

#1

CONSTRUCTION SPECIFICATIONS

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Phoenix, AZ 85009

FOR

CONTRACT FCD 98-37

Camelback Ranch Levee North and Glendale Airport Extension Levee
PCN400052



(Engineer's
Seal)

Prepared By

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Recommended by: Edward A. Raleigh Date: 11/4/98
Edward A. Raleigh, P.E.
Manager Engineering Division

Issued for Public Bidding by: M.S. Ellegood Date: 11/4/98
Michael S. Ellegood, P.E.
Chief Engineer and General Manager

SUPPLEMENTARY TO MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD
SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION EDITION OF 1998 AND REVISIONS AND
SUPPLEMENTS THERETO.

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ATTENTION

ALL PROSPECTIVE BIDDERS

A.R.S. Section 34-201 requires that construction bid proposals be accompanied by a certified check, cashiers check or surety bond for ten percent (10%) of the total amount of the bid.

All bonds must be executed solely by a surety company or companies holding a Certificate of Authority to transact surety business in Arizona, issued by the Director of the (State) Department of Insurance.

Bonds (bid, payment and performance) executed by an individual surety or sureties are not in compliance with the Arizona Revised Statutes. Bids received containing bid bonds not in compliance with the Arizona Revised Statutes will be considered as being non-responsive. The use of District-supplied bond forms is required.

Please submit your bids accordingly.

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 CONTRACT FCD 98-37
 PCN 400052
 Camelback Ranch Levee North and Glendale Airport Extension Levee**

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(1) Federal Wage and Labor Requirements.....	27 pages
(2) Federal Wage Rates	11 pages
(3) Airport Safety and Security.....	8 pages
21. Drawings: (130 Plan Sheets)	(Separate)

(Area to left reserved
for Engineer's Seal)



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

INVITATION FOR BID

BID OPENING DATE: Tuesday, December 8, 1998

PROJECT LOCATION: At the confluence of the Agua Fria River and New River north of Camelback Road, west of 107th Avenue, and south of the Glendale Airport.

PROPOSED WORK: The proposed work consists of construction of approximately 10,000 linear feet of soil cement levee; the excavation of the New River; the placement of fill on the south end of the Glendale Airport; and the installation of utilities for the Wastewater Treatment Plant.

BIDS:

SEALED BIDS for the proposed work will be received by the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009 until 2:00 p.m. (Phoenix time) on Tuesday, December 8, and then publicly opened and read at 2801 West Durango Street, Phoenix, Arizona 85009. All bids are to be marked in accordance with Section 102.9 of the MAG Uniform Standard Specifications and addressed to the Chief Engineer and General Manager, Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009. No bids will be received after the time specified for bid opening. All bids must be submitted on proposal forms furnished by the Flood Control District and included in the Proposal Pamphlet. The Board of Directors reserves the right to reject any and all bids and to waive any informality in any bid received.

ELIGIBILITY OF CONTRACTOR:

The bidder shall be required to certify that it has the appropriate "A" Contractor's license in the State of Arizona to perform the before-mentioned type of work. Certification shall be on the form provided herein.

The bidder may be required to furnish an affidavit as evidence of previous satisfactory performance in the above-mentioned type of work.

PRE-BID CONFERENCE:

A Pre-Bid conference will be held on Thursday, November ²⁴~~19~~, 1998 at ^{1:00}~~2:00~~ p.m. in the Flood Control District New River Conference Room, 2801 West Durango Street, Phoenix, Arizona. All potential contractors and subcontractors are encouraged to attend this pre-bid conference and be prepared at that time to submit in writing and discuss any comments concerning this solicitation.

Questions or items for clarification may be addressed to the Contracts Manager, in writing, at least five (5) days prior to bid opening date. Questions received after this deadline may not be accepted. Responses to all questions submitted will be sent to all planholders by addenda. Verbal interpretations, unless specifically addressed by addendum, shall not be binding nor have any legal effect.

CONTRACT TIME:

All work on this Contract is to be completed within two hundred seventy (270) calendar days after date of Notice to Proceed.

MBE/WBE PARTICIPATION:

It is the policy of the Flood Control District of Maricopa County to endeavor to ensure in every way possible that minority and women-owned business enterprises have every opportunity to participate in providing professional services, purchased goods, and contractual services without being discriminated against on the grounds of race, religion, sex, age, disability, or national origin.

The Maricopa County Minority and Women-Owned Business Enterprise Program, effective January 1, 1992, is incorporated herein by reference.

Two Affidavits are included herein. The first form, the "M/WBE Assurances Affidavit", must be completed and submitted with the bid - **Failure to do so may be cause for rejection of the bid.** If M/WBE goals have been established, the first and second low bidders must complete and return the second form, "Actual M/WBE Participation Affidavit", to the Minority Business Office, with a copy to the Flood Control District, by 4:00 p.m. on the seventh calendar day after bid opening,

For this contract, a goal of ten percent (10%) MBE/WBE is established for Minority/Women-Owned Business Enterprises. Complete instructions and additional forms are available from the Maricopa County Minority Business Office, located at 2901 West Durango Street, Phoenix, Arizona, telephone number 506-8656. Failure to implement "good faith" efforts in accordance with the Maricopa County Minority Business Enterprise Program to the satisfaction of Maricopa County may result in rejection of the bid.

PROJECT PLANS, SPECIAL PROVISIONS AND CONTRACT DOCUMENTS:

Plans and Construction Specifications may be obtained from the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona 85009 upon payment of \$70.00 by check, payable to the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY. This payment will not be refunded. Mail orders for project documents must include an additional \$7.50 for first class U.S. postage and handling. The total \$77.50 will not be refunded. Regardless of circumstances, we cannot guarantee mail delivery.

Each bid must be accompanied by a Bid Bond executed on the District-supplied bond form, cashier's or certified check or postal money order equal to 10 percent (10%) of the bid, made payable to the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY as a guarantee that if the work is awarded to the bidder, the bidder will within ten (10) days of receipt of the Proposal Acceptance, enter into proper contract and bond condition for the faithful performance of the work, otherwise, said amount may be forfeited to the said BOARD OF DIRECTORS.

FEDERAL REGULATIONS:

The following federal regulations are attached and incorporated by reference into the resulting contract.

Federal Wage and Labor Requirements
Federal Wage Rates
Airport Safety and Security

PRINCIPLE ITEMS AND APPROXIMATE QUANTITIES

QUANTITY	UNIT	DESCRIPTION
299,760	CY	Fill Construction
73,938	CY	Soil-Cement Bank Protection
4,400	LF	24" Forcemain
358,834	CY	Channel Excavation
12,477	TONS	Cement for Soil Cement
2,200	LF	24" Reclaimed Water Line

BID

TO THE BOARD OF DIRECTORS
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PHOENIX, ARIZONA

Gentlemen:

The following Bid is made for Camelback Ranch Levee North and Glendale Airport Extension Levee, FCD 98-37, in the County of Maricopa, State of Arizona.

The following Bid is made on behalf of

and no others. Evidence of authority to submit the bid is herewith furnished. The bid is in all respects fair and is made without collusion on the part of any person, firm, or corporation mentioned above, and no member or employee of the Board of Directors is personally or financially interested, directly or indirectly, in the bid, or in any purchase or sale of any materials or supplies for the work in which it relates, or in any portion of the profits thereof.

The Undersigned certifies that the approved Plans, Supplementary General Conditions, Special Provisions, Forms of Contract, Bonds, and Sureties authorized by the Board of Directors and constituting essential parts of the bid, have been carefully examined and also that the work site has been personally inspected.

The Undersigned declares that the amount and nature of the work to be done is understood and that at no time will misunderstanding of the Plans, Construction Specifications, Special Provisions, Supplementary General Conditions, or conditions to be overcome, be pled. On the basis of the Plans, Construction Specifications, Special Provisions, Supplementary General Conditions, the Forms of Contract, Bonds, and Sureties proposed for use, the Undersigned proposes to furnish all the necessary machinery, equipment, tools, apparatus, and other means of construction, to do all the work and to furnish all the materials in the manner specified and to finish the entire project within the time hereinafter proposed and to accept, as full compensation therefore, the sum of various products obtained by multiplying each unit price, herein bid for the work or materials, by the quantity thereof actually incorporated in the complete project, as determined by the Engineer or Architect.

The Undersigned understands that the quantities mentioned herein are approximate only and are subject to increase or decrease and hereby proposes to perform all quantities of work, as either increased or decreased, in accordance with the provisions of the Specifications, at the unit price bid in the Bidding Schedule.

The Undersigned further proposes to perform all extra work that may be required on the basis provided in the Specifications and to give such work personal attention and to secure economical performance.

The Undersigned further proposes to execute the Contract Agreement and furnish satisfactory Bonds and Sureties within ten (10) days of receipt of Notice of Bid acceptance, **TIME BEING OF THE ESSENCE**. The Undersigned further proposes to begin work as specified in the Contract attached hereto, and to complete the work within two hundred seventy (270) calendar days from the effective date specified in the Notice to Proceed, and maintain at all times a Payment and Performance Bond, approved by the Board of Directors, each in an amount equal to one hundred percent of the contract amount. This Bond shall serve not only to guarantee the completion of the work on the part of the Undersigned, but also to guarantee the excellence of both workmanship and material and the payment of all obligations incurred, said Bonds and Sureties to be in full force and effect until the work is finally accepted and the provisions of the Plans, Specifications, and Special Provisions fulfilled.

A bid bond in the amount and character named in the Invitation to Bid, and amounting to not less than ten (10) percent of the total bid, is enclosed. The bid bond is submitted as a guaranty of good faith that the Bidder will enter into a written contract to do the work, as provided, if successful in securing the award thereof. It is therefore agreed that if the Undersigned withdraws its bid at any time except as herein provided, or if the bid is accepted and the Undersigned fails to execute the Contract and furnish satisfactory Bonds and Sureties as herein provided, the Flood Control District of Maricopa County shall be entitled and is hereby given the right to retain the said Bid Bond as liquidated damages.

The Undersigned acknowledges receipt of the following addenda, attached these to the bid package, and has included their provisions in the bid:

Addendum No. _____	Dated _____

The Undersigned has enclosed the required bid security to this Bid.

BID SCHEDULE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	EXTENDED AMOUNT
105-1	Partnering	LS	1	10,000.00	10,000.00
107-1	SWPP, NPDES Permit Requirements	LS	1		
107-2	Public Relations Allowance	LS	1	5,000.00	5,000.00
107-3	Sign Allowance	LS	1	3,000.00	3,000.00
202	Mobilization	LS	1		
211	Fill Construction	CY	299,760		
215	Earthwork for Open Channels	LS	1		
216	Channel Excavation	CY	358,834		
220-1	Riprap (Loose)	CY	49		
220-2	Riprap (Grouted)	CY	69		
221-1	Soil-Cement Bank Protection	CY	73,938		
221-2	Cement for Soil-Cement	TON	12,477		
310	Aggregate Base Course	SY	19,485		
350	Removal of Existing Improvements	LS	1		
360-1	Fiber Optic Conduit	LF	2,100		
360-2	Fiber Optic Pull Boxes	EA	7		
401	Traffic Control	LS	1		
421	Smooth Wire Fence	LF	185		
430	Seeding	AC	96		
505-1	MAG Std. Detail 501-5 Inlet Structure (36" Pipe)	EA	1		
505-2	Per Detail Sheet 24 Outlet Headwall Structure (36" Pipe)	EA	2		
505-3	Mag Std. Detail 501-1 Straight Type Headwall (18" Pipe)	EA	4		
505-4	Mag Std. Detail 501-1 L Type Headwall (18" Pipe)	EA	3		
520-1	Safety Rail	LF	6,942		
520-2	Fence Gate	EA	5		
520-3	Equestrian Gate	EA	3		

BID SCHEDULE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	EXTENDED AMOUNT
525	Pneumatically Placed Mortar (Guniting)	SY	684		
610	12" Potable Water Line (DIP)	LF	2,100		
615-1	24" Raw Sewage Forcemain (DIP)	LF	4,400		
615-2	8" Waste Activated Sludge Forcemain (DIP)	LF	2,100		
616-1	12" Reclaimed Water Line (DIP)	LF	2,100		
616-2	24" Reclaimed Water Line (DIP)	LF	2,200		
618-1	36" Storm Drain Pipe (RGRCP Class III)	LF	1,138		
618-2	18" Irrigation Drain Pipe (RCP Class V)	LF	112		
618-3	8" Storm Drain Pipe (DIP)	LF	260		
619-1	36" Flap Gate	EA	1		
619-2	36" Flap Gate (Remove and Relocate Existing)	EA	1		
625-1	Manhole Structure MAG Detail 520 & 522	EA	2		
625-2	Manhole Structure MAG Detail 523 & 523-2	EA	2		
630	Air Release Valves And Manholes	EA	3		
900	Salt River Project Irrigation Facilities	LS	1		
901	Aluminum Stop Gates	EA	7		
TOTAL BID AMOUNT WRITTEN IN NUMBERS					
TOTAL BID AMOUNT WRITTEN IN WORDS					

IF BY AN INDIVIDUAL:

By: _____
(Printed Name - Title)

(Address)

(Signature) (Date)

(Telephone Number)

IF BY A FIRM, PARTNERSHIP OR L.L.C. (LIMITED LIABILITY COMPANY)

(Firm Name)

(Firm Address)

By: _____
(Signature - Title) (Date)

(Telephone Number)

**** Name and Address of Each Member, or each Manager of L.L.C. per Operating Agreement**

****The name and post office address of each member of the Firm or Partnership must be shown, or of each Manager of an L.L.C., also address of the registered office of the L.L.C.**

IF BY A CORPORATION

(Corporate Name)

(Corporation Address)

(Printed Name - Title)

(Telephone Number)

By: _____
(Signature) (Date)

***Incorporated under the Laws of the State of _____ Names and Addresses of Officers:**

(President)

(Address)

(Secretary)

(Address)

(Treasurer)

(Address)

***The name of the State under which the Laws of the Corporation was Chartered and name, title and business address of the President, Secretary, and Treasurer must be shown.**

SUBCONTRACTOR LISTING

As required in Section 102.6 of the Supplementary General Conditions, the following is a listing of Subcontractors and material suppliers (including any M/WBE participation) that are to be used in the event the undersigned should enter into contract with the Owner. Although this list will not be considered as final commitment on the part of the successful proposer, any Subcontractor changes from those listed must have Owner's written approval prior to commencement of Subcontractor work on site.

(Signature)

SURETY BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, as Principal, (hereinafter called the Principal), and the _____, a corporation duly organized under the laws of the State of _____, as Surety, (hereinafter called the Surety), are held and firmly bound unto the Flood Control District of Maricopa County as Obligee, in the sum of ten percent (10%) of the total amount of the bid of Principal, submitted by him to the Flood Control District of Maricopa County, for the work described below, for the payment of which sum, well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, and administrators, successors and assigns, jointly and severally, firmly by these presents, and in conformance with the Arizona Revised Statutes.

WHEREAS, the said Principal is herewith submitting its proposal for Contract FCD 98-37, Camelback Ranch Levee North and Glendale Airport Extension Levee.

NOW, THEREFORE, if the Flood Control District of Maricopa County shall accept the proposal of the Principal and the Principal shall enter into a contract with the Flood Control District of Maricopa County in accordance with the terms of the proposal and give the Bonds and Certificates of Insurance as specified in the Standard Specifications with good and sufficient Surety for the faithful performance of the contract and for the prompt payment of labor and material furnished in the prosecution of the contract, or in the event of the failure of the Principal to enter into the contract and give such Bond and Certificate of Insurance, if the Principal pays to the Flood Control District of Maricopa County the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Flood Control District of Maricopa County may in good faith contract with another party to perform the work covered by the proposal then this obligation is void. Otherwise it remains in full force and effect, provided, however, that this bond is executed pursuant to the provisions of Section 34-201, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of the section to the extent as if it were copied at length herein.

Signed and sealed this _____ day of _____, A.D., 199 ____.

Agency of Record, State of Arizona

Agency Address and Phone Number:

Principal

By: _____
(Printed Name) (Signature)
Title: _____

Surety Name
By: _____
Title: _____

Bond Number: _____

ATTACH SURETY POWER OF ATTORNEY

**AFFIDAVIT BY CONTRACTOR
CERTIFYING THAT THERE WAS NO COLLUSION
IN BIDDING FOR CONTRACT**

STATE OF _____)
County of _____)SS

_____ being first duly sworn, deposes and says:

That he/she is _____ of _____ bidding on Contract FCD 98-37, Camelback Ranch Levee North and Glendale Airport Extension Levee, in the County of Maricopa, State of Arizona.

That, in connection with the above-mentioned project, neither he/she, nor anyone associated with the aforesaid business, has, directly or indirectly, participated in any collusion, entered into any contract, combination, conspiracy or other act in restraint of trade or commerce in violation of the provisions of A.R.S. Section 34-251, Article 4, as amended.

(Signature of Affiant)

Subscribed and sworn to before me this ___ day of _____, 199__

(Notary Public)

My Commission Expires

CERTIFICATION OF LICENSE

Pursuant to A.R.S. Section 32-1169, I hereby state that I hold a current contractor's license, duly issued by the office of the Registrar of Contractors for the State of Arizona, said license has not been revoked, that the license number is: _____ that my privilege license number (as required by A.R.S. Section 42-1305) is: _____; and that, if any exemption to the above licensing requirements is claimed;

(1) The basis for the claimed exemption is: _____ and;

(2) The name(s) and license number(s) of any general, mechanical, electrical, or plumbing contractor(s) to be employed on the work are:

IT IS UNDERSTOOD THAT THE FILING OF AN APPLICATION CONTAINING FALSE OR INCORRECT INFORMATION CONCERNING AN APPLICANT'S CONTRACTOR'S LICENSE OR PRIVILEGE LICENSE WITH THE INTENT TO VOID SUCH LICENSING REQUIREMENTS IS UNSWORN FALSIFICATION PUNISHABLE ACCORDING TO A.R.S. SECTION 13-2704.

Signature of Licensee

Date: _____

Company: _____

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
MINORITY/WOMEN-OWNED BUSINESS ENTERPRISE PROGRAM
MBE/WBE ASSURANCES AFFIDAVIT**

NOTE: FAILURE TO COMPLETE AND SUBMIT THIS AFFIDAVIT WITH THE BID PROPOSAL MAY BE CAUSE FOR REJECTION OF THE BID.

The undersigned, fully cognizant of the Flood Control District of Maricopa County MBE/WBE Program requirements and of the goal established, hereby certifies that in the preparation of this bid,

_____ (the entity submitting the bid)

(CHECK ONE)

- Will meet the **established** goal for participation by Minority/Women-Owned Business Enterprises.
- Will provide the necessary documentation to Minority Business Office to establish that a good faith effort was made.

The first and second low bidders will specify their MBE/WBE participation on the Actual Participation affidavit or provide documentation of their good faith efforts not later than 4:00 p.m., the seventh calendar day following the bid opening. If participation is "None", the documentation shall provide bidder's good faith efforts to obtain the participation. This documentation will be reviewed by the MBO to determine whether in fact a comprehensive "good faith" effort has been implemented. The required affidavit shall be obtained by the apparent first and second low bidders from the Minority Business Office, 2901 West Durango Street, Phoenix, Arizona 85009, Telephone 506-8656, following the bid opening and verbal notification from the Procurement Officer of the Procurement Agency; a SAMPLE affidavit form for reference purposes follows.

Name of Firm

By: _____
Signature

Title

STATE OF _____)
County of _____) ss

Subscribed and sworn to before me this ___ day of _____, 1998

Notary Public

My Commission Expires: _____

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
MINORITY/WOMEN OWNED BUSINESS ENTERPRISE PROGRAM
ACTUAL MBE/WBE PARTICIPATION AFFIDAVIT
 (NOTE: COMPLETED AFFIDAVIT MUST BE SUBMITTED WITHIN SEVEN CALENDAR DAYS
 FOLLOWING THE BID OPENING).

Name of Contractor _____ Project/Contract Number FCD 98-37 Total Amount of Contract _____
 Contract M/WBE Goal: 10%

Contact Person _____

Street No. _____

City _____ State _____ Zip _____

<u>Minority/Women Owned Firm</u>	<u>Principal</u>	<u>Address</u>	<u>Type of Work</u>	<u>Contract Percentage</u>

TOTALS (Dollars/Percentage) _____

The undersigned has entered into a formal agreement with the MBE/WBE subconsultants/subcontractors /suppliers listed above, in the execution of this contract with Maricopa County.

Signature _____

Title _____

STATE OF _____ }

}ss

County of _____ }

Subscribed and sworn to before me this _____ day of _____ by _____
 Notary Public

My commission Expires: _____

**MARICOPA COUNTY
MINORITY/WOMEN-OWNED BUSINESS ENTERPRISES PROGRAM**

**D/M/WBE PARTICIPATION REPORT
(To be attached with Each Request for Pay)**

Date: _____

General Contractor/Prime Consultant:

Contact Person: _____

Address: _____

Telephone Number: _____

Fax Number: _____

Project Description: _____

Contract Number: _____

For Pay Period of (indicate dates): _____

D/M/WBE Subcontractor/Subconsultant Name: _____

Contact Person: _____

Address: _____

Telephone Number: _____

Type of Firm: _____

Type of Work performed for this project: _____

Total D/M/WBE Subcontract Amount: \$ _____

**Amount Paid to this D/M/WBE
Subcontractor this invoice:** \$ _____

Total paid to this Subcontractor to date: \$ _____

Total D/M/WBE Contract Goal this project = ____ %

**Total D/M/WBE Participation
on this contract to date =** ____ %

**cc: Maricopa County Infrastructure
Contracts and D/W/MBE Office
2901 West Durango Street
Phoenix, Arizona 85009**

CONTRACT AGREEMENT

THIS AGREEMENT, made and entered into this ___ day of _____, 1998 by and between the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, hereinafter called the Owner, acting by and through its BOARD OF DIRECTORS, and _____, hereinafter called the Contractor.

WITNESSETH: That the said Contractor, for and in the consideration of the sum of _____ (\$) to be paid to him by the Owner, in the manner and at the times hereinafter provided, and of the other covenants and agreements herein contained, hereby agrees for himself, heirs, executors, administrators, successors, and assigns as follows:

ARTICLE I - SCOPE OF WORK: THE Contractor shall construct, and complete in a workmanlike and substantial manner and to the satisfaction of the Chief Engineer and General Manager, a project for the Flood Control District of Maricopa County, designated as **Contract FCD 98-37, Camelback Ranch Levee North and Glendale Airport Extension Levee**, and furnish at its own cost and expense all necessary machinery, equipment, tools, apparatus, materials, and labor to complete the work in the most substantial and workmanlike manner according to the Plans and Construction Specifications on file with the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona, and such modifications of the same and other directions that may be made by the Flood Control District of Maricopa County as provided herein.

ARTICLE II - CONTRACT DOCUMENTS: The Construction Specifications, i.e. Invitation to Bid, Plans, Standard Specifications and Details, Supplementary General Conditions, Special Provisions, Addenda, if any, Proposal, Affidavits, Performance Bond, Payment Bond, Certificates of Insurance, and Change Orders, if any, are by this reference made a part of this Contract and shall have the same effect as though all of the same were fully inserted herein.

ARTICLE III - TIME OF COMPLETION: The Contractor further covenants and agrees at its own proper cost and expense, to do all work as aforesaid for the construction of said improvements and to completely construct the same and install the material therein, as called for by this agreement free and clear of all claims, liens, and charges whatsoever, in the manner and under the conditions specified within two hundred seventy (270) calendar days following notice to proceed.

ARTICLE IV - PAYMENTS: For and in consideration of the faithful performance of the work herein embraced as set forth in the Contract Documents, which are a part hereof and in accordance with the directions of the Owner, through its Engineer and to its satisfaction, the Owner agrees to pay the said Contractor the amount earned, computed from actual quantities of work performed and accepted or materials furnished at the unit bid price on the Proposal made a part hereof, and to make such payment in accordance with the requirements of A.R.S. Section 34-221, as amended. The Contractor agrees to discharge its obligations and make payments to its subcontractors and suppliers in accordance with A.R.S. Section 34-221.

ARTICLE V - TERMINATION: The Owner hereby gives notice that pursuant to A.R.S. Section 38-511(A) this contract may be canceled without penalty or further obligation within three years after execution if any person significantly involved in initiation, negotiation, securing, drafting or creating a contract on behalf of the Owner is, at any time while the contract or any extension of the contract is in effect, an employee or agent of any other party to the contract in any capacity or a consultant to any other party of the contract with respect to the subject matter of the contract. Cancellation under this section shall be effective when written notice from the Chief Engineer and General Manager of the Owner is received by all of the parties to the contract. In addition, the Owner may recoup any fee for commission paid or due to any person significantly involved in initiation, negotiation, securing, drafting or creating the contract on behalf of the Owner from any other party to the contract arising as a result of the contract.

ARTICLE VI - NEGOTIATION CLAUSE: Recovery of damages related to expenses incurred by the Contractor for a delay for which the Owner is responsible, which is unreasonable under the circumstances and which was not within the contemplation of the parties to the contract, shall be negotiated between the Contractor and the Owner. This provision shall be construed so as to give full effect to any provision in the contract which requires notice of delays, provides for arbitration or other procedure for settlement or provides for liquidated damages.

ARTICLE VII - COMPLIANCE WITH LAWS: The Contractor is required to comply with all Federal, State and local ordinances and regulation. The Contractor's signature on this contract certifies compliance with the provisions of the I-9 requirements of the Immigration Reform Control Act of 1986 for all personnel that the Contractor and any subcontractors employ to complete this project. It is understood that the Owner shall conduct itself in accordance with the provisions of the Maricopa County Procurement Code.

ARTICLE VIII - MBE/WBE PROGRAM: The Owner will endeavor to ensure in every way possible that minority and women-owned business enterprises shall have every opportunity to participate in providing professional services, purchased goods, and contractual services to the Owner without being discriminated against on the grounds of race, religion, sex, age, disability, or national origin. The Maricopa County Minority Business Program implemented January 1, 1992, is incorporated by reference.

ARTICLE IX - ANTI-DISCRIMINATION PROVISION: The Contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, or disability and further agrees not to engage in any unlawful employment practices. The Contractor further agrees to insert the foregoing provision in all subcontracts hereunder.

IN WITNESS WHEREOF: Five (5) identical counterparts of this Contract, each of which shall for all purposes be deemed an original thereof, have been duly executed by the parties hereinabove named, on the date and year first above written.

Party of the First Part

By _____
(Printed Name) (Signature)

Title: _____

Date: _____

Tax Identification Number

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PARTY OF THE SECOND PART

RECOMMENDED BY:

Chief Engineer and General Manager Date
Flood Control District of Maricopa County

By: _____
Chairman, Board of Directors Date

ATTEST:

Clerk of the Board Date

LEGAL REVIEW

Approved as to form and within the powers and authority granted under the laws of the State of Arizona to the Flood Control District.

By: _____
District, General Counsel Date

**STATUTORY PAYMENT BOND PURSUANT TO TITLE 34
CHAPTER 2, ARTICLE 2, OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Contract amount)**

KNOW ALL MEN BY THESE PRESENTS:

That, _____ (hereinafter called the Principal), as Principal, and _____ a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ (hereinafter called the Surety), as Surety, are held and firmly bound unto the Flood Control District of Maricopa County, in the County of Maricopa, State of Arizona (hereinafter called the Obligee), in the amount of _____ (\$ _____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Flood Control District of Maricopa County, dated the _____ day of _____, 199__ for Contract FCD 98-37, Camelback Ranch Levee North and Glendale Airport Extension Levee, which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal promptly pays all monies due to all persons supplying labor or materials to the Principal or the Principal's Subcontractors in the prosecution of the work provided for in the contract, this obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of the Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the same extent as if they were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as a part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

Witness our hands this _____ day of _____, 199__

Agency of Record, State of Arizona

Agency Address and Phone Number:

Principal

By: _____
Printed Name and Signature

Title: _____

Surety Seal

By: _____
Title: _____

ATTACH SURETY POWER OF ATTORNEY

**STATUTORY PERFORMANCE BOND PURSUANT TO TITLE 34
CHAPTER 2, ARTICLE 2, OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Contract amount)**

KNOW ALL MEN BY THESE PRESENTS:

That, _____ hereinafter called the Principal, as Principal, and _____ a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ (hereinafter called the Surety), as Surety, are held and firmly bound unto the Flood Control District of Maricopa County, in the County of Maricopa, State of Arizona, in the amount of _____ (\$ _____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Flood Control District of Maricopa County, dated the _____ day of _____, 199____, for **Contract FCD 98-37, Camelback Ranch Levee North and Glendale Airport Extension Levee**, which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal faithfully performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of the contract during the original term of the contract and any extension of the contract, with or without notice to the Surety, and during the life of any guaranty required under the contract, and also performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of all duly authorized modifications of the contract that may hereafter be made, notice of which modifications to the Surety being hereby waived; the above obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, and Article 2, Arizona Revised Statutes, to the same extent as if they were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

Witness our hands this _____ day of _____, 199____.

Agency of Record, State of Arizona

Agency Address and Phone Number: _____

BOND NUMBER: _____

ATTACH SURETY POWER OF ATTORNEY

Principal

By: _____
(Printed Name) (Signature)

Title: _____

Surety Seal

By: _____

Title: _____

INDEMNIFICATION

To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the District, Maricopa County, the City of Glendale, Arizona, and the City of Phoenix, Arizona, their agents, representatives, officers, directors, officials, and employees from and against all claims, damages, losses and expenses (including but not limited to attorney fees, court costs, and the cost of appellate proceedings), relating to, arising out of, or resulting from the Contractor's work or services. The Contractor's duty to defend, hold harmless and indemnify the District, Maricopa County, the City of Glendale, Arizona, and the City of Phoenix, Arizona, their agents, representatives, officers, directors, officials, and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, or injury to, impairment, or destruction of property including loss of use resulting therefrom, caused in whole or in part by any act or omission by the Contractor, anyone the Contractor directly or indirectly employs, or anyone for whose acts the Contractor may be liable, regardless of whether it is caused in part by a party indemnified hereunder, including the District.

The amount and type of insurance coverage requirements set forth below will in no way be construed as limiting the scope of the indemnity in this paragraph.

INSURANCE REQUIREMENTS

Without limiting any of its obligations or liabilities, the Contractor, at the Contractor's own expense, shall purchase and maintain the hereafter stipulated minimum insurance with companies duly licensed, possessing a current A.M. Best, Inc. rating of B++6, or approved unlicensed to do business in the State of Arizona with policies and forms satisfactory to the County.

All insurance required herein shall be maintained in full force and effect until all work required to be performed under the terms of the Contract is satisfactorily completed and formally accepted; failure to do so may, at the sole discretion of the District, constitute a material breach of this Contract.

The Contractor's insurance shall be primary insurance as respects the District, and any insurance or self insurance maintained by the District shall not contribute to it.

Any failure to comply with the claim reporting provisions of the policies or any breach of the policy warranty shall not affect coverage afforded under the policies to protect the District.

The policies, except Workers' Compensation, shall contain a waiver of transfer rights of recovery (subrogation) against the District, its agents, representatives, directors, officers, and employees for any claims arising out of the Contractor's work or service.

The policies may provide coverage which contain deductibles or self insured retentions. Such deductible and/or self insured retentions shall not be applicable with respect to the coverage provided to the District under such policies. The Contractor shall be solely responsible for the deductible and/or self insured retentions and the District, at its option, may require the Contractor to secure the payment of such deductible or self insured retentions by a surety bond or an irrevocable and unconditional letter of credit.

The District reserves the right to request and to receive, within 10 working days, certified copies of any or all of the above policies and/or endorsements. The District shall not be obligated, however, to review same or to advise the Contractor of any deficiencies in such policies and endorsements, and such receipt shall not relieve the Contractor from, or be deemed a waiver of the District's right to insist on, strict fulfillment of the Contractor's obligations under this Contract.

The insurance coverage, except Workers' Compensation and Professional Liability, required by this Contract shall name the District, its agents, representatives, officers, directors, officials, and employees as Additional Insureds.

General Liability. The Contractor shall maintain Commercial General Liability insurance with a limit of not less than \$2,000,000 for each occurrence with a \$2,000,000 Products and Completed Operations Limit and \$2,000,000 General Aggregate Limit, and include coverage for bodily injury, broad form property damage, personal injury, products/completed operations and blanket contractual covering, but not limited to, the liability assumed under the indemnification provisions of this Contract, which coverage will be at least as broad as the Insurance Service Office, Inc. Policy Form CG 00011093 or any replacements thereof. The coverage shall not exclude X, C, U.

Such policy shall contain a severability of interest provision, and shall not contain a sunset provision or commutation clause, nor any provision which would serve to limit third party action over claims.

The Commercial General liability additional insured endorsement will be at least as broad as the Insurance Service Office, Inc. Additional Insured, Form B, CG 20101093, or replacements thereof.

Any failure to comply with the reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the District.

If required by this contract, the Contractor subletting any part of the work awarded to the Contractor shall purchase and maintain, at all times during prosecution of the work under this Contract, an Owner's and Contractor's Protective Liability insurance policy for bodily injury and property damage, including death, which may arise in the prosecution of the work or Contractor's operations under this contract. Coverage shall be on an occurrence basis with a limit not less than \$1,000,000 per occurrence, and the policy shall be issued by the same insurance company that issues the Contractor's Commercial General Liability insurance.

Automobile Liability. The Contractor shall maintain Commercial/Business Automobile Liability insurance with a combined single limit for bodily injury and property damage of not less than \$1,000,000 each occurrence with respect to the Contractor's any owned, hired, and non-owned vehicles assigned to or used in performance of the Contractor's work or services. Coverage will be at least as broad as coverage code 1, "any auto" (Insurance Services Office, Inc. Policy Form CA 00011293, or any replacements thereof). Such insurance shall include coverage for loading and off-loading hazards. If hazardous substances, materials, or wastes are to be transported, MCS 90 endorsement shall be included and \$5,000,000 per accident limits for bodily injury and property damage shall apply.

Workers' Compensation. The Contractor shall carry Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor's employees engaged in the performance of the work or services; and Employer's liability insurance of not less than \$500,000 for each accident, \$500,000 disease for each employee, and \$500,000 disease policy limit.

In case any work is subcontracted, the Contractor will require the subcontractor to provide Workers' Compensation and Employer's Liability to at least the same extent as required of the Contractor.

Builders' Risk (Property) Insurance. The Contractor shall purchase and maintain, on a replacement cost basis, Builders' Risk insurance in the amount of the initial Contract amount as well as subsequent modifications thereto for the entire work at the site. Such Builders' Risk insurance shall be maintained until final payment has been made or until no person or entity other than the District has an insurable interest in the property required to be covered, whichever is earlier. This insurance shall include interests of the District, the Contractor, and all subcontractors and sub-subcontractors in the work during the life of the Contract and course of construction, and shall continue until the work is completed and accepted by the District. For new construction projects, the Contractor agrees to assume full responsibility for loss or damage to the work being performed and to the structures under construction. For renovation construction projects, the Contractor agrees to assume responsibility for loss or damage to the work being performed at least up to the full Contract amount, unless otherwise required by the Contract documents or amendments thereto.

Builders' Risk insurance shall be on an all-risk policy form and shall also cover false work and temporary buildings and shall insure against risk of direct physical loss or damage from external causes including debris

removal, demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's service and expenses required as a result of such insured loss and other "soft costs" as required by the Contract.

Builders' Risk insurance must provide coverage from the time any covered property becomes Contractor's control and/or responsibility, and continue without interruption during construction or renovation or installation, including any time during which the covered property is being transported to the construction installation site, and while on the construction or installation site awaiting installation. The policy will provide coverage while the covered premises or any part thereof are occupied. Builders' Risk insurance shall be primary and not contributory.

If the Contract requires testing of equipment or other similar operations, at the option of the District, the Contractor will be responsible for providing property insurance for these exposures under a Boiler Machinery insurance policy.

Required coverages may be modified by an amendment to the Contract documents.

Certificates of Insurance

Prior to commencing work or services under this Contract, the Contractor shall furnish the District with Certificates of Insurance, or formal endorsements as required by the contract, issued by the Contractor's insurer(s), as evidence that policies providing the required coverages, conditions and limits required by this Contract are in full force and effect. Such certificates shall identify this Contract number and title.

Subcontractor: The Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. If a policy does expire during the life of the Contract, a renewal Certificate of the required coverage must be sent to the District at least fifteen (15) days prior to the expiration date.

In the event any insurance policy(ies) required by this Contract is(are) written on a "claims made" basis, coverage shall extend for two years past completion and acceptance of the work or services and as evidenced by annual Certificates of Insurance.

Insurance evidenced by this Certificate shall not expire, be canceled, or materially changed without fifteen (15) days prior written notice to the District. If a policy does expire during the life of the contract, a renewal Certificate must be sent to the District fifteen (15) days prior to the expiration date.

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CERTIFICATE OF INSURANCE**

CONTRACT FCD 98-37

PROJECT TITLE: Camelback Ranch Levee North and Glendale Airport Extension Levee

NAME AND ADDRESS OF INSURANCE AGENCY	INSURANCE COMPANIES AFFORDING COVERAGES	
	Company Letter	A
	Company Letter	B
	Company Letter	C
NAME AND ADDRESS OF INURED	Company Letter	D
	Company Letter	E
	Company Letter	F

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time

CO. LTR	TYPE OF INSURANCE	POLICY NUMBER	EFFECTIVE DATE (MM/DD/YY)	EXPIRATION DATE (MM/DD/YY)	LIMITS	
	COMMERCIAL GENERAL <input checked="" type="checkbox"/> LIABILITY FORM <input checked="" type="checkbox"/> PREMISES OPERATIONS <input checked="" type="checkbox"/> CONTRACTUAL <input checked="" type="checkbox"/> BROAD FORM PROPERTY DAMAGE <input checked="" type="checkbox"/> EXPLOSION & COLLAPSE <input checked="" type="checkbox"/> PRODUCTS/COMPLETED OPERATIONS HAZARD <input checked="" type="checkbox"/> UNDERGROUND HAZARD <input checked="" type="checkbox"/> INDEPENDENT CONTRACTORS <input checked="" type="checkbox"/> PERSONAL INJURY				GENERAL AGGREGATE PRODUCTS/COMPLETED OPERATIONS BODILY INJURY AND PROPERTY DAMAGE PERSONAL INJURY EACH OCCURRENCE	\$2,000,000 \$2,000,000 \$2,000,000 \$2,000,000 \$2,000,000
	COMPREHENSIVE AUTO <input checked="" type="checkbox"/> LIABILITY & NON-OWNED				EACH OCCURRENCE	\$1,000,000
	<input type="checkbox"/> EXCESS LIABILITY				NECESSARY IF UNDERLYING NOT ABOVE MINIMUM	
	<input checked="" type="checkbox"/> WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY				STATUTORY each accident	\$500,000
	<input type="checkbox"/> ENGINEERS PROFESSIONAL LIABILITY				EACH CLAIM AND ANNUAL AGGREGATE	
	<input checked="" type="checkbox"/> OTHER	In addition to the Flood Control District, add Maricopa County, the City of Glendale, Arizona, and the City of Phoenix, Arizona as additional insured.				

Except for Professional Liability Insurance and Workers' Compensation Insurance, the Flood Control District of Maricopa County is added as an additional insured on those types of policies described herein which are required to be furnished by this contract entered into between the insured and the Flood Control District. To the extent provided in this contract, insured shall hold harmless the Flood Control District of Maricopa County from liability arising out of any services provided or duty performed by insured as required by statute, law, purchase order or otherwise required, with the exception of liability for loss or damage resulting from the sole negligence of Flood Control District, its agents, employees or indemnities. It is agreed that any insurance available to the named insured shall be primary of other sources that may be available. It is further agreed that no policy shall expire, be canceled, or materially changed to affect the coverage available to the District without thirty (30) days written notice to the District. THIS CERTIFICATE IS NOT VALID UNLESS COUNTERSIGNED BY AN AUTHORIZED REPRESENTATIVE OF THE INSURANCE COMPANY.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY 2801 West Durango Street Phoenix, Arizona 85009	DATE ISSUED _____ _____ AUTHORIZED REPRESENTATIVE
-------------------------------------------------------------------------------------------------	-------------------------------------------------------------

It is further agreed that:

The Contractor hereby agrees to indemnify and save harmless the **Flood Control District of Maricopa County, Maricopa County, the City of Glendale, Arizona, and the City of Phoenix, Arizona**, or any of their departments, agencies, officers or employees, from and against all loss, expense, damage or claim of any nature whatsoever which is caused by any activity, condition or event arising out of the performance or nonperformance of any of the provisions of this Agreement, with the exception of liability for loss resulting from the sole negligence of the Flood Control District, its agents, employees, or indemnities.

The **Flood Control District of Maricopa County, Maricopa County, the City of Glendale, Arizona, and the City of Phoenix, Arizona** shall, in all instances, be indemnified against all liability, losses and damages of any nature for or on account of any injuries to or death of persons or damages to or destruction of property arising out of or in any way connected with the performance or nonperformance of this Agreement, except such injury or damage as shall have been occasioned by the sole negligence of the **Flood Control District of Maricopa County, Maricopa County, the City of Glendale, Arizona, and the City of Phoenix, Arizona**.

The above cost of damages incurred by the **Flood Control District of Maricopa County, Maricopa County, the City of Glendale, Arizona, and the City of Phoenix, Arizona**, or any of their departments, agencies, officers or employees, or others aforesaid shall include in the event of an action, court costs, expenses for litigation and reasonable attorneys fees.

Firm: _____

Principal: _____

By: _____

Title: _____

Date: _____

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONTRACT FCD 98-37
Camelback Ranch Levee -North
And the Glendale Airport Levee
PCN 4000532**

SUPPLEMENTARY GENERAL CONDITIONS

SUPPLEMENTARY GENERAL CONDITIONS

SPECIFICATIONS

Except as otherwise amended in these Supplementary General Conditions and the Construction Special Provisions, construction of this project shall be in accordance with all applicable Maricopa Association of Governments (MAG) Uniform Standard Specifications and Uniform Standard Details, dated 1998, together with the Maricopa County Department of Transportation (MCDOT) Supplements to the Uniform Standard Details, dated 1993.

PRECEDENCE OF CONTRACT DOCUMENTS

This Contract and its designated documents, whether taken separately or together, are to be interpreted according to full intent, meaning, and spirit, and shall be deemed to mutually explain each other and to be descriptive of any materials to be furnished and the work to be performed under this Contract. In cases of any difference or discrepancy between the Contract documents, the order of precedence shall be (a) Addendum to the Invitation for Bids, (b) the Contract form, (c) Supplementary General Conditions, (d) Construction Special Provisions, (e) Project Plans, (f) MCDOT Supplements to the Uniform Standard Details, and (g) MAG Uniform Standard Specifications and Uniform Standard Details.

Subsection 101.2 - Definitions and Terms: Make the following changes:

- (1) Change the definition of the phrase "Board of Supervisors" to being the Board of Directors acting under the authority of the laws of the State of Arizona and in their capacity of the Board of Directors of the Flood Control District of Maricopa County.
- (2) Change the definition of the phrase "Budget Project" to being a project financed by funds set aside in the annual budget or otherwise approved by the Flood Control District of Maricopa County Board of Directors.
- (3) Add to the definition of the phrase "Contract Documents," the phrase "Supplementary General Conditions."
- (4) Change the definition of the term "Engineer" to being the person appointed by the Flood Control District of Maricopa County Board of Directors to the office of Chief Engineer and General Manager of the Flood Control District of Maricopa County acting directly or through its authorized representative, the Chief of the Flood Control District of Maricopa County Planning and Project Management Division.
- (5) Change the definition for the phrase "Notice of Award" to a letter from the Flood Control District of Maricopa County advising Contractor that it is the successful bidder and the Flood Control District of Maricopa County has accepted its proposal.
- (6) Change the definition of the term "Owner" to the Flood Control District of Maricopa County and the City of Glendale, Arizona, acting through their legally constituted officials, officers, or employees.
- (7) Add the definition for Maricopa County Minority Business Office (MBO), as being the office responsible for administering the Maricopa County Minority and Women Owned Business Enterprise Program.
- (8) Add the definition for the Maricopa County Minority and Women Owned Business Enterprise Program as being the Program adopted by the Board of Supervisors effective January 1, 1992.

Subsection 102.4 - Examination of the Plans, Special Provisions, and Site Work: Add the following: The soil borings logs and geotechnical report, including ground water conditions, are available for review

at the Owner's office, and Contractors are encouraged to do so. Existing moisture conditions shall be no basis for claim for additional monies or time extensions. The Contractor shall manipulate the existing soil as required to achieve stable soil conditions and the required densities, as well as safe and stable side slopes during construction activities.

Subsection 102.5 - Preparation of Proposal: Add the following:

Bids, including the Bidding Schedule, must be legibly written in ink or typed, with all prices given in numerals. In case of a conflict between the unit bid price and the extension, the unit bid price shall govern.

It shall be the responsibility of prospective bidders to determine, prior to submission of a bid, if any addenda have been issued by the Flood Control District. This may be accomplished by calling 602-506-1501. Any addendum issued, if not already bound into the Special Provisions, **shall be attached and included as part of the Specifications** and any quantities on the Bidding Schedule requiring change shall be adjusted to the new figure by pen and ink. **Bids which do not have appropriate addenda attached, show appropriate changes to the Bidding Schedule, and acknowledge receipt of addenda in the Proposal may be invalid.**

The bidder's Arizona State Contractor's License number and the classification under which it proposes to perform the work shall be shown on the proposal. An "A" **General Engineering** License is required for this contract. The two lowest bidders may be required to provide certification of prior satisfactory completion for similar construction and to furnish a copy of their license and the renewal certificate.

Subsection 102.6 - Subcontractors' List: Add the following:

A list of subcontractors and suppliers (including any M/WBE participation) intended to be used on the project shall be submitted with the bid, on the form provided in the Proposal. Although this list will not be considered as final commitment on the part of the successful proposer, any subcontractor changes from those listed must have Owners written approval prior to work performed on site by a subcontractor.

Subsection 102.7 - Irregular Proposals: Add the following:

- (F) If the Maricopa County Minority and Women-Owned Business Enterprises Assurances Affidavit is not completed and submitted.
- (G) If any addenda are not acknowledged and attached.
- (H) If the Owner's bond forms are not utilized.
- (I) If the entire specifications document is not returned.
- (J) If the statement from bidder's insurance carrier as required by Subsection 103.6 is not included.

Subsection 103.6 - Contractor's Insurance: Add the following:

A statement from bidder's insurance carrier shall be included in the proposal certifying that it will furnish the specified kind and amounts of insurance to the bidder if it is awarded the contract. As required by law, the statement will be from an insurance carrier or carriers authorized to do business in the State of Arizona, or countersigned by an agent of the carrier authorized to do business in the State of Arizona. Concurrently with the execution of the contract, Contractor shall furnish a Certificate of Insurance using the included Certificate that names the additional insureds as set out in the Certificate. The Certificate shall also name the additional insureds as Certificate Holders. The types of insurance and the limits of liability shall be as indicated on the included form.

Subsection 103.6.1(D) - Contractor's Insurance: Add the following:

Include additional insureds as indicated on the included Certificate of Insurance.

Subsection 103.6.2 - Indemnification of the Contracting Agency Against Liability: Add the following:

Additionally, Contractor shall execute the Indemnification found in the Contract Documents.

Subsection 104.1.1 - General: Add the following:

All water for construction purposes, drinking water, lighting, temporary electric power, heat, and telephone service shall be arranged and provided for as per requirements of the work by Contractor at his expense.

Subsection 104.1.2 Maintenance of Traffic: Add the following:

The contractor shall not disrupt neither the traffic on Camelback Road nor the Airport traffic (air or ground) and shall notify and obtain approval from the agency that has jurisdiction.

