

**SPECIFICATIONS**

for

**Skunk Creek**

Gila River Basin

Maricopa County, Arizona

Authority: Public Law 89-298, Flood Control Act of 1965

Appropriation: 96 X 3122, Construction General

96 X 8862, Contributed Funds, Required

Corps of Engineers



**US Army Corps  
of Engineers**

A400.506 Mes District

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Phoenix, AZ 85009

<b>SOLICITATION, OFFER, AND AWARD</b> <i>(Construction, Alteration, or Repair)</i>	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	DACW09-87-R-0001	<input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)	25 Nov 1986	1 of 3

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.
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7. ISSUED BY	CODE	8. ADDRESS OFFER TO
U.S. ARMY ENGINEER DISTRICT, LOS ANGELES P.O. Box 2711 Los Angeles, California 90053-2325		U.S. ARMY ENGINEER DISTRICT, LOS ANGELES P.O. Box 2711 300 North Los Angeles Street Los Angeles, California 90053-2325

9. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS)
	SEE "INSTRUCTIONS TO OFFERS"	

**SOLICITATION**

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, Identifying no., date):

SKUNK CREEK, Maricopa County, Arizona

Work consists of: diversion and control of water; clearing and grubbing; excavation; 4,200 cubic yards of compacted fill; 51,800 cubic yards of backfill; constructing a spillway; grouted stone, including 28,500 tons of stone, 7,120 cubic yards of grout, 50,200 cwt of cement, and 1,900 gallons of stain; side drains; asphalt concrete access road; one pipe gate; landscaping; and any appurtenant work.

11. The Contractor shall begin performance within 5 calendar days and complete it within 180 calendar days after receiving  award,  notice to proceed. This performance period is  mandatory,  negotiable. (See \_\_\_\_\_.)

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? (If "YES," indicate within how many calendar days after award in Item 12B.)	12B. CALENDAR DAYS
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and \_\_\_\_\_ copies to perform the work required are due at the place specified in Item 8 by N/A (hour) local time N/A (date). If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee  is,  is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 60 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)	15. TELEPHONE NO. (Include area code)
CODE	16. REMITTANCE ADDRESS (Include only if different than Item 14)
FACILITY CODE	

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within \_\_\_\_\_ calendar days after the date offers are due. (Insert any number equal to or greater than the minimum requirement stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)

AMOUNTS ▶

In accordance with the attached Bidding Schedule.

18. The offeror agrees to furnish any required performance and payment bonds

**19. ACKNOWLEDGMENT OF AMENDMENTS**

(The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER <i>(Type or print)</i>	20B. SIGNATURE	20C. OFFER DATE
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**AWARD (To be completed by Government)**

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA
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24. SUBMIT INVOICES TO ADDRESS SHOWN IN: <i>(4 copies unless otherwise specified)</i>	ITEM	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO <input type="checkbox"/> 10 USC 2304(c)( ) <input type="checkbox"/> 41 USC 253(c)( )
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26. ADMINISTERED BY CODE	27. PAYMENT WILL BE MADE BY
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**CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE**

<input type="checkbox"/> 28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return _____ copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.	<input type="checkbox"/> 29. AWARD (Contractor is not required to sign this document.) Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.
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30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print)	31A. NAME OF CONTRACTING OFFICER (Type or print)		
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA	31C. AWARD DATE
		BY	

Continuation of Standard Form 1442

20D. (1) IF THE OFFEROR IS A JOINT VENTURER, COMPLETE THE FOLLOWING:

_____	_____	_____
(Company Name)	(Signature)	(Title)
_____	_____	_____
(Company Name)	(Signature)	(Title)
_____	_____	_____
(Company Name)	(Signature)	(Title)

NOTE: If a Corporation is participating as a member of a Joint Venture, the Certificate as to Corporate Principal in item (3) below must also be completed and signed.

(2) IF THE OFFEROR IS A PARTNERSHIP, LIST FULL NAME OF ALL PARTNERS

_____	_____
(Name)	(Signature)
_____	_____
(Name)	(Signature)
_____	_____
(Name)	(Signature)

(3) IF THE OFFEROR IS A CORPORATION, THE FOLLOWING CERTIFICATE SHOULD BE COMPLETED:

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, \_\_\_\_\_, certify that I am the \_\_\_\_\_  
 (name)  
 Secretary of the corporation named as offeror in the within offer; that  
 \_\_\_\_\_, who signed said offer on behalf of the corporation,  
 (name)  
 was then \_\_\_\_\_ of said corporation; that the signature thereto  
 (title)  
 is genuine; and that said contract was duly signed, sealed and attested for  
 and in behalf of said corporation by authority of its governing body.

\_\_\_\_\_  
(Name of Corporation)

(Affix)  
(CORPORATE SEAL)

\_\_\_\_\_  
(Secretary)

## BIDDING SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
1.	DIVERSION AND CONTROL OF WATER	1	Job	L.S.	_____
2.	CLEAR SITE AND REMOVE OBSTRUCTIONS	1	Job	L.S.	_____
3.	EXCAVATION				
	A. First 75,000 cubic yards	75,000	Cu.Yd.	_____	_____
	B. Over 75,000 cubic yards	20,000	Cu.Yd.	_____	_____
4.	COMPACTED FILL	4,200	Cu.Yd.	_____	_____
5.	MISCELLANEOUS FILL	29,000	CU.YD.	_____	_____
6.	BACKFILL, TOE	51,800	Cu.Yd.	_____	_____
7.	EARTHWORK, SPILLWAY	1	Job	L.S.	_____
9.	GROUT	7,120	Cu.Yd.	_____	_____
10	CEMENT	50,200	Cwt.	_____	_____
11.	STAIN	1,900	Gal.	_____	_____
12.	SIDE DRAINS	1	Job	L.S.	_____
13.	AGGREGATE BASE COURSE	850	Cu.Yd.	_____	_____
14.	A.C. PAVING	540	Tons	_____	_____
15.	PIPE GATE	1	Ea.	_____	_____
16.	TREES AND SHRUBS	1	Job	L.S.	_____

TOTAL ESTIMATED AMOUNT \$ \_\_\_\_\_

NOTE: If a bid or modification to a bid based on unit prices is submitted which provides for a lump sum adjustment to the total estimated cost, the application of the lump sum adjustment to each unit price in the Bidding Schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the Bidding Schedule.

Amounts and prices shall be indicated in either figures or words, not both.

Bids shall be submitted on all items of the Bidding Schedule.

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## INSTRUCTIONS TO OFFERORS

### 1. SOLICITATION DEFINITIONS (APR 1984) FAR 52.215-5.

"Offer" means "proposal" in negotiation.

"Solicitation" means a request for proposals (RFP) or a request for quotations (RFQ) in negotiations.

### 2. ACKNOWLEDGEMENT OF AMENDMENTS TO SOLICITATIONS (APR 1984) FAR 52.215-8.

Offerors shall acknowledge receipt of any amendment to this solicitation (a) by signing and returning the amendment, (b) by identifying the amendment number and date in the space provided for this purpose on the form for submitting an offer, or (c) by letter or telegram. The Government must receive the acknowledgement by the time and at the place specified for receipt of offers.

### 3. SUBMISSION OF OFFERS (APR 1984) FAR 52.215-9.

3.1 Offers and modifications thereof shall be submitted in sealed envelopes or packages (1) addressed to the office specified in the solicitation and (2) showing the time specified for receipt, the solicitation number, and the name and address of the offeror.

3.2 Telegraphic offers will not be considered unless authorized by the solicitation; however, offers may be modified or withdrawn by written or telegraphic notice, if such notice is received by the time specified for receipt of offers.

3.3 Item samples, if required, must be submitted within the time specified for receipt of offers. Unless otherwise specified in the solicitation, these samples shall be (1) submitted at no expense to the Government and (2) returned at the sender's request and expense, unless they are destroyed during preaward testing.

4. EXPLANATION TO PROSPECTIVE OFFERORS (APR 1984) FAR 52.215-14. Any prospective offeror desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective offerors before the submission of their offers. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective offeror concerning a solicitation will be furnished promptly to all other prospective offerors as an amendment to the solicitation, if the information is necessary in submitting offers or if the lack of it would be prejudicial to other prospective offerors.

### 5. LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF PROPOSALS (APR 1984) FAR 52.215-10.

5.1 Any proposal received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it:

5.1.1 Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th); or

5.1.2 Was sent by mail (or was a telegram if authorized), and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation; or

5.1.3 Is the only proposal received.

5.2 Any modification of a proposal or quotation, except a modification resulting from the Contracting Officer's request for "best and final" offer, is subject to the same conditions as in subparagraphs 5.1.1 and 5.1.2 above.

5.3 A modification resulting from the Contracting Officer's request for "best and final" offer received after the time and date specified in the request will not be considered unless received before award and the late receipt is due solely to mishandling by the Government after receipt at the Government installation.

5.4 The only acceptable evidence to establish the date of mailing of a late proposal or modification, sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark on the wrapper or on the original receipt from the U.S. or Canadian Postal Service. If neither postmark shows a legible date, the bid, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, offerors or quoters should request the postal clerks to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

5.5 The only acceptable evidence to establish the time of receipt at the Government installation is the time/date stamp of that installation on the proposal wrapper or other documentary evidence of receipt maintained by the installation.

5.6 Notwithstanding paragraph 5.1 above, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

5.7 Proposals may be withdrawn by written notice or telegram (including mailgram) received at any time before award. Proposals may be withdrawn in person by an offeror or its authorized representative if the representative's identity is made known and signs a receipt for the proposal before award.

## 6. PREPARATION OF OFFERS (APR 1984). FAR 52.215-13.

6.1 Offerors are expected to examine the drawings, specifications, Schedule, and all instructions. Failure to do so will be at the offeror's risk.

6.2 Each offeror shall furnish the information required by the solicitation. The offeror shall sign the offer and print or type its name on the Schedule and each continuation sheet on which it makes an entry. Erasures or other changes must be initialed by the person signing the offer. Offers signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

6.3 For each item offered, offerors shall (1) show the unit price/cost, including, unless otherwise specified, packaging, packing, and preservation and (2) enter the extended cost/price for the quantity of each item offered in the "Amount" column of the Schedule. In case of discrepancy between a unit price/cost and an extended price/cost, the unit price/cost will be presumed to be correct, subject, however, to correction to the same extent and in the same manner as any other mistake.

6.4 Offers for supplies or services other than those specified will not be considered unless authorized by the solicitation.

6.5 Offerors must state a definite time for delivery of supplies or for performance of services, unless otherwise specified in the solicitation.

Time, if stated as number of days, will include Saturdays, Sundays, and holidays.

#### 7. CONTRACT AWARD (APR 1984). FAR 52.215-16.

7.1 The Government will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the Government, cost or price and other factors, specified elsewhere in this solicitation, considered.

7.2 The Government may (1) reject any or all offers, (2) accept other than the lowest offer, and (3) waive informalities or minor irregularities in offers received.

7.3 The Government may award a contract on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint.

7.4 The Government may accept any item or group of items of an offer, unless the offeror qualifies the offer by specific limitations. Unless otherwise provided in the Schedule, offers may be submitted for quantities less than those specified. The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the offer.

7.5 A written award or acceptance of offer mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer shall result in a binding contract without further action by either party. Before the offer's specified expiration time, the Government may accept an offer (or part of an offer, as provided in paragraph 7.4 above), whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. Negotiations conducted after receipt of an offer do not constitute a rejection or counteroffer by the Government.

7.6 Neither financial data submitted with an offer, nor representations concerning facilities or financing, will form a part of the resulting contract. However, if the resulting contract contains a clause providing for pricing reduction for defective cost or pricing data, the contract price will be subject to reduction if cost or pricing data furnished is incomplete, inaccurate, or not current.

8. UNNECESSARILY ELABORATE PROPOSALS OR QUOTATIONS (APR 1984). FAR 52.215-7.

8.1 Unnecessarily elaborate brochures or other presentations beyond those sufficient to present a complete and effective response to this solicitation are not desired and may be construed as an indication of the offeror's or quoter's lack of cost consciousness. Elaborate art work, expensive paper and bindings, and expensive visual and other presentation aids are neither necessary nor wanted.

9. FAILURE TO SUBMIT OFFER (APR 1984). FAR 52.215-15.

9.1 Recipients of this solicitation not responding with an offer should not return this solicitation, unless it specifies otherwise. Instead, they should advise the issuing office by letter or postcard whether they want to receive future solicitations for similar requirements. If a recipient does not submit an offer and does not notify the issuing office that future solicitations are desired, the recipient's name may be removed from the applicable mailing list.

10. RESTRICTION ON DISCLOSURE AND USE OF DATA (APR 1984). FAR 52.215-12.

10.1 Offerors or quoters who include in their proposals or quotations data that do not want disclosed to the public for any purpose or used by the Government except for evaluation purposes, shall:

10.1.1 Mark the title page with the following legend:

"This proposal or quotation includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed-in whole or in part-for any purpose other than to evaluate this proposal or quotation. If, however, a contract is awarded to this offeror or quoter as a result of-or in connection with-the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets (insert numbers or other identification of sheets)"; and

10.1.2 Mark each sheet of data it wishes to restrict with the following legend:

"Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal or quotatio."

11. DIRECTIONS FOR SUBMITTING OFFERS.

11.1 Envelopes containing offers, guarantee, etc., must be sealed, marked, and addressed as follows:

Offer Under Reference No:  
(DACW09-87-B-0001)

To: U.S. ARMY ENGINEER DISTRICT  
LOS ANGELES  
P.O. Box 2711  
Los Angeles, California 90053-2325

11.2 Hand carried offers shall be deposited in Room 6202, 300 North Los Angeles Street, Los Angeles, California, prior to the time and date set for receipt of offers.

12. TYPE OF CONTRACT (APR 1984). FAR 52.216-1. The Government contemplates award of a Firm-Fixed Price contract.

13. BID (OFFER) GUARANTEE (APR 1984). FAR 52.228-1.

13.1 Failure to furnish a bid (offer) guarantee in the proper form and amount, by the time set for receipt of offers, may be cause for rejection of the offer.

13.1.2 The offeror (bidder) shall furnish a bid (offer) guarantee in the form of a firm commitment, such as a bid (offer) bond, postal money order, certified check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid (offer) guarantees, other than bonds, (1) to unsuccessful bidders as soon as practicable after the date set for receipt of offers, and (2) to the successful offeror upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the offer as accepted.

13.1.3 If the successful offeror, upon acceptance of its offer by the Government within the period specified for acceptance, fails to execute all contractual documents or give a bond(s) as required by the solicitation within the time specified, the Contracting Officer may terminate the contract for default.

13.1.4 Unless otherwise specified in the offer, the offeror will (1) allow 60 days for acceptance of its offer and (2) give bond within 10 days after receipt of the forms by the offeror.

13.1.5 In the event the contract is terminated for default, the offeror is liable for any cost of acquiring the work that exceeds the amount of its offer, and the bid (offer) guarantee is available to offset the difference.

14. AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) (APR 1984) FAR 52.210-2. Single copies of specifications cited in this solicitation may be obtained by submitting a written request to the supply point listed below. The request must contain the title of the specification, its number, date, applicable amendment(s), and the solicitation or contract number. In case of urgency, telephone or telegraphic requests are acceptable. Voluntary standards, which are not available to offerors and contractors from Government sources, may be obtained from the organization responsible for their preparation, maintenance, or publication.

Commanding Officer  
U.S. Naval Publication and Forms Center  
5801 Tabor Avenue  
Philadelphia, PA 19120  
Telex Number.....834295  
Western Union Number....710-670-1685  
Telephone Number.....(215) 697-3321

15. AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS, STANDARDS, PLANS, DRAWINGS, DATA ITEM DESCRIPTIONS, AND OTHER PERTINENT DOCUMENTS (JUN 1977). FAR SUP 52.210-7003. The specification, standards, plans, drawings, descriptions, and other

pertinent documents cited in this solicitation may be examined at the following locations:

300 North Los Angeles Street  
Los Angeles, California 90053-2325

16. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE. Whenever a contract or modification of contract price is negotiated, the Contractor's cost proposals for equipment ownership and operating expenses shall be determined in accordance with the requirements of paragraph, EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE of the SPECIAL CLAUSES. A copy of EP 1110-1-8 "Construction Equipment Ownership and Operating Expense Schedule" is available for review at Room 7216, 300 North Los Angeles Street, Los Angeles, California.

17. SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING. Offerors are cautioned that failure to comply in good faith with the CONTRACT CLAUSES entitled (1) "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns" and (2) "Small Business and Small Disadvantaged Business Subcontracting Plan (Alternate I)", when applicable, will be a material breach of contract. In order to assist prime contractors in developing a source list of Small and Small Disadvantaged Business Concerns, you are encouraged to contact minority Contractor associations, the Minority Business Development Agency, and the appropriate General Business Service Centers in your Standard Metropolitan Statistical Area, addresses of which may be obtained from:

Write: U.S. Army Engineer District, Los Angeles  
ATTN: SPLSD  
300 North Los Angeles Street, P.O. Box 2711  
Los Angeles, California 90053-2325

Telephone Alice Tafoya  
Small and Disadvantaged Business Utilization Specialist  
Area Code (213) 688-5676

18. ADDITIONAL INFORMATION pertaining to these plans and specifications may be obtained by writing or calling (collect calls not accepted) U.S. Army Engineer District, Los Angeles, Attn: Mr G. E. Davis, P. O. Box 2711, Los Angeles, California 90053-2325. Telephone (213) 688-5493.

18.1 All inquiries after the date specified for receipt of offers should be directed as specified hereinbefore, Attn: Mr. Bernard Meirowsky. Telephone (213) 688-5660.

19. SITE INSPECTION. Arrangements for visiting the site may be made by contacting: Mr. Neil Erwin, Telephone (602) 261-3023.

20. NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE (APR 1984). FAR 52.219-6.

20.1 Definition. "Small business concern", as used in this clause, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the size standards in this solicitation.

20.2 General.

20.2.1 Offers are solicited only from small business concerns. Offers received from concerns that are not small business concerns shall be considered nonresponsive and will be rejected.

20.2.2 Any award resulting from this solicitation will be made to a small business concern.

20.3 Agreement. A manufacturer or regular dealer submitting an offer in its own name agrees to furnish, in performing the contract, only end items manufactured or produced by small business concerns inside the United States, its territories and possessions, the Commonwealth of Puerto Rico, the Trust Territory of the Pacific Islands, or the District of Columbia. However, this requirement does not apply in connection with construction or service contracts.

20.4 Small Business Size Standard. For the purpose of this solicitation, in order to qualify as a "small business concern" the average annual receipts of the concern and its affiliates for its preceding three (3) fiscal years did not exceed 17,000,000.

21. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (APR 1984). FAR 52.222-23.

21.1 The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

21.2 The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade
25.0 to 30.0%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

21.3 The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or

female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

21.4 The Contractor shall provide written notification to the Director, Office of Federal Contract Compliance Programs, within 10 working days following award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the:

- (1) Name, address, and telephone number of the subcontractor;
  - (i) Employer identification number of the subcontractor;
- (2) Estimated dollar amount of the subcontract;
- (3) Estimated starting and completion dates of the subcontract; and
- (4) Geographical area in which the subcontract is to be performed.

21.5 As used in this Notice, and any contract resulting from this solicitation, the "covered area" is Maricopa County, Arizona.

## 22. BONDS.

22.1 Bid (Offer) Bonds. Each Offeror shall submit with his bid a Bid (Offer) Bond (Standard Form 24) with good and sufficient surety or surities acceptable to the Government, or other security as provided in Paragraph: BID (OFFER) GUARANTEE hereinbefore, in the form of twenty percent (20%) of the amount of the offer or \$3,000,000, whichever is lesser. The Bid (Offer) Bond penalty may be expressed in terms of a percentage of the amount of the offer or may be expressed in dollars and cents.

22.2 Performance and Payment Bonds. After the perscribed forms have been presented to the offeror to whom award is made for signature, two bonds, each with good and sufficient surety or sureties acceptable to the Government, shall be furnished; namely a Performance Bond (Standard Form 25) and a Payment Bond (Standard Form 25A). The penal sums of such bonds will be as follows:

22.2.1 Performance Bond. The penal sum shall equal one hundred percent (100%) of the contract price.

22.2.2 Payment Bond.

22.2.2.1 When the contract price is \$1,000,000 or less, the penal sum will be fifty percent (50%) of the contract price.

22.2.2.2 When the contract price is in excess of \$1,000,000 but not more than \$5,000,000, the penal sum shall be forty percent (40%) of the contract price.

22.2.2.3 When the contract price is more than \$5,000,000, the penal sum shall be \$2,500,000.

22.3 Any bonds furnished will be furnished by the Contractor to the Government prior to commencement of Contract performance.

23. EQUAL OPPORTUNITY PREAWARD CLEARANCE OF SUBCONTRACTORS (APR 1984). FAR 52.222-28. Notwithstanding the clause of this contract entitled "Subcontractors," the Contractor shall not enter into a first-tier subcontract for an estimated or actual amount of \$1 million or more without obtaining in writing from the Contracting Officer a clearance that the proposed subcontractor is in compliance with equal opportunity requirements and therefore is eligible for award.

\* \* \* \* \*

REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFEROR

1. CERTIFICATES OF INDEPENDENT PRICE DETERMINATION (APR 1985) FAR 52.203-2.

(a) The Offeror certifies that-

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other Offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the Offeror, directly or indirectly, to any other Offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the Offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory-

(1) Is the person in the Offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above

(insert full name of person(s) in the Offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the Offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the Offeror deletes or modifies subparagraph (a)(2) above, the Offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

2. CONTINGENT FEE REPRESENTATION AND AGREEMENT (APR 1984) FAR 52.203-4.

(a) Representation. The Offeror represents that, except for full-time bona fide employees working solely for the Offeror, the Offeror-

(Note: The Offeror must check the appropriate boxes. For interpretation or the representation, including the term "bona fide employee," see Subpart 3.4 of the Federal Acquisition Regulation.)

(1)  has,  has not employed or retained any person or company to solicit or obtain this contract; and

(2)  has  has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(b) Agreement. The Offeror agrees to provide information relating to the above Representation as requested by the Contracting Officer and, when subparagraph (a)(1) or (a)(2) is answered affirmatively, to promptly submit to the Contracting Officer-

(1) A completed Standard Form 119, Statement of Contingent or Other Fees, (SF 119); or

(2) A signed statement indicating that the SF 119 was previously submitted to the same contracting office, including the date and applicable solicitation or contract number, and representing that the prior SF 119 applies to this offer or quotation.

3. TYPE OF BUSINESS ORGANIZATION-SEALED BIDDING (APR 1985) FAR 52.214-2.

The bidder, by checking the applicable box, represents that it operates as

- a corporation incorporated under the laws of the State of \_\_\_\_\_,  
 an individual,  a partnership,  
 a nonprofit organization, or  a joint venture.

4. PARENT COMPANY AND IDENTIFYING DATA (APR 1984) FAR 52.214-8.

(a) A "parent" company, for the purpose of this provision, is one that owns or controls the activities and basic business policies of the bidder. To own the bidding company means that the parent company must own more than 50 percent of the voting rights in that company. A company may control a bidder as a parent even though not meeting the requirement for such ownership if the parent company is able to formulate, determine, or veto basic policy decisions of the Offeror through the use of dominant minority voting rights, use of proxy voting or otherwise.

(b) The bidder  is,  is not (check applicable box) owned or controlled by a parent company.

(c) If the bidder checked "is" in paragraph (b) above, it shall provide the following information:

Name and Main Office Address  
of Parent Company  
(including Zip Code)

Parent Company's Employer's  
Identification Number

(d) If the bidder checked "is not" in paragraph (b) above, it shall insert its own Employer's Identification Number on the following line \_\_\_\_\_.

5. SMALL BUSINESS CONCERN REPRESENTATION (APR 1984) FAR 52.219-1.

The Offeror represents and certifies as part of its offer that it  is,  is not a small business concern and that  all,  not all supplies to be furnished will be manufactured or produced by a small business concern in the United States, its possessions, or Puerto Rico. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the size standards in this solicitation.

6. SMALL DISADVANTAGED BUSINESS CONCERN REPRESENTATION (APR 1984) FAR 52.219-2.

(a) Representation. The Offeror represents that it  is,  is not a small disadvantaged business concern.

(b) Definitions.

"Asian-Indian American," as used in this provision, means a United States citizen whose origins are in India, Pakistan, or Bangladesh.

"Asian-Pacific American," as used in this provision, means a United States citizen whose origins are in Japan, China, the Phillipines, Vietnam, Korea, Samoa, Guam, The U.S. Trust Territory of the Pacific Islands, the Northern Mariana Islands, Laos, Cambodia, or Taiwan.

"Native Americans," as used in this provision, means American Indians, Eskimos, Aleuts, and native Hawaiians.

"Small business concern," as used in this provision, means a concern including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121.

"Small disadvantaged business concern," as used in this provision, means a small business concern that (1) is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged, or publicly owned business having at least 51 percent of its stock owned by one or more socially and economically disadvantaged individuals and (2) has its management and daily business controlled by one or more such individuals.

(c) Qualified Groups. The Offeror shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Asian-Indian Americans, and other individuals found to be qualified by the SBA under 13 CFR 124.1.

7. WOMEN-OWNED SMALL BUSINESS REPRESENTATION (APR 1984) FAR 52.219-3.

(a) Representation. The Offeror represents that it  is,  is not a women-owned small business concern.

(b) Definitions.

"Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121,

"Women-owned," as used in this provision, means a small business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

8. CERTIFICATION OF NONSEGREGATED FACILITIES (APR 1984) FAR 52.222-21.

(a) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(b) By the submission of this offer, the Offeror certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Offeror agrees that a breach of this certification is a violation of the Equal Opportunity clause in the contract.

(c) The Offeror further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will-

(1) Obtain identical certifications from proposed subcontractors before the award of subcontracts under which the subcontractor will be subject to the Equal Opportunity clause;

(2) Retain the certifications in the files; and

(3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES.**

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract under which the subcontractor will be subject to the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

**NOTE:** The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

**9. PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984) FAR 52.222-22.**

The Offeror represents that-

(a) It  has,  has not participated in previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;

(b) It  has,  has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

**10. CLEAN AIR AND WATER CERTIFICATION (APR 1984) FAR 52.223-1.**

The Offeror certifies that-

(a) Any facility to be used in the performance of this proposed contract is  , is not  listed on the Environmental Protection Agency List of Violating Facilities;

(b) The Offeror will immediately notify the Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the Offeror proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and

(c) The Offeror will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

11. DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER REPORTING (DEC 1980) FAR SUP 52.204-7004.

In the block with its name and address, the Offeror should supply the Data Universal Numbering System (DUNS) Number applicable to that name and address. The DUNS Number should be preceded by "DUNS:". If the Offeror does not have a DUNS Number, it may obtain one from any DUN and Bradstreet branch office. No Offeror should delay the submission of its offer pending receipt of its DUNS Number.

12. PREFERENCE FOR LABOR SURPLUS AREA CONCERNS (APR 1984) FAR 52.220-1.

(a) This acquisition is not set aside for labor surplus area (LSA) concerns. However, the Offeror's status as such a concern may affect (1) entitlement to award in case of tie offers or (2) offer evaluation in accordance with the Buy American Act clause of this solicitation. In order to determine whether the Offeror is entitled to a preference under (1) or (2) above, the Offeror must identify, below, the LSA in which the costs to be incurred on account of manufacturing or production (by the Offeror or the first-tier subcontractors) amount to more than 50 percent of the contract price.

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(b) Failure to identify the locations as specified above will preclude consideration of the Offeror as an LSA concern. If the Offeror is awarded a contract as an LSA concern and would not have otherwise qualified for award, the Offeror shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

CLAUSES INCORPORATED BY REFERENCE (APR 1984) FAR 52.252-2.

This contract incorporates the following clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting officer will make their full text available.

- I. FEDERAL ACQUISITION REGULATIONS (48 CFR CHAPTER 1) CLAUSES.
- II. ENGINEER FEDERAL ACQUISITION REGULATION SUPPLEMENT (EFARS) CLAUSES.
- III. DEPARTMENT OF DEFENSE FAR SUPPLEMENT (DFARS) (48 CFR CHAPTER 2) CLAUSES.

(End of clause)

These clauses may be obtained from Contracting Division, 300 North Los Angeles Street, Room 6021, Los Angeles, California, 90053-2325.

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CONTRACT CLAUSES

CONSTRUCTION-INSIDE THE U.S

Issued by: Department of the Army, Corps of Engineers  
Edition of 15 NOV 85

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GENERAL WAGE DECISION NO. AZ86-1

Supersedes General Wage Decision No. AZ83-5102

State: ARIZONA

County(ies): Maricopa

Construction  
Type: Building

Construction  
Description: Building Projects (does not include single family homes  
and apartments up to and including 4 stories)

Modification Record:

No.	Publication Date	Page No.(s)
1	Jan 31, 1986	2-3
2	July 18, 1986	2-3
3	Aug 22, 1986	2
4	Oct 17, 1986	6

	Basic Hourly Rates	Fringe Benefits
<b>ASBESTOS WORKERS:</b>		
Commercial	14.00	3.33
Industrial	19.68	4.50
<b>BOILERMAKERS</b>	18.86	4.50
<b>BRICKLAYERS; Stonemasons</b>	11.50	3.04
<b>CARPENTERS:</b>		
Carpenters; Saw Filer; Shingler; and Drywall; Hangers	15.415	2.80
Floor Layer and Piledriver	15.76	2.80
Millwrights	16.29	2.59
<b>CEMENT MASONS:</b>		
Cement Masons	13.99	3.05
Concrete Troweling ; Sawing and Scor- ing, Curb and Gutter, Grinding Ma- chine Operator; Clary and similar type of power Screed; Color pigment; Steps; Composition Finisher	14.20	3.05
<b>DRYWALL TAPERS</b>	15.06	1.20
<b>ELECTRICIANS:</b>		
Electricians	12.18	1.32
Sound Installers	16.00	2.14+ 3%
<b>ELEVATOR CONSTRUCTORS:</b>		
Mechanics	15.53	3.29+ a
Helpers	10.87	3.29+ a
Probationary Helpers	7.765	
<b>GLAZIERS</b>	15.39	1.78
<b>INSULATION INSTALLERS</b>	8.57	
<b>IRONWORKERS</b>	16.25	5.60
<b>LABORERS</b>	7.55	
<b>LANDSCAPE SPRINKLER FITTER/INSTALLER</b>	6.65	
<b>LANDSCAPE LABORER</b>	4.59	
<b>LINE CONSTRUCTION:</b>		
Groundmen	13.41	4.75+ 3.5%
Equipment Operator; Powdermen & Mech- anics	15.83	4.75+ 3.5%
Linemen, Crane Operator, Sagger, and Pilot	18.15	4.75+ 3.5%
Cable splicers	18.66	4.75+ 3.5%
<b>PAINTERS:</b>		
Brush and Roller; Sandblaster (No- zzleman); Sheetrock Taper; Floor Coverer; Sandblaster (pot tender)	13.54	1.30
Spray; Paperhanger	13.79	1.30
Creosote Applier	13.87	1.30
<b>Swing Stage:</b>		
Brush; Sandblaster	13.94	1.30
Spray	14.19	1.30
Steeplejack	14.40	1.30
Steel and Bridge, Brush; Nozzle- man and Pot Tender; Steel (steam cleaner); Electric and Air Tool Operator; Steel Sandblaster	14.47	1.30
Steel and bridge, Spray	14.67	1.30

PLASTERERS	15.69	3.06
PLUMBERS	16.00	3.03
ROOFERS	10.84	2.11
SHEET METAL WORKERS	16.50	3.30
SOFT FLOOR LAYERS	12.46	.92
SPRINKLER FITTERS	18.90	3.40
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Group 3	13.82	3.08
Group 4	14.47	3.08
Group 5	15.27	3.08
Group 6	16.06	3.08
Group 7	16.51	3.08
Group 8	17.01	3.08
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TRUCK DRIVERS:		
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Group 2	12.65	2.67
Group 3	12.97	2.67
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Group 5	13.70	2.67
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Group 7	14.76	2.67
Group 8	15.515	2.67
Group 8A	16.62	2.67
Group 8B	16.00	2.67

## FOOTNOTE:

- a. Employer contributes 8% of basic hourly rate for 5 years' service and 6% basic hourly rate for 6 months' to 5 years' service as Vacation Pay Credit. Seven Paid Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving; and Christmas Day

WELDERS- Receive rate prescribed for craft performing operation to which welding is incidental.

## POWER EQUIPMENT OPERATORS

Group 1: Air Compressor Operator; Pump Operator; Conveyor Operator; Generator Operator (all); Power Grizzly Operator; Fireman (all); Welding Machine Operator; Tripper Operator; Concrete Mixer Operator, skip type; Highline Cableway Signalman

Group 2: Oiler; Forklift and Ross Carrier Operator; Skiploader, 1 1/2 cu. yd. and less; Pavement Breaker; Roller Operator (except as otherwise classified); Wheel-type Tractor Operator (Ford-Ferguson type); Slurry Seal Machine Operator (driver Moto-paver); Power Sweeper

Group 3: Self-propelled Chip Spreading Machine; Conveyor Ope-

AZ86-1

rator; Dinky Operator, under 20 ton; Elevator Hoist Operator, Husky and similar

Group 4: Motor Crane Driver; Beltcrete Operator; Curing Machine Operator, Boring Bridge and Texture; Cross Tining and Pipe Float; Straw Blower; Hydrographic Seeder; Hydrographic Mulcher; Jumbo Finishing Machine; Joint Inserter

Group 5: A-Frame Boom Truck or Winch Truck Operator; Grade Checker (excluding Civil Engineer); Multiple Power Concrete Saw Operator; Screed Operator; Stationary Pipe Wrapping and Cleaning Machine Operator; Tugger Operator

Group 6: Aggregate Plant Operator (including crushing, screening, and sand plants, etc.); Asphalt Laydown Machine Operator; Asphalt Plant Mixer Operator; Boring Machine Operator; Concrete Mechanical Tamping, Spreading or Finishing Machine Operator (including Clary, Johnson or similar types); Concrete Pump Operator; Concrete Batch Plant Operator, all types and sizes; Conductor, Brakeman, or Handler; Drilling Machine Operator, all types and sizes except as otherwise classified; Field Equipment Serviceman; Kolman Belt Loader Operator or similar type, with belt width 48" or over; Locomotive Engineer (including Dinky 20 tons weight and over); Moto-paver and similar type equipment Operator; Operating Engineer Rigger; Pneumatic-tired Scraper Operator, up to and including 12 cu. yds. (Turnapull, Euclid, Cat, D.W. Hancock, and similar equipment); Power Jumbo Form Setter Operator; Pressure Grout Machine Operator (as used in heavy engineering construction); Road Oil Mixing Machine Operator; Roller Operator, on all type asphalt pavement; Self-propelled Compactor, with blade; Skip Loader Operator, all types with a rated capacity over 1-1/2 but less than 4 cu. yds.; Slip Form Operator (power driven lifting device for concrete forms); Soil Cement Road Mixing Machine Operator, single pass type; Stationary Central Generating Plant Operator, rated 300 K.W. or more; Surface Heater and Planer Operator; Traveling Pipe-wrapping Machine Operator

Group 7: Pneumatic-tired Scraper Operator, all sizes and types over 12 cu. yds. MRC (Turnapull, Euclid, Cat, D.W. Hancock and similar equipment); Tractor Operator (Pusher, Bulldozer, Scraper); Trenching Machine Operator

Group 8: Asphalt or Concrete Planing, Rotomill, and Milling Machine Operator; Auto Grade Machine Operator (CMI and similar equipment); Boring Machine Operator (including Mole, Badger and similar type); Concrete Mixer Operator, paving type and Mobile Mixers; Concrete Pump Operator, with boom attached (truck mounted); Crane Operator, Crawler and Pneumatic type under 100 ton capacity MRC; Crawler-type Tractor Operator, with boom attachment or Slope Bar; Derrick Operator; Forklift Operator for hoisting personnel; Gradall Operator; H. D. Mechanic and/or Welder; Helicopter Hoist Operator; Highline Cableway Operator (less than 20 tons rated capacity); Mass Excavator Operator (150 Bucyrus Erie and similar types); Mechanical Hoist Operator (two or more drums); Motor Grader Operator, any type power blade; Motor Grader Operator, with Elevating Grader attachment; Mucking Machine Operator;

Overhead Crane Operator; Piledriver Engineer (portable, stationary or skid rig); Pneumatic-tired Scraper Operator, all sizes and types (Turnapull, Euclid, Cat, D.W. Hancock and similar equipment over 45 cu. yds. MRC); Power driven Ditch Lining or Ditch Trimming Machine Operator; Skip Loader Operator, all types rated capacity 4 cu. yd. but less than 8 cu. yds.; Slip Form Paving Machine Operator (including Gunnert, Zimmerman and similar types); Specialized Power Digger Operator, attached to wheel-type tractor; Tower Crane (or similar type) Operator; Tugger Operator (two or more); Universal Equipment Operator, Shovel, Backhoe, Dragline, Clamshell, etc., up to 8 cu. yds.

Group 9: Crane Operator, Pneumatic or Crawler, 100 ton hoisting capacity and over MRC rating; Helicopter Pilot, FAA qualified, when used in construction work other than executive travel and single casual rental; Highline Cableway Operator, over 20 ton rated capacity and using traveling head and tail tower; Remote-control Earth Moving Equipment Operator; Skip Loader Operator, all types with rated capacity of 8 cu. yds. or more; Universal Equipment Operator, Shovel, Backhoe, Dragline, Clamshell, etc., 8 cu. yds. and over

#### TRUCK DRIVERS

Group 1: Teamsters; Pick-ups; Station Wagon; Man Haul Driver

Group 2: Dump or Flatrack (2 or 3 axle); Water Truck (under 2500 gallons); Buggymobile (1 cu. yd. or less); Bus Driver; Self-propelled Street Sweeper; Shop Greaser

Group 3: Dump or Flatrack (4 axle); Dumptor or Dumpster (less than 7 cu. yds.); Water Truck (2500 gallons but less than 4000 gallons); Tireman

Group 4: Dumptor or Dumpster (7 cu. yds. but less than 16 cu. yds.); Dump or Flatrack (5 axle); Water Truck (4000 gallons and over); Slurry type equipment Driver or Leverman; Vacuum Pump Truck Drivers; Flaherty Spreader or similar type equipment or Leverman; Transit Mix (8 cu. yds. or less mixer capacity); Ambulance Driver

Group 5: Dump or Flatrack (6 axle); Transit Mix (over 8 cu. yds. but less than 10.5 cu. yds.); Rock Truck (i.e. Dart, Euclid and other similar type end dumps, single unit) less than 16 cu. yds.

Group 5A: Oil Tanker or Spreader and/or Bootman, Retortman or Leverman

Group 6: Transit Mix (over 10.5 cu. yds. but less than 14 cu. yds. mixer capacity); Ross Carrier, Fork Lift or Lift Truck; Hydro Lift, Swedish Crane, Iowa 300 and similar types; Concrete Pump (when integral part of transit Mix Truck); Dump or Flatrack (7 axle); Transport Driver (unless axle rating

AZ86-1

results in higher classification)

Group 7: Dump or Flatrack (8 axle)

Group 8: Off-highway equipment Driver (including but not limited to: 2 or 4 wheel power unit, i.e. Cat, DW Series, Euclid, International and similar type equipment, transporting material when top loaded or by external means including pulling Water Tanks, Fuel Tanks or other applications under Teamster Classifications; Rock Trucks (Dart, Euclid, or other similar end dump types) 16 cu. yds. and over; Eject-alls; Dumptor or Dumpster (16 cu. yds. and over); Dump or Flatrack (9 axle)

Group 8A: Heavy-duty Mechanic/Welder; Body and Fender Man

Group 8B: Field Equipment Servicemen or Fuel Truck Driver

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)(ii))

**SPECIFICATIONS**

for

**Skunk Creek**

Gila River Basin

Maricopa County, Arizona

Authority: Public Law 89-298, Flood Control Act of 1965

Appropriation: 96 X 3122, Construction General

96 X 8862, Contributed Funds, Required

Corps of Engineers



**US Army Corps  
of Engineers**

Los Angeles District

## SPECIAL CLAUSES

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1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (1984 APR) FAR 52.212-3. The Contractor shall be required to (a) commence work under this contract within 5 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 180 calendar days after the date of receipt of notice to proceed, except for seeding and planting. Seeding and planting shall be completed as soon as practicable and within the time limits stated in the Technical Provisions or as directed by the Contracting Officer. The time stated for completion shall include final cleanup of the premises.

2. LIQUIDATED DAMAGES-CONSTRUCTION (APR 1984) FAR 52.212-5.

2.1 If the Contractor fails to complete the work within the time specified in the contract, or any extensions, the Contractor shall pay to the Government as liquidated damages, the sum of \$750.00 for each day of delay.

2.2 If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

2.3 If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

3. CONTRACT DRAWINGS AND SPECIFICATIONS. (JAN 1985) (DFARS 52.236-7002).

3.1 Ten sets of large scale contract drawings and specifications will be furnished the Contractor without charge, except applicable publications incorporated into the Technical Provisions by reference. Additional sets will be furnished on request at the cost of reproduction. The work shall conform to the contract drawings which form a part of these specifications and are available in the office of the U.S. Army Engineer District, Los Angeles, 300 North Los Angeles Street, Los Angeles, California. The list of drawings set out in the following drawing is hereby incorporated by reference into the contract:

3.2 Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

3.3 The Contractor shall check all drawings furnished him immediately upon their receipt and shall promptly notify the Contracting Officer of any discrepancies. Figures marked on drawings shall in general be followed in preference to scale measurements. Large scale drawings shall in general govern small scale drawings. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.

#### 4. SUBMITTALS.

4.1 General. Reference is made to the CONTRACT CLAUSE: SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION. The Contractor shall submit for approval all shop drawings, certificates of compliance, equipment data, and/or material samples called for by these specifications.

4.2 Submittal Register. Within 15 days after receipt of notice to proceed, the Contractor shall complete and submit to the Contracting Officer, in duplicate, Submittal Register, ENG FORM 4288, listing all submittals required under the contract (including the Contract Clauses, the Special Clauses, and the Technical Provisions) and dates of submittals. Blank ENG FORMS 4288 will be furnished by the Contracting Officer on request. In addition to the items listed on the register, the Contractor will furnish submittals for any deviation from the plans or specifications. The scheduled need dates must be recorded on the register for each item for control purposes. In preparing the register, adequate time, a minimum of 30 days, will be allowed for review, approval and possible resubmittal. Scheduling shall be coordinated with the approved progress schedule. The Contractor's Quality Control representative shall review the register at least every 30 days and take appropriate action to maintain an effective system. Copies of updated or corrected registers shall be submitted to the Contracting Officer at least every 60 days in the quantity specified. Payment will not be made for any material or equipment which does not comply with contract requirements.

4.2.1 The attached Submittal Register is a minimum listing of the submittals that the Contractor shall submit to the Contracting Officer. The Contractor shall complete those columns in the submittal register entitled "NAS Activity Code", "Submittal Identification Number", and "Contractor Schedule Dates". The Contractor shall coordinate the submittal register with the specific detailed requirements of the Technical Provisions of the contract. In the case of conflict between the submittal register and the Technical Provisions of this contract, the requirements of the Special Clauses shall govern.

4.2.2 The listing of submittals in the Submittal Register shall not relieve the Contractor from providing additional submittals required by the Contracting Officer under the provisions of the Contract Clauses.

4.3 Transmittals. The Contractor shall complete ENG FORM 4025, "Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance" with each set of shop drawings, certificates, equipment data or samples submitted. Blank ENG FORM 4025 will be furnished by the Contracting Officer on request. Six (6) copies of each submittal will be required.

4.4 Shop Drawings. The Contractor shall submit to the Contracting Officer for approval 10 copies of all shop drawings called for by these specifications. One set will be returned to the Contractor.

4.5 Certificates of Compliance (1969 MAY OCE). Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in 6 copies. Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

4.6 Resubmittals. If a submittal is returned for correction or is not satisfactory and is disapproved by the Contracting Officer, the Contractor shall resubmit the corrected material, in the same quantity, as specified for the original submittal, for approval within 14 days after receipt of the disapproved material.

5. PHYSICAL DATA (APR 1984) FAR 52.236-4. Data and Information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

5.1 The indications of physical conditions on the drawings and in the specifications are the result of site investigations by topographic surveys and as-built drawings.

5.2 Weather Conditions. The Contractor shall satisfy himself as to the hazards likely to arise from weather conditions. Complete weather records and reports may be obtained from any U.S. Weather Bureau Office.

5.3 Transportation Facilities. The Contractor shall make his own investigation of the condition of available public and private roads, railroads, and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress at the site work. It shall be the Contractor's responsibility to construct and maintain at his own expense, any haul roads required for construction operations.

5.4 Additional Information, including but not necessarily limited to, results of laboratory tests of material encountered in test holes or other explorations and field logs, is available for inspection and study in the office of District Engineer, Geotechnical Branch, 300 N. Los Angeles Street, Los Angeles, California.

6. SALVAGE MATERIALS AND EQUIPMENT (1965 JAN) DoD FAR SUP. 52.236-7005. The Contractor shall maintain adequate property control records for all materials or equipment specified to be salvaged. These records may be in accordance with the Contractor's system of property control, if approved by the property administrator. The Contractor shall be responsible for the adequate storage and protection of all salvaged materials and equipment and shall replace, at no cost to the Government, all salvaged materials and equipment which are broken or damaged during salvage operations as the result of his negligence, or while in his care.

7. LAYOUT OF WORK (APR 1984) FAR 52.236-17.

7.1 The Contractor shall lay out its work from the Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

8. QUANTITY SURVEYS (APR 1984) FAR ALT I 52.236-16 (EFARS 52.2/9102(d)).

8.1 Quantity surveys shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

8.2 The Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. All these surveys shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance. The Government shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.

8.3 Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

9. VARIATION IN ESTIMATED QUANTITIES-SUBDIVIDED ITEMS (1985 JAN HQ USACE) (EFARS 52.2/9109(g)). This clause is applicable only to Item No. 3.

9.1 Variation from the estimated quantity in the actual work performed under any second or subsequent sub-item or elimination of all work under such a second or subsequent sub-item will not be the basis for an adjustment in contract unit price.

9.2 Where the actual quantity of work performed for Item No. 3 is less than 90 percent of the quantity of the first sub-item listed under such item, the Contractor will be paid at the contract unit price for that sub-item for the actual quantity of work performed and, in addition, an equitable adjustment in contract price shall be made upon demand of the Contractor. The equitable adjustment in price for the under-run shall be made on the basis that the Contractor has assumed the risk and is entitled to no adjustment for the first 10 percent under-run.

9.3 If the quantity of work performed under Item No. 3 exceeds 105 percent or is less than 96 percent of the total estimated quantity of the sub-items under that item, and if such variation causes an increase or a decrease in the time required for performance of this contract the contract completion time will be adjusted as follows.

9.3.1 If the quantity variation is such that it will cause an increase in the time necessary for completion, the Contracting Officer shall, upon receipt of a written request for an extension within 10 days from the beginning of such delay or within such further period of time which the Contracting Officer grants prior to the date of final settlement of the contract, ascertain the facts and make such adjustment for extending the completion date as in his judgment the findings justify.

9.3.2 If the quantity variation is such that it will cause a decrease in the time necessary for completion, the Contracting Officer shall ascertain the facts and promptly notify the Contractor in writing of his findings and the extent of adjustment.

9.4 If the parties fail to agree upon the adjustment to be made the dispute shall be determined as provided in the CONTRACT CLAUSE: DISPUTES.

#### 10. AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984) FAR 52.236-14.

10.1 The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates as determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

10.2 The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

#### 11. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE. (1985 JAN HQ USACE) (EFARS 52.2/9108(f)).

11.1 Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a Contractor or subcontractor at any tier shall be based on actual cost data when the Government

can determine both ownership and operating costs for each piece of equipment or equipment groups of similar serial and series from the Contractor's accounting records. When both ownership and operating costs cannot be determined from the Contractor's accounting records, equipment costs shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule," Region VII. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply.

11.2 Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(11) and FAR 31.205-36 substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Costs for major repairs and overhaul are unallowable.

11.3 When actual equipment costs are proposed and the total amount of the pricing action is over \$25,000, cost or pricing data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet." By submitting cost or pricing data, the Contractor grants to the Contracting Officer or an authorizing representative the right to examine those books, records, documents and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement the Contractor shall certify that the equipment costs or pricing data submitted are accurate, complete and current.

## 12. PERFORMANCE OF WORK BY THE CONTRACTOR (1984 APR) FAR 52.236-1.

12.1 The Contractor shall perform on the site, and with its own organization, work equivalent to at least thirty-five (35) percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement of this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

## 13. PERFORMANCE EVALUATION OF CONTRACTOR (1985 JAN HQ USACE) (EFARS 52.2/9006(f)).

13.1 As a minimum, the Contractor's performance will be evaluated upon final acceptance of the work. However, interim evaluation may be prepared at any time during contract performance when determined to be in the best interest of the Government.

13.2 The format for the evaluation will be SF 1421, and the Contractor will be rated either outstanding, satisfactory, or unsatisfactory in the areas of Contractor Quality Control, Timely Performance, Effectiveness of Management, Compliance with Labor Standards, and Compliance with Safety Standards. The

Contractor will be advised of any unsatisfactory rating either in an individual element or in the overall rating, prior to completing the evaluation, and all Contractor comments will be made a part of the official record. Performance Evaluation Reports will be available to all DOD Contracting offices for their future use in determining Contractor responsibility, in compliance with DFARS 36.201(C)(1).

14. HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA (APR 1984 FAR 52.223-3).

14.1 The Contractor agrees to submit a Material Safety Data Sheet (Department of Labor Form OSHA-20), as prescribed in Federal Standard No. 313A, for all hazardous material 5 days before delivery of the material, whether or not listed in Appendix A of the Standard. This obligation applies to all materials delivered under this contract which will involve exposure to hazardous materials or items containing these materials.

14.2 "Hazardous material," as used in this clause is as defined in Federal Standard No. 313A, in effect on the date of this contract.

14.3 Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

14.4 The Contractor shall comply with applicable Federal, state, and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

14.5 The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

14.5.1 To use, duplicate, and disclose any data to which this clause is applicable. The purposes of this right are to (i) apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials; (ii) obtain medical treatment for those affected by the material; and (iii) have others use, duplicate, and disclose the data for the Government for these purposes.

14.5.2 To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph 14.5.1 above, in precedence over any other clause of this contract providing for rights in data.

