AGREEMENT TO FURNISH ENGINEERING SERVICES

FOR THE SITING AND DESIGN

OF THE

NW SAN TIMOTEO CANYON AND CHURCH STREET

WELLS AND APPURTENANCES

This AGREEMENT is made and entered into as of this 5th day of March, 1991.

by and between — City of Redlands Public Works Department herein after referred to as "OWNER"

and — Krieger & Stewart, Inc. hereinafter referred to as "ENGINEER"

In consideration of the mutual promises, covenants and conditions hereinafter set forth, the parties do hereby agree as follows:

ARTICLE 1 - ENGAGEMENT OF THE ENGINEER

1.1 The OWNER hereby engages the ENGINEER and the ENGINEER hereby accepts the engagement to perform engineering services in connection with the Siting and Design of the NW San Timoteo Canyon and Church Street Wells and Appurtenances, hereinafter referred to as the project.

1.2 All services under this AGREEMENT shall be done in a professional manner, and ENGINEER represents that the firm employs those with the demonstrated skill and the professional expertise necessary to provide high quality services under this AGREEMENT.

1.3 The ENGINEER shall be responsible, to the level of competency presently maintained by other practicing professional engineers providing the same type of services, for the professional and technical soundness, accuracy and adequacy of all reports, designs, drawings, specifications, and other services and materials furnished under this AGREEMENT.

ARTICLE 2 - SERVICES OF THE ENGINEER

2.1 The ENGINEER will perform the services in connection with the Project as defined in the Proposal Section I - Scope of Work.

2.2 The following additional services may be provided by the ENGINEER when requested and approved by the OWNER and agreed to by the Engineer:

1. Additional copies of plans and specifications.
2. Miscellaneous services not specified elsewhere in the AGREEMENT.

2.3 The ENGINEER will prepare an environmental initial study for the project. The initial study will include an analysis of the environmental impacts of the proposed project as well as identify the mitigation measures necessary to mitigate adverse impacts to a level of non-significance.

The ENGINEER will present the initial study to the City's Environmental Review Committee (ERC). Following the ERC hearing, the initial study will be revised to include comments from said hearing. A mitigation monitoring plan will then be developed.

The scope of environmental services includes all services necessary leading to a negative declaration or mitigated negative declaration.

ARTICLE 3 - RESPONSIBILITIES OF THE OWNER

3.1 The OWNER will place at the disposal of the ENGINEER all available information pertinent to the Project, including previous reports and any other data relative to the Project.

3.2 The OWNER will provide access to and make all provisions for the ENGINEER to enter upon public and private lands as required for the ENGINEER to perform his services under this AGREEMENT.

3.3 The OWNER will provide all environmental assessments or impact reports required for this project and not otherwise specifically required to be provided by the ENGINEER.

3.4 The OWNER will designate in writing a person to act as the OWNER's representative with respect to the services to be performed under this Agreement, such person to have complete authority to transmit instructions, receive information, interpret and define the Owner's

policies and decisions with respect to materials, equipment, elements and systems pertinent to the services covered by this AGREEMENT.

ARTICLE 4 - PERIOD OF SERVICE

4.1 The ENGINEER shall proceed with the engineering services set forth in Article 2 in accordance with the schedule defined in the Proposal, Section III - Schedule.

4.2 The ENGINEER shall proceed with the services under this AGREEMENT promptly and will prosecute them diligently.

ARTICLE 5 - PAYMENTS TO THE CONSULTANT

5.1 For the services performed under Article 2, OWNER will pay the ENGINEER on a time and materials basis in accordance with the estimated hourly effort by task and hourly fee schedule shown in the Proposal, Section IV - Project Cost. The upset limits shall be $48,000 for design engineering services and $62,500 for construction engineering services.

5.2 Payment for additional services requested by the OWNER per Article 2.2 will be in accordance with a separately negotiated fee or in accordance with the hourly fees shown in the Proposal, Section V - Appendix, Fee Schedule.

5.3 ENGINEER agrees that at the point 75-percent of budgeted costs have been expended for the project, the ENGINEER will notify the OWNER in writing, including a brief report on job status, percent complete, analysis of budget, and envisioned expenses to complete the contractual effort. Budgets shall not be exceeded except if previously approved by OWNER.

5.4 The ENGINEER shall bill the OWNER monthly. An invoice shall be submitted indicating the work performed, who performed the work, the job category of those performing the work, identification of outside services and reimbursable expenses, and backup material, when requested.

Payments by OWNER to ENGINEER shall be made within 30 days after receipt and approval of ENGINEER'S herein-above invoice, by warrant payable to the ENGINEER.

