SADDLEBACK FRS & DIVERSION

Specifications & Drawings

Harquahala Valley Watershed

Maricopa and Yuma Counties, Arizona August 1979

U.S. Department of Agriculture
Soil Conservation Service

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Room 3008 - Federal Bldg.
Phoenix, Arizona 85025
July 15, 1980

ADDENDUM NO. 1 to Invitation No. SCS-12-AZ-80 scheduled to be opened at 1:00 p.m. local time, at the place of bid opening, August 14, 1980, and then be publicly opened and read for the construction of the Saddleback Floodwater Retarding Structure and Diversion.

1. Prospective bidders are hereby advised of the following changes:

   a. Add gates as follows to gate schedule sheet 3 of 41, Saddleback FRS

      Station 149 + 85 — 75' left to 61' left and 40' right to 54' right

      Station 150 + 15 — 65' left

   b. Sheet 40 of 41 Drawing No. 7-E-24039 Saddleback FRS.
      In pay section for principal spillway SAF Outlet Station 0 + 13± revise structure excavation backfill paylines to read structure backfill pay lines.

   c. Construction Specification 31, Concrete, page 31-20 Section 26.a.(4) and Sheets 12, 24, 26, 29, and 39 of Saddleback F.R.S. drawings No. 7-E-24039. Change waterstop designation 16 and 17 to 18 and 19 respectively. Type B waterstop shall have a minimum bulb diameter D = 3/4 inch.

   d. Sheet 35 of 41 drawing No. 7-E-24039 Saddleback F.R.S. Animal Guard Detail - Change outside dimension from 10" x 10" to 12" x 12" and change dimension from center of 6" diameter hole to center of 3/4 inch diameter hole from 4½ inch to 5-1/8 inch.

   e. Delete (not part of this contract) where this statement is found in drawings 7-E-24039 Saddleback F.R.S. and drawings 7-E-24040 Saddleback Diversion.

   f. Change 75 foot dimension to 90 feet and 40 foot dimension to 65 feet on sheets 5, 6, and 10 of drawing No. 7-E-24039 Saddleback F.R.S. for distance from east fence line to center line dam station 34 + 75 to station 79 + 55 and station 241 + 61± to station 272 + 70 respectively.

2. All other conditions of this Invitation for Bids remain the same.

3. Bidders must acknowledge receipt of this addendum. Acknowledgment must be shown in the spaces provided herein and must be received before the time set for receiving bids, 1:00 p.m. local time, at the place of bid opening.

4. Failure to acknowledge receipt of this addendum will cause rejection of bid.

ACKNOWLEDGED:
Bidder: _____
By: _____
Title: _____
Date: _____

B. E. Osterquist
Contracting Officer

C O N T E N T S

Invitation No. SCS-12-AZ-80

CONTENTS - Continued

SPECIFICATIONS - Continued

OF-17 (NOV. 60) FPR (41CFR) 1-16.805

IMPORTANT— NOTICE TO BIDDER

On the envelope submitting your bid, it is imperative:

1. That your name and address appear in the UPPER left corner.
2. That the bottom portion of this label be filled in and pasted on the LOWER left corner.

5017-102

SEALED

INVITATION NO.

DATE OF OPENING

TIME OF OPENING

A. M. P. M.

BID FOR

BID

STANDARD FORM 20
JANUARY 1961 EDITION
GENERAL SERVICES ADMINISTRAT
FED. PROC. REG. (41 CFR) 1-16.4

ERENCE

NVITATION NO. SCS-12-AZ-80

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July 15, 1980

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NAME AND LOCATION OF PROJECT

Harquahala Valley I
Saddleback Floodwat
Structure and Di
approximately 28
Buckeye, Maricop

partment of Agriculture
servation Service

BY (*Issuing office*)

Phoenix, AZ 85025

Sealed bids in single copy for the work described herein will be received until 1:00 p.m. local time at the place of bid opening, August 14, 1980

at Room 3008 - Federal Building, 230 North First Avenue, Phoenix, Arizona 85025.

and at that time publicly opened.

Information regarding bidding material, bid guarantee, and bonds

A bid guarantee in an amount not less than 20% of the total bid price must be submitted with each bid in excess of $25,000, in a form described in Clause 4 of the attached Instructions to Bidders, Standard Form 22.

If a contract is awarded in excess of $25,000, a Performance Bond and a Payment Bond on forms provided by the Government, in penal sums, 100% and 40% respectively, of the original amount of the contract, shall be furnished as provided in Clause 11 of the attached Instructions to Bidders, Standard Form 22.

The following attachments hereto form a part of the invitation for bids and any resultant contract: Bid Schedule: General Provisions - Standard Form 23-A; Special Provisions: Labor Standards Provisions - Standard Form 19-A; Disabled Veterans and Veterans of the Vietnam Era - Form AD-716; Employment of the Handicapped - Form AD-655; Standard Federal Equal Employment Opportunity Construction Contract Specifications; Supplement to OSHA Part 1926, Construction Standards and Interpretations and Specifications and Drawings listed under "Contents".

Description of work: This job consists of the construction of one floodwater retarding structure and diversion channel involving the estimated quantities shown in the attached bid schedule.

The work shall be commenced within twenty (20) calendar days and be completed within four hundred twenty seven (427) calendar days after the date of receipt of the notice.

Inspection of Job Site: Prospective bidders may assemble in the parking lot of Tonopah Joe's & Alice's Cafe, located approximately 25 miles west of Buckeye, Arizona, 5 miles north of the Palo Verde Nuclear Power Plant, off Interstate 10, on Tuesday, July 29 and Tuesday, August 5, 1980, for a group showing of the work site. The group will leave at 10:00 a.m. on each of the above days. Robert R. Koons, Project Engineer of Sergent, Hauskins & Beckwith, Consulting Soil and Foundation Engineers, will conduct the group site showing. If you are unable to attend one of the group site showings, arrangements to inspect the site may be made with Robert R. Koons, Project Engineer, Sergent, Hauskins & Beckwith, 3940 W. Clarendon, Phoenix, AZ 85019. Phone: (602) 272-6848.

U.S. GOVERNMENT PRINTING OFFICE: 1960—O-572728

STANDARD FORM 20
JANUARY 1961 EDITION
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.401

REFERENCE
INVITATION NO. SCS-12-AZ-80

INVITATION FOR BIDS
(CONSTRUCTION CONTRACT)

DATE
July 15, 1980

NAME AND LOCATION OF PROJECT
Harquahala Valley Watershed Project
Saddleback Floodwater Retarding
Structure and Diversion located
approximately 28 miles west of
Buckeye, Maricopa County, Arizona

DEPARTMENT OR AGENCY
U. S. Department of Agriculture
Soil Conservation Service

BY (*Issuing office*)
SOIL CONSERVATION SERVICE
Room 3008 - Federal Building
230 North First Avenue
Phoenix, AZ 85025

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U.S. GOVERNMENT PRINTING OFFICE: 1960—O-572728

INSTRUCTIONS TO BIDDERS

(CONSTRUCTION CONTRACT)

1. **Explanations to Bidders.**—Any explanation desired by a bidder regarding the meaning or interpretation of the invitation for bids, drawings, specifications, etc., must be requested in writing and with sufficient time allowed for a reply to reach bidders before the submission of their bids. Any interpretation made will be in the form of an amendment of the invitation for bids, drawings, specifications, etc., and will be furnished to all prospective bidders. Its receipt by the bidder must be acknowledged in the space provided on the Bid Form (Standard Form 21) or by letter or telegram received before the time set for opening of bids. Oral explanations or instructions given before the award of the contract will not be binding.

2. **Conditions Affecting the Work.**—Bidders should visit the site and take such other steps as may be reasonably necessary to ascertain the nature and location of the work, and the general and local conditions which can affect the work or the cost thereof. Failure to do so will not relieve bidders from responsibility for estimating properly the difficulty or cost of successfully performing the work. The Government will assume no responsibility for any understanding or representations concerning conditions made by any of its officers or agents prior to the execution of the contract, unless included in the invitation for bids, the specifications, or related documents.

3. **Bidder's Qualifications.**—Before a bid is considered for award, the bidder may be requested by the Government to submit a statement regarding his previous experience in performing comparable work, his business and technical organization, financial resources, and plant available to be used in performing the work.

4. **Bid Guarantee.**—Where a bid guarantee is required by the invitation for bids, failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

A bid guarantee shall be in the form of a firm commitment, such as a bid bond, postal money order, certified check, cashier's check, irrevocable letter of credit or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Bid guarantees, other than bid bonds, will be returned (*a*) to unsuccessful bidders as soon as practicable after the opening of bids, and (*b*) to the successful bidder upon execution of such further contractual documents and bonds (including any necessary coinsurance or reinsurance agreements) as may be required by the bid as accepted.

If the successful bidder, upon acceptance of his bid by the Government within the period specified therein for acceptance (sixty days if no period is specified) fails to execute such further contractual documents, if any, and give such bond(s) (including any necessary coinsurance or reinsurance agreements) as may be required by the terms of the bid as accepted within the time specified (ten days if no period is specified) after receipt of the forms by him, his contract may be terminated for default. In such event he shall be liable for any cost of procuring the work which exceeds the amount of his bid, and the bid guarantee shall be available toward offsetting such difference.

5. **Preparation of Bids.**—(*a*) Bids shall be submitted on the forms furnished, or copies thereof, and must be manually signed. If erasures or other changes appear on the forms, each erasure or change must be initialed by the person signing the bid. Unless specifically authorized in the invitation for bids, telegraphic bids will not be considered.

(*b*) The bid form may provide for submission of a price or prices for one or more items, which may be lump sum bids, alternate prices, scheduled items resulting in a bid on a unit of construction or a combination thereof, etc. Where the bid form explicitly requires that the bidder bid on all items, failure to do so will disqualify the bid. When submission of a price on all items is not required, bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.

(*c*) Unless called for, alternate bids will not be considered.

(*d*) Modification of bids already submitted will be considered if received at the office designated in the invitation for bids by the time set for opening of bids. Telegraphic modifications will be considered, but should not reveal the amount of the original or revised bid.

6. **Submission of Bids.**—Bids must be sealed, marked, and addressed as directed in the invitation for bids. Failure to do so may result in a premature opening of, or a failure to open, such bid.

7. **Withdrawal of Bids.**—Bids may be withdrawn by written or telegraphic request received from bidders prior to the time set for opening of bids. (See par. 8 regarding late withdrawals.)

STANDARD FORM 22 (Rev. 2–78)
Prescribed by GSA, FPR (41 CFR) 1–16.401

8. Late Bids, Modifications of Bids, or Withdrawal of Bids.—(*a*) Any bid received at the office designated in the soliciation after the exact time specified for receipt will not be considered unless it is received before award is made and either:

(1) It was sent by registered or certified mail not later than the fifth calendar day prior to the date specified for the receipt of bids (e.g., a bid submitted in response to a solicitation requiring receipt of bids by the 20th of the month must have been mailed by the 15th or earlier); or

(2) It was sent by mail (or 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.

(*b*) Any modification or withdrawal of a bid is subject to the same conditions as in (a), above. A bid may also be withdrawn in person by a bidder or his authorized representative, provided his identify is made known and he signs a receipt for the bid, but only if the withdrawal is made prior to the exact time set for receipt of bids.

(*c*) The only acceptable evidence to establish:

(1) The date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. Postal Service postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. If neither postmark shows a legible date, the bid, modification, or withdrawal shall be deemed to have been mailed late. (The term "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 on the date of mailing by employees of the U.S. Postal Service. Therefore, offerors should request the postal clerk to place a hand cancellation bull's-eye "postmark" on both the receipt and the envelope or wrapper.)

(2) The time of receipt at the Government installation is the time-date stamp of such installation on the bid wrapper or other documentary evidence of receipt maintained by the installation.

(*d*) Notwithstanding (a) and (b) of this provision, a late modification of an otherwise successful bid which makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

NOTE: The term "telegram" includes mailgrams.

9. Public Opening of Bids.—Bids will be publicly opened at the time set for opening in the invitation for bids. Their content will be made public for the information of bidders and others interested, who may be present either in person or by representative.

10. Award of Contract.—(*a*) Award of contract will be made to that responsible bidder whose bid, conforming to the invitation for bids is most advantageous to the Government, price and other factors considered.

(*b*) The Government may, when in its interest, reject any or all bids or waive any informality in bids received.

(*c*) The Government may accept any item or combination of items of a bid, unless precluded by the invitation for bids or the bidder includes in his bid a restrictive limitation.

11. Contract and Bonds.—The bidder whose bid is accepted will, within the time established in the bid, enter into a written contract with the Government and, if required, furnish performance and payment bonds on Government standard forms in the amounts indicated in the invitation for bids or the specifications.

☆ U.S.G.P.O.: 1979–281-187/4209

SPECIAL INSTRUCTIONS TO BIDDERS

1. Award of Contract. (a) No bid will be considered unless all items in the bid schedule are priced, and only one contract will be awarded unless otherwise stated in the invitation.

(b) The contract will be awarded based on the total bid, corrected if necessary, for errors in price extensions and/or additions. In case of error in extension price, the unit price will govern.

2. Specifications. Specifications referred to herein shall include all revisions and amendments in effect on the date of issuance of the invitation for bids. Information as to where these specifications may be obtained can be acquired from the office issuing the invitation.

3. Records. Records of the site investigations and soil mechanics testing report may be reviewed by prospective bidders by contacting the office issuing this invitation.

4. Workweek - Construction Schedule. The Contractor shall, within ten days after receipt of a written request from the Contracting Officer and prior to award, submit in writing for approval: (a) a construction schedule showing the order in which he proposes to carry on the work indicating the periods during which he will perform work on each item listed in the bid schedule: and (b) the hours and days he proposes to carry out the work. The maximum workweek that will be approved is ten hours a day, Monday through Saturday including daily starting and stopping times. Failure to submit the proposed construction schedule, and days and hours of work, within the time specified may be cause for rejection of the bid.

5. The bidder shall enter its DUNS Contractor Establishment Number in the space provided on Standard Form 21, (Rev. 2-79) Bid Form.

6. Reporting Requirements for Construction Contracts over $10,000.
(a) Standard Form 257 - Monthly Employment Utilization Report.
All prime contractors and subcontractors performing work on Federally-funded projects are required to complete Standard Form 257, listing their aggregate work force in each trade, on all projects both Federally and non-Federally funded in the Plan Area. Each prime and subcontractor must also attach a listing of all projects (both Federal and non-Federal in the Plan Area included herein). The accompanying list must provide the following information:

1. Name and location of project.
2. Owner of project (city, county, private).
3. Project number, if any.
4. Percent complete.
5. Dollar amount of Contract.
6. Estimated date of completion.

Prime contractors are responsible for collecting the Standard Form 257 and the listing of all projects (both federal and non-federal in excess of $10,000) from each of his subcontractors performing work on this project. The prime contractors will then forward their Standard Form 257 and all of their subcontractors' Standard Forms 257 and project list information to:

Associate Regional Administrator for OFCCP/ESA-O
U.S. Department of Labor
450 Golden Gate Avenue - Rm. 11435
San Francisco, California 94102

Failure to submit the Standard Form 257 by the fifth day of each month constitutes non-compliance with Executive Order 11246. Non-compliance is grounds for the issuance of a legal Show Cause Notice for an informal hearing, authorized by OFCCP Rules and Regulations 41 CFR Part 60-1.7. Such a hearing could result in cancellation, termination or suspension of the contract.