14.5.3 That the Government is not precluded from using similar or identical data acquired from other sources.

14.5.4 That the data shall not be duplicated, disclosed, or released outside the Government, in whole or in part for any acquisition of manufacturing purpose, if the following legend is marked on each piece of data to which this clause applies-

"This is furnished under United States Government Contract No. \_\_\_\_\_ and shall not be used, duplicated, or disclosed for any acquisition or manufacturing purpose without the permission of \_\_\_\_\_. This legend shall be marked on any reproduction of this data."

14.5.5 That the Contractor shall not place the legend or any other restrictive legend or any data which (i) the Contractor or any subcontractor previously delivered to the Government without limitations or (ii) should be delivered without limitations under the conditions specified in the Federal Acquisition Regulation in the clause at 52.227-18, Rights in Data.

14.6 The Contractor shall insert this clause, including this paragraph, with appropriate changes in the designation of the parties, in subcontracts at any tier (including purchase designations or purchase orders) under this contract involving hazardous material.

## 15. AS-BUILT DRAWINGS.

15.1 General. The Contractor shall furnish 3 full size sets of as-built blueline prints for use in preparation of as-built drawings by the Government. The as-built prints shall be a record of the construction as installed and completed by the Contractor. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings, and all changes which are made after final inspection of the contract work. In event the Contractor accomplishes additional work which changes the as-built conditions of the facility after submission of the as-built drawings, the Contractor shall furnish revised and/or additional drawings as required to depict as-built conditions. The requirements for these additional drawings will be the same as for the as-built drawings included in the original submission. The prints shall show the following information, but not be limited thereto:

15.1.1 The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.

15.1.2 The location and dimensions of any changes within the building or structure.

15.1.3 Correct grade or alignment of roads, structures or utilities if any changes were made from contract plans.

15.1.4 Correct elevations if changes were made in site grading.

15.1.5 Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

15.1.6 The topography and grades of all drainage installed or affected as a part of the project construction.

15.1.7 All changes or modifications which result from the final inspection.

15.1.8 Options. Where contract drawings or specifications allow options, only the option selected for construction shall be shown on the as-built drawings.

15.1.9 Submittal to Contracting Officer for review and approval. Not later than 2 weeks after acceptance of the project by the Government, the Contractor shall deliver to the Contracting Officer 3 full size sets of blue-line prints marked up to depict as-built conditions. If upon review, the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the drawings to the Contracting Officer within ten (10) calendar days.

16. ENVIRONMENTAL LITIGATION (1974 NOV OCE) (EFARS 52.2/9109(j)).

16.1 If the performance of all or part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a subcontractor at any tier not required by the terms of this contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a subcontractor at any tier other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the CONTRACT CLAUSE: SUSPENSION OF WORK. The period of such suspension, delay or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

16.2 The term "environmental litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

17. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER.

17.1 This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE: DEFAULT. The listing below defines the monthly anticipated adverse weather for the contract period and is based upon NOAA or similar data for the geographical location of the project.

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS

<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>
10	6	2	1	0	0	2	3	2	2	3	9

17.2 Determination.

17.2.1 The above schedule of anticipated adverse weather will constitute the base line for monthly (or portion thereof) weather time evaluations. Upon acknowledgment of the notice to proceed and continuing throughout the contract on a monthly basis, actual adverse weather days will be recorded on a calendar day basis (including weekends and holidays) and compared to the monthly anticipated adverse weather in subparagraph 17.1 above. For purposes of subparagraph 17.2, the term actual adverse weather days shall include days impacted by actual adverse weather days.

17.2.2 The number of actual adverse weather days shall be calculated chronologically from the first to the last day in each month. Once the number of actual adverse weather days anticipated in subparagraph 17.1 above have been incurred, the Contracting Officer will examine any subsequently occurring adverse weather days to determine whether a Contractor is entitled to a time extension. These subsequently occurring adverse weather days must prevent work for 50 percent or more of the Contractor's work day and delay work critical to the timely completion of the project. The Contracting Office will convert any delays to meeting the above requirements to calendar days and issue a modification in accordance with the CONTRACT CLAUSE: DEFAULT.

17.3 The Contractor's schedule must reflect the above anticipated adverse weather delays on all weather dependent activities.

\* \* \* \* \*

SUBMITTAL REGISTER		(ER 415-1-10)		TITLE AND LOCATION				Skunk Creek, Maricopa County, Arizona				CONTRACTOR		CONTRACT NUMBER		
NAS ACTIVITY CODE	SUBMITTAL IDENTIFICATION (ITEM NUMBER)	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL						ACTION ELEMENT	CONTRACTOR SCHEDULED DATES			CORPS ACTION DATES		REMARKS
				SHOP DRAWING	SAMPLE	GUARANTEE	MFR'S DATA	CERTIFICATE	TEST REPORT		OTHER AS NOTED	*TECH REVIEW BY	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	
		1C, 2.1	Contractor Quality Control (CQC) Plan							X						
		1D, 3	Environmental Protection Plan							X						
		1D, 7	Restoration of Landscape Damage Plan							X						
		2F, 3.1	Aggregate Base Course Test Results							XX						
		2G, 3.3	Bituminous Materials, Prime Coat							XX						
		2G, 10	Waybills and Delivery Tickets							X						
		2H, 3.2	Tack Coat						X							
		2H, 9	Waybills and Delivery Tickets							X						
		2I, 6.1	Job Mix Formula							X						
		2I, 6.1	Aggregate and Asphalt Samples		X											
		2J, 3.1	Topsoil Sample		X											
		2J, 3.2	Certificates of Compliance (or Con- formance) for Plants						X							
		2J, 3.3	Plant Maintenance Instructions							X						
		2J, 3.4	Licenses							X						
		4A, 6	Waybills and Delivery Tickets							X						
		4B, 2.1.1	Aggregate Source and Certification						X	X						
		5A, 4.1	Shop Drawings	XX												

\*AE-Architect Engineer

ED-Engineering Division

CD-Construction Division

AREA-Area Engineer

RE-Resident Engineer



T A B L E O F C O N T E N T S

TECHNICAL PROVISIONS

<u>Section</u>	<u>Title</u>
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1B	Measurement and Payment
1C	Contractor's Quality Control
1D	Environmental Protection
2A	Diversion and Control of Water
2B	Clearing Site and Removing Obstructions
2C	Excavation
2D	Fills and Subgrade Preparation
2E	Side Drains
2F	Aggregate Base
2G	Prime Coat and Weed Killer
2H	Tack Coat
2I	Asphalt Concrete (Central-Plant Hot-Mix)
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9A	Stain

SECTION 1A

GENERAL REQUIREMENTS

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| 4. Project Engineer's Office                      | 13. Water Contamination                                 |
| 5. Bulletin Board                                 | 14. Dust Control  |
| 6. Maintenance and Disposal of Project Facilities | 15. Permits   |
| 7. Scrap Materials                                |   |
| 8. Salvage Materials                              |   |
| 9. Archaeological Findings During Construction    |   |

1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 Federal Specifications (Fed. Spec.).

FF-B-575C	Bolts, Hexagon and Square
FF-N-105B & Am-3	Nails, Brads, Staples and Spikes: Wire, Cut and Wrought
FF-N-836D & Am-1	Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat
MM-L-751H	Lumber; Softwood
TT-E-529F	Enamel, Alkyd, Semi-Gloss
TT-P-25E & Am-2	Primer Coating, Exterior (Undercoat for Wood, Ready-Mixed, White and Tints)

1.2 U.S. Department of Commerce National Bureau of Standards, Product Standard (Prod. Std).

PS 1-74	Construction and Industrial Plywood
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2. PROJECT FACILITIES. The Contractor shall construct and/or erect the following project facilities.

2.1 Construction Signs. The signs shall be erected as soon as possible and within 15 days after commencement of work under this contract.

2.1.1 Five project signs at location designated by the Contracting Officer.

2.1.2 Warning Signs facing approaching traffic on all haul roads crossing under overhead power transmission lines.

2.1.3 Hard hat signs at locations directed.

2.2 Project Engineer's Office, including a fenced parking area.

2.3 Bulletin Board at the Contractor's office.

2.4 Sanitary Facilities.

### 3. CONSTRUCTION SIGNS.

#### 3.1 Materials.

3.1.1 Lumber shall conform to Fed. Spec. MM-L-751, and shall be seasoned Douglas Fir, S4S, Grade D or better except that posts, braces and spacers shall be construction Grade (WCLB).

3.1.2 Plywood shall conform to Prod. Std. PS 1, grade A-C, Group 1, exterior type.

3.1.3 Bolts, Nuts and Nails. Bolts shall conform to Fed. Spec. FF-B-575, nuts shall conform to Fed. Spec. FF-N-836, and nails shall conform to Fed. Spec. FF-N-105.

3.1.4 Paints and Oils. Paints shall conform to Fed. Spec. TT-P-25 for primer and TT-E-529 for finish paint and lettering.

#### 3.2 Construction.

3.2.1 Project and hard hat signs shall be constructed as detailed on Figures 1, 2 and 3. Decals and safety signs will be furnished by the Contracting Officer.

3.2.2 Warning Signs shall be constructed of plywood not less than 1/2 inch thick and shall be securely bolted to the supports with the bottom of the sign face 3 feet above the ground. The sign face shall be 2 x 4 feet, all letters shall be 4 inches in height, and the wording shall be: "WARNING: OVERHEAD TRANSMISSION LINES."

3.3 Painting. All exposed surfaces and edges of plywood shall be given one coat of linseed oil and be wiped prior to applying primer. All exposed surfaces of signs and supports shall be given one coat of primer and 2 finish coats of white paint. Except as otherwise indicated, lettering on all signs shall be black and sized as indicated.

### 4. PROJECT ENGINEER'S OFFICE.

4.1 General. The Contractor shall provide a suitable office trailer building for the Project Engineer. The exact site will require the Contracting Officer's approval. The trailer shall be adequately heated, well lighted, suitably ventilated, and cooled with an exterior mounted air-conditioner, complete, with all piping and electrical connections. An adequate supply of cooled drinking water shall be furnished and maintained. Open parking space for 6 vehicles and water and sanitary facilities shall be located convenient to the office. The combined parking and trailer area shall be enclosed with a woven wire fence approximately 6 feet high with a 10-foot wide lockable gate accessible from a road

or street. The fenced area shall be of sufficient size to permit ease in the parking of vehicles. Materials for the facilities need not be new provided they are adequate for the intended use.

4.2 Office Trailer shall be approximately 10 feet wide by 40 feet in length.

5. BULLETIN BOARD. A weatherproof bulletin board, approximately 36 inches wide and 30 inches high, with hinged glass door shall be provided adjacent to or mounted on the Contractor's project office. If adjacent to the office, the bulletin board shall be securely mounted on no less than 2 posts. Bulletin board and posts shall be painted or have other approved factory finish. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and such other items required to be posted.

6. MAINTENANCE AND DISPOSAL OF PROJECT FACILITIES. The Contractor shall maintain the project facilities in good condition throughout the life of the contract. Upon completion of work under this contract, the facilities covered under this section will remain the property of the Contractor and shall be removed from the site at his expense.

7. SCRAP MATERIAL. Materials indicated to be removed and not indicated to be salvaged, stored or reinstalled are designated as scrap and shall become the property of the Contractor and be removed from the site of work. The Contractor by signing this contract hereby acknowledges that he made due allowance for value, if any, of such scrap in the contract price.

8. SALVAGE MATERIALS. All materials and/or equipment removed and indicated to be either stored or reinstalled are designated as salvaged materials and/or equipment. Any salvaged materials and equipment which are excess upon completion of the work and are not indicated to be stored shall become the property of the Contractor.

9. ARCHAEOLOGICAL FINDINGS DURING CONSTRUCTION. Should the Contractor or any of his employees in the performance of this contract find or uncover any archaeological remains, he shall notify the Project Engineer immediately. Such notifications will be a brief statement in writing giving the location and nature of the findings. Should the discovery site require archaeological studies resulting in delays and/or additional work, the Contractor will be compensated by an equitable adjustment under the CONTRACT CLAUSES.

10. PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS.

10.1 General. The approximate location of all railroads, pipe lines, power and communication lines, and other utilities known to exist within the limits of the work are indicated on the drawings. The sizes, locations, and names of owners of such utilities are given from available information, but their accuracy is not guaranteed. Except as otherwise indicated on the drawings, all existing utilities will be left in place and the Contractor shall conduct his operations in such a manner that the utilities will be protected from damage at all times, or arrangements shall be made by the Contractor for their relocation at the Contractor's own expense. The Contractor shall be responsible for any damage to utilities known to exist and shall reimburse the owners for such damage caused by his operations.

10.2 Relocation or Removal. Utilities to be relocated or removed not as part of this contract are designated "To be Relocated by Others" or "To be Removed by Others," respectively. Utilities shown on the plans and not so designated will be left in place and be subject to the CONTRACT CLAUSE: PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS. The Contractor may make arrangements with the owner for the temporary relocation and restoration of utilities not designated to be relocated, or for additional work in excess of the work needed to relocate utilities designated for relocation at no additional cost to the Government.

10.3 Utilities Not Shown. If the Contractor encounters, within the construction limits of the entire project, utilities not shown on the plans and not visible as of the date of this contract and if such utilities will interfere with construction operations, he shall immediately notify the Contracting Officer in writing to enable a determination by the Contracting Officer as to the necessity for removal or relocation. If such utilities are left in place, removed or relocated, as directed by the Contracting Officer, the Contractor shall be entitled to an equitable adjustment for any additional work or delay.

10.4 Coordination. The Contractor shall consult and cooperate with the owner of utilities that are to be relocated or removed by others to establish a mutual performance schedule and to enable coordination of such work with the construction work. These consultations shall be held as soon as possible after award of the contract or sufficiently in advance of anticipated interference with construction operations to provide required time for the removal or relocation of affected utilities.

10.5 Notices. The Contractor shall notify the Contracting Officer, in writing, not less than 14 days in advance of the date on which he will complete trenching, excavation, fill or rough grading, as applicable, at each location where such completed work is required for temporary or permanent relocations by others. The Contractor shall allow a period of 14 calendar days at each relocation, after which time the Contractor may resume his operations.

10.6 Restrictions.

10.6.1 Representatives of Other Agencies. Personnel representing owners and agencies may be present for various portions of the work. However, the Contractor will be responsible only to the Contracting Officer.

11. PUBLIC SAFETY. Attention is invited to the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES. The Contractor shall provide temporary fencing, barricades, and/or guards, as required, to provide protection in the interest of public safety. Whenever the Contractor's operations create a condition hazardous to the public, he shall furnish at his own expense and without cost to the Government, such flagmen and guards as are necessary to give adequate warning to the public of any dangerous conditions to be encountered and he shall furnish, erect, or maintain such fences, barricades, lights, signs and other devices as are necessary to prevent accidents and avoid damage or injury to the public. Flagmen and guards, while on duty and assigned to give warning and safety devices shall conform to applicable city, county, and state requirements. Should the Contractor appear to be neglectful or negligent in furnishing adequate warning and protection measures, the Contracting Officer may direct attention to the existence of a hazard and the necessary warning and protective measures shall be furnished and

installed by the Contractor without additional cost to the Government. Should the Contracting Officer point out the inadequacy of warning and protective measures, such action of the Contracting Officer shall not relieve the Contractor from any responsibility for public safety or abrogate his obligation to furnish and pay for those devices. The installation of any general illumination shall not relieve the Contractor of his responsibility for furnishing and maintaining any protective facility.

12. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) STANDARDS. The OCCUPATIONAL SAFETY and HEALTH ACT (OSHA) STANDARDS for CONSTRUCTION (Title 29, Code of Federal Regulations Part 1926 as revised from time to time) and the Corps of Engineers General Safety and Health Requirements Manual, EM 385-1-1, are both applicable to this contract. The most stringent requirement of the two standards will be applicable.

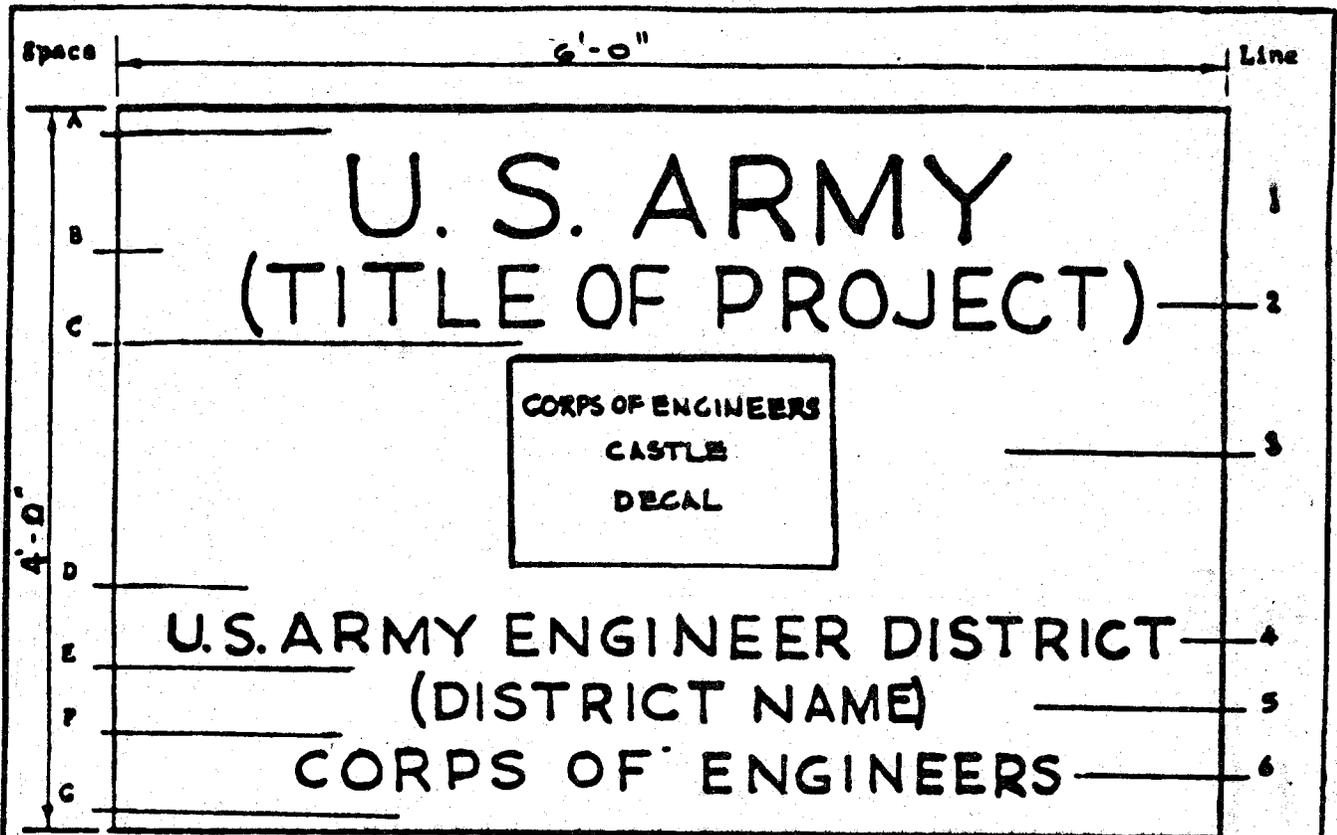
13. WATER CONTAMINATION. In order to prevent contamination of water along waterways, all refuse, oil, greases, and other petroleum products; all toxic materials; all cement or concrete; or water containing such materials shall be disposed of in a manner to prevent their entry into water along waterways.

14. DUST CONTROL. The Contractor shall provide an acceptable plan for preventing the generation of dust due to his operation in construction zones, along haul routes, in equipment parking areas, and in waste areas located on the Base. This plan may consist of water sprinkling or an equivalent service.

15. PERMITS.

15.1 General. Reference is made to the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES, which obligates the Contractor to obtain all required licenses and permits.

\* \* \* \* \*



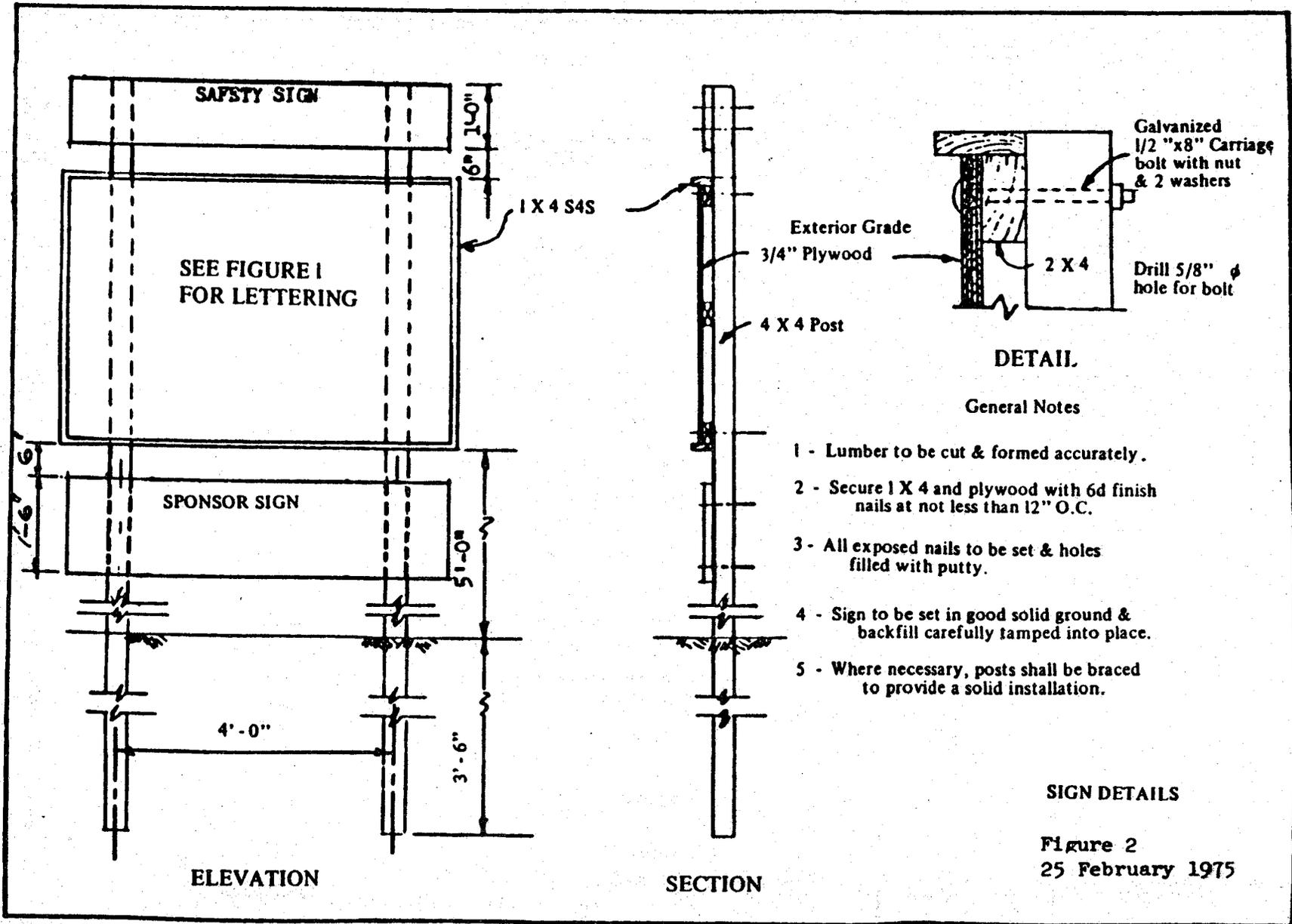
SCHEDULE

<u>Space</u>	<u>Height</u>	<u>Line</u>	<u>Description</u>	<u>Letter Height</u>	<u>Stroke</u>
A	3"	1	U. S. ARMY	5 1/2"	7/8"
B	2"	2	PROJECT NOMENCLATURE	4"	5/8"
C	2"	3	CORPS OF ENGINEERS CASTLE (DECAL)	1 1/2"	--
D	3"	4	U. S. ARMY ENGINEER DISTRICT	2 3/4"	3/8"
E	2"	5	DISTRICT NAME	2 1/4"	1/4"
F	2"	6	CORPS OF ENGINEERS	2 1/2"	3/8"
G	3"				

Lettering Color -- Black

PROJECT SIGN  
(Army-Civil Works)

Figure 1  
14 August 1972



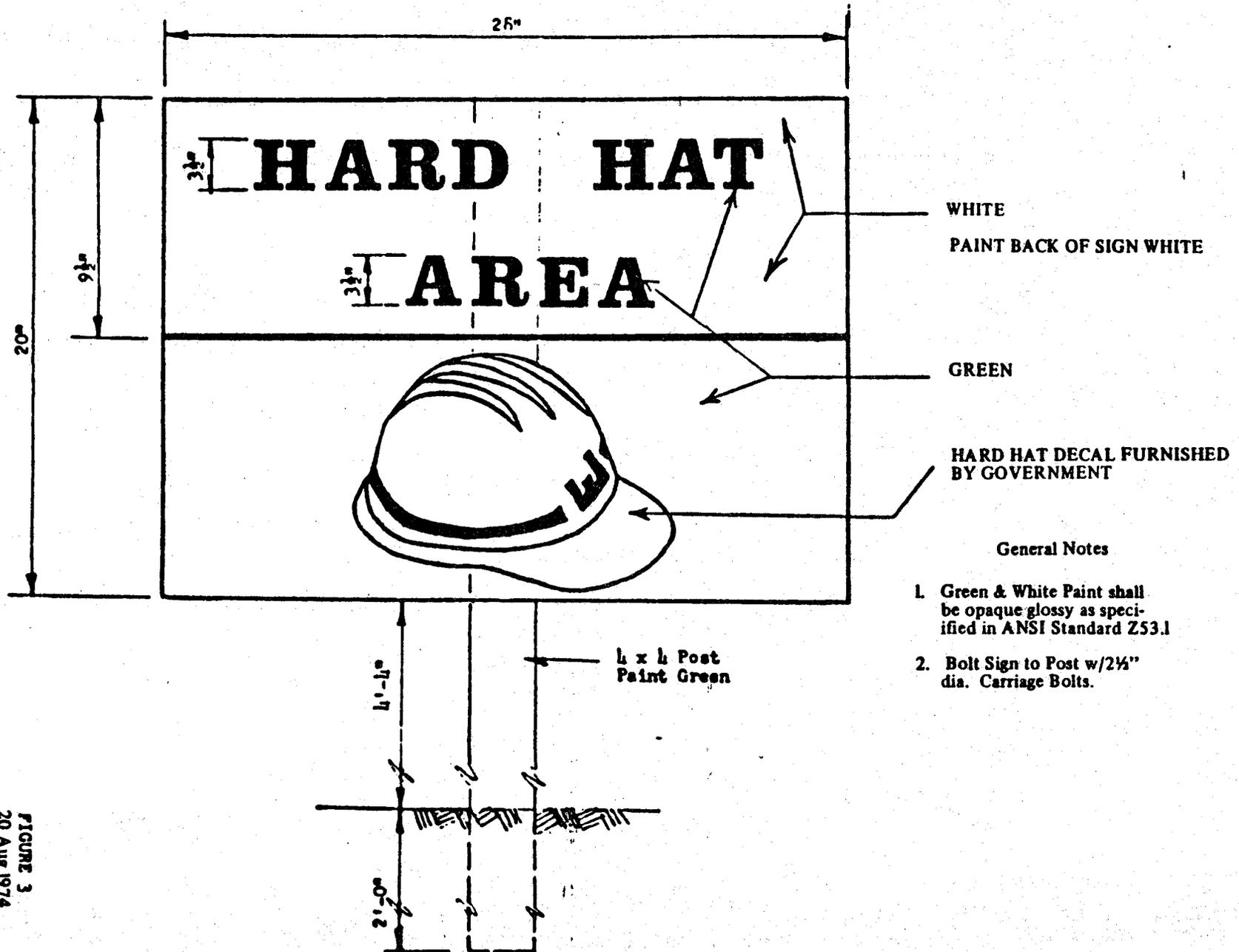


FIGURE 3  
20 Aug 1974

## SECTION 1B

### MEASUREMENT AND PAYMENT

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| 1. Diversion and Control of Water          | 9. Grout                    |
| 2. Clearing Site and Removing Obstructions | 10. Cement                  |
| 3. Excavation                              | 11. Stain                   |
| 4. Compacted Fill                          | 12. Side Drains             |
| 5. Miscellaneous Fill                      | 13. Aggregate Base Course   |
| 6. Backfill, Toe                           | 14. Asphalt Concrete Paving |
| 7. Earthwork, Spillway                     | 15. Pipe Gate               |
| 8. Stone                                   | 16. Trees and Shrubs        |

1. DIVERSION AND CONTROL OF WATER. Payment will be made at the applicable contract price, which payment shall constitute full compensation for the diversion and control of water, complete.

