

**GREENFIELD COUNTY WATER DISTRICT
551 Taft Highway
BAKERSFIELD, CALIFORNIA 93307
General Manager: Nick Cooper
Telephone: (661) 831-0989**

**SPECIAL PROVISIONS,
BID PROPOSAL AND AGREEMENT**

FOR

McKee Well Drilling Project

REQUIREMENTS

Project Advertisement: April 4, 2022

Pre-Bid Meeting: April 21, 2022 @ 10:00 AM at
Greenfield County Water District
551 Taft Highway
Bakersfield, CA 93307
Attendance is Non-Mandatory

Bids Due/Bid Opening: May 16, 2022 @ 2:00 PM
QK
5080 California Avenue, Suite 220
Bakersfield, CA 93309

All questions shall be emailed to cathy.williams@qkinc.com

All questions must be submitted no later than 5:00pm April 29,
2022

Answers to questions will be sent out May 4, 2022

Contractor License Requirement(s): Class C57, Well Drillers



QK
5080 California Avenue, Suite 220
Bakersfield, California 93309
(661) 616-2600

**GREENFIELD COUNTY WATER DISTRICT
CONTRACT DOCUMENTS
FOR
MCKEE WELL DRILLING PROJECT**

**QK
5080 California Ave., Suite 220
Bakersfield, CA 93309**



TABLE OF CONTENTS

BID FORM
NON COLLUSION AFFADAVIT
AGREEMENT
CERTIFICATE OF CONTRACTOR
PERFORMANCE BOND
PAYMENT BOND
CONTRACTOR'S CERTIFICATE REGARDING WORKER'S COMPENSATION
CERTIFICATE OF INSURANCE – Worker's Compensation & Employer's Liability
INSURANCE ENDORSEMENT - Worker's Compensation & Employer's Liability
CERTIFICATE OF INSURANCE – Liability
INSURANCE ENDORSEMENT- Liability
GENERAL PROVISIONS
SPECIAL PROVISIONS
SPECIFICATIONS
WELL LOCATION EXHIBITS

BID FORMS

BID FORM
GREENFIELD COUNTY WATER DISTRICT
FOR THE
MCKEE WELL DRILLING PROJECT

NAME OF BIDDER _____
BUSINESS P.O. BOX _____
STATE, ZIP _____
BUSINESS STREET ADDRESS _____
(Please include even if P.O. Box used)
STATE, ZIP _____
TELEPHONE NO: AREA CODE () _____
FAX NO: AREA CODE () _____
CONTRACTOR LICENSE NO. _____

TO THE GOVERNING BODY OF THE
GREENFIELD COUNTY WATER DISTRICT

Pursuant to and in compliance with your Notice Inviting Sealed Proposals (Bids) and the other documents relating thereto, the undersigned bidder, being fully familiar with the terms of the Contract Documents, local conditions affecting the performance of the Agreement, the character, quality, quantities, and scope of the work, and the cost of the work at the place where the work is to be done, hereby proposes and agrees to perform within the time stipulated in the Agreement, including all of its component parts and everything required to be performed, and to furnish any and all of the labor, material, tools, equipment, transportation, services, permits, utilities, and all other items necessary to perform the Agreement and complete in a workmanlike manner, all of the work required in connection with the construction of said work all in strict conformity with the plans and Specifications and other contract documents, including all for the prices hereinafter set forth.

Acknowledgement of Bid Addenda: The Bidder confirms that this Bid Proposal incorporates and is inclusive of all items or other matters contained in Bid Addenda issued by or on behalf of the District.

ADDENDUM NUMBER AND DATE

ADDENDUM NUMBER AND DATE

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ADDENDUM NUMBER AND DATE

The Board Members of the Greenfield County Water District reserves the right to reject any and all bids, and to waive any and all irregularities in any bid.

The work for which this proposal is submitted is for construction in conformance with the general provisions (including the payment of not less than the State general prevailing wage rates), the

project plans described below, including any addenda thereto and the Agreement annexed hereto.

The Bidder shall set forth for each unit basis item of work a unit price and a total for the item, and for each lump sum item a total for the item, all in clearly legible figures in the respective spaces provided for that purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail.

The undersigned, as Bidder, declares that the only persons or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm, or corporation; that he has carefully examined the location of the proposed work, the annexed proposed form of the Agreement, and the plans therein referred to; and he proposes, and agrees if this proposal is accepted, that he will enter into an Agreement with the GREENFIELD COUNTY WATER DISTRICT, in the form of the copy of the Agreement annexed hereto, to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the Agreement, in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that he will take in full payment therefore the following prices, to wit:

**Schedule of Work Items
Greenfield County Water District
McKee Well Drilling Project**

BASE BID

Item No.	Quantity	Unit	Item Description	Unit Price (In Figures)	Total Price (In Figures)
1	1	LS	Mobilization, Demobilization, Permitting and Clean-Up		
2	50	LF	Drill 50 foot deep 38 inch diameter hole, Furnish and install 50 feet of 30 inch OD x 5/16 inch thick conductor casing, and grout in place		
3	710	LF	Drill 28 inch diameter hole and conduct geophysical logging		
4	360	LF	Furnish and install 16 5/8 inch OD x 5/16 inch thick blank HSLA steel casing		
5	390	LF	Furnish and install 16 5/8 inch OD x 5/16 inch thick "FulFlo" louvered HSLA steel casing		
6	315	LF	Furnish and install 3 inch diameter gravel feed tube		
7	335	LF	Furnish and install 2 inch diameter sounding tube		
8	450	LF	Furnish and install gravel envelope		
9	310	LF	Furnish and install annular seal		
10	60	HR	Conduct preliminary well development by airlifting and swabbing		
11	60	HR	Conduct well development by pumping and surging		
12	22	HR	Conduct test pumping		
13	1	EA	Conduct television survey		
14	1	LS	1/4" Stainless Steel Sounding Tube		
15	1	LS	Remove Existing Well Pump for inspection and maintenance		
16	1	LS	Construct Pump Pedestal and Replace Existing Well Pump in new well		
TOTAL BASE BID					

Bidder acknowledges that estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents.

List the name of the person who inspected the site of the proposed work for your firm:

_____. Date of Inspection: _____

The undersigned Bidder is licensed in accordance with an act providing for the registration of contractors,

License No. _____ Classifications _____,

Expiration Date: _____;

Department of Industrial Relations (DIR) registration number: _____.

Signature of Bidder

Date

The Contractor bidding shall hereinafter list the subcontractor(s) who will be the Subcontractor(s) on the job for each particular trade or subdivision of the work and will state the firm name and principal location of the mill, shop, or office of each:

DESCRIPTION OF WORK	NAME AND ADDRESS OF SUBCONTRACTOR	LOCATION OF SUBCONTRACTOR	PERCENTAGE OF TOTAL PROJECT,

The Bidder's attention is direction to Section 6-1 of the General Provisions.

The Bidder's execution on the signature portion of this proposal shall also constitute an endorsement and execution of those certifications which are a part of this proposal.

The names of all persons interested in the foregoing proposals as principals are as follows: (NOTICE - If Bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer, and manager thereof; if a general partnership, state true name of firm, also names of all individual partners composing firm; if a limited partnership, the names of all general partners and limited partners; if Bidder or other interested person is an individual, state first and last names in full; if the Bidder is a joint venture, state the complete name of each venturer).

Bidder hereby confirms that it has all licenses and permits required by federal, state, and local statutes, regulations, and ordinances. The following are the Contractor's applicable license numbers (add pages if needed):

<u>Contractor's Name and License No.</u>	<u>Expiration Date</u>	<u>Classifications(s)</u>	<u>Dept. of Industrial Relations Registration No.</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Pursuant to the requirements of California Business and Professions Code Section 7028.15(e), a bid submitted to the District by a Contractor who is not licensed pursuant to Chapter 9 of Division 3 of the Business and Professions Code shall be considered nonresponsive and shall be rejected as provided for by law.

Signature and Title of Bidder: _____

Dated: _____, 20__.

NOTE: If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation and the corporate seal; if Bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership; if the Bidder is an individual, his signature shall be placed above; if the Bidder is a joint venture, the name of the joint venture shall be set forth above with the signature of an authorized representative of each venturer.

**INFORMATION REQUIRED OF BIDDER
GENERAL INFORMATION**

The Bidder shall furnish the following information. Failure to comply with this requirement will render the Proposal non-responsive and may cause its rejection. Additional sheets shall be attached as required.

(1) Number of years as a Contractor in construction work of this type: _____

(2) Names and titles of all officers of Contractor's firm:

(3) Name of person who inspected site of proposed work for your firm: _____

Date of Inspection: _____

(4) Name, address, and telephone number of surety company and agent who will provide the required bonds on this Agreement: _____

(5) ATTACH TO THIS BID the experience resume of the person who will be designated chief construction superintendent.

(6) List five reverse rotary large-capacity municipal wells to a depth of at least 800 feet in similar materials as at the site completed in the last five years:

Project: _____
Agreement Price: _____
Name, address and telephone number of owner:

Project: _____
Agreement Price: _____
Name, address and telephone number of owner:

Project: _____
Agreement Price: _____
Name, address and telephone number of owner:

Project: _____
Agreement Price: _____
Name, address and telephone number of owner:

Project: _____
Agreement Price: _____
Name, address and telephone number of owner:

AGREEMENT

THIS AGREEMENT, made and entered into by and between the

GREENFIELD COUNTY WATER DISTRICT

hereinafter referred to as "DISTRICT" and

_____;
a corporation under the laws of the state of _____;

a partnership composed of _____;
_____;

a joint venture composed of _____;
_____;

an individual doing business as _____;
hereinafter referred to as "CONTRACTOR."

DISTRICT and CONTRACTOR agree as follows:

- (1) SCOPE OF WORK: CONTRACTOR will furnish all materials and will perform all of the work for the construction of

MCKEE WELL DRILLING PROJECT

in accordance with the plans and Specifications and other contract documents therefore.

- (2) TIME FOR COMPLETION: The work shall be completed within the times set forth in the Specifications. Time is of the essence, and forfeiture due to delay will be assessed as provided for in the General Provisions.
- (3) CONTRACT SUM: DISTRICT will pay CONTRACTOR in accordance with the prices shown in the Bid Form.
- (4) PAYMENTS: Monthly progress payments and the final payment will be made in accordance with the General Provisions. The filing of the notice of completion by DISTRICT shall be preceded by acceptance of the work made only by an action of the Governing Body of DISTRICT in session.
- (5) CONTRACT DOCUMENTS: The complete Agreement includes all the Contract Documents set forth herein, to wit: Bid Form, Agreement, Performance Bond, Payment Bond, Contractor's Certificate Regarding Workers' Compensation, Certificate of Insurance (Workers' Compensation and Employer's Liability), Insurance Endorsement (Workers' Compensation and Employer's Liability), Certificate of Insurance (Liability), Insurance

Endorsement (Liability), Certificate of Insurance (Builders' Risk "All Risk"), Insurance Endorsement (Builders' Risk "All Risk"), General Provisions, Special Provisions Specifications, Plans, and also Bid Addenda thereto.

This Agreement is executed by the DISTRICT pursuant to an action of its Governing Body in session on _____, 20__, authorizing the same, and CONTRACTOR has caused this Agreement to be duly executed.

Dated: _____, 20__ By _____
(Authorized Representative of District)

Title: _____

Dated: _____, 20__ _____
(Contractor)

By _____
(Authorized Representative of Contractor)

(Seal if Corporation) Title _____

(Attach Acknowledgment for Authorized Representative of Contractor)

APPROVED:

(Attorney for District)

CERTIFICATE OF CONTRACTOR

I, _____, certify that I am a/the _____ [designate sole proprietor, partner in partnership, or specify corporate office, e.g., secretary] in the entity named as CONTRACTOR in the foregoing Agreement.

I hereby expressly certify that the name of the entity to which I am associated is _____; that this entity is in good standing and has complied with all applicable laws and regulations, and that I have been expressly authorized by the proper parties in this entity to execute this Agreement on behalf of the above-named entity.

ATTEST:

Name _____
(Please Type)
Title _____

On this _____ day of _____, 20____, before me personally came _____ to me known, or proven to me on the basis of satisfactory evidence, who being duly sworn, did depose and say: that (he/she) is an authorized representative of the Contractor and acknowledged to me that (he/she) executed the within instrument on behalf of said Contractor, _____.

In witness whereof, I have signed and affixed my official seal on the date in this certificate first above written.

NOTARY PUBLIC

PERFORMANCE BOND

We, _____ as Principal,
and _____ as Surety, jointly and severally,
bind ourselves, our heirs, representatives, successors and assigns, as set forth herein, to the

GREENFIELD COUNTY WATER DISTRICT

(herein called District) for payment of the penal sum of _____

_____ Dollars (\$ _____), lawful money of the
United States. District has awarded Principal an Agreement for the construction of

MCKEE WELL DRILLING PROJECT

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal shall in all things abide by and well and truly keep and perform the covenants, and provisions in the said Agreement, and any alteration thereof made as therein provided, on his part to be kept and performed at the time and in the manner therein specified, and shall faithfully fulfill the one-year guarantee of all materials and workmanship, and shall indemnify and save harmless the District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, employees and agents, as therein stipulated, this obligation shall become null and void, otherwise, it shall be and remain in full force and effect.

Surety agrees that no change, extension of time, alteration, or addition to the terms of the Agreement, or the work to be performed thereunder, or the plans and Specifications shall in any way affect its obligation on this bond, and it does hereby waive notice thereof.

Principal and Surety agree that if the District is required to engage the services of an attorney in connection with the enforcement of this bond, each shall pay District's reasonable attorney's fees incurred, with or without suit, in addition to the above sum.

Executed in four original counterparts on

_____ 20__.

PRINCIPAL

(Seal if Corporation)

By _____

Title _____

(Attach Acknowledgment of Authorized Representative of Principal)

Any claims under this bond may be addressed to:

_____ (name and address of Surety)

_____ (name and address of Surety's agent for service of process in California, if different from above)

_____ (telephone number of Surety's agent in California)

(Attach Acknowledgment)

SURETY

By _____
(Attorney-in-Fact)

APPROVED:

(Attorney for DISTRICT)

NOTICE:

No substitution or revision to this bond form will be accepted. Sureties must be authorized to do business in and have an agent for service of process in California. Certified copy of Power of Attorney must be attached.

PAYMENT BOND

We, _____ as Principal,
and _____ as Surety, jointly and severally,
bind ourselves, our heirs, representatives, successors and assigns, as set forth herein, to the

GREENFIELD COUNTY WATER DISTRICT

(herein called Owner) for payment of the penal sum of _____

_____ Dollars (\$ _____),
lawful money of the United States. District has awarded Principal an Agreement for the
construction of

MCKEE WELL DRILLING PROJECT

If Principal or any of his Subcontractors fails to pay any of the persons named in Section 3181 of the California Civil Code, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Agreement or during the one-year guarantee period, or for any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the Contractor and his Subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, then Surety will pay the same in an amount not exceeding the sum specified above, and also will pay, in case suit is brought upon this bond, such reasonable attorney's fees as shall be fixed by the court.

This bond shall inure to the benefit of any of the persons named in Section 3181 of the California Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Surety agrees that no change, extension of time, alteration, or addition to the terms of the Agreement, or the work to be performed thereunder, or the plans and Specifications shall in any way affect its obligation on this bond, and it does hereby waive notice thereof.

Principal and Surety agree that should District become a party to any action on this bond that, each will also pay District's reasonable attorney's fees incurred therein in addition to the sum above set forth.

Executed in four original counterparts on

_____, 20__.

PRINCIPAL

(Seal if Corporation)

By _____

Title _____

(Attach Acknowledgment of Authorized Representative of Principal)

Any claims under this bond may be addressed to:

_____ (name and address of Surety)

_____ (name and address of Surety's agent for service of process in California, if different from above)

_____ (telephone number of Surety's agent in California)

(Attach Acknowledgment)

SURETY

By _____
(Attorney-in-Fact)

APPROVED:

(Attorney for DISTRICT)

NOTICE:

No substitution or revision to this bond form will be accepted. Sureties must be authorized to do business in and have an agent for service of process in California. Certified copy of Power of Attorney must be attached.

CONTRACTOR'S CERTIFICATE
REGARDING WORKERS' COMPENSATION

Description of Agreement: GREENFIELD COUNTY WATER DISTRICT
MCKEE WELL DRILLING PROJECT

Labor Code Section 3700 Provides (in part):

"Every employer except the State shall secure the payment of compensation in one or more of the following ways:

- (a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this State.

- (b) By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees."

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Agreement.

Dated: _____, 20____
(Contractor)

By _____

(Official Title)

(SEAL)

(Labor Code Section 1861 provides that the above certificate must be signed and filed by the Contractor with the District prior to performing any work under this Agreement.)

CERTIFICATE OF INSURANCE

Description of Agreement: GREENFIELD COUNTY WATER DISTRICT
MCKEE WELL DRILLING PROJECT

Type of Insurance: Workers' Compensation and
Employers' Liability Insurance

THIS IS TO CERTIFY that the following policy has been issued by the below-stated company in conformance with the requirements of Articles 8-1 and 8-2 of the General Provisions and is in force at this time, and is in a form approved by the Insurance Commissioner.

The Company will give at least 30 days' written notice to the District and Engineer prior to any cancellation of said policy.

POLICY NUMBER EXPIRATION DATE LIMITS OF LIABILITY

Workers' Compensation:
Statutory Limits Under the Laws
of the State of California

Employers' Liability:

\$ _____ Each Accident

\$ _____ Disease -
Policy Limit

\$ _____ Disease -
Each Employee

Named Insured (Contractor)

Insurance Company

Street Number

Street Number

District and State

District and State

By _____
(Company Representative)

(SEE NOTICE ON PAGE 2)

Insurance Company Agent for Service
of Process in California:

Name

Agency

Street Number

District and State

Telephone Number

This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend, or alter the coverage afforded by the policy listed herein.

This is to certify that the policy has been issued to the named insured for the policy period indicated, notwithstanding any requirement, term, or condition of any Agreement or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policy described herein is subject to all the terms, exclusions, and conditions of such policy.

NOTICE:

No substitution or revision to the above certificate form will be accepted. If the insurance called for is provided by more than one insurance company, a separate certificate in the exact above form shall be provided for each insurance company.

INSURANCE ENDORSEMENT

Description of Agreement: GREENFIELD COUNTY WATER DISTRICT
MCKEE WELL DRILLING PROJECT

Type of Insurance: Workers' Compensation and
Employers' Liability Insurance

This endorsement forms a part of Policy No. _____.

ENDORSEMENT

It is agreed that with respect to such insurance as is afforded by the policy, the Company waives any right of subrogation it may acquire against the District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, and employees by reason of any payment made on account of injury, including death resulting therefrom, sustained by any employee of the insured, arising out of the performance of the above-referenced Agreement.

The additional premium for this endorsement shall be _____%* of the California Workers' Compensation premium otherwise due on such remuneration.

This endorsement does not increase the Company's total limits of liability.

_____	_____
Named Insured (Contractor)	Insurance Company
_____	_____
Street Number	Street Number
_____	_____
District and State	District and State

By _____
(Company Representative)

(SEE NOTICE ON PAGE 2)

* - Contractor's insurance company to fill in this percentage.

NOTICE:

No substitution or revision to the above endorsement form will be accepted. If the insurance called for is provided by more than one policy, a separate endorsement in the exact above form shall be provided for each policy.

CERTIFICATE OF INSURANCE

Description of Agreement: **GREENFIELD COUNTY WATER DISTRICT
MCKEE WELL DRILLING PROJECT**

Type of Insurance: **Liability Insurance**

THIS IS TO CERTIFY that the following policies have been issued by the below-stated company in conformance with the requirements of Articles 8-1 and 8-3 of the General Provisions and are in force at this time:

**POLICY NUMBER EXPIRATION DATE LIMITS OF LIABILITY
In Thousands (000)**

	A.	GENERAL LIABILITY		
		General Aggregate Products-Comp Ops Aggregate	\$ _____	
		Personal and Advertising <u>Injury</u>	\$ _____	
		<u>Each Occurrence</u> Fire Damage (any one fire) Medical Expense (any one person)	\$ _____	
			\$ _____	
	B.	EXCESS GENERAL LIABILITY	<u>Each Occurrence</u> \$ _____	<u>Aggregate</u> \$ _____
	C.	AUTOMOBILE LIABILITY		
		Bodily Injury (Each Person)	\$ _____	
		Bodily Injury (Each Accident)	\$ _____	
		Property Damage	\$ _____	
		Or Bodily Injury and Property Damage Combined Single Limit	\$ _____	
	D.	EXCESS AUTOMOBILE LIABILITY	<u>Each Occurrence</u> \$ _____	<u>Aggregate</u> \$ _____

The following types of coverage are included in said policies (indicate by "X" in space):

A. GENERAL LIABILITY

- Commercial Form..... YES__ NO__
- Premises-Operations..... YES__ NO__
- Explosion and Collapse Hazard YES__ NO__
- Underground YES__ NO__
- Products/Completed Operations..... YES__ NO__
- Contractual Insurance YES__ NO__
- Broad Form Property Damage YES__ NO__
- Independent Contractors YES__ NO__
- Personal Injury and Advertising Injury YES__ NO__

B. EXCESS GENERAL LIABILITY

- Following Form YES__ NO__

C. AUTOMOBILE LIABILITY

- Business Auto Form Including Loading and Unloading..... YES__ NO__
- Owned..... YES__ NO__
- Hired YES__ NO__
- Non-Owned YES__ NO__

D. EXCESS AUTOMOBILE LIABILITY

- Following Form..... YES__ NO__

This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend, or alter the coverage afforded by the policies listed herein.

This is to certify that the policy has been issued to the named insured for the policy period indicated, notwithstanding any requirement, term, or condition of any Agreement or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions, and conditions of such policies.

The Company will give at least 30 days' written notice to the District and the Engineer prior to any cancellation of said policies.

Named Insured (Contractor) Insurance Company

Street Number Street Number

District and State District and State

By _____
(Company Representative)

(SEE NOTICE ON PAGE 4)

Insurance Company Agent for Service
of Process in California:

Name

Agency

Street Number

District and State

Telephone Number

NOTICE:

No substitution or revision to the above certificate form will be accepted. If the insurance called for is provided by more than one insurance company, a separate certificate in the exact above form shall be provided for each insurance company.

Insurers must be authorized to do business and have an agent for service of process in California and have a "B+" policyholder's rating and a financial rating of at least Class VIII in accordance with the most current Best's Rating.

INSURANCE ENDORSEMENT

Description of Agreement: GREENFIELD COUNTY WATER DISTRICT
MCKEE WELL DRILLING PROJECT

Type of Insurance: Liability Insurance

This endorsement forms a part of Policy No. _____.

ENDORSEMENT

The District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, and employees are included as additional insureds under said policy but only while acting in their capacity as such and only as respects operations of the named insured. This insurance shall not apply to an additional insured to the degree that the loss or damage is ultimately determined to be the result of the additional insured's negligence (including any connected with the preparation or approval of maps, drawings, opinions, reports, surveys, designs, or Specifications). The insurance afforded to these additional insureds is primary insurance. If the additional insureds have other insurance which might be applicable to any loss, the amount of this insurance shall not be reduced or prorated by the existence of such other insurance.

This endorsement does not increase the Company's total limits of liability.

