

TO: BOARD OF DIRECTORS
REVIEWED: MARIO IGLESIAS
GENERAL MANAGER
FROM: PETER V. SEVCIK, P.E.
DIRECTOR OF
ENGINEERING & OPERATIONS
DATE: AUGUST 23, 2019



HYDROGEOLOGICAL SERVICES FOR EUREKA WELL REPLACEMENT PROJECT

ITEM

Authorize contract for professional hydrogeological services for Eureka Well Replacement Project in the amount of \$96,850 with Hopkins Groundwater Consultants, Inc., and authorize contingency in the amount of \$10,000 [RECOMMEND ADOPT RESOLUTION AUTHORIZING CONTRACT WITH HOPKINS GROUNDWATER CONSULTANTS, INC. IN THE AMOUNT OF \$96,850 AND AUTHORIZE CONTINGENCY IN THE AMOUNT OF \$10,000].

BACKGROUND

The Eureka Well had historically been one of the District's largest producing wells. The well was drilled in 1979 and the 2007 Master Plan Update identified a nominal flow capacity of 890 gallons per minute (gpm) for the well based on the long-term average of flow records. In late 2016, the well casing failed and staff determined that the well was no longer serviceable. The well needs to be properly abandoned and replaced with a new well. The replacement well will be drilled on the same site as the existing well since the existing well had excellent water quality and quantity characteristics. In addition, using the existing site for the replacement well will maximize use of the District's investment in support infrastructure at the site.

In July 2017, the Board authorized a Task Order with Martin B. Feeney for professional hydrogeological services to assist in the design and drilling of the new well. The Board also authorized a Task Order with Cannon Corporation to assist in the design, bidding, and equipping of the new well.

Mr. Feeney prepared the concept design report for drilling the replacement well and developed estimates of the quantity of water that must be disposed of during the well development process. The estimated quantity of water that will need to be disposed of is greater than originally envisioned. Design work on the project was delayed while the District worked to secure a site for the required spray field. A suitable site, owned by Murphy Santa Maria 1, LLC ("Murphy") has been secured. Murphy agreed to lease the land to the District for a term of one year, beginning September 1, 2019, at its appraised value of \$66,500. The Board accepted the Temporary Construction Easement Agreement at the August 14, 2019 Board meeting.

In late June 2019, Mr. Feeney notified the District that he would be unable to finish the hydrogeologic work on the project due to circumstances beyond his control.

Staff requested a proposal for professional hydrogeological services from Hopkins Groundwater Consultants, Inc. to assist in finalizing the design and oversee the drilling of the new well. Mr. Hopkins has over thirty years of municipal well drilling experience and has overseen numerous supply well drilling efforts.

Hopkins Groundwater Consultants, Inc. will assist the District in finalizing the well design and siting, reviewing proposals from well drillers and will directly oversee drilling operations to ensure the well is completed as designed. Hopkins Groundwater Consultants, Inc. proposes a time and materials budget of \$96,850. Staff reviewed Hopkins Groundwater Consultants, Inc. proposal and feels the proposed cost of service is reasonable. Attached is the proposed scope of work and budget for the well design and drilling phase of the project.

The time required for drilling operations can vary significantly based on site conditions. Since much of Hopkins Groundwater Consultants, Inc. time will be directly linked to drilling operations, staff is recommending a 10% contingency (\$10,000) be approved for the contract.

FISCAL IMPACT

The District's 2019/2020 Budget includes \$1,000,000.00 for the Eureka Well Replacement Project.

STRATEGIC PLAN

Goal 1 – WATER SUPPLY – Actively plan to provide reliable water supply of sufficient quality and quantity to serve both current customers and those in the long-term future.

Goal 2. FACILITIES THAT ARE RELIABLE, ENVIRONMENTALLY SENSIBLE AND EFFICIENT. Plan, provide for and maintain District facilities and other physical assets to achieve reliable, environmentally sensible, and efficient District operations.

RECOMMENDATION

Staff recommends that the Board, by motion and roll call vote, adopt Resolution 2019-XXXX authorizing a Task Order with Hopkins Groundwater Consultants, Inc. in the amount of \$96,850, and a contingency in the amount of \$10,000.00, for hydrogeological services for the Eureka Well Replacement Project.

ATTACHMENTS

- A. Resolution 2019-XXXX Eureka Well Replacement Project Hydrogeological Services
- B. August 6, 2019, Hopkins Groundwater Consultants, Inc. Proposal

AUGUST 28, 2019

ITEM D-4

ATTACHMENT A

**NIPOMO COMMUNITY SERVICES DISTRICT
RESOLUTION NO. 2019-XXXX**

**A RESOLUTION OF THE BOARD OF DIRECTORS OF THE NIPOMO COMMUNITY SERVICES DISTRICT
AUTHORIZING A CONTRACT WITH HOPKINS GROUNDWATER CONSULTANTS, INC. FOR
HYDROGEOLOGICAL SERVICES IN SUPPORT OF THE EUREKA WELL REPLACEMENT PROJECT**

WHEREAS, the Eureka Well was drilled nearly forty years ago by the Nipomo Community Services District ("District") and has historically been one of the District's largest water production wells; and

WHEREAS, the Eureka Well has exceeded its service life and is now inoperable; and

WHEREAS, replacement of the Eureka Well needs to be completed in a timely manner to restore the District's groundwater pumping capability; and

WHEREAS, District Purchasing Policy Resolution 2010-1201 provides for the procurement of professional services through non-competitive negotiations in limited situations; and

WHEREAS, Martin B. Feeney who, under Nipomo Community Services District Resolution No. 2017-1450, was authorized by the District to provide hydrogeological services for the Eureka Well is now unable to provide these services; and

WHEREAS, Hopkins Groundwater Consultants, Inc. has extensive experience with siting, design, and drilling of municipal supply wells; and

WHEREAS, the cost of services is reasonable and public exigency will not permit additional delay.

NOW THEREFORE, BE IT RESOLVED, DETERMINED AND ORDERED BY THE NIPOMO COMMUNITY SERVICES DISTRICT BOARD OF DIRECTORS AS FOLLOWS:

- 1) The above recitals are true and correct and constitute findings for the exclusive use of Hopkins Groundwater Consultants, Inc. to provide hydrogeological consulting services in support of the Eureka Well Replacement project.
- 2) The District Board of Directors does hereby direct District staff to execute a Task Order with Hopkins Groundwater Consultants, Inc. in the amount of \$96,850 with a contingency in the amount of \$10,000.