2. CLEARING SITE AND REMOVING OBSTRUCTIONS. Payment will be made at the applicable contract price, which payment shall constitute full compensation for clearing the site and removing obstructions, including clearing and grubbing, complete.

#### 3. EXCAVATION.

3.1 Measurement. A survey of the site shall be made prior to commencement of work, and all measurements will be based on this survey without regard to any changes in the site that may be made between the excavation lines and grades indicated on the drawings or staked in the field and ground surfaces as indicated by the above mentioned surveys. The actual slopes as excavated may be greater or less than those indicated or staked depending on the materials excavated and methods used in performing the work, but such alterations shall not change the measurement for payment from the original lines as specified herein. The quantity of directed excavation necessary for the removal of unsuitable foundation material as specified shall be included in the measurement of the excavation where the unsuitable soils are encountered. Quantities will be computed in cubic yards by the average end area method and the planimeter will be considered a precise instrument for measurement of plotted cross sections. All excavation outside of excavation lines shown on the drawings or staked in the field will be considered as being for the convenience of the Contractor. Measurement for the payment will not include voids larger than 5 cubic feet in structures to be removed.

3.2 Payment for Excavation will be made at the applicable contract price, which payment shall constitute full compensation for excavation, stockpiling and disposal of the excavated materials, complete.

#### 4. COMPACTED FILL.

4.1 Measurement of compacted fills will be made between the excavation and structure lines and the fill limit lines, or between the ground lines and fill lines, as indicated or staked in the field. Quantities will be computed in cubic yards by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections.

4.2 Payment will be made at the applicable contract price, which payment shall constitute full compensation for placing and compacting the fill, complete.

#### 5. MISCELLANEOUS FILL.

5.1 Measurement of miscellaneous fill will be measured to the nearest cubic yard. Quantities will be computed by the average area end method and the planimeter will be considered a precise instrument for measuring plotted cross sections.

5.2 Payment for miscellaneous fill will be made at the applicable contract price, which payment shall constitute full compensation for placing the miscellaneous fill, complete.

#### 6. BACKFILL, TOE.

6.1 Measurement for payment of the Backfill, Toe will be made between the toe excavation line and soil cement structure line and the excavation channel lines (invert line) as indicated. Quantities will be computed in cubic yards by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections.

6.2 Payment for Backfill, Toe will be made at the applicable contract price, which payment shall constitute full compensation for placing and compacting the backfill, complete.

7. EARTHWORK, SPILLWAY. Payment will be made at the applicable contract price, which payment shall constitute full compensation for all earthwork done at the spillway, complete.

#### 8. STONE.

8.1 Measurement of stone will be the number of tons of stone, determined by scale weights, acceptably placed within the lines and grades indicated on the drawings or directed by the Contracting Officer. Excluded from this item is stone used for bridge protection.

8.2 Payment for the Stone will be made at the applicable contract price, which payment shall constitute full compensation for the stone, complete in place.

#### 9. GROUT.

9.1 Measurement. The quantity of grout to be paid for will be measured to the nearest cubic yard by weighing all the ingredients in trial batches of grout and converting each batch to absolute volume. This volume and the number of batches of a grout corresponding proportions acceptably placed in the work shall be used to determine the quantity of grout.

9.2 Payment for Grout will be made at the applicable contract price, which payment shall constitute full compensation for all costs of the grout, including materials (except cement), placing and curing, complete.

10. CEMENT.

10.1 Measurement. The quantity of cement to be paid for will be the number of hundred-weight (100 pounds) of cement used in the grout paid for on a cubic yard basis unless specifically excepted, wasted or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved weight in pounds of the cement per cubic yard by the number of cubic yards of grout within the paylines of the structures and dividing by 100.

10.2 Payment for cement will be made at the applicable contract price, which payment shall constitute full compensation for the cement used in the grout.

11. STAIN.

11.1 Measurement. The quantity of stain to be paid for will be measured to the nearest gallon of stain actually applied to the grouted stone in accordance to the specifications. Stain wasted or used for the convenience of the Contractor will not be measured for payment.

11.2 Payment for Stain will be made at the applicable contract price, which payment shall constitute full compensation for the acid stain, including surface preparation, complete.

12. SIDE DRAINS. Payment will be made at the applicable contract price, which payment shall constitute full compensation for removal of existing side drains and installation of new side drains including all materials and labor, complete in place.

13. AGGREGATE BASE COURSE.

13.1 Measurement of Aggregate Base Course completed and accepted by the Contracting Officer will be in cubic yards. The volume of the aggregate base in place will be determined by the average job thickness obtained in accordance with paragraph: THICKNESS CONTROL of the SECTION: AGGREGATE BASE and the dimensions indicated.

13.2 Payment for aggregate Base Course will be made at the applicable contract price, which payment shall constitute full compensation for the construction and completion of the aggregate base course, complete.

14. ASPHALT CONCRETE PAVING.

14.1 Measurement. The unit of measurement for Asphalt Concrete Paving will be the ton (2000 pounds). The Contractor shall weigh each load on a certified platform scale and shall furnish the Contracting Officer with duplicate Weighmaster's Certificates showing the actual net weights. One ticket shall be furnished to the plant inspector and one ticket furnished to the inspector at the construction site. The bituminous mixture shall be weighed after mixing and no deduction will be made for the weight of bituminous material incorporated therein. Asphalt concrete used for the convenience of the Contractor will not be measured for payment.

14.2 Payment for Asphalt Concrete Paving will be made at the applicable contract price, which payment shall constitute full compensation for furnishing, spreading, forming and compacting the asphalt concrete surfacing, complete in place.

15. PIPE GATE.

15.1 Measurement of the pipe gate will be the actual number of pipe gates acceptably installed.

15.2 Payment for the pipe gate will be made at the applicable contract price, which payment shall constitute full compensation for the pipe gate, complete in place.

16. TREES AND SHRUBS. Payment will be made at the applicable contract price, which payment shall constitute full compensation for all trees and shrubs, including materials, installation, and maintaining, complete.

\* \* \* \* \*

## SECTION 1C

### CONTRACTOR'S QUALITY CONTROL

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| 1. General                      | 6. Tests                         |
| 2. Quality Control Plan         | 7. Completion Inspection         |
| 3. Quality Control Organization | 8. Documentation                 |
| 4. Submittals                   | 9. Notification of Noncompliance |
| 5. Control                      |                                  |

1. GENERAL. The Contractor shall establish and maintain an effective quality control system in compliance with CONTRACT CLAUSE: INSPECTION OF CONSTRUCTION. The quality control system consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with contract requirements. The system shall cover construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence.

#### 2. QUALITY CONTROL PLAN.

2.1 General. The Government will consider an interim plan for the first 15 days of operation. However, the Contractor shall furnish for approval by the Government, not later than 30 days after receipt of Notice to Proceed the Contractor Quality Control (CQC) Plan with which he proposes to implement the requirements of CONTRACT CLAUSE: INSPECTION OF CONSTRUCTION. The plan shall identify personnel, procedures, instructions, records, and forms to be used. If the Contractor fails to submit an acceptable QC plan with the time herein prescribed, the Contracting Officer (CO) may refuse to allow construction to start if an acceptable interim plan is not furnished or withhold funds from progress payments in accordance with the CONTRACT CLAUSE: PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS until such time as the Contractor submits an acceptable final plan.

2.2 Coordination Meeting. Before start of construction, the Contractor shall meet with the CO and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's inspection and control with the Government's inspection. Minutes of the meeting shall be prepared and signed by both the Contractor and the CO. The minutes shall become a part of the contract file. There may also be occasions when subsequent conferences will be called to reconfirm mutual understandings.

2.3 The Quality Control Plan. This plan shall include as a minimum, the following:

2.3.1 A description of the quality control organization including chart showing lines of authority and acknowledgement that the CQC staff shall conduct the phase inspections for all aspects of the work specified and shall report to the project manager or someone higher in the Contractor's organization.

2.3.2 The name, qualifications, duties, responsibilities and authorities of each person assigned a QC functions.

2.3.3 A copy of the letter to the QC manager signed by an authorized official of the firm, which describes the responsibilities and delegates the authorities of the QC manager shall be furnished.

2.3.4 Procedures for scheduling and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.

2.3.5 Control testing procedures for each specific test. (Laboratory facilities will be approved by the Contracting Officer).

2.3.6 Reporting procedures including proposed reporting formats.

2.4 Acceptance of Plan. Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC plan and operations as necessary to obtain the quality specified.

2.5 Notification of Changes. After acceptance of the QC plan, the Contractor shall notify the CO in writing of any proposed change. Proposed changes are subject to acceptance by CO.

### 3. QUALITY CONTROL ORGANIZATION.

3.1 System Manager. The Contractor shall identify an individual, within his organization at the site of the work, who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC System Manager shall be approved by the CO.

3.2 Personnel. A staff shall be maintained under the direction of the system manager to perform all QC activities. The actual strength of the staff during any specific work period may vary to cover work phase needs, shifts, and rates of placement. The personnel of this staff shall be fully qualified by experience and technical training to perform their assigned responsibilities and shall be directly hired by and work for the Prime Contractor.

4. SUBMITTALS. Submittals shall be as specified in the SPECIAL CLAUSE: SUBMITTALS. The CQC Organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

5. CONTROL. Contractor Quality Control is the means by which the Contractor assures himself that his construction complies with the requirements of the contract plans and specifications. The controls shall be adequate to cover all construction operations, including both onsite and offsite fabrication, and will be keyed to the proposed construction sequence. The controls shall include at least three phases of inspection for all definitive features of work as follows:

5.1 Preparatory Inspection. This shall be performed prior to beginning any work on any definable feature of work. It shall include a review of contract requirements; a check to assure that all materials and/or equipment have been tested, submitted and approved; a check to assure that provisions have been made

to provide required control testing; examination of the work area to ascertain that all preliminary work has been completed; and a physical examination of materials, equipment and sample work to assure that they conform to approved shop drawings or submittal data and that all materials and/or equipment are on hand. The Contracting Officer's Representative (COR) shall be notified at least 24 hours in advance of the preparatory inspection and such inspection shall be made a matter of record in the Contractor's Quality Control documentation as required below. Subsequent to the preparatory inspection and prior to commencement of work, the Contractor shall instruct each applicable worker as to the acceptable level of workmanship required in his CQC plan in order to meet contract specifications.

5.2 Initial Inspection. This shall be performed as soon as a representative portion of the particular feature of work has been accomplished and shall include examination of the quality of workmanship and a review of control testing for compliance with contract requirements, use of defective or damaged materials, omissions, and dimensional requirements. The Contracting Officer's Representative shall be notified at least 24 hours in advance of the initial inspection and such inspection shall be made a matter of record in the CQC documentation as required below.

5.3 Follow-up Inspections. These shall be performed daily to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. Such inspections shall be made a matter of record in the CQC documentation as required below. Final follow up inspections shall be conducted and test deficiencies corrected prior to the addition of new features of work.

## 6. TESTS.

6.1 Testing Procedure. The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements. The Contractor shall procure the services of an industry recognized testing laboratory or he may establish an approved testing laboratory at the project site. A list of tests which the Contractor understands he is to perform shall be furnished as a part of the CQC plan to the Contracting Officer. The list shall give the test name, specification paragraph containing the test requirements, and the personnel and laboratory responsible for each type of test. The Contractor shall perform the following activities and record and provide the following data.

6.1.1 Verify that testing procedures comply with contract requirements.

6.1.2 Verify that facilities and testing equipment are available and comply with testing standards.

6.1.3 Check test instrument calibration data against certified standards.

6.1.4 Verify that recording forms, including all of the test documentation requirements, have been prepared.

## 6.2 Testing.

6.2.1 Capability Check. The COR will have the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check laboratory technician's testing procedures and techniques.

6.2.2 Capability Re-Check. If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$675.00 to reimburse the Government for each succeeding re-check of the laboratory or the checking of a subsequently-selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

6.2.3 Project Laboratory. The COR will have the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

6.2.4 Transportation of Samples for Testing. Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

For delivery by mail: Director  
South Pacific Division Laboratory  
U.S. Army Corps of Engineers  
P.O. Box 37  
Sausalito, CA 94966

For other deliveries: Director  
South Pacific Division Laboratory  
U.S. Army Corps of Engineers  
Bridgeway, Foot of Spring St.  
(bldg. directly east of 2000 Bridgeway)  
Sausalito, CA 94965

7. COMPLETION INSPECTION. At the completion of all work or any increment thereof established by a completion time stated in the paragraph: COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK of the SPECIAL CLAUSES, or stated elsewhere in the specifications, the CQC System Manager shall conduct a completion inspection of the work and develop a punch list of items which do not conform to the approved plans and specifications. Such a list shall be included in the CQC documentation, as required by paragraph: DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or his staff shall make a second completion inspection to ascertain that all deficiencies have been corrected and so notify the Contracting Officer's Representative. The completion inspection and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

8. DOCUMENTATION.

8.1 The Contractor shall maintain correct records of quality control operations, activities, and tests performed including the work of suppliers and subcontractors. In addition, these records shall include factual evidence that the required activities or tests have been performed, including but not limited to the following:

8.1.1 Type and number of control activities and tests involved.

8.1.2 Results of control activities or tests.

8.1.3 Nature of defects, causes for rejection, etc.

8.1.4 Proposed remedial action.

8.1.5 Corrective actions taken.

8.2 These records shall cover both conforming and defective or deficient features and shall include a statement that supplies and materials incorporated in the work comply with the contract. Legible copies of these records shall be furnished to the CO daily.

9. NOTIFICATION OF NONCOMPLIANCE. The Contracting Officer will notify the Contractor of any noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice immediately take corrective action. Such notice, when delivered to the Contractor or his representative at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of claim for extension of time or for excess costs or damage by the Contractor.

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## SECTION 1D

### ENVIRONMENTAL PROTECTION

#### Index

- |  |  |
|--|--|
| 1. Scope                                 | 7. Restoration of Landscape Damage                       |
| 2. Quality Control                       | 8. Maintenance of Pollution Control Facilities           |
| 3. Submittals                            | 9. Training of Contractor Personnel in Pollution Control |
| 4. Subcontractors                        | 10. Post Construction Clean Up                           |
| 5. Notification                          |  |
| 6. Protection of Environmental Resources |  |

1. SCOPE. This section covers prevention of environmental pollution and damage as the result of construction operations under this contract and for those measures set forth in other Technical Provisions of these specifications. For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants.

2. QUALITY CONTROL. The Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. The Contractor shall record on daily reports any problems in complying with laws, regulations and ordinances and corrective action taken.

3. SUBMITTALS. The Contractor shall submit an environmental protection plan in accordance with provisions as herein specified.

3.1 Environmental Protection Plan shall include but not be limited to the following:

(1) A list of Federal, State and local laws, regulations, and permits concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations and permits.

(2) Methods for protection of features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection, i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archeological and cultural resources.

(3) Procedures to be implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the environmental protection plan.

(4) Permit or license and the location of the solid waste disposal area.

(5) Drawings showing locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

(6) Environmental monitoring plans for the jobsite, including land, water, air, and noise monitoring.

(7) Methods of protecting surface and groundwater during construction activities.

(8) Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or non-use. Plan should include measures for marking the limits of use areas.

3.2 Implementation. After receipt of Notice to Proceed, the Contractor shall submit in writing the above Environmental Protection Plan within the time specified under SPECIAL CLAUSES. Approval of the Contractor's plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures.

4. SUBCONTRACTORS. Assurance of compliance with this section by subcontractors will be the responsibility of the Contractor.

5. NOTIFICATION. The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, State or local laws or regulations, permits and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspension.

6. PROTECTION OF ENVIRONMENTAL RESOURCES. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this Contractor shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the drawings and specifications. Environmental protection shall be as stated in the following subparagraphs.

6.1 Protection of Land Resources. Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, cacti, shrubs, vines, grasses, top soil, and land forms without special permission from the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.

## SECTION 1D

### ENVIRONMENTAL PROTECTION

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- |  |  |
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| 1. Scope                                 | 7. Restoration of Landscape Damage                       |
| 2. Quality Control                       | 8. Maintenance of Pollution Control Facilities           |
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| 6. Protection of Environmental Resources |  |

1. SCOPE. This section covers prevention of environmental pollution and damage as the result of construction operations under this contract and for those measures set forth in other Technical Provisions of these specifications. For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants.

2. QUALITY CONTROL. The Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. The Contractor shall record on daily reports any problems in complying with laws, regulations and ordinances and corrective action taken.

3. SUBMITTALS. The Contractor shall submit an environmental protection plan in accordance with provisions as herein specified.

3.1 Environmental Protection Plan shall include but not be limited to the following:

(1) A list of Federal, State and local laws, regulations, and permits concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations and permits.

(2) Methods for protection of features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection, i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archeological and cultural resources.

(3) Procedures to be implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the environmental protection plan.

(4) Permit or license and the location of the solid waste disposal area.

(5) Drawings showing locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

(6) Environmental monitoring plans for the jobsite, including land, water, air, and noise monitoring.

(7) Methods of protecting surface and groundwater during construction activities.

(8) Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or non-use. Plan should include measures for marking the limits of use areas.

3.2 Implementation. After receipt of Notice to Proceed, the Contractor shall submit in writing the above Environmental Protection Plan within the time specified under SPECIAL CLAUSES. Approval of the Contractor's plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures.

4. SUBCONTRACTORS. Assurance of compliance with this section by subcontractors will be the responsibility of the Contractor.

5. NOTIFICATION. The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, State or local laws or regulations, permits and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspension.

6. PROTECTION OF ENVIRONMENTAL RESOURCES. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this Contractor shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the drawings and specifications. Environmental protection shall be as stated in the following subparagraphs.

6.1 Protection of Land Resources. Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, cacti, shrubs, vines, grasses, top soil, and land forms without special permission from the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.

6.1.1 Work Area Limits. Prior to any construction the Contractor shall mark the areas within the construction work limits that are not required to accomplish all work to be performed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be fenced or flagged. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor shall convey to his personnel the purpose of marking and/or protection of all necessary objects.

6.1.2 Protection of Landscape. Trees, cacti, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by fencing, flagging, or any other approved techniques.

6.1.3 Reduction of Exposure of Unprotected Erodible Soils. Earthwork brought to final grade shall be finished as indicated and specified. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils.

6.1.4 Temporary Protection of Disturbed Areas. Such methods as necessary shall be utilized to effectively prevent erosion and control sedimentation, including but not limited to the following:

(1) Redardation and Control of Runoff. Runoff from the construction site shall be controlled by construction of diversion ditches, benches, and berms to retard and divert runoff to protected drainage courses, and any measures required by area-wide plans approved under paragraph 208 of the Clean Water Act.

6.1.5 Erosion and Sedimentation Control Devices. The Contractor shall construct or install all temporary and permanent erosion and sedimentation control features as necessary. Temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.

6.1.6 Location of Field Offices, Storage and Other Contractor Facilities. The Contractors' field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated by the Contracting Officer. Due to the sensitive nature of riparian habitat in the basin, strict adherence to the designated areas is necessary. Temporary movement or relocation of Contractor facilities shall be made only on approval by the Contracting Officer.

6.1.7 Spoil Areas shall be managed and controlled to limit spoil to areas designated and prevent erosion of soil or element from entering nearby water courses or lakes.

6.1.8 Temporary Excavations and Embankments for plant and/or work areas shall be controlled to protect adjacent areas from spoiling.

6.1.9 Disposal of Solid Wastes. Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. All handling and disposal shall be conducted to prevent contamination and shall conform to the requirements of applicable local, State and Federal laws and regulations.

6.1.10 Disposal of Chemical Waste. Chemical waste shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State and local regulations. Crankcase oil and other waste chemicals shall be captured and not drained onto the ground.

6.1.11 Disposal of Discarded Materials. Discarded materials other than those which can be included in the solid waste category will be handled as directed by the Contracting Officer.

6.2 Preservation and Recovery of Historical, Archeological and Cultural Resources. Existing historical, archeological and cultural resources within the Contractor's work area will be so designated by the Contracting Officer and precautions taken to preserve all such resources as they existed at the time they were pointed out to the Contractor. The Contractor shall install all protection for these resources so designated on the drawings and shall be responsible for their preservation during this contract. If during construction activities the Contractor observes unusual items that might have historical or archeological value all work in the immediate area shall be stopped and such observations shall be reported as soon as practicable to the Contracting Officer. Recording and preservation of historical and archeological finds during construction shall conform to the requirements of SPECIAL CLAUSES.

6.3 Protection of Water Resources. The Contractor shall keep construction activities under surveillance, management and control to avoid pollution of surface and groundwaters. Special management techniques as set out below shall be implemented to control water pollution by the listed construction activities which are included in this contract.

6.3.1 Washing and Curing Water. Waste waters directly derived from construction activities shall not be allowed to enter water areas. These waste waters shall be collected and placed in retention ponds where suspended material can be settled out or the water evaporates so that pollutants are separated from the water.

6.3.2 Cofferdam and Diversion Operations. The Contractor shall plan his operation and perform all work necessary to minimize adverse impact or violation of the water quality standard of Federal, state, or local governments. Construction operations for dewatering, removal of cofferdams shall be controlled at all times to limit the impact of water turbidity on the habitat for wildlife and impacts on water quality for downstream use.

6.3.3 Monitoring of Water Areas Affected by Construction Activities shall be the responsibility of the Contractor. All water areas affected by construction activities shall be monitored by the Contractor.

6.4 Protection of Fish and Wildlife Resources. The Contractor shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of fish and wildlife. Species that require specific attention along the measures for their protection will be listed by the Contractor prior to beginning of construction operations.

6.5 Protection of Air Resources. The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict

accordance with the State of Arizona and all Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained for those construction operations and activities specified in this section. Special management techniques as set out below shall be implemented to control air pollution by the construction activities which are included in the contract.

6.5.1 Particulates. Dust particles, aerosols, and gaseous by-products from all construction activities, processing and preparation of materials, such as from asphaltic batch plants, shall be controlled at all times, including weekends, holidays and hours when work is not in progress. A permit will be required by Maricopa County that will require particulate suppression control.