Named Insured (Contractor) Insurance Company

Street Number Street Number

District and State District and State

By _____
(Company Representative)

NOTICE:

No substitution or revision to the above endorsement form will be accepted. If the insurance called for is provided by more than one policy, a separate endorsement in the exact above form shall be pro

GENERAL PROVISIONS

TABLE OF CONTENTS
GENERAL PROVISIONS

SECTION		PAGE
1	DEFINITIONS, TERMS, AND ABBREVIATIONS	1
	1-1 DEFINITIONS	1
	1-2 TERMS	2
	1-3 ABBREVIATIONS	2
2	PROPOSAL REQUIREMENTS AND CONDITIONS	3
	2-1 CONTRACT DOCUMENTS	3
	2-2 LICENSE	3
	2-3 PROPOSALS	3
	2-4 WITHDRAWAL OF BID	3
	2-5 BIDDERS INTERESTED IN MORE THAN ONE BID	3
	2-6 INTERPRETATION OF PLANS AND OTHER CONTRACT DOCUMENTS	3
	2-7 ADDENDA	4
	2-8 EXISTING CONDITIONS AND EXAMINATION OF CONTRACT DOCUMENTS	4
3	AWARD AND EXECUTION OF AGREEMENT	6
	3-1 AWARD OF AGREEMENT OR REJECTION OF BIDS	6
	3-2 EXECUTION OF AGREEMENT	6
	3-3 BONDS	6
	3-4 INSURANCE REQUIREMENTS	6
	3-5 FAILURE TO EXECUTE AGREEMENT	7
4	SCOPE OF WORK	8
	4-1 WORK TO BE DONE	8
	4-2 CHANGES IN THE WORK	8
	4-3 OBSTRUCTIONS	8
	4-4 UTILITIES	8
	4-5 PLANS AND SPECIFICATIONS FURNISHED BY THE DISTRICT	9
	4-6 FINAL CLEANUP	9
5	QUALITY OF THE WORK	10
	5-1 AUTHORITY OF THE DISTRICT'S REPRESENTATIVE	10
	5-2 SUPPLEMENTAL DRAWINGS	10
	5-3 CONFORMITY WITH CONTRACT DOCUMENTS AND ALLOWABLE DEVIATIONS	10
	5-4 MANUFACTURER'S INSTRUCTIONS	10
	5-5 COORDINATION OF PLANS AND SPECIFICATIONS	10
	5-6 INTERPRETATION OF PLANS AND SPECIFICATIONS	10
	5-7 ERRORS OR DISCREPANCIES NOTED BY CONTRACTOR	11
	5-8 SUPERVISION AND SUPERINTENDENCE	11
	5-9 SHOP DRAWINGS	12
	5-10 QUALITY AND SAFETY OF MATERIALS AND EQUIPMENT	13
	5-11 STANDARDS, CODES, SAMPLES, AND TESTS	13
	5-12 OBSERVATION OF WORK BY DISTRICT'S REPRESENTATIVE	13
	5-13 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK	14
	5-14 ONE-YEAR GUARANTEE	14
6	PROSECUTION AND PROGRESS	16
	6-1 SUBCONTRACTING	16

SECTION		PAGE
	6-2 ASSIGNMENT	16
	6-3 CONTRACTOR'S CONSTRUCTION SCHEDULE AND COST BREAKDOWN	16
	6-4 TIME FOR COMPLETION AND FORFEITURE DUE TO DELAY	16
	6-5 EXTENSION OF TIME	17
	6-6 USE OF COMPLETED PORTIONS	18
7	LEGAL RELATIONS AND RESPONSIBILITIES	19
	7-1 OBSERVING LAWS AND ORDINANCES	19
	7-2 PERMITS AND LICENSES	19
	7-3 INVENTIONS, PATENTS, AND COPYRIGHTS	19
	7-4 PUBLIC CONVENIENCE AND SAFETY	19
	7-5 RESPONSIBILITY FOR LOSS, DAMAGE, OR INJURIES	20
	7-6 CONTRACTOR'S RESPONSIBILITY FOR THE WORK	20
	7-7 PRESERVATION OF PROPERTY	20
	7-8 REGIONAL NOTIFICATION CENTER CONTACT	21
	7-9 EXCAVATION	21
	7-10 SAFETY	23
	7-11 PERSONAL LIABILITY	23
	7-12 INDEMNITY	23
	7-13 HOURS OF LABOR	24
	7-14 PREVAILING WAGE	24
	7-15 TRAVEL AND SUBSISTENCE PAYMENTS	25
	7-16 APPRENTICES	25
	7-17 WARRANTY OF TITLE	25
	7-18 PROPERTY RIGHTS IN MATERIALS	26
	7-19 MUTUAL RESPONSIBILITY OF CONTRACTORS	26
	7-20 TERMINATION FOR BREACH	27
	7-21 NOTICE AND SERVICE THEREOF	28
	7-22 PARTIAL INVALIDITY	28
	7-23 LANDS AND RIGHTS-OF-WAY	28
	7-24 WAIVER OF RIGHTS	28
	7-25 TAXES	29
	7-26 ASSIGNMENT OF ANTI-TRUST ACTIONS	29
	7-27 PAYROLL RECORDS	29
8	CONTRACTOR'S INSURANCE	30
	8-1 GENERAL	30
	8-2 WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY INSURANCE	30
	8-3 LIABILITY INSURANCE	30
	8-4 CONTRACTOR'S LIABILITY NOT LIMITED BY INSURANCE	31
9	ESTIMATES AND PAYMENTS	31
	9-1 PAYMENT FOR CHANGES IN THE WORK	31
	9-2 PROGRESS PAYMENTS	32
	9-3 FINAL ESTIMATE AND PAYMENT	32
	9-4 DISTRICT'S RIGHT TO WITHHOLD CERTAIN MOUNTS AND MAKE APPLICATION THEREOF	33
	9-5 REQUIRED RELEASES RELEASE FORM	33

SECTION 1 DEFINITIONS, TERMS, AND ABBREVIATIONS

1-1 DEFINITIONS

Whenever the following terms occur in the Contract Documents, the meaning shall be interpreted as follows:

ACCEPTANCE, FINAL ACCEPTANCE - The formal action by the District accepting the work as being complete.

ACCEPTED BID - The bid accepted by the District.

AGREEMENT - The written Agreement executed between the District and the Contractor covering the performance of the work.

BIDDER - Any individual, partnership, corporation, joint venture, or other combination thereof submitting a proposal for the work contemplated, acting directly or through an authorized representative.

CONTRACTOR - The individual, partnership, corporation, joint venture, or other combination thereof who has entered into the Agreement with the District for the performance of the work. The term "Contractor" means the Contractor or his authorized representative.

CONTRACT DOCUMENTS - The Contract Documents set forth in the Agreement; also any and all supplemental Agreements amending or extending the work contemplated. Supplemental Agreements are written Agreements covering alterations, amendments, or extensions to the Agreement and include Agreement change orders.

DAYS - Unless otherwise specified, days shall mean calendar days.

ENGINEER - The term "Engineer" means the consultant Engineer for the District or his authorized representative.

PLANS, DRAWINGS - The Plans (Drawings), or reproductions thereof, which show the location, character, dimensions, and details of the work to be done.

SPECIFICATIONS - The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, and workmanship for the Work, and performance of related services.

SUBCONTRACTOR - An individual, partnership, corporation, joint venture, or other combination thereof who has an Agreement with the Contractor to perform any of the work at the site. Subcontractor also means an individual, partnership, corporation, joint venture, or other combination thereof who has an Agreement with another subcontractor to perform any of the work at the site.

UTILITY - Public or private fixed works for the transportation of fluids, gases, power, signals, or communications.

DISTRICT - The Greenfield County Water District. The term "District" means the District or its authorized representative.

DISTRICT'S REPRESENTATIVE - The person or firm authorized in writing by the District to represent it during the performance of the work by the Contractor. The District's Representative means the District's Representative or his assistants

WORK - Any and all obligations, duties, and responsibilities necessary to complete the construction assigned to, or undertaken by, the Contractor pursuant to the Contract Documents including all labor necessary to produce such construction and all materials, equipment, and supplies incorporated or to be incorporated in the construction. Also, the completed construction or parts thereof required to be provided under the Contract Documents.

1-2 TERMS

Wherever the terms "required," "permitted," "ordered," "designated," "directed," "prescribed," or terms of like import are used, it shall be understood that the requirements, permission, order, designation, prescription, or direction of the District's Representative is intended. Similarly, the terms "acceptable," "satisfactory," "or equal," or terms of like import shall mean acceptable to or satisfactory to the District's Representative, unless otherwise expressly stated. The word "provide" shall be understood to mean furnish and install. Whenever the context so requires, the singular shall include the plural, and the masculine and neuter genders shall each include the other.

1-3 ABBREVIATIONS

Wherever the following abbreviations are used, they shall have the meanings indicated:

ACI	American Concrete Institute
ANSI	American National Standards Institute (formerly USASI, USAS, ASA)
APWA	American Public Works Association
ASTM	ASTM International
AWWA	American Water Works Association
CBC	California Building Code
CDWR	California Department of Water Resources
GCWD	Greenfield County Water District
U/L or UL	Underwriters' Laboratories, Inc.

SECTION 2 PROPOSAL REQUIREMENTS AND CONDITIONS

2-1 CONTRACT DOCUMENTS

The Contract Documents are set forth in THE AGREEMENT and the definition of "Contract Documents" in the section on DEFINITIONS, TERMS, AND ABBREVIATIONS.

2-2 LICENSE

No bid will be accepted from a bidder who is not licensed to conduct business in the state of California and licensed to perform the class of work defined by the Contract Documents.

2-3 BIDS

Bids shall be made upon the bid form furnished by the District and a part of the Contract Documents. All bids shall be properly executed and with all items filled in; the signatures of all persons signing shall be in longhand. Erasures, interlineations, or other corrections shall be authenticated by affixing in the margin immediately opposite the correction the initials of a person signing the bid. If the unit price and the total amount named by a bidder for any item are not in Agreement, the unit price alone shall be considered as representing the bidder's intention, and the totals shall be corrected to conform thereto.

Bids shall not contain any recapitulation of the work to be done. Alternative proposals will not be considered, except as called for. No oral, telegraphic, or telephonic proposals or modifications will be considered.

Bids shall be sealed in an envelope marked and addressed as set forth in the Special Provisions. Bids shall be delivered to the addressee at the location designated in the Notice Inviting Sealed Proposals on or before the day and hour set for the opening of bids in the Notice Inviting Sealed Proposals, and shall bear the name of the bidder. A bid will not be accepted after the date and time designated in the Notice Inviting Sealed Proposals. It is the sole responsibility of the bidder to see that his bid is delivered and received in proper time. Any bid received after said designated date and time shall be returned to the bidder unopened.

2-4 WITHDRAWAL OF BID

A bidder may withdraw his bid by a signed written request any time prior to the date and time for receiving bids designated in the Notice Inviting Sealed Proposals.

The withdrawal of a bid does not prejudice the right of a bidder to file a new bid so long as the new bid is delivered as set forth in the article on PROPOSALS prior to the closing time specified for all bids.

2-5 BIDDERS INTERESTED IN MORE THAN ONE BID

No person, partnership, or corporation shall be allowed to make or file, or be interested in more than one bid for the work, unless alternative bids are called for. A person, partnership, or corporation submitting a subproposal to a bidder, or who has quoted prices on material to a bidder, is not thereby disqualified from submitting a subproposal or quoting prices to other bidders.

2-6 INTERPRETATION OF PLANS AND OTHER CONTRACT DOCUMENTS

If any person or entity contemplating submitting a bid for the proposed Agreement is in doubt as to the true meaning of any part of the Plans, Specifications, or other Contract Documents, or finds discrepancies in, or omissions from the Plans and Specifications or other Contract Documents, he may submit to the Engineer a written request for an interpretation or correction thereof. The person submitting the request will be responsible for its prompt delivery. An interpretation or correction of the Contract Documents will be made only by Addendum duly issued by the Engineer. A copy of such Addendum will be mailed or delivered

to each person or entity that has received a set of such documents. The District and the Engineer will not be responsible for any other explanation or interpretation of the documents.

2-7 BID ADDENDA

Addenda issued before the time in which to submit bids expires shall be included in the bid and shall be made a part of the Agreement.

2-8 EXISTING CONDITIONS AND EXAMINATION OF CONTRACT DOCUMENTS

The bidder represents that he has carefully examined the Contract Documents and the site where the work is to be performed and that he has familiarized himself with all local conditions and federal, state and local laws, ordinances, rules, and regulations that may affect in any manner the performance of the work. The bidder further represents that he has studied all surveys and investigation reports about subsurface and latent physical conditions pertaining to the jobsite, that he has performed such additional surveys and investigations as he deems necessary to complete the work at his bid price, and that he has correlated the results of all such data with the requirements of the Contract Documents. The submittal of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, including locality, uncertainty of weather and all other contingencies, and as to the character, quality, quantities, and scope of the work.

The Plans and Specifications for the work show subsurface conditions or otherwise hidden conditions as they are supposed or believed by the Engineer to exist; but it is not intended or to be inferred that the conditions as shown thereon constitute a representation that such conditions are actually existent. Except as otherwise specifically provided in the Contract Documents, the District, the Engineer, and their consultants shall not be liable for any loss sustained by the Contractor as a result of any variance of such conditions as shown on the Plans and the actual conditions revealed during the progress of the work or otherwise.

Where the District or the Engineer or their consultants have made investigations of subsurface conditions in areas where the work is to be performed, such investigations were made only for the purpose of study and design. The conditions indicated by such investigations apply only at the specific location of each boring or excavation at the time the borings or excavations were made. Where such investigations have been made, bidders or Contractors may inspect the records as to such investigations subject to and upon the conditions hereinafter set forth. The inspection of the records shall be made at the office of the Engineer.

The records of such investigations are not a part of the Agreement and are shown solely for the convenience of the bidder or Contractor. It is expressly understood and agreed that the District, the Engineer, and their consultants assume no responsibility whatsoever in respect to the sufficiency or accuracy of the investigations; the records thereof; or of the interpretations set forth therein or made by the District's consultants, the Engineer or his consultants in the use thereof by the Engineer, and there is no warranty or guarantee, either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas, or any part thereof, or that unlooked-for developments may not occur, or that materials other than, or in proportions, densities, or other characteristics different from, those indicated may not be encountered.

When a log of test borings showing a record of the data obtained by the investigation of subsurface conditions by the District, the Engineer, or their consultants is included with the Plans or other documents, it is expressly understood and agreed that said log of test borings does not constitute a part of the Agreement, represents only the opinion of the District or the Engineer or their consultants as to the character of the materials encountered by them in the test borings, is included in the Plans or other documents only

for the convenience of bidders, and its use is subject to all of the conditions and limitations set forth in this article.

The availability or use of information described in this article is not to be construed in any way as a waiver of the provisions of the first paragraph in this article and a bidder or Contractor is cautioned to make such independent investigations and examination as he deems necessary to satisfy himself as to conditions to be encountered in the performance of the work.

No information derived from such inspection of records of investigations or compilation thereof made by the District, the Engineer, or their consultants will in any way relieve the bidder or Contractor from any risk or from properly fulfilling the terms of the Agreement nor entitle the Contractor to any additional compensation.

SECTION 3 AWARD AND EXECUTION OF AGREEMENT

3-1 AWARD OF AGREEMENT OR REJECTION OF BIDS

The District, reserves the right to select the schedules under which the bids are to be compared, to reject any and all bids, and to waive any irregularity in bids received. If, in the judgment of the District, a bid is unbalanced or if the bidder is not responsible, it shall be considered sufficient grounds for rejection of the entire bid.

The District shall have the period of 60 Calendar Days after the opening of bids within which to accept or reject the bids. No bidder may withdraw his bid during said period.

Before award of the Agreement, any bidder shall furnish upon request a recent statement of his financial condition and previous construction experience or such other evidence of his qualifications as may be requested by the District. If a bidder fails to furnish in a timely manner the information requested, it shall be considered sufficient grounds for rejection of such bidder's entire bid.

3-2 EXECUTION OF AGREEMENT

The form of Agreement, bonds, and other documents which the successful bidder, as Contractor, will be required to execute are included as a part of the Contract Documents.

The Agreement shall be signed by the successful bidder and returned to the District, together with the bonds and certificates of insurance and endorsements, within 15 calendar days or such additional time as may be allowed by the District from the date of the mailing of notice from the District to the bidder or from the date of personal delivery of notice from the District to the bidder that the Agreement is ready for signature. One original copy of the Agreement, bonds, certificates of insurance and endorsements, and other documents shall be executed by the Contractor and shall be filed with the District. A copy shall be filed with the Attorney for the District and the Engineer for the District.

3-3 BONDS

The successful bidder, simultaneously with the execution of the Agreement, shall furnish a payment bond and a performance bond each in an amount equal to 100 percent of the Agreement amount, or equivalent cash or security in lieu of bonds pursuant to Section 995.710 of the Code of Civil Procedure. Bonds shall be furnished by surety companies satisfactory to the District on the forms furnished as part of the Contract Documents. Surety companies, to be acceptable to the District, must be authorized to do business and have an agent for service of process in California.

3-4 INSURANCE REQUIREMENTS

The successful bidder will be required to furnish the District proof of full compliance with all insurance requirements as specified in the section on CONTRACTOR'S INSURANCE. The forms of certificate of insurance and endorsement which the successful bidder, as Contractor, will be required to furnish are included as a part of the Contract Documents.

3-5 FAILURE TO EXECUTE AGREEMENT

Failure by a bidder to whom the contract is awarded to execute the Agreement or to furnish the required bonds or insurance certificates and endorsements shall be just cause for the annulment of the award.

A bidder who is awarded the Agreement and fails to execute the Agreement or furnish the required bonds or insurance certificates and endorsements shall be liable to the District for all damages resulting therefrom including reasonable attorneys' fees.

SECTION 4 SCOPE OF WORK

4-1 WORK TO BE DONE

The work to be done consists of furnishing all transportation, labor, materials, tools, equipment, services, permits, utilities and all other items which are necessary or appurtenant to construct and complete the entire project and construct the project designated in the Contract Documents, and to leave the grounds in a neat and presentable condition.

4-2 CHANGES IN THE WORK

The District may require changes in, additions to, or deductions from the work, including complete termination thereof. Adjustment, if any, in the amounts to be paid to the Contractor by reason of any such change, addition, or deduction shall be determined as set forth in the section on ESTIMATES AND PAYMENTS.

The District's Representative may order minor changes in the work not involving an increase or decrease in the Agreement amount, not involving a change in the time for completion, and not inconsistent with the purposes for which the work is being constructed. If the Contractor believes that any order for minor changes in the work involves changes in the Agreement amount or time for completion, he shall not proceed with the minor changes so ordered and shall within seven days of the receipt of such order notify the District's Representative in writing of his estimate of the changes in the Agreement amount and time for completion he believes to be appropriate.

No payment for changes in the work will be made, and no changes in the time for completion by reason of changes in the work will be made, unless the changes are covered by a written change order approved by the District in advance of the Contractor's proceeding with the changed work.

4-3 OBSTRUCTIONS

The Contractor shall remove and dispose of all structures, debris, or other obstructions of any character necessary to accommodate the work. Where such obstructions consist of improvements not required by law to be removed by the owner thereof, all such improvements shall be removed, maintained, and permanently replaced by the Contractor at his expense except as otherwise specifically provided in the Contract Documents.

4-4 UTILITIES

The Engineer has endeavored to determine the existence of utilities at the site of the work from the records of the owners of known utilities in the vicinity of the work. The positions of these utilities as derived from such records are shown on the Plans. The service connections to these utilities may not be shown on the Plans.

The Contractor shall make his own investigations, including exploratory excavations, to determine the locations and type of existing service laterals or appurtenances when their presence can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of the work. If the Contractor discovers Utility facilities not identified in the Plans or Specifications or in a position different from that shown in the Plans and Specifications, he shall immediately notify in writing the District's Representative and the owner of the Utility facility.

The District shall have the responsibility for the timely removal, relocation, protection, and temporary maintenance of existing main or trunkline Utility facilities which are not indicated in the Plans and Specifications with reasonable accuracy.

In case it should be necessary to remove, relocate, protect, or temporarily maintain a Utility because of interference with the work, the work on such Utility shall be performed and paid for as follows:

When it is necessary to remove, relocate, protect, or temporarily maintain an existing main or trunkline Utility facility not indicated in the Plans and Specifications with reasonable accuracy, the District will compensate the Contractor for the costs of locating, for the costs of repairing damage not due to the failure of the Contractor to exercise reasonable care, for the costs of removing, relocating, protecting, or temporarily maintaining such Utility facilities, and for the costs for equipment on the site necessarily idled during such work. These costs, the work to be done by the Contractor in locating, removing, relocating, protecting, or temporarily maintaining such Utility facilities shall be covered by a written change order conforming to the provisions of the article on CHANGES IN THE WORK and the article on PAYMENT FOR CHANGES IN THE WORK. The District may make changes in the alignment and grade of the work to obviate the necessity to remove, relocate, protect, or temporarily maintain such Utility facilities or to reduce the costs of the work involved in removing, relocating, protecting, or temporarily maintaining such Utility facilities. Changes in alignment and grade will be ordered in accordance with the article on CHANGES IN THE WORK.

When it is necessary to remove, relocate, protect, or temporarily maintain a Utility (other than [1] existing main or trunkline Utility facilities not indicated in the Plans and Specifications with reasonable accuracy, or [2] existing service laterals or appurtenances when their presence cannot be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of the work) the cost of which is not required to be borne by the owner thereof, the Contractor shall bear all expenses incidental to the work on the Utility or damage thereto. The work on the Utility shall be done in a manner satisfactory to the owner thereof; it being understood that the owner of the Utility has the option of doing such work with his own forces, or permitting the work to be done by the Contractor. No representations are made that the obligations to remove, relocate, protect, or temporarily maintain any Utility and to pay the cost thereof is or is not required to be borne by the owner of such Utility, and it shall be the responsibility of the Contractor to investigate to find out whether or not said cost is required to be borne by the owner of the Utility.

The right is reserved to governmental agencies and to owners of utilities to enter at any time upon any street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the work and for the purpose of maintaining and making repairs to their property.

4-5 PLANS AND SPECIFICATIONS FURNISHED BY THE DISTRICT

The District will furnish to the Contractor free of charge all copies of Plans and Specifications reasonably necessary for the execution of the work. The Contractor shall keep one set of Plans and Specifications in good order available to the District's Representative at the site of the work.

4-6 FINAL CLEANUP

Upon completion and before making application for Acceptance of the work, the Contractor shall clean all rights-of-way, streets, borrow pits, and all other grounds occupied by him in connection with the work of all rubbish, excess materials, temporary structures, and equipment, and all parts of the work and grounds occupied by him shall be left in a neat and presentable condition.

SECTION 5 QUALITY OF THE WORK

5-1 AUTHORITY OF THE DISTRICT'S REPRESENTATIVE

The District's Representative shall decide any and all questions which may arise as to the interpretation of the Plans and Specifications and shall have authority to disapprove or reject materials and equipment furnished and work performed which, in his opinion, is not in accordance with the Contract Documents.

5-2 SUPPLEMENTAL DRAWINGS

The Plans may be supplemented by such Drawings as are necessary to better define the work. All such Drawings delivered to the Contractor by the District's Representative shall be deemed written instructions to the Contractor. If the Contractor believes that any supplemental Drawings call for changes in the work for which the Agreement amount or time for completion should be changed, he shall not proceed with the changes in the work so called for and shall within seven days of the receipt of the supplemental Drawings notify the District's Representative in writing of his estimate of the changes in the Agreement amount and time for completion he believes to be appropriate.

No payment for changes in the work will be made and no change in the time for completion by reason of changes in the work will be made, unless the changes are covered by a written change order approved by the District in advance of the Contractor's proceeding with the changed work.

5-3 CONFORMITY WITH CONTRACT DOCUMENTS AND ALLOWABLE DEVIATIONS

The work shall conform to the lines, grades, dimensions, tolerances, and material and equipment requirements shown on the Plans or set forth in the Specifications. Although measurement, sampling, and testing may be considered evidence as to such conformity, the District's Representative shall be the sole judge as to whether the work or materials deviate from the Plans and Specifications, and his decision as to any allowable deviations therefrom shall be final.

If specific lines, grades, and dimensions are not shown on Plans, those furnished by the District's Representative shall govern.

5-4 MANUFACTURER'S INSTRUCTIONS

All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, supplier, or distributor, except as otherwise specifically provided in the Contract Documents.

5-5 COORDINATION OF PLANS AND SPECIFICATIONS

The Specifications, Plans, and other Contract Documents are essential parts of the Agreement, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for the complete work. In the event of an apparent difference between Plans and Specifications, reference shall be made to the District's Representative whose decision thereon shall be final.

Special Provisions shall govern over General Provisions and Specifications.

5-6 INTERPRETATION OF PLANS AND SPECIFICATIONS

Figured dimensions on Drawings shall govern, but work not dimensioned shall be as directed. Work not particularly shown or specified shall be the same as similar parts that are shown or specified. Large-scale details shall take precedence over smaller scale Drawings as to shape and details of construction.

Specifications shall govern as to materials and workmanship. Drawings and Specifications are intended to be fully complementary and to agree. The specification calling for the higher quality material or workmanship shall prevail. Materials or work described in words which so applied have a well-known technical or trade meaning shall be deemed to refer to such recognized standards. In the event of any discrepancy between any Drawings and the figures thereon, the figures shall be taken as correct. In the event of any doubt or question arising respecting the true meaning of the Plans or Specifications, reference shall be made to the District's Representative whose decision thereon shall be final.

5-7 ERRORS OR DISCREPANCIES NOTED BY CONTRACTOR

It is the duty of the Contractor to promptly notify the District's Representative in writing of any design, materials, or specified method that the Contractor believes may prove defective or insufficient. If the Contractor believes that a defect or insufficiency exists in design, materials, or specified method and fails to promptly notify the District's Representative in writing of this belief, the Contractor waives any right to assert that defect or insufficiency in design, materials, or specified method at any later date in any legal or equitable proceeding against District, or in any subsequent arbitration or settlement conference between the District and the Contractor. The District's Representative, on receipt of any such notice, will promptly investigate the circumstances and give appropriate instructions to the Contractor. Until such instructions are given, any work done by the Contractor after he comes to the belief that a defect or insufficiency exists in design, materials, or specified method which is directly or indirectly affected by such alleged defect or insufficiency in design, materials, or specified method will be at his own risk and he shall bear all cost arising therefrom.