(b) Reporting Subcontractors. The prime contractor shall provide written notification to the Associate Regional Administrator of the Office of Federal Contract Compliance Programs, within 10 working days of 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 following:

1. Name of contractor.
2. Address.
3. Telephone Number.
4. Employers identification number.
5. Estimated dollar amount of subcontract.
6. Estimated starting and completion dates.
7. Geographical area in which the contract is to be performed; i.e., city, county, state, etc.

Send information to:

Associate Regional Administrator
Office of Federal Contract Compliance Programs - ESA
Department of Labor
450 Golden Gate Avenue - Rm. 11435
San Francisco, California 94102

(c) EEO-1 Reporting Requirements.

1. Each construction prime contractor and first tier subcontractor who has 50 or more employees on total corporate or company payroll and sign a direct Federal or financially-assisted contract or subcontract amounting to $50,000 or more, shall file annually in triplicate on or before the 31st day of March, complete and accurate reports on Standard Form 100 (EEO-1) to the joint Reporting Committee.

2. Each contractor or subcontractor required in paragraph 1 above shall submit an EEO-1 to the Joint Reporting Committee and shall also file an EEO-1 to the Office of Federal Contract Compliance Programs, U.S. Department of Labor, 450 Golden Gate Avenue - Rm. 11435, San Francisco, CA 94102, WITHIN 30 DAYS after award of such contract or subcontract as mentioned in paragraph 1 above, UNLESS such contractor or subcontractor has already submitted an EEO-1 report to the Joint Reporting Committee within 12 months preceding the date of award of an SCS Federal or Federally-assisted contract.

3. Failure to file timely, complete and accuarate reports as required in paragraphs 1 and 2 above constitute non-compliance with the contractors or subcontractors obligations under Executive Order 11246, as amended, and is grounds for the imposition by OFCCP of any sanctions authorized by Executive Order 11246 and other rules and regulations issued pursuant thereto.

(d) Contractors and subcontractors may obtain EEO-1 reporting forms by writing to:

Joint Reporting Committee
2401 E. Street N.W.
Washington, D.C. 20506

BID FORM
(Construction Contract)

REFERENCE

Invitation No. SCS-12-AZ-80

Read the instructions to Bidders (Standard Form 22).
This form is to be submitted in

DATE OF INVITATION

July 15, 1980

NAME AND LOCATION OF PROJECT

Harquahala Valley Watershed Project, Saddleback Floodwater Retarding Structure and Diversion located approximately 28 miles west of Buckeye, Maricopa County, Arizona.

BIDDER'S NAME AND ADDRESS *(Include ZIP Code) (Type or print)*

TELEPHONE NUMBER *(Include Area Code)*

DATE

TO: CONTRACTING OFFICER
SOIL CONSERVATION SERVICE
230 North 1st Avenue, Rm. 3008 Federal Building
Phoenix, Arizona 85025

In compliance with the above-dated invitation for bids, the undersigned hereby proposes to perform all work for

Construction of one floodwater retarding structure and diversion channel.

in strict accordance with the General Provisions (Standard Form 23–A), Labor Standards Provisions Applicable to Contracts in Excess of $2,000 (Standard Form 19–A), specifications, schedules, drawings, and conditions, for the following amount(s)

TOTAL PRICE BID:_____

NOTE:
Performance and payment bonds shall be furnished when (1) the contract award resulting from this bid exceeds $25,000, or (2) bonds are specifically required by the Invitation for Bids (Standard Form 20).

(Continue on other side)

DUNS CONTRACTOR ESTABLISHMENT NUMBER

The undersigned agrees that, upon written acceptance of this bid, mailed or otherwise furnished within calendar days (**calendar days unless a different period be inserted by the bidder) after the date of opening of bids, he will within 15 calendar days (unless a longer period is allowed) after receipt of the prescribed forms, execute Standard Form 23, Construction Contract, and give performance and payment bonds on Government standard forms with good and sufficient surety. The undersigned further agrees that, when reinsurance agreements are contemplated, all necessary reinsurance agreements will be on Government forms and will be executed and submitted with the bonds. However, when an additional period of days (not to exceed 45 calendar days) is authorized by the procuring activity, reinsurance agreements may be submitted within such period after the execution of the bond.

The undersigned agrees, if awarded the contract, to commence the work within 20 calendar days after the date of receipt of notice to proceed, and to complete the work within 427 calendar days after the date of receipt of notice to proceed.

**Bids acceptance period. Bids offering less than 60 days for acceptance by the Government from the date set for opening will be considered nonresponsive and will be rejected.

RECEIPT OF AMENDMENTS: *The undersigned acknowledges receipt of the following amendments of the invitation for bids, drawings, and/or specifications, etc. (Give number and date of each):*

AMENDMENT NO.						
DATE						
AMENDMENT NO.						
DATE						

The representations and certifications on the accompanying STANDARD FORM 19-B are made a part of this bid.

ENCLOSED IS BID GUARANTEE, CONSISTING OF	IN THE AMOUNT OF

NAME OF BIDDER *(Type or print)*	FULL NAME OF ALL PARTNERS *(Type or print)*
BUSINESS ADDRESS *(Type or print) (Include "ZIP Code")*	
BY *(Signature in ink. Type or print name under signature)*	
TITLE *(Type or print)*	

DIRECTIONS FOR SUBMITTING BIDS: *Envelopes containing bids, guarantee, etc., must be sealed, marked, and addressed as follows:*

Contracting Officer
Soil Conservation Service
230 North 1st Avenue
Room 3008 Federal Building
Phoenix, Arizona 85025

Invitation for Bids No. SCS-12-AZ-80
For opening at 1:00 p.m., local time
at the place of bid opening.

CAUTION—*Bids should not be qualified by exceptions to the bidding conditions.*

U.S. GOVERNMENT PRINTING OFFICE: 1983—383249 p-1

REPRESENTATIONS AND CERTIFICATIONS **(Construction and Architect-Engineer Contract)** **(For use with Standard Forms 19, 21 and 252)**	REFERENCE *(Enter same No.(s) as on SF 19, 21 and 252)* Invitation No. SCS-12-AZ-80
NAME AND ADDRESS OF BIDDER *(No., Street, City, State, and ZIP Code)*	DATE OF BID

In negotiated procurements, "bid" and "bidder" shall be construed to mean "offer" and "offeror."

The bidder makes the following representations and certifications as a part of the bid identified above. *(Check appropriate boxes.)*

1. SMALL BUSINESS

He ☐ is, ☐ is not, a small business concern. (A small business concern for the purpose of Government procurement is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operations in which it is bidding on Government contracts, and can further qualify under the criteria concerning number of employees, average annual receipts, or other criteria as prescribed by the Small Business Administration. For additional information see governing regulations of the Small Business Administration (13 CFR Part 121)).

2. MINORITY BUSINESS ENTERPRISE

He ☐ is, ☐ is not a minority business enterprise. A minority business enterprise is defined as a "business, at least 50 percent of which is owned by minority group members or, in case of publicly owned businesses, at least 51 percent of the stock of which is owned by minority group members." For the purpose of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American-Aleuts."

3. CONTINGENT FEE

(a) He ☐ has, ☐ has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the bidder) to solicit or secure this contract, and *(b)* he ☐ has, ☐ has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for the bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to *(a)* and *(b)* above as requested by the Contracting Officer. *(For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 41, Subpart 1-1.5.)*

4. TYPE OF ORGANIZATION

He operates as an ☐ individual, ☐ partnership, ☐ joint venture, ☐ corporation, incorporated in State of .....

5. INDEPENDENT PRICE DETERMINATION

(a) By submission of this bid, each bidder certifies, and in the case of a joint bid each party thereto certifies as to his own organization, that in connection with this procurement:

(1) The prices in this bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, in the case of a bid, or prior to award, in the case of a proposal, directly or indirectly to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition.

(b) Each person signing this bid certifies that:

(1) He is the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein and that he has not participated, and will not participate, in any action contrary to (*a*)(1) through (*a*)(3) above; or

(2) (i) He is not the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein but that he has been authorized in writing to act as agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (*a*)(1) through (*a*)(3) above, and as their agent does hereby so certify; and (ii) he has not participated, and will not participate, in any action contrary to (*a*)(1) through (*a*)(3) above.

(c) This certification is not applicable to a foreign bidder submitting a bid for a contract which requires performance or delivery outside the United States, its possessions, and Puerto Rico.

(d) A bid will not be considered for award where (*a*)(1), (*a*)(3), or (*b*) above, has been deleted or modified. Where (*a*)(2) above, has been deleted or modified, the bid will not be considered for award unless the bidder furnishes with the bid a signed statement which sets forth in detail the circumstances of the disclosure and the head of the agency, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

NOTE.—Bids must set forth full, accurate, and complete information as required by this invitation for bids (including attachments). The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

STANDARD FORM 19-B, JUNE 1976 EDITION
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.401 AND 1-16.701

THE FOLLOWING NEED BE CHECKED ONLY IF BID EXCEEDS $10,000 IN AMOUNT.

6. EQUAL OPPORTUNITY

He ☐ has, ☐ has not, participated in a previous contract or subcontract subject to the Equal Opportunity Clause herein, the clause originally contained in Section 301 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114; he ☐ has, ☐ has not, filed all required compliance reports; and representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards.

(The above representations need not be submitted in connection with contracts or subcontracts which are exempt from the equal opportunity clause.)

7. PARENT COMPANY AND EMPLOYER IDENTIFICATION NUMBER

Each bidder shall furnish the following information by filling in the appropriate blocks:

(a) Is the bidder owned or controlled by a parent company as described below? ☐ Yes ☐ No. *(For the purpose of this bid, a parent company is defined as one which either owns or controls the activities and basic business policies of the bidder. To own another company means the parent company must own at least a majority (more than 50 percent) of the voting rights in that company. To control another company, such ownership is not required; if another company is able to formulate, determine, or veto basic business policy decisions of the bidder, such other company is considered the parent company of the bidder. This control may be exercised through the use of dominant minority voting rights, use of proxy voting, contractual arrangements, or otherwise.)*

(b) If the answer to *(a)* above is "Yes," bidder shall insert in the space below the name and main office address of the parent company.

NAME OF PARENT COMPANY	MAIN OFFICE ADDRESS *(No., Street, City, State, and ZIP Code)*

(c) Bidder shall insert in the applicable space below, if he has no parent company, his own Employer's Identification Number (E.I. No.) *(Federal Social Security Number used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941)*, or, if he has a parent company, the E.I. No. of his parent company.

EMPLOYER IDENTIFICATION NUMBER OF	PARENT COMPANY	BIDDER

8. CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" 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 which 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. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certificatons from proposed subcontractors prior to the award of subcontractors exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of 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. CLEAN AIR AND WATER

(Applicable if the bid or offer exceeds $100,000, or the contracting officer has determined that orders under an indefinite quantity contract in any year will exceed $100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.)

The bidder or offeror certifies as follows:

(a) Any facility to be utilized in the performance of this proposed contract has ☐, has not ☐, been listed on the Environmental Protection Agency List of Violating Facilities.

(b) He will promptly notify the contracting officer, prior to award, of the receipt of any communication from the Director, Office of Federal Activities, Environmental Protection Agency, indicating that any facility which he proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities.

(c) He will include substantially this certification, including this paragraph (c), in every nonexempt subcontract.

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10. The bidder shall complete the following representation for all bids which exceed $10,000:

WOMAN-OWNED BUSINESS

Concern is _____is not_____a woman-owned business.

A woman-owned business is a business which is, at least, 51 percent owned, controlled, and operated by a woman or women. Controlled is defined as exercising the power to make policy decisions. Operated is defined as actively involved in the day-to-day management.

For the purposes of this definition, businesses which are publicly owned, joint stock associations, and business trusts are exempted. Exempted businesses may voluntarily represent that they are, or are not, woman-owned if this information is available.

11. The bidder shall complete the following representation for all bids which exceed $10,000:

PERCENT OF FOREIGN CONTENT

The offeror/contractor will represent (as an estimate), immediately after the award of a contract, the percent of the foreign content of item or service being procured expressed as a percent of the contract award price (accuracy within plus or minus 5 percent is acceptable).

12. By the submission of this bid, each bidder certifies that he understands and agrees to be bound by the equal opportunity requirements of Executive Order 11246, U.S. Department of Labor (OFCCP) Regulations Part 41 CFR 60-1.4 and 60-4. All of which shall be applicable throughout the performance of work under this contract and all other projects both Federally-funded and privately-funded projects in excess of $10,000. Each bidder agrees that, if awarded this contract, the bidder will include in each subcontract all of the foregoing policies and regulations.