6.5.1.1 Particulates Control. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards mentioned in paragraph hereinabove to be exceeded or which would cause a hazard or a nuisance. Sprinkling, treatment with an approved non-toxic dust palliative, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated at such intervals as to keep the disturbed area damp at all times. The Contractor must have sufficient competent equipment available to accomplish this task. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

6.5.2 Hydrocarbons and Carbon Monoxide. Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

6.5.3 Odors. Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

6.5.4 Monitoring of Air Quality shall be the responsibility of the Contractor. All air areas affected by the construction activities shall be monitored by the Contractor.

6.6 Protection of Sound Intrusions. The Contractor shall keep construction activities under surveillance, and control to minimize damage to the environment by noise.

7. RESTORATION OF LANDSCAPE DAMAGE. The Contractor shall restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas. Such restoration shall be in accordance with the plan submitted for approval by the Contracting Officer. This work will be accomplished at the Contractor's expense.

8. MAINTENANCE OF POLLUTION CONTROL FACILITIES. The Contractor shall maintain all constructed facilities and portable pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

9. TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL. The Contractor shall train his personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual familiarization with cultural resource identification, and installation and care of facilities (vegetative covers, and instruments required for monitoring purposes) to ensure adequate and continuous environmental pollution control.

10. POST CONSTRUCTION CLEAN UP. The Contractor shall clean up areas used for construction.

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## SECTION 2A

### DIVERSION AND CONTROL OF WATER

#### 1. REQUIREMENT.

1.1 General. All permanent construction shall be carried on in areas free from water. Water in varying quantities may be flowing in the channel during the entire period of construction as a result of either rainfall or releases from the Arizona Canal tailwater ditch. Runoff from the watersheds is rapid, and, during periods of rain, intermittent freshets may be expected. The responsibility of the Contractor for protection of work against water flows is specified in paragraph: DAMAGE TO WORK of the SPECIAL CLAUSES. At all locations where construction work is at a lower elevation than the elevation of the stream or ground water at the time of doing the work, suitable cofferdams or dikes, if necessary, shall be constructed, the construction area shall be dewatered prior to commencement of work, and all subgrades, whether for earth fill, stone, or concrete, shall be kept drained and free of water throughout the working period. Within 10 days after receipt of Notice to Proceed, the Contractor shall submit plans showing the method that he proposes to use to dewater each working area and control the water from rain, sheet flow, stream flow, and any other surface water. The plans shall show the scheme of operations and a complete layout of drainage pipes, pumps, diversion channels, cofferdams, etc. The plans shall also take into consideration the following specific requirements.

1.2 Flood Flows. The Contractor shall provide for diversion of channel flows as hereinafter specified. The channel flows will include water originating from upstream of the work; urban runoff; adjacent drainages; and the Arizona Canal tailwater ditch, in addition to any and all seepage originating within the work. Flood flows on Skunk Creek are defined as 2000 cfs.

1.3 Drainage Ditches. The location and depth of any drainage ditch to be constructed under this contract shall be subject to the approval of the Contracting Officer. Special precautions shall be taken to avoid impairing the permanent subgrade, and any excavation below the existing streambed or invert subgrade shall be refilled with compacted fill in accordance with SECTION: FILLS AND SUBGRADE PREPARATION by and at the expense of the Contractor.

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## SECTION 2B

### CLEARING SITE AND REMOVING OBSTRUCTIONS

#### Index

1. Protection
2. Burning
3. Requirements
4. Disposal of Cleared, Grubbed and Removed Material

#### 1. PROTECTION.

1.1 Environmental Protection. All work and Contractor operations shall comply with the requirements of SECTIONS: ENVIRONMENTAL PROTECTION and EXCAVATION.

2. BURNING. The use of burning at the project site for the disposal of refuse and debris will not be permitted.

#### 3. REQUIREMENTS.

3.1 General. Except as otherwise specified, and/or indicated, areas to be cleared will be limited to actual excavation areas and areas on which fills and/or structures are to be placed. The removal of trees, shrubs, turf, and other vegetation outside of these areas shall be held to a minimum and care shall be exercised not to damage any trees, shrubs, turf, or vegetation which can be left in place.

3.2 Existing Structures and Obstructions. The Contractor shall clear and grub the site, including all fill, borrow, and excavation areas, and remove and dispose of all existing structures and obstructions for project construction, except as otherwise noted on the drawings. Obstructions which are designated or specified to be removed but which are not designated or specified to be removed by others shall be removed by the Contractor. Except as otherwise specified, obstructions designated to be removed by others will be removed in sufficient time to preclude interference with the Contractor's operations. Utility relocations are not considered to be obstructions.

3.2.1 Clearing. Trees smaller than 1-1/2 inches in diameter and other vegetation, except as specified, shall be cut off at least 6 inches below the indicated channel subgrade or ground level whichever is lower. Other vegetation shall be cut off flush or slightly below the original ground surface. Clearing operations shall be conducted so as to prevent damage to trees, structures, and installations under construction, or to remain in place, and to provide for the safety of employees and others. All rubbish, waste dumps, and debris areas shall be cleared.

3.2.2 Grubbing shall consist of removing all trees, stumps, roots, logs, and other objectionable vegetable matter in the required fills, foundation areas, and all excavation areas. In grubbing out stumps and roots, all roots or other timber more than 1-1/2 inches in diameter shall be removed to at least 3 feet below the depth of the required excavation or existing ground level, whichever is lower. Trees and stumps shall be pulled, not cut off.

3.3 Utilities. Prior to removing an obstruction, all applicable utility relocations shall have been coordinated. Pipes designated by owners as "abandoned" shall be removed within the limits of the project as necessary for clearing. All pipe shall be plugged at the cut ends.

4. DISPOSAL OF CLEARED, GRUBBED, AND REMOVED MATERIAL. All material removed, except material specified and/or indicated to be salvaged, is designated as scrap, shall become the property of the Contractor, and shall be removed from the site. Materials removed during clearing operations may be temporarily used for diversion and control of water. Disposal shall be in accordance with the requirements of SECTION: ENVIRONMENTAL PROTECTION.

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## SECTION 2C

### EXCAVATION

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| 2. Applicable Publications   | 6. Excavation for Roads            |
| 2. General                   | 7. Excavation for Drains           |
| 3. Blasting                  | 8. Removal of Unsatisfactory Soils |
| 4. Preservation of Property  | 9. Disposal of Excavated Materials |
| 5. Excavation for Structures | 10. Overcut                        |

1. **APPLICABLE PUBLICATIONS.** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society for Testing and Materials (ASTM) Standard.

D 2487-83

Classification of Soils for  
Engineering Purposes

2. **GENERAL.** Excavation shall consist of the removal of every type of material encountered (except materials covered by the provisions of the SECTION: CLEARING SITE AND REMOVING OBSTRUCTIONS) in the designated areas or from areas directed. The material to be removed may include but is not limited to earth, hardpan, silt, clay, gravel, cemented sand and gravel, cobbles and boulders, adobe, detached pieces of stone and concrete, rock fills, existing fills of miscellaneous debris and rubbish, and other unsuitable materials. Slope lines indicated on the drawings for temporary cuts do not necessarily represent the actual slope to which the excavation must be made to safely perform the work. The stability of temporary cut slopes and the safety of personnel shall be the responsibility of the Contractor. Stability of temporary cut slopes may require flatter slopes in some instances than that indicated on the drawings. Excavation for permanent cuts shall be made to the slope lines indicated. Excavation shall be performed in a manner which will not impair the subgrade. Except as otherwise specified, the finish surface of subgrades shall be smooth and shall not vary more than 1 inch from indicated grade.

3. **BLASTING.** Blasting will not be permitted.

4. **PRESERVATION OF PROPERTY.** All excavation operations shall be conducted in such a manner that street pavements, sidewalks, curbs, utilities, or other facilities and improvements which are to remain in place permanently will not be subjected to settlement or horizontal movement.

5. **EXCAVATION FOR STRUCTURES.** Excavation within the vicinity of existing structures, utilities, and drainage pipes to remain in place shall be performed in a manner to prevent damage to the structure. Earth banks and facilities to remain in place shall be supported as necessary during excavation. In general, unless otherwise shown or specified, the actual side slopes will be at the Contractor's option.

6. EXCAVATION FOR ROADS will include excavation of materials unsuitable for street subgrade.

7. EXCAVATION FOR DRAINS. All excavations shall be made by open cut unless otherwise specified. The banks of trenches shall be kept as nearly vertical as practicable. Unless otherwise indicated, trenches shall be not less than 12 inches wider nor more than 16 inches wider than the outside diameter of the pipe to be laid therein, and shall be excavated true to line, so that a clear space not less than 6 inches nor more than 8 inches in width is provided on each side of the pipe. The maximum width of trench specified applies to the width at or below the level of the top of the pipe; the width of the trench above the level may be made as wide as necessary for sheathing and bracing and the proper installation of the work. The bottom of trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe at every point along its entire length, except for portions of the pipe sections where it is necessary to excavate for the proper sealing of pipe joints. Except as otherwise indicated, the bottom of all trenches excavated shall be shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe or to the lower curved portion of pipe arch for the entire length of the pipe or arch. If soft, spongy, unsuitable material, or material which by reason of its nature cannot be properly shaped or finished to a true pipe subgrade is encountered, it shall be removed and replaced with compacted fill.

8. REMOVAL OF UNSATISFACTORY SOILS. The removal of soils which are unsatisfactory for foundations of the channel, structures, levees, roads, and drains, may be required in certain areas. Unsatisfactory materials shall consist of any material classified by ASTM D 2487 as CH, OH, MH, and OL. Unsatisfactory materials include but are not limited to those materials containing roots and other organic matter, trash, debris, and stones larger than 4 inches. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction. Satisfactory materials consist of those materials not designated as unsatisfactory. The Contractor will be required to excavate any such areas to the depth directed and backfill the areas with compacted fill conforming to the requirements of the SECTION: FILLS AND SUBGRADE PREPARATION.

9. DISPOSAL OF EXCAVATED MATERIALS.

9.1 General. Excavated materials suitable for required fills shall be placed in temporary stock piles or used directly in the work. All excess materials suitable for fills under the various specifications of this contract shall be placed in miscellaneous fill areas or become the property of the Contractor and shall be removed from the site. Excavated material not suitable for fills and unsatisfactory materials shall become the property of the Contractor and shall be removed from the site. No excavated materials or waste of any kind shall be disposed of at any place beyond the limits of the work under this contract without express authority. Prior to placing material, the disposal areas and stockpile area(s) shall be cleared of trash and vegetation. Clearing shall conform to the applicable requirements of the SECTION: CLEARING SITE AND REMOVING OBSTRUCTIONS. The stockpiles and disposal fills shall be placed in manner to preclude ponding of water.

9.2 All required fills shall be completed prior to disposal of any materials in disposal area(s) selected by the Contractor unless approved in writing by the Contracting Officer.

9.3 Additional requirements for disposal of excess excavated material can be found in the SPECIAL CLAUSES; SECTIONS: GENERAL REQUIREMENTS; ENVIRONMENTAL PROTECTION; and CLEARING SITE AND REMOVING OBSTRUCTIONS.

10. OVERCUT. Except as otherwise specified or as may be ordered in writing by the Contracting Officer, any overcut or excavation made outside the lines indicated on the drawings or directed shall be backfilled with compacted fill, or concrete, and all excavating, backfilling, compacting of backfill, and concreting occasioned thereby shall be by the Contractor at no additional cost to the Government. Any overcut under bridge footings shall be backfilled with concrete.

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## SECTION 2D

### FILLS AND SUBGRADE PREPARATION

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- |                                       |                                   |
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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

#### 1.1 American Society for Testing and Materials (ASTM) Standards.

D 1556-82	Density of Soil In-Place by the Sand-Cone Method
D 1557-78	Moisture-Density Relations of Soils Using a 10-Lb. (4.54-kg) Rammer and an 18-In. (457 mm) Drop
D 2922-81	Density of Soil and Soil-Aggregate In-Place By Nuclear Methods (Shallow Depth)

#### 2. COMPACTION EQUIPMENT.

2.1 General. Compaction equipment shall conform to the following requirements, shall be used as prescribed in subsequent paragraphs, and shall be maintained in satisfactory working condition at all times.

#### 2.2 Tamping Rollers.

2.2.1 Towed. Tamping rollers shall consist of two or more non-vibratory roller drums mounted side-by-side in a suitable frame and towed by either a crawler-type or rubber tired tractor having sufficient power to pull the roller satisfactorily when the drums are fully ballasted. Each drum shall be free to pivot about an axis parallel to the direction of travel. Rollers operated in tandem sets shall be controlled in a manner such that the prints produced by the tamping feet of the tandem units are staggered. Each drum of a roller shall have an outside diameter of not less than 5 feet and shall be not less than 5 feet in length. The space between two adjacent drums, when on a level surface, shall not be less than 12 inches nor more than 15 inches. (Each drum ballasted with fluid shall be equipped with at least one pressure-relief valve and with at least one safety head. The safety head shall be equal to union-type safety heads equipped with rupture discs suitable for rupturing pressures between 50 and 75 psi as manufactured by Fike Metal Products Corporation, Blue Spring, Missouri. The pressure-relief valve is a manually operated valve and shall be opened periodically. Personnel responsible for opening pressure-relief valves shall be periodically instructed to ascertain that valve openings are free from plugging to assure that any pressure developed in roller drums is released at each inspection.) At least one tamping foot shall

be provided for each 100 square inches of drum surface. The length of each tamping foot from the outside surface of the drum shall be not more than 10 inches and shall be maintained at not less than 7 inches. The bearing surface of each tamping foot shall be flat with a surface area not less than 5 square inches nor more than 10 square inches. During the operation of rolling, the spaces between the tamping feet shall be maintained clear of materials which would impair the effectiveness of the tamping rollers. The weight of a roller when fully loaded shall be not less than 4,000 pounds per foot of length of drum. The weight of a roller when empty shall be not more than 2,500 pounds per foot of drum length. The bearing surface, tamping foot size, the drum loading, and operation of the rollers shall be as required to obtain the desired compaction. If more than one roller is used on any one layer of fill, all rollers so used shall be of the same type and essentially of the same dimensions. Rollers shall be drawn by crawler-type or rubber-tired towing tractors at a speed not to exceed 5.0 miles per hour. The use of rubber-tired towing equipment shall be discontinued if the tires leave ruts that prevent uniform compaction by the tamping roller, and the substitution of crawler-type towing equipment may be directed by the Contracting Officer.

2.2.2 Self-propelled. The use of self-propelled non-vibratory tamping rollers conforming to the following specifications will be permitted, and their design and operation shall be subject to the approval of the Contracting Officer who shall have the right at any time during the prosecution of the work, to direct such modifications to the tamping feet or variations in roller drum weight where applicable, as may be found necessary to secure optimum compaction of the earthfill materials. If use of self-propelled tamping rollers causes shearing of the fill, laminations in the fill, or results in inadequate compaction, the Contracting Officer may direct that such rollers be removed from the fill and that appropriate towed tamping rollers be used. Two- or three-drum side-by-side units that are either in drive position or drawn by separate power equipment shall have a clearance between adjacent drums not less than 12 inches nor more than 15 inches. Two-drum or four-drum equipment separated by cab and differential and arranged in tandem must have its static weight equally distributed to all compaction drums and must have the tandem drums positions such that the prints of the tamping feet produced by the tandem drums are staggered. The surface on which the tamping feet are mounted shall have a minimum outside diameter of 4 feet and at least one tamping foot for each 100 square inches of drum surface. The distance between the centers of any two adjacent tamping feet shall be not less than 9 inches. The length of each tamping foot from the outside mounting surface of the drum shall be not more than 11 inches and shall be maintained at not less than 9 inches. The bearing surface of each tamping foot shall be flat and have a surface area not less than 7 square inches nor more than 14 square inches. Cupped recesses within the bearing surface of each tamping foot will be permitted but shall not exceed 0.5 inches in depth. During rolling operations, the spaces between the tamping feet shall be maintained clear of materials which would impair the effectiveness of the tamping roller. The weight of all roller drums during compaction of fill materials shall be maintained uniform and with the weight per foot of drum length not less than 4,300 pounds. For self-propelled rollers with drums capable of being ballasted with fluid, each drum shall be equipped with at least one pressure-relief valve and with at least one safety head. The safety head shall be equal to union type safety heads equipped with rupture discs suitable for rupturing pressures between 50 and 75 psi as manufactured by the Fike Metal Products Corporation, Blue Springs, Missouri. The pressure relief valve is a manually operated valve and shall be opened periodically. Personnel responsible for opening pressure-relief valves shall be periodically instructed to ascertain

that valve openings are free from plugging to assure that any pressure developed in roller drums is released at each inspection. For self-propelled rollers in which steering is accomplished through the use of rubber-tired wheels, the pressure shall not exceed 40 psi. The use of the compactor shall be discontinued if the tires leave ruts that prevent uniform compaction by the tamping roller and the substitution of appropriate towed tamping rollers may be directed by the Contracting Officer. When a self-propelled roller is provided with a dozer blade, coverages made with the blade in operation shall not be counted as compaction coverages. Self-propelled rollers shall be operated at a speed not to exceed 5.0 mph.

2.2.3 Vibratory rollers shall be equipped with smooth steel compaction drum and shall be operated at a frequency of vibration during compaction operations between 1100 and 1500 vpm. Vibratory rollers may be either towed or self-propelled and shall have an unsprung drum weight that is a minimum of 60 percent of the rollers' static weight. Towed rollers shall have a least 90 percent of their weight transmitted to the ground through the compaction drum when the roller is standing in a level position hitched to the towing vehicle. Rollers shall have a minimum static weight of 20,000 pounds, a minimum dynamic force of 40,000 pounds when operating at 1400 vpm, and an applied force not less than 9,000 pounds per foot of compaction drum length. The level of amplitude and vibration frequency during compaction will be maintained uniform throughout the zone within which it is operating. Rollers shall be operated at speeds not to exceed 1.5 miles per hour. The equipment manufacturer shall furnish sufficient data, drawings, and computation for verification of the above specifications, and the character and efficiency of this equipment shall be subject to the approval of the Contracting Officer.

2.2.4 Rubber-Tired Rollers shall have a minimum of 4 wheels equipped with pneumatic tires. The tires shall be of such size and ply as to be capable of being operated at tire pressures between 80 and 100 pounds per square inch at a 25,000- pound wheel load. The roller wheels shall be located abreast and be so designed that each wheel will carry approximately equal load in traversing uneven ground. The spacing of the wheels will be such that the distance between the nearest edges of adjacent tires will not be greater than 50% of the rated tire width of a single tire at the operating pressure for a 25,000-pound wheel load. The roller shall be provided with a body suitable for such ballast loading that the load per wheel may be varied as directed by the Contracting Officer from 18,000 to 25,000 pounds. The roller shall be towed at speeds not to exceed 5 miles per hour. The character and efficiency of this equipment shall be subject to the approval of the Contracting Officer. If the rubber-tired rollers cause shearing of the fill or laminations in the fill, the Contracting Officer may direct that the rollers be removed from the fill and that tract-drawn tamping rollers be used.

2.2.5 Mechanical Tampers. Compaction of Material, in areas where it is impracticable to use a roller, shall be performed by the use of approved mechanical tampers.

### 3. GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS.

3.1 Control. Moisture-density relations shall be established by the Contractor. Field density tests shall be performed by the Contractor in sufficient number and in such locations to insure that the specified density is being obtained.

Moisture-density relations and field densities shall be reported on approved forms. One copy of density data less dry weight determinations shall be provided on the day each test is taken. The completed test reports shall be provided with the Contractor Quality Control Report on the work day following the test.

3.1.1 Laboratory Control. One moisture-density relation shall be made for each classification, blend or change in classification of soil material encountered. Approval of moisture-density relations shall be obtained prior to the compacting of any material in the work. The moisture-density relations shall be determined in a laboratory in accordance with ASTM D 1557, modified as specified hereafter.

3.1.1.1 A separate batch of materials will be used for each compaction test specimen. No materials will be re-used.

3.1.1.2 The desired amount of mixing water will be added for each compaction test specimen, mixed well, and the mixture will be placed in a container with an airtight cover and allowed to cure for 24 hours. A shorter curing time may be allowed where tests show that shortening the curing time will not affect the results.

3.1.2 Field Control. Field in-place density shall be determined in accordance with ASTM D 1556, except that in each test, the weight of the disturbed sample representing the full depth of layer shall be not less than 10 pounds for fine grain material and 12 pounds for coarse grain material using a scale for weighing of sufficient capacity and sensitive to .01 pounds. The density tests shall be well distributed and shall average not less than one test for each 2000 cubic yards of compacted fill and backfill material, and not less than one test per 4,000 square feet of subgrade area. At least one test shall be made in each 2 feet of elevation of compacted material processed as a unit and at least one test shall be made in each area. Determination of in-place densities using the nuclear method (ASTM D 2922) may be used to supplement the sand-cone density tests, but will not be permitted as the primary control. In using a nuclear density device, the results obtained using factory supplied curves must be compared with density and water contents determined by the sand-cone method. If field density tests determined by the nuclear method vary by more than 3 pounds per cubic foot from comparison sand-cone tests, and are consistently high or low, then adjustment of the calibration curve is necessary.

3.1.3 Moisture-Density Curves for Cohesionless and Cohesive Material. Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils typically show straight lines or reverse-shaped moisture-density curves, and cohesive soils typically show normal moisture-density curves.

3.2 Settling of Fills or Backfills with Water will not be permitted, except as specified hereinafter for backfills and culverts.

3.3 Fill material shall be obtained from the required excavations; shall be free from sod, roots, brush, debris, trash or other objectionable material, and shall contain no stone whose greatest dimension is more than 3/4 of the layer thickness.

3.4 Placement. Fill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 2,500 p.s.i. when tested in accordance with the SECTION: CONCRETE. Heavy equipment shall not be operated over pipes and buried structures until at least 2 feet of fill material has been placed and compacted over them in conformance with the requirements of SECTION: SIDE DRAINS. Compacted fill and backfill shall be placed with suitable equipment in horizontal layers which after compaction, shall not exceed 9 inches in depth for rubber-tired or vibratory rollers, 6 inches in depth for tamping rollers, and 4 inches in depth when mechanical tampers are used. The Contractor may vary the layer thickness within these limits for most efficient operations. Material containing stones shall be placed in a manner to prevent the stones from striking the concrete structures and to prevent the formation of voids.

3.5 Moisture Content. Material shall have a uniform moisture content while being placed and compacted. Water shall be added at the source, if required, or by sprinkling each layer of material during placement. Uniform distribution of moisture shall be obtained by disking, harrowing, or otherwise manipulating the soil during and after the time water is added. Material containing an excess of moisture shall be manipulated with suitable implements to facilitate maximum aeration and shall be permitted to dry to the proper consistency before being compacted. Fill shall have a maximum moisture content of not more than 3 percent above optimum and a minimum moisture content of not less than 2 percent below optimum.

3.6 Compaction. No layer of fill shall be compacted before the practicable uniform moisture content has been obtained. If the compacted surface of any layer of material is determined by the Contracting Officer to be too smooth to bond properly with the succeeding layers, it shall be scarified by an approved method. Scarified areas shall be compacted as specified for the fill placed thereon. Rollers will not be permitted to operated within one foot of channel or structure walls or over buried structures until the compacted fill over the top of the structures has reached a depth of 2 feet. Compaction equipment shall be so operated that structures are not damaged nor overstressed during compaction operations. Mechanical tampers shall be used for compaction of fill material adjacent to structures where rolling equipment is impracticable for use in compaction.

4. COMPACTED FILL, CULVERTS. Bedding and backfill for culverts shall conform to the requirements of SECTION: SIDE DRAINS.

5. COMPACTED FILL, ROAD.

5.1 Location. Compacted road fill shall consist of fill placed for access road construction, and all other fill and backfill within the road right-of-way.

5.2 Compaction. Each layer of road fill shall be compacted to not less than 90 percent of maximum density as determined by ASTM D 1557, as except the upper 6 inches of fill shall be compacted to not less than 95 percent of maximum density.

5.3 Trimming. All shoulders and side slopes shall be neatly and accurately trimmed to the cross section indicated.

6. MISCELLANEOUS FILL shall consist of material from the required excavation, placed in the areas indicated and shall be placed in layers which shall not exceed 24 inches in depth before consolidation. Broken concrete, rock, and bituminous paving shall become the property of the Contractor and shall be disposed of in accordance with the requirements of SECTION: CLEARING SITE AND REMOVING OBSTRUCTIONS. No depressions in which water might pond shall be left in miscellaneous fill areas. The finished areas shall be sloped to drain. Compaction other than that obtained by the controlled movement of the construction equipment will not be required.

## 7. BACKFILLS.

### 7.1 Backfill and Fill About Structures.

7.1.1 Location. Backfill shall consist of all fill against and/or around structures, except backfill for culvert trenches.

7.1.2 Material. Backfill and fill material shall be obtained from the required excavation as approved by the Contracting Officer. In general, the best material available will be designated as backfill and fill about structures. Backfill may consist of sand, gravelly sand, silty sands, sandy silts, clayey sands, and sandy clays. Organic material, silt, clay, broken concrete or pavement, boulders and other objectionable material shall not be used.

7.1.3 Placing. Fill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 2,500 p.s.i. when tested in accordance with SECTION: CONCRETE. Fill shall be placed in 4-inch layers.

