo and Recommendations; 03 - Carlsbad 1 FCF Replacement: Design Phase; 04 - Fallbrook 4/Rainbow 5 /Rainbow 7 FCF Modifications: Design Phase; 09 - Visual Observation and Condition Assessment of Pipelines 1 and 2 at Turnouts 1 and 2 at the Vista 1/Vallecitos 2 Flow Control Facility; 10- Vista 1/ Vallecitos 2 Flow Control Facility Design and Bid Phase Services $57,972; 11- Ramona Pipeline Pumpwell Project $6,330

Mesa Water District, On-Call Structural Engineering Services, Costa Mesa and Huntington Beach, CA, 2012-2013 – Structural Engineer providing On-Call Structural Design Services for Mesa Water District who serves an 18 square mile service area in north Orange County which includes distribution of a combination of imported water, local groundwater and recycled water to approximately 23,500 retail accounts for a population of over 110,000. Task Orders include: Structural assessment for Access Hatch Additions to Four Existing Valve Vault Roofs; Preparation of plans, specifications and an estimate of the probable construction cost for the replacement of the precast concrete lids at four existing buried control valve vaults.

As-Needed Structural Engineering Services (G1302-J0102), San Diego County Water Authority, San Diego, CA, 2013 – Structural Engineer for the SDCWA facilities maintenance program which are vital for maintaining the quality of life in San Diego County. These facilities include the five large diameter pipelines that comprise the First and Second Aqueducts, smaller interconnection pipelines, numerous flow control facilities, turnout structures and vaults. The As-Needed Professional Structural Engineering Services program provides the engineering services required to design and construct new facilities that will expand and improve SDCWA's capabilities as the foremost provider of raw and potable water in San Diego County. Task Orders have included:

- Lake Hodges Hydroelectric Facility Fire-Life Safety/Exiting, Fall Projection and Water Infiltration Remediation

Project Role:
Structural Engineering

Education:
B.S., Civil Engineering,
California State University,
Los Angeles, 1995

Registrations/Certifications:
Registered Structural Engineer
California, 2004, No. 4720

Registered Civil Engineer
California, 1997, No. 56863

Professional Affiliations:
Structural Engineers Association of Southern California

American Institute of Steel Construction

Field Safety Certifications
Confined Space
Fall Protection

Office:
San Dimas, CA

Years of Experience:
35

Years with Tetra Tech:
27

- Lift Restraints & Electrical Insulation
- Olivenhain – Lake Hodges Pipeline, Surge Shaft Lining
- Lake Hodges Hydroelectric Facility Improvements- Fire Protection and Exiting: Preliminary Design
- Construction Phase Services NIB 12-05 Exiting & Fire Protection and 12-06 Waterproofing Improvements at Lake Hodges Hydroelectric Facility

Conveyance Pipeline for Carlsbad 50 MGD Seawater Desalination Plant, Poseidon Resources Corporation, Carlsbad, CA, 2013 – Structural Engineering Manager for the design six structures associated with the interconnection of the new 54 in diameter Carlsbad Conveyance Pipeline with the existing SDCWA P3 and P4 pipelines. The six structures are buried reinforced concrete vaults that consist of two pump wells, two isolation valve vaults, an interconnect valve vault and a flow control facility. The flow control facility vault has an above-grade concrete masonry control room, with a steel framed roof built on top of it.

Groundwater Reliability Improvement Program (GRIP) Advanced Water Treatment Facility, Water Replenishment District of Southern California, Pico Rivera, CA, 2016 – Lead Structural Engineer for a new 13,000 acre-feet per year of fully advanced treated recycled water. Treatment process includes influent facilities, MF/UF system, RO system, UV Advanced Oxidation system, post-treatment/stabilization/disinfection, product water wet well, and brine/waste disposal connection.

