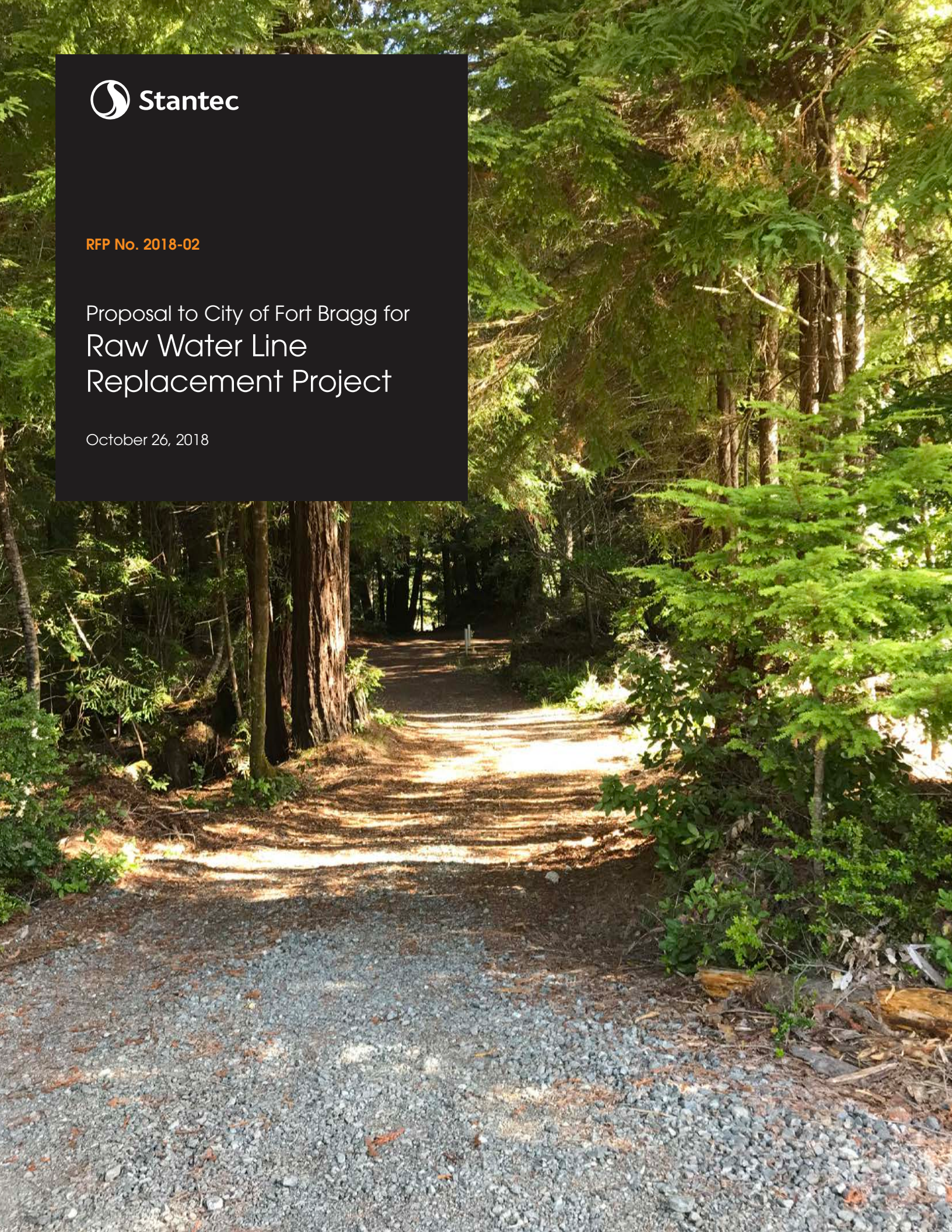




RFP No. 2018-02

Proposal to City of Fort Bragg for Raw Water Line Replacement Project

October 26, 2018





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Stantec Consulting Services Inc.
3875 Atherton Road, Rocklin, CA 95765-3716

October 26, 2018

City of Fort Bragg
Attn: June Lemos, CMC,
City Clerk
416 North Franklin Street
Fort Bragg, CA 95437
jlemos@fortbragg.com

Reference: Request for Proposals #2018-02, Raw Water Line Replacement Project

Dear Ms. Lemos,

The right partner for this project is a firm who provides comprehensive services for raw water transmission lines, knows your staff, your standards, and most importantly, your community. Stantec Consulting Services, Inc. (Stantec) has a highly qualified team of senior management and technical staff ready to help the City of Fort Bragg (City or Fort Bragg) secure raw water supplies from the best quality **sources** through pre-design and design services.

The raw water replacement project's success rests on a solid understanding of environmental conditions and community needs. We have years of experience designing pipelines for geologically active areas with potentially difficult access and riparian habitats. Our project manager, **Jigar Shah, PE**, and principal-in-charge, **Gabe Aronow, PE**, have provided a similar scope of services for both the City of Lincoln and Merced County.

Efficiency of this project builds on planning, researching the existing alignment, and permitting support. This project is a team effort, which is why our design experts will collaborate across disciplines to determine the most effective approach and definitive survey requirements, while integrating permitting and funding potential throughout the design process.

Our team is nationally recognized for trenchless design. In-house experts, **Erez Allouche, Ph.D., P.Eng.**, and **Anil Dean, PE, GE**, are two of the most prominent professionals in trenchless technology and condition assessment in the industry. We have completed more than 90 rehabilitation projects in the last 10 years, matching the right technology with the right situation, every time.

Financial responsibility is key to project success. We understand how challenging managing capital improvement projects with a limited budget can be. Not only will we work with you to find the right fit for conceptual designs and phasing components, we always design our projects to have positive benefit-to-cost ratios that consider future maintenance needs up front. If your project scope needs change, we will work closely with you to find the best way forward. We have secured \$300 million in funding over the past ten years for our public clients and will maintain full compliance with funding source requirements.

Why Stantec?

- **In-House Expertise.** Our team brings in-house expertise to all aspects of project planning and design.
- **Workable Solutions.** Putting concepts on paper is one thing, constructing and operating them is another. We will work closely with you to understand what you want. We put boots-on-the-ground project constraints, then design practical, well-considered solutions to provide reliable long-term function.
- **Responsiveness.** Our team is accustomed to coordinating multiple tasks simultaneously. Working closely with you, we will meet your project delivery goals. We have strengthened our team with **Andregg Psomas (Andregg)** to provide local support within minutes.

Should you have any questions, please reach out to Jigar Shah at (916) 773-8100 or jigar.shah@stantec.com.

Sincerely,

Stantec Consulting Services Inc.

Jigar Shah, PE
Project Manager

Gabe Aronow, PE
Principal-in-Charge



A.

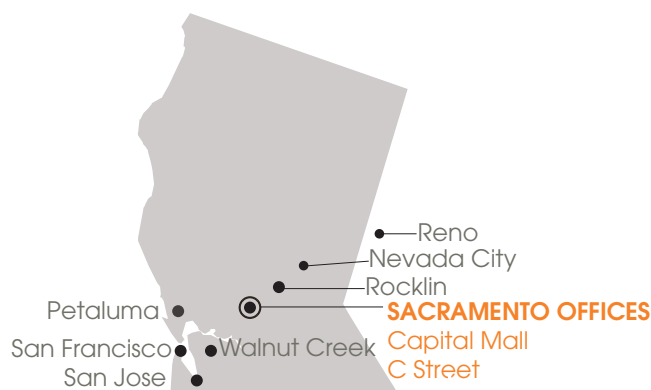
Firm Description

When you work with Stantec, you work with an award-winning team of more than 22,000 specialists in over 400 locations. Our work—professional consulting in engineering, design, surveying, planning, project management—begins at the intersection of community, creativity, and client relationships.

About Us

Stantec is a global industry leader in planning and design services for water related systems founded in 1954, and with the acquisition of MWH in 2016, we have more than 200 years of combined experience. The Stantec community unites approximately 22,000 employees working in over 400 locations across 6 continents. We collaborate across disciplines and industries to bring buildings, energy and resources, environmental services, water, and infrastructure projects to life. Our work begins at the intersection of community, creativity, and client relationships.

We have 28 offices throughout California to serve clients in both public and private sectors. Our local Sacramento offices house 220+ project planning and design professionals.



830+

In-house specialists in California

220+

In-house specialists in the Sacramento area

2,000+

Water resource specialists

With 28 offices in California and three in the Sacramento area, we have the depth of resources and availability to immediately support your IRP development.

Ranked No. 3 for Trenchless Technologies by Trenchless Technology Magazine in 2017.

The City will benefit from the Stantec Team by our:

- **Successful track record for providing quality deliverables and service on time and on budget.**
We hold ourselves to an exceptionally high standard of professional excellence. We have established effective quality assurance and quality control (QA/QC) protocols that are implemented on our projects. Through years of hands-on experience assisting our clients, our QA/QC protocols have been “battle tested” and proven effective. As an ISO 9001 certified company, our work is subject to third-party and regulatory reviews, and we consistently achieve approval and compliance.
- **Qualified, trusted, and reliable partner.**
We have the experience to help ensure your project comes in on time and on budget. We successfully deliver assignments at or below established services budgets. Our construction estimates are based on current unit costs from multiple sources and routinely match within 5-percent of construction bids. Our rate of services is included in Section F: Budget and Schedule of Charges. We hold the necessary qualifications and insurance for this contract.
- **Timeliness.**
We can help you plot out a realistic and cost-effective project plan. We understand the importance of timelines and quality; therefore, we will work closely with you to determine key project milestones and then adjust our schedule to meet those milestones.
- **Responsiveness.**
We understand time is sensitive and our services could be needed at many different project stages, including planning, design, and permitting. As we have shown, we will work with you until the process is complete.
- **Proven experience.**
Our team's project experience, as outlined in this response, provides a strong sample of projects where we have completed similar tasks and produced a quality product suited to individual needs. As demonstrated, our team has the expertise and experience to carry out the work required and continues to expand on this knowledge base through training, conferences, and research opportunities.



Relevant Experience

Our team has worked together on dozens of similar projects. The experience laid out below involves our proposed team members.

Relevant Experience

Experience Summary Table

Project Name	Client	Relevance
Gravity Supply Line Siphon Engineering Support Services	Amador Water Agency	Similar Pipe Diameter Similar Services Provided Environmental and Access Challenges
Sanitary Sewer Beach Inceptor Trenchless Improvements	South Coast Water District	CIPP Trenchless Technology Coastal Zone
City of Lincoln Gravity Sewers and Reclamation Project	City of Lincoln	SRF Funding Environmental Permitting and Compliance Finance and Engineering Services
Regional Water Supply Project	Nevada Irrigation District	Environmental Constraints and Permitting Strategy Environmental Permitting and Compliance Similar Pipeline Length
Mid-Western Placer Regional Sewer Project	City of Lincoln	Environmental Permitting and Compliance Funding Assistance CEQA Documents
Bear River Siphon Replacement Design	Nevada Irrigation District	Environmental Permitting and Compliance Steep Terrain Forestry Area
Pipeline 63 Reactivation	Confidential	Environmental Permitting and Compliance Geohazards Assessment HDD Design National Forest Land Multiple Pipe Failures
Humboldt Wind Project	Department of Homeland Security	Environmental Permitting and Compliance Complex Coastal Environment Timber Harvest Plan Biological Surveys



Gravity Supply Line Siphon Engineering Support Services

AMADOR COUNTY, CA

Relevance:

- ✓ Similar Pipe Diameter
- Similar Services Provided
- Environmental and Access Challenges

As part of the Central Amador Water Project, a new gravity supply line (GS) transports water from the Tiger Creek Forebay to the Buckhorn Water Treatment Plant.

The Amador Water Agency's (AWA) The AWA's 20-inch steel pipeline includes siphon and intake structures at the Tiger Creek Forebay site. Stantec provided civil, process, mechanical, instrumentation, and electrical engineering services. Our design included the following: siphon, main, vacuum and air compression systems, electrical system, controls/telemetry system, plumbing, backup generator, and heating/ventilating system. The vacuum pump, control panels, and backup generator are enclosed in a small block building.

Client: Amador Water Agency



Public
Agency

Sanitary Sewer Beach Inceptor Trenchless Improvements

LAGUNA BEACH, CA

Relevance:

- ✓ CIPP Trenchless Technology
- Coastal Zone

Stantec prepared construction plans and specifications for the design of the cured-in-place pipe (CIPP) improvements. The project included point repair of 15-inch VCP and 21-inch VCP. We also provided bid assistance and engineering support during construction.

To reduce infiltration, improve reliability and extend the useful service life of the sewer interceptor, in addition to repair of a partial structural collapse in the crown region of two pipe segments, the South Coast Water District proposed structural rehabilitation using trenchless technology. The sewer interceptor is routed parallel to the Pacific Ocean shoreline within the County of Orange's Aliso Beach Park. Stantec prepared a Preliminary Design Report that studied five pipe lining alternatives for rehabilitation of 3,073 linear feet of sanitary sewer interceptor ranging in size from 15 to 24-inches. Our analysis included reviewing the CCTV files, performing hydraulic calculations for the potential liners, performing hydraulic calculations during the construction by-pass condition, and analyzing sewer by-pass requirements. Flow monitoring was performed to determine average and peak existing flows that must be by-passed. After the alternatives were analyzed, cured-in-place pipe (CIPP) was recommended for installation.

Client: South Coast Water District

City of Lincoln Gravity Sewers and Reclamation Project

PLACER COUNTY, CA

Relevance:

- ✓ SRF Funding
- Environmental Permitting and Compliance
- Finance and Engineering Services

Stantec conducted baseline studies in the Auburn Ravine and Ingram Slough watersheds in western Lincoln for this project.

The City of Lincoln is planning to expand its wastewater effluent reclamation program. This requires construction of over 7,000 linear feet of new pipeline including deep gravity sewers. Stantec conducted baseline studies in the Auburn Ravine and Ingram Slough watersheds in western Lincoln for this project. In addition, we drafted an IS/MND for the recycled water project which involves work adjacent to both Auburn Ravine and Ingram Slough. Stantec prepared a biological assessment that has been submitted to NMFS addressing concerns that reclamation operations would reduce effluent discharges to Auburn Ravine and impact protected steelhead and salmon migratory habitat. Section 7 consultation has been initiated. Stantec will work with NMFS and the State Water Board, who will be funding the project, to ensure timely completion of that process. Stantec has also been working to address CDFG and Foothills Water Network protests of water rights petition filed by the City for the reclamation operation.

Client: City of Lincoln



Regional Water Supply Project

NEVADA COUNTY, CA

Relevance:

- ✓ Environmental Constraints and Permitting Strategy
- Environmental Permitting and Compliance
- Similar Pipeline Length

Stantec completed the environmental constraints and permitting strategy including the management, surveys and review for the cultural resource sensitivity analysis, historic and prehistoric resources surveys.

The Nevada Irrigation District (NID) Regional Water Supply Project is a collaborative water supply project involving the NID and the City of Lincoln. The project will ultimately supply treated water to portions of the NID service area located in Placer County. Stantec completed the environmental constraints and permitting strategy including the management, surveys and review for the cultural resource sensitivity analysis, historic and prehistoric resources surveys. Stantec archeologists surveyed a 17-mile water pipeline route in the Sierra Nevada Foothills from Combie Dam, along Combie Phase 1 Canal, Combie Ophir Canal to Lincoln. The surveys included a large proposed reservoir site and Regional Water Treatment Plant Site, as well as the crossing of numerous other NID canals. Stantec is now contracted to complete the CEQA EIR, including updated Cultural Resources Studies.

Client: Nevada Irrigation District



Mid-Western Placer Regional Sewer Project

PLACER COUNTY, CA

Relevance:

- ✓ Environmental Permitting and Compliance
- Funding Assistance
- CEQA Documents

This complicated, environmentally sensitive, and high-profile project was completed with an accelerated 12-month schedule to accommodate federal funding application requirements.

We have partnered with the City of Lincoln for over 20 years to make sure their infrastructure is well planned in a holistic manner that minimizes total costs to rate payers while maximizing water resources. Our initial work involved helping the City determine how to properly treat and dispose of their wastewater. We studied many options, and then designed a new \$61 million treatment and reclamation facility.

By looking at the watershed as a whole, we realized the new plant would eventually be part of a regionalized system encompassing much of northern Placer County. So, we designed a plant that was easy to expand and upgrade, and worked with two adjoining agencies to provide funding to oversize collection and treatment infrastructure.

Our foresight paid off in 2014. Two older plants in the area had to be expanded to meet regulatory requirements and population growth—an extremely costly effort. Instead, we decommissioned and demolished the SMD1 plant, upgraded the Lincoln plant, and added 15 miles of HDPE gravity pipeline and a new lift station with emergency storage basin.

Client: City of Lincoln



Bear River Siphon Replacement Design

NEVADA AND PLACER
COUNTIES, CA

Relevance:

- ✓ Environmental Permitting and Compliance
- Steep Terrain
- Forestry Area

The Bear River siphon included design of a 54-inch diameter inverted siphon replacement project for the Nevada Irrigation District. This project replaced a 45 year old 30-inch to 42-inch diameter siphon that traverses the Bear River Canyon.

The Bear River siphon included design of a 54-inch diameter inverted siphon replacement project for the Nevada Irrigation District. This project replaced a 45 year old 30-inch to 42-inch diameter siphon that traverses the Bear River Canyon. The reasons for this replacement project were threefold: 1) part of the original siphon was made of Techite, a brittle fiberglass material that fails catastrophically as it ages (and failures of this material installed elsewhere within the District around the same time period have occurred); 2) part of the siphon consist of an aerial bridge at the bottom of the canyon that was not designed to support inspectors or facilities needed to complete repairs, which has resulted in a lack of attention to the siphon since it was constructed 45 years ago, and 3) limited capacity. The new siphon provides additional capacity required to accommodate future needs. This project was complicated due to very severe site constraints, including 50% grade canyon slopes, unstable geology in some places, unimproved access roads, narrow easements between contentious neighbors and the need for a 200-foot free-span bridge over the Bear River at the bottom of the siphon. Further complications included the need to keep the system in service during construction of the replacement. Due to the complexities, a contractor was included on the design team to help ensure that the new design was constructible and well value engineered to accommodate the constraints.

Client: Nevada Irrigation District



Pipeline 63 Reactivation

ANGELES NATIONAL FOREST, CA

Relevance:

- ✓ Environmental Permitting and Compliance
- Geohazards Assessment
- HDD Design
- National Forest Land
- Multiple Pipe Failures

Our team helped get this pipeline running through the Angeles National Forest back in service.

A 14-inch diameter pipeline runs from San Joaquin Valley to Long Beach through the Angeles National Forest. The pipeline is located in the Transverse Range Geomorphic Province characterized by east-west trending mountain ranges. The surface topography of the general area is rugged with steep ridges and canyons.

Portions of the existing pipeline were taken out of service due to the risk of failure caused by the erosion of gullies and potential for landslides. Stantec was engaged to help with relocations and get the pipeline back in service.

This project consisted of an overland relocation and multiple HDD crossings. The first was a 2,150-foot long segment that encountered a thick sequence of sedimentary rock consisting of interbedded claystones, siltstones, and arkosic sandstones with variable properties. A second portion of the pipeline needed to cross beneath the Santa Clara River. This 2,000-foot crossing passed through a thick sequence of recent and older alluvial sediments.

We performed geotechnical investigations, including reconnaissance geologic mapping along and in the vicinity of the planned HDD profiles. Since detailed geologic maps were not available, we conducted reviews of aerial photos and LIDAR to interpret the geologic and geomorphic features. We also installed piezometers and inclinometers to support the Southgate HDD design.

Client: Confidential



Humboldt Wind Project

HUMBOLDT, CA

Relevance:

- ✓ Environmental Permitting and Compliance
- Complex Coastal Environment
- Timber Harvest Plan
- Biological Surveys

Our team provided environmental studies for 124 parcels of land crossed by this project zone.

The Humboldt Wind Energy Project is a wind energy generation facility that consists of up to 60 wind turbine generators and associated infrastructure with a nameplate generating capacity of 155 megawatts. In addition to the wind turbines and transformers, the project would include ancillary facilities such as temporary staging areas, access roads, 34.5 kilovolts collection lines, an operations and maintenance facility, a substation, utility switchyard modification, and a 115 kV generation transmission line (gen-tie).

The project is distributed over a maximum of 124 parcels and lands crossed by the project are zoned as Agriculture Exclusive and Timber Production Zone, except for limited intermittent segments of the gen-tie, and are currently used primarily for timber production. This required a Conditional Use Permit from Humboldt County.

Our team conducted environmental studies to collect additional site condition information which will be used to further refine the project layout, as appropriate, to avoid and minimize environmental impacts. Several elements of the project that posed challenges included the environmental permitting for this project, along with a complex coastal environment, necessity for a timber harvest plan, and extensive biological surveys, including owl studies.

Client: Department of Homeland Security



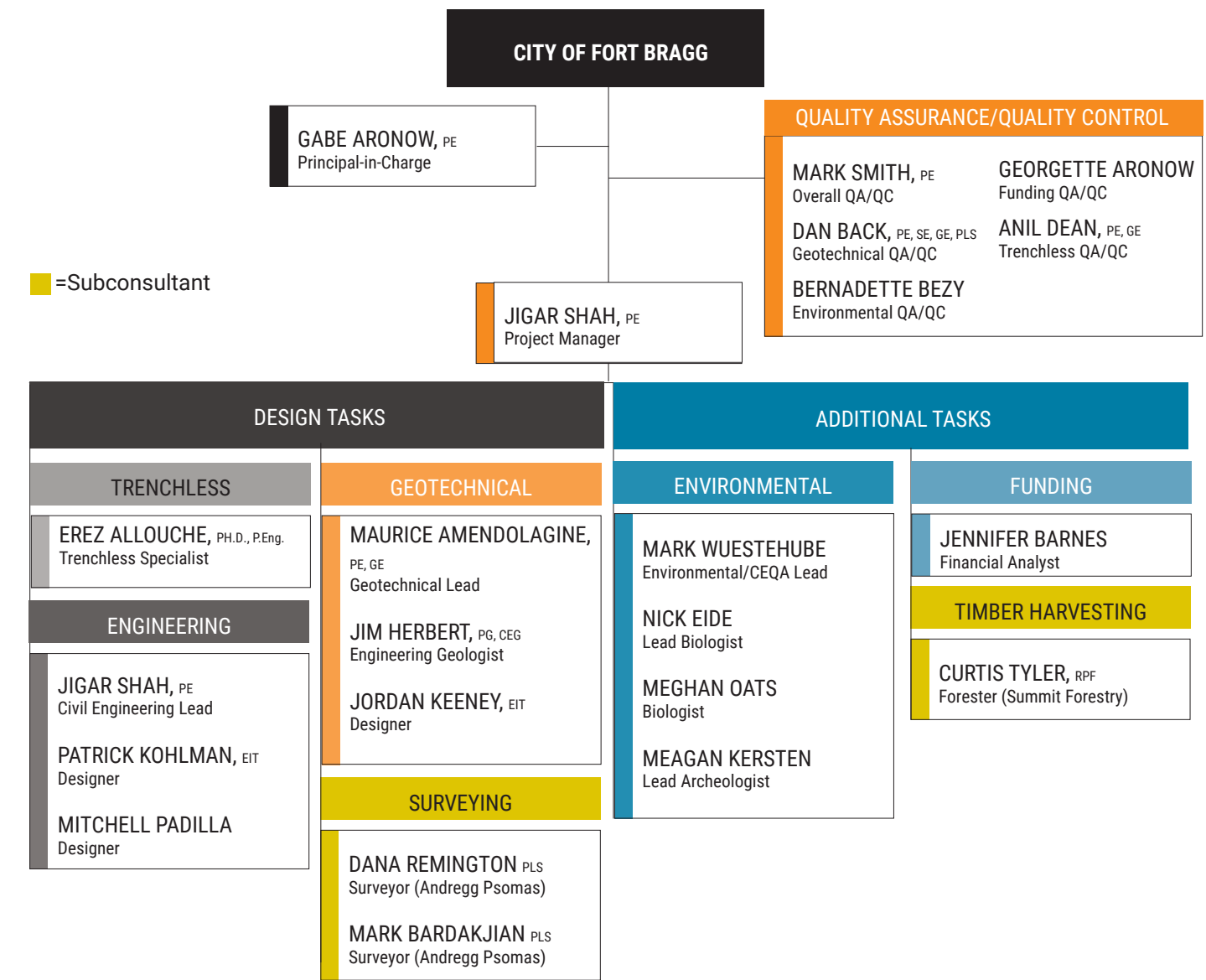
Key Personnel Qualifications

Engaging the right people is the cornerstone of any successful project. Our local team of industry leaders have the availability and experience working together to help ensure the successful completion of your projects.

Key Personnel Qualifications

Organizational Chart

The organizational chart below depicts our key personnel who will work on the project and their respective roles. While tasks are displayed separately for clarity, this team is accustomed to providing an interdisciplinary approach for project deliverables.



Synopsis of Relevant Experience

Project Leadership



Gabe Aronow PE
Principal-in-Charge

Education: MS, Environmental Engineering; BS, Civil Engineering
Registration: Professional Engineer CA #55307

Gabe has 20 years of experience focused on planning, engineering design, and project management of water and wastewater projects. He has led many significant wastewater treatment design efforts and has designed collection systems, including pump stations, force mains and gravity mains, raw sewage and effluent storage facilities, wastewater treatment plants and disposal, and reclamation facilities. His work has ranged from planning and permitting through design, construction, and operational support.

Project Experience:

- **Mid-Western Placer Regional Sewer Project, City of Lincoln, Lincoln, CA (Project Manager):** *Gabe decommissioned and demolished the SMD1 plant, upgraded the Lincoln plant, and added 15 miles of HDPE gravity pipeline and a new lift station with emergency storage basin.*
- **Gravity Sewers and Reclamation Project, City of Lincoln, Lincoln, CA (Project Manager/Technical Lead):** *Gabe managed the construction of more than 7,000 linear feet of new pipeline including deep gravity sewers.*



Jigar Shah PE
Project Manager/Civil Engineer Lead

Education: MS, Civil Engineering; BS, Civil Engineering
Registration: Professional Engineer CA #66080

Jigar has 20 years of experience managing various phases of planning, design, and construction management for new and existing wet utility infrastructure projects. His experience is primarily in rehabilitation and replacement projects, pipeline and pump station design, tank and reservoirs design, trenchless technology, and construction management. In addition, his experience includes master planning, project management, hydraulic analysis, permitting, planning and design, cost estimating, and bid documents. He also serves as a Resident Engineer for sewer, storm drain and water conveyance facility projects. Many of his projects have included significant trenchless technology components such as Horizontal Directional Drilling (HDD), Auger Bore and Jack (BJ), Pilot Tubing (PT), and Microtunneling (MTBM). Jigar has extensive background in sewer collection system and rehabilitation, construction inspection and review, pipeline design, and project management.

Project Experience:

- **Salt Marsh Recycled Water Pipeline, Sonoma County Water Agency, Sonoma, CA (Pipeline Engineer):** *Jigar helped design more than 8 miles of 18-inch to 24-inch diameter pipeline to provide recycled water to reduce salinity in and restore habitats in the Napa-Sonoma Marsh Wildlife Area and provide water to supplement local agricultural irrigation water supplies.*
- **Dry Creek Hwy 49 AC Trunk Sewer Pipe Rehabilitation Project, Placer County SMD 1, Auburn, CA (Project Engineer):** *Jigar prepared the sewer rehabilitation scope of work and evaluated construction method to fix the deteriorating condition of the existing 300 LF of 21-inch Asbestos Concrete pipe (ACP) sewer pipe.*
- **Lawrence Expressway Sanitary Sewer Rehabilitation CA and PDR, City of Sunnyvale, Sunnyvale, CA (Pipeline Engineer):** *Jigar provided engineering services for conducting condition assessment and prepared a preliminary design report.*



Mark Smith PE
Quality Assurance/Quality Control

Education: BS, Civil Engineering

Registration: Professional Engineer CA #44197

Mark specializes in wastewater and water facility design. He provides project management, design, cost estimating, and construction support for various potable water, wastewater, and other public infrastructure systems throughout California. His project experience includes rehabilitating pipelines, water transmission mains, distribution systems, wells, booster and storage facilities, water station facilities, and design and bid of water treatment plants. Throughout his 25+ year career, he has developed an invaluable perspective relative to not only planning new systems but also successfully moving projects forward from the conceptual stage through to the completion of construction.

Project Experience:

- **Tesla Water Treatment Facility (320 MGD), San Francisco, California (Local Design Manager):** *Mark served as the local design manager for design and construction support services of the 320 MGD Tesla Water Treatment Facility (\$125 mil.-Design/Build delivery).*
- **Metro Air Park Tank & Booster Pump Station & Water Mains, Sacramento, California (Project Manager/Engineer):** *Mark was responsible for the design of a 2.5-MG potable storage reservoir and ultimate 12,800 GPM booster pump station. This is the primary storage/pumping facility serves the Metro Air Park development.*



Dan Back PE, SE, GE, PLS
Geotechnical QA/QC

Education: MS, Civil Engineering; BS, Civil Engineering

Registrations: Professional Engineer CA # 36102; Structural Engineer CA # 3087; Geotechnical Engineer CA GE#3087; Professional Land Surveyor KY # 3413

Dan is a structural/geotechnical engineer responsible for the analysis and design of a variety of large civil engineering projects. He has more than 25 years of involvement specifically with dams, hydraulic and waterfront Structures projects, his experience covers more than 50 dams with scopes which varied from onsite evaluations and risk assessments, to complete design and construction of large structures. His project experience typically includes evaluation, concept development, system selection, detailed design, specifications, contract bidding support and field inspection during construction.

Project Experience:

- **Salt River Project, Horse Mesa Dam Pump Storage Unit Intake Structure Repairs, Maricopa County, AZ (Senior Structural Engineer):** *Dan served on the team of senior dam engineers developing a timely and cost effective solution after the partial collapse of the 40-year old upper intake structure forced the idling of the pump storage unit, a key element of the SRP Phoenix area electric power balance.*
- **Kings Bay Naval Submarine Base Routine Waterfront Facility Inspection and Assessment and Refit Wharf 3 Repair Designs, Naval Facilities Engineering Service Center Kings Bay, GA (Structural Engineer):** *Dan served as the structural engineer for this project which included under/above water inspections and assessments for the base's 15 facilities. Led the design of a \$10 million dollar repair and corrosion protection system for Refit Wharf No. 3.*
- **Hydrographic Survey, Pier Analysis and Alternative Evaluation, Louisville District, Morehead City, NC (Project Manager):** *Dan oversaw the structural evaluation of waterfront structures and conceptual design of alternatives to complete the Morehead City facility renovation.*



Bernadette Bezy
Environmental QA/QC

Education: MS, Biology; BS Environmental Science; BS Aquatic Biology and Environmental Science

Bernadette is an environmental project manager and senior biologist with more than 20 years of project management, fieldsurvey, environmental compliance, and permitting experience. Bernadette conducts planning and permitting efforts on a wide array of large- and small-scale infrastructure (alternative energy, water and wastewater, linear transportation, communication, pipeline) and conservation (research, restoration, reintroduction, and conservation) projects. She is well versed in National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), "CEQA Plus" State Revolving Fund, US Department of Agriculture (USDA) Federal Cross-Cutting processes and Federal Energy Regulatory Commission (FERC) filings in California and throughout the Western US. On the federal level, she is experienced in Clean Water Act (CWA) 401 and 404, Federal Endangered Species Act Section 7 and 10 permitting. For example, Bernadette has experience in securing more than 300 stream crossing permits from the US Army Corps of Engineers (USACE) and California Department of Fish and Wildlife (CDFW). Bernadette regularly and successfully conducts consultations and secures permits with the US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Environmental Protection Agency (EPA), Water Quality Control Boards, California Coastal Commission (CCC), and local governments. Her forte is building consensus around client solutions that save public funds, comply with regulations, and are good for the environment.

Project Experience:

- **Regional Water Pipeline Constraints Analysis, Nevada County Irrigation District, Placer County, California (Environmental Project Manager, Biologist and GIS-Specialist):** *Bernadette developed GIS-based permit streamlining analysis to aid engineers in designing to avoid/minimize water pipeline impacts. She improved design elements. 17 mile pipeline.*
- **Nevada County Irrigation District, Regional Water Treatment Plant, Reservoir and Pipeline Project EIR and Permitting, Placer County, CA (Environmental Compliance Specialist and Project Aquatic Biologist):** *Bernadette is currently managing the planning and CEQA compliance portions of the project.*
- **Combie Phase I Canal Rehabilitation Project, Nevada Irrigation District, Multiple Sites, CA (Project Manager):** *Bernadette is conducting baseline studies and drafting CEQA document for a canal rehabilitation project along the Bear River. 5 mile pipeline.*
- **Wastewater Treatment Plant, Supplemental Environmental Program, Surface Water Ambient Monitoring Program (SWAMP) Implementation, City of Lincoln, Lincoln, CA (Project Manager and Aquatic Biologist):** *Implemented long term bioassessment monitoring program in Auburn Ravine using the State Board's SWAMP protocol.*



Georgette Aronow
Funding QA/QC

Education: MA, Public Policy; BA, Government

With more than 20 years of experience, Georgette has a broad background in public finance, specifically with public water infrastructure and operations funding. She specializes in utility financing studies and funding mechanisms, such as the Proposition 218 rate study analyses and implementation, as well as financial assistance in the form of state and federal grants and low-interest loans. Georgette excels at creating customized funding and financing models and rate studies to meet the unique needs of each project and client. She is also experienced in revenue bond issuance, assessing district formation, establishing public entity credit ratings, urban economics, and land use planning.

Project Experience:

- **Financial and SRF Loan Assistance, City of Lincoln, Lincoln, CA (Finance Consultant):** *Georgette is assisting the City of Lincoln in applying for an SRF loan to fund a \$45M project to upgrade the Wastewater Treatment and Reclamation Facility (WWTRF) to keep up with the demands on the wastewater system because of population growth.*
- **Financial and SRF Small Community Grant Assistance, City of Grass Valley, Grass Valley, CA (Funding Consultant):** *Georgette aided the City of Grass Valley in applying for funding assistance for its water and sewer utilities. With Georgette's assistance, the City will receive approximately \$10M in grant funding.*



Anil Dean PE, GE
Trenchless QA/QC

Education: MS, Civil and Environmental Engineering (Geotechnical Engineering); MBA, Business Administration; BS, Civil Engineering
Registration: Professional Engineer CA #C58887; Geotechnical Engineer CA #G2693

With more than 20 years of experience, Anil has held a number of leadership positions within the underground industry, including tunnel, geotechnical, civil, and environmental engineering; construction management; project management; and tunnel design management. His expertise includes large diameter tunnels, microtunneling, and trenchless design. He has experience on projects involving water and wastewater conveyance, light and heavy rail, pressurized natural gas pipelines and other utilities, hydroelectric tunnels, and inspection and rehabilitation of existing tunnels. His trenchless expertise includes HDD, auger boring, and pipe jacking. Anil also has significant experience with the management of ISO 9001 compliant quality management systems.