All notices, bills and payments shall be made in writing and may be given by personal delivery or by mail. Notices, bills and payments sent by mail should be addressed as follows:

TO OWNER:

CITY OF REDLANDS
Public Works Department
Utilities Division
P. O. Box 3005
2 E. Citrus Avenue
Redlands CA 92373

TO ENGINEER:

KRIEGER & STEWART, INCORPORATED
3602 University Avenue
Riverside CA 92501
Attn: Mark E. Messersmith

When so addressed, such notices shall be deemed given upon deposit in the United States Mail. In all other instances, notices, bills and payments shall be deemed given at the time of actual delivery. Changes may be made in the names and addresses of the person to whom notices, bills and payments are to be given by giving notice pursuant to this paragraph.

ARTICLE 6 - INSURANCE AND INDEMNIFICATION

6.1 ENGINEER shall maintain worker's compensation insurance and, in addition, shall maintain insurance to protect OWNER from claims for damage due to bodily injury, personal injury, or death and claims for injury to or destruction of tangible property while performing the services covered by this AGREEMENT. Said public liability and property damage insurance shall be in a minimum combined single limit of $1,000,000 per occurrence. The OWNER shall be named a primary additional insured on insurance coverage for public liability and property damage. The ENGINEER shall provide OWNER with a certificate evidencing such insurance coverage.

6.2 ENGINEER agrees to maintain professional liability insurance pursuant to this paragraph to protect OWNER from negligent acts, errors or omissions of a professional nature; the total aggregate of ENGINEER'S professional liability insurance coverage shall be a minimum of $1,000,000.

6.3 ENGINEER agrees to indemnify, hold harmless and defend OWNER and any and all of their elected officials, officers, agents, engineers, and employees from and against all claims, loss, damage, charge or expense, to which they or any of them may be put or subjected to arising out of or resulting from any willful misconduct or negligent act or actions, omission or failure to act on the part of the ENGINEER, his contractors, his suppliers, anyone directly or indirectly employed by any

of them or anyone for whose acts or omissions any of them may be liable in the performance of the services described in this AGREEMENT.

ARTICLE 7 - GENERAL CONSIDERATIONS

7.1 In the event of any legal action brought by either party against the other to enforce any of the obligations hereunder or arising out of any dispute concerning the terms and conditions hereby created, the losing party shall pay the prevailing party such reasonable amounts for fees, costs, expenses, including attorney's fees, as may be set by the Court.

7.2 The ENGINEER shall not sublet or assign any of the services covered by this AGREEMENT, except with the prior written approval of the OWNER and in strict compliance with the terms, provisions, and conditions of the AGREEMENT.

7.3 The key ENGINEER'S personnel proposed for this project are as follows:

Robert A. Krieger, P.E. - Principal in Charge
Mark E. Messersmith, P.E. - Project Manager
David K. Luker, P.E., Project Engineer - Design Engineering Services
Charles A. Krieger, P.E., Project Engineer - Construction Engineering Services
Thomas E. Field - Staff Geologist
Michael P. Thornton, P.E., Project Engineer - Pipeline Design

ENGINEER agrees that these key people will be made available and assigned to the OWNER'S project, and that they will not be replaced without concurrence from the OWNER.

7.4 It is understood and agreed by and between the parties that all documents, records, drawings, designs and specifications, cost estimates, and other project documents developed by the ENGINEER pursuant to this AGREEMENT shall become the property of OWNER and shall be delivered to OWNER upon completion of services or upon demand. Any reuse of such documents for other projects and any use of incomplete documents will be at the OWNER's sole risk.

7.5 ENGINEER is for all purposes an independent contractor. All qualified personnel provided by ENGINEER pursuant to the provisions of this AGREEMENT are to be employed by ENGINEER for his account only, and in no event shall ENGINEER or any personnel retained by him be deemed to have been employed by the OWNER or engaged by the OWNER for the account of or on behalf of the OWNER.

4. Preparation of Contract Documents for Wells and Pumping Equipment

Contract Documents will consist of a specification and a site drawing for each well. It is our understanding that the City's basic specification format will be used and Krieger & Stewart will provide the bid sheets, special requirements, and technical specifications. The bid sheets will include two bid schedules for each well, one for the well and one for the well pumping unit and electrical work.

The bid schedule for well construction will include bid items for the conductor bore with sanitary seal, pilot bore, reamed bore, electric logs, caliper log, blank casing, well screen, sounding tube, envelope gravel, alignment survey, well development, well step-drawdown test, constant rate aquifer test, color video of completed well, and well disinfection. In addition, additive and deductive bid items will be provided for required adjustments to the well as construction proceeds.

The bid schedule for the well pumping unit and electrical work will include bid items for the concrete well pedestal, grading (if required), fencing, electrical service, main service switchboard, electrical work, pump bowl assembly, pump column tube and shaft assembly, discharge head, and motor.