7.1.4 Compaction shall be not less than 90 percent of maximum density as determined by ASTM D 1557.

7.2 Backfill, Culvert Trenches. Backfill for culverts shall conform to SECTION: CULVERTS.

7.3 Backfill, Toe shall consist of material placed over the toe of the grouted stone protection. In general, the fill shall consist of material suitable for compacted fill placed in horizontal layers not more than 12 inches in thickness, smoothed and dressed to the lines and grades indicated, and compacted to not less than 90 percent maximum density as determined by ASTM A 1557. No depressions shall be left in toe backfill areas.

8. SUBGRADE PREPARATION FOR ROADS. The subgrade shall be alternately watered and scarified until the material is uniformly moistened throughout for a depth of not less than 6 inches. All stones larger than 4 inches in diameter, and hard ribs of earth shall be removed. All unsatisfactory materials, as defined in SECTION: EXCAVATION, shall also be removed. The amount of water to be applied shall be that which is required to provide optimum results in compaction under rolling. Following the above operations, the roadbed shall be shaped to a true cross section sufficiently higher than the specified grade to allow for subsequent compaction and then be thoroughly compacted to not less than 95 percent of maximum density as determined by ASTM D 1557. After the subgrade has been prepared and

completed, the surface shall be firm, hard, and unyielding, with a true, even, and uniform surface conforming to the grade and cross section indicated on the drawings. All points of the finished subgrade shall be not more than 1/4 inch below or above true subgrade.

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SECTION 2E

SIDE DRAINS

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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 Federal Specification (Fed. Spec.).

HH-P-117

Packing; Jute, Twisted

SS-S-210A

Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints

1.2 Federal Standards (Fed. Std.).

No. 601

Rubber: Sampling and Testing

1.3 American Association of State Highway and Transportation Officials (AASHTO), Standards.

M 170-84

Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

1.4 American Society for Testing and Materials (ASTM) Standards.

C 76-84a

Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

C 270-84

Mortar for Unit Masonry

C 443-79

Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets

D 1556-82

Density of Soil in Place by the Sand-Cone Method

D 1557-78

Moisture-Density Relations of Soils, and Soils-Aggregate Mixtures Using 10-lb. (4.5-Kg) Rammer and 18-in. (457-mm) Drop

## 2. DELIVERY, STORAGE, AND HANDLING OF MATERIALS.

2.1 Delivery and Storage. Materials delivered to site shall be inspected for damage, unloaded, and stored with the minimum of handling. Do not store materials directly on the ground. Inside of pipes and fittings shall be kept free of dirt and debris.

2.2 Handling. Materials shall be handled in such a manner as to insure delivery to the trench in sound undamaged condition. Pipe shall be carried to the trench not dragged. Gasket materials and plastic materials that are not to be installed immediately shall not be stored in the direct sunlight.

3. MANUFACTURER'S RECOMMENDATIONS. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Contracting Officer prior to installation. Installation of the item will not be allowed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

4. TESTS FOR PIPE. Certified copies of test reports demonstrating conformance to applicable pipe specifications shall be delivered to the Contracting Officer before pipe is installed. Strength tests for concrete, clay, and asbestos-cement pipe as required in applicable specifications shall be the three-edge bearing tests.

5. PIPE FOR CULVERTS shall be as indicated and shall conform to requirements for the following.

5.1 Reinforced Concrete Pipe. ASTM C 76 or AASHTO M 170, type as shown on the drawings.

5.2 Mortar. Type M, conforming to ASTM C 270 except the maximum placement time shall be 30 minutes after the ingredients are mixed with water.

6. CONCRETE PIPE JOINTS. Unless otherwise specified, one of the following methods of jointing for bell-and-spigot and tongue-and-groove pipe shall be used:

6.1 Cement-Mortar Bell-And-Spigot Joint. The first pipe shall be bedded to the established gradeline, with the bell end placed upstream. The interior surface of the bell shall be carefully cleaned with a wet brush and the lower portion of the bell filled with mortar to such depth as to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into the bell so that sections are closely fitted. After each section is laid, remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside of the joint with sufficient additional mortar. Mortar for pipe joints and connections shall conform to ASTM C 270, Type M, except the maximum placement time shall be 30 minutes after the ingredients are mixed with water. If the mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped or bandaged with cheesecloth to hold the mortar in place.

6.2 Cement-Mortar Oakum Joint for Bell-And-Spigot Pipe. A closely twisted gasket shall be made of joint packing, conforming to Fed. Spec. HH-P-117, of diameter required to support the spigot end of the pipe at the proper grade and to make the

joint concentric. Joint packing shall be in one piece of sufficient length to pass around the pipe and lap at the top. This gasket shall be thoroughly saturated with neat cement grout. The bell of the pipe shall be thoroughly cleaned with wet brush, and the gasket shall be laid in the bell for the lower third of the circumference and covered with mortar. The spigot of pipe shall be thoroughly cleaned with a wet brush, inserted in the bell, and carefully driven home. A small amount of mortar shall be inserted in the annular space for the upper two-thirds of the circumference. The gasket then shall be lapped at the top of the pipe and driven home in the annular space with a calking tool. The remainder of annular space then shall be filled completely with mortar and beveled at an angle of approximately 45 degrees with the outside of the bell. If the mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint thus made shall be wrapped with cheesecloth. Placing of this type of joint shall be kept at least five joints behind laying operations.

6.3 Cement-Mortar Diaper Joint for Bell-And-Spigot Pipe. The pipe shall be centered so that annular space is uniform. The annular space shall be calked with joint packing conforming to Fed. Spec. HH-P-117. Before calking, the inside of bell and outside of spigot shall be clean.

6.3.1 Diaper bands shall consist of heavy cloth fabric to hold the grout in place at the joints and shall be cut into such lengths that they will extend one-eighth of the circumference of pipe above the spring line on one side of the pipe and up to the spring line on the other side of the pipe. Longitudinal edges of fabric bands shall be rolled and stitched around two pieces of wire. Width of fabric bands shall be such that after the fabric has been securely stitched at both edges with wires, the wires will be uniformly spaced not less than 8 inches apart. Wires shall be cut into lengths to pass around the pipe with sufficient extra length for the ends to be twisted at the top of pipe to hold the band securely in place; bands shall be accurately centered around the lower portion of joint.

6.3.2 Grout shall be poured between band and pipe from only the high side of band, until grout rises to the top of the band at the spring line of the pipe, or as nearly as possible, on the opposite side of pipe, to insure a thorough sealing of joint around the portion of pipe covered by the band. Silt, slush, water, or polluted mortar grout forced up on the lower side shall be carefully forced out by the pouring and removed.

6.3.3 The remaining unfilled upper portion of the joint shall then be filled with mortar and a bead formed around the outside of this upper portion of the joint with sufficient amount of additional mortar. The diaper shall be left in place. Placing of this type joint shall be kept at least five joints behind actual laying of pipe. No backfilling around joints shall be done until joints have been fully inspected and approved.

6.4 Cement-Mortar Tongue-And-Groove Joint. The first pipe shall be bedded carefully to the established gradeline with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint and filled with mortar to provide a bed for the pipe. The grooved end of the first pipe shall be carefully cleaned with a wet brush, and a layer of soft mortar applied to the lower half of the groove. The tongue of the second pipe shall be cleaned carefully with a wet brush; while in horizontal position, a layer of soft mortar shall be applied to the upper half of the tongue. The tongue end of the second

pipe then shall be inserted in the grooved end of the first pipe until mortar is squeezed out on interior and exterior surfaces. Sufficient mortar shall be used to fill the joint completely and to form a bead on the outside.

6.5 Cement-Mortar Diaper Joint for Tongue-And-Groove Pipe. The joint shall be of the type described in paragraph: Cement-Mortar Tongue-And-Groove Joint below, except that the shallow excavation directly beneath the joint shall not be filled with mortar until after a gauze or cheesecloth band dipped in cement mortar has been wrapped around the outside of the joint. The cement-mortar bead at the joint shall be at least 1/2-inch thick, and the width of the diaper band shall be at least eight inches. The diaper shall be left in place. Placing of this type joint shall be kept at least five joints behind the actual laying of the pipe. No backfilling around the joints shall be done until joints have been fully inspected and approved.

6.6 Rubber Gasket Joint. Design of joints and physical requirements for rubber-type gaskets shall conform to ASTM C 443 or AASHTO M 198. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber gasket type are permitted if nominal diameter of pipe being gasketed exceeds 54 inches. Material conforming to Fed. Spec. SS-S-210 is acceptable as an alternate to ASTM C 443 provided the necessary installation instructions are furnished. Gaskets or jointing materials shall not swell more than 100 percent by volume when immersed in accordance with Method 6211 of Fed. Std. 601, in immersion medium No. 3 for 70 hours at 212 degrees F. Certified copies of test results shall be delivered to the Contracting Officer before gaskets or jointing materials are installed. Alternate types of watertight joint may be furnished if specifically approved. Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pulled together. If, while making the joint, the gasket or jointing material becomes loose and can be seen through the exterior joint recess when joint is pulled up to within one inch of closure, the pipe shall be removed and the joint remade.

7. EXCAVATION AND TRENCHING FOR PIPE CULVERTS. Excavation of trenches shall be in accordance with the applicable portions of SECTION: EXCAVATION and the following requirements.

7.1 Trenching. Width of trenches shall be as shown on the drawings. Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

7.2 Removal of Rock. Rock encountered during excavation in either ledge or boulder formation shall be replaced with satisfactory materials containing no stone larger than that recommended by the pipe manufacturer providing a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2-inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Satisfactory materials shall be as defined in SECTION: EXCAVATION.

7.3 Removal of Unstable Material. Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is encountered in bottom of trench, such material shall be removed to depth required and replaced to the proper grade with satisfactory material, compacted as provided in paragraph: BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, resulting material shall be excavated and replaced.

## 8. BEDDING FOR CULVERTS.

8.1 General. Bedding for culverts shall consist of sand fill placed around the pipe in accordance with paragraph: BACKFILLING. Compacted fill above the bedding shall be placed in accordance with paragraph: BACKFILLING.

8.1.1 Material for the bedding for the culvert shall be clean sand, free of trash, organic materials, debris, and with 100 percent passing the No. 4 sieve and not more than 10 percent passing the No. 100 sieve.

8.1.2 Material for the compacted fill above the bedding shall not contain any stone larger than 3/4 inch and may consist of sand, gravelly sand, silty sands, sandy silts, clayey sands, and sandy clays. Organic material, silt, clay, broken concrete or pavement, boulders and other objectionable material shall not be used.

8.2 Placing. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. The pipe shall be bedded carefully in a soil or soil-cement foundation accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe, for the entire length of pipe. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be only of such length, depth, and width as required for properly making the particular type joint.

9. PLACING PIPE. Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated metal pipe shall be placed in the same vertical plane as the major axis of the pipe. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall be inspected before backfilling, and those damaged during placement shall be removed and replaced at no additional cost to the Government.

9.1 Concrete and Asbestos-Cement Pipe. Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow. Asbestos-cement pipe and couplings are frangible, therefore additional care should be used in handling these items.

## 10. BACKFILLING.

10.1 Backfilling Pipe in Trenches. After the bedding has been prepared and the pipe installed, satisfactory material containing no stone larger than that recommended by the pipe manufacturer shall be placed along both sides of pipe in a single lift to the springing line (maximum horizontal dimension of a pipe). The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Water shall be applied to the sand fill by jetting in a manner, quantity, and at a rate sufficient to thoroughly saturate the entire lift. Vibrating compaction equipment shall be used to obtain not less than 85 percent of maximum density. Care shall be taken to insure thorough compaction of the satisfactory material under the haunches of the pipe. Above the springing line, the trench shall be filled with satisfactory material containing no stone larger than that recommended by the pipe manufacturer. The satisfactory material, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 4 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Each layer shall be thoroughly compacted with mechanical tampers or vibrators to not less than 85 percent of maximum density. This method of filling and compacting shall continue until the fill has reached an elevation of at least 24 inches above the top of the pipe. The remainder of the trench shall be backfilled and compacted by the spreading and rolling or compacted by mechanical tampers or vibrators in layers not exceeding 6 inches compacted to 90 percent of maximum density. Where it is necessary in the opinion of the Contracting Officer, any sheeting and/or portions of bracing used shall be left in place, and the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

10.2 Backfilling Pipe Trench in Fill Sections. For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified above. The fill material above the springing line shall be uniformly spread in layers longitudinally on both sides of pipe, not exceeding 4 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or vibrating to obtain not less than 85 percent of maximum density. Prior to commencing normal filling operations, the crown width of the fill at a height of 24 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 24 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 6 inches.

10.3 Movement of Construction Machinery. In compacting by rolling or operating heavy equipment displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert at any stage of the construction shall be at the Contractor's risk. Any pipe damaged thereby shall be repaired or replaced at the expense of the Contractor.

10.4 Compaction.

10.4.1 Laboratory Control. The moisture-density relations shall be determined in a laboratory in accordance with ASTM D 1557.

10.4.2 Field Control. Tests shall be well distributed and shall average not less than one test for each 200 lineal feet of trench for each 2 feet or less of backfill. At least one test shall be made in each trench. Field in-place density shall be determined in accordance with ASTM D 1556, except that in each test, the weight of the disturbed sample representing the full depth of layer shall be not less than 10 pounds for fine grain material and 12 pounds for coarse grain material using a scale for weighing of sufficient capacity and sensitive to .01 pounds.

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SECTION 2F

AGGREGATE BASE

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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society for Testing and Materials (ASTM) Standards.

- |                   |  |
|-------------------|--|
| C 117-84          | Materials Finer than No. 200 (75- $\mu$ ) Sieve in Mineral Aggregates by Washing             |
| C 127-84          | Specific Gravity and Absorption of Coarse Aggregate  |
| C 128-84          | Specific Gravity and Absorption of Fine Aggregate  |
| C 131-81          | Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine      |
| C 136-84a         | Sieve or Screen Analysis of Fine and Coarse Aggregates                                       |
| D 75-82           | Sampling Aggregates  |
| D 422-63 (R 1972) | Particle-Size Analysis of Soils  |
| D 1556-82         | Density of Soil in Place by the Sand-Cone Method   |
| D 1557-78         | Moisture Density of Relations of Soils Using 10-lb. (4.5 Kg) Rammer and 18-in. (457 mm) Drop |
| D 4318-84         | Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils                   |
| E 11-81           | Sieves for Testing Purposes  |

2. MATERIALS. Aggregates shall consist of crushed stone or slag, crushed gravel, angular sand, soil, or other sound, durable, approved materials processed and blended or naturally combined. Aggregates shall be durable and sound, free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. It shall be the responsibility of the Contractor to obtain materials that will meet the requirements specified herein and that can be constructed to meet the grade and smoothness requirements specified herein after all compaction requirements have been completed. The material retained on a No. 4 sieve shall be known as coarse aggregate, and the material passing the No. 4 sieve shall be known as binder material.

2.1 Coarse Aggregate conforming to the requirements specified above shall have a percentage of wear not to exceed 50 percent after 500 revolutions. Slag shall be an air-cooled blast-furnace product having a dry weight of not less than 65 pounds per cubic foot. Coarse aggregate shall consist of angular fragments reasonably uniform in density and quality. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3, and an elongated particle is one having a ratio of length to width greater than 3.

2.1.1 Coarse aggregate retained on each sieve specified shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the piece. When two fractures are adjacent, the angle between the planes of the fractures must be at least 30 degrees to count as to fractured faces.

2.2 Binder Material shall consist of screenings, angular sand, soil, or other finely divided mineral matter processed or naturally combined with the coarse aggregate. Liquid-limit and plasticity-index requirements stated herein shall apply to any component that is blended to meet the required gradation and shall also apply to the completed course. The portion of any component or of the completed course passing the No. 40 sieve shall be either nonplastic or shall have a liquid limit not greater than 25 and a plasticity index not greater than 5.

2.3 Gradation requirements specified herein shall apply to the completed base course, and it shall be the responsibility of the Contractor to obtain materials that will meet the gradation requirements after mixing, placing, compacting, and other operations. The aggregates shall have a maximum size of one inch and shall be continuously graded within the limits specified below:

Sieve Designation	Percentage by Weight Passing Square-Mesh Sieve
1-1/8 Inch	100
No. 4	38-65
No. 8	25-60
No. 30	10-40
No. 200	3-12

The values are based on aggregates of uniform specific gravity, and the percentages passing the various sieves are subject to appropriate correction by the Contracting Officer when aggregates of varying specific gravities are used.

3. SAMPLING AND TESTING shall be by and at the expense of the Contractor.

3.1 Samples shall be of the size required and shall be taken by the Contractor. Copies of test results shall be submitted for approval 14 days prior to starting the work, and therefore at regular intervals during production, as specified hereinafter. These samples shall be obtained at the source, from test pits, borings, trucks, stockpiles, or from other designated locations. Samples for material gradation, liquid-limit determination, and plasticity-index tests shall be taken in conformance with ASTM D 75. After the material has been placed and compacted, samples for density tests shall be taken as specified in ASTM D 1556, and additional samples for gradation, liquid-limit, and plasticity-index tests shall be taken by an appropriate method. Where deemed necessary, the sampling will be supervised by the Contracting Officer. The Contractor shall arrange his work so that sampling and testing may be performed without interruption.

3.2 Tests.

3.2.1 Aggregate Gradation. Aggregate gradation shall be determined in accordance with ASTM C 117, C 127, C 128, C 136, and D 422. Sieves shall conform to ASTM E 11.

3.2.2 Liquid Limit shall be determined in accordance with ASTM D 4318.

3.2.3 Plasticity Index shall be determined in accordance with ASTM D 4318.

3.2.4 Wear Test shall be made in conformance with ASTM C 131.

3.2.5 Field in-place density shall be determined in accordance with ASTM D 1556. Moisture-density relations shall be established in the laboratory in accordance with ASTM D 1557, Method D.

3.3 Testing Frequency. Results of tests to determine particle shape, presence of objectionable coatings and foreign matter, percentage of wear, fracture count, gradation, liquid-limit, plasticity-index, specific gravity, and other specification requirements for determination of the acceptability of the source shall be submitted for approval at least 15 days prior to starting of manufacture of the base course material. Production testing for material gradation, liquid limit, and plasticity index shall be performed at regular intervals with at least one test being made for each 1,000 cubic yards or fraction thereof, of material produced and results shall be submitted on a daily basis. Deviations from specification requirements shall be corrected immediately upon discovery. After the material has been placed and compacted, one field density test for each 1,000 square yards or fraction thereof of finished base course and one additional gradation, liquid-limit, and plasticity index test for each 5,000 square yards of base course or fraction thereof shall be performed. Maximum-density moisture relations shall be established for each 5,000 square yards of base course material. The location of the after-placement tests shall be as directed. One copy of density data (less dry weight determinations) shall be provided on the day each test is taken. The completed test report shall be provided with the

Contractor Quality Control Report on the following work day. Results of all tests made shall be submitted for approval on a daily basis and subsequent paving operations shall not commence until final approval has been obtained. Failure of any test shall be reported verbally, by the most expeditious means and followed promptly by written report. Contractor field operations shall immediately reflect corrective measures. For every failing test, retesting after completion of corrective measures have been taken will be required.

3.4 Approval of Material. The source of the material shall be selected 14 days in advance of the time materials will be required in the work. Tentative approval of the preliminary reports submitted by the Contractor and the source will be based on an inspection by the Contracting Officer. Tentative approval of the materials will be based on test samples as specified herein. Final approval of both the source and the materials will be based on specific tests performed on samples taken from the completed and compacted base course.

4. EQUIPMENT. All plant, equipment, and tools used in the performance of the work covered by this section will be subject to approval by the Contracting Officer before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and have the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein and within the specified time limits.

5. OPERATION OF PITS OR QUARRIES. All work involved in clearing, stripping, and excavating in opening or operation of pits or quarries shall be performed by the Contractor. Pits or quarries shall be opened to expose vertical faces of deposit to depths suitable for working. Materials excavated from pits shall be obtained in successive vertical cuts extending through all exposed strata. All pockets or strata of unsuitable materials overlying or occurring within the deposit shall be wasted as directed. The methods of operating pits or quarries and the processing and blending of the material may be changed or modified by the Contracting Officer when necessary to obtain material conforming to the specified requirements. Quarries shall be conditioned in agreement with the local laws or authorities.

6. WEATHER LIMITATIONS. Aggregate base shall be constructed only when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F., the Contractor shall protect all areas of the completed aggregate base course, by approved methods, against any detrimental effects of freezing. Areas of completed aggregate base course damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

7. PREPARATION OF UNDERLYING SURFACE. Prior to constructing the aggregate base course, the previously constructed subgrade shall be cleaned of all foreign substances. Surface of the subgrade shall be inspected by the Contractor for adequate compaction and surface tolerances. The subgrade shall conform to SECTION: FILLS AND SUBGRADE PREPARATION. Ruts or soft, yielding spots that may appear in the subgrade areas having inadequate compaction, and deviations of the surface from the requirements set forth therein shall be corrected to line and grade and to all specification requirements. The finished subgrade shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the base course is placed.

8. GRADE CONTROL. During construction the lines and grades including crown and cross slope indicated for the aggregate base course shall be maintained by means

of line and grade stakes placed by the Contractor at the worksite in accordance with SPECIAL CLAUSES of these specifications.

9. MIXING AND PLACING MATERIALS. The material shall be mixed by the stationary-plant, traveling-plant or road-mix method and placed in such a manner as to obtain uniformity of the aggregate base course material and at a uniform optimum moisture content for compaction. The Contractor shall make such adjustments in mixing or placing procedures or in equipment as may be directed to obtain the true grades, to minimize segregation and degradation, to reduce to accelerate loss or increase of water, and to insure a satisfactory aggregate base course meeting all the requirements of this specification.

10. LAYER THICKNESS. the compacted thickness of the aggregate base course shall be as indicated. When a compacted layer of 6 inches is indicated, the material may be placed in a single layer. When a compacted layer thickness of more than 6 inches is indicated, the material shall be placed in two layers of approximately equal thickness.

11. COMPACTION. Each layer of the aggregate base course (including shoulders) shall be compacted with approved compaction equipment. Water content shall be maintained at optimum or at the percentage specified during compaction. In places not accessible to the rollers, the mixture shall be compacted with mechanical tampers. Compaction shall continue until each layer through the full depth is compacted to at least 100 percent of maximum density. The Contractor shall make such adjustments in rolling or finishing procedures as may be required to obtain true grades, to minimize segregation and degradation, to reduce or accelerate loss or gain of water, and to insure a satisfactory aggregate base course. Unsatisfactory materials shall be reworked to produce a satisfactory material.

12. EDGES OF BASE COURSE. Where the course is not placed between curbs or similar construction, approved material shall be placed along the edges of the aggregate base course in such quantities as will compact to the thickness of the course being considered, or when the course is being constructed in two layers, to the thickness of each layer of the course. Allow in each operation at least a 1-foot width of the shoulder to be rolled and compacted simultaneously with the rolling and compacting of each layer of the base course.

13. SMOOTHNESS TEST. The surface of each layer shall not show any deviations in excess of 3/8 inch when tested with either a 10-foot straightedge applied both parallel with and at right angles to the center line of the paved area. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting, as directed.

14. THICKNESS CONTROL. The completed thicknesses of the base course shall be within 1/2 inch, plus or minus, of the thickness indicated. Thickness test shall be made and recorded by the Contractor. The thickness of the base course shall be measured at intervals in such manner that there will be a thickness measurement for at least 1,000 square yards of base course. The thickness measurement shall be made by test holes at least 3 inches in diameter through the base course. Where the measured thickness of the base course is more than 1/2 inch deficient in thickness, the Contractor, at no additional expense to the Government, shall correct such areas by scarifying, adding mixture of proper gradation, reblading, and recompacting, as directed. Where the measured thickness of the base is more

than 1/2 inch thicker than that indicated, it shall be considered as conforming with the specified thickness requirements plus 1/2 inch. The average job thickness shall be the average of the job measurements determined as specified above, but shall be within 1/4 inch of the thickness indicated.

15. MAINTENANCE. The Contractor shall maintain the aggregate base course in a satisfactory condition until the completed work is accepted.

16. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be attached to the Daily Contractor Quality Control Report for the day of delivery. Before the final statement is allowed, the Contractor shall file with the Contracting Officer waybills and/or certified delivery tickets for all aggregates actually used in the construction covered by the contract.

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SECTION 2G

PRIME COAT AND WEED KILLER

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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society for Testing and Materials (ASTM) Standards.

D 140-70 (R 1981)

Sampling Bituminous Materials

D 2027-76 (R 1981)

Liquid Asphalt (Medium-Curing Type)

2. BITUMINOUS MATERIAL. The bituminous material for the prime coat shall be liquid asphalt, conforming to ASTM D 2027, designation MC-70.

3. SAMPLING AND TESTING.

3.1 Sampling. Samples of bituminous material, unless otherwise specified, shall be in accordance with ASTM D 140.

3.2 Testing shall be the responsibility of the Contractor. Testing shall be performed by an acceptable commercial testing laboratory or by the Contractor on approval of the Contracting Officer. Materials shall be tested to establish compliance with the specified requirements.

3.3 Certified Laboratory Test Reports. Before delivery of bituminous materials, certified copies, in triplicate, of the tests specified herein and in referenced publications shall be submitted to and approved by the Contracting Officer. The testing shall have performed by an independent laboratory approved by the Contracting Officer.

4. QUANTITY TO BE APPLIED. Bituminous material for the prime coat shall be applied in quantities of not less than 0.10 gallon nor more than 0.35 gallon per squared yard of the surface to be primed. Application of prime coat shall be divided, if necessary, into 2 applications to avoid flowing off the surface. The exact quantities which may be varied to meet field conditions shall be determined by the Contractor and approved.