Project Experience:

- **On Call Geotechnical Services for Trenchless Construction Methods, City of Santa Cruz Water Department, Santa Cruz, CA (Project Manager):** *The initial task order included geotechnical investigation, analysis, and reports related to construction of 3.5 miles of pipeline, generally 24 inches in diameter, for raw water supply to be installed using both conventional and trenchless methods.*
- **Sanchez Avenue Area Sanitary Sewer Rehabilitation, City of Burlingame, Burlingame, CA (Tunnel Design Manager):** *Anil managed trenchless design study and Caltrans permitting process.*
- **Fort Kamehameha Wastewater Treatment Plant Outfall Replacement, US Navy, Pearl Harbor, HI (Project Engineer):** *Anil evaluated construction feasibility of various trenchless methods and compared trenchless design options with traditional installation methods.*



Erez Allouche Ph.D., P.Eng.
Trenchless Specialist

Education: Ph.D., Construction Engineering; MS, Structural Engineering; BS, Civil Engineering
Registration: P.Eng. Canada

Erez is Stantec's pipeline condition assessment and trenchless expert. His work focuses on the development of new condition assessment technologies and design and analysis models for underground construction using trenchless methods. He specializes in the design of complex HDD crossings, evaluating the soil/structure/liner interaction, and design of unique rehabilitation solutions to pressure pipes (AC, DI, CI, RCP) and large diameter gravity pipes. He is familiar with nearly 60 different rehabilitation systems, and has design experience with 18 such methods. Prior to joining Stantec, Erez was an associate professor of Civil Engineering at Louisiana Tech University and the director of the Trenchless Technology Center. He has won and managed 117 research projects in the area of buried infrastructure, including investigation of failure mechanisms of ductile iron pipes on the behalf of AWWA. He is also the inventor or co-inventor of 17 trenchless technologies patents and the author (and co-author) of more than 200 publications in the areas of buried infrastructure management and pipeline installation using trenchless techniques, including 62 peer-reviewed journal papers (academic and trade publications). Erez is a board member of the North American Society for Trenchless Technology, Associate Editor of the ASCE Journal of Pipeline Systems, and has served as a reviewer for numerous technical journals, technical conferences, and grant awarding agencies.

Project Experience:

- **Water Distribution System Condition Assessment of Lawrence-Livermore National Laboratory, Lawrence-Livermore National Laboratory, Livermore, CA (Senior Professional):** *Erez performed condition assessment of more than 17 miles of AC pipes (4 inch to 10 inch) in Site 200 and Site 300, utilizing a comprehensive multi-attribute desk study, and targeted NDT and intrusive testing. This project included the design of a localized collection system for blowdown water used in the cooling towers and conveyance of the collected water to an area-specific treatment facility prior to discharge. This project provided an effective and efficient collection and treatment system that was subsequently permitted by the Regional Water Quality Control Board.*
- **Kenilworth Transmission Watermain Renewal, City of Hamilton, Hamilton, Ontario (Senior Professional):** *Erez performed condition assessment and developed a rehabilitation plan for Kenilworth water main, 1,050mm steel main constructed in the 1960s. The section inspected consists of a 250 meter horizontal section and a 48 meter vertical section, which are housed in a concrete tunnel. Design of rehabilitation work currently underway.*

Additional Key Personnel



Patrick Kohlman EIT
Engineer

Education: BS, Environmental Engineering

Registration: Engineer-in-Training CA #156854

Patrick has experience in various fields including WTP/WWTP design, irrigation system modernization, pipeline condition assessment and rehabilitation, urban water management plans, water supply assessments, and field sampling. Prior to joining Stantec, Patrick completed an internship with the City of Roseville for their Dry Creek Wastewater Treatment Plan nitrogen study.

Project Experience:

- **LLNL Site 200 and Site 300 Master Plan, Lawrence Livermore National Laboratory, Livermore, CA (Engineering Support):** *Patrick helped with the condition assessment of the existing water distribution system infrastructure as well as the feasibility/cost evaluation of various pipeline rehabilitation methods.*
- **Water Supply Assessment, City of McFarland, McFarland, CA (Engineering Support):** *Patrick assisted with a Water Supply Assessment which enabled the City to evaluate the feasibility of constructing over 2,000 acres of urban development.*



Mitchell Padilla
Engineer

Education: BS, Chemical Engineering

Mitchell is an engineer in training with experience in water/wastewater treatment, reuse and sustainability. He has designed new tertiary filtration and disinfection facilities for Reno-Stead Water Reclamation Facility, written a full Operations and Maintenance manual for the Town of Discovery Bay, developed and executed action plans to monitor ammonia in process wastewater for BioMarin Pharmaceutical Inc., edited drawing sets, reviewed vendor submittals, and presented the water sustainability efforts of strategically chosen companies.

Project Experience:

- **Oroville Spillway Reconstruction Project, California Department of Water Resources, Oroville, CA (Project Engineer):** *Mitchell assisted the California Department of Water Resources' (DWR) engineering team working on the reconstruction Oroville Spillway.*
- **P2426 & Devil Canyon FERC Relicensing Project, California Department of Water Resources, Sacramento, CA (Engineer Intern):** *Mitchell helped draft and edit the Pre-Application Document submitted to FERC for the Relicensing of P2426 and Devil Canyon in Southern California.*



Maurice Amendolagine PE, GE
Geotechnical Lead

Education: MS, Geotechnical Engineering; BS, Geological Engineering

Registration: Professional Engineer CA #62962; Geotechnical Engineer CA #2746

Maurice has more than 28 years of experience in geotechnical engineering and consulting. His professional experience has included a variety of infrastructure, commercial, residential mining and military projects for public and private sectors, including pipelines, bridges, pavement and roadways, industrial facilities, low to mid-rise buildings, residential developments, schools, tailings and water retention dams, lined and unlined canals, landfills, quarries, and airports. He has a broad range of technical skills in the geotechnical field with extensive experience in the areas of foundation and geotechnical earthquake engineering and slope stability evaluation.

Project Experience:

- **San Vicente Dam Bypass Pipeline, San Diego County Water Authority, Lakeside, CA (Project Engineer):** *Maurice helped design this 1,500-foot long, 5-foot diameter water pipeline adjacent to the recently raised San Vicente Dam Reservoir.*
- **Long Beach Municipal Urban Storm Water Treatment Conveyance Pipeline Project, City of Long Beach, Long Beach, CA (Project Manager):** *Maurice provided the geotechnical investigation and recommendations for a new 3-mile long, shallow 12-inch diameter storm-water pipeline.*
- **Imperial Avenue Sewer Replacement, Imperial County, Imperial County, CA (Project Engineer):** *Geotechnical investigation for 1.8 miles of sewer replacement below Imperial Avenue.*



Jim Herbert PG, CEG
Engineering Geologist

Education: BS, Geological Sciences

Registration: Professional Geologist CA #5213 CA; Certified Engineering Geologist CA #1657

Jim has extensive experience in the engineering geology, geotechnical, hazardous waste assessment, and associated construction fields. He manages quality control programs for significant hillside and flatland earthwork developments, rock excavations, contaminated soil and groundwater assessments, dam instrumentation, and both rock and soil slope stabilizations. Jim is also adept at evaluating existing site conditions with respect to historical design plans, construction specifications, and as-built construction records, geotechnical documentation, geological maps and literature, and aerial imagery to develop comprehensive models of subsurface conditions in support of site rehabilitation and forensic investigations. His early career included a valuable stint as a soils lab technician. During the course of his career, he has provided detailed plans for investigations into landslides and soil creep, rock slope stability, embankment settlements, bridge and dam foundations, aggregate resources, structural distress, and groundwater flow/contaminant transport.

Project Experience:

- **East-West Conveyance Project - Phase 1 Design and Environmental, City of Patterson, Patterson, CA (Engineering Geologist):** *Jim provided scoping and investigation costing, subsurface investigation work plan preparation and implementation for development of Geotechnical Data Report (GDR) and design parameter technical memorandum for 3.3-mile long canal modernization project.*
- **Recovery and Storage Project, Cadiz Valley Water Conservation, Cadiz Valley, CA (Engineering Geologist):** *Jim developed the geological and geotechnical investigations in support of preliminary, planning-level designs for the estimated 60-inch diameter pipe to be installed in a 15-foot deep, cut-and-cover trench.*



Jordan Keeney EIT
Engineer

Education: MS, Civil Engineering; BS, Civil Engineering

Registration: Engineer-in-Training KT # 14948

Jordan specializes in geotechnical engineering services including slope stability analysis, foundation engineering, geotechnical explorations, earth dam assessments, material parameter development, and data analysis and reporting.

Project Experience:

- Normandy Toe Drain Replacement, Tennessee Valley Authority (TVA), Bedford and Coffee Counties, TN (Project Engineer): *Completed material assessment and reporting for the replacement of a toe drain system.*

- Levee Local Protection Projects (LPP), City of Pineville and City of Harlan, Pineville and Harlan, KY (Project Engineer): *Jordan provided comprehensive and investigative slope stability analyses and reporting of multiple levee systems in Eastern Kentucky.*
- KAWC Owenton and Deer Lake Dams, Kentucky American Water Company, Owenton and Scott Counties, KY (Project Engineer): *Jordan provided comprehensive slope stability and seepage evaluation of earthen structures.*



Mark Wuestehube
Environmental/CEQA Lead

Education: BS, Wildlife Management; AS, Geology

Registration: Certified Wildlife Biologist

With 19 years of experience, Mark manages biological and other environmental investigations, prepares CEQA and NEPA documentation, assists in identification of environmental constraints and integrates impact avoidance into project design, regulatory compliance and permitting, and mitigation and restoration efforts. He also assists clients in developing project plans and alternatives, conducting field investigations, communication with regulatory agencies, providing guidance on difficult technical and regulatory issues, and helps ensure delivery within budgetary and time constraints.

Project Experience:

- Line 123 Pipeline Replacement Project: Wetland Delineation/Permitting Support/Construction Monitoring, Pacific Gas and Electric, Placer County, CA (Biological Support): *Mark managed biological and regulatory support, preconstruction surveys, construction monitoring, and restoration monitoring for replacement of the Line 123 pipeline in Placer County.*



Nick Eide
Lead Biologist

Education: BS, Biology

Registration: ISA Certified Arborist #WE-9153A

Nick provides project management, biological resources, and regulatory compliance services. He has considerable experience in biological resources documentation such as preparing technical reports/documents (e.g., ESA biological assessments, wetland delineations, biological resource assessments, habitat evaluations), CEQA and NEPA document sections, and regulatory permitting packages. He also frequently performs surveys for special-status wildlife species, habitat suitability surveys for special-status species, wetland delineations, and arborist surveys. Nick has experience providing and managing deliverables for on-call projects for municipalities, agencies, utilities, and developers.

Project Experience:

- **Urban and Non-Urban Levee Investigations and Monitoring, California Department of Water Resources, Merced, San Joaquin, Stanislaus, Fresno, and Madera Counties, CA (GIS Support):** *GIS support to cultural and biological resources staff investigating levee sites throughout California.*
- **Geotechnical Levee Investigations, California Department of Water Resources, Multiple Counties, California (Assistant Project Manager/Biologist):** *Provided nesting bird surveys, habitat assessments for state and federally listed species, and species identification on over 80 miles of levees.*



Meghan Oats
Biologist

Education: BS, Environmental Science and Management

Meghan is a biologist/environmental scientist with four years of experience in biological resources, natural resource management, environmental education, and scientific research. In her years previous to those at Stantec, Meghan managed nature preserves, riparian and wetland areas, and oak woodlands throughout 14 California State Parks in the central valley and southern Cascade Range. The management of these State Parks included noxious weed surveys, vegetation mapping and monitoring in woodland, wetland, and forested areas, sensitive species surveys and assessments (both plant and wildlife), monitoring of non-native and invasive species (plant), trail restoration, GIS/GPS mapping, data analysis, and environmental compliance. With Stantec, Meghan has completed data analysis, assisted in the preparation of California environmental permit applications, and has written multiple CEQA documents and biological assessments/evaluations for various projects. Additionally, she conducts environmental compliance monitoring and has conducted a variety studies and surveys in many regions throughout California including the Sierra Nevada Foothills, as well as the Central Valley, Northern and Southern California.

Project Experience:

- **Midwestern Placer Regional Sewer Project – Monitoring Compliance, Nevada Irrigation District, Placer County, CA (Botanist):** *Meghan conducted a complete vegetation assessment for the restoration and revegetation of the project area. She completed the monitoring reports in compliance with project's mitigation measures and permit stipulations.*
- **Combie Phase 1 Canal and Bear River Siphon Replacement Project, Nevada Irrigation District, Placer County, California (Biologist):** *Meghan conducted a biological assessment and delineation of environmentally sensitive areas. She assisted in preparation and submission of CDFW SAA 1600, RWQCB 401, and USACE 404 permits.*
- **Devil Canyon Project, FERC Project No. 14797, Botanical Study, San Bernardino County, California (Botanist):** *Meghan conducted protocol-level special-status plant and non-native invasive plant surveys within the Project area of Silverwood Lake.*



Meagan Kersten
Lead Archeologist

Education: MA, Anthropology; BA Anthropology; AA, Liberal Arts

Meagan is an archaeologist and environmental compliance specialist with more than nine years of experience in cultural resources management and environmental compliance. She has served as both a project manager and task manager on numerous large- and small-scale infrastructure projects requiring CEQA, NEPA, environmental permitting (recreation, water, wastewater, transportation, mining, pipeline, alternative energy, and oil & gas). Meagan works regularly with local, state, and federal agencies and Native Americans to facilitate environmental compliance and has project experience throughout California. She prepares and supervises technical documents and provides quality control and peer review for cultural resources studies and CEQA documents in compliance with local, state, and federal laws and regulations. Meagan has extensive experience conducting archaeological surveys and excavations, cultural resource records searches, Native American outreach and coordination, cultural resource construction monitoring, National Historic Preservation Act Section 106 compliant reports, CEQA and NEPA Cultural Resources sections/studies. Meagan specializes in bioarchaeological studies involving human skeletal remains analysis and she meets the Secretary of the Interior's standards and guidelines for a professional archaeologist.

Project Experience:

- **City of Lincoln, Midwestern Placer Regional Sewer Project, Placer County, CA (Project Archaeologist):** *Meagan completed three weeks of archaeological field surveys for over 30 miles of proposed and alternative sewer pipelines and surveyed three existing wastewater treatment plants. Also completed a cultural resource records search, Native American outreach, including two field meetings with Native American representatives, and worked with local tribes to involve them in cultural resource monitoring during construction. Assisted with the cultural resource evaluation process. She reviewed a NHPA Section 106 compliant report prior to submittal to SHPO and drafted the letter to SHPO on behalf of SRF. Meagan successfully obtained SHPO concurrence on cultural resource findings for the project.*
- **City of Grass Valley Water Distribution System Pipeline Repair and Replacement Project, Nevada County, CA (Project Archaeologist):** *Meagan was the project archaeologist and completed a cultural resource review in support of SRF federal funding for the project.*



Jennifer Barnes
Financial Analyst

Education: BS, Business Administration

For the last 5 years Jennifer has been assisting California Water Agencies and Special Districts to secure project financing through the State Water Board administered State Revolving Fund, including small community planning and construction grants. She has assisted Agencies with assessments of their enterprise fund expenses and revenues, provided analysis of system rates/charges and supported applications for financial assistance for disadvantaged communities throughout the western United States. Recently, this has included assistance to the Cities of Woodlake, Newman, and Grass Valley, as well as the San Andreas Sanitary District, the Amador Water Agency, Valley Springs PUD and the County of Madera. With a background in project finance, Jennifer's can-do approach has been applied to various projects including wastewater facilities, public schools, and the UC Davis Medical Center. Her attention to detail along with regular reviews of project scope, budget, and contracts has helped keep numerous projects on budget. Jennifer has over ten years of experience helping Clients navigate State finance agencies; tracking financial and regulatory requirements from project start to completion.

Project Experience:

- **Midwestern Placer Regional Sewer Project, City of Lincoln, Lincoln, CA (Project Manager Assistant):** *Jennifer facilitates a fast track environmental compliance process required to secure \$83 million dollars for a regional sewerline and wastewater treatment plant upgrade project connecting several communities in Placer County.*
- **Wastewater Master Planning and I/I Construction Project, City of Grass Valley, Grass Valley, CA (Funding Coordinator):** *Jennifer recently managed the preparation and submittal of an Infiltration and Inflow Project Financial Assistance Construction Packages for approximately \$4 million in grant assistance.*
- **Fairmead Septic to Sewer Project MD-33, G Aronow Consulting, County of Madera, CA (Funding Coordinator):** *Jennifer is assisting MD 33 to help ensure they receive \$8 million dollars of principle forgiveness from the State Water Board through the small communities grant program.*



Dana Remington PLS *Surveyor (Andregg Psomas)*

Education: BA, Degree

Registration: Professional Land Surveyor CA #8448

Dana has more than 25 years of surveying and mapping experience with Andregg Psomas. He has performed and supervised cadastral, control, topographic and construction surveys for numerous public and private projects. Dana has worked on numerous GPS projects and is responsible for processing and adjusting data from GPS, digital level and conventional surveys. His proficiency with software from AutoCAD, Trimble and StarNet is used in preparing topographic maps, final maps and reports. He also leads projects using resource grade GPS (Trimble Pro XRS) and hydrographic surveys with GPS, Knudsen Echo Sounder, and HydroLite Echo Sounder.

Project Experience:

- **Auburn Dam Site Channel Restoration, Placer County Water Agency, American River, Placer County, CA (Project Manager):** *This restoration project that included control, photogrammetric, bathymetric, topographic hydrographic, volumetric and construction surveys for the design of a pumping station and restoration of the American River channel at the Auburn Dam site.*
- **Brunswick Road Pipeline Project Nevada County, Nevada Irrigation District (NID), Grass Valley, CA (Project Manager):** *Dana is providing surveying and mapping services for this project of approximately 8,000 ft of pipeline.*



Mark Bardakjian PLS *Surveyor (Andregg Psomas)*

Education: BS, Surveying and Photogrammetry

Registration: Professional Land Surveyor CA #4567

Mark has more than 38 years of experience in land and geodetic surveying and is responsible for all field operations and Global Positioning System (GPS) operations for ANDREGG PSOMAS. He serves as Vice President and Senior Project Manager. He has performed and supervised cadastral, control, topographic and construction surveys for numerous public and private projects. Mr. Bardakjian's experience includes GPS and satellite surveys, conventional first order geodetic surveys and complete network adjustments and analysis, hydrographic, FEMA, USACE, Caltrans, DoD, U.S. Forest Service surveys.

Project Experience:

- **Brunswick Road Pipeline Project Nevada County, Nevada Irrigation District (NID), Grass Valley, CA (Senior Project Manager):** *Mark provides surveying and mapping services for this project of approximately 8,000 ft of pipeline. Services include topographic mapping, photogrammetry, locate boundary and easement lines, legal descriptions and exhibit plats.*
- **Meadow Vista Water District WTP Site Improvements, Placer County, CA (Principal-in-Charge):** *Mark performed field and office work to set and control aerial targets, obtain aerial photography and a topographic map for design at a scale of 1"=20 ft with 1 foot contours.*



Curtis Tyler RPF
Lead Forester (Summit Forestry)

Education: BS, Forest Research Management

Registration: Registered Professional Forester CA #2990

Curtis has more than 22 years of experience leading all aspects of timber harvest plans as well as providing GIS mapping, archaeology, and aerial photography. Curtis also provided botanical and wildlife surveys along with fixed plot mapping for California Department of Forestry contracts.

He has experience creating mapping products that meet the US Army Corps of Engineers specifications for development, remediation and assessment. Additionally, he assists in the planning and utilization of resources for local native american tribes through digitized data and aerial photography.

Project Experience:

- **Archeological Commitssion of County of Mendocino, Mendocino County, CA (Commissioner):** *Curtis reviews coastal development permits, parcel splits, and other projects for potential historical and prehistoric archaeological impacts.*
- **GIS Services, County of Mendocino, Ukiah, CA (GIS Technician):** *Curtis educates county staff on GIS procedures and also prepares GIS maps and data.*



D.

References

The measure of our success is best described directly by our clients, who can attest to our ability to consistently meet our time commitments. We encourage you to contact the references outlined below to discuss how our practical, experienced approach will benefit your project.

References

Client	Contact	Relevant Project Experience
City of Lincoln	Ray Leftwich, City Engineer P: (916) 434-2457	▪ City of Lincoln Gravity Sewers and Reclamation Project ▪ Mid-Western Placer Regional Sewer Project
Nevada Irrigation District	Doug Roderick, Engineer P: (530) 273-6185	▪ Regional Water Supply Project ▪ Bear River Siphon Replacement Design
Amador Water Agency	Gene Mancebo, General Manager P: (209) 257-5245	▪ Gravity Supply Line Siphon Engineering Support Services

What Our Clients Say

“Thanks for everyone’s hard work and attention to the natural resources issues!”

-Carol Oz, Staff Environmental Scientist,
California Department of Fish and Wildlife

“The Stantec CEQA Compliance team worked ... to ensure that the project, when implemented, will comply with CEQA and will save money for mitigation by reducing possible project impacts. ”

-Tom Tim McCall, McCall Engineering

“Stantec provided excellent coordination between engineering needs and environmental compliance, solid knowledge of foothill ecology, respected agency relationships, integrity, water quality expertise, and quality permitting, environmental compliance, and engineering work.”

-Gary S. Ghio President, Weber, Ghio and Associates, Inc

“I have to add that Donner Summit Public Utility District did the right thing in selecting Stantec as its consulting engineers. Good job everyone!!!!”

- Tom Skjelstad, District Manager, Donner Summit Public Utilities

“Stantec’s CEQA Team’s tough, honest no nonsense input to the engineers..... is extremely value added because minor project adjustments haveand reduced or eliminated costly mitigation measures”

-Steve Schimp, District Manager, San Andreas Sanitary District

“The CEQA team at Stantec is highly qualified professionals who genuinely seek input from stakeholders and—in our experience on Donner Summit– have fashioned a Wastewater Treatment Plant design that will lead to a great improvement in the plant discharge into the South Yuba River.”

-Jason Rainy, Executive Director, South Yuba Citizens League



Scope of Work

We understand the potential challenges your project presents and their viable, cost-effective solutions. Through our analysis of city-provided data and experience on projects of a similar size and nature, we have outlined both our approach to the project as well as a potential preliminary design report.

1. Project Understanding

City Infrastructure and Priorities

The City of Fort Bragg (City or Fort Bragg) owns, operates, and maintains approximately 2,900 water meter connections and 30 miles of distribution pipeline and its appurtenances. The City has treated water storage capacity of 3.3 million gallons (MG) and a water treatment plant with a daily capacity of 2.2 MG. Summer demand peaks at 1.2 to 1.4 MGD while in winter, the demand drops to 0.5 to 0.8 MGD. Fort Bragg's top priorities are:

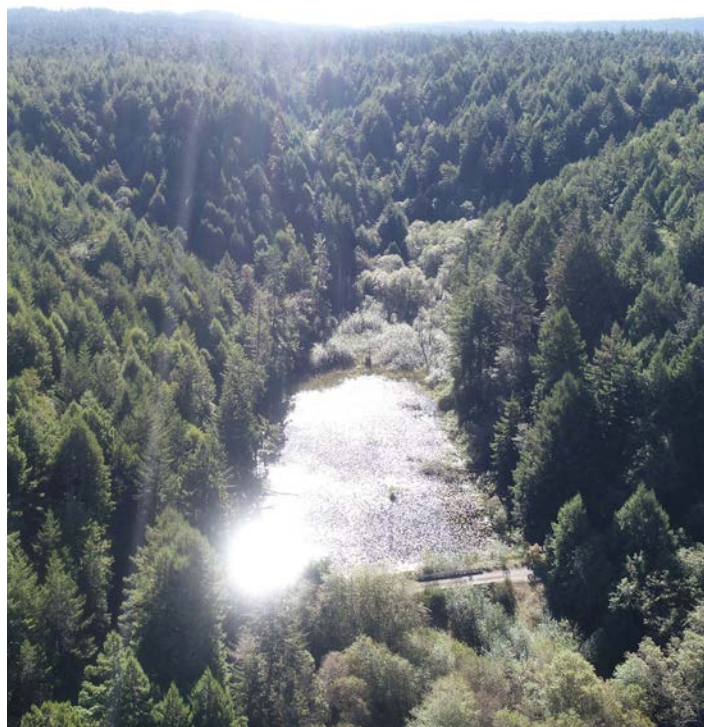
- Achieve back-up for critical parts for its distribution system
- Increase storage capacity to help ensure an adequate water supply under drought conditions
- Maintain approximately 260 Fire Hydrants throughout the city
- Improve aging infrastructure

Fort Bragg's water comes from the following three sources:

- Noyo River
- Newman Gulch
- Waterfall Gulch

The quality of the water source and permit restrictions govern when and how much water may be drawn from each location. Water from Newman Gulch is shut off during wet weather conditions when it is affected by naturally occurring tannins that leach from forested land. Alternatively, water intake from Waterfall Gulch is available throughout the year. During the California drought years (2012 to 2015), the water supply from Newman Gulch and Waterfall Gulch declined significantly. Recently, the City has constructed the Summers Lane Reservoir providing 45 acre-feet, or upwards of two months, of storage. This newly constructed reservoir receives its water from Newman Gulch and Waterfall Gulch.

The Raw Water Pipeline (RW pipeline) was originally constructed in the 1930s and travels from Waterfall Gulch to Summers Lane Reservoir and eventually to Water Treatment plant. The RW pipeline has continually experienced slow to significant water leakages, pipe breaks and reduced pressure on an annual basis. While Fort Bragg has replaced sections of the RW pipeline as depicted in the **Figure 1** on the following page, approximately 15,000 linear feet of pipeline needs replacement.



Noyo River

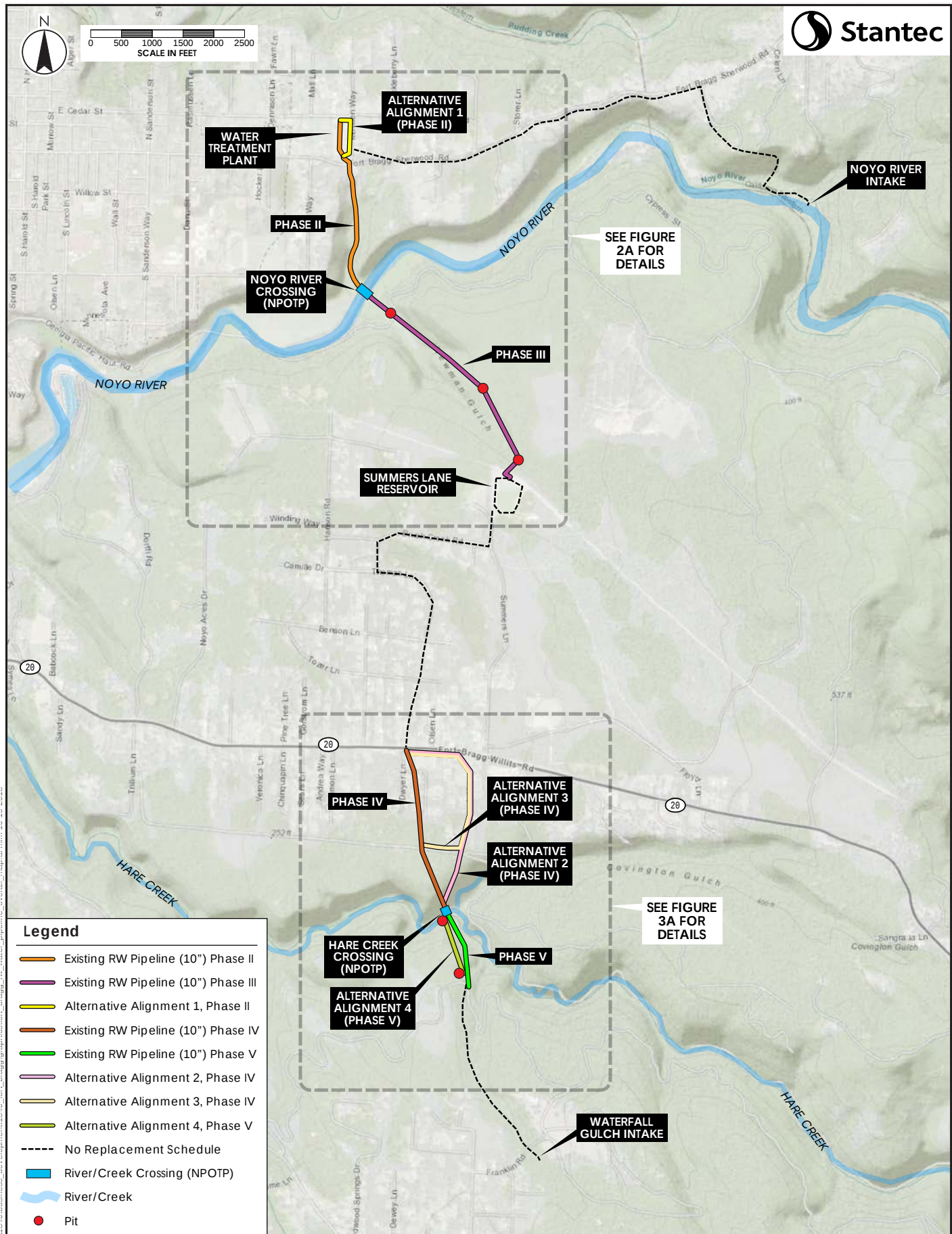
Project Purpose

This project considers effective methods of locating and replacing the aging RW pipeline between the Water Treatment Plant and Waterfall Gulch Intake areas. Several justifications for replacement include:

- Critical source of water for the Fort Bragg
- Aging infrastructure (~90 years old)
- Routine pipeline breaks and leaks
- Very limited access for Fort Bragg's operations and maintenance (O&M) staff

Our directive and motivation is to help the City address these issues, not uncommon to rural communities in California and throughout North America. The end result of this thoughtful alternatives evaluation will reduce the risk of water shortage, enhance protection of public health and the environment, and contribute to greater opportunities for economic development and prosperity for the City and its

Figure 1: Fort Bragg Raw Water Pipeline



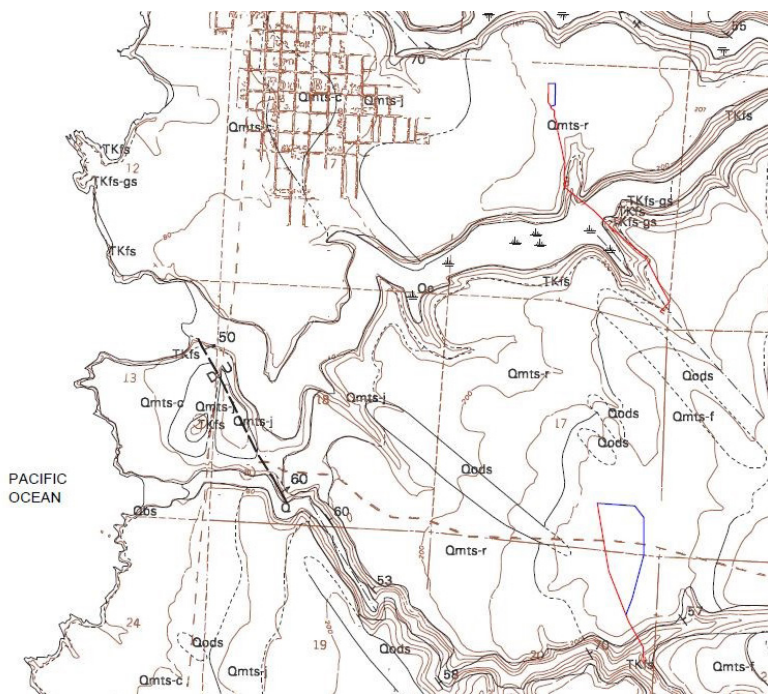
residents.

2. Project Approach

Stantec has completed considerable research on this project, including multiple site visits; review of existing City information, design calculations, pipeline layout, construction methodology, geotechnical analysis, environmental and permitting research, and sources of funding. Our team evaluated several options to conduct preliminary analysis. Through this effort, we identified and developed solutions for many of the key issues, challenges, concerns, and constraints that will drive identification, analysis, and selection of a cost effective, constructible, enduring, operable, and maintainable facility. We have examined each project component and developed a preliminary project assessment. **The Stantec team has the approach, expertise, and commitment best suited to provide exactly what the City needs to meet your reasoning of the project.** Below is our approach of various disciplines for the pre-design and design tasks.

Geotechnical Analysis

Based on maps published by the California Geological Survey (CGS, 2001), the surface geology along the existing pipeline route includes quaternary marine terrace deposits in the upland areas, tertiary coastal belt Franciscan complex in the steeply sloping areas above the river valleys and underlying the terrace deposits, and quaternary alluvium and estuarine deposits in the river valleys.



Geologic Map of Project Area

Groundwater is present in the Noyo River Valley but is not anticipated in other upland areas of the pipeline alignment.

Previous slope instability occurred in a section of the pipeline alignment north of the Noyo River Valley and we understand this slope area was repaired in 2003. We observed another area of slope instability several hundred feet north of the previous 2003 slope repair area during our recent site visit.

We are proposing to perform a Geo-Hazard Evaluation to evaluate this area and other areas along the existing or proposed pipeline alignment which may be subject to slope instability or other geologic hazards. In addition, we will supplement the Geo-Hazard Evaluation with test pit excavations at selected areas to characterize the shallow subsurface conditions relative to pipeline construction. Laboratory testing of representative materials will be performed to assist in characterization of the subsurface. This combination of geologic/geotechnical investigation techniques will allow us to evaluate and develop mitigation options for the geologic hazards along the existing and proposed pipeline alignment.

Surveying

Locating an existing RW pipeline alignment through steep terrain that presents difficult access is a critical element of this project. Fort Bragg's O&M staff has accessed and previously repaired the pipeline during pipe breaks. This information is invaluable to both our team and the project. Therefore, to maximize cost efficiency and project cost controls, we assume that the Fort Bragg's O&M staff will locate the existing RW pipeline alignment, leveraging their experience and previous records and will flag the alignment every 100 feet.

Our surveying subconsultant, **Andregg Psomas (Andregg)** has experience and expertise in providing surveying services in this terrain. Andregg will prepare cross-sections of the existing RW pipeline per Fort Bragg's demarcations. Additionally, they will survey the alternative alignments as depicted in the figures on the following pages. For the design drawings, Andregg will provide a topographic map at 1-foot contour accuracy for the preferred alignment. they will prepare easement documents to secure the legal access of the proposed pipeline. This will assist in preparing the detailed construction drawings and bid documents for the project.

Trenchless Analysis

Stantec's trenchless experts, **Erez Allouche** and **Anil Dean**, will complete a section on trenchless alternatives analysis during the predesign task and incorporate the information into the Preliminary Engineering Report (PER). The trenchless team will utilize the findings from the land survey of the existing/proposed alignments including the access points, pipe condition assessment data review, geo-hazard and geotechnical analysis review and environmental/regulatory considerations. This data will determine the feasibility to develop conceptual trenchless construction alternatives that may be incorporated into the detailed design task as the preferred project construction methodologies for the Phases III and V pipeline segments as an alternative to open-cut construction.

It is understood that the majority of the existing pipeline comprises 10-inch asbestos concrete (AC) pipe through alignment Phases II to IV and partly V, with the exceptions of the out of scope Noyo River and Hare Creek crossings that comprise ductile iron pipe. It is understood that some segments of Phase V comprise of 6-inch AC pipe. Along the Phase III alignment segment, the pipeline was observed to be exposed at ground surface in some locations and does not appear to follow a linear corridor but has numerous bends. Given potential alternative open-cut trench alignments and/or steeply sloping forested terrain making equipment access challenging for Phase IV, this pipeline segment is not currently included in the trenchless scope of work.