The site drawings will show site limits, existing utilities, well locations, site grading as required, site access, site fencing, electrical service location, and main service switchboard. During this time we will request from Southern California Edison electrical service for the proposed plants.

5. Construction Engineering Services

We will assist the City during the bidding period by answering questions, preparing addenda if required, attending the bid opening, and assisting City in analysis of bids.

We envision our services during construction to consist of conducting the preconstruction meeting and providing a memorandum of same, reviewing and approving submittals (well casing, well screen, gravel, pumping unit and electrical equipment), reviewing and approving partial payment requests, providing correspondence and conferences with City staff and Contractor(s) during construction, and providing construction inspection.

For well construction, we envision full-time construction inspection to be required for first day to insure equipment delivered to the site is adequate for the work, during drilling of the pilot bore, during placement of the well casing and screen, during placement of the gravel pack, during well development and well testing. For the

balance of the project, we envision intermittent inspection as required to insure compliance with the Contract Documents.

During drilling of the pilot bore, we will secure our own formation samples and analyze them in our lab to assist us in selecting well screen and envelope gravel.

For the well pumping unit and electrical work, we envision witnessing factory tests of the pumping units, full-time inspection during pumping unit installation, and intermittent inspection for the balance of the project as required to insure compliance with the Contract Documents. Once the well pumping plant and connecting pipelines are completed, we will be present for start-up to check all equipment including pumping units and electrical controls for proper operation. We will provide testing of the pumping unit to confirm flow rate, head, and efficiency.

6. Preparation of Contract Documents for Well Pumping Plant Pipelines

Once the well sites have been selected, we will prepare the Contract Documents for the well pumping plant pipelines. We envision our services to consist of meetings with City staff, records search, design survey, preparation of plan/profile drawings, and preparation of specifications.

Records search will consist of survey data, record maps, and utilities. Design survey will include both horizontal and vertical control. The construction drawings will have a horizontal scale of 1"=40' and a vertical scale of 1"=4'.

The plan portion of the construction drawings will show existing improvements and utilities, survey data, proposed pipeline, and all pipeline appurtenances including connections to the wells. The profile portion of the construction drawings will show existing ground surface over the centerline of the pipeline, pipeline flowline elevations, pipeline slopes, utility crossings, and pipeline appurtenances.

The pipeline specifications will be based on the City's standard format. We will provide the bid sheets and special requirements.

7. Well Pumping Plant Pipeline Construction Engineering Services

If required, we will provide construction engineering services for the well pumping plant pipelines. Said services will include attending preconstruction meeting, reviewing and approval submittals, reviewing and approving partial payment requests, providing correspondence and conference with City staff and Contractor(s) during construction, providing construction staking, and providing full time construction inspection.

SECTION II
PROJECT TEAM

SECTION II
PROJECT TEAM

A. Members

Robert A. Krieger - Principal In Charge

Robert A. Krieger is the President of Krieger & Stewart and is one of the two founders. Krieger is a registered civil engineer and has had considerable experience in well site selection, well construction, and well pumping plant design and construction. Krieger will direct the project and be directly involved in the records review, site selections, and preparation of the Contract Documents for the wells and pumping equipment.

Mark E. Messersmith - Project Manager

Mark E. Messersmith has been associated with Krieger & Stewart for over 17 years and is one of the principals. Messersmith is a registered civil engineer and has had experience in well construction, well pumping plant design, and considerable experience in water facilities design and construction. Messersmith will assist Krieger in the site selections and preparation of Contract Documents for the wells and pumping equipment. Messersmith will assist City staff with well site acquisition and will be responsible for preparation of Contract Documents for well pumping plant pipelines.

David K. Luker - Project Engineer

David K. Luker has been associated with Krieger & Stewart for over 10 years and is a registered civil engineer. Luker has had considerable experience in well construction and well pumping plant design and construction. Luker will assist Krieger in preparation of Contract Documents for the wells and well pumping plants.

Charles A. Krieger - Project Engineer

Charles A. Krieger has been associated with Krieger & Stewart for over 5 years and is a registered civil engineer. Krieger has had considerable experience in well and well pumping plant construction. Krieger will direct the construction engineering services for the wells and pumping equipment.

Thomas F. Field - Staff Geologist

Thomas F. Field has been with Krieger & Stewart for over 2 years and is a graduate geologist. Field has had considerable experience in well site selection and well construction. Field will assist

Krieger in records review, site selection, and will be the primary inspector during well construction.

Michael P. Thornton - Project Engineer - Well Pumping Plant Pipeline

Michael P. Thornton has been associated with Krieger & Stewart for over 5 years and is a registered civil engineer. Thornton has had considerable experience in water facility design and construction. Thornton will assist Messersmith in preparation of the Contract Documents for the well pumping plant pipelines.