The Contractor shall also maintain access to all local businesses and residences.

Subsection 104.2.6 - Changes: Add to Subsection 104.2 Alteration of Work

The Owner may at any time, by written order, and without notice to the sureties, if any, make changes within the general scope of this contract in any one or more of the following:

- (A) Drawings, designs, or specifications;
- (B) Method or manner of performance of the work;
- (C) Owner-furnished facilities, equipment, materials, services, or site;
- (D) Directing acceleration in the performance of the work.

Any other written or oral order from the Owner that causes a change shall be treated as a change order under this section provided that the Contractor gives the Owner written notification within two work days after receipt of such direction stating:

- (A) The date, nature, and circumstances of the conduct regarded as a change;
- (B) The particular elements of the contract performance for which the Contractor is seeking an equitable adjustment under this section, including any price or schedule adjustments;
- (C) The Contractor's estimate of the time by which the Owner must respond to the Contractor's notice to minimize cost, delay, or disruption of performance.

The Contractor shall diligently continue performance of this contract to the maximum extent possible in accordance with its provisions. Except as provided in this section, no order, statement, or conduct of the Owner shall be treated as a change or entitle the Contractor to an equitable adjustment. If any change under this section causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, the Owner shall make an equitable adjustment and modify the contract in writing.

The equitable adjustment shall not include increased costs or time extensions for delay resulting from the Contractor's failure to provide notice or to diligently continue performance. No proposal for the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

Subsection 104.2.7 - Cost Estimates or Price Proposals: Add to Subsection 104.2 Alteration of Work:

The Contractor and any lower-tier subcontractors shall submit itemized cost estimates or price proposals for any owner-directed change order or Contractor-initiated claim.

Cost estimates or pricing proposals shall be itemized to include direct labor by man-hours, individual craft, hourly wage rate and verifiable labor burden. Other direct costs shall include rental and operator rates for rented or owned equipment, material trucking expenses and other costs clearly identified and directly allocable to contract performance. Material costs shall be itemized by item description, quantity(s) for each item, unit price per item, including applicable sales tax markup, and extended total price per item. The Contractor shall provide copies of material supplier quote sheets, invoices or purchase orders, as appropriate.

Lump sum cost estimates or price proposals shall be rejected and returned to the Contractor for itemization as described above. Failure of the Contractor to submit properly itemized cost estimates or price proposals shall not constitute an excusable delay and result in a change order being unilaterally priced as the Owner's fair estimated price.

Subsection 104.2.8 - Value Engineering: Add to Subsection 104.2 Alteration of Work:

(A) **General.** The Contractor is encouraged to voluntarily develop, prepare, and submit value engineering change proposals (VECPs). The Contractor shall share in any instant contract savings realized from accepted VECPs, in accordance with paragraph (f) below. The Owner reserves the right to make alterations to the contract, in accordance with procedures elsewhere within this contract. Such alterations will not be eligible for inclusion in any VECP.

(B) **Definitions.**

Contractor's development and implementation costs means those costs the Contractor incurs on a VECP in developing, testing, preparing, and submitting the VECP as well as those costs incurred by the Contractor to make the changes required by the Owner's acceptance of the VECP.

Owner costs means those owner costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistical support. The term does not include the normal administrative costs of processing the VECP.

Instant contract savings means the estimated reduction in Contract cost of performance resulting from acceptance of the VECP, minus the allowable Contractor's development and implementation costs, minus subcontractors' development and implementation costs (see paragraph (g) below).

Value engineering change proposal (VECP) means a proposal that (1) requires a change to the contract; (2) results in reducing the contract price or estimated cost without impairing essential functions or characteristics; and (3) does not involve a change in deliverable end item quantities, schedule, or a change to the contract type.

(C) **VECP Preparation.** As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change affects contractually required schedule and cost reporting, it shall be revised to incorporate proposed VECP modifications. The VECP shall include the following:

- (1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effects of the change on the end item's performance. All design changes must be submitted on 24"x 36" standard drawing sheets along with supporting calculations. Each drawing sheet and at least the content sheet of the calculations shall be sealed by an Engineer registered in the State of Arizona.
- (2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revision.

- (3) A separate, detailed cost estimate for the affected portions of the existing contract requirements and the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (g) below.
 - (4) A description and estimate of costs the Owner may incur implementing the VECP, such as test and evaluation and operating and support costs. This is an estimate based only on the Contractor's understanding of additional efforts to be expended by the Owner, should the VECP be accepted. The final cost will be determined by the Owner.
 - (5) A prediction of any effects the proposed change would have on collateral costs to the agency, i.e., costs of operation or maintenance.
 - (6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.
 - (7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved and previous Owner actions, if known.
- (D) **Submission.** The Contractor shall submit VECPs to the Owner's Engineer.
- (E) **Owner Action.**
- (1) The Owner shall notify the Contractor of the status of the VECP within 15 calendar days after receipt from the Contractor. If additional time is required, the Owner shall notify the Contractor within the 15-day period and provide the reason for the delay and the expected date of the decision. The Owner will process VECPs expeditiously; however, it shall not be liable for any delay in acting upon a VECP.
 - (2) If the VECP is not accepted, the Owner shall notify the Contractor in writing, explaining the reasons for rejection.
 - (3) The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Owner.
 - (4) Any VECP may be accepted, in whole or in part, by the Owner's award of a change order to this contract, citing this subsection. The Owner may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a change order incorporates a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Owner's decision to accept or reject all or any part of any VECP shall be final and not subject to disputes or otherwise subject to litigation.
- (F) **Cost Sharing.**
- (1) **Rates.** The Owner's share of savings is determined by subtracting the Owner's costs from instant contract savings and multiplying the result by 50 percent. The Contractor's share shall be the remaining 50 percent.
 - (2) **Payment.** Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a change order to this contract to accept the VECP, reduce the contract price or estimated cost by the amount of instant contract savings, and provide the Contractor's share of savings by adding the amount calculated to the contract price.

- (G) **Subcontracts.** The Contractor may include an appropriate value engineering clause in any subcontract. In computing any adjustment in this contract's price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Owner under this contract, but shall exclude any value engineering incentive payments; provided that these payments shall not reduce the Owner's share of the savings resulting from the VECP.

Subsection 105.1.1 - Engineer's Evaluation: Add to Subsection 105.1 Authority of Engineer:

Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to subsections 105.2~~X~~, 105.3.1 and 106.4, (contained herein) but such time shall not exceed 20 calendar days. Engineer will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized without Engineer's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. Engineer will record time required by Engineer and Engineer's Consultants in evaluating substitutes proposed or submitted by Contractor pursuant to subsections 105.3.1 and 106.4(B) (contained herein) and in making changes in the Contract Documents (or in the provisions of any other direct contract with Owner for work on the project) occasioned thereby. Whether or not Engineer accepts a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer and Engineer's Consultants for evaluating each such proposed substitute item.

Subsection 105.2 - Plans and Shop Drawings: Add the following:

- A) Shop drawings means drawings, submitted to the Engineer by the Contractor pursuant to the contract, showing in detail (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., form, fit and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract.
- B) Product Data is information on manufactured items, either stock or modified, and includes descriptive literature, operating data, performance curves, certified dimensional drawings, wiring or schematic control diagrams, piping, instrumentation, parts lists, and operating, maintenance and lubrication manuals.

Subsection 105.3.1 - Substitute Construction Methods or Procedures: Add to Subsection 105.3

Conformity with Plans and Specifications:

If a specific means, method, technique, sequence or procedure of construction is shown or indicated and expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by Engineer will be similar to that provided in subparagraph 106.4(B).

Subsection 105.5.1 - Partnering: Add to Subsection 105.5 Cooperation of Contractor:

The Owner intends to encourage the foundation of a partnering relationship with the Contractor and its subcontractors. This partnering relationship will be structured to draw on the strength of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance intended to achieve completion within budget, on schedule, and in accordance with plans and specifications.

This partnering relationship will be bilateral in makeup. Any cost associated with effectuating partnering will be covered by the bid item. The initial partnering workshop shall be scheduled after award of the contract, and prior to the Notice to Proceed, and shall be facilitated by a third party competent in the

fundamentals of partnering, and mutually acceptable to Contractor and Owner. The Contractor shall be responsible for scheduling, coordinating, and hiring the third party facilitator, and planning all of the partnering meetings in consultation with the Engineer. The Owner will be responsible to notify and coordinate attendance at the partnering meetings by other agencies. To achieve the desired partnering relationships, the Contractor will need to encourage attendance by its major subcontractors on the project. Follow-up workshops will be held periodically throughout the duration of the contract as agreed to by the Contractor and Owner.

An integral aspect of partnering is the resolution of disputes in a timely, professional, and non-adversarial manner. Alternative dispute resolution (ADR) methodologies will be encouraged in place of the more formal dispute resolution procedures. ADR will assist in promoting and maintaining an amicable working relationship to preserve the partnering relationship. ADR in this context is intended to be a voluntary, non-binding procedure available for use by the parties to this contract to resolve any dispute that may arise during performance.

Payment for Partnering will be made on the basis of invoices of actual costs, and will be for a total amount not to exceed the amount shown in the bid schedule for the item.

ITEM 105-1 - PARTNERING

Subsection 105.5.2 – Pre-Construction Meeting: Add to Subsection 105.5 Cooperation of Contractor: After award of the contract and prior to the commencement of the work or mobilization, a pre-construction meeting shall be scheduled at a location and time to be agreed upon between the Owner and the Contractor. The Contractor shall make all necessary arrangements to have key personnel of his company and of his principal subcontractors present at the meeting. Each representative shall have authority to make commitments and act for his firm. The purpose of the pre-construction meeting is to discuss any specific concerns or potential problems that the Contractor is aware of, to provide general information appropriate to the contract, to identify responsible individuals for various functions within each organization, and to develop tentative dates for the start of construction. The Contractor shall submit to the Engineer during the pre-construction meeting the following documents:

- 1) Manufacturer's certification for all materials
- 2) Material data safety sheets
- 3) Preliminary work schedule
- 4) Preliminary traffic control plan
- 5) Shop drawings
- 6) Emergency telephone numbers
- 7) Signing authority letter
- 8) Name and telephone number of the certified safety professional
- 9) Any other documents specified in the SP's or SGC's

The pre-construction meeting will cover topics such as critical elements of the work schedule, payment application and processing of invoices. Additionally, a scheduled start date for the work will be determined.

The Contractor shall be responsible to take minutes of the pre-construction meeting and distribute copies to all meeting participants. The meeting minutes shall be distributed within 48 hours of the meeting. At the subsequent construction progress meeting, the minutes will be attested or revised, as appropriate. The cost for attendance at the pre-construction meeting, and preparation and distribution of meeting minutes shall be incidental to the project and no extra payment will be made.

Subsection 105.5.3 -Construction Progress Meetings: Add to Subsection 105.5 Cooperation of Contractor:

Construction progress meetings shall be scheduled weekly, or as considered necessary by the Owner. The Contractor shall make all arrangements to have key personnel of his company and of his principal subcontractors present at all progress meetings; representatives shall have authority to make commitments and act for their firms. The Contractor shall assume full responsibility to act for and commit any subcontractor employed by the Contractor, whether or not such subcontractor is represented at the meeting.

During the construction progress meeting the Owner's representative will act as chairman and will advise the Contractor of any administrative matters connected with the contract. The Contractor shall submit for review his two-week rolling schedule. The Contractor's representative at these meetings shall be prepared to discuss and resolve construction problems and concerns, material delivery and vendor data submittals status, construction progress as measured against the Contractor's approved construction schedule and the Contractor's short range construction activities as provided on his two-week rolling schedule. The Contractor shall not be relieved of his responsibility to fulfill all of the terms of the contract as a result of any inferences drawn or suggestions made available at these meetings.

The Contractor shall be responsible to take minutes of the construction progress meetings and distribute copies to all meeting participants. The meeting minutes shall be distributed within 48 hours of the meeting. At the subsequent construction progress meeting, the minutes will be attested or revised, as appropriate. The cost for attendance at meetings, and preparation and distribution of meeting minutes shall be incidental to the project and no extra payment will be made.

Subsection 105.6 - Cooperation with Utilities: Add the following:

An attempt has been made to determine the location of all underground utilities, drainage pipes, and structures; however, it shall be the Contractor's responsibility to cooperate with the pertinent utility companies so that any obstructing utility installation(s) may be adjusted. (The location of the underground and overhead utilities as shown on the plans is based on the best available information.) The Contractor shall not assume that this represents an exact location of the line. No guarantee is made to the accuracy of the location shown on the plans. The Contractor shall determine for himself the exact location of all utilities.) Should Contractor's operations result in damage to any utility the location of which has been brought to its attention, he shall assume full responsibility for such damage. There also exists the strong likelihood that other abandoned older and undocumented underground utility and irrigation lines exist within the project area. Contractor shall contact Arizona Blue Stake (telephone number 263-1100) a minimum of two (2) working days before beginning any underground work. In addition, Blue Stake notification(s) shall be maintained on a current basis.

The following phone numbers should put the Contractor in contact with the proper personnel:

SRP Construction Coordinator, Sue Hladik	236-4951
SRP Watermaster, Greg Watkins	236-4958
Flood Control District	506-1501
Southwest Gas, Bob Sprague	484-5343
U.S. West Communications (US West), Holy	937-0902
Arizona Public Service, Steve Goodman	371-6969
El Paso Natural Gas Company Bill	438-4224
City of Glendale Engineer Dan Sherwood	930-3630
City of Glendale Airport Jim McCue	930-2188
Blue Stake	263-1100

Subsection 105.8 - Construction Stakes, Lines, and Grades: Add the following:

- A. The Engineer will furnish a Benchmark, which the Contractor shall use to set line and grade for all construction. All other surveying required for the project shall be the Contractor's responsibility. The Engineer will not set any construction stakes.
- B. Before any construction work is started, the Contractor shall perform all base surveys and cross sections of existing conditions that may be required as a basis for quantity determination.
- C. The Contractor shall submit original construction surveyor's notes duly signed by a Registered Land Surveyor to the Engineer at the end of the project. Copies of the survey notes shall be submitted to the Engineer at the first weekly meeting after being generated.
- D. As-built plans sealed by an Engineer registered in the State of Arizona shall be provided by the Contractor to the Engineer prior to project close out.

Subsection 106.1 - Source of Materials and Quality: Add the following:

Select Material, Aggregate Base, Mineral Aggregate, concrete, steel products and pipe shall be obtained from commercial sources. Contractor shall pay all royalties or any other charges or expenses, incurred in connection with the securing and hauling of the material. Contractor will be required to furnish Engineer with a list of its proposed commercial sources prior to use, and shall present certificates stating that the material produced from any commercial sources is in accordance with the Uniform Standard Specifications and these Supplementary General Conditions.

Subsection 106.4 - Trade Names and Substitutions: Replace with the following:

Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quantity required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or-equal" item or no substitution is permitted, other items of material or equipment of other Suppliers may be accepted by Engineer under the following circumstances:

- (A) "Or-Equal": If in the Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.
- (B) Substitute Items: If in Engineer's sole discretion an item does not qualify as an "or-equal" item under subparagraph 106.4 (A), it will be considered a proposed substitute item. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. The procedure for review by Engineer will include the following and may be supplemented in the Special Provisions and as Engineer may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to Engineer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for work on the project) to adapt the design to the proposed substitute and whether or not incorporation or use of

the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other Contractors affected by the resulting change, all of which will be considered by Engineer in evaluating the proposed substitute. Engineer may require Contractor to furnish additional data about the proposed substitute.

- (C) Contractor's Expense: All data to be provided by Contractor in support of any proposed "or-equal" or substitute item will be at Contractor's expense.

Subsection 106.5.1 - Contractors Marshaling Yards: Add Subsection 106.5 Storage of Materials:

The Contractor shall obtain approval of the Engineer when using vacant property to park and service equipment and store materials for use. The Contractor will obtain prior written approval of the property owner for such use and submit a copy of the approval to the Engineer prior to use of the property.

The Contractor shall grade all construction yards, easements and limits of construction which are disturbed by construction or construction related activities to the lines and grades shown on the plans; or as a minimum, where no line or grade is shown, to a condition similar to or better than the pre-existing condition.

Subsection 107.2 - Permits: Replace with the following:

Contractor shall obtain all permits and licenses, including but not limited to those required by law; pay all charges, fees, taxes, and provide all notices necessary and incidental to the due and lawful prosecution of the work. Permits for earth moving may be obtained from Air Pollution Control, Maricopa County Department of Environmental Management, 2406 South 24th Street, Suite E-214, Phoenix, Arizona 85034, telephone number 506-6700. The cost for the earth moving dust control permit is \$80 plus \$8 per acre. There are approximately (160) acres in this project. The above permit costs are subject to change. It is the responsibility of the Contractor to verify these costs.

Subsection 107.2.1 - NPDES Permit Requirements: Add to Subsection 107.2 Permits:

- A. This project is subject to the National Pollutant Discharge Elimination System (NPDES) Storm water requirements for construction sites under the Environmental Protection Agency (EPA) General Permit for Arizona. Under provisions of that permit, the Contractor shall be designated as permittee, and shall take all necessary measures to assure compliance with the NPDES General Permit for Arizona as well as all other applicable Federal, State and local laws, ordinances, statutes, rules and regulations pertaining to Storm water discharge. As the permittee, the Contractor is responsible for preparing, in a manner acceptable to the EPA, all documents required by this regulation, including but not necessarily limited to:
1. Storm water Pollution Prevention Plan (SWPPP) for the project, including certification of compliance form. Contractor shall be required to develop, implement, update and revise the SWPPP, as necessary, in order to assure compliance with the EPA permit requirements. The SWPPP shall be retained on the project site at all times during construction.
 2. Notice of Intent (NOI) to assure compliance with the NPDES General Permit for Arizona, including certification of signatures.
 3. Notice of Termination (NOT) of coverage under NPDES General Permit for Arizona.
- B. Preliminary copies of the NOI and the SWPPP shall be submitted to Owner during the pre-construction meeting and shall be subject to review by Owner prior to implementation.

- C. Contractor shall submit the completed and duly signed NOI forms no later than forty-eight (48) hours prior to the initial start of construction on the project to the following agencies:

EPA Storm water Notice of Intent
P.O. Box 1215
Newington, VA 22122

A copy to: Storm Water Coordinator
Arizona Department of Environmental Quality
P.O. Box 600
Phoenix, Arizona 85001-0600

Failure by the Contractor (or Subcontractors of any tier) to submit NOI's within the mandated time frame shall result in delay of the construction start date, and no claim for extension of time will be granted for such delay. A copy of the completed NOI shall be posted at the construction site.

- D. Inspections of all Storm water pollution control devices on the project shall be performed by Contractor on a monthly basis and following each rainfall of 0.50 inches or more in a 24-hour period at the project site as required under provisions of the NPDES General Permit for Arizona. Contractor shall prepare reports on such inspections and retain the reports for a period of three years following the completion of the project. Inspection reports shall be submitted monthly to Owner along with progress payment requests. Additionally, Contractor shall maintain all Storm water pollution control devices on the project in proper working order, which shall include cleaning and/or repair during the duration of the project.
- E. Contractor warrants that its employees and Subcontractors of any tier and their employees shall at all times comply with all applicable laws, ordinances, statutes, rules and regulations set forth by all federal, state and local governments and the Environmental Protection Agency in connection with NPDES Permitting requirements and laws and regulations pertaining to air, groundwater and surface water quality.
- Fines and penalties imposed by the EPA against Owner or the Contractor for Contractor's failure to comply with any of the requirements of NPDES General Permit of Arizona shall be borne by the Contractor.
- F. Upon project completion, acceptance and demobilization, Contractor shall submit its completed, duly executed NOT form to the EPA, with a copy to the Arizona Department of Environmental Quality (and the appropriate municipality), at the address listed in Section (B) above, thereby terminating all NPDES permit coverage for the project. Contractor shall then surrender to Owner copies of the SWPPP, inspection information and all other documents prepared and maintained by the Contractor in compliance of the NPDES General Permit. Contractor shall retain the originals of such documents for a period of three (3) years following the completion of the project.
- G. The Lump Sum price for the SWPPP shall include all material, labor, and all other costs relating to the preparation, installation and maintenance of the SWPPP during project construction, including assuring proper operation of the pollution control devices installed, and all maintenance, cleaning, and disposal costs associated with clean-up and repair following storm events, runoff or releases on the project. The Lump Sum price for the SWPPP shall be inclusive of all costs, and no additional claims shall be made by Contractor under any other specification provision of these documents, including Changed Conditions. Payment for this bid item shall be upon final completion and acceptance of the project, as per Section 109.1.
- H. Copies of all required forms and guidance for preparing the SWPPP are available in the "Drainage Design Manual for Maricopa County, Volume III Erosion Control." The manual is available at the Flood Control District, 2801 West Durango Street, Phoenix, Arizona 85009.

Payment for NPDES/SWPPP permit requirements shall be made on the basis of lump sum for all work described in Subsection 107.2 .1 for:

ITEM 107-1 NPDES/SWPPP PERMITS

Subsection 107.2.2- Protection of Environmental Resources: Add to Subsection 107.2 Permits:

The Contractor shall ensure that the following environmental specifications are performed during the construction of the flood control structure. Environmental concerns shall be included as a part of the weekly progress meeting

A) Endangered Species

A review of information from the Arizona Game and Fish Heritage Data Management System has been assessed and current records of special status species indicate that the proposed activity would not affect federally listed endangered or threatened species, or their critical habitat. However, should construction activities encounter plants or animals that are designated as endangered or threatened, construction will be in accordance with the Endangered Species Act of 1973 (Public law 93-205)

B) Handling of Protected Species

The Contractor shall notify the District Engineer seven days in advance of the commencement of all clearing operations so that arrangements can be made for a designated Ecologist to survey the area immediately prior to clearing, for the presence of any federally-listed endangered or threatened species, or their critical habitat.

The Contractor shall alert his personnel to the possible presence of listed protected species in the project area and of the procedure to be followed should they be encountered during the work. Illustrations of the species shall be provided to all personnel involved in the clearing operation. The Contractor shall contact the Engineer if any of these special status species are encountered.

C) Archaeological Resource

Findings from an archaeological survey conducted on the site indicated that there were no significant historical sites in the area of the channel improvement. However, in the event that historic or archaeological artifacts (i.e., pottery shards, bones) are discovered while accomplishing activities authorized by this permit, the Contractor shall immediately cease work in the area of the discovery. The District will notify the Army Corp of Engineers (ACOE) to ensure compliance with the requirements of the National Historic Preservation Act of 1966 (Public Law 104-182). The Contractor and the Engineer are restricted from entering any archaeological site on or adjacent to the project area. If artifacts are identified they will be marked and the area secured with fencing and taped off as a restricted area.

In the event that human remains (i.e., bones) are uncovered during construction, work is to cease immediately at that location and the human remains and any associated grave goods be avoided and protected in place. The Contractor shall immediately contact the Engineer to arrange for proper treatment, evaluation, and disposition of these remains. The area will be marked and secured with fencing and taped off as a restricted area until such time that the remains can be identified and removed.

D) Vegetation Protection:

Immediately prior to clearing, an ecologist shall survey the area for protected status species in accordance with the Arizona Game and Fish Guidelines and the Arizona Department of Agriculture Native Plant Law.

The Contractor shall report any changes in the project boundaries to the Engineer. Project boundaries will be marked with ribbon to restrict equipment from impacting off-site areas. All vegetation removal will comply with the Arizona Native Plant Law (1991).

In accordance with the Arizona Department of Agriculture, the Flood Control District is only exempt from the Arizona Native Plant Law with respect to construction projects on existing canals, laterals, and ditches in accordance with the ARS Title 3-915. Consequently, the District has notified the Department of Agriculture concerning the removal of plants during the construction of the channel. The Department of Agriculture will make the appropriate arrangements for tree salvage in the areas of impact prior to construction.

E) Noxious Weed Proliferation:

Heavy equipment that is brought in to the project from outside state lines shall be steam cleaned for removal of noxious weeds prior to entrance within the project, subject to approval by the Engineer.

F) Conduct of Operations for Environmental Protection:

In recognition of the State of Arizona Executive Orders pertaining to the protection of riparian areas and resources (Executive Order No. 89-16 and 91-06), the Contractor shall exercise precaution at all times to preserve all vegetation outside the clearing limits throughout the project. Where warranted by the proximity of sensitive areas (i.e., those occurring on lands managed by the USDA) fencing shall be installed and maintained throughout the project in order to keep equipment and personnel from straying outside the construction limits. Based on a review by the Arizona Game and Fish, there have been no sensitive areas identified at the site.

G) Good Housekeeping Practices

The SWPPP shall specify the Contractor's good housekeeping practices and requirements, including vehicle wash-down areas, onsite and offsite tracking control, protection of equipment storage and maintenance areas, and sweeping off highways and roadways related to hauling activities.

Recommendations for good housekeeping practices for the SWPPP include but are not limited to the following list:

- 1) The Contractor shall take sufficient precautions, considering all conditions, to prevent pollution of streams, lakes, and reservoirs with fuels, oil, bitumen, and calcium chloride, fresh Portland cement, fresh Portland cement concrete, raw sewage, muddy water, chemicals or other harmful materials. None of these materials shall be discharged into any channels. The SWPPP shall meet and include the implementation of spill prevention and material management controls and practice to prevent the release of pollutants into stormwater. The SWPPP shall also provide storage procedures for chemicals and construction materials, disposal procedures, cleanup procedures, the contractor's plans for handling such pollutants, and other pollution prevention measures as required. No hazardous chemicals or waste shall be stored in the channel at any time.
- 2) Machinery service and refueling areas shall be located away from streambeds or washes. Where the Contractor's working area encroaches on a running or intermittent stream, barriers shall be constructed and maintained between the working areas and the streambed adequate to prevent the discharge of any contaminants. In the event of a leak, the Engineer shall be notified and all necessary precautions shall be conducted to contain the spill and remove the contaminated soil promptly. The soil shall be placed on plastic and disposed of accordingly. Excavated areas shall be backfilled with material from an approved borrow area free of hazardous waste.
- 3) Mechanical equipment shall not be operated in running streams. All equipment shall be removed from the channel at the close of day to anticipate unforeseen precipitation events, which may damage equipment and ultimately degrade waters of the U.S..

H) Protection and Restoration of Property and Landscape:

Disposal of debris from construction operations shall be limited to only those areas outside of the site

boundaries. All construction material is to be stockpiled or disposed of off-site and shall not encroach on running or intermittent streams, or other waters of the U.S.

Oily or greasy substances originating from the Contractor's operations shall not be placed where they will later enter a stream or watercourse.

Immediately prior to clearing, the Engineer will survey the area for protected status species by conducting a site survey of the proposed location of the impacted area.

Following the clearing and grubbing activity, the work area shall be restored after construction to an environmentally acceptable condition. All construction materials shall be removed and properly disposed of outside of the 100-year floodplain. All disturbed project areas within waters of the U.S. shall be re-seeded by the Contractor with an approved local native seed mix, and watercourse morphology shall be re-established to match pre-construction configurations where appropriate.

D) Trees, Shrubs and Plants

The work under this section shall include the removing of vegetation within the proposed channel boundaries and re-seeding with native vegetation along the right of way. All vegetation removal shall comply with the Arizona Native Plant Law (1991). In accordance to the Arizona Department of Agriculture, the Flood Control District is exempt from the Arizona Native Plant Law with respect to construction projects on existing canals, laterals, and ditches in accordance with the ARS Title 3-915. However, in accordance to executive order no. 89-16, related to streams and riparian resources, efforts shall be made to minimize or avoid any impact to plants outside of the proposed channel boundaries and limit impact to the right of way on each side of the channel.

J) Dust Suppression

Water for dust suppression, if used shall not contain contaminants that could violate ADEQ water quality standards for surface waters or aquifers.

K) Heavy Equipment Access

Mechanized equipment shall not be operated in stream channels or live streams except as may be necessary to construct crossings or barriers and channel modifications.

Equipment access shall be limited to those areas that are designated for construction. This would include limiting ingress and egress points into the waters of the U.S. to avoid any excess impacts to the waters of the U.S. and the existing rights of way.

Fill material used in the construction of the channel shall be obtained from a source free of hazardous materials or from acceptable borrow areas (areas above the 100 % design baseline elevation) within the channel below the high water mark.

Excavated material (i.e., stock piles) shall be removed from the channel to avoid sedimentation in the channel due to unforeseen precipitation and flooding events.

The entire construction site shall be considered a "Hard Hat Area" and all personnel in the area will be required to wear a hard hat.

Subsection 107.5.3 - Compliance with the Arizona Communication Standard: Add to Subsection 107.5 Safety and Sanitation Provisions:

Owner will provide Contractor with Material Safety Data Sheets (MSDS) for any products known to exist on the site that are deemed health hazards. Contractor will provide a copy of Owner-provided MSDS to all Subcontractors.

Contractor will provide Owner and all Subcontractors with MSDS for any products that have or are deemed health hazards that will be brought onto the site or created on the site by either Contractor or by any Subcontractors.

Contractor will provide Owner with a statement certifying that all personnel (Contractor and Subcontractor) employed by Contractor or by a Subcontractor on the job site have received the required Hazard Communication Standard training.

Subsection 107.5.4 Contractor's Status During any Hazard Remediation: Add to Subsection 107.5 Safety and Sanitation Provisions:

If remediation of any discovered Regulated Substance, contamination or asbestos is necessary, the Owner will address the problem, and if this interferes with the project's critical path, then the CPM and project schedule will be reviewed and revised as mutually acceptable by the Engineer and Contractor to minimize the impact to the **total project schedule**. An extension in contract time for any delay to Contractor then resulting will be granted by Engineer in accordance with Subsection 108.7.

If any Regulated Substance, asbestos, or other type of contamination is encountered that results in a changed condition, then a change order may be issued in accordance with the contract.

If the delay impacts the CPM in such a manner that Contractor is prevented from continuing work on any portion of the project, and Owner issues a suspension of work order, then Contractor shall be entitled to compensation in the form of a **one-time payment** of Demobilization and Remobilization costs, which shall be no more than 6 percent of the original bid item for mobilization.

Subsection 107.6.3 Public Information and Notification: Add to Subsection 107.6 Public Convenience and Safety:

The Contractor shall employ a specialty public information service as a subcontractor to provide the community relations program for the project as described herein. The name and address of the public information subcontractor shall be submitted with the bid as specified in subsection 102.6 of the Supplementary General Conditions. Contractor shall work closely with his subcontractor in developing and carrying out the community relations program, but shall not expect to actually perform the work of providing the public information services. Contractor shall submit a history of the subcontractor's qualifications and experience in public information services at the pre-construction conference for acceptance by the Engineer. The community relations program shall be designed to run the full length of calendar days in the contract for this project. The program will include but not be limited to:

1. Distributing a pre-construction information letter to all residents, business, schools, farm operations, etc. within an area to be determined by the Engineer.
2. Printing and distribution of public notices and/or newsletters.

The Contractor will use these or other means to inform the local citizens of necessary operations which create high noise levels, street closures, limited access, detour locations, haul route and material delivery routes, hours of construction and disruption of bus, trash, school bus and other delivery/pick-up routes.

The Contractor will be required to furnish a private line telephone to be used solely for receiving incoming calls from local citizens with questions or complaints concerning construction operations or procedures. The Contractor shall publish this phone number and maintain a 24-hour answering service. The answering service shall be operated by Contractor personnel during all hours that work is being performed on the job site. The Contractor shall maintain a log of incoming calls, responses, and action taken which shall be submitted to the Engineer weekly and/or upon request.

Prior to the start of work, the Contractor shall notify, by letter, all affected businesses and residents of construction plans and schedules within the geographic area identified above. In addition, all schools and emergency services which serve the geographic area will also be notified even though they may be

located outside the geographic area described above. The letter shall contain, as a minimum, the following information:

1. Name of Contractor
2. 24-hour telephone complaint number
3. Brief description of the project
4. Name of Contractor project Superintendent
5. Name of Engineer
6. Name of area supervisor
7. Construction schedule including anticipated work hours
8. Traffic regulations including lane restrictions

The Contractor shall submit a Public Information and Notification Plan to the Engineer at the pre-construction meeting. No payments shall be made for this item until the Engineer approves the plan.

The plan and work which is eligible for reimbursement shall include: meetings with impacted businesses, schools, emergency services, residents, ~~etc.~~ scheduling, preparation and distribution of newsletters at discretion of the Engineer, and maintaining a 24-hour telephone hot line for complaints.

The Contractor shall submit a final report/evaluation of the Public Information and Notification process performed for this project. This report shall be submitted before the Contractor receives final payment.

Payment will be based on invoices, and will be for a total amount not to exceed the amount shown in the bid schedule for the item, "PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE", for work performed in notifying and coordinating with the local population impacted by this project. To cover the cost for administration and supervision, the General Contractor may add an amount equal to not more than 5 percent of the invoiced billing for actual public information services provided by a Subcontractor. This cost for administration and supervision will be considered included in the "PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE".

ITEM 107-2 - PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE

Subsection 107.6.4 - Project Signs: Add to Subsection 107.6 Public Convenience and Safety:

Contractor shall provide and install three (3) project information signs before beginning construction.

The signs will inform the public of the forthcoming project, construction dates, and suggested alternate travel routes. Project signs shall include the names of all agencies participating in the project. Signs shall be constructed in accordance with the Project Sign Information drawing to be provided to the Contractor at the pre-construction meeting. The signs shall be installed at the location(s) approved by the Engineer. The Contractor shall maintain the signs as necessary, and update the information as requested by the Engineer. Payment shall be made according to the allowance in the Bidding Schedule in installments of 50% upon installation, and the remaining 50% upon final payment for the work.

ITEM 107-3 PROJECT SIGNS ALLOWANCE

Subsection 107.8 - Use of Explosives: Add the following:

Because of the proximity residences and businesses, the use of explosives will NOT be permitted for any construction activities on the project.

Subsection 107.9 - Protection and Restoration of Property: Add the following:

The Contractor shall protect-in-place all existing structures and other features as identified on the plans.

The Contractor shall limit all construction activities to the areas shown in the plans and shall not disturb any areas other than as required for construction as shown on the plans.

The Contractor will grade all Temporary Construction and Permanent Easement areas, and project areas which are disturbed during construction to the lines and grades shown on the plans, or as a minimum, where no lines and grades are shown, to a condition similar to or better than the pre-existing condition.

Subsection 107.10 - Contractor's Responsibility for Work: Add the following:

- A. The Contractor shall protect-in-place at all times all existing utilities.
- B. The Contractor shall protect his work and equipment at all times from flows that frequent the New and Agua Fria Rivers.
- C. The Contractor shall take all necessary action to protect the public from the construction work area.
- D. The Contractor shall take all necessary action to ensure that all construction materials are stored in such a Manner that storm runoff from the storage area does not reach adjacent properties.
- E. The work to be performed on the south end of the Glendale Airport is a Federally regulated part of this project as such falls under Federal regulations which, are attached to the back of the Construction Specification. The contractor shall keep all necessary recorders substantiating his compliance with the Federal regulation Davis-Bacon i.e.. The work that is under Federal regulations includes but is not limited to the following; The placement of fill material at the end of the runway, the airport fencing, the soil cement levee around the end of the runway, and utilities that are placed or cross the area at the end of the runway. These Federal regulations shall not apply to any other aspect of this project.
- F. Salt River Project (SRP) irrigation work will be in accordance with the SRP plans and specifications which, are attached to the back of the District's plans and specifications. SRP will be installing the pipeline turnout structure and related facilities. SRP will also provide survey, inspection, and field engineering activities for the entire SRP irrigation system. SRP anticipates their construction activities will be between January 4 - 14, 1999. Coordination between the contractor and SRP will be required. Dry-up information can be obtained from the Area Watermaster, Greg Watkins, at 236-4958. A pre-construction meeting with SRP will be required, coordinate with Sue Hladik, at 236-4951.

Subsection 108.1 - Notice to Proceed: Delete Paragraph (A) and replace with the following:

- (A) Contractor shall commence work within seven (7) calendar days after the date of the Notice to Proceed and complete all work within two hundred and seventy (270) calendar days beginning the effective date specified in the Notice to Proceed.

Subsection 108.2 - Subletting of Contract: Add the following:

For this project, Contractor shall perform, with its own organization, work amounting to 50 percent or more of the total contract cost.

Subsection 108.4 - Contractor's Construction Schedule: Delete in its entirety and replace with the following:

Contractor shall submit a proposed work schedule to Engineer at the pre-construction meeting for review before starting work using the Primavera or other similar software program that is acceptable to the Engineer. Weekly updates shall be submitted to Engineer at the weekly coordination meeting.

Contractor shall be solely responsible for the planning, scheduling and execution of the work to assure timely completion of the project.

Subsection 108.4.1 - Contractor's Billing Schedule: Add to Subsection 108.4 Contractor's Construction Schedule:

The Contractor shall furnish the Engineer an Estimated Billing Schedule which shall include the

estimated amount of each billing for the total project at the preconstruction conference, and thereafter at monthly intervals or as directed by the Engineer.

Subsection 108.5 - Limitation of Operations: Add the following:

Should Contractor elect to perform any work after regular working hours, on weekends, or legal holidays, with or without written approval of Engineer, any charges incurred by Owner for inspection of the work, surveys or tests of materials will be deducted from monies due or to become due to Contractor.

Subsection 108.9 - Failure to Complete on Time: Add the following:

The actual cost per calendar day incurred by the District for Administrative and Inspection Services on this project will be added to the daily charges as indicated by TABLE 108, LIQUIDATED DAMAGES, and will be deducted from monies due or to become due to the Contractor for each and every calendar day that work shall remain incomplete after the time specified for the completion of the work in the proposal, or as adjusted by the Engineer. Nothing contained in this provision shall prohibit the Owner from deducting from monies due or to become due to the Contractor for any other costs incurred by the Owner directly attributable to the delay in completing this contract.

Subsection 109.2 - Scope of Payment: Add the following:

In addition to the contained provisions, the work under this section shall consist of preparatory work and operations, including but not limited to, the movement of personnel, equipment, supplies and incidentals to the project site; the establishment of all offices, buildings and other facilities necessary for work on the project, and for all other work operations that must be performed and costs incurred prior to beginning work on the various items on the project site.

The "complete-in-place" rate shall include but not necessarily be limited to all labor, material and equipment costs for preparation, installation, construction, modification, alteration or adjustment of the items, which shall include all costs for salaries and wages, all payroll additives to cover employee benefits, allowances for vacation and sick leave, company portion of employee insurance, social and retirement benefits, all payroll taxes, contributions and benefits imposed by any applicable law or regulation and any other direct or indirect payroll-related costs. The rate shall also include but not necessarily be limited to all costs for indirect charges or overhead, mileage, travel time, subsistence, materials, freight charges for material to Contractor's facility or project site, equipment rental, consumables, tools, insurance to the levels specified in Section 103.6, CONTRACTOR'S INSURANCE, all applicable taxes, as well as Contractor's fee and profit. This rate shall further include all site clean-up costs and hauling of construction debris to disposal sites designated by the Engineer.

Payment will be made for only those items listed in the proposal and will not be made in accordance with the measurement and payment provisions of the MAG Standard Specifications where this differs from the items listed in the proposal. All materials and work necessary for completion of this project are included in proposal items. Any work or materials not specifically referred to in these items are considered incidental to the item and are included in the unit price.

Payment shall not be made for unused materials.

It is the responsibility of the bidders to contact all municipalities in the area to determine if they will charge Contractor sales taxes or any other fees for work on this project. Any such taxes or fees shall be paid by Contractor.

Subsection 109.7 - Payment for Bond Issue and Budget Projects: Make the following changes:

(A) Partial Payments: To third paragraph, add:

Payment or release of retained funds shall be made to the Contractor within thirty (30) days following final payment to the Contractor [reference (B) following], and Contractor furnishing to Engineer satisfactory receipts for all labor and material billed and waivers of liens from any and all

persons and Subcontractors holding claims against the work. Additionally, Contractor shall furnish a completed Certificate of Performance to Engineer evidencing it has satisfactorily discharged all its duties in connection with the work to be performed under this Contract. The form of Certificate of Performance shall be provided to Contractor by the Engineer.

- (B) Final Payments: Delete second and third paragraphs and replace with the following:
The final payment will be made to Contractor by Owner within thirty (30) days following receipt of Engineer's final estimate and receipt by Owner of Consent of Contractor's Surety to said final payment. If payment will be longer than thirty (30) days as aforesaid, Owner will provide Contractor specific written findings for reasons justifying the delay in payment.

Add (C) as follows:

- (C) The Contractor's monthly pay estimates shall be initially processed by the Engineer during the last week of the month covered.

**CONSTRUCTION
SPECIAL PROVISIONS
FOR
CAMELBACK RANCH LEVEE - NORTH
GLENDALE AIRPORT LEVEE**

PCN 400052
FCD CONTRACT NO. 98-37



October 26, 1998

Prepared for:
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango
Phoenix, AZ 85009
(602) 506-1501

Prepared by:
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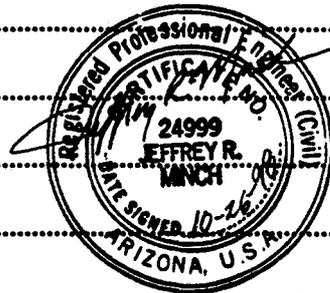
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**CONSTRUCTION
SPECIAL PROVISIONS
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SECTION 201 - CLEARING AND GRUBBING

201.1 - Description: is revised to add:

Stripping of organic soil, grass, dead crops and other objectionable material shall be removed from the area required for the detention basin, levee embankment, engineered fill (zoned embankment) and toe excavation limits. The objectionable material removed in the clearing and grubbing of the site shall be removed by the Contractor from the project site and disposed of in a legal landfill.

201.5 - Payment, Clearing and Grubbing: is modified to add:

Clearing and Grubbing including the removal of trees is considered incidental work, and will not be a separate pay item. The cost of this work is to be included in the cost of other items.

SECTION 202 - MOBILIZATION

The MAG Standard Specification is modified to add:

202.1 - Description:

The work under this section shall consist of preparatory work and operations, including but not limited to, the movement of personnel, equipment, supplies and incidentals to the project site; the establishment of all offices, buildings and other facilities necessary for work on the project, and for all other work and operations that must be performed and costs incurred prior to beginning work on various items on the project site.

Field Office:

This work shall consist of providing and maintaining a furnished Field Office for the exclusive use of occupancy by the Engineer and the Engineer's staff.

The office shall be a building or mobile trailer erected at a location convenient to the project. The office shall be for the sole use of the engineer and shall be located adjacent to or within reasonable walking distance to the Contractors field office.

The Contractor shall obtain approval from the property owner upon site selection of the field office.

The Contractor may furnish equivalent facilities in an existing building provided such facilities and building are located to provide convenient service.

The field office shall be an approved and weatherproof building or mobile trailer providing a minimum of 500 square feet of clear floor space, not including the toilet area. The structure shall have a minimum ceiling height of seven (7) feet and shall be provided with weatherproof doors equipped with adequate locking devices. Windows shall also be provided with adequate locking devices. The Contractor shall also provide the following:

- a. Lighting - Electric light, non-glare type luminaries to provide a minimum illumination level at desk height level.
- b. Heating & Cooling - Adequate electrically powered equipment to maintain an ambient air temperature of 72 degrees F plus or minus 8 degrees.
- c. Telephone, answering, and paper FAX/Copier machine - Two (2) telephones with two (2) outside lines for the exclusive use of the Engineer. The Contractor will pay for the cost of the line and local calling charges. The District will pay for long distance charges made on this line.
- d. Toilet - A commode and wash sink in a separately enclosed room within the building or mobile trailer, properly ventilated and complying with applicable sanitary codes. Contractor shall provide water service.
- e. Maintenance - The Contractor shall maintain all facilities and furnished equipment in good and clean working condition.
- f. Fire Extinguisher - Two non-toxic, dry chemical, fire extinguishers meeting Underwriters Laboratories, Inc. approval for Class A, Class B, and Class C fires with a minimum rating of 2A: 2B: 10C.
- g. Electricity - Contractor shall provide electric power and pay for all electric services.
- h. Furnishings - Two office desks with drawers, two office chairs (padded, swivel type) one drafting table (adjustable height 3 feet by 6 feet), one conference table, eight folding chairs, one draftsman's stool, and a four drawer legal file cabinet.
- i. First Aid Kit
- j. Potable Water supply or service

The office shall be fully equipped and made available for the Engineer's use and occupancy prior to the start of any contract work and not later than 10 days after the notice to proceed. The Engineer will notify the Contractor, in writing, of the acceptability of the Field Office provided. The Contractor shall maintain the field office in operating condition until seven (7) days after acceptance of the contract work.

All facilities shall be maintained in good operating condition and appearance by the Contractor for the designated period, after which all portable buildings or trailers, fencing, surfacing, and utilities shall be removed from the site, the areas cleaned and seeded if required and left in a neat and acceptable condition.

202.3 - Basis of Payment:

Payment shall be made on the basis of the lump sum price bid and shall be full compensation for supplying and furnishing all materials, facilities, and services and performing all work involved as specified herein. The lump sum price bid shall not exceed three (3%) percent of the total project bid amount exclusive of mobilization. No additional payment will be made for occupancy and services during periods of contract extension of time due to engineering changes.

ITEM 202 – MOBILIZATION

SECTION 210 - BORROW EXCAVATION

Revise the MAG Standard Specifications to add the following:

210.1 - Description:

Borrow sites for material to construct the levees and the engineered fill is the detention basin and channel excavation as indicated on the project plans. The material excavated from the borrow areas shall be incorporated into the project. Excess material excavated from the borrow areas or material excavated from the project and not incorporated into the project shall be stockpiled as directed by the Engineer. The Contractor shall not remove any material excavated from the borrow area or project site from the project site. Prior to project close out, the Contractor shall leave the borrow site excavation and the stockpile area clean and uniform, with the side slopes, and grades per the plans and acceptable to the Engineer.

210.2 - Measurement and Payment:

No separate measurement or payment will be made for material excavated from the borrow area. The costs for excavation from the borrow area shall be included in the price bid for Item 216 - Channel Excavation.

SECTION 211 - FILL CONSTRUCTION

Revise the MAG Standard Specifications to add the following:

211.1 - Description is modified to add:

The work under this section shall consist of placing and compacting material in fill areas designated as "Embankment, Engineered Fill (Zoned Embankment) and Toe Backfill."

211.1.1 - Embankment

This item of work shall consist of the construction of earthen embankments and foundation excavation backfill as shown on the project plans; including furnishing the fill materials, watering, grading, shaping, and compaction. Embankment shall be constructed to a smooth and uniform surface and in conformity with the lines, grades, dimensions, and cross-sections shown on the Plans or established by the Engineer. Embankment shall be compacted to ninety-five percent (95%) of maximum density at optimum moisture content.

The levee embankment shall be placed in lifts not to exceed 12-inch thick compacted layers. Compaction criteria includes compacting to not less than 95% of the maximum dry density and within $\pm 2\%$ of the optimum moisture content as determined by ASTM D698. All layers should be placed horizontally and slopes trimmed after placement.

211.1.2 - Toe Backfill

This work shall consist of the backfill of the soil cement levee toe excavations as shown on the project plans; including furnishing the fill material, watering, grading and shaping. Toe excavation backfill shall be constructed to a smooth and uniform surface and in conformity with the project plans and cross-sections. Toe excavation backfill will not be subject to normal compaction testing requirements unless otherwise noted on the plans; the normal action of placement and vehicle travel being considered sufficient to ensure adequate compaction.

211.1.3 – Engineered Fill (Zoned Embankment)

This item of work shall consist of the construction of earthen fill for the Glendale Municipal Airport runway extension; including furnishing the fill materials, watering, grading, shaping, and compaction. Engineered fill shall be constructed to a smooth and uniform surface and in conformity with the lines, grades, dimensions, and cross-sections shown on the Plans or established by the Engineer. Engineered fill shall be compacted to ninety-five percent (95%) of maximum density at optimum moisture content.