If the Contractor, either before commencing work or in the course of the work, finds any discrepancy between the Specifications and the Plans or between either of them and the physical conditions at the site of the work or finds any error or omission in any of the Plans or in any survey, he shall promptly notify the District's Representative of such discrepancy, error, or omission. If the Contractor observes that any Plans or Specifications are at variance with any applicable law, ordinance, regulation, order, or decree, he shall promptly notify the District's Representative in writing of such conflict. The District's Representative, on receipt of any such notice, will promptly investigate the circumstances and give appropriate instructions to the Contractor. Until such instructions are given, any work done by the Contractor after his discovery of such error, discrepancy, or conflict which is directly or indirectly affected by such error, discrepancy, or conflict will be at his own risk and he shall bear all cost arising therefrom.

5-8 SUPERVISION AND SUPERINTENDENCE

The Contractor shall supervise and direct the work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the work in accordance with the Contract Documents. The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but the Contractor shall not be solely responsible for the negligence of others in the design or selection of a specific means, method, technique, sequence, or procedure of construction which is indicated in and required by the Contract Documents except as otherwise provided in the article on ERRORS OR DISCREPANCIES NOTED BY CONTRACTOR.

The Contractor shall be responsible to see that the completed work complies with the Contract Documents.

The Contractor shall designate and keep on the work at all times during its progress a competent superintendent who shall not be replaced without written notice to the District's Representative. The superintendent will be the Contractor's representative at the site and shall have authority to act on behalf of the Contractor. All communications given to the superintendent shall be as binding as if given to the Contractor. During periods when the work is suspended, the Contractor shall make appropriate arrangements for any emergency work which may be required.

Whenever the superintendent is not present on any particular part of the work where the District's Representative may desire to inform the Contractor relative to interpretation of the Plans and Specifications or to disapproval or rejection of materials or work performed, the District's Representative may so inform the foreman or other worker in charge of the particular part of the work in reference to which the information is given. Information so given shall be as binding as if given to the superintendent.

5-9 SHOP DRAWINGS

Shop Drawings are Drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier, or distributor and which illustrate some portion of the work.

The Contractor shall review, mark with his approval, and submit for review by the District's Representative Shop Drawings as called for in the Specifications or requested by the District's Representative. Drawings shall be submitted electronically in pdf format to the District's Representative and be accompanied by a letter of transmittal listing the Drawings submitted. Drawings shall show the name of the project, the name of the Contractor, and, if any, the names of suppliers, manufacturers, and subcontractors. If the Shop Drawings incorporate any documents prepared by the Engineer, such Shop Drawings shall not reproduce the registration stamp or company logo of the Engineer. Shop Drawings shall be submitted with promptness and in orderly sequence so as to cause no delay in prosecution of the work.

Shop Drawings shall be complete in all respects. If the Shop Drawings show any deviations from the requirements of the Plans and Specifications because of standard shop practices or other reasons, the deviations and the reasons therefor shall be set forth in the letter of transmittal.

By submitting Shop Drawings, the Contractor represents that material, equipment, and other work shown thereon conforms to the Plans and Specifications, except for any deviations set forth in the letter of transmittal.

Within 14 calendar days after receipt of said Drawings, the District's Representative will return a pdf copy of the Drawings to the Contractor with any comments noted thereon. If so noted by the District's Representative, the Contractor shall correct the Drawings and resubmit them in the same manner as specified for the original submittal. The Contractor in the letter of transmittal accompanying resubmitted Shop Drawings shall direct specific attention to revisions other than the corrections requested by the District's Representative on previous submittals.

The review by the District's Representative is only of general conformance with the design concept of the project and general compliance with the Plans and Specifications and shall not be construed as relieving the Contractor of the full responsibility for: providing materials, equipment, and work required by the Agreement; the proper fitting and construction of the work; the accuracy and completeness of the Shop Drawings; selecting fabrication processes and techniques of construction; and performing the work in a safe manner.

No portion of the work requiring a Shop Drawing submittal shall be commenced until the submittal has been reviewed by the District's Representative and returned to the Contractor with a notation indicating that resubmittal is not required.

If the Contractor believes that any Shop Drawing or communication relative thereto calls for changes in the work for which the Agreement amount or time for completion should be changed, he shall not proceed with the changes in the work so called for and shall promptly notify the District's Representative in writing of his estimate of the changes in the Agreement amount and time for completion he believes to be appropriate. No payment for changes in the work will be made and no change in the time for completion by reason of

changes in the work will be made, unless the changes are covered by a written change order approved by the District in advance of the Contractor's proceeding with the changed work.

5-10 QUALITY AND SAFETY OF MATERIALS AND EQUIPMENT

All equipment, materials, and supplies to be incorporated in the work shall be new, unless otherwise specified. All equipment, materials, and supplies shall be produced in a good and workmanlike manner. When the quality of a material, process, or article is not specifically set forth in the Plans and Specifications, the best available quality of the material, process, or article shall be provided.

Whenever any material, process, or article is indicated or specified by grade, patent or proprietary name, or by name of manufacturer, such specification shall be deemed to be used for the purpose of facilitating description of the materials, process, or articles desired and shall be deemed to be followed by the words "or (approved) equal," and the Contractor may offer any material, process, or article which shall be substantially equal or better in every respect to that so indicated or specified; provided, however, that if the material, process, or article offered by the Contractor is not, in the opinion of the District's Representative, equal or better in every respect to that specified, then the Contractor must furnish the material, process, or article specified or one that in the opinion of the District's Representative is the substantial equal or better in every respect. In the event that the Contractor furnishes material, process, or article more expensive than specified, the difference in cost of such material, process, or article so furnished shall be borne by the Contractor.

The Contractor shall submit data substantiating requests for substitution of "equal" items within 35 days after award of the Agreement. This 35-day period of time is included in the number of days allowed for the completion of the work.

All materials, equipment, and supplies provided shall, without additional charge to District, fully conform with all applicable state and federal safety laws, rules, regulations, and orders, and it shall be Contractor's responsibility to provide only such materials, equipment, and supplies notwithstanding any omission in the Contract Documents therefor or that a particular material, equipment, or supply was specified.

5-11 STANDARDS, CODES, SAMPLES, AND TESTS

Whenever reference is made to a standard, code, specification, or test and the designation representing the date of adoption or latest revision thereof is omitted, it shall mean the latest revision of such standard, code, specification, or test in effect on the day the Notice Inviting Sealed Proposals (Bids) is dated.

Tests shall be made in accordance with commonly recognized procedures of technical organizations and such special procedures as may be prescribed elsewhere in the Plans and Specifications. The Contractor shall furnish without charge such samples for testing as may be required by the District's Representative.

5-12 OBSERVATION OF WORK BY DISTRICT'S REPRESENTATIVE

The District's Representative shall at all times have access to the work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship, and character of materials and equipment used and employed in the work.

Whenever the Contractor varies the normal period during which work or any portion of it is carried on each day, he shall give timely notice to the District's Representative so that the District's Representative may, if he wishes, be present to observe the work in progress. If the Contractor fails to give such timely notice, any work done in the absence of the District's Representative will be subject to rejection.

The Contractor shall give timely notice to the District's Representative in advance of backfilling or otherwise covering any part of the work so that the District's Representative may, if he wishes, observe such part of the work before it is concealed.

The observation, if any, by the District's Representative of the work shall not relieve the Contractor of any of his obligations to fulfill the Agreement as prescribed. Defective work shall be made good, and materials and equipment furnished and work performed which is not in accordance with the Contract Documents may be rejected notwithstanding the fact that such materials, equipment, and work have been previously observed by the District's Representative or that payment therefor has been included in an estimate for payment.

5-13 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK

Any work which does not conform to the requirements of the Contract Documents shall be remedied or removed and replaced by the Contractor, together with any other work which may be displaced in so doing, and no compensation will be allowed him for such removal, replacement, or remedial work. All nonconforming materials shall be immediately removed from the site.

Any work done beyond the lines and grades shown on the Plans or established by the District's Representative or any changes in, additions to, or deductions from the work done without written authority will be considered as unauthorized and will not be paid for. Work so done may be ordered remedied, removed, or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply promptly with any order of the District's Representative made under the provisions of this article, the District's Representative shall have authority to cause nonconforming materials, rejected work, or unauthorized work to be remedied, removed, or replaced at the Contractor's expense and to deduct the costs from any moneys due or to become due the Contractor.

5-14 ONE-YEAR GUARANTEE

Besides guarantees required elsewhere, the Contractor shall and hereby does guarantee the work for a period of one year after the date of Acceptance of the work by the District, except for any portion of the work that is utilized or placed into service by the District in accordance with the provisions of the article on USE OF COMPLETED PORTIONS. The guarantee period for portions of the work so utilized or placed into service shall be one year commencing on the date of the written notification to the Contractor described in the article on USE OF COMPLETED PORTIONS. The Contractor shall repair or remove and replace any and all work, together with any other work which may be displaced in so doing, that is found to be defective in workmanship and/or materials within said one-year periods, without expense whatsoever to the District, ordinary wear and tear and unusual abuse or neglect excepted. In the event of failure to comply with the above-mentioned conditions within one week after being notified in writing, the District is hereby authorized to proceed to have the defects remedied and made good at the expense of the Contractor, who hereby agrees to pay the cost and charges therefor immediately on demand. Such action by the District will not relieve the Contractor of the guarantees required by this article or elsewhere in the Contract Documents.

The performance bond and the payment bond shall continue in full force and effect for the guarantee period.

If, in the opinion of the District, defective work creates a dangerous condition or requires immediate correction or attention to prevent further loss to the District or to prevent interruption of operation of the District, the District will attempt to give the notice required by this article. If the Contractor cannot be contacted or does not comply with the District's request for correction within a reasonable time as determined by the District, the District may, notwithstanding the provisions of this article, proceed to make such correction or provide such attention; and the costs of such correction or attention shall be charged

against the Contractor. Such action by the District will not relieve the Contractor of the guarantees required by this article or elsewhere in the Agreement Documents.

This article does not in any way limit the guarantee on any items for which a longer guarantee is specified or on any items for which a manufacturer or supplier gives a guarantee for a longer period. The Contractor agrees to act as a co-guarantor with such manufacturer or supplier and shall furnish the District all appropriate guarantee or warranty certificates upon completion of the project. No guarantee period, whether provided for in this article or elsewhere, shall in any way limit the liability of Contractor or his sureties or insurers under the indemnity or insurance provisions of these General Provisions.

SECTION 6 PROSECUTION AND PROGRESS

6-1 SUBCONTRACTING

If the Contractor shall subcontract any part of this Agreement, the Contractor shall be as fully responsible to the District for the acts and omissions of his Subcontractor and of the persons either directly or indirectly employed by his Subcontractor as he is for the acts and omissions of persons directly employed by himself. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the District. The Contractor shall cause every Subcontractor to be bound by the terms of the Contract Documents.

The Contractor shall perform, with the Contractor's own organization, Agreement work amounting to not less than 50 percent of the original Agreement price. The value of work subcontracted will be based on the estimated percentage of the Agreement bid price, subject to approval by the Engineer.

The divisions and sections of the Specifications and the identifications of any Drawings shall not control the Contractor in dividing the work among Subcontractors.

6-2 ASSIGNMENT

The performance of the Agreement may not be assigned, except upon the written consent of the District which may be withheld in the District's sole discretion. Consent will not be given to any proposed assignment which would relieve the original Contractor or his surety of their responsibilities under the Agreement, nor will the District consent to any assignment of a part of the work under the Agreement.

Upon obtaining a prior written consent of the District, the Contractor may assign moneys due or to become due him under the Agreement, to the extent permitted by law, but any assignment of moneys shall be subject to all proper setoffs in favor of the District and to all deductions provided for in the Agreement, and particularly all money withheld, whether assigned or not, shall be subject to being used by the District for the completion of the work in the event that the Contractor should be in default therein.

No assignment of this Agreement will be approved unless it shall contain a provision that the funds to be paid to the assignee under the assignment are subject to a prior lien for services rendered or materials supplied for performance of the work called for under the Agreement in favor of all persons, firms, or corporations rendering such services or supplying such materials and that the District may withhold funds due until all work required by the Contract Documents is completed to the District's satisfaction.

6-3 CONTRACTOR'S CONSTRUCTION SCHEDULE AND COST BREAKDOWN

Within ten days after execution of the Agreement, the Contractor shall deliver to the District's Representative a construction progress schedule and cost breakdown in bar chart form showing the proposed dates of commencement and completion and cost of each of the various parts of the work and the anticipated amount of each monthly payment that will become due the Contractor in accordance therewith.

6-4 TIME FOR COMPLETION AND FORFEITURE DUE TO DELAY

The Contractor shall complete all or any designated portion of the work called for under the Agreement within the time set forth in the Special Provisions. Time is of the essence in this Agreement.

Failure of the Contractor to perform any covenant or condition contained in the Contract Documents within the time period specified shall constitute a material breach of this Agreement entitling the District to terminate the Agreement unless the Contractor applies for, and receives, an extension of time in accordance with the procedures set forth in this article and the article on EXTENSION OF TIME.

Failure of the District to insist upon the performance of any covenant or condition within the time period specified in the Contract Documents shall not constitute a waiver of the Contractor's duty to complete performance within the designated periods unless the waiver is in writing.

The District's Agreement to waive a specific time provision or to extend the time for performance shall not constitute a waiver of any other time provisions contained in the Contract Documents. Failure of the Contractor to complete performance promptly within the additional time authorized in the waiver or extension of time Agreement shall constitute a material breach of this Agreement entitling the District to terminate.

In accordance with Government Code 53069.85, Contractor agrees to forfeit and pay District the amount per day set forth in the Special Provisions for each and every day of delay which shall be deducted from any payments due or to become due the Contractor.

The Contractor shall not be deemed in breach of this Agreement and no forfeiture due to delay shall be made because of any delays in the completion of the work due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor, provided the Contractor requests an extension of time in accordance with the procedures set forth in this article and the article on EXTENSION OF TIME. Unforeseeable causes of delay beyond the control of Contractor shall include acts of God, acts of a public enemy, acts of the government, acts of the District, or acts of another contractor in the performance of an Agreement with the District, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and weather, or delays of Subcontractors due to such causes, or delays caused by failure of the District or the owner of a Utility to provide for removal or relocation of existing Utility facilities. Delays caused by actions or neglect of Contractor or his agents, servants, employees, officers, Subcontractors, directors, or of any party contracting to perform part or all of the work or to supply any equipment or materials shall not be excusable delays. Excusable delays (those beyond Contractor's control) shall not entitle the Contractor to any additional compensation except as noted below. The sole remedy of the Contractor shall be to seek an extension of time.

The Contractor will be compensated for damages incurred due to delays for which the District is responsible if such delays are unreasonable in the circumstances involved and were not within the contemplation of the parties when the Agreement was awarded to the Contractor. Such actual costs will be determined by the Engineer. The District will not be liable for, and in making this determination the Engineer will exclude, all damages which the Engineer determines the Contractor could have avoided by any reasonable means including, without limitation, the judicious handling of forces, equipment, or plant.

6-5 EXTENSION OF TIME

The time specified for completion of all of the work or any part of the work may be extended only by a written change order executed by the District or other written form executed by the District.

Requests for an extension of time must be delivered to the District's Representative within ten consecutive calendar days following the date of the occurrence which caused the delay. The request must be submitted in writing and must state the cause of the delay, the date of the occurrence causing the delay, and the amount of additional time requested. Requests for extensions of time shall be supported by all evidence reasonably available or known to the Contractor which would support the extension of time requested. Requests for extensions of time failing to include the information specified in this article and requests for extensions of time which are not received within the time specified above shall result in the forfeiture of the Contractor's right to receive any extension of time requested.

If the Contractor is requesting an extension of time because of weather, he shall supply daily written reports to the District's Representative describing such weather and the work which could not be performed that

day because of such weather or conditions resulting therefrom and which he otherwise would have performed.

The District's Acceptance of the daily reports shall not be deemed an admission of the Contractor's right to receive an extension of time or a waiver of the District's right to strictly enforce the time provisions contained in the Contract Documents.

When the Contractor has submitted a request for an extension of time in accordance with the procedures of this article and the article on TIME FOR COMPLETION AND FORFEITURE DUE TO DELAY, the Governing Body of the District will ascertain the facts and extent of the delay and extend the time for completing the work if, in its judgment, the findings of fact justify such an extension, and its findings of facts thereon shall be final and conclusive. An extension of time may be granted by the Governing Body of the District after the expiration of the time originally fixed in the Agreement or as previously extended, and the extension so granted shall be deemed to commence and be effective from the date of such expiration.

Any extension of time shall not release the sureties upon any bond required under the Agreement.

6-6 USE OF COMPLETED PORTIONS

When the work or any portion of it is sufficiently complete to be utilized or placed into service, the District shall have the right upon written notification to the Contractor to utilize such portions of the work and to place the operable portions into service and to operate same.

Upon said notice and commencement of utilization or operation by the District, the Contractor shall be relieved of the duty of maintaining the portions so utilized or placed into operation; provided, however, that nothing in this article shall be construed as relieving the Contractor of the full responsibility for completing the work in its entirety, for making good defective work and materials, for protecting the work from damage, and for being responsible for damage and for the work as set forth in the General Provisions and other Contract Documents nor shall such action by the District be deemed completion and Acceptance, and such action shall not relieve the Contractor, his sureties, or insurers of the provisions of the section on CONTRACTOR'S INSURANCE, the article on INDEMNITY, and the article on GUARANTEES.

SECTION 7 LEGAL RELATIONS AND RESPONSIBILITIES

7-1 OBSERVING LAWS AND ORDINANCES

The Contractor shall keep himself fully informed of all laws, ordinances, and regulations which in any manner affect those engaged or employed in the work or the materials used in the work or which in any way affect the conduct of the work and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over same. If any discrepancy or inconsistency is discovered in the Plans, Specifications, or Agreement for the work in relation to any such law, ordinance, regulation, order, or decree, he shall forthwith report the same to the District's Representative in writing and cease operations on that part of the work until the District's Representative has given him appropriate instructions as provided for in the article on ERRORS OR DISCREPANCIES NOTED BY CONTRACTOR.

The Contractor shall at all times observe and comply with and shall cause all his agents, employees, Subcontractors, and suppliers to observe and comply with all laws, ordinances, regulations, orders, and decrees, and shall hold harmless, indemnify, and defend the District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, employees, and agents from and against all claims, damages, losses, expenses, and other costs, including costs of defense and attorneys' fees, arising out of or resulting from the violation of any such law, ordinance, regulation, order, or decree by the Contractor, his employees, agents, Subcontractors, or suppliers.

7-2 PERMITS AND LICENSES

Contractor shall apply for Kern County well drilling permit and pay fees as required. The District will apply for the State well drilling Permit.

7-3 INVENTIONS, PATENTS, AND COPYRIGHTS

The Contractor shall pay all royalties and assume all costs arising from the use of any invention, design, process, materials, equipment, product, or device which is the subject of patent rights or copyrights.

The Contractor shall hold harmless, indemnify, and defend the District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, employees, and agents from and against all claims, damages, losses, expenses, and other costs, including costs of defense and attorneys' fees, arising out of any infringement of patent rights or copyrights incident to the use in the performance of the work or resulting from the incorporation in the work of any invention, design, process, materials, equipment, product or device, and shall defend all such claims in connection with any alleged infringement of such rights.

7-4 PUBLIC CONVENIENCE AND SAFETY

The Contractor shall so conduct his operations as to offer the least possible obstruction and inconvenience to the public, and he shall have under construction no greater length or amount of work than he can prosecute properly with due regard to the rights of the public.

Convenient access to driveways, houses, and buildings along the line of work shall be maintained and temporary crossings shall be provided and maintained in good condition. Not more than one crossing or intersecting street or road shall be closed at any one time.

The Contractor shall provide and maintain such fences, barriers, directional signs, lights, and flagmen as are necessary to give adequate warning to the public at all times of any dangerous conditions to be encountered as a result of the construction work and to give directions to the public.

7-5 RESPONSIBILITY FOR LOSS, DAMAGE, OR INJURIES

The Contractor shall be responsible for all claims, demands, or liability from any cause arising out of or resulting from or in connection with the performance of the work, excepting only those as may be caused solely and exclusively by the fault or negligence of the District, the Engineer, the District's Representative, or their consultants, or their directors, officers, employees, and agents. Such responsibility shall extend to claims, demands, or liability for loss, damage, or injuries occurring after completion of the work as well as during the progress of the work.

In the event any hazardous materials, including but not limited to asbestos, are utilized in construction or hazardous materials are otherwise encountered during construction, the Contractor shall take all appropriate precautions to protect persons and property and shall comply with all applicable regulations for the installation and handling of such hazardous materials. The Contractor is solely responsible for protection of persons and property that could be affected by construction and the Contractor's handling of such materials.

7-6 CONTRACTOR'S RESPONSIBILITY FOR THE WORK

Until the Acceptance of the work, the Contractor shall have the responsible charge and care of the work and of the materials to be used therein (including materials for which he has received partial payment or materials which have been furnished by the District) and shall bear the risk of injury, loss, or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the nonexecution of the work.

The Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damages to any portion of the work or the materials occasioned by any cause before its completion and Acceptance and shall bear the expense thereof. Where necessary to protect the work or materials from damage, the Contractor shall at his expense provide suitable drainage and erect such temporary structures as are necessary to protect the work or materials from damage. The suspension of the work or the granting of an extension of time from any cause whatever shall not relieve the Contractor of his responsibility for the work and materials as herein specified.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorizations, shall act at his discretion to prevent such threatened loss or injury.

Notwithstanding the foregoing provisions of this article, the Contractor shall not be responsible for the cost of repairing or restoring damage to the work, which damage is determined to have been proximately caused by an Act of God, in excess of 5 percent of the contracted amount, provided that the work damaged is built in accordance with accepted and applicable building standards and the Plans and Specifications. For the purposes of this paragraph, "Acts of God" shall include only the following occurrences or conditions and effect: earthquakes in excess of a magnitude of 3.5 on the Richter Scale and tidal waves.

7-7 PRESERVATION OF PROPERTY

The Contractor shall exercise due care to avoid injury to existing improvements or facilities, Utility facilities, adjacent property, and trees and shrubbery that are not to be removed.

All trees, shrubbery, and landscaping that are not to be removed, and pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and waterlines, all highway or street facilities, and any other improvements or facilities within or adjacent to the work shall be protected from injury or damage, and the Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operation, they shall be replaced or restored at the Contractor's expense to a condition

as good as when the Contractor entered upon the work or as good as required by the Plans and Specifications if any such objects are a part of the work being performed.

The fact that any such pipe or other underground facility is not shown on the Plans shall not relieve the Contractor of his responsibility under this article.

In addition to any requirements imposed by law, the Contractor shall shore up, brace, underpin, and protect as may be necessary, all foundations and other parts of all existing structures adjacent to and adjoining the site of the work which are in any way affected by the excavations or other operations connected with the performance of the work. Whenever any notice is required to be given by the District or the Contractor to any adjacent or adjoining landowner or other party before commencement of any work, such notice shall be given by the Contractor.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorizations, shall act at his discretion to prevent such threatened loss or injury.

7-8 REGIONAL NOTIFICATION CENTER CONTACT

Contractor, except in an emergency, shall contact the appropriate regional notification center at least two working days prior to commencing any excavation if the excavation will be conducted in an area or in a private easement which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the District, and obtain an inquiry identification number from that notification center. No excavation shall be commenced and carried out by the Contractor unless such an inquiry identification number has been assigned to the Contractor or any Subcontractor of the Contractor and the District has been given the identification number by the Contractor.

Emergency shall be defined as a sudden, unexpected occurrence, involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services. Emergency includes such occurrences as fire, flood, earthquake, or other soil or geologic movements, as well as such occurrences as riot, accident, or sabotage (Government Code Section 4216).

Subsurface installation means any underground pipeline, conduit, duct, wire, or other structure operated or maintained in or across a public street or public right-of-way (Government Code Section 4216).

7-9 EXCAVATION

A. Excavation Plans for Worker Protection Required by Labor Code Section 6705

If the total amount of the Agreement is in excess of \$25,000, the Contractor shall submit to the District for Acceptance, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of any trench or trenches five (5) feet or more in depth. The plan shall be prepared by a registered civil or structural engineer. As a part of the plan, a note shall be included stating that the registered civil or structural engineer certifies that the plan complies with the CAL/OSHA Construction Safety Orders, or that the registered civil or structural engineer certifies that the plan is not less effective than the shoring, bracing, sloping, or other provisions of the Safety Orders.