Carson Regional Water Reclamation Facility, West Basin Municipal Water District, Carson, CA, 2013 –The Carson Regional Water Reclamation Facility was originally constructed to provide both MF/RO treated water at 3.2 mgd and nitrified Title 22 water for industrial purposes. Tetra Tech was part of the 30% design for an expansion of the facility to add 2.5 mgd of microfiltration (MF) using pressurized membrane system along with a 2.0 mgd tertiary MBR facility to produce nitrified water. Mr. Ramirez served as Structural Engineer

Pyrite Canyon Treatment Facility, State of California, Department of Toxic Substances Control, Glen Avon, CA, 2011 – The existing Stringfellow Pretreatment Plant located in Glen Avon, California, was designed and built in 1986 as an interim facility under the direction of the US Environmental Protection Agency to pre-treat extracted contaminated groundwater prior to sewer discharge. The plant continues to be operational; however, it requires significant expenditure of funds and effort to continuously repair and replace its aging components and to keep it operating within its current permit limits. As a result of the plant's age and more stringent effluent discharge requirement, the treatment plant will be replaced by the new Pyrite Canyon Treatment Facility (PCTF). The plant is designed to treat approximately 120 gpm of contaminated groundwater. In 2009, the California Department of Toxic Substances retained Tetra Tech for design and construction services of the new PCTF. The scope of work for the five year project includes preparation of a basis of design report, preliminary and final design plans and specifications, construction cost estimate, bidding services and construction administration services.

Michelson Water Reclamation Plant, Phase II Improvements, Irvine Ranch Water District, CA, Irvine, CA, 2011 – Tetra Tech in collaboration with HDR designed the expansion of Michelson Water Reclamation Plant, which will have a capacity of 33 MGD per day when completed. The expansion of the plant facilities includes intercepting the existing sewer pipes, new headworks, expanded primary clarifiers, new primary effluent pump station, new aeration blower, membrane bio-reactor, high rate clarifier, ultra violet disinfection, expanded effluent pump station and various chemical feed facilities, for which Tetra Tech provided all of the structural design. Most of the new concrete process structures, masonry buildings and influent sewer lines were founded on piles to mitigate concerns about settlement due to the poor quality of the soil. Finite element models were created for the analysis of major structures and three dimensional graphical models with walkthrough capabilities were completed to show complicated construction phasing and the interface between existing and proposed structures.

Calexico Water Treatment Plant Expansion Phase II, City of Calexico, 2006 – Project Structural Engineer for the preparation of structural plans, specifications and construction cost estimates for additional expansion of the City of Calexico's water treatment plant, which is currently in design. The structures to be designed by Tetra Tech as part of this project include expansion of the existing filter gallery that was constructed as part of Phase I, a new clarifier, new generator building, new chlorine building, and two wet wells.

TETRA TECH

Timothy Joyce, P.E.

Mr. Joyce has more than 25 years of experience in planning, conceptual design, final design, and construction management of municipal, environmental, and civil engineering projects. Throughout his career, he has been directly involved in the design and construction of collection systems, stormwater treatment systems, and roadway/freeway systems. He has designed stormwater conveyance and treatment facilities for flow rates ranging from 0.1 cfs up to 175 cfs.

Project Role:
Mechanical/Pump Stations

Education:
B.S., Civil Engineering, University of Connecticut, 1990

Registrations/Certifications:
Professional Engineer, California, No. 51596

Professional Affiliations:
American Society of Civil Engineers

Office:
Irvine, California

Years of Experience:
25

Years with Tetra Tech:
One

EXPERIENCE

Development of a TMDL Compliance Plan for the Los Cerritos Channel Sub-basin 4 Drainage Area, City of Signal Hill, Long Beach, CA – Tetra Tech is providing hydrology, hydraulic, and water quality data and analyses to provide a recommendation for an initial project and an overall capital improvement plan for the approximately 2,000-acre watershed. The project components for an initial project at the Skylinks Golf Course in Long Beach include a diversion structure to divert runoff from a 40' wide x 8' deep flood control channel, a large diameter diversion pipeline, a pretreatment device to remove debris from the water, an underground infiltration gallery, and a pipeline to return overflows to the flood control channel. Diversion flows of up to 180 cfs and an underground infiltration gallery of up to 30 acre-feet are being considered for the Skylinks project. The goal of the project is to not only help the Cities of Signal Hill and Long Beach comply with the metals Total Maximum Daily Loads (TMDLs), as presented in the Los Cerritos Channel Watershed Management Program, but also to provide additional benefits including augmentation of local groundwater supplies. Tetra Tech will provide design services to prepare 30% plans, specifications and estimates for the City that will be used as bidding documents for a design-build project.