Other Staff

The project team will be assisted by Krieger & Stewart staff of engineers, drafters, and inspectors. Krieger & Stewart has over ten individuals besides the ones listed herein who have had considerable experience in providing inspection services for well construction. These individuals will be available as needed to assist Field in providing the necessary inspection. Resumes for Krieger, Messersmith, Luker, Krieger, Field, and Thornton are included in the proposal appendix.

B. Experience

Krieger & Stewart with the Project Team listed herein has provided design and construction engineering services for over 50 wells (12" to 24" in diameter and up to 2,000 feet in depth), 30 pumping plants (20 horsepower to 600 horsepower), and over 1,000,000 feet of waterlines (6" to 60" in diameter and up to 350 psi working pressure).

SECTION III
PROJECT SCHEDULE

SECTION III
PROJECT SCHEDULE

Based on authorization to proceed by February 12, 1991, we propose to complete the records review and site selections by March 15, 1991. As soon as we have City staff approval of the site locations, we will start the Contract Documents for the wells and pumping equipment. We propose to complete the site acquisitions and Contract Documents for the wells and well pumping plants by April 5, 1991.

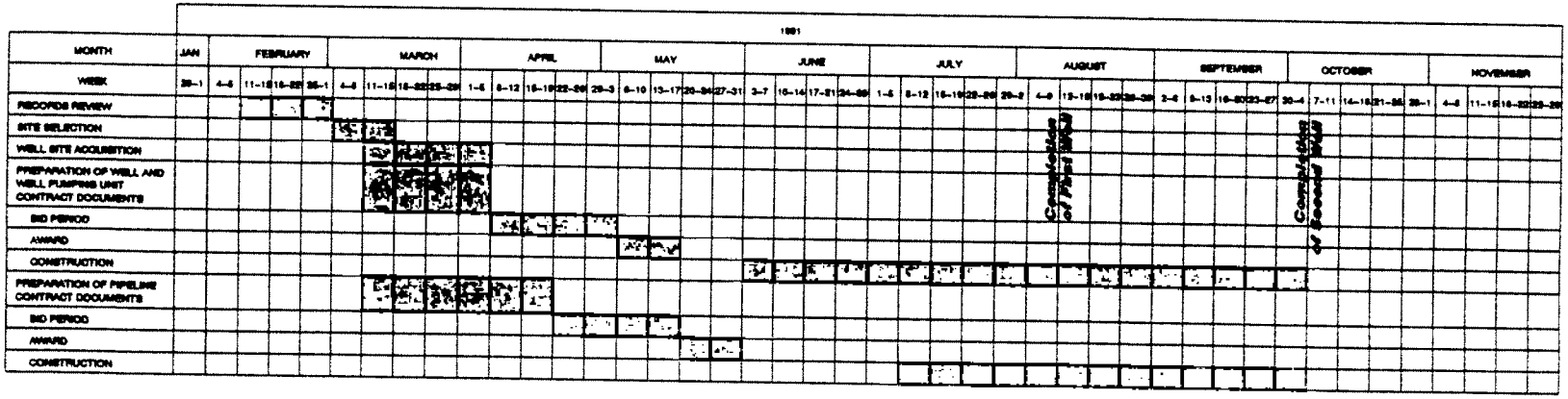
Allowing six weeks for bidding and award and two weeks for Contract execution and submittal approval, the construction on the first well could begin by June 3, 1991.

Assuming 10 weeks for well and pumping equipment construction (we have assumed some of the well construction and plant work could overlap reducing the construction time from 12 weeks to 10 weeks), the first well should be operational by August 9, 1991. To accommodate this schedule, contract documents for the well pumping plant pipeline will have to be completed by April 19, 1991. If construction of the second well immediately follows completion of the first well, the second well could be operational by October 4, 1991.

This schedule is optimistic and assumes all components will proceed on a timely basis without delays. The project could be delayed by problems with well site acquisition, untimely and incomplete submittals, execution of contracts, and well drillers unable to start construction quickly. With all the possible delays, completion of the wells could be delayed 3 or 4 months, until November or December of 1991.

TABLE I

CITY OF REDLANDS
CHURCH STREET WELL AND SAN TIMOTEO CANYON WELL
PROJECT SCHEDULE



PROPOSAL/46P13PS
2/5/91

SECTION IV
PROJECT COST

SECTION IV
PROJECT COST

A. General

We estimate our fee for providing design engineering services for the wells and pumping equipment to be $48,000. Said fee does not include any permit charges nor the cost of the preliminary title reports or appraisal fees. The estimated fee is shown on Table II by components of service. We estimate our fee for providing construction engineering services for the wells and pumping equipment to be $62,500. Our estimated fee is shown on Table III by Components of Service.