BID SCHEDULE NO. 1

SADDLEBACK FLOODWATER RETARDING STRUCTURE

Item No.	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
1.	Clearing and Grubbing	2	146	acres	_____	_____
2.	Seeding	6	118.8	acres	_____	_____
3.	Mobilization	8	1 job	Lump sum	_____	_____
4.	Foundation Excavation, common	21	351,912	Cu.Yd.	_____	_____
5.	Channel Excavation, common	21	456,450	Cu.Yd.	_____	_____
6.	Structure Excavation, common	21	1,657	Cu.Yd.	_____	_____
7.	Structural Backfill	23	2,683	Cu. Yd.	_____	_____
8.	Earth Fill	23	687,770	Cu. Yd.	_____	_____
9.	Drain Fill	24	37,527	Cu. Yd.	_____	_____
10.	Concrete Class 4000 X	31	324.5	Cu. Yd.	_____	_____
11.	Cement	31	95	Tons	_____	_____
12.	Steel Reinforcement	34	48,567	Lbs.	_____	_____
13.	6-inch dia. drain pipe	44	1,690	Lin.Ft.	_____	_____
14.	Loose Rock Riprap	61	110	Cu. Yd.	_____	_____
15.	Slide Gate, 12" X 12"	71	2	EA	_____	_____
16.	Metalwork	81	1	Lump Sum	_____	_____
17.	Identification Sign	81	1	Lump Sum	_____	_____
18.	6' Chain Link Fence	91	62	Lin. Ft.	_____	_____
19.	4-strand barbed wire fence	92	65,250	Lin. Ft.	_____	_____
20.	Grouted Rock Riprap	200	183	Cu. Yd.	_____	_____
21.	Grouting Rock Surface	201	90	Cu. Yd.	_____	_____
22.	Surface Preparation & Cleaning	201	533	Sq. Yd.	_____	_____

Total..... $_____

BID SCHEDULE NO. 2

SADDLEBACK DIVERSION

Item No.	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
1.	Clearing & Grubbing	2	210	Acre	_____	_____
2.	Seeding	6	300	Acre	_____	_____
3.	Mobilization	8	1 Job	Lump Sum	_____	_____
4.	Channel Excavation, common	21	914,790	Cu. Yd.	_____	_____
5.	Channel Excavation, Unclassified	21	107,157	Cu. Yd.	_____	_____
6.	Structure Excavation, Common	21	11,350	Cu. Yd.	_____	_____
7.	Foundation Excavation, Common	21	12,500	Cu. Yd.	_____	_____
8.	Structure Backfill	23	7,100	Cu. Yd.	_____	_____
9.	Earth Fill	23	141,800	Cu. Yd.	_____	_____
10.	Drain Fill	24	1,810	Cu. Yd.	_____	_____
11.	Concrete Class 4000 X	31	80	Cu. Yd.	_____	_____
12.	Cement	31	23	Tons	_____	_____
13.	Steel Reinforcement	34	5,387	Lbs.	_____	_____
14.	12" dia. Reinforced Concrete Pipe	42	280	Lin. Ft.	_____	_____
15.	21" dia. Reinforced Concrete Pipe	42	70	Lin. Ft.	_____	_____
16.	6" dia. Drain Pipe	44	1,246	Lin. Ft.	_____	_____
17.	Loose Rock Riprap	61	198	Cu. Yd.	_____	_____
18.	Metal Work	81	1	Lump Sum	_____	_____
19.	Identification Sign	81	1	Lump Sum	_____	_____
20.	4-strand barbed wire fence	92	56,500	Lin. Ft.	_____	_____
21.	Grouted Rock Riprap	200	13,503	Cu. Yd.	_____	_____
				Total.....	$_____	

BID SCHEDULE NO.3

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
SADDLEBACK FRS & DIVERSION

Item No.	Work or Material	Spec. No.	Quantity	Unit	Unit Price	Amount
1.	Structure Excavation, Common	21	2,425	Cu. Yd.	$_____	$_____
2.	Structure Backfill	23	1,205	Cu. Yd.	_____	_____
3.	Earth Fill	23	7,640	Cu. Yd.	_____	_____
4.	Concrete	31	236.6	Cu. Yd.	_____	_____
5.	Steel Reinforcement	34	34,250	Lbs.	_____	_____
6.	65" X 40" Corrugated Metal Pipe Arch (Including End Sections)	51	345	Lin. Ft.	_____	_____
7.	Loose Rock Riprap	61	1,350	Cu. Yd.	_____	_____
8.	Grouted Rock Riprap	200	141	Cu. Yd.	_____	_____
9.	Pavement Replacement - Courthouse Road	400	756	Sq. Yd.	_____	_____
10.	Untreated Base - Buckeye Salome Road & 479th Ave.	400	6,145	Sq. Yd.	_____	_____

Total....$_____

GENERAL PROVISIONS

(Construction Contract)

1. DEFINITIONS

(a) The term "head of the agency" or "Secretary" as used herein means the Secretary, the Under Secretary, any Assistant Secretary, or any other head or assistant head of the executive or military department or other Federal agency; and the term "his duly authorized representative" means any person or persons or board (other than the Contracting Officer) authorized to act for the head of the agency or the Secretary.

(b) The term "Contracting Officer" as used herein means the person executing this contract on behalf of the Government and includes a duly appointed successor or authorized representative.

2. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the work a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy either in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at his own risk and expense. The Contracting Officer shall furnish from time to time such detail drawings and other information as he may consider necessary, unless otherwise provided.

3. CHANGES

(a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make any change in the work within the general scope of the contract, including but not limited to changes:

(1) In the specifications (including drawings and designs);

(2) In the method or manner of performance of the work;

(3) In the Government-furnished facilities, equipment, materials, services, or site; or

(4) Directing acceleration in the performance of the work.

(b) Any other written order or an oral order (which terms as used in this paragraph (b) shall include direction, instruction, interpretation, or determination) from the Contracting Officer, which causes any such change, shall be treated as a change order under this clause, provided that the Contractor gives the Contracting Officer written notice stating the date, circumstances, and source of the order and that the Contractor regards the order as a change order.

(c) Except as herein provided, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment hereunder.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any order, an equitable adjustment shall be made and the contract modified in writing accordingly: *Provided, however,* That except for claims based on defective specifications, no claim for any change under (b) above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as therein required: *And provided further,* That in the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with such defective specifications.

(e) If the Contractor intends to assert a claim for an equitable adjustment under this clause, he must, within 30 days after receipt of a written change order under (a) above or the furnishing of a written notice under (b) above, submit to the Contracting Officer a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended by the Government. The statement of claim hereunder may be included in the notice under (b) above.

(f) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

4. DIFFERING SITE CONDITIONS

(a) The Contractor shall promptly, and before such conditions are disturbed, notify the Contracting Officer in writing of: (1) Subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this contract. The Contracting Officer shall promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly.

(b) No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in (a) above; provided, however, the time prescribed therefor may be extended by the Government.

(c) No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

5. TERMINATION FOR DEFAULT—DAMAGES FOR DELAY—TIME EXTENSIONS

(a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within such time, the Government may, by written notice to the Contractor, terminate his right to proceed with the work or such part of the work as to which there has been delay. In such event the Government may take over the work and prosecute the same to completion, by contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefor. Whether or not the Contractor's right to proceed with the work is terminated, he and his sureties shall be liable for any damage to the Government resulting from his refusal or failure to complete the work within the specified time.

(b) If fixed and agreed liquidated damages are provided in the contract and if the Government so terminates the Contractor's right to proceed, the resulting damage will consist of such 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.

(c) If fixed and agreed liquidated damages are provided in the contract and if the Government does not so terminate the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until the work is completed or accepted.

(d) The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:

(1) The delay in the completion of the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of the public enemy, acts of the Government in either its sovereign or contractual capacity, acts of another contractor in the performance of a contract with the Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and such subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any such delay (unless the Contracting Officer grants a further period of time before the date of final payment

under the contract), notifies the Contracting Officer in writing of the causes of delay.

The Contracting Officer shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in his judgment, the findings of fact justify such an extension, and his findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in Clause 6 of these General Provisions.

(e) If, after notice of termination of the Contractor's right to proceed under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for convenience of the Government, be the same as if the notice of termination had been issued pursuant to such clause. If, in the foregoing circumstances, this contract does not contain a clause providing for termination for convenience of the Government, the contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly; failure to agree to any such adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes."

(f) The rights and remedies of the Government provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

(g) As used in Paragraph (d) (1) of this clause, the term "subcontractors or suppliers" means subcontractors or suppliers at any tier.

6. DISPUTES

(a) Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the head of the agency involved. The decision of the head of the agency or his duly authorized representative for the determination of such appeals shall be final and conclusive. This provision shall not be pleaded in any suit involving a question of fact arising under this contract as limiting judicial review of any such decision to cases where fraud by such official or his representative or board is alleged: *Provided, however*, That any such decision shall be final and conclusive unless the same is fraudulent or capricious or arbitrary or so grossly erroneous as necessarily to imply bad faith or is not supported by substantial evidence. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of his appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

(b) This Disputes clause does not preclude consideration of questions of law in connection with decisions provided for in paragraph (a) above. Nothing in this contract, however, shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

7. PAYMENTS TO CONTRACTOR

(a) The Government will pay the contract price as hereinafter provided.

(b) The Government will make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates approved by the Contracting Officer. If requested by the Contracting Officer, the Contractor shall furnish a breakdown of the total contract price showing the amount included therein for each principal category of the work, in such detail as requested, to provide a basis for determining progress payments. In the preparation of estimates the Contracting Officer, at his discretion, may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site may also be taken into consideration (1) if such consideration is specifically authorized by the contract and (2) if the Contractor furnishes satisfactory evidence that he has acquired title to such material and that it will be utilized on the work covered by this contract.

(c) In making such progress payments, there shall be retained 10 percent of the estimated amount until final completion and acceptance of the contract work. However, if the Contracting Officer, at any time after 50 percent of the work has been completed, finds that satisfactory progress is being made, he may authorize payment in full of each progress payment for work performed beyond the 50 percent stage of completion. Also, whenever the work is substantially complete, the Contracting Officer, if he considers the amount retained to be in excess of the amount adequate for the protection of the Government, at his discretion, may release to the Contractor all or a portion of such excess amount. Furthermore, on completion and acceptance of each separate building, public work, or other division of the contract, on which the price is stated separately in the contract, payment may be made therefor without retention of a percentage.

(d) All material and work covered by progress payments made shall thereupon become the sole property of the Government, but this provision shall not be construed as relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work. or as waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(e) Upon completion and acceptance of all work, the amount due the Contractor under this contract shall be paid upon the presentation of a properly executed voucher and after the Contractor shall have furnished the Government with a release of all claims against the Government arising by virtue of this contract, other than claims in stated amounts as may be specifically excepted by the Contractor from the operation of the release. If the Contractor's claim to amounts payable under the contract has been assigned under the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), a release may also be required of the assignee.

8. ASSIGNMENT OF CLAIMS

(a) Pursuant to the provisions of the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), if this contract provides for payments aggregating $1,000 or more, claims for moneys due or to become due the Contractor from the Government under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party, except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Unless otherwise provided in this contract, payments to an assignee of any moneys due or to become due under this contract shall not, to the extent provided in said Act, as amended, be subject to reduction or setoff. (The preceding sentence applies only if this contract is made in time of war or national emergency as defined in said Act; and is with the Department of Defense, the General Services Administration, the Energy Research and Development Administration, the National Aeronautics and Space Administration, the Federal Aviation Administration, or any other department or agency of the United States designated by the President pursuant to Clause 4 of the proviso of section 1 of the Assignment of Claims Act of 1940, as amended by the Act of May 15, 1951, 65 Stat. 41.)

(b) In no event shall copies of this contract or of any plans, specifications, or other similar documents relating to work under this contract, if marked "Top Secret," "Secret," or "Confidential," be furnished to any assignee of any claim arising under this contract or to any other person not entitled to receive the same. However, a copy of any part or all of this contract so marked may be furnished, or any information contained therein may be disclosed, to such assignee upon the prior written authorization of the Contracting Officer.

9. MATERIAL AND WORKMANSHIP

(a) Unless otherwise specifically provided in this contract, all equipment, material, and articles incorporated in the work covered by this contract are to be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in this contract, reference to any equipment, material, article, or patented process, by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor may, at his option, use any equipment, material, article, or process, which, in the judgment of the Contracting Officer, is equal to that named. The Contractor shall furnish to the Contracting Officer for his approval the name of the manufacturer, the model number,

and other identifying data and information respecting the performance, capacity, nature, and rating of the machinery and mechanical and other equipment which the Contractor contemplates incorporating in the work. When required by this contract or when called for by the Contracting Officer, the Contractor shall furnish the Contracting Officer for approval full information concerning the material or articles which he contemplates incorporating in the work. When so directed, samples shall be submitted for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles installed or used without required approval shall be at the risk of subsequent rejection.

(b) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may, in writing, require the Contractor to remove from the work any employee the Contracting Officer deems incompetent, careless or otherwise objectionable.

10. INSPECTION AND ACCEPTANCE

(a) All work (which term includes but is not restricted to materials, workmanship, and manufacture and fabrication of components) shall be subject to inspection and test by the Government at all reasonable times and at all places prior to acceptance. Any such inspection and test is for the sole benefit of the Government and shall not relieve the Contractor of the responsibility of providing quality control measures to assure that the work strictly complies with the contract requirements. No inspection or test by the Government shall be construed as constituting or implying acceptance. Inspection or test shall not relieve the Contractor of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of the Government after acceptance of the completed work under the terms of paragraph (f) of this clause, except as hereinabove provided.

(b) The Contractor shall, without charge, replace any material or correct any workmanship found by the Government not to conform to the contract requirements, unless in the public interest the Government consents to accept such material or workmanship with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(c) If the Contractor does not promptly replace rejected material or correct rejected workmanship, the Government (1) may, by contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the Contractor, or (2) may terminate the Contractor's right to proceed in accordance with the clause of this contract entitled "Termination for Default—Damages for Delay—Time Extensions."

(d) The Contractor shall furnish promptly, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspection and test as may be required by the Contracting Officer. All inspection and test by the Government shall be performed in such manner as not unnecessarily to delay the work. Special, full size, and performance tests shall be performed as described in this contract. The Government reserves the right to charge to the Contractor any additional cost of inspection or test when material or workmanship is not ready at the time specified by the Contractor for inspection or test or when reinspection or retest is necessitated by prior rejection.

(e) Should it be considered necessary or advisable by the Government at any time before acceptance of the entire work to make an examination of work already completed, by removing or tearing out same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work if found to meet the requirements of the contract, an equitable adjustment shall be made in the contract price to compensate the Contractor for the additional services involved in such examination and reconstruction and, if completion of the work has been delayed thereby, he shall, in addition, be granted a suitable extension of time.

(f) Unless otherwise provided in this contract, acceptance by the Government shall be made as promptly as practicable after completion and inspection of all work required by this contract, or that portion of the work that the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except as regards latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Government's rights under any warranty or guarantee.

11. SUPERINTENDENCE BY CONTRACTOR

The Contractor, at all times during performance and until the work is completed and accepted, shall give his personal superintendence to the work or have on the work a competent superintendent, satisfactory to the Contracting Officer and with authority to act for the Contractor.

12. PERMITS AND RESPONSIBILITIES

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any applicable Federal, State, and municipal laws, codes, and regulations, in connection with the prosecution of the work. He shall be similarly responsible for all damages to persons or property that occur as a result of his fault or negligence. He shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. He shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire construction work, except for any completed unit of construction thereof which theretofore may have been accepted.

13. CONDITIONS AFFECTING THE WORK

The Contractor shall be responsible for having taken steps reasonably necessary to ascertain the nature and location of the work, and the general and local conditions which can affect the work or the cost thereof. Any failure by the Contractor to do so will not relieve him from responsibility for successfully performing the work without additional expense to the Government. The Government assumes no responsibility for any understanding or representations concerning conditions made by any of its officers or agents prior to the execution of this contract, unless such understanding or representations by the Government are expressly stated in the contract.

14. OTHER CONTRACTS

The Government may undertake or award other contracts for additional work, and the Contractor shall fully cooperate with such other contractors and Government employees and carefully fit his own work to such additional work as may be directed by the Contracting Officer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor or by Government employees.

15. SHOP DRAWINGS

(a) The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract.

(b) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate his approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate his approval or disapproval of the shop drawings and if not approved as submitted shall indicate his reasons therefor. Any work done prior to such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (c) below.

(c) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation(s), he shall issue an appropriate contract modification, except that, if the variation is minor and does not involve a change in price or in time of performance, a modification need not be issued.

16. USE AND POSSESSION PRIOR TO COMPLETION

The Government shall have the right to take possession of or use any completed or partially completed part of the work. Prior to such possession or use, the Contracting Officer shall furnish the Contractor an itemized list of work remaining to be performed or corrected on such portions of the project as are to be possessed or used by the Government, provided that failure to list any item of work shall not relieve the Contractor of responsibility for compliance with the terms of the

contract. Such possession or use shall not be deemed an acceptance of any work under the contract. While the Government has such possession or use, the Contractor, notwithstanding the provisions of the clause of this contract entitled "Permits and Responsibilities," shall be relieved of the responsibility for the loss or damage to the work resulting from the Government's possession or use. If such prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment in the contract price or the time of completion will be made and the contract shall be modified in writing accordingly.