The engineered fill shall be placed in lifts not to exceed 12-inch thick compacted layers. Compaction criteria includes compacting to within 95% of the maximum dry density and within $\pm 2\%$ of the optimum moisture content as determined by ASTM D698. The final 2-feet of fill, the subgrade for the runway extension, shall be compacted to no less than 95% of the maximum dry density and within $\pm 2\%$ of the optimum moisture content as determined by ASTM D1557. All layers should be placed horizontally and slopes trimmed after placement.

211.2 - Placing is modified to add:

Placement of fill and benching shall be in accordance with the MAG Standard Specifications.

211.2.1 - Embankment Placement

"Embankment" construction shall not be started until clearing and grubbing and proof-rolling for the embankment area is completed in accordance with the requirements of MAG Standard Specifications Section 201, and these special provisions.

"Embankment" shall be constructed to a total width at least two (2) feet wider than that indicated on the plans, of which one (1) foot of additional width shall occur on each side of the embankment. Once constructed, the face on which soil cement is to be placed shall be trimmed back to the finished lines, grades, and dimensions shown on the plans in order to insure proper compaction and stability of the embankment. Material trimmed from the embankment slopes shall be used as fill and/or backfill at other locations on the project. No additional payment shall be made for material placed beyond the finished lines and grades of the levees or for trimming, removing, and hauling said material, rather, these costs are considered incidental to the construction of the levee.

211.2.2 - Engineered Fill

"Engineered Fill" construction shall not be started until clearing and grubbing and proof-rolling for the embankment area is completed in accordance with the requirements of MAG Standard

Specifications Section 201, and these special provisions. All layers should be placed horizontally and slopes trimmed after placement.

No additional payment shall be made for material placed beyond the finished lines and grades of the embankment or for trimming, removing, and hauling said material, rather, these costs are considered incidental to the construction of the "Engineered Fill".

211.3 - Compacting is modified to add:

Wheel rolling with construction hauling equipment exclusively, will not be an acceptable method of compaction. Equipment specifically designed for earthwork compaction will be acceptable. If a steel wheel roller is used, the resulting smooth surface shall be sufficiently roughened after compaction to insure bond to the succeeding layer. Vibratory compaction methods or equipment shall not be used when and/or where their use contributes to sloughing or caving of soils which the soil-cement is to be placed against.

211.3.1 - Embankment Compaction

"Embankment" material shall be placed in uniform horizontal layers not exceeding twelve (12) inches in depth before compaction.

Compaction shall be accomplished by rolling, tamping, or other suitable means utilizing equipment specifically designed for earthwork compaction. Wheel rolling with construction hauling equipment will not be considered an acceptable method of compaction. Vibratory compaction methods or equipment shall not be used when and/or where their use contributes to sloughing or caving of soils which the soil-cement is to be placed against. Each layer of earth material shall be compacted to the specified density before the next layer is placed. Effective spreading equipment shall be used on each layer to obtain uniform thickness prior to compacting. As the compaction of each layer progresses, continuous leveling and manipulation of the material will be required to assure uniform density. Water shall be added or removed, if necessary, in order to obtain the required density. It shall be the Contractor's responsibility to properly place and compact all materials in the embankment section, and to correct any deficiencies resulting from improper or insufficient compaction of such materials throughout the Contract period.

The top ten (10) inches of ground on which embankment is to be constructed shall be proof-rolled to a density of not less than ninety-five percent (95%) of the maximum density. All material placed in embankment areas upon which embankment is to be constructed shall be compacted to a density of not less than ninety-five percent (95%) of the maximum density.

Each layer of earth material for embankment construction shall be compacted to a density of not less than ninety-five percent (95%) of the maximum density and within $\pm 2\%$ of optimum moisture content as determined by ASTM D698.

211.3.2 - Engineered Fill Compaction

'Engineered Fill' material shall be placed in uniform horizontal layers not exceeding twelve (12) inches in depth before compaction.

Compaction shall be accomplished by rolling, tamping, or other suitable means utilizing equipment specifically designed for earthwork compaction. Wheel rolling with construction hauling equipment will not be considered an acceptable method of compaction. Vibratory compaction methods or equipment shall not be used when and/or where their use contributes to sloughing or caving of soils which the soil-cement is to be placed against. Each layer of earth material shall be compacted to the specified density before the next layer is placed. Effective spreading equipment shall be used on each layer to obtain uniform thickness prior to compacting. As the compaction of each layer progresses, continuous leveling and manipulation of the material will be required to assure uniform density. Water shall be added or removed, if necessary, in order to obtain the required density. It shall be the Contractor's responsibility to properly place and compact all materials in the embankment section, and to correct any deficiencies resulting from improper or insufficient compaction of such materials throughout the Contract period.

The top ten (10) inches of ground on which embankment is to be constructed shall be proof-rolled to a density of not less than ninety-five percent (95%) of the maximum density. All material placed in embankment areas upon which embankment is to be constructed shall be compacted to a density of not less than ninety-five percent (95%) of the maximum density.

Large cobbles screened from the aggregate production process for use in the soil cement mix may be placed within 8-feet of the top of the engineered fill or within the levee toe backfill. Compaction testing will not be required but rolling should continue until "pumping" is eliminated.

Each layer of earth material for embankment construction shall be compacted to a density of not less than ninety-five percent (95%) of the maximum density and within $\pm 2\%$ of optimum moisture content as determined by ASTM D698. All layers should be placed horizontally and slopes trimmed after placement. The final 2-feet of the engineered fill, the subgrade for the runway extension, shall be compacted to no less than 95% of the maximum dry density and within $\pm 2\%$ of the optimum moisture content as determined by ASTM D1557.

211.4 - Tests:

Replace Subsection 211.4 of the MAG Standard Specifications with the following:

Optimum moisture and maximum density shall be determined in accordance with ASTM D-698 or AASHTO T-99 for embankment. Optimum moisture and maximum density for the top two feet of the engineered fill shall be determined in accordance with ASTM D-1557. Field density tests shall be performed in accordance with ASTM D-1556, "Sand Cone Method" or AASHTO T-238, "Nuclear Method". Moisture contents shall be measured and reported to the nearest 0.1%.

During the progression of the work, the Engineer will review the Contractor's operations with regard to the following items:

1. Lift thickness shall not exceed the maximum allowed as herein stated. Thinner lifts than the maximum allowed might be necessary to obtain required result on some materials.
2. The compaction effort shall be uniformly applied.

3. Significant rutting, under the action of the compactor, on the final passes on a layer shall not occur.
4. Proper compaction on a layer shall be obtained as required by the specifications.

Whenever a deficiency is noted in the Contractor's operations, the Engineer will prohibit placement of an overlaying lift until the Contractor takes effective corrective action. When the Engineer determines that density tests are necessary, the Contractor shall provide any assistance requested to facilitate such tests. Such assistance shall include, but will not be limited to, excavation and backfill of test pits and holes. This work shall be considered to be incidental to construction.

Damage to any compacted lift at any time during the course of construction, such as rutting under the loads imposed by earth moving equipment, shall be fully repaired by the Contractor, at his own expense, prior to placement of any overlaying material.

211.5 - Measurement is modified to add:

Approximate quantities of "Embankment" and "Engineered Fill" are indicated on the Bid Schedule as item 211. "Toe Backfill" is a non-pay item and measurement is not indicated.

The quantities of "Embankment" between the lines and limits shown on the plans will be measured by the cubic yard, computed in the final compacted position. Any additional quantity of material required to compensate for foundation settlement, compaction, erosion, or other cause shall not be included in the measurement of this item. The quantities of embankment shall exclude the total volume of bank protection. No deductions will be made for the volumes occupied by pipes or culverts.

The Contractor shall cross-section the existing ground after clearing, grubbing and proof-rolling prior to any excavation or fill construction. Cross-sections shall be taken perpendicular to the construction control line for the levees and sufficient number of points to describe the existing ground surface. Cross-sections shall be taken at a minimum of 100 foot stations, angle points in the alignment and at the beginning and end of curves.

Cross-sections shall be taken perpendicular to a Contractor defined construction control line through the engineered fill and sufficient number of points to describe the existing ground surface. Cross sections shall be taken at a minimum of 100 foot stations.

The Contractor shall cross-section the excavation limits, finished soil cement levee section, and engineered fill at the same locations as the existing ground cross-sections were taken.

The Contractor shall plot the existing ground, excavation limits, finished soil cement levee section, and engineered fill at the same both horizontal and vertical scale on standard 24" x 36" cross-section sheets for submittal to the Engineer.

The quantity of toe excavations will not be measured or paid for separately. The cost of said work is to be included in the cost bid for Embankment.

The Contractor shall plot the embankment lines on the cross-sections and compute the average end area volume of "Embankment" for the fill construction.

The 1.8:1 to 1:1 slopes of the earth cuts and embankment slopes for the levee may slough if surcharges of equipment or embankment are placed on the ground surface above and adjacent to the slope prior to soil-cement placement against the slope and all such slopes may be slough or fail from excess moisture, rain, insufficient moisture, seismic events, or other similar causes. Such sloughed slopes shall be reconstructed to the 1.8:1 to 1:1 earth slope line shown on the plans before placing the soil-cement against them, or the sloughed material shall be removed and replaced with additional soil-cement. The costs of reconstructing the 1.8:1 to 1:1 slopes, or placement of additional soil-cement (inclusive of cement) between sloughed slope faces and the 1.8:1 to 1:1 earth slope lines, as shown on the plans, shall be considered as included in the Contract price paid for Embankment constructed to the lines and grade shown on the plans, and therefore no separate payment will be made.

211.6 - Payment is modified to add:

No measurement or direct payment will be made for construction of "Toe Excavation" or grading of site drainage collection swales. The cost of "Toe Excavation" backfill is to be included in the cost bid for soil cement.

Payment for "Embankment and Engineered Fill" will be made for the number of cubic yards in place, as measured above, on the basis of unit prices stipulated in the Bid Schedule for Item 211, and shall include preparation of ground surfaces.

ITEM 211 - FILL CONSTRUCTION

SECTION 215 - EARTHWORK FOR OPEN CHANNELS

Revise the MAG Standard Specifications to add the following:

215.1 - Description

Open channels for the purpose of this project shall mean the unlined irrigation ditches adjacent to the east levee, and the SRP Colter Drain and detention basin outfall ditches to the Agua Fria River.

215.7 - Measurement

No measurement will be made of earthwork for open channels.

215.8 - Payment

Earthwork for open channels will be paid for on a lump sum basis. Such price shall include clearing, stripping, excavation, fill, backfill, compaction, grading, hauling, removal and disposal of excess excavated material and debris.

ITEM 215 - EARTHWORK FOR OPEN CHANNELS

SECTION 216 - CHANNEL EXCAVATION

Revise the MAG Standard Specifications to add the following:

216.1 - Description

This item of work shall include New River channel excavation, detention basin excavation, overbank filling, drainage channel excavation, and grading behind embankment fills, watering, grading, shaping, and compaction.

216.2 - Excavation and Fill and Backfill

216.2.1 - Excavation

Prior to commencing any excavation work, the contractor shall notify the appropriate utility companies or Arizona Blue Stake as noted in MAG Standard Specifications, Subsection 105.6

The Contractor shall take full responsibility for costs incurred due to damage to utilities as a result of excavation or embankment operations. Utility locations shown are approximate and all utilities are not necessarily shown. No direct payment will be made for this work, the cost being included in the price for Channel Excavation.

The Contractor shall provide for continued access to private property during and after grading of the right-of-way has been accomplished. The Engineer shall first approve any deviation from the Plans necessary for this purpose, in writing. The Contractor shall secure written permission from the appropriate property owner prior to undertaking any work outside the designated right-of-way necessary for this purpose. No direct payment will be made for this work, the cost being included in the price for Channel Excavation.

In the event that additional material is needed to balance the earthwork for the project, the Contractor shall define the area where additional Channel Excavation is proposed to occur for review and approval by the Engineer. The additional material obtained from the Channel Excavation shall not cause ponding areas to develop within the New River. Additional excavation will occur by scalping material within one (1) foot of the lines, grades, and cross-sections shown on the Plans. No additional material will be excavated left of the New River Channel construction centerline to balance the earthwork so as to prevent conflicts with the requirements of the U.S. Army Corps of Engineers 404 Permit. In the event that less material is needed to balance the earthwork for the project, the Contractor shall grade the New River channel excavation area to prevent ponding.

216.2.2 - Fill and Backfill

At the time of compaction, the moisture content of material to be used in fill areas shall be such that the specified compaction will be obtained and the fill will be firm and unyielding. Material containing excessive moisture shall not be compacted until the material is dry enough to obtain the required compaction. Compensation for additional work involved in drying fill material to the required moisture content shall be considered as included in the Contract price for Channel Excavation and no additional compensation will be allowed. Concrete is allowable within backfill areas if it is crushed into pieces less than eight (8) inches in diameter placed in such a manner that no nesting occurs and is covered with a minimum of three (3) feet of clean fill.

216.3 - Measurement

The quantities of Channel Excavation will be measured by the cubic yard of excavation only, as computed in the original position within the payment limits indicated on the Plans. The Contractor will compute the quantities of Channel Excavation based upon the differences between field cross-sections of the existing ground, obtained at the start of the project, and the channel design grades. Cross-sections will be obtained at a maximum spacing of 100 feet and quantities will be computed using the "average end area" method. Over-excavation shall not be paid for unless authorized, in writing, by the Engineer.

216.4 - Payment

The Contract unit price for Channel Excavation includes payment for all work encompassed by this Section, and shall be full compensation for performing all work and for furnishing all equipment, labor, and materials as necessary to complete the work of the item, except where specific costs are designated or included in another pay item of work.

All incidental costs, such as acquisition of borrow pits or material outside of the right-of-way, rock and/or concrete drilling and blasting, compaction and special test requirements, stockpiling and rehandling of materials, precautionary measures to protect private property and utilities, to form and trim graded surfaces, and any delays caused by corrective work, shall all be included in the unit price of the pay item where such costs are incurred. When there is no pay item for Construction Water in the itemized proposal, the work shall be performed in accordance with the specifications for the appropriate items but the costs thereof shall be included in those pay items that require the application of water. Payment shall be made at the Contract unit price per cubic yard of in-place volume for Item 216 in the Bid Schedule and shall cover all costs of channel excavation, overexcavation, and backfill as indicated on the design plans. No additional compensation will be made for overhaul required to complete the work.

ITEM 216 – CHANNEL EXCAVATION

SECTION 220 - RIPRAP CONSTRUCTION

Replace Section 220 of the MAG Standard Specifications with the following:

220.1 - Description:

The work shall consist of furnishing all plant, labor, equipment, and materials and performing all work necessary, including toe excavation, backfill, and dewatering to place a protective covering of erosion-resistant material on the slopes of embankments, riverbanks, or levees, at culvert inlets and outlets, on bottoms and side slopes of channels, at abutment wings, at structure foundations, at other locations shown on the plans, or as directed by the Engineer.

The work shall be done in accordance with these specifications and in conformity with the lines and grades shown on the plans or established by the Engineer. The items of work included in this specification are:

- (A) **Salvaged Riprap:** Salvaged riprap consists of river run cobbles obtained through on-site screening and grading operations and from the removal of existing base riprap from existing bank protection.
- (B) **Imported Riprap:** At the Contractor's option, riprap meeting the specifications for salvaged riprap.
- (C) **Grouted Riprap:** Loose riprap grouted in place.

220.2 - Materials:

Rock used for riprap shall be from that salvaged from the existing bank protection or shall meet the following requirements.

Rock used for riprap shall be sound and durable, free from clay or shale seams, cracks or other structural defects and shall have a specific gravity of at least 2.50.

Control of gradation will be by visual inspection. The Contractor shall provide two samples of rock of at least five (5) cubic yards each, meeting the gradation specified herein. One sample shall be provided at the quarry and one sample at the construction site. The sample at the construction site may be a part of the furnished riprap covering. These samples shall be used as a frequent reference for judging the gradation of the riprap supplied. Any difference of opinion between the Engineer and the Contractor shall be resolved by dumping and checking the gradation of two random truck loads of rock. The Contractor at no additional cost shall provide mechanical equipment, a sorting site, and labor needed to assist in checking gradation to the District. No source of rock is designated. It shall be the Contractor's responsibility to negotiate for the material, obtain the right-of-way and pay all applicable royalties and damages.

The source from which the rock will be obtained shall be selected well in advance of the time when the rock will be required in the work. The acceptability of the rock will be determined by the Engineer on the basis of test results furnished by the Contractor. Suitable samples of rock shall be taken in the presence of the Engineer at least 45 days in advance of the time when the use of the rock is expected to begin. The approval of some rock fragments from a particular quarry site shall not be construed as constituting the approval of all rock fragments taken from the quarry. The Contractor shall provide the Engineer with test reports from an independent testing laboratory to establish that the sampled rock has a minimum specific gravity (Bulk SSD) of 2.50 per ASTM C127. Rock shall contain no swelling type clay.

220.3 - Preparation of Ground Surfaces:

Areas on which riprap is to be constructed shall be cleared, grubbed, excavated, or backfilled in accordance with the MAG Standard Specifications and these Special Provisions. The areas shall be graded and dressed to produce a ground surface in reasonable conformance with the lines and grades shown on the plans or established by the Engineer. All soft or spongy material shall be removed to the depth directed by the Engineer and replaced with approved material. Filled area shall be compacted as specified in Section 211 - Fill Construction for "Embankment".

Placement of riprap and/or filter fabric through water will not be permitted unless otherwise approved, in writing, by the Engineer.

220.4 - Plain Riprap:

Salvaged riprap shall be stone that has been obtained from on-site screening grading operations ranging from 3- to 24-inches in size.

All points on individual grading curves shall be between the boundary limits as defined by smooth curves drawn through specified grading limits plotted on a mechanical analysis diagram. The individual grading curves shall not exhibit abrupt changes in slope denoting skip grading or scalping of certain sizes. Specified grading of all material shall be met both at the source and as delivered to the project.

It is anticipated that salvaged riprap may be obtained from on-site screening and grading operations. Stone may be furnished from other sources at the option of the Contractor, subject to the conditions stated herein. Material to be used for riprap, whether salvaged on-site or obtained elsewhere, shall conform to the gradation tables below for the types of riprap specified:

RIPRAP GRADATION Type I (D ₅₀ = 8")	
Diameter	Percent Passing
16"	90-100
12"	70-85
8"	30-50
5"	5-15
3"	0-5

RIPRAP GRADATION Type II (D ₅₀ = 12")	
Diameter	Percent Passing
24"	90-100
18"	70-85
12"	30-50
8"	5-15
4"	0-5

RIPRAP GRADATION Type III (D ₅₀ = 14")	
Diameter	Percent Passing
24"	100
18"	90-100
14"	30-50
9"	5-15

220.4.1 - Filter Fabric

Loose riprap Types II & III shall be constructed on a filter fabric. The filter fabric material shall conform to the following specifications:

Min. permeability: 1.6x10⁻³ ft./sec.
Max. AOS: 0.6mm

Type: Mirafti 140n,
 TYPAR 3401,
 TRIVERA Spunbound 1112
 or Approved Equal

Overlap: 18-inch minimum at
 Fabric Edge

Filter fabric overlaps shall be pinned using steel securing pins, 3/16 inch diameter, 18 inches long, pointed at one end and fitted with a 1.5 inch diameter metal washer at the other end. Pins shall be placed along the overlap at approximately three feet on center.

220.4.2 - Placement

Rock for riprap shall be placed on the prepared slope or base in a manner, which will produce a reasonably well-graded mass of rock with a minimum practicable percentage of voids. The entire mass of rock shall be placed in conformance with the lines and grades shown on the project plans. The thickness of the riprap is provided in a table below. Riprap shall be placed to its full course thickness at one operation and in such manner as to avoid displacing the underlying material. Placing the riprap in layers, or by dumping into chutes, or by similar methods likely to cause segregation, will not be permitted.

The larger rocks shall be well distributed and the entire mass of rock shall conform to the gradation specified in Subsection 220.4. All material going into riprap bank protection shall be so placed and distributed that there will be no large accumulations of either the larger or smaller sizes of rock.

It is the intent of these specifications to produce a fairly compact riprap protection in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual rocks by mechanical equipment may be required to the extent necessary to secure the results specified.

The Contractor shall maintain the riprap protection until accepted, and any material displaced by any cause shall be replaced to the lines and grades shown on the plan at no additional cost to the District.

Riprap Location

Location	Type	Thickness
Detention basin outfall pipe outlet headwall	Type III (loose) Type III (grouted)	Match existing (2.5' loose, 1.5' grouted)
Glendale Airport 36" pipe outlet headwall	Type II (loose)	2.5'
Glendale Levee Sta 38+00 to Sta 38+50±	Type I (grouted)	18-inches

220.5 - Grouted Riprap

Riprap shall be placed as specified and grouted for the full depth with Portland cement mortar. The grout shall consist of one part cement and three parts by volume of aggregate. The Portland Cement shall be Type II as specified in Section 725 of the MAG Standard Specifications, and the aggregate shall be two parts sand and one part gravel passing a 3/8-inch square mesh screen. The quality of the sand and gravel shall be as specified in Section 701 of the MAG Standard Specifications.

Rock to be used for grouted riprap shall conform to the Riprap Gradation Table, TYPE I as specified in Section 220.4.

The water content of the mix shall not exceed 8-1/2 gallons per sack of cement. In calculating total water content of the mix, the amount of moisture carried on the surfaces of aggregate particles shall be included. Slump of grout mix shall be between 9 and 10 inches for the first course, and between 7 and 8 inches for the second course. The grout shall be mixed in a concrete mixer in the manner specified for concrete, except that time of mixing shall be as long as is required to produce a satisfactory mixture, and the grout shall be used in the work within a period of 30 minutes after mixing. Retempering of grout will not be permitted.

The consistency of the grout shall be such as to permit gravity flow into the interstices of the stones with the help of spading, rodding, and brooming in order to assure penetration of the grout for full depth of the riprap layer. Grout batches in the same course shall be uniform in mix, size, and consistency.

220.5.2 - Placement

New riprap shall be placed to the dimensions and locations as shown on the plans.

Prior to grouting, the stone shall be thoroughly washed with water to wash down the fines and remove silt from the full depth of the gabions, and to prevent absorption of water from the grout. The stone shall be kept wet just ahead of the actual placing of the grout.

The grout shall be placed in two courses on the side slopes. Each course shall be placed full width or in successive lateral strips approximately 10 feet in width, as applicable, extending from toe of slope to top of side slopes. The grout shall be placed by pumping, discharging directly into the voids between the stones and vibrated to full depth penetration. The flow of grout shall be directed with brooms or other approved baffles to cover the entire area and to assure that all crevices are filled. Sufficient barring shall be done to loosen tight pockets of stone and otherwise aid the penetration of grout. The first course shall fully penetrate the stone blanket. The second course shall be placed as soon as the first course has sufficiently stiffened so that it will not flow when additional grout is added. On side slopes, all brooming shall be uphill. The finished surface of the grout shall fill the interstices of the stones to the top of stone surfaces and then lightly brushed. The upper surface of the completed grout layer shall be approximately 2 inches below the upper surface plane of riprap stone. After the grout has been placed, the portion of stone projecting above the grouted surface shall be cleaned by air-water blasting. Cleaning shall remove all grout, cement paste, and discolorations caused by the grout without damaging the grout to remain in place.

After completion of any strip or panel, no workmen or other load shall be permitted on the grouted surface for a period of 24 hours. The grouted surface shall be protected from injurious

action of the sun; shall be protected from rain, flowing water, and mechanical injury; and shall be moist cured or membrane cured at the Contractor's option.

220.5.3 - Curing and Protection

The grout shall be kept moist for a period of seven (7) days following placement or may be covered with a suitable curing material subject to the Engineer's approval. Any damage to the protective membrane provided by an approved curing material occurring within the initial 7 days of placement shall be repaired immediately to the satisfaction of the engineer.

Curing compounds shall be applied as soon as the free water disappears and shall be applied in a 2-coat continuous operation by approved power-spraying equipment at a rate not to exceed 200 square feet per gallon for the combined coats. The second coat shall be applied to overlap the first coat in a direction approximately at right angles to the direction of the first application.

Membrane curing compound shall be resin-base dissipating membrane-type conforming to CRD-C 300.

Whenever atmospheric temperatures are expected to drop below 30 F, grouted riprap shall be protected from freezing for 7 days after its construction by a covering of loose earth, straw, or other suitable material approved by the engineer.

220.6 - Measurement:

The quantities of riprap construction shall be measured by the cubic yards of riprap, in place, within the limits of dimensions shown on the plans. Quantities of salvaged riprap in excess of design requirements may be disposed of within the project limits, placed in the toe excavation backfill or bottom of the engineered fill. No measurement shall be made for quantities in excess of design requirements.

220.7 - Payment:

Payment for loose riprap will be made for the number of cubic yards of riprap in place, as measured above, on the basis of unit prices stipulated in the Bid Schedule for Item 220-1 and shall include preparation of ground surfaces and trenching.

Payment for grouted riprap shall be by the cubic yard, in place, inclusive of all labor and materials on the basis of the unit prices stipulated in the Bid Schedule for Item 220-2.

No separate payment shall be made for Filter Blanket/Filter fabric. Such costs are incidental to the cost for loose riprap.

ITEM 220-1 – RIPRAP (LOOSE)

ITEM 220-2 – RIPRAP (GROUTED)

SECTION 221 - SOIL-CEMENT BANK PROTECTION

Add to the MAG Standard Specifications:

221.1 - Description:

The work shall consist of furnishing all labor, equipment and materials and constructing soil-cement bank protection as required by the Plans, including toe trench excavation, backfill, and dewatering for the construction of all soil-cement falling below the proposed channel bed profile.

The Contractor shall submit a plan showing his intended method of constructing the soil-cement at least two weeks prior to the start of soil-cement production. The plan shall be sufficient in detail to clearly describe the planned execution of the work. Such plan shall include, but not necessarily be limited to, mixing plant, transport equipment, spreading equipment, and compacting equipment, indicating number and capacities of each type of equipment.

The Contractor shall have full responsibility for administration of a Quality Control Plan for soil-cement, which shall meet the same quality control requirements as Section 105 of the MAG Standard Specifications.

The plan shall also show the access planned for performing the work.

221.2 - Materials:

221.2.1 - Portland Cement

Portland Cement shall comply with the latest specifications as approved by the Engineer, for Portland Cement (ASTM C150, Type II [low alkali]), and shall conform to the requirements of Subsection 725.2 of the MAG Standard Specifications.

221.2.2 - Water

Water shall be clear and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances. Water shall contain not more than 1,000 parts per million of chlorides as CL or of sulfates as SO₄. Water shall be sampled and tested in accordance with the requirements of AASHTO T26.

221.2.3 - Aggregate

Soil aggregate for use in soil-cement may be produced by the Contractor by processing, screening, crushing and/or blending soils obtained from the required excavations, and/or may be furnished by the Contractor from Contractor - furnished borrow. Soil aggregate for soil-cement shall contain no deleterious material. Before mixing as soil-cement the soils shall be stockpiled and sampled, and shall be approved by the Engineer, in accordance with the requirements of Section 221.9 of these Special Provisions. The distribution and gradation of materials in the soil-cement lining shall not result in lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from surrounding material.

The maximum allowable plasticity index for soil-cement aggregate shall be five (5). Soil aggregate for soil-cement shall conform to the following gradation requirements when tested in accordance with ASTM C-136 and C-117:

Sieve #	Percent Passing, By Dry Weight
2"	100%
No. 4	50% to 80%
No. 200	5% to 20%

Plasticity index shall be between 0 and 5 when tested in accordance with the requirements of AASHTO T-90.

Soil aggregate for soil-cement shall not contain clay/silt lumps larger than one (1) inch.

Blending of soil aggregate by combining soils from separate soil stockpiles shall be performed by utilization of separate storage feed bins at the plant, to the satisfaction of the Engineer.

221.2.4 - Fly Ash

Fly ash shall not be allowed as cementitious material.

221.3 - Equipment:

The soil-cement bank protection may be constructed with any combination of machines and/or equipment, except as noted herein, that will produce completed soil-cement meeting the requirements for soil pulverization, cement and water application, mixing, saw cutting, excavating, transporting, placing, compacting, finishing, and curing as provided in these Specifications.

221.4 - Construction Requirements:

221.4.1 - Required Contractor Submittals

Approval by the Engineer shall not relieve the Contractor of the responsibility for achieving the desired result of constructing sound soil-cement, free from defects, according to the specifications and plans, or as directed by the Engineer.

Prior to the start of construction, the Contractor shall submit, in writing, for approval, the following items:

1. The approximate length of soil-cement bank protection to be placed prior to starting compaction operations.
2. The type of compaction equipment to be used.
3. The number and type of watering equipment to be used.
4. The method to be used to keep surfaces continually moist until subsequent layers of soil-cement are placed.
5. The method to be used to cure permanently exposed soil-cement surfaces.
6. The proposed source(s) of soil to be used in soil-cement.

7. The proposed size and number of soil aggregate stockpiles.
8. The mix design to be used in conformance with the requirements specified herein.

221.4.2 - Preparation

Before soil-cement processing begins, the area on which soil-cement will be placed shall be graded and shaped to lines and grades as shown on the Plans or as directed by the Engineer.

The subgrade shall be compacted to a minimum of 95% of the maximum density. Optimum moisture and maximum density shall be determined in accordance with ASTM D-698 or AASHTO T-99. Field density tests shall be performed in accordance with ASTM D-1556 "Sand Cone Method" or AASHTO T-238 "Nuclear Method". Moisture contents shall be measured and reported to the nearest 0.1%.

Immediately prior to placement of the soil-cement mixture, the subgrade shall be moistened. Soft or yielding subgrade shall be corrected and made stable before construction proceeds.

Excavation and backfill of toes, and any dewatering necessary to construct soil-cement bank protection below the channel bed profile elevations shown on the plans shall be considered incidental to the construction of the soil-cement and included in the cost of Item 221-1, Soil-Cement Bank Protection.

221.4.3 - Mixing

Soil-cement shall be mixed in an approved central-type plant having a stationary twin shaft pugmill mixer of the continuous-mixing type or an approved batch-type pugmill. The mixing plant shall be designed, coordinated, and operated to produce a soil-cement mixture of the proportions specified within the required tolerances. The plant shall be equipped with positive means for controlling and maintaining a constant time of mixing. Twin shaft pugmills shall also be equipped with a positive means for maintaining a constant speed of rotation of the shafts. The plant shall be equipped with screening, feeding, and weighing and metering measuring devices that will add the soil, cementitious material(s) and water into the mixer in the specified quantities. The blades of twin shaft continuous pugmill mixers shall be adjustable for angular position on the shaft and reversible to retard the flow of the mix.

When the quantity of water is controlled by metering, the Contractor shall make provisions whereby the quantity of water delivered through the meter can be readily converted to weight. A water storage tank may be required to prevent the adverse effects created by surge drawdown.

A variable speed belt or a remotely operated gate, calibrated to accurately deliver any specified quantity of material shall control the soil aggregate feed rate. The feed rate shall be readily adjustable from the control panel to compensate for changes in the moisture content of the soil or to change soil aggregate proportions when blending is required and separate bins are utilized. The combined aggregate belt feeding the mixer shall be equipped with an approved belt scale. The belt scale shall operate automatic controls which will govern the proportions of cementitious material and water as ratios of the total soil aggregate, with provisions for ready changing of the proportions.

When a continuous mixing plant with a fixed soil aggregate feed rate system is used, the belt shall travel at a constant speed. The feed system shall continuously deliver aggregate to the mixer at a constant feed rate, calculated on a dry weight basis, at any locked gate setting. The feed system shall be mechanically interlocked with all other feed devices. The soil aggregate feed monitoring system shall provide and record the rate of and total quantity of soil aggregate fed into the mixture.

The plant shall be equipped with a hydraulically or mechanically operated discharge holding bin having a minimum capacity of twenty (20) tons.

Mixing shall be sufficient to secure a homogeneous, intimate, uniform mixture of the soil, and water within the specified tolerances. Soil and cementitious material shall be mixed sufficiently to prevent cementitious balls from forming when water is added.

Mixing shall not proceed when the soil aggregate or the area on which the soil-cement is to be placed is frozen. Soil-cement shall not be mixed or placed when the air temperature is below 45° F (7° C), unless the air temperature is at least 40° F (5° C) and rising.

At the completion of moist mixing, any lumps consisting of silt, clay and/or cementitious material shall be so pulverized that, exclusive of gravel-sized and larger stones, 100% shall pass a one (1) inch sieve, and at least 80% by dry weight shall pass a No. 4 sieve.

In the production of soil-cement, the percent of cementitious material shall not vary by more than +0.3 percent of the contents specified by the Engineer.

Silos and feeders shall be equipped and operated so as to provide uniform rates of feed and prevent caking. Provisions shall be made to allow for ready, safe sampling of the cementitious material(s).

The weighing and metering systems shall include digital readouts, which continuously display, and shall provide an hourly printed record of, the following information:

1. The total discharged quantity per hour of each weighed or metered material.
2. The cumulative total discharged quantity of each weighed or metered material.
3. The moisture content of the combined soil aggregate currently entering the mixer.
4. The cumulative total discharged weight of soil aggregate moisture.

Copies of the hourly printed records of discharged quantities and the Contractor shall give soil aggregate moisture information to the Engineer at the end of each day of soil-cement mixing.

Measuring devices shall be calibrated prior to production of soil cement and as deemed necessary by the Engineer. All measuring device calibration shall be approved by the Engineer and performed at the Contractor's expense.

Each measuring device shall be calibrated throughout its range to within an accuracy between plus/minus two (2.0) percent and shall be inspected and calibrated as often as the Engineer deems necessary to assure their accuracy. A certified lab shall perform calibration.

The Contractor shall notify the Engineer at least 48 hours in advance of the initial plant calibration. Prior to or at the time of this notification, the Contractor shall provide a Plant Operating Manual to the Engineer.

221.4.4 - Required Moisture

At the time of compaction, the moisture content of the soil-cement shall be in the range of optimum to optimum plus 2.0 percent when the mean air temperature during construction hours does not exceed 90° F. The relationship between the soil-cement's moisture content and its optimum moisture content will be determined in accordance with ASTM D-558 or AASHTO T-134. When the mean air temperature does exceed 90° F, or there is a breeze or wind which promotes the rapid drying out of the soil-cement mixture, the moisture content of said mix shall be increased as needed at the direction of the Engineer, but shall be less than that quantity that will cause the soil-cement to become unstable during compaction and finishing operations.

221.4.5 - Sampling Facilities

Free and safe access to the plant must be provided to the Engineer at all times for inspection of the plants operation.

The Contractor shall provide suitable facilities and shall take representative samples of materials as they enter the mixer, are discharged from the mixer, and are discharged from the gob hopper. The frequency of the Engineers sampling of the combined said aggregate feed shall be at the discretion of the Engineer, but will not be less than once a day or once for each 500 cubic yards of soil-cement produced. These samples shall be used for the Contractors quality control and the Engineers Quality assurance testing. The Contractor shall furnish all necessary platforms, tools, equipment and trained personnel for obtaining samples.

221.4.6 - Handling

The soil-cement mixture shall be transported from the mixing area to the embankment in clean equipment provided with suitable protective devices in unfavorable weather. The total elapsed time between the addition of water to the mixture and the start of compaction shall be the minimum possible. In no case shall the total elapsed time exceed thirty (30) minutes. (This time may be reduced by the Engineer when the air temperature exceeds 90° F or when there is a breeze or wind, which promotes rapid drying of the soil-cement mixture.) Compaction shall start as soon as possible after spreading.

The Contractor shall take all necessary precautions to prevent damage to completed soil-cement by the equipment and to prevent the deposition of raw earth or foreign materials between layers of soil-cement. Earth ramps crossing completed soil-cement must have at least two (2) feet compacted thickness. Where ramps are constructed over soil-cement that is not to grade, all foreign materials and the uppermost one (1) inch of the previously placed soil-cement mixture must be removed prior to continuation of the soil-cement construction.

221.4.7 - Placing

The mixture shall be placed on the moistened subgrade, embankment, or previously completed soil-cement with spreading equipment that will produce layers of nine (9) feet in width with a thickness as is necessary for compaction to the required dimensions of the completed soil-cement layers. The nine (9) feet dimension is to allow for full compaction of the design width of eight (8) feet with one (1) foot of excess that will not be trimmed. The compacted layers of soil-cement shall not exceed eight (8) inches in thickness nor be less than four (4) inches in thickness. The maximum depth of compacted soil cement that shall be placed per day shall be five (5) feet.

Each successive layer shall be placed as soon as practicable after the compaction of the preceding layer has been verified by the Engineer.

The Contractor shall schedule placement of all soil-cement above channel bottom such that the placement of soil-cement protection at each location will be completed from channel bottom to plan top of soil-cement within five (5) calendar days, unless otherwise approved by the Engineer, or unless prevented by inclement weather.

All soil-cement surfaces that will be in contact with succeeding layers of soil-cement shall be kept continuously moist by fog spraying until placement of the subsequent layer, except that the Contractor will not be required to keep such surfaces continuously moist for a period longer than seven (7) days.

Mixing shall not proceed when the soil aggregate or the area on which the soil-cement is to be placed is frozen. Soil-cement shall not be mixed or placed when the air temperature is below 45° F (7° C), unless the air temperature is at least 40° F (5° C) and rising.

221.4.8 - Compaction

The running average of five consecutive in-place density tests shall not be less than 98% of the maximum density obtained by ASTM D-558, with no individual test less than 95%. The Contractor shall remove and replace all soil cement not meeting these requirements at his own cost. Optimum moisture and maximum density shall be determined in accordance with ASTM D-558 or AASHTO T-134. Field density tests shall be performed in accordance with ASTM D-1556 "Sand Cone Method" or AASHTO T-238 "Nuclear Method". Moisture contents shall be measured and reported to the nearest 0.1%.

Wheel rolling with hauling, grading, spreading, or watering equipment, exclusively, shall not be an acceptable method of compaction. Vibratory compaction methods or equipment shall not be used when their use contributes to sloughing or caving of the soils which the soil-cement is to be placed against.

At the start of compaction, the mixture shall be in a uniform, loose condition throughout its full depth. Its moisture content shall be as specified in Subsection 221.4.4 herein. No section shall be left undisturbed for longer than thirty (30) minutes during compaction operations. Compaction of each layer shall be done in such a manner as to produce a dense surface, free of compaction planes, in not longer than one (1) hour from the time water is added to the mixture. Whenever the Contractor's operation is interrupted for more than two (2) hours, the top surface of the completed layer, if smooth, shall be scored to a depth of at least one (1) inch with a spike-

tooth instrument, or by other means approved by the Engineer, prior to placement of the next lift. The spacing of scores shall not exceed eighteen (18) inches, measures across the direction of soil-cement placement. The surface, after said scoring, shall be swept using a power broom or other method approved by the Engineer to completely free the surface of all loose material prior to actual placement of the soil-cement mixture for the next lift.

221.4.9 - Finishing

After compaction, the top surface of the soil-cement shall be shaped to the required lines, grades, and cross-sections and rolled to a reasonably smooth surface.

Surface compaction and finishing of each layer shall be done in such a manner as to produce a dense surface free of compaction planes or loose material in no more than two (2) hours from the time compaction is started or three (3) hours from the time water is added to the mixture.

221.4.10 - Curing

Temporarily exposed surfaces shall be kept moist as set forth in Subsection 221.4.7.

Care shall be exercised to ensure that no curing material other than water is applied to surfaces that will be in contact with succeeding layers of soil-cement.

Permanently exposed surfaces of the soil-cement shall be kept moist during the seven (7) day cure period. Whenever atmospheric temperatures are expected to drop below 30° F, soil-cement shall be protected from freezing for seven (7) days after its construction by a covering of loose earth, straw, or other suitable material approved by the Engineer.

221.4.11 - Construction Joints

At the end of each day's work, or whenever construction operations are interrupted for more than two (2) hours, a transverse construction joint shall be formed in the last-placed lift by cutting back into the complete lift to form a full-depth vertical face.

221.4.12 - Maintenance

The Contractor shall be required, within the limits of the Contract, to maintain the soil-cement in good condition until all work is completed and accepted. Maintenance shall include immediate repairs of any defects that may occur. This work shall be done by the Contractor at his own expense and repeated as often as necessary. Faulty work shall be replaced for the full depth of the layer.

221.4.13 - Connection to Existing Levee

The Contractor is required to coordinate with the Flood Control District of Maricopa County (District) for inspection of all work related to existing soil cement removal and connection of the new east levee. Contact Fred Fuller, Chief Construction Inspector at 506-1501. The District shall inspect and approve all work relating to the soil cement removal and connection of the new east levee.

At the connection of the new east levee with the existing New River levee, the contractor shall sawcut the soil cement to a minimum 6-inch depth, referring to dimensions depicted in the Drawings. Remove the soil cement using a 145,000-lb. excavator with hoe ram, breaking two (2) feet outside the excavation limits to ensure the soil cement remains on a stable subgrade. Demolition shall be performed with hydraulically operated excavation equipment. Blasting will not be permitted.

All loose material shall be removed from the cut soil cement edge. All exposed surfaces of the existing soil cement at the connection shall be rough, sand blasted and thoroughly cleaned prior to placing soil cement adjacent to the removed section, to the satisfaction of the Engineer. Immediately prior to placement of the soil cement lifts adjacent to the existing soil cement levee, the existing soil cement shall be coated with an epoxy bonding agent.

221.5 - Inspection and Testing:

The Engineer, with the assistance and cooperation of the Contractor, will make such inspections and tests, as he deems necessary to verify the conformance of the work to the Contract Documents. These inspections and tests will include, but will not be limited to: (1) the taking of test samples of the soil-cement and its individual components at all stages of processing and after completion, and (2) the close observation of the operation of all equipment used on the work. Only those materials, machines, and methods meeting the requirements of the Contract Documents will be approved by the Engineer.

All testing of soil-cement or its individual components, unless otherwise provided specifically in the Contract Documents, shall be in accordance with the latest applicable test methods in effect as of the date of advertisement for bids on the project.

Testing for proper compaction shall be done on at least every other lift of compacted soil-cement and at least once for every 500 cubic yards of soil-cement. The Engineer shall choose test locations. If the lift being tested does not meet the specified density requirements, it must be reworked as directed by the Engineer until it passes or be removed by the Contractor at the Contractor's expense. The Contractor shall not be permitted to continue placing lifts of soil-cement on any lift which has failed the compaction tests until such time as that lift has been reworked, retested, and passed as to meeting density and moisture content requirements.

The initial acceptance of material shall in no way preclude further examination and testing at any time, during the course of construction or subsequent warranty period, if the Engineer suspects the material is no longer properly represented by the acceptance sample. The acceptance at any time of any material incorporated into the work shall not bar its future rejection if it is subsequently found to be defective in quality or uniformity.

221.6 - Mix Design Methodology:

The design requirements for the soil-cement bank protection shall be such that it has a minimum compressive strength of 750 psi at seven (7) days for the work as indicated on the plans. The Engineer will determine the mix proportions of the aggregate, cement and water, and the Contractor shall furnish soil-cement conforming to the requirements specified herein. The job-mix design with the supporting test results will be made available prior to the Contractor incorporating any of the material into the work.

Included in the job-mix design data shall be the type of cement and source of aggregate. A new mix design will be required any time the Contractor requests a change in material, or proportioning of the materials, from that given in the approved mix designs.

221.7 - Mix Design for This Project:

For bidding purposes only, the estimated mix design for this project shall include ten percent (10%) cementitious material for the soil-cement construction.

The percent of cementitious material to be used in the mix shall be calculated to be the weight of cementitious material divided by the total weight of the dry soil-cement materials. The actual mix designs used on this project shall be determined by the Engineer for each soil aggregate stockpile after construction of stockpiles has been completed.

The cement content may be increased at any time by the Engineer if, in the Engineer's opinion, increased cement content is needed to assure design strength. An increase in cement content may be justified by inconsistencies in production methods; various test results, and test results which drop below acceptable standard deviation.

221.8 - Stockpiling of Aggregate:

Soil aggregate stockpiles shall be constructed on level, firm ground free of brush, trees, stumps, roots, rubbish, debris, and other objectionable or deleterious material and shall be located so as to provide a distance of not less than fifty (50) feet from the outside bottom edge of conical stockpiles built up under processing plant conveyors or any other existing stockpiles. Stockpiles shall not be placed in the New River channel. The stockpiles shall be constructed in layers, each layer not exceeding two (2) feet in thickness. Ramps formed for stockpile construction shall be of the same material as that being stockpiled, and will be considered a part of the stockpile. Before steepening a ramp, any contaminated surface material shall be removed. The stockpile height shall be limited to a maximum of twenty-four (24) feet.

Stockpiled material shall be thoroughly mixed throughout its depth, width, and length before utilization. The material shall be homogeneous and uniform in color, gradation, and moisture throughout.

Sampling of stockpiles will be done by the Engineer. After the stockpiles have been sampled and approved, material shall not be added to them. Each stockpile shall be completed and approved at least fourteen (14) days prior to start of soil-cement production from the stockpile.

221.9 - Sampling and Use of Stockpiles:

During construction of stockpiles to be utilized in the production of soil-cement, the Contractor will be solely responsible for monitoring the uniformity of the material being placed therein to assure conformance with the gradation requirements specified for said soil material. The Contractor's attention is directed to the soils reports prepared for this project and which are on file at the office of the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, AZ 85009.

Stockpiles for use in soil-cement production shall be constructed to the following minimum size:

1. 20,000 cubic yards, or

2. The total quantity of material required to complete all soil-cement when the quantity of material required for blending into the soil aggregate is less than 20,000 cubic yards.

The height of the stockpiles shall be limited to a maximum of twenty-four (24) feet. The location and height of the stockpiles constructed by the Contractor shall not interfere with the Glendale Airport operations. The Contractor shall provide the Engineer with a copy of the written approval from the Glendale Airport defining the stockpile locations and heights.

Upon completion of each stockpile, the Contractor shall notify the Engineer in order to allow for verification of the soil gradation determined during random site sampling. The Contractor shall provide the manpower and equipment necessary to sample each stockpile in accordance with the following procedure:

Under the direction of the Engineer, the Contractor shall use a front-end loader to excavate a face for the full height of the stockpile, extending into the stockpile a distance required by the Engineer, at a minimum of four (4) different sampling locations around the perimeter of the stockpile. The Contractor shall excavate one (1) additional sampling location for each 5,000 cubic yards in the stockpile in excess of 20,000 cubic yards. The front-end loader shall then be used to channel the total excavated face at each location from the bottom to the top in one operation, and the material obtained shall be dumped on the ground in piles.

The Engineer or his representative will then sample each of the sample piles by channeling it with a hand shovel at four (4) locations equally spaced around the perimeter.

Approval of a stockpile shall not relieve, in any degree, the full responsibility of the Contractor to furnish, in its final position, a material conforming to all the specification requirements.

221.10 - Field Quality Control:

The Contractor shall establish and maintain an effective quality control program for soil-cement, which will be his means of ensuring compliance with Contract requirements and of maintaining records of his control. The program shall include, but not limited to the following: aggregate manufacture and gradations, moisture, batching requirements and mix proportions at the mixing plant, insuring adequate materials are on hand, and all other tests inspections required by the Specification.

All quality control tests shall be performed in strict accordance with the applicable standards as specified hereinafter. The quality control program for soil-cement shall be established by the Contractor and be proposed to the Engineer for review and approval at least two weeks prior to soil-cement production. The Contractor shall supply all equipment and provide qualified personnel for testing and fulfillment of his quality control program. No soil-cement placement or aggregate production will be allowed until the Contractor has received approval of an acceptable quality control program. The Contractor's program shall be similar in nature to the quality control program established in the following paragraphs. If at any time, in the opinion of the Engineer, the Contractor's proposed system is inadequate or fails to ensure compliance with the Specification, the Contractor will be required to adopt a new system which, at a minimum, conforms strictly to the requirements stated in the following paragraphs.