B. Design Engineering Services

Our fee for design engineering services is based on our experience with similar projects. Said fee could be affected if there is difficulty or delays in obtaining the well sites.

C. Construction Engineering Services for Well Construction

Our estimate for construction engineering services for well construction is based on a 12 week construction period (six weeks for each site). For each well, we have assumed we will provide full time inspection for 140 hours (mobilization, pilot bore, screen and casing placement, gravel placement, well development and well testing). During the pilot bore, we have assumed we will provide inspection on a 24 hour basis until the pilot bore is complete. In addition, for each well, we have assumed we will provide 80 hours of intermittent inspection.

D. Construction Engineering Services for Well Pumping Plants

Our estimate for construction engineering services for well pumping plants is based on an 8 week construction period (4 weeks for each site). For each plant, we have assumed we will provide 30 hours of full-time inspection (pumping unit factory tests and pumping unit installation), 60 hours of intermittent inspection, and 20 hours inspection for plant start-up and pumping unit testing.

Our estimate for construction engineering services is based on our experience with similar projects; however, our actual fee for construction engineering services will depend on the efficiency, competence, and diligence of the Contractor(s).

E. Fee Schedule

We propose to invoice the City on a monthly basis for services performed in accordance with our fee schedule. A copy of our

current fee schedule is included in the appendix of our proposal. Our current fee schedule is scheduled to be adjusted on July 1, 1991. Our design engineering services were estimated utilizing the current fee schedule and our construction engineering services were estimated utilizing the fee schedule anticipated after July 1, 1991.

TABLE II

CITY OF REDLANDS

CHURCH STREET WELL AND SAN TIMOTEO CANYON WELL
ESTIMATED COST FOR DESIGN ENGINEERING SERVICES

COMPONENT	CONSULTING ENGINEER		PRINCIPAL ENGINEER		STAFF ENGINEER		ASSISTANT ENGINEER/ STAFF GEOLOGIST		DRAFTER		CLERCIAL		2-MAN SURVEY CREW		TOTAL $
	HOURS	$	HOURS	$	HOURS	$	HOURS	$	HOURS	$	HOURS	$	HOURS	$	
RECORDS REVIEW	40	4,000	40	3,520			40	2,240							9,760
SITE SELECTION	40	4,000	40	3,520	40	2,880			24	1,080	24	768	16	2,160	14,408
PREPARE CONTRACT DOCUMENTS	20	2,000	40	3,520	80	5,760	80	4,480	100	4,500	40	1,280			21,540
SUBTOTAL	100	10,000	120	10,560	120	8,640	120	6,720	124	5,580	64	2,048	16	2,160	45,708

REIMBURSABLES (5%):	2,285
ENGINEERING SERVICES TOTAL:	47,993
ENGINEERING SERVICES ROUNDED:	48,000

CONSULTING ENGINEER	@ $100.00/HR
PRINCIPAL ENGINEER	@ $88.00/HR
STAFF ENGINEER	@ $72.00/HR
ASSISTANT ENGINEER	@ $56.00/HR
DRAFTER	@ $45.00/HR
CLERICAL	@ $32.00/HR
2-MAN SURVEY CREW	@ $135.00/HR

PROPOSAL/48P13T2
2/9/91

TABLE III

CITY OF REDLANDS

CHURCH STREET WELL AND SAN TIMOTEO CANYON WELL
ESTIMATED COST FOR CONSTRUCTION ENGINEERING SERVICES
(WELLS AND WELL PUMPING PLANTS)

COMPONENT	CONSULTING ENGINEER		PRINCIPAL ENGINEER		STAFF ENGINEER		INSPECTOR		CLERCIAL		TOTAL $
	HOURS	$	HOURS	$	HOURS	$	HOURS	$	HOURS	$	
BIDDING PERIOD	2	212	10	940	10	760					1,912
PRECONSTRUCTION MEETING			4	376	6	456	4	180	4	136	1,148
SUBMITTAL REVIEW	2	212	4	376	24	1,824					2,412
PARTIAL PAYMENT REQUESTS					10	760					760
CORRESPONDENCE/CONFERENCES	20	2,120	20	1,880	240	18,240			40	1,360	23,600
CONSTRUCTION INSPECTION							660	29,700			29,700
SUBTOTAL	24	2,544	38	3,572	290	22,040	664	29,880	44	1,496	59,532
										REIMBURSABLES (5%):	2,977
										ENGINEERING SERVICES TOTAL:	62,509
										ENGINEERING SERVICES ROUNDED:	62,500

CONSULTING ENGINEER @ $106.00/HR
PRINCIPAL ENGINEER @ $94.00/HR
STAFF ENGINEER @ $76.00/HR
INSPECTOR @ $45.00/HR
CLERICAL @ $34.00/HR

NOTE: HOURLY RATES WERE BASED ON OUR ANTICIPATED FEE SCHEDULE EFFECTIVE JULY 1, 1991.