On the motion of Director _____, seconded by Director _____, and on the following roll call vote, to wit:

AYES:
NOES:
ABSENT:
CONFLICTS:

The foregoing resolution is hereby adopted this 28th day of August 2019.

ED EBY
President, Board of Directors

ATTEST:

APPROVED AS TO FORM
AND LEGAL EFFECT:

MARIO IGLESIAS
General Manager and Secretary to the Board

WHITNEY G. MCDONALD
District Legal Counsel

AUGUST 28, 2019

ITEM D-4

ATTACHMENT B

August 6, 2019

Project No. 19-002-01

Nipomo Community Services District

Post Office Box 326

Nipomo, CA 93444-0326

Attention: Mr. Peter Sevcik
Director of Engineering and Operations

Subject: Proposal for Professional Services to Review Proposed Well Design, Finalize Preparation of Technical Section to Project Plans and Specifications, Assist with Project Permitting, Provide Well Construction Inspection, Documentation, and Final Well Design Services, and Summary of Operations Report for the Nipomo Community Services District Eureka Well No. 2 Construction Project.

Dear Mr. Sevcik:

As you requested, Hopkins Groundwater Consultants, Inc. (Hopkins) is pleased to provide this proposal to assist the Nipomo Community Services District (District) with construction of a replacement well designated as Eureka Well No. 2 and located in the vicinity of the existing well, Eureka Well No. 1. It is our understanding the District desires to replace the existing well and develop a reliable municipal supply. As requested, this proposal is organized into two phases of work that include five work tasks that remain consistent with the original scope of work developed for the subject project. It is our understanding that our work will include review and utilization of draft work products that have been prepared for this project by another consultant(s), prior to the project's delay.

PERSONNEL QUALIFICATIONS

Curtis Hopkins, Principal Hydrogeologist, will serve as project manager for this important project. Mr. Hopkins is a Certified Engineering Geologist and a Certified Hydrogeologist with over 32 years of professional experience as a geologist. Mr. Hopkins will be responsible for overall project coordination, quality assurance/quality control of the well siting evaluation, and provide final well design details based on the subsurface findings at the selected site. His duties will include direct oversight of all personnel performing observations of well construction activities and documentation and analysis of well production testing procedures. Mr. Hopkins will oversee all documentation of contractor activities to confirm compliance with the project plans and specifications. He will be responsible for coordination of field observations to ensure all contractor activities are efficiently monitored during the project to control project costs. Hopkins' Staff Hydrogeologists that may be assigned to this project to assist Mr. Hopkins with the construction inspection tasks includes Mr. Louis Hengehold, Mr. Geoffrey Faneros, and Mr. Nick Mitchell.

Mr. Hopkins has recently served as an active member of the Fox Canyon Groundwater Management Agency, Technical Advisory Group, the County of Los Angeles Department of Public Works, Antelope Valley Well Specifications, Technical Advisory Committee, and presently serves on the Santa Paula Basin Technical Advisory Committee Working Group on behalf of the City of Ventura. Mr. Hopkins' other qualifications and project experience are included in Attachment A – Resume. A list of comparable well construction projects is provided in Attachment B – List of Representative Projects.

PHASE 1 WORK TASKS

TASK NO. 1 – WELL DESIGN REVIEW

This work task will include reviewing the basis-of-design for the new well previously prepared for the project that includes overall well design, drilling and construction methods, and approaches to handle the well construction logistical constraints.

Initial work will include a review of historical data and past reports relating to hydrogeology, water quality, and well production of Eureka Well No. 1. Hopkins will meet with District staff to observe and discuss well site constraints and obtain available information prior to augmenting and finalizing draft project plans and specifications.

The Task No. 1 component of the project is estimated to require approximately 10 man-hours to complete.

TASK NO. 2 – PROJECT PLANS AND SPECIFICATIONS

Specifications. Hopkins will work directly with District staff to review the draft technical specifications for the new well that were previously prepared for the project, and complete the technical portions for inclusion in the District's standard bid package.

For this task Hopkins determine if certain accommodations could be provided by the District for the contractor, which would result in lower project costs (i.e., construction water, and area for cuttings storage and/or disposal, etc.). Based on the findings of this effort, Hopkins will prepare the special provisions section of the project bid document package that will be required to solicit bids from qualified construction contractors. The special provisions section will include thorough specifications and requirements for the: a) drilling process to be used, b) drilling fluids properties to be maintained, c) the borehole geophysical logs required, d) the type of materials and installation methods to be used, e) the well development procedures to clean the well and gain well production, and f) the final testing of the well that will provide information necessary for design of the permanent pump capacity and setting.

Well construction specifications will provide a detailed description of the specific materials, methods, and procedures required to accomplish the following project components:

1. Mobilization/Demobilization
2. Conductor Casing Installation
3. Pilot Borehole Drilling
4. Geophysical Logging
5. Pilot Bore Reaming
6. Caliper Survey
7. Well Casing, Screen, Gravel Tube, and if desired, Sounding Tube Assemblages
8. Gravel Pack Envelope
9. Cement Sanitary Seal
10. Well Alignment Test
11. Mechanical Development
12. Test Pump Installation and Removal
13. Hydraulic Well Development
14. Production Testing
15. Well Disinfection
16. Concrete Pad or Pedestal
17. Site Clean-up

A unit of payment for each project component will be identified and will be based on either an hourly rate, linear footage, lump sum, or other appropriate quantity cost. All well construction conditions will be in accordance with the requirements of the State of California and the County of San Luis Obispo.

Hopkins will prepare an engineer's opinion of probable costs for well construction activities that is based on current construction costs, anticipated hydrogeologic conditions, preliminary well design, and permit conditions.

A 90 percent draft of the technical specifications document will be provided to District for its review and comment. The draft will include a section for contractor prequalification requirements suitable for the District Project. Upon receipt of District review comments, Hopkins will finalize the project technical plans and specifications for the District to incorporate into the final specifications document. It is our understanding that District will combine these technical specifications sections with District's standard construction project requirements to produce a final and complete project specifications document.

Bid Process Support. During the bidding period it is anticipated that Hopkins will attend a pre-bid meeting with the contractors and District personnel to review the critical aspects of the technical specifications for well construction and answer questions about site conditions or

specified materials, methods and procedures. It is anticipated that Hopkins will assist the District with preparation of any technical addendum that may be required during the bidding period to provide clarification of the work specified. Subsequently, Hopkins will assist the District by reviewing the formal bids and determining the lowest responsive bidder's drilling qualifications.