The District or the Engineer or their consultants may have made investigations of subsurface conditions in areas where the work is to be performed. If so, these investigations are identified in the Specifications and the records of such investigations are available for inspection at the office of the Engineer. The detailed plan showing the design of shoring, etc., which the Contractor is required to submit to the District for Acceptance in advance of excavation will not be accepted by the District if the plan is based on subsurface conditions which are more favorable than those revealed by the investigations made by the District or the

Engineer or their consultants; nor will the plan be accepted if it is based on soils-related design criteria which is less restrictive than the criteria set forth in the report on the aforesaid investigations of subsurface conditions.

The detailed plan showing the design of shoring, etc., shall include surcharge loads for nearby embankments and structures, for spoil banks, and for construction equipment and other construction loadings. The plan shall indicate for all trench conditions the minimum horizontal distances from the side of the trench at its top to the near side of the surcharge loads.

Nothing contained in this article shall be construed as relieving the Contractor of the full responsibility for providing shoring, bracing, sloping, or other provisions which are adequate for worker protection.

B. Excavations Below Four (4) Feet

If any work required by this Agreement includes digging trenches or other excavations that extend deeper than four (4) feet below the surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the District in writing of any:

1. Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law;
2. Subsurface or latent physical conditions at the site differing from those indicated;
3. Unknown physical conditions at the site of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Agreement.

Nothing in this section is intended to relieve the Contractor of his responsibility to carefully examine the Contract Documents and the site where the work is to be performed in accordance with Section 2-8 of the General Conditions; to familiarize himself with all local conditions and federal, state, and local laws, ordinances, rules, and regulations that may affect the performance of any work; to study all surveys and investigation reports about subsurface and latent physical conditions pertaining to the jobsite; to perform such additional surveys and investigations as the Contractor deems necessary to complete the work at his bid price; and to correlate the results of all such data with the requirements of the Contract Documents.

If the District determines that hazardous waste exists and that conditions exist which Contractor could not discover through the investigations required by the preceding paragraph, the District shall notify the Contractor and the Contractor may request a change order in accordance with the Contract Documents. Nothing in this section shall relieve the Contractor of the obligation to pay all fees and costs associated with removal and cleanup of any hazardous waste used at, or brought to, the jobsite by the Contractor. Nor shall this section relieve the Contractor of responsibility for site conditions discoverable by any investigation required by the preceding paragraph.

In the event that a dispute arises between the District and the Contractor involving hazardous waste and whether site conditions differ materially from those the Contractor could or should have discovered by the investigations required by this Agreement, the Contractor shall not be excused from the scheduled completion date provided in the Contract Documents and shall proceed with all work in the manner and in the time required by the Contract Documents.

7-10 SAFETY

In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for conditions of the jobsite, including safety of all persons and property during performance of the work, and the Contractor shall fully comply with all state, federal and other laws, rules, regulations, and orders relating to safety of workers and all others.

The right of the Engineer or the District's Representative to conduct construction review or observation of the Contractor's performance will not include review or observation of the adequacy of the Contractor's safety measures in, on, or near the construction site.

7-11 PERSONAL LIABILITY

No director, officer, employee, or agent of the District, the Engineer, the District's Representative, or their consultants shall be personally responsible for any liability arising under or by virtue of the Agreement.

7-12 INDEMNITY

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, agents, and employees from and against all claims, damages, losses, expenses, and other costs, including costs of defense and attorneys' fees, arising out of or resulting from or in connection with the performance of the work, both on and off the jobsite, provided that any of the foregoing (1) is attributable to personal injury, bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself), including the loss of use resulting therefrom, and (2) is caused in whole or in part by any act or omission of the Contractor, any Subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose acts or omissions any of them may be liable, regardless of whether or not caused in part by any act or omission (active, passive, or comparative negligence included, excepting the active negligence of the District), of a party indemnified hereunder.

In any and all claims against the indemnified parties by any employee of the Contractor, any Subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under the first and fourth paragraphs in this article on INDEMNITY shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable, by or for the Contractor, or any Subcontractor, or any supplier, or other persons under workers' compensation acts, disability benefit acts, or other employee acts.

The obligations of the Contractor under the first and fourth paragraphs in this article on INDEMNITY shall not extend to the liability of the Engineer, the District's Representative, and their consultants, and each of their directors, officers, employees, and agents, arising out of or resulting from or in connection with the preparation or approval of maps, Drawings, opinions, reports, surveys, designs or Specifications, providing that the foregoing was the sole and exclusive cause of the loss, damage, or injury.

The Contractor shall also indemnify and hold harmless the District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, employees, and agents from and against all losses, expenses, damages (including damages to the work itself), attorneys' fees, and other costs, including all costs of defense, which any of them may incur with respect to the failure, neglect, or refusal of Contractor to faithfully perform the work and all of the Contractor's obligations under the Agreement. Such costs, expenses, and damages shall include all cost, including attorneys' fees, incurred by the indemnified parties in any lawsuit to which they are a party.

7-13 HOURS OF LABOR

The Contractor shall forfeit as a penalty to the District \$25 for each worker employed in the execution of the Agreement by the Contractor or any Subcontractor under him for each calendar day during which such worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of the Labor Code and, in particular, Section 1810 to Section 1815 thereof, inclusive, except that work performed by employees of Contractors in excess of 8 hours per day and 40 hours during any one week shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than one and one-half times the basic rate of pay as provided in said Section 1815.

7-14 PREVAILING WAGE

The Contractor shall comply with Labor Code Section 1775. In accordance with said Section 1775, the Contractor shall forfeit as a penalty to the District up to \$50 for each calendar day or portion thereof for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed for any work done under the Agreement by him or by any Subcontractor under him in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. The amount of the forfeiture will be determined by the Labor Commissioner based on the considerations specified in Labor Code Section 1775. In addition to said penalty and pursuant to said Section 1775, the difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor. Pursuant to Labor Code Section 1775, to the extent there is insufficient money due a Contractor to cover all penalties forfeited and amounts due, the Division of Labor Standards Enforcement shall be notified of the violation and the Division of Labor Standards Enforcement may maintain an action in any court of competent jurisdiction to recover the penalties and amounts due pursuant to Labor Code Section 1775.

Section 1776 of the Labor Code requires each contractor and its Subcontractors to keep accurate payroll records and make such available for inspection by persons and entities identified in that section, in the manner stated therein. Section 1776(g), places the responsibility for compliance with Section 1776 on the prime contractor.

Pursuant to Labor Code Section 1777.1, whenever any contractor or Subcontractor performing a public works project is found by the Labor Commissioner to be in violation of Labor Code Section 1770, et seq. with the intent to defraud, except Section 1775, the contractor or Subcontractor or any firm, corporation, partnership or association in which the contractor or Subcontractor has a substantial interest shall be ineligible to bid on or to receive any public works contract for a period of not less than one year or more than three years. The period of debarment shall run from the date the determination of the violation is made by the Labor Commissioner.

Whenever any contractor or Subcontractor performing a public works project pursuant to this chapter is found by the Labor Commission to be in willful violation of this chapter, except Section 1777.5, the contractor or Subcontractor or any firm, corporation, partnership, or association in which the contractor or Subcontractor has a substantial interest shall be ineligible to bid on or to receive any public works contract for a period up to three years for each second and subsequent violation occurring within three of a separate and previous willful violation of this chapter. These periods of debarment shall run from the date the determination of the violation is made by the Labor Commissioner.

A willful violation occurs when the contractor or Subcontractor knew or reasonably should have known of his or her obligations under the public works law and deliberately fails or refuses to comply with its provisions.

Whenever Federal Funding is included in the project the contractor shall comply with the Davis Bacon Act. Higher wages shall prevail.

7-15 TRAVEL AND SUBSISTENCE PAYMENTS

Each worker needed to execute the work must be paid travel and subsistence payments as defined in the applicable collective bargaining Agreements filed in accordance with Labor Code Section 1773.8.

7-16 APPRENTICES

Attention is directed to the provisions in Sections 1777.5, 1777.6 and 1777.7 of the Labor Code concerning the employment of apprentices by the Contractor or any Subcontractor under him.

The Contractor and any Subcontractor under him shall comply with the requirements of Sections 1777.5 and 1777.6 of the Labor Code in the employment of apprentices.

Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex officio the Administrator of Apprenticeship, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

Willful violations of Section 1777.5 will result in the Contractor, and the business entity under which the Contractor is doing business, being denied the right to bid on, or to receive, any public works contract for a period of up to one year for the first violation and for a period of up to three years for the second and subsequent violations commencing from the date the determination of noncompliance by the Administrator of Apprenticeship becomes an order of the California Apprenticeship Council. In addition, if the Contractor violates Section 1777.5, he will forfeit as a civil penalty the sum of Fifty Dollars (\$50.00) for each calendar day of noncompliance which shall be withheld from progress payments by District upon notice from the Department of Industrial Relations. (Labor Code Section 1777.7.)

In lieu of the penalty provided for above, the director may for a first time violation and with the concurrence of the joint apprenticeship committee, order the contractor or Subcontractor to provide apprentice employment equivalent to the work hours that would have been provided for apprentices during the period of noncompliance.

7-17 WARRANTY OF TITLE

No materials, supplies, or equipment for the work under this Agreement shall be purchased subject to any chattel mortgage or under a conditional sale contract or other Agreement by which an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants clear and good title to all materials, supplies, and equipment installed and incorporated in the work and agrees upon completion of all work to deliver the premises, together with all improvements and appurtenances constructed or placed thereon by him, to the District free from any claims, liens, encumbrances, or charges and further agrees that neither he nor any person, firm, or corporation furnishing any material or labor for any work covered by the Agreement shall have any right to a lien upon the premises or any improvement or appurtenance thereon, provided that this shall not preclude the Contractor from installing metering devices or other equipment of Utility companies or of municipalities, the title of which is commonly retained by the Utility company or the municipality. Nothing contained in this article, however, shall defeat or impair the right of such persons furnishing materials or labor under any bond given by the Contractor for their protection or any right under any law permitting such persons to look to funds due the Contractor in the hands of the District. The provisions of this article shall be inserted in all subcontracts and material contracts, and notices of its provision shall be given to all persons furnishing materials for the work when no formal Agreement is entered into for such materials.

7-18 PROPERTY RIGHTS IN MATERIALS

Nothing in the Agreement shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or the soil, or after payment has been made for materials delivered to the site of the work, or stored subject to or under the control of the District. All such materials shall become the property of the District upon being so attached or affixed or upon payment for materials delivered to the site of the work or stored subject to or under the control of the District.

Soil, stone, gravel, and other materials found at the site of the work and which conform to the Plans and Specifications for incorporation into the work may be used in the work. No other use shall be made of such materials except as may be otherwise described in the Plans and Specifications.

7-19 MUTUAL RESPONSIBILITY OF CONTRACTORS

Nothing in the Agreement shall be interpreted as granting to the Contractor exclusive occupancy of the site of the project. The Contractor must ascertain to his own satisfaction the scope of the project and the nature of any other contracts that have been or may be awarded by the District in the construction of the project, to the end that the Contractor may perform this Agreement in the light of such other contracts, if any.

The Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the project. If the performance of any Agreement for the project is likely to be interfered with by the simultaneous performance of some other Agreement or Agreements, the District's Representative shall decide which contractor shall cease work temporarily and which contractor shall continue or whether the work under the Agreements can be coordinated so that the contractors may proceed simultaneously. On all questions concerning conflicting interest of contractors performing related work, the decision of the District's Representative shall be binding upon all contractors concerned and the District, the Engineer, the District's Representative, and their consultants shall not be responsible for any damages suffered or extra costs incurred by the Contractor resulting directly or indirectly from the award or performance or attempted performance of any other Agreement or Agreements on the project or caused by a decision or omission of the District's Representative respecting the order of precedence in the performance of the Agreements.

If through acts of neglect on the part of the Contractor, any other contractor or any Subcontractor shall suffer loss or damage on the work, the Contractor agrees to settle with such other contractor or Subcontractor by Agreement or arbitration, if such other contractor or Subcontractor will so settle. If such other contractor or Subcontractor shall assert any claim against the District, the Engineer, the District's Representative, or their consultants or any of their directors, officers, employees, or agents on account of any damage alleged to have been so sustained, the District shall notify the Contractor who shall hold harmless, indemnify, and defend the District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, employees, and agents against any such claim, including all attorneys' fees and any other costs incurred by the indemnified parties relative to any such claim.

7-20 TERMINATION FOR BREACH

If the Contractor refuses or fails to prosecute the work or any separable part thereof with such diligence as will ensure its completion within the time specified herein, or any extension thereof, or fails to complete such work within such time, or if the Contractor should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he files a petition to take advantage of any debtor's act, or if he or any of his Subcontractors should violate any of the provisions of the Agreement, or if he should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials to complete the work in the time specified, or if he should fail to make prompt payment to Subcontractors or for material or labor, or if he should persistently disregard laws, ordinances,

or instructions given by the District or District's Representative, the District may, without prejudice to any other right or remedy, serve written notice upon the Contractor and his surety of his intention to terminate the Agreement, said notice to contain the reasons for such intention to terminate the Agreement, and unless within ten days after the service of such notice such violations shall cease and satisfactory arrangements for the corrections thereof be made, the Agreement shall upon the expiration of said ten days cease and terminate. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.

In the event of any such termination, the District shall immediately serve written notice thereof upon the surety and the Contractor, and the surety shall have the right to take over and perform the Agreement; provided, however, that if the surety within 15 days after the serving upon it of a notice of termination does not give the District written notice of its intention to take over and perform the Agreement or does not commence performance thereof within 30 days from the date of serving said notice, the District may take over the work and prosecute the same to completion, by Agreement or by any other method it may deem advisable, for the account and at the expense of the Contractor, and his surety shall be liable to the District for any excess cost or other damage occasioned the District thereby, and in such event the District may, without liability for so doing, take possession of and utilize in completing the work such materials, appliances, plants, and other property belonging to the Contractor that may be on the site of the work and be necessary therefor. For any portion of such work that the District elects to complete by furnishing its own employees, materials, tools, and equipment, the District shall be compensated for such in accordance with the schedule of compensation for force account work in the article on PAYMENT FOR CHANGES IN THE WORK.

If the unpaid balance of the Agreement price exceeds the direct and indirect costs of completing the work, including, but not limited to, all costs to District arising from professional services and attorneys' fees and all costs generated to insure or bond the work of substituted contractors or Subcontractors utilized to complete the work, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to District promptly upon demand; on failure of Contractor to pay, the Surety shall pay on demand by District. Any portion of such difference not paid by Contractor or surety within 30 days following the mailing of a demand for such costs by District shall earn interest at the rate of 10 percent per annum or the maximum rate authorized by California law, whichever is lower.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the District.

In the event a national emergency occurs, and public work being performed by the Agreement is stopped, directly or indirectly, because of the freezing or diversion of materials, equipment or labor, as the result of an order or a proclamation of the President of the United States, or of an order of any federal authority, and the circumstances or conditions are such that it is impracticable within a reasonable time to proceed with a substantial portion of the work, then the District and the Contractor may, by written Agreement, terminate said Agreement.

7-21 NOTICE AND SERVICE THEREOF

Any notice required or given under the Agreement shall be in writing, be dated, and signed by the party giving such notice or his duly authorized representative, and be served as follows:

If to the District, by personal delivery or by deposit in the United States mail.

If to the Contractor, by personal delivery to the Contractor or to his authorized representative at the site of the project or by deposit in the United States mail.

If to the surety or any other person, by personal delivery to said surety or other person or by deposit in the United States mail.

All mailed notices shall be in sealed envelopes, shall be sent by certified mail with postage prepaid, and shall be addressed to the addresses in the Contract Documents or such substitute addresses which a party designates in writing and serves as set forth herein.

7-22 PARTIAL INVALIDITY

If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions shall nevertheless continue in full force without being impaired or invalidated in any way.

7-23 LANDS AND RIGHTS-OF-WAY

The lands and rights-of-way for the facility to be constructed will be provided by the District. The Contractor shall make his own arrangements and pay all expenses for additional area required by him outside the limits of the District's lands and rights-of-way.

Work in public right-of-way shall be done in accordance with the requirements of the permit issued by the public agency in whose right-of-way the work is located in addition to conforming to the Plans and Specifications. If a permit is not required, the work shall conform to the standards of the public agency involved in addition to conforming to the Plans and Specifications.

7-24 WAIVER OF RIGHTS

Except as otherwise specifically provided in the Contract Documents, no action or failure to act by the District, Engineer District's Representative, or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract Documents, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder.

7-25 TAXES

The Contractor shall pay all sales, consumer, use, and other taxes.

NOTICE OF TAXABLE POSSESSORY INTEREST - The terms of this document may result in the creation of a possessory interest. If such a possessory interest is vested in a private party to this document, the private party may be subjected to the payment of personal property taxes levied on such interest.

7-26 ASSIGNMENT OF ANTI-TRUST ACTIONS

In entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties.

In submitting a bid to a public purchasing body, the Bidder offers and agrees that if the bid is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2

[commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the Bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the Bidder.

7-27 PAYROLL RECORDS

It shall be the responsibility of the Contractor to maintain an accurate payroll record showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each employee in accordance with Labor Code Section 1776, and to ensure that each Subcontractor also complies with all provisions of Labor Code Section 1776 and this Agreement provision.

All payroll records shall be certified as accurate by the applicable contractor or Subcontractor or its agent having authority over such matters.

The Contractor shall ensure that all payroll records are available for inspection at the Contractor's principal office during normal business hours and shall notify the District, in writing, of the place where all payroll records are located from time to time.

The Contractor shall furnish a copy of all payroll records, upon request, to employees or their authorized agents, to the District, to the Division of Labor Standards Enforcement, and to the Division of Apprenticeship Standards of the Department of Industrial Relations. The Contractor shall also furnish a copy of payroll records to the general public upon request provided the public request is made through the District, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement of the Department of Industrial Relations. In no event shall members of the general public be given access to payroll records at the Contractor's principal office.

Records made available to the general public in accordance with the prior paragraph shall be marked or obliterated in such a manner that the name and address of the Contractor and/or Subcontractor and the name, address, and telephone number of all employees does not appear on the modified record.

The Contractor shall file a certified copy of any requested payroll records with the entity that requested such records within ten days of the date a written request for payroll records has been received.

Failure of the Contractor to comply with any provision of this article or Labor Code Section 1776 within ten days of the date a written request for compliance is received shall result in a forfeiture of \$25 per calendar day or portion thereof, for each worker, until strict compliance is obtained. Upon notification by the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement of the Department of Industrial Relations, the District shall withhold penalties under this article or Labor Code Section 1776 from the Contractor's payments then due.

SECTION 8 CONTRACTOR'S INSURANCE

8-1 GENERAL

The Contractor shall not commence or continue to perform any work unless he, at his own expense, has in full force and effect all required insurance. The Contractor shall not permit any Subcontractor to perform work on this project unless all of the required insurance has been complied with by such Subcontractor.

The types of insurance the Contractor shall obtain and maintain are Workers' Compensation and Employers' Liability Insurance, General and Automobile Liability Insurance, Builders' Risk "All Risk" or Installation Floater Insurance, and, if so determined by the District at the time of award of the Agreement, Earthquake and Tidal Wave Insurance, all as set forth herein.

Workers' Compensation and Employers' Liability Insurance and Liability Insurance shall be maintained in effect for the full guarantee period.

Insurers must be authorized to do business and have an agent for service of process in California and must have at least a "B+ VIII" rating in accordance with the most current Best's Rating Guide.

As evidence of specified insurance coverage, the Contractor shall provide certificates of insurance and endorsements on the forms provided as a part of the Contract Documents. No alteration or substitution of said forms will be allowed.

8-2 WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY INSURANCE

Upon execution of the Agreement, the Contractor shall provide a certificate(s) of insurance certifying that he has obtained full Workers' Compensation Insurance coverage for no less than the statutory limits and Employers' Liability Insurance coverage in limits not less than the amounts set forth in the Special Provisions, for all persons whom he employs or may employ in carrying out the work under the Agreement. At the same time, the Contractor shall provide the insurance endorsement(s) on the forms provided as part of the Contract Documents. This insurance shall be in strict accordance with the requirements of the most current and applicable state Workers' Compensation Insurance laws.

8-3 GENERAL AND AUTOMOBILE LIABILITY INSURANCE

Upon execution of the Agreement, the Contractor shall provide a certificate(s) of insurance showing that he has Liability Insurance coverage in limits not less than the amounts set forth in the Special Provisions. At the same time, the Contractor shall provide the insurance endorsement(s) on the forms provided as a part of the Contract Documents.

Included in such insurance shall be a "Cross Liability" or "Severability of Interest" clause.

The Liability Insurance coverage shall include each of the following types of insurance or coverage for exposures, as applicable:

- A. General Liability
 - (1) Commercial Form.
 - (2) Premises-Operations.
 - (3) Explosion and Collapse Hazard.
 - (4) Underground Hazard.
 - (5) Products/Completed Operations.
 - (6) Blanket Contractual Insurance.

- (7) Broad Form Property Damage
- (8) Independent Contractors.
- (9) Personal Injury and Advertising Injury

B. Automobile Liability

- (1) Business Auto Form Including Loading and Unloading.
- (2) Owned.
- (3) Hired.
- (4) Non-Owned.

Included with the Certificate(s) of Insurance shall be endorsements which name as additional insureds the District, the Engineer, the District's Representative, and their consultants, and each of their directors, officers, and employees and state that the insurance afforded to these additional insureds shall be primary insurance and if the additional insureds have other insurance which might be applicable to any loss, the amount of the insurance provided under this article on GENERAL AND AUTOMOBILE LIABILITY INSURANCE shall not be reduced or prorated by the existence of such other insurance.

8-4 CONTRACTOR'S LIABILITY NOT LIMITED BY INSURANCE

Nothing contained in these insurance requirements is to be construed as limiting the liability of the Contractor or the Contractor's insurers.

SECTION 9 ESTIMATES AND PAYMENTS

9-1 PAYMENT FOR CHANGES IN THE WORK

Changes in, additions to, or deductions from the work, including increases or decreases in the quantity of any item or portion of the work, shall be set forth in a written change order executed by the District and by the Contractor which shall specify:

The changes, additions, and deductions to be made.

The increase or decrease in compensation due the Contractor, if any.

Adjustment in the time of completion, if any.

Adjustment in the compensation due the Contractor shall be determined by one or more of the following methods in the order of precedence listed below:

Unit prices contained in the Agreement.

Mutually agreeable lump-sum or unit prices. If requested by the District's Representative, the Contractor shall furnish an itemized breakdown of the quantities and prices used in computing proposed lump-sum and unit prices.

Force account whereby the Contractor is compensated for furnishing labor, materials, tools, and equipment as follows:

Cost of labor plus 15 percent for workers directly engaged in the performance of the work. Cost of labor shall include actual wages paid including employer payments to or on behalf of the workers for health and welfare, pension, vacation, and similar purposes plus payments imposed

on payroll amounts by state and federal laws plus subsistence and travel allowance payments to workers.

Cost of material plus 15 percent. Cost of material shall include sales tax, freight, and delivery charges. The District reserves the right to furnish such materials as he deems advisable and the Contractor shall not be paid the 15 percent markup on such materials.

For tools and equipment actually engaged in the performance of the work, rental rates plus 15 percent. The rental rates shall be those prevailing in the area where the work is performed. No rental charge shall be made for the use of tools or equipment having a replacement value of \$500 or less.

Subcontractor invoices to the Contractor plus 5 percent. Subcontractor invoices shall be based on the above-described cost of labor plus 15 percent, cost of material plus 15 percent, and tool and equipment rental rates plus 15 percent.

No payment shall be made for any item not set forth above, including without limitation, Contractor's overhead, general administrative expense, supervision, or damages claimed for delay in prosecuting the remainder of the work.

For force account work, the Contractor shall submit to the District's Representative for his verification daily work sheets showing an itemized breakdown of labor, materials, tools, and equipment used in performing the work. No payment will be made for work not verified by the District's Representative.

9-2 PROGRESS PAYMENTS

The District shall, on or before the tenth day of each calendar month after actual construction work is started, cause an estimate in writing to be made by the District's Representative of the value of the work completed by the Contractor and of materials delivered on the ground at the site of the work or stored subject to or under the control of the District to the first of the month in which the estimate is made. In estimating such value, the District's Representative may take into consideration, along with other facts and conditions deemed by him to be proper, the ratio of the difficulty or cost of the work done to the probable difficulty or cost of the work remaining to be done. The District shall retain 10 percent of such estimated value as part security for the fulfillment of the Agreement by the Contractor, unless the Contractor has substituted equivalent securities as defined by Section 9-5 of these General Provisions, and shall by the end of each month in which the estimate is made pay to the Contractor the balance of such estimated value after deducting therefrom all previous payments and all sums to be kept or retained under the terms of the Agreement.

9-3 FINAL ESTIMATE AND PAYMENT

When the work has been substantially completed, the District's Representative will make a final estimate of the total amount of work done thereunder and the amount to be paid therefor under the terms of the Agreement. If the District finds the work has been substantially completed according to the Agreement, he shall accept the work, shall file a notice of completion, and shall pay the entire sum so found to be due after deducting therefrom all previous payments and all amounts to be retained under the provisions of the Agreement. All prior progress estimates and payments shall be subject to correction in the final estimate and payment. The final payment shall not be due and payable until the expiration of 40 days from the date of filing a notice of completion of the work by the District.