5. WEATHER LIMITATIONS. The prime coat shall be applied only when the prepared surface is dry or contains moisture not exceeding quantity to permit uniform distribution and desired penetrations. Prime coat shall be applied only when the ambient temperature is 50 degrees F. or above an the temperature has not been below 35 degrees F. for 12 hours immediately prior to application.

## 6. EQUIPMENT.

6.1 General. All equipment, tools, and machines, used in the performance of the work required by this section shall be subject to the approval and shall be maintained in satisfactory working conditions.

6.2 Bituminous Distributor shall have pneumatic tires of such width and number than the load produced on the base surface shall not exceed 650 pounds per inch of tire width. The distributor shall be designed and equipped to distribute the bituminous material uniformly at even heat on variable widths of surface at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard with a pressure range of 25 to 75 pounds per square inch and with an allowable variation not to exceed 5 percent from any specified rate. Distributor equipment shall include a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gages, volume-measuring devices, adequate heaters for heating the materials to the proper application temperature, a thermometer to show the temperature of the tank contents, and a hose attachment suitable for applying bituminous material to spots avoidably missed by the distributor. The distributor shall be equipped to circulate and agitate the bituminous material during the heating process.

6.3 Heating Equipment for Storage Tanks. Equipment for heating bituminous material shall consist of steam coils and equipment for producing steam, so designed that steam cannot get into the material. An armored thermometer with a range from 40 to 200 degrees F. shall be fixed to the tank so that the temperature of the bituminous material may be read at all times.

6.4 Brooms and Blowers shall be of the power type and shall be suitable for cleaning prepared surfaces.

7. PREPARATION OF SURFACE. Immediately before applying the weed killer and prime coat, all loose material, dirt, clay or other objectionable substance shall be removed from the surface by means of a power broom or blower supplemented with hand brooms. After the cleaning operation and prior to the application of the material, an inspection of the area to be treated shall be made by the Contractor to determine the fitness of the area to receive the material. The Contracting Officer shall be notified 24 hours in advance of application of the material. To assure a uniform spread of the material, the areas prepared for treatment, if excessively dry, shall be lightly sprinkled with water immediately before the application as directed.

8. WEED KILLER. A chemical weed killer shall be applied to subgrade surfaces of top of levees and access ramps prior to application of the prime coat. The weed killer may be either a fire retardant non-corrosive, water soluble mixture of sodium chlorates and sodium borates, or dry, free flowing borax. The sodium chlorate-sodium borate mixture shall be applied in a water solution at a rate that will yield a minimum of one pound of sodium chlorate per 100 square feet of treated surface. The equipment used for application of the solution shall mechanically agitate and circulate the solution at all times application is in process. Borax shall be applied dry on a previously dampened subgrade at a rate to yield the equivalent of 3 pounds of boron trioxide ( $B_2O_3$ ) per 100 square feet of treated surface. After application of the borax, the area shall be uniformly sprinkled with water. The quantity of water applied in the solutions or after application of dry borax shall be at least 4 gallons per 100 square feet of treated surfaces.

9. APPLICATION OF BITUMINOUS MATERIAL. Immediately following the preparation of the surface, the bituminous materials shall be applied by means of a bituminous distributor. The bituminous material shall be applied at a pressure within the range of 25 to 75 pounds per square inch and in the amounts as directed. The bituminous material shall be so applied that uniform distribution is obtained at all points of the surface to be treated. Unless the distributor is equipped to obtain satisfactory results at the junction of the previous and subsequent application, building paper shall be spread on the surface of applied material for a sufficient distance back from the ends of each application so that flow from the sprays may be started and stopped on the paper, and all sprayers operate at full force on the surface to be treated. Immediately after the application, building paper shall be removed and destroyed. Spots unavoidably missed by the distributor shall be properly treated with bituminous material. Following the application of bituminous material, the surface shall be allowed to dry without being disturbed for a period of not less than 48 hours, or longer as necessary to attain penetration into the foundation course and evaporation of the volatiles from prime material. The Contractor shall furnish and spread enough approved sand to blot up effectively and cure any excess bituminous material. The Contractor shall maintain the primed surface until the succeeding layer of pavement is placed by protecting the surface against damage and by repairing and repriming deficient areas at no additional cost to the Government. No smoking, fires, or flames other than heaters that are a part of the equipment shall be permitted in the vicinity of heating, distributing, or transferring operations of bituminous material.

9.1 Application Temperature shall be as directed and shall provide an application viscosity between 40 and 120 centistokes, kinematic, or 20 and 60 seconds, Saybolt-Furol. Application temperatures shall be within the following range, except that appropriate changes should be made when the ranges of viscosity are raised or lowered.

MC-70

120-190 degrees F.

The temperature-viscosity relationship shall be furnished to the Contracting Officer.

10. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be submitted during the progress of the work. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and/or certified delivery tickets for all bituminous material actually used in the construction of pavement covered by this section of the specification. The Contractor shall not remove bituminous material from the tank car or storage tank until the initial outage and temperature measurements have been taken by the Contracting Officer; nor shall the Contractor release the car or storage tank until the final outage has been taken by the Contracting Officer.

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## SECTION 2H

### TACK COAT

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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society of Testing and Materials (ASTM) Standards.

D 140-70 (R 1981)

Sampling Bituminous Materials

D 977-84

Emulsified Asphalt

2. BITUMINOUS MATERIAL used for the tack coat shall be asphalt emulsion and shall conform to the following requirements.

2.1 Asphalt Emulsion shall conform to ASTM D 977, Type SS-1h. The Contractor shall furnish a certified statement from the emulsion manufacturer giving an analysis of the base asphalt used in the manufacturer of the emulsion and attesting to conformity to the applicable requirements above.

3. SAMPLING AND TESTING.

3.1 Sampling. Samples of bituminous material, unless otherwise specified, shall be in accordance with ASTM D 140.

3.2 Testing shall be responsibility of the Contractor. Testing shall be performed by an acceptable commercial testing laboratory or by the Contractor on approval of the Contracting Officer. Materials shall be tested to establish compliance with the specified requirements. Certificates of compliance shall be furnished.

4. QUANTITIES TO BE APPLIED. Bituminous materials for the tack coat shall be applied in quantities of not less than 0.05 gallon nor more than 0.15 gallon per square yard. The exact quantities within the range specified may be varied to suit field conditions, shall be determined by the Contractor and approved.

5. EQUIPMENT.

5.1 General. All equipment, tools, and machines used in performance of work required by this section shall be subject to approval and shall be maintained in satisfactory working condition.

5.2 Bituminous Distributor shall have pneumatic tires of such width and number that the load produced on the base surface shall not exceed 650 pounds per inch of tire width. The distributor shall be designed and equipped to distribute

bituminous material uniformly at even heat on variable widths of surface at readily determined and controlled rates ranging from 0.05 to 2.0 gallons per square yard, with a pressure range of 25 to 75 pounds per square inch and with an allowable variation from specified rate not exceeding 5 percent. Distributor equipment shall include a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gages, volume measuring devices, adequate heaters for heating materials to proper application temperature, thermometer for reading the temperature of tank contents, and a hose attachment suitable for applying bituminous material manually to cover areas inaccessible to the distributor. The distributor shall be equipped for circulation and agitation of the bituminous material during the heating process.

5.3 Heating Equipment. The equipment for heating bituminous material shall consist of steam coils and equipment for producing steam, designed so steam will not be introduced into the material. An armored thermometer with a range from 40 degrees F. to 170 degrees F. shall be fixed to the tank so temperature of the bituminous material may be read at all times.

5.4 Power Brooms and Power Blowers shall be suitable for cleaning the surfaces to which the tack coat is applied.

6. WEATHER LIMITATIONS. Tack coat shall be applied only when the surface to be treated is dry and the temperature shall not have been lower than 35 degrees F. for 12 hours immediately prior to application. It shall not be applied when the atmospheric temperature in the shade is lower than 50 degrees F.

7. PREPARATION OF SURFACE. Immediately before applying the tack coat, if surface is sufficiently bonded, all loose material, dirt, clay, or other objectionable material, shall be removed from the surface to be treated with a power broom or blower supplemented with hand brooms. After the cleaning operation, and prior to application of the tack coat, an inspection of the area to be treated will be made by the Contracting Officer to determine fitness of the area to receive the bituminous coating. That portion of surface prepared for immediate treatment shall be dry and in a satisfactory condition.

8. APPLICATION OF BITUMINOUS MATERIAL. Immediately following preparation of surface, the bituminous material shall be applied by a bituminous distributor at a temperature determined by the Contracting Officer, within the range of 75 to 130 degrees F. Under no circumstances shall emulsion be heated to a temperature greater than 140 degrees F. or exposed to a temperature of less than 40 degrees F. The bituminous material shall be applied so uniform distribution is obtained over all points of the surface to be treated. Unless the distributor is equipped to obtain satisfactory results at the junction of previous and subsequent applications, building paper shall be spread on the surface for a sufficient distance back from the ends of each application so that flow through the sprays may be started and stopped on the paper, and all sprays operate at full force on the surface to be treated. Immediately after application, the building paper shall be removed and destroyed. Lightly coated areas and spots missed by the distributor shall be properly treated with bituminous material. Following application of bituminous material, the surface shall be allowed to dry to a proper condition of tackiness to receiver surfacing. The period of time shall be as determined by the Contracting Officer. The Contractor shall furnish and spread a sufficient quantity of clean, dry sand on all areas that show an excess of bituminous material, to effectively blot up and cure the excess when directed by

the Contracting Officer. The treated surface shall be maintained by the Contractor until the succeeding layer of pavement has been placed. During this interval the Contractor shall protect the treated surface against damage and shall repair all damaged spots at no additional cost to the Government.

9. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be submitted during the progress of the work. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and/or certified delivery tickets for all bituminous material used in the construction of the pavement covered by this section of the specification. The Contractor shall not remove bituminous material from tank car or storage tank until initial outage and temperature measurements have been taken, nor shall the Contractor release the car or storage tank until the final outage has been taken.

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SECTION 2I

ASPHALT CONCRETE

CENTRAL-PLANT HOT-MIX

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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Association of State Highway Officials (AASHO) Standard.

M 226-80	Viscosity Graded Asphalt Cement
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1.2 American Society for Testing and Materials (ASTM) Standards.

C 117-84	Materials Finer Than No. 200 (75 um) Sieve in Mineral Aggregates by Washing
C 127-84	Specific Gravity and Absorption of Coarse Aggregate
C 128-84	Specific Gravity and Absorption of Fine Aggregate
C 136-84	Sieve or Screen Analysis of Fine and Coarse Aggregates
D 242-70 (R 1980)	Mineral Filler for Bituminous Paving Mixtures
D 1559-82	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

1.3 Military Standard.

MIL-STD-620A & Notice 1	Test Methods for Bituminous Paving Materials
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2. DESCRIPTION. Asphalt concrete indicated as "A.C." or "P.M.S." shall consist of fine and coarse aggregates and mineral filler, if required, uniformly mixed with hot bituminous material, and placed and compacted on a prepared base course subgrade.

3. AGGREGATES shall consist of crushed stone, crushed slag, crushed or uncrushed gravel, screenings, sand, and mineral filler. Aggregates shall have a satisfactory service record in bituminous pavement construction. The source selected shall be approved by the Contracting Officer. Material passing the No. 200 sieve shall be known as mineral filler. Mineral filler shall conform to ASTM D 242. The combined aggregates and mineral filler shall meet the requirements of subsequent paragraphs: AGGREGATE GRADATION and COMPOSITION OF MIXTURE.

4. BITUMINOUS MATERIAL to be mixed with the mineral aggregates shall be asphalt cement conforming to AASHTO M 226, viscosity grade AR-40 or AR-80 Table 3.

5. AGGREGATE GRADATION. The aggregate gradation as determined by ASTM C 117 and C 136 and as selected by the Contracting Officer shall conform to one of the following.

Sieve Openings	Percentage by Weight Passing	
	a	b
1 inch	100	100
3/4 inch	97-100	80-100
1/2 inch	85-100	65-85
3/8 inch	70-90	55-75
No. 4	55-75	40-60
No. 8	35-65	25-45
No. 50	25-40	10-30
No. 200	2-8	2-8

#### 6. COMPOSITION OF MIXTURE.

6.1 Job-Mix Formula shall be submitted by the Contractor, and no bituminous mixture shall be manufactured until it has been approved. The formula will indicate the percentage of each sieve fraction of aggregate, percentage of asphalt, and temperature of the mixture as discharged from the mixer. The percentage of asphalt in the job-mix formula will be between 5.5 percent and 6.5 percent for mix a and 4.0 and 5.5 percent for mix b. Samples of the aggregates and asphalt shall be submitted for approval with the job-mix formula.

6.2 Test Properties of Bituminous Mixtures. The apparent specific gravity, as determined by ASTM C 127 and C 128, shall be used in computing the voids total mix and voids filled with bitumen, and the mixture shall meet the following requirements as determined by ASTM D 1559:

Test Property	50-Blow Compaction
Stability, minimum, pounds	500
Flow, maximum, 1/100-inch	20
Voids total mix, percent	3-5
Voids filled with bitumen, percent	75-85

6.3 Stripping of Aggregates. If the index of retained stability of the job-mix formula is less than 75 when tested in accordance with Method 104 of MIL-STD-620, the aggregates shall be rejected or treated by one of the following procedures:

- (1) Addition of heat-stable additives to bitumen.

(2) Addition of hydrated lime, or other cementitious material containing free lime, as a portion of the mineral filler.

7. MIXING PLANT shall be a weigh-batch or continuous-mixing type approved by the Contracting Officer and operated so as to produce a mixture within the job-mix formula.

#### 8. OTHER EQUIPMENT.

8.1 Bituminous-Materials Spreaders shall be self-propelled, capable of producing a finished surface conforming to the smoothness requirements specified hereinafter. The use of a spreader that leaves indentations or other objectionable irregularities in the freshly-laid mix will not be permitted.

8.2 Blowers and Brooms shall be of the power type suitable for cleaning the surface to be paved.

8.3 Saw shall be of the power type, capable of rapidly cutting pavement and trimming joints and edges of pavement.

8.4 Small Tools available on the work shall consist of the following: rakes, lutes, shovels, tampers, smoothing irons, pavement cutters, portable heater for heating small tools, wood sandals and stilt sandals of standard type, and other small tools as may be required.

8.5 Steel-Wheel Rollers shall be self-propelled, 3-wheel (tricycle) and/or tandem type, weighing not less than 20,000 pounds each. The rollers shall have adjustable wheel scrapers, water tanks, and sprinkling apparatus to keep the wheels sufficiently wet to prevent the bituminous mixture from sticking to the wheels. Rollers shall be capable of reversing without backlash and shall be free from worn parts. Roller wheels shall not have flat or pitted areas or projections that will leave marks in the pavement.

8.6 Pneumatic-Tired Rollers shall be self-propelled and shall consist of 2 axles on which are mounted multiple pneumatic-tired wheels in such a manner that the rear group of wheels will not follow in the tracks of the forward group but spaced to give essentially uniform coverage with each pass. Axles shall be mounted in a rigid frame provided with a loading platform or body suitable for ballast loading. Tires shall be smooth and capable of being inflated to at least 90 p.s.i. Construction of roller shall be such that each wheel can be loaded to a minimum of 4,500 pounds.

9. TREATMENT OF UNDERLYING SURFACE. Prior to laying a bituminous course, the underlying surface shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, and hand brooms, as directed. The surface to be paved shall receive a prime coat conforming to the requirements of SECTION: PRIME COAT AND WEED KILLER.

10. TRANSPORTATION OF BITUMINOUS MIXTURE. The bituminous mixture shall be transported from the mixing plant to the site in trucks having tight, clean, smooth bodies with a minimum coating of concentrated solution of hydrated lime and water to prevent adhesion of the mixture. Each load of mixture shall be covered with canvas or other suitable material to protect the mixture from the weather and to prevent loss of heat. Mixtures having temperatures greater than 350 degrees,

mixtures having temperatures less than 235 degrees, or mixtures which form or show indications of moisture will be rejected. Hauling over freshly laid material will not be permitted.

11. PLACING. Contact surfaces of previously constructed pavement, curbs, manholes and other structures shall be sprayed with a thin coat of asphalt conforming to the requirements of SECTION: TACK COAT. The mechanical spreader shall be adjusted and its speed regulated so that the surface of the course being placed will be smooth and continuous without tears and pulling. The course will be of such depth that after compaction, the cross section, grade, and contour will be as indicated. In areas where the use of machine spreading is impractical, the mixture shall be spread by hand. Unless otherwise directed, placing shall begin on the high side of areas with a one-way slope or along the centerline of areas with a crowned section and shall be in the direction of the main traffic flow. Placing of the mixture shall be as continuous as possible, and the speed of placing shall be adjusted, as directed, to permit proper rolling.

12. COMPACTION OF MIXTURE shall be accomplished by steel-wheel and pneumatic-tired rollers. Rolling shall begin as soon after placing as the mixture will support the roller without undue displacement. Rolling of the course shall be continued until all roller marks are eliminated and at least 95 percent of the density of a laboratory specimen of the same mixture has been obtained. The speed of the rollers at all times shall be slow enough to avoid displacement of the hot mixture. The wheels of the roller shall be moistened to prevent adhesion of the mixture. In areas not accessible to the roller, the mixture shall be compacted with hot hand tampers.

13. JOINTS. The joints between old and new pavements or between lanes of new work shall be constructed so as to insure uniform bond, texture, density, and smoothness as in other sections of the course. Edges of existing pavement shall be cut to straight, vertical surfaces. All contact surfaces of existing pavement shall be painted with a thin, uniform coat of asphalt.

14. PROTECTION OF PAVEMENT. After final rolling, no vehicular traffic shall be permitted on the pavement for at least 6 hours after rolling.

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SECTION 2J

TREES AND SHRUBS

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- |                                    |                               |
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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 Federal Specification (Fed. Spec.).

O-F-241D

Fertilizers, Mixed Commercial

1.2 American National Standards Institute (ANSI) Publication.

Z60. 1-1980

American Standard for Nursery Stock

1.3 American Joint Committee on Horticultural Nomenclature (AJCHN) Publication.

Standardized Plant Names, (Second Edition, 1942)

1.4 American Society for Testing and Materials (ASTM) Standard.

C 136-84a

Sieve Analysis of Fine and Course  
Aggregates

2. SOURCE INSPECTIONS.

2.1 Plant Materials. Plant materials will be inspected by the Contracting Officer at the growing site and tagged or otherwise approved for delivery. Such inspection does not preclude right of rejection at the project site.

2.2 Topsoil. The source of topsoil will be inspected by the Contracting Officer to determine the acceptability of the topsoil and the depth to which it is to be stripped.

3. SUBMITTALS.

3.1 Samples. The following samples shall be submitted for approval before work is started.

a. Topsoil--representative samples shall be taken from several locations on the area under consideration.

3.2 Certificates of Conformance or Compliance. Before delivery, notarized certificates attesting that the following materials meet the requirements specified, shall be submitted in triplicate for approval.

a. Plant Materials.

3.3 Maintenance Instruction. Prior to the end of the contract maintenance period, 3 copies of written instructions for year round maintenance and care of installed plants shall be furnished to the Contracting Officer.

3.4 Licenses. Licenses shall be submitted, in 3 copies, to the Contracting Officer.

4. DELIVERY, STORAGE, AND HANDLING.

4.1 Delivery.

4.1.1 The Contractor shall notify the Contracting Officer of the delivery schedule in advance so the plant material may be inspected upon arrival at the jobsite by the Contracting Officer. Unacceptable plant material shall be removed from the jobsite immediately.

4.1.2 Plants shall be protected during delivery to prevent damage to the root balls or desiccation of leaves. Trees shall be protected during transportation by tying in the branches and covering all exposed branches.

4.1.3 Fertilizer shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name or trademark, and in conformance to state and Federal law. In lieu of containers, fertilizer may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.

4.1.4 All pesticide material, including soil fumigants, shall be delivered to the site in the original unopened containers. Containers that do not have a legible label that identifies the Environmental Protection Agency registration number and the manufacturer's registered uses will be rejected.

4.2 Storage.

4.2.1 Plant Storage. Plants not installed on the day of arrival at the site shall be stored and protected. Outside storage locations shall be continually shaded and protected from the wind. Plants stored on the project shall be protected from any drying at all times. Plants in containers, shall be kept in a moist condition until planted by routine watering.

4.2.2 Storage of Other Materials. Pesticide material shall be kept in dry storage and shall not contaminate adjacent material, and shall be handled and stored following manufacturer's directions. Storage of materials shall be in areas designated or as approved by the Contracting Officer.

4.3 Handling. Care shall be taken to avoid damaging plants being moved from the nursery or storage area to the planting site. Plants shall be protected from freezing or drying out by covering with burlap, tarpaulin or mulching material during transportation to planting site. Plants shall not be handled by the trunk or stems. Damaged plants will be rejected and shall be removed from the site.

5. ENVIRONMENTAL PROTECTION. All work and Contractor operations shall comply with the requirements of SECTION: ENVIRONMENTAL PROTECTION.

## 6. MATERIALS.

### 6.1 Plants.

6.1.1 Plants shall conform to the varieties specified in the plant list and be true to botanical names as listed in AJCHN Standardized Plant Names. Plants shall be in accordance with ANSI Z60.1 except as otherwise stated in the specifications or shown on the plans. Where the drawings or specifications are in conflict with ANSI Z60.1, the drawings and specifications shall prevail.

6.1.2 Planting stock shall be well-branched and well-formed, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion, and harmful insects or insect eggs and shall have healthy, normal and unbroken root systems. Deciduous trees and shrubs shall be symmetrically developed, of uniform habit of growth, and free from objectionable disfigurements. Plants shall have been grown under climatic conditions similar to those in the locality of the project.

6.1.3 The minimum acceptable sizes of all plants, measured before pruning and with branches in normal position, shall conform to the measurements indicated. Plants larger in size than specified may be used with the approval of the Contracting Officer with no change in the contract price. If larger plants are used, the ball of earth or spread of roots shall be increased in accordance with ANSI Z60.1.

6.1.4 The Contractor shall facilitate inspection and identifications by labeling trees and bundles or containers of the same shrub, with a durable waterproof label and weather-resistant ink. Labels shall state the correct plant name and size as specified in the list of required plants. Labels shall be securely attached to plants, bundles, and containers of plants and shall be legible for 60 days after delivery to the planting site.

6.1.5 Plant material shall be nursery grown unless otherwise indicated and shall conform to the requirements and recommendations of ANSI Z60.1. Plants shall be dug and prepared for shipment in a manner that will not cause damage to branches, shape, and future development after planting.

6.1.5.1 Container grown plants shall have sufficient root growth to hold the earth intact when removed from containers but shall not be root bound.

6.1.6 Substitutions shall be made only when a plant (or its alternates as specified) is not obtainable and the Contracting Officer authorizes a change order providing for use of the nearest equivalent obtainable size or variety of plant having the same essential characteristics with an equitable adjustment of the contract price.

### 6.2 Topsoil.

6.2.1 Topsoil shall be the existing surface soil stripped and stockpiled on the site.

6.2.2 If additional topsoil is required, it shall be furnished by the Contractor from borrow areas approved by Contracting Officer.

6.3 Staking Material. Stakes for support if required shall be lodge pole pine, free from knots, rot, cross grain, or other defects that would impair the strength. Standard stakes shall be a minimum of 2-1/2 inches in diameter, and pointed at one end, and of length indicated on the drawings.

6.4 Water. Water shall not contain elements toxic to plant life.

## 7. INSTALLATION.

7.1 Planting Seasons and Conditions. Planting shall be done when the ground is not frozen, water logged or in an otherwise unsuitable condition for planting. Planting shall be done within the following dates:

a. Deciduous material from 1 February to 1 May for spring planting and from 1 October to 15 November for fall planting.

b. Evergreen material from 1 February to 1 May for spring planting and from 1 October to 15 November for fall planting.

7.2 Setting Plants. Container-grown plants shall be handled and moved only by the container. Plants shall be set plumb and held in position until sufficient soil has been firmly placed around roots or ball. Plants shall be set in relation to surrounding grade so that they are even with the depth at which they were grown in the nursery container.

7.2.1 Planting shall be done with the approval of the Contracting Officer only when the ground is in suitable condition for planting. If special conditions exist that may warrant a variance in the above planting conditions, a written request shall be submitted to the Contracting Officer stating the special conditions and proposed variance.

7.2.2 Layout. Plant material locations and bed outlines shall be staked on the project site by the Contractor and approved by the Contracting Officer before any plant pits or beds are dug. The Contracting Officer may adjust plant material locations to meet field conditions.

## 7.3 Excavation for Planting.

7.3.1 Prior to excavating for plant pits the area shall conform to the lines and grades shown on the plans and the locations of any underground utilities shall be verified by the Contractor and the Contracting Officer. Damage to utility lines shall be repaired at the Contractor's expense. Existing trees, shrubbery, and beds that are to be preserved shall be barricaded in a manner that will effectively protect them during planting operations.

7.3.2 Rocks and other underground obstructions shall be removed to a depth necessary to permit proper planting according to plans and specifications. If underground utilities, construction, or solid rock ledges are encountered, other locations may be selected by the Contracting Officer.

7.3.3 Plant pits may be dug by any method approved by the Contracting Officer provided that the pits have vertical sides and flat bottoms. When pits are dug with an auger and the sides of the pits become glazed, the glazed surface shall be scarified. The size of plant pits shall be as shown on the plans.