Trenchless construction methods will be considered for pipeline rehabilitation for Phases III and for new pipeline installation for Phase V following completion of the land survey and other constraints identified by the geotechnical and environmental team. The following trenchless methods are considered and described in further detail in the following subsections:

Rehabilitation Methods for Existing Pipeline (Phase III)

- Pipe bursting (not recommended for AC pipe—see below)
- Close-fit slip-lining
- Cure in place pipe (CIPP)

Rehabilitation/Replacement Methods for Highway 20 Crossing (Phase IV)

- Close-fit slip-lining
- CIPP
- Horizontal Directional Drilling (HDD)

Replacement Method of New Pipeline (Phase V)

- HDD

Asbestos Cement Pipe Limitations

The selection of methods for AC pipe rehabilitation and replacement needs to consider the potential risk of exposure to asbestos fibers for workers and the general public. It also needs to follow relevant regulation, such as the Asbestos National Emission Standard and Hazardous Air Pollutants (NESHAP) and Occupational Safety and Health Administration (OSHA). Rehabilitation methods such as pipe bursting break the AC pipe into pieces and leave some or all of the fragments in the ground potentially creating a hazardous waste site. These methods are severely restricted by NESHAP. Local authorities may impose even stricter regulations limiting the maximum length or denying the use of rehabilitation and replacement methods. For this reason, pipe bursting is not recommended for this project.

Rehabilitation methods using trenchless methods like close-fit slip-lining and CIPP are better rehabilitation methods for this project because these methods allow for asbestos fiber release to be controlled.

Replacement methods considering HDD will leave the existing AC pipe in place and will avoid contact, with the exception of potential tie-in locations, that can be completed in a controlled manner to manage asbestos fiber release.

Rehabilitation Method - Close-Fit Slip-Lining

Liner technologies of water mains can be classified as either: a) slipliners (including swagelining/close-fit PE liners and fold-and-form products such as PolyFold™); b) thermosetting liners that are either pulled-in or inverted into the host pipe (multiple versions of CIPP are offered by companies such as Sanexen, Insituform, and Nordipipe, with new players coming to the marketplace); and, c) chemically hardened spray-on linings (including CML and 'high-build' polyuria, polyurethane, and epoxy).

Swagelining (and similar 'close-fit' sliplining systems) use PE pipe which has an outside diameter slightly larger than the inside diameter of the pipe to be lined. After sections of PE pipe are butt-fused together to form a continuous pipe column, the PE pipe is pulled through a reduction die to temporarily reduce its diameter. This allows the PE pipe to be pulled through the host pipe. After the PE liner has been pulled through the host pipe, the tensile load is released, allowing the PE pipe to return to its original diameter, providing a tight fit against the inside wall of the host pipe. Benefits include a full range of rehabilitation options, from corrosion protection and water tightness to a fully structural solution; a short construction schedule; and, a relatively small footprint (and thus minimum impact in heavily forested areas and disruptions to traffic and business activities).

Typical spacing requirements for close-fit slip-lining is approximately 1000 linear feet (less if there are bends).



Close-fit slip-lining

Stantec

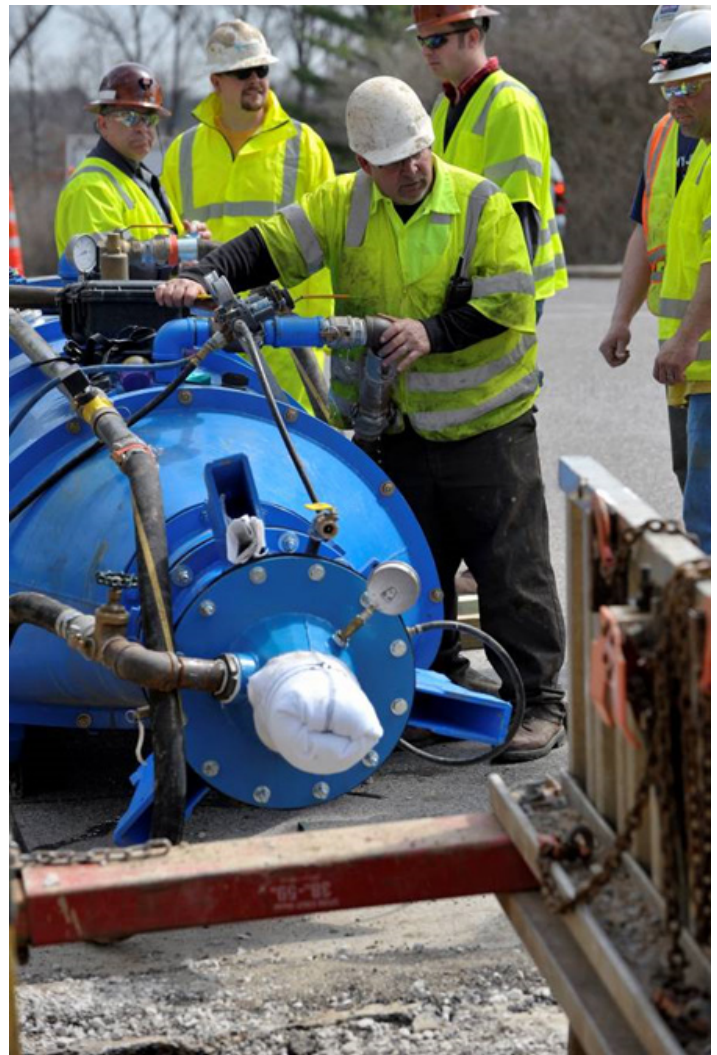
Rehabilitation Method - CIPP

The CIPP rehabilitation process involves a flexible textile liner tube that is inserted into the host pipe and cured to a hard state using a liquid resin saturation that forms a new seamless pipe within the existing pipe.

CIPP liners have been used in the rehabilitation of gravity pipes since 1971. However, the technical and operational aspects of CIPP lining continue to evolve. These changes are driven by both technical innovations and the need to stay competitive within the CIPP market and with other liner systems. Recent innovations are in the introduction of UV-cure liner systems, the refinement of site operations to recycle hot water used for curing, composite liner technologies, and the expansion of CIPP installation providers.

Increasing experience, new technical solutions, and a growing number of players in the marketplace steadily improve the economic viability of this technology for water main rehabilitation.

Typical spacing requirements for CIPP is approximately 600 – 750 linear feet depending on installation specifics.



CIPP

Replacement Method - HDD

HDD is a pipeline replacement method that is surface-launched and widely used by construction companies for the installation of flexible conduits (HDPE, PVC, steel, etc.), often under rivers or other surface obstructions.

For this technique, a pilot hole is drilled, which determines the path of the installed pipe. A small diameter (38 to 150 mm) drilling string with a steering head penetrates the ground at a predetermined angle, usually between 8 and 18°, to the prescribed entry location. The steerable drilling string is pushed through the ground along a pre-determined alignment and returns to the surface on the other side of the obstacle or waterway. The progress of the drilling head is tracked using an electromagnetic transmitter located near the drill head.



Next, a hole opener (reamer) is attached to the drilling string to cut an oversized bore for the carrier pipe to be pulled through. The final reamed size of the bore is generally 30 to 50% larger than the outside diameter of the product pipe. This overcut provides adequate annular space for drilling fluids and spoil to return to the surface, reduces pullback forces, and also facilitates bending of the pipeline during the pullback process. A bentonite-based drilling fluid is used to lubricate and stabilize the pilot hole and reamed bore.

Finally, the pipeline, suspended and lubricated by the drilling fluid and connected to the drill pipe using a pulling head and a swivel, is pulled back into the freshly excavated hole. The pullback operation continues until the pipeline reaches the drill rig.

The footprint of a typical HDD project varies depending on the project specification. Maxi-rigs with up to or exceeding 1,000,000 lbf of pull back force used for large river crossings require working space as large as 250 ft x 400 ft. By contrast, a mini-size HDD rig with up to 20,000 lbf of pull back force can fit into a work zone as tight as 10 ft x 15 ft. All HDD projects require a pipe lay-down area on the pilot bore exit side, which is generally as long as the installation.



Pipeline Rehabilitation/Replacement Class 4 Cost Estimate

The following Class 4 cost estimate was completed using Contractor rates in Northern California for consideration to rehabilitation and replacement of AC pipe. It should be noted that the following cost estimate was determined under good access conditions and a large volume (~35,000 linear feet).

DIAMETER (INCHES)	CIPP AQUA PIPE (Rehab of AC Pipe)	SLIP LINING (Rehab of AC Pipe)	OPEN CUT (New PE Pipe)	HDD (New PE Pipe)
4	\$120	\$90	\$230	\$110
6	\$120	\$130	\$250	\$160
8	\$140	\$160	\$280	\$200
10	\$160	\$180	\$300	\$250
12	\$200	\$220	\$320	\$280

Pre-Design Feasibility Assessment of Trenchless Methods

Rehabilitation Pre-Design Phase III and Highway 20 Crossing

For the purposes of this proposal, rehabilitation trenchless techniques will be limited to the Phase III pipeline segments and Highway 20 crossing. Both close-fit slip lining and CIPP methods will be considered in the pre-design task. Phase III is approximately 4,000 linear feet and the Highway 20 crossing is approximately 100 feet.

An assessment of the work area will be conducted to identify needs for equipment access, material storage and access pit locations. The following items will be provided to a conceptual level of detail in the pre-design task:

- Review of existing pipe including geometry/bends, access points, materials, diameters, depth of cover, air release values, crossings, etc.
- Identify access locations/access pits for rehabilitation methods
- For close-fit sliplining identify minimum required wall thickness based on external and internal loadings, and maximum permissible pulling lengths
- For CIPP identify minimum required liner wall thickness based on external and internal loading
- Identify transition/connection methods between adjacent lined sections and between lined section and new pipeline sections

HDD Pre-Design Phase IV and V

For the purposes of this proposal, HDD replacement techniques will be limited to Phase IV and V. The highway 20 crossing method can be HDD or Bore and Jack method as approved by the State of California Department of Transportation (Caltrans). The trenchless assessment pre-design task will include the conceptual design for one HDD drillpath for the highway 20 crossing and Phase V pipeline segment length of approximately 1,200 feet that traverses over mature forest cover and a steep valley slope where the existing pipe is considered to be 6-inch AC.

An assessment of the work area needed for machines, storage, access, etc., and the worksite layout including an assessment of the location of winches for pull-in of HDPE pipe will be completed. The following items will be provided to a conceptual level of detail in the pre-design task:

- Review of existing geotechnical data and interpretations
- Assessment of HDD installation feasibility and drillpath geometry that includes the following:
 - Preliminary drillpath and pull force assessment of HDPE casing to be installed using HDD from Hare's Creek
 - Preliminary hydrofracture assessment
- An assessment of the pull-in forces needed for the HDPE pipe over a drillpath length of approximately 1,200 feet
- An assessment of risk and mitigation methods for the drillpath
- An estimated duration of the HDD work for the drillpath
- Opinion of probable construction cost for the drillpath.
 - This will be a conceptual level cost opinion based on Stantec's HDD cost database and our understanding of HDD scope items, as well as selected material quotations. An appropriate level of contingency will be added commensurate with the conceptual nature of the design. This estimate will be prepared for HDD installation of the pipe only

Civil Design

Stantec's pipeline experts, **Jigar Shah**, **Gabe Aronow**, and **Mark Smith**, will perform the preliminary engineering analysis to incorporate into the PER for the pre-design phase. Our team will utilize the findings from the land survey of the existing/proposed alignments including the access points, alignment of existing RW pipeline, geo-hazard and geotechnical analysis, conceptual trenchless construction alternatives, and environmental/regulatory considerations to determine feasibility and develop a preliminary design that will be incorporated into the detailed design.

Stantec visited the project site on October 9th during the City scheduled site walk. Our team has discussed and analyzed the RW pipeline alignments and alternatives extensively. We then evaluated the possibilities of alternative alignments for the existing RW pipeline. Below is the discussion of various pipeline alignments and constructability methods Stantec has endeavor for the project.

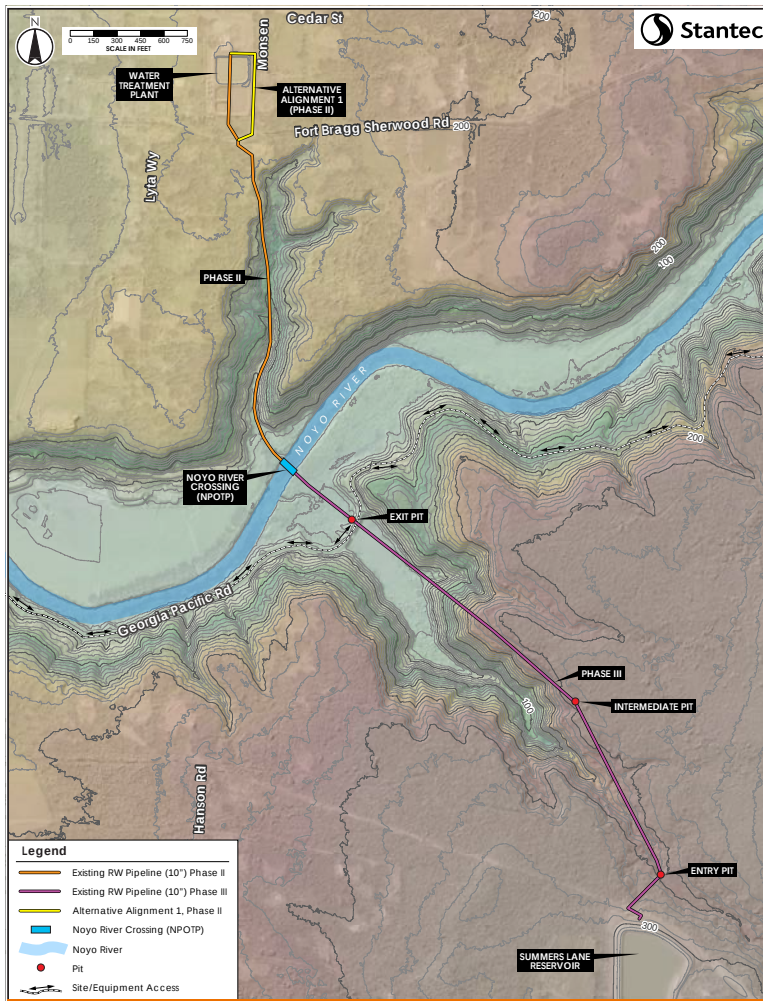


Figure 2A: Fort Bragg Raw Water Pipeline - Phase II and Phase III Plan

Northern Phase (II and III)

As depicted in **Figure 2A**, the northern portion of the existing RW pipeline alignment travels through the water treatment plant and under the existing ponds. We have reviewed the possibility for an alternative alignment and propose a new RW pipeline beginning from the water treatment plant eastward through the plant area and travels southerly on Mosen Way. It will cross Sherwood Road and travel parallel with the existing RW pipeline alignment. The new RW Pipeline will continue southward parallel to the existing pipeline within the existing dirt access road up to the Noyo River Crossing. This Phase II of the alignment is proposed to be constructed via open-cut methodology. The new RW pipeline will require a minimum of 10-foot permanent easement and up to 40-foot-wide, temporary construction easement.

Phase III of the RW pipeline alignment just south of the Noyo River crossing travels to the Overflow pond near Summers Lane Reservoir, which resides in a heavily wooded area with steep terrain. We also found a portion of the existing pipeline that was exposed and missing a significant amount of bedding and backfill material. Our team will analyze the possibility of rehabilitating the existing 10-inch RW pipeline via a CIPP or slip lining process. Both techniques will be evaluated during the Pre-Design phase of the project by our trenchless design team. We will also locate the existing RW pipeline alignment that will assist in determining pipeline accessibility, geological, and slope stability constraints. A less feasible option for phase III is to construct a parallel RW pipeline via open-cut method. **Figure 2B** depicts the current terrain along the existing RW pipeline.

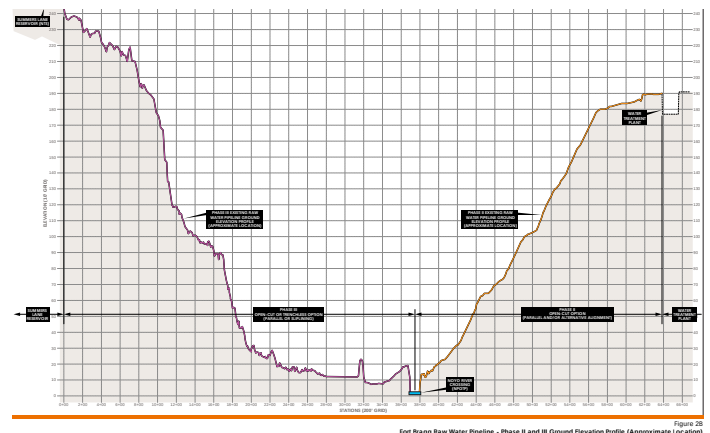


Figure 2B: Current Terrain Along Existing RW Pipeline

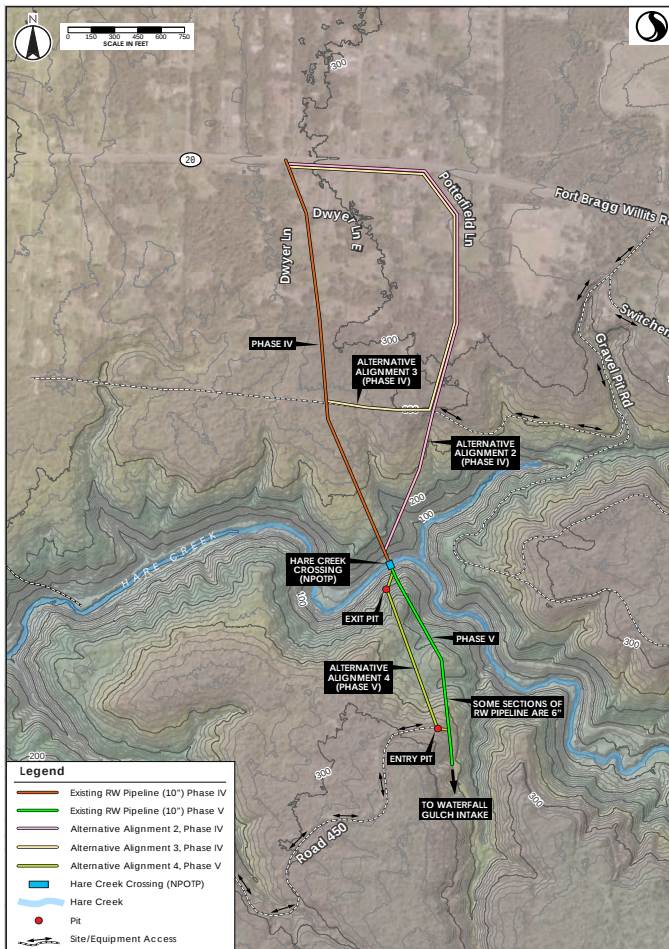


Figure 3A: Fort Bragg Raw Water Pipeline- Phase IV and V Plan

Southern Phase (IV and V)

The southern phase of the RW pipeline begins south of State Highway 20 near Dwyer Lane and travels southward through various private properties. The existing alignment has several houses being constructed over the existing RW pipeline, which makes it inaccessible by O&M staff. The Phase IV of the existing RW pipeline ends just north of Hare Creek crossing. To provide a better alternative to the City from pipeline accessibility and longevity, Stantec visited Porterfield Lane, Gravel Pit road, and Swithenbank Lane and has reviewed alternative alignments. Of these three alignment alternatives, the Porterfield Lane alignment traveling southward and connecting to the no-name dirt road is well graded and most feasible. While the Gravel Pit road does not continue to Hare Creek crossing, Swithenbank Lane connects into Gravel Pit road and it can be used as an access road for bringing a small size excavator or construction equipment. Stantec will further analyze these alternatives for geotechnical, environmental and constructability constraints. Stantec recommends using Open-Cut construction method for the Phase IV alignment. **Figure 3A** shows these possible alignment alternatives.

Phase V of the project travels south of Hare Creek crossing up to the Waterfall Gulch Intake pipeline connection on Road 450. This terrain is a very steep and heavily wooded area. Stantec will review the possibility of Horizontal Directional Drilling (HDD) or Open-Cut construction methodology. Our team will locate the existing RW pipeline and investigate potential ways to rehabilitate or replace this section of the pipeline. **Figure 3B** shows the severity of the existing steep slopes along the existing RW pipeline.

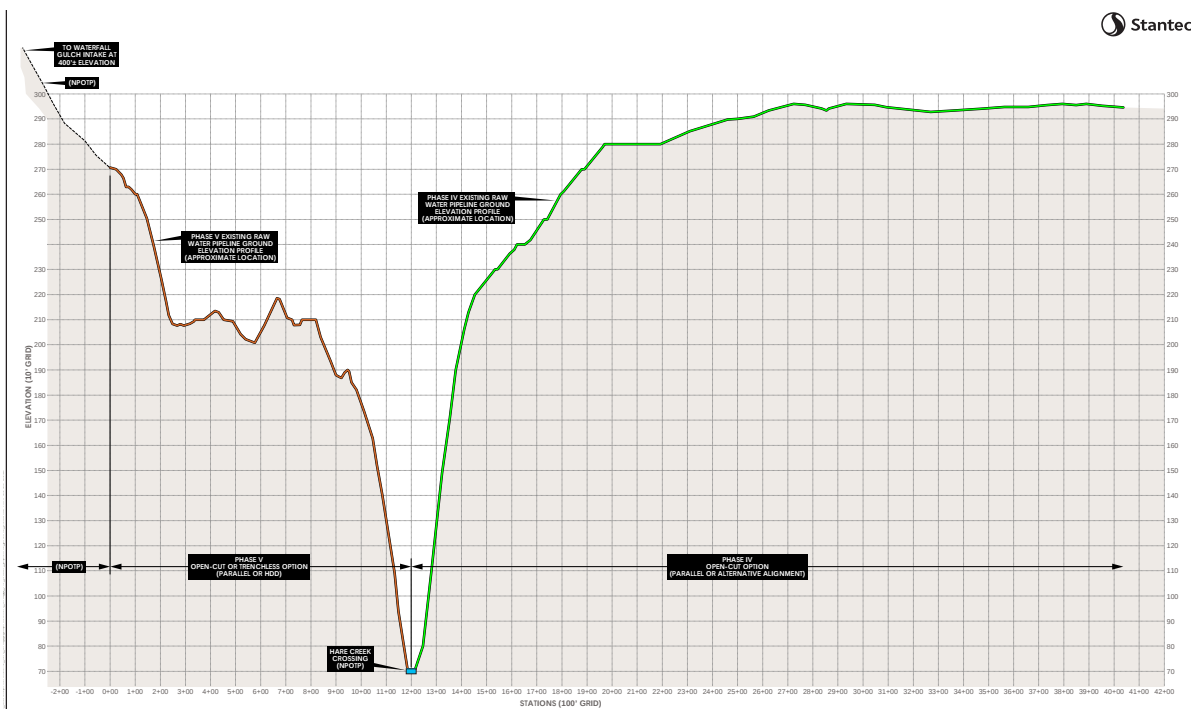


Figure 3B: Fort Bragg Raw Water Pipeline- Phase IV Ground Elevation Profile (Approximate Location)

Preliminary Engineering Analysis

Stantec will perform preliminary engineering analysis, define the project design criteria, and complete a site reconnaissance with our team and your staff to identify existing pipeline alignment and discuss likely project constraints. Preliminary analysis will rely on previously completed reports, drawings, survey data, environmental constraints, utility coordination, geotechnical report, and other pertinent documents. Some of the various project constraints to be analyzed along the alignment are:

- Accessibility/O&M
- Constructability
- Construction method
- Environmental/permitting
- Geology and geotechnical constraints
- Utility coordination
- Right-of-way/easement
- By-Pass pumping
- Project cost

Stantec will facilitate a workshop discussion involving City staff to review the preliminary engineering analysis, design criteria and confirm accuracy. The presentation shall be a succinct, clear, and concise set of design criteria presented as PowerPoint slides to the City at the workshop. During this workshop we will field and address your questions and comments. Based on the discussion and decisions made, we will move forward with the final preliminary engineering report document, which provides the following key functions:

- Identify all engineering issues and project constraints
- Provide schedule impacts due to permitting
- Provide construction funding options to Fort Bragg
- Provide detailed guidance for effective and efficient execution of preliminary and final design
- Illustrate tie-in requirements and expectations so Fort Bragg can confirm
- Calculate cost estimations for each alternative (including both “hard” construction costs and “soft” non-construction constraint costs)
- Coordinate environmental constraints and requirements into assessment and route selection
- Provide a detailed guidance on any permit, encroachment, right-of-way, easement requirements

Knowing the complexity of this project and involvement of several disciplines as well as project management and coordination with these disciplines makes this project very challenging but exciting to work for. With that in mind, we have also examined each project component and developed a preliminary project assessment for additional tasks as requested by the City.

Final Design

This challenging project requires a multi-phased approach and involvement of several disciplines with strong project management skills, technical expertise, and access to various disciplines when they are most needed. Stantec has the capacity, technical expertise, and commitment your project needs to succeed. After conducting extensive research on the project, our team gathers all relevant data from the disciplines to make a decision. Identified project constraints will determine the preferred alignment to carry raw water from Waterfall Gulch Intake to the Water Treatment Plant.

The final design for the project will be built upon the PER and available funding sources. Our design team will prepare 60%, and 100% (bid documents) for the project. These construction drawings, technical specifications and Opinion of Probable Construction Cost (OPCC) will incorporate plan and section detail drawings per project constraints, QA/QC comments, constructability issues, phasing and sequencing approach for the project, and to acquire project funding. The drawings and specifications will meet the funding source requirements.

Our approach to environmental, funding, and timber harvesting tasks for the project can be found on the following pages.

Environmental Analysis

Environmental permitting and compliance can be a critical path aspect of the project. To avoid potentially costly delays, it is important to consider environmental opportunities and constraints early in the project's pre-design phase. We understand the City's responsibility to its rate payers to achieve efficient environmental compliance, and already prepared a preliminary assessment of potential environmental issues and approaches for reducing permit requirements, costs, and timelines by designing to avoid and minimize impacts.

The proposed project crosses various habitats including closed-cone pine-cypress, coast redwood, annual grassland, riverine, and barren areas. Although the major river crossings are already spanned and not considered part of the proposed project, potential alignments and access roads do parallel several drainages. In addition, the project vicinity contains multiple known occurrences of sensitive species and habitat, including: northern red-legged frog, foothill yellow-legged frog, Bolander's beach pine and pygmy cypress, coast lily, hair-leaved rush, southern torrent salamander, marbled murrelet, northern spotted owl and other protected nesting migratory birds (**Figure 4**).

In addition, trench excavation in the vicinity of waterways such as Noyo River and Hare Creek and along the coast often entails a high potential for cultural resource sensitivities.

Given the project may potentially impact drainages that are tributary to Noyo River and Hare Creek and may entail federal funding sources, environmental permitting is anticipated to include the permits listed in **Table 1** on page 40.



Foothill Yellow-legged Frog



Northern Red-legged Frog



Bolanders Beach Pine



Biological Survey

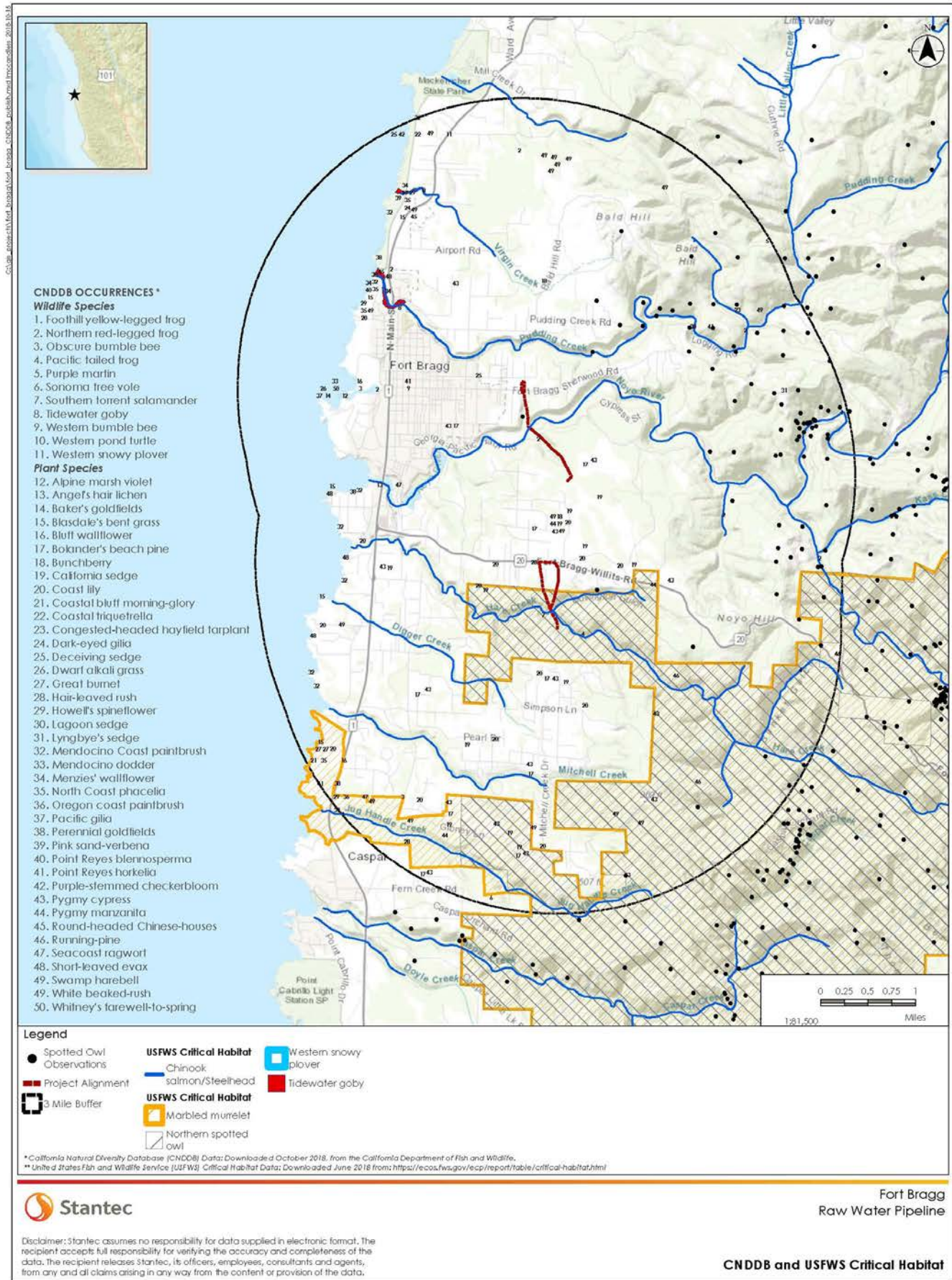


Figure 4: Special-Status Species Known to Occur in the Proposed Project Vicinity

Table 1: Anticipated Federal, State and Local Permit Requirements and Streamlining Options

Regulation	Jurisdictional Agency	Permit Name	Trigger	Estimated Timeline	Permit Pre-requisites for Approval	Additional Permit Streamlining Options
Federal Regulations						
NEPA	EPA/USDA (USACE)	Federal-Cross Cutters for NEPA compliance	Federal funding (SRF or USDA) would trigger a NEPA-like process. Issuance of a USACE permit also triggers NEPA, but complete for Nationwide Permits	Concurrent with Permitting	For USDA and SRF, Federal Permit Applications and Approvals and the Federal Agency Environmental Checklists form the basis for NEPA compliance.	Impact Avoidance (access roads and alignments that avoid drainages and sensitive habitats)
CWA Section 404	USACE	Nationwide Permit 12, Utilities	Placement of dredged or fill material into waters of the U.S. Impact less than 0.5 acre of waters of the U.S.	6 to 9 months	FESA Section 7 NHPA Section 106 CWA Section 401	Avoid discharge to waters of the U.S. to the extent practicable. Early identification of federal lead agency for FESA and NHPA compliance and coordinate with USACE if USACE not lead federal agency. Some potential for non-notifying nationwide permit if impacts less than 0.10 acre and no effects determinations can be made for FESA and NHPA. Negotiate concurrence on temporary impacts and on-site restoration to avoid/reduce possible mitigation fees.
FESA Section 7 and MBTA	USFWS (and NOAA Fisheries)	Section 7 - Possible Formal Consultations	Potential for “take” of federally protected habitat or individuals (i.e., NSO and marbled murrelet)	Protocol level survey duration 6 months to a year	-	Avoid nest tree removal and nesting impacts for listed species, avoid red-legged frog habitat with access roads. Potentially utilize eDNA for surveys rather than year long protocols.
National Historic Preservation Act Section 106	State Historic Preservation Officer (SHPO)	SHPO NHPA Section 106 Concurrence Letter	Federal funding or USACE permit to assess the potential for adverse effects to cultural resources eligible for listing under the National Register of Historic Places	Approximately 6 to 9 months	Federal Approval of the Area of Potential Effect	Provide the archaeology survey team with an Area of Potential Effect (APE) that includes access roads and laydown areas early in the design process, so they can get it approved by the regulatory agencies and initiate surveys.
Delegated Federal/State Regulations						
CWA 401	RWQCB	Water Quality Certification	Potential water quality impacts to surface waters	4-6 months (agency timeline is 90 days)	CEQA Notice of Determination	Summer construction, stringent BMPs, anticipated water quality monitoring for drainages crossings
SWRCB – WDR for discharges of stormwater runoff associated with Construction Activity (General Order)	SWRCB	General Construction Stormwater Permit	Any construction project over 1 acre (Grading > 1 acre)	Covered with NOI Submittal (60 days)	-	-
Low Threat Dewatering and other low threat discharges to surface (General Order)	SWRCB	Dewatering Permit	Dewatering or well development – flow requirements typically for temporary	1 to 3 months (~30 day Regional Board review of NOIO	NOI and demonstration of coverage under general permit stipulations	-
State Regulations						
CEQA (including Assembly Bill 52)	Fort Bragg (Lead Agency)	CEQA compliance and Notice of Determination	Discretionary action – project approval by the City Council	6 to 9 months from completion of the Project Description (for an Initial Study/Mitigated Negative Declaration)	-	Initiate CEQA in coordination with Engineers upon completion of the DRAFT PDR. Note: AB 52 compliance is embedded in the CEQA timeline.
DFG Code 1602	CDFW	Stream and Lakebed Alteration Agreement	Impacts to drainages or riparian zone/floodplain with defined bed and bank, tributary to the Noyo and Hare Rivers.	4 to 6 monhts. Note: Agency timeline is 90 days for reviews.	CEQA NOD	Work with the engineers to make alignment adjustments and avoid or minimize impacts on drainages and riparian zones.
Z’Berg-Nejedly Forest Practice Act of 1973	California Department of Forestry and Fire Protection (CAL FIRE)	Timber Harvest Plan	Although there are specific exemptions in some cases, compliance with the Forest Practice Act and the State Board of Forestry and Fire Protection rules apply to all commercial harvesting operations for landowners of small parcels, ranchers owning hundreds of acres, and large timber companies with thousands of acres.	The process generally takes 3 to 4 months from commencement to approval including a public comment period.	-	Assess compliance with existing THPs and minimize tree removal.
Coastal Zone Consistency	Mendocino County (delegated authority from the California Coastal Commission)	Local Coastal Plan Consistency	Phase III (Northern Route) located in the Coastal Zone, triggering permitting.	-	-	-

Often the environmental permitting process can hold up a project start date; however, in the case of the proposed project, it is the required surveys prior to permitting that have long timelines.