It is mutually agreed between the parties to the Agreement that no certificate given or payment made under the Agreement shall be conclusive evidence of performance of the Agreement and no payment shall be construed to be an Acceptance of any defective work or improper materials.

9-4 DISTRICT'S RIGHT TO WITHHOLD CERTAIN AMOUNTS AND MAKE APPLICATION THEREOF

In addition to the amount which the District may retain under the above article on PROGRESS PAYMENTS, the District may withhold a sufficient amount or amounts from any payment otherwise due to the Contractor as in his judgment may be necessary to cover:

Payments which may be past due and payable for properly filed claims against the Contractor or any Subcontractors for labor or materials furnished in or about the performance of the work under this Agreement.

Estimated or actual costs for correcting defective work not remedied.

Amounts claimed by the District as forfeiture due to delay or other offsets.

The District may apply such withheld amount or amounts to the payment of such claims in his discretion. In so doing, the District shall be deemed the agent of the Contractor and any payments so made by the District shall be considered as a payment made under the Agreement by the District to the Contractor, and the District shall not be liable to the Contractor for such payment made in good faith. Such payments may be made without prior judicial determination of the claim or claims. The District will render to the Contractor a proper account of such funds disbursed in behalf of the Contractor.

9-5 REQUIRED RELEASES

The Contractor shall not be entitled to any payment specified in his Agreement which is undisputed until such time as the Contractor has executed a release, in the following form, releasing the District from all claims relating to the work for which the Contractor is being paid. The release form contains space for the Contractor to claim any disputed amount and to designate the retention amount for each period associated with the release. Contractor hereby expressly agrees that failure on his part to designate any disputed amount or to designate the correct retention amount for each release period on the release form shall constitute an express waiver of the right of the Contractor to claim any disputed amount or any retention amount at any later date. The District shall have no obligation to pay the Contractor for any work done until the release form attached to these Contract Documents has been executed by the Contractor and submitted to the District.

RELEASE FORM

TO: GREENFIELD COUNTY WATER DISTRICT

NAME OF CONTRACTOR: _____

PROJECT DESCRIPTION: _____

PERIOD WORK PERFORMED: _____

The above-named Contractor hereby acknowledges payment in full for all compensation of whatever nature due the Contractor for all labor and materials furnished and for all work performed on the above-referenced project for the period specified above with the exception of Agreement retention amounts and disputed claims specifically shown below.

RETENTION AMOUNT FOR THIS PERIOD: \$ _____

DISPUTED CLAIMS

DESCRIPTION OF CLAIM

AMOUNT CLAIMED

The Contractor further expressly waives and releases any claim the Contractor may have, of whatever type or nature, for the period specified which is not shown as a retention amount or a disputed claim on this form. This release and waiver has been made voluntarily by Contractor without any fraud, duress, or undue influence by any person or entity.

Contractor further certifies, warrants, and represents that all bills for labor, materials and work due Subcontractors for the specified period have been paid in full and that the parties signing below on behalf of Contractor have express authority to execute this release.

DATED:

PRINT NAME OF CONTRACTOR

DESCRIBE ENTITY (Partnership,
Corporate, etc.)

By _____

By _____

SPECIAL PROVISIONS

SPECIAL PROVISIONS

A. Definitions

Whenever the following terms occur in the contract documents, their meaning is as follows:

DISTRICT	Greenfield County Water District 551 Taft Highway Bakersfield, CA 93307
GOVERNING BODY	Board Members of Greenfield County Water District
ENGINEER/ARCHITECT	QK 5080 California Avenue, Suite 220 Bakersfield, CA 93309 O: (661) 616-2600

B. Terms

Command type sentences used in the contract documents refer to and are directed to the Contractor.

C. Time for Completion and Forfeiture Due to Delay

Work for the base bid will be substantially completed within **90 CONSECUTIVE CALENDAR DAYS**, from and after the date of award of the Agreement.

Forfeiture for each day completion is delayed beyond the time allowed will be at the rate of \$500 per Day.

D. Permit

Contractor shall apply for Kern County well drilling permit and pay fees as required. The District will apply for the State well drilling Permit.

E. Amount of Liability Insurance

General Liability:	Bodily Injury and Property Damage coverage shall be for not less than	
	\$2,000,000	General Aggregate.
	\$1,000,000	Products/Completed Operations Aggregate.
	\$1,000,000	Personal and Advertising Injury.
	\$2,000,000	Each Occurrence.
	OR	
	Bodily Injury and Property Damage coverage shall be in a Combined Single Limit of not less than	
\$2,000,000	Each Occurrence and Aggregate.	
Automobile Liability:	Bodily Injury coverage shall be for not less than	
	\$1,000,000	Each Person.
	\$2,000,000	Each Accident.
	\$2,000,000	Property Damage coverage shall be for not less than
	OR	
	\$2,000,000	Bodily Injury and Property Damage coverage shall be in a Combined Single Limit of not less than
Employers' Liability:	Bodily Injury coverage shall be for not less than	
	\$1,000,000	Each Accident.
	\$1,000,000	Each Disease-Policy Limit.
	\$1,000,000	Each Disease-Each Employee.

****END OF SECTION****

SPECIFICATIONS

SECTION 01 32 16

CONSTRUCTION SCHEDULE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Specific requirements for the preparation, submittal, updating, status reporting and management of the construction Progress Schedule.
- B. Measurement and Payment:
 - 1. The contract price for the McKee Well Project shall include full compensation for all costs and work involved with constructing the project and associated tasks specified herein.

1.2 SUBMITTALS

- A. Shop Drawings:
 - a. Tentative Schedule.
 - b. Final Schedule.
 - c. Revised Schedules.
 - d. Look-Ahead Schedules.

1.3 DESCRIPTION

- A. Prepare and submit the Tentative Schedule at the pre-construction meeting and Final Schedule within 5 working days after as required in the General Conditions. Update the schedule as specified herein.
- B. Upon receipt of approved Final Schedule, within 10-days, submit an estimated payment schedule by each month of project duration.
 - 1. Include a composite curve to show estimated value of work complete and stored materials less specified retainage.
 - 2. Update with new composite curves at key months or whenever variation is expected to be more than plus or minus 10 percent.
 - 3. Retain original or previous composite curves as dashed curves on all updates.

1.4 PREPARATION

- A. Schedules shall be calendar day-based. Include proper sequence of construction, trades, equipment lead time, Shop Drawing approval, equipment fabrication, startup, demonstration, and other time-consuming factors.
- B. The duration indicated for each activity shall be in CALENDAR DAYS and shall represent time planned for the activity including time for inclement weather. Except for certain non-labor activities, durations shall not exceed 14 days, not be less than 1 day, nor exceed \$50,000 in value unless otherwise accepted by the Project Engineer.

- C. Provide allowance for adverse weather. Weather days shall be calculated using NOAA data for the local area and shall be based on a 10-year average for the number of days per month for which rainfall is greater than 0.5 inch. Unused weather days will remain as float in the schedule.
- D. The project owns the float. As such, liability for delay of the project completion date rests with the party causing delay to the project completion date.
- E. Schedules shall show the following as a minimum:
 - 1. A graphic network and computerized tabulation in Bar/Gantt Chart or CPM time-scaled network diagram on 11 x 17-inch sheets, minimum.
 - 2. Holidays that will be observed during construction.
 - 3. Project start date, scheduled completion date and other milestones.
 - 4. A logical succession of work activities performed by Contractor, subcontractors and suppliers from start to finish.
 - 5. Number of planned working days and shifts per week.
 - 6. Testing and settlement periods.
 - 7. Utility notification and relocation.
 - 8. Erection and removal of falsework and shoring.
 - 9. Finish work and final cleanup.
 - 10. Definition of each work activity.
 - 11. Submittal development, delivery, review and approval, including those from Contractor, subcontractors and suppliers.
 - 12. A logical flow of work crews and equipment crews defined by manpower category and labor hours; equipment by type and hours.
 - 13. Earliest starting, earliest completion, latest starting, latest finish, and free and total float for each task or item.
 - 14. Early Completion Time:
 - a. Early completion time may be shown on any schedule provided that the requirements of the Contract are met.
 - b. Contractor may increase early completion time by improving production, reallocating resources to be more efficient, performing sequential activities concurrently or by completing activities earlier than planned.
- F. Provide monthly updates that include the following:
 - 1. Narrative Schedule Report.
 - 2. Revised Schedule as appropriate to reflect approved Change Orders occurring since the prior update
 - 3. Explanation of changes in logic, duration of activities.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Cast-in-place concrete for structural, architectural, and miscellaneous applications.
- B. Coordination:
 - 1. Review installation procedures under other Sections and coordinate the installation of items that must be installed in the concrete.
- C. Related Sections include but are not necessarily limited to:
 - 1. Section 31 23 00 – Earthwork
- D. Measurement and Payment:
 - 1. The contract price for cast-in-place concrete shall include full compensation for all costs and work involved with cast-in-place concrete, under the appropriate sections.

1.2 REFERENCES

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
- B. American Concrete Institute (ACI):
 - 1. 116R – Cement and Concrete Terminology.
 - 2. 117 – Tolerances for Concrete Construction and Materials
 - 3. 207.1R – Mass Concrete.
 - 4. 207.4R – Cooling and Insulating Systems for Mass Concrete.
 - 5. 211.1 – Selecting Proportions for Normal – Heavyweight – and Mass Concrete
 - 6. 211.2 – Selecting Proportions for Structural Lightweight Concrete
 - 7. 214 – Recommended Practice for Evaluation of Strength Test Results of Concrete.
 - 8. 301 – Structural Concrete
 - 9. 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete
 - 10. 305R – Hot Weather Concreting
 - 11. 306R – Cold Weather Concreting
 - 12. 308R – Standard Practice for Curing Concrete
 - 13. 309R – Guide for Consolidation of Concrete
 - 14. 311 – Guide for Concrete Inspection.
 - 15. 318 – Building Code Requirements for Reinforced Concrete and Commentary
 - 16. 350R – Environmental Engineering Concrete Structures.
 - 17. 347R – Guide to Formwork for Concrete
 - 18. SP-66-04 – ACI Detailing Manual
- C. ASTM International (ASTM):
 - 1. C31/C31M-08 – Making and Curing Concrete Test Specimens in the field
 - 2. C33-07 – Concrete Aggregates

3. C39/C39M-05 – Compressive Strength of Cylindrical Concrete Specimens
 4. C94/C94M-07 – Ready-Mixed Concrete
 5. C143/C143M-05 – Slump of Hydraulic Cement Concrete
 6. C150-07 – Portland Cement
 7. C157 – Test Method for Length of Change of Hardened Hydraulic-Cement Mortar and Concrete.
 8. C171-07 – Sheet Materials for Curing Concrete
 9. C172-07 – Sampling Freshly Mixed Concrete
 10. C173-07 – Air Content of Freshly Mixed Concrete by the Volumetric Method
 11. C192/C192M-07 – Making and Curing Concrete Test Specimens in the Laboratory
 12. C231-08 – Air Content of Freshly Mixed Concrete by the Pressure Method
 13. C260-06 – Air-Entraining Admixtures for Concrete
 14. C309-07 – Liquid Membrane-Forming Compounds for Curing Concrete
 15. C330-05 – Lightweight Aggregates for Structural Concrete
 16. C494/C494M-08 – Chemical Admixtures for Concrete
 17. C496-06 – Splitting Tensile Strength of Cylindrical Concrete Specimens
 18. C567-05 – Density of Structural Lightweight Concrete
 19. C618-08 – Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
 20. C666/C666M-03 – Resistance of Concrete to Rapid Freezing and Thawing
 21. C881/C881M-02 – Epoxy-Resin-Base Bonding Systems for Concrete
 22. C1107/1107M-07 – Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
 23. C1315-08 Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
 24. D6-95(R2006) – Loss on Heating of Oil and Asphaltic Compounds
 25. D297-93(R2006) – Rubber Products-Chemical Analysis
 26. D1751-04 – Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
 27. D4397-02 – Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
 28. E329 – Specification for Agencies Engaged in the Testing and/or Analysis of Materials Used in Construction.
 29. E1155-96(R2008) – Determining F_F Floor Flatness and F_L Floor Levelness Numbers
- D. American Welding Society (AWS):
1. D1.4-05 – Structural Welding Code - Reinforcing Steel
- E. American National Standards Institute and American Hardboard Association (ANSI/AHA):
1. A135.4-2004 – Basic Hardboard
- F. American Association of State Highway and Transportation Officials
1. AASHTO M 182 – Burlap Cloth Made from Jute or Kenaf.
- G. Concrete Reinforcing Steel Institute (CRSI):
1. Handbook 2008
- H. National Cooperative Highway Research Program (NCHRP):
1. Report On – Concrete Sealers for the Protection of Bridge Structures

1.3 DESCRIPTION

- A. Provide all labor, materials, equipment, and appurtenances as shown, specified, and required to furnish, place, finish, and cure cast-in-place concrete where shown on the drawings and specified herein.
- B. Providing openings in concrete to accommodate the Work under this and other Sections, and build into the concrete all items including sleeves, frames, anchor bolts, inserts, and all other embedded items.
- C. Classes of Concrete:
 - 1. All concrete shall be steel reinforced Class "A" concrete per paragraph 2.3 A unless indicated otherwise.

1.4 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures for general submittal requirements and content.
- B. Concrete Design Mix:
 - 1. The following information must be submitted completely to satisfy submittal requirements:
 - a. Design Mix Proportions.
 - b. Cement Information.
 - c. Aggregate Information.
 - d. Admixture Information.
 - e. Measured Slump and Air Content.
 - f. 7 day and 28 day Compressive Strength Tests.
 - 2. Concrete Mix Design:
 - a. Submit complete concrete design mix information as outlined in paragraph 2.3 herein.
- C. Temperature monitoring system:
 - 1. Manufacturer's literature, illustrations, directions, specifications, rated capacities, make, and model of each component of the temperature monitoring system.
 - 2. Detailed description of the temperature monitoring system including placement of sensors and wire leads and location and operation of equipment for determining and recording temperatures.
 - 3. Detailed drawings showing the layout and designation of all temperature sensors for each mass concrete placement.
- D. Temperature control system:
 - 1. Detailed description of the temperature control system including placement of insulation blankets coordinated with curing.
- E. Cement Information:
 - 1. Submit certified copies of mill test reports covering chemical and physical properties of cement included in concrete design mix.
- F. Aggregate Information:
 - 1. Submit the following information on the aggregates used in the concrete design mix:
 - a. Complete identification of aggregate source of supply.

- b. Sieve analysis report of fine and coarse aggregates to show compliance with specified requirements.
 - c. Scale weight of each aggregate.
 - d. Absorbed water in each aggregate.
 - e. Laboratory test verifying that aggregate material contains less than 1% asbestos by weight or volume.
- G. Admixture Information:
- 1. Submit manufacturer's literature that shows compliance with ASTM C260 for air entraining admixtures, and with ASTM C494, Type A for water reducing admixtures.
 - 2. Submit manufacturer's literature for set control and high-range water reducing admixtures where the use of the admixture will enhance the placement of concrete while maintaining the required strength and durability.
 - 3. All submitted admixtures must be included and tested in the concrete design mix to predetermine satisfactory results.
 - 4. Submit notarized certification of conformance to referenced standards when requested by the Engineer.
- H. Test Reports for Mix Design:
- 1. Submit copies of test reports for the following:
 - a. Concrete design mix batch tests.
 - b. Production concrete quality control tests.
 - 2. The laboratory tests should list the information outlined in Articles 1.5 and 3.9B herein.
 - 3. Engineer's review of test reports will be to confirm compliance with the specified requirements.
- I. Delivery Tickets:
- 1. Furnish to field Engineer copies of all delivery tickets for each load of concrete delivered to the site. Provide the following items of information on the delivery tickets:
 - a. Project name.
 - b. Amount of concrete being delivered.
 - c. Time that water was added to the dry ingredients.
 - d. Other items as specified in ASTM C94, Section 15.
 - e. Amount of water, if any, was added on-site.
- J. Epoxy Bonding Agent:
- 1. Submit manufacturer's literature that shows compliance with requirements for epoxy bonding agent as outlined herein.
- K. Concrete Crack Repair System:
- 1. Submit manufacturer's literature that shows compliance with requirements for concrete crack repair system as outlined herein.
- L. Concrete Surface Repair Materials
- 1. Submit manufacturer's literature that shows compliance with requirements for concrete surface repair materials as outlined herein.
- M. Reinforcing Steel
- 1. Mill test certificates identifying chemical and physical analysis of each load of reinforcing steel delivered. If mill tests are unavailable and the quantity of steel for a

structure exceeds 5 tons, provide a laboratory test to prove conformance with the specified ASTM standard.

2. Bending lists and placing drawings for all reinforcing steel. Placing drawings shall indicate all openings including additional reinforcing at openings and corner bar arrangements indicated in the typical detail and structural drawings. Placing drawings shall be coordinated with the concrete placing schedule. Each bending list and placing drawing submitted shall be complete for each major element of a structure including dowels and corner bars. Furnishing such lists shall not be construed that the lists will be reviewed for accuracy. The Contractor shall be wholly and completely responsible for the accuracy of the lists and for furnishing and placing reinforcing steel in accordance with the details shown in the drawings and as specified. Placing drawings shall be prepared by the Contractor and shall not be photo copies of the contract drawings.

1.5 QUALITY ASSURANCE

A. Concrete Testing Service:

1. Employ a testing laboratory experienced in design and testing of concrete materials and mixes to perform material evaluation tests and to design concrete mixes.
 - a. Testing agency shall meet the requirements of ASTM E329.
 - b. Selection of a testing laboratory is subject to Engineer's approval.
 - c. Submit a written description of the proposed concrete testing laboratory giving qualifications of personnel, laboratory facilities and equipment, and other information that may be requested by Engineer.
2. Materials and installed Work may require testing and retesting, as directed by Engineer, at any time during the progress of the Work. Allow free access to material stockpiles and facilities at all times. Tests not specifically indicated to be done at Owner's expense, including the retesting of rejected materials and installed Work, shall be done at no additional cost to the Owner.

B. Qualifications of Water Reducing Admixture Manufacturer:

1. Water reducing admixtures shall be manufactured under strict quality control in facilities operated under a quality assurance program. Furnish copy of manufacturer's quality assurance handbook to document the existence of the program. Manufacturer shall maintain a concrete testing laboratory which has been approved by the Cement and Concrete Reference Laboratory at the Bureau of Standards, Washington, D.C.
2. Provide a qualified concrete technician employed by the admixture manufacturer to assist in proportioning the concrete for optimum use of the admixture. The concrete technician shall advise on proper addition of the admixture to the concrete and on adjustment of the concrete mix proportions to meet changing jobsite conditions.

C. Laboratory Trial Batch:

1. Each concrete mix specified shall be verified by a laboratory trial batch, unless one has been prepared within the past 6 months.
2. Each trial batch shall include the following testing:
 - a. Aggregate gradation for fine and coarse aggregates.
 - b. Fly ash testing to verify meeting specified properties, unless certification by an independent testing laboratory is provided by the fly ash supplier.
 - c. Slump.
 - d. Air content.
 - e. Compressive strength based on 3 cylinders each tested at 7-days and at 28-days.
 - f. Shrinkage test as specified herein for Class A and B concretes.

3. Each trial batch shall provide the following information:
 - a. Project identification name and number.
 - b. Date of report.
 - c. Complete identification of aggregate source of supply.
 - d. Tests of aggregates for compliance with specified requirements.
 - e. Scale weight of each aggregate.
 - f. Absorbed water in each aggregate.
 - g. Brand, type and composition of cement.
 - h. Brand, type and amount of each admixture.
 - i. Amounts of water used in trial mixes.
 - j. Proportions of each material per cubic yard.
 - k. Gross weight and yield per cubic yard of trial mixtures.
 - l. Measured slump.
 - m. Measured air content.
 - n. Compressive strength developed at 7 days and 28 days, from not less than 3 test cylinders cast for each 7-day and 28-day test, and for each design mix.
 - o. Shrinkage test results where required and as specified herein.

D. Tests for Concrete Materials:

1. Submit written reports to Engineer, for each material sampled and tested. Provide the Project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 65 00 – Delivery, Storage, and Handling for general requirements.
- B. All materials used for concrete must be kept clean and free from all foreign matter during transportation and handling and kept separate until measured and placed in the mixer. Bins or platforms having hard clean surfaces shall be provided for storage. Suitable means shall be taken during hauling, piling and handling to ensure that segregation of the coarse and fine aggregate particles does not occur and the grading is not affected.
- C. Conform to ACI 304. Store aggregate separately for each kind or grade, to prevent segregation of sizes and avoid inclusion of dirt and other materials.
- D. Deliver cement in original sealed containers bearing name of brand and manufacturer, and marked with net weight of contents. Store in suitable watertight building in which floor is raised at least 300-mm (1-foot) above ground. Store bulk cement and fly ash in separate suitable bins.
- E. Deliver other packaged materials for use in concrete in original sealed containers, plainly marked with manufacturer's name and brand, and protect from damage until used.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cementitious Materials

1. Cement:
 - a. Portland cement, ASTM C 150, Type II/V.
 - b. Use portland cement made by a single manufacturer and produced by not more than one plant.
 - c. Unless otherwise specified, under normal conditions of supply, only 1 brand of cement from the same mill shall be used for concrete mix design and throughout the duration of the Project.
2. Pozzolan:
 - a. Fly Ash:
 - 1) Fly ash shall meet the requirements of ASTM C618 Class F, except as follows:
 - a) The loss on ignition shall be a maximum of 4%.
 - b) The maximum amount of sulfur trioxide (SO₃) shall be 4.0 percent.
 - 2) Fly ash shall be considered to be a cementitious material.
3. Ground Granulated Blast Furnace Slag:
 - a. Ground granulated blast furnace slag (GGBS) mineral admixture, when used, shall meet the requirements of ASTM C989, Grade 100 or better.
 - b. GGBS shall be considered to be a cementitious material.

B. Aggregates:

1. General:
 - a. Comply with ASTM C33 containing less than 1 percent asbestos by weight and as herein specified:
 - b. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, ochre, or other materials that can cause stains on exposed concrete surfaces.
2. Fine Aggregate:
 - a. Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances.
 - 1) Dune sand, bank run sand, and manufactured sand are not acceptable.
 - b. Aggregate shall pass a 4.75-mm (No. 4) sieve, 10 percent maximum shall pass a 150- μ m (No. 100) sieve.
3. Coarse Aggregate:
 - a. Clean, uncoated, crushed stone, processed from natural rock or stone processed aggregate containing no clay, mud, loam, or foreign matter.
 - 1) Washed gravel, either natural or crushed. Use of slag and pit or bank run gravel is not permitted.
 - b. Size: ASTM C33, Nos. 57 or 67, except that No. 467 may be used for footings, foundation mats, and walls 16-inches or greater in thickness.

- C. Water: Clean, free from injurious amounts of oils, acids, alkalis, organic materials or other substances that may be deleterious to concrete or steel.

2.2 CONCRETE ADMIXTURES

- A. Provide admixtures produced by established reputable manufacturers, and use in compliance with the manufacturer's printed instruction. Do not use admixtures that have not been

incorporated and tested in the accepted mixes, unless otherwise authorized in writing by Engineer.

B. Air Entraining Admixtures: ASTM C260.

1. Product and Manufacturer: Provide one of the following:
 - a. SIKA AER, as manufactured by Sika Corporation.
 - b. MB VR, as manufactured by Master Builders Inc.
 - c. Daravair, as manufactured by W.R. Grace & Conn.
 - d. Or approved equal.

C. Water Reducing Admixture: ASTM C494, Type A.

1. Proportion all Class "A" and Class "B" concrete with non-air entraining, normal setting, water reducing, aqueous solution of a modification of the salt of polyhydroxylated organic acids. The admixture shall not contain any lignin, nitrates, or chlorides added during manufacture.
2. Product and Manufacturer: Provide one of the following:
 - a. Eucon WR 75, as manufactured by The Euclid Chemical Company.
 - b. Pozzolith, as manufactured by Master Builders Inc.
 - c. WRDA-15, as manufactured by W.R. Grace & Conn.
 - d. Or approved equal.

D. Set Control Admixtures: ASTM C494, as follows:

1. Type B, Retarding.
2. Type C, Accelerating.
3. Type D, Water reducing and Retarding.
4. Type E, Water reducing and Accelerating.
5. Type F, Water-reducing, high range admixtures.
6. Type G, Water-reducing, high range, and retarding admixtures.

E. Prohibited Admixtures:

1. Do not use calcium chloride or thiocyanate in concrete, unless otherwise authorized in writing by Engineer. Do not use admixtures containing calcium chloride where concrete is placed against galvanized steel.