(A) Aggregate Gradations:

1. Testing:

At least once during each shift that soil-cement is placed and that aggregates are produced, aggregates shall be checked for the characteristics specified in Section 221.2.3. A recheck sample is required for any test out of specifications. The location from which samples are taken may be selected by the Contractor providing that they give an accurate indication of gradations of materials as they enter the mixer. However, provisions must be made for accurate sampling of aggregates on the feed belts.

2. Action Required:

Whenever a test result is outside of the specification limits, the Engineer shall be immediately notified and a recheck sample taken. If the recheck sample is outside of the specification limits, the Engineer shall be immediately notified again, the process shall be considered out of control, and positive steps shall be taken by the Contractor to rectify the situation. The Engineer will advise the Contractor if production and placement of soil-cement shall be stopped at that time. The Contractor will be responsible for all costs incurred as a result of stopping any soil-cementing operations due to out of specification materials.

(B) Aggregate Moisture Determination:

1. Testing:

At least once during each day of placement for each aggregate size used, moisture content determinations shall be made in accordance with ASTM C566 (ASTM C70 where appropriate for fine aggregate if it is stockpiled separately). The location from which the sample is selected may be determined by the Contractor, providing that it is typical of materials entering the soil-cement.

2. Action Required:

The Engineer may test for verification any field determinations of moisture contents made by the Contractor. This verification will use the oven drying procedure. If there is a discrepancy between the Contractor's test results and the verification tests, immediate steps shall be taken to identify the source of the problem and correct it so that accurate field determinations are obtained. When moisture content determinations indicate a change in water entering the soil-cement with the aggregates, the placement foreman shall be contacted to see if a corresponding adjustment in water added at the soil-cement mixer is necessary to obtain maximum compaction at the placement site.

(C) Soil-Cement Plant Control:

When the mixing plant is operating, the measurement of all constituent materials including cement, each size of aggregate, water and admixtures, shall be continuously controlled. The aggregate weights and amount of added water to compensate for free moisture in the aggregates shall be adjusted as necessary. A daily report shall be prepared indicating the type and source of cement used during that day; the amount, type and source of admixtures used; aggregate size groups used; required mix proportions per cubic yard for each mix design used; the amount of water as free moisture in each size of aggregate; and the aggregate and water weights per cubic yard for each mix design of soil-cement made during plant operation.

(D) Scales for Weigh Batching:

1. Tests and Checking:

The accuracy of scales shall be checked by test weights prior to the start-up of soil-cementing operations. Such tests shall also be made whenever there are variations in properties of the soil-cement that could result from batching errors. The accuracy of each batching device when weight batching procedures are used shall be routinely checked during a weighing operation by noting and recording the required weight and the weight actually batched. Rechecks shall be made at least every four shifts of operation thereafter and whenever there are variations in the properties or control of soil-cement that could result from batching errors.

2. Action Required:

Whenever either the weighing accuracy or batching accuracy is found not to comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made.

(E) Volumetric Feed Calibrations:

1. Tests and Checking:

The accuracy of volumetric feeds shall be checked by collecting all material delivered during a unit of time to the mixer and also by washout tests of material exiting from the mixer. Suitable methods and equipment shall be provided for obtaining and handling samples at the mixing plant. The weight of material corresponding to a standard time interval, and the resulting proportions of materials per cubic yard, shall be determined. The accuracy of volumetric feeds shall be determined at least three times during check out of the mixing plant prior to production operations and soil-cement placement. Rechecks shall be made at least every four shifts of operation thereafter and whenever there are variations in the properties of control of soil-cement that could result from volumetric feed errors. The sample shall be of sufficient size to give accurate determinations and calibration may require weights in excess of 500 pounds per item checked.

2. Action Required:

Whenever the volumetric feed is found not to comply with Specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made.

(F) Testing Soil-Cement Mixes:

1. General:

Fresh soil-cement shall be sampled and tested for compliance with the Specification and for additional information required by the Engineer. Samples and tests will primarily be made at the placing location at the time of placement, but may also be required at the mixing plant. The Contractor shall provide a method of readily obtaining representative soil-cement samples from the plant and any gob hopper locations.

2. Mixer Performance:

A complete mixer performance test of three different batches of soil-cement or runs through a volumetric plant shall be made on each stationary mixer in accordance with the Army Corps of Engineers CRD-C 55 prior to the start of soil-cement placing. Additional tests may be made at any time to support a Contractor's request for reduction of mixing time. Whenever mixer adjustments are necessary because of failure of a mixer to comply, the mixer shall be retested after adjustment. The abbreviated test may be used for this purpose. Abbreviated tests shall be run routinely on each mixer at least once every five days.

3. Temperature:

a. Testing:

At least one test of temperature shall be made at the mixing plant and at the placement on a randomly selected batch of each mix design of soil-cement used per shift of placement. Additional tests shall be made when rapid set time or workability loss is reported by the placing foreman or Engineer's inspector, or when cold weather problems occur. The temperature of air and soil-cement shall be reported during the period of cure and cold weather protection when those restrictions are applicable.

b. Action Required:

Whenever the mix temperature falls below 50° F or is above 90° F, the Contractor shall notify the Engineer immediately. All other temperatures shall be included as standard data in the quality control reports.

4. Moisture Content:

a. Tests and Checking:

At least once during each four hours of production placement at the mixing plant, and once every two hours at the placement site (immediately after compaction), the moisture content shall be determined on the soil-cement mix using a nuclear gauge in accordance with AASHTO T-239. The gauge shall be calibrated against oven-dry samples of each mix design used. If, after three days of production placement, consistent moisture control is achieved, the rate of testing may be decreased to one test per eight hours at the plant and one test per four hours at the placement. In any case, at least three tests shall be made in different areas of each layer of soil-cement placed. The placing foreman shall continuously monitor the apparent effectiveness of compaction equipment from a visual standpoint, and shall notify the mixing plant whenever the mix becomes too dry or too wet.

b. Action Required:

Whenever moisture content tests indicate a change from what has been established as the optimum batching and placing moisture for maximum density and efficiency of compaction equipment, a corresponding adjustment shall be made in the mix water added at the mixing plant and the adjustment shall be noted. Whenever the placing foreman observes a condition of moisture which begins to consistently allow the vibratory rollers to sink excessively in the mix, cause excessive paste to develop at the surface, or leave an open appearing unconsolidated surface, an adjustment shall be made in the mix water added at the plant and the adjustment shall be noted.

5. Cement Content:

The Contractor shall obtain samples of the soil-cement mix at the mixing plant and/or placement area for determination of cement content using a chemical chloride titration or similar procedure. The test equipment shall also allow moisture content determinations to be made. The equipment shall be provided by the Contractor and all testing shall be by the Contractor.

6. Density:

a. Testing and Checking:

At least once every two hours during placement, but not less than once every 500 cubic yards of soil-cement, the density and moisture content of soil-cement after compaction shall be determined with a nuclear density gauge in accordance with AASHTO Designation T-238, previously calibrated against sand cone densities. The Contractor shall maintain a nuclear gauge in good working condition on the placement

area at all times. The Engineer shall have access to the gauge at all times and shall be allowed to use it for quality assurance check tests.

Each lift of soil-cement shall be tested by the nuclear gauge in at least six separate locations for density. The direct transmission mode shall be used and readings shall be taken in each quadrant of a circle obtained by rotating the gauge 90° each after each reading around the transmission probe. The probe shall be inserted into pre-driven holes of diameter recommended by the manufacturer to a depth of at least 10 inches for each reading. Density shall be as specified in Subsection 221.4.8 of this Special Provision. The vibratory roller operators shall continually monitor their "on board" compaction meters as an indicator of any areas, which have not been fully compacted.

b. Action Required:

Whenever a roller operator finds that his compaction meter indicates insufficient compaction, he shall continue rolling until the required compaction meter readout is achieved. If this requires more than an estimated six passes, the Engineer shall be notified by the placing foreman, and the Contractor shall determine the actual density with a nuclear gauge. Whenever the nuclear gauge indicates compaction of less than specified in Subsection 221.4.8 of this Special Provision, a retest shall be made. If the retest indicates incomplete compaction, the Engineer shall be notified, additional rolling shall be immediately provided and a determination shall be made as to whether the lower density resulted from insufficient passes of the roller or a change in the mix properties. If the mix properties have changed, adjustments such as increasing or decreasing the moisture content shall be made at the mixing plant. If the problem persists, the Engineer may require the Contractor to adjust the proportions of aggregates, and/or cement. If the lower density is the result of incomplete rolling, the operator shall be notified and the Engineer may require removal of the incompletely compacted material at no cost. If the same operator repeatedly rolls less than the required number of passes, and/or if his compaction meter repeatedly indicates underrolling due to deliberate action or inattentiveness, he shall be replaced with a different operator.

(G) Compaction Equipment:

1. Tests and Checking:

Before any compactor is used in soil-cement construction, it shall be checked for current dimensions, weight and vibratory capacity. At least once per four shifts of use, a spot recheck of frequency shall be made. At least once per each shift of placement for the first five days of operation by any new operator, his performance shall be spot checked for the correct number of passes, correct spread, coverage of the area being rolled, and good rolling practice. Thereafter, spot checks shall be made on each operator at least every four shifts.

2. Action Required:

Compaction equipment not meeting the physical dimensions and weights required in subsection 221.12 shall be removed from the site. Any roller having improper frequency shall be corrected before being used for soil-cement compaction. Roller operators running at speeds in excess of Specification requirements shall be immediately notified and shall correct any noted improper practices or be replaced by another operator.

(H) Dumping and Spreading:

1. Tests and Checking:

The placing foreman or other designated representative shall continually observe and monitor dumping and spreading operations to insure that they are done in a manner that minimizes segregation and spreading after dumping. Each lift of soil-cement shall be routinely checked in its spread uncompacted condition for evenness and correct thickness that will result in a smooth, even, compacted layer having thickness as required.

2. Action Required:

Whenever thickness checks on uncompacted soil-cement indicate an excess or shortage of material, the lift shall be immediately bladed off or supplemented to establish the correct thickness before compaction. Whenever a compacted layer thickness or elevation exceeds the specified thickness by two inches, the Engineer shall be immediately notified and he will determine whatever corrective action is necessary.

(I) Preparation for Soil-Cement Placement:

The Contractor shall inspect foundations and construction joints in sufficient time prior to each soil-cement placement in order to certify that the area is ready to receive soil-cement. The results of inspections shall be reported in writing as a part of the quality control reports. The placing foreman shall supervise all placing operations and shall be responsible for measuring and recording concrete temperatures, ambient temperature, weather conditions, time of placement, yardage placed and method of placement. The placing foreman shall not permit placing to begin until he has verified that an adequate number of vibratory rollers and spreading equipment of the right size, in working order, and with competent operators are available.

(J) Construction Joints:

Vertical construction joints are to be provided at the end of each day's work or when work is halted for two hours or more. The joints shall be trimmed to a straight line and vertical to the full depth of the lift. Before resuming placement of new soil-cement, loose material shall be removed from the joint.

(K) Curing, Protection and Joint Surfaces:

1. Moist Curing:

At least once each shift around the clock, seven days per week, an inspection shall be made of all areas subject to moist curing and joint protection. The surface moisture condition shall be noted and recorded. If an isolated area has been allowed to dry, that area shall be considered as improperly cured. The Contractor shall immediately wet the surface and take positive steps to insure that the problem does not reoccur.

2. Protection:

At least once each shift, around the clock, seven days per week, an inspection shall be made of all areas subject to cold weather protection or protection against damage. Deficiencies shall be noted. During removal of cold weather protection, measurement of soil-cement and ambient temperature shall be made at least every three hours.

(L) Finishing:

After compaction, the soil-cement shall be further shaped, if necessary, to the required lines, grades, and cross sections, and rolled to a reasonably smooth surface.

(M) Backfill:

Backfill shall not be placed against the soil-cement until it has achieved its full design strength. Special care shall be taken when placing backfill against soil-cement.

(N) Reports:

Mixing plant control reports and all results (both passing and failing) of tests conducted at the site shall be delivered to the Engineer daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in the preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Engineer has the right to examine all Contractor quality control records.

221.11 - Acceptance Sampling and Testing

Rejection of soil-cement will occur due to improper temperatures, and/or density for the soil-cement mixture delivered to the site, placed and compacted.

(A) Sampling and Testing of Soil-Cement:

1. General:

Fresh soil-cement shall be sampled and tested for compliance with the Specification. Samples and tests will be made at the placing location at the time

of placement. The Contractor shall provide a method of readily obtaining representative soil-cement samples from the placement locations.

2. Temperature:

At least one test of temperature shall be made at the placement location on a randomly selected batch of each mix design of soil-cement used per shift of placement. Additional tests shall be made when rapid set time or workability loss is reported or when cold weather problems occur.

3. Moisture Content:

At least once during each four hours at the placement site (immediately after compaction), the moisture content shall be determined on the soil-cement mix using a nuclear gauge in the direct transmission mode. The probe shall be driven to a depth of at least 10 inches for each reading. The gauge shall be calibrated against oven-dry samples of each mix design used. If, after three days of production placement, consistent moisture control is achieved, the rate of testing may be decreased to one test per eight hours of placement.

In any case, at least three tests shall be made in different areas of each layer of soil-cement placed.

4. Density:

At least once every two hours during placement, but not less than once every 500 cubic yards of soil-cement, the density and moisture content of soil-cement after compaction shall be determined by the Engineer with a nuclear density gauge in accordance with AASHTO Designation T-238, previously calibrated against sand cone densities. Each lift of soil-cement shall be tested by the nuclear gauge in at least six separate locations for density. The direct transmission mode shall be used and readings shall be taken in each quadrant of a circle obtained by rotating the gauge 90° each after each reading around the transmission probe. The probe shall be inserted into pre-driven holes of diameter recommended by the manufacturer to a depth of at least 10 inches for each reading. The Engineer may check densities at any time to ensure compliance with the Specification and to require more compaction or removal.

5. Soil-Cement Compressive Strength:

The Engineer shall cast, transport, and cure specimens for compressive strength tests and test the specimen for compressive strength at time intervals as directed by the Engineer, but not less than one set of three cylinders per 500 cubic yards of soil-cement placed. The cylinders shall be prepared and tested in accordance with the requirements of Arizona Test Method 241a.

(B) Acceptance of Soil-Cement:

Acceptance and penalties for placed soil-cement which meets the above mixture requirements or is allowed to remain in place shall be determined by the results of the in-place density tests. Soil-cement represented by density tests, which do not meet the minimum density specified, may be allowed to remain in place at the discretion of the Engineer. No payment will be made for such soil-cement.

221.12 - Control Strips:

At the beginning of work on the soil-cement, the Contractor shall construct a soil-cement control strip. The control strip construction shall be used to demonstrate equipment and procedures necessary to attain the required densities for the specified course.

Each control strip, if constructed to acceptable density and surface tolerances, shall remain in place and become an integral part of the completed levee protection. Unacceptable control strips (i.e., those that fail to meet the specified requirements for density or surface tolerances) shall be replaced at the Contractor's expense. A control strip shall have an area of not less than 500 square yards and the compacted thickness specified for the construction of the course, which it represents.

Compaction equipment shall be capable of obtaining the specified compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units meeting the requirements of this section.

Rollers shall be the self-propelled drum drive vibratory type which will be capable of transmitting dynamic impact to the surface to be compacted through a steel drum by means of revolving weights, eccentric shafts, or other equivalent methods. The compactor shall have a gross weight of not less than 21,000 pounds and shall produce a dynamic force of at least 400 pounds per lineal inch of drum width at the operating frequency, which is used during construction. The roller shall have a vibrating frequency of at least 1,800 CPM (cycles per minute). The roller shall have a smooth drum or drums with a drum diameter between 4 and 5.5 feet and a width of between 5.5 and 8 feet. The engine driving the eccentric mass shall have a rating of not less than 125 horsepower. Heavier compacting equipment may be required to achieve the soil-cement density requirements.

The equipment used in the construction of the control strip shall be of the same type and weight to be used on the remainder of the course represented by the control strip.

The materials used in the construction of the control strip shall conform to the specification requirements. They shall be furnished from the same source and shall be of the same type used in the remainder of the course represented by the control strip. The underlying surface upon which a control strip is to be constructed shall have the prior approval of the Engineer.

221.14 - Measurement:

This work shall be measured in cubic yards of complete-in-place soil-cement between the limits shown by the specified lines, grades, and cross-sections shown on the Plans. The Contractor shall compute the volume of soil cement placed by the average end area method from the cross-sections required in Subsection 211.5 developed for the Fill Embankment and placing the neat line soil cement limits on the

cross-sections. Portland cement, used for soil-cement, shall be measured and paid in tons of cement incorporated into the soil-cement, as determined by tests.

221.15 - Payment:

This work shall be paid for at the Contract unit price per cubic yard for Soil-Cement Bank Protection as set forth in the Bid Schedule under Item 221-1. Such payment shall constitute full reimbursement for performing all work and for furnishing all equipment, labor, and materials necessary to complete the soil-cement bank protection, connection to existing levee, dewatering, trench excavation and toe backfill, watering, mixing, placing, compacting, curing, inspection, and testing assistance and all other incidental operations.

Cement furnished will be paid for at the Contract unit price per ton under Item 221-2 of the Bid Schedule. The cement quantity to be paid will be measured using the percentages, weights and dry-density called for in the corresponding mix design. Payment for cement is based on 100% compaction of the soil cement, the required cement content, and the neat line soil cement limits as measured above. Any waste of cement and/or soil cement by the Contractor during the handling, mixing, placing, etc., operations shall not be paid for. Unbalancing of unit price bid or any material bid below market cost shall be the basis for rejection of the bid.

ITEM 221-1 – SOIL-CEMENT BANK PROTECTION

ITEM 221-2 – CEMENT FOR SOIL-CEMENT

SECTION 225 - WATERING

In addition to the requirements of the MAG Standard Specifications:

225.1 - Description:

Replace Section 225.1 of the MAG Standard Specifications with the following:

The work under this section shall consist of furnishing and applying all water required for the control of dust, for the safety and convenience of the traveling public, and for the reduction of the dust nuisance to adjacent property.

The Contractor shall obtain the necessary permits required under the County Air Pollution Statutes. It shall be the responsibility of the Contractor to keep the construction site moistened to prevent pollution of air, water and adjacent property.

225.3 - Construction Equipment:

The use of pressure pumps and spray bars on all sprinkling equipment used for the application of water will be required. The use of gravity flow spray bars and splash plates will not be permitted.

225.5 - Payment:

There is no pay item for watering.

SECTION 310 - AGGREGATE BASE COURSE

Replace Section 310 of the MAG Standard Specifications with the following:

310.1 - Description:

Aggregate Base Course, also referred to as ABC or AB, shall be placed in a 4-inch layer for the maintenance roads and turn around areas, where shown on the design plans.

310.2 - Materials:

Materials for use as ABC shall be in accordance with Section 702 - Base Materials of the MAG Standard Specifications.

310.3 - Placement:

The ABC may be placed and compacted in a single layer. After distributing, the base material shall first be watered and then immediately bladed to a uniform layer that will net, after rolling, the required thickness. If the materials deposited are not uniformly blended together, the blading operation shall be continued to such extent as may be necessary to eliminate segregation. The quantity of water applied shall be that amount which will assure proper compaction resulting in a relative density of not less than 100 percent as determined under Section 301 of the MAG Standard Specifications. Care shall be exercised in connection with watering operations to avoid wetting the subgrade or any lower base course to detrimental extent.

Upon completion, the base surface shall be true, even and uniform conforming to the grade and cross-section shown on the design plans.

ABC may vary not more than ½ inch above or below required grade and cross-section.

310.4 - Measurement:

Quantities of ABC shown on the design plans are measured by the square yards, based upon the actual dimensions shown. No allowance is made for waste beyond those limits.

310.5 - Payment:

Payment shall be by the square yard in place, to the dimensions shown on the design plans for Item 310 of the Bid Schedule. Such payment shall be compensation in full for materials, transportation, miscellaneous earthwork, labor, equipment, placement, watering, and roller compaction.

ITEM 310 – AGGREGATE BASE COURSE

SECTION 350 - REMOVAL OF EXISTING IMPROVEMENTS

In addition to the requirements of the MAG Standard Specifications:

350.1 - Description:

This work shall consist of removal of existing fence, buildings, asphalt road paving, concrete pads, irrigation structures, canal and ditch lining, culverts, manholes, headwalls, sand piles, gravel piles, rock piles, and other miscellaneous items from within the limits of the work. Holes, cavities and trenches resulting from the removal of structures shall be backfilled in accordance with Section 206 and 211.

350.2 - Construction Method:

All materials, unless designated on the plans or by the Engineer as to be salvaged, reused, or relocated shall become the property of the Contractor and shall be immediately removed from the job site.

350.3 - Miscellaneous Removal and Other Work:

In addition to subsection 350.3 of the MAG Standard Specifications, the work shall include but not be limited to:

- Removal of existing fence
- Removal of gabion wire baskets
- Remove and salvage existing gabion rock
- Remove and salvage existing riprap
- Remove grouted riprap
- Remove irrigation ditch lining
- Remove irrigation ditch junctions

350.4 - Payment:

Payment for removal of all existing improvements will be made at the lump sum price for Item 350 of the Bid Schedule. This lump sum price shall be full compensation for the item complete, as described herein or on the plans.

ITEM 350 – REMOVAL OF EXISTING IMPROVEMENTS

SECTION 360 - TELECOMMUNICATIONS INSTALLATION

In addition to the requirements of the MAG Standard Specifications:

360.1 Description is revised to add:

360.1.1 - Fiber Optic Communications Ducts:

(A) Scope:

1. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install fiber optic communications duct and fittings to form a complete and coordinated system.

2. The fiber optic communication conduit ducts shall be installed at the locations shown on the Drawings, or as specified. The communications conduit duct shall provide interconnection between the pull boxes.
3. The fiber optic communication conduit ducts shall be a manufactured product consisting of eight 1-1/4-inch PVC conduits bundled together with high impact spacers and designed specifically for this application.

360.1.2 - Fiber Optic Communication Pull Boxes:

(A) Scope:

1. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install fiber optic communications pull boxes.

360.3 Cable Installation is revised to add:

360.3.1 - Fiber Optic Communications Ducts:

(A) Quality Assurance:

Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:

1. UL Standard No. 651, Schedule 40 and 80 PVC Conduit.
2. NEMA TC2, Electrical Plastic Tubing, Conduit and Fittings.
3. NEMA TC3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.

(B) Submittals:

Shop Drawings: Submit for approval the following:

1. Manufacturer's catalog cuts and technical information for the conduit, fittings and supports proposed for use.
2. Installation instructions.
3. Test results.

(C) PVC Ducts:

1. All PVC conduit furnished by the CONTRACTOR shall be UL-listed, and meet NEMA and NEC requirements.
2. All conduit shall be Schedule 40 PVC and meet the requirements of NEMA Standard TC-2, UL 651 and the NEC.
3. The 1-1/4 inch I.D. conduit ducts shall be installed with holder/spacers which group the conduits into bundles of eight. Spacers shall be molded from high impact plastics and shall accommodate handling and installation forces and stresses. Each duct shall be allowed to float when secured by spacers to support field flexibility.
4. Construction of the conduit ducts shall include a coupling, or approved equivalent seal to protect the inner conduit ducts against water intrusion at water heads of up to

20 feet. The seal shall also provide pressure-sealing integrity of up to 15 psi to support "blowing" of fiber optic cable. Protection for conduit ducts collapsing from pressurization shall be included in the construction.

5. All materials utilized for the construction of the conduit ducts shall meet the requirements listed below:

- a) Be compatible with direct burial requirement.
- b) Not compromise dielectric fiber optic cables (not contain electrically conductive material).
- c) Be compatible with fiber optics cable materials and construction in accordance with Bellcore TR-NWT-000020 and REA PE-90.
- d) Be compatible with wireline cable construction in accordance with REA PE-39.
- e) Accommodate termination with pull boxes or vaults with terminating and sealing collars and sealing plugs.
- f) Be available in standard bend radius common within the conduit industry from 4 to 9 feet in selected sectional lengths and with materials that are designed to minimize the coefficient of friction and associated conduit rope burn-through.
- g) Be compliant with the intent of Bellcore TR-NWT-000356 for innerduct materials and construction supporting fiber optics cable installation.
- h) Comply with the requirements of NEMA TC-2 requirements for communications conduit as applicable to EPC-40 and Schedule 40 PVC.
- i) Comply with ASTM temperature versus flexural load over a temperature range in accordance with NEMA TC-2 for EPC-40 conduit.

6. Each conduit shall have the following characteristics listed below:

- a) Inner diameter 1.25-inch nominal.
- b) Good environmental stress crack resistance (in excess of 21,000 hours at 70 F, no failures).
- c) Good cold impact resistance, -50 F not brittle until -148 F.
- d) Minimum tensile strength of 600 lbs. for finished product in accordance with ASTM D-638.
- e) Minimum crush strength of 650 lbs.
- f) Low coefficient of friction (0.18 for straight runs and 0.12 for bend radius sections).
- g) Ends shall be smoothed to prevent scraping of the fiber optic cable.
- h) Prelubricated with a manufacturer recommended lubricant factory applied to the interior of the conduit duct material to reduce pulling friction. The lubricant may be an integral part of the conduit duct material or an applied coating. A means of applying lubricants to the conduit ducts to support pulling shall be provided to prevent damage to the fiber optic cables and to minimize the probability of burn-through from the pulling rope.

7. The conduit ducts shall be manufactured with holders/spacers which group the conduits into bundles of eight. Spacers shall be molded from high impact plastics and shall accommodate handling and installation forces and stresses. Each conduit shall be allowed to float when secured by spacers to support field flexibility.

8. Product and Manufacture: Provide one of the following:
 - a) Carlon Telecom Systems.
 - b) Or equal.

(D) Joining Methods:

1. Joints shall be water tight and withstand a minimum 100 lbs. of pullout tension. Tensile strength shall comply with ASTM D-638 test methods.
2. The coupling shall be factory assembled in the bell end of the outer conduit, and shall be supplied with lead-ins to facilitate assembly. The couplings shall be designed and factory certified to handle normal expansion and contraction. The coupling shall have a minimum of two (2) seals per side of coupling body.
3. Each complete conduit system shall be identically keyed to provide for proper alignment of the inner duct. The spigot end of the conduit section shall have circumferential ring to provide a reference point for proper alignment during connection.
4. Factory Bends: Factory bends shall be available at nominal radii of 4, 6, and 9 feet. Bend angles of 11.25, 22.5, 45, and 90 degrees shall be available in length of 2 feet 7-inches to 15 feet 11-inches as appropriate for angle and bend radius. In no case shall conduit bend radius exceed that acceptable for fiber optic cable and shall not be less than 3 feet. Complete rigid factory bend sections shall be manufactured with bell and spigot ends.
5. Termination Kits: Termination kits shall be furnished by the conduit manufacturer to connect the conduits to the vaults. The terminations shall provide for a watertight seat between the conduits and the structure wall.
6. Expansion Fittings: Expansion fitting shall be installed in conduit runs between pull boxes. Expansion fittings shall allow for thermal expansion up to 8-inches.
7. Permanent Markings on Conduit: The top and bottom of the conduits shall include high contrast lettering repeated every three feet identifying the conduit as "City of Glendale Communications". The lettering shall be a minimum of ½-inch in height. The conduit shall be marked a minimum of every three feet with the manufacturer's name, part number of the product, and the date of manufacturer. The size of this lettering shall be at the discretion of the manufacturer but shall be readable by a technician at a distance of 3.5 feet in normal lighting conditions. Markings shall be permanent and shall not deteriorate with exposure to moisture and soil borne chemicals which the conduit has been designed to protect against.
8. Pull Ropes: All conduit ducts installed shall be installed with a braided pull rope that is specifically manufactured for the purpose of pulling fiber optic cables into conduit ducts.

9. **Warning Tape:** All conduit ducts installed shall be installed with conduit warning tape that shall be a 4 mil inert plastic film specifically formulated for prolonged use underground. All tape shall be highly resistant to alkalis, acids, and other destructive agents found in the soil. The tape shall have a continuous printed message warning of the location of underground conduits. The message shall be in permanent ink specifically formulated for prolonged underground use and shall carry a warning message that fiber optic cables are buried below in black letters on an orange background.
10. **Locator Wires:** All conduit ducts installed shall be installed with a locator wire that shall be a minimum AWG No. 12 stranded insulated single conductor.

(E) Execution:

1. Conduit shall be placed in accordance with the lines, grades, details and dimensions shown on the Drawings, or as otherwise approved by the ENGINEER. Unless otherwise shown on the Drawings underground conduit shall be installed a minimum of 18-inches deep. Installation of conduit shall be in accordance with the requirements of the NEC.
2. Conduit runs shown on the Drawings shall be changed to avoid underground obstructions as approved by the ENGINEER. A nominal spacing of 600 feet shall be maintained between communication pullboxes.
3. The total sum of bend radii for either conduit duct between consecutive communication pullboxes or vaults shall not exceed 360 degrees.

(F) Installation:

1. **Terminations:** All conduit ends shall be reamed to remove burrs and sharp edges. Where conduit is threaded in the field, a standard conduit cutting die with a 3/4-inch taper per foot shall be used.
2. All PVC conduit terminations shall be fitted with bushings or bell ends. All metal conduit terminations shall be fitted with a grounding type bushing except that conduit used for duct cable casing that does not terminate in a ground box, is not exposed at any point, and conduit terminating in threaded bossed fittings need not have a bushing.
3. Installation of the conduit shall be in accordance with the requirements of the NEC and in accordance with the manufacturer's instructions.
4. Conduit shall be adequately supported or tied down prior to backfill to prevent movement of the conduit.
5. All conduit runs shall be installed complete with Warning Tape and Locator Wire as specified.

(G) Testing:

Prior to final acceptance, a spherical template having a diameter of not less than 75 percent of the inside diameter of the conduit shall be drawn or blown through the conduit to be sure the conduit is free of obstructions. The ends of all conduits shall be fitted with watertight caps.

360.3.2 - Fiber Optic Communication Pull Boxes:

(A) Quality Assurance:

Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:

1. NEC Article 370, Outlet, Switch and Junction Boxes, and Fittings.
2. UL Standard No. 50, Electrical Cabinets and Boxes.
3. UL Standard No. 886, Electrical Outlet Boxes and Fittings for Use in Hazardous Locations.

(B) Submittals:

Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for fiber optic communications pull boxes proposed for use.

(C) Precast Concrete Box:

The communication pull box shall be capable of supporting the following functions:

1. Provide storage of cable service loops within minimum bend radius limits of 10-inches.
2. Provide storage of breakout and fiber optic splice closures.
3. Provide attachment bracket kit for splice closure mounting on box side.
4. Provide access to cable and equipment after installation to support maintenance
5. Accommodate a degree of security of cable and equipment from vandalism and theft by requiring an access tool.
6. Provide modular addition of conduits through knockouts or other means form four sides.
7. Provide protection of cable and devices from run-over by vehicles and non-deliberate, heavy vehicles, without damage to the communication pull box or enclosed cables and devices.
8. Support National Electrical Code requirements for grounding of shielded or metallic strength member cables as deemed necessary by the communications installation design.
9. Support water drainage for any invasive water.
10. Nominal dimensions shall be 36-inches by 24-inches by 36-inches.
11. Each box shall be provided with recesses for a hanger suitable for mounting a fiber optic splice closure.
12. All ferrous metal parts shall be galvanized.
13. Product and Manufacturer: Provide one of the following:
 - a) Quazite "PG" style service boxes with heavy-duty cover.

b) Or equal.

(D) Precast Concrete Box Covers:

1. Precast Concrete Box Covers: Covers shall be secured with 3/8-inch bolts, cap screws, or studs and nuts which shall be of stainless steel or other non-corroding metal material. Stainless steel hold down bolts, cap screws or studs, and nuts and washers shall have a chromium content of not less than 18 percent and a nickel content of not less than 8 percent.
2. Covers for pull boxes shall be marked with "COMMUNICATIONS". Marking shall be clearly defined and uniform in depth and may be placed parallel to either the long or short sides of the cover. Markings letter shall be between 3-inches high.

(E) Installation:

1. Pull boxes shall be installed at the locations shown on the Drawings. CONTRACTOR may, upon ENGINEER's approval and at the CONTRACTOR's expense, install additional pull boxes to facilitate the Work.
2. The bottoms of pull boxes shall be bedded in crushed rock and shall be grouted prior to the installation of conduits.

(F) General Construction:

1. The communication pull box shall be constructed for in ground installation, using light weight, high strength materials. The enclosure shall be non-conductive and shall contain a lid which:
 - a) Includes locking devices which are non-corrosive and requires removal using a special access tool/key.
 - b) Includes provisions for lifting and removal using a maintenance tool.
2. The communication pull box shall nominally be 36-inches long by 24-inches wide by 36-inches deep. Extensions may be used to obtain the required depth. Knockouts shall accommodate conduit terminations. Four (4) conduit knockouts shall be provided on each wide dimension of the communication pull box. On the shorter dimension side of the communication pull box, three (3) knockouts shall be provided for conduit penetrations.
3. Each communication pull box shall be designed with sidewall mounting provisions on the longest width for a splice closure which complies with Bellcore TA-NWT-000771. Each communication pull box splice closure mounting kit shall include brackets allowing attachment of a cylindrical splice closure utilizing nylon ties. Attachment provision for the splice closure mounting bracket shall be included in the construction of the communication pull box sidewall. Mounting provisions shall include preformed holes for screw seat inserts with inserts part of the mounting kit or screw seats molded into the sidewall. Alternate mounting provisions may be utilized if they are prefabricated and support ease of bracket installation. Bracket mounting

kit shall be designed to accommodate tolerances of the screw seat locations on the sidewall. The splice closure brackets shall support a minimum load weight of 18 lbs.

4. Each communication pull box shall be configured with mounting kits for closures and wall penetrator/conduit terminators as required for the Project's conduit runs. Each communication pull box shall contain knockouts compatible with the numbers and conduit sized required by the Drawings. CONTRACTOR shall:
 - a) Knockout conduit penetration ports on the communication pull box and condition the port to protect the conduit in accordance with the manufacturer's recommendations.
 - b) Adjust conduit length to penetrate the installed communication pull box.
 - c) Place the securing collars or other mounting and sealing provisions on the conduit to secure it to the communication pull box.
 - d) Reseal conduit.
5. Each communication pull box shall be provided with lid installation and removal tool kits.

(G) Tools and Kits:

Each communication pull box shall be supplied with lid installation and removal tool sets and fiber cable bend radius protection pulling attachments. Communication pull box tool sets shall be provided as a contract deliverable. Tools provided shall be of professional quality and shall be designed to support communication pull box servicing over life expectancy stated in this specification.

(H) Conduit to Communication Pull Box Interconnect:

The primary conduit shall utilize a collar to allow the conduit to be removed from the communication pull box should damage occur to the communication pull box requiring communication pull box replacement. The collar shall comply with main conduit specifications. The collar shall be compatible with the multiduct sealing requirements.

360.5 Payment is revised to add:

Payment for the fiber optic conduit will be made at the unit price bid per lineal foot and shall be compensation in full for the complete installation of duct including labor, materials, equipment, excavation and backfill, and all incidentals necessary to complete the installation.

Payment for the fiber optic pull boxes will be made at the unit price bid each and shall be compensation in full for the complete installation including all labor, material, equipment, excavation and backfill, and all incidentals necessary to complete the installation.

ITEM 360-1 – FIBER OPTIC CONDUIT
ITEM 360-2 – FIBER OPTIC PULL BOXES

SECTION 401 - TRAFFIC CONTROL

In addition to the requirements of the MAG Standard Specifications:

401.1 - Description:

Traffic control may be necessary during construction of the maintenance vehicle access at Camelback Road and when construction equipment crosses existing surface streets.

401.2 - Traffic Control Devices:

The number and kind of barricades, signs, delineators, barriers, and all other traffic control devices and the approval of the Contractor's method of application of all traffic control measures, shall not relieve the Contractor of the responsibility of protecting the work, the workers, and the traveling public.

401.4 - Traffic Control Measures:

At the time of the pre-construction conference, the Contractor shall submit for review and approval a traffic control plan. The plan shall show all measures, including types of signs, barricades, and sand berms with their placement and spacing. All advance warning signs shall be mounted on steel channels driven into the ground. Locations of all signs shall be coordinated with the Maricopa County Highway Department, Traffic Engineering Division before placement (contact Mr. Greg Holverson, Senior Inspector - 506-8744).

The Contractor shall provide and maintain all necessary signs, barricades, and centerline vertical panels for five working days beyond any construction which prevents traffic from using the roadway, or acceptance of the project by the District, whichever is greater.

401.6 - Measurement:

In addition to providing temporary traffic control, work shall consist of providing; erecting, paint striping, and maintaining before final acceptance all traffic control devices.

401.7 - Payment:

The traffic control both temporary and permanent will be paid for at the lump sum price for the type and size specified on the design plans and under Item 401 in the Bid Schedule.

This shall be considered full compensation for performing all work and for furnishing all labor, equipment, and materials required to erect, install, maintain, and remove traffic control devices.

ITEM 401 – TRAFFIC CONTROL

SECTION 420 - CHAIN LINK FENCE

In addition to the requirements of the MAG Standard Specifications:

420.1 – Description:

This work shall consist of the removal and replacement of any damaged chain link fence as the result of construction adjacent to the Glendale Airport perimeter fence within the project limits to the satisfaction of the Engineer.

420.4 – Measurement:

No direct measurement will be made for the removal and replacement of any damaged chain link fence as the result of any work adjacent to the Glendale Airport perimeter fence.

420.5 – Payment:

No direct payment will be made for the removal and replacement of any damaged chain link fence as the result of construction adjacent to the Glendale Airport perimeter fence. Such costs are incidental to the soil-cement and engineered fill construction items.

SECTION 421 - SMOOTH WIRE FENCE

In addition to the requirements of the MAG Standard Specifications:

421.1 - Description:

The work under this section shall consist of furnishing all materials and constructing wire fence at the location and in accordance with the details shown on the plans. Fences shall be of the types and sizes shown on the plans and shall be constructed in accordance with the requirements of these specifications.

421.2 - Materials:

Fencing wire shall be 12-1/2 gauge steel wire and shall be either zinc coated or aluminum coated. Zinc coated steel wire shall conform to the requirements of ASTM A 121 Class 1 coating. Aluminum coated steel wire shall conform to the requirement of ASTM A 585, Type 1, Class 1 coating.

Posts, rails, braces and caps for gates shall conform to Section 772.2, Type A.

Line posts shall conform to the requirements of ASTM A 702. Lengths of posts shall be as shown on the plans. Packaging of posts will not be required. The type of post furnished, tee, channel or U or Y type shall be the same on any one project.

End, corner and pull posts and braces shall conform to the requirements of ASTM A 702, for uprights and braces.

Posts and braces shall be painted green.

Portland cement concrete shall conform to the requirements of Section 725.

421.3 - Construction:

The Contractor shall clear the fence lines of all earth, trees, brush and other obstructions which interfere with the proper construction of fences, unless the Engineer orders certain trees to remain in place. Disposal of removed material shall be in accordance with the requirements of Section 201.

Fence shall be constructed along and up to twelve inches (12") within the project right of way as shown on the plans.

Fence posts shall be spaced at the intervals and set to depths shown on the plans.

In the determining the post spacing measurements shall be made parallel to the ground slope, and all posts shall be placed in a vertical position, except in unusual locations where the Engineer may direct that the posts be set perpendicular to the ground surface.

Line posts may be driven into undisturbed earth provided driving does not injure the posts. All voids around the post shall be backfilled and the material thoroughly tamped.

End, corner, pull, latch and gate posts and braces shall be set in concrete footings and crowned at the top to shed water.

Any high points, which interfere with the placing of fence wire, shall be excavated to provide the clearance.

After post assemblies have been placed, the wire shall be pulled taut to the satisfaction of the Engineer and each longitudinal wire shall be cut and securely fasten to the brace post with devices suited for the purpose. Wire shall not be carried past a post assembly, but shall be cut and fastened to the post independently of the adjacent spans. A maximum of two splices on wire will be permitted between post assemblies, but not on the same wire. No splice shall be placed closer than 100 feet to any post assembly

After the tensioning of the wire between the post assemblies, all longitudinal wires shall be attached to each intervening line post at the height and spacing as shown on the plans. The distance from the bottom wire to the ground may vary at any one point from that shown on the plans four inches plus or minus. Where abrupt changes occur in the fence line grade, intermediate line posts may be required to maintain proper distances between the bottom wire and the ground.

Spacing of the twisted vertical wire stays shall be as shown on the plans for each type of fence. The vertical wire stays shall be woven into every horizontal wire.

At all grade depressions where stresses tend to pull the posts from the ground, the affected fence posts shall be anchored in concrete. The volume of concrete required to anchor the posts shall be not less than one cubic foot.

421.4 - Measurement:

Wire fence shall be measured on the fence line along the top of the completed fence from center of end posts.

421.5 - Payment:

Payment shall be made at the contract price bid per linear foot for smooth wire fence, and shall be fully compensated for furnishing and installing the wire fence as specified, including removal of obstructions and all incidental costs not specifically covered in other items.

ITEM 421 – SMOOTH WIRE FENCE

SECTION 422 - TEMPORARY FENCING

In addition to the requirements of the MAG Standard Specifications:

422.1 - General

The Contractor shall furnish and install 72-inch temporary chain link fencing, or approved equal, to the satisfaction of the Engineer, and as necessary adjacent to the Glendale Airport perimeter fence within the project construction limits. The temporary fencing shall maintain perimeter security for the Airport after normal working hours to prevent unauthorized access and wildlife from entering the active runways/taxiways. New permanent fence is to be installed as soon as practicable thereby eliminating the need for temporary fence.

422.3 - Measurement and Payment

No direct payment will be made for furnishing or installing temporary fencing. Such costs are incidental to the soil-cement and engineered fill construction items.

SECTION 430 - LANDSCAPING AND PLANTING

Amend Section 430 of the Standard Specifications with the following:

430.2 - General:

Delete Paragraphs 3, 4 and 5.

430.3 - Lawn Areas:

Replace in total with the following:

430.3 - Vegetative Areas:

430.3.1 - Seeded Area

The seeded area shall consist of the vegetative slope stabilization area, the 3:1 backslope of the levees, engineered fill embankment for the runway extension at the Glendale Airport, exposed earthen surfaces on the Glendale Airport Outlet Channel, dike, detention basin, and New River Channel Excavation as shown on the project plans.

Seeding Window: All seeded areas shall be seeded within 4 weeks after the completion of construction. Only if delays are due to events outside the control of the Contractor, seeding shall be conducted from February 15 through March 31.

For the vegetative slope stabilization area, the seed fertilizer and mulch shall be mixed in the required amount of water to provide a homogeneous slurry and then uniformly applied under pressure at the following rates per acre:

Seed - as specified in seed mix
Wood Fiber Mulch - 500 pounds/acre
Fertilizer - 160804 Commercial Fertilizer - 200 pounds/acre

The seed shall not remain in the hydroseeder for longer than one (1) hour.

Straw Mulch: Straw shall be applied over the seed, fertilizer and mulch. The rate of application shall be 1.75 tons per acre. The straw shall be applied by commercial mulch blowing equipment.

Wood Fiber Mulch: Following the hydroseeding operation, Psyllium mucilloid organic tackifier, and wood fiber mulch shall be mixed in the required amount of water to produce a homogeneous slurry and the hydromulch is placed under pressure at the following rates per acre (dry weight):

Wood Fiber Mulch - 1500 lbs.
Psyllium tackifier - 130 lbs.

430.10 - Measurement and Payment:

Vegetative slope stabilization area will be paid for at the contract unit price per acre for Item 430 as listed in the Bid Schedule. The price shall be full compensation for the work, including furnishing all labor, water, materials, tools, equipment and incidentals to install and maintain the material as shown on the plans or as directed by the District Ecologist, from start of construction through the maintenance period.

ITEM 430 – SEEDING

SECTION 520 - STEEL AND ALUMINUM HANDRAILS

In addition to the requirements of the MAG Standard Specifications:

520.1 - Description:

Safety Railings and Fence Gates shall be made of galvanized Schedule 40 steel pipe conforming to ASTM A 53, galvanized in accordance with Section 771 of the MAG Standard Specifications.

Pipe Post for Safety Rails shall be of galvanized Schedule 40 steel pipe of nominal 2½-inch diameter (2-7/8-inch OD) conforming to ASTM A 53; with a nominal weight of 4.64 lb/ft. Construction shall be continuous along the top of the soil-cement embankment.

Pipe rail for safety rails shall be of galvanized Schedule 40 steel pipe of nominal 1-1/2-inch diameter conforming to ASTM A53. Construction shall be continuous along the top of the soil cement

embankment. Rails shall be provided in 32-foot length or manufacturer's largest lengths (minimum of 24-foot lengths). Contractor shall provide end caps on all pipe ends. Endcaps to be clamped to pipe and secured with hex head bolt.

Fence Gate frames shall be of galvanized Schedule 40 steel pipe of nominal 1-7/8-inch diameter conforming to ASTM A 53; with a nominal weight of 2.28 lbs/ft. Gate post shall be of galvanized Schedule 80 steel pipe of nominal 3-inch size conforming to ASTM A 53.

Equestrian Gate frames shall be high strength steel pipe (HSSP) per MAG Standard specification 772.2, Type C of 2-inch nominal diameter (2-3/8-inch OD); with a nominal weight of 3.12 lbs/ft. Endcaps shall be clamped to the pipe and secured with a hex head bolt.

520.2 - Fabrication:

Jointing for Safety Railings shall be by one of the following:

1. Flush-type rail fittings, welded and ground smooth with railing splice locks secured with 3/8-inch hexagonal-recessed-head setscrews.
2. Mitered and welded joints made by fitting post to top rail and intermediate rail to post, mitering corners groove welding joints, grinding smooth, and coated to prevent rusting. Railing splices shall be butted and reinforced by tight-fitting exterior sleeve not less than 6 inches long.

Joints for the Fence and Equestrian Gate shall be mitered, grooved and welds ground smooth. Tension lines shall be 7-gauge (0.177-inch diameter) coil spring steel with a minimum tensile strength of 75,000 pounds per square inch, and shall be zinc-coated or aluminum coated.

Surfaces of galvanized metals that are abraded or cut during construction and surfaces, which are welded, shall be covered with Grade 50B solder conforming to the requirements of ASTM B32.

520.3 - Erection:

Installation shall be by grouting pipe post or gate post into drilled holes in the soil cement or embankment by placement in a concrete footing to the dimensions shown on the design plans. Concrete mixture for grouting pipe post into soil cement embankment shall be Class C per Section 725 of the Standard Specifications.

520.4 - Measurement:

Measurement of safety rails will be by the number of linear feet measured horizontally along its entire length as designated on the plans. Measurement of fence gates and equestrian gates will be by each as designated on the plans.

520.5 - Payment:

Payment shall be made at the contract price bid per linear foot for safety railing, which shall be full compensation for furnishing and installing the safety railing as specified. Payment for fence gates and equestrian gates will be made at the contract unit price bid per gate. Such payments shall be

compensation in full, inclusive of all fabrication, gate posts, end posts, intermediate posts, cross-bars, hinges, braces, joints, dense rubber cover, locking chain, galvanizing, and field touch-up.

ITEM 520-1 – SAFETY RAIL

ITEM 520-2 – FENCE GATE

ITEM 520-3 – EQUESTRIAN GATE

SECTION 525 - PNEUMATICALLY PLACED MORTAR (GUNITE)

525.1 - Description: replace in total with the following:

The fine and coarse aggregate for the wet process shall use gradation no. 2.