The Task No. 2 component of the project is estimated to require approximately 60 man-hours to complete.

TASK NO. 3 – WELL CONSTRUCTION PERMITTING

Work performed under this task will be limited to assisting the District and their engineering/planning professionals with preparation of an initial study and negative declaration, if required. Assistance will also be provided toward acquisition of specific permits required for drilling and testing the water well. It is anticipated that this will include a well construction permit from the County of San Luis Obispo, and possibly a water disposal permit for spray irrigation. For this task, it is assumed that the District would apply for the permits and that Hopkins would provide assistance as necessary.

The Task No. 3 component of the project is estimated to require approximately 36 man-hours to complete.

TASK NO. 4 – DRINKING WATER SOURCE AREA PROTECTION (OPTIONAL)

This task would include preparation of a Drinking Water Source Area Protection (DWSAP) document if required by DDW for this well. The report would utilize information provided by the District to be combined with the hydrogeological information obtained from drilling for report preparation.

The Task No. 4 component of the project will be performed on a time and materials basis, if needed.

PHASE 2 WORK TASKS

TASK NO. 5 - WELL CONSTRUCTION OBSERVATION AND DOCUMENTATION

Well Construction Inspection

Preconstruction Meeting. Upon receipt of all required contract submittals, Hopkins will participate with District staff in a preconstruction meeting where construction related details will be discussed specifically for identification and clarification of project-critical issues prior to commencement of work. Specific contacts will be identified for all the parties actively involved to facilitate communication that must be executed in a timely and succinct manner in order to avoid change order claims or project delays.

Construction Inspection and Documentation. During well drilling and construction, Hopkins staff will monitor contractor activities and document compliance with the construction specifications. Hopkins will provide around-the-clock (24-hour) inspection services during the drilling and well construction aspects of the project where this work schedule is required of the

contractor and of the work and where the work is critical to the ultimate performance of the well. Hopkins will coordinate with District staff and the anticipated Contractor schedule to minimize unnecessary inspection time during mobilization and demobilization, pump installation and removal, site cleanup, etc. as a measure to control contract costs. Hopkins will document its observations and conversations with Contractor personnel on daily field reports, which will provide a legal basis to protect the District and minimize its liability and risks. Hopkins will review and approve technical submittals required from the Contractor for well construction.

Lithological Logging and Final Well Design. During the well drilling process Hopkins' services will include lithological logging of the pilot borehole cuttings, inspection and interpretation of the geophysical electric log, collection of formation samples for conducting laboratory sieve analyses (if necessary), and monitoring (and if necessary, verification testing) of drilling fluid parameters. After completion of the pilot borehole, the lithological log and geophysical surveys will be correlated to provide a basis for final well design recommendations. The final well design will take into consideration both the fluid quality and quantity of groundwater production that can be inferred from geophysical log interpretation. The final design will consider material types versus project costs, provide sufficient materials strengths, result in prudent screen entrance velocities and up hole velocities, and provide casing diameter/depth considerations.

Drilling Fluid Monitoring and Materials Inspection. During pilot borehole reaming activities the drilling fluid parameters will be monitored more closely to prevent excessive formation damage that can be caused by drilling fluid invasion. Drilling fluid parameters are important to develop a stable borehole and minimize risk of collapse during the well construction process. After completion of the drilling process, Hopkins will monitor well construction to verify that the materials and construction methods used during well installation are in accordance with those specified. A random selection of well screen slot openings will be callipered and wall thicknesses measured to verify quality assurance and control is provided on the more critical aspects of well design. Representative samples of the wells select gravel pack materials may be submitted to a laboratory for a grain-size analysis (as necessary) to assure conformance with the specified gradation that will promote low sand production and high well efficiency.

Well Development and Testing Observations. Upon completion of well construction activities, Hopkins will observe active well development procedures to document development progress and effectiveness. Well development is anticipated to incorporate chemical, mechanical and hydraulic methods in combination to provide quick and reliable development of well screen intervals. During well development pumping and subsequent production testing, Hopkins will instrument the pumping well with a pressure transducer and data logger (HERMIT) to obtain accurate water level readings. Water level data will be collected during the variable rate discharge (step) test, constant rate discharge test, and well recovery test periods. Hopkins will assist in facilitating the collection of water samples for laboratory testing for Title 22 analyses. Sampling and testing is assumed to be performed by the District's usual analytical laboratory.

Final Inspections. Upon removal of the test pumping equipment and after bailing fill from the bottom of the well, Hopkins will inspect the post completion well video, the plumbness and alignment survey, and well chlorination procedures.

Construction Change Order Processing. Hopkins will assist the District with the review of drilling Contractor change orders that may be submitted over the course of the project. All change order requests will be reviewed and analyzed with regard to the provisions detailed in the technical plans and specifications. Review findings will be submitted to the District in the form of a recommendation for final approval or rejection.

Contractor Invoice Review and Approval. Hopkins will review progress payment invoices from the drilling Contractor as they are received to ensure that they are accurate and that the amounts being invoiced are consistent with observations documented in Hopkins' daily field reports. Upon completion of our review, the Contractor requests for payment will be forwarded to the District. If there are invoice discrepancies, the items will be identified for District review to facilitate subsequent correction of the invoice amounts.

Based on our experience with comparable sized well construction projects the Task No. 5 component of the project is estimated to require approximately 400 man-hours to complete.

TASK NO. 6 – FINAL REPORTING

Summary of Operations Report

Upon the completion of well construction and testing activities, Hopkins will assemble a summary of operations report that will be complete with documentation of construction procedures, copies of well logs, and "As-Built" well details. The well production testing data will be processed to estimate aquifer parameters and determine well performance characteristics for use in well interference analyses and to provide recommendations for a permanent well pump design and depth setting. Three (3) bound copies and an electronic copy (pdf file) of the final report will be provided to District for its use and future reference.

The Task No. 6 component of the project is estimated to require approximately 62 man-hours to complete.

TASK NO. 7 – PROJECT MANAGEMENT

Monthly Progress Reports and Meetings

On a monthly basis Hopkins will provide District with progress reports of the project work status that will accompany the project invoices. The reports will summarize the project components that were completed over the previous billing period. The status report will be accompanied by a billings progress summary sheet that identifies Hopkins project work tasks, the established budget, and the amount and percentage of budget used to date. It is anticipated that throughout the project meetings may be required to update the District on project progress,

facilitate project management, and coordination of project activities. We have assumed that over the course of the project, the time required for project management related issues will require approximately 20-man hours of time to perform.