7.4 Container grown stock shall be removed from containers in such a way so as to prevent damage to plant or root system. Planting shall be completed as specified above.

7.4.1 Container stock shall be backfilled with topsoil to approximately half the depth of the ball and then tamped and watered. The remainder of backfill of topsoil shall be tamped and watered. Earth saucers or water basins shall then be formed around isolated plants. Water holding basins shall be ample enough in size and height to hold at least 2-1/2 gallons for shrubs or 5 gallons for trees.

7.5 Watering. Depressed water basins shall be used around all plants. All watering shall be done in a manner which will provide deep penetration, but which will not cause erosion or damage to the finished surface. Sufficient water shall be applied to penetrate the planting bed to a depth of 24 inches. Frequent watering may be necessary during periods of hot weather.

7.6 Inspection. The trunks of the trees shall be inspected for physical damage or insect infestation and required treatment or rejection shall be determined.

## 8. PRUNING.

8.1 New plant material shall be pruned in the following manner. Dead and broken branches shall be removed. Trees and shrubs shall be pruned to reduce total amount of anticipated foliage by one fourth. Typical growth habit of individual plants shall be retained with as much height and spread as is practicable. Cuts shall be made with sharp instruments, and shall be flush with trunk or adjacent branch to insure elimination of stubs. "Headback" cuts at right angles to line of growth shall not be permitted. Trees shall not be poled or the leader removed. Trimmings shall be removed from the site. Cuts 1/2 inch in diameter and larger shall be painted with the specified tree wound dressing.

8.2 Restoration and Clean-Up. Excess and waste material shall be removed daily. When planting in an area has been completed, they shall be cleared of all debris, spoil piles, and containers.

8.3 Maintenance During Installation. Maintenance operations shall begin immediately after each plant is planted and shall continue as required until final acceptance. Plants shall be kept in a healthy, growing condition by watering, pruning, spraying, weeding, and any other necessary operations of maintenance. Plant saucers and beds shall be kept free of weeds, grass, and other undesired vegetation. Plants shall be inspected at least once per week by the Contractor during the installation period and needed maintenance performed promptly.

9. PLANT ESTABLISHMENT PERIOD. Final acceptance of all work and materials under this section shall be at the end of a period of establishment to be determined as follows.

9.1 Beginning of the Plant Establishment Period. The period of establishment shall begin on the date that an inspection by the Contracting Officer shows that all plants are in place and have been installed in accordance with the specifications and plans. Replacement of plants that were not supplied by the Contractor but were relocated under this contract and that die for any reason other than improper handling during transplanting and/or lack of proper care will

not be required. Loss through Contractor negligence, however, shall require replacement in kind and size per specification and shall be at the Contractor's expense.

## 9.2 During the Plant Establishment Period.

9.2.1 During the plant establishment period, the Contractor shall water all plants as necessary to maintain an adequate supply of moisture within the root zone. Water shall not be applied so quickly that it cannot be absorbed by the plants.

9.2.2 Plants shall be pruned as required.

9.2.3 Stakes and eroded plant saucers shall be replaced as required.

9.2.4 Other work, such as spraying with approved insecticides and fungicides to control pests, shall be done (each day if necessary) to ensure plant survival in a healthy growing condition.

9.2.5 Dead plants shall be removed immediately at the Contractor's expense. The Contractor will not be responsible for theft or damage to plants by vehicles or vandalism following completion and approval of the installation portion of the planting contract.

## 9.3 Termination of the Plant Establishment Period.

9.3.1 A preliminary inspection by the Contractor and the Contracting Officer will be held 90 days from the date of the beginning of the plant establishment period to determine plant acceptability and the number of replacements. Alternate or substituted varieties of plants shall be used only if approved by the Contracting Officer.

9.3.2 A final inspection of all plants will be held after the replacement planting has been completed. No additional plant establishment period will be required for replacement plants. The establishment period will end on the date of this inspection and said inspection will be considered final acceptance provided the Contractor has complied with the following requirements.

a. Dead, missing, and defective plant material shall have been replaced as directed by the Contracting Officer otherwise, final acceptance will be delayed until such replacements have been satisfactorily accomplished.

b. Plant saucers shall be free of weeds.

c. Stakes and guys shall be in good condition.

d. Remedial measures directed by the Contracting Officer to ensure plant survival shall have been carried out.

e. Plant material shall have been fertilized as required prior to acceptance.

10. FINAL ACCEPTANCE.

10.1 General. At conclusion of the installation portion of the contract an inspection will be made by the Contracting Officer, upon written notice requesting inspection submitted by the Contractor at least 10 days prior to the anticipated date. The purpose of the inspection will be for the acceptance of the contract work, including maintenance but exclusive of replacement. After inspection, the Contractor will be notified in writing of acceptance of the plants subject to guarantee. If there are any deficiencies in the maintenance, the Contractor will be notified and the work subject to re-inspection before acceptance.

10.2 Replacement. At the end of the guarantee period the Contracting Officer will make another inspection to determine the condition of plants. Plants not in healthy growing condition, as determined by the Contracting Officer will be noted and as soon as seasonal conditions permit shall be removed from the site and replaced with plants of the same species and sizes as originally specified. Such replacements shall be made in the same manner as specified for the original plantings, and at no cost to the Government. The guarantee on plants will be limited to one replacement.

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SECTION 4A

STONE PROTECTION

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| 1. Applicable Publications | 4. Placement                     |
| 2. Materials               | 5. Scales                        |
| 3. Foundation Preparation  | 6. Waybills and Delivery Tickets |

1. APPLICABLE PUBLICATIONS. The American Society for Testing and Materials (ASTM) Standards listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

C 88-83	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
C 127-84	Specific Gravity and Absorption of Coarse Aggregate
C 295-85	Petrographic Examination of Aggregates for Concrete
C 535-81	Resistance to Abrasion of Large Size Coarse Aggregate by Use of the Los Angeles Machine
D 1141-75 (R 1980)	Substitute Ocean Water

2. MATERIALS.

2.1 Definitions.

a. Cobblestone. Stone which is obtained from alluvial deposits and is nearly spherical and well rounded, ranging from 4 to 12 inches in size.

b. Quarry Stone. Stone which is obtained from a rock quarry and is angular in shape.

c. Stone. Sound, durable, weather-resistant rock over 4 inches in diameter resulting from quarrying of rock or from alluvial deposits.

2.2 Source and Material Approval. No stone shall be placed without prior written acceptance of stone source by the Contracting Officer. The contractor shall make all arrangements, pay all royalties, and secure all permits for the procurement, furnishing and transporting of stone. The source(s) from which the Contractor proposes to obtain the material shall be selected and a sample submitted a minimum of 45 days in advance of the time when the material will be required in the work. Stone from a proposed source or sources will be tested by the Government for quality compliance. The Government will test one sample each from a maximum of 3 sources at its expense. If a stone sample fails the tests, or if the Contractor desires to utilize more than three sources, additional testing will be

accomplished by the Government for the sum of \$1600 for each additional sample tested. The costs of such additional tests will be deducted from payment due the Contractor. All test samples (500 pounds minimum) shall be representative of the stone source and shall be obtained by the Contractor under the supervision of the Contracting Officer and delivered at the Contractor's expense to the South Pacific Division Laboratory, U.S. Army Engineer Division, South Pacific, Sausalito, California. The Contractor shall vary the quarrying, processing, loading and placing operations to secure the type and quality of stone protection specified. If the stone being furnished by the Contractor does not fully meet all the requirements of these specifications, the Contractor shall furnish, at no additional cost to the Government, other stone meeting the requirements of these specifications. Approval of a source shall not be construed as a waiver of the right of the Government to require the Contractor to furnish stone which complies with these specifications. Materials produced from localized areas, zones or strata will be rejected when such stone does not comply with the specifications.

2.2.1 It is anticipated that significant amounts of acceptable stone will not be available from the required excavation. The required stone will need to be obtained from offsite commercial sources. It is also anticipated that acceptable stone from more than one source will need to be utilized to obtain the required quantity for the project. If sufficient amounts of stone conforming to these specifications are not available from a source or sources used in the work, the Contractor shall submit stone from another source for approval.

2.3 Quality Compliance. Test results and/or service records will be used by the Contracting Officer to determine the acceptability of the stone protection materials. In the event complete or current compliance test reports and/or service records are not available, the material shall be subjected to the tests outlined in these specifications to determine its acceptability for use in the work. In the event stone is accepted based on service records, samples of the actual stone to be used for construction shall be taken and shall be subjected to the tests outlined in these specifications. Before a proposed source or sources of cobblestone will be considered for sampling and testing the Contractor must demonstrate that the gravel plant(s) has sufficiently stockpiled cobblestone and results of sufficient explorations must be made available to the Government to demonstrate that an adequate quantity of cobblestone is available to fulfill the contract requirements. Before a proposed source or sources of quarry stone will be considered for sampling and testing, one of the following conditions must be met:

a. The quarry or quarries must be sufficiently developed to demonstrate that an adequate quantity of stone is available to fulfill the contract requirements; or,

b. A sufficiently exposed face or faces must be present and results of sufficient explorations must be made available to the Government to demonstrate that an adequate quantity of quarry stone is available to fulfill the contract requirements.

2.3.1 Service records are considered to be acceptable if stone from a proposed source has remained sound with no significant deterioration after 10 or more years of exposure.

2.4 Quality Compliance Tests for Stone Protection. Stone shall meet the following test requirements.

Test	Test Method	Requirement
Specific Gravity (Bulk SSD)	ASTM C 127	2.50 minimum
Absorption	ASTM C 127	2.0% maximum
Wetting & Drying	SPD Test Procedure <sup>(1)</sup>	No fracturing <sup>(3)</sup>
Magnesium Sulfate	ASTM C 88 <sup>(2)</sup>	10% max. loss <sup>(4)</sup>
Abrasion Loss	ASTM C 535	50% max. loss

In addition to the above tests, the stone shall be subjected to a petrographic and X-ray diffraction analysis in accordance with ASTM C 295. The stone must not contain any swelling type clay (illite or montmorillonite).

NOTE: (1): Test procedure wetting-and-drying tests. The initial step of the test is the careful examination of the entire sample and the selection of representative test specimens. The piece should be large enough to produce two cut slabs, one inch thick ( $\pm 1/4$  inch) with a minimum surface area of 30 square inches on one side. Two chunks approximately three by four inches are also chosen. The slabs and chunks are carefully examined under a low-power microscope and all visible surface features are noted and recorded. The specimens are then oven dried at 140 degrees F., for eight hours, cooled and weighed to the nearest tenth of a gram. The test specimens are photographed to show all surface features before the test. The chunks and slabs are then subjected to fifteen cycles of wetting and drying. One slab and one chunk are soaked in fresh tap water, the other slab and chunk are soaked in salt water prepared in accordance with ASTM D 1141. Each cycle consists of soaking for sixteen hours at room temperature and then drying in an oven for eight hours at 140 degrees F. After each cycle the specimens are examined with the low-power microscope to check for opening or movement of fractures, flaking along edges, swelling of clays, softening of rock surfaces, heaving of micaceous minerals, breakdown of matrix material and any other evidence of weakness developing in the rock. The cycle in which any of these action occurs is recorded. After fifteen cycles, the slabs and chunks are again carefully examined and all changes in the rocks are noted and recorded. The test specimens together with all flakes or particles which come off during the test are oven dried, weighed and photographed.

NOTE: (2): The test shall be made on 50 particles each weighing 1000 grams,  $\pm 20$  grams, in lieu of the gradation given in C 88.

NOTE: (3): Weakening and loss of individual surface particles is permissible unless bond of the surface grains softens and causes general disintegration of the surface material.

NOTE: (4): Sandstones which have a loss greater than the specified limit will be accepted if the Contractor demonstrates that the rock has a satisfactory service record.

2.4.1 Stone to be used in the work shall be of the same lithology as the stone sampled for testing and for which service records are provided as a basis for approval. All stone shall be sound, durable, hard, and free from laminations, weak cleavages or undesirable weathering. Stone shall be of such character that it will not disintegrate from the action of air, water, or the conditions of handling and placing. All stone shall be clean and free from earth, clay, refuse, and adherent coatings.

2.5 Gradation Sampling and Testing for Stone Protection performed by an approved testing laboratory on samples selected by the Contracting Officer. The Government reserves the right to perform check tests and to use the Contractor's sampling and testing facilities to make the tests. Each sample shall consist of not less than five tons of materials and shall be selected at random from the production run. One gradation test is required at the beginning of production prior to delivery of stone to the project and a minimum of one additional test for each (10,000) tons of material placed. All sampling and gradation tests performed by the Contractor shall be under the supervision of the Contracting Officer.

## 2.6 Gradation.

2.6.1 General. 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. In addition, material not meeting the required grading due to segregation or degradation during placement shall be rejected. If test results show that stone does not meet the required grading, the hauling operation will be stopped immediately and will not resume until processing procedures are adjusted and a gradation test is completed showing gradation requirements are met. All gradation tests shall be at the expense of the Contractor.

2.6.2 Stone may be obtained from any source approved by the Contracting Officer and shall be reasonably well graded between 4 and 12 inches with not less than 25 nor more than 50 percent passing a 6-inch sieve.

2.6.3 Stone to be grouted may vary from the above gradation by the following allowance. For grouted stone thicknesses of 18 inches, ten (10) percent of the stone may be larger than 12 inches to a maximum size of 24 inches.

3. FOUNDATION PREPARATION. Areas on which filter material or stone is to be placed shall be trimmed and dressed to conform to cross sections indicated or directed, within an allowable tolerance of plus or minus one-half inch from the theoretical slope lines and grades. Where such areas are below the allowable minus tolerance limit they shall be brought to grade by filling with earth similar to the adjacent material and well compacted, or by filling with approved material, and no additional payment will be made for any material thus required. Immediately prior to placing the filter material or stone, the prepared base shall be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

4. PLACEMENT. Stone shall be placed to produce a surface in which the tops of the individual stones do not vary more than plus 2 inches from true grade. Stones larger than the 18-inch size limit will be allowed to project more than 2 inches above finish grade for the 18-inch stone layer. The stones larger than 18 inches must be placed such that they rest on the foundation. Double decking of thin flat stones to bring the surface up to the required grade will not be permitted.

5. SCALES shall be standard truck scales of the beam type. The scales shall be of sufficient size and capacity to accommodate all trucks used in hauling the material. Scales shall be tested, approved, and sealed by an inspector of the State Inspection Bureau charged with scales inspection within the state in which

the project is located. Scales shall be calibrated and resealed as often as necessary to insure continuous accuracy. The necessary number of standard weights for testing the scales shall be on hand at all times and, if an official inspection bureau of the state is not available, the scales will be tested by the Contracting Officer.

6. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be submitted to the Contracting Officer within 24 hours of delivery of stone. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and/or certified delivery tickets for all stone actually used in the construction covered by the contract.

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SECTION 4B

GROUTING STONE PROTECTION

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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society for Testing and Materials (ASTM) Standards.

C 33-85	Concrete Aggregates
C 150-85	Portland Cement

1.2 U.S. Department of the Army, Corps of Engineers, Handbook for Concrete and Cement.

CRD-C 300-77	Membrane-Forming Compounds for Curing Concrete
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2. MATERIALS.

2.1 Aggregate.

2.1.1 General. Aggregate as delivered to the mixers, shall consist of clean, hard, uncoated particles, and shall conform to ASTM C 33. The Contractor shall designate in writing within 15 days after date of notice to proceed the source or sources from which he proposed to furnish the aggregate and submit certification from an approved testing laboratory that aggregates to be furnished meet the requirements of these specifications.

2.1.2 Gradation. The aggregate shall conform to the following specific requirements.

Sieve Designation, U.S. Standard Square Mesh	Percentage by Weight Passing
3/8 in.	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

In addition to the grading limits shown above, the aggregate, as delivered to the mixer, shall have a fineness modulus of not less than 2.40 or more than 3.10. The grading of the aggregate shall also be controlled so that the fineness moduli of

at least 9 to 10 test samples of the aggregate as delivered to the mixer shall not vary more than 0.15 from the average fineness modulus of all samples previously taken. The fineness modulus shall be determined by dividing by 100, the sum of the cumulative percentages retained on U.S., Standard Sieves Nos., 4, 8, 16, 30, 50, and 100. At the option of the Contractor, aggregate may be separated into 2 or more sizes or classifications, but the resulting combined sand shall be of uniform grading within the limits specified above.

2.2 Portland Cement shall conform to the requirements of ASTM C 150, Type II. The alkali content of the cement shall not exceed 0.6 percent.

2.3 Water shall be fresh, clean, and potable.

3. MIXING. Grout shall be composed of cement, sand, and water mixed in the proportions as directed. The estimated cement content requirement per cubic yard of grout shall be 7-1/2 sacks. 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. Grout batches in the same course shall be uniform in mix, size, and consistency.

4. PLACING.

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

4.2 The grout shall be placed in two courses in 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 brought to the place of final deposit by approved means and discharged directly on the stone. A splash plate of metal or wood shall be used where necessary to prevent displacement of stone directly under discharge. 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.

4.3 Placement and brooming of the grouted surface shall be such that the outer layer of rock projects 1/3 to 1/4 their diameter above the grouted surface. After the top course has stiffened the entire surface shall be rebroomed to eliminate runs in the top course and to fill voids caused by sloughing of the layers of grout.

4.4 The exposed surfaces of the stone shall be cleaned by air-water blasting or other approved method.

4.4.1 The air-water blasting shall be capable of producing a minimum pressure of 100 psi and shall be of such nature as to adequately perform the work required.

4.4.2 The grout will be allowed to set for a minimum of one hour, or other length of time as directed by the Contracting Officer before air-water blasting is commenced. The air-water blasting shall be at right angles to the surface of the grout.

4.5 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.

4.6 Acid stain shall be applied as indicated in SECTION: STAIN.

#### 5. CURING AND PROTECTION.

5.1 Moist curing shall consist of covering the grout with a uniform thickness of 2 inches of sand which shall be kept continuously saturated for a period of 14 days.

5.2 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 of 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.

5.2.1 Membrane curing compound shall be a non-pigmented curing compound, conforming to Corps of Engineers Serial No. CRD-C 300.

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SECTION 5A

MISCELLANEOUS METAL

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1. APPLICABLE PUBLICATIONS. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society for Testing and Materials (ASTM) Standards.

A 53-84a	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A 123-78	Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
A 475-78 (R 1984)	Zinc-Coated Steel Wire Strand
A 525-83	Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

1.2 American Welding Society (AWS) Publication.

D1.1-85	Structural Welding Code - Steel
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2. GENERAL REQUIREMENTS. The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123, A 386, or A 525, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

3. DISSIMILAR MATERIALS. Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

#### 4. SUBMITTALS.

4.1 Shop Drawings. Shop drawings shall be submitted in accordance with SPECIAL CLAUSES. Shop drawings shall indicate material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Shop drawings for the following items shall be submitted.

4.2 Samples. Samples shall be full size, shall be taken from manufacturer's stock, and shall be complete as required for installation in the structure. After approval, samples may be installed in the work, provided each sample is clearly identified and its location recorded.

5. WORKMANSHIP. Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alinement. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

6. ANCHORAGE. Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts, lag bolts, and screws for wood. Slotted inserts shall be of types required to engage with the anchors and shall be approved.

7. PIPE GATE. Pipe gate shall be made of galvanized standard weight pipe of the sizes indicated on the drawings and conform to ASTM A 53. Installation shall be as indicated.

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## SECTION 9A

### STAIN

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1. **APPLICABLE PUBLICATIONS.** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 U.S. Department of Agriculture.

Handbook 18-Soil Survey Manual

1.2 Munsell Soil Color Charts, 1975 Edition.

2. **DEFINITION.** The term "acid stain" as used herein is defined in this section under paragraph: **MATERIALS.**

3. **PACKAGING, LABELING, AND STORAGE.** Stain shall be in sealed containers that legibly show the designated name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer. Stain shall be furnished in containers not larger than 5 gallons. Stain shall be stored on the project site or segregated at the source of supply sufficiently in advance of need to allow 45 days for testing. Stain shall be stored to prevent freezing.

4. **SUBMITTALS.**

4.1 **Certificates of Compliance.** The Contractor shall furnish a certificate of compliance in accordance with the **SPECIAL CLAUSES** attesting that all stain proposed for use contain not more than 0.06 percent lead as defined in paragraph **HAZARDOUS MATERIALS RESTRICTIONS.**

4.2 **Manufacturer's Instructions.** Detailed mixing, thinning and application instructions, minimum and maximum application temperature, and curing time and drying time between coats and minimum drying time shall be furnished. Instructions shall also include surface preparation requirements and the number and types of coats required for each surface.

4.3 **Sample Panels.** Acid stain shall be applied to a sample 24" x 24" panel of the same material as that on which the stain coating will be applied in the work and shall be submitted for approval for each color specified. The approved sample panels will be used for quality control of the application of the acid stain

coating system. Work matching grouted stone color for reach 1 of the ACDC project adjacent to the project site will be accepted in lieu of the above referenced panels.

4.4 Samples. Upon notification by the Contractor that the material is at the site or source of supply, a one-quart sample of each batch, except for small quantities approved as proprietary brands, shall be taken by random selection from the sealed containers by the Contractor in the presence of a representative of the Contracting Officer. The contents of the sampled containers shall be thoroughly mixed to render the sample representative. Samples shall be identified by designated name, specification number, batch number, project contract number, intended use, and quantity involved.

4.5 Test Reports. The Contractor shall furnish either one of the following reports for batches in excess of 25 gallons.

a. A test report showing that the batch meets all specification requirements.

b. A test report showing that a previous batch of the same formulation as the batch to be used met all specification requirements, and a report of test results for properties of weight per gallon, viscosity, fineness of grind, drying time, and color.

5. COLORS AND TINTS. Colors and tints shall conform to U.S. Department of Agriculture Handbook 18-Soil Survey Manual and shall be color 10 YR 7/3 (and of the Munsell Color Charts) approved by the Contracting Officer.

6. QUALITY ASSURANCE PROVISIONS. Materials will be approved based on test reports furnished, except where samples are tested, approval will be based on tests of samples. If materials are approved based on test reports furnished, samples will be retained by the Government for testing should the materials appear defective during or after application. In addition to any other remedies under the contract, the actual cost of retesting materials found to be defective will be deducted from payments due the Contractor.

7. ENVIRONMENTAL CONDITIONS. Unless otherwise recommended by the stain manufacturer, the ambient temperature shall be between 50 and 90 degrees F. when applying coatings. Coatings will only be applied within the minimum and maximum temperature recommended by the coating manufacturer. Stain shall be applied only to surfaces that are completely free of surface moisture as determined by sight or touch. In no case shall stain be applied to surfaces upon which there is visible moisture.

8. MATERIALS. Materials shall conform to the requirements of the specifications listed herein.

8.1 Acid Stains. Acid stains for coloring grouted stone shall be a water solution of metallic salts containing dilute muriatic acid that etches the existing grouted stone surface so the staining ingredients can penetrate and react uniformly. Acid stain products shall have a minimum of 5 years of demonstrable manufacturing, use, and successful application and wear.

## 9. HAZARDOUS MATERIALS RESTRICTIONS.

9.1 Lead. Stain shall contain not more than 0.06 percent lead by weight (calculated as lead metal) in the total nonvolatile content.

## 10. SURFACE PREPARATION.

10.1 General. Items not to be stained which are in contact with or adjacent to stained surfaces shall be removed or protected prior to surface preparation and staining operations. Surfaces to be stained shall be clean according to acid stain manufacture recommendations before applying. Oil and grease shall be removed with clean cloths and cleaning solvents. Cleaning solvents shall be of low toxicity with a flashpoint in excess of 100 degrees F.

10.2 Thoroughly clean all surfaces with a minimum of two (2) washings, use a heavy application of water applied with a fire hose or other high pressure application technique. Remove all debris and deleterious material from the site and dispose of in a safe and approved manner. After the entire project has been acid stained it shall be washed down according to the manufacture recommendations.

## 11. MIXING AND THINNING.

11.1 General. Packaged acid stain may be thinned immediately prior to application per manufacturer's specifications. The use of thinner shall not relieve the Contractor from obtaining complete covering. Stain of different manufacturers shall not be mixed.

## 12. APPLICATION.

12.1 General. Stain may be applied by brush or spray except as hereinafter specified. At time of application, stain shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application. Stain shall be applied so finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Covering shall be complete. One coat shall be applied as a film of uniform thickness. Special attention shall be given to insure that all surfaces including edges, corners, and crevices receive a film thickness equivalent to that of adjacent painted surfaces. Adequate ventilation shall be provided during stain application. Respirators shall be worn by all persons engaged in spray staining. Adjacent areas shall be protected by approved precautionary measures. Stain shall be applied only to surfaces that are completely free of surface moisture as determined by sight or touch. In no case shall stain be applied to surfaces upon which there is visible moisture.

12.2 Stain. One coat of the specified acid stain shall be sprayed over the entire project surface as indicated. The stain shall be applied no earlier than 15 days after moist curing has been started.

12.3 Time Between Surface Preparation and Staining. Surfaces that have been cleaned, pretreated and otherwise prepared shall be given a coat of the specified stain as soon as practicable after such pretreatment has been completed, but prior to any deterioration of the prepared surface.

13. CLEANING. Cloths, cotton waste and other debris that might constitute a fire hazard shall be placed in closed metal containers and removed at the end of each day. Upon completion of the work debris and containers shall be removed from the site. Stain and other deposits upon adjacent surfaces shall be removed and the entire job left clean and acceptable.

\* \* \* \* \*

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