520.12 - Measurement: replace in total with the following:

Measurement of pneumatically placed mortar will be by the square yard.

525.13 – Payment: replace in total with the following:

Payment for pneumatically placed mortar will be made at the unit price per square yard completed and accepted. The payment shall be full compensation for furnishing all labor, tools and equipment and accomplishing all work in conformity with the plans and specifications.

ITEM 525 – PNEUMATICALLY PLACE MORTAR (GUNITE)

SECTION 610 - WATER LINE CONSTRUCTION

In addition to the requirements of the MAG Standard Specifications:

610.18 - Measurement and Payment is modified to add:

No separate measurement or direct payment will be made for the potable water line gate valves. The cost of the complete installation of gate valves, vaults, valve boxes and covers, including all labor, materials, equipment, and all incidentals necessary to complete the installation, is to be included in the cost bid for the 12" potable water line.

ITEM 610 – 12" POTABLE WATER LINE

SECTION 615 - SEWER LINE CONSTRUCTION

In addition to the requirements of the MAG Standard Specifications:

615.1 Description: is modified to add:

Install the raw sewage forcemains and waste activated sludge forcemain as indicated on the project plans.

615.13 Measurement and Payment is modified to add:

Payment for the 24" raw sewage forcemain and the 8" waste activated sludge forcemain will be made at the unit price bid per lineal foot and shall be compensation in full for the complete installation of piping including labor, material, equipment, excavation and backfill, plugs, testing, and all incidentals necessary to complete the installation.

ITEM 615-1 – 24" RAW SEWAGE FORCEMAIN
ITEM 615-2 – 8" WASTE ACTIVATED SLUDGE FORCEMAIN

SECTION 616 - RECLAIMED WATER LINE CONSTRUCTION

In addition to the requirements of the MAG Standard Specifications:

616.7 – Measurement and Payment is modified to add:

Payment for the 12" and 24" reclaimed water lines will be made at the unit price bid per lineal foot and shall be compensation in full for the complete installation of piping including all valves, plugs, labor, materials, equipment, excavation and backfill, and all incidentals necessary to complete the installation.

ITEM 616-1 – 12" RECLAIMED WATER LINE
ITEM 616-2 – 24" RECLAIMED WATER LINE

SECTION 618 - STORM DRAIN CONSTRUCTION

In addition to the requirements of the MAG Standard Specifications:

618.1 – Description

Install 8" storm drain pipe as indicated on the project plans.

618.2 - Materials

The 8" storm drain shall be constructed of ductile iron pipe as indicated on the project plans.

618.5 – Measurement and Payment

Payment will be made at the unit price bid per lineal foot and shall be compensation in full for the complete installation of piping including labor, materials, equipment, excavation and backfill, plugs, testing, and all incidentals necessary to complete the installation.

ITEM 618-1 – 36" STORM DRAIN PIPE RGRCP Class III
ITEM 618-2 – 18" STORM DRAIN PIPE RCP Class V
ITEM 618-3 – 8" STORM DRAIN PIPE DIP

SECTION 619 - FLAP GATES

In addition to the requirements of the MAG Standard Specifications:

619.1 – Description:

The work under this item shall consist of furnishing flap gates and all labor, equipment and materials necessary for installing the flap gates at the locations shown on the plans. This work shall also include the removal and installation of the existing flap gate at the Glendale Airport 36-inch outfall pipe.

Contractor shall submit shop drawings for all new components in accordance with Section 105.2 of the MAG Standard Specifications.

619.2 – Materials:

The new flap gates shall Waterman F-25 or approved equals with a minimum 3-degree seating angle and cast iron seat.

619.3 – Measurement:

Flap gates will be measured as a unit for each installation.

619.4 – Payment:

Flap gates will be paid for at the contract unit price under Items 619-1 and 619-2, complete and in-place, including the gate and installation. The payment shall be full compensation for furnishing all labor, tools and equipment and accomplishing all work in conformity with the plans and specifications.

ITEM 619-1 – 36" FLAPGATE

ITEM 619-2 – 36" FLAPGATE (REMOVE AND RELOCATE EXISTING)

SECTION 630 - TAPPING SLEEVES, VALVE, AND VALVE BOXES ON WATER LINES

630.6 – Air Release and Vacuum Valves is modified to add:

- (C) Air release on the 24" reclaimed water line shall be controlled by the use of a 4" combination air valve Model 149C.5 by Apco or equal.
- (D) Air release on the 24" raw sewage forcemains shall be controlled by the use of a 4" sewage combination air valve with a small orifice diameter of 7/32", Model 449WA.1 by Apco or equal. Sewage combination air valves shall include backflushing attachments which includes a 5' minimum rubber hose with quick disconnect coupling on each end, a shut off valve and a blow off valve.

Combination air valves shall incorporate an isolation valve to allow removal of the valve without shutting down the equipment. Protective hoods shall be provided to prevent debris and foreign matter from entering the valves.

630.8 Measurement and Payment

Measurement and payment will be made at the unit price bid each and shall be compensation in full for the installation of the air release valves, manholes, all appurtenances, labor, materials, equipment, and all incidentals necessary to complete the installation.

ITEM 630 – AIR RELEASE VALVES AND MANHOLES

SECTION 750 - IRON WATER PIPE AND FITTINGS

750.2 – Ductile Iron Water Pipe: is modified to add:

- a. 8-inch Storm Drain – Storm drain shall be pressure class 350 ductile iron pipe. Lining shall be a bituminous seal coated cement mortar lining in accordance with AWWA C104.
- b. 8-inch WAS Pipe – WAS pipeline shall be pressure class 350 ductile iron pipe. Pipe and fittings shall be lined with 40 mils nominal dry film thickness of Protecto 401 Ceramic Epoxy or equal.
- c. 12-inch Water Line – Water line shall be pressure class 350 ductile iron pipe. Lining shall be a bituminous seal coated cement mortar lining in accordance with AWWA C104.
- d. 12-inch Reclaimed Water Line – The reclaimed water line shall be pressure class 350 ductile iron pipe with a bituminous seal coated cement mortar lining in accordance with AWWA C104.
- e. 24-inch Reclaimed Water Line – Provide pressure class 350 ductile iron pipe with a bituminous seal coated cement mortar lining in accordance with AWWA C104.
- f. 24-inch Raw Sewage Force Main – Provide pressure class 350 ductile iron pipe. Pipe and fittings shall be lined with 40 mils nominal dry film thickness of Protecto 401 Ceramic Epoxy or equal.
- g. All buried ductile iron pipe and fittings shall be bituminous coated on the exterior in accordance with ANSI/AWWA C151/A21.51 standards and encased in a polyethylene sleeve for protection against corrosive soils. The polyethylene sleeve for protective wrap shall conform to the requirements of ANSI/ASM D1248 and be as manufactured by American Cast Iron Pipe Company or equal. Prior to installation, damaged exterior coatings of ductile iron pipe and fitting shall be repaired with a coat of Rockote Black Mastic No. 612 Medium, or approved equal.

SECTION 795 - LANDSCAPE MATERIAL

The Standard MAG Specifications is hereby modified as follows:

795.2 - Topsoil

Delete in total.

795.3 - Soil Fertilizing Materials:

In addition to the requirements of the MAG Standard Specifications:

795.3.1 - Fertilizer is added:

Where fertilizer is furnished from bulk storage, the Contractor shall furnish a supplier's certification of analysis and weight. Fertilizer shall be a hard prill type fertilizer, which is uniform in composition, pelleted, dry, and free flowing. Guaranteed usable analysis of fertilizer shall be as follows:

Ammoniacal nitrogen (N)	16.0%
Available phosphoric acid (P2O3)	8.0%
Water soluble potash (K2O)	4.0%
Sulphur	16.0%
Iron (Fe) (chemical)	1.5%
Manganese (MN) (chelated)	0.1%
Zinc (Zn) (chelated)	0.1%

When slow release nitrogen forms are used in the fertilizer mixture, they shall be derived from sulfur coated urea, urea formaldehyde, plastic or polymer coated prills or isobuylenediurea.

795.4 - Organic Soil Conditioners replace in total with the following:

795.4 - Mulch:

Straw mulch materials shall consist of wheat, barley, oat, or rye straw. The mulch material shall be air dry, reasonably light in color, and shall not be musty, caked or otherwise of low quality. The use of mulch that contains noxious weeds will not be permitted. The Contractor shall provide a method satisfactory to the Engineer for determining weight of mulch furnished.

Wood Fiber Mulch: The mulch material shall consist of virgin wood fibers manufactured expressly from whole wood chips. The chips shall be processed in such a manner as to contain no growth or germination inhibiting factors. Fiber shall not be produced from recycled material such as sawdust, paper, cardboard or residue from pulp and paper plants. The wood cellulose fibers of the mulch must maintain uniform suspension in water under agitation. The wood fiber mulch shall blend with grass seed, fertilizer and other additives to form a homogeneous slurry. The wood fiber mulch shall conform to the following specifications:

Percent Moisture Content	10.0%
Percent Organic Matter	99.0%
Percent Ash Content	0.8%
PH	4.8 to 5.5
Water Holding Capacity (minimum)	1 gram of water/100 grams fiber

Psyllium Mucilloid Organic Tackifier: The material shall be a totally organic substance supplied in dry, powdered form, at least 70 percent of which is 92 percent pure mucilloid, derived from *Plantago ovata*.

insularis husk. The material shall be water-soluble, non-toxic, hydrophilic and shall not inhibit germination.

795.6 - Seeds is modified to add:

For vegetative slope stabilization:

Seed shall be labeled in accordance with Arizona State laws and the U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitations for bids. Bag tag figures will be evidence of purity and germination. No seed will be accepted with a date of test of more than nine (9) months prior to the date of delivery to the site.

Seed shall be certified to be the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures and pure live seed. Seed shall be labeled in conformance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable.

All of the impacted areas will be hydro-seeded with a native seed mix (Table 1) within four weeks after completion of construction. The re-vegetation area will be approximately 39.04 acres, of which 100% will be hydro-seeded. If necessary, the area will be disked prior to seeding. Following disking and prior to seeding, a general fertilizer will be broadcast over the area to prepare the soil for seeding germination.

Table 1. Native Seed Mix:

Common Name	Scientific Name	PLS/Acre
Sand Dropseed	<i>Sporobolus cryptandus</i>	2.5
Brittle Bush	<i>Encelia farinosa</i>	4.0
Desert Broom	<i>Baccharis sarothroides</i>	2.0
Burro Bush	<i>Hymonclea spp.</i>	2.0
Desert Cassia	<i>Cassia covesii</i>	6.0
Purple Three-Awn	<i>Bebbia junea</i>	2.0
Globe Mallow	<i>Sphaeralcea ambigua</i>	3.0
Indian Wheat	<i>Plantago insularis</i>	2.0
Triangle-leaf Bursage	<i>Ambrosia deltoidea</i>	6.0
Total		29.5

795.6.1 - Ordering Seed is hereby added:

If specified seed is not available; the Contractor shall submit recommended substitutes to the Resident Engineer for review and approval.

The Contractor shall submit a list of seed suppliers that he has contacted and the source from which he is ordering seed.

The District Ecologist shall respond in writing prior to the pre-construction conference to accept or reject the recommended seed substitute.

795.7 - Plants, Trees, and Shrubs:

Delete in total.

795.8 - Miscellaneous Material:

Delete in total

SECTION 900 - SALT RIVER PROJECT IRRIGATION FACILITIES

900.1 – Description:

The work under this item shall consist of constructing the Salt River Project (SRP) irrigation facilities. The work shall include furnishing all labor, equipment and materials necessary for installing the irrigation system as shown on the plans.

SRP forces will construct all of the facilities on sheet 2 of the SRP plans with the following exceptions:

1. SRP will install a single eight (8) foot length of thirty-inch (30") pipe west of the control structure (construction note 2). The remaining length of thirty-inch (30") pipe through the levee will be constructed with this project.
2. The 30" pipe headwall (construction note 7) will also be constructed with this project.

All elements of the irrigation system designed but not constructed by SRP forces will be installed with this contract to provide the working irrigation system as designed by SRP and shown on the project plans.

900.2 – Materials:

All materials used in the construction of the SRP irrigation facilities shall conform to the SRP Construction Information and Specifications package attached to the end of the construction special provisions.

900.3 – Measurement and Payment:

The SRP irrigation system will be paid at the lump sum price bid for Item 900 in the Bid Schedule for the facilities indicated on the design plans and in accordance with these special provisions. This shall be considered full compensation for performing all work and for furnishing all labor, equipment, and materials necessary for installing the irrigation system as shown on the plans.

ITEM 900 – SALT RIVER PROJECT IRRIGATION FACILITIES

SECTION 901 - ALUMINUM STOP GATES

Add to the MAG Standard Specifications:

901.1 – Description:

The work under this item shall consist of furnishing irrigation gates and all labor, equipment and materials necessary for installing the irrigation gates at the locations shown on the plans. The Contractor shall submit shop drawings for all components in accordance with Section 105.2 of the MAG Standard Specifications.

901.2 – Materials:

The irrigation delivery gates shall be 24" Waterman Model AR surface mounted aluminum stop gates or approved equals.

901.3 – Measurement:

Aluminum stop gates will be measured as a unit for each installation.

901.4 – Payment:

The aluminum stop gates will be for paid at the contract unit price under Item 901, complete and in-place including the gate and installation. The payment shall be full compensation for furnishing all labor, tools and equipment and accomplishing all work in conformity with the plans and specifications.

ITEM 901 – ALUMINUM STOP GATES

SRP CONSTRUCTION INFORMATION AND SPECIFICATIONS

PROVIDE THIS ENTIRE PACKAGE TO YOUR CONTRACTOR

GENERAL

Temporary Irrigation Outage Agreement Instructions
Temporary Irrigation Outage Agreement Form
Permit-Required Confined Space Policy
Confined Space Checklist - Pipe Crawl
Confined Space Entry Permit Form

STANDARD SPECIFICATIONS

SRP 02227 Salt River Project Standard Specification
for Shurry Backfill Materials

WTR 02614 Salt River Project Water Group
Standard Specification
for Precast Concrete Pipe

SRP 03210 Salt River Project Standard Specification
for Reinforcing Steel

SRP 03300 Salt River Project Standard Specification
for Concrete

GE 03305 Salt River Project Generation Engineering
Standard Specification
for Concrete Formwork and Placement

REFERENCE DRAWINGS

WES-30300-001 Pipeline Bedding/Backfill
Requirements

WES-30300-003 Standard Concrete Pipe Collar

WES-30300-004 Rubber Gasket Joints

WES-30350-200 45 Degree Trashrack for Pipeline
Headwall

SRP APPROVED LANDFILLS MAP

TEMPORARY IRRIGATION OUTAGE AGREEMENT INSTRUCTIONS

Whenever an SRP irrigation outage is needed for construction, an Outage Agreement must be completed by SRP and signed by the Contractor before SRP will allow construction to begin.

To initiate the process, the Contractor shall contact the SRP Inspector and request a pre-construction meeting.

At the pre-construction meeting, or subsequent meetings, if all conditions have been met to the satisfaction of SRP, the Outage Agreement form will be filled out by SRP. The Outage Agreement form must be signed by the SRP Watermaster and by the Contractor. A copy of the signed Outage Agreement will be provided to the Contractor.

After the Outage Agreement form has been completed and signed, the Contractor may proceed with the agreed upon work during the time period specified.



Delivering More Than Power.™

SRP File or License # _____

TEMPORARY IRRIGATION OUTAGE AGREEMENT

This TEMPORARY IRRIGATION OUTAGE AGREEMENT ("OUTAGE AGREEMENT") is made by and between _____ ("CONTRACTOR") and the SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT ("SRP"), an agricultural improvement and power district organized and existing under the laws of the State of Arizona.

During the period from _____ 19__ at ____:00 ____M. through _____ 19__ at ____:00 ____M. ("OUTAGE PERIOD"), SRP agrees to cease irrigation deliveries through the SRP irrigation facilities at the following location(s):

The CONTRACTOR, having read both sides of this OUTAGE AGREEMENT, understands and agrees to all the terms and conditions contained herein. CONTRACTOR further acknowledges that CONTRACTOR (1) has been informed that the workplace may contain OSHA Permit-Required Confined Spaces, (2) agrees that CONTRACTOR will conduct any Permit-Required Confined Space entry under a permit space program that complies with applicable OSHA requirements, and (3) has received and reviewed SRP's Association Permit-Required Confined Space Program.

Authorized CONTRACTOR Representative _____ Date _____

Office Phone No.: _____ Emergency Phone No.: _____

SRP _____ Date _____



SRP emergency phone number: 236-5296

COPIES: WHITE - INSPECTOR

CANARY - WATERMASTER

PINK - CONTRACTOR

TERMS AND CONDITIONS

In consideration of the permission granted by SRP to the CONTRACTOR to perform certain work (the "Work") on or near SRP's irrigation facilities as identified herein, the CONTRACTOR agrees as follows:

1. CONTRACTOR shall complete the Work and shall restore the affected SRP irrigation system to full operational condition during the OUTAGE PERIOD.
2. If CONTRACTOR does not complete the Work during the OUTAGE PERIOD, CONTRACTOR, upon demand, shall pay SRP for all costs and expenses incurred in completing the Work and/or restoring the irrigation facilities to full operational condition and for all direct and indirect damages incurred by SRP.
3. CONTRACTOR shall comply with all applicable federal, state, and local laws, rules, regulations and ordinances.
4. If CONTRACTOR or CONTRACTOR's employees enter a Permit-Required Confined Space as defined in OSHA 29 C.F.R. 1910.146, CONTRACTOR shall notify SRP of the Permit-Required Confined Space program that the CONTRACTOR followed and shall notify SRP during OSHA required debriefing about any hazards encountered or created. SRP has informed CONTRACTOR of potential known hazards of Permit-Required Confined Spaces, including but not limited to: engulfment from water; atmospheric hazards such as oxygen deficiency, carbon monoxide or flammable atmosphere from methane gas; and/or entrapment hazard from roots or other debris in the pipeline.

NOTE: THIS OUTAGE AGREEMENT DOES NOT GUARANTEE DRY CONDITIONS.

5. CONTRACTOR is responsible for "The Control of Hazardous Energy (Lockout/Tagout)" as defined in OSHA 29 C.F.R. 1910.147. CONTRACTOR shall protect the job site from water that may leak through SRP gates or from storm water and nuisance water that may enter the system uncontrolled, and CONTRACTOR shall relieve SRP from any such responsibility.
6. CONTRACTOR shall indemnify, defend and hold harmless the United States, Salt River Valley Water Users' Association, and SRP, for, from, and against all damages, costs, liabilities, and expenses, including attorneys' fees, arising out of any act, omission, or negligence of CONTRACTOR or of any of its contractors or subcontractors.
7. CONTRACTOR shall dispose of all waste materials removed from the site that are associated with the construction or modification of SRP's irrigation facilities in an SRP APPROVED LANDFILL.
8. If CONTRACTOR enters into any contract or subcontract for performance of any Work, CONTRACTOR shall require each such contractor or subcontractor to agree to the terms and conditions of this OUTAGE AGREEMENT. If contract or subcontract Work is performed in Permit-Required Confined Space as defined by OSHA 29 C.F.R. 1910.146, CONTRACTOR shall provide each such contractor or subcontractor with a copy of SRP's Association Permit-Required Confined Space Program, inform each such contractor or subcontractor that the workplace may contain OSHA Permit-Required Confined Spaces, and ensure all permit-required confined space entries are made under a Permit-Required Confined Space program that complies with applicable OSHA requirements. CONTRACTOR shall be responsible for compliance by such contractors or subcontractors with the terms and conditions of this OUTAGE AGREEMENT.
9. This OUTAGE AGREEMENT shall be governed by and construed under the laws of the State of Arizona. No change, addition, or modification shall be binding upon SRP unless in writing and signed by SRP.

ASSOCIATION PERMIT-REQUIRED CONFINED SPACE POLICY

April 15, 1993

PURPOSE:

To provide a procedure assuring that Salt River Project personnel can safely enter new, existing or other permit-required confined spaces to accomplish inspection, repairs or construction of water transmission and distribution facilities.

COMPLIANCE WITH OSHA STANDARD CFR 1910.146, CFR 1910.147

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I. DEFINITIONS, TERMINOLOGY, DUTIES OF PARTICIPANTS

A. PERMIT-REQUIRED CONFINED SPACE DEFINITION

1. Any space which is large enough to enter and work in;
2. Has limited means for entry or exit;
3. Is not designed for continuous occupancy; AND,
4. Has one or more of the following characteristics:
 - a. Contains, or has the potential to contain, a hazardous atmosphere;
 - b. Is an engulfment hazard; or,
 - c. Any other recognized serious safety or health hazard.

5. Examples of permit-required confined space: structures, manholes, vaults, pipelines, well casings, stand pipes, sumps, and culverts.

Examples of non-confined space: canals, open lateral structures, removing check boards from a structure, assembling pre-cast structures.

6. No pipe crawl will be made in pipe less than 24" nominal diameter.

B. CONFINED SPACE ENTRY PERMIT

A document that defines the conditions under which permitted confined space may be entered; states the reason(s) for entering a space, the anticipated hazards of the entry, lists the attendants, entrants and the individuals who may be in charge of the entry and establishes the length of time for which the permit may remain valid. Entry permit must be maintained in departmental file for one year after the permit is cancelled.

If gas monitor goes off while entrants are in the confined space, send the original copy of permit to Employee Safety Services.

Confined Space Checklist and Confined Space Entry Permit shall be completed prior to entry into a confined space.

C. DUTIES OF PARTICIPANTS

No person(s) will participate in an entry into a permitted confined space unless they have had prior Association confined space training.

All participants will be trained as the "attendant", "entrant", and or "crew leader". These roles may be rotated as directed by crew leader.

No pipe crawl shall take place unless the crew is in complete agreement as to the safety of the confined space entry.

Rescue will be conducted by local fire department personnel.

1. **ATTENDANT**

An employee stationed outside the permitted confined space who is trained in accordance with OSHA Standard 29 CFR 1910.146 and who monitors the authorized entrants inside the confined space and does not attempt rescue of entrant.

2. **ENTRANT**

An employee who is trained in accordance with the OSHA Standard 29 CFR 1910.146 and who is authorized by the employer to enter a confined space. Entrant must have minimum SRP Category B respirator certification. The employee is considered an "entrant" as soon as any part of the employee's body breaks the opening of a confined space.

3. **CREW**

Refers to entrant(s), attendant, crew leader (foreman, inspector), zanjero, watermaster.

4. **CREW LEADER**

This job function title may also refer to foreman or inspectors regarding confined space policies, permits, checklist. Crew Leader authorizes entry and ensures that permit contains all information and that all procedures,

practices and equipment for safe entry are in effect before notifying ADC of entry. Crew leader continues to monitor at appropriate intervals and ensures that only entrants are permitted in the confined space. Crew leader terminates entry whenever conditions are unacceptable and upon completion of work, cancels permit. If there are air quality problems requiring assistance, the crew leader will call the foreman.

5. **FOREMAN**

Existing Pipe: foreman or crew leader meets with watermaster and reviews microfilm drawings, print, and Zanjero Hazards Identification Map when problem arises. Passes all of above information on to the crew leader.

6. **ZANJERO**

A person with SRP water distribution systems who will arrange the system for dry-up and act as standby at a specific location for control of potential water hazards. Identifies points of Lock Out/Tag Out.

7. **WATERMASTER**

Existing Pipe: Meets with foreman and reviews microfilm drawings, print, and Zanjero Hazards Identification Map to identify potential water hazards when problem arises. Arranges for dry-up with zanjeros.

D. TERMINOLOGY

1. **CULVERTS**

Pipelines or other confined spaces, 100 feet or less in length such as road crossings, ties to open ditch where both ends are open.

2. **ENTRY**

The employee is considered to have entered as soon as any part of the employee's body breaks the plane of an opening into the confined space.

3. **EXISTING PIPELINE**

Any irrigation pipeline that has had water in it or any new irrigation pipeline that is tied into existing facilities as determined by the foreman and/or watermaster.

4. **HOT WORK PERMIT**

Employer's written authorization to perform operations which could provide a source of ignition.

5. **NEW PIPELINE**

A pipeline which has not yet been tied into the existing facilities as determined by the foreman and/or watermaster.

6. **PIPE CRAWL**

When one or more employees enter a pipeline.

II. REQUIRED SPECIAL EQUIPMENT FOR PERMITTED CONFINED SPACES

Each department involved in permitted confined space work will provide and maintain the following equipment for use when entering confined spaces. Most of the equipment listed below is stored in a Confined Space Box along with other equipment, such as: knee pads, batteries, etc. Prior to going to work site, monitors may be obtained from tool room and upon completion of work, returned to tool room for battery charging.

- A. Flammable gas, oxygen and carbon monoxide gas monitors with sampling pumps in appropriate carrying cases. Each entrant is required to carry a monitor.
- B. One emergency air/oxygen escape pack for each entrant and one spare in crew truck.
- C. NOTIFICATION SIGNS FOR ENTERING EXISTING PIPE:
 - 1. Magnetic Sign for wellsite starter cabinet:

"DANGER DO NOT START, PERSON IN PIPELINE"
 - 2. Clearance Tag with Special Lock:
SRP Warehouse Stock Code # 73-2293

"DO NOT OPERATE"
- D. Air Blowers for ventilation
- E. Radios for Existing Pipe - a minimum of two are required when working in existing pipeline. One unit with the attendant at the entry point and one unit with the zanjero, both using the same channel.

Radios for New Pipe and "other" confined spaces - a minimum of one is required.
- F. Air horns in Existing & New Pipe - a minimum of four are required. Two for inside the pipeline and two outside at the entry point.
- G. Safe-Alert Measuring Probe used by Zanjero is an additional safety precaution which is placed at water surface at the nearest upstream structure. Any influx of water will trigger the probe and alert the zanjero who is also visually monitoring the water level.

III. CHECKING FOR HAZARDOUS GASES AND ADEQUATE AIR FLOW IN ALL CONFINED SPACES

PERFORM TESTS NO LONGER THAN 30 MINUTES PRIOR TO ENTERING ANY CONFINED SPACE

- A. Crew will check entrance opening to all confined spaces for oxygen, flammable gases and carbon monoxide content.
- B. In New and Existing Pipe, crew will check downstream opening to determine that an adequate flow of air is coming out of the pipeline to ensure that the line is clear.
- C. Crew leader will determine if a suitable air supply does exist. If air is not suitable, a portable air blower will be used. Blower runs a minimum of 10 minutes before entry. Care should be taken to place the gasoline/powered blowers so that the exhaust fumes will not be sucked into the air stream going into the confined space.

AFTER VENTILATION, THE AIR SUPPLY MUST BE RETESTED

- D. If there are any questions, the crew leader will call the foreman. The foreman will call Employee Safety Services if additional assistance is required.

IV. PROCEDURES FOR ENTERING EXISTING PIPELINE

- A. Crew will consist of two or more employees depending on the job.
 - 1. A minimum of two people will enter existing pipe together to repair or construct.
One person may enter existing pipe for inspection or observation.
 - 2. One attendant is required.
- B. Prior to entrant(s) entering existing pipeline:
 - 1. Watermaster meets with foreman, crew leader or inspector when problem arises.
 - Review microfilm drawings and copy
 - Review zanjero identification map
 - 2. Crew leader, entrant(s), watermaster and zanjero will meet at the job site to inspect the area for anything that might impact the pipeline; i.e. street drains.
 - 3. Crew leader will pass on all information to crew gathered from the microfilm and the meeting held with the foreman/watermaster.

IN CASE OF EMERGENCY,
CONTACT ADC VIA RADIO OR PHONE 236-5296

C. Procedure to PLACE Lock Out/Tag Out Equipment

1. Zanjero will identify all lockout/tag out sources.

Crew Leader will issue equipment: Safe Alert Probe, special locks and clearance tags, and if needed, signs for pump starter boxes.

Crew Leader & Zanjero will place locks/tags on all sources using special locks and clearance tags, and if needed, signs for pump starter boxes.

2. Zanjero will recheck the pipeline upstream and downstream for any possible source of water including waste water, street drainage and well sites.

The dry up will be such that both the upstream and downstream ends of the pipe will be open to allow a free flow of air through the pipeline.

If there is a well site that could discharge water into the pipeline, the Crew Leader will place magnetic sign on the outside of the starter box that states: **DANGER DO NOT START, PERSON IN PIPELINE**

Crew Leader, at direction of Zanjero, will place special lock & tag on control box and switch deep-well to "MANUAL" if pump is on supervisory control and notify ADC (circuit breaker switch must be on outside of control box). If circuit breaker is on inside of motor control box, call Groundwater).

Crew Leader, at direction of Zanjero, will place special lock and clearance tag on the first upstream control gate to prevent it from being operated when someone is in the pipe.

CREW LEADER HOLDS KEYS TO SPECIAL LOCKS

Zanjero stations himself/herself at the nearest upstream structure where water could possibly enter and installs the Safe-Alert probe in the nearest upstream structure.

3. Crew leader will review checklist, complete Confined Space Entry Permit and then notify ADC that they are about to enter pipeline, giving all required permit information.

ADC will broadcast entry on both channels D and E and notify appropriate municipalities and agencies.

D. Procedure to REMOVE Lock Out/Tag Out Equipment

1. Crew leader will inform zanjero, foreman, and ADC when the work is completed and all entrant(s) are out of the pipeline.

ADC will broadcast completion on channel D and E. This cancels the permit.

Zanjero will remain on the job and monitor the pipeline until the crew leader has informed the zanjero that all employees are out of the pipeline and the job is completed.

2. Crew Leader who placed all of the special locks and clearance tags upstream and on control box must remove them. If used, Crew Leader who placed magnetic sign on pump starter will remove it and return pump to "Supervisory" control at direction of Transmission.

OSHA regulations require that the same "authorized" person who places a specific lock and tag, removes them.

If the Crew Leader who placed the locks/tags is unable to remove them, the Crew Leader will notify the Foreman who will name a replacement Crew Leader. An "Authorized Exception" Form shall be completed which names another Crew Leader as the authorized replacement.

3. Crew Leader checks that all numbered locks and tags are returned to the confined space box upon completion of every confined space entry.

**IN CASE OF EMERGENCY,
CONTACT ADC VIA RADIO OR PHONE 236-5296**

V. PROCEDURES FOR ENTERING NEW PIPELINE

- A. Crew will consist of two or more employees depending on the job.

One person may enter new pipe, the second person will act as attendant.

- B. Crew leader will review checklist, complete Confined Space Entry Permit and then notify ADC that they are about to enter new pipe, giving all required permit information.

ADC will broadcast entry on both channels D and E and notify appropriate municipalities and agencies.

IN CASE OF EMERGENCY,
CONTACT ADC VIA RADIO OR PHONE 236-5296

VI. PROCEDURES FOR ENTERING NEW OR EXISTING IRRIGATION STRUCTURES, MANHOLES, VAULTS OR CULVERTS

- A. Crew will consist of two or more employees depending on the job.

One person may enter the confined space provided the attendant has verbal or visual contact with the entrant.

- B. Crew leader will review checklist, complete Confined Space Entry Permit and then notify ADC that they are about to enter confined space, giving all required permit information.

ADC will broadcast entry on both channels D and E and notify appropriate municipalities and agencies.

IN CASE OF EMERGENCY,
CONTACT ADC VIA RADIO OR PHONE 236-5296

CONFINED SPACE CHECKLIST

Pipe Crawl

Foreman, Crew Leader and Inspector are synonymous

Check Here

1. WATERMASTER	Meet with Foreman, Crew Leader or Inspector when problem arises.	
	Review microfilm drawings and copy.	
	Review area zanjero Hazards Identification Map.	
2. WATERMASTER/ZANJERO	Arrange for dry-up with zanjeros/Transmission.	
3. CREW LEADER	Obtain necessary ventilation equipment.	
	Obtain gas monitors from charge base.	
	Obtain confined space storage box.	
4. WATERMASTER	Arrange for zanjeros as needed.	
5. AREA ZANJERO (OR Most Experienced)	Check all upstream and downstream facilities. Crew Leader & Zanjero place all locks/tags.	
6. AREA ZANJERO CREW LEADER	Meet to review & discuss Lock Out/Tag Out Procedures. In case of problems, instructs zanjeros which channel to use.	
7. ON-SITE MEETING: Crew Leader, Crew, Foreman, Watermaster & Area Zanjero		
8. CREW LEADER	Crew has checked structure for gas, oxygen content and carbon monoxide no longer than 30 minutes before entry.	
	Complete Confined Space Entry Permit.	
	Notify ADC with Confined Space Entry Permit information.	
	ADC announces on Channel "D" and "E" that a confined space entry is about to begin at _____ location. Terminates entry when necessary.	
	Notify ADC when confined space entry has been completed. Crew Leader & Zanjero remove all locks/tags.	
	ADC announces on Channel "D" and "E" that a confined space entry has been completed. Release zanjero from site.	

Crew Leader will turn in Confined Space Entry Permit to Foreman which will be kept on file for one year

If Gas Monitor sounds, during confined space entry, send a copy of permit to Employee Safety Services

AUTHORIZED EXCEPTION
CONFINED SPACE LOCK OUT/TAG OUT
OSHA CFR 1910.147

Directions: In the event that the same authorized person (crew leader) who placed the special locks and tags, cannot remove them, the following documentation is required by OSHA and SRP Employee Safety Services. Complete spaces with correct information.

PERMIT # _____ Date _____ Time _____

1. Name of authorized person who PLACED Lock Out/Tag Out equipment:

2. Reason for an Authorized Exception:

3. Name of authorized replacement who will REMOVE Lock Out/Tag Out equipment:

4. Signature of Supervisor/Crew Leader reviewing & acknowledging transfer:

Authorized Exception Form is to be turned in with the Permit
Blank Forms are to be kept in the Confined Space Box

PERMIT # _____

SALT RIVER PROJECT

DATE _____

ASSOCIATION CONFINED SPACE ENTRY PERMIT

SPECIAL EQUIPMENT: Confined Space Box ___ Ventilation ___ Hyd. Probe ___ Signs ___ Radios ___
PERSONAL PROTECTION EQUIPMENT: Emergency Escape Pack ___ Air Horn ___ Gas Monitor ___

INFORMATION BELOW MUST BE COMPLETED AND CALLED TO ADC PRIOR TO ENTRY
IN CASE OF EMERGENCY NOTIFY ADC

ADC Phone Number 236-5296

1. ADC NOTIFIED BY CREW LEADER: _____ TIME: _____

2. PURPOSE: INSPECT ___ CONSTRUCT ___ REPAIR ___ 3. NEW PIPE ___ EXISTING PIPE ___ HOT WORK ___ OTHER ___

4. COORDINATES: _____ - _____ 5. Emergency Notification:
City/Agency _____

6. STREET ADDRESS: _____

7. POINT OF ENTRY: MANHOLE ___ STRUCTURE ___ CANAL ___ LATERAL ___ GATE ___ OTHER ___

8. Trained Participants	Name(s):	Radio #	Channel
Crew Leader			D / E
Attendant			
Entrant(s)	(1) _____ (2) _____ (3) _____		
Foreman			D / E
Watermaster			D / E
Area Zanjero		Truck # _____	D / E
Standby Zanjero		Truck # _____	D / E

9. Standby Location: COORDINATES _____ - _____ CANAL ___ LATERAL ___ GATE ___

STREET ADDRESS _____

10. LOCK OUT/TAG OUT PROTECTION

PUMP #	Coordinates	Canal #	Lateral #	GATE #	Coordinates	DRAIN
	-				-	
	-				-	
	-				-	
	-				-	

11. WORK COMPLETED/ADC NOTIFIED TIME: _____ Date _____ SIGNED _____

Maintain Permit in Departmental Files One Year

If Gas Monitor sounds during pipe crawl, send a copy of permit to Employee Safety Services

SALT RIVER PROJECT
STANDARD SPECIFICATION
FOR
SLURRY BACKFILL MATERIALS
(SRP 02227)

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Reviewed By: P. M. Kandarlis
(Revised for Metric 6/7/96)

**STANDARD SPECIFICATION
FOR
SLURRY BACKFILL MATERIALS
(SRP 02227)**

1.0 GENERAL

1.1 Work Included

This specification shall cover the furnishing of all labor, equipment and materials for supplying and placing slurry-type backfills.

The following is a brief description of the types of slurry backfills and their intended uses:

ASB - Aggregate Slurry Backfill - washed gravel and sand, no cementitious materials, for use as a backfill around wood and concrete transmission line poles and trench backfill where no structural loads will be anticipated.

LMB 1/2 SACK - Lean Mix Backfill with 1/2 Sack (21.3-kg) portland cement per cubic yard (0.84-m^3) - washed gravel and sand with cement, for use as a general trench backfill in low load areas (streets and parking areas).

LMB 1 SACK - Lean Mix Backfill with 1 Sack (42.5-kg) portland cement per cubic yard (0.84-m^3) - washed gravel and sand with cement, for use as a general trench backfill in low load areas (streets and parking areas). Use in lieu of LMB 1/2 Sack (21.3-kg) when required by municipality.

LMB 1-1/2 SACK - Lean Mix Backfill with 1-1/2 Sacks (63.8-kg) portland cement per cubic yard (0.84-m^3) - washed gravel and sand with cement, for use as a structural backfill under foundations and as thermal fill and/or mechanical protection of duct banks.

DBA - Duct Bank Backfill w/ Aggregate - washed gravel and sand with four sacks (170-kg) portland cement per cubic yard (0.84-m^3), used as a thermal backfill/encasement for electrical ductbank with conduits spaced greater than 2 inches (51-mm) apart.

DBS - Duct Bank Backfill w/ Sand - washed sand with four sacks (170-kg) portland cement per cubic yard (0.84-m^3), used as a thermal backfill/encasement for electrical ductbank with conduits spaced less than 2 inches (51m-mm) apart and for pumping grout around conduits run through a pipe sleeve.

DEPB - Direct Embed Pole Backfill - a lean concrete with a minimum strength of 1000 psi (6.9-MPa) at 28 days, for use as backfill around direct embed steel poles.

RFG - Rock with Fly Ash Grout - a two component backfill for direct embed steel and concrete poles; the initial component, RFG-Gravel, is a uniform size, coarse gravel. The gravel is placed by ready-mix truck in the annulus space of direct embedment poles. The second component, RFG-Grout is a flowable fly ash/cement/lime grout. The grout is batched separately and placed afterward, filling voids in the aggregate backfill by gravity flow (no pumping).

Each of these backfill materials has an SRP Material Stock Code Number (See Table 1). All references to these materials in purchase order documents, submittals and invoices shall use the SRP material stock code. Vendor may assign its own product codes in addition to those required by the Purchaser.

1.2 Reference Standards

1.2.1 Reference to standards and/or specifications herein shall be interpreted to mean the latest revision unless noted otherwise.

1.2.2 The following abbreviations appear in this Specification:

ACI	American Concrete Institute
ARPA	Arizona Rock Products Association
ASTM	American Society for Testing and Materials
NRCMA	National Ready-Mixed Concrete Association
SRP	Salt River Project

1.2.3 The following standards shall be made a part of this Specification:

ASTM C25	Standard Test Method for Chemical Analysis of Limestone, Quicklime and Hydrated Lime
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C117	Standard Test Method for Materials Finer Than 75-Micrometer (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C136	Standard Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C403	Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
ASTM C494	Standard Specifications for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C937	Standard Specification for Grout Fluidifer for Preplaced-Aggregate Concrete
ASTM C939	Standard Test Method for Flow of Grout for Preplaced Concrete Aggregate (Flow Cone Method)
ASTM C1064	Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
ASTM D512	Standard Test Methods for Chloride Ion in Water
ASTM D516	Standard Test Method for Sulphate Ion in Water

1.2.4 Exceptions to this specification must be approved in writing by the Engineer prior to commencement of the affected work.

1.3 Definitions

One Sack of cement: same as one 94 pound (42.5-kg) bag of cement.

1.4 Submittals

1.4.1 Vendor shall submit the following items for each material to be supplied:

- a. Plant Certification
- b. Mix designs
- c. Source and gradation of coarse and fine aggregate
- d. Cement certification and mill test report
- e. Certification of testing of the water
- f. Fly ash certification
- g. Admixture brand and source
- h. Lime certification and chemical analysis

1.4.2 If the mix design and batch plant have been pre-approved by the Engineer, submittals under Section 1.4.1 will be waived.

1.4.3 Vendor shall refer to the mix designs by the SRP Material Stock Code Number.

1.4.4 In addition to the specified materials, Vendors may submit alternate mix designs or deviations to the specifications for review and approval. The Engineer may request additional test and certification documentation for alternate mixes submitted.

1.5 Quality Assurance

1.5.1 Each plant from which the Vendor intends to provide materials governed by this specification must have current NRMCA, ARPA or equivalent laboratory certification.

1.5.2 Vendor shall provide access to the plant for inspection of materials and/or batch plant equipment.

1.6 Storage and Handling

1.6.1 All materials shall be stored and handled in such a manner as to prevent deterioration or intrusion of foreign matter and to produce a minimum amount of segregation.

1.6.2 Storage of aggregate on a natural ground surface will be permitted if bottom 6 inches (152-mm) of pile is not used in batching.

2.0 PRODUCT

2.1 Cement

Cement shall conform to ASTM C150, Type II with alkali content not to exceed 0.6 percent.

2.2 Fly Ash

not deleteriously reactive with alkali in cement. Fly ash shall be sampled and tested in accordance with ASTM C311.

2.3 Lime

Lime shall be commercial dry hydrated lime containing a minimum 85 percent calcium hydroxide, $\text{Ca}(\text{OH})_2$, as determined by ASTM C25. Lime shall be protected from exposure to moisture until used and shall be sufficiently dry and flow freely when handled.

2.4 Aggregate

Aggregate shall conform to ASTM C33; coarse aggregate shall be sized as noted in Table 1 of this specification.

2.5 Water

Water for washing aggregates and for mixing slurry shall be potable or shall meet requirements of ASTM C94. If water does not meet said requirements, a chemical analysis of water shall be performed in accordance with ASTM D512 and ASTM D516 by an independent testing laboratory at Vendor's expense and submitted to the Engineer for approval.

2.6 Admixtures

2.6.1 Admixtures shall be approved in writing by the Engineer prior to use. Admixtures shall be added at the plant at the time of batching unless noted otherwise.

2.6.2 Air-entraining admixtures shall conform to ASTM C260 and shall be used only in DEPB.

2.6.3 Water-reducing, retarding, and accelerating admixtures shall conform to ASTM C494. Chloride admixtures shall not be used.

2.6.4 Superplasticizers shall conform to ASTM C494, Type F or G. Superplasticizer may be added at batch plant or at jobsite.

2.6.5 Grout Fluidifiers shall conform to ASTM C937.

2.7 Measurement and Mixing of Materials

- 2.7.1 Measurement and mixing of materials shall be in accordance with ASTM C94 and C685.
- 2.7.2 Mixes shall be homogenous, readily placeable and uniformly workable. Proportioning of ingredients shall produce consistency, durability, workability and other required properties appropriate for the intended usage.
- 2.8 Mix Design for RFG Grout
- 2.8.1 Proportioning of ingredients shall produce grout with efflux (flow consistency), set, strength and shrinkage characteristics as specified herein and appropriate for intended usage. Grout upon delivery shall be homogeneous, readily placeable and uniformly flowable.
- 2.8.2 Grout shall have an efflux time of less than 18 seconds for minimum 30 minutes after arrival at jobsite (tested in accordance with ASTM C939), shall be firm to the touch within 72 hours after placement, shall have no more than three percent volume loss (including fluid separation) seven days after batching and have a compressive strength when combined with aggregate of minimum 1000 psi (6.9-MPa) in 56 days. Mix shall maximize use of fly ash. General proportions for mix design are as follows:
- a. Solids: 5 parts fly ash to 1 part cement to 3/4 part lime
 - b. 2 1/4 parts solids to 1 part water
 - c. 20 ounces (0.6-L) of high-range water-reducing admixture per 100 pounds (45.2-kg) of solids
- Vendor is responsible for final mix design that meets performance requirements of this specification.
- 2.8.3 Retarding admixtures may be added to mix to meet efflux requirements and compensate for travel time to specific jobsites. Volume of retarding agent added is responsibility of Vendor, but specific type must be preapproved by the Engineer prior to batching of grout.
- 2.8.4 No change in source, character or mix proportions of grout shall be made without prior written approval of the Engineer. For changes to be approved, affected items listed under Paragraph 1.4.1 shall be resubmitted.
- 2.9 Batching RFG Grout
- 2.9.1 Mixing shall follow the procedures in ASTM C94, with all grout constituents added at the batch plant.
- 2.9.2 Fly ash shall be added in a manner and at a rate as to minimize incompletely mixed fly ash nodules within the grout. Dry fly ash nodules over one inch

diameter shall not be allowed. Grout containing non-uniform material exceeding one percent of total grout volume, as determined by the Engineer, will be rejected at full cost to the Vendor.

2.10 Washed Gravel for RFG

2.10.1 Gravel shall be washed to remove dust and dirt prior to placement in mixer.

2.10.2 Washed gravel shall be sent to jobsite by ready-mix truck. Maximum of two gallons (7.6-L) of water per cubic yard (0.84-m³) of gravel may be added.

3.0 EXECUTION

3.1 Delivery

3.1.1 Deliver materials in conformance with ASTM C94.

3.1.2 When materials contain cement, machine-stamp batch out time of truck on delivery ticket at Vendor's plant. A copy of delivery ticket having machine-stamped batch out time shall be given to the Engineer at the time of delivery. Deliveries of materials containing cement without machine-stamped batch out time on delivery ticket will be rejected.

3.1.3 Deliver materials within 30 minutes of requested delivery time. Time lapse between successive deliveries shall not vary by more than 20 minutes from that requested. The Engineer may reject any batch not meeting these requirements. Vendor shall allow 30 minutes for material discharge. Standby time may be charged after 30 minutes.

3.1.4 Backfill containing cement will be rejected if the Engineer determines that, on arrival at the jobsite, backfill temperature is outside the range of 50°F (10°C) to 90°F (32°C), or that backfill has attained its initial set. Rejected backfill shall be at the Vendor's cost.

3.1.5 Vendor may add water only once to bring a mix to the desired slump. Water shall not be added to RFG-Grout. Mix not meeting slump requirements will be rejected.

3.2 Placement

3.2.1 Slurry and Lean Mix Backfills

Discharge backfill containing cement within 1-1/2 hours after initial mixing water is added. The Engineer may waive this limitation if slump is such that the material can be placed without addition of water.

Place backfill so that it flows easily around and beneath conduit, pipe or other obstructions in trenches and excavations. Slurry shall have consistency, workability, flow characteristics and pumpability (where required) such that the

material when placed is self-compacting and has sufficient plasticity that mechanical compaction or vibration is typically not required. Mechanical compaction or vibration may be used to consolidate around obstructions.

Place slurry backfill equally on both sides of conduit or pipe to prevent displacement of conduit or pipe.

Place slurry backfill in lift depths that will not float the conduit or pipe; to place backfill in greater lift depths, provide sufficient approved anchorage so the conduit or pipe cannot float.

3.2.2 Washed Gravel for RFG

Remove all excess water prior to placement of gravel by rotating mixer and directing water away from backfill area. Time for removal of excess water shall be at Vendor's cost. Wet gravel must flow uniformly and readily out of truck.

Gravel that has not been washed of dust and dirt will be rejected. Gravel that is not surface saturated shall not be placed.

3.2.3 RFG Grout

Discharge grout within 30 minutes after arrival at jobsite. This requirement may be waived by the Engineer if retarding admixtures are used.

Grout that exceeds efflux time requirements upon arrival at jobsite (as determined by flow testing), shall be rejected at full cost to Vendor. No water shall be added at jobsite or after batching to decrease efflux time.

3.3 Protection

3.3.1 Slurry backfill for trenches shall be protected from vehicular loading and shall not be covered with pavement prior to having reached initial set per ASTM C403, or for 12 hours, whichever occurs first. Set time tests shall be performed during initial placement while backfill is fluid.