17. SUSPENSION OF WORK

(a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as he may determine to be appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Contracting Officer in the administration of this contract, or by his failure to act within the time specified in this contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent (1) that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or (2) for which an equitable adjustment is provided for or excluded under any other provision of this contract.

(c) No claim under this clause shall be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of such suspension, delay, or interruption, but not later than the date of final payment under the contract.

18. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT

If not physically incorporated elsewhere, the clause in Section 1–8.703 of the Federal Procurement Regulations, or paragraph 7–602.29(a) of the Armed Services Procurement Regulation, as applicable, in effect on the date of this contract is hereby incorporated by reference as fully as if set forth at length herein.

19. PAYMENT OF INTEREST ON CONTRACTORS' CLAIMS

(a) If an appeal is filed by the Contractor from a final decision of the Contracting Officer under the Disputes clause of this contract, denying a claim arising under the contract, simple interest on the amount of the claim finally determined owed by the Government shall be payable to the Contractor. Such interest shall be at the rate determined by the Secretary of the Treasury pursuant to Public Law 92–41, 85 Stat. 97, from the date the Contractor furnishes to the Contracting Officer his written appeal under the Disputes clause of this contract, to the date of (1) a final judgment by a court of competent jurisdiction, or (2) mailing to the Contractor of a supplemental agreement for execution either confirming completed negotiations between the parties or carrying out a decision of a board of contract appeals.

(b) Notwithstanding (a) above, (1) interest shall be applied only from the date payment was due, if such date is later than the filing of appeal; and (2) interest shall not be paid for any period of time that the Contracting Officer determines the Contractor has unduly delayed in pursuing his remedies before a board of contract appeals or a court of competent jurisdiction.

20. PRICING OF ADJUSTMENTS

When costs are a factor in any determination of a contract price adjustment pursuant to the Changes clause or any other provision of this contract, such costs shall be in accordance with the contract cost principles and procedures in Part 1–15 of the Federal Procurement Regulations, (41 CFR 1–15) or Section XV of the Armed Services Procurement Regulation, as applicable, which are in effect on the date of this contract.

21. PATENT INDEMNITY

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and employees against liability, including costs and expenses, for infringement upon any Letters Patent of the United States (except Letters Patent issued upon an application which is now or may hereafter be, for reasons of national security, ordered by the Government to be kept secret or otherwise withheld from issue) arising out of the performance of this contract or out of the use or disposal by or for the account of the Government of supplies furnished or construction work performed hereunder.

22. ADDITIONAL BOND SECURITY

If any surety upon any bond furnished in connection with this contract becomes unacceptable to the Government, or if any such surety fails to furnish reports as to his financial condition from time to time as requested by the Government, or if the contract price is increased to such an extent that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the Government and of persons supplying labor or materials in the prosecution of the work contemplated by this contract.

23. EXAMINATION OF RECORDS BY COMPTROLLER GENERAL

(a) This clause is applicable if the amount of this contract exceeds $10,000 and was entered into by means of negotiation, including small business restricted advertising, but is not applicable if this contract was entered into by means of formal advertising.

(b) The contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of 3 years after final payment under this contract or such lesser time specified in either Appendix M of the Armed Services Procurement Regulation or the Federal Procurement Regulations Part 1–20, as appropriate, have access to and the right to examine any directly pertinent books, documents, papers, and records of the contractor involving transactions related to this contract.

(c) The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of 3 years after final payment under the subcontract or such lesser time specified in either Appendix M of the Armed Services Procurement Regulation or the Federal Procurement Regulations Part 1–20, as appropriate, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used in this clause excludes (1) purchase orders not exceeding $10,000 and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

(d) The periods of access and examination described in (b) and (c), above, for records which relate to (1) appeals under the "Disputes" clause of this contract, (2) litigation or the settlement of claims arising out of the performance of this contract, or (3) costs and expenses of this contract as to which exception has been taken by the Comptroller General or any of his duly authorized representatives, shall continue until such appeals, litigation, claims, or exceptions have been disposed of.

24. BUY AMERICAN

(a) *Agreement.* In accordance with the Buy American Act (41 U.S.C. 10a–10d), and Executive Order 10582, December 17, 1954 (3 CFR, 1954–58 Comp., p. 230), as amended by Executive Order 11051, September 27, 1962 (3 CFR, 1959–63 Comp., p. 635), the Contractor agrees that only domestic construction material will be used (by the Contractor, subcontractors, materialmen, and suppliers) in the performance of this contract, except for nondomestic material listed in the contract.

(b) *Domestic construction material.* "Construction material" means any article, material, or supply brought to the construction site for incorporation in the building or work. An unmanufactured construction material is a "domestic construction material" if it has been mined or produced in the United States. A manufactured construction material is a "domestic construction material" if it has been manufactured in the United States and if the cost of its components which have been mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. "Component" means any article, material, or supply directly incorporated in a construction material.

(c) *Domestic component.* A component shall be considered to have been "mined, produced, or manufactured in the

United States" (regardless of its source in fact) if the article, material, or supply in which it is incorporated was manufactured in the United States and the component is of a class or kind determined by the Government to be not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality.

25. EQUAL OPPORTUNITY

(The following clause is applicable unless this contract is exempt under the rules, regulations, and relevant orders of the Secretary of Labor (41 CFR, ch. 60).)

During the performance of this contract, the Contractor agrees as follows:

(a) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this Equal Opportunity clause.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(c) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the contractor's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Contractor's noncompliance with the Equal Opportunity clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The Contractor will include the provisions of paragraphs (a) through (g) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action will respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however*, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

26. COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

27. OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress or resident Commissioner shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

28. CONVICT LABOR

In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment at hard labor except as provided by Public Law 89–176, September 10, 1965 (18 U.S.C. 4082(c)(2)) and Executive Order 11755, December 29, 1973.

29. UTILIZATION OF SMALL BUSINESS CONCERNS

(a) It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with small business concerns.

(b) The Contractor agrees to accomplish the maximum amount of subcontracting to small business concerns that the Contractor finds to be consistent with the efficient performance of this contract.

30. UTILIZATION OF MINORITY BUSINESS ENTERPRISES

(a) It is the policy of the Government that minority business enterprises shall have the maximum practicable opportunity to participate in the performance of Government contracts.

(b) The Contractor agrees to use his best efforts to carry out this policy in the award of his subcontracts to the fullest extent consistent with the efficient performance of this contract. As used in this contract, the term "minority business enterprise" means a business, at least 50 percent of which is owned by minority group members or, in case of publicly-owned businesses, at least 51 percent of the stock of which is owned by minority group members. For the purposes of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American-Indians, American-Eskimos, and American-Aleuts. Contractors may rely on written representations by subcontractors regarding their status as minority business enterprises in lieu of an independent investigation.

31. FEDERAL, STATE, AND LOCAL TAXES

(a) Except as may be otherwise provided in this contract, the contract price includes all applicable Federal, State and local taxes and duties.

(b) Nevertheless, with respect to any Federal excise tax or duty on the transactions or property covered by this contract, if a statute, court decision, written ruling, or regulation takes effect after the contract date, and—

(1) Results in the Contractor being required to pay or bear the burden of any such Federal excise tax or duty or increase in the rate thereof which would not otherwise have been payable on such transactions or property, the contract price shall be increased by the amount of such tax or duty or rate increase: *Provided*, That the Contractor if requested by the Contracting Officer, warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price as a contingency reserve or otherwise; or

(2) Results in the Contractor not being required to pay or bear the burden of, or in his obtaining a refund or drawback of, any such Federal excise tax or duty which would otherwise have been payable on such transactions or property or which was the basis of an increase in the contract price, the contract price shall be decreased by the amount of the relief, refund, or drawback, or that amount shall be paid to the Government, as directed by the Contracting Officer. The contract price shall be similarly decreased if the Contractor, through his fault or negligence or his failure to follow instructions of the Contract-

ing Officer, is required to pay or bear the burden of, or does not obtain a refund or drawback of, any such Federal excise tax or duty.

(c) No adjustment pursuant to paragraph b above will be made under this contract unless the aggregate amount thereof is or may reasonably be expected to be over $100.00.

(d) As used in paragraph b above, the term "contract date" means the date set for the bid opening, or if this is a negotiated contract, the date of this contract. As to additional supplies or services procured by modification to this contract, the term "contract date" means the date of such modification.

(e) Unless there does not exist any reasonable basis to sustain an exemption, the Government, upon request of the Contractor, without further liability, agrees, except as otherwise provided in this contract, to furnish evidence appropriate to establish exemption from any tax which the Contractor warrants in writing was excluded from the contract price. In addition, the Contracting Officer may furnish evidence to establish exemption from any tax that may, pursuant to this Clause, give rise to either an increase or decrease in the contract price. Except as otherwise provided in this contract, evidence appropriate to establish exemption from duties will be furnished only at the discretion of the Contracting Officer.

(f) The Contractor shall promptly notify the Contracting Officer of matters which will result in either an increase or decrease in the contract price, and shall take action with respect thereto as directed by the Contracting Officer.

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SPECIAL PROVISIONS

1. LAND RIGHTS

(a) Adequate land rights needed in order to perform the work under this contract have been acquired by or on behalf of the Government. The right to enter, remove, or otherwise make use of adjacent property, roads, utility lines, fences, and other improvements not included within the land rights provided shall be the sole responsibility of the Contractor.

(b) Where ingress and egress is not defined on the drawings, the Contracting Officer shall designate the right-of-way to be used.

2. RECORDS OF TEST PITS AND BORINGS

The Government does not represent that the available records show completely the existing conditions and does not guarantee any interpretation of these records. The Contractor assumes all responsibility for deductions and conclusions as to the nature of rock and other materials to be excavated, the difficulties of making and maintaining the required excavations and of doing other work affected by the geology of the site of the work, and for the final preparation of the foundations for the spillway, dikes and other structures.

3. MATERIALS TO BE FURNISHED BY THE CONTRACTOR

(a) Unless otherwise specified in this contract, the Contractor shall furnish all materials required for the completion of the contract.

(b) Unless otherwise waived in writing by the Contracting Officer, the Contractor shall furnish the Government with certifications dated and signed by the manufacturer and/or supplier to the effect that the items listed therein meet the requirements of this contract. Such certifications shall be furnished prior to the use of the material in any part of the construction and shall identify the project on which the material is to be used.

4. WATER

Unless otherwise specified in this contract, the Contractor shall provide and maintain at his own expense an adequate supply of water suitable for construction purposes.

5. ACCIDENT PREVENTION AND SAFETY MEASURES

The contractor shall comply with OSHA Part 1926, Construction Standards and Interpretations, in effect on the date of issuance of the invitation for bids and the Soil Conservation Service Supplement to OSHA, which is made a part of the contract.

6. WORKWEEK - CONSTRUCTION SCHEDULE

(a) Unless furnished prior to contract award, the Contractor shall, prior to commencement of work, submit to the Contracting Officer for approval (1) a construction schedule showing the order in which he proposes to carry on the work indicating the periods during which he will perform work on each item listed in the bid schedule; and (2) the hours and days in which he proposes to carry on the work.

(b) If, in the opinion of the Contracting Officer, the Contractor falls behind the approved construction schedule, the Contractor shall take such steps as may be necessary to improve his progress and the Contracting Officer may require him to either increase the number of shifts, days or hours of work, or the amount of construction plant, or all of them, and to submit for approval of such revised construction schedule as may be deemed necessary to show the manner in which the agreed rate of progress will be regained, all without additional cost to the Government. If the Contractor fails to submit a revised construction schedule within the time specified by the Contracting Officer, the Contracting Officer may withhold approval of progress payments and/or take such other actions as provided in this contract until such time as the Contractor submits the required construction schedule.

(c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for determination by the Contracting Officer that the Contractor is not prosecuting the work with such diligence as will insure completion within the time specified. Upon such determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part thereof, in accordance with Clause 5 of the General Provisions.

7. SUBCONTRACTORS

(a) Work shall not be subcontracted in whole or in part without the prior

written approval of the Contracting Officer. The request shall be in writing with the name of the proposed subcontractor and a description of the work to be done.

(b) If at any time the Contracting Officer determines that any subcontractor is incompetent or undesirable, he shall notify the Contractor accordingly and the Contractor shall take immediate steps for cancellation of the subcontract.

(c) Subcontracting by subcontractors shall be subject to the above requirements.

(d) Nothing contained in this contract shall create any contractual relationship between any subcontractor and the Government.

8. SURVEYS

(a) Unless otherwise stated in the Invitation for Bids, only the basic staking shall be done by the Government. If the Government does the staking, the Contractor shall notify the Contracting Officer in advance of any staking required in order that such work can be properly scheduled.

(b) Bench marks shall be preserved by the Contractor, and in the case of their destruction or removal by him or his employees they shall be replaced by the Government at the Contractor's expense.

(c) Survey stakes destroyed or removed by the carelessness of the Contractor or his employees shall be replaced by the Government at the Contractor's expense. Stakes removed or destroyed in the due course of the work shall be replaced by the Government without cost to the Contractor.

(d) If the Contractor finds any errors or omissions in the layout as given by survey points or staking, he shall immediately inform the Contracting Officer, in writing.

9. CLEANUP WORK

(a) During construction the Contractor shall keep the worksite, areas adjacent to the worksite and access roads in an orderly condition, free and clear from debris and discarded materials. Care shall be taken to prevent spillage when hauling is being done. Any spillage or debris resulting from the Contractor's operations shall be immediately removed.

(b) Upon completion of the work the Contractor shall remove from the worksite, areas adjacent to the worksite and access roads: all plant, buildings, debris, unused materials, concrete forms and other material belonging to him or used under his direction during the construction. He shall grade all access roads, other than public, removing wheel tracks and smoothing up such roads.

10. WEATHER

(a) The Contracting Officer may order suspension of the work in whole or in part, commencing with the day after receipt of the Notice to Proceed by the Contractor, due to weather or the effects of weather at the site, for such time as he considers it unfavorable for satisfactory prosecution of the work.

(b) When the Contracting Officer orders suspension under (a) of this clause, the contract completion date shall be extended a full calendar day for each calendar day during suspension of the work if:

(1) All work is suspended except minor items as may be designated in this contract (work of an emergency, protective or maintenance nature may be performed at any time); and

(2) The hours lost in any one workday of the authorized workweek through suspension equal one-half or more of the hours of an authorized workday.

(c) If the Contracting Officer orders suspension of work as provided in (b) of this clause and the hours lost in the workday immediately preceding a nonworkday equal one-half or more of the hours in an authorized workday, the contract completion date shall be extended a full calendar day for each nonworkday during suspension of the work.

(d) When the Contracting Officer orders any suspension of the work under this clause, the Contractor shall not be entitled to any cost or damages resulting from such suspension.

(e) When the contract completion date is extended under this clause, the contract shall be modified in writing accordingly.

11. NONCOMPLIANCE WITH CONTRACT REQUIREMENTS

(a) The Contracting Officer may order suspension of the work in whole or in part for such time as he deems necessary because of the failure of the Contractor to comply with any of the requirements of this contract, and the completion date shall not be extended on account of any such suspension of the work.