In addition, northern spotted owl, a tree nesting species listed as threatened under the Federal and California Endangered Species Acts, is known to occur through the project area (**Figure 4**). Survey requires a two-year protocol with six calls being performed in the spring of year one and six calls in the spring of year two, ending in May. This allows for potential harvesting in mid to late May through the summer months of year two.

The project also crosses marbled murrelet habitat (**Figure 4**), an avian species listed as threatened under the Federal Endangered Species Act and as endangered under the California Endangered Species Act. Marbled murrelets nest in the top of old growth forests, on large diameter branches with moss or forking branches. For this species the most efficient approach, given the relatively small impact area in their habitat, would be to first assess the tree characteristics to identify if they are possible nesting substrate and design to avoid tree removal and construction activities in any moderate to high potential nesting areas. This is because the minimum area surveyed should be the potential habitat that falls within the proposed project area and within one-quarter mile of the project area boundary that is contiguous with the project area.

In addition, audio-visual surveys are necessary with intensive surveys occurring for at least two consecutive years. Radar surveys are also recommended by the USFWS to detect and track murrelets in flight. Stantec is doing this for a wind energy project in Humboldt County (page 11) and it can be very costly. As such, on this project, which will not have operational impacts, the goal will be to avoid murrelet habitat impacts. The proposed scope tasks below, thus do not include protocol-level surveys, rather it is assumed the species impacts can be avoided.

Botanical surveys tend to span from early spring to late summer in order to survey for certain species of special concern during their flowering period.

In addition, cultural resource surveys are required; however, the biological surveys here are a much longer time frame.

Based on the results of the field surveys and given the project may cross drainages and/or be federally funded through EPA dollars in the State Revolving Fund or the USDA, environmental compliance will entail all the permits listed in Table 1. These include compliance with the California Environmental Quality Act (CEQA) and various federal, state, and local regulations.

Funding Analysis

Construction funding for the City RW pipeline replacement project has not been identified. Absent existing planning or design documents, a detailed project cost estimate is also not available. However, based on engineering experience, a reasonable project budget could be approximately \$5 million, based on 15,000 linear feet of new 10-inch water main plus allowances for access constraints, timber removal, design and environmental approvals, construction management, and inspection. That breaks down to roughly \$3 million in pipeline related construction costs, \$1 million for access, timber and other constraint mitigations, and approximately \$1 million in engineering, environmental, and administrative costs. Costs to permanently record existing or procure new easement costs are unknown at this time and may or may not require funding beyond this proposed \$5 million budget.

Coincidentally, the City is eligible for up to \$5 million in State Water Resources Control Board drinking water grants. In this task, Stantec proposes to facilitate a Drinking Water State Revolving Fund (DWSRF) construction application including completion of the State Water Resources Control Board (SWRCB) State Revolving Fund (SRF) required environmental compliance documentation. This environmental documentation is in addition to the CEQA and permitting support identified in a separate task. Those separately scoped environmental elements are required by law for any project, but this DWSRF grant program requires additional environmental coordination, including completion of their "CEQA-Plus" cross cutter forms to comply with NEPA to access Federal monies.

Based on our extensive and recent experience with the DWSRF grant program, including other applications completed in 2018, the City is likely to qualify as a small disadvantaged community as defined by the Division of Financial Assistance (DFA) and DWSRF Policy (population < 10,000, MHI < 80% of Statewide MHI). The City is likely be able to obtain up to \$5 million in grant funds (maximum \$30,000 per connection) for the raw water transmission line replacement project.

Median Household Income 2016

\$67,739

State of
California

\$37,506

City of
Fort Bragg

It is important to note that applying for DWSRF grant funds has three primary interdependent components that must coordinate to successfully secure SRF funds in addition to the general application: technical, environmental and financial. The environmental aspects are as described above for CEQA/NEPA compliance, but they also play into coordinating with the technical work to help streamline the project and minimize environmental impacts and costs. The technical design team will be required to complete a "Project Report" that incorporates the project needs with the environmental constraints and generates accurate project costs for the funding application. Our financial team has coordinated the DWSRF application process for many of our clients. The team is well versed in the necessary steps including collecting the appropriate City fiscal information, budgets, water rates, expenditure forecasts, etc. to comply with the program financial requirements. We will coordinate the technical and environmental funding packages to provide a streamlined application process for the City.

It can also be noted that the tasks in this proposal, including this funding application task, are reimbursable against the DWSRF grant. The date of completion for these tasks in advance of a Funding Agreement does not preclude them from being reimbursable, though they cannot be submitted for reimbursement until after the Funding Agreement date.

The Stantec team proposed on this project has worked together on many projects and has helped to secure over \$300 million in SRF funds for our small and disadvantaged clients over the last decade. This funding support task brings that same team and focus to the City of Fort Bragg.



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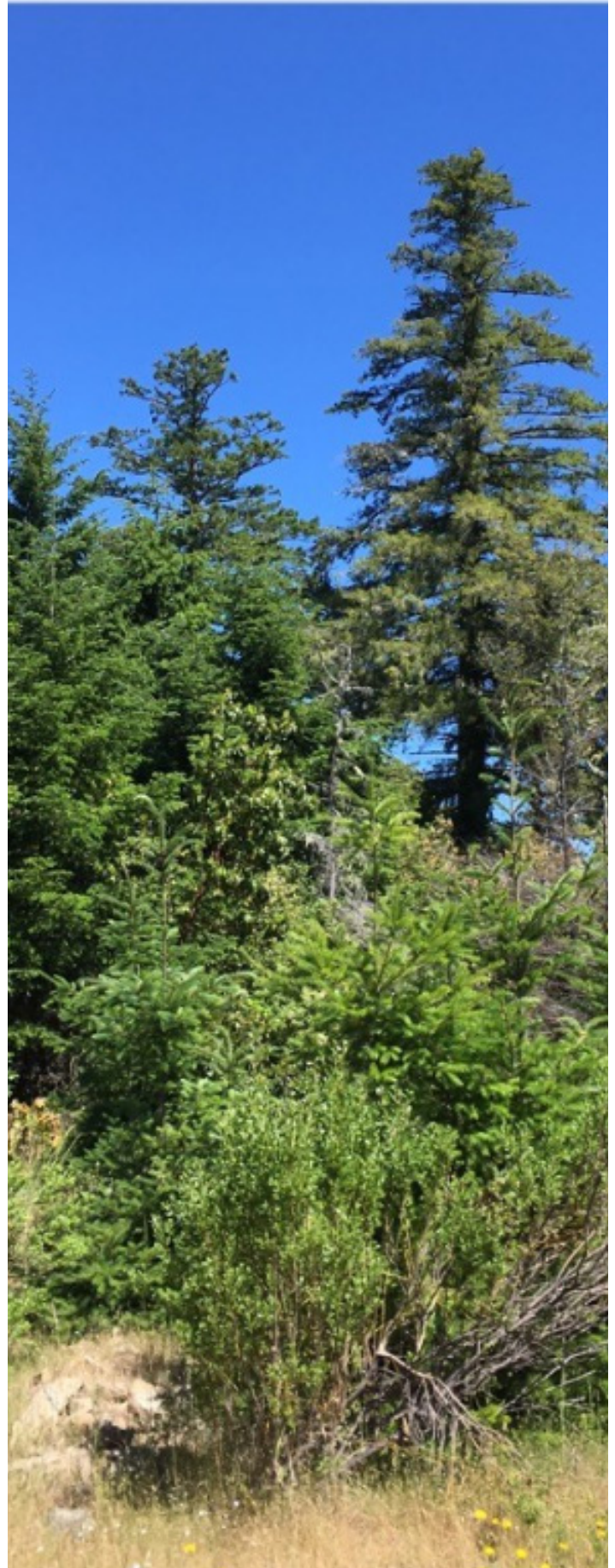
Timber Harvesting Plan

To log on private or corporate land, a Registered Professional Forester (RPF) must prepare a document which outlines the proposed logging operations, known as a Timber Harvest Plan (THP), and submit this to the state. The THPs have two functions: to provide information for the CALFIRE director to determine if the proposed logging conforms to the rules and to provide direction to logging operators who carry out the THP. The THP will evaluate the potential direct and cumulative impacts that might occur as a result of the logging plan and to implement feasible measures which would reduce this impact to a level of insignificance.

CALFIRE “shall disapprove a plan as not conforming to the rules” if it does not contain enough information to evaluate potential environmental effects, if it would cause “significant, long-term damage” or cause a “taking” of a threatened or endangered species or if it would cause irreparable harm to rare or endangered plant species (see 898.2 of the FPRs). Over 99% of the THPs that are submitted, however, receive CALFIRE’s reliable approval.

When a THP is prepared, the submitter is required to notify landowners within 1,000 feet downstream of its boundary and request information on domestic water sources that could be affected by the proposed logging operations. At least ten days after providing this notice, the THP may be submitted, and CALFIRE then has ten days to accept it for filing or return it to the submitter.

For the proposed project our specialized and local Registered Forester will determine the nature of the THP and/or exemption associated with the replacement of the City’s RWP, draft the THP, and then once approved, layout the field appropriate flagging and marking for the THP and/or exemption.



3. Scope of Work

Pre-Design

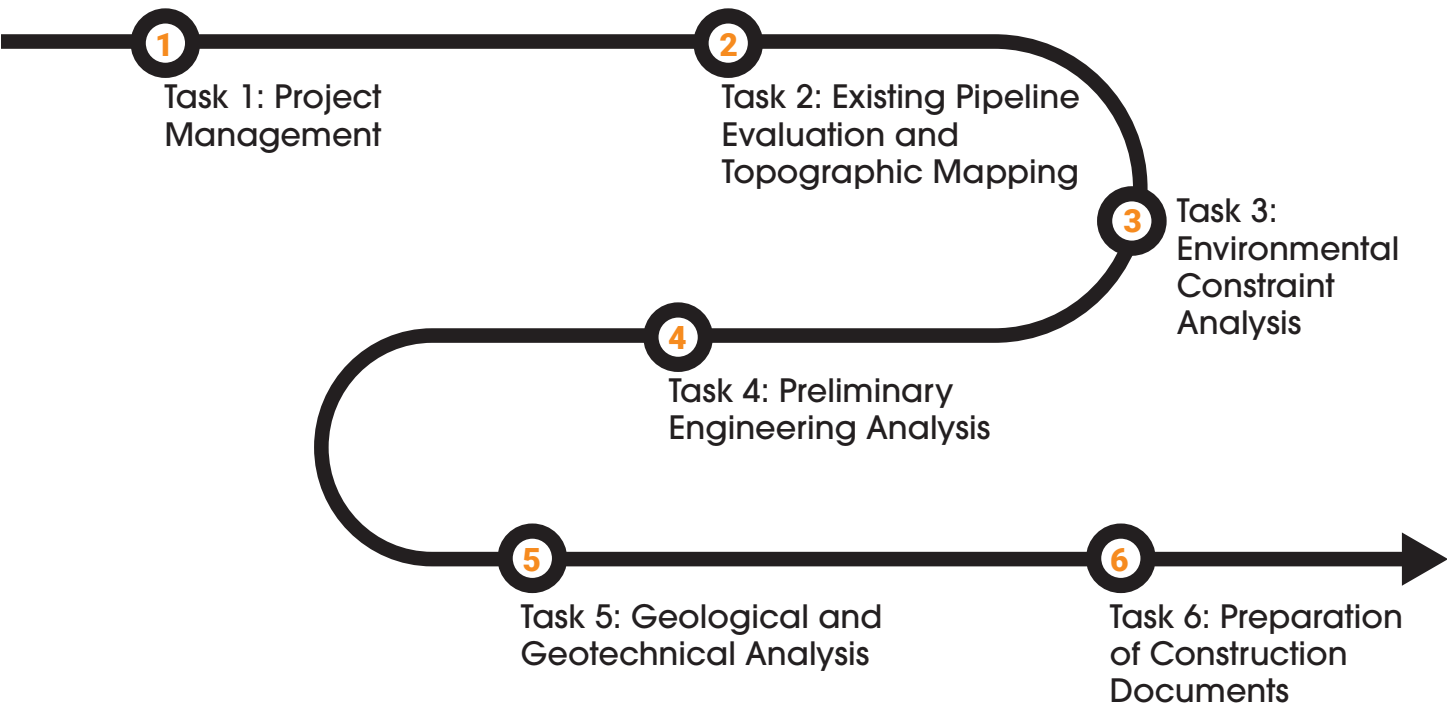
The Stantec team will provide the services and deliverables requested in the City’s Request for Proposal. The following provides a brief task and sub task summary of our work approach as shown in **Figure 5**. Detailed scopes of work for each of our teaming partners can be provided upon request.

Task 1: Project Management

Stantec will be responsible for providing project management and quality control for this project. We will follow our internal project management framework that complies with our ISO 9001 certification and is summarized in **Figure 6** on the following page. Because Stantec prides itself on the technical excellence and involvement of our project managers, Fort Bragg can rest assured that **Jigar Shah** and **Gabe Aronow** will provide active and efficient management of every part of the project. The following outline describes the services that will be provided under this task.

- 1.1 Project Communication and Control
 - Coordination/documentation of key team activities and meetings, including agenda and meeting notes
 - Coordination and consultation with appropriate regulatory agencies (Caltrans)
 - Coordination and consultation with project stakeholders (City, City Council, Jackson Demo State Forest, Coastal Zone, underground utilities)
 - Monthly communication of project progress and issues to City staff
 - Summary of work accomplished each month
 - Description of current / future activities and schedule update for each task/sub-task
 - Identification of problem areas and corrective actions
 - Invoice showing total contract, invoice amounts, cumulative amounts, and remaining budget
 - Availability to City staff for meetings, updates, or to discuss concerns at any time
 - Communication and file maintenance
 - Standardized electronic and hard copy file maintenance by entire team
 - Setup of a project SharePoint (FTP) site to promote communication and exchange of files

Figure 5: Scope of Work Overview



1.2. Quality Assurance/Quality Control

- Assign QA/QC Manager for project – **Mark Smith**
- Develop and implement project specific work plan with the entire project team, including Stantec Quality Assurance/Quality Control Policy
- Help ensure QA/QC procedures are being followed, recorded and reported to the City at each step in the design process

1.3. Facilitation of Preliminary Design workshop with City staff.

Drafts of all major deliverables will be reviewed with Fort Bragg at this Workshop. Following the Workshop, comments from Fort Bragg will be addressed in the final design and delivered to Fort Bragg.

Deliverables

- » Project Kick-off Meeting (agenda and notes sent by email)
- » Up to four (4) Project Update Meetings (agenda and notes sent by email)
- » Monthly Progress Reports (by email)

Figure 6: Project Management Framework

Stantec Project Management Framework	
Point	Description
0	Prepare a proposal that includes a preliminary Project Plan including scope, project budget, resources, deliverables, and schedule. Conduct and document an independent review of the final proposal. Conduct and document a hazard assessment and apply applicable controls if a field or site visit is required during the proposal phase.
1	Obtain written instructions to proceed and execute an approved contract . Obtain written subconsultant agreements (if applicable).
2	Prepare a Project Plan to an appropriate level of detail. Conduct and document an independent review .
3	Establish hard copy and electronic project record directories and file project records accordingly.
4	Complete a Health, Safety & Environment risk management assessment and documentation for all projects involving field work.
5	Monitor the PM Dashboard on a regular basis. Follow best practices for managing project financials , including time charges, work in progress (WIP), accounts receivable (AR), and estimates to complete (ETC).
6	Obtain the client's written approval on scope of service changes in a timely manner.
7	Conduct and document a quality review of all final* deliverables prior to issue.
8	Conduct and document an independent review of all final* deliverables prior to issue.
9	Close off the project financials and close out the project files .

*final: A final deliverable is defined as any record (written or graphic) based on professional expertise or judgment that is intended to be relied only by others and that provides direction to others as part of a service to the public (e.g., professional reports, documentation issued for construction, permit submissions, and maps).

Task 2: Existing Pipeline Evaluation and Topographic Mapping

It is very critical to know the location of the existing RW Pipeline as the project requires to connect with the existing pipeline at the Creek/River crossings and at the replaced section of pipeline from Waterfall Gulch Intake. Stantec will conduct an extensive field investigation along with the surveyor to locate the existing RW pipeline alignment. After locating the existing RW pipeline, Stantec team will place stakes at every 100-feet on the centerline of the pipe. Following are the details of this task:

2.1. Research and Review Existing Documentation

- Research available RW pipeline documents including as-built drawings, maps, easement documents, O&M work orders
- Discuss with the City Staff on the pipeline repair history
- Summarize the Documentation findings for Pipeline research

2.2. Existing Pipeline Research and Site Visit

- City's O&M staff will locate the existing RW pipeline alignment and provide demarcations at every 100 feet.
- Survey 70' +/- wide cross-sections along the existing RW pipeline at every 100 feet intervals. The cross-sections include top of slope, toe of slope, edge of water, flow line, edge of pavement, top back of curb, gutter flowline, road centerline, visible evidence of any utilities, water valves, power poles and guy anchors, trees 24" dbh and larger, accessible storm drain manholes including pipe size and inverts, drain inlets including pipe size and inverts, culverts including pipe size and inverts and any other features that may affect design.

2.3. Design Survey

- Set and survey semi-permanent survey control points suitable for design surveys and future construction staking using Rapid or Fast Static GPS survey observation techniques tied to nearby existing second order NGS control stations or to nearby Continuous Operating Stations (CORS) in areas with open skies.
- Conventional field traverse methods shall be used for project control and field surveys along the existing pipeline route and preferred alternate routes due to dense tree and vegetation canopy.
- Locate sufficient monumentation to determine boundary and right of way line work within the mapping limits utilizing record maps and deeds to create a LandNet. The record boundary, right of way linework, and easement of record shall be shown on the mapping and shall be accurate to the scale of the mapping.
- Produce a composite archival base map combining all the cross sections and topographic information.

- All based mapping will be prepared in AutoCAD 2018 Civil 3D .dwg format. A surface will be generated using AutoCAD Terrain Model Explorer. Contours will be generated at an interval of 1-foot with a mapping scale of 1 inch = 40 feet. The mapping information will be on individual layers within the electronic drawing files. Frozen layers will contain the remainder of the survey information (information not required to be viewed on the based map). Information shown on frozen and unfrozen layers will be free of conflicts. Incorporate utility base CAD drawing provided by others into our base mapping. Andregg will not be responsible for any of the data shown on utility layers or any differences in horizontal and vertical datum shifts.

2.4. Plat and Legal Description

Complete field and office work to prepare plat and legal descriptions for temporary construction and/or permanent utility easement for the preferred pipeline alignment. For project budgeting purposes, it is assumed ten new easements will require plat and legal descriptions to complete project construction.

Assumptions

- » After commencement of field survey efforts, if the surveyor more sees severe site conditions than assumed, additional scope may be required.
- » Excessive wet weather will increase the delivery date of our field surveys and the surveyor may modify the fee due to the weather delays.
- » The following are excluded from this task:
 - » Boundary Survey, Boundary Dispute Resolution or Monumentation
 - » Preparing a Record of Survey
 - » Ground Penetrating Radar (GPR) or subsurface exploration
 - » Easement resolution or Staking Easements
 - » Review of Title Reports
 - » USA Notification

Deliverables

- » AutoCAD Civil 3D 2018 .dwg file containing the base map and legend
- » Land XML file
- » One printed copy of the survey
- » ASCII point file in PNEZD comma delimited format

Task 3: Environmental Constraint Analysis

Under this task, Stantec's environmental specialists will coordinate with the project engineers to review the pre-design report and other associated documents to assist with modification input that would help streamline the environmental permitting process. More detail on this task can be found in Task 7.

Task 4: Preliminary Engineering Analysis

Stantec will conduct preliminary engineering analysis necessary to confirm feasibility of project, selecting a preferred RW Pipeline alignment and set direction for detailed design. Preliminary engineering activities are described as follows:

4.1. Initial Research and Field Studies

Stantec shall complete preliminary field investigations, and research necessary to complete initial feasibility and alternatives analysis. The results of this task will be presented to Fort Bragg for discussion and consensus on preferred alignment alternatives that will be developed in more detail under the subsequent preliminary design report task(s). Initial research and field studies will include:

- Review existing data provided by the City and from site reconnaissance per the existing pipeline evaluation task
- Review surveying topographic data, existing property boundary, easement research for the existing RW pipeline alignment
- Research and review existing utilities present within the alignment using ABC Process as agreed upon by the APWA joint utilities coordination committee to collect Quality Level C information as defined by ASCE Standard 38-02 for the collection and depiction
- Review and incorporate geotechnical analysis in the preliminary design
- Review and incorporate environmental constraint analysis in the preliminary design
- Consolidate project constraints/preliminary design feasibility workshop

4.2. Preliminary Design Feasibility Workshop

Stantec will collect and review results of preliminary records research; geotechnical; environmental; easement and property boundary; and utility coordination information; project constraints and combined with the site reconnaissance information to analyze the feasibility of the project alternative, with particular emphasis on identifying “fatal flaws” and constraints and confirming alternatives

and design criteria necessary to complete preliminary engineering report(s) for RW pipeline. Stantec will facilitate a workshop discussion involving City staff to review the results and confirm project next steps. Stantec will prepare a workshop presentation including:

- Project location (map of project location and key areas of concern)
- Construction constraints (geotechnical, environmental, existing utilities, right-of-way, easement, encroachment, confirmation of key stakeholders)
- Project hydraulics (System design flows, cleaning velocities, hydraulic profile, maximizing capacity versus minimizing depth, etc.)
- Pipeline planning (Connections/transition between existing and new pipe segments, preferred alignment, pipe materials, trenchless versus traditional construction, protecting pipe failure in landslides and soft soils, and steep segments, etc.)
- Construction standards and project delivery (review City standards and if deemed necessary possible modifications required – particularly on steep terrain, etc.)
- Schedule confirmation (confirm critical path items, environmental processing, encroachment permit processing, Right-of-Way procurement, etc.)
- Confirm stakeholders (Coastal Zone, Jackson Demonstration State Forest, etc.) design requirements, discuss key areas of concern, and requirements of pipeline access and easements (gravel road, graded road, etc.)
- Preliminary cost estimate (30% contingency level)
- Construction project funding options (SRF, USDA, CDBG and others)

4.3. Preliminary Engineering Analysis/Report

Stantec will incorporate the City's comments, project constraints, and our engineering analysis in the final PER. This report will describe the project findings, constraints, background data listed in the Appendix, project practicability analysis and new RW Pipeline design criteria. Stantec has successfully completed similar reports in past for many pipeline projects needing for the federal or state agency funding such as USDA, CDBG, and SRF sources. Below is the outline of the PER that will tailored to City desired funding source.

Sample PER Outline

01. Project Planning

- a. Location
- b. Environmental resources present
- c. Population trends and community development
- d. Community engagement

02. Existing Facilities

- a. Location map
- b. History
- c. Conditions of existing water system
- d. Financial status of Agency/rates
- e. Applicable Water/energy/waste audits

03. Project Needs

- a. Health and safety
- b. Aging infrastructure
- c. Accessibility concerns

04. Pipeline Alignment Alternatives and Hydraulics

- a. Description
- b. Design Criteria/Project Practicability Analysis
 - i. Pipeline hydraulics
 - ii. Pipe Size
 - iii. Pipe material
 - iv. Pipe appurtenances
- c. Environmental Constraints
- d. Geological & Seismic Constraints
- e. Trenchless Feasibility Analysis
- f. Constructability Issues
- g. Land/Easement Requirements
- h. O&M and accessibility
- i. Sustainability Considerations

05. Selection of an Alternative

- a. Project constraint comparison
- b. Life cycle cost analysis
- c. Construction Cost comparison
- d. Preferred alternative alignment
- e. Total cost (OPCC)

06. Project Funding Options

- a. DWSRF
- b. USDA
- c. CDBG

07. Implementation and Schedule/Phasing Impacts

08. Preliminary Drawings

- a. Plans and Profiles
- b. Technical specifications

Deliverables

- » Preliminary Design Feasibility Workshop (agenda and presentation)
- » Draft Preliminary Engineering Report (pdf sent by email)
- » Final Preliminary Engineering Report (3 hardcopies + PDF)

Task 5: Geological and Geotechnical Analysis

Below is the scope of services for the geological and geotechnical analysis task:

5.1. Research and Review Existing Documentation

Review readily available subsurface information for the site and nearby locations including previous geotechnical investigations

5.2. Geo-Hazard Evaluation

Perform a geologic hazard evaluation of the existing and proposed pipeline alignment

- Conduct a detailed site walk of the proposed pipeline route to perform the Geo-Hazard Evaluation by a Certified Engineering Geologist. The engineering geologist will observe and map outcrops and landforms to evaluate potential geologic hazards along the proposed pipeline alignment. A Geo-Hazard Evaluation Report will be prepared to summarize the observed conditions and provide opinions with regard to existing hazards and possible mitigation
- A preliminary geologic site reconnaissance will be performed for the Preliminary Engineering Report prior to performing the Geo-Hazard Evaluation. A memorandum will be prepared to summarize the findings from the preliminary geologic site reconnaissance
- In order to perform this evaluation, the proposed pipeline route will need to be sufficiently marked out in the field so that the alignment can be followed. Property access conditions will also be needed for the site reconnaissance activity

5.3. Limited Subsurface Investigation

A limited subsurface investigation will be performed at selected locations to characterize the shallow (approximately four feet to eight feet deep) subsurface soil conditions. A subcontracted rubber tire backhoe will be used to excavate approximately 4 shallow test pits at the following locations:

- One to two test pits will be excavated adjacent to an existing road at the north end of the alignment, several hundred feet north of an area where a 2003 slope repair was performed. Relatively shallow slope instability has been observed at the proposed test pit location. The purpose of the test pits is to evaluate if there is competent soil within the depth of the shallow test pits. The presence of competent soil may provide a target depth for a pipeline trench.

- One to two test pits will be excavated along accessible areas at the southern portion of the proposed pipeline alignment. The specific locations of these test pits will be determined in the initial stages of the project. The purpose of these test pits is to characterize the shallow subsurface conditions in order to provide recommendations relative to trench depth, bedding material, and excavation characteristics.
- The test pits will be backfilled with the excavated soil immediately after the test pit is logged and sampled.
- In order to perform this evaluation, the proposed pipeline route will need to be sufficiently marked out in the field so that the test pits can be adequately located. Property access permission and utility mark out will also be needed for the test pits.

5.4. Laboratory Tests

Perform geotechnical laboratory tests on selected samples including gradation and corrosion potential.

5.5. Geotechnical Report

Summarize findings, conclusions, and recommendations in a geotechnical investigation report including an exploration plan, geologic maps, test pit logs, cross-sections, and laboratory test results. The results of the field and laboratory test programs will be evaluated to develop conclusions and preliminary recommendations regarding:

- Subsurface soil conditions beneath the site
- Potential geologic hazards
- Excavation characteristics
- Corrosivity of selected on-site soil with respect to metal and concrete
- Seismic design parameters, as specified by the 2016 California Building Code
- Recommendations for pipe bedding and backfill
- Mitigation options for geologic hazards as necessary

5.6. Design Support

Stantec will work with the City and review the geotechnical scope for the design support based on the preferred RW pipeline alignment. Below are the assumptions and exclusions to be included for the geological and geotechnical analysis.

Assumptions/Exclusions:

- » Site access and permission for the test pit excavation and geo-hazard evaluation will be coordinated by others.
- » The proposed pipeline alignment will be sufficiently marked out by others prior to our work.
- » Underground utility mark-out and clearance will be provided by others.
- » Traffic control, including delineators and caution tape, will not be required.
- » Test pits will be backfilled with excavated materials. The excavated soil is assumed as non-hazardous.
- » Additional services can be provided on a time and materials basis as needed.

Deliverables

- » Draft and Final Geotechnical Investigation Report (PDF sent by email)



↑ Geotechnical Laboratory Testing

Design

Task 6: Preparation of Construction Documents

Stantec will prepare contract documents (improvement plans, technical specifications and cost estimates) in three submittals: 60%, Draft 100% and Final 100% (Final Bid Documents). The Concept PER will serve as the foundation for detailed design and the effort put into producing a very high quality and detailed preliminary design will pay off exponentially in detailed design execution. Prior to each submittal, the work product will be reviewed and revised through Stantec QA/QC process. Submittal of the 60% review document will occur at Project Review Meeting with the entire project team. The submittal will be presented to City staff to familiarize the group with the information submitted and the design thought process behind the work. Following the Project Review Meeting, City staff will have a 2-week review period to provide any additional comments which were not brought forward in the Project Review Meeting. In our experience, this kind of active review of submittal documents more fully engages the entire project team in the design process.

6.1. 60% Improvement Plans and Technical Specifications

At this stage, the design of all new pipeline infrastructure will be completed. Stantec design staff will present a near complete design to City staff so that staff can more easily and thoroughly visualize how the finished facilities will look and function. This approach to the 60% submittal allows for a clearer understanding of facility layout, access and clearance issues, and overall system functionality. The detailed drawings, technical specifications and Opinion for Probable Construction Cost (OPCC) for the 60% deliverable will provide a path towards a complete pipeline project.

6.2. 100% Bid Documents

The 100% design submittal will be a complete project package, with all design drawings, details and specifications completed and ready for City chosen funding source. The period between the 60% and 100% will solely be dedicated to inter-disciplinary coordination, “funding ready” set and final QA/QC checking of all documents. This submittal will incorporate plan and section detail drawings per project constraints, QA/QC comments, constructability issues, phasing and sequencing approach for the entire project and to acquire project funding. This provides for clear drawings and reduced risk on the bidding contractors’ part. The draft 100% design set for funding source will be reviewed by the City and by funding agency to assure that all comments have been recognized and addressed by Stantec.

The final 100% Bid Documents submittal incorporates comments provided by Fort Bragg at the previous design stage, funding agency and QA/QC comments generated by Stantec’s QA/QC review team, and OPCC of the project. The result is clear, complete, cross-checked bid-ready design documents. Stantec will prepare a complete 100% set to confirm compliance with all permitting, funding requirements and other final coordination items. Stantec will make minimal final revisions and produce a Final 100% Bid Documents.

Deliverables

- » 60% Drawings, Specifications and OPCC (pdf send by email)
- » Draft 100% Drawings and Specifications (three hard copies of half-size drawings and pdf sent by email)
- » Final 100% Bid Documents (three hard copies of full-size and half-size drawings, three sets of bind technical specification, PDF, and source files)

Additional Tasks

Task 7: Environmental Analysis and CEQA Documentation

Under this task, Stantec will provide environmental consulting services to assist in permit acquisition.

Stantec has completed environmental compliance services on similar pipeline and SRF-funded projects to facilitate over \$300 million in funds for our public agency clients. We know the regulators and the SRF environmental review unit staff well and can therefore streamline the process to the extent practicable. That said, phased construction will likely occur over an extended period of time. The environmental issues may need to be revisited and updated or modified during the design and/or construction process.

7.1. Environmental Constraints Analyses

Under this task, Stantec environmental staff will review existing documentation pertinent to the biological and cultural resources in the project area and further identify potential environmental issues that may need to be addressed in the environmental compliance documentation. Specifically, Stantec will review up to date data from the following background information related to the Project:

- National Wetland Inventory (NWI) data
- Existing Soil Survey Data
- California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB)
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) online database
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants in California online database
- California Register of Historical Resources database
- U.S. Geological Survey (USGS) topographic maps
- National Register of Historic Places
- Baseline documents from Fort Bragg and the Jackson Demonstration Forest
- North Western Information Center (NWIC) records search
- Aerial photos

We will work with the project engineers to overlay environmental constraints on preliminary design drawings and thereby facilitate environmental impact avoidance and minimization and permit streamlining. The constraints analyses will include access roads and proposed staging and other additional work areas.

The deliverable for this task will be desktop environmental constraints maps provided to the project engineers to facilitate designs that avoid and minimize environmental impacts to the extent feasible. These maps would include: waters of the US, riparian area, biological resources, and cultural resource desktop database maps.

Stantec

7.2 Field Survey Preparation, Surveys, and Reporting

Under this task, local biologists will complete the following pre-survey preparation, survey, and technical reporting subtasks for biological and cultural resources:

- Review of database information collected during the environmental constraints analyses.
- Field logistics and preparation
- Field surveys:
 - Cultural Resources (It is assumed these surveys can be completed by one archaeologist over three days or less).
 - Botanical Resources (Early and Late Bloom)
 - Wetland Resources (delineation of waters of the U.S. and avoidance areas)
 - Biological Resources (habitat assessment and reconnaissance-level surveys for semi aquatic and terrestrial species). We assume no fisheries surveys are required due to stream impact avoidance.
 - Protocol-level surveys for Northern Spotted Owl. We assume Northern red-legged frog habitat will be avoided.

Deliverables

- » NHPA section 106 compliant cultural resource report. It is assumed that all cultural resources can be avoided and the project will entail no adverse effect on cultural resources. If potential impacts are unavoidable, Stantec will provide a separate scope for eligibility determinations and additional avoidance and mitigation support. We also assume no architectural history analysis will be needed for the proposed project.
- » Biological resource evaluation, suitable for supporting CEQA and CDFW Streambed Alteration Agreement. For California Endangered Species Act it is assumed that no take of state listed species will occur.
- » Biological assessment suitable for supporting federal endangered species act consultations for northern spotted owl, marbled murrelet, and nesting migratory birds. It is assumed adverse effects on these species will be avoided during the design phase and therefore informal consultations and a may affect, not likely to adversely effect determination is assumed.
- » Aquatic resource delineation (formally termed a wetland delineation report) to inform avoidance options and form the basis for Clean Water Act section 404 permitting should avoidance be infeasible.

Schedule

Given that the northern spotted owl surveys will likely be required due to their prevalence in the area, a two-year survey timeline will be necessary. All other surveys and reporting can fit into this timeline.

7.3. CEQA Compliance (IS/MND)

Under this task, Stantec will first develop a draft CEQA-compliant Project Description based on the pre-design report, for approval by the City. The Project Description will describe the site's location, property ownership, historic; current uses; and condition, Project history, existing access road, a list of agencies that are expected to use the CEQA document, required permits and other approvals needed for the Project, and other federal, state, or local regulatory requirements, if any. This section will include graphics to illustrate the site and the Project. We will utilize the baseline survey data and Project footprint provided by the project engineers, including tree locations and topography. We assume the pre-design report will include a description of the Project need, construction methods, timing, and equipment, including estimated truck trips and fill volume.

Stantec will prepare an Administrative Draft ISMND for the Project in accordance with the most recent version of the CEQA Guidelines Appendix G checklist. The analysis will address all CEQA resource topics.

Scopes for the more complex topics are detailed below.

- **Biological Resources:** Stantec will use the desktop analysis completed as a part of the constraints analyses and the field data collected during surveys to define the baseline. The data will be collected in a manner suitable for CEQA analysis and permitting. Under this task, Stantec will adapt those results to the CEQA biological resources section covering potential impacts and mitigation solutions.
- **Cultural and Tribal Cultural Resources:** Under this task, Stantec cultural resources staff will complete the Cultural Resources and Tribal Cultural Resources sections of the ISMND. We will use content from the NHPA Section 106 report for the Cultural and Tribal Cultural resource sections as needed.
- In accordance with AB 52, the CEQA lead agency (City) is required to offer the opportunity to consult to Native American representatives within 14 days of undertaking a project as part of the CEQA process. Stantec will assist the City with AB 52 consultations and complete the following:
 - If the City does not already have a list of Native American Tribes that have requested to be consulted, Stantec will contact the Native American Heritage Commission (NAHC) on behalf of the City and request a Local Government Tribal Consultation List and a Sacred Lands File Search for the Project Area.
 - Once a response is received from the NAHC or a list of Native American contacts is provided by the City,

Stantec will draft and send letters notifying the Native American representatives of the Project. Letters should be on City letterhead and signed by the City Project Manager. We assume one round of City review of the letter.