2.3 PROPORTIONING AND DESIGN OF MIXES

A. Prepare concrete design mixes subject to the following limitations:

Class	Coarse Aggregate		Minimum Cement (lbs/cy)	Maximum W/C	Slump	Air (%)	Minimum Compressive Strength (psi)
	Size A	Size B					
A	#57	#8	590(2)	0.44	3.5" +/- 1"	6 +/- 1	4500
B	#67 or 467	#8	505(2)	0.44	3.5" +/- 1"	6 +/- 1	3200

B. Type of work for each concrete class:

1. Class A concrete for all structures and concrete not otherwise specified. Concrete fill at structure foundations, cradle, supports across pipe trenches and reinforced pipe encasements.

2. Class B concrete for valley gutter.
- C. Notes:
1. Coarse aggregate size numbers refer to ASTM C33. Where a size A and B are listed, it is intended that the smaller size B aggregate is to be added, replacing a portion of the coarse and /or fine aggregate, in the minimum amount necessary to make a workable and pumpable mix with a sand content not exceeding 41% of total aggregate.
 2. Cementitious material shall consist of cement and either fly ash as 30 percent of total cementitious material or GGBS as 65 percent of total cementitious material. Cementitious material shall not consist of Type I or III cement.
 3. The slumps listed are prior to the addition of high range water reducer (super plasticizer)
 4. Mix designs shall be made so that the compressive strength achieved for the laboratory trial batches will be no less than 125% of the specified design strength. This is to assure meeting the design strength for all concrete batched during the project.
- D. Use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix designs.
1. The testing facility shall not be the same as used for field quality control testing.
- E. Proportion mixes through the use of laboratory trial batches using materials to be employed on the Project for concrete required. Comply with ACI 211.1.
- F. Submit written reports to Engineer of proposed mix of concrete at least 15-days prior to start of Work. Do not begin concrete production until mixes have been approved by Engineer.
- G. Laboratory Trial Batches: Prepare test specimens and conduct strength tests as specified in ACI 301, Chapter 3 Proportioning. However, 4,500-psi concrete mixes need not be designed for greater than 5,700-psi regardless of the production facility's standard deviation.
- H. Adjustment to Concrete Mixes: Mix design adjustments may be requested when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to the Owner and as accepted by Engineer. Laboratory test data for revised mix designs and strength results must be submitted to and accepted by Engineer before using the revised mixes.
- I. Admixtures:
1. Use air entraining admixture in all concrete, except interior slabs subject to abrasion, unless otherwise shown or specified. Add air entraining admixture at the manufacturer's prescribed rate to result in concrete at the point of placement having air content within the prescribed limits.
 2. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities and types of admixtures as required to maintain quality control.
- J. Slump Limits:
1. Proportion and design mixes to result in concrete slump at the point of placement of not less than 1-inch and not more than 4-inches.

2.4 TEMPERATURE CONTROL SYSTEM

A. Insulation

1. Insulation shall be of a type that is effective in a wet environment. Insulation shall be flexible or rigid foam sheets or quilted insulation blankets. Insulation R value of 2 or less shall be selected such that a minimum of two layers will be required.
2. Provide accessory material required to keep insulation in position and protected, such as plywood sheets, seam tapes, and sand bags as required.

2.5 EPOXY BONDING AGENT

A. Provide an epoxy resin bonding agent, two component, polysulfide type.

B. Product and Manufacturer: Provide one of the following:

1. Sikadur 32, Hi Mod LPL, as manufactured by Sika Corporation.
2. Eucopoly LPL, as manufactured by the Euclid Chemical Company.
3. Or approved equal.

2.6 CONCRETE CRACK REPAIR SYSTEM

A. Epoxy Crack Repair System:

1. Provide a two-component, moisture insensitive, polyamide based epoxy resin system for repair of structural cracks as outlined in these Specifications. Epoxy injection resin to comply with ASTM C 881, Type 1, Grade 1, Class B and C. Follow manufacturer's installation procedures.
2. Product and Manufacturer: Provide one of the following:
 - a. Sikadur Hi-Mod L.V. and Hi-Mod Gel by Sika Chemical Corp.
 - b. Euco Epoxy #452 L.V. and #452 Gel by the Euclid Chemical Company.
 - c. Or approved equal.

B. Flexible Polymer Crack Repair System:

1. Repair "moving" cracks and leaking expansion joints, as directed by the Engineer. Provide hydrophobic polyurethane chemical foam grout that exhibits tensile strength properties of at least 10 psi and 25% elongation, with 0% shrinkage. Follow manufacturer's installation procedures.
 - a. Product and Manufacturer:
 - 1) Mountain Grout, By Green Mountain, Inc.
 - 2) Sikafix HH, by Sika Chemical Corp.
 - 3) Or approved equal.

2.7 CONCRETE SURFACE REPAIR MATERIALS

A. Polymer Modified Repair Mortar

1. Provide a polymer modified cementitious coating for patching or resurfacing defective concrete surfaces.
2. Product and Manufacturer:
 - a. Euco Thin Coat or Euco Concrete Coat by the Euclid Chemical Company.
 - b. Sika-Top by Sika Chemical Corp.
 - c. Or approved equal.

2.8 CONCRETE CURING MATERIALS

- A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 10 ounces per square yard and complying with AASHTO M182, Class 3.
- B. Moisture Retaining Cover: One of the following, complying with ASTM C171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. White burlap polyethylene sheet.
- C. Curing Compound: ASTM C309 Type 1 D (water retention requirements):
 - 1. Product and Manufacturer: Provide one of the following:
 - a. Super Aqua Cure VOX, as manufactured by The Euclid Chemical Company.
 - b. Sealtight 1100, as manufactured by W.R. Meadows, Incorporated.
 - c. MasterKure, as manufactured by Master Builders, Inc.
 - d. Or approved equal.
 - 2. Provide without fugitive dye when requested by Engineer.

2.9 FORMWORK

- A. Design forms according to ACI 347.
- B. Class I Forms: Use steel forms, ply form, or smooth-surface plywood 3/4-inch minimum thickness for straight surfaces and 1/2-inch minimum thickness for curved surfaces.
- C. Class II Forms: Use plywood in good condition, metal, or smooth-planed boards free from large or loose knots with tongue and groove or ship lap joints.
- D. Class II forms may be used for exterior concrete surfaces that are 1 foot or more below finished grade. Use Class I forms for all other surfaces.
- E. Coat forms with form release agent.
- F. Form Release Agent
 - 1. Form release agent shall effectively prevent absorption of moisture and prevent bond with the concrete. Agent shall be nonstaining and nontoxic after 30 days.
 - 2. For steel forms, release agent shall prevent discoloration of the concrete due to rust.

2.10 REINFORCING STEEL

- A. Reinforcement shall conform to ASTM A615 or A706, Grade 60.
- B. Fabricate reinforcing in accordance with the current edition of the Manual of Standard Practice, published by the Concrete Reinforcing Steel Institute. Bend reinforcing steel cold.
- C. Deliver reinforcing steel to the site bundled and with identifying tags.
- D. Tie Wire
 - 1. Tie wire shall be 16 gauge minimum, black, soft annealed.

E. Bar Supports

1. Bar supports in beams and slabs exposed to view after form stripping shall be galvanized and plastic coated. Use concrete supports for reinforcing in concrete placed on grade.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the substrate and the conditions under which Work is to be performed and notify Engineer in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Engineer.

3.2 FORMS

A. Form Tolerances

1. Failure of the forms to produce the specified concrete surface and surface tolerance shall be grounds for rejection of the concrete work. Rejected work shall be repaired or replaced at no additional cost to the Owner.
2. The following table indicates tolerances or allowable variations from dimensions or positions of structural concrete work:

	Maximum Tolerance (inch)
Sleeves and inserts	±1/4
Projected ends of anchors	+1/4 -0.0
Anchor bolt setting	±1/4
Finished concrete, all locations except ringwall footing	±1/4 in 10 feet Max ±1 inch in total length
Ringwall footing	
Overall average elevation	±1/4
Maximum difference in elevation across ring	±1/4
Maximum difference in level over 16 feet	±1/8

The planes or axes from which the above tolerances are to be measured shall be as follows:

Sleeves and inserts:	Centerline of sleeve or insert
Projected ends of anchors:	Plane perpendicular to the end of the anchor as located in the drawings.
Anchor bolt setting:	Centerline of anchor bolt.
Finish concrete:	The concrete surface as defined in the drawings.

Where equipment is to be installed, comply with manufacturer's tolerances if more restrictive than above.

B. Form Surface Preparation

1. Clean form surfaces to be in contact with concrete of foreign material prior to installation.

2. Coat form surfaces in contact with concrete with a release agent prior to form installation.

C. Form Reuse

1. Reuse only forms that provide a uniform surface texture on exposed concrete surfaces. Apply light sanding or other surface treatment between uses for uniform texture. Plug unused tie rod holes with corks, shave flush, and sand the concrete surface side. Do not patch forms other than filling tie rod holes, except in the case of Class II forms. Do not use metal patching discs on Class I forms.

D. Removal of Forms

1. The following table indicates the minimum allowable time after the last cast concrete is placed before forms, shoring, or wall bracing may be removed:

Sides of slabs on grade, curbs, miscellaneous concrete	24 hours
Sides of ringwall footing and pump pads	48 hours

2. Do not remove forms from concrete that has been placed with outside air temperature below 50°F without first determining if the concrete has properly set without regard for time. Do not apply heavy loading on green concrete. Immediately after forms are removed, the surface of the concrete shall be carefully examined and any irregularities in the surface shall be repaired and finished as specified.

E. Formed Openings

1. Openings shall be of sufficient size to permit final alignment of pipes or other items without deflection or offsets of any kind. Provide a slight flare to facilitate grouting and the escape of entrained air during grouting. Provide formed openings with reinforcement as indicated in the typical structural details. Reinforcing shall be at least 2 inches clear from the opening surfaces and encased items.

3.3 EMBEDDED ITEMS

- A. Set anchor bolts and other embedded items accurately and hold securely in position until the concrete is placed and set. Check all special castings, channels, or other metal parts that are to be embedded in the concrete prior to and again after concreting.

3.4 BEVELED EDGES (CHAMFER)

- A. Form 3/4-inch beveled edges on exposed concrete edges and corners, and where indicated in the drawings. Reentrant corners in concrete members shall not have fillets, unless shown otherwise in the drawings. The top edges of slabs, walkways, beams, and walls may be beveled with an edging trowel in lieu of using chamfer strips.

Both the top outside corner and the top inside corner of the tank ringwall footing shall be chamfered. Accurate placement of these chamfer strips on the forms will assist the contractor in meeting the form tolerances specified herein and will enable the Owner's Representative to check the accuracy of the form work prior to concrete placement.

3.5 PLACING REINFORCEMENT

- A. Place reinforcing steel in accordance with the current edition of Recommended Practice for Placing Reinforcing Bars, published by the Concrete Reinforcing Steel Institute.

- B. Place reinforcing in accordance with the following, unless otherwise indicated:
 - 1. Reinforcement indicated in the drawings is continuous through the structure to the farthest extent possible. Terminate bars and hooks 2 inches clear from faces of concrete.
 - 2. Splices may be used to provide continuity due to bar length limitations. Minimum length of bars spliced for this reason is 30 feet. Splicing of reinforcement that is detailed to be continuous in the drawings is not permitted.
- C. Reinforcing steel, before being positioned and just prior to placing concrete, shall be free from loose mill and rust scale and from any coatings that may destroy or reduce the bond. Clean reinforcing steel by sandblasting or wire brushing and remove mortar, oil, or dirt to remove materials that may reduce the bond.
- D. Do not straighten or rebend reinforcing steel in the field. Do not use reinforcing with bends not shown in the drawings or the accepted shop drawings.
- E. Position reinforcing steel in accordance with the drawings and secure by using annealed wire ties or clips at intersections and support by concrete or metal supports, spacers, or metal hangers. Do not place metal clips or supports in contact with the forms. Bend tie wires away from the forms to provide the specified concrete coverage. Bars, in addition to those shown in the drawings, which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at his own expense.
- F. Place reinforcement a minimum of 2 inches clear of any metal pipe or fittings.
- G. Secure reinforcing dowels in place prior to placing concrete. Do not press dowels into the concrete after the concrete has been placed.

3.6 CONCRETE MIXING

- A. General:
 - 1. Concrete may be produced at batch plants or it may be produced by the ready mixed process. Batch plants shall comply with the recommendations of ACI 304, and shall have sufficient capacity to produce concrete of the qualities specified, in quantities required to meet the construction schedule. All plant facilities are subject to testing laboratory inspection and acceptance of Engineer.
 - 2. Mixing:
 - a. Mix concrete with an approved rotating type batch machine, except where hand mixing of very small quantities may be permitted.
 - b. Remove hardened accumulations of cement and concrete frequently from drum and blades to assure acceptable mixing action.
 - c. Replace mixer blades when they have lost 10 percent of their original height.
- B. Job Site Mixing: When job site mixing of concrete is permitted, mix all materials for concrete in an acceptable drum type batch machine mixer. For mixers of one cubic yard, or smaller capacity, continue mixing at least 1 1/2 minutes, but not more than 5 minutes after all ingredients are in the mixer, before any part of the batch is released. For mixers of capacity larger than one cubic yard, increase the minimum 1 1/2 minutes of mixing time by 15 seconds for each additional cubic yard, or fraction thereof. Do not exceed the catalog rating or nameplate capacity for the total volume of materials used per batch. Equip the mixer with automatic controls, or semi-automatic controls if acceptable, for proportioning materials and

the proper measured quantities. Do not exceed 45 minutes total elapsed time between intermingling of damp aggregates and cement to the discharge of the completed mix.

1. Provide a batch ticket for each batch discharged and used in the Work, indicating the project identification name and number, date, mix type, mix time, quantity and amount of water introduced.
2. Use quantities such that a whole number of bags of cement is required, unless otherwise permitted.

C. Ready Mix Concrete:

1. Comply with the requirements of ASTM C94, and as herein specified. Proposed changes in mixing procedures, other than herein specified, must be accepted by Engineer before implementation.
 - a. Plant equipment and facilities: Conform to National Ready Mix Concrete Association "Plant and Delivery Equipment Specification".
 - b. Mix concrete in revolving-type truck mixers that are in good condition and that produce thoroughly mixed concrete of the specified consistency and strength.
 - c. Do not exceed the proper capacity of the mixer.
 - d. Mix concrete for a minimum of two minutes after arrival at the job site, or as recommended by the mixer manufacturer.
 - e. Do not allow the drum to mix while in transit.
 - f. Mix at proper speed until concrete is discharged.
 - g. Maintain adequate facilities at the job site for continuous delivery of concrete at the required rates.
 - h. Provide access to the mixing plant for Engineer at all times.
 - i. Maximum water content shall not be exceeded. Upon approval of the Engineer, if all water allowed by the specification has not been added at the start of mixing, it may be permissible to add remaining allowable water at the point of delivery.
 - j. The production of concrete of excessive slump or adding water in excess of the proportioned water-cement ratio to compensate for slump loss resulting from delays in delivery or placing is prohibited.

- D. Maintain equipment in proper operating condition, with drums cleaned before charging each batch. Schedule rates of delivery in order to prevent delay of placing the concrete after mixing, or holding dry mixed materials too long in the mixer before the addition of water and admixtures.

3.7 TRANSPORTING CONCRETE

- A. Transport and place concrete not more than 90 minutes after water has been added to the dry ingredients.
- B. Take care to avoid spilling and separation of the mixture during transportation.
- C. Do not place concrete in which the ingredients have been separated.
- D. Do not retemper partially set concrete.
- E. Use suitable and approved equipment for transporting concrete from mixer to forms.

3.8 CONCRETE PLACEMENT

- A. General: Place concrete continuously so that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as specified by the Engineer. Deposit concrete at close intervals and as nearly as practical in its final location to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure that will cause segregation.
1. Screed concrete that is to receive other construction to the proper level to avoid excessive skimming or grouting.
 2. Do not use concrete that becomes non plastic and unworkable, or does not meet the required quality control limits, or that has been contaminated by foreign materials. Do not use retempered concrete. Remove rejected concrete from the job site and dispose of it in an acceptable location.
 3. Do not place concrete until all forms, bracing, reinforcement, and embedded items are in final and secure position.
 4. Do not place footings in freezing weather unless adequate precautions are taken against frost action.
 5. Do not place footings, piers or pile caps on frozen soil.
 6. Unless otherwise approved, place concrete only when Engineer is present.
- B. Concrete Conveying:
1. Handle concrete from the point of delivery and transfer to the concrete conveying equipment and to the locations of final deposit as rapidly as practical by methods that will prevent segregation and loss of concrete mix materials.
 2. Provide mechanical equipment for conveying concrete to ensure a continuous flow of concrete at the delivery end. Provide runways for wheeled concrete conveying equipment from the concrete delivery point to the locations of final deposit. Keep interior surfaces of conveying equipment, including chutes, free of hardened concrete, debris, water, snow, ice and other deleterious materials.
 3. Do not use chutes for distributing concrete unless approved in writing by Engineer.
 - a. Provide sketches showing methods by which chutes will be employed when requesting such approval.
 - b. Design chutes, if permitted, with proper slopes and supports to permit efficient handling of the concrete.
 4. Pumping concrete is permitted, however do not use aluminum pipe for conveying.
- C. Placing Concrete into Forms:
1. Deposit concrete in forms in horizontal layers not deeper than 18-inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place concrete at such a rate that concrete that is being integrated with fresh concrete is still plastic.
 2. Do not permit concrete to free fall within the form from a distance exceeding 4-feet. Use "elephant trunks" to prevent free fall and excessive splashing on forms and reinforcement.
 3. Remove temporary spreaders in forms when concrete placing has reached the elevation of such spreaders.
 4. Consolidate concrete placed in forms by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with the applicable recommended practices of ACI 309.

Vibration of forms and reinforcing will not be permitted, unless otherwise accepted by Engineer.

5. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate the layer of concrete and at least 6-inches into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit the duration of vibration to the time necessary to consolidate the concrete and complete embedment of reinforcement and other embedded items without causing segregation of the mix.
6. Do not place concrete in beam and slab forms until the concrete previously placed in columns and walls is no longer plastic.
7. Force concrete under pipes, sleeves, openings and inserts from one side until visible from the other side to prevent voids.

D. Placing Concrete Slabs:

1. Deposit and consolidate concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is completed.
2. Consolidate concrete during placing operations using mechanical vibrating equipment, so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Consolidate concrete placed in beams and girders of supported slabs, and against bulkheads of slabs on ground, as specified for formed concrete structures.
4. Bring slab surfaces to the correct level. Smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.

E. Bonding for Next Concrete Pour: Roughen surfaces of set concrete at all joints. Construction joints shown on the Drawings are specified in Section 03 15 16 of these Specifications. Clean surfaces of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner to expose bonded aggregate uniformly and to not leave laitance, loose particles of aggregate or damaged concrete at the surface.

1. Prepare for bonding of fresh concrete to new concrete that has set but is not fully cured, as follows:
 - a. Thoroughly wet the surface but allow no free-standing water.
2. Bonding of fresh concrete to fully cured hardened concrete or existing concrete, and horizontal surfaces that will receive a topping shall be accomplished by using an epoxy resin bonding agent as specified in Section 03 25 10 of these Specifications.

F. Quality of Concrete Work:

1. Make all concrete solid, compact and smooth, and free of laitance, cracks and cold joints.
2. All concrete for liquid retaining structures, and all concrete in contact with earth, water, or exposed directly to the elements shall be watertight.
3. Cut out and properly replace to the extent ordered by Engineer, or repair to the satisfaction of Engineer, surfaces that contain cracks or voids, are unduly rough, or are in any way defective. Thin patches or plastering will not be acceptable.
4. All leaks through concrete, and cracks, holes or other defective concrete in areas of potential leakage, shall be repaired and made watertight by Contractor.
5. Repair, removal, and replacement of defective concrete as ordered by Engineer shall be at no additional cost to Owner.

G. Cold Weather Placing:

1. Protect all concrete Work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 306 and as herein specified.
2. When the air temperature has fallen to or may be expected to fall below 40 °F, provide adequate means to maintain the temperature, in the area where concrete is being placed, at between 50 °F and 70 °F for at least seven days after placing. Provide temporary housings or coverings including tarpaulins or plastic film. Maintain the heat and protection, if necessary, to ensure that the ambient temperature does not fall more than 30 °F in the 24 hours following the seven day period. Avoid rapid dry out of concrete due to overheating, and avoid thermal shock due to sudden cooling or heating.
3. When air temperature has fallen to or is expected to fall below 40 °F, uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 55 °F and not more than 85 °F at point of placement.
4. Do not use frozen materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Ascertain that forms, reinforcing steel, and adjacent concrete surfaces are entirely free of frost, snow and ice before placing concrete.
5. Do not use salt and other materials containing antifreeze agents or chemical accelerators, or set control admixtures, unless approved by Engineer, in mix designs.

H. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
2. When ambient air temperature is at or above 90 °F, cool ingredients before mixing to maintain concrete temperature at time of placement below 80 °F when the temperature is rising and below 85 °F when the temperature is falling. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated in the total amount of mixing water.
3. Cover reinforcing steel with water soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
4. Wet forms thoroughly before placing concrete.
5. Do not place concrete at a temperature so as to cause difficulty from loss of slump, flash set, or cold joints.
6. Do not use set control admixtures unless approved by Engineer in mix designs.
7. Obtain Engineer's approval of other methods and materials proposed for use.

3.9 CONCRETE CURING

- A. Curing shall be by the moist cure methods. The moist cure method shall use curing mats kept wet by soaker hoses with a moisture retaining cover over the entire system.
- B. Adjust curing water temperature to be no more than 30 °F cooler than surface concrete temperature.
- C. Maintain curing for a minimum period of 14-days.

3.10 FINISH OF FORMED SURFACES

A. Rough Form Finish:

1. Standard rough form finish shall be the concrete surface having the texture imparted by the form material used, with tie holes and defective areas repaired and patched with mortar of 1 part cement to 1½ parts sand and all fins and other projections exceeding ¼-inch in height rubbed down or chipped off.
2. Use rough form finish for the following:
 - a. Tank ringwall footing below finished grade not exposed to view.

B. Steel Trowel Finish:

1. Produce smooth finish without local depressions or high points and apply a light broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of drainage.
2. Use steel trowel finish for the following:
 - a. Tank ringwall footing above finished grade.
 - b. Other cast in place concrete exposed to view.

3.11 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperature, and maintain without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete.
2. Start initial curing after placing and finishing concrete as soon as free moisture has disappeared from the concrete surface. Keep continuously moist for not less than 72 hours.
3. Begin final curing procedures immediately following initial curing and before the concrete has dried. Continue final curing for at least 7-days and in accordance with ACI 301 procedures. For concrete sections over 30-inches thick, continue final curing for an additional 7-days, minimum. Avoid rapid drying at the end of the final curing period.

B. Curing Methods:

1. Perform curing of concrete by moist curing, or by moisture retaining cover curing. Use curing compound only in cold weather and only when permitted by Engineer.
 - a. For curing, use water that is free of impurities that could etch or discolor exposed, natural concrete surfaces.
2. Provide moisture curing by any of the following methods:
 - a. Keeping the surface of the concrete continuously wet by covering with water.
 - b. Continuous water fog spray.
 - c. Covering the concrete surface with the specified absorptive cover, thoroughly saturating the cover with water, and keeping the absorptive cover continuously wet with sprinklers or porous hoses. Place absorptive cover so as to provide coverage of the concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
3. Provide moisture retaining cover curing as follows:
 - a. Cover the concrete surfaces with the specified moisture retaining cover for curing concrete, placed in the widest practical width with sides and ends lapped at least 3-inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.

4. Provide liquid curing compound as follows:
 - a. Apply the specified curing compound to all concrete surfaces when permitted by Engineer. Slabs to receive chemical resistant heavy duty concrete topping shall not be cured with liquid curing compound, but shall be moisture cured. The compounds shall be applied immediately after final finishing in a continuous operation by power spray equipment in accordance with the manufacturer's directions. Recoat areas that are subjected to heavy rainfall within 3 hours after initial application. Maintain the continuity of the coating and repair damage to the coat during the entire curing period. For concrete surfaces that will be in contact with potable water, the manufacturer shall certify that the curing compound used is EPA approved.
- C. Curing. Formed Surfaces:
 1. Cure formed concrete surfaces, including the undersides of girders, beams, supported slabs and other similar surfaces by moist curing with the forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- D. Curing Unformed Surfaces:
 1. Initially cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by using the appropriate method specified above.
 2. Final cure unformed surfaces, unless otherwise specified, by utilizing methods specified above, as applicable.
- E. Temperature of Concrete During Curing:
 1. When the atmospheric temperature is 40 °F and below, maintain the concrete temperature between 50 °F and 70 °F continuously throughout the curing period. When necessary, make arrangement before concrete placing for heating, covering, insulation or housing as required to maintain the specified temperature and moisture conditions continuously for the concrete curing period. Provide cold weather protection complying with the requirements of ACI 306.
 2. When the atmospheric temperature is 80 °F and above, or during other climatic conditions that will cause too rapid drying of the concrete, make arrangements before the start of concrete placing for the installation of wind breaks or shading, and for fog spraying, wet sprinkling, or moisture retaining covering. Protect the concrete continuously for the concrete curing period. Provide hot weather protection complying with the requirements of ACI 305, unless otherwise specified.
 3. Maintain concrete temperature as uniformly as possible, and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete that exceed 5 °F in any one hour and 50 °F in any 24-hour period.
 4. Provide a 1" insulating blanket for thick slabs, regardless of season (summer, winter, etc.). Thick slabs are defined as those slabs that have a thickness greater than 30-inches.
- F. Protection from Mechanical Injury:
 1. During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations.