(b) When the Contracting Officer orders any suspension of the work under (a) of this clause, the Contractor shall not be entitled to any costs or damages resulting from such suspension.

(c) The rights and remedies of the Government provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

12. QUANTITY VARIATIONS

(a) Where the quantity of work shown for an item in the bid schedule, including any modification thereof, is estimated, no adjustment of the contract price nor of the performance time shall be made for overruns or underruns which are within 25 percent of the estimated quantity of any such item.

(b) For overruns of more than 25 percent, the Contracting Officer shall re-estimate the quantity for the item, establish an equitable contract price for the overrun of more than 25 percent, adjust contract performance time equitably, and modify the contract in writing accordingly; this clause to thereafter be applicable to the total re-estimated item quantity.

(c) For underruns of more than 25 percent, the Contracting Officer shall determine the quantity for the item, establish an equitable contract price therefor, adjust contract performance time equitably, and modify the contract in writing accordingly.

13. LIQUIDATED DAMAGES

If the work, or any part thereof, is not completed within the time agreed upon in this contract or any extension thereof, the Contractor shall be liable to the Government in the amount of $2,040.00 per day for each and every calendar day the completion of the work is delayed beyond the time provided in this contract, as fixed and agreed liquidated damages and not as a penalty; and the Government shall have the right to deduct from and retain out of moneys which may be then due or which may become due and payable to the Contractor, the amount of such liquidated damages; and if the amount so retained by the Government is insufficient to pay in full such liquidated damages, the Contractor shall pay to the Government the amount necessary to effect payment in full of such liquidated damages.

14. WATER AND VEGETATIVE QUALITY

(a) Water quality - the Contractor is required to adhere to the "Policy on Construction and Related Activities in Water" adopted April 13, 1977 by the "Water Quality Control Council" of Arizona. The Contractor is required to be responsible for protecting water from pollution with fuels, oils, bituminous, calcium chloride and other harmful materials, and for scheduling operations so as to avoid or minimize muddying and silting of the water. Methods for preventing water pollution include:

(1) Isolation of the construction area and diverting of surface water by sand dikes.

(2) Pumping or draining of water from the construction area into settling ponds before returning it to the water.

(3) Minimizing operation of mechanized equipment in channel water.

(4) Establishing turn areas, roads, paving areas, temporary building sites, etc., at locations best suited to prevent contamination of water or the destruction of game or fish habitat.

(5) Providing tanks or barrels to dispose of chemical pollutants including crankcase oil, transmission grease or oil, greases, soaps, etc. All disposal containers shall be removed from the site after construction and placed where pollutants will not later enter a live stream.

(6) Returning the flow of streams as nearly as possible to its location prior to construction.

(7) Removal of road ramps used for access to the construction areas.

(b) Vegetative quality - the contractor is to be responsible for protecting the vegetative quality of the work area. Methods for the protection include:

(1) Placing equipment yards in approved areas.

(2) Providing access to work sites by approved routes that will cause the least erosion and require the removal of a minimum amount of trees.

(3) Operating mechanized equipment at the job site in a manner that will avoid removal of trees other than those necessary for construction of the measure.

(4) Limiting the clearing of borrow or quarry areas to that size necessary to obtain materials and operate equipment.

15. MINOR ITEMS OF WORK

The following bid items are designated as minor items of work. These items may be performed without charge to performance time during periods when all other work is suspended if such items are excepted in the suspend work order:

Bid Schedule No. 1

Item No. 1 Clearing and Grubbing

Item No. 3 Mobilization

Bid Schedule No. 2

Item No. 1 Clearing and Grubbing

Item No. 3 Mobilization

16. QUANTITIES OF WORK AND MATERIALS

The quantities listed in the bid schedule on which unit prices are requested are estimates only. See clause title "Quantity Variations" of these Special Provisions.

17. PERFORMANCE OF WORK BY CONTRACTOR

The Contractor shall perform on this site, and with his own organization, work equivalent to at least twenty percent (20%) of the total amount of work to be performed under the contract. If during the progress of the work hereunder, the Contractor requests a reduction in such percentage, and the Contracting Officer determines that it would be of advantage to the Government, the percentage of work required to be performed by the Contractor may be reduced with the written approval of the Contracting Officer.

18. SUBCONTRACTS

(The provisions of this clause do not apply to firm fixed-priced and fixed price with escalation (economic price adjustment) contracts. The clause does apply to new subcontracts or modifications of existing subcontracts which are necessitated because of unpriced contract changes pursuant to the Changes clause of other provisions of this contract.)

(a) As used in this clause, the term "subcontract" includes purchase orders.

(b) The Contractor shall notify the Contracting Officer reasonably in advance of entering into any subcontract if the Contractor's procurement system has not been approved by the Contracting Officer and if the subcontract:

(1) Is to be a cost-reimbursement, time and materials, or labor-hour contract which it is estimated will involve an amount in excess of ten thousand dollars ($10,000) including any fee;

(2) Is proposed to exceed one hundred thousand dollars ($100,000); or

(3) Is one of a number of subcontracts, under this contract, with a single subcontractor for the same or related supplies or services which, in the aggregate, are expected to exceed one hundred thousand dollars ($100,000).

(c) The advance notification required by paragraph (b) above shall include:

(1) A description of the supplies or services to be called for by the subcontract;

(2) Identification of the proposed subcontractor and an explanation of why and how the proposed subcontractor and an explanation of why and how the proposed subcontractor was selected, including the competition obtained;

(3) The proposed subcontract price, together with the Contractor's cost or price analysis thereof;

(4) The subcontractor's current, complete, and accurate cost of pricing data and Certificate of Current Cost of Pricing Data, when such data and certificates are required by other provisions of this contract to be obtained from the subcontractor;

(5) Identification of the type of subcontract to be used;

(6) A memorandum of negotiation which sets forth the principal elements of the subcontract price negotiations. A copy of this memorandum shall be retained in the Contractor's file for use of Government reviewing authorities. The memorandum shall be in sufficient detail to reflect the most significant considerations controlling the establishment of initial or revised prices. The memorandum should include an explanation of why cost or pricing data was, or was not required, and, if it was not required in the case of any

price negotiation in excess of $100,000, a statement of the basis for determining that the price resulted from or was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation. If cost or pricing data was required, the memorandum shall reflect the extent to which reliance was not placed upon the factual cost or pricing data submitted and the extent to which this data was not used by the Contractor in determining the total price objective and in negotiating the final price. The memorandum shall also reflect the extent to which it was recognized in the negotiation that any cost or pricing data submitted by the subcontractor was not accurate, complete, or current; the action taken by the Contractor and the subcontractor as a result; and the effect, if any, of such defective data on the total price negotiated. Where the total price negotiated differs significantly from the Contractor's total price objective, the memorandum shall explain this difference;

(7) When incentives are used, the memorandum of negotiation shall contain an explanation of the incentive fee profit plan identifying each critical performance element, management decisions used to quantify each incentive element, reasons for incentives on particular performance characteristics, and a brief summary of trade-off possibilities considered as to cost, performance, and time; and

(8) The Subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract to be obtained from the subcontractor.

(d) The Contractor shall not enter into any subcontract for which advance notification to the Contracting Officer is required by this clause, without the prior written consent of the Contracting Officer; Provided that the Contracting Officer in his discretion, may ratify in writing any subcontract. Such ratification shall constitute the consent of the Contracting Officer required by this paragraph.

(e) Neither consent by the Contracting Officer to any subcontract or any provisions thereof nor approval of the Contractor's procurement system shall be construed to be a determination of the acceptability of any subcontract price or of any amount paid under any subcontract of to relieve the Contractor of any responsibility for performing this contract, unless such approval or consent specifically provides otherwise.

(f) The Contractor agrees that no subcontract placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis.

19. CLEAN AIR AND WATER

(Applicable only if the contract exceeds $100,000, or the Contracting Officer has determined that orders under an indefinite quantity contract in any one year will exceed $100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal

Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or the contract is not otherwise exempt.)

(a) The Contractor agrees as follows:

(1) To comply with all the requirements of section 114 of the Clean Air Act as amended (42 U.S.C. 1857 et seq., as amended by Pub. L. 91-604) and section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq., as amended by Publ. L. 92-500), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this contract.

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date when this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use his best efforts to comply with clean air standards and clean water standards at the facility in which the contract is being performed.

(4) To insert the substance of the provisions of this clause into any nonexempt subcontract, including this paragraph (a)(4).

(b) The terms used in this clause have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub. L. 91-604).

(2) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub. L. 92-500).

(3) The term "clean air standards" means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110(d) of the Clean Air Act (42 U.S.C. 1857c-5(d)), an approved implementation procedure or plan under section 111(c) or section 111(d), respectively, of the Air Act (42 U.S.C. 1857c-6(c) or (d)), or an approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by Local Government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317).

(5) The term "compliance" means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency or an air or water pollution control agency in accordance with the requirements of the Air Act or Water Act and regulations issued pursuant thereto.

(6) The term "facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a Contractor or subcontractor, to be utilized in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are co-located in one geographical area.

20. WAGE RATES

(a) Pursuant to the provisions of the Davis-Bacon Act, as amended (40 U.S.C. 276a through 276a-7), the Secretary of Labor has hereby determined that the wage rates and fringe benefits payments listed herein are prevailing for the described classes of labor and shall be the minimums to be paid under this contract by the Contractors and any subcontractors on the work.

(b) While the wage rates shown in the wage determination are the minimum hourly rates required to be paid during the life of the contract, it is the responsibility of bidders to inform themselves as to the local labor conditions such as the length of workday and workweek, overtime compensation, health and welfare contributions, labor supply, and prospective changes or adjustments in the local wages. The Contractor shall abide by and conform to all applicable laws, exeuctive orders, rules, regulations and orders of Federal agencies authorized to pass upon and determine wage rates. No increase in contract price shall be allowed or authorized an account of payment of wage rates in excess of those listed therein.

THE WAGE DETERMINATION DECISION IS ATTACHED.

21. PAYMENTS TO THE CONTRACTOR

Clause 7, Standard Form 23A is deleted and the following substituted therefor;

(a) The Government will pay the contract price as hereinafter provided.

(b) The Government will make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer. If requested by the Contracting Officer, the Contractor shall furnish a breakdown of the total contract price showing the amount included therein for each principal category of the work, in such detail as requested, to provide a basis for determining progress payments. In the preparation of estimates the Contracting Officer, at his discretion, may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the

Contractor at locations other than the site may also be taken into consideration (1) if such consideration is specifically authorized by the contract and (2) if the Contractor furnishes satisfactory evidence that he has acquired title to such material and that it will be utilized on the work covered by this contract.

(c) In making such progress payments, there shall be retained ten (10) percent of the estimated amount until final completion and acceptance of the contract work. However, if the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, he may authorize such payment to be made in full without retention of a percentage. Also, whenever the work is substantially complete, the Contracting Officer shall retain an amount he considers adequate for protection of the Government and, at his discretion, may release to the Contractor all or a portion of any excess amount. Furthermore, on completion and acceptance of each separate building, public work, or other division of the contract, on which the price is stated separately in the contract, payment may be made therefor without retention of a percentage.

(d) All material and work covered by progress payments made shall thereupon become the sole property of the Government, but this provision shall not be construed as relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work, or as waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(e) If Miller Act (40 U.S.C. 270a-270e) performance or payment bonds are required under this contract, the Government shall pay to the Contractor the total premiums paid by the contractor to obtain the bonds. This payment shall be paid at one time to the contractor together with the first progress payment otherwise due after the contractor has (1) furnished the bonds (including coinsurance and reinsurance agreements, when applicable), (2) furnished evidence of full payment to the surety company and (3) submitted a request for such payment. The payment by the Government of the bond premiums to the contractor shall not be made as increments of the individual progress payments and shall not be in addition to the contract price.

(f) Upon completion and acceptance of all work, the amount due the Contractor under this contract shall be paid upon the presentation of a properly executed voucher and after the Contractor shall have furnished the Government with a release of all claims against the Government, arising by virtue of this contract, other than claims in stated amounts as may be specifically excepted by the Contractor from the operation of the release. If the Contractor's claim to amounts payable under the contract has been assigned under the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), a release may also be required of the assignee.

22. CONVICT LABOR

Clause 28, Standard Form 23-A, is deleted and the following substituted therefor:

In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment except as provided by Public Law 89-176, September 10, 1965, (18 U.S.C. 4082 (c)(2)) and Executive Order 11755, December 29, 1973.

23. ADMINISTRATION OF THE DIFFERING SITE CONDITIONS CLAUSE

(a) Nature of clause. Clause 4 of the General Provisions, Standard Form 23-A, provides for an equitable adjustment to the Contractor or the Government which reflects the increases or decreases in the Contractor's cost of and time for performance that result from a differing site condition (as that term is defined in the clause) encountered by the Contractor. However, an equitable adjustment is only available to the Contractor if he gives the Contracting Officer a prompt notice in writing before disturbing the conditions (or secures an extension of the time for giving such notice) and asserts the claim before final payment under the contract.

(b) Notice of differing site conditions. When the Contractor believes that a differing site condition has been encountered, the clause requires that a prompt written notice be given to the Contracting Officer so that the condition of the site can be investigated, the facts can be ascertained, and a determination can be made regarding the presence or absence of a differing site condition. The prompt notice requirement enables the Government to examine the condition of the site and, if necessary, (1) to modify the contract so that it will reflect the increased or decreased cost of and time for performance or (2) to develop records concerning any increase or decrease in the cost of and time for performance. Cost and time information is essential for an independent Government judgment regarding an equitable adjustment of the contract. A failure to give a timely notice could prejudice the Government's ability to determine the extent to which the Contractor or the Government is entitled to an equitable adjustment. Since the existence of a differing site condition is not always recognizable immediately the clause provides that the Contracting Officer may extend the time for submission of the required notice.

The purpose of the authority to extend the time for notice is to insure that the contractor is not deprived of the remedy provided by the clause because an inadvertent failure to give the required notice. However, this authority to extend the notice does not entitle the Contractor to a time extension beyond the time when he knew, or reasonably should have known, of the existence of a differing site condition. If the Contractor gives the required notice at the time he knew, or reasonably should have known, he is entitled to an equitable adjustment which reflects the increased costs and time required for performance that result from the differing site condition. If the Contractor fails to submit the required notice to the Contracting Officer by the time he knew, or reasonably should have known, of the existence of a differing site condition, he is not entitled to an equitable adjustment which reflects the increased costs and time required for performance prior to the time when he gave the notice or the time when the Government had actual notice of the existence of a differing site condition.

(c) Processing of Claims:

(1) Since the time required by the Contractor to ascertain the amount of his claim varies with the circumstances, no specific time for the submission of a claim is specified in the clause. The clause simply states that no claim will be allowed if asserted after final payment. However, the Contractor should not unnecessarily postpone the submission of claims for equitable adjustments.