PROJECT BUDGET AND SCHEDULE

Fee. The estimated costs for this project include the required labor, equipment, and travel expenses, etc., for the successful completion of each task. Work for this project will be performed on a time and materials basis and billed in accordance with our current Project Fee Schedule (attached). The estimated cost of services to be provided for this project is summarized in Table 1 – Project Cost Estimate.

Table 1 - Project Cost Estimate

| Description | Estimated Hopkins Staff Hours | Estimated Fee |
|--|---|------------------|
| TASK 1 – WELL DESIGN REVIEW | 10 hrs Principal Professional Mileage | \$ 2,400 |
| TASK 2 – FINALIZE PREPARATION OF PROJECT PLANS AND SPECIFICATIONS AND BID PROCESS SUPPORT SERVICES | 8 hrs Word Processing 8 hrs Drafting 20 hrs Staff Hydrogeologist 24 hrs Principal Professional | \$ 9,940 |
| TASK 3 – WELL CONSTRUCTION PERMITTING | 16 hrs Staff Hydrogeologist 20 hrs Principal Professional | \$ 6,960 |
| TASK 4 – DRINKING WATER SOURCE AREA PROTECTION (OPTIONAL) | Time and materials if needed | NA |
| TASK 5 – WELL CONSTRUCTION INSPECTION | 360 hrs Staff Hydrogeologist 40 hrs Principal Professional Per Diem, Mileage, and Equipment Rental (\$5,500) | \$ 63,700 |
| TASK 6 – SUMMARY OF OPERATIONS REPORT | 6 hrs Word Processing 8 hrs Drafting 36 hrs Staff Hydrogeologist 12 hrs Principal Professional | \$ 9,050 |
| TASK 7 – PROJECT MANAGEMENT AND MEETINGS | 20 hrs Principal Professional | \$ 4,800 |
| Total Project Costs | | \$ 96,850 |

We recommend the District establish a project budget of \$96,850 for hydrogeological consultation, construction supervision and inspection, and project permitting and reporting services. In addition, we recommend that the District establish a 10 percent contingency budget of \$9,680 to be authorized for use by the District's project manager in the event additional services are required. Additional services are only anticipated if the low bid contractor encounters construction, related difficulties and additional inspection services are required for the District's protection. The total cost of construction inspection will largely be determined by the contractor's ability to perform the work and the amount of effort that is required of Hopkins for inspection at the time of work performance.

Schedule. It is anticipated that the total project will be completed over an approximate 6-month-period. The duration of fieldwork for the well construction portion of the project is anticipated to be conducted over an approximate 8-week-period beginning at the time the contractor mobilizes. The project fieldwork schedule has been estimated based on our recent experiences with similar well construction projects that provided facilities constructed to depths that are comparable to that which is anticipated for this project. The schedule assumes the contractor will have the equipment and crews required to conduct continuous operations and will directly proceed from construction into well development and well testing without delay.

We trust this proposal is responsive to the needs of the Nipomo Community Services District. As always, Hopkins is pleased to have this opportunity to be of service. If you have questions or need any additional information, please give us a call.

Sincerely,

HOPKINS GROUNDWATER CONSULTANTS, INC.



Curtis J. Hopkins
Principal Hydrogeologist

Attachment: Attachment A – Resume
Attachment B – List of Representative Projects
Attachment C – Project Fee Schedule

c: Mr. Larry Krammer, Cannon

RESUME

Resume

Curtis J. Hopkins

Principal Hydrogeologist

EDUCATION: B.A. Geological Sciences, University of California Santa Barbara, 1986
Credential in Ground Water Science, Ohio State University, National Water Well Association, 1991

QUALIFICATIONS: Professional Geologist, California No. 5695
Certified Engineering Geologist, California No. EG1800
Certified Hydrogeologist, California No. HG 114

EXPERIENCE: Mr. Hopkins has over 30 years of experience as the manager and/or lead investigator of groundwater development projects. These projects include groundwater basin resource availability and management studies, artificial recharge and recovery programs, brackish and saline groundwater supply development studies for desalination projects, and forensic groundwater studies utilizing isotope geochemistry and surface geophysical methods. Mr. Hopkins' technical experience has focused on constructing groundwater models, providing well design and well construction specifications for public bid, and directing construction management for numerous production and injection well projects. His work throughout central and southern California has included hydrogeologic study in coastal areas where seawater intrusion into aquifer systems is a significant concern and impacts of groundwater extractions and/or the design of abatement programs must be considered.

Mr. Hopkins has served as an expert witness and provided technical support for cases involving well construction disputes, impacts from groundwater pumping, groundwater management, water quality impacts, and water rights issues. He has provided responsible hydrogeologic services for numerous water resource projects that include groundwater development and monitoring programs, and basin safe yield studies in both fractured bedrock and sedimentary basin aquifer systems. He has extensive experience in conducting aquifer tests and performing data analysis to determine aquifer parameters and groundwater supply availability. Mr. Hopkins' has considerable experience evaluating well performance and the suitability of rehabilitation and/or redevelopment options to cost effectively repair or increase production in aging wells.

Before focusing his education on groundwater resources, Mr. Hopkins was a geophysical technician and conducted borehole geophysical surveys for Water Well Surveys and subsequently, Westech Geophysical, of Ventura California. During his 2-1/2 years with Westech, he operated geophysical exploration equipment and provided field interpretation of borehole and cased hole geophysical logs that were conducted for production, injection, and monitoring well projects. Mr. Hopkins' also worked on numerous water well rehabilitation or redevelopment projects for aging wells with structural problems or declining production.

Hopkins Groundwater Consultants, Inc. was incorporated in August 2001. The following project list is partly experience gained by Mr. Hopkins, while working over

Curtis J. Hopkins

Principal Hydrogeologist

the previous 14 years (1987 to 2001) with his former employer, Fugro West, Inc.

Santa Paula Basin Technical Advisory Committee, Professional Support to City of San Buenaventura (2009 to Present). Participate in TAC meetings and TAC Working Group Technical evaluations of the Santa Paula Groundwater Basin conditions and historical changes in basin conditions. Contribute technical review of annual basin conditions reports submitted to the Court, and provided a study of historical changes in the Santa Paula Basin that contribute to long-term water level variations.