3.12 FIELD QUALITY CONTROL

- A. Employ a testing laboratory to perform field quality control testing. Testing lab shall make slump tests and will direct the number of tests and cylinders required. Testing lab shall make standard compression test cylinders and entrained air tests as specified below. Furnish all necessary assistance as required. Testing lab shall also furnish all labor, material and equipment required including cones, rods, molds, air tester, thermometer, curing in a heated storage box, and all other incidentals required. Testing lab shall furnish all necessary storage, curing, and transportation required by the testing.
- B. Quality Control Testing During Construction:
1. Perform sampling and testing for field quality control during the placement of concrete, as follows:
 - a. Sampling Fresh Concrete: ASTM C172.
 - b. Slump: ASTM C143; one test for each concrete load at point of discharge; and one for each set of compressive strength test specimens.
 - c. Air Content: ASTM C231; one for every other concrete load at point of discharge, or when required by an indication of change.
 - d. Compressive Strength Tests: ASTM C39; one set of compression cylinders for each 50 cubic yards or fraction thereof, of each mix design placed in any one day or for each 2,500 square feet of surface area placed; 1 specimen tested at 7 days, and 2 specimens tested at 28 days.
 - 1) Adjust mix if test results are unsatisfactory and re submit for Engineer's approval.
 - 2) Concrete that does not meet the strength requirements is subject to rejection and removal from the Work, or to other such corrective measures as directed by Engineer, at no additional cost to the Owner.
 - e. Compression Test Specimens: ASTM C31; make one set of 3 standard cylinders for each compressive strength test, unless otherwise directed.
 - 1) Cast, store and cure specimens as specified in ASTM C31.
 - f. Concrete Temperature: Test hourly when air temperature is 40 °F and below, and when 80 °F and above; and each time a set of compression test specimens is made.
 2. The testing laboratory shall submit certified copies of test results directly to Engineer and Contractor within 24 hours after tests are made.
- C. Evaluation of Quality Control Tests:
1. Do not use concrete delivered to the final point of placement that has slump or total air content outside the specified values.
 2. Compressive strength tests for laboratory cured cylinders will be considered satisfactory if the averages of all sets of three consecutive compressive strength tests results equal or exceed the 28 day design compressive strength of the type or class of concrete; and, no individual strength test falls below the required compressive strength by more than 500 psi.
 - a. Where questionable field conditions may exist during placing concrete or immediately thereafter, strength tests of specimens cured under field conditions will be required by Engineer to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded at the same time and from the same samples as the laboratory cured specimens.
 - 1) Provide improved means and procedures for protecting concrete when the 28 day compressive strength of field cured cylinders is less than 85 percent of companion laboratory cured cylinders.

- 2) When laboratory cured cylinder strengths are appreciably higher than the minimum required compressive strength, field cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85 percent criterion is not met.
 - 3) If individual tests of laboratory cured specimens produce strengths more than 500 psi below the required minimum compressive strength, or if tests of field-cured cylinders indicate deficiencies in protection and curing, provide additional measures to assure that the load bearing capacity of the structure is not jeopardized. If the likelihood of low strength concrete is confirmed and computations indicate the load bearing capacity may have been significantly reduced, tests of cores drilled from the area in question will be required at no additional cost to the Owner.
- b. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength and subject to replacement, reconstruction or to other action approved by Engineer.

D. Testing Concrete Structure for Strength:

1. When there is evidence that the strength of the in place concrete does not meet specification requirements, employ the services of a concrete testing service to take cores drilled from hardened concrete for compressive strength determination. Tests shall comply with ASTM C42 and the following:
 - a. Take at least 3 representative cores from each member or suspect area at locations directed by Engineer.
 - b. Strength of concrete for each series of cores will be considered satisfactory if their average compressive strength is at least 85 percent and no single core is less than 75 percent of the 28 day required compressive strength.
 - c. Report test results in writing to Engineer on the same day that tests are made. Include in test reports the Project identification name and number, date, name of Contractor, name of concrete testing service, location of test core in the structure, type or class of concrete represented by core sample, nominal maximum size aggregate, design compressive strength, compression breaking strength and type of break (corrected for length diameter ratio), direction of applied load to core with respect to horizontal plane of the concrete as placed, and the moisture condition of the core at time of testing.
2. Fill core holes solid with non-shrink, high strength grout, and finish to match adjacent concrete surfaces.
3. Conduct static load test and evaluations complying with ACI 318 if the results of the core tests are unsatisfactory, or if core tests are impractical to obtain, as directed by Engineer.

3.13 MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures for the passage of work by other contractors, unless otherwise shown or directed, after the work of other contractors is in place. Mix, place and cure concrete as herein specified, to blend with in place construction. Provide all other miscellaneous concrete filling shown or required to complete the Work.

B. Equipment Bases:

1. Unless specifically shown otherwise, provide concrete bases for all pumps and other equipment. Construct bases to the dimensions shown, or as required to meet

manufacturers; requirements and Drawing elevations. Where no specific elevations are shown, bases shall be 6-inches thick and extend 6-inches beyond the equipment anchors. Bases to have smooth trowel finish, unless a special finish is required. In those cases, provide appropriate concrete finish.

2. Include all concrete equipment base work not specifically included under other Sections or other contracts.
3. In general, place bases up to 1-inch below the metal base. Properly shim equipment to grade and fill 1-inch void with non-shrink grout as specified in Section 03 60 00.

3.14 CONCRETE REPAIRS

A. General:

1. If in the opinion of the Engineer new concrete does not meet specifications and is unacceptable and is non-repairable, it will be removed and new concrete will be placed per specifications.
2. If in the opinion of the Engineer new concrete does not meet specifications and is unacceptable, and is repairable, Sections 3.11B, C, D, and E will cover the repair.

B. Repair of Formed Surfaces:

1. Repair exposed to view formed concrete surfaces, that contain defects that adversely affect the appearance of the finish. Surface defects that require repair include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, and holes left by the rods and bolts; fins and other projections on the surface; and stains and other discolorations that cannot be removed by cleaning.
2. Repair concealed formed concrete surfaces that may contain defects that adversely affect the durability of the concrete. Surface defects that require repair include cracks in excess of 0.01-inch wide, cracks of any width and other surface deficiencies that penetrate to the reinforcement or completely through non reinforced sections, honeycomb, rock pockets, holes left by tie rods and bolts, and spalls except minor breakage at corner.
3. Repair structural cracks and cracks in water holding structures.

C. Method of Repair of Formed Surfaces:

1. Repair and patch defective areas with cement mortar immediately after removal of forms and as directed by Engineer.
2. Cut out honeycomb, rock pockets, voids over ½-inch diameter, and holes left by tie rods and bolts, down to solid concrete but, in no case, to a depth of less than 1-inch. Make edges of cuts perpendicular to the concrete surface. Before placing the cement mortar, thoroughly clean, dampen with water, and brush coat the area to be patched with the specified bonding agent.
 - a. For exposed to view surfaces, blend white portland cement and standard portland cement so that, when dry, the patching mortar color will match the color of the surrounding concrete. Contractor shall impart texture to repaired surfaces to match texture of existing adjacent surfaces. Provide test areas at inconspicuous locations to verify mixture, texture and color match before proceeding with the patching. Compact mortar in place and strike off slightly higher than the surrounding surface.
3. Cracks that require repair shall be pressure grouted using specified crack repair materials. Installation shall be by manufacturer's certified personnel. Apply in accordance with the manufacturer's directions and recommendations.

4. Fill holes extending through concrete by means of a plunger type gun or other suitable device from the least exposed face, using a flush stop held at the exposed face to ensure completely filling.
5. Abrasive blast exposed to view surfaces that require removal of stains, grout accumulations, sealing compounds, and other substances marring the surfaces. Use sand finer than No. 30 and air pressure from 15 to 25-psi.

D. Repair of Unformed Surfaces:

1. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to the tolerances specified for each surface and finish. Correct low and high areas as herein specified.
2. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having the required slope. Correct high and low areas as herein specified.
3. Repair finish of unformed surfaces that contain defects that adversely affect the durability of the concrete. Surface defects, as such, include crazing, cracks in excess of 0.01-inch wide or which penetrate to the reinforcement or completely through non reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
4. Repair structural cracks and cracks in water holding structures.

E. Methods of Repair of Unformed Surfaces:

1. Correct high areas in unformed surfaces by grinding, after the concrete has cured sufficiently so that repairs can be made without damage to adjacent areas.
2. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out the low areas and replacing with fresh concrete or specified concrete repair material. Finish repaired areas to blend into adjacent concrete. Apply in accordance with the manufacturer's directions and recommendations.
3. Repair defective areas, except random cracks and single holes not exceeding 1-inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts, and expose reinforcing steel with at least ¾-inch clearance all around. Dampen all concrete surfaces in contact with patching concrete and brush with the specified bonding agent. Place patching concrete before grout takes its initial set. Mix patching concrete of the same materials and proportions to provide concrete of the same type or class as the original adjacent concrete. Place, compact and finish as required to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
4. Repair isolated random cracks, and single holes not over 1-inch diameter, by the dry pack method. Groove the top of cracks, and cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen all cleaned concrete surfaces and brush with the specified bonding agent. Place dry pack before the cement grout takes its initial set. Mix dry pack, consisting of 1 part portland cement to 2 1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact dry pack mixture in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72-hours.
5. Cracks that require repair shall be pressure grouted using approved crack repair materials. Installation shall be by manufacturer's certified personnel. Apply in accordance with the manufacturer's directions and recommendations.
6. Assure that surface is acceptable for flooring material to be installed in accordance with manufacturer's recommendations.

- F. Other Methods of Repair:
1. Repair methods not specified above may be used if approved by Engineer

END OF SECTION

33 11 13
GREENFIELD COUNTY WATER DISTRICT
TECHNICAL WELL SPECIFICATIONS
FOR MCKEE REPLACEMENT WELL

1.0 SCOPE OF WORK

DESCRIPTION OF WORK

The work includes drilling a 760-foot deep hole, running electric log and caliper log, and constructing, developing, and testing a 750-foot deep public supply well, using the reverse rotary drilling method. The well owner is Greenfield County Water District. The engineer is Q/K, Inc. of Bakersfield and the geologist is Kenneth D. Schmidt and Associates of Bakersfield.

The work includes supplying all labor, materials, and equipment, performing all drilling, geophysical logging, providing and installing all casing, gravel pack and seals, well development, test pumping, and cleanup at the wells sites specified herein.

LOCATION OF WORK

The drilling site is located at 1604 Charterten Avenue, southeast of the intersection of H Street and McKee Road, Kern County (see attached map).

2.0 GENERAL

EXPERIENCE AND QUALIFICATIONS

The Contractor shall have had a California Well Driller's License (C57) for the last five years and have constructed at least five reverse rotary large-capacity municipal wells to a depth of at least 800 feet in similar materials as at the site. The Contractor shall submit a list of municipal wells successfully completed in the last five years that were at least 800 feet in depth. Information on clients, dates, engineers, and geologists shall be submitted as a part of the bid proposal. Failure to demonstrate adequate experience will be grounds for rejection of the proposal.

SUPERVISORS AND PERSONNEL

The Contractor shall employ only competent workers for the execution of its work and all such work shall be performed under the direct supervision of an experienced well driller satisfactory to the geologist. An experienced tool pusher shall be in charge of the project, and shall be continuously available for consultation with the geologist during drilling and testing. The tool pusher shall be subject to approval by the geologist. The name of the tool pusher shall be submitted as a part of the bid proposal.

INTENT OF PLANS AND SPECIFICATIONS

The intent of the plans and specifications is to prescribe

the details for the construction and completion of the work which the Contractor undertakes to perform.

PRE-CONSTRUCTION CONFERENCE

Prior to beginning the work, a conference shall be held between the Contractor, his subcontractor for the pumping and development, if one is used, and the engineer and geologist. At that time the responsibilities of the contract parties, procedures for payments and changes, schedules, coordination of inspection and testing will be discussed.

ORDER OF WORK

The Contractor shall be responsible for notifying the Engineer and the Geologist when he will be performing work 48 hours prior to commencing the work. Prior to commencing the work, the Contractor shall provide the engineer the schedule to be followed in performing the work. It shall be the responsibility of the Contractor to stay in constant communication with the Geologist and be available to respond to any difficulties that may arise as a result of the work.

MATERIALS AND SUPPLIES

All materials and supplies shall be new unless otherwise specified. The unit price or lump sum bids shall include all

sales and other taxes which may be payable. All casing shall be new and shall not exhibit any evidence of corrosion.

PROGRESS OF THE WORK AND TIME FOR COMPLETION

The Contractor shall complete all parts of the work as agreed upon in the approved schedule. The work shall be completed before the expiration of 60 days from the Notice to Proceed.

LIMITS OF WORK

The engineer will establish the exact locations of the two well sites. Precise location and limits of work will be designated in the field by the engineer. The Contractor shall give 48 hours notice when he requires the services described herein. The Contractor shall preserve all stakes and shall be liable for any expense incurred in replacing said stakes.

PROTECTION OF EXISTING FACILITIES

The Contractor shall protect and preserve all existing gas pipes, electrical conduits, wires, sewers, drains, manholes, water lines, fire hydrants, concrete structures, and other structures, and in case of damage they shall be restored by him without additional compensation to as good a condition as they were found. Underground Service Alert (U.S.A.) shall be notified 48 hours prior to excavation.

WATER WELL STANDARDS

All work on this project shall comply with the Water Well Standards: State of California as outlined by the State of California, Department of Water Resources in Bulletin 74-81, December, 1981 and Bulletin 74-90, January 1990 and the Kern County Water Well Standards. For standards that are periodically updated, the most current version of said standards shall be used. Any deviation from these standards requires approval from the engineer.

PERMITS

Contractor shall obtain water well drilling permit at his cost from the Kern County Department of Environmental Health.

CONSTRUCTION RECORDS & DELIVERABLES

The Contractor shall maintain and keep records providing the following information. These shall be provided to the engineer as specified.

1. Drillers Daily Report: An accurate daily written report of the depths drilled, the work performed, hours worked, personnel on-site, and formations encountered shall be maintained up-to-date by the Contractor on-site. The reports shall be in triplicate format and one copy provided to the engineer each morning.

2. An accurate current tally of the drill pipe in the hole shall be maintained and available for the engineers review.
3. Contractor shall take representative samples of the drill cuttings at 10-foot depth intervals from the ground surface to the total depth of the hole, placed in sealable plastic bags, and properly labeled as to depth. The samples shall be stored on the ground in a safe, dry area. The contractor shall have an electric and a caliper log run by Boredata, West Coast Geophysical, or Pacific Surveys in the hole. The logs will be submitted to the Geologist.
4. The Contractor shall perform a deviation survey of the every 100 feet in depth in order to ensure the straightness of the hole. A drift indicator reading three degrees maximum shall be employed on the hole. One-half degree is the maximum allowable deviation for the total depth of the well. The results shall be submitted to the engineer and will become the property of Greenfield County Water District.
5. A completion report for the well will be submitted to the engineer, Kern County, the California Department

of Water Resources, and Greenfield CWD and shall show: casing diameter, wall thickness, casing material type, depths and lengths of casing and screen installed, type and aperture size of casing openings/screen, borehole diameter, cement seal depths, gradation and depth interval of gravel envelope, and all other pertinent information.

CONSTRUCTION WATER

Water from the Greenfield CWD water system shall be used. The Contractor shall be responsible for bringing this water for drilling to the site. The nearest hydrant is located at the site.

REMOVAL AND STORAGE OF DRILLING FLUIDS AND CUTTINGS

Excess materials produced in drilling the well shall be maintained on-site at all times and be removed from the site to a suitable and legal disposal sites at the expense of the Contractor upon completion of the project. Sites to be determined and coordinated by the Contractor. Except for the presence of the casing and appurtenances of the completed well, the site shall be returned to the original condition.

DISPOSAL OF WATER

The Contractor shall be responsible for the disposal and discharge of pumped water and development water as required. The Contractor will need to get an encroachment permit from the Kern Delta Water District in order to discharge water to the Kern Island Canal. This shall be coordinated with the engineer and District, as necessary. Contractor shall furnish and install all necessary piping and appurtenances. The Contractor shall be responsible for restoring this area and any areas crossed with equipment or piping to its original condition and to the complete satisfaction of the Owner at the completion of the project.

SUBMITTALS

Prior to commencing work the Contractor shall provide the following information to the engineer for approval:

- A. Copy of well drilling permit.
- B. Data sheets for any proposed drilling fluids other than water.
- C. Copy of forms to be used for recording pumping and surging and pump test data.

3.0 MOBILIZATION/DEMOBILIZATION

SCOPE

Mobilization and demobilization shall include the transporta-

tion of personnel, equipment, and operating supplies to and from the site; establishment of portable sanitary facilities; obtaining an adequate source of drilling water; provision for the installation/removal of pumping equipment and discharge lines and other work required by the Contractor in these specifications not listed in a separate line item.

The Contractor shall provide a reverse rotary drilling rig with above ground mud pits; all tools, accessories, power, fuel, materials, supplies, lighting, water, and other support equipment; and experienced personnel necessary to conduct efficient drilling operations. The drilling rig shall be in good condition and of such capacity to drill the hole and construct the well as required by these specifications to a depth of about 750 feet.

MEASUREMENT AND PAYMENT

Measurement and payment shall include the cost of all work and materials involved for mobilization, demobilization, permitting, and clean-up associated with the drilling of this well (Bid Item No. 1). Such payment shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work. The Contractor shall be held responsible and payment may be withheld for damages done to the wells due to any cause or negligence or faulty operation.

4.0 CONDUCTOR CASING

SCOPE

For the well, the Contractor shall drill a minimum 38-inch diameter bore hole from the ground surface to a depth of 50 feet. The 30-inch I. D. steel conductor casing will be installed and grouted in, to serve as a surface sanitary seal.

MATERIAL REQUIREMENTS

The conductor casing shall be fabricated of mild steel plate conforming to the requirements of ASTM designation A-139-74, Grade B steel. Casing sections shall be spirally welded or manufactured of single plates, with one longitudinal seam parallel to the casing axis and one circumferential seam in ten-feet of casing length. The conductor casing shall conform to the following requirements:

- | | |
|--------------------|-----------|
| 1. Length | 50 feet |
| 2. Inside Diameter | 30 inches |
| 3. Plate Thickness | 5/16-inch |
| 4. Annular Seal | 50 feet |

INSTALLATION REQUIREMENTS

A 38-inch diameter hole shall be drilled to a minimum depth of fifty-feet (50) and the drill cuttings stockpiled in an area approved by the engineer. Samples of the drill cuttings shall

be collected, bagged, and labeled at 10 foot depth intervals. The 30-inch I. D. conductor casing shall be shop assembled in sections and be field welded with joints that are collared or butt welded. All joints in the conductor casings shall be securely welded a minimum of the conductor wall thickness and shall be watertight. All welds shall be continuous and all welders shall be pre-qualified under the AWS Standard Qualification procedure for the type of work being performed. Centering guides shall be welded to the conductor casings with a minimum two sets of guides (one near the bottom and one near the top). Each set shall consist of three guides spaced circumferentially.

After the conductor casing has been installed it shall be sealed by pressure grouting the annular space between the hole and the conductor casing in accordance with AWWA Standard A-100-97 and Section 9.0 "Annular Seal". Cement grout shall be pumped under pressure through a tremie pipe from the bottom of the hole to the top. The concrete seal shall be brought to the ground surface and be visible outside of the conductor casing. After cementing operations are completed, the concrete shall be left undisturbed for a period of not less than 24 hours. Any conductor or casing left open and unattended shall be covered with a secure cover.

The flow pipes to the mud pits shall be removed after completion of the well construction, and a plate shall be welded on to

close the openings in the conductor casing.

The Contractor shall be responsible for scheduling the installation of the annular seal for the conductor with the geologist and Kern County Environmental Health prior to placement.

MEASUREMENT AND PAYMENT

Measurement and payment shall be made on a lineal foot basis for the actual length of the completed conductor, including the cost of all work and materials specified in this section including the drilling of the bore hole, furnishing and installing the conductor pipe, and cement sealing. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the completion of the work. Payment shall be as stated in the Bid Schedule for "Conductor Casing" - Bid Item No. 2.

5.0 HOLE DRILLING

SCOPE

For the well, a 28-inch diameter hole shall be drilled below the bottom of the conductor casing to a depth of 760 feet, using reverse circulation rotary drilling. The Contractor shall maintain adequate facilities for the collection of representative samples of the drill cuttings. The mud pit shall have a volume at least three times greater than the borehole volume. The pits

shall be above ground and be partitioned so as to provide a barrier from the cuttings to the return line. The compartment layout shall provide for maximum removal of drill cuttings and avoid re-circulation of these materials back down the hole. The pit shall be cleaned and maintained throughout the drilling process and particularly when water producing strata are encountered beneath thick clay layers. Cuttings shall be removed from the pits and stored on-site in a designated area. After completion of the work, the Contractor shall remove all fluids and cuttings from the designated area and legally dispose of the same.

The hole shall be straight and plumb with a maximum deviation from plumb not to exceed 6 inches per 100 feet for any depth. There shall be no reversal or deviation from any direction in a single plane for the full depth of the hole.

Satisfactory alignment of the drilled hole shall be the responsibility of the Contractor. The drilled hole shall be checked for alignment and kept within the above specifications. Graphic records shall be kept of all straightness surveys. Any deviation exceeding the tolerance limits set forth herein, deemed unacceptable by the geologist, shall be satisfactorily remedied by any reasonable method selected by the Contractor with the approval of the engineer. Where any deviation cannot be

satisfactorily remedied the drilled hole will be deemed unacceptable and shall be abandoned, backfilled as directed by the engineer and a new hole drilled. No additional compensation will be allowed for abandoning and back-filling of an unacceptable hole and the drilling of a new hole. All costs therefore shall be borne by the Contractor.

Once the hole is completed, the Contractor shall provide electric and caliper logging as specified herein. Once this logging is complete, the Contractor shall provide the geologist with a well construction schedule.

DRILLING FLUID

Only water from the Greenfield CWD sample shall be used for drilling fluid. Any fluid or additive, other than water, shall receive approval by the geologist prior to its use. The Contractor shall maintain a fluid system of minimum weight and low solids content which deposits a thin, easily removed filter cake on the face of the borehole.

ELECTRIC LOG

Upon completion of the hole, the Contractor shall have Boredata, West Coast Geophysical, or Pacific Surveys run an electric log for the full depth of the hole. The electric log shall in-

clude spontaneous potential and short and long normal resistivity curves. It shall be the Contractor's responsibility to coordinate and furnish the results of this logging and ensure that the log is run to the total depth of the hole. The Contractor shall provide the geologist with three field copies and the engineer with six final copies of this log.

CALIPER LOG

Upon completion each of the reamed hole to the total depth, a caliper log shall be run by Boredata, West Coast Geophysical, or Pacific Surveys. The caliper tool shall be calibrated immediately prior to logging with at least three gauge rings. The caliper tool shall be large enough to measure borehole diameters up to 36 inches in diameter. The caliper log shall be used to determine the hole diameter, and calculate the actual volumes of gravel and cement grout required to fill the annulus between the casing and the borehole. Three field copies and six final copies will be provided.

MEASUREMENT AND PAYMENT

Measurement and payment for the hole drilling shall be made on a lineal foot basis for the actual length (not including conductor casing depth) of the completed hole, including the cost of all work and materials involved in drilling the hole, and providing the electric and caliper logging.

Such payment shall constitute full compensation for all labor, equipment, tools, and all other necessary and incidental to the completion of the work. Payment shall be as stated in the Bid Schedule for "Drill 28-inch Diameter Hole" - Bid Item No. 3.

REJECTED WELL

No payment shall be made for any labor, tools, equipment, materials, or transportation costs associated with the drilling of the bore holes when such hole or holes fails to meet the specified final depth, diameter, plumbness, or alignment, or tolerances for any preventable cause. Such hole shall be rejected and shall be replaced as specified herein. Preventable failures include any failure caused by faulty or inadequate drilling equipment, negligence or improper drilling operations or techniques, installation of faulty or non-approved materials, or improperly protecting the drilled hole from natural elements, including cave-in resulting from existing soil conditions or delays.