(2) To prevent the Contractor from unnecessarily postponing the submission of claims, the Contracting Officer shall take the following actions:

(i) When the Contractor gives a prompt written notice of a differing site condition but has not submitted a claim for an equitable adjustment, although there has been a reasonable opportunity to ascertain the amount of the adjustment involved, the Contracting Officer shall send a written request to the Contractor (by registered or certified mail) that he submit within a specified period of time either a written claim or a request for an extension of the time for submission of the claim together with the reasons why the additional time is needed.

(ii) In the event that the Contractor fails to submit a claim within the time specified in the request, or an approved time extension, the Contracting Officer shall make a uniteral determination of the amount of the equitable adjustment which the Contractor is entitled to and shall notify the Contractor of the determination. Such unilateral determination may not be appealed under the Disputes clause of the contract.

24. DISPUTES

Clause 6 and Clause 19 of General Provisions, Standard Form 23-A, April 1975 Edition, are deleted and replaced by the following clause:

(a) This contract is subject to the Contract Disputes Act of 1978 (41 U.S.C. 601, et. seq.). If a dispute arises relating to the contract, the contractor may submit a claim to the Contracting Officer who shall issue a written decision on the dispute in the manner specified in DAR 1-314 (FPR 1-1.318).

(b) "Claim" means:

(1) a written request submitted to the Contracting Officer;

(2) for payment of money, adjustment of contract terms, or other relief;

(3) which is in dispute or remains unresolved after a reasonable time for its review and disposition by the Government; and

(4) for which a Contracting Officer's decision is demanded.

(c) In the case of disputed requests or amendments to such requests for payment exceeding $50,000, or with any amendment causing the total request in dispute to exceed $50,000, the Contractor shall certify, at the time of submission as a claim, as follows:

I certify that the claim is made in good faith, that the supporting data are accurate and complete to the best of my knowledge and belief; and that the amount requested accurately reflects the contract adjustment for which the

Contractor believes the Government is liable.

_____
(Contractor's Name)

_____
(Title)

(d) The Government shall pay the Contractor interest.

(1) on the amount due on claims submitted under this clause;

(2) at the rates fixed by the Secretary of the Treasury, under the Renegotiation Act, Public Law 92-41;

(3) from the date the Contracting Officer receives the claim, until the Government makes payment.

(e) The decision of the Contracting Officer shall be final and conclusive and not subject to review by any forum, tribunal, or Government agency unless an appeal or action is timely commended within the times specified by the Contract Disputes Act of 1978.

(f) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal or action related to the contract, and comply with any decision of the Contracting Officer.

25. PRESERVATION OF HISTORICAL AND ARCHAEOLOGICAL DATA

(a) Public Law 93-291, May 24, 1974, provides for the preservation of historical and archaeological data (including relics and specimens) which might otherwise be lost due to alterations of the terrain as a result of any Federal or Federally-assisted construction project.

(b) The Contractor agrees that should he or any of his employees in the performance of this contract discover evidence of possible historical or archaeological data he will notify the Contracting Officer immediately in writing, giving the location and nature of the findings.

(c) Where appropriate by reason of a discovery, the Contracting Officer may order delays in performance and/or changes in the work. The contract completion data and contract price shall be adjusted in accordance with other applicable provisions of this contract.

(d) The Contractor agrees to insert this clause in all subcontracts which involve the performance of work or the terrain of the site.

26. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY

Arizona Plan Area Goals and Timetables

Minority Goals

Plan area includes entire state of Arizona. The specific goals for minorities developed for the area are as follows:

Trades	Goals (Percent)
(All trades)	25.0 to 30.0

Goals for Women

All Trades	Goals (Percent)
From 4-1-79 to 3-31-80	5.0
From 4-1-80 to 3-31-81	6.9

These goals are applicable to all the contractor's construction work (whether or not it is Federal or Federally-assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Employment Clause, specific affirmative action obligations required by specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and 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, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of 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 name, address, and telephone number of the subcontractor, employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

27. NOTICE

The notice "Equal Employment Opportunity is the Law" is to be displayed in conspicuous places, available to all employees and applicants for employment. It must be similarly displayed by you in the performance of your contract. This notice is available from the contracting office.

28. Utilization of small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals.

(a) It is the policy of the United States that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practicable opportunity to participate in the performance of contracts let by any Federal agency.

(b) The contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with the efficient performance of this contract. The contractor further agrees to cooperate in any studies or surveys that may be conducted by the Small Business Administration or the contracting agency which may be necessary to determine the extent of the contractor's compliance with this clause.

(c) (1) The term "small business concern" shall mean a small business as defined pursuant to Section 3 of the Small Business Act and in relevant regulations promulgated pursuant thereto.

(2) The term "small business concern" owned and controlled by socially and economically disadvantaged individuals" shall mean a small business concern--

(i) which is at least 51 per centum owned by one or more socially and economically disadvantaged individuals; or in the case of any publicly owned business, at least 51 per centum of the stock of which is owned by one or more socially and economically disadvantaged individuals; and

(ii) whose management and daily business operations are controlled by one or more of such individuals.

The contractor shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, and other minorities, or any other individual found to be disadvantaged by the Small Business Administration pursuant to section 8(a) of the Small Business Act.

(d) Contractors acting in good faith may rely on written representations by their subcontractors as either a small business concern or a small business concern owned and controlled by socially and economically disadvantaged individuals.

29. Small business and small disadvantaged business subcontracting program (Advertised).

(a) The offeror represents that it is aware:

(1) Of the subcontracting plan requirement in this provision and, if selected for award, it will submit within the time specified by the contracting officer, a subcontracting plan that will afford the maximum practicable opportunity to participate in the performance of the contract to small and small disadvantaged business concerns and will include:

(i) Percentage goals (expressed in terms of percentage of total planned subcontracting dollars) for the utilization as subcontractors of small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals; (For the purposes of the subcontracting plan, the contractor may include all purchases which contribute to the performance of the contract, including a proportionate share of products, services, etc. whose costs are normally allocated as indirect or overhead costs.)

(ii) The name of an individual within the employ of the offeror who will administer the subcontracting program of the offeror and a description of the duties of such individual;

(iii) A description of the efforts the offeror or bidder will take to assure that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals will have an equitable opportunity to compete for subcontracts;

(iv) Assurances that the bidder will include the clause entitled Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals in all contracts which offer further subcontracting opportunities, and that the bidder will require all subcontractors (except small business concerns) who receive subcontracts in excess of $1,000,000 in the case of a contract for the construction of any public facility, or in excess of $500,000 in the case of all other contracts, to adopt a plan similar to the plan agreed to by the bidder;

(v) Assurances that the bidder will submit such periodic reports and cooperate in any studies or surveys as may be required by the contracting agency or the Small Business Administration in order to determine the extent of compliance by the bidder with the subcontracting plan; and

(vi) A recitation of the types of records the successful bidder will maintain to demonstrate procedures which have been adopted to comply with the requirements and goals set forth in the plan, including the establishment of source lists of small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals; and efforts to identify and award subcontracts to such small business concerns.

(2) Of the clause entitled Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals in the contract.

(b) If the contracting officer believes that the subcontracting plan submitted pursuant to this Section does not reflect the best effort by the bidder to award subcontracts to small and small disadvantaged firms to the fullest extent consistent with the efficient performance of the contract, he shall notify the agency's director of the Office of Small and Disadvantaged Business Utilization who shall in turn notify the Small Business Administration and request a review of the plan pursuant to Section 8(d)(10) and (11) of the Small Business Act. Such request for an SBA review shall not delay award of the contract. Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the contracting officer in determining the responsibility of the bidder for award of the contract.

(c) The bidder understands that:

(1) It agrees to carry out the government's policy to provide the maximum practicable opportunity for small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals to participate in the performance of the contract, consistent with its efficient performance.

(2) If it does not submit a subcontracting plan within the time limits prescribed by the contracting agency, it will be ineligible to be awarded the contract.

(3) Prior compliance of the bidder with other such subcontracting plans under previous contracts will be considered by the contracting officer in determining the responsibility of the offeror for award of the contract.

(4) It is the contractor's responsibility to develop a subcontracting plan with respect to both small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals.

(d) Subcontracting plans are not required of small business concerns.

(e) The failure of any contractor or subcontractor to comply in good faith with (i) the clause entitled Utilization of Small Business Concerns and Small Business Concerns Owned and Controlled by Socially and Economically Disadvantaged Individuals, or (ii) the terms of any subcontracting plan required by this Small Business and Small Disadvantaged Business Subcontracting Plan (Advertised) provision, will be a material breach of the contract or subcontract.

(f) Nothing contained in this provision supersedes the requirements of Defense Manpower Policy 4A or any successor policy.

(g) The contracting officer may, in a letter accompanying the solicitation or otherwise, inform the offeror of the goal the Government contemplates for subcontracting to both small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals. Any such letter shall state that the goals are informational only and not legally binding.

30. DUST ABATEMENT AND HAUL ROAD MAINTENANCE

Water shall be applied to haul roads and other dust-producing areas as needed to prevent excessive dust to maintain the roads in good condition for efficient operation while they are in use.

31. PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS AND VEGETATION

The Contractor shall conduct his operations in such a manner as to avoid damage to adjacent property, existing improvements or facilities and existing vegetation.

STATE: Arizona
COUNTY: Statewide
DECISION NUMBER: AZ79-5100
DATE: Date of Publication
Supersedes Decision No. AZ78-5114 dated August 11, 1978, in 43 FR 35226.
DESCRIPTION OF WORK: Building Construction (does not include single family homes and garden type Apartments up to and including 4 stories), heavy and highway construction.

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
BOILERMAKERS	$ 14.36	1.175	1.00	1.00	.03
BRICKLAYERS; (Phoenix Area) Bricklayers; Manhole Builders; Stonemasons:					
Zone A: 0-35 miles from the City Hall in Phoenix, Flagstaff and Yuma	12.52	.65	1.10		.09
Zone B: 35-50 miles from the City Hall in Phoenix and Williams AFB	13.54	.65	1.10		.09
Zone C: 50-75 miles from the City Hall in Phoenix	14.17	.65	1.10		.09
Zone D: 75-100 miles from City Hall in Phoenix	14.81	.65	1.10		.09
Zone E: 100-200 miles from the City Hall in Phoenix	15.32	.65	1.10		.09
Zone F: 200 miles from the City Hall in Phoenix	16.34	.65	1.10		.09
BRICKLAYERS: (Tucson Area Bricklayers; Stonemasons					
Zone A: 0-15 miles from Tucson City Limits	11.22	1.00	.90		.06
Zone B: Over 15 miles to 30 miles from Tucson City Limits	11.59	1.00	.90		.06
Zone C: Over 30 to 40 miles from Tucson City Limits	11.96	1.00	.90		.06
Zone D: Over 40 miles from Tucson City Limits	12.72	1.00	.90		.06
Manhole Builders:					
Zone A: 0-15 miles from Tucson City Limits	11.47	1.00	.90		.06
Zone B: 15-30 miles from Tucson City Limits	11.84	1.00	.90		.06
Zone C: 30-40 miles from Tucson City Limits	12.21	1.00	.90		.06
Zone D: Over 40 miles from Tucson City Limits	12.97	1.00	.90		.06

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
CARPENTERS:					
Central and Southern Areas: Carpenters; Drywall Applicators; Sawfliers; Shingler Floorlayers (finish)	$ 11.435	$ 1.075	$ 1.085		$ .05
Piledriverman	11.74	1.075	1.085		.05
Millwrights	11.88	1.075	1.085		.05
Northern Area: Carpenters; Drywall Applicator; Saw Flier; Shingler; Floorlayers (finish);	12.36	1.045	1.055		.05
Piledriverman	12.645	1.045	1.055		.05
Millwrights	12.775	1.045	1.055		.05
CEMENT MASONS:					
Apache, Coconino, Gila, Mohave, Navajo, Yavapai, Yuma & the Northern portions of Graham, Greenlee, Maricopa & Pinal Ctys.					
Central & Southern Areas:					
Cement Masons	10.21	.95	1.30		.05
Concrete troweling machine; sawing and scoring machine; curb and gutter machine.	10.37	.95	1.30		.05
Northern Area;					
Cement Masons	12.085	.95	1.30		.05
Concrete troweling machine; sawing and scoring machine; curb and gutter machine;	12.245	.95	1.30		.05
Cochise, Pima, Santa Cruz & the southern portions of Graham, Greenlee, Maricopa & Pinal Ctys.					
Central & Southern Areas:					
Cement Masons	10.22	.85	.85		.05
Concrete troweling machine; sawing and scoring machine; curb and gutter machine;	10.385	.85	.85		.05
Cement Masons (Maricopa County)					
Northern Area	13.085	.95	1.30		.05
Southern Area	11.44	.95	1.30		.05
ASBESTOS WORKERS:					
Zone 1	14.19	.82	1.30		.03
Zone 2	14.89	.82	1.30		.03
Zone 3	15.09	.82	1.30		.03
Zone 4	15.54	.82	1.30		.03
Zone 5	17.69	.82	1.30		.03
ELECTRICIANS: (Flagstaff Area): In the city of Flagstaff, that area lying in a sq. extending 20 mi. north-south, east-west of Post Office; for Williams, Winslow & Sedona that area covering a sq. extending 5 mi. north-south, east-west of the Post Office in each town. Zone A	12.80	.69	3%+.88		½%
Zone B: All territorial jurisdiction allotted outside of Zone A.	15.35	.69	3%+.88		½%

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ELECTRICIANS: (Globe-Miami Area)					
Zone A: the area within 16 road miles beginning where the Southern Pacific Railroad intersects Hwy. 60-70 at Kaiser Crossing					
Electricians	$ 13.93	$ .60	11%		1%
Cable Splicers	14.18	.60	11%		1%
Zone B: 16-28 miles from above-mentioned base point:					
Electricians	14.67	.60	11%		1%
Cable Splicers	14.92	.60	11%		1%
Zone C: 28-46 miles from above-mentioned base point:					
Electricians	15.30	.60	11%		1%
Cable Splicers	15.55	.60	11%		1%
Zone D: 46 miles and over from above mentioned base point:					
Electricians	16.05	.60	11%		1%
Cable Splicers	16.30	.60	11%		1%
ELECTRICIANS: (Phoenix Area) Zone A: Beginning at the north-east corner, a line extending southward on Bush Hwy. to McKellips Road to a point one mile east of the intersection of State Hwy. 88 and U.S. 60 and 70 near Apache Junction; southward to Baseline Road; west on Baseline Road to the intersection of Baseline Road and Ellsworth Road; south on Ellsworth road to Hunt Hwy; west on Hunt Hwy. to Powers road; a line extending south on Powers road five miles then extending straight west to a point five miles west of I-10, then northwest on a line parallel with I-10 to intersect with Pecos road, west on Pecos road to intersect with Cotton Lane, north on Cotton Lane to Beloat road, east on Beloat road to Airport road. north on Airport road in a straight line to intersect Waddell road: east on Waddell road to intersect with Cotten Lane, north on Cotton Lane to Deer Valley Dr. and east on Deer Valley Dr. to intersect with Bush Hwy. including Luke and Williams AFB.	13.86	.96	3%+.88		3/4%