Lakewood Stormwater and Runoff Capture Project, City of Lakewood, Lakewood, CA – Design Lead responsible for pump station design. Tetra Tech was contracted by the City of Lakewood to evaluate two potential site locations for the development of the Lakewood Stormwater and Runoff Capture Project: Mayfair Park site and the Bolivar Park site. Tetra Tech provided a Project Engineering Study Report (PESR) that represents 10% design completion level and describes the evaluation of the two sites with all site investigation, hydrology and hydraulic, and water quality data and analyses to provide a recommendation for site selection. The project components will include a diversion structure to divert water from one of the major flood control channels, a pretreatment structure to remove debris from the runoff, an underground structure to infiltrate or capture the water that will be treated for landscape irrigation use, and a rehabilitated park surface with new picnic areas. The goal of the project is to not only help the City comply with the metals Total Maximum Daily Loads (TMDLs), as presented in the Los Cerritos Channel Watershed Management Program, but also provide additional benefits, such as revitalized park infrastructure and augmentation of local water supplies. Currently, Tetra Tech is providing design services to prepare final plans, specifications and estimates for the City.

Temescal Canyon Park Stormwater BMP Project, City of Los Angeles, Bureau of Engineering, Los Angeles, CA, 2014 – Project Manager for a project to assist the City in compliance with the Santa Monica Bay Beaches Bacteria TMDL near Temescal Canyon Road. The engineering services for the

project included concept development, preliminary design, detailed design, construction support, hydrologic analyses for the performance of the facility, site surveying, support of CEQA activities, environmental services, archaeological services, geotechnical explorations, permitting (Coastal, City Building and Safety, Caltrans, and Los Angeles County), and community outreach. Components of the BMP are a 22 million gallons per day (mgd) storm drain diversion structure; a hydrodynamic separator; a 1.25 million gallon detention tank; a 3 mgd pump station; new park playground equipment; new park restrooms; 500 feet of new 36-inch storm drain pipe; 1,000 feet of new 16-inch force main; and rehabilitation of 3,000 feet of existing 16-inch force main that discharges into the sanitary sewer for treatment at the Hyperion Wastewater Treatment Plant.

Aliso Creek – Limekiln Creek Restoration Project, City of Los Angeles, BOE, Los Angeles, CA – Project Manager/Design Lead responsible for overseeing pre-design and design services. The project is located at the confluence of the concrete lined Aliso and Limekiln Creek flood channels, which merge together in the southern portion of the project site. The project improvements involve constructing several stormwater BMPs intended to treat on-site and off-site runoff and reduce contamination in Aliso Creek, Limekiln Creek, and the Los Angeles River. The proposed BMPs include low flow channel diversions, stormwater pump stations, stormwater pre-screening devices, bioswales, vegetated detention/retention basin, the restoration of upland, riparian habitat, and BMP educational signage. The goal of the project is to significantly reduce the pollutant loads, as well as transform a specifically built flood control facility into a multi-function green infrastructure facility. The project will also be designed to achieve a Platinum Envision Rating. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads.

Albion Riverside Park Project, City of Los Angeles, BOE, Los Angeles, CA – QA/QC Reviewer responsible for overseeing the pre-design services for the Albion Riverside Park Project. Tetra Tech will also be providing design and construction support services. The project, located adjacent to the Los Angeles River, involves transforming a 6-acre site, previously used for dairy warehousing and distribution, into a riverfront park and recreational facility that will benefit nearby disadvantaged low income neighborhoods. In addition, the City is using the redeveloped property to increase the current capacity for managing stormwater runoff. This important water quality project is part of the City's overall efforts through the Proposition O Bond Program to improve water quality and reduce pollutant loads that are currently being conveyed to the rivers, lakes, and oceans within the greater Los Angeles area. In addition, the project is being designed to achieve a Platinum Envision™ rating.

Santa Monica Urban Runoff Reclamation Faciltiy (SMURRF), Santa Monica, CA, 2001 – City Project Manager for the design of a unique facility that captures and treats dry-weather storm drain runoff (flows up to 0.5 mgd) from the Santa Monica Pier and Pico Boulevard storm drains to Title 22 standards for use as reclaimed water. The project entails a stormwater diversion system; pumping systems; supply and discharge pipelines; and a stormwater treatment facility. Treatment processes include fine screening, a grit chamber, dissolved air flotation, micro-filtration, and UV disinfection. The treated water is used for landscape irrigation at City parks and gray water in several buildings.