Any rejected well hole shall be properly abandoned at no additional cost to the Owner or its agents and in accordance with applicable provisions of Bulletin No. 74 of the State of California, Department of Water Resources, entitled "Water Well

Standards, State of California", dated December, 1981 and Bulletin No. 74-90 dated January, 1990 and the Kern County Water Well Ordinance. For standards which are periodically updated, the most current version of said standard shall apply. Any rejected bore hole shall be replaced by another hole adjacent to the first, at a location provided by the engineer.

6.0 WELL CASING

SCOPE

For the well, the Contractor shall furnish and install new factory assembled well casing as detailed in the drawings and described herein. The exact perforated and blank intervals, gravel size and slot size shall be confirmed by the Geologist after the electric log and has been completed. Slight modifications may be made after interpreting the electric log. For bidding purposes, the well casing shall conform to the following estimated requirements:

1. Length Blank Casing: 360 feet
2. Length Perforated Casing: 390 feet
3. Casing Diameter: 16-5/8-inch O.D.
4. Wall Thickness: 5/16-inch
5. General: Casing shall be Roscoe Moss, corrosion re-

sistant, high-strength, low-alloy (HSLA) steel. Perforated casing shall be Roscoe Moss "Ful Flo" louvered well casing and the slot size will be 0.08-inch.

CASING MATERIALS

GENERAL

The well casing shall be fabricated of steel plate conforming to the requirements of ASTM designation A242. All casing shall be new and free from corrosion. The casing shall be fabricated from high-strength, low-alloy (HSLA) steel in accordance with the ASTM Specification A606 Type 4 using the spiral double weld process, in accordance with ASTM Specification A139 Grade B. The Contractor shall submit to the engineer a test report certifying the chemical and physical properties of the steel well casing. In addition the casing manufacturer shall submit a certificate of verification that the well casing meets or exceeds all requirements specified by AWWA A100 for the depth, diameter, and wall thickness of the casing installed. The casing shall extend from the specified depth to three feet above ground surface and be capped. The casing shall be supplied in 40-foot lengths. In no case shall the Contractor use shorter lengths except to match depth intervals specified by the geologist.

BLANK CASING

A smooth cap shall be installed at the bottom of the casing. Factory assembled collars shall be provided on the ends of the casing joints in accordance with the following standards: Collars for each casing joint shall conform to the requirements of the casing to which they are to be attached. Collars shall be the same thickness of the casing, shall be a minimum of 5 inches in width, shall be rolled to fit the outside diameter of the casing, and shall be welded to the casing sections as specified herein. The inside edge of the collars shall be ground or sufficiently scarified to remove sharp edges or burrs. Section ends shall be machined flat perpendicular to the axis of the casing and shall not vary more than 0.010-inch at any point from a true plane at right angles to the axis of the casing. Three one-inch diameter alignment holes shall be provided in each collar, equidistantly spaced around the collar, to ensure proper matching of the sections. The alignment holes shall be welded closed prior to placing the casing in the well hole.

A two-inch diameter steel sounding tube shall be installed outside the casing of the well and shall enter the casing at a designated depth via an approved transition into the casing - See Section 7.0 "Gravel Feed Tube and Sounding Tube".

PERFORATED CASING

The perforated casing shall be manufactured to the same standards as the blank casing specified above including the collars for each casing section. The openings in the perforated casing shall be machine made, horizontal to the axis of the casing, and of a louver form with the aperture facing downward using Roscoe Moss "Ful Flo" casing (0.08 inch slot).

CASING INSTALLATION

The Contractor shall install the casing in the hole in accordance with the final approved casing schedule provided by the Geologist. Casing installation shall be by an approved method that will ensure that no damage occurs to either the casing or the drilled hole. Suitable casing centralizers made of the same materials as the casing shall be installed. The centralizers shall be two-inches (2") wide by thirty-inches (30") long by 5/16-inches thick and be welded to the casing at the joints in order to center and hold the casing in proper position until the gravel and cement seal are in place. There shall be three centralizers equidistantly spaced around the well casing at eighty (80) foot depth intervals. The casing centralizers shall extend out radially five-inches (5") from the surface of the casing. The casing shall be suspended above the bottom of the drilled hole to ensure that the casing is not resting on the bottom.

The casing shall be lowered in the hole with the collared end facing upward. The plain end of the following casing joint shall be inserted in the collar. True contact of the two joints shall be verified by observation through the inspection holes. Spot welds shall be placed on the collars in order to hold the contact position. The welding procedure for joining the casing sections shall be in accordance with Section "Field Welding".

The Contractor shall record and maintain the length of each casing and ensure that the casing is installed in accordance with the approved casing schedule. The Contractor shall visibly inspect the interior of each casing section as it is lifted into position for welding to verify that there are no obstructions or deleterious materials in the interior of the casing.

A permanent gravel feed tube shall be installed with the casing as specified in Section 7.0 "Gravel Feed Tube and Sounding Tube".

FIELD WELDING

Field welding of the casing shall conform to the American Welding Society (AWS) requirements for Welding of Transmission Pipelines. Welders employed for field assembly of well casing 6. and screen shall be qualified in accordance with the latest version of ASME Boiler Construction Code, or by the AWS Standard Qualification Procedure. The Contractor shall provide the

Welder's Certification papers for the pre-qualified welding process associated with the welding contained in these specifications to the Engineer prior to any welding.

Welded joints of casing sections shall be continuous full fillet welds. All joints shall be welded. Welds shall consist of, at a minimum, two passes: Rod sizes and welding amperages shall be appropriate for the welding procedure used. Slag shall be wire brushed or wire wheeled clean at all starts and stops and prior to making a succeeding pass. Special attention shall be given to carefully welding shut all inspection holes for observing casing joint alignment.

REJECTED WELL

No payment shall be made for any labor, equipment, tools, incidentals or transportation costs associated with the construction of the well when such well fails to meet requirements for plumbness or alignment.

Any rejected well shall be properly abandoned at no additional cost to the Owner and in accordance with applicable provisions of Bulletin No.74 of the State of California, Department of Water Resources, entitled "Water Well Standards, State of California", dated December, 1981 and Bulletin 74-90, dated January, 1990 and the Kern County Water Well Standards. For standards which are periodically updated, the most current version of

said standards shall be used. Any rejected well hole shall be replaced by another hole adjacent to the first, at a location directed by the Engineer.

MEASUREMENT AND PAYMENT

Measurement and payment for the well casing shall be made on a lineal foot basis for the actual length for blank casing and for perforated casing. Payment shall include the cost of all work and materials specified herein which includes furnishing and installing the 16-5/8-inch outside diameter blank and perforated casing. Payment shall be as stated in the Bid Schedule for the "Blank Casing" - Bid Item No. 4, and "Louvered Casing" - Bid Item No. 5.

7.0 GRAVEL FEED TUBE AND SOUNDING TUBE

MATERIALS

GRAVEL FEED TUBE

The gravel feed tube shall be three-inch diameter ASTM A53, Grade B, Schedule 40-steel pipe.

SOUNDING TUBE

A two-inch diameter ASTM A242 high-strength, low-alloy (HSLA) steel sounding tube shall be installed in the well from the surface to a depth of 335 feet below ground surface and be capped at the surface. Contractor shall provide the engineer a detail of the proposed transition into the well casing prior to the

commencement of installing steel casing. The transition box shall be high-strength, low-alloy (HSLA) steel.

INSTALLATION

GRAVEL FEED TUBE

The gravel feed tube shall be installed in the hole before the well casing is installed. All joints shall be clamped for alignment and then welded. Prior to the installation of the gravel feed tube or any gravel, the tube shall be chased with a weight to ensure the pipe is open and free to pass gravel.

SOUNDING TUBE

The sounding tube shall be installed with the well casing. The tubing shall be butt-welded together and tack-welded to each casing collar to hold it in place. The sounding tube joints shall be chased with a weight to ensure that the each tube is open and free of obstructions. The bottom of the sounding tube shall terminate in a fabricated steel box welded to an opening in the well casing at a depth specified by the engineer. Extreme care shall be taken to ensure that the inner surface of the casing is not penetrated by the box or by welding burrs. No part of the sounding tubes shall protrude into the well casing.

MEASUREMENT AND PAYMENT

Measurement and payment for installing the gravel feed tube and the sounding tube shall be made on a lineal foot basis for the actual length installed and include the cost of all work and materials necessary to complete the installation. Such payment shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work. Payment shall be made as stated in the Bid Schedule for the "Gravel Feed Tube" - Bid Item No. 6 and "Sounding Tube" - Bid Item No. 7.

8.0 GRAVEL ENVELOPE

SCOPE

A gravel envelope shall be installed from the bottom of the hole to the depth specified to fill the annulus between the hole and the well casing. Gravel shall be composed of sound, durable, well rounded natural particles and shall be free of organic matter, clay balls, and other deleterious substances.

GRAVEL MATERIALS

The gravel shall be 4x12, or an approved equivalent. The gravel will be well rounded and crushed rock won't be accepted. Samples of the gravel shall be submitted by the Contractor to the geologist for approval prior to placement. Copies of sieve

analyses by a certified laboratory shall be submitted with the samples.

Material data sheets, analyzed by an approved laboratory, describing the physical and chemical characteristics of the gravel along with a gravel sample shall be submitted for review and approval prior to any shipment of gravel.

Any material delivered to the site shall be accompanied with a certified weight ticket detailing the weight of the material. Any loads not meeting the characteristics as approved by the said submitted data sheets and samples shall be rejected at the expense of the Contractor. Gravel that comes in contact with the ground shall not be used. All gravel shall be protected from contamination until installed.

GRAVEL INSTALLATION

Prior to placement of the gravel envelope in the well, the drilling fluid shall be thinned with clean water. Clean water (not from the mud pit) shall be circulated during gravel placement. Gravel, as specified, shall be installed in the annular space between the drilled hole and the casing. The gravel shall be carefully installed to insure complete filling of the annular space from the bottom of the hole up to the depth specified by the engineer. The gravel pack shall be placed by means of a

tremie pipe. The Contractor shall maintain a log of gravel placed and the corresponding depth of placement. The tremie pipe shall be gradually lifted from the bottom when the gravel reaches the bottom of the tremie pipe. Gravel shall be placed to ensure continuity of the gravel pack without creating voids, separations, or bridging. The rate of gravel placement shall proceed without interruption until completion.

During the entire gravel packing operation, clean water (not from the mud pit) along with 12% sodium hypochlorite shall be circulated through the perforated casing and up the annular space outside the casing in accordance with AWWA C-654. When the gravel has been placed, a swab shall be carefully worked opposite all perforated sections of casing while circulating with clean water. As the gravel settles, more shall be added. This operation shall be performed until there is no further measurable settlement of gravel, and the gravel has been washed clean. The depth to the top of the gravel must be measured by wire line and recorded on the driller's daily log.

The quantities of gravel placed in the annulus of the well shall not be less than the theoretically computed volume of the annulus less the theoretically computed volume of the permanent gravel feed tube and permanent sounding tube. A quantity less than the computed volume will be judged as an indication of voids and corrective measure shall be taken by the Contractor.

Immediately after completing installation of the gravel pack, the well shall be gently swabbed while circulating clean water. The gravel level shall be measured, and gravel added as necessary.

MEASUREMENT AND PAYMENT

Measurement and payment for the gravel envelopes shall be made on a lineal foot basis for the actual depth of gravel installed. Payment shall include the cost of all work and materials for furnishing and installing the gravel envelope. Such payment shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work. Payment shall be as stated in the Bid Schedule for "Gravel Envelope" - Bid Item No. 8.

9.0 ANNULAR SEAL

SCOPE

An annular seal shall be installed from a depth of 310 feet to the ground surface. The cement seal shall fill the annular spaces between the hole and the well casing. The Contractor shall furnish the engineer with a mix design one week prior to placing any cement.

MATERIALS

The grout used in sealing the annular space around the well casing shall consist of a sand-cement grout using Type II Portland Cement with 2 percent calcium chloride and 2 percent bentonite. The cement grout slurry shall weigh approximately 115 pounds per cubic foot.

INSTALLATION

The annular seal shall be placed into the annular space above the gravel envelope as described herein. Prior to placement of the annular seal in the well, five feet of bentonite shall be placed on top of the gravel envelope to separate it from the sand-cement grout seal. The cement seal shall be placed by installing a tremie pipe and placing the cement material from the bottom up by pumping with hydraulic or pneumatic pressure in a continuous operation through said feed line inserted between the casing and the wall of the hole. The feed line shall be lowered to within five feet of the bottom of the zone to be sealed. The line shall be slowly withdrawn as the annular space fills with sand-cement grout. After the annular seal is placed, a minimum of twenty-four hours (24) shall be allowed prior to further work on the well.

MEASUREMENT AND PAYMENT

Measurement and payment for the annular seal shall be made on a lineal foot basis for the actual depth of seal installed in the annulus between the casing and the bore hole for the well. Such payment shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work. Payment shall be made as stated on the Bid Schedule for the "Annular Seal" - Bid Item No. 9.

10.0 DEVELOPMENT BY AIRLIFT-SWABBING

SCOPE

After the well has been completely constructed in accordance with the specifications, the Contractor shall notify the engineer and shall make the necessary arrangements for conducting the preliminary well development. Disposal of all development and pumped water is the responsibility of the Contractor. The Contractor shall provide for disposing of the water as specified in Section 2.0. Swabbing and airlifting shall be used to provide preliminary well development. The Contractor shall use an approved swabbing apparatus to thoroughly develop the perforated casing opposite each permeable water-producing strata. The swabbing and airlifting shall commence within two days of the completion of the well construction and shall continue for a minimum of 60 hours for the well.

METHOD

The airlift-swabbing tool shall be a double flanged swab assembly with the swab flanges no more than ten feet apart. The outside diameter of the swab shall be not more than 1/2-inch less than the inside diameter of the perforated casing. The pipe section between the swab flanges shall have a sufficient number of openings and the bottom of the pipe section between the swab flanges shall be closed.

The Contractor shall commence swabbing at the top of the perforated interval and continue in short intervals of no more than ten feet, working the swab from the top to the bottom of the perforated interval. The Contractor shall then repeat the process working from the bottom of the perforated interval to the top. A continuous stream of clean water shall be added to the gravel envelope from the top through the gravel pipe, and airlift-swabbing shall be continued until there is no further settlement of gravel, and all sand, silt, and mud has been washed from the gravel envelope. During airlift-swabbing, the gravel level shall be measured and at completion of airlift-swabbing the gravel level shall be at its specified depth.

MEASUREMENT AND PAYMENT

Measurement and payment for airlifting and swabbing shall be made on an hourly basis and shall include the Contractor's own

costs and the costs of supplies, subcontractors, and other items necessary for development work performed. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the completion of the work. Payment shall be as stated in the Bid Schedule for "Airlifting and Swabbing" Bid Item No. 10.

11.0 DEVELOPMENT BY PUMPING AND SURGING

SCOPE

If a subcontractor is used for the pump installation, development pumping, and test pumping, this subcontractor shall be provided a copy of the well specifications and attend the pre-construction conference. The well shall then be further developed by pumping and surging with a test pump. The pumping equipment shall be clean and in good operating condition upon delivery to the site. Within not more than ten days after completion of preliminary development of the well, the Contractor shall commence well development by pumping and surging.

PUMPING EQUIPMENT & MATERIALS

The test pump and prime mover shall be capable of producing water at a rate of 2,000 gallons per minute with a pumping level of 400 feet. The pump shall be placed at a depth of 400 feet during development and testing operations. Discharge piping,

gauges, Rossum sand tester, and a totalizing flowmeter reading in gallons, shall be furnished. The Contractor shall supply a certificate of calibration for all measuring devices prior to testing. The Contractor will install a Rossum sand tester in the discharge line to measure sand concentration during development and test pumping. A one-inch diameter access tube (smooth inside) will be installed with the pump to near the total depth of the pump to allow water level measurements with an electric sounder. Water shall be disposed of by the Contractor in accordance with Section "Disposal of Water". The Contractor shall be responsible for the removal of all sand and mud deposited as a result of the development operations. Contractor shall contact the engineer to determine requirements and coordinate disposal of water. Contractor shall be responsible for piping the water to the disposal area.

An electric sounder will be used to measure the water levels. The water being pumped during development shall begin at a low pumping rate and gradually increased as development continues. From time to time the pump shall be stopped and the water in the pump column allowed to flow back into the perforated casing. The operation of gradually increasing the pumping rate shall be repeated as development of the well continues and shall be done in a manner satisfactory to the geologist. The well shall be thoroughly developed so that it will produce a maximum specific

capacity (gpm per foot of drawdown) and so that it will not produce sand in excess of five parts per million by volume after twenty minutes of pumping after surging at the maximum pumping rate. During testing, the rate of sand production shall be measured by a Rossum Sand Tester. The tester shall be supplied by the Contractor. Pumping rates, static level, pumping levels, sand production, and dates and times shall be recorded in the Contractor's log and provided to the Geologist at the end of development. Final production testing shall be performed prior to final acceptance of the well. Field data shall be provided to the geologist as it is developed.

Contractor shall provide at least sixty (60) hours of pump and surge development for the well.

RECORDS

The Contractor shall provide dates, times, pumping rates, and water-level (static and pumping) measurements for the well.

The records shall show, at a minimum, static water level, date and time, pumping rate in gpm, cumulative pumpage reading in total gallons, pumping levels, specific capacity, number of surges, sand production, water clarity, and any other remarks such as odor. These shall be recorded and maintained in a format approved by the Engineer. All depth to water readings shall be measured with a calibrated electric sounder. Copies of the

daily results for pumping and surging shall be submitted to the Geologist.

MEASUREMENT AND PAYMENT

Measurement and payment for pumping and surging of the well shall be made on a hourly basis and shall include the Contractor's own costs and the costs of supplies, subcontractors, and other items necessary for development work performed. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the completion of the work. Payment shall be as stated in the Bid Schedule for "Pumping and Surging" - Bid Item No. 11.

12.0 PUMP TEST

SCOPE

A test procedure will be furnished to the Contractor by the geologist upon completion of the development of the well. A variable speed power source shall be used so that the well can be pumped at different rates as specified by the geologist. The well shall be allowed to sit idle overnight before initiating the pump testing. The pump shall be operated continuously for a period of 12 hours and shall be operated at three different pumping rates as selected by the geologist. The well shall

then be allowed to sit idle overnight. A 10-hour constant discharge test will then be done at a rate specified by the Geologist. The pump supplied shall meet the same specifications as that provided for the pumping and surging phase of development as set out herein. The quantity of water pumped shall be measured by an approved measuring device.

TESTING METHODS

For the step drawdown test the well will be pumped for four hours at each of three rates, specified by the geologist. For the constant discharge test, the well will be at a rate specified by the geologist. All gauges, valves, Rossum sand tester, flowmeter and other equipment for the test shall have been installed and be in place prior to pumping operations as set out herein. Copies of test data, in an approved format, shall be furnished to the engineer, including all field measurements and data, during the testing operation.

BAILING AND CLEANUP

The test pump will not be pulled from the well until after at least twelve (12) hours after pumping for the constant discharge test has stopped in order to allow water-level recovery measurements to be made. The Contractor shall remove the test pump and bail the well clean of all loose material. Upon completion of

the development operations, the Contractor shall demonstrate to the satisfaction of the geologist that the bottom of the well is clear of all sand, mud, and other foreign materials. The well casing shall be capped by tack welding a one quarter inch (1/4") thick steel plate on its top.

The Contractor shall also cap the 2-inch sounding access tubes and 3-inch gravel feed tubes. All pipes shall extend a minimum of three feet above ground level.

The Contractor shall restore all areas used in developing the wells, make final cleanup of all debris, silt, mud, sand or other foreign material and restore the well sites to their original ground condition and level in accordance with Section "Disposal of Water".

MEASUREMENT AND PAYMENT

Measurement and payment for production testing of the well shall be made on an hourly basis and shall include the Contractor's own costs and the costs of supplies, subcontractors, and other items necessary for the development work performed. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the completion of the work. Payment shall be as stated in the Bid Schedule for "Test Pumping" - Bid Item No. 12.

13.0 TELEVISION SURVEY

After bailing the well and letting the well remain idle for at least five days, the Contractor shall obtain a complete television survey of the well interior by Well Spy or Pacific Surveys. The video survey shall be in full color, run from the top of the well to the bottom of the well. The camera shall have both side-view and down hole-view capability. Two copies of the TV survey shall be furnished to the engineer in CD format. The geologist shall be notified at least 48 hours in advance of televising the well. The Contractor shall be responsible for ensuring that the well water is clear and that an adequate well video of the casing can be obtained. If any well damage or lack of development is indicated, the contractor shall remedy this at his own cost.

MEASUREMENT AND PAYMENT

Measurement and payment for the well video shall be made on a lump sum basis and shall include the Contractor's own costs and the costs of supplies, subcontractors, and other items as necessary for the work performed. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the completion of the work. Payment shall be as stated in the Bid Schedule for "Television Survey" - Bid Item No. 13.

WELL LOCATION EXHIBITS

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QA/QC BY: CW
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SHEET NO.: 1 of 2

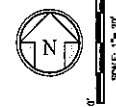
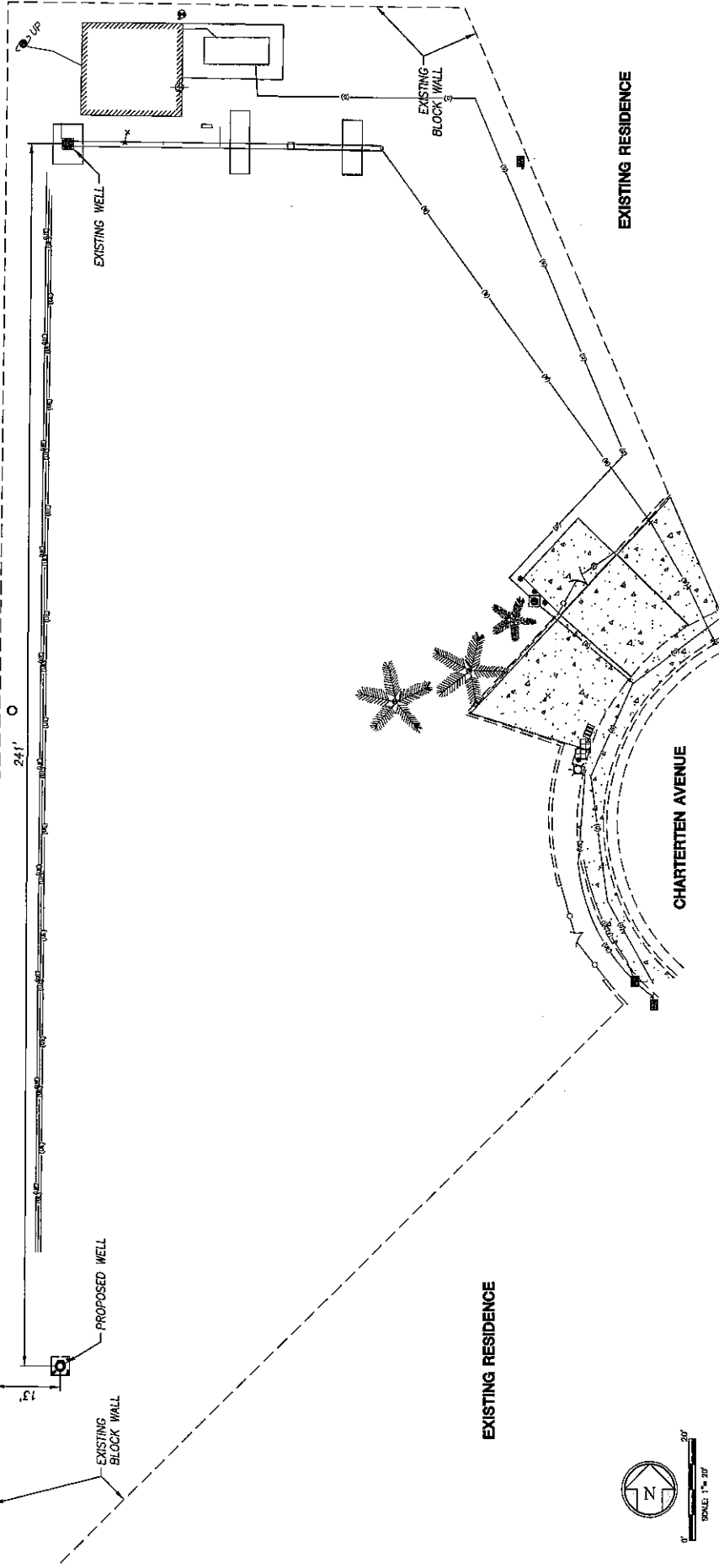
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GREENFIELD COUNTY WATER DISTRICT**



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