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ELECTRICIANS: Zone B: Area outside of Zone A and bounded by a line formed by measuring sixteen (16) road miles from the outer boundaries of an area enclosed by the following boundaries: Power Road on the east, from Hunt Hwy. on the south to one mile south of Pinnacle Peak Road on the north; one mile south of Pinnacle Peak Road to Cotton Lane on the West; Cotton Lane to Pecos Road on the south. Pecos Road to Price Road and from Price Road to Hunt Hwy. on the south. Hunt Hwy. to Powers Road on the east.	$ 15.86	.96	3%+.88		3/4%
Zone C: Outside edge of Zone B and extended to the outside limits of the Union's jurisdiction	$ 16.86	.96	3%+.88		3/4%
ELECTRICIANS: (Kingman) Zone A: The area within the 16th road mile from the City Hall					
Electricians	12.04	.96	1%+.70		½%
Cable Splicers	12.64	.96	1%+.70		½%
Zone B: from the 16th road mile and extend up to and including the 32nd road mile					
Electricians	14.15	.96	1%+.70		½%
Cable Splicers	14.85	.96	1%+.70		½%
Zone C: From the 32nd road mile extending up t the outside limits of th union's jurisdiction					
Electricians	15.23	.96	%+.70		½%
Cable Splicers	15.99	.96	%+.70		½%
ELECTRICIANS: (Prescott) Zone A: The area within 20 road miles from the City Hall					
Electricians	12.04	.96	1%+.70		½%
Cable Splicers	12.64	.96	1%+.70		½%

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ELECTRICIANS: (Prescott)					
Zone B: From the 20th road mile extending up to and including the 32nd road mile					
Electricians	$ 14.15	.96	1%+.70		½%
Cable Splicers	14.85	.96	1%+.70		½%
Zone C: From the 32nd road mile extending to the outside limits of the union's jurisdiction					
Electricians	15.23	.96	1%+.70		½%
Cable Splicers	15.99	.96	1%+.70		½%
ELECTRICIANS: (Tucson & Yuma Area) Zone A: Area within 16 road miles from the City Hall in Tucson, Yuma, Douglas, Area within 16 road miles from center of Town in Nogales, Sierra Vista; Area within the boundaries of the incorporated City limits of Parker, plus an area extending from the south City Limits of Parker in a northeasterly direction to mile post No. 150 located on State Hwy. 95, northeast of Parker from the Colorado River on the west, an area mile wide paralleling the Colorado River.					
Electricians	13.93	.60	11%		½%
Cable Splicers	14.18	.60	11%		½%
Zone B: Area from the outer limits of Zone A extending up to and including 12 road miles, excluding Douglas Area					
Electricians	14.67	.60	11%		½%
Cable Splicers	14.92	.60	11%		½%
Zone C; Area from the outer 1 limits of Zone B extending up to and including 18 road miles excluding Douglas Area					
Electricians	15.30	.60	11%		½%
Cable Splicers	15.55	.60	11%		½%
Zone D: Area outside of Zone C; in Douglas, the area outside of Zone A.					
Electricians	16.05	.60	11%		½%
Cable Splicers	16.30	.60	11%		½%

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ELEVATOR CONSTRUCTORS	$ 13.85	$ .895	.69	3%+a	.03
ELEVATOR CONST. HELPERS	9.695	.895	.69	3%+a	.03
ELEVATOR CONSTRUCTORS HELPERS (PROB.)	6.925				
GLAZIERS	11.34	.85	.30		.01
IRONWORKERS:					
Central and Southern Area.	12.30	1.34	2.47		.11
Northern Area	14.43	1.34	2.47		.11
LATHERS: (Tucson Area)					
Zone A: 0-30 mi.from Tucson	10.88	.50	.40		
Zone B: 30-40 miles from Tucson	11.38	.50	.40		
Zone C: 40-50 miles from Tucson	11.63	.50	.40		
Zone D: Area outside Zone C	12.38	.50	.40		
LINE CONSTRUCTION:					
Zone 1: Phoenix and Tucson 30 miles radius from center of town:					
Groundmen	10.22	1.00	1.50		½%
Equipment Operator; Powdermen; Mechanics; Linemen; Technicians;	12.07	1.00	+1.50		½%
Crane Operators;	13.60	1.00	1.50		½%
Cable Splicers	14.00		1.50		½%
Zone 1-A: Douglas, Flagstaff, Globe, Kingman, Prescott and Yuma 10 mile radius from center of town:					
Groundmen	11.06	1.00	1.50		½%
Equipment Operators; Powdermen; Mechanics Linemen; Technicians;	12.84	1.00	1.50		½%
Crane Operators;	14.42	1.00	1.50		½%
Cable Splicers	14.90	1.00	1.50		½%
Zone 2: Other Areas:					
Groundmen	11.84	1.00	1.50		½%
Equipment Operators; Powdermen; Mechanics; Linemen: Technicians;	13.63	1.00	1.50		½%
Crane Operators;	15.22	1.00	1.50		½%
Cable Splicers	15.65	1.00	1.50		½%
MARBLE WORKERS: (Phoenix Area)	10.91	.65	1.10		.19

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ELECTRICIANS: (Gallup Area-Apache County north of Hwy. #66)					
Electricians	$ 14.10	$ .60	$ 3%+,70		½%
Cable Splicers	14.69	.60	3%+.70		½%
LATHERS:					
Maricopa County north of a line crossing the state drawn thru Ajo Randolph & Springerville;	12.49	.75			.06
Maricopa County south of a line crossing the state drawn thru Ajo, Randolph & Springerville.	14.03	.50			
PAINTERS:					
North of a line drawn east & west thru the town of Winkelman, AZ					
Zone A: 0-40 road miles from Court House in Phoenix, Mesa & including Luke & Williams AFB:					
Brush; Roller; Taper; Sandblaster (Nozzleman); Sandblaster (Pot Tender);	10.69	.60	.40		.08
Spray; Paperhangers;	10.94	.60	.40		.08
Creosote Applier	11.02	.60	.40		.08
Swing Stage;					
Brush; Sandblaster	11.09	.60	.40		.08
Spray	11.34	.60	.40		.08
Zone B: 41-60 miles from Court House in Phoenix; Brush; Roller; Taper; Sandblaster (Nozzleman);					
Sandblaster (Pot Tender);	11.69	.60	.40		.08
Spray; Paperhangers;	11.94	.60	.40		.08
Creosote Applier	12.02	.60	.40		.08
Swing Stage:					
Brush; Sandblaster	12.09	.60	.40		.08
Spray	12.34	.60	.40		.08
Zone C: 61 miles and over from the Court House in Phoenix: Brush; Roller; Taper; Sandblaster (Nozzleman); Sandblaster (Pot Tender)	12.94	.60	.40		.08
Spray; Paperhangers;	13.19	.60	.40		.08
Creosote Applier	13.27	.60	.40		.08
Swing Stage:					
Brush; Sandblaster	13.34	.60	.40		.08
Spray	13.59	.60	.40		.08
South of a line drawn east & west thru the town of Winkelman, AZ					
Brush	11.96	.77	.45		.06
Spray; Sandblaster	12.46	.77	.45		.06
Paperhangers	12.06	.77	.45		.06
Swing Stage (under 40 ft.)					
Brush	12.26	.77	.45		.06
Spray	12.76	.77	.45		.06
Swing Stage (over 40 ft.)					
Brush	12.71	.77	.45		.06
Spray	13.21	.77	.45		.06

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
PAINTERS: (Flagstaff Area)					
Zone A: From Flagstaff Courthouse to 20 miles:					
Brush; Soft Floor Layer	$ 11.60	$ .90	$ .80		$ .20
Brush, steel & bridge	12.10	.90	.80		.20
Spray	12.05	.90	.80		.20
Spray, steel & bridge	12.60	.90	.80		.20
Zone B: 20-35 miles from Courthouse in Flagstaff:					
Brush, Soft Floor Layer	12.35	.90	.80		.20
Brush, steel & bridge	12.85	.90	.80		.20
Spray	12.80	.90	.80		.20
Spray, steel & bridge	13.35	.90	.80		.20
Zone C: 35-80 miles from Courthouse in Flagstaff:					
Brush; Soft Floor Layer	13.35	.90	.80		.20
Brush; Steel & bridge	13.85	.90	.80		.20
Spray	13.80	.90	.80		.20
Spray, steel & bridge	14.35	.90	.80		.20
Zone D: 80 miles and over from Courthouse in Flagstaff:					
Brush; Soft Floor Layer	13.60	.90	.80		.20
Brush; steel & bridge	14.10	.90	.80		.20
Spray	14.05	.90	.80		.20
Spray, steel & bridge	14.60	.90	.80		.20
Plasterer's Tenders	9.51	.92	.98		.10
LATHERS: North of a line crossing the state drawn through Ajo, Randolph & Springerville; except as follows: NE of a line drawn from Springerville to a point 4 miles NE of Keams Canyon	12.49	.75			.06
Mason Tender	9.05	.92	.98		.04
ROOFERS: (Tucson Area): Asbestos; Shinglers; Tile & Waterproofing;					
Zone A: 0-44 mi. from Tucson	9.77	.845	.20		.03
Zone B: over 44 mi. from Tucson	11.52	.845	.20		.03
ROOFERS: (Phoenix Area)					
Roofers and Waterproofers	10.16	.845	.20		.02
SHEET METAL WORKERS: (Maricopa Cty.)					
Zone 1: 0-25 miles excluding Luke & Williams AFB	11.70	.90	1.30		.10
Zone 2: 25-50 miles including Luke & Williams AFB	12.35	.90	1.30		.10
Zone 3: 50 miles and over	14.20	.90	1.30		.10
SOFT FLOOR LAYERS: (Phoenix Area)					
Zone A: 0-40 mi. from Courthouse in Phoenix & Flagstaff including Luke & Williams AFB	9.21	.59	.12		.12
Zone B: 41-60 mi. from Courthouse in Phoenix and Flagstaff	10.21	.59	.12		.12
Zone C: 61 miles and over from Courthouse in Phoenix & Flagstaff	10.71	.59	.12		.12

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
PLASTERERS: (Phoenix Area)					
Zone A: 0-35 miles from Phoenix	$11.02	.95	1.30		.06
Zone B: 35-60 miles from Phoenix	11.77	.95	1.30		.06
Zone C: 60 miles and over from Phoenix	12.895	.95	1.30		.06
PLASTERERS: (Tucson Area					
Zone A: 0-30 miles from Tucson	8.57	.35	.60		
Zone B: 30-40 miles from Tucson	9.07	.35	.60		
Zone C: 40-50 miles from Tucson	9.32	.35	.60		
Zone D: 50 miles and over from Tucson	10.07	.35	.60		
PLASTERERS' TENDERS: Central and Southern Areas	10.30	.92	1.10		.10
PLUMBERS; Steamfitters:					
FREE ZONE 0-15 miles					
The "Free Zone" (Zone 1 shall be 15 road miles from the stated base points in Flagstaff, Yuma Tucson and Douglas. The "Free Zone" from Phoenix shall be 15miles radius from the stated base point. In addition, all areas within the City Limits of Phoenix, Chandler, Scottsdale, Tempe, Glendale, Mesa, Kingman, Havasu City, Prescott, Winslow, and Holbrook will be included as Free Zones. Any work contracted for outside of these zones will be determined from the Phoenix and Tucson basing points.					
Zone 1: 0-15 miles	13.24	.75	1.35		.13
Zone 2: 15-30 miles	13.64	.75	1.35		.13
Zone 3: 30-40 miles	14.09	.75	1.35		.13
Zone 4: 40 miles & over	15.59	.75	1.35		.13

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
SOFT FLOOR LAYERS:(Maricopa Cty)					
Zone A: 0-40 miles from Courthouse in Phoenix and including Luke & Williams AFB	$ 9.21	$ .59	$ .12		$ .12
Zone B: 41-60 miles from Court-House in Phoenix	10.21	.59	.12		.12
Zone C: 61 miles and over	10.71	.59	.12		.12
SOFT FLOOR LAYERS: (Tucson Area)	9.25	.38			
SPRINKLER FITTERS	12.74	.75	1.05		.08
TERRAZZO WORKERS: Tile Setters; Marble Masons; (Tucson Area)	9.27	.90	.85		
TERRAZZO WORKERS: (Phoenix Area)	10.91	.65	1.10		.19
FOOTNOTE:					
a. Employer contributes 4% of basic hourly rate for 5 years service and 2% basic hourly rate for 6 months to 5 years as vacation pay credit. Six paid Holidays: A- F.					
PAID HOLIDAYS:					
A-New Years Day; B-Memorial Day; C-Independence Day; D- Labor Day; E-Thanksgiving Day; F-Christmas Day.					
LABORERS: (C & S AREAS)					
Group 1:	9.06	.92	1.10		.10
Group 2:	9.20	.92	1.10		.10
Group 3:	9.35	.92	1.10		.10
Group 4:	9.47	.92	1.10		.10
Group 5:	9.65	.92	1.10		.10
Group 6:	10.055	.92	1.10		.10
Group 7:	10.745	.92	1.10		.10
LABORERS: (Tunnel & Shaft)					
Group 1:	8.605	.92	.98		.10
Group 2:	8.77	.92	.98		.10
Group 3:	8.90	.92	.98		.10
Group 4:	9.26	.92	.98		.10
Group 5:	9.435	.92	.98		.10
Group 5A:	9.685	.92	.98		.10
POWER EQUIPMENT OPERATORS: (Except Piledriving and Steel)					
Group 1:	9.66	1.10	1.10		.08
Group 2:	10.06	1.10	1.10		.08
Group 3:	10.55	1.10	1.10		.08

	Basic Hourly Rates	Fringe Benefits Payable: H & W	Pensions	Vacation	Education and/or Appr. Tr.
POWER EQUIPMENT OPERATORS (CONTINUED) (C&S AREAS)					
Group 4:	$ 11.13	1.10	1.10		.08
Group 5:	11.70	1.10	1.10		.08
Group 5A:	12.03	1.10	1.10		.08
Group 6:	12.39	1.10	1.10		.08
Group 7:	13.04	1.10	1.10		.08
TRUCK DRIVERS:					
Group 1:	9.23	.92	1.10		.08
Group 2:	9.37	.92	1.10		.08
Group 3:	9.61	.92	1.10		.08
Group 4:	9.99	.92	1.10		.08
Group 5:	10.16	.92	1.10		.08
Group 5A:	10.36	.92	1.10		.08
Group 6:	10.51	.92	1.10		.08
Group 7:	10.91	.92	1.10		.08
Group 8:	11.505	.92	1.10		.08
Group 8A:	12.21	.92	1.10		.08
Group 8B:	9.84	.92	1.10		.08
Group 8C:	11.88	.92	1.10		.08
LABORERS (N AREA)					
Group 1:	9.985	.92	.98		.10
Group 2:	10.115	.92	.98		.10
Group 3:	10.255	.92	.98		.10
Group 4:	10.365	.92	.98		.10
Group 5:	10.535	.92	.98		.10
Group 6:	10.91	.92	.98		.10
Group 7:	11.54	.92	.98		.10
LABORERS (TUNNEL&SHAFT)					
Group 1:	10.23	.92	.98		.10
Group 2:	10.395	.92	.98		.10
Group 3:	10.525	.92	.98		.10
Group 4:	10.885	.92	.98		.10
Group 5:	11.06	.92	.98		.10
Group 5A:	11.31	.92	.98		.10
POWER EQUIPMENT OPERATORS (Except Piledriving & Steel Erection)					
Group 1:	10.555	1.05	1.00		.08
Group 2:	10.925	1.05	1.00		.08
Group 3:	11.385	1.05	1.00		.08
Group 4:	11.915	1.05	1.00		.08
Group 5:	12.445	1.05	1.00		.08
Group 5A:	12.755	1.05	1.00		.08
Group 6:	13.085	1.05	1.00		.08
Group 7:	13.685	1.05	1.00		.08