3.3.2 Slurry backfill for foundation excavations shall be protected from foundation loading and placement of foundation concrete prior to having reached initial set per ASTM C403, or for six hours, whichever occurs first.

3.3.3 Where the Engineer has identified soils as being moisture sensitive, a drainage notch or drain wick shall be placed longitudinally along centerline of slurry backfill within first hour following placement. Drainage water shall be collected at end of trench or excavation and removed.

3.4 Testing

- 3.4.1 Samples will be taken directly from transit mix truck. Sampling and testing will be in accordance with the following standards:

Sampling	ASTM C172
Temperature	ASTM C1064
Slump	ASTM C143
Air	ASTM C231
Gradation	ASTM C117/ ASTM C136

- 3.4.2 Testing of gradation shall be done for all projects in public rights-of-way and other locations as determined by the Engineer; sampling shall be done at material source prior to the start of mix production.
- 3.4.3 Testing will be performed by the Engineer at no cost to Vendor.
- 3.5 Acceptance of Backfill Materials
- 3.5.1 Backfill materials shall be considered deficient and will be rejected if:
- slump is less than specified in table.
 - aggregate gradation is outside specified limits.
- 3.5.2 Rejected material shall not be used and shall be replaced with new material. Cost of disposing of rejected material and replacing with new material, including Purchaser's direct and indirect costs, shall be paid by Vendor.

TABLE 1 - BACKFILL MIXES

Stock Code Number	Backfill Designation	Description	Coarse Aggregate ASTM C33	Fine Aggregate	Slump Range	Minimum Cement Content (lbs/cu. yd.)	Required Admixtures
00-0100	ASB	Aggregate Slurry Backfill	No. 67 [3/4" (19mm) nom. max]	A, H	6"-9" (152-229mm)	None	
00-0101	DEPB	Direct Embed Pole Backfill	No. 8 [3/8" (9.5mm) nom. max]	A	6"-9" (152-229mm)	376 B (223 kg/m ³)	C
00-0104	LMB 1/2 SACK	Lean Mix Backfill w/ 1/2 Sack Cement pcy	No. 57 [1" (25mm) nom max]	A	6"-9" G (152-229mm)	47 (28 kg/m ³)	
00-0105	LMB 1 SACK	Lean Mix Backfill w/ 1 Sack Cement pcy	No. 57 [1" (25mm) nom. max]	A	6"-9" G (152-229mm)	94 (56 kg/m ³)	
00-0106	LMB 1-1/2 SACK	Lean Mix Backfill w/ 1-1/2 Sack Cement pcy	No. 57 [1" (25mm) nom. max]	A	6"-9" G (152-229mm)	141 (84 kg/m ³)	
00-0108	DBA	Duct Bank Backfill w/ Large Aggregate	No. 8 [3/8" (9.5mm) nom. max]	A	6"-9" (152-229mm)	376 (223 kg/m ³)	
00-0109	DBS	Duct Bank Backfill w/ Sand	None	A	6"-9" (152-229mm)	376 (223 kg/m ³)	
00-0160	RFG GRAVEL	Washed Gravel for RFG	No. 4 [1-1/2" (38.1mm) to 3/4" (19mm)]	None			
00-0161	RFG GROUT	Lime and Fly Ash Grout for RFG	None	None		D, E	F

NOTES

- A. Fine aggregates (sand) shall be in accordance with ASTM C33
- B. Maximum water/cement ratio .60
- C. Air entrainment 4% +/- 1%, Superplasticizers as required to obtain slump
- D. Cementitious solids: 5 parts fly ash to 1 part cement to 3/4 part lime, by weight. See paragraph 2.8.2
- E. Limit water content to 1 part water to 2.25 parts cementitious solids by weight. See paragraph 2.8.8
- F. High range water reducing admixture
- G. Purchaser may request material at lower slumps
- H. Fine aggregates 45-50% of the total aggregate weight

SALT RIVER PROJECT
WATER GROUP

STANDARD SPECIFICATION
FOR
PRECAST CONCRETE PIPE
(WTR 02614)

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PREPARED: CHARLES W. THUMS

APPROVED: *[Signature]*

STANDARD SPECIFICATION
FOR
PRECAST CONCRETE PIPE
(WTR 02614)

1.0 **GENERAL**

1.1 Work Specified

This specification covers the fabrication, furnishing and installation of precast concrete pipe.

1.2 Measurements

Both English and metric measurements are shown in this specification. The English and metric measurements shown may not be exactly equal, however, the difference between them will generally be between +/- 1.5%. The system of measurement to be used relative to this specification for a particular project will be that used in the project-specific documents and drawings.

1.3 Reference Standards

1.3.1 Reference to standards or specifications shall be interpreted to mean the latest revision unless noted otherwise.

1.3.2 The following abbreviations appear in this specification.

ASTM	American Society for Testing and Materials
CE	Civil Engineering
OSHA	Occupational Safety and Health Administration
SRP	Salt River Project
29 CFR	Code of Federal Regulations, Title 29

1.3.3 The following standards shall be made a part of this specification:

ASTM C14	Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe (reference only - for hydrostatic testing of ASTM C76 pipe)
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ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C207	Standard Specification for Hydrated Lime for Masonry Purposes
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C361	Standard Specification for Reinforced Concrete Low-Head Pressure Pipe
ASTM C443	Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C822	Standard Terminology Relating to Concrete Pipe and Related Products
ASTM D698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (Standard Proctor)
ASTM C924	Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method
ASTM C969	Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines
ASTM C1103	Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines

SRP 02227	Salt River Project Standard Specification for Slurry Backfill Materials
SRP 02230	Salt River Project Standard Specification for Aggregate Base, Select Material and Surface Material
CE 02.272	Salt River Project Standard Specification for Geotextiles
OSHA	General Industry Occupational Safety and Health Standards (29 CFR Part 1910)
OSHA	Safety and Health Standards for Construction (29 CFR Part 1926)
SRP ESRM	Salt River Project Excavation Safety Resource Manual

1.3.4 Exceptions to this specification require approval in writing by the Engineer prior to beginning the affected work.

1.4 Quality Assurance

As part of purchase agreement for pipe, Contractor shall stipulate that the Engineer shall have access to the following:

- a. Pipe manufacturing specifications.
- b. Certification of pipe by others.
- c. Pipe manufacturing quality control test results.
- d. Manufacturing facilities to observe manufacture of pipe.
- e. Testing facilities to observe testing of materials and pipe.

1.5 Delivery, Storage and Handling

1.5.1 Notify the Engineer of name and address of pipe seller a minimum of two working days before delivery of pipe.

1.5.2 Deliver only requested quantity of pipe to jobsite. Delivery of greater or lesser quantity of pipe requires advance approval of the Engineer.

1.5.3 Provide copy of D-load test documentation along with delivery for each production lot of pipe included in that delivery. Pipe shall not be installed if copy of D-load test information for that particular production lot/date is not available on site.

1.5.4 Integrity of pipe is responsibility of seller until pipe has been delivered and unloaded at jobsite. Contractor is responsible for protecting pipe from physical damage or loss after delivery at jobsite until acceptance of the Work by the Engineer.

1.6 Warranty

Contractor shall warranty material and workmanship for a period of one year from date of written final acceptance of pipeline by the Engineer; leaks, defects and deterioration shall be repaired/replaced at no cost to SRP. Contractor shall make repairs/replacements within 14 days, or if dry-up is required, during first available dry-up following notification of leak or deficiency.

2.0 PRODUCT

2.1 Type and Class of Pipe

Type and class of pipe required for project will be stated in project-specific specifications or shown on drawings.

2.2 Pipe Markings

Pipe shall be marked as required by the applicable ASTM specification.

2.3 Irrigation and Low Head Pressure Drain Pipe

2.3.1 Rubber gasketed reinforced concrete pipe (RGRCP) shall meet one of the following requirements:

- a. ASTM C361 and withstand minimum 10 PSI (70 kPa) hydrostatic test pressure.
- b. ASTM C76, class III, wall B and meet hydrostatic test requirements as specified in ASTM C14.

2.3.2 Reinforced concrete elliptical pipe (RCEP) shall meet requirements of ASTM C507 and withstand minimum 10 PSI (70 kPa) hydrostatic test pressure as specified in hydrostatic testing requirements of ASTM C361.

2.3.3 Premanufactured bend shall meet requirements of specification for type of pipe with which it is to be

used. Maximum angle of bend shall not exceed that shown on drawings. Premanufactured bends shall be manufactured in accordance with approved shop drawings; submit shop drawings to the Engineer for approval minimum two weeks prior to manufacture of bend.

2.4 Rubber Gasket Joints

2.4.1 Rubber gasket joints shall meet requirements of ASTM C443.

2.4.2 When pipe is supplied with gasket installed, gasket end of pipe shall be enclosed in weathertight protective covering.

2.5 Source Quality Control

2.5.1 External load crushing strength tests shall be in accordance with ASTM standard under which pipe was manufactured.

2.5.2 Pipe tests shall be performed at no cost to SRP at either pipe manufacturer's plant or at an independent testing facility acceptable to the Engineer.

2.6 Mortar/Grout

Mortar for repair of precast concrete pipe shall be composed of two parts sand to one part portland cement (by volume) and sufficient water to provide a plastic mixture. Up to one-fifth part hydrated lime may be added to adjust consistency of mix. Lime shall be in addition to and not a replacement for cement. Equal or similar mortar may be substituted with prior approval of the Engineer.

- a. Sand (aggregate) shall conform to requirements of ASTM C144.
- b. Portland cement shall conform to requirements of ASTM C150, Type II.
- c. Hydrated lime shall conform to requirements of ASTM C207, type N.

2.7 Pipe Diaper

Pipe diaper shall be made of Tyvar or other suitable fabric having porosity low enough to prevent loss of cement from grout. Edges of fabric shall be hemmed; steel strapping bands for securing diaper around pipe shall be sewn into outside edges of diaper.

2.8 Geotextiles

Geotextiles used to stabilize subgrade shall conform to requirements of CE 02.272.

2.9 Bedding

Granular fill used for Class C or better bedding shall be processed aggregate base material (ABC) meeting requirements of SRP 02230.

2.10 Backfill

2.10.1 Native material used for backfill shall meet following particle size requirements:

- a. Maximum 50 percent (by weight) retained on 3/4" (19 mm) sieve.
- b. From bedding to finish grade, native backfill shall not contain solid material exceeding three inches (75 mm) in greatest dimension or exceeding 1/3 distance between side of pipe and trench wall.

Suitability of native material for use as backfill for specific project will be determined by the Engineer.

2.10.2 Granular backfill material shall be processed aggregate base material (ABC) meeting requirements of SRP 02230.

2.10.3 Aggregate slurry backfill shall be processed (washed) aggregate base material (ABC) in slurry form meeting requirements of SRP 02227.

2.10.4 Lean mix backfill shall meet requirements of SRP 02227.

2.10.5 Unsuitable backfill materials include, but are not limited to, the following:

- a. Silt and clay soils which have moisture content significantly over optimum or which cannot be compacted to required density.
- b. Expansive soils.
- c. Sod, matted or decayed vegetation.
- d. Deleterious materials.

3.0 EXECUTION

3.1 Protection

3.1.1 Cost of excavation protection shall be included in excavation bid price.

3.1.2 Protect excavation and safeguard personnel as required for safety and conformance to governing law, including OSHA standards and SRP ESRM. The Engineer reserves the right to stop work deemed unsafe until unsafe condition is corrected by Contractor.

3.1.3 Maintain underground and overhead utilities in continuous service unless prior approval to interrupt service has been obtained from the Engineer. Locate conflicting utilities shown on drawings and identified in field. Comply with Blue Stake requirements for locating all utilities. Contractor shall be responsible for locating, protecting and repairing private lines. Pothole for true depths. Relocate conflicting utilities to resolve conflicts. Utilities identified before excavation and subsequently damaged by Contractor shall be repaired at Contractor's expense.

3.1.4 Contractor shall protect against and shall be liable for damage to buildings, foundations and structures.

3.1.5 Keep pipe trench free of water. Berm or otherwise protect trench from surface drainage and runoff. Failure to protect trench is not grounds for extension of irrigation outage.

3.1.6 Provide safe and convenient passage for pedestrians and vehicles. Maintain access to hospitals, fire stations, and fire hydrants at all times. Barricade or bridge trenches at end of day's work as specified by governing municipality/agency. The Engineer may designate additional points at which passage shall be provided.

3.1.7 Remove excess material from jobsite within 48 hours after backfilling trench. See paragraph 3.8.1 for disposal requirements. Treat loose material to control dust and to prevent pollution of runoff water as specified by governing municipality/agency.

3.2 Excavation

3.2.1 Comply with open trench length requirements of governing municipality/agency.

3.2.2 Alignments and elevations will be surveyed and staked by SRP, unless noted otherwise. Contractor shall

be responsible for protecting stakes. Restaking shall be at Contractor's expense.

3.2.3 Excavations shall conform to alignments, elevations, dimensions and tolerances indicated on drawings or in specifications. Do not begin excavation before establishment of alignments and elevations.

3.2.4 Trench width shall be as specified in Table 1 unless otherwise indicated on drawings or in project-specific specifications. Written approval of the Engineer is required prior to substitution of other pipe or bedding for that specified. From one foot (300 mm) above top of pipe, trench may be widened as necessary to accommodate sheeting, bracing and proper installation of pipe.

Size of Pipe (ID)	Maximum Width at Top of Pipe (Add to Barrel OD)	Minimum Width at Springline (Each Side of Pipe)
Less than 18 in. (450 mm)	16 in. (400 mm)	6 in. (150 mm)
18 in. to 24 in. (450-600 mm) inclusive	19 in. (475 mm)	8 in. (200 mm)
27 in. to 39 in. (675-975 mm) inclusive	22 in. (550 mm)	9 in. (225 mm)
42 in. to 60 in. (1050-1500 mm)	1/2 OD	12 in. (300 mm)
Over 60 in. (1500 mm)	36 in. (900 mm)	12 in. (300 mm)

3.2.5 When backfill below springline of pipe is to be mechanically compacted, minimum distance from all points on pipe at springline to edge of trench shall be width of compaction shoe plus two inches (50 mm).

3.2.6 When backfill from bottom of trench to springline or above is to be aggregate slurry, minimum distance from pipe at springline to edge of trench shall be three inches (75 mm).

3.2.7 Trench bottom shall be level for full width; remove, or fill and compact tooth marks greater than two inches (50 mm) deep. In rock, bottom of trench shall be overexcavated minimum six inches (150 mm) and filled with granular bedding material to provide smooth surface; compact granular bedding material for full width of trench to requirements shown on drawings.

3.2.8 Excavation carried beyond dimensions or elevations indicated on drawings without the Engineer's approval, shall be backfilled and compacted as directed by the Engineer at Contractor's expense.

3.3 Subgrade

3.3.1 Existing subgrade material and subgrade fill material shall be compacted to a minimum of 85 percent of maximum density and moisture content shall be between four percent below and two percent above optimum moisture content as determined per ASTM D698, unless noted otherwise in specifications or drawings.

3.3.2 Suitability of subgrade will be determined by the Engineer prior to placement of bedding.

3.3.3 Unsuitable subgrade materials include, but are not limited to, the following:

- a. Silt and clay soils which have moisture content significantly over optimum or which cannot be compacted to required density.
- b. Expansive soils.
- c. Sod, matted or decayed vegetation.
- d. Deleterious materials.

3.3.4 Treatment of existing subgrade material which exceeds optimum moisture content by more than two percent must be approved by the Engineer. Method of treatment shall be submitted in writing to the Engineer for approval.

3.3.5 Remove unsuitable materials, soil that cannot be dried to meet moisture content specified in paragraph 3.3.1 and soil that cannot attain a maximum dry density of 85 percent. Overexcavate trench minimum two feet (600 mm) each side of pipe bell at springline and maximum four feet (1200 mm) below elevation indicated on drawings, or to suitable subgrade, whichever occurs first. Dispose of removed material in accordance with paragraph 3.8.1. Fill overexcavation with granular material (ABC) to grade indicated on drawings and compact to 95 percent of optimum density per ASTM D698.

3.3.6 Subgrade soils which are unsuitable only because of high moisture content may be left in place and stabilized using geotextiles, if approved by the Engineer. Geotextile shall comply with requirements of CE 02.272. Subgrade preparation, placement of geotextiles, and

placement and compaction of fill material shall be in accordance with geotextile manufacturer's recommendations.

3.4 Bedding

3.4.1 Bedding requirements shall be as called for on drawings. Class C bedding or better is required unless otherwise specified on drawings, on license or in project-specific specifications.

3.4.2 Remove loose material, rocks, deleterious material, and debris from trench bottom prior to placing bedding material.

3.4.3 Bedding material shall be at a uniform moisture content of between optimum and five percent above optimum; compact to density required in 3.6.3 Compaction in one foot (300 mm) or smaller uncompacted lifts.

3.4.4 Finish and compact bedding to elevation indicated on drawings; assure that bedding will provide continuous support for pipe.

3.4.5 Excavate bell holes with minimum two inch (50 mm) clearance to prevent point loading of laid pipe and to maintain continuous support of pipe barrel. Excavate cable holes to prevent movement of pipe when removing sling.

3.4.6 Added or disturbed bedding material shall be compacted to densities required in 3.6.3. Compaction.

3.5 Pipe Installation

3.5.1 General

- a. Install pipe to alignment and elevation shown on drawings. Variation from indicated alignment and elevation shall not exceed 0.1 foot (30 mm), and the rate of departure from or return to indicated alignment and elevation shall be no more than 0.1 foot (30 mm) in ten feet (3000 mm), unless otherwise approved by the Engineer. Bends shall be within one-half pipe section of station shown on drawings. All changes in station require prior approval of the Engineer. Contractor shall mark approved changes in stationing, based on measurement of installed pipe, on drawings and shall supply marked drawings to the Engineer.
- b. Lay pipeline with minimum horizontal separation of two feet (600 mm) from parallel utilities and with minimum one foot (300 mm)

vertical separation from utilities which cross below pipeline. No overcrossings of SRP irrigation pipe will be allowed without approval of the Engineer. Notify the Engineer immediately if it is found that a utility will be closer to pipeline than specified minimum separation.

- c. Install elliptical pipe and elliptically reinforced pipe with vertical axis within ten degrees of true vertical.
- d. Gaps in pipeline during installation due to utility conflicts will not be allowed unless otherwise approved by the Engineer.

3.5.2 Joint Assembly

- a. Rubber gasketed joints (C76 and C361 pipe): Lay pipe with bell ends facing in direction of laying unless otherwise approved by the Engineer. Begin laying pipe at lower end of slope and proceed upward on grades which exceed ten percent. Only use gaskets and lubricant supplied by pipe seller. Clean joint mating surfaces and gasket before joining pipes. Apply generous, uniform coating of gasket lubricant to inside surface of bell end of pipe, in groove portion of spigot, and on gasket. Install gasket in accordance with pipe seller's instructions. Keep joint from contacting ground when inserting pipe spigot into bell. Use industry approved methods to push or pull pipe to complete joint closure.
- b. Tongue and groove mortar joints (C507 pipe): Clean joint mating surfaces prior to joining pipes. Thoroughly wet tongue and groove with water and keep moist until mortar is placed; use brush to apply water. Apply mortar to upper half of tongue and to bottom half of groove in a manner which will fill entire joint. Use industry approved methods to push or pull pipe into position until mortar is squeezed from both inside and outside of joint. Adjust pipe to design alignment and grade; secure pipe section firmly in position using a small amount of bedding material placed and tamped thoroughly against lower portion of pipe at midpoint of length. Remove excess mortar from interior joint and finish interior joint recess smooth and flush with inside of pipe; remove all debris.

If adjustment of position of pipe is required after it has been laid, remove pipe, clean and rejoin it.

Keep the finishing of exterior joints between five and two sections of pipe behind pipe laying operations. Complete outside of joint by covering with hand-placed mortar band extending completely around outside of pipe. As soon as mortar band has set sufficiently, coat it with white-pigmented curing compound conforming to ASTM C309, Type 2, Class A, or provide a suitable moist cure acceptable to the Engineer.

- c. Pipe diaper joints: Grout bands may be placed by diapering when specifically authorized by the Engineer.

After joining pipe, center and secure diaper over the exterior joint recess. Diaper shall completely and snugly encase the exterior joint except for an opening at the top; width of diaper is governed by size of pipe. Moisten joint recess with water prior to grout placement. Form grout band around pipe by pumping grout into opening of diaper; pump grout to one side of pipe until it flows completely under bottom of pipe and partially up other side, then pump to opposite side to fill diaper and complete grout band. Close opening in diaper. Keep grout band moist until trench is backfilled and band is covered.

3.5.3 Radius Curves

- a. Gasketed joints: Long radius curves shall be made by using pipe manufactured with beveled ends or by pulling pipe joints of straight sections of pipe (deflecting pipe unit from straight alignment by opening one side of the outside perimeter of the joint wider than the other side) as it is laid. Maximum opening of pulled joint is $\frac{1}{2}$ " (13 mm) wider than width of joint when pipe is assembled in straight alignment. Deflections requiring outside joint to be pulled more than $\frac{1}{2}$ " (13 mm) shall be considered to be field bends.
- b. Field bends and grade changes: Use reinforced pipe collar to make joints at field bends up to and including 45° (degrees) and grade changes.

Collar for reinforced concrete pipe shall be of mechanically compacted, reinforced, minimum 3000 psi (20 MPa) concrete. Outside of collar shall be made by forming; inside of collar shall conform to inside diameter of pipe. Maintain full pipe cross-section and smoothness through length of bend or grade change. Ensure that forming material is completely removed from inside pipe.

- c. Precast Bends: Shall be as shown on drawings. Submit shop drawings of precast bends to the Engineer for approval; approval of the Engineer is required before beginning fabrication of precast bends.

3.5.4 Branch Connections

Type, size, location and angle of branch connections for irrigation pipe will be shown on drawings. Shop drawings are required for all pre-fabricated connections; submit shop drawings for approval of the Engineer.

3.5.5 Repairs

- a. Repair tie holes, minor cracks and depressions in pipe surface with cement based, rapid setting mortar such as Speed Crete 2028 (Tammis Industries Co.) or approved equal. Clean and moisten surface before applying mortar.
- b. If new or existing pipe has 0.01 inch (0.3 mm) or wider crack(s) notify the Engineer and request inspection of the pipe.

Repair 0.01 inch (0.3 mm) or wider cracks in an otherwise acceptable section of pipe with epoxy grout approved by the Engineer. V-groove inside cracks minimum 1/4 inch (6 mm) deep. Clean area prior to repair.

If crack goes through pipe wall or if structural integrity of pipe is in question, the Engineer may, at his option, require removal of damaged pipe and replacement with new.

- c. Finished surface of inside repairs shall be smooth and flush with inside pipe surface.
- d. Repairs shall not reduce inside pipe diameter.

3.5.6 Plugs

- a. Temporarily cover or plug installed piping systems each day at end of work. Covers or plugs shall prevent entry of persons, small animals or deleterious material into pipe.
- b. Completely remove all temporary covers, plugs, caps or dikes installed during construction before completion of construction.

3.6 Backfilling

3.6.1 General

- a. Unless otherwise noted on drawings or in project-specific specifications, backfill shall be as noted in 2.10 Backfill.
- b. Moisture content of backfill shall be as noted in paragraph 3.6.2.
- c. Do not disturb or damage pipe when backfilling trenches. Place backfill evenly on opposite sides of pipe to prevent movement of pipe.
- d. Lift thickness shall not exceed that which can be effectively compacted by type of equipment and method used. Maximum uncompacted lift thickness for processed or native granular material shall be limited to one foot (300 mm); maximum uncompacted lift thickness for non-granular native material shall be limited to eight inches (200 mm). Do not allow mechanical compaction equipment to come into direct contact with pipe.
- e. Place and consolidate lean mix backfill and aggregate slurry backfill in lift depths that will not cause pipe to move or float. Discharge backfill directly from mixer into trench with even distribution on opposite sides of pipe. Backfill shall flow freely and uniformly around and under pipe without leaving voids; vibrate backfill to consolidate when slump is less than six inches (150 mm) or whenever required to fill voids.

3.6.2 Moisture Content

- a. Contractor shall have sole responsibility to control moisture content of backfill. Optimum moisture content of backfill shall be determined in accordance with ASTM D698. Moisture

content which is outside of range specified shall be sufficient cause to require removal of placed backfill.

- b. Moisture condition backfill material before placement, unless otherwise approved by the Engineer.
- c. Place granular material, except for aggregate slurry, at a uniform moisture content of between optimum and three percent above optimum.
- d. Place aggregate slurry with water content as specified in SRP 02227. The Engineer may require increase or decrease in water content to obtain desired slump.
- e. Place native material, which does not meet requirements for classification as granular material, at a uniform moisture content of between three percent below to two percent above optimum.

3.6.3 Compaction

Compact or consolidate bedding and backfill to, at minimum, density specified in Table 2. Where conflicting density requirements exist, use highest density. Test density in accordance with ASTM D698. Bedding or backfill not meeting density requirements shall be removed/reworked at Contractor's expense.

3.6.4 Field Quality Control

- a. Inspection and compaction tests are required on trench backfill. Compaction tests are not required on lean mix backfill meeting requirements of SRP 02227.
- b. The Engineer will verify density and moisture content of bedding and backfill material during construction. Tests will be made at discretion of the Engineer.
- c. Backfill lifts shall not be covered before compaction tests are performed. If lift is covered prior to testing, Contractor is at own risk and shall excavate test holes for making density tests on lower portions of backfill at instruction of the Engineer. Refill and compact test holes in accordance with specifications. Excavating, refilling and compacting test holes shall be at Contractor's expense.

Compaction Type	Location	From Surface to 2' (600 mm) Below Surface	From 2' (600 mm) Below Surface to 1' (300 mm) Above Top of Pipe	From 1' (300 mm) Above Top of Pipe to Bottom of Trench
I	Under any existing or proposed pavement, curb, gutter, sidewalk, or such construction included in the contract, or when any part of the trench excavation is within 2' (600 mm) of the above.	100% for granular, 95% for non-granular	90%	90%
II	On any utility easement, street, road or alley right-of-way outside limits of (I).	85%	85%	90%
III	Around any structures or exposed utilities.	95%	95%	95%

3.7 Field Test

3.7.1 The Engineer may, at his option, require Contractor to test integrity of installed pipeline or joints. Pipeline and joint tests shall be made at Contractor's expense. The Engineer will monitor field testing.

3.7.2 Pipeline tests shall be in accordance with ASTM C969. Test pressure shall correspond to maximum operating head condition stipulated by SRP Watermaster responsible for that area. Test period shall be 24 hours. The availability of water for pipeline field tests is entirely at the option and convenience of SRP.

3.7.3 Joint tests shall be in accordance with ASTM C924 for 24" (600 mm) pipe or smaller and ASTM C1103 for 27" (675 mm) pipe or larger.

3.7.4 Contractor shall repair all deficiencies revealed by field testing. Tests shall be successfully completed prior to final acceptance of the pipeline.

3.8 Cleanup

3.8.1 Remove unsuitable material and excess spoil material from jobsite and dispose of at SRP approved disposal site, unless otherwise directed by the Engineer. Removal and disposal of material shall be at Contractor's expense.

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3.8.2 Dress grades adjacent to the work as needed to return site to like original condition, unless otherwise directed by the Engineer.

3.8.3 All work and property of SRP and/or others damaged or destroyed by Contractor, its employees or Subcontractors shall be repaired or replaced at Contractor's expense to the satisfaction of the Engineer.

SALT RIVER PROJECT
STANDARD SPECIFICATION
FOR
REINFORCING STEEL
(SRP 03210)

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STANDARD SPECIFICATION
FOR
REINFORCING STEEL
(SRP 03210)

1.0 GENERAL

1.1 Work Specified

This Specification covers the furnishing of all shop drawings, plant, labor, materials, tools, equipment and performing all operations and incidentals necessary for supplying reinforcing steel, plain steel dowels and bar supports.

1.2 Work Performed by Purchaser

When construction work is performed by Purchaser, the term Contractor shall mean the reinforcing steel supplier.

1.3 Standard Units

Either English or SI (metric) units may be used. Whichever units are specified on the drawings shall be considered standard for that project. Substitution between English and SI products will be allowed, provided that at least equivalent cross-sectional area is furnished.

1.4 Reference Standards

1.4.1 Reference to standards or specifications shall be interpreted to mean the latest revision unless otherwise noted.

1.4.2 The following abbreviations appear in this Specification:

ACI	American Concrete Institute
ASTM	American Society for Testing and Material
CRSI	Concrete Reinforcing Steel Institute

1.4.3 The following standards shall be made a part of this Specification:

ACI 315	Details and Detailing of Concrete Reinforcement
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ACI 318/318M	Building Code Requirements for Reinforced Concrete
ACI SP-66	ACI Detailing Manual
ASTM A36/A36M	Standard Specification for Carbon Structural Steel
ASTM A82	Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A185	Standard Specification for Steel Welded Wire Fabric, Plain for Concrete Reinforcement
ASTM A615/ A615M	Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A775/ A775M	Standard Specification for Epoxy-Coated Reinforcing Steel Bars
CRSI Handbook	Concrete Reinforcing Steel Institute Handbook

1.4.4 Exceptions to this Specification must be approved in writing by the Engineer prior to beginning the affected work.

1.5 Submittals

1.5.1 Shop Drawings

- a. Two prints of each shop drawing shall be submitted to the Engineer for review and approval. The Engineer will require at least three working days for review of shop drawings.
- b. Shop drawings shall include placement drawings, bar list, bending details, standees and spreader bars, and schedules for fabrication and delivery of reinforcing steel.
- c. Shop drawings shall be checked and signed prior to submittal.
- d. The Engineer will return one print of each shop drawing marked "Approved", "Approved as Noted", or "Not Approved". Submittals that are marked "Approved as Noted" or "Not Approved" shall be corrected and resubmitted. Each revision shall be dated.

- e. The Engineer's approval of submittals shall not relieve Contractor from responsibility for compliance with Drawings, Specifications and other Contract Documents nor from responsibility for errors in submittals.
- f. Fabrication shall not begin until all shop drawings are approved by the Engineer.
- g. Four sets of prints and one vellum of each final approved shop drawing shall be provided to the Engineer. The Engineer will distribute shop drawings to jobsite Foreman and Inspector when construction work is performed by Purchaser.

1.5.2 Two copies of original material manufacturer's Material Test Reports (MTR) for reinforcing steel shall be submitted to the Engineer prior to shipment.

1.5.3 Two copies of manufacturer's catalog data for each splicing device or other specialty item shall be submitted to the Engineer prior to shipment.

1.6 Storage and Handling

1.6.1 Reinforcing steel shall be protected during shipping and unloading to prevent damage to material or loss of identification tags.

1.6.2 Reinforcing steel shall be stored above grade and in such a manner as to prevent contamination with dirt, rust, oil or other bond-breaking coatings.

1.6.3 Damaged, misfabricated or deteriorated materials, not caused by Purchaser's actions, shall be replaced by Contractor at no additional cost to Purchaser.

2.0 PRODUCT

2.1 Reinforcing Steel

2.1.1 All reinforcing steel shall comply with the following standards:

- a. Bars shall conform to ASTM A615, Grade 60 (ASTM A615M, Grade 400) unless noted otherwise.
- b. Epoxy-coated bars shall conform to ASTM A775/A775M.

- c. Plain steel wire reinforcement shall conform to ASTM A82.
- d. Plain steel welded wire fabric shall conform to ASTM A185.
- e. Plain steel dowels shall conform to ASTM A36/A36M.

2.1.2 All material shall be new and free from loose rust, loose mill scale, dirt, oil and paint.

2.1.3 Reinforcing steel with tightly adhered mill scale or rust or a combination of both will be acceptable provided the minimum dimensions (including deformations) and weight of a hand wire-brushed test specimen are not less than acceptable ASTM requirements.

2.2 Bar Supports

2.2.1 Chairs and bolsters shall be steel, plastic or concrete, and shall be of size and dimensions necessary to perform required function.

2.2.2 Standees shall be furnished with the reinforcing steel when top and bottom mats in slabs are shown on the drawings. Maximum standee spacing shall be 4 feet (1200 mm) each way.

2.2.3 Spreader bars shall be furnished with the reinforcing steel when reinforcing in both faces of walls is shown on the drawings and the concrete pour height in such walls exceeds 8 feet (2400 mm). Maximum spreader bar spacing shall be 4 feet (1200 mm) each way.

2.3 Specialty Items

Materials not specifically described, but required for complete and proper installation of reinforcing steel, shall be approved by the Engineer prior to use.

2.4 Drawing Requirements

2.4.1 All placement drawings shall have a clear area within the border in lower right corner for Purchaser's drawing number to be affixed by the Engineer.

2.4.2 Letters, figures and line work on reproducibles shall be clear and dense enough to reproduce legibly on prints. Background shall be free of blemishes which would show on reproduction.

2.4.3 Drawings and data shall be in sufficient detail to indicate the type, size, arrangement and weight of each component.

2.5 Fabrication

2.5.1 All reinforcing steel shall be shop fabricated in accordance with approved shop drawings.

2.5.2 All bars shall be bent cold.

2.5.3 Welding reinforcing steel will not be allowed.

2.5.4 Fabrication details and tolerances shall comply with requirements of ACI 315.

2.6 Quality Assurance

2.6.1 All material shall be subject to inspection by the Engineer. Materials not meeting the requirements of this Specification will be rejected. Reinforcing steel may be rejected at fabrication plant or at jobsite. The Contractor shall be responsible for all Purchaser's direct and indirect costs for removal and replacement of rejected reinforcing steel. Inspection may be waived by the Engineer but such waiver shall not be interpreted as releasing Contractor from responsibility for delivery of materials conforming to this Specification.

2.6.2 Each bundle shall be tagged with quantity, bar size, and piece mark in accordance with approved shop drawings. A complete shipping list shall be provided for each shipment. Failure of Contractor to comply with these requirements will result in rejection of the shipment.

3.0 EXECUTION

None

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FOR
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(SRP 03300)

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STANDARD SPECIFICATION
FOR
CONCRETE
(SRP 03300)

1.0 GENERAL

1.1 Work Specified

This specification covers the furnishing of all plant, labor, materials and equipment necessary for mixing and delivering normal weight portland cement concrete ready for placement.

1.2 Work Performed by Purchaser

When construction work is performed by Purchaser, the term Contractor shall mean the concrete supplier.

1.3 Standard Units

When both English and SI (metric) units are stated, the English units are the standard. The SI units are approximations listed for information only.

1.4 Reference Standards

1.4.1 Reference to standards or specifications shall be interpreted to mean the latest revision unless noted otherwise.

1.4.2 The following abbreviations appear in this Specification:

ACI	American Concrete Institute
ARPA	Arizona Rock Products Association
ASTM	American Society for Testing and Materials
MAG	Maricopa Association of Governments
NRMCA	National Ready-Mixed Concrete Association
SRP	Salt River Project

1.4.3 The following standards shall be made a part of this Specification:

ACI 301	Specifications for Structural Concrete for Buildings
ACI 305R	Hot Weather Concreting
ACI 306.1	Standard Specification for Cold Weather Concreting
ACI 318/318M	Building Code Requirements for Reinforced Concrete
ASTM C31	Standard Practice for Making and Curing Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C42	Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C138	Standard Test Method for Unit Weight, Yield, and Air Contents (Gravimetric) of Concrete
ASTM C143	Standard Test Method for Slump of Hydraulic Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C233	Standard Test Method for Air-Entraining Admixtures for Concrete
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete

ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete
ASTM C1064	Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
ASTM D512	Standard Test Methods for Chloride Ion in Water
ASTM D516	Standard Test Method for Sulfate Ion in Water

1.4.4 Exceptions to this specification must be approved in writing by the Engineer prior to beginning the affected work.

1.5 Submittals

1.5.1 Contractor shall submit the following items for each mix to be supplied:

- a. Plant certification
- b. Cement certification and mill test report
- c. Fly ash certification
- d. Fly ash replacement ratio
- e. Source and gradation of fine and coarse aggregate
- f. Admixture brand and certification
- g. Source of water and certification
- h. Mix design
- i. Mix design performance/trial batch data

1.5.2 Concrete supplier shall use SRP Stock Code Numbers, but may assign mix design product codes in addition to SRP Stock Code Numbers specified in Table 1 (Page 10).

1.6 Quality Assurance

1.6.1 Each batch plant from which concrete supplier intends to provide concrete must have current NRMCA, ARPA or equivalent laboratory certification.

1.6.2 Concrete supplier shall provide documentation that an Arizona-registered professional engineer has reviewed mix design and other submittals prior to submitting to Purchaser for review and approval.

1.6.3 Concrete supplier shall provide access to batch plant for sampling/inspection of materials and equipment.

1.7 Storage and Handling

1.7.1 Materials shall be stored and handled in a manner that prevents deterioration, segregation, or intrusion of foreign matter.

1.7.2 Storage of aggregate on natural ground surface will be permitted if bottom six inches of pile is not used in batching.

2.0 PRODUCT

2.1 Cement

Cement shall be portland cement, Type II, low alkali, moderate heat of hydration, conforming to ASTM C150. Equivalent alkali content shall not exceed 0.6 percent, per Table 2, ASTM C150.

2.2 Aggregate

Coarse and fine aggregate shall conform to ASTM C33.

2.3 Water

Water for washing aggregate and for mixing concrete shall be potable or shall meet requirements of ASTM C94. If potable water is not used, concrete supplier shall have independent testing laboratory perform chemical analysis of water certifying suitability in accordance with ASTM D512 and ASTM D516.

2.4 Admixtures

2.4.1 Admixtures shall not be used or substituted without prior written approval of the Engineer.

2.4.2 Air-Entraining Admixtures

- a. Air-entraining admixtures shall conform to ASTM C260.
- b. Air-entraining admixtures shall be tested in accordance with ASTM C233.
- c. Air content, unless specified otherwise, shall conform to ACI 318, Table 4.2.1, moderate exposure. Tolerance for air content as delivered shall be ± 1.5 percent.

2.4.3 Water-Reducing, Retarding, and Accelerating Admixtures

- a. Water-reducing, retarding, and accelerating admixtures shall conform to ASTM C494.
- b. Chloride admixtures shall not be used.

2.4.4 Superplasticizers

- a. Superplasticizers shall conform to ASTM C494, Type F or G.
- b. Superplasticizer may be added at batch plant or at jobsite.

2.5 Fly Ash

2.5.1 Fly ash shall be used in all mix designs, unless noted otherwise in Table 1.

2.5.2 Fly ash shall conform to ASTM C618, Class F.

2.5.3 Fly ash shall be compatible with cement and shall not react deleteriously with alkalis in cement. Concrete supplier shall have fly ash sampled and tested in accordance with ASTM C311.

2.5.4 Maximum 20 percent of weight of cement required for mix design may be replaced when using fly ash. Concrete supplier shall be responsible to determine replacement ratio for each pound of replaced cement to maintain specified compressive strength f_c .

2.6 Proportioning of Mix

2.6.1 Source, character or gradation of materials shall not be changed without prior written approval of the Engineer.

2.6.2 Mix shall be homogeneous, readily placeable and uniformly workable. Proportioning of ingredients shall produce consistency, durability, workability, specified compressive strength f_c , and other properties as required per reference standards in Section 1.4.

2.7 Measurement of Materials

Material shall be measured in accordance with ASTM C94.

2.8 Mixing

2.8.1 Mixing shall follow the procedures in accordance with ASTM C94.

2.8.2 Water, or cement and water, shall not be added at the jobsite unless concrete supplier has received prior written approval from the Engineer.

2.9 Delivery

2.9.1 Ready-mix concrete shall be produced and delivered in accordance with ASTM C94. Concrete that is outside the temperature range of 55°F (13 °C) to 90 °F (32 °C), or has attained its initial set upon arrival at jobsite, as determined by the Engineer, will be rejected at Contractor's cost. Engineer may waive these limitations if slump is such that concrete can be placed without addition of water. Concrete shall be discharged within 1-1/2 hours after initial mixing water has been added to cement and aggregate.

2.9.2 Concrete supplier shall be responsible to make corrections to bring mix to specified slump. Only one addition of water to bring mix to specified slump shall be allowed. Mix not meeting slump requirements will be rejected.

2.9.3 Batch out time of truck shall be machine-stamped on delivery ticket at concrete supplier's plant. A copy of delivery ticket having machine-stamped batch out time shall be given to the Engineer at time of delivery. Concrete deliveries without machine-stamped batch out time on delivery ticket shall be rejected.

2.9.4 Concrete shall be delivered within 30 minutes of requested delivery time. Time-lapse between successive deliveries shall not vary by more than 20 minutes from that requested. The Engineer may reject any batch not meeting these requirements.

2.10 Hot Weather Concreting

2.10.1 During conditions of high temperature, low relative humidity, or wind which might impair quality of concrete, setting time shall be delayed by using proper admixtures.

2.10.2 Hot weather concreting shall be in accordance with ACI 305R. The concrete temperature during discharge shall not exceed 90° F (32° C).

2.11 Cold Weather Concreting

Cold weather concreting shall be in accordance with ACI 306.1. Concrete temperature during discharge shall not be less than 55° F (13° C).

2.12 Direct and Indirect Costs

Direct and indirect costs incurred by Purchaser due to failure to meet requirements of this specification shall be paid by Contractor.

3.0 EXECUTION

3.1 Testing, Strength Compliance, and Acceptance of Concrete

3.1.1 Testing

- a. Frequency for sampling concrete for strength compliance will be in accordance with ACI 318 or as specified by the Engineer.
- b. Concrete samples will be taken directly from transit mix truck. Sampling and testing will be in accordance with the following standards:

ASTM C138	Unit Weight & Yield
ASTM C143	Slump
ASTM C172	Sampling
ASTM C231	Air
ASTM C1064	Temperature

- c. Concrete strength specimens will be made in accordance with ASTM C31. Test specimens will be 4" (100 mm) diameter by 8" (200 mm) long cylinders.
- d. Test cylinders will be tested in accordance with ASTM C39.

3.1.2 Testing specified in Section 3.1.1 will be performed by the Engineer at no cost to Contractor.

3.1.3 Compliance With Compressive Strength Provisions

Compressive strength will be considered satisfactory if test results meet following requirements:

- a. 7-day average compressive strength, per strength test (average of two cylinders) equals or exceeds 70 percent specified compressive strength f_c .
- b. 28-day average compressive strength of all sets of three consecutive strength tests equals or exceeds specified compressive strength f_c .
- c. No individual strength test (average of two cylinders) falls more than 500 psi (3 Mpa) below specified compressive strength f_c when at least three strength tests are made.
- d. When less than three strength tests are made, no individual cylinder strength falls below specified compressive strength f_c .

3.1.4 Failure to Meet Compliance Requirements

- a. Failure to meet requirements of Section 3.1.3a indicates that potentially low-strength concrete has been delivered. Contractor will be notified of potential problem for remedial action.
- b. Failure to meet requirements of Section 3.1.3b or Section 3.1.3c shall be basis for investigation of low-strength concrete per Section 3.1.5.
- c. Failure to meet requirements of Section 3.1.3d will be basis for investigation of low-strength concrete per Section 3.1.5.

3.1.5 Investigation of Low-Strength Concrete

- a. A set of three cores representing each strength test shall be taken.
- b. Cores shall be taken within 72 hours of testing for 28-day compressive strength or as specified by the Engineer, in accordance with ASTM C42 and tested in accordance with ASTM C39.
- c. Contractor shall be responsible for costs associated with investigation of low-strength concrete. However, Contractor's cost will be reimbursed if requirements of Section 3.1.6 have been satisfied.

3.1.6 Acceptance of Low-Strength Concrete

Concrete in an area represented by core tests will be considered acceptable if the average of three cores is minimum 85 percent specified compressive strength f_c and no single core is less than 75 percent specified compressive strength f_c .

3.1.7 Rejection of Low-Strength Concrete

Concrete failing to meet acceptance requirements of Section 3.1.6 will be rejected. Contractor shall be responsible for direct and indirect costs of removal and replacement of rejected concrete.

TABLE 1
CONCRETE MIXES

SRP Stock Code Number	Description	Specified Compressive Strength @ 28 Days f _c Psi (Mpa)	Coarse Aggregate Max. Size in. (mm) ASTM C33 Table 2	Slump Range in. (mm)	Maximum Water/ Cementitious Material Ratio (By Wt.)	Remarks	
0000220	MAG C or Canal Bottom	2,000 (15)	1 (25) #57	3-5 (75-125)	N/A		
0000221	Slipform		1/2 (12.5) #7	3-4 (75-100)	N/A	Min. cement 423 lbs/yd ³ (250 Kg/m ³)	
0000222	Masonry Grout		3/8 (9.5) #8	4-6 (100-150)	0.60		
0000230	MAG A or Normal	3,000 (20)	1 (25) #57	3-5 (75-125)	N/A		
0000231	Flowable			6-8 (150-200)	0.55	Use superplasticizer	
0000232	C.I.P. Pipe 42 in. (1050 mm) & larger		3/4 (19) #67	2-3 (50-75)			
0000233	C.I.P. Pipe 36 in. (900 mm) & smaller Cable Trench		1/2 (12.5) #7	3-4 (75-100)			
0000234	Shotcrete		3/8 (9.5) #8	3-5 (75-125)	0.47	75-85% Coarse aggregate passing 3/8 in. (9.5mm) sieve	
0000235	Ditchmix				0.60		
0000240	MAG AA or Normal		4,000 (30)	1 (25) #57	3-5 (75-125)	N/A	
0000241	Normal with air	6-8 (150-200)			0.50	Use superplasticizer	
0000242	Flowable						
0000243	Flowable with air						
0000244	Precast without flyash	1/2 (12.5) #7		3-5 (75-125)			
0000250	Normal	5,000 (35)	1 (25) #57	3-5 (75-125)	0.45	Use superplasticizer	
0000251	Normal with air			6-8 (150-200)			
0000252	Flowable						
0000253	Flowable with air						
0000254	Normal without flyash		1/2 (12.5) #7	3-5 (75-125)			
0000255	Normal with small aggregate						
0000256	Normal with small aggregate & without flyash						

SALT RIVER PROJECT
 GENERATION ENGINEERING
STANDARD SPECIFICATION
FOR
CONCRETE FORMWORK AND PLACEMENT
 (GE 03305)

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STANDARD SPECIFICATION
FOR
CONCRETE FORMWORK AND PLACEMENT
(GE 03305)

1.0 GENERAL

1.1 Work Specified

This Specification covers the furnishing of labor, equipment and materials needed to form, place, consolidate, finish and cure cast-in-place concrete.

1.2 Reference Standards

1.2.1 Reference to standards or specifications shall be interpreted to mean the latest revision unless noted otherwise.

1.2.2 The following abbreviations appear in this Specification:

ACI	American Concrete Institute
ASTM	American Society for Testing and Materials
CRSI	Concrete Reinforcing Steel Institute
SRP	Salt River Project

1.2.3 The following Standards shall be made a part of this Specification:

ACI 117	Standard Specification for Tolerances for Concrete Construction and Materials
ACI 302	Guide for Concrete Floor and Slab Construction
ACI 304R	Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 304	Placing Concrete by Pumping Methods
ACI 305R	Hot Weather Concreting
ACI 306.1	Standard Specification for Cold Weather Concreting

ACI 308	Standard Practice for Curing Concrete
ACI 309R	Guide for Consolidation of Concrete
ACI 318/318M	Building Code Requirements for Reinforced Concrete
ACI 347R	Guide to Formwork for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C920	Standard Specification for Elastomeric Joint Sealants
ASTM D1752	Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
CRSI	CRSI Recommended Practice for Placing Reinforcing Bars
SRP 03210	Salt River Project Standard Specification for Reinforcing Steel
SRP 03300	Salt River Project Standard Specification for Concrete
GE 07920	Generation Engineering Standard Specification for Caulking and Sealants

1.2.4 Exceptions to this specification must be approved in writing by the Engineer prior to beginning the affected work.

1.3 Submittals

Fabrication and placement drawings for reinforcing steel and embedded items, mix designs, and Manufacturer's Material Safety Data Sheets (MSDS) for chemicals shall be submitted to the Engineer for approval at least five working days prior to placement of concrete. Work shall not proceed until submittals have been approved by the Engineer.