PROPOSAL/48P13T3
2/9/91

SECTION V
APPENDIX

KRIEGER & STEWART INCORPORATED • ENGINEERING CONSULTANTS

3602 University Av • Riverside, CA 92501 • Tel 714-684-6900 • Fax 714-369-5026

FEE SCHEDULE
90/91

CLASSIFICATION	RATES $/HOUR
Engineering Services	
Consulting Engineer	100.00
Principal Engineer	88.00
Senior Engineer	80.00
Staff Engineer	72.00
Associate Engineer	64.00
Assistant Engineer	56.00
Junior Engineer	49.00
Senior Designer	58.00
Staff Designer	53.00
Junior Designer	47.00
Senior Drafter	51.00
Staff Drafter	45.00
Junior Drafter	40.00
Senior Construction Inspector	42.00
Staff Construction Inspector	38.00
Junior Construction Inspector	34.00
Utility Technician	28.00
Surveying Services	
Principal Surveyor	80.00
Senior Surveyor	72.00
Staff Surveyor	65.00
Associate Surveyor	56.00
Survey Technician	45.00
3 Man Crew and Equipment	170.00
2 Man Crew and Equipment	135.00
Support Services	
Senior Secretary	32.00
Staff Secretary	30.00
Junior Secretary	28.00
Utility Clerk	24.00
Outside Services	
Special Consultants and Purchased Services	Cost + 15%
Reimbursable Expenses	
Vehicle Mileage	0.35/Mile
Subsistence, where applicable (Field Services)	Cost
Copies, prints, telephone, delivery charges	Cost

The above rates are subject to change on or about July 1 each year due to salary and cost increases.

A FINANCE CHARGE of one and one half percent (1-1/2%) per month (18% per year) will be added to any unpaid amount commencing thirty (30) days from date of invoice. A mechanic's lien may be filed for any invoice remaining unpaid after thirty (30) days from date of invoice.

9005

Resume
of
MARK E. MESSERSMITH
1990

EDUCATION: B.S. in Civil Engineering
University of California, Davis (1968)

M.S. in Environmental Engineering
University of California, Irvine (1971)

REGISTRATION: Registered Civil Engineer, California, No. 22020

AFFILIATIONS:
Member - American Concrete Institute
Member - American Society of Civil Engineers
Member - American Water Works Association
Member - National Society of Professional Engineers
Member - Society for Testing and Materials
Member - Southern California Water Utilities Association
Member - Steel Structures Painting Council
Member - Water Pollution Control Federation

EXPERIENCE:

1982 to Present: Vice President
1973 to 1982: Associate Engineer to Principal Engineer
Krieger & Stewart, Incorporated

Representative Assignments:

Design and preparation of construction drawings and specifications for water systems including pipelines, reservoirs, and pumping plants; design and preparation of construction drawings and specifications for sanitary sewers; site development including street improvements, grading, water facilities, sewer facilities, and storm drain facilities; structural design; administration of construction contracts and supervision of construction inspection; Assessment District engineering; preparation of water and wastewater standard specifications and standard drawings; preparation of water and wastewater master plans; preparation of Environmental Impact Reports.

1972 to 1973: Design Engineer
Neste, Brudin & Stone, Inc.

Representative Assignments:

Design and preparation of construction drawings and specifications for a 1 MGD wastewater treatment plant; design for converting an existing 1 MGD anaerobic digester to an aerobic digester; preparation of an operation and maintenance manual for a 1 MGD activated sludge wastewater treatment plant.

1968 to 1972: Civil Engineering Assistant
City of Los Angeles

Representative Assignments:

Design of storm drain facilities; design of sanitary sewer systems; participation in preparation of project reports.

Resume
of
DAVID K. LUKER
1990

EDUCATION: San Bernardino Valley College (1982)

Mount San Jacinto Junior College (1975-1979)

Civil Engineering
International Correspondence Schools (1978-1979)

REGISTRATION: Registered Civil Engineer, California, No. 36810
Licensed Land Surveyor, California, No. 5744

AFFILIATIONS: Member - National Society of Professional Engineers
Member - American Water Works Association
Member - Water Pollution Control Federation
Member - National Water Well Association
Member - California Land Surveyors Association

EXPERIENCE: 1987 to Present: Vice-President
1980 to 1987: Associate Engineer to Senior Engineer
Krieger & Stewart, Incorporated

Representative Assignments:

Service as expert witness in litigation matters involving drainage, flooding, and well construction; service as city engineer, public works director, and planning director; preparation of assessment district engineer's reports, environmental studies and assessments pursuant to CEQA requirements; engineering design, surveying, inspection and project management of water wells, pumping plants, water pipelines, water reservoirs, sanitary sewers, and other civil works; water supply, power use, utility rate, and flood hydrology studies; preparation and performance of computer work for earthwork computation, hydrology studies, hydraulics, and water system network analyses.