Statewide Stormwater On-call Services, State of California, Department of Transportation (Caltrans), CA, 2014 – Project Manager for several task orders for an on-call stormwater services contract with Caltrans. The engineering services for the task orders include hydrology/hydraulic design of treatment Best Management Practice (BMP) pilot projects; reconnaissance studies of new treatment BMPs; preliminary design reports; and plan, specification, and estimate preparation for treatment BMP pilot projects.

City Maintenance Yard Stormwater Treatment Unit Design-Build Project, City of Santa Monica, Santa Monica, CA – Project Manager and senior designer for a stormwater treatment design-build contract with the City of Santa Monica. The project involved preparation of a preliminary engineering report; preparation of final PS&E; obtaining Los Angeles County permits; bidding the project to several subcontractors; awarding and managing a construction contract; and providing construction oversight of a 9 cfs stormwater treatment unit.

Craig Ziel, P.E., QSP/D

Mr. Ziel's experience involves the planning, analysis, design and cost estimates for residential, commercial, and municipal development projects. His proficiency includes the design and preparation of construction documents for sewer, water, and stormdrains, as well as improvement plans for the geometric design of roads, highways, bike paths and parking areas. Mr. Ziel also has sufficient experience preparing grading and drainage plans for roads, mass grading, finish grading, and grading for Low Impact Development (LID) projects.

Mr. Ziel understands the unique characteristics of every site and employs a variety of design techniques including AutoDesk's Civil 3D, as well as various hydraulic/hydrologic analysis software programs. This approach allows him to analyze the interaction of utilities, grading, and drainage during the design process and develop innovative and dynamic solutions for every project.

Furthermore, Mr. Ziel has ample experience implementing the State Water Board requirements for preventing and mitigating stormwater pollutants. This includes preparing traditional and linear Stormwater Pollution Prevention Plans (SWPPP) for the purposes of eliminating pollutant discharges during construction. He is also experienced in preparing Water Quality Management Plans (WQMPs) for development and redevelopment projects. Mr. Ziel incorporates his knowledge of hydraulic/hydrologic analysis and Low Impact Design Best Management Practices to mitigate post development impacts to the environment.

EXPERIENCE

Carlsbad Seawater Desalination Conveyance Pipeline, Poseidon Resources Corporation, Carlsbad, CA, 2013 – Project Engineer responsible for providing the Stormwater Pollution Prevention Plan (SWPPP) for the 82,000 linear feet of pipeline that serves the product water from the planned 50 million gallons per day desalination plant in the City of Carlsbad. Pipeline diameters ranged from 24-inch to 54-inch welded steel pipeline operating at a maximum pressure of 800 psi. Seven flow control facilities were planned. The pipeline was routed through the cities of Carlsbad, San Marcos, Vista and Oceanside. In addition, there were two bridge crossings, Caltrans right-of-way crossing, railroad crossing, and several bore and jack crossings located throughout the project. The project is a design-build project with a fast paced schedule. The SWPPP was prepared in phases in order to allow for construction to begin with the first portion of the pipeline and then updated to include the additional segments.

Carson Transfer Station Storm Water Quality Improvements, Waste Management, Carson, CA, 2013 – Project Engineer responsible for analyzing site hydrology at the Carson Transfer Station, and calculating design flow rates and volumes for treating the design storm. The existing facility is approximately 6.1 acres, of which more than 90 percent is covered by impervious surface. Carson Transfer Station lacks permanent structural Best Management Practices (BMPs) to help keep storm water runoff under the effluent benchmark limits, as mandated by the Industrial Storm Water General Permit. Therefore, sediment, trash, debris, nutrients, copper and lead have a potential to be conveyed to water courses and thus impair them. In order to satisfy discharge requirements, Waste Management selected Tetra Tech to develop construction plans and specifications to implement necessary storm water improvements to help immediately address the water quality issues. Mr. Ziel was also responsible for sizing filters and specified

Project Role:

Cost Estimating

Education:

B.S., BioResource and Agricultural Engineering, California Polytechnic State University, San Luis Obispo, 2006

Registrations/Certifications:

Professional Engineer, California, 2009, No. 74743

Qualified SWPPP Developer/Practitioner, QSD/QSP # 23344

Professional Affiliations:

American Society of Civil Engineers

Office:

San Luis Obispo, CA

Years of Experience:

8

Years with Tetra Tech:

5

treatment media to address site specific pollutants of concern; locating BMPs to minimize impacts to site traffic/operations; and preparing improvement plans and site specific details for installing the proposed BMPs.