	Basic Hourly Rates	H & W	Pensions	Vacation	Education and/or Appr. Tr.
TRUCK DRIVERS:					
Group 1:	$ 10.145	.92	.98		.08
Group 2:	10.275	.92	.98		.08
Group 3:	10.495	.92	.98		.08
Group 4:	10.845	.92	.98		.08
Group 5:	11.005	.92	.98		.08
Group 5A:	11.185	.92	.98		.08
Group 6:	11.325	.92	.98		.08
Group 7:	11.735	.92	.98		.08
Group 8:	12.25	.92	.98		.08
Group 8A:	12.905	.92	.98		.08
Group 8B:	12.595	.92	.98		.08
Group 8C:	10.705	.92	.98		.08

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TRUCK DRIVERS

Group 1: Teamsters; Pickups; Station Wagons; Manhaul driver

Group 2: Dump or flatrack (2 or 3 axle); Water truck (under 2500 gallons); Buggymobile (1 cu. yd. or less); Tiremen; Bus drivers, ambulance driver, self-propelled street sweeper; Warehousemen

Group 3: Dump or flatrack (4 axle); Dumptor or dumpster (less than 7 cu. yd.); Water truck (2500 gallons but less than 4000 gallons)

Group 4: Dumptor or dumpster (7 cu. yd. but less than 16 cu. yd.); Dump or flatrack (5 axle); Water truck (4000 gallons and over); Slurry type equipment or leverman; Flaherty spreader or similar type equipment or leverman; Transit mix (8 cu. yd. or less)

Group 5: Dump or flatrack (6 axle); Transit mis (over 8 cu. yd. but less than 10.5 cu. yd.); Rock truck (i.e. Dart, Euclid and other similar type end dumps, simgle unit less than 16 cu. yd.)

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

Group 6: Transit Mix (over 10.5 cu. yd. but less than 14 cu. yd.); Ross carrier; Fork lift or lift truck; Hydro lift, Swedish crane Iowa 300 and similar type; Concrete pump (when integral part of transit mix truck); Dump or flatrack (7 axle)

Group 7: Dump or Flatrack (8 axles)

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. yd. and over); Dump or flatrack (9 axles)

Group 8A: Heavy duty mechanis/welder; Body and fender man

Group 8B: Field equipment serviceman or fuel truck driver

Group 8C: Heavy duty mechanis/welder helper

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POWER EQUIPMENT OPERATORS
(Except Piledriving and Steel Erection)

Group 1: Air compressor operator; Field equipment servicemen helper; Heavy duty repair helper; Heavy duty welder helper; Oiler; Pump operator

Group 2: Conveyor operator; Generator operator - portable; Power grizzly operator; Self-propelled chip spreading machine - conveyor operator; Watch fireman; Welding machine operator - gasoline and diesel power

Group 3: Concrete mixer operator - skip type; Dinky operator - (under 20 tons wt.); Driver-moto paver, Slurry seal machine, and similar type equipment; Motor crane driver; Power sweeper operator - self-propelled; Ross carrier or fork lift operator; Skip loader operator - all types with rated capacity 1-1/2 cu. yds. or less; Wheel type tractor operator (Ford, Ferguson, or similar type) with attachments such as fresno, push blade, post hole auger, mower, etc., excluding compacting equipment

Group 4: A-Frame boom truck or winch truck operator; Asphalt plant firemen; Elevator hoist operator (including Tuskey hoist or similar type; Grade checker (excluding civil engineer); Multiple power concrete saw operator; Pavement breaker, mechanical compactor operator, power propelled; Roller operator - all types - except as otherwise classified; Screed operator; Self-propelled chip spreading machine operator (including Slurry seal machine operator) Stationary pipewrapping and cleaning machine operator; Tugger operator

Group 5: Aggregate plant operator (including crushing, screening and snad palnts, etc.); Asphalt plant mixer operator; Beltcrete machine; Boring machines operator; Concrete mechanical tamping, spreading or finishing machine (including Clary, Johnson or similar types); Concrete pumps operator; Concrete batch plant operator, all types and sizes; Conductor, brakeman, or handler; Drilling machine, including water wells; Elevating grader operator - all types and sizes (except as otherwise classified); Field equipment serviceman; Highline cableway signalman; Kolman belt loader operator or similar, with belt width 48" or over; Locomotive engineer (including Dinky - 20 tons wt. and over); Moto-paver and similar type equipment operator; Operating engineer rigger; Pneumatic-tired scraper operator (Turnapull, Euclid, Cat, D-W, Hancock and similar equipment) up to and including 12 cu. yds.; Power jumbo form setter operator; Pressure grout machine operator (as used in heavy engineering construction); Road oil mixing machine operator; Roller operator - on all types asphalt pavement; Self-propelled compactor, with blade; Skip loader operator - all types with 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; Travelling pipewrapping machine operator

Group 5A: Heavy duty mechanic and/or welder; Pneumatic tired scraper, all sizes and types over 12 cu. yds. up to and including 45 cu. yds. MRC (Turnapull, Euclid, Cat, D-W, Hancock and similar equipment); Tractor operator (Pusher, Bulldozer, Scraper) up to 400 net horsepower rating; Trenching machine opertor

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POWER EQUIPMENT OPERATORS (Cont'd)
(except Piledriving and Steel Erection)

Group 6: Auto-Grade machine (CMI and similar equipment); Boring machine operator (including Mole, Badger and similar type); Concrete Mixer operator-paving type, and mobile mixer; concrete pump operator with boom attachment (truck mounted); Crane operator - crawler and pneumatic type, under 100 ton capacity MRC; Crawler type tractor operator - with boom attachment; Derrick operator; Forklift operator for hoisting personnel; Grade-all operator; Helicopter hoist; 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 grade operator - any type power blade; Motor grade operator with elevating grader attachment; Mucking machine operator; Overhead crane operator; Pile-driver envineer (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 with rated capacity 4 cu. yds., 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; Tractor operator (Pusher, Bulldozer, Scraper (400 net horsepower and over); Tugger operator (two or more); Universal equipment operator - Shovel, Backhoe, Dragline, Clamshell, etc. up to 8 cu. yds.

Group 7: Crane operator - pneumatic or crawler (100 ton hoisting capacity and over MRC rating); Helicopter pilot - FAA qualified when used in construction work; 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 - Shovel, Backhoe, Dragline, Clamshell, etc., 8 cu. yds. and over

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LABORERS

Group 1: All Helpers not herein separately classified; Cesspool Diggers and installers; Chat Box Man; Checker, tool dispatcher; Concrete dump manbelt, pipe and/or hoseman; Dumpman and/or spotter; Fence builder, guard rail builder highway; Form strippers; Labor, general or construction; Landscape gardener and nurseryman; Packing rod steel and pans; Rip rap stoneman; Astro turf layer; Cleanup, Bull gang; Trackman-railroad

Group 2: Cement finisher tender; Concrete curer (impervious membrane); Cutting torch operator; Fine grader (highway, engineering and sewer work only); Kettleman - Tarman; Power type concrete buggy

Group 3: Bander; Chucktender (except tunnel); Creosote tieman; Guinea chaser; Powderman helper; Rip-rap stone paver; Sandblaster (pot tender); Spike and wrenchers

Group 4: Cement dumpers (Skip-type mixer or handling bulk cement); Chain saw machines (on clearing and grubbing); Concrete vibrating machines; Cribber and shorer (except tunnel); Floor sanders concrete; Hydraulic jacks, and similar mechanical tools not separately classified herein; Operators and tenders of pneumatic and electric tools; Pipe caulker and/or backup man (pipeline); Pipe wrapper; Pneumatic gopher; Rigger/Signalman (pipeline)

Group 5: Air and water wash-out nozzleman; Asphalt rakers and ironers, Driller; Grade setter (pipeline); Hand guided trencher and similar operated equipment: Jackhammer and/or pavement breakers; Pipelayers (including but not limited to non-metallic, transite and plastic pipe, water pipe, sewer pipe, drain pipe, underground tile and conduit); Rock slinger; Scaler (using Bos'ns chairs or safety belt); Tampers (mechanical all types); Precast manhole erector

Group 6: Concrete Cutting Torch; Concrete saw (hand guided); Driller, (core diamond, wagon or air track); Drill doctor and/or air tool repairman; Gunman and mixerman (gunite) Sandblaster (nozzleman)

Group 7: Concrete Road Form Setter; Gunite nozzleman or rodman; Drillers, Joy Mustang, PR 143, 220 Gardner-Denver, Hydrasonic; Powderman; Scaler (drillers); Welders and/or Pipelayers installing process piping; Form setter and/or builder

LABORERS
(Tunnel and Shaft Workers)

Group 1: Bull Gang, muckers, trackman; Dumpmen; Concrete crew (includes rodders and spreaders); Grout Crew; Swamper (brakeman and switchmen on tunnel work); Change house man

Group 2: Nipper; Chucktender, Cabletender, Vibratorman, Jackhammer, Pneumatic tools (except driller)

Group 3: Grout Gunman

Group 4: Timberman, Retimberman - wood or steel blaster, driller powerman; Cherry pickerma Powderman - primer house; Steel form raiser and setter; Kemper and other pneumatic concrete placer operator; Miner - finisher; Miners - Tunnel (hand or machine)

Group 5: Diamond Drill

Group 5A: Shaft and Raise Miner Welder

LABOR STANDARDS PROVISIONS

Applicable to Contracts in Excess of $2,000

1. DAVIS-BACON ACT (40 U.S.C. 276a–276a–7)

(a) All mechanics and laborers employed or working directly upon the site of the work shall be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Copeland Regulations, 29 CFR Part 3), the full amounts due at time of payment computed at wage rates not less than the aggregate of the basic hourly rates and the rates of payments, contributions, or costs for any fringe benefits contained in the wage determination decision of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor or subcontractor and such laborers and mechanics. A copy of such wage determination decision shall be kept posted by the Contractor at the site of the work in a prominent place where it can be easily seen by the workers. The term "mechanics and laborers" shall be deemed to include apprentices and trainees not covered by an approved program as provided by the Apprentices and Trainees clause of this contract.

(b) The Contractor may discharge his obligation under this clause to workers in any classification for which the wage determination decision contains:

(1) Only a basic hourly rate of pay, by making payment at not less than such basic hourly rate, except as otherwise provided in the Copeland Regulations (29 CFR Part 3); or

(2) Both a basic hourly rate of pay and fringe benefits payments, by making payment in cash, by irrevocably making contributions pursuant to a fund, plan, or program for, and/or by assuming an enforceable commitment to bear the cost of, bona fide fringe benefits contemplated by the Davis-Bacon Act, or by any combination thereof. Contributions made, or costs assumed, on other than a weekly basis shall be considered as having been constructively made or assumed during a weekly period to the extent that they apply to such period. Where a fringe benefit is expressed in a wage determination in any manner other than as an hourly rate and the Contractor pays a cash equivalent or provides an alternative fringe benefit, he shall furnish information with his payrolls showing how he determined that the cost incurred to make the cash payment or to provide the alternative fringe benefit is equal to the cost of the wage determination fringe benefit. In any case where the Contractor provides a fringe benefit different from any contained in the wage determination he shall similarly show how he arrived at the hourly rate shown therefor. In the event of disagreement between or among the interested parties as to an equivalent of any fringe benefit, the Contracting Officer shall submit the question, together with his recommendation, to the Secretary of Labor for final determination.

(c) The assumption of an enforceable commitment to bear the cost of fringe benefits, or the provision of any fringe benefits not expressly listed in section 1(b)(2) of the Davis-Bacon Act or in the wage determination decision forming a part of the contract, may be considered as payment of wages only with the approval of the Secretary of Labor pursuant to a written request by the Contractor. The Secretary of Labor may require the Contractor to set aside assets, in a separate account, to meet his obligations under any unfunded plan or program.

(d) The Contracting Officer shall require that any class of laborers or mechanics, including apprentices and trainees, which is not listed in the wage determination decision and which is to be employed under the contract shall be classified or reclassified conformably to the wage determination decision, and shall report the action taken to the Secretary of Labor. If the interested parties cannot agree on the proper classification or reclassification of a particular class of laborers or mechanics, including apprentices and trainees to be used, the Contracting Officer shall submit the question, together with his recommendation, to the Secretary of Labor for final determination. Apprentices and trainees may be added under this clause only where they are employed pursuant to an apprenticeship or trainee program meeting the requirements of the Apprentices and Trainees clause below.

(e) In the event it is found by the Contracting Officer that any laborer or mechanic, including apprentices and trainees, employed by the Contractor or any subcontractor directly on the site of the work covered by this contract has been or is being paid at a rate of wages less than the rate of wages required by paragraph (a) of this clause, or by the Apprentices and Trainees clause of this contract, the Contracting Officer may (1) by written notice to the Government Prime Contractor terminate his right to proceed with the work, or such part of the work as to which there has been a failure to pay said required wages, and (2) prosecute the work to completion by contract or otherwise, whereupon such Contractor and his sureties shall be liable to the Government for any excess costs occasioned the Government thereby.

(f) Paragraphs (a) through (e) of the clause shall apply to this contract to the extent that it is (1) a prime contract with the Government subject to the Davis-Bacon Act, or (2) a subcontract also subject to the Davis-Bacon Act under such prime contract.

2. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT—OVERTIME COMPENSATION (40 U.S.C. 327–333).

This contract is subject to the Contract Work Hours and Safety Standards Act and to the applicable rules, regulations, and interpretations of the Secretary of Labor.

(a) The Contractor shall not require or permit any laborer or mechanic, including apprentices, trainees, watchmen, and guards, in any workweek in which he is employed on any work under this contract to work in excess of 8 hours in any calendar day or in excess of 40 hours in such workweek on work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer or mechanic, including apprentices, trainees, watchmen, and guards, receives compensation at a rate not less than 1½ times his basic rate of pay for all such hours worked in excess of 8 hours in any calendar day or in excess of 40 hours in such workweek, whichever is the greater number of overtime hours. The "basic rate of pay," as used in this clause, shall be the amount paid per hour exclusive of the Contractor's contribution or cost for fringe benefits, and any cash payment made in lieu of providing fringe benefits, or the basic hourly rate contained in the wage determination, whichever is greater.

(b) In the event of any violation of the provisions of paragraph (a), the Contractor shall be liable to any affected employee for any amounts due, and to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including an apprentice, trainee, watchman, or guard, employed in violation of the provisions of paragraph (a) in the sum of $10 for each calendar day on which such employee was required or permitted to be employed on such work in excess of 8 hours or in excess of the standard workweek of 40 hours without payment of the overtime wages required by paragraph