- If Native American representatives request consultation on the Project, Stantec can provide additional support on an hourly basis.
- **Air Quality, Greenhouse Gases, and Noise:** It is assumed the project engineers will provide conceptual construction techniques, durations, and construction equipment to complete the Air Quality, Greenhouse Gases, and Noise impacts analysis. Stantec will use this information to run the required air quality analyses model, CalEEMod.

Stantec will prepare and submit the Administrative Draft ISMND to the City for review. We assume that the City will provide one consolidated set of comments on the Administrative Draft ISMND. Upon receipt of the ISMND comments, Stantec will make necessary revisions to prepare and submit the screen check Draft ISMND to the City. It is assumed that comments on the Draft ISMND will be minimal.

After implementation of screen check draft comments, Stantec will prepare the Public Draft ISMND. This is the version of the document which will be circulated to the public, posted on the City website, and submitted to the County Clerk and State Clearinghouse. Stantec understands that the City will prepare all public notices, newspaper notices, citizen mailings, etc., however, we can provide such services under a separate scope if needed. Stantec will complete the Notice of Completion (NOC) form and submit 15 summary sheets and electronic copies (CDs) of the CEQA documentation to the State Clearinghouse. Stantec will provide the City with five bound hard copies and one electronic copy (PDF) of the public version of the ISMND. It is also assumed that the City will be responsible for further distribution of the ISMND as required by law (i.e. placement of copies at City and a library nearest the Project site). Stantec will also prepare a Mitigation Monitoring and Reporting Program (MMRP) for the Project ISMND.

Deliverables

- » One digital copy of the Administrative Draft ISMND
- » Public Draft ISMND - five hardcopies and one digital copy
- » County one hardcopy of the NOC and CEQA document and State Clearinghouse one hardcopy of the NOC, 15 hardcopies of the Summary Form, and 15 CDs of the entire document.
- » One digital copy of the Project MMRP

7.4 Permit Applications and Agency Coordination

Stantec will coordinate the following environmental permit applications with regulatory agencies, in accordance with the preliminary Project design. Should the Project design change requiring changes to required permits or agency coordination, Stantec will provide the City with a revised Scope and adjust fees accordingly.

USACE CWA Section 404 Compliance Support

Work in and near drainages to the Noyo River and Hare Creek may require placement of fill in a waters of the U.S. requires Clean Water Act (CWA) Section 404 compliance. Stantec will prepare a CWA Section 404 Nationwide Permit (NWP) Pre-construction Notification (PCN) (i.e., permit application) for submittal to the United States Army Corps of Engineers (USACE). It is assumed based on the relatively small area of effect to Waters of the U.S. (WOTUS) and Waters of the State that the City would seek authorization under an existing Nationwide Permit (i.e., most likely Nationwide Permit 12 for Utility Line Activities). Stantec will prepare a PCN, as required. The PCN will include an impact assessment and figures, as well as the acreages of jurisdictional features that will be impacted. It will also include a required Aquatic Resources Delineation Report developed under the survey and reporting task listed above. The Aquatic Resources Delineation typically takes 45+ days to verify and the NWP typically takes 90+ days for approval. Stantec will submit both documents simultaneously and continue to coordinate with the USACE to expedite the timeline.

FESA Section 7 and Migratory Bird Treaty Act (MBTA) Compliance Support

Federal agencies, prior to issuing a permit or providing funding, must verify compliance with Section 7 of Federal Endangered Species Act (FESA) with the US Fish and Wildlife Service (USFWS).

Regarding USFWS Consultations: Under this task Stantec will staff will use the Biological Assessment (BA) report to seek a confirmation of the finding of No Effect or No Adverse Effect on, northern spotted owl, marbled murrelet and nesting migratory birds. The BA will be prepared for submittal to the USACE and USFWS to facilitate their FESA compliance documentation. Informal consultation between the USACE and USFWS typically takes 90+ days and formal consultations can take 180 days. We assume informal consultations are practicable due to impact avoidance; however, if impacts can't be avoided, the longer timeline and additional scope services will be required. Under this task Stantec will continue to work with USFWS and the USACE to expedite the timeline, to the extent feasible.

Regarding marbled murrelet, we assume impacts can be avoided and therefore the USFWS will concur with a not likely to adversely effect determination.

NHPA Section 106 Compliance Support

The USACE or Federal Funding Agency must verify compliance with Section 106 of the National Historic Preservation Act (NHPA) prior to issuing a permit. The USACE requires a Cultural Resource Report that meets the published standard requirements to facilitate their coordination and verification process with the State Historic Preservation Officer (SHPO).

Under this task, Stantec assumes that a finding of no historic properties affected will be appropriate and that no eligible cultural resources will be within the APE.

Stantec will provide the Section 106 compliant report developed under the survey and reporting task above to the USACE and the federal funding lead agency. USACE and SHPO typically takes approximately 90 days; however, this can vary. Stantec will implement the following to move the process forward as quickly as possible: 1) Stantec will develop the APE immediately, in coordination with the City and the USACE, to include access areas and staging sites; 2) Stantec will also complete Native American outreach to assist and likely expedite the USACE's Native American Consultation process; and 3) Stantec will check-in with the USACE frequently to facilitate their review and SHPO review coordination process.

RWQCB CWA Section 401 Compliance Support

The work in and adjacent to waters of the U.S., triggers the need for a Regional Water Quality Control (RWQCB) Water Quality Certification (WQC). Stantec will prepare a Section 401 WQC application for submittal to the RWQCB. Stantec will prepare the standard application form including figures depicting acreages of jurisdictional features that will be impacted. We assume the City will pay the permit fees associated with this process directly to the RWQCB, based on instructions provided by Stantec.

The WQC application is generally submitted at the same time as the PCN and takes approximately 90 days for WQC permit issuance. The issuance of this WQC is contingent upon proof of CEQA compliance.

CDFW LSA Section 1600 Compliance Support

Work within drainages that are tributary to Noyo River and Hare Creek and riparian habitat triggers the need for a California Department of Fish and Wildlife (CDFW) Lake Streambed Alteration Agreement (LSAA) prior to construction. Stantec will prepare a LSAA application for submittal to the CDFW. Stantec will prepare the standard LSAA notification form along with figures and acreages of jurisdictional features that will be impacted. We assume the City will pay the permit fees associated with this process directly to the RWQCB, based on instructions provided by Stantec.

CDFW has 30 days to deem this application complete and 60 days to issue the LSAA (i.e., permit). The issuance of this LSAA is contingent upon proof of CEQA compliance. As such to expedite the process, Stantec will submit the application concurrent with the CEQA process such that the permit is ready for issuance upon CEQA completion.

Deliverables

- » USACE NWP PCN – application
- » RWQCB WQC application
- » CDFW Draft LSAA application

Note: The NHPA Section 106 Compliant Report, Biological Assessment, Biological Resource Evaluation, and Aquatic Resources Delineation are included in the survey and reporting task above.

Task 8: Timber Harvest Plan

8.1. Preparation of Timber Harvest Plan

- Construction will require removal of many trees which will need a Timber Harvest Plan (THP). It is anticipated that each phase will require its own THP. The documents should be prepared such that adjustments can be readily implemented. Describe how your firm or sub-consultant can accomplish this.

Task 9: Construction Funding Application

The DWSRF program currently offers debt financing at interest rates that are one-half of the State's most recent General Obligation (GO) Bond rate (current DWSRF rate at approximately 1.8%) and a financing term of 30 years. However, based on the City population and MHI, the City is eligible for to receive grants up to \$5 million per project under the DWSRF small communities program. While the current focus is for the Raw Water Transmission Line Replacement Project, it should be noted that the City is also eligible for grants related to other water supply, storage, treatment or distribution projects.

The following sections outline the tasks necessary to apply for construction funding on behalf of the City for the proposed project.

9.1. DWSRF General Application

The DWSRF preliminary funding application will be developed in coordination with City staff and submitted to the DFA.

9.2. DWSRF Technical Package

The DWSRF Technical application will be developed in coordination with City staff and submitted to the DFA. There are two major elements of the Technical application. These include 1) the Project Report and 2) the Technical, Managerial, and Financial (TMF) Assessment Form.

The Project Report requirements are specified by the DFA, but generally describes all of the components of the project including why the project is needed, who it will serve, the specific project improvements and the estimated costs. This includes:

- Review the existing facilities and their operation.
- Assess the constructability/feasibility of the system improvement alternatives.
- Prepare a report section summarizing the system alternatives evaluation
- Preliminary layouts and site plans
- It is assumed that much of the Project Report technical information will be developed in the Preliminary Design Report (PDR) developed in separate tasks. The Project Report will capitalize in the PDR data, but must add to in keeping with the DWSRF program requirements.
- The Project Report can also serve as the information source to complete submittals supporting parallel funding requests, such as those required by CDBG or USDA, as deemed appropriate by the City. Each of these funding programs require the "report" data be presented in a specific format and so the Project Report proposed here can be restructured and augmented as needed for each program.

In California, a TMF Assessment must be completed by public water systems that are applicants for funding. This requirement helps ensure that public water systems have long-term sustainability and are able to maintain compliance with all applicable drinking water laws and regulations. The TMF Assessment includes a significant amount of information regarding the technical and financial management of the water operation/fund including the following elements:

- **Technical:** Consolidation Feasibility, System Description, Certified Operators, Source Capacity, Operations Plan, Training
- **Managerial:** Ownership, Water Rights, Organization, Emergency Response Plan, Policies
- **Financial:** Budget/Capital Improvement Plan, Budget Control

9.3. DWSRF Financial Security Package

Another critical component essential to DWSRF approving the loan is the Financial Security package. In preparing the Financial Security package, Stantec will look at the financial health of the City's Enterprise Fund. The information presented in the Financial Security package will be used by DFA to determine the borrowing capabilities of the City. The DFA policy requires this information even if the funding will be provided as a grant or in the form of principal forgiveness. Therefore, ensuring a favorable determination is imperative to the overall success of the financing and DWSRF application process.

The City will need to provide substantial information to DFA to facilitate their evaluation of the Financial Security package. Stantec will assemble and provide the information in a cohesive format that will demonstrate the City's ability to borrow and repay any loan funds, or in the case of a grant or principal forgiveness, the City's ability to maintain the value of the funding provided through good operation and maintenance practice and a sound fiscal standing, long term. It is assumed that the City will participate and provide the underlying or supporting documentation needed for the Financial Security package. Legal opinions, resolutions, and other completed forms such as the tax questionnaire are also included within this task.

9.4. State Revolving Funds (SRF) Federal Funding Environmental Compliance Assistance

Stantec will assist the City with the environmental compliance requirements for SRF Federal funding, including compliance with biological, cultural, and air quality regulations. Under this task supplemental, federally compliant resource reports will be prepared in addition to completion of the SRF ERU Checklist.

SRF ERU Environmental Compliance Support Services will also include finalizing the required SRF-specific environmental checklist ("federal cross-cutting forms") that must be included along with any necessary supplemental resource reports.

9.5. DWSRF Application Facilitation and Completion

Stantec will facilitate the application process for the City and help see the application through the various DWSRF project approvals. This includes checking in with DWSRF staff via phone and email on a regular basis generally ensuring that DWSRF staff has what they need to continue processing the City's application.

To minimize costs, it is assumed that Stantec coordination and review with DWSRF and City staff will primarily be performed via phone and email. No face to face meetings with the City and DWSRF staff are assumed in this scope.

9.6. CDBG, USDA or other funding support allowance.

As noted, it has already been determined that the City is eligible for \$5M in DWSRF grants and that this value may be roughly equal to the required project budget. Further, because the City plans to phase the project, not all of the funding will be required in the first project phase and therefore, there will be time to assess if additional funds are needed and to initiate the application process in advance of the later project phases. This task, therefore provides an allowance of \$5,000 to discuss and coordinate with the City and alternative funding sources the need for, and viability of applying for, additional funds. If it is determined that additional funds should be sought, Stantec will coordinate and scope that specific effort with the City, as needed.

Deliverables

- » Complete Construction Application
- » Technical Report
- » TMF Binder
- » Environmental Checklist
- » Financial Status Memo

Task 10: Utility Location and Research

As an optional task, Stantec can provide a scope and fee to research existing utilities and RW pipelines via a Ground Penetration Radar (GPR), probing for the pipeline, Electronic Detection (ED) equipment or by other means.

Deliverables

- » Utility locating marks
- » AutoCAD drawings with demarcations and utility base map



Budget and Schedule of Charges

Our goal is to provide **well-designed** projects that are built to last. To achieve this goal, we design our projects to have positive benefit-to-cost ratios that consider future maintenance needs up front.

Personnel Rate Sheet

We approach all projects with a realistic pricing strategy. Our price reflects accomplishing work in the most efficient and least costly manner, while preserving high standards of safety, professionalism, and quality.

Billing Level	Hourly Rate	Description
3 4 5	\$92 \$102 \$116	Junior Level Position - Independently carries out assignments of limited scope using standard procedures, methods, and techniques - Assists senior staff in carrying out more advanced procedures - Completed work is reviewed for feasibility and soundness of judgment - Graduate from an appropriate post-secondary program or equivalent - Generally, one to three years of experience
6 7 8	\$121 \$126 \$137	Fully Qualified Professional Position - Carries out assignments requiring general familiarity within a broad field of the respective profession - Makes decisions by using a combination of standard methods and techniques - Actively participates in planning to ensure the achievement of objectives - Works independently to interpret information and resolve difficulties - Graduate from an appropriate post-secondary program, with credentials or equivalent - Generally, three to six years of experience
9 10 11	\$142 \$147 \$158	First Level Supervisor or First Complete Level of Specialization - Provides applied professional knowledge and initiative in planning and coordinating work programs - Adapts established guidelines as necessary to address unusual issues - Decisions accepted as technically accurate; however, may be reviewed for soundness of judgment - Graduate from an appropriate post-secondary program, with credentials or equivalent - Generally, five to nine years of experience
12 13 14	\$166 \$175 \$185	Highly Specialized Technical Professional or Supervisor of Groups of Professionals - Provides multi-discipline knowledge to deliver innovative solutions in related field of expertise - Participates in short and long range planning to ensure the achievement of objectives - Makes responsible decisions on all matters, including policy recommendations, work methods, and financial controls associated with large expenditures - Reviews and evaluates technical work - Graduate from an appropriate post-secondary program, with credentials or equivalent - Generally, ten to fifteen years of experience with extensive, broad experience
15 16 17	\$196 \$216 \$224	Senior Level Consultant or Management - Recognized as an authority in a specific field with qualifications of significant value - Provides multi-discipline knowledge to deliver innovative solutions in related field of expertise - Independently conceives programs and problems for investigation - Participates in discussions to ensure the achievement of program and/or project objectives - Makes responsible decisions on expenditures, including large sums or implementation of major programs and/or projects - Graduate from an appropriate post-secondary program, with credentials or equivalent - Generally, more than twelve years of experience with extensive experience
18 19 20 21	\$232 \$240 \$250 \$265	Senior Level Management Under Review by Vice President or Higher - Recognized as an authority in a specific field with qualifications of significant value - Responsible for long range planning within a specific area of practice or region - Makes decisions which are far reaching and limited only by objectives and policies of the organization - Plans/approves projects requiring significant human resources or capital investment - Graduate from an appropriate post-secondary program, with credentials or equivalent - Generally, fifteen years of experience with extensive professional and management experience

Fee Schedule

Description	Billing Level	17	16	15	14	13	11	10	9	8	7	6	4	3	Stantec Subtotals		Sub-consultants	ODC Expenses	Subtotal	Total Cost
	Hourly Rate	\$224	\$216	\$196	\$185	\$175	\$158	\$147	\$142	\$137	\$126	\$121	\$102	\$92	Hrs	Cost				
PRE-DESIGN																				
Task 1: Project Management		40	32		112				14						198	\$38,580		\$1,500	\$1,500	\$40,080
1.1 Project Communication and Control		24			80				14						118	\$22,164				\$22,164
1.2 Project Meetings		16			32										48	\$9,504		\$1,500	\$1,500	\$11,004
1.3 Quality Assurance/Quality Control			32												32	\$6,912				\$6,912
Task 2 - Existing Pipeline Evaluation and Topographic Mapping		8			32					16					56	\$9,904	\$152,650		\$167,915	\$177,819
2.1 Research and Review Existing Documentation		8			32					16					56	\$9,904				\$9,904
2.2 Existing Pipeline Location and Site Visits																	\$60,000		\$66,000	\$66,000
2.3 Surveying																	\$68,650		\$75,515	\$75,515
2.4 Easement Documentations																	\$24,000		\$26,400	\$26,400
Task 3 - Environmental Constraint Analysis		8			24					16					48	\$8,424				\$8,424
3.1 Project Coordination and Report Review		8			24					16					48	\$8,424				\$8,424
Task 4 - Preliminary Engineering Analysis		44			128			32		164	24				392	\$63,732		\$350	\$350	\$64,082
4.1 Initial Research and Field Studies		8			24					40					72	\$11,712				\$11,712
4.2 Preliminary Design Feasibility Workshop		12			24			8		24					68	\$11,592		\$350	\$350	\$11,942
4.3 Preliminary Engineering Analysis/Report		24			80			24		100	24				252	\$40,428				\$40,428
Task 5 - Geological and Geotechnical Analysis		6	92		110	8			94	10					320	\$57,684		\$11,300	\$11,300	\$68,984
5.1 Research and Review Documentation					40				14						54	\$9,388				\$9,388
5.2 GeoHazard Evaluation			92			8									100	\$21,272		\$1,300	\$1,300	\$22,572
5.3 Subsurface Investigation and Soil Testing					30				40						70	\$11,230		\$10,000	\$10,000	\$21,230
5.4 Geotechnical Report		6			40				40	10					96	\$15,794				\$15,794
DESIGN																				
Task 6 - Preparation of Construction Documents		24	12		100					440	24				600	\$89,772				\$89,772
6.1 60% Improvement Plans, Specifications, and OPCC		24	8		40					200					272	\$41,904				\$41,904
6.2 100% Bid Documents			4		60					240	24				328	\$47,868				\$47,868
(Pre-Design & Design Tasks) TOTALS		130	136		506	8		32	108	646	48				1,614	\$268,096	\$152,650	\$13,150	\$181,065	\$449,161

Additional Tasks Fee Schedule

Description	Billing Level	17	16	15	14	13	11	10	9	8	7	6	4	3	Stantec Subtotals		Sub-consultants	ODC Expenses	Subtotal	Total Cost
	Hourly Rate	\$224	\$216	\$196	\$185	\$175	\$158	\$147	\$142	\$137	\$126	\$121	\$102	\$92	Hrs	Cost				
ADDITIONAL TASKS																				
Task 7 - Environmental Analysis & CEQA Preparation		16	32		128	100	186	120		134		112		18	846	\$132,270	\$24,000	\$3,090	\$29,490	\$161,760
7.1 Environmental Constraint Analysis		4			8		16			24					52	\$8,192				\$8,192
7.2 Field Survey Preparation, Surveys, and Reporting		4	12		40	100	50	120		50					376	\$60,778	\$24,000	\$2,340	\$28,740	\$89,518
7.3 CEQA Compliance (IS/MND)			12		40		40			60		80		12	244	\$35,316		\$750	\$750	\$36,066
7.4 Permit Applications and Agency Coordination		8	8		40		80					32		6	174	\$27,984				\$27,984
Task 8 - Timber Harvest Plan					16					24					40	\$6,248	\$50,000		\$55,000	\$61,248
8.1 Preparing Timber Harvesting Plan					16					24					40	\$6,248	\$50,000		\$55,000	\$61,248
Task 9 - Funding Assistance and Acquisition		62	4	67	32		16	148	192		4				525	\$85,856	\$0	\$1,000	\$1,000	\$86,856
9.1 DWSRF General Application		2		1					8						11	\$1,780				\$1,780
9.2 DWSRF Technical Package		44		24	16		16	132	108						340	\$54,788		\$1,000	\$1,000	\$55,788
9.3 DWSRF Financial Security Package		2		16					24						42	\$6,992				\$6,992
9.4 DWSRF Federal Funding Env Compliance Assistance			4					16	8		4				32	\$4,856				\$4,856
9.5 DWSRF Application Facilitation and Completion		8		16					32						56	\$9,472				\$9,472
9.6 CDBG, USDA, or Other Funding Support Allowance		6		10	16				12						44	\$7,968				\$7,968
(Additional Tasks) TOTALS		78	36	67	176	100	202	268	192	158	4	112		18	1,411.0	\$224,374	\$74,000	\$4,090	\$85,490	\$309,864



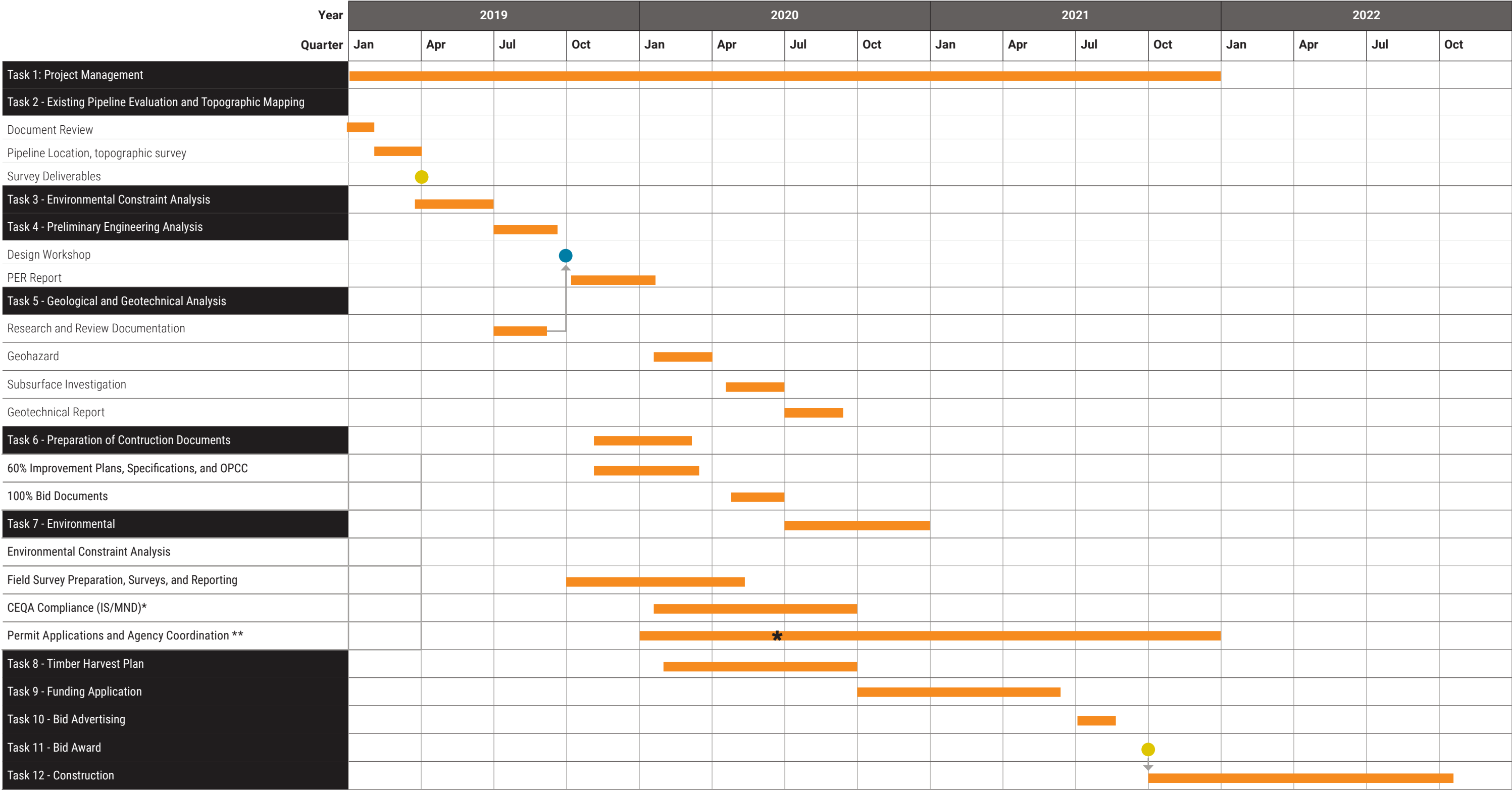
Work Schedule

Our proposed schedule delineates the time estimates for the specific subtasks identified in the Scope of Work. We are confident that with our unique qualifications and specialized team, successful development of the Raw Water Line Replacement Project will be completed on time.

Anticipated Project Schedule

Reliable and flexible

We understand the importance of timelines and quality. No matter how aggressive the schedule, our resource capacity will help help ensure the project continues to run smoothly and on schedule. We will also work closely with you to determine key project milestones and then adjust our schedule to meet those milestones.



Notes:

- Deliverable
- Technical Workshop for City staff

* Assumes and Initial Study/Mitigated Negative Declaration is the appropriate CEQA disclosure document for this project.

** The worst case two plus year environmental permitting timeline assumes tree removal could impact Northern Spotted Owl (NSO) nests, and therefore requires a 2 year protocol-level survey for permitting. However, Stantec environmental staff and engineers will make it a priority during the early pre-design environmental constraints and permit streamlining process to facilitate a design that avoids and minimizes NSO and other impacts to the extent feasible, thereby reducing permit timelines, survey costs.



Insurance

We value our **clients** and our community, and we are committed to working with you on this raw water line replacement project.



CERTIFICATE OF LIABILITY INSURANCE

5/1/2019

DATE (MM/DD/YYYY)

4/26/2018

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

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

PRODUCER Lockton Companies 444 W. 47th Street, Suite 900 Kansas City MO 64112-1906 (816) 960-9000		CONTACT NAME: PHONE (A/C, No, Ext): FAX (A/C, No): E-MAIL: ADDRESS:		
INSURED 1415077 STANTEC CONSULTING SERVICES INC. 8211 SOUTH 48TH STREET PHOENIX AZ 85044		INSURER(S) AFFORDING COVERAGE		NAIC #
		INSURER A: Zurich American Insurance Company		16535
		INSURER B: Travelers Property Casualty Co of America		25674
		INSURER C: American Guarantee and Liab. Ins. Co.		26247
		INSURER D:		
		INSURER E:		
INSURER F:				

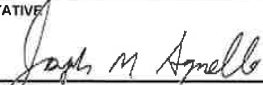
COVERAGES**CERTIFICATE NUMBER:** 14435166**REVISION NUMBER:** XXXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR ☒ CONTRACTUAL/CROSS ☒ XCU COVERED GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☒ PROJECT ☒ LOC ☐ OTHER	N	N	GLO0246172	5/1/2018	5/1/2019	EACH OCCURRENCE \$ 2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 25,000 PERSONAL & ADV INJURY \$ 2,000,000 GENERAL AGGREGATE \$ 4,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000 \$
B B B	☒ AUTOMOBILE LIABILITY ☒ ANY AUTO ☐ OWNED AUTOS ONLY ☐ HIRED AUTOS ONLY ☐ SCHEDULED AUTOS ☐ NON-OWNED AUTOS ONLY	N	N	TC2J-CAP-8E086819 TJ-BAP-8E086820 TC2J-CAP-8E087017	5/1/2018 5/1/2018 5/1/2018	5/1/2019 5/1/2019 5/1/2019	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ XXXXXXXX BODILY INJURY (Per accident) \$ XXXXXXXX PROPERTY DAMAGE (Per accident) \$ XXXXXXXX \$ XXXXXXXX
C	☒ UMBRELLA LIAB ☒ OCCUR ☒ EXCESS LIAB ☐ CLAIMS-MADE ☐ DED ☒ RETENTION \$ 10,000	N	N	AUC9184637	5/1/2018	5/1/2019	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000 \$ XXXXXXXX
B B B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N	N/A	TC2J-UB-8E08592 (AOS) TRJ-UB-8E08593 (MA, WI) EXCEPT FOR OH ND WA WY	5/1/2018 5/1/2018	5/1/2019 5/1/2019	☒ PER STATUTE ☐ OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
RE: TO WHOM IT MAY CONCERN

CERTIFICATE HOLDER**CANCELLATION**

14435166 TO WHOM IT MAY CONCERN	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE 

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ACORD 25 (2016/03)

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Consultant Agreement

We have reviewed your proposed RFP/contract terms and believe that should we be selected for this assignment, we will be able to conclude a mutually satisfactory contract with you.

We have reviewed your proposed RFP/contract terms and believe that should we be selected for this assignment, we will be able to conclude a mutually satisfactory contract with you.



1.

Addendum Forms

We acknowledge the receipt of Addendum 1 (issued 9-25-2018). Signed copies of all addendums are included on the following pages.

WITHOUT A SIGNED COPY OF THIS ADDENDUM MAY BE CONSIDERED NON-RESPONSIVE AND MAY BE REJECTED.

June Lemos, CMC, City Clerk September 25, 2018

The undersigned has received and read this addendum.

Stantec Consulting Services, Inc.	
Contractor	Signature

Name (Printed) Gabe Aronow Date October 26, 2018



2.

Résumés

We have assembled a strong team of our top experts to **deliver** the best project experience possible. On the following pages you will find information on their experience and why we selected each individual for this team.

Gabe Aronow, PE
Principal-in-Charge



Years of Experience

25

Education

MS, Environmental Engineering,
University of California, Berkeley

BS, Civil Engineering, University
of California, Berkeley

Registrations

CA, Professional Engineer #55307

Office Location

Nevada City, CA

Gabe's has more than 25 years of experience focused on planning, engineering design, and project management of water and wastewater projects. His work has ranged from planning and permitting through design, construction and operational support. He has led many significant planning, pipeline, and treatment design efforts, covering water distribution pipelines, storage and booster pump systems, sewers and sewer pump stations, force mains and gravity mains, raw sewage and effluent storage facilities, and wastewater disposal and reclamation facilities, including all aspects of the civil improvements required for complete municipal services.

Gabe's Relevant Project Experience

Mid-Western Placer Regional Sewer Project (Design), Placer County, California (Project Manager) // This regional project included a new high head sewage pump station to consolidate wastewater treatment for the City of Lincoln and western Placer County. The pump station included three (3) new 450 HP submersible sewage pumps, with redundant wet wells, two emergency storage basins and a 15-mile force main. The force main traversed a mountainous terrain with narrow corridors, rocky outcrops, narrow easements and significant environmental constraints. Facilities also included expanded wet well storage volume for pipeline flushing during low flow periods (summer), and basin flushing gates for cleaning the flushing storage after a pipe flush cycle. The facility also included 1.5 MW of standby power, odor control, pigging facilities and a SCADA system viewable from the wastewater treatment plant.

Bear River Siphon Replacement Design, Nevada Irrigation District, Nevada and Placer Counties, California (Project Manager) // Gabe managed the design of a 54-inch diameter inverted siphon replacement project, replacing the 45-year-old existing infrastructure traversing the Bear River Canyon. This project faced severe constraints including very steep canyon slopes in the range of 50% and necessity for keeping the system in service throughout the project timeline. The final design was value engineered and constructible to accommodate these constraints.

City of Lincoln Wastewater Treatment and Reclamation Facility (WWTRF), Lincoln, California (Lead Project Engineer) // Gabe lead the planning, design, and support during construction of this new green-field treatment facility for the City of Lincoln. The project included siting work, sewer routing, effluent pipe routing, storage, and land disposal in addition to design of 4.2 Mgal/d ADWF of new Title 22 treatment capacity, with oversizing for efficient expansions. Gabe was responsible for the design of the hydraulic profile of the facility and all hydraulic conveyance components of the project, including the influent pump station, maturation pond pump station, filter feed pump station and effluent pump station. Other pump stations included the high pressure plant water pump station, filter backwash pump station, plant drain pump station and reclamation run-off return pump stations. All pumping facilities included redundant equipment and pumps ranged from low head submersible sewage pumps to high head vertical turbine pumps.

Inflow and Infiltration Reduction Project, Grass Valley, California (Project Manager)

// The City of Grass Valley wastewater master plan identified many aged and deficient pipe segments as well whole collection areas totaling near 11 miles of pipe with deficient capacity and with significant amounts of inflow and infiltration (I/I). As a disadvantaged community, Stantec was able to define an I/I improvement project for which the city is eligible for \$5M in State grants. This project is currently poised to move into design and is anticipated to use a variety of rehabilitation techniques, including slip lining, CIPP, pipe bursting and replacement.

County of Madera Maintenance District No. 19 Water Storage, Pressurization, and Distribution System Project (Project Manager and Engineer)

// The Madera County Maintenance District No. 19, required emergency provisions to provide a supplemental water supply to the District, including connection to a well, storage, a booster pump station and pipeline connections to the community distribution piping. This was designed over the spring of 2016, and completed and operational that summer to address drought concerns and provide a reliable water source. Piping included new 6-inch and 8-inch distribution piping, a 400,000 gallon steel tank and a 300 gpm booster pump station and piping connections to the District water system.

County of Madera Maintenance District No. 33 Wastewater Collection and Treatment Alternative Evaluation (Project Manager and Engineer)

// The Madera County Maintenance District No. 33, also known as Fairmead, is a small community of approximately 700 people and a regional elementary school. The community is exclusively served with septic systems; they are over 50 years old, positioned on sub-standard sized lots, are located over the community water supply (groundwater) and the absence of a more viable wastewater system has deterred economic growth and development from the community. This study considered multiple means of sewer collection, treatment and disposal. The collection system alternatives considered conventional gravity sewers, STEP systems and vacuum systems. Treatment options considered utilizing on-site treatment plants (ponds) with land disposal, onsite activated sludge plants with crop irrigation and Title 22 tertiary disinfected effluent compatible with a surface water discharge. Also considered was regionalizing to a neighboring POTW – the City of Chowchilla. A life cycle cost analysis suggested a gravity sewer collection system with a pump station and four mile 6-inch force main to the City of Chowchilla as the recommended wastewater solution. The pump station will utilize a submersible pump configuration with redundant pumps, back-up power, odor control provisions and emergency storage.

Valley Springs Public Utility District Wastewater Treatment Alternatives (Project Manager and Engineer)

// The Valley Springs PUD provides water and wastewater service to City of Valley Springs with approximately 750 people. The District's WWTP site is at risk of flooding by adjacent Cosgrove Creek as a result of natural wetlands formation around the site and current effluent storage volume and summer spray field areas are inadequate to contain all effluent under 100-year rainfall conditions at current influent flows. Sludge handling facilities are also deficient and the site has become landlocked by development. The recommended project includes a relocating the treatment plant to a remote site on high ground with a new pump station and force main. The existing site would be retrofitted to provide emergency storage and the existing generator retained for the new pump station. The pump station will have back-up pumps, odor control and pigging facilities to service the pipelines.

Wastewater Collection, Treatment and Disposal Facilities Assessment and Master Planning, Grass Valley, California (Project Manager)

// This project included development of a wastewater collection, treatment and disposal facilities master plan for the City of Grass Valley. The plan balanced cost with the need quality facilities that will provide compliant operation. Plan development involved public meetings and negotiations with developers. The City's system includes approximately 65 miles of pipelines ranging in size from 4-inch to 30-inch diameter constructed of a wide variety of materials. In addition to completing the system assessment and master plan, assistance was provided in seeking financial assistance and funding for the project. The City of Grass Valley is designated a small disadvantaged community by the State Water Board Division of Financial Assistance (DFA) and has allotted just under \$500,000 in planning grant funding through the DFA Small Communities program.