South Gate Transfer Station Storm Water Quality Improvements, Waste Management, South Gate, CA, 2013 – Project Engineer responsible for analyzing site hydrology at the South Gate Transfer Station and calculating design flow rates and volumes for treating the design storm. The existing facility is approximately 2.4 acres, of which more than 90 percent is covered by impervious surface. South Gate Transfer Station lacks permanent structural Best Management Practices (BMPs) to help keep storm water runoff under the effluent benchmark limits, as mandated by the State Industrial General Permit. Therefore, sediment, trash, debris, nutrients, copper and lead have a potential to be conveyed to water courses and thus impair them. In order to satisfy discharge requirements, Waste Management selected Tetra Tech to develop construction plans and specifications to implement necessary storm water improvements to help immediately address the water quality issues. Mr. Ziel was responsible for sizing the infiltration basin based on site specific percolation data; placing BMPs in specific locations to preserve the exiting site traffic and operations; utilizing the existing pervious areas to treat and infiltrated stormwater runoff; and preparing improvement plans and site specific details for installing the proposed BMPs.

Stormwater and Safety Improvement Project at Central Los Angeles Recycling and Transfer Station (CLARTS), MWH Americas, Los Angeles, CA, 2013 – Project Engineer responsible for project design, hydrology computations, for a large-volume recycling facility and transfer station built over an old inert landfill. The improvements include LID features, new storm drain infrastructure, stormwater diversion and underground storage. To meet Total Maximum Daily Load (TMDL) and the City's LID requirements, the project was approved to divert the "first flush" to the sewer system. An underground storage system was designed to capture the water quality inflows detain the flow and release it at an approved flowrate allowable to be released to the sanitary sewer. Peak storm flows are routed to the existing storm drain system. Bioswales and raised planter areas were sited to prevent conflict with existing truck circulation patterns and facility operations. Drop inlet filters were proposed at all new inlets in order to reduce the total suspended solids, heavy metals and other debris from entering the storm drain system and being conveyed to the Los Angeles River. The proposed drainage design adheres to the City of Los Angeles' LID Ordinance and the City's Standard Urban Stormwater Management Plan (SUSMP) requirements. A SUSMP report was prepared to document compliance with the project requirements. Once the project is complete, the number of pollutant exceedances will be drastically reduced, thus improving downstream water quality.

Santa Ana River Interceptor Relocation Project, Orange County Flood Control District, 2013 –Project Engineer responsible for preparing the Water Quality Management Plan (WQMP). Tetra Tech was contracted to provide preliminary and final design services for relocation of 19,500 linear feet segment of 54-inch trunk interceptor, 6,000 linear feet of 15- and 18-inch sewer mains, flow metering station and the decommissioning of the existing trunk interceptor segment for Orange County Flood Control District. Project responsibilities included the preparation of the WQMP for the project in accordance with the Orange County and the Santa Ana Regional Water Quality Control Board's requirement. The WQMP was a necessary permitting tool to ensure that appropriate Low Impact Development (LID) and Best Management Practices (BMPs) were selected to prevent hydromodification of the watershed.

Kompogas Digester Plan, Hitachi Zosen Innova, San Luis Obispo, CA, Ongoing – Project Engineer responsible for providing project entitlement and final engineering design services for a 40,000 square foot building that served a new 850 kilowatt green waste digester. Preliminary engineering services were provided to obtain a Conditional Use Permit (CUP). These services included preliminary grading and drainage plans as well as preparing a detailed Storm Water Control Plan (SWCP). The SWCP ensured that the site complied with post construction storm water requirements by implementing LID Best Management Practices. Project services also included the preparation of detailed design plans for construction. Mr. Ziel is currently providing project support services for the construction phase of the project.