1979 to 1980: Project Designer
To-Mac Engineering

Representative Assignments:

Design of water systems and streets; participation in hydrology studies; preparation of tract maps, survey maps, and legal descriptions.

1976 to 1979: Engineering Technician
Rancho California Water District

Representative Assignments:

Design of pumping plants, water pipelines, sanitary sewers, and other civil works.

Resume
of
CHARLES A. KRIEGER
1990

EDUCATION: Bachelor of Science in Engineering
University of California, Davis (1984)

REGISTRATION: Registered Civil Engineer, California No. 44545

AFFILIATIONS:
Member - American Concrete Inspectors Association
Member - American Society of Civil Engineers
Member - American Water Works Association
Member - California Groundwater Association
Member - Inland Counties Water Association
Member - National Water Well Association
Member - Southern California Water Utilities Association
Member - Water Pollution Control Federation

EXPERIENCE:

1985 to Present: Assistant Engineer to Staff Engineer
Krieger & Stewart, Incorporated

Representative Assignments:

Preparation of contract documents (specifications and drawings) and supervision of construction inspection for water well, storage reservoir, and public road projects; construction inspection of wastewater treatment plant, storage reservoirs, water wells, and well pumping plant facilities; participation in preparation of appraisals for water and sewer systems; participation in preparation of domestic water system general plans; preparation of Environmental Impact Report; administration of construction contracts.

1984 to 1985: Teaching Assistant
Department of Civil Engineering
University of California, Davis

Representative Assignments:

Preparation of lecture materials; organization and preparation of laboratory experiments and field exercises for undergraduate classes; conducting undergraduate engineering courses.

1978 to 1984: Technician to Junior Engineer
Krieger & Stewart, Incorporated

Representative Assignments:

Design and construction surveying; construction inspection of water and wastewater facilities; preparation of inventories for water system appraisals; participation in structural design of timber, masonry, steel, and concrete structures.

Resume
of
THOMAS F. FIELD
1990

EDUCATION: B.A. in Geology
California State University, Chico (1985)

AFFILIATIONS: Member - Geological Society of America
Member - American Water Works Association
Member - California Groundwater Association
Member - National Water Well Association

EXPERIENCE:

1989 to Present: Staff Geologist
Krieger & Stewart, Incorporated

Representative Assignments:

Well design including well log preparation and well screen and envelope gravel selection; aquifer and pump test design and monitoring; groundwater contamination investigations; mineral resource assessment; design and construction surveying.

1987 to 1989: Staff Geologist
Richard Mills Associates

Representative Assignments:

Geologic mapping and field reconnaissance; downhole logging; aerial photo investigations; fault search/seismic trench logging and interpretation; groundwater investigations; environmental site assessments.

1986 to 1987: Hydrologic Technician
U.S. Geological Survey, Water Resources Division, Santa Barbara

Representative Assignments:

Water quality analysis for Santa Barbara saltwater intrusion project; acid rain station site supervision (National Atmospheric Deposition Program); Gibralter Dam and Jameson Reservoir water budgeting for domestic supplies to Santa Barbara and Montecito, California; stream gauging; hydrographic surveying.

8907

Resume
of
MICHAEL P. THORNTON
1990

EDUCATION: B.S. in Civil Engineering
California State Polytechnic University, Pomona (1985)

REGISTRATION: Registered Civil Engineer, California No. 44226

AFFILIATIONS: Member - American Society of Civil Engineers
Member - American Water Works Association
Member - Water Pollution Control Federation

EXPERIENCE: 1986 to Present: Assistant Engineer to Staff Engineer
Krieger & Stewart, Incorporated

Representative Assignments:

Design and preparation of construction drawings and specifications for water pipelines, sanitary sewers, site developments, and municipal improvements; design and construction surveying; computerized mapping and coordinate geometry; hydraulic network analysis; and construction inspection.

1985 to 1986: CHJ Incorporated, Colton, California

Representative Assignments:

Soils engineering including preliminary soils investigations and percolation test evaluation.

1983 - 1985 Rockwell International, Anaheim, California

Representative Assignments:

Mass properties engineering.

AGENDA ITEM NO.