City of Lincoln Chambers Drive Sewer, Lincoln, CA (Project Manager and Engineer)

// The City of Lincoln constructed a new treatment plant that came on line in 2004, but many of the old sewers continued to flow by gravity to the old WWTP site, where they were pumped to the new plant. In 2015, a project was completed to install new 30-inch sewers to intercept the existing gravity lines and divert the sewage to the new treatment plant by gravity. This enabled the old WWTP pump station and site be decommissioned and the old WWTP permit rescinded, saving the City the cost of maintenance and operation, as well as the liability of the old pump station, and sell the land to new in-fill development within the City. This project was completed successfully in 2015.

Jigar Shah

Project Manager



Years of Experience

20

Education

MS, Civil Engineering - Water Resources/Water Quality, California State University Sacramento

BS, Environmental Engineering, California Polytechnic State University, San Luis Obispo

Registrations

CA PE #66080

Memberships

Member, North American Society for Trenchless Technology

Member, California Water Environment Association

Member, Water Environment Federation

Office Location

Rocklin, CA

Jigar has experience managing various phases of planning, design, and construction management for new and existing wet utility infrastructure projects. His experience is primarily in rehabilitation and replacement projects, pipeline and pump station design, tank and reservoirs design, trenchless technology, and construction management. In addition, his experience includes master planning, project management, hydraulic analysis, permitting, planning and design, cost estimating, and bid documents. He also serves as a Resident Engineer for sewer, storm drain and water conveyance facility projects. Many of his projects have included significant trenchless technology components such as Horizontal Directional Drilling (HDD), Auger Bore and Jack (BJ), Pilot Tubing (PT), and Microtunneling (MTBM). Jigar has extensive background in sewer collection system and rehabilitation, construction inspection and review, pipeline design, and project management.

Jigar's Relevant Project Experience

Loomis Diversion Sewer Project*, South Placer Municipal Utility District, Loomis, California (Project Engineer/Resident Engineer) // Jigar provided preliminary engineering and PSand E for the approximately 7200 linear feet of new 15" to 18" open-trench gravity sewer pipe with two trenchless crossings. The project consists of planning; design; environmental permitting; ROW procurement; survey; geotechnical investigation; and trenchless construction methods. He coordinated with several property owners for project activity access, Caltrans, and utility agencies. During the construction phase of the project, Jigar acted as a resident engineer for SPMUD. Several challenges occurred during construction such as unexpected finding of granitic rock underground and perch groundwater within pipe trenches. Areas with granitic rock were removed by controlled trench blasting method. Jigar prepared blasting specs, managed the contractor and geo-refraction monitoring sub-consultant at the job site. Jigar coordinated daily construction operations with the contractor, environmental subconsultant, utility agencies such as PGand E, acquired necessary permits and managed weekly project update meetings.

Foothills Trunk Sewer Replacement*, South Placer Municipal Utility District, Rocklin, California (Project Engineer) // Jigar provided engineering and PSand E for approximately 2275 linear feet of new 24" gravity pipe from El Don Road, west along backyard easements adjacent to perennial creek/wetland, across the City of Rocklin/Placer County line, across Aguilar Rd., terminating west of the Creekside Village Apartment complex where it connects to the SPMUD Lower Secret Ravine Trunk Line. Services included planning; design; environmental permitting (401, 404, Streambed Alteration, Cultural Resources); geotechnical investigation; trenchless feasibility assessment; survey; and services during construction.

Upper Antelope Creek East Trunk Sewer*, South Placer Municipal Utility District, Penryn, California (Project Engineer/Resident Engineer) // Jigar was the project engineer for 8,000 linear feet of new 8" FPVC gravity sewer and decommissioning of Munoz Pump Station. Services included alignment study, final design and construction administration; hydraulics and pipe

material selection; utility coordination; ROW and easement procurement; environmental permitting and public outreach. He was responsible for hydraulic and pipeline design calculations, pipeline alignment, life cycle cost analysis and preparation of basis of design report. This project required coordination with multiple local and state agencies including the Placer County, Town of Loomis, and State Water Resources Control Board, as well as other existing utilities in the area. The construction period on this fast-track project was restricted by the nesting periods for raptors and migratory birds, along with potential of high groundwater and scattered hard granitic rocks rock cropping throughout the pipeline alignment.

Lagoon Seawall Trunk Sewer Relocation *, City of Alameda, Alameda, California (Project Manager) // Jigar provided design on the realignment of 1,000 linear feet of 8" VCP with new 8" gravity sewer using HDPE and FPVC; realignment of over 20 lateral connections; 350-LF of 8" pipe using trenchless guided boring method to limit public impact; a new duplex 350 GPM sewage pump station and 700-LF of 4" PVC forcemain; five residential E-One pump stations; and abandonment of 1,000-LF of pipeline suspended on a seawall and the associated lift station. Project services included alignment study, hydraulics; preliminary design report; final design and construction administration; utility coordination; encroachment and easement procurement services; environmental permitting, and significant public outreach. Jigar conducted field visit including GPS survey, door-hanger notices, meeting with the homeowners, and proposing several design options in serving the sewer service laterals. Jigar prepared a bid documents including design drawings for public right-of-way and private property infrastructure and specifications.

Sharon Heights Recycled Water Project*, West Bay Sanitary District, Menlo Park, CA (Pipeline Engineer) // The Sharon Heights Design-Build project consists of a 0.5 MGD recycled WTP at the Sharon Heights Golf and Country Club, recycled water distribution line, influent WW PS and approximately 10,000 linear feet of force main. As a Pipeline Engineer, Jigar assisted with force main alignment from the existing sewage pump station to the new influent WW pump station including trenchless crossing at the dual Hetch-hetchy pipeline and I-280, and preparation of design-build drawings.

Redundant Forcemain Replacement for Burlingame and Canon Pump Stations, Stege Sanitary District, El Cerrito, CA (Project Manager) // Stege Sanitary District operates and maintains Burlingame and Canon Sewage Pump Stations. Burlingame Pump Station is build in 1970s, has wet-well/dry-well configuration with two 7.5 HP submersible pumps, and

approximately 1,000 linear feet of 8-inch Asbestos Cement (AC) pipe forcemain. Canon Pump Station serves a small residential area in Kensington and it consists of two 4-inch Cornell pumps and 4-inch AC pipe forcemain. As a project manager, Jigar proposed accurately locating existing utilities using Letters "ABC" process, choosing a new forcemain routes, analyzed new pipe material and proposed HDPE DR 11 fused pipe, selected valve arrangement and coordinated with subconsultants. Jigar guided engineering staff in preparing the contract documents and provided Engineering Services During Construction for the project.

Yosemite Lake Park Sewer Improvement, County of Merced, Merced, CA (Project Manager) // Merced County Department of Public Works (County) has experienced falling septic tanks and leach-field in the Yosemite Park area near UC Merced campus. As a project manager, Jigar has analyzed various sewer alternatives to better serve the Yosemite Park area. He prepared a feasibility/route study analyzing various project constraints such as environmental, utility crossing, Merced Irrigation District canal crossings, and constructability. The project consists of designing a sewer collection system, two pump station, Horizontal Directional Drilling (HDD) crossings and forcemain connecting with the City of Merced sewer system. Jigar coordinated with the County, a surveyor and Stantec employees to execute the project.

Applegate Regional Sewer Project*, Placer County, Applegate, California (Project Engineer) // This fast-track design project included 4 miles of 10-inch sewer force main that diverges the sewer flow to an existing low-pressure force main. The project consisted of designing a 4 mile long forcemain that crosses Interstate 80, one pump station with vertical turbine pumps, a septic tank system, chemical feed system, a water well, emergency storage tanks, standby generator and a bio-filtration system. In conjunction with a sub-consultant, Jigar prepared the 30, 60 and 90 percent drawings. Jigar prepared the basis of design report and prepared 60 and 90 percent specifications. Jigar communicated and attended client and utility owners meetings, such as PGand E, PCWA, UPRR, ATand T and local cable companies. Jigar conducted background research on vertical turbine pump selection and prepared its specifications. He also assisted in design using trenchless technology such as Horizontal Directional Drilling (HDD) method at Interstate 80 crossing.

* Indicates projects completed with a different firm

Mark Smith, PE
Overall QA/QC



Years of Experience

34

Education

BS, Civil Engineering, California
State University, Sacramento

Registrations

CA PE #44197

Memberships

Member, American Water Works
Association

Office Location

Rocklin, CA

Mark specializes in wastewater and water facility design. He provides project management, design, cost estimating, and construction support for various potable water, wastewater, and other public infrastructure systems throughout California. His project experience includes rehabilitating pipelines, water transmission mains, distribution systems, wells, booster and storage facilities, water station facilities, and design and bid of water treatment plants. Throughout his 25+ year career, he has developed an invaluable perspective relative to not only planning new systems but also successfully moving projects forward from the conceptual stage through to the completion of construction.

Mark's Relevant Project Experience

Permanent Canal Closures and Pumps Project, New Orleans, Louisiana (Design Manager)

// Mark served as the design manager for a \$640 million design-build project to help protect the City of New Orleans from storm surges from Lake Pontchartrain. Our solution blocks the surges, which can have wave heights of almost 14 feet, from entering three local canals with 12-foot high floodwalls, large gate structures, levees, pump stations, and erosion protection. The pump stations have a combined capacity of 24,200 cubic feet per second. Pumping is accomplished with 24- 2.6 megawatt generators backed up by six redundant units for a total of 78 megawatts across all three sites. When complete, the three pump stations will represent the largest pump station project in the United States and was constructed under a fast-track schedule. This project included large vertical turbine pumps, mechanical equipment, flow/water level monitoring, SCADA, and instrumentation.

Tesla Water Treatment Facility (320 MGD), San Francisco, California (Local Design Manager)

// Mark served as the local design manager for design and construction support services of the 320 MGD Tesla Water Treatment Facility (\$125 mil.-Design/Build delivery). The design included 12-48" UV reactors, disinfection system, and pH adjustment works. He provided hydraulic analysis and design of large diameter waterlines and plant piping and mechanical systems. The pipelines range in size from 8" ductile iron to 144" diameter AWWA C200 steel mains and included valves, fittings, and appurtenances. Additionally, Mark led the design of a 3,000-GPM fire pump station; 500-GPM domestic water pump station; and various onsite water, sewer, and utility systems. The design and construction support services were provided under a very aggressive schedule and project costs were maintained within budget.

Metro Air Park Tank and Booster Pump Station and Water Mains, Sacramento, California (Project Manager/Engineer)

// Mark was responsible for the design of a 2.5-MG potable storage reservoir and ultimate 12,800 GPM booster pump station. This is the primary storage/pumping facility serving the Metro Air Park development, located just east of the Sacramento International Airport. The facility receives treated water from the City of Sacramento through a dedicated 24" supply line and intertie. This project included large vertical pumps and manifolds, valves, two surge control vessels, 30" magnetic flow meter, 4 miles of 24" to 36" mains, generator, disinfection facilities, SCADA, and instrumentation.

24" Gravity Supply Line (GSL) Intake and Siphon Facility, Amador County, California (Project Engineer) // Mark served as project engineer for the design of a 24" potable water intake, pipeline, and siphon facility. The project included an 8 MGD intake siphon with self-cleaning screens, 24" HDPE/ductile iron siphon, air scour facilities, flow meter and MOVs, automated siphon fill station, radio antenna, SCADA, and instrumentation.

Jackson Township-Water System Study, Sacramento, California (Project Manager/Engineer) // Mark provided hydraulic analysis and master planning of a potable water system serving a 1,800 acre community. The study included the analysis of a 15,600 GPM pump station, storage requirements, and 12"-20" diameter piping system.

Sly Park Campground 8" Waterline, Design/Build, Pollock Pines, California (Project Manager) // Mark served as project manager/engineer for the design of 15,000 linear feet of 8" waterline, a pressure reducing valve (PRV) station, bulk meter station, three surge relief stations, and a flushing device for the USACE. The design/build project was successfully completed under a very aggressive schedule and budgetary constraints.

Tanner Water Treatment Plant (20 MGD), Sutter Creek, California (Project Manager) // Mark provided project management and permitting services for preliminary design of the Tanner Membrane MF WTP, expandable to 20 MGD, on a site located adjacent to the existing conventional Tanner plant. This project includes two main elements: 1) New 6-MGD membrane MF facility that is expandable to 20 MGD with high-head pump station and clear-well reservoirs, and 2) Conversion of the 9-mile lone 16" raw water main to a treated water line and bypass of the existing lone WTP and reservoir.

Ras Al-Khair Industrial City Seawater Cooling System-Phase 1, Kingdom of Saudi Arabia, (QA/QC) // Mark provided QA/QC services to review the hydraulic analysis and pump station design for a sea water cooling system including a 475 MGD pump station and 17 miles of 36"-132" diameter FRP pipe system.

City of Lincoln WTRP, SMD-1 Pump Station and Force Main, Lincoln, California (Project Engineer) // Project engineer for the design of an 11 MGD wastewater pump station that will pump flows from the SMD1 WWTP to the City of Lincoln WWTRF. Predesign services included the hydraulic analysis of 6 miles of 24" HDPE force main and the pumping facility. The pump station design includes three 450 Hp non-clog submersible pumps, 20" magnetic flow meter and motor actuated valves, force main flushing facilities, cast in place self-cleaning wet well, flow storage, mains, generator, SCADA and instrumentation, and head-works facilities.

Stoneridge Water Transmission Main, Roseville, California (Project Manager and Civil Engineer) // Mark provided project management and design services for approximately 4,400 linear feet of 48" – 54" AWWA C303 water transmission mains, mainline valves, fittings, appurtenances, and corrosion test stations. He provided construction support services and coordination with City and local utility companies.

Antelope N. 36" Waterline*, Sacramento, California (Project Engineer) // Mark served as project engineer for the design of 4,000 linear feet of 36" AWWA C303 concrete cylinder water main for the Sacramento Suburban Water District. The potable waterline was constructed in county roadways.

Walerga Road 36" Waterline*, Sacramento, California (Project Engineer) // Mark served as project engineer for the design of 10,000 linear feet of 36" AWWA C303 concrete cylinder water main in county roadways for the Sacramento Suburban Water District. The project included numerous easement acquisitions, permitting, and a jack-and-bore crossing of the Union Pacific Railroad.

Water Master Plans and System Studies, Various Cities, California (Project Engineer) // Mark prepared hydraulic models and performed extensive hydraulic analysis and systems planning for the following projects: 1994 City of Roseville Water Master Plan, Parkway Development (Folsom); Stoneridge Development (Roseville, CA), Metro Air Park, Broadstone, Units 2 and 3 (City of Folsom); Northpointe Development SPA (North Natomas); Folsom Heights (City of Folsom); Laguna Ridge SPA (City of Elk Grove-SCWA); and Vineyard Springs SPA (City of Elk Grove-SCWA). The Roseville Water Master Plan included alternative evaluations, comprehensive hydraulic analysis and modeling, cost estimating, and development of a 20 year Capital Improvement Program (CIP) for the city, which supported growth over the past 20 years.

Franklin Boulevard Water Treatment Plant, Sacramento, California (Project Engineer) // Project engineer for design of an 8,000 GPM recycled water pump station, 3 MG storage tank, and connecting T-main piping for the Sacramento County Water Agency. This facility includes a pump house, vertical turbine pumps, mechanical systems, site piping, electrical/control systems, and site improvements.

* Indicates projects completed with a different firm

Dan Back, PE, SE, GE, PLS
Geotechnical QA/QC



Years of Experience

40

Education

MS, Civil Engineering, Cornell
University

BS, Civil Engineering, University of
Kentucky

Registrations

CA PE# 36102

CA SE # 3087

CA GE#3087

KY PLS # 3413

Office Location

Lexington, KY

Dan is a structural/geotechnical engineer responsible for the analysis and design of a variety of large civil engineering projects. He has more than 25 years of involvement specifically with dams, hydraulic and waterfront Structures projects, his experience covers more than 50 dams with scopes which varied from onsite evaluations and risk assessments, to complete design and construction of large structures. His project experience typically includes evaluation, concept development, system selection, detailed design, specifications, contract bidding support and field inspection during construction.

Dan's Relevant Project Experience

Salt River Project, Horse Mesa Dam Pump Storage Unit Intake Structure Repairs, Maricopa County, Arizona (Senior Structural Engineer) // Served on the team of senior dam engineers developing a timely and cost effective solution after the partial collapse of the 40-year old upper intake structure forced the idling of the pump storage unit, a key element of the SRP Phoenix area electric power balance. Technical challenges included inability to lower the lake level due to environmental and political constraints. The repair design was developed to be implemented by "Saturation Divers" working continually, 160 feet below the lake level. The design developed allowed the rapid installation of new hydraulic guide vanes and required structural supports, minimizing the extremely expensive diver bottom time. Work included quick response engineering support throughout the construction period.

Kings Bay Naval Submarine Base Routine Waterfront Facility Inspection and Assessment and Refit Wharf 3 Repair Designs, Naval Facilities Engineering Service Center Kings Bay, Georgia (Structural Engineer) // Dan served as the structural engineer for this project which included under/above water inspections and assessments for the base's 15 facilities. Led the design of a \$10 million dollar repair and corrosion protection system for Refit Wharf No. 3. Responsibilities included performing and overseeing the site inspections including non-destructive and destructive testing, geotechnical and structural analyses, feasibility studies, development of design alternatives, final designs including an impressed current CP system, MCACES cost estimates, SPECSINTACT specifications and bid documents.

Hydrographic Survey, Pier Analysis and Alternative Evaluation, Louisville District, Morehead City, North Carolina (Project Manager) // Dan oversaw the structural evaluation of waterfront structures and conceptual design of alternatives to complete the Morehead City facility renovation.

Morehead City Waterfront Assessment and Redevelopment - U.S. Army Morehead City USARC, U.S. Army Reserve, Morehead City, North Carolina (QA/QC Manager) // As QA/QC manager, oversaw the structural evaluation of waterfront structures and conceptual design of alternatives to complete the Morehead City facility renovation. The renovation included over 600 linear feet of steel bulkhead, large concrete berthing piers, timber

piers, channel and turning basin dredging and removal and disposal of contaminated site material. Responsibilities included performing quality reviews of the field inspections, hydrographic surveys, mooring and berthing analysis, vessel/structure interaction analysis, structural analyses, design of piers and wharves, MCASES cost estimates, and dredging studies.

Curtis Bay Wharf Assessment and Repair - U.S. Army Curtis Bay Marine AMSA, U.S. Army Reserve, Baltimore, Maryland (QA/QC Manager and Project Manager) // Served as the QA/QC manager and project manager for this project from initial underwater inspections and site assessments to design and construction of over \$6 million dollars in repairs, renovations and replacements. He performed and oversaw the QA/QC process for site inspections including non-destructive and destructive testing, geotechnical and structural analyses, feasibility studies, development of design alternatives, final designs including an impressed current cathodic protection system, MCASES cost estimates, SPECSINTACT specifications and bid documents. Additionally, Dan performed and supervised bid analysis, post bid construction support and Title II inspection services as construction of the project was completed.

A/E Waterfront Services ID/IQ Contract, United States Navy, Various Locations, Worldwide (QA/QC Manager) // Dan has managed the QA/QC for this contract over the past six years. Responsibilities have included technical support to the project team and supervising and performing Stantec's QA/QC program for all analyses, assessments, designs and submittals. Dan's supervision and oversight has been instrumental in Stantec's success on this contract leading to consecutive outstanding ACASS ratings, commendations for the quality of submittals and technically sound, effective engineering services.

* Indicates projects completed with a different firm

Bernadette Bezy

Environmental QA/QC



Years of Experience

22

Education

MS, Biology, University of Costa Rica, Graduated Summa cum laude

BS, Aquatic Biology and Environmental Science, University of California, Santa Barbara

BS, Environmental Science, University of California

Office Location

Nevada City, CA

Bernadette is an environmental project manager and senior biologist with more than 20 years of project management, fieldsurvey, environmental compliance, and permitting experience. Bernadette conducts planning and permitting efforts on a wide array of large- and small-scale infrastructure (alternative energy, water and wastewater, linear transportation, communication, pipeline) and conservation (research, restoration, reintroduction, and conservation) projects. She is well versed in National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), "CEQA Plus" State Revolving Fund, US Department of Agriculture (USDA) Federal Cross-Cutting processes and Federal Energy Regulatory Commission (FERC) filings in California and throughout the Western US. On the federal level, she is experienced in Clean Water Act (CWA) 401 and 404, Federal Endangered Species Act Section 7 and 10 permitting.

Bernadette's Relevant Project Experience

Nevada County Irrigation District, Regional Water Pipeline Constraints Analysis, Placer County, California (Environmental Project Manager, Biologist and GIS-Specialist)

// Bernadette developed GIS-based permit streamlining analysis to aid engineers in designing to avoid/minimize water pipeline impacts. She improved design elements. 17 mile pipeline.

Nevada Irrigation District, Combie Phase I Canal Rehabilitation Project, Multiple Sites, California (Project Manager)

// Bernadette is conducting baseline studies and drafting CEQA document for a canal rehabilitation project along the Bear River. 5 mile pipeline.

Bear Valley Water District Outfall and Tertiary Facility Upgrades, Alpine County, California (Assistant Project Manager and Biologist)

// Conducted wetland and wildlife surveys for raptors, migratory birds, and mountain yellow legged frog. Reviewed and drafted multiple sections of the IS/MND for wastewater treatment plant improvements designed to meet emergency capacity issues. Drafted and obtained a Streambed Alteration Agreement from the California Department of Fish and Game for an outfall to Bloods Creek. Linear Project = Approx. 1 mile Pipeline.

Nevada Irrigation District, DS Canal Flume/ Pipeline Replacement Project, Nevada County, California (Project Manager and Sr. Aquatic Biologist)

// Bernadette managed and conducted pre-construction clearance surveys for invasive plants, rare plants, and protected wildlife species. She conducted biological monitoring during construction and managed and conducted water quality monitoring in support of the DS Canal Flume Replacement project. Bernadette used Hach turbidimeter to measure water quality and monitored BMPs at project site to help ensure that all BMPs and Mitigation was being upheld during project construction. She worked closely with project engineers and stakeholders to help ensure full disclosure of mitigation compliance.

City of Angels Camp Pipeline Outfall Permitting, Calaveras County, California (Project Manager, Permitting Specialist and Aquatic Biologist) // Bernadette conducted preliminary wildlife surveys and developed a compliance assessment to streamline the permitting process. She conducted California red-legged frog and foothill yellow legged frog habitat assessments and protocol-level nocturnal surveys. Bernadette performed in-stream dilution studies and developed CDFG Streambed Alteration Agreement application and US Army Corps of Engineers Section 404 Nationwide Permit Application. Bernadette conducted environmental awareness and construction monitoring for California red-legged frog. 0.5 mile pipe.

Williams Kern River II Pipeline Project, Multiple Sites, Western US (Permitting Specialist/Biologist) // Conducted biological surveys on an 800 mile linear project. Performed Tand E wildlife surveys for raptors, amphibians, reptiles (CA horned lizard) and mammals in California (Mojave Desert), Utah and Wyoming. Completed rare plant surveys for 16 protected plants in California, Utah, and Wyoming. Utilized GPS to map all stream crossings, and Tand E species habitats and individual sightings, including migratory bird nests. In Wyoming alone, performed 32 wetland delineations over 66 miles of a proposed pipeline routes. Participated in the writing and review of biological and water resources sections for the Federal Energy Regulatory Commission (FERC) filing. Supported Army Corp of Engineer CWA Section 404 permitting process and the completion of a Biological Assessment in compliance with Sections 7 and 10 of the Endangered Species Act.

Line 407 Phase II Pipeline Project, Permitting, Pre-construction Surveys, and Construction Monitoring, Placer, Sutter, and Yolo Counties, California (Principal-in-Charge) // Bernadette and her environmental team were awarded this contract sole source under the PGand E Mod4 contract, based on our ability to efficiently deliver, our local knowledge of the rea/environmental issues, our experience with linear projects, and our familiarity with local regulators. We are managing the fast track final permitting for Phase 2 (western alignment) and starting construction monitoring. The project runs down Riego Road and Baseline Road. Resources of key importance on this project are: Traffic, noise, air quality, wetlands and vernal pools, Swainson's Hawk and other migratory bird nests, giant gartersnake habitat, VELB, vernal pools, among others.

Squaw Valley Public Service District Alternative Water Supply Environmental Feasibility Analysis, Placer County, California (Project Manager and Biologist) // Bernadette managed and conducted review of a water supply alternative environmental feasibility analysis. She assessed the potential environmental constraints relative to two pipelines connecting Martis Valley and Squaw Valley. Bernadette also measured triggers for CEQA, NEPA, and state and federal environmental permitting as well as local land use planning consistency across multiple county and city jurisdictions. She focused biological analysis on key issues such as potential fisheries (Lahontan cutthroat trout) and raptor (goshawk) nesting impacts. Bernadette completed permit streamline strategy for the route alternatives. This linear project was approximately 10 miles.

Zone 7 Water Agency Chain of Lakes Water Supply Project, CEQA, CDFG, and USFWS, and NPDES SWPPP Compliance, Alameda County, California (CEQA Project Manager and Sr. Aquatic Biologist) // Bernadette managed CEQA compliance, and Environmental Permitting for a well and pipeline project in the San Francisco Bay Area. She facilitated designs that avoided impacts to federal- and state-listed species such the red-legged frog and tiger salamander. Successfully secured environmental permits. Bernadette also reviewed Stormwater Pollution Prevention Plan (SWPPP) to ensure compliance with WDRs for discharges of Stormwater Runoff associated with Construction Activity (NPDES General Construction Permit).

Effluent Pipeline and Outfall Installation Project – SRF Funding Compliance City of Turlock, Turlock, California (SRF Project Manager and Aquatic Biologist) // Bernadette is managing SRF compliance (NEPA, USFWS, SHPO, Clean Air Act, etc) to obtain federal SRF funds. She is conducting environmental compliance in an accelerated schedule.

Wastewater Treatment Plant Improvement Project, City of Williams, Colusa County, California (CEQA Project Manager and Project Biologist) // Bernadette conducted wetland delineation and wildlife surveys. She worked with city engineers to avoid sensitive environmental resource/permitting issues. Bernadette drafted CEQA documents and successfully navigated "CEQA Plus" SRF and USDA compliance process.

Treatment Plant Improvement Project Constraints Analysis and Field Surveys, Delhi County Water District, San Joaquin County, California (Project Manager/Biologist) // Bernadette conducted a GIS based desktop study to assess the potential for biological, wetland and farmland impacts or permitting constraints. She conducted habitat assessment for Swainson's hawk, Merced kangaroo rat, and valley elderberry longhorn beetle. Bernadette drafted survey summary report and CEQA compliance and permitting strategy for the water agency.

Georgette Aronow

Funding QA/QC



Years of Experience

25

Education

MPP (Master of Public Policy),
Kennedy School of Government,
Harvard University

BA, Government, Harvard University

Office Location

Nevada City, CA

With more than 25 years of experience, Georgette has a broad background in public finance, specifically with public water infrastructure and operations funding. She specializes in utility financing studies and funding mechanisms, such as the Proposition 218 rate study analyses and implementation, as well as financial assistance in the form of state and federal grants and low-interest loans. Georgette excels at creating customized funding and financing models and rate studies to meet the unique needs of each project and client. She is also experienced in revenue bond issuance, assessing district formation, establishing public entity credit ratings, urban economics, and land use planning.

Georgette's Relevant Project Experience

Financial and SRF Loan Assistance, City of Lincoln, Lincoln, California

(Finance Consultant) // Georgette is assisting the City of Lincoln in applying for an SRF loan to fund a \$45M project to upgrade the Wastewater Treatment and Reclamation Facility (WWTRF) to keep up with the demands on the wastewater system because of population growth.

Financial and SRF Small Community Grant Assistance, City of Grass Valley, Grass Valley, California (Funding Consultant)

// Georgette aided the City of Grass Valley in applying for funding assistance for its water and sewer utilities. With Georgette's assistance, the City will receive approximately \$10M in grant funding.

San Andreas Sanitary District Sewer Rate Study 2009 and 2016, San Andreas, California (Lead Finance Consultant)

// Georgette was the lead finance consultant for the District's 2016 and 2009 sewer rate study. These rate studies were key components in allowing the District to successfully apply for and receive almost \$11M in grant funding from California's Small Community Wastewater Grant program. As a result, the District was able to upgrade wastewater facilities without drastically increasing customer rates.

City of Lincoln Infrastructure Development Funding Models, City of Lincoln, Lincoln, California (Finance Consultant)

// Georgette supported the City of Lincoln in the development of funding models, coordinated with developers, and helped to develop capital improvement programs, including those for the Wastewater Treatment and Reclamation Facility during the 2000s when the City of Lincoln experienced an exponential population growth from approximately 8,000 to 45,000 people. Georgette's involvement contributed to the establishment and updating of the City's wastewater enterprise fund annual budgets and future projections.

City of Jackson's Sewer Rate Study 2016, City of Jackson, California (Lead Finance Consultant)

// Georgette was the lead finance consultant for the City of Jackson's 2016 Sewer Rate Study. Georgette helped the City update its sewer rates so it could move forward with securing approximately \$12M in low interest SRF loan to fund necessary improvements to their wastewater treatment plant.

City of Ceres Sewer Rate Studies 2008 and 2012, City of Ceres, California (Lead Finance Consultant) // Georgette was the lead finance consultant for the City's 2008 and 2012 Sewer Rate Studies. Georgette helped the City create an updated rate structure that addressed rate equity among various user groups which provided adequate funding for the City to undertake necessary capital improvement projects for the wastewater system.

Wastewater Rate Studies 2007 and 2014, City of Auburn, Auburn, CA (Lead Finance Consultant) // Georgette was the lead finance consultant for the City's 2007 and 2014 Wastewater Rate Studies. Georgette helped the City critically assess their rate structure, which considered funding needs through 2020. The City is currently in the process of upgrading its wastewater treatment plant to comply with NPDES requirements, for which the Rate Study was a key component in securing necessary funding.

Utility Rate Studies, Northern and Central California (Finance Consultant) // Georgette prepared water and wastewater revenue program analyses for communities in Northern and Central California. She calculated user rates based on fair share allocation of capital and/or operations and maintenance costs. In addition, Georgette assisted in implementing revised utility rate structures through the Proposition 218 process, including preparing public notices and giving public presentations at public workshops and hearings. Many of the rate studies have facilitated the awarding of state or federal loans or grants to fund necessary public projects.

Water Rate Study 2014, Christian Valley Park Public Utilities District, Placer County, California (Lead Finance Consultant) // Georgette was the lead finance consultant for the Christian Valley Park Public Utilities District's 2014 water rate study and helped assess its financing capacity in respect to needed CIP improvements. The 2014 water rate study was the first one the District had done in over ten years, and it allowed the District to collect funds for critical facility improvement, including repair and replacement of its critical water system infrastructure. Georgette worked to assess the District's cash flow and ability to fund a \$3.5M project to replace its water storage tank facilities.

Bond Finance and Debt Issuance, Massachusetts (Finance Consultant) // Georgette coordinated over \$150M in tax-exempt bond transactions issued by the Massachusetts Industrial Finance Agency on behalf of non-profit, environmental, and corporate borrowers for the purposes of capital expansion programs. She also prepared RFPs on behalf of borrowers to assist in the selection of underwriter, bond counsel, and trustee. She also developed a financial models to help borrowers evaluate the cost effectiveness of tax-exempt financings versus conventional sources of funding.

Anil Dean, PE, GE
Trenchless QA/QC



Years of Experience

22

Education

MBA, Business Administration

MS, Civil Environmental Engineering

BS, Civil Engineering

California Registrations

PE #58887

GE #2693

Office Location

Walnut Creek

With more than 20 years of professional experience, Anil has held a number of leadership positions within the underground industry, including tunnel, geotechnical, civil, and environmental engineering; construction management; project management; and tunnel design management. His expertise includes large diameter tunnels, microtunneling, and trenchless design. He has experience on projects involving water and wastewater conveyance, light and heavy rail, pressurized natural gas pipelines and other utilities, hydroelectric tunnels, and inspection and rehabilitation of existing tunnels.

Anil has provided specialized consulting support related to property protection and the evaluation and mitigation of ground loss resulting from tunnel and underground construction activities. He has experience with EPB and slurry TBMs, road headers, hard rock TBMs (including machines with hard rock EPB capability), NATM/SEM, and cut-and-cover tunneling methods. His trenchless expertise includes HDD, auger boring, and pipe jacking. Anil also has significant experience with the management of ISO 9001 compliant quality management systems.

Anil has authored and coauthored a number of published articles, presentations, and posters. His awards include the Fuqua Merit Scholarship from Duke University.

Anil's Relevant Project Experience

Natural Gas Pipeline Reinforcement Project, Piute Pipeline Company, Elko County, Nevada (Project Engineer) // Anil managed geotechnical investigation and trenchless design tasks. Project included design of four trenchless pipeline crossings for an 8.6-inch OD pressurized natural gas pipeline (Grade X42 pipe). Auger boring and HDD recommendations and designs were prepared together with pipe stress analyses and hydrofracture calculations for HDD drillpaths. Two of the crossings were beneath sensitive wetlands, with the other two beneath Nevada DOT right-of-way. Total of 10 borings were drilled in soil and rock to depths of up to 75 feet.

On Call Geotechnical Services for Trenchless Construction Methods*, City of Santa Cruz Water Department, Santa Cruz, California (Project Manager) // The initial task order included geotechnical investigation, analysis, and reports related to construction of 3.5 miles of pipeline, generally 24 inches in diameter, for raw water supply to be installed using both conventional and trenchless methods. Report was developed to provide analysis for a variety of trenchless crossings along the alignment. Larger length trenchless crossings were installed using HDD techniques, while smaller crossings and service laterals were installed using auger boring (six HDD and four auger boring). Caltrans permits obtained for crossings of Highway 1 north of the City of Santa Cruz.

Sanchez Avenue Area Sanitary Sewer Rehabilitation*, City of Burlingame, Burlingame, California (Tunnel Design Manager)

// Anil managed rehabilitation of existing sewers in and around Sanchez Avenue. Managed trenchless design study and Caltrans permitting process. A Caltrans Encroachment Permit was successfully obtained for the crossing of El Camino Real Highway. The project included approximately 183 feet of 18-inch fusible C905 PVC pipe installed in a 24-inch steel casing.

LAX Modernization and Expansion Project*, Los Angeles World Airports, Los Angeles, California (Tunnel Engineer)

// A \$3.4 billion expansion Los Angeles International Airport. Responsible for the design of trenchless utility crossings for all utilities, and coordination of the design with the construction contractor during preconstruction for various enabling projects, including the Concourse Construction Package and Taxilane S. Utility sizes ranged from 8-inch to 54-inch constructed in soft ground.

I-94 Mitchell Interchange Storm Sewer System Trenchless Installation*, Wisconsin Department of Transportation, Milwaukee, Wisconsin (Project Engineer)

// Project included design of storm sewer system as part of the I-94 North – South Freeway Project at the Mitchell Interchange. Storm sewer pipeline consisted of approximately 9,300 feet of 48- to 60-inch diameter RCP installed primarily using microtunneling methods with some open face tunnel construction and a small segment of open cut construction. Ground conditions consisted of interbedded glacial and lacustrine deposits with water table ranging from 10 to 60 feet above the tunnel invert. Drafted the Geotechnical Baseline Report.