Foster Park Well Field Water Supply Master Plan, City of San Buenaventura, Ventura River Basin. Project manager and lead investigator for evaluation of the City of Ventura Foster Park well field located in the Upper Ventura River alluvial groundwater basin. A detailed study of the historical river supply was conducted and included construction of a Modflow groundwater flow model to estimate the potential to discontinue use of the City surface diversion structure and produce the entire river supply from a well field. Existing well facilities were evaluated and tested to determine their structural condition, production potential, aquifer properties, and future well placement alternatives. The findings of the study concluded the City could produce the historical supply from wells and provided potential well construction locations. This study was performed in conjunction with design engineering provided by Kennedy Jenks Consultants.

City of Santa Paula Water System Master Plan, Santa Paula and Fillmore Basins. Project manager and lead investigator for evaluation of the City of Santa Paula well field located in the eastern Santa Paula groundwater basin. Conducted a detailed study of the historical municipal supply and provided an update of anticipated groundwater conditions in the basin that would affect the proposed City scheme of water and wastewater treatment. The study developed an understanding of water quality and well yields that could be obtained from the shallow, intermediate, and deep aquifer zones. Existing well facilities were evaluated to determine their structural condition, production potential, aquifer properties, and the anticipated remaining service life of each well facility. The findings of the study concluded that a failure of Well 12 would virtually render 1 of the 2 City water treatment plans inoperable. In addition, the study estimated the frequency of well rehabilitation requirements and projected the timing for future well construction. The findings of the study were incorporated in the comprehensive master plan and utilized to develop the City's water system capital improvements and operations budgets. This study was performed in conjunction with design engineering provided by Boyle Engineering Corporation.

City of Santa Paula Municipal Groundwater Supply Wellfield Alternatives Study, Santa Paula Basin. Project manager and lead investigator for evaluation of the City of Santa Paula well fields located in the eastern Santa Paula groundwater basin and evaluated the adequacy of the produced water quality to meet the proposed City water and wastewater treatment strategy. The findings of the study concluded the City could produce the required low chloride groundwater supply from wells located east of Santa Paula Creek. The study also prioritized well facility needs in the existing wellfield locations.

City of Camarillo Groundwater Production Alternatives and Well Siting Study, Pleasant Valley Basin. Project manager and lead investigator for evaluation of the City

Curtis J. Hopkins Principal Hydrogeologist

of Camarillo well fields located in the northern Pleasant Valley Groundwater Basin and evaluated the adequacy of the produced water quality to meet the proposed City water supply strategy. The findings of the study concluded the City could produce substantially more groundwater in the vicinity of its northern most wellfield, but the quality of produced groundwater was superior at its southern wellfield location. Both locations were subject to the Fox Canyon Groundwater Management Agency ordinance.

Northeast Pleasant Valley Basin Surface Water and Groundwater Study, Calleguas Municipal Water District. Project manager and lead investigator for evaluation of the groundwater conditions in the northeastern Pleasant Valley Groundwater Basin. The study evaluated the effluent dominated source of recharge to the basin from the Arroyo Las Posas/Calleguas Creek flows. The study documented the gradual degradation in produced water quality during the approximate 200-foot rise in groundwater levels, which occurred over an approximate 10-year period.

City of Oxnard Blending Station No. 3 Well Site Relocation Project and Emergency Aquifer Storage and Recovery Project, Oxnard Plain Basin. Project manager and lead investigator for evaluation of the groundwater conditions in the Oxnard Plain Groundwater Basin for establishment of a municipal supply. The study evaluated the hydrogeology in the northeast area of the City and determined 4 wells could be constructed on the same site into the Oxnard Aquifer, Mugu Aquifer, and upper Hueneme Aquifer zones without mutual interference impacts during pumping. Hopkins provided subsequent well construction inspection services and summarized the production potential and aquifer condition encountered by each well. Provide professional development and oversight of City emergency ASR program utilizing Well No. 29, which was designed for this purpose in the upper Hueneme Aquifer. The program conducted successful operations of storage and subsequent recovery of 1,200 acre-feet of imported water supply from Calleguas Municipal Water District.

Well Site Evaluation, Groundwater Supply Development Project, Alameda County Flood Control and Water Conservation District, Zone 7 Water Agency. Contract Manager and lead investigator for groundwater development project. Zone 7 is increasing its capability to produce groundwater for emergency supply and drought period shortfalls. The groundwater expansion project incorporates seasonal groundwater injection, storage, and extraction of surplus surface water supplies. Test wells were constructed to obtain water quality data and aquifer parameters that were used to estimate well design capacities and provide well interference analyses. Six well sites in the Pleasanton/Livermore area were evaluated to determine the suitability of the aquifer system for proposed groundwater development.

Reclaimed Water Injection/Extraction Alternatives, Las Virgenes Municipal Water District. Contract Manager and lead investigator for development of groundwater conjunctive use options considered in an environmental impact assessment for LVMWD Malibu Creek Discharge Avoidance Study. The project included the conceptual design and study of groundwater injection and extraction options that would prevent discharge to Malibu Creek and augment the reclaimed water supply to balance with peak summer demands. Mr. Hopkins evaluated groundwater quality impacts, aquifer storage capacities, and operational limitations of proposed injection/extraction facilities for each of the viable groundwater alternatives. This study was performed in conjunction with design

Curtis J. Hopkins Principal Hydrogeologist

engineering provided by Boyle Engineering Corporation.

Saline Groundwater Supply Study, Cooperative Desalination Study, Central Basin Municipal Water District. Project Manager and lead investigator for the study managed by the Central Basin District on behalf of the City of Long Beach Water Department, Metropolitan Water District of Southern California, Southern California Edison Company (SCE), Water Replenishment District of Southern California (WRD), and West Basin Municipal Water District. Mr. Hopkins developed conceptual project alternatives for producing saline groundwater to supply raw water to a desalination facility to be located at the SCE Los Alamitos Generation Station in Long Beach. The study included installation and testing of demonstration wells and a canal infiltration assessment to model the multiple aquifer system beneath the site. The comprehensive model evaluated the amount of infiltration that could be induced from groundwater production located between the SCE ocean water intake canals and the San Gabriel River, and assessed the impacts on the WRD groundwater injection barrier (for seawater intrusion). This study was performed in conjunction with design engineering provided by Black and Veatch.