COUNCIL MEETING OF 3-5-91

REQUEST FOR COUNCIL ACTION

SUBJECT: **AGREEMENT TO FURNISH ENGINEERING SERVICES FOR THE SITING AND DESIGN OF THE NW SAN TIMOTEO CANYON AND CHURCH STREET WELLS AND APPURTENANCES**

MOTION:

I move that the Council approve the Agreement to Furnish Engineering Services for the Siting and Design of the NW San Timoteo Canyon and Church Street Wells and Appurtenances with Krieger & Stewart, Inc., of Riverside.

STAFF RECOMMENDATION:

Staff recommends that Council approve the subject agreement with Krieger & Stewart, Inc., of Riverside.

DISCUSSION:

As the State of California enter its fifth consecutive year of drought and both the State Department of Water Resources and federal water authorities announce drastic supply cutbacks to farm and urban water users, the importance of an abundant supply of local water resources is underscored. Historically, the City of Redlands reliance upon imported State water has been minimal, largely due to a relatively abundant supply of local surface and groundwater. Typically, the supply of water to the City's water customers has come from the following sources: 25% Santa Ana River; 33% Mill Creek; 40% groundwater; and 2% imported State water.

The demand for water in Redlands has increased as a result of population and commercial/industrial growth. Even with a growth control measure in place, water supplies must be increased by a minimum of 450 ac. ft. per year in order to meet incremental demands, water resource reliability and the traditional Redlands lifestyle. Incremental demands have been historically met by the acquisition of water stock in local water companies and treating the water at the treatment facilities. This source of supply was preferred over groundwater supplies because it minimized power requirements necessary to operate wells. However, water stock availability has decreased and groundwater sources and State project water have been more readily available.

State project water is an important source of supply to the City, but recent events, such as shutdowns for repair, curtailments due to the drought and seismic vulnerability underscore the belief that this water source does not afford the reliability necessary for a primary water source.

Groundwater appears to be a very good alternative to both local surface and State project waters. Groundwater has several key advantages:

- o Locally available and relatively abundant
- o Stored in natural groundwater "reservoirs" and readily available upon demand with proper planning and investment in well facilities
- o Easily tied into the distribution system
- o Locally controlled, in general
- o Water efficient (less evaporation)
- o Less subject to certain natural disasters and terrorism

The disadvantages of groundwater include reliance upon electric energy to run wells, risks associated with well development and risks associated with contaminants in groundwater.

Redlands has increased its attention to groundwater resources. The Rees Well - Well Head Treatment Facilities are currently under construction in order to return that well to production by early summer. Well head treatment facilities for Well 31A are currently out to bid and may be on line by October. In addition, several new wells are planned in the Capital Improvement Program and currently budgeted.

The northwest San Timoteo Canyon and north Church Street areas have been identified as likely locations for two domestic water production wells. These well sites also appear to be the two most practicable to have on line for use this summer.

With the short time frame involved to site, design, drill, develop, and connect the wells to the distribution system, staff determined that engineering experts must begin work immediately. After careful review of the request for qualifications issued in December, the firm of Krieger & Stewart, Incorporated, of Riverside, was determined to be the most capable of completing the project within the short timeframe. Krieger & Stewart, Inc. has successfully sited and designed many wells in both San Bernardino and Riverside Counties. Krieger & Stewart has successfully completed several other projects for the City, most noteworthy the Citrus Avenue and Roosevelt Road Trunk Sewers. These projects crossed both the high school parking lot and downtown area. The Public Works Commission commended both staff and Krieger & Stewart with regards to this project.

The scope of services and fees were negotiated with Krieger & Stewart and appear reasonable for the services to be provided.

COMMISSION RECOMMENDATION:

The NW San Timoteo Canyon Well and Church Street Well are shown in the FY 89/90 to FY 93/94 Water System Capital Improvement Program. The Capital Improvement Program was reviewed by the Public Works Commission at their August 1990 meeting.

ALTERNATIVES:

The alternative is to not approve the Agreement for the siting and design of the subject wells. It is essential that the City continue to develop its water resources. Groundwater is a key resource and these wells appear to be the most practicable under the current drought conditions and with immediate need for water.

FISCAL IMPACT:

The projects are scheduled in the FY 89/90 to FY 93/94 CIP for implementation. The projects are budgeted in the approved FY 90/91 annual budget. The cost of siting and design of the well and well head facilities ($48,000) and the cost of well construction phase engineering services ($62,000), represent 12.6% of the budget estimate of $875,000 for the two wells.

Prepared by:

SEONG (SAM) KIM, P. E.
Deputy Public Works Director
Utilities

Concurrence:

RONALD C. MUTTER
Assistant City Manager/
Public Works Director

Reviewed by:

JIM WHEATON
City Manager