Fort Kamehameha Wastewater Treatment Plant Outfall Replacement*, US Navy, Pearl Harbor, Hawaii (Project Engineer)

// Anil evaluated alternative layouts for a 2.3-mile long, 42-inch diameter outfall. Evaluated effect of geotechnical conditions on HDD and microtunneling installation methods. Evaluated construction feasibility of various trenchless methods and compared trenchless design options with traditional installation methods. Coordinated preliminary geotechnical field investigations, both on-land and over water. Project was a national finalist for the 2005 ACEC Engineering Excellence Awards.

Dogue Creek Force Main Design*, Fairfax County, Fairfax, Virginia (Project Engineer) // Project included evaluation, siting, and preliminary design services for placement of approximately 4,000 feet of 36-inch force main using HDD. New main runs between Dogue Creek Pump Station to an outfall located on Fort Belvoir property. Site is heavily wooded, includes wetlands

and archaeological areas, and crosses Mount Vernon Highway. Performed HDD feasibility analyses (single drive versus two drives), constructability analysis, preliminary construction cost estimates, and pipe assessment for steel and HDPE pipe materials.

Hart Street Wastewater Pump Station Force Main Replacement*, City and County of Honolulu, Honolulu, Hawaii (Project Engineer)

// Anil's responsibilities included supervision of field surveying and coordination with property owners and city, county, and state agencies. Evaluated geotechnical properties effecting HDD and microtunneling methods for installation of 5,100 feet of force main. The 3,200-foot long HDD portion included twin 40-inch OD HDPE sewer force mains installed in 46-inch steel casings. HDD segment was connected to a 1,900-foot long microtunnel segment, which was constructed with a 48-inch diameter HOBAS pipe in three drives. The alignment progressed beneath Honolulu Harbor and below deep piles supporting active cargo handling facilities on an artificial island. Jet grouting was used to stabilize port facilities prior to HDD installation, and shafts were used for the microtunnel segment. This project was awarded a Grand Conceptor Award from Consulting Engineers Council of Hawaii in 2002.

American River Watershed Project*, U.S. Army Corps of Engineers, Sacramento, California (Geotechnical Engineer)

// This project is part of large levee strengthening program along the American River. Design features included an 80-foot deep slurry wall along a 12-mile reach of river. Responsibilities included technical review and finalization of project specifications.

Piute Dam Rehabilitation*, Piute Reservoir and Irrigation Company, Utah (Project Engineer)

// Anil's responsibilities included static, rapid drawdown, and seismic slope stability analyses and geotechnical characterization. Rehabilitation was completed in 2005 at a cost of \$8.3 million, and the project was ultimately awarded a National Rehabilitation Project of the Year Award from Association of Dam Safety Officials. The project was overseen by the Utah State Engineer's Office.

* Indicates projects completed with a different firm

Erez Allouche, Ph.D., P.Eng.
Trenchless Specialist



Years of Experience

20

Education

Ph.D., Construction Engineering

MS, Structural Engineering

BS, Civil Engineering

Memberships

Standards Committee Member
(Pipe Renewal Methods), American
Water Works Association

Board Member, North American
Society for Trenchless Technology

Member - PINS Task Group,
American Society of Civil Engineers

Member, Canadian Society for Civil
Engineering

Member - Rand D Committee,
Common Ground Alliance

Office Location

Edmonton, Alberta

Dr. Erez Allouche has devoted much of the past 16 years to research and practice in the area of underground infrastructure. His work focuses on the development of new condition assessment technologies and design and analysis models for underground construction using trenchless methods. He specializes in the design of complex HDD crossings, evaluating the soil/structure/liner interaction, and design of unique rehabilitation solutions to pressure pipes (AC, DI, CI, RCP) and large diameter gravity pipes. He is familiar with nearly 60 different rehabilitation systems, and has design experience with 18 such methods.

Prior to joining Stantec, Dr. Allouche was an Associate Professor of Civil Engineering at Louisiana Tech University and the Director of the Trenchless Technology Center, where he managed a staff of 45 graduate students, research engineers, and technicians. Over the past 13 years, he won and managed 117 research projects in the area of buried infrastructure totaling \$14,000,000, including investigation of failure mechanisms of ductile iron pipes on the behalf of AWWA. He is also the inventor or co-inventor of 17 patents in the area of trenchless technologies, and the author (and co-author) of more than 200 publications in the areas of buried infrastructure management and pipeline installation using trenchless techniques, including 62 peer-reviewed journal papers (academic and trade publications).

Dr. Allouche is a Board Member of the North American Society for Trenchless Technology, Associate Editor of the ASCE Journal of Pipeline Systems, and has served as a reviewer for numerous technical journals, technical conferences, and grant awarding agencies.

Erez's Relevant Project Experience

Water Distribution System Condition Assessment of Lawrence-Livermore National Laboratory, City of Livermore, Livermore, California (Senior Professional)

// Dr. Allouche performed condition assessment of more than 17 miles of AC pipes (4 inch to 10 inch) in Site 200 and Site 300, utilizing a comprehensive multi-attribute desk study, and targeted NDT and intrusive testing. This project included the design of a localized collection system for blowdown water used in the cooling towers and conveyance of the collected water to an area-specific treatment facility prior to discharge. This project provided an effective and efficient collection and treatment system that was subsequently permitted by the Regional Water Quality Control Board.

2015-2016 Watermain Condition Assessment Program, City of Ottawa, Ottawa, Canada (Trenchless Specialist)

// Erez performed technical review of condition assessment data and reports prepared by Simon, Gumpertz and Heger as well as inspection report prepared by Pure Technologies, for Ottawa South A (1220mm PCCP), Ottawa South B (762mm PCCP) and Bridlewood A (762mm PCCP).

Sault Ste. Marie Canal Powerhouse, Marie, Ontario (Senior Professional) // Erez led the condition assessment of a 120 years old, 300 m long 2,000mm diameter flanged steel Penstock pipe, (between intake at Lake Superior to the west of the canal locks) and 130 m of discharge and dewatering pipes. The condition assessment program was used to develop a rehabilitation plan for restoring the operational functionality of the piping system serving the historical Sault Ste. Marie powerhouse

EM Inspection of Burlington Street PCCP Trunk Main, City of Hamilton, Hamilton, Ontario (Trenchless Specialist) // Dr. Allouche provided technical review of condition assessment data and reports prepared by pure technologies and develop a physical inspection plan for suspected pipe segments.

Permanent Canal Closures and Pumps Project, City of New Orleans, New Orleans, Louisiana (Trenchless Specialist) // Dr. Allouche designed multiple HDD installations of 4" PVC conduits for electrical lines along the toe of a USACE's levee. The massive pumps are powered by twenty-four, 2.6 megawatt generators backed up by six redundant units for a total of 78 megawatts across all three sites. Our site layout maximizes the distance from existing structures and minimizes acoustic and visual impacts for surround neighborhoods. Critical equipment and infrastructure is indoors, buried, or located in hurricane rated enclosures for protection from flying debris. Over 600,000 gallons of diesel fuel and other critical backup utilities are provided on-site for operating the facilities at full capacity for five days.

Loveland Pipeline Replacement Project, HDD Crossing, Loveland, Colorado (Project Engineer) // Design of three HDD crossings across the Big Thompson River and an irrigation ditch, 8" diameter water main.

HDD Crossings at Siesta Key, City of Saratoga, Saratoga, Florida (Design Reviewer) // Dr. Allouche provided design review of twin NPS 20, 3,000 lf long, subsea HDD crossings, to be used a water main and a force main, respectively.

CN Industrial Force Main, City of Saskatoon, Saskatoon, Saskatchewan (Project Engineer) // Dr. Allouche led the design of 950 m of 350 mm diameter sanitary sewer force main constructed by Horizontal Directional Drilling, as well as 66 m of cased auger boring crossing beneath a Canadian National railroad right-of-way.

Kenilworth Transmission Watermain Renewal, City of Hamilton, Hamilton, Ontario (Senior Professional) // Dr. Allouche performed condition assessment and developed a rehabilitation plan for Kenilworth water main, 1,050mm steel main constructed in the 1960s. The section inspected consists of a 250 meter horizontal section and a 48 meter vertical section, which are housed in a concrete tunnel. Design of rehabilitation work currently underway.

Parkland Sanitary Transmission System Forcemain Replacement, HDD Crossing, Capital Region, Alberta (Project Engineer) // Dr. Allouche worked on the design of a 400-meter long, 1050 mm diameter directionally drilled crossing along the south shore slope of Big Lake, AB.

Regional Municipality of Wood Buffalo Sanitary Trunks and River Crossing*, The Regional Municipality of Wood Buffalo, Fort McMurray, Alberta (Project Engineer) // Design of a twin barrel, 1,250-meter long, 914 mm diameter directionally drilled crossing of the Athabasca River. Selected as NASTT's Northwest Chapter 2010 Trenchless Project of the Year.

Trans-Mountain Pipeline*, Vancouver, British Columbia (Project Engineer) // Design review of a 1,400-meter long, 609 mm diameter directional crossing of the Frazer River.

Cameron Heights Lift Station*, City of Edmonton, Edmonton, Alberta (Project Engineer) // Design review of a 420-meter long, 254 mm diameter forcemain directional crossing.

North Saskatchewan River Directional Crossing*, Edmonton, Alberta (Project Engineer) // Design review of a 660-meter long, 406 mm diameter directional crossing of the North Saskatchewan River.

North Saskatchewan River Crossing*, EPCOR, Edmonton, Alberta (Project Engineer) // Design review of a 451-meter long, 610 mm diameter directional crossing of the North Saskatchewan River.

False Creek Crossing*, Vancouver, British Columbia (Project Engineer) // Design of a 472-meter long, 1,016 mm diameter force main crossing of False Creek using HDD.

Yellow Trail Transportation Corridor Crossing*, Edmonton, Alberta (Project Engineer) // Design of a 531-meter long, 914 mm diameter steel conduit crossing of the Yellow Trail transportation corridor using HDD.

ELKO Area Expansion Project*, Elko, Nevada (Project Manager) // Design of multiple HDD and auger boring crossings for 8" diameter, high pressure natural gas line.

* Indicates projects completed with a different firm

Patrick Kohlman, EIT
Designer



Years of Experience

3

Education

BS, Environmental Engineering,
University of California, Merced

California Registrations

EIT #156854

Office Location

Sacramento, CA

Patrick has experience in various fields including WTP/WWTP design, irrigation system modernization, pipeline condition assessment and rehabilitation, urban water management plans, water supply assessments, and field sampling. Prior to joining Stantec, Patrick completed an internship with the City of Roseville for their Dry Creek Wastewater Treatment Plan nitrogen study.

Patrick's Relevant Project Experience

Site 300 Water Filtration Design Services Project, Lawrence Livermore National Laboratory, Livermore, California (Engineer) // Patrick assumed a lead role in the coordination of Submittals and RFIs for the Site 300 Water Filtration Design Services project.

LLNL Site 200 and Site 300 Master Plan, Lawrence Livermore National Laboratory, Livermore, California (Engineer) // Patrick assisted in the completion of the Lawrence Livermore National Laboratory Master Plans for Site 200 and Site 300. His role involved condition assessment of the existing water distribution system infrastructure as well as the feasibility/cost evaluation of various pipeline rehabilitation methods.

City of McFarland Water Supply Assessment, City of McFarland, McFarland, California (Engineer) // Patrick assisted in the completion of the Water Supply Assessment for the City of McFarland. This study enabled the City to evaluate the feasibility of constructing over 2,000 acres of urban development. Patrick's role involved water calculations regarding the change in water supply, water demand, evapotranspiration, and percolation.

South System Improvements, NSJWCD, Lodi, California (Engineer) // Patrick assisted the project team with grants, engineers report cost estimate, 30% design/CAD, and pump station review.

Miners Ranch Water Treatment Plant Improvements Project, South Feather Water and Power, Oroville, California (Engineer) // Patrick assisted in the expansion of Miners Ranch WWTP owned by South Feather Water and Power. He has completed various tasks such as calculating the new hydraulic profile, compiling an equipment list, submittal review, and mechanical design sheet review.

City of Dixon WWTF ENVISION Certification, City of Dixon, Dixon, California (Engineer) // Patrick assisted in the completion of the ENVISION application for the City of Dixon WWTF. The project received ENVISION Silver in 2017. His role involved gathering and presenting information relative to Resource Allocation. This demonstrated the reduction in groundwater salinity through a reduction in evaporative losses as well as the use of sustainable materials and construction practices.

Rio Vista Urban Water Management Plan, City of Rio Vista, Rio Vista, California (Engineer) // Patrick assisted in the completion of the 2015 Rio Vista Urban Water Management Plan. His role involved water calculations regarding past, present, and future water supply and water demands. His role also involved preparing the written portion of the report and its submission to DWR.

City of Dixon Wastewater Treatment Facility Improvements Project, City of Dixon, Dixon, California (Engineer) // Patrick

assisted in writing the Operation and Maintenance Manuals for the City of Dixon WWTF. The facility was upgraded in 2015 to increase treatment capacity and reduce groundwater salinity.

Additional Project Experience:

- Site 200 Water Treatment and Site 300 Water Filtration Design Project, Lawrence Livermore National Laboratory, Livermore, California
- Water System Repair and Replacement, City of Grass Valley, Grass Valley, California
- UV Validation Report, AquaAzul, Lincoln, California
- Mad River Fish Hatchery UV Upgrade Project, Department of General Services, Arcata, California
- Miners Ranch WTP Web Based Interactive Operations and Maintenance Manual (IOM), South Feather Water and Power, Oroville, California
- City of Dixon WWTF Web Based Interactive Operations and Maintenance Manual (IOM), City of Dixon, Dixon, California
- GET EF, Aerojet, Rancho Cordova, California

Mitchell Padilla

Designer



Years of Experience

1

Education

BS, Chemical Engineering,
University of California, Davis

Office Location

Rocklin, CA

Mitchell is an engineer in training with experience in water/wastewater treatment, reuse and sustainability. He has designed new tertiary filtration and disinfection facilities for Reno-Stead Water Reclamation Facility, written a full Operations and Maintenance manual for the Town of Discovery Bay, developed and executed action plans to monitor ammonia in process wastewater for BioMarin Pharmaceutical Inc., edited drawing sets, reviewed vendor submittals, and presented the water sustainability efforts of strategically chosen companies.

Mitchell's Relevant Project Experience

Oroville Spillway Reconstruction Project, Oroville, California (Project Engineer) // Mitchell assisted the California Department of Water Resources' (DWR) engineering team working on the reconstruction Oroville Spillway. He was responsible for collecting, organizing and presenting all concrete pour data. He also prepared reports sent to FERC, summarized meetings held by the Contractor for DWR and helped with inspections.

Reno-Stead Water Reclamation Facility Expansion Project, Rocklin, California (Project Engineer) // Mitchell helped design a new UV disinfection, new tertiary filtration, new filter feed and drain pump stations and upgrades to the headworks and biofilter of the Reno-Stead Water Reclamation Facility. He wrote technical memorandums on options to upgrade the disinfection systems, filters and headworks. He performed cost analyses for various alternatives. He developed hydraulic models for plant processes and the stormwater drain system. He developed 30% design drawing sets for the drafter to execute.

Discovery Bay WWTP and Sewer Conveyance Pump Stations Oand M Manual, Rocklin, California (Project Engineer) // Mitchell was responsible for writing the Operations and Maintenance Manual for the Town of Discovery Bay WWTPs and sewer conveyance system. He analyzed past drawing sets to draft the current operations and maintenance strategies.

BioMarin Pharmaceutical Inc. Wastewater Ammonia Monitoring and Probe Verification Project, Novato, California (Project Engineer) // Mitchell helped BioMarin Pharmaceutical Inc. determine sources of ammonia spikes and excessive foaming in process wastewater. He identified an ammonia probe to install on-site. He performed sampling and data analysis to verify the performance of the probe.

P2426 and Devil Canyon FERC Relicensing Project, Sacramento, California (Engineer Intern) // Mitchell helped draft and edit the Pre-Application Document submitted to FERC for the Relicensing of P2426 and Devil Canyon in Southern California. He also prepared schedules and cost estimates for future study plans at the Project sites.

Rocklin-Nevada City Young Professionals Group (YPG) Development and Leadership Rocklin-Nevada City YPG, Rocklin, California (Chair) // Mitchell lead the development and sustained operation of a Rocklin-Nevada City joint YPG chapter. He serves as Chair and oversees the organization of monthly lunch and learns, social events, youth outreach and budgeting.

Selma-Kingsburg-Fowler County Sanitary District Wastewater Treatment Plant, Rocklin, California (Project Engineer) //

Mitchell was responsible for developing the online Interactive Operation and Maintenance Manual for SKF WWTP.

City of Madera WWTP Rehabilitation Project, Rocklin, California (Project Engineer) // Mitchell prepared project specifications, and reviewed submittals and RFIs from the Contractor

California Men's Colony State Prison Wastewater Storage Evaluation, Rocklin, California (Project Engineer) // Mitchell performed a water balance for two wastewater retention basins used by California Men's Colony for storage after the state prison received a Notice of Violation. He developed a report with wastewater handling recommendations.

Midas Gold Aquatic Habitat Field Work, Yellow Pine, Idaho (Engineer Intern) // Mitchell performed field work in Idaho for the mining company Midas Gold. He surveyed riverbeds in the region to monitor the effects of mining operation on salmon spawning habitats.

Fresno-Kings Subbasin Groundwater Sustainability Agency Formation, Sacramento, California (Engineer Intern) // Mitchell was responsible for compiling and analyzing surveys taken by parties involved in the formation of the Groundwater Sustainability Agency in the Fresno-Kings Subbasin. He also prepared presentations to members of the forming agency by the MWH team.

MWD Historical Flows Project, Sacramento, California (Engineer Intern) // Mitchell was responsible for researching historical flow conditions along the Sacramento River and into the Delta before and during the construction of levees. This research assisted the Metropolitan Water District of Southern California in their preparation of a report concerning the effects of flow through the Delta.

Maurice Amendolagine

PE, GE

Geotechnical Lead



Years of Experience

28

Education

MS, Geotechnical Engineering,
University of California, Berkeley

BS, Geological Engineering,
University of Nevada

California Registrations

CE #62962

GE #2746

Memberships

Tau Beta Pi National Engineering
Honor Society

Earthquake Engineering Research
Institute (EERI)

Office Location

San Diego, CA

Maurice has more than 28 years of experience in geotechnical engineering and consulting. His professional experience has included a variety of infrastructure, commercial, residential mining, and military projects for public and private sectors, including pipelines, bridges, pavement and roadways, industrial facilities, low to mid-rise buildings, residential developments, schools, tailings and water retention dams, lined and unlined canals, landfills, quarries, and airports. He has a broad range of technical skills in the geotechnical field with extensive experience in the areas of foundation and geotechnical earthquake engineering and slope stability evaluation.

Maurice's Relevant Project Experience

Long Beach Municipal Urban Storm Water Treatment Conveyance Pipeline Project, City of Long Beach, Long Beach, California (Project Manager) // Project manager responsible for geotechnical investigation and recommendations for a new 3-mile long, shallow 12-inch diameter storm-water pipeline in a dense urban environment with very loose and soft soils and shallow groundwater.

Canal and Pipeline Crossings for Highway 111 Bypass*, Imperial County, Imperial County, California (Project Engineer) // Project engineer responsible for geotechnical evaluation of canal and pipeline crossings for Highway 111 Bypass in Imperial County, CA. A Geotechnical evaluation of potential impacts to canals and pipelines was provided. Geotechnical options were provided for mitigation of the potential impacts to the canals and pipelines.

Port Hueneme Wastewater Collection Pipeline*, Port Hueneme, California (Project Manager and Project Engineer) // Project manager and project engineer for geotechnical investigation for a several miles of a proposed wastewater collection pipeline. Geotechnical report included geotechnical recommendations for excavation, dewatering, trenchless construction, and backfill.

Imperial Avenue Sewer Replacement*, Imperial County, Imperial County, California (Project Engineer) // Project engineer for geotechnical investigation for 1.8 miles of sewer replacement below Imperial Avenue (Highway 86), from Ocotillo Drive to Villa Lane. Geotechnical report included geotechnical recommendations for temporary excavations, dewatering, backfill, and pavement section design.

Southern Regional Pump Station and Sewer Lines*, City of El Centro, El Centro, California (Project Engineer) // Project engineer for geotechnical investigation for a sewer pump station and associated pipelines. Pump station was to extend 23 feet below grade and the pipeline alignment extended several miles. Report included geotechnical recommendations for foundation design, temporary excavations, dewatering, backfill, and geotechnical pipeline parameters.

San Vicente Dam Bypass Pipeline*, San Diego County Water Authority, Lakeside, California (Project Engineer) // Project engineer for design of the Bypass Pipeline for the San Vicente Dam Raise project. The project consisted of a geotechnical investigation for a new 1,500-foot long, 5-foot diameter water pipeline adjacent to the recently raised San Vicente Dam Reservoir. The pipeline included open trench sections through engineered fill and natural soils, and a tunneled section through conglomerate and granite.

Otay Water District Reservoir and Pump Station*, Otay Water District, Chula Vista, California (Project Engineer) // Project engineer for geotechnical investigation for a 3.4 million gallon, buried concrete reservoir and pump station adjacent to a descending 40-foot high fill slope. Geotechnical recommendations were provided for foundation design of the reservoir and pump station, and for distribution pipelines.

Ocotillo Water Reservoir and Waterline*, Otay Water District, Ocotillo, California (Project Engineer) // Project engineer responsible for geotechnical investigation for construction of a steel tank reservoir and several thousand feet of waterline. Report included geotechnical recommendations for foundation design of the steel tank, and for the distribution pipelines.

All American Canal Lining Project*, Imperial County, California (Project Engineer) // Project engineer for the geotechnical investigation for the All-American Canal Lining Project (AACLP), a major 23-mile long canal in Imperial County, California. Construction of the AACLP had to be completed in a manner that permitted continuous operation of the existing canal and hydroelectric generating facilities during construction. Approximately 4,800 feet of the canal lining was constructed in the existing canal while it was in operation. This was accomplished by driving sheet piles to split the canal in half and lining one half at a time. Additionally, over two miles of the canal were constructed partially in the existing canal. Maurice directed laboratory testing program, performed stability analyses, and developed geotechnical recommendations for the canal design.

Camp Pendleton Desalination Project*, Marine Corps Base (MCB) Camp Pendleton, California (Project Engineer) // Project engineer for a feasibility study for construction of a desalination project. An offshore and onshore geotechnical investigation was performed. Geotechnical recommendations were provided for plant facilities, pipelines, shafts and tunnels.

Palo Verde Water Treatment Facility*, Palo Verde County Water District, Blythe, California (Project Engineer) // Project engineer for construction of a steel tank reservoir and water pipeline that an existing water treatment facility. The geotechnical report included geotechnical recommendations for foundation design of the steel tank, and for the distribution pipelines.

* Indicates projects completed with a different firm

Jim Herbert, PG, CEG
Engineering Geologist



Years of Experience

38

Education

BS/BSc, Geological Sciences,
California State University, Long
Beach

California Registrations

CEG #1657

PG # 5213

Memberships

Member, Association of
Environmental and Engineering
Geologists

Member, United States Society on
Dams

Office Location

Walnut Creek, CA

Jim has extensive and varied experience in the engineering geology, geotechnical, hazardous waste assessment, and associated construction fields. He has spent considerable time effectively managing quality control programs for significant hillside and flatland earthwork developments, rock excavations, contaminated soil and groundwater assessments, dam instrumentation, and both rock and soil slope stabilizations. Jim is also adept at evaluating existing site conditions with respect to historical design plans, construction specifications, and as-built construction records, geotechnical documentation, geological maps and literature, and aerial imagery to develop comprehensive models of subsurface conditions in support of site rehabilitation and forensic investigations. His early career included a valuable stint as a soils lab technician.

Jim's Relevant Project Experience

San Andreas Pipeline No. 2 Extension, San Francisco, California (Engineering Geologist)

// Engineering Geologist providing oversight of the Conditions Assessment and Seismic Safety Evaluation for the existing potable water pipeline originally constructed in southwestern San Francisco in 1934, particularly that segment crossing Pine Lake Park Canyon. Defined geologic model of the area used for slope stability and liquefaction assessments, and identified pre-existing ancient landslide in close proximity to the pipeline alignment.

SPA Recycled Water Project, Sacramento, California (Engineering Geologist)

// Engineering Geologist responsible for proposal scoping and investigation costing, subsurface Report (GDR) and design parameter technical memorandum for 3.3 mile long canal modernization project. Portions of existing embankment and at-grade canal were replaced with an underground pipeline or canal embankments are being improved for seismic stability and increased freeboard. Stantec acted as owner's engineer, supporting development of the design-build contract bid documents.

North Bay Aqueduct-Alternative Intake Project, Sacramento, CA

(Engineering Geologist) // Provided preliminary EIR level assessment of soils, geologic, and seismic characterization of 3 alternatives for proposed 20 mile pipeline from new intakes on the Sacramento River.

East-West Conveyance Project - Phase 1 Design and Environmental, Patterson Irrigation District, California (Engineering Geologist)

// Engineering Geologist responsible for proposal scoping and investigation costing, subsurface investigation work plan preparation and implementation for development of Geotechnical Data Report (GDR) and design parameter technical memorandum for 3.3 mile long canal modernization project. Portions of existing embankment and at-grade canal are being replaced with an underground pipeline or canal embankments are being improved for seismic stability and increased freeboard. Stantec acted as owner's engineer, supporting development of the design-build contract bid documents.

Cadiz Valley Water Conservation, Recovery and Storage Project, Cadiz Valley Water District, Cadiz Valley, CA

(Engineering Geologist) // Engineering geologist responsible for development of the geological and geotechnical investigations in support of preliminary, planning-level designs for the estimated 60-inch diameter pipe to be installed in a 15-foot deep, cut-and-cover trench and other Project features. The proposed pipeline will extend across a remote region of California high desert plains and bedrock outcrops a distance of about 43 miles. Four seismic refraction lines (3,200 feet total length) were surveyed and twenty-seven 20 to 100 feet deep soil borings were advanced and sampled to evaluate pipeline installation and potential scour conditions. Project Geotechnical Data and Interpretive Reports (GDR and GIR) were delivered.

Central Bayside System Improvement Project, San Francisco, California (Engineering Geologist)

// Engineering Geologist responsible for managing and implementing follow-up subsurface geotechnical investigations into conditions associated with potential tunnel boring machine (BM) sending and receiving shafts for two proposed alignments. The common to both alignments sending shaft, also the planned location for the groundwater lift station, is currently planned to extend from 120 to 180 feet below ground surface, and is largely within Young Bay Mud (YBM). The receiving shaft is expected to be shallower, but will also encounter YBM, but also potentially old fill associated with the former port developments and the 1906 San Francisco earthquake.

Waste Water Replacements Program, Mojave Desert, California (Engineering Geologist)

// Engineering Geologist responsible for planning and implementing geotechnical investigations for replacement of existing leachfields, septic tanks, and force and gravity mains at the Hinds, Eagle Mountain, Iron Mountain and 2012 pumping plants located on the Mojave Desert portion of the Colorado River Aqueduct. Percolation tests were conducted in coarse alluvial fan deposits accordance with county of San Bernardino and Riverside county specifications. Subsurface explorations were conducted along proposed main alignments primarily to identify intervals of shallow bedrock and the potential for difficult excavation. Onsite Wastewater Treatment System reports were prepared to define leachfield areas and trench lengths.

Moccasin Wastewater Treatment Plant Replacement Project, Chattanooga, Tennessee (Engineering Geologist)

// Engineering Geologist responsible for reviewing existing geological and geotechnical data and performing and visual reconnaissance of existing conditions to develop an understanding of the potential foundation conditions. Using

existing data and publically-available aerial imagery, conceptual plans and profiles were developed to guide placement of the planned treatment equipment to minimize the need for excavation and replacement of old fill materials.

Santa Anita Dam Re-Analysis, San Gabriel, California

(Engineering Geologist) // Engineering geologist supporting design of seismic stability and Probable Maximum Flood modifications to the 225-foot high concrete arch dam built in 1924-1927 in the San Gabriel Mountains. Evaluated geologic conditions in and around the shotcrete-covered impact zone for the modified spillway and in the area of a proposed helicopter pad needed for emergency evacuations.

Jordan Keeney, EIT
Designer



Years of Experience

2

Education

MS, Civil Engineering, University of Kentucky

BS, Civil Engineering, Western Kentucky University

Registrations

KY EIT #14948

Memberships

Member, Kentucky Society of Professional Engineers

Member, American Society of Civil Engineers

Office Location

Rocklin, CA

Jordan specializes in geotechnical engineering services including slope stability analysis, foundation engineering, geotechnical explorations, earth dam assessments, material parameter development, and data analysis and reporting.

Jordan's Relevant Project Experience

Normandy Toe Drain Replacement, Tennessee Valley Authority (TVA), Bedford and Coffee Counties, Tennessee (Project Engineer) // Project

Engineer completing material assessment and reporting for the replacement of a toe drain system. Performed review and analysis of soil laboratory testing and in-situ testing data. Responsible for the organization, reporting, and analyses of the Basis of Design Report and technical specifications. Developed material parameters for subsequent stability assessments.

Levee Local Protection Projects (LPP), City of Pineville and City of Harlan, Pineville and Harlan, Kentucky (Project Engineer) // Project engineer

responsible for various tasks for the comprehensive and investigative slope stability analyses and reporting of multiple levee systems in Eastern Kentucky. Specific tasks included preparation of the proposals, budget monitoring, completion of geotechnical exploration and lab testing, UAS based photogrammetric modeling, performance of slope stability analyses, and reporting of the findings.

KAWC Owenton and Deer Lake Dams, Kentucky American Water Company, Owenton and Scott Counties, Kentucky (Project Engineer) // Project

engineer responsible for various tasks for the comprehensive slope stability and seepage evaluation of earthen structures. Tasks included preparation of the proposals, budget monitoring, review of historic exploration and testing programs, completion of geotechnical explorations and lab testing, UAS based photogrammetric modeling, and performance of slope stability and seepage analyses.

Spurlock Access Road Slope Failure, East Kentucky Power Cooperative (EKPC), Maysville, Kentucky (Project Engineer) // Project Engineer

responsible for various tasks for the comprehensive and investigative slope stability analyses of an access road failure. Tasks included preparation of the proposals, budget monitoring, completion of geotechnical exploration and lab testing, UAS based photogrammetric modeling, and performance of slope stability analyses.

Midwest Fertilizer Facility, Midwest Fertilizer, Mt. Sterling, Indiana (Project Engineer) // Project engineer responsible for various tasks for a million-dollar

geotechnical exploration. Tasks for this project included the oversight of geotechnical exploration and lab testing, oversight and direction for CPT and geophysical testing, UAS based photogrammetric modeling and mapping of the project site, and performance of seismic site response and liquefaction analyses.

Mark Wuestehube

Environmental/CEQA Lead



Years of Experience

21

Education

BS, Wildlife Management,
Humboldt State University

California Registrations

Certified Wildlife Biologist, The
Wildlife Society

ISA Certified Arborist, International
Society of Arboriculture

Memberships

Member, The Wildlife Society

Member, International Society of
Arboriculture

Office Location

Chico, CA

Mark has over 19 years of professional experience managing biological and other environmental investigations, preparation of CEQA and NEPA documentation, assisting in identification of environmental constraints and integrating impact avoidance into project design, regulatory compliance and permitting, and mitigation and restoration efforts. He has managed environmental investigations and regulatory permitting projects and routinely works on projects that require permitting from the Corps, consultation with USFWS and NMFS, Streambed Alteration Agreements with DFW, Section 401 Water Quality Certification and NPDES permits from the Regional Water Quality Control Boards, and compliance with other environmental laws and regulations.

Mark's Relevant Project Experience

Line 123 Pipeline Replacement Project: Wetland Delineation/Permitting Support/Construction Monitoring*, Pacific Gas and Electric Company, Placer County, California (Project Manager) // Managed biological and regulatory support, preconstruction surveys, construction monitoring, and restoration monitoring for replacement of the Line 123 pipeline in Placer County. Resource issues included vernal pools, seasonal wetlands, streams and other waters of the United States, vernal pool fairy and tadpole shrimp, mitigation preserves, and Swainson's hawk and other nesting birds. Coordinated efforts to ensure that full-time monitoring personnel were available onsite as needed.

Little Chico Creek Exposed Gas Main Emergency Repair*, Pacific Gas and Electric Company, Butte County, California (Project Manager) // Provided biological and permitting support for emergency pipeline repair in the city of Chico. Assisted with identifying sensitive biological resources and conservation measures; provided support for emergency notification packages for agency permitting; managed environmental training and construction monitoring; and assisted PGand E with post-project notifications to complete the permitting process.

San Joaquin River Basin Storage Investigation EIS: Supporting Studies*, Bureau of Reclamation, Fresno and Madera Counties, California (Project Manager) // Responsible for overseeing the preparation of multiple investigations to support preparation of the EIS including Bald and Golden Eagle Protection Plan, CWA 404(b)(1) Alternatives Analysis, CVHM Groundwater Modeling, HEC5Q Temperature Modeling, Real Estate Plan, and EDT Modeling Sensitivity Analysis. Managed staff and subcontractors and participated in multiple meetings and communications with Reclamation and resource agencies.

Glenn County Bridge Replacement Projects*, Glenn County Planning and Public Works, Glenn County, California (Project Manager) // Currently responsible for overseeing preparation of NES reports, wetland delineations, ASR/HPSR reports, and section 7 biological assessments for nine bridge replacement projects in Glenn County. Responsible for securing the following permits: Clean Water Act Sections 404 and Section 401; and Section 1602 Streambed Alteration Agreement Notification.

Joaquin County Department of Transportation: On-Call Environmental Support Services*, San Joaquin County Department of Public Works, Transportation Engineering Division, San Joaquin County, California (Project Manager)

// Currently assisting San Joaquin County with technical studies, environmental documentation, regulatory permitting, and construction support for multiple transportation projects including: Cotta Road Bridge Replacement Project and Wildwood Road Bridge Replacement Project. Services include: NES, delineation of waters of the United States, archaeological/historic property survey, wetlands permitting, pre-construction surveys, worker environmental awareness training, fish salvage, and construction monitoring.

Lower Clear Creek Anadromous Fish Habitat Restoration and Management Project: Technical Studies, CEQA Compliance, and Regulatory Permitting*, Bureau of Reclamation, Shasta County, California (Project Manager/Regulatory Specialist) // Managed technical investigations and reporting, including delineation of waters of the United States, Biological Assessment/Essential Fish Habitat Assessment, and archaeological resources archival investigation. Prepared application packages for CWA Sections 404 and 401 authorizations. Prepared IS/MND to support CWA Section 401 Water Quality Certification.

Palermo Reconductoring Project Wetland Delineation and Mitigation Monitoring*, Pacific Gas and Electric Company, Butte and Yuba Counties, California (Project Manager) // Managed field delineation and report preparation for a 42-mile electric transmission line project. A total of 76.43 acres of wetlands and other waters of the United States were identified and mapped. Responsibilities included coordinating field efforts for multiple staff; ensuring implementation of appropriate safety training and protocols (e.g., railroads); assigning and tracking field production rates (miles/day) to meet ambitious completion schedule; technical review of field data forms, wetland maps, and other GIS deliverables; preparation of delineation report; and remobilization of field crews and document revisions to respond to last-minute changes in project alignment. Managed biological monitoring staff during multi-year project construction.