Hydrogeological Evaluation of Groundwater Supply Alternatives for the Integrated Water Plan Project EIR, City of Santa Cruz. Project manager and lead investigator for the evaluation of impacts of the groundwater production scenarios in the coastal Purisima Formation aquifer system. The study evaluated the impacts of continued operation of the Beltz well field in a historically manner that varied annually based on climatic conditions. Annual production ranged from 30 to 1,200 acre-feet per year and impacts evaluated included subsidence, seawater intrusion, depletion of storage, well interference, and surface water body or stream depletion. This study was performed in conjunction with the project environmental planning study provided by EDAW.

North Coast Brackish Groundwater Desalination Project and Hydrogeologic Evaluation of Groundwater Supply Alternatives, City of Santa Cruz. Project manager and lead investigator for the evaluation of brackish groundwater in a coastal bedrock aquifer system for use as a raw water supply to a desalination facility. Subsequent redirection of this project expanded the scope to include hydrogeologic evaluation of all the coastal groundwater supply options available to the City. Each option was evaluated to determine the water quality, seasonal availability, safe yield, and extraction facility requirements. This study was performed in conjunction with design engineering provided by Carollo Engineers.

North Las Posas Basin Aquifer Storage and Recovery Demonstration Project, Groundwater Supply Investigation, Metropolitan Water District of Southern California and Calleguas Municipal Water District. Project manager and lead investigator of the hydrogeologic assessment of aquifer conditions used in a comprehensive study and conceptual design of a 250,000 acre-foot groundwater injection and storage project. The comprehensive data review and summary of the Las Posas Groundwater Basin conditions were used to recommend the optimal location of the proposed injection well field and identify existing wells that were appropriate for immediate injection pilot testing. This study was performed in support of a comprehensive conceptual program study provided by CH2MHILL.

Desalination Water Supply Study, Saline Groundwater Alternative, City of San

Curtis J. Hopkins Principal Hydrogeologist

Buenaventura. Project manager and lead investigator for a coastal groundwater study to assess the technical feasibility of using saline groundwater wells to provide a feed water supply for a desalination facility. Test wells were constructed at three locations along the City beach to provide data to assess groundwater quality issues, aquifer properties of the beach sands, and allow flow modeling of groundwater production scenarios. Production scenarios incorporated a shoreline collection system of multiple well points and radial collector wells with horizontal screens that would extend offshore beneath the surf zone. This study was performed in conjunction with design engineering provided by Boyle Engineering Corporation.

Desalination Water Supply Study, Saline Groundwater Alternative, City of Santa Cruz. Principal in charge and lead investigator for a coastal groundwater study to assess the technical feasibility of using saline groundwater produced from shoreline well facilities as feed water for a desalination plant. A detailed study of the coastal hydrogeology was performed to develop a preliminary understanding of the production potential. Production scenarios included a shoreline collection system of multiple well points and/or radial collector wells with horizontal screens that would extend offshore beneath the surf zone. The findings of the study indicated that the required supply could not be provided from conventional coastal wells or lateral collector wells along the shore. This study was performed in conjunction with design engineering provided by Carollo Engineers.

City of Santa Paula Well Facility Siting Study. Project manager and lead investigator for evaluation of potential well sites located within and proximate to the City boundary. The study provided a detailed evaluation of over 30 potential well sites and rated and ranked the sites with criteria developed to identify site suitability. The findings of the study concluded the City should construct wells in three different locations to maintain a stable supply until construction of the proposed water softening/treatment facility. The study also scored the well sites in each wellfield location and identified the highest ranking sites that would provide the greatest benefits to the City water system.

City of Ventura Well Rehabilitation Projects; Saticoy Well No. 2, Victoria Well No. 2, Mound Well No. 1, and Nye Well Nos. 7 and 8. Hopkins conducted a well conditions review study, developed a well repair and rehabilitation program and project specifications for solicitation of contractor bids, and provided construction management inspection services for a 400-foot deep well, 2,000 gpm capacity (Saticoy Well No. 2, included swage patch repair and cement seal prior to rehabilitation), 1,200-foot deep well 3,000 gpm capacity (Victoria Avenue Well No. 2), and 75-foot deep 1,500 gpm capacity (Nye Well No. 7, included installation of a stainless steel liner during rehabilitation).

Well Rehabilitation Projects. Hopkins conducted well conditions review studies, developed well repair and rehabilitation programs and prepared technical specifications for solicitation of contractor bids, and provided construction management inspection service for numerous municipal water supply well projects. Well repair methods have included reperforation of the original well casing and installation of well liners and swage patches. Well rehabilitation methods utilized for each well is unique based on specific well conditions and included chemical (acid wash treatments), mechanical (brushing, bailing, swabbing, and jetting), detonation, and hydraulic well redevelopment methods. Well rehabilitation services were provided for clients that include: **Crestview Mutual Water Company**; Well No. 5 (1,400-foot deep well, 1,000 gpm capacity); **City of Santa Cruz**; Beltz Well Nos. 8 and 9 (200-foot deep wells, 800 gpm capacity); **Del Norte Mutual**

Curtis J. Hopkins

Principal Hydrogeologist

Water Company; Greenhill Well No. 10 (1,200-foot deep well, 600 gpm capacity); **City of South Gate;** Well No. 27 (900-foot deep well, 1,500 gpm capacity) and Well No. 25 (1,300-foot deep well, 2,500 gpm capacity); **United Water Conservation District;** PTP Well No. 2 (1,100-foot deep well, 1,800 gpm capacity) and El Rio Well No. 11 (300-foot deep well, 2,500 gpm capacity); **City of Modesto FMC** Well No. 6 (270 feet deep well, 1,500 gpm capacity); **Willdan/Morongo Band of Indians** Morongo Well No. 5 (450 feet deep well, 1,200 gpm capacity); **City of Santa Paula;** Well No. 12 (700 feet deep well, 2,000 gpm capacity); **County of Ventura;** Well Nos. 2, 15, 95, 96, 97, and 98 (depths of up to 1,500 feet and capacities in the range of 1,000 to 1,800 gpm); **Hiji Brothers;** Freidrick Well No. 4, Kotaki Well No. 1, Montoalvo Well, Round Mountain, and Cawelti Wells (400- to 900-foot deep wells, 600 to 1,200 gpm capacities); **Grether Farming Company;** Rancho Roberto Well No. 2, Rancho Medio Dia Well No. 3 (1,000 and 1,400-foot deep wells, 600 to 1,200 gpm capacities).

Well Siting, Design, Specifications Preparation, and Construction Management of Water Supply Wells for Municipal Water Agencies. Clients included the cities of San Buenaventura, Oxnard, Santa Barbara, and Santa Cruz; County of Ventura; United Water Conservation District; Las Virgenes Municipal Water District; Alameda County Zone 7 Water Agency; and Carpinteria County Water District. Conduct well siting studies to determine optimal well locations and provide construction manager for municipal well projects in both fractured bedrock and sedimentary basin aquifer systems. Well construction methods used for test hole and/or final well completion include cable tool, direct air rotary, dual-air rotary (casing advancement), air hammer, direct and reverse circulation mud rotary drilling methods. Well design capacities range up to 4,000 gpm with completion depths of over 1,200 feet.

TECHNICAL ADVISORY GROUPS

Antelope Valley Well Technical Advisory Committee, Los Angeles County Department of Public Works, Waterworks Division, Lancaster California. Provided professional advice on the technical aspects of the County well construction specifications being used in the Antelope Valley. Meetings were conducted between February and May 2008.

Fox Canyon Groundwater Management Agency, Technical Advisory Group, Ventura, California. Provide professional, review, analysis, and advice on the technical issues related to ongoing groundwater management agency strategies to achieve groundwater basin management objectives (2008 to 2010).

Fox Canyon Groundwater Management Agency, Groundwater Sustainability Agency, Technical Advisory Group, Ventura, California (Serving as the 5 Cities Representative). Provide professional, review, analysis, and advice on the technical issues related to basin boundary determination, basin goals and objectives, and review and rating of consultants proposals submitted to perform the Groundwater Sustainability Plan (August 2015 to Present).

Resume

HOPKINS
GROUNDWATER
CONSULTANTS

Curtis J. Hopkins

Principal Hydrogeologist

PROFESSIONAL AFFILIATIONS:

American Public Works Association
American Water Works Association
Association of California Water Agencies
Association of Ground Water Scientists and Engineers
Association of Water Agencies of Ventura County
California Groundwater Association, Technical Division
Channel Counties Water Utilities Association
Coast Geologic Society
Groundwater Resources Association of California

LIST OF REPRESENTATIVE PROJECTS

LIST OF REPRESENTATIVE WATER WELL PROJECTS

SATICOY GROUNDWATER STORAGE MANAGEMENT PROJECT (WELL NOS. 1 THROUGH 4)

Client: United Water Conservation District

Services Provided: Preparation of plans and specifications and bidding process support, provide lithologic logging and final well designs, construction inspection services, analyze production testing of all 4 wells to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the construction project.

Well No 1 - Depth, Diameter, Capacity: 375 feet deep, 18-inch-diameter well screen, extraction design capacity 2,000 gpm

Well No. 2 - Depth, Diameter, Capacity: 330 feet deep, 18-inch-diameter well screen, extraction design capacity 2,000 gpm.

Well No. 3 - Depth, Diameter, Capacity: 360 feet deep, 18-inch-diameter well screen, extraction design capacity 2,000 gpm.

Well No. 4 - Depth, Diameter, Capacity: 280 feet deep, 20-inch-diameter well screen, extraction design capacity 2,000 gpm.

OXNARD WELL NO. 26

Client: City of Oxnard

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the construction project.

Depth, Diameter, Capacity: 780 feet deep, 14-inch-diameter well screen, extraction design capacity 1,500 gpm, well extraction capability 2,500 gpm.

OXNARD WELL NO. 27

Client: City of Oxnard

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the construction project.

Depth, Diameter, Capacity: 550 feet deep, 16-inch-diameter well screen, extraction design capacity 1,500 gpm.

OXNARD BLENDING STATION NO. 3 (WELL NOS. 28 THROUGH 31)

Client: City of Oxnard

Services Provided: Preparation of plans and specifications and bidding process support, provide lithologic logging and final well designs, construction inspection and documentation services, analyze production testing of all 4 wells to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the construction project. Three wells were constructed as municipal water supply wells and one was constructed as an injection well for aquifer storage and recovery (Well Nos. 28, 29, 30, and 31).

Well No. 28-Depth, Diameter, Capacity: Up to 590 feet deep, 18- to 14-inch-diameter well screen, extraction design capacity 3,000 gpm.

Well No. 29-Depth, Diameter, Capacity: Up to 430 feet deep, 24- to 18-inch-diameter well screen, extraction design capacity 3,000 gpm, injection design capacity 1,500 gpm.

Well No. 30-Depth, Diameter, Capacity: Up to 295 feet deep, 18-inch-diameter well screen, extraction design capacity 2,000 gpm.

Well No. 31-Depth, Diameter, Capacity: Up to 170 feet deep, 18-inch-diameter well screen, extraction design capacity 2,500 gpm.

COUNTY OF VENTURA MAINTENANCE YARD RELOCATION WELL

Client: RiverPark Development Company

Services Provided: Provide well design and specifications, lithological logging, well construction management services, analyze production test data for final pump design, and provide final report with “as-built” documentation for County water supply well.

Depth, Diameter, Capacity: 700 feet deep, 18x14-inch-diameter casing and well screen, 2,000 gpm design capacity.

COUNTY OF VENTURA WATERWORKS DISTRICT NO. 19, WELL NO. 4

Client: County of Ventura

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the construction project.

Depth, Diameter, Capacity: 1,060 feet deep, 16-inch-diameter casing and well screen, 2,000 gpm design capacity.

CRESTVIEW MUTUAL WATER COMPANY, WELL NO. 4

Client: Crestview Mutual Water Company

Services Provided: Plans and specifications and bidding process support, NPDES permitting support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the construction project for Crestview.

Depth, Diameter, Capacity: 800 feet deep, 16-inch-diameter casing and well screen, 2,000 gpm design capacity.

CITY OF COMPTON WATER DEPARTMENT, WELL NO. 19

Client: City of Compton

Services Provided: Plans and specifications and bidding process support, County storm drain connection and NPDES permitting support, DWSAP filling with CDPH, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the construction project.

Depth, Diameter, Capacity: 325 feet deep, 18-inch-diameter casing and well screen, 2,500 gpm design capacity.

VENTURA REGIONAL SANITATION DISTRICT, BAILARD LANDFILL BUFFER PARCEL, WELL NO. 1

Client: County of Ventura

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the irrigation well construction project.

Depth, Diameter, Capacity: 300 feet deep, 14-inch-diameter casing and well screen, 2,500 gpm design capacity.

HANSEN AGRICULTURAL LEARNING CENTER, WELL NO. 1

Client: University of California

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the irrigation well construction project.

Depth, Diameter, Capacity: 200 feet deep, 10-inch-diameter well screen, extraction design capacity 600 gpm.

RANCHO CHRISTINA WELL NO. 4

Client: Mittag Farms International

Services Provided: Preparation of well siting study and preliminary well design, provide lithological logging and final well design, construction inspection services, and analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of irrigation well construction project.

Depth, Diameter, Capacity: 850 feet deep, 16-inch-diameter well screen, extraction design capacity 1,500 gpm.

KOTAKE WELL NO. 4

Client: Hiji Brothers

Services Provided: Provide lithological logging and final well design, construction inspection services, and analyze production tests of wells to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the irrigation well construction project.

Depth, Diameter, Capacity: 1,150 feet deep, 16-inch-diameter well screen, extraction design capacity 1,500 gpm.

**CITY OF SANTA CRUZ, BELTZ WELL NO. 10, SANTA MARGARITA TEST WELL,
AND COASTAL MONITORING WELL CONSTRUCTION PROJECT**

Client: City of Santa Cruz Water Department

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection and management services, analyze production tests of wells to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the construction project for municipal supply wells in the Purisima Formation and Santa Margarita Formation aquifers. Construct 4 new monitoring wells and convert 5 old failing production wells to monitoring wells for coastal monitoring system and groundwater management.

Depth, Diameter, Capacity: 400 feet and 800 feet deep, 8-inch-diameter well screen, 400 to 500 gpm design capacity.

MESA SCHOOL IRRIGATION WELL

Client: Mesa Union School District

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the irrigation well construction project.

Depth, Diameter, Capacity: 880 feet deep, 8-inch-diameter casing and well screen, 300 gpm design capacity.

FAIRMONT BUTTE MOTORSPORTS PARK, WELL NO. 1

Client: **Water Resources Engineering Associates**

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the irrigation well construction project.

Depth, Diameter, Capacity: 500 feet deep, 10-inch-diameter casing and well screen, 900 gpm design capacity.

STRAWBERRY PEAK WATER WELL NO. 15

Client: **Alpine Water Users Association**

Services Provided: Plans and specifications and bidding process support, lithologic logging and final well design, construction inspection services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the irrigation well construction project.

Depth, Diameter, Capacity: 900 feet deep, 8-inch-diameter casing and well screen, 200 gpm design capacity.

HOLLANDIA NURSERY WELL NO. 2

Client: **Hollandia Produce Inc.**

Services Provided: Provide well siting study and preliminary well design, provide lithological logging and final well design, well construction management services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the irrigation well construction project.

Depth, Diameter, Capacity: 325 feet deep, 8-inch-diameter casing and well screen, 250 gpm design capacity.

HOLLANDIA FLOWERS WELL NO. 1

Client: **Hollandia Produce Inc.**

Services Provided: Provide well siting study and preliminary well design, provide lithological logging and final well design, well construction management services, analyze production tests of well to provide information required for permanent pump design, and provide final reporting and “as-built” documentation of the irrigation well construction project.

Depth, Diameter, Capacity: 330 feet deep, 8-inch-diameter casing and well screen, 250 gpm design capacity.

PROJECT FEE SCHEDULE

Project Fee Schedule

Labor Category

| | |
|---|--------|
| Expert Witness | \$ 480 |
| Principal Professional | \$ 240 |
| Associate Professional | \$ 205 |
| Senior Professional | \$ 185 |
| Project Professional | \$ 165 |
| Staff Professional | \$ 135 |
| Technician | \$ 115 |
| (Prevailing Wage Projects Requiring Technician Labor 1.5 times normal rate) | |

| | |
|-----------------------|--------|
| Draftsman/Illustrator | \$ 100 |
| Word Processor | \$ 85 |

Other Expenses

| | |
|--------------------------------|----------------------|
| Travel Expenses | Cost plus 15 percent |
| Reproduction Expenses | Cost plus 15 percent |
| Outside services and materials | Cost plus 15 percent |
| Vehicle Mileage | IRS Rate |

Equipment Rental

| | <u>Daily Rate</u> | <u>Weekly Rate</u> | <u>Monthly Rate</u> |
|---|-------------------|--------------------|---------------------|
| MiniTROLL (data logger < 100 FT) | \$100 | \$310 | \$ 925 |
| HERMIT 3000 (data logger) | \$125 | \$400 | \$1,200 |
| Pressure Transducer (< 400 FT) | \$ 65 | \$190 | \$ 575 |
| Pressure Transducer (< 1,000 FT) | \$ 95 | \$300 | \$ 900 |
| Water Level Sounder | \$ 40 | \$140 | \$ 420 |
| Stream Flow Meter | \$ 40 | \$140 | \$ 420 |
| Grundfos RediFLo 2 Sample Pump | \$150 | \$450 | \$1,350 |
| Trash Pump (3-inch dia. discharge) | \$ 65 | \$260 | \$ 780 |
| HyDAC/Hanna (Ec, pH, temp. meter) | \$ 45 | \$140 | \$ 420 |
| Horiba U-10 Water Quality Probe | \$ 75 | \$260 | \$ 780 |
| YSI 556MPS Water Quality Probe | \$ 65 | \$220 | \$ 660 |
| Rossum Sand Tester | \$ 30 | \$ 75 | \$ 225 |
| Mud Parameter Test Kit | \$ 35 | \$140 | \$ 420 |
| Drilling Fluid/Mud Press | \$ 45 | \$180 | \$ 540 |
| MFI/SDI Test Kit | \$ 25 | \$ 75 | \$ 225 |
| Truck Rental (3/4 ton) | \$100 | \$600 | \$2,400 |
| Field Computer | \$ 50 | ----- | ----- |
| Digital Camera | \$ 15 | ----- | ----- |
| GA-52Cx Magnetometer | \$ 50 | \$140 | ----- |
| Field Handheld GPS Unit | \$ 25 | ----- | ----- |
| Water Quality Bailer (2") | \$ 45 | ----- | ----- |
| Tedlar Gas Sample Bags | \$ 40 | ----- | ----- |
| Nitrate or Chloride Field Test Kits | \$ 40 | ----- | ----- |
| Electric Generator (220/110 W) (8 hr/day) | \$ 85 | \$200 | \$ 600 |
| Electric Power Inverter (8 hr/day) | \$ 25 | \$ 75 | \$ 180 |
| Downhole Video Camera (hand operated) | \$400 | ----- | ----- |