2.0 PRODUCT

2.1 Materials

2.1.1 Concrete shall conform to SRP 03300.

2.1.2 Reinforcing steel shall conform to SRP 03210.

2.1.3 Waterstop shall be dumbbell shape extruded elastomeric polyvinyl chloride of type, width and thickness specified on Drawings.

2.1.4 Expansion joint filler material shall be preformed neoprene sponge rubber conforming to ASTM D1752, Type I.

2.1.5 Elastomeric sealants for expansion and control joints shall conform to GE 07920. Polyethylene foam backer rod shall be used for back-up of cold-applied elastomeric sealants.

2.1.6 Sealants in fuel or chemically active water containments shall be compatible with properties of stored material.

2.2 Curing Compound

Curing compound shall conform to ASTM C309. Type 1-D, Class A clear resin compound shall be used for interior applications. Type 1-D, Class A clear resin compound with fugitive dye or Type 2, Class A white-pigmented wax emulsion compound shall be used for exterior applications.

2.3 Form Lumber

Form lumber in contact with exposed concrete surfaces shall be new and shall conform to the following:

- a. Structural Plywood, Class I or II. High-density overlay shall be used when highly smooth, grain-free concrete surface is required.
- b. Dimension lumber, Douglas Fir or Larch, Number 2 grade, seasoned and surfaced all sides.

2.4 Metal Forms

A commercial metal forming system or combination metal and plywood forming system may be used provided it is straight, clean and assembled to manufacturer's instructions.

2.5 Other Accessories

2.5.1 Form accessories such as, but not limited to, styrofoam form liners or fiberglass may be used.

2.5.2 Form accessories or other embedded items which are to be partially or entirely embedded in concrete shall be of a commercially manufactured type.

2.5.3 Aluminum pipe which is to be embedded in concrete shall be completely taped with Polyken two-inch wide pipe wrap, spiral wrapped with 50% overlap.

2.5.4 Reinforcing bar supports shall conform to CRSI Class 3 (bright wire) for use in contact with formed surfaces that will not be exposed, and CRSI Class 1 (plastic tipped or coated) for use in contact with formed surfaces that will be exposed.

2.5.5 Concrete block or plastic reinforcing bar supports may also be used.

3.0 EXECUTION

3.1 Forming

3.1.1 Contractor shall be responsible for design and construction of forms, in accordance with ACI 347R. Forms shall have adequate strength to support weight of fresh concrete and added loads imposed by workers, wind and construction equipment.

3.1.2 Forms shall be designed, constructed, braced, and maintained so that finished concrete will be true to line and elevation, and will conform to dimensions and contours specified in Contract Documents. Forms shall be sufficiently tight to prevent leakage of mortar paste.

3.1.3 Reusable forms shall be maintained and kept in good condition as to accuracy of shape, strength, rigidity, watertightness, and smoothness of surface. Forms unsatisfactory to the Engineer shall not be used.

3.1.4 Three-quarter inch chamfer shall be provided in forms at exposed corners and edges of concrete. Horizontal edges of curved forms may be radiused with an edging tool.

3.1.5 Forms shall be treated with form-release agent which will not adhere to or discolor concrete. Form-release agent shall be cleaned from rebar and other embedded items prior to concrete placement.

3.1.6 Shear keys in construction joints shall be formed prior to concrete placement.

3.2 Reinforcing Steel Placement

3.2.1 Reinforcing steel shall be positioned on supports, spacers or hangers and secured in place with wire ties or clips. Welding of reinforcing steel and embedded items will not be permitted.

3.2.2 Reinforcing steel shown on Drawings is the minimum required. Additional bars may be added for working supports, at Contractor's expense, provided these do not interfere with concrete placement or violate concrete cover requirements.

3.2.3 Solid grout or concrete blocks or non-eroding chairs or bolsters shall be used to position bottom mat of slab reinforcing steel.

3.2.4 The following minimum concrete cover shall be provided for reinforcing steel, unless noted otherwise in Contract Documents:

- | | | |
|----|------------------------------------------------------------|--------------|
| a. | Concrete cast against and permanently exposed to earth: | 3 inches |
| b. | Concrete exposed to earth or weather: | |
| | #6 through #18 bars | 2 inches |
| | #5 bar, W31 or D31 wire, and smaller | 1-1/2 inches |
| c. | Concrete not exposed to weather nor in contact with earth: | |
| | Slabs, Walls, Joists: | |
| | #11 bar and smaller | 3/4 inch |
| | #14 and #18 bars | 1-1/2 inches |
| | Beams, Columns: | |
| | Primary Reinforcement, Ties,
Stirrups, Spirals | 1-1/2 inches |

3.2.5 Contact splices of reinforcing steel are preferred. Noncontact splices shall be spaced no farther apart transversely than 1/5 required lap splice length nor six inches clear distance.

3.3 Waterstop Installation

Waterstop shall be accurately located and properly braced to prevent movement during placement of concrete. Waterstop shall be clean and free of dirt, grease or concrete splatter. Splices shall be kept minimum, but when unavoidable, splices shall be made using teflon coated splicing iron to assure watertight joints. Prefabricated intersections shall be used where possible.

3.4 Concrete Placement

3.4.1 Contractor shall notify the Engineer at least 24 hours in advance of each proposed concrete placement. Installation of anchor bolts, reinforcing steel, embedded items, and forms shall be approved by the Engineer prior to concrete placement.

3.4.2 Unless specifically waived by the Engineer, concrete placement shall be done in the presence of the Engineer and shall not commence until the work has been authorized to proceed.

3.4.3 Concrete slabs on grade shall be placed on undisturbed soil or compacted subgrade. Frozen subgrade or subgrade that contains frozen materials will not be acceptable.

3.4.4 Forms and construction joint surfaces shall be clean and free of foreign materials. Sandblasting, water-blasting, or other methods specified in ACI 304R shall be used to achieve a clean interface at construction joints.

3.4.5 Subgrade shall be dampened and excess water removed prior to placement of concrete on grade. Wooden forms that will be in contact with concrete shall be thoroughly moistened unless wood has been properly treated with form release agent. When ambient temperature exceeds 90°F, fog nozzles shall be used to cool reinforcing steel and forms prior to concrete placement. When temperature of reinforcing steel is greater than 120°F, steel forms and reinforcing steel shall be sprayed with water just prior to placing concrete. During cold weather (mean daily temperature below 40°F), ice, snow and frost shall be removed from reinforcing steel and placement areas and temperature of all surfaces which will be in contact with fresh concrete shall be raised to minimum 40°F. Minimum concrete temperature of 50°F shall be maintained during and after placement.

3.4.6 Concrete from mixer shall be conveyed and deposited in place by methods which will prevent segregation or loss of materials. Where concrete trucks cannot access jobsite, concrete shall be pumped or conveyed, or energy dissipating chutes (elephant trunks) shall be used.

3.4.7 Equipment for chuting and pumping concrete shall be of a size and design that can provide a continuous flow of concrete at the delivery end. Aluminum conveying equipment shall not be used.

3.4.8 Mud, soil or foreign matter shall be prevented from entering concrete or forms during placement operations.

3.4.9 Concrete in walls shall be placed continuously in level layers not exceeding two feet thick, so that no cold joints form. Prior to concrete placement, Contractor shall make arrangements to assure uninterrupted delivery of concrete.

3.4.10 Beams and floor slabs shall be placed in one continuous operation unless noted otherwise.

3.4.11 Grade beams, pedestals, columns, and walls shall be placed monolithic, without joints, unless noted otherwise.

3.4.12 Construction joints for walls shall be placed at maximum ten feet height unless noted otherwise.

3.5 Consolidation

3.5.1 Concrete shall be compacted thoroughly into a dense homogeneous mass throughout entire depth of layer being consolidated.

3.5.2 Concrete for slabs, drilled piers, footings, and walls shall be consolidated by vibration, spading or rodding so that concrete is thoroughly worked around reinforcing steel, conduit, embedded items and into corners of forms. Manual consolidation methods for structural concrete placement shall not be used. Structural concrete slab surface shall not be hand tamped when concrete has four inch or greater slump.

3.5.3 Adequate number of vibrators of sufficient capacity shall be provided to keep up with maximum rate of concrete placement. An adequate supply of standby equipment, including a minimum of one vibrator, shall be kept at jobsite.

3.5.4 Internal vibrators shall be inserted vertically through the full depth of layer being placed, penetrating into the previous layer. Vibrator shall not be dragged, but inserted and withdrawn slowly with vibrator running continuously so that no void is left in concrete. Vibrator shall not be used to flow concrete from one location to another.

3.5.5 Concrete shall be vibrated until it is thoroughly consolidated and voids are filled as evidenced by level appearance of concrete at exposed surface and embedment of surface aggregate.

3.5.6 Form vibrators may be used only where sections are too thin or inaccessible for internal vibrators.

3.6 Finishing

3.6.1 Concrete for foundations shall be finished so that free water will not collect on surface.

3.6.2 Threads on anchor bolts and reinforcing steel dowels shall be protected from concrete buildup and/or splatter. Threads on anchor bolts shall be cleaned so that nuts turn freely without interference.

3.6.3 Exposed concrete surfaces for floor slabs shall have final finish conforming to ACI 302.1R unless noted otherwise.

3.6.4 Floor slabs which are to be covered with resilient flooring or coatings shall have smooth, steel trowel finish.

3.6.5 Slabs on which concrete pedestals are to be placed shall have rough, scored finish.

3.6.6 All other exposed concrete surfaces shall have formed or smooth, steel trowel finish, unless noted otherwise.

3.6.7 Control joints may be formed or sawcut. Sawcutting shall be done during initial setting of concrete, but in no case later than 12 hours after completion of concrete placement. Sawcut shall extend full design length. Wall and edge conflicts will preclude use of sawcutting.

3.6.8 Exposed concrete shall be free from irregularities, fins, rock pockets, or other imperfections. Defective concrete surfaces including misalignment and holes from form ties, shall be repaired. Defective surfaces shall be repaired prior to placement of backfill. Repairs to defective surfaces shall be made in following manner:

- a. Surface shall be chipped back to minimum depth of one-half inch beyond imperfection. Edges shall be chipped perpendicular to surface, and the depression shall be pre-wetted and brushed with neat cement immediately before patching.

- b. Mortar used for patching shall have same sand-cement ratio as original concrete with minimum water for placing. Color of existing concrete shall be matched at exposed surfaces.
- c. Mortar to patch form-tie holes shall be applied with hammer and ramming rod within 24 hours of removal of wall forms and shall be struck flush.
- d. Repairs shall be cured by moistening for three days or by using curing compound.

3.7 Curing

3.7.1 Concrete surfaces shall be cured by methods recommended in ACI 308, ACI 305R or ACI 306.1. The following are acceptable methods:

- a. Using saturated burlap, soaker hoses, or sprinklers to keep concrete continuously wet for minimum seven days.
- b. Covering concrete with polyethylene sheets, other than black film, applied in full contact with surfaces and sealed around edges.
- c. Applying curing compound to unformed concrete surfaces within one hour after applying finish. Curing compound shall be applied to formed concrete within one hour after stripping forms. Where epoxy coating or staining of concrete is required, curing compound shall contain no waxes, paraffins or oils. Curing compound shall be applied by spraying with uniform coverage, at rate recommended by manufacturer.

3.7.2 Curing compound shall not be used on concrete surfaces which are to be in contact with grout; if curing compound is used, concrete surfaces shall be sandblasted prior to placing grout. Other means of surface cleaning, such as high pressure water blasting/water jetting, will also be acceptable.

3.7.3 If concrete shows tendency to set and dry too rapidly, form shrinkage cracks or form cold joints, concrete shall be kept moist using fog spray, wet burlap, cotton mats, or other method(s) acceptable to the Engineer.

3.7.4 Concrete placed during cold weather shall be protected with insulating blankets or heated enclosures. Fresh concrete shall not be exposed to carbon monoxide or carbon dioxide fumes from heaters or engines.

3.8 Form Removal

3.8.1 Forms shall not be relieved of load or removed without approval of the Engineer. Formwork for structural slabs shall not be removed until concrete has attained 70 percent specified minimum compressive design strength ($f'c$) or until

seven days, whichever occurs first. Formwork for structural walls shall remain in place for minimum 24 hours after concrete placement. Side forms for nonstructural members may be removed, at Contractor's risk, after concrete has set.

3.8.2 70 percent specified minimum compressive design strength (f_c) shall be required before backfilling against walls or application of loads.

3.9 Tolerances

Tolerances for concrete construction shall conform to ACI 117. Following tolerances are maximum, noncumulative, variations from dimensions shown on Contract Documents.

- a. Plumbness in lines and surfaces of concrete walls, columns and piers:

In any 10 feet	1/4 inch
Maximum for total structure height	1/2 inch
- b. Cross-sectional dimensions of columns, beams, walls and slab thickness:

Up to 12 inches	+ 3/8 inch/- 1/4 inch
More than 12 inches	+ 1/2 inch/- 3/8 inch
- c. Footings, Horizontal Dimensions:

Formed Excavation	+ 2 inches/- 1/2 inch
Unformed Excavation	+ 3 inches
- d. Minimum Concrete Cover:

Beams, Walls & Columns	- 0 inch
------------------------	----------
- e. Finished Slab Surfaces:

Maximum depression in floors shall not exceed 3/16 inch below a 10 foot straightedge.
- f. Anchor bolts shall be plumb and to the following tolerances:

Bolt projection	+1/4 inch/- 0 inch
Bolt location (without sleeves)	\pm 1/8 inch
Bolt location (with sleeves)	\pm 3/16 inch

Top of plastic anchor bolt sleeves shall be cut off flush with rough concrete just prior to grouting or setting equipment and base plates.

3.10 Quality Control

3.10.1 Reinforcing steel setting, embedded items, electrical grounding wires and form accessories will be inspected by the Engineer prior to concrete placement. Concrete shall not be placed until all items have been approved by

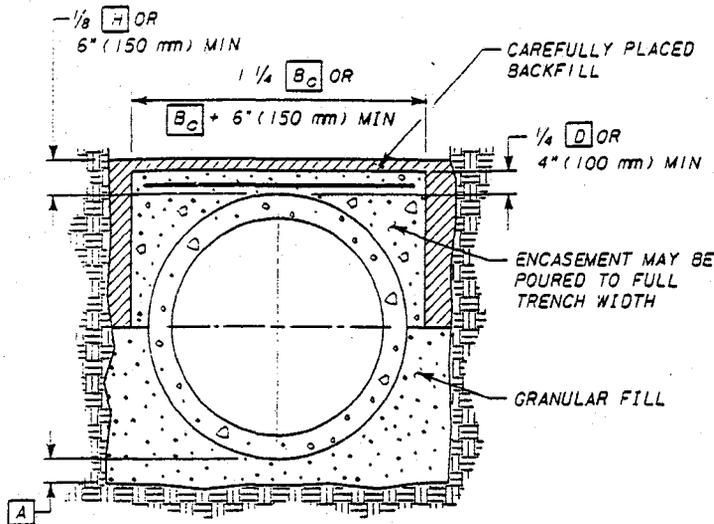
the Engineer. Contractor shall bear cost of delays in concrete placement caused by not providing sufficient inspection time or for making corrections to comply with requirements.

3.10.2 Concrete Testing

- a. The Engineer will furnish test equipment and trained personnel to perform required field tests and to make required test cylinders.
- b. The Engineer shall be provided access and adequate time for securing samples to determine whether materials are in accordance with Contract Documents.
- c. The Engineer may select and pay an independent testing laboratory to perform required laboratory tests.
- d. Testing, strength compliance, and acceptance of concrete will be in accordance with SRP 03300.
- e. Contractor has right to observe all phases of concrete cylinder fabrication, curing and testing. Should Contractor observe deviations from the prescribed testing procedure that may be detrimental to concrete strength test results, Contractor shall immediately notify the Engineer.
- f. The Engineer may require modifications of materials on the basis of field or laboratory tests. Contractor shall make such modifications at his own expense.

3.10.3 Contractor shall have sole responsibility for meeting concrete placement requirements. Inspection by the Engineer shall not relieve Contractor of responsibility for errors or deviations from specifications.

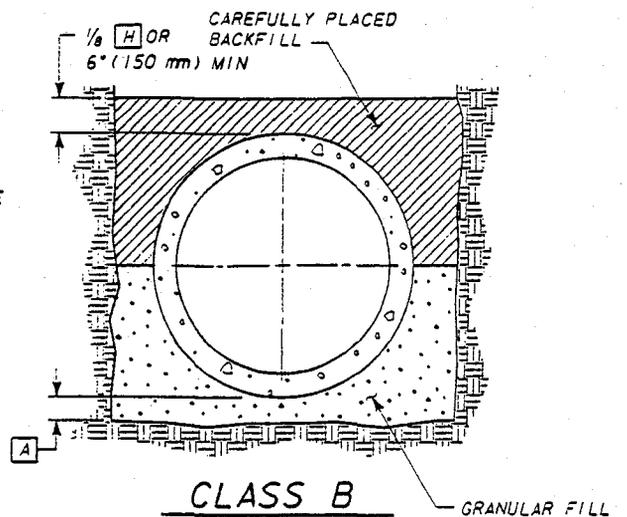
3.10.4 Concrete rejected by the Engineer for nonconformance shall be corrected to conform to specifications or removed and replaced. Contractor shall be responsible for direct and indirect costs of correction, removal and replacement of rejected concrete, including costs incurred by the Engineer.



CLASS A
ARCH ENCASUREMENT

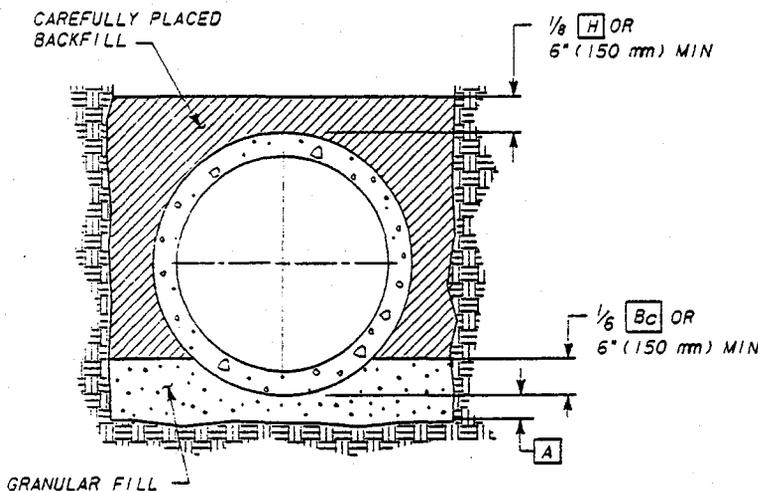
LOAD FACTOR $\left[\begin{array}{l} \text{REINFORCED, } A_s = 0.40\% = 3.5 \\ \text{REINFORCED, } A_s = 1.00\% = 4.8 \\ \text{PLAIN} = 2.8 \end{array} \right.$

A_s = PERCENTAGE OF AREA OF TRANSVERSE STEEL IN THE CONCRETE ABOVE CROWN OF PIPE



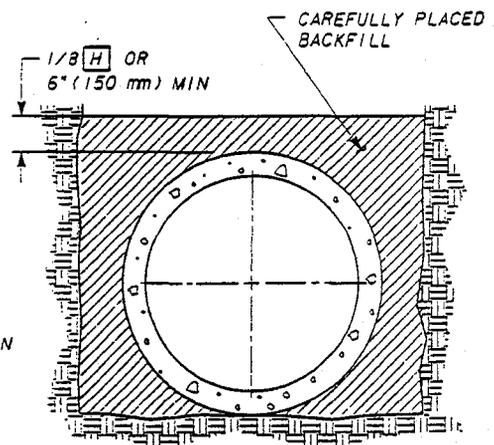
CLASS B
FIRST-CLASS BEDDING

LOAD FACTOR 1.9



CLASS C
ORDINARY BEDDING

LOAD FACTOR 1.5



CLASS D
FLAT BOTTOM BEDDING

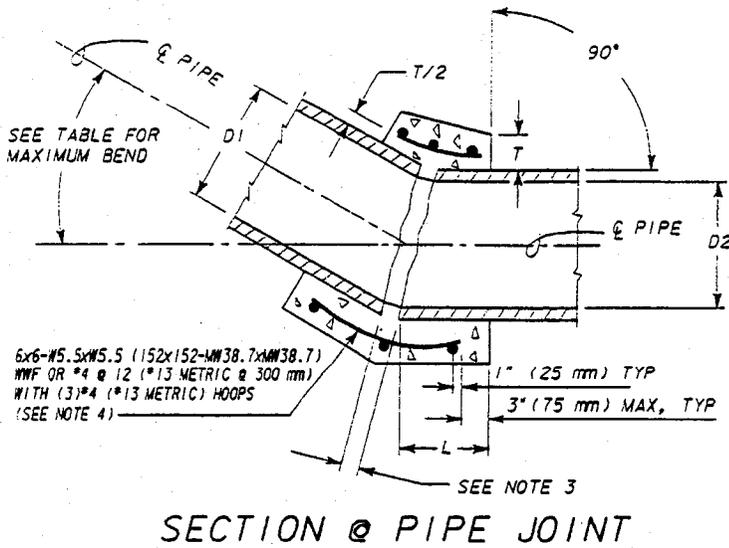
LOAD FACTOR 1.15

TABLE OF FILL DEPTHS BELOW PIPE	
D DIAMETER	A MINIMUM
36" (900 mm) & SMALLER	4" (100 mm)
OVER 36" (900 mm)	1/12 OF Bc

H = DEPTH OF FILL ABOVE TOP OF PIPE

Bc = OUTSIDE DIMENSION OF PIPE

REFERENCES	REVISIONS	SALT RIVER PROJECT WATER ENGINEERING STANDARDS																													
PRECAST CONCRETE PIPE SPECIFICATION WTR 02614	<table border="1"> <tr> <th>REV NO</th> <th>DATE</th> <th>DFTR</th> <th>CHKR</th> <th>ENGR</th> <th>SUP</th> <th>ISSUE</th> </tr> <tr> <td>0</td> <td>2/89</td> <td>AK</td> <td>WJC</td> <td>REL</td> <td>AAR</td> <td>TNS</td> </tr> <tr> <td colspan="7">ADDED METRIC DIMENSIONS</td> </tr> <tr> <td>1</td> <td>4/97</td> <td>MD</td> <td>---</td> <td>CWT</td> <td>---</td> <td>CBK</td> </tr> </table>	REV NO	DATE	DFTR	CHKR	ENGR	SUP	ISSUE	0	2/89	AK	WJC	REL	AAR	TNS	ADDED METRIC DIMENSIONS							1	4/97	MD	---	CWT	---	CBK	<p>PIPELINE BEDDING/BACKFILL REQUIREMENTS</p>	
REV NO	DATE	DFTR	CHKR	ENGR	SUP	ISSUE																									
0	2/89	AK	WJC	REL	AAR	TNS																									
ADDED METRIC DIMENSIONS																															
1	4/97	MD	---	CWT	---	CBK																									
		SCALE: NONE	P92: (129, 236) 3030001. WES																												
		DWG SIZE	17 X 22	WES-30300-001																											



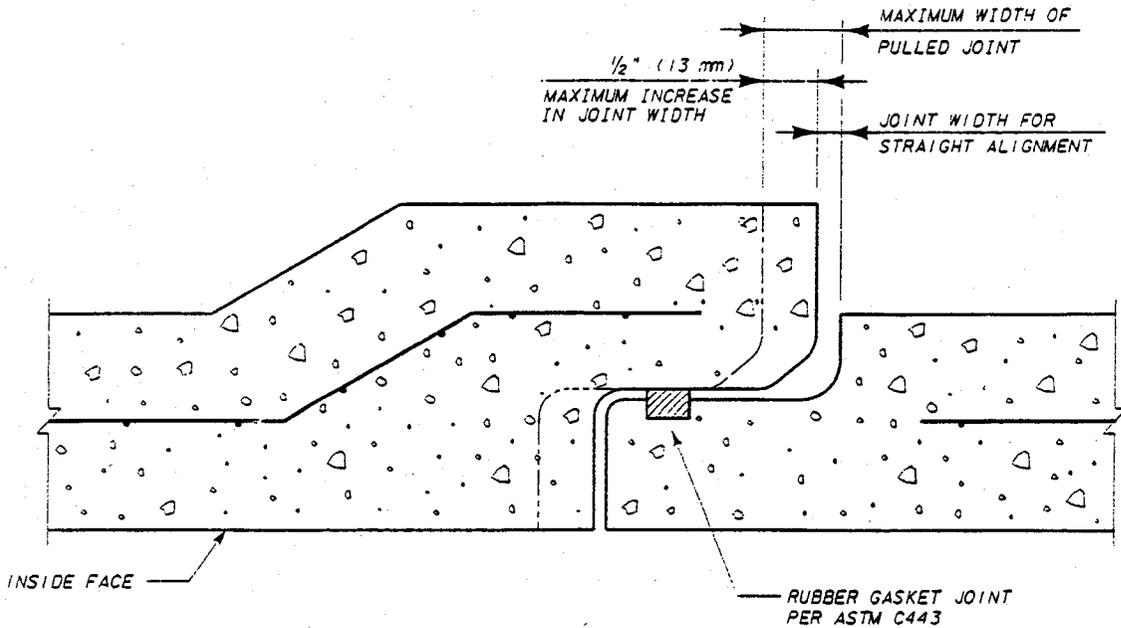
D	L	T	MAXIMUM BEND
12" (300 mm)	12" (300 mm)	6" (150 mm)	22 1/2°
24" (600 mm)	12" (300 mm)	6" (150 mm)	30°
36" (900 mm)	18" (450 mm)	8" (200 mm)	45°*
48" (1200 mm)	18" (450 mm)	10" (250 mm)	
54" (1350 mm)	18" (450 mm)	10" (250 mm)	
60" (1500 mm)	21" (525 mm)	11" (275 mm)	
66" (1650 mm)	24" (600 mm)	11" (275 mm)	
72" (1800 mm)	24" (600 mm)	11" (275 mm)	
78" (1950 mm)	24" (600 mm)	12" (300 mm)	
84" (2100 mm)	30" (750 mm)	12" (300 mm)	
90" (2250 mm)	30" (750 mm)	12" (300 mm)	
96" (2400 mm)	30" (750 mm)	12" (300 mm)	

* 30" (750 mm) PIPE OR LARGER

NOTES:

1. A CONCRETE COLLAR IS REQUIRED WHERE PIPES OF DIFFERENT DIAMETERS OR MATERIALS ARE JOINED, OR WHERE A CHANGE IN ALIGNMENT OR GRADE EXCEEDS THAT ALLOWED FOR AN ORDINARY JOINT.
2. D-D1 OR D2, WHICHEVER IS GREATER. FOR PIPE SIZES NOT LISTED USE NEXT LARGER SIZE.
3. PIPE ENDS SHALL BE TRIMMED SUCH THAT THE MAXIMUM DISTANCE BETWEEN PIPES AT ANY POINT IS 2" (50 mm).
4. THE DIAMETER OF THE WWF OR REBAR HOOPS SHALL BE THE OUTSIDE DIAMETER OF THE PIPE PLUS "T". LAP SHALL BE 12" (300 mm).
5. CONCRETE COLLARS SHALL BE FINISHED SMOOTH AND FLUSH WITH THE INSIDE SURFACE OF THE PIPE.
6. ALL CONCRETE SHALL BE A MINIMUM OF 3000 PSI (20 MPa) AT 28 DAYS AND SHALL BE CONSOLIDATED BY MECHANICAL VIBRATOR OR EQUIVALENT METHOD.
7. ALL WELDED WIRE FABRIC (WWF) SHALL BE ASTM A185 AND ALL REINFORCING STEEL BARS SHALL BE ASTM A615 GR 40 (ASTM A615M GR 400) MINIMUM.
8. ALL FORMS SHALL BE REMOVED PRIOR TO BACKFILLING.

REFERENCES	REVISIONS							SALT RIVER PROJECT WATER ENGINEERING STANDARDS		
	REV NO	DATE	DFTR	CHKR	ENGR CHK	SUPV APPC	ISSUE AUTH	STANDARD CONCRETE PIPE COLLAR		
	1	09/88	AK	WJC	TCTN		TNS			
	2	1/90	AK	WJC	LAB	REL	TNS			
	REVISED TABLE (ADDED ANGLES) & ADDED METRIC DIMENSIONS									SCALE: NONE
	3	5/97	WD		CWT			DWG SIZE 17 x 22	WES-30300-003	

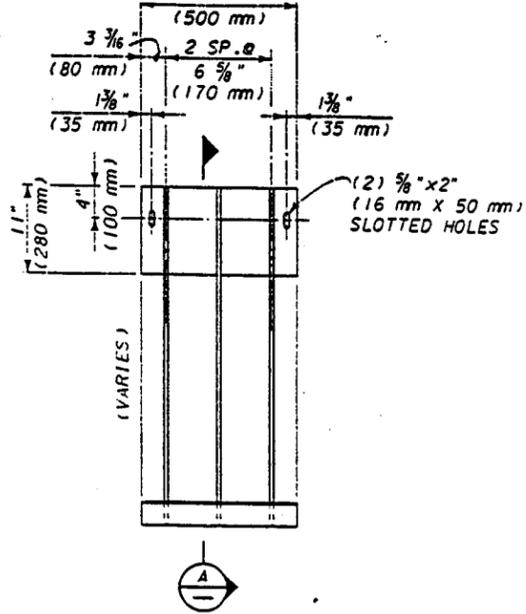


SECTION THRU PIPE JOINT

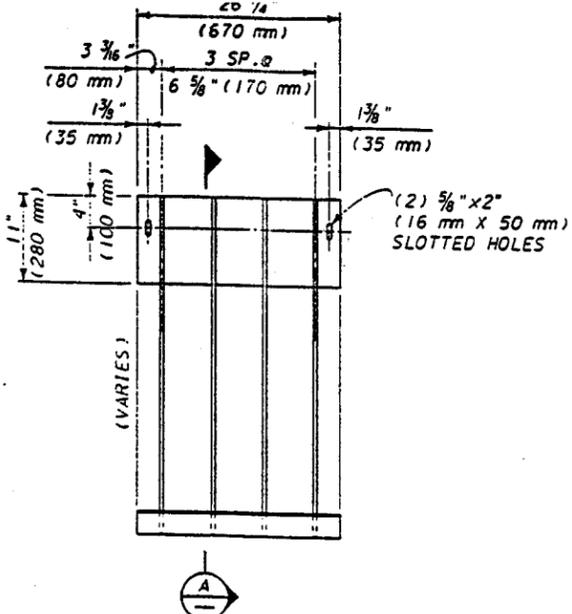
NOTES:

1. THIS DETAIL IS FOR A TYPICAL RUBBER GASKET BELL & SPIGOT ASSEMBLY. FLUSH BELL RUBBER GASKET JOINTS MUST MEET THE SAME SPECIFICATIONS.

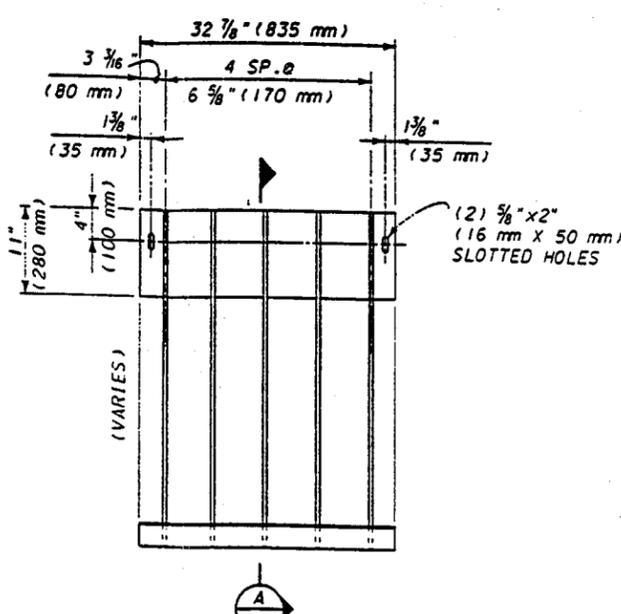
REFERENCES		REVISIONS							SALT RIVER PROJECT WATER ENGINEERING STANDARDS		
PRECAST CONCRETE PIPE SPECIFICATION _____ WTR 02614		REV NO	DATE	DFTR	CHKR	ENGR CHK	SUPV APPD	ISSUE AUTH	<p style="text-align: center;">RUBBER GASKET JOINTS</p>		
		INITIAL ISSUE									
		0	2/89	AK	WJC	REL	AAR	TNS			
		REVISED TO ASTM C433 STANDARD									
		1	5/97	NW		CWT		<i>[Signature]</i>			
									SCALE: NONE	P02-C120.23613030004.WES	
									DWG SIZE	WES-30300-004	
									17 x 22		



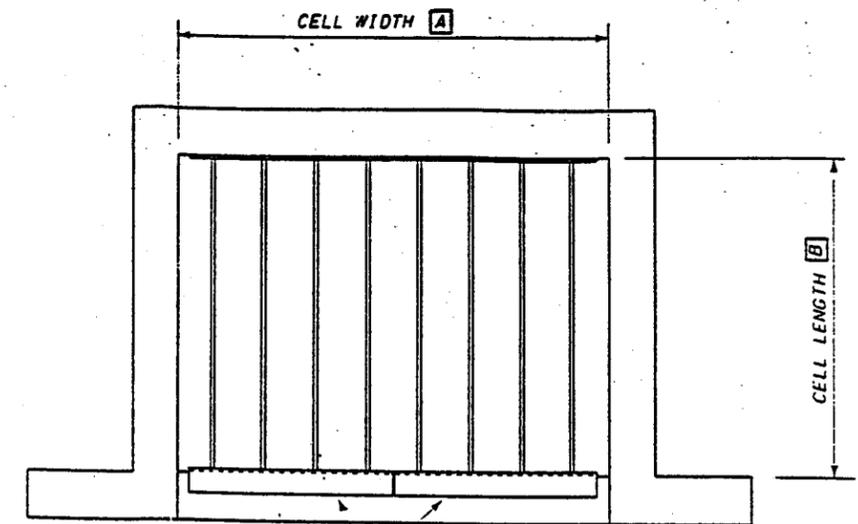
TRASHRACK-TYPE I



TRASHRACK-TYPE II



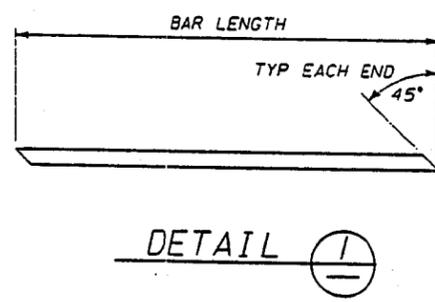
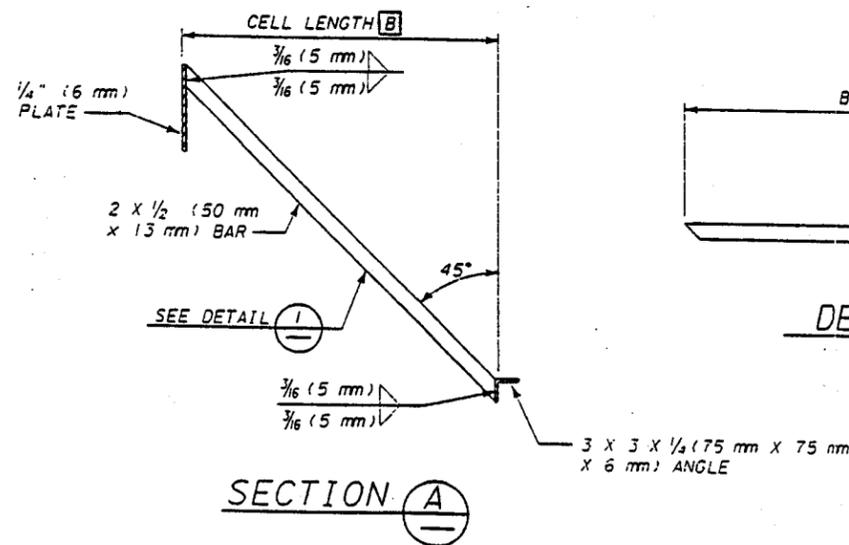
TRASHRACK-TYPE III



SEE TRASHRACK SCHEDULE FOR NUMBERS AND TYPES OF TRASHRACKS REQUIRED FOR VARYING CELL WIDTHS.

HEADWALL KEY PLAN

TRASHRACK SCHEDULE			
HEADWALL CELL WIDTH [A]	NUMBER OF PANELS REQUIRED		
	TYPE I	TYPE II	TYPE III
32" (813 mm)		1	
40" (1016 mm)			1
48" (1219 mm)	1	1	
56" (1422 mm)		2	
64" (1626 mm)		1	1
72" (1829 mm)			2
80" (2032 mm)	1	2	
88" (2235 mm)		2	1
96" (2438 mm)		1	2
108" (2743 mm)	2		2
120" (3048 mm)		2	2
132" (3353 mm)		1	3
144" (3658 mm)	2		3
156" (3962 mm)	1		4
168" (4267 mm)			5
180" (4572 mm)	1	1	4
192" (4877 mm)	1		5



TRASHRACK BAR LENGTH SCHEDULE	
HEADWALL CELL LENGTH [B]	BAR LENGTH
16" (406 mm)	23 1/8" (608 mm)
24" (610 mm)	35 1/4" (895 mm)
32" (813 mm)	46 5/8" (1183 mm)
40" (1016 mm)	57 7/8" (1470 mm)
48" (1219 mm)	69 1/8" (1757 mm)
56" (1422 mm)	80 1/2" (2045 mm)

CONTRACTOR NOTE:
 TRASHRACK(S) MUST BE MANUFACTURED PRIOR TO REQUESTING A IRRIGATION OUTAGE FOR THIS JOB.
 TRASHRACKS AND ASSOCIATED HARDWARE CAN BE SUPPLIED BY SALT RIVER PROJECT UPON REQUEST. PLEASE CALL THE MECHANICAL CONSTRUCTION & MAINTENANCE DIVISION OF SRP FOR PRICE QUOTES: (602)236-4154.

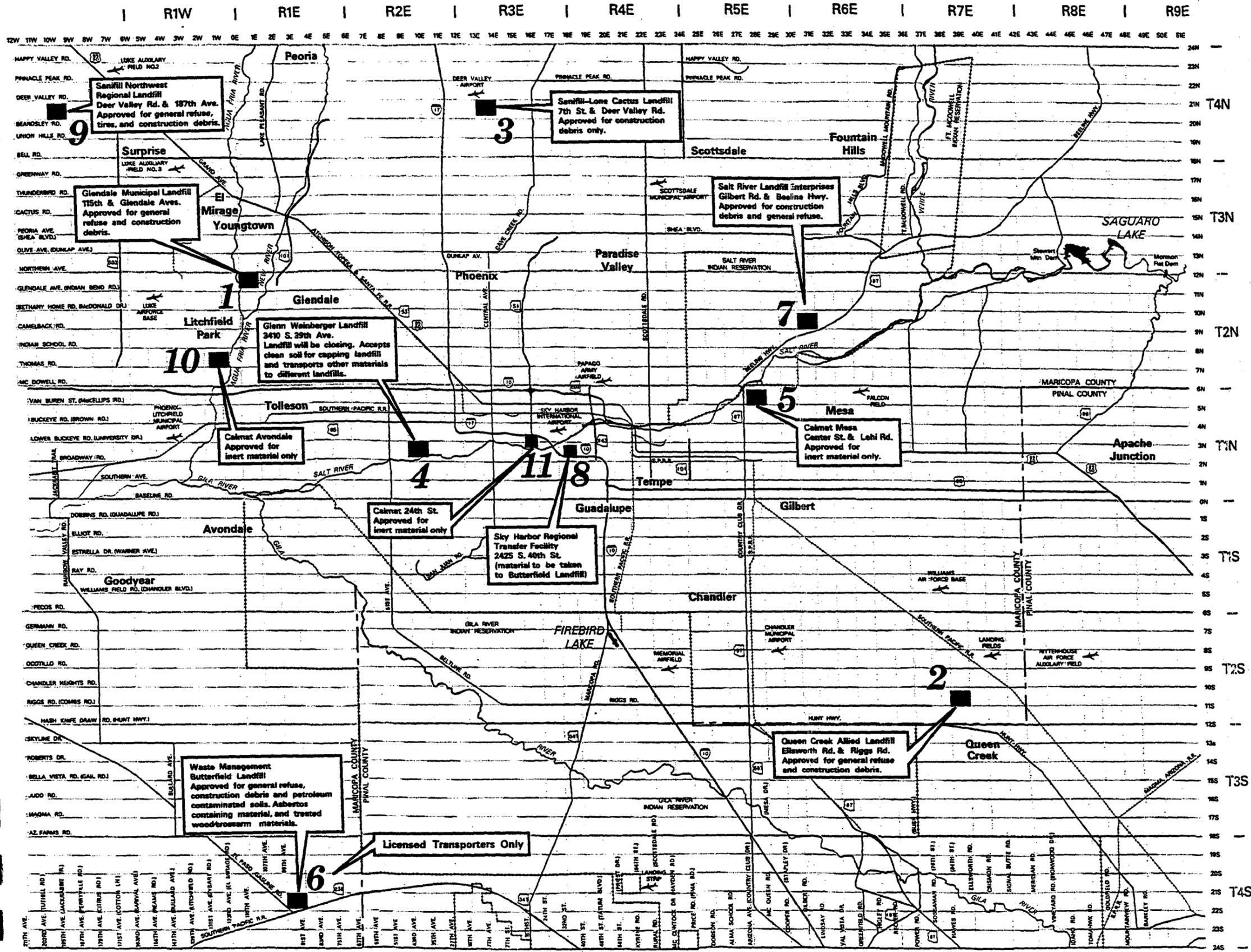
- NOTES:**
- UNLESS OTHERWISE SPECIFIED, TOLERANCE DIMENSIONS SHALL BE $\pm 1/32$ " (1 mm).
 - ALL STEEL SHALL BE ASTM A36 UNLESS OTHERWISE NOTED.
 - SANDBLAST TO NEAR WHITE AND ZINC METAL SPRAY OR HOT DIP GALVANIZE 5-7 MILS (0.127-0.178 mm) AFTER FABRICATION.

REFERENCES		REVISIONS						SALT RIVER PROJECT WATER ENGINEERING STANDARD	
REV NO.	DFTR	DSGN	ENGR CHK	ISSUE AUTH	DATE	 45° TRASHRACK FOR PIPELINE HEADWALL			
2	MOD		CWT	REL	5/23/97				
REVISED CONTRACTOR NOTE									
1 MOD CWT MLK PEL 06/20/96						SCALE: NONE	P02: (120, 236) 30350200.WES		
						22X34	WES-30350-200		

SRP APPROVED LANDFILLS

LEGEND

-  County Boundary
-  Indian Reservation Boundary
-  Approved Landfill Sites



CONSTRUCTION DEBRIS includes solid waste from construction, repair, or remodeling of buildings or other structures (does not include asbestos-containing material or treated wood poles or crossarm material)

GENERAL REFUSE includes solid waste such as garbage, trash, rubbish, refuse, and household waste.

INERT MATERIAL includes uncontaminated concrete, asphalt pavement, brick, rock, gravel, sand and soil. (can include metal but only if used as reinforcement in concrete.)

No Liquids or Lighting Wastes to any Landfill.

Contact Environmental Compliance Division, x6330, x3457, x2811, or x8077, for disposal of any petroleum contaminated soil or asbestos containing material.

Contact Environmental, Health & Safety Audits at x-8118 for approval of any landfills not shown on map.

**Federal Wage and
Labor Requirements**

**Federal Wage and
Labor Requirements**

FEDERAL WAGE AND LABOR REQUIREMENTS

SECTION A (Federal Aviation Administration Requirements)

2.01 Airport Improvement Project. The work in this Contract is included in Airport Improvement Program 3-04-0064-09, which is being undertaken and accomplished by the Owner in accordance with the terms and conditions of a grant agreement between the Owner and the United States, under the Airport Improvement Act of 1982, as amended by the Airport and Airway Safety and Capacity Expansion Act of 1987, and Part 152 of the Federal Aviation Regulations (14 CFR Part 152), pursuant to which the United States has agreed to pay a certain percentage of the costs of the project that are determined to be allowable project costs under that Act. The United States is not a party to this Contract and no reference in this Contract to the FAA or any representative thereof, or to any rights granted to the FAA or any representative thereof, or the United States, by the Contract, make the United States a party to this Contract.

2.02 Consent of Assignment. The Contractor shall obtain the prior written consent of the Owner to any proposed assignment of any interest in or part of this contract.

2.03 Convict Labor. No convict labor may be employed under this contract.

2.04 Veterans Preference. In the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to qualified individuals who have served in the military service of the United States (as defined in section 101(1) of the Soldiers and Sailors Civil Relief Act of 1940 (50 U.S.C. App. 501) and have been honorably discharged from the service, except that preference may be given only where that labor is available locally and is qualified to perform the work to which the employment relates.

2.05 Withholding: Sponsor from Contractor. Whether or not payments or advances to the Owner are withheld or suspended by the FAA, the Owner may withhold or cause to be withheld from the Contractor as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics employed by the Contractor or any Subcontractor on the work the full amount of wages required by this Contract.

2.06 Nonpayment of Wages. If the Contractor or Subcontractor fails to pay any laborer or mechanic employed or working on the site of the work any of the wages required by this Contract, the Owner may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment or advance of funds until the violations cease.

2.07 FAA Inspection and Review. The Contractor shall allow any authorized representative of the FAA to inspect and review any work or materials used in the performance of this Contract.

2.08 Subcontracts. The Contractor shall insert in each of his subcontracts the provisions contained in paragraphs 2.01, 2.03, 2.04, 2.05, 2.06, and 2.07, and also a clause requiring the Subcontractors to include these provisions in any lower tier subcontracts which they may enter into together with a clause requiring this insertion in any further subcontracts that may in turn be made.

2.09 Contract Termination. A breach of paragraphs 2.06, 2.07, and 2.08 may be grounds for termination of the Contract.

SECTION B (Secretary of Labor Requirements)

2.10 Minimum Wages.

(a) All laborers and mechanics employed or working upon the site of the work, shall be paid unconditionally not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at the time of payment computed at rates not less than those contained in the wage part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b) (2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (2.10) (g) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed without regard to skill, except as provided in paragraph 2.13. Laborers and mechanics performing work in more than one classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (b) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its Subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(b) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(c) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits when appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator or an

authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(d) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(e) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1) (C) or (D) of this paragraph, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

(f) Whenever the minimum wage rate prescribed in the Contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(g) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

2.11 Withholding. The FAA shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this Contract or any other Federal Contract with the same prime Contractor, or any other Federally-assisted Contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any Subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work all or part of the wages required by the Contract, the FAA may, after written notice to the sponsor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

2.12 Payrolls and Basic Records.

(a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1 (b) (2) (B) of Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a) (1) (iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1 (b) (2) (B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB control numbers (1215-0140 and 1215-0017.)

(b) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the sponsor for transmission to the FAA. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 5.5(a) (i) of Regulations, 29 CFR Part 5. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime Contractor is responsible for the submission of copies of payrolls by all Subcontractors. (Approved by the Office of Management and Budget under OMB control number 1215-0149.)