External Corrosion Direct Assessment Water Crossings – Wetlands, Biological, Cultural, and Permitting Support and Construction Monitoring*, Pacific Gas and Electric Company, Contra Costa, Shasta, and Solano Counties, California (Project Manager) // Managed wetland delineation, biological and cultural field investigations, fisheries assessments, permitting support, preconstruction surveys, environmental

training, and construction monitoring for three External Corrosion Direct Assessment projects in Shasta, Contra Costa, and Solano counties. Coordinated with PGand E to identify resource constraints, minimize the need for regulatory permits, obtain required permits, and provide required pre-construction and post-construction documentation to CDFW.

Western Area Power Administration Biological Resources and Regulatory Permitting Support*, Western Area Power Administration, Sierra Nevada Region, Northern California (Regulatory Specialist) // Provides biological and regulatory permitting assistance for projects and tasks related to Western's Right-of-Way Maintenance Program, Integrated Vegetation Management Program, and Roads Program. Currently assisting Western with coordination with the State Water Resources Control Board to prepare CEQA documentation to support issuance of a programmatic CWA Section 401 Water Quality Certification and Waste Discharge Requirements permit for Western's North Area Right-of-Way (ROW) Maintenance Program; and prepare NEPA Supplemental Analysis documents for multiple ROW maintenance programs in northern California.

FERC Oroville Facilities Hydroelectric License Implementation*, California Department of Water Resources, Butte County, California (Project Manager/Regulatory Specialist) // Managed task orders issued in support of the Oroville Hydroelectric License Implementation. Completed projects include: Brad B. Freeman Bike Trail Realignment Project IS/MND and Regulatory Permitting Assistance; Lower Feather River Fish Counting Weir Tiered IS/MND; and Lower Feather River Gravel Supplementation and Improvement Project Tiered IS/MND and Regulatory Support. Authored the environmental compliance documents, managed and reviewed biological resource investigations, reviewed the supporting technical reports, participated in agency meetings and consultations, prepared wetland permit applications; and assisted in the development of onsite mitigation programs.

* Indicates projects completed with a different firm

Nick Eide

Lead Biologist



Years of Experience

11

Education

BS, Biology, Sonoma State University

California Registrations

ISA Certified Arborist #WE-9153A, International Society of Arboriculture

Memberships

Member, International Society of Arboriculture

Office Location

Rocklin, CA

Nick's experience is project management, biological resources, and regulatory compliance. His expertise in project management includes mobilizing, managing, and coordinating with staff and technical experts on projects; working collaboratively with clients on projects to ensure effective solutions to biological resource issues; and providing clients with project deliverables on time and on budget. Nick also has considerable experience in biological resources documentation such as preparing technical reports/documents (e.g., ESA biological assessments, wetland delineations, biological resource assessments, habitat evaluations), CEQA and NEPA document sections, and regulatory permitting packages. He also frequently performs surveys for special-status wildlife species, habitat suitability surveys for special-status species, wetland delineations, and arborist surveys. Nick has experience providing and managing deliverables for on-call projects for municipalities, agencies, utilities, and developers.

Nick's Relevant Project Experience

Little Chico Creek Exposed Gas Main Emergency Repair Project*, Pacific Gas and Electric Company, Chico, California (Project Manager) // Provided biological and permitting support for emergency pipeline repair in the city of Chico. Provided support for emergency notification packages for agency permitting; environmental training and construction monitoring; and provided prepared post-project notifications to complete the permitting process.

PGand E Natural Gas Line 406 and 407 Installation Project*, California State Lands Commission, Yolo County, California (Biologist) // Monitored installation and construction of 15-mile, 30-inch natural gas pipeline on behalf of California State Lands Commission. Responsibilities included ensuring that onsite biological/environmental monitors enforced state and federal regulations regarding biological and environmental resources. Produced daily reports and photo logs illustrating construction progress and any potential environmental issues.

Natural Gas Line 406 and 407 Installation Project*, Yolo County, California (Biological Monitor) // Monitored the installation and construction of a 15-mile, 30-inch natural gas pipeline on behalf of the California State Lands Commission. Responsibilities included ensuring that onsite biological/environmental monitors enforced state and federal regulations regarding biological and environmental resources. Produced daily reports and photo logs illustrating construction progress and any potential environmental issues.

McKean Road Tank and Pipeline Project*, San Jose Water Company, Santa Clara County and the City of San Jose, California (Project Manager/ Biologist) // Provided construction support services (e.g., construction monitoring and pre-construction surveys) for the project. Duties included coordinating with the project engineer and construction contractor to ensure the pre-construction surveys and construction monitoring was performed in accord with the regulatory permits and environmental commitments, and ensured appropriate environmental/biology staffing was available to

cover the project over the two year construction period. Also preformed daily pre-activity clearance surveys and biological monitoring for special-status plant and animal species including California tiger salamander, California red-legged frog, western pond turtle, western burrowing owl, and smooth lessingia. The clearance surveys and monitoring were performed in accordance with the USFWS Biological Opinion, the Santa Clara Valley Habitat Conservation Plan permit conditions, the Streambed Alteration Agreement issued by CDFW, and other measures provided in the project's governing permits and documentation.

Community Pipeline Safety Initiative (previously called Pipeline Pathways) Biological/Permitting Support and Construction Monitoring*, Pacific Gas and Electric Company Various Locations, California (Project Manager/Biologist) // Reviewed environmental constraints analyses, coordinated San Joaquin Valley Habitat Conservation Plan (SJVHCP) pre-activity surveys, prepared and provided QA/QC of Master Streambed Alteration Agreement Verification Request Forms and Lake or Streambed Alteration Notifications for submittal to CDFW, coordinated and provided QA/QC for preconstruction surveys for nesting birds, provided worker environmental training, and coordinated construction monitoring efforts. Managed tasks for approximately 1,000 project areas throughout PGand E's Northern, Bay Area, and Central Valley Regions.

L-050A/L-167 and L-124A Pipeline Replacement Project*, Pacific Gas and Electric Company, Sutter and Yuba Counties, California (Biologist) // Performed preconstruction wetland and elderberry surveys and mapping. Wrote sections of the biological constraints analysis reports. Served as lead construction monitor with responsibility for coordinating with PGand E, scheduling monitoring staff, and reviewing deliverables for the L-050A segment.

Lassen Pines Mutual Water Company, Water Systems Improvements Project , Shasta County, California (Deputy Project Manager) // Prepared and managed the preparation of an IS/MND, which evaluated impacts associated with the construction of a new water storage facility and associated infrastructure upgrades to surrounding residences. Responsibilities included oversight and coordination with staff and the client for the preparation of the IS/MND, performing QA/QC of the draft document, and providing technical advice/ input.

Columbine Station Improvements Project, San Jose Water, San Jose, California (Project Manager) // Managed the preparation of an IS/MND and MMRP for the construction of two new water storage tanks within the existing footprint of

San Jose Water's Columbine Station. Responsibilities included coordinating with project engineers to develop a project description, managing the preparation of the IS/MND and MMRP, coordinating with the City of San Jose (CEQA Lead) to ensure all issues/concerns were addressed in the CEQA document and that project timelines/milestones were met, QA/QC of deliverables, and working with project staff to ensure deadlines were met.

Urban and Non-Urban Levee Investigations and Monitoring*, California Department of Water Resources, Merced, San Joaquin, Stanislaus, Fresno, and Madera Counties, California (GIS Support) // Nick provided GIS support to cultural and biological resources staff investigating levee sites throughout California. Tasks completed for cultural resources staff include generating California Historic Records Information System literature search maps, project location maps, DPR 523-J location maps for isolates, and preparing the GPS for use by field staff. Support for biological staff includes mapping the project alignment on high resolution aerial photo backgrounds, performing CNDDDB database queries, and digitizing special-status species habitat based on aerial photo interpretation.

Geotechnical Levee Investigations*, California Department of Water Resources, Fresno, Madera, Merced, San Joaquin, Sacramento, and Stockton, Sutter, and Yolo Counties, California (Assistant Project Manager/Biologist) // Provided nesting bird surveys, habitat assessments for state and federally listed species, and species identification on over 80 miles of levees in Fresno, Madera, Merced, San Joaquin, Sacramento, and Stockton, Sutter, and Yolo counties. Authored numerous nesting bird and biological clearance reports for compliance with the project's Programmatic Effects Analysis issued to the California Department of Water Resources (DWR) and required reconnaissance level sensitive species identification and habitat mapping. Made recommendations to DWR biologists regarding protective measures for sensitive species and their habitat identified during the surveys. Monitored geotechnical evaluations to ensure compliance with a "no take" determination made by USFWS. Other responsibilities included clearing proposed work areas and providing Worker Environmental Awareness Program training to all construction personnel. Daily reports were written describing construction activities, site location, site habitat, and any potential environmental issues.

* Indicates projects completed with a different firm

Meghan Oats

Biologist



Years of Experience

3

Education

BS, Environmental Science and Management (Concentration in Ecology, Biodiversity, and Conservation Biology), University of California, Davis

Natural Resource Management, University of Copenhagen

Office Location

Nevada City, CA

Meghan is a biologist/environmental scientist with four years of experience in biological resources, natural resource management, environmental education, and scientific research. In her years previous to those at Stantec, Meghan managed nature preserves, riparian and wetland areas, and oak woodlands throughout 14 California State Parks in the central valley and southern Cascade Range. The management of these State Parks included noxious weed surveys, vegetation mapping and monitoring in woodland, wetland, and forested areas, sensitive species surveys and assessments (both plant and wildlife), monitoring of non-native and invasive species (plant), trail restoration, GIS/GPS mapping, data analysis, and environmental compliance. With Stantec, Meghan has completed data analysis, assisted in the preparation of California environmental permit applications, and has written multiple CEQA documents and biological assessments/evaluations for various projects. Additionally, she conducts environmental compliance monitoring and has conducted a variety studies and surveys in many regions throughout California including the Sierra Nevada Foothills, as well as the Central Valley, Northern and Southern California.

Meghan's Relevant Project Experience

Nevada Irrigation District, Combie Phase 1 Canal and Bear River Siphon Replacement Project, Placer County, California (Biologist)

// Meghan conducted a biological assessment and delineation of environmentally sensitive areas. She assisted in preparation and submission of CDFW SAA 1600, RWQCB 401, and USACE 404 permits.

Midwestern Placer Regional Sewer Project – Monitoring Compliance, Placer County, California (Botanist)

// Meghan conducted a complete vegetation assessment for the restoration and revegetation of the project area. She completed the monitoring reports in compliance with project's mitigation measures and permit stipulations.

Community Pipeline Safety Initiative, Pacific Gas and Electric (PGand E), Vegetation Removal, Northern, California (Biologist)

// Meghan conducts visual encounter surveys for sensitive species, including foothill yellow-legged frog, California red-legged frog, and more within PGand E vegetation removal work area. Meghan also performs biological monitoring. Additionally, she conducts numerous nesting bird surveys during active nesting season in areas where vegetation removal will occur and within the surrounding buffer.

Line 407 Natural Gas Transmission Pipeline Project, Phase I and II, Pacific Gas and Electric (PGand E), Yolo and Sutter Counties, California (Biologist)

// Meghan conducts full-season protocol-level Swainson's Hawk surveys, baseline vegetation surveys, and pre-construction surveys for sensitive species, including giant garter snake and burrowing owl. She also provides support with construction monitoring and overall compliance with this 26-mile pipeline alignment. Additionally, Meghan prepared the Vegetation Restoration Plan, Tree Replacement Plan, and Weed Abatement Plan for both phases of the Project.

Line 901 Refugio Oil Spill, Santa Barbara, California (Marine

Biologist) // Meghan worked with a team to analyze the damages and injuries that occurred from the Line 901 oil spill in Santa Barbara, CA. She analyzed species-specific data in accordance to the Natural Resource Damages Assessment.

Pacific Gas and Electric, Drum-Spaulding Hydroelectric Project, Fish Rescue and Release in the Bear River Canal and Lower Wise Canal, Placer County, California (Assistant to PGand E Biologist) // Meghan assisted PGand E Senior Aquatic

Biologist with fish rescue and release at a total of seven sites in the Bear River and Lower Wise Canals. Fish capture was conducted using a Smith Root Model 24 backpack. Meghan aided in the shocking, netting, identification, data collection, transporting, and release of all native and non-native fish species caught.

Devil Canyon Project, FERC Project No. 14797, Botanical Study, San Bernardino County, California (Botanist) //

Meghan conducted protocol-level special-status plant and non-native invasive plant surveys within the Project area of Silverwood Lake. This was completed by using random meandering techniques to ensure thorough coverage of plant communities that could support NNIP. Following surveys, she post-processed all botanical data, including compiling all the data into databases and providing quality control support for all the quantitative field data.

Oroville Emergency Recovery Project-Oroville to Table Mountain 230kV Transmission Lines (Biological Lead

Assistant) // Meghan provides project field support by assisting managing onsite biological monitors and overall project coordination for the newly rerouted 230kV transmission line construction. Meghan provides daily communication to DWR regarding biological monitoring updates, as well as communicates with the contractor to provide updates to staff and the client. She also provides support and guidance to onsite biologists regarding nest removal, relocation, and compliance support per the project's MBTA permit.

Meagan Kersten

Lead Archeologist



Years of Experience

9

Education

MA, Anthropology, California State University, Sacramento

BA, Anthropology, University of California, Davis

Memberships

Member, American Association of Physical Anthropologists

Member, Society for California Archaeology

Office Location

Nevada City, CA

Meagan is an archaeologist and environmental compliance specialist with more than nine years of experience in cultural resources management and environmental compliance. She has served as both a project manager and task manager on numerous large- and small-scale infrastructure projects requiring CEQA, NEPA, environmental permitting (recreation, water, wastewater, transportation, mining, pipeline, alternative energy, and oil and gas). Meagan works regularly with local, state, and federal agencies and Native Americans to facilitate environmental compliance and has project experience throughout California. She prepares and supervises technical documents and provides quality control and peer review for cultural resources studies and CEQA documents in compliance with local, state, and federal laws and regulations. Meagan has extensive experience conducting archaeological surveys and excavations, cultural resource records searches, Native American outreach and coordination, cultural resource construction monitoring, National Historic Preservation Act Section 106 compliant reports, CEQA and NEPA Cultural Resources sections/studies. Meagan specializes in bioarchaeological studies involving human skeletal remains analysis and she meets the Secretary of the Interior's standards and guidelines for a professional archaeologist.

Meagan's Relevant Project Experience

City of Lincoln, Midwestern Placer Regional Sewer Project, Placer County, California (Project Archaeologist) // Meagan completed three weeks of archaeological field surveys for over 30 miles of proposed and alternative sewer pipelines and surveyed three existing wastewater treatment plants. Also completed a cultural resource records search, Native American outreach, including two field meetings with Native American representatives, and worked with local tribes to involve them in cultural resource monitoring during construction. Assisted with the cultural resource evaluation process. She reviewed a NHPA Section 106 compliant report prior to submittal to SHPO and drafted the letter to SHPO on behalf of SRF. Meagan successfully obtained SHPO concurrence on cultural resource findings for the project.

City of Grass Valley Water Distribution System Pipeline Repair and Replacement Project, Nevada County, California (Project Archaeologist)

// Meagan was the project archaeologist and completed a cultural resource review in support of SRF federal funding for the project. The cultural resource review included a NCIC cultural resources records search and Native American Heritage Commission Sacred Lands File and Native American contacts list request.

Wastewater Treatment Improvement Projects, San Andreas Sanitary District, San Andreas, California (Environmental Task Manager and Cultural Resource Lead) // Meagan worked with the District and Stantec engineers to complete two supplemental CEQA Initial Study Mitigated Negative Declarations and State Revolving Fund (SRF) and USDA federal funding environmental compliance for the project. In addition to coordinating the overall environmental compliance, cultural resources work conducted included a cultural resource survey, CCIC cultural resources records search, Native American outreach (including a site visit with the Calaveras Band of Mi-Wuk Indians), and completing a NHPA Section 106 compliant report.

Meagan also drafted a consultation letter to SHPO at the request of SRF. The District received approximately six million dollars in SRF and USDA grant funding for the project.

Valley Springs Public Utility District Effluent Management and Wastewater Treatment Project, Calaveras County, California

// Project Cultural Resource Lead, Meagan completed the CEQA Initial Study Mitigated Negative Declaration Cultural Resources section and the NHPA Section 106 compliant report in support of State Revolving Fund (SRF) federal funding for the project. Cultural resources work conducted included a cultural resource survey, CCIC cultural resources records search, Native American outreach (including a site visit with the Calaveras Band of Mi-Wuk Indians), NRHP and CRHR evaluations, and NHPA Section 106 compliant report.

Placer County Memorial Emigrant Trail Project Donner Summit, California

// Currently completing an environmental constraints study of approximately 500 acres of land near Donner Summit along the vicinity of the Overland Emigrant Trail in order to determine a preferred alignment for an approximately 8 mile long alignment for the Project. Ms. Kersten is working with the County to design the project to minimize impacts to cultural resources in this area with high sensitivity for cultural resources. Completing a cultural resources inventory to comply with the requirements of Section 106 of the NHPA, NEPA, and the CEQA. Work completed to date includes working with the USFS archaeologist to obtain a USFS Special Use Permit, completing cultural resource records search and surveys, recording and evaluating cultural resources, and consulting with local Native American tribes.

Tuolumne Utility District, Ditch System Sustainability Project, Tuolumne County, California

// Funded by the Sierra Nevada Conservancy, the purpose of the project was to prepare a Capital Improvement Plan and Operation and Maintenance Strategies for the ditch system given the cultural resources and environmental constraints. Completed cultural resource surveys of 56 miles of the Tuolumne Utility District ditch system. Worked with experienced local archaeologists. The purpose of the cultural resource surveys was to determine the TUD ditch systems' eligibility to the National Register of Historic Places (NRHP).

City of Turlock Harding Drain Pipeline and WWTP Upgrade Projects, Stanislaus County, California (Cultural Resources Specialist)

// Meagan completed the cultural resource NHPA Section 106 compliant report for two State Revolving Fund (SRF) projects involving the City of Turlock WWTP expansion

and upgrade and a new City of Turlock outfall pipeline. Responsible for completing the NHPA Section 106 process including a cultural record search, field survey, and Native American consultations on an accelerated schedule.

Nevada Irrigation District, Regional Water Treatment Plant, Reservoir and Pipeline Project EIR and Permitting, Placer and Nevada County, California (Project Cultural Resource Specialist)

// Meagan managed the archeological field studies. Conducted a week long cultural resource field survey and initiated the pre-planning for the CEQA/EIR process for a 17 mile pipeline project.

City of Dixon Wastewater Treatment Facility Improvements Project, Solano County, California (Archaeologist)

// Project involved CEQA and CWA SRF compliance. Meagan completed archaeological field surveys for over 444 acres of proposed improvements to the City of Dixon existing WWTF. Meagan completed a cultural resource records search, Native American consultations, and CRHR and NRHP evaluations. Completed a NHPA Section 106 compliant report for submittal to SHPO. Additionally, Meagan drafted the CEQA IS/MND and SRF checklist and was assistant Project Manager.

City of Lincoln, Midwestern Placer Regional Sewer Project, Placer County, California (Archaeologist)

// Meagan completed three weeks of archaeological field surveys for over 30 miles of proposed and alternative sewer pipelines and surveyed three existing wastewater treatment plants. Also completed a cultural resource records search, Native American consultations, including two field meetings with Native American representatives, and worked with local tribes to involve them in cultural resource monitoring during construction. Assisted with the cultural resource evaluation process. Reviewed a NHPA Section 106 compliant report prior to submittal to SHPO. Drafted the letter to SHPO on behalf of SRF. Successfully obtained SHPO concurrence on cultural resource findings for the project.

Nevada Irrigation District, Nevada County, California (Assistant Project Manager and Cultural Resource Specialist)

// Meagan completed CEQA, including cultural resources studies and drafted the CEQA for the following Nevada Irrigation District Projects: Banner-Taylor Reservoirs Restoration Project, Nevada County, California (IS/MND); Combie Phase 1 Canal and Bear River Siphon Replacement Project, Nevada & Placer County, California (IS/MND); Locksley Lane Intertie Project, Placer County, California (IS/ND); Rock Creek Siphon Project, Placer County, California (IS/MND).

Jennifer Barnes

Financial Analyst



Years of Experience

10

Education

BS, Business Administration,
Finance (Economics minor),
California State University,
Sacramento

Office Location

Nevada City, CA

For the last 5 years Jennifer has been assisting California Water Agencies and Special Districts to secure project financing through the State Water Board administered State Revolving Fund, including small community planning and construction grants. She has assisted Agencies with assessments of their enterprise fund expenses and revenues, provided analysis of system rates/charges and supported applications for financial assistance for disadvantaged communities throughout the western United States. Recently, this has included assistance to the Cities of Woodlake, Newman, and Grass Valley, as well as the San Andreas Sanitary District, the Amador Water Agency, Valley Springs PUD and the County of Madera. With a background in project finance, Jennifer's can do approach has been applied to various projects including wastewater facilities, public schools, and the UC Davis Medical Center.

Jennifer's Relevant Project Experience

Midwestern Placer Regional Sewer Project, City of Lincoln, Lincoln, California (Project Manager Assistant) // Jennifer was the Project Manager Assistant facilitating a fast track environmental compliance process required to secure \$83 million dollars for a regional sewerline and wastewater treatment plant upgrade project connecting several communities in Placer County.

City of Jackson, Jackson, California (Project Manager Assistant, Funding Coordinator) // Jennifer provided assisted to the City of Jackson to complete their Financial Assistance Construction Packages for the State Water Board State Revolving Fund.

Fairmead Septic to Sewer Project MD-33, County of Madera, California (Funding Coordinator) // Jennifer provided assisted G Aronow Consulting with financial analysis of the County of Madera's Maintenance District 33 (MD33) to provide a future sewer rate structure for Septic users. MD 33 is currently slated to receive \$8 million dollars of principle forgiveness from the State Water Board through the small communities grant program. Jennifer is currently managing the Financial Assistance Construction Packages to ensure the County's project can move forward.

City of Grass Valley Wastewater Master Planning and I/I Construction Project, Grass Valley, California (Funding Coordinator) // The City of Grass Valley is designated as a small disadvantaged community by the State Water Board Division of Financial Assistance (DFA) and has received just under \$500,000 in grant funding through the DFA Small Communities program to fund studies of their collection and treatment facilities. Jennifer has assisted the City manage the expenditure of these planning funds. These planning efforts have identified critical facility improvements for which the City is interested in seeking financial assistance. Jennifer recently managed the preparation and submittal of an Infiltration and Inflow Project Financial Assistance Construction Packages to the State water Board for one of these critical projects. The City will be receiving approximately \$4 million in grant assistance for their I/I construction project.

City of Woodlake Wastewater Treatment Facility Upgrade and Expansion, Woodlake, California (Project Manager Assistant, Funding Coordinator) // Jennifer helped secured \$500,000 in planning funds from the Clean Water Small Communities grant program for the City's Wastewater planning needs.

San Andreas Sanitary District Wastewater Treatment and Disposal Master Planning and Facilities Upgrade, San Andreas, California (Project Funding Coordinator) // In 2013, Stantec secured a \$482,000 planning grant on the District's behalf through the State Water Board's Division of Financial Assistance. Jennifer assisted with securing this financial assistance for the District and is coordinating the ongoing State Revolving Fund planning studies which they are funding. The District has currently been approved for \$1.3 Million in principal forgiveness for the design and construction of a new wastewater sludge digester. Stantec is continuing to assist the District in securing USDA funding for the balance of the project funding needs. In preparation for California's 218 process, Jennifer along with G Aronow Consulting are also performing financial analysis to evaluate potential changes to the District's current sewer rate structure.

City of Newman, Newman, California (Funding Coordinator) // Jennifer has secured \$500,000 in planning funds from the Clean Water Small Communities grant program for the City to update their Sewer Collection System Master Plan and address current State Water Board waste discharge requirements.

SMUD East Campus-Operations Center (EC-OC) Design Build Project, Sacramento, California (Project Manager Assistant) // Jennifer was the Project Manager Assistant for the Furniture, Fixtures and Equipment (FFE) package for a 261,700 sf operations center for the Sacramento Municipal Utility Department (SMUD). She tracked project labor and budget, including coordination with multi-office management. Jennifer assisted in the processing and execution of project contracts and internal work orders to help expedite the project.

UC Davis Medical Center Surgery and Emergency Services Pavilion, Sacramento, California (Project Manager Assistant) // Jennifer was the Project Manager Assistant for the Architects of record on the 471,000 sf surgery and emergency services pavilion. She was charged with planning, preparing and tracking construction documents including change orders, field reports, submittals, and meeting minutes ensuring optimum project deliverables. She aided in obtaining Office of Statewide Health Planning and Development (OSHPD), Client, and consultant project approvals. Jennifer facilitated Architectural change order requests analyzing labor and budget data for presentation to the Client, as well as played an integral role in analyzing the final project closing costs for OSHPD.



**ANDREGG
P S O M A S**

Years of Experience

25

Education

BA, California State University
Fresno

California Registrations

PLS #8448

Memberships

American Council of Engineering
Companies, California / Sierra
Chapter

Society of American Military
Engineers / Sacramento Post

American Public Works Association
/ Sacramento Chapter

Dana has more than 25 years of surveying and mapping experience with Andregg Psomas. He has performed and supervised cadastral, control, topographic and construction surveys for numerous public and private projects. Dana has worked on numerous GPS projects and is responsible for processing and adjusting data from GPS, digital level and conventional surveys. His proficiency with software from AutoCAD, Trimble and StarNet is used in preparing topographic maps, final maps and reports. He also leads projects using resource grade GPS (Trimble Pro XRS) and hydrographic surveys with GPS, Knudsen Echo Sounder, and HydroLite Echo Sounder.

Dana's Relevant Project Experience

American River - Auburn Dam Site Channel Restoration, Placer County Water Agency, Placer County, California (Project Manager)

// Dana served as project manager on this restoration project that included control, photogrammetric, bathymetric, topographic hydrographic, volumetric and construction surveys for the design of a pumping station and restoration of the American River channel at the Auburn Dam site. Mapping of the submerged river channel was performed upstream and downstream of the Coffey Dam. Digital terrain models were included in the mapping to facilitate surface visualization and volume computations.

Brunswick Road Pipeline Project Nevada County, Nevada Irrigation District (NID), Grass Valley, California (Project Manager)

// Dana was responsible for providing surveying and mapping services for this project of approximately 8,000 ft of pipeline. Services include topographic mapping, photogrammetry, locate boundary and easement lines, legal descriptions and exhibit plats. Topographic mapping to include field and office work to set and survey permanent control points suitable for future boundary, design and construction surveys. Field surveys are to augment the photogrammetric mapping and identify existing edge of pavement and driveway cuts, surface evidence of utilities and other visible features impacting the route, storm drain manhole, catch basin pipe sizes, and invert elevations, sanitary sewer manhole pipe sizes and invert elevations, and canal crossing detail.

Central Valley Flood Evaluation Project (CVFED), CA Department of Water Resources, California (Project Manager)

// Dana provided 300 first order survey control points and monuments for the Orthophotography and LiDAR mapping of over 2,000 square miles of the central California valley for flood studies. In addition, ANDREGG provided GPS base stations for Airborne LiDAR data acquisition and performed over 600 QA/QC surveys for LiDAR calibration and quality control.

San Juan Water Treatment Plant and Pipeline Project, SJWD, Granite Bay and Sacramento County, CA (Project Manager)

// Dana was responsible for providing surveying and mapping services in support of San Juan Water District's water treatment plant and associated conveyance systems. The 18-mile 92" diameter water pipeline spanned from Folsom Lake to Antelope and crossed heavily developed urban areas, an interstate highway and Southern Pacific Railroad tracks. Tasks included surveying, mapping, right of way and design surveys for the design of the conveyance system.

**Banner Cascade Pipeline, Nevada County, CA Nevada
Irrigation District (NID) Colusa Drainage Study, US Army
Corps of Engineers, Colusa County, California (Project
Manager)**

// Dana was responsible for design surveys and mapping for transmission pipelines, water treatment plant sites along with storage and overflow areas. The project corridor for mapping and boundaries is 8 miles and includes 330 parcels in the land net. Andregg performed all research, surveying and mapping. In addition, Andregg prepared legal descriptions and exhibit plats for right of way and easement acquisition over 62 parcels and temporary construction easements on 50 parcels.

Mark Bardakjian, PLS
Surveyor



Years of Experience

38

Education

BS, Surveying and Photogrammetry,
California State University, Fresno

California Registrations

PLS #4567

FAA Remote Pilot Certification
#3908036

Memberships

American Council of Engineering
Companies, California / Sierra
Chapter

Society of American Military
Engineers / Sacramento Post

California Land Surveyor
Association

American Public Works Association
/ Sacramento Chapter

Mark has more than 38 years of experience in land and geodetic surveying and is responsible for all field operations and Global Positioning System (GPS) operations for ANDREGG PSOMAS. Mark serves as Vice President and Senior Project Manager. He has performed and supervised cadastral, control, topographic and construction surveys for numerous public and private projects. His experience includes GPS and satellite surveys, conventional first order geodetic surveys and complete network adjustments and analysis, hydrographic, FEMA, USACE, Caltrans, DoD, U.S. Forest Service surveys.

Mark's Relevant Project Experience

Brunswick Road Pipeline Project Nevada County, Nevada Irrigation District (NID), Grass Valley, CA (Senior Project Manager) // Mark provided surveying and mapping services for this project of approximately 8,000 feet of pipeline. Services include topographic mapping, photogrammetry, locate boundary and easement lines, legal descriptions and exhibit plats. Topographic mapping to include field and office work to set and survey permanent control points suitable for future boundary, design and construction surveys. Field surveys are to augment the photogrammetric mapping and identify existing edge of pavement and driveway cuts, surface evidence of utilities and other visible features impacting the route, storm drain manhole, catch basin pipe sizes, and invert elevations, sanitary sewer manhole pipe sizes and invert elevations, and canal crossing detail.

Meadow Vista Water District WTP Site Improvements, Placer County, California (Principal-in-Charge) // Mark provided field and office work to set and control aerial targets, obtain aerial photography and a topographic map for design at a scale of 1"=20 ft with 1 foot contours. Field surveys augmented the photogrammetric mapping to identify the existing pavement edge, driveway cuts and valley gutters, utilities, storm drain manhole and catch basin pipe sizes and invert elevations, sanitary sewer manhole pipe sizes and invert elevations, and oak trees within the project area. Andregg also provided approximate boundary lines to overlay onto the mapping and additional design surveys as needed by the agency Engineer.

On-Call Surveying Services, El Dorado Irrigation District, El Dorado, California (Project Manager) // Andregg has the current On-Call contract with the District which includes managing project surveyors, developing budgets, coordination of field and office support, interaction with related agencies and proactive approach with EID design consultants. These projects require topographic surveying, legal descriptions and right-of-way surveying work for a variety of projects including pipelines and facilities related sites.

PCWA Long Ravine Pipeline Review and Preliminary Mapping, Placer County (Senior Project Manager) // Mark is in charge of conducting fields surveys to install and locate Aerial Targets along the pipeline's length, easterly, to the pipeline inlet along Cape Horn Road. Collected the location of the pipeline's critical crossing locations; including tunnel entrances and exits, sag and crest locations, and the crossing of Interstate 80. Prepared preliminary planning grade assessor parcel boundary line work for overlay onto aerial photography and contour mapping. Preliminary planning boundary line work and contouring to be used as basis for pre design planning of the pipeline's ultimate replacement.

The Delta Water Supply Project, Stockton, CA: (Senior Project Manager) // Mark provided surveying services for the design of a new supplemental water supply for the Stockton Metropolitan Area by taking in water from the Delta and pumping that water through 8 miles of pipeline running along Eight Mile Road. The project also included more than 13 miles of a 54-inch diameter pipeline to transport the water to a new 30-million-gallon-per-day (mgd) treatment plant, which includes a treated water reservoir and pump station; and 7 miles of 36- and 42-inch diameter pipelines to deliver treated water to the city's distribution system.

Penryn/Lincoln Pipeline, PCWA, Placer County, California (Project Manager) // Mark was in charge of providing all GPS control surveys, digital aerial photography, photogrammetric mapping, field design surveys, Right of Way determinations, environmental surveys, composite digital color aerial photographs with contour, right of way and contour overlay. Also managed easement preparation and compilation of plan and profile base sheets for this five-mile pipeline project.

54"/48" Waterline, City of Roseville, Roseville, California (Senior Project Manager) // Mark was the senior project manager for 15,000 feet of water pipeline along Sierra College Boulevard, Olympus Drive and East Roseville Parkway. ANDREGG PSOMAS provided control surveys, topographic mapping, design surveys, Right of Way surveys, and construction layout services.

Foothill Water Treatment Plant, PCWA, Placer County, CA: (Senior Project Manager) // Mark was responsible for assisting PCWA with its plans for expansion mapped the treatment plant site and adjoining lands using photogrammetric mapping. Existing facilities were documented using design surveys and as-built surveys. During construction of the plant upgrades, performed surveys of access roads, pipelines, mechanical and facilities improvements, ponds, and tanks. Prepared legal descriptions, plats, and court exhibits, and supplied testimony about boundaries and features of the plant site when the County encountered litigation with an adjoining landowner regarding ownership and access to the plant headworks.

Curtis Tyler, RPF
Forester



Years of Experience

22

Education

BS, Forest Resource Management,
Humboldt State University

California Registrations

Forester RPF #2990

Office Location

Westport, CA

Curtis has more than 22 years of experience leading all aspects of timber harvest plans as well as providing GIS mapping, archaeology, and aerial photography. Curtis also provided botanical and wildlife surveys along with fixed plot mapping for California Department of Forestry contracts.

He has experience creating mapping products that meet the US Army Corps of Engineers specifications for development, remediation and assessment. Additionally, he assists in the planning and utilization of resources for local native american tribes through digitized data and aerial photography.

Curtis' Relevant Experience

Archeological Commission County of Mendocino, Mendocino, California (Commissioner)

// Review coastal development permits, parcel splits and other projects for potential historical and prehistoric archaeological impacts. Recommend and review archaeological reports and studies for projects that come before the Commission. Update Commission ordinance, goals and guidelines and develop procedures for screening projects to be reviewed.

Other Experience Includes:

- Responsible for all aspects of timber harvest plan (THP) preparation including: layout of road, skid trail, and harvest units, tree marking, yarding method determination, stream classification and channel surveys, timber cruising, in field and office mapping as well as THP writing and editing.
- GIS mapping utilizing ArcGIS 9.x and 10.x. Responsible for introduction of GIS into the workflow, installation of GIS software, acquisition of GIS compatible hardware and maintenance of hardware, acquisition, creation and backup of data including GPS data post processing.
- GIS analysis of elevation, slope, aspect, visual, and hydrologic aspects of timbered environments.
- Drone use for mapping and surveying timber stands, roads, slides and other natural and manmade features. Creation of orthorectified imagery, DEM's, DTM's, 3D models and spherical panoramas. FAA certified remote pilot #3917667.
- Trimble GPS utilization for fixed plot mapping for California Dept. of Forestry Contract and PALCO contract.
- Aerial photography interpretation for wildlife habitat and timber stand types as well as inclusion into GIS maps using digital elevation Models (DEM's) and/or digital orthophoto quadrangles (DOQ's).
- Supervise other employees in the use of GIS, forest field work and data entry.
- Archaeology survey and site delineation and archaeology survey reports including GIS mapping using GPS site boundaries and/or points.
- Wildlife surveys including Northern Spotted Owls, Southern Seep Salamanders, yellow and red legged frogs, raptors, Red Tree Voles and Marbled Murrelets.
- Botanical surveys and reports for threatened, rare and/or endangered