(c) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or Subcontractor or his or her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:

- (1) That the payroll for the payroll period contains the information required to be maintained under 5.5(a) (3) (i) of Regulations, 29 CFR Part 5 and that such information is correct and complete;
- (2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR Part 3;
- (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Contract.

(d) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (2.12) (C) of this section.

(e) The falsification of any of the above certifications may subject the Contractor or Subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(f) The Contractor or Subcontractor shall make the records required under paragraph (2.12) (a) of this section available for inspection, copying or transcription by authorized representatives of the FAA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or Subcontractor fails to submit the required records or to make them available, FAA may, after written notice to the sponsor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

2.13 Apprentices and Trainees.

(a) Apprentices will be permitted to work less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journey men on the job site in any craft classification shall not be greater than the ration permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ration permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or Subcontractor's registered program for the apprentice's level of progress, shall be expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a state apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate of work performed until an acceptable program is approved.

(c) Equal Employment Opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

(d) Application of CFR 5.59(a)(4). On Contracts in excess of \$2,000, the employment of all apprentices and trainees, as defined in 29 CFR 5.2(c), shall be subject to the provisions of 29 CFR 5.5(a)(4) (see paragraphs 2.13 (a), (b) and (c) above).

2.14 Compliance with Copeland Act Requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this Contract.

2.15 Subcontracts. The Contractor or Subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a) (1) through (10) and such other clauses as the FAA may by appropriate instructions, require, and also a clause requiring the Subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any Subcontractor or lower tier Subcontractor with all the Contract clauses in 29 CFR 5.5.

2.16 Contract Termination; Debarment. A breach of the Contract clauses in 29 CFR 5.5 may be grounds for termination of the Contract, and for debarment as a Contractor and a Subcontractor as provided in 29 CFR 5.12.

2.17 Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this Contract.

2.18 Disputes Concerning Labor Standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its Subcontractors) and the Contracting agency, the U.S. Department of Labor, or the Employees or their representatives.

2.19 Certification of Eligibility.

(a) By entering into this Contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government Contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a) (1).

(b) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government Contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a) (1).

(c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

2.20 Overtime Requirements. No Contractor or Subcontractor Contracting for any part of the Contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of eight hours in any calendar day or in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of eight hours in a calendar day or in excess of forty hours in such workweek, whichever is greater.

2.20-1 Violation; Liability for Unpaid Wages; Liquidated Damages. In the event of any violation of the clause set forth in paragraph 2.20, the Contractor and any Subcontractor responsible therefor shall be liable for the unpaid wages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 2.20 in the sum of \$10 for each calendar day or which such individual was required or permitted to work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 2.20.

2.20-2 Withholding for Unpaid Wages and Liquidated Damages. The FAA shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or Subcontractor under any such Contract or any other Federal Contract with the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or Subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2.20-1.

2.20-3 Subcontracts. The Contractor or Subcontractor shall insert in any Subcontracts the clauses set forth in paragraph 2.20 through 2.20-3 and also a clause requiring the Subcontractors to include these clauses in any lower tier Subcontracts. The prime Contractor shall be responsible for compliance by any Subcontractor or lower tier Subcontractor with the clauses set forth in paragraphs 2.20 through 2.20-3.

SECTION C (Equal Employment Opportunity Clause)

2.21 During the performance of this Contract, the Contractor agrees as follows:

- (1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination, rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post, in conspicuous places available to employees and applicants for employment, notices (to be provided) setting forth the provisions of this nondiscrimination clause.
- (2) The Contractor will, in solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
- (3) The Contractor will send, to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding, a notice (to be provided) advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The Contractor will comply with all provisions of Executive Order 11246, as amended, of 24 September 1965, and of the rules, regulations, and relevant orders of the Secretary of labor.
- (5) The Contractor will furnish all information and reports required by Executive Order 11246, as amended, of 24 September 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his/her books, records, and accounts by the FAA and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (6) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations, or orders, this Contract may be cancelled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246, as amended, of 24 September 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246, as amended, of 24 September 1965 or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (7) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraph (1) through (7) in every Subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246, as amended, of 24 September, 1965, so that such provisions will be binding upon each Subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the FAA may direct as a means of enforcing such provisions, including sanctions for

noncompliance: provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or vendor as a result of such direction by the FAA, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

SECTION D (Standard Federal Equal Employment Opportunity Construction Contract Specification (Executive Order 11246, as amended))

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this Contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

d. "Minority" includes:

(1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);

(3) Asian and Pacific Islander (all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(4) American Indian or Alaskan native (all persons having origins in any of the original peoples of the North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each Subcontract in excess of \$10,000 the provisions of these specifications and the notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this Contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the plan area (including goals and timetables) shall be in accordance with that plan for those trades which have unions participating in the plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve

each goal under the plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this Contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any office of Federal Contract Compliance Programs office or from Federal Procurement Contracting officers. The Contractor is expected to make substantially uniform progress towards its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, as amended, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure EEO. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:

(a) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

(b) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

(c) Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union, or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor along with whatever additional actions the Contractor may have taken.

(d) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(e) Develop on the job training opportunities and/or participate in training programs for the area which expressly include minorities and women including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

(f) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

(g) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoffs, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(h) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

(i) Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(j) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

(k) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

(l) Conduct, at least annually, an inventory and evaluation, at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

(m) Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

(n) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(o) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction Contractors and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

(p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a Contractor association, joint Contractor-union, Contractor-community, or other similar groups of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide EEO and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of the executive order if a particular group is employed in a substantially desperate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the executive order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standard to discriminate against any person because of race, color, religion, sex or national origin.
11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government Contracts pursuant to Executive Order 11246, as amended.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the executive order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the community Development Block Grant Program).

SECTION E (DOT Title VI Requirements)

1. During the performance of this Contract, the Contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:
 - (a) Compliance with Regulations. The Contractor shall comply with the regulations relative to nondiscrimination in federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Contract.

(b) Nondiscrimination. The Contractor, with regard to the work performed by it during the Contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of Subcontractors, including procurements of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the Contract covers a program set forth in Appendix B of the Regulations.

(c) Solicitation for Subcontracts, Including Procurements of Materials and Equipment. In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under subcontract, including procurements of materials or leases of equipment, each potential Subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this Contract and the regulations relative to nondiscrimination on the grounds of race, color, or national origin.

(d) Information and Reports. The Contractor shall provide all information and reports required by the regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Owner or the Federal Aviation Administration (FAA) to be pertinent to ascertain compliance with such regulations, orders, and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the Owner or the FAA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance. In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the Owner shall impose such Contract sanctions as it or the FAA may determine to be appropriate, including but not limited to --

(1) Withholding of payments to the Contractor under the Contract until the Contractor complies, and/or

(2) Cancellation, termination, or suspension of the Contract, in whole or in part.

(f) Incorporation of Provisions. The Contractor shall include the provisions of paragraphs a through e in every subcontract, including procurements of materials and leases of equipment, unless exempt by the regulations or directives issued pursuant thereto. The Contractor shall take such action with respect to any subcontract or procurement as the Owner or the FAA may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or supplier as a result of such direction, the Contractor may request the Owner to enter into such litigation to protect the interests of the Owner and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

(g) Rights to Inventions - Materials. All rights to inventions and materials generated under this Contract are subject to regulations issued by the FAA and the recipient of the Federal grant under which this Contract is executed. Information regarding these rights is available from the FAA and the grantee.

SECTION F (Requirements Under The Disadvantaged Business Enterprise Program)

1. General. This project is subject to part 23, Title 49, Code of Federal Regulations entitled "Participation by Minority Business Enterprise in Department of Transportation (DOT) Programs" and Appendix A. Portions of the Regulations are set forth hereunder and the Regulations in their entirety are incorporated herein by this reference.

Bidders shall be fully informed respecting the requirements of the Regulations; particular attention is directed to the following matters:

- (a) A Disadvantaged Business Enterprise (DBE) must be a small business concern as defined pursuant to Section 3 of U.S. Small Business Act, owned and controlled by socially and economically disadvantaged individuals (DBE's). Individuals who are reputedly presumed to be socially and economically disadvantaged include women, Blacks, Hispanics, Native Americans, Asian-Pacific Americans and Asian-Indian Americans.
- (b) A DBE may participate as a prime contractor, subcontractor, joint venture partner with a prime or subcontractor, or vendor of material or supplies;
- (c) A DBE joint venture partner must be responsible for a clearly defined portion of the work to be performed in addition to satisfying requirements for ownership and control. The DBE joint venturer must submit Schedule B contained in Section 23.87 of the Regulations;
- (d) A DBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing, and supervising the work.
- (e) Credit for a DBE vendor of materials or supplies is limited to 20 percent of the price, unless the vendor manufactures or substantially alters the goods;
- (f) A DBE must be certified before credit may be allowed toward the DBE goal. The sponsor shall have available a directory or source list to facilitate identifying DBE's with capabilities relevant to general contracting requirements and to particular solicitations. The sponsor shall make the directory available to bidders and proposers in their efforts to meet the DBE requirements. It shall specify which firms the DOT, the sponsor or the Small Business Administration has determined to be eligible DBE's in accordance with procedures set forth in the Regulations;

2. The DBE program varies with the category of the airport and the size of the federal assistance furnished. The particular groupings and the corresponding value of the grant are as follows:

Group I

Airport Category	Amount of Federal Grant
General Aviation	\$0 - \$250,000
Non-Hub	\$0 - \$400,000
Large, Medium and Small Hubs	\$0 - \$500,000

Group II

General Aviation	Over	\$250,000
Non-Hub	Over	\$400,000

Group III

Large, Medium and Small Hubs	Over	\$500,000
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3. The following assurances are applicable to projects in all the three groups above.

(a) Policy. It is the policy of the FAA that disadvantaged business enterprises as defined in 49 CFR Part 23 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds under this contract. Consequently, the DBE requirements of 49 CFR Part 23 apply to this contract.

(b) DBE Obligation. The contractor agrees to ensure the disadvantaged business enterprises as defined in 49 CFR Part 23 have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal Funds provided under this Contract. In this regard, the Contractor shall take all necessary and reasonable steps in accordance with 49 CFR Part 23 to ensure that disadvantaged business enterprises have the maximum opportunity to compete for and perform contracts. The Contractor shall not discriminate on the basis of race, color, national origin or sex in the award and performance of FAA-assisted contracts.

(c) Failure to carry out the requirements set forth above shall constitute a breach of contract. After notification, this may result in termination of the Contract by the sponsor or such remedy as the sponsor deems appropriate.

4. DBE Goals. The sponsor has established a total Disadvantaged Business Enterprise participation goal of 10 percent for this project. A Certificate of Assurance concerning this goal is included in the proposal and shall be executed by the bidder.

5. Award of Contract. The sponsor reserves the right to reject any or all bids. The award of contract, if it be awarded, will be to the lowest responsible and reliable bidder. In addition to any other requirements a bidder must meet to qualify as a responsive, responsible and reliable bidder, every such bidder must meet the following DBE requirements:

(a) If a bidder meets or exceeds the contract requirements for DBE goals and the bid is otherwise responsive and the sponsor considers the amount of the bid to be reasonable, such bidder will be the successful bidder. If there is more than one such bidder, the lowest monetary bidder will be the successful bidder.

(b) If the sponsor does not consider the amount of the bid of the bidders who meet or exceed the contract DBE goals to be reasonable, or if there are no such bidders, the bidder with the highest percentage of DBE participation of those bidders who did not meet or exceed the contract DBE goals, but who has demonstrated sufficient reasonable efforts to do so, will be considered. If the sponsor considers the amount of the bid to be reasonable, such bidder will be the successful bidder. If the

sponsor considers the amount of such bid to be unreasonable, the remaining bids will be considered in descending order of the percentage of DBE participation until the sponsor considers both the amount of the bid under consideration and said bidder's efforts to meet said goals to be reasonable, in which event such bidder will be the successful bidder. If there is more than one such bidder, the lowest monetary bidder will be the successful bidder.

(c) If the sponsor does not consider the amount of any of the bidders with DBE participation to be reasonable, the sponsor may determine any bidder that has demonstrated sufficient reasonable efforts to meet the DBE contract goal to be the successful bidder, provided the sponsor determines the amount of the bid to be reasonable. If there is more than one such bidder, the lowest monetary bidder will be the successful bidder.

(d) Notwithstanding any of the above, the sponsor reserves the right to reject any or all bids and to waive any informality or technicality. Being the successful bidder, pursuant to the DBE requirements, does not mean that the contract is required to be awarded to said bidder or that the contract will be awarded at all.

6. DBE Information. After the bid opening and before award of the contract, those bidders/proposers that have submitted a contract price that has been determined to be reasonable will be asked by the sponsor, as a condition of remaining in competition for the award, to submit within 10 calendar days the names of DBE's they proposed to use, the type of subcontract work each DBE will perform, and the dollar value of each proposed DBE subcontract.

7. Subcontractor.

(a) No substitution of a DBE subcontractor shall be made at any time without the written consent of the sponsor.

(b) If a DBE subcontractor is unable to perform successfully and is to be replaced, the contractor will be required to make good faith efforts to replace the original DBE subcontractor with another DBE subcontractor.

SECTION G (Compliance with Nondiscrimination Laws)

Contractor shall comply with all federal, state and local nondiscrimination statutes in the operation, implementation and delivery of, including state and federal civil rights and disabilities laws. In particular the contractor shall ensure that the City of Glendale's obligations for program, facility and service accessibility in Title II of the Americans with Disabilities Act are complied with in all activities arising under this contract, and shall hold harmless the City for any and all loss, including but not limited to damages, costs or expenses, incurred or arising from any alleged violation of the Americans with Disabilities Act under the auspices of this contract unless resulting from an intentional or actual negligent act of the City and its employees.

Failure to comply with the nondiscrimination or accessibility requirements herein shall be construed as nonperformance and may result in termination of funding, civil action or both.

24. WAGE RATES: The following wage rates shall apply:

**Federal Wage
Rates**

**Federal Wage
Rates**

General Decision Number AZ980002

Superseded General Decision No. AZ970002

State: Arizona

Construction Type:
HIGHWAY

County(ies):
STATEWIDE

HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	02/13/1998
1	06/12/1998
2	06/19/1998
3	07/03/1998
4	07/17/1998
5	09/04/1998

COUNTY(ies):
STATEWIDE

BRAZ0001C 07/01/1997

Rates Fringes
COCHISE, PIMA, and SANTA CRUZ COUNTIES; and the area of GRAHAM,
GREENLEE, and PINAL COUNTIES located East and South of the San
Francisco River to the Gila River

BRICKLAYERS 15.40 2.69

* BRAZ0003A 09/01/1998

Rates Fringes
REMAINING COUNTIES including the area of GRAHAM, GREENLEE & PINAL
COUNTIES located West and North of the San Francisco River to the
Gila River

BRICKLAYERS 18.40 2.69

* CARP0408C 06/01/1998

Rates Fringes
CARPENTERS:
Carpenters 17.07 3.30
Piledrivermen 17.57 3.30

* CARP1914A 09/01/1998

Rates Fringes
MILLWRIGHTS:
Zone 1 17.85 5.29
Zone 2 19.23 5.29
Zone 3 19.85 5.29
Zone 4 21.85 5.29

ZONE DEFINITIONS FOR MILLWRIGHTS:

Mileage shall be calculated from the construction site to the
City Hall in Phoenix or Tucson, or to the workmen's residence,
whichever is less:

Zone 1: 0-30 miles
Zone 2: 30-45 miles
Zone 3: 45-60 miles
Zone 4: over 60 miles

ELEC0518A 09/01/1997

Rates Fringes
APACHE COUNTY [South of Highway 66]; All of GILA COUNTY; NAVAJO
COUNTY [South and East of boundary beginning at a point where

Northeasterly along Clear Creek and Northeasterly to Cottonwood Wash, along Cottonwood Wash North easterly to where it intersects the Navajo Indian Reservation, then East along the Navajo Indian Reservation Boundary line to a point where it intersects the Navajo-Apache County Line]; and PINAL COUNTY [North of the line, "First Standard Parallel South" and East of the line, "Second Guide Meridian East"]:

ELECTRICIANS	18.25	12%+3.20
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ELEC0570A 07/01/1998

	Rates	Fringes
COCHISE, GRAHAM, GREENLEE, LA PAZ, PIMA, PINAL [Southern Portion], SANTA CRUZ, AND YUMA COUNTIES:		

ELECTRICIANS:

Zone 1	17.00	12%+2.20
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ZONE DEFINITIONS:

Zone 1: 0 to 22 miles radius from City Hall in Tucson

Zone 2: More than 22 miles up to 46 miles radius from City Hall in Tucson, add \$1.25 to Zone 1 basic hourly rate

Zone 3: More than 46 miles radius, add \$3.15 to Zone 1 basic hourly rate

ELEC0611H 06/01/1997

	Rates	Fringes
APACHE COUNTY [Area North of Highway 66]		

ELECTRICIANS	25.20	4%+4.85
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ELEC0640A 06/21/1998

	Rates	Fringes
COCONINO; MARICOPA; MOHAVE; and YAVAPAI COUNTIES; and the following portions of Counties:		

NAVAJO COUNTY (North and West of a boundary beginning at a point where Clear Creek crosses the Coconino- Navajo County line, Northeasterly along Clear Creek and Northeasterly to Cottonwood Wash, along Cottonwood Wash Northeasterly to where it intersects the Navajo Indian Reservation then Easterly along the Navajo Indian Reservation Boundary line to a point where it intersects the Navajo-Apache County line);

PINAL (area lying North and West of the boundary line beginning at a point where Papago Indian Reservation Road No. 15 crosses the Pima-Pinal County line, then extending in a Northeasterly direction on Papago Indian Reservation Road No. 15 to the intersection with Highway FAS-267, extending North on Highway FAS-267 to the intersection with the Florence Canal, North and East on the Florence Canal to the intersection of the line "Second Guide Meridian East" then North to the Pinal-Maricopa

County lines)

ELECTRICIANS	18.15	3%+2.72
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ELEC0769A 05/01/1998

LINE CONSTRUCTION:	Rates		Fringes
	ZONE 1	ZONE 2	
Lineman, Technician, Crane Operator, and Pilot	23.88	26.29	3.75%+5.50
Cable Splicer	24.50	26.98	3.75%+5.50
Equipment Operator, Mechanic, and Powderman	19.47	21.82	3.75%+5.50
Groundman	16.49	18.95	3.75%+5.50

ZONE DEFINITIONS FOR LINE CONSTRUCTION:

Zone 1: Area within a 35 mile radius from City Hall in
Phoenix and Tucson, and a 25 mile radius from
City Hall in Yuma

Zone 2: Area outside Zone 1

ENGI0428B 06/01/1998

POWER EQUIPMENT OPERATORS:	Rates	Fringes
ZONE 1:		
GROUP 1	14.34	3.68
GROUP 2	17.61	3.68
GROUP 3	18.69	3.68
GROUP 4	19.72	3.68

ZONE PAY:

All Zones will be calculated from the nearest City Hall in the
following cities:

PHOENIX:

Zone 1: 0 to 60 miles
Zone 2: 61 to 100 miles, add \$2.00 per hour
Zone 3: 101 to 150 miles, add \$3.00 per hour
Zone 4: 151 miles and over, add \$5.00 per hour

FLAGSTAFF, TUCSON, YUMA:

Zone 1: 0 to 50 miles
Zone 2: 51 to 90 miles, add \$2.00 per hour
Zone 3: 91 to 140 miles, add \$3.00 per hour
Zone 4: 141 miles and over, add \$5.00 per hour

POWER EQUIPMENT OPERATORS CLASSIFICATIONS:

GROUP 1: A-frame boom truck, winch truck, air compressor,
Beltcrete, boring bridge and texture, concrete mixer (skip type),
conductor, brakeman, handler, conveyor, cross timing and pipe

float, curing machine, dinky (under 20 tons), elevator hoist (Husky and similar), firemen (all), forklift and Ross carrier, generator (all), highline cableway signalman, hydrographic mulcher, hydrographic seeder, joint inserter, jumbo finishing machine, Kolman belt loader, machine conveyor, multiple power concrete saw, oiler, pavement breaker, power grizzly, power sweeper, pressure grout machine, pump, roller (except as otherwise classified), self-propelled chip spreading machine, skiploader (3.5 cu. yd. and less), slurry seal machine (Moto paver driver), small self-propelled compactor (with blade) - backfill, ditch operation, straw blower, tractor (D-5 and under), tripper, tugger, welding machine, wheel-type tractor (Ford, Ferguson type with attachments, Bee Gee etc.)

GROUP 2: Aggregate plant (including crushing, screening and sand plants, etc.), asphalt plant mixer, asphalt laydown machine, backhoe (rubber tired or track, less than 1 cu. yd. MRC), Bee Gee operator boring machine, concrete batch plant (all types and sizes), concrete mechanical tamping, spreading or finishing machine (including Clary, Johnson or similar types), concrete mixer (paving type and mobile mixers), concrete pump, crane (crawler and pneumatic less than 15 ton capacity MRC), drilling machine (including water wells), elevating grader (all types and sizes except as otherwise classified), field equipment serviceman, grade checker (excluding civil engineer), paver and similar type equipment, motor grader (any type power blade - rough), oiler driver, operating engineer rigger, pneumatic tired scraper (all sizes and types), power jumbo form setter, road oil mixing machine, roller (on all types asphalt pavement), screed, self-propelled compactor (with blade, 815, 825 or equivalent - grade operation), skip loader (all types with a rated capacity over 3.5 but less than 6 cu. yd.), slip form (power driven lifting device for concrete forms), soil cement road mixing machine (single pass type), heater and planer, tractor (dozer, pusher - all), traveling pipe-wrapping machine, trenching machine, tugger (two or more)

GROUP 3: Asphalt or concrete planing, rotomill and milling machine, auto grade machine (CMI and similar equipment), boring machine (including mole, badger and similar type), concrete pump (truck mounted with boom), crane (crawler and pneumatic over 15 tons but less than 100 tons capacity MRC), crawler type tractor with boom attachment and slope bar, derrick, Gradall, heavy duty mechanic/welder, helicopter hoist operator or pilot, highline cableway, mass excavator (150 Bucyrus, Erie and similar type), mechanical hoist (two or more drums), motor grader (any type power blade - finish), mucking machine, overhead crane, piledriver engineer (portable, stationary or skid rig), power driven ditch lining or ditch trimming machine, remote control earth moving machine, skip loader (all types with rated capacity 6 cu. yd. but less than 10 cu. yd.), slip form paving machine (including Gunnert, Zimmerman and similar types), tower crane or similar type, universal equipment operator (backhoe, clamshell, dragline, shovel etc., up to 10 cu. yd.); Operating Engineers Electrician including Tower Erector, Lineman & Cable Splicer (load side of main disconnect).

GROUP 4: Crane operator (pneumatic or crawler - 100 tons hoisting capacity and over, MRC rating), skip loader (all types with rated capacity of 10 cu. yd. or more), universal equipment operator (backhoe, clamshell, dragline, shovel, etc., 10 cu. yd. and over)

Multiple-Unit Earth Equipment (Holland Loader etc.), Tractor operator, Pneumatic-Tired or Track type, Two Units - \$0.50 per hour over base rate; and \$1.00 per hour for each additional unit

All Operators, Oilers, and Motor Crane Drivers on equipment with Booms, except concrete pumping truck booms, including Jibs, shall receive \$0.01 per hour per foot over 80 ft in addition to regular rate of pay

Premium pay for performing hazardous waste removal \$0.50 per hour over base rate.

* IRON0075A 08/01/1998

	Rates	Fringes
IRONWORKERS:		
0-50 miles from City Hall in Phoenix or Tucson	17.00	8.86
50-100 miles	18.50	8.86
100-150 miles	19.75	8.86
over 150 miles	21.00	8.86

LABO0383A 06/01/1998

	Rates	Fringes
LABORERS		
PROJECTS OVER \$6 MILLION:		
GROUP 1	10.89	3.05
GROUP 2	11.62	3.05
GROUP 3	12.14	3.05
GROUP 4	12.41	3.05
GROUP 5	13.89	3.05
PROJECTS UNDER \$6 MILLION:		
GROUP 1	9.54	3.05
GROUP 2	10.45	3.05
GROUP 3	10.93	3.05
GROUP 4	11.15	3.05
GROUP 5	13.40	3.05

LABORERS CLASSIFICATIONS:

GROUP 1: Laborer, general or construction; tool dispatcher or checker; manually controlled signal operator; fence builder, guard rail builder - highway; chat box man; dumpman and/or spotter; rip rap stone man; rock slinger; form stripper; packing rod steel and pans; cesspool diggers and installers; astro turf layer; clean up - bull gang trackman, railroad; chipper

(clearing and grubbing); kettleman - tarman; spikers, wrenchers-creosote tieman; floor sanders - concrete; sandblaster (pot tender); powderman tender; fine grader; all tenders not herein separately classified; window cleaner; flagger

GROUP 2: Concrete laborer (belt, pipe and/or hoseman); cement mason tender; cutting torch operator; power type concrete buggy; bander; guinea chaser

GROUP 3: Operator and tender of pneumatic and electric tools; concrete vibrating machines, chain saw (on clearing and grubbing); hydraulic jacks and similar mechanical tools not separately herein classified; pipe caulker and/or backup man - pipeline; riggers and signal man - pipeline; pipe wrapper; cribber & shorer (except tunnel); pneumatic gopher; pre-cast manhole erector

GROUP 4: Asphalt raker and ironer; air and water washout nozzle (low and high pressure); scaler (using bos'n's chair or safety belt); tamper (mechanical - all types); sandblaster (nozzleman); concrete saw (hand-guided); concrete cutting torch; gunite (gunman, mixer, rodman); bio-filer, pressman, installer, operator; hand-guided trencher and similarly operated equipment; driller (jackhammer and/or pavement breaker); grade setter (pipeline); pipe layer including but not limited to non-metallic transite and plastic pipe, water pipe, sewer pipe, drain pipe, and underground tile pipe and conduit); chuck tender (except tunnel)

GROUP 5: Drill doctor and/or air tool repairman; scaler (driller); form setter and/or builder; welder and/or pipelayer installing process piping; driller - core, diamond, wagon, air track, Joy, Mustang, PR-143, 220 Gardner-Denver, Hydrasonic, powderman; water blaster operator

LAB00383D 06/01/1998

	Rates	Fringes
TUNNEL LABORERS:		
GROUP 1	16.09	3.05
GROUP 2	16.38	3.05
GROUP 3	16.61	3.05
GROUP 4	17.26	3.05
GROUP 5	17.65	3.05
GROUP 6	18.07	3.05

TUNNEL LABORERS CLASSIFICATIONS

GROUP 1: Bull Gang, Muckers, Trackman, Dumpman, Concrete Crew, Grout Crew, Swamper (Brakeman & Switchman on tunnel work), Change House Man.

GROUP 2: Nipper, Chucktender & Cabetender, Vibratorman, Jack Hammer, Pneumatic Tools except driller.

GROUP 3: Grout Gunman.

GROUP 4: Timberman, Retimberman, Wood or Steel Blaster, Driller, Powderman, Cherry Pickerman, Poderman - Primer House, Steel Form Raiser & Setter, Kemper and other Penumatic-Concrete-Placer-Operator, Miner-Finisher, Miner-Tunnel (hand or machine).

GROUP 5: Diamond Drill,

GROUP 6: Shaft & Raise Miner & Welder

PAIN0086B	04/22/1998		
		Rates	Fringes
PAINTER		14.20	1.70

PLAS0394A	10/01/1997		
		Rates	Fringes
NORTHERN AREA: APACHE, COCONINO, MOHAVE AND NAVAJO COUNTIES:			
Area NORTH of a straight line drawn between a point 35 miles due North of the City Hall in Flagstaff and a point 35 miles due North of the City Hall in Kingman, extending to the Arizona/Nevada State line on the West and extending to a point 35 miles due North of the City Hall in Holbrook, thence due East to the intersection of the Arizona - New Mexico State line:			

CEMENT MASONS:			
Cement Masons	19.65		3.31
Concrete Troweling Machine;			
Sawing and Scoring Machine;	19.87		3.31
Curb and Gutter Machine			

REMAINDER OF ARIZONA

CEMENT MASONS:			
Cement Masons	15.90		3.31
Concrete Troweling Machine;			
Sawing and Scoring Machine;	16.12		3.31
Curb and Gutter Machine			

PLUM0469B	07/01/1998		
		Rates	Fringes
APACHE, COCONINO, LA PAZ, MARICOPA, MOHAVE, NAVAJO, YAVAPAI AND YUMA COUNTIES:			

PLUMBERS AND PIPEFITTERS:			
ZONE 1:			
Commercial	21.35		6.95
Industrial	24.35		6.95
ZONE 2:			
Commercial	24.35		6.95
Industrial	27.35		6.95

ZONE DEFINITIONS FOR PLUMBERS AND PIPEFITTERS

ZONE 1: Area within a 20 mile radius of the center of the following towns: Flagstaff, Holbrook, Kingman, Lake Havasu City, Prescott, Show Low, Springerville, St. John's, Winslow, and Yuma; and area within 40 miles of the center of Phoenix

ZONE 2: Area outside a 20 mile radius of the center of Flagstaff, Holbrook, Kingman, Lake Havasu City, Prescott, Show Low, Springerville, St. John's, Winslow, and Yuma; and area outside a 40 mile radius of Phoenix

PLUM0741B	07/01/1998		
		Rates	Fringes
COCHISE, GILA, GRAHAM, GREENLEE, PIMA, PINAL, AND SANTA CRUZ			
PLUMBERS & PIPEFITTERS		20.25	5.45

SUAZ3001A	01/22/1993		
		Rates	Fringes
LANDSCAPE SPRINKLER INSTALLER			
		8.27	.24
LANDSCAPE LABORER			
		5.15	.24

TEAM0104B	06/01/1998		
		Rates	Fringes
TRUCK DRIVERS:			
GROUP 1		9.87	3.67
GROUP 2		13.24	3.67
GROUP 3		13.28	3.67
GROUP 4		14.13	3.67
GROUP 5		14.34	3.67
GROUP 6		14.85	3.67
GROUP 7		16.22	3.67

TRUCK DRIVERS CLASSIFICATIONS:

GROUP 1: Pickup Driver, Station Wagon Driver, Man Haul Driver, Self-propelled Street Sweeper, Buggymobile 1 cu yd or less, Vacuum Pump Truck Driver, Forklift or Fork Truck or Ross Carrier, Dumpster under 7 cu yd, Slurry type equipment driver or Leverman, Flaherty Spreader or Leverman

GROUP 2: 2 or 3 axle Dump or Flatrack Driver, Water Truck under 2500 gal., Boom Truck "A" Frame, Ginpole Winch Truck and similar equipment, Heavy Duty Mechanic/Welder

GROUP 3: 4 axle Dump/Flatrack, Dumpster 7 cu yd and over, Redi-Mix Driver less than 10.5 cu yd, Concrete Pump Driver (when integral part of Redi-Mix Truck), Oil Tanker/Distributor Truck Driver/Bootman/Retortman/Leverman, Foremost Rollagon/Melroe/Hosky

and similar type equipment when hauling men, material, and equipment, Water Truck Driver 2500 gal. but less than 4000 gal.

GROUP 4: 5 axle Dump or Flatrack Driver, Water Truck Driver 4000 gal. and over, Redi-Mix Drivers 10.6 cu yd and up to 14 cu yd, Hydro Lift, Swedish Crane, Iowa 300 and similar types.

GROUP 5: 6-axle Dump or Flatrack Driver, Rock Truck Driver (Dart, Euclid, CAT Payhauler, and other similar type and Dumps, Single Unit) less than 16 cu yd.

GROUP 6: 7-axle Dump or Flatrack Driver, 8-axle Dumptor Flatrack Driver, Redi-Mix Driver 14 cu yd or over Eject-alls, Transport Drivers (unles axle rating results in higher classification)

GROUP 7: Off-highway Equipment Driver including but not limited to: 2 or 4 wheel Power Unit, CAT DW Services, Euclid, International, and Similar type equipment, Transporting material when Top Loader or by external means, including pulling Watger Tanks, Fuel Tanks, or other applications under Teamster classifications, Rick Trucks (Dart, Euclid or similar End Dump types) 16 cu yd and over, Eject-alls, Dumptor or Dumpster, 16 cu yd and over, 9-axle Dump or Flatrack Driver.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.
END OF GENERAL DECISION

**Airport Safety
and Security**

**Airport Safety
and Security**

AIRPORT SAFETY AND SECURITY

DESCRIPTION. In the interest of safety, the Contractor shall acquaint his employees with the provisions of the following Federal Aviation Administration Advisory Circulars:

150/5370-2C "Operational Safety on Airports During Construction"

150/5200-18A "Airport Safety Self-Inspection"

SPECIAL REGULATIONS FOR CONSTRUCTION AROUND AIRCRAFT TRAFFIC.

Air traffic will continue to use existing runways, aprons and taxiways of the airport during the time that work under this contract is being performed. The Contractor shall at all times so conduct his work as to create no hindrance, hazard or obstacle to aircraft using the airport, and must at all times conduct the work in conformance with requirements of the Airport Director and FAA Control Tower, or their authorized representative.

When absolutely essential, in order to permit construction under this contract, runways or taxiways may be closed to aircraft operations upon 72-hour advance written application by the Contractor to the Airport Director or his designated representative. Closures, when approved, are typically from 11:00 P.M. to 5:00 A.M. The Contractor will schedule and organize his work so that a minimum of closings or crossings of runways and taxiways will be required during the performance of the entire contract.

During all working hours when construction work or operations incidental thereto are in progress within 250 feet of runways or 150 feet of taxiways that have not been closed in accordance with the above paragraph, the Contractor shall furnish two-way radio communications with the control tower at each location where such work or operation is in progress. Such radio communication must be manned at all times by a qualified operator and shall be in conjunction with flag men and an adequate public address or other loudspeaker system, so that instructions from the control tower will be immediately passed on to the Contractor's personnel. Any instructions emanating from the control tower shall be immediately obeyed. Radio operator and communications procedure shall be satisfactory to the Airport Director.

ASSURING OPERATIONAL SAFETY. If construction operations require shutdown of a navigational aid from service for more than twenty four (24) hours, or in excess of four (4) hours daily on consecutive days, a forty five (45) day minimum notice to the FAA is required prior to the facility shutdown. Notification of construction, rough pavement, and other conditions affecting the use of the airport shall be made by NOTAMs. The Contractor shall report safety-related airport conditions to the Engineer, who shall coordinate the issuance of NOTAMs with the FAA.

SPECIAL AIRPORT SECURITY REQUIREMENTS. The Contractor will be required to coordinate his work so as to satisfy clearance requirements for arrival and departure of scheduled aircraft, and in compliance with FAA Advisory Circular 150/5370-2 concerning operational safety on airports during construction activity.

The airport is operated in strict compliance with Federal Aviation Regulation - Part 107 which prohibits unauthorized persons or vehicles in the Air Operation Area. Equipment and workmen will be restricted to the work area defined on the plans. Any violations by Contractor's personnel will subject the Contractor to penalties imposed by FAA and the Aviation Department Airport Security Office.

Airport restricted areas are fenced and must remain fenced at all times. Any required temporary security fences and/or gates shall be constructed by the Contractor. These gates will remain closed and locked, or if it is being continuously used for ingress and egress, a gate guard will be provided at the Contractor's expense. The Contractor shall furnish the guard with a roster of his personnel and ensure that each individual has adequate identification. Two duplicate keys for each lock will be turned over to the airport authorities.

Gate guards provided by the Contractor shall be provided a direct or indirect method of communications to contact the Aviation Department. Direct contact is for a guard to have immediate access to a telephone. Indirect access would be the guard having a radio communicator to an individual who has direct access.

The Contractor shall maintain the security integrity between the public and Air Operations Area (AOA). All barrier designs and their phasing shall be submitted to the Aviation Department and approved by them in writing prior to erection.

All construction personnel assigned to the project, except for escorted in-transit material suppliers, shall make application for and wear security badges. The prime contractor and the subcontractor can make application for these items by contacting Glendale Aviation Department Operations Section at (602) 930-2188 to make arrangements. Photo identification badges may be required for each employee. Initial badges may require a fee contact the Aviation Department for details.

All Contractor's employees who are designated to have unescorted access to any area on the airport for security reasons shall have an employment history check for the past **ten** years, with verification of the previous **five** years. Each employee background check requires the following:

- i. Employee completes a ten year employment history form and submits form to contractor/employer. History must explain any gaps in employment of more than twelve months. **Employer is responsible for documenting and verifying the employment history and maintaining the information in a file.** (May use a company form, or ten year employment history form available in Security Badging Office).
- ii. Employee is required to complete a "**Disqualifying Crimes List**" **Form**. All questions must be answered "yes" or "no". Applicants may be subject to a criminal history records check and fingerprinting. Completed form must be submitted to the Security Badging office along with the employee's Security Badge Application Form. (Form available in Security Badging Office).
- iii. Badging applicant must submit **two** forms of current I.D., one of which must bear

the individual's photograph.

- iv. Company official/officials listed on the company application for Air Operations Area Access must sign each individual employee badge application form stating company is in compliance with the ten year history verification, and state why the individual badge is required.

The Contractor shall maintain an up-to-date record of all badge holders showing name, address, sex, height, weight, color of eyes and badge number. The Contractor will be required to furnish this information to the Airport Authorities upon request.

The Contractor shall restrict passage into the Security Area to badged persons, vehicles and equipment displaying his identification or that of the Airport Authorities. Should the Contractor wish to allow visitors, vendors or delivery through his access point, he shall provide for the following:

- i. A method, acceptable to the Aviation Department, of temporarily placing his identification on each person or vehicle. (An acceptable alternate will be to provide an escort for each person or vehicle.)
- ii. Each person or vehicle entering the Security Area displaying the Contractor's identification or under his escort shall carry the full coverage of his liability and property damage.

The Contractor shall be responsible to provide at his own cost an escort service for all vehicles that do not operate on a daily basis within the AOA. Escorted vehicles shall not be left unattended. Any escorted vehicle allowed on the AOA by the Contractor shall be escorted back and forth to the point of entry.

The Contractor is required to submit a plan on how he/she will safely operate within the AOA. This plan shall be submitted and approved by the Airport Security Coordinator before the commencement of any construction.

The Contractor will contact the Airport Security Coordinator, telephone (602) 930-2188, ten (10) days prior to start of construction to submit the necessary airport security information for all vehicles and personnel required inside the restricted area during construction.

SECURITY. The Contractor shall be responsible for the security of his equipment and materials. He shall be responsible for the security of all gates utilized by him. The gates shall be locked at all times or a guard posted at the gate if it is being continuously used for ingress and egress.

The following security requirements shall be adhered to throughout the project:

- a. Access to the premises by the Contractor and his forces shall be via existing access drives.

- b. No personnel, equipment or vehicles shall be permitted to travel across existing turf, except within the Contract limits as shown on the Drawings. Under no circumstances will Contractor personnel, equipment or vehicles travel outside the Construction limits.
- c. The Contractor shall arrange employee parking at a location approved by the Engineer and Department of Aviation.

VEHICLES ON AIRPORTS. Vehicular activity on airport movement areas shall be kept to a minimum. Where vehicular traffic on airport operations areas cannot be avoided, it shall be carefully controlled. Aircraft always have the right-of-way. Specific requirements of vehicle control and identification are:

- a. Visibility. Vehicles which will routinely operate on airport operations areas shall be marked / flagged for high daytime visibility and, if appropriate, lighted for nighttime operations. Vehicles which are not marked and lighted shall be escorted by one that is equipped with temporary marking and lighting devices. (See AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport, current edition.)
- b. Identification. The Contractor shall mark each of his vehicles and his subcontractor's vehicles and pieces of equipment in a manner acceptable to the Aviation Department. Lettering shall be a minimum 8" in height. (For the purpose of this Special Provision, a vehicle shall be defined as a device whose primary function is the transportation of personnel. Other devices which are primarily used in construction activities will be classified as equipment.) (See AC 150/5210-5B.) Vehicles needing intermittent identification may be marked with tape or with magnetically attached markers which are commercially available.
- c. Vehicular Reverse Alarms. Construction vehicles/equipment shall have automatic signaling devices to sound an alarm when moving in reverse.
- d. Movement. The control of vehicular activity on Airport Operations Areas is of the highest importance. This requires coordination with airport users and air traffic control. Two-way radios, signal lights, traffic signs, flag men, escorts, or other means suitable are required to control the movement of Contractor vehicles on the airport. Communication with the Air Traffic Control Tower (ATCT) shall be via airport radios on ground frequency. It should be remembered that even with the most sophisticated procedures and equipment, systematic training of vehicle operators is necessary to achieve safety. The Contractor shall give training to intermittent operators on vehicle procedures on the airport, such as construction workers, even if escort service is being provided.
- e. Work Across Active Taxiways. At such time as the Contractor is conducting hauling operations across active taxiways, the Contractor shall have a flagperson stationed at

such active taxiway crossing to monitor aircraft movement and to direct construction traffic. The flagperson shall be equipped with hand held signs or flags to assist in the direction of construction traffic. The flagperson shall also be equipped with lighted wands should nighttime construction be allowed by the Owner. In addition, one power broom with dust suppression equipment shall be dedicated to and stationed full time at each active taxiway crossing to maintain the surface of the taxiway free from construction traffic debris. Mud and other material tracked onto taxiway surfaces shall be removed by hand if necessary to obtain its complete removal.

SPECIAL SAFETY REQUIREMENTS DURING CONSTRUCTION

- A. Runway Ends. Construction equipment shall not penetrate the 20:1 approach surface of the operational active runways measured from the runway threshold. If equipment and construction activities penetrate this surface, temporary displacement of the threshold will be required. Issuance of NOTAMs shall be coordinated 72 hours prior to the activity through the Engineer.
- B. Runway Edges. Construction activities shall not be permitted within 200 feet of the centerline of Runway. However, construction may be permitted within 200 feet of the runway centerline on a case-by-case basis with approval of the Engineer and Aviation Department.
- C. Taxiways and Aprons. Construction activity barricades and set back lines shall be located at a distance of 150 feet. However, construction activity may be permitted up to the taxiway and aprons in use provided that the activity is first coordinated with the Engineer and Aviation Department; NOTAMs are issued; marking and lighting provisions are implemented; and it is determined the height of equipment and materials is safely below any part of the aircraft using the airport operations areas which might overhang those areas. An occasional passage of an aircraft with wing span greater than 150 feet should be dealt with on a case-by-case basis.
- D. Excavation and Trenches. During hours of restriction visibility and/or darkness.
 - a. Runways. Excavations and open trenches may be permitted up to 200 feet from the centerline of an active runway, provided they are adequately signed, lighted and marked. In addition, excavation and open trenches may be permitted within 250 feet of the runway centerline on a case-by-case basis, i.e., cable trenches, pavement tie-ins, etc., upon approval of the Aviation Department through the Engineer.
 - b. Taxiways and Aprons. Excavation and open trenches may be permitted up to the edge of structural taxiway and apron pavements provided the drop-off is adequately signed, lighted and marked.
- E. Stockpiled Material. Extensive stockpiled materials shall not be permitted within 200 feet of any runway centerline, nor 150 feet of any taxiway centerline or apron edge.

Stockpiled material shall be constrained in a manner to prevent movement as a result of aircraft blast or wind. Material shall not be stored near aircraft turning areas or movement areas.

- F. Maximum Equipment Height. The Contractor shall furnish equipment and batch plant information to the FAA in a completed FAA Form 7460-1, Notice of Construction or Alteration. Or shall be erected outside of the controllers airspace.
- G. Proximity of Construction Activity to Navigational Aids. Construction activity in the vicinity of navigational aids requires special consideration. The effect of the activity and its permissible distance and direction from the aid must be evaluated in each instance. A coordinated evaluation by airport operator and the FAA is necessary. Technical involvement by FAA Regional Airports, Air Traffic, Flight Standards and Airway Facilities Specialists is needed as well as construction engineering and management input. Particular attention needs to be given to stockpiling materials as well as to the movement and parking of equipment which may interfere with line-of-sight from the tower or interfere with electronic emissions. (See AC 150/5300-13, Chapter 6, Airport Design Standards--Site Requirements for Terminal Navigational Facilities, current edition, for critical areas of NAVAIDS.) The Contractor shall locate his stockpiles and batch plant areas so as to provide the minimum effect on operational NAVAIDS as deemed by the FAA Airway Facilities and Air Traffic personnel.
- H. Limitation on Construction.
 - a. Open-flame welding or torch-cutting operations shall be prohibited unless adequate fire and safety precautions are provided and have been approved by the Aviation Department.
 - b. All vehicles are to be parked and serviced behind the construction restriction line.
 - c. Under no circumstances are flare pots to be used on this project.
- I. Marking and Lighting of Closed or Hazardous Areas on Airports. The Contractor shall designate a representative on call twenty-four (24) hours each day for emergency maintenance of airport hazard lighting and barricades.
 - a. Permanently Closed Runways and Taxiways. For runways and taxiways which have been permanently closed, the lighting circuits shall be disconnected. With runways, the threshold markings, runway designation marking, and touchdown zone markings should be obliterated, and crosses should be placed at each end at one thousand (1,000') foot intervals. With taxiways, a cross is placed at each entrance of the closed taxiway.
 - b. Temporarily Closed Runways and Taxiways. Temporarily closed runways are treated in the same manner as in the above paragraph, except runway markings are

not obliterated. Rather, crosses are usually of the temporary type (constructed of material such as fabric or plywood), and they are required only at runway ends. The crosses shall be located on top of the runway numerals. For temporary marking, the dimensions of the crosses may be reduced to permit use of standard sheets of 4'-0" x 8'-0" foot plywood. Temporarily closed taxiways are usually treated as a non-usable area as explained in the next paragraph.

- c. Hazardous Areas. Hazardous areas, in which no part of an aircraft may enter, are indicated by use of barricades with alternate orange and white markings. The barricades are supplemented with orange flags at least twenty inches by twenty inches (20" x 20") and so constructed and installed that they are always in the extended position and properly oriented. For night time use, the barricades are supplemented with flashing yellow lights. The intensity of the lights and spacing for barricades, flags, and lights must be such to delineate adequately the hazardous area.
 - d. Open trenches, excavations, and stockpiled material at the construction site shall be prominently marked with orange flags and lighted with flashing yellow light units (acceptable to the Aviation Department and the FAA) during hours of restricted visibility and/or darkness. Under no circumstances are flare pots to be near aircraft turning areas.
 - e. Notices to Airmen (NOTAMs). The Aviation Department will be responsible to provide information on closed or hazardous conditions to the local air traffic control facility (control tower, approach control, center, flight service station) so that a NOTAM can be issued. The Contractor shall notify the Engineer at least 72 hours prior to the required NOTAM issuance, who then shall notify the Owner.
- J. Temporary Runway Threshold Displacements. Identification of temporary runway threshold displacements should be located outboard of the runway surface. These shall include outboard lights, and markings acceptable to the Engineer and the Aviation Department.

LIABILITY FOR FINES ASSESSED.

Safety Violations. In the event the Contractor, its agents, employees, subcontractors, suppliers, or others related to the Project at the request or invitation of the Contractor violate any safety requirements of any or all government agencies, the Contractor shall be liable for payment of any and all fines, penalties, costs and fees assessed for such safety violation. The Owner shall be entitled to deduct all such amounts from remaining contract amounts due the Contractor in the event the Contractor fails or refuses to make such payments.

Runway Incursions. In the event the Contractor, its personnel, subcontractors, suppliers, or anyone else at the request or invitation of the Contractor shall enter an operational area of the Airfield without permission of the FAA Air Traffic Control Tower, and should such an event, in

part or in whole, result in the FAA assessing a fine against the Owner, the Contractor shall pay such fines. The Owner shall be entitled to deduct such fines from remaining contract amounts should the Contractor fail or refuse to make timely payments. Typical fines are one thousand dollars (\$1,000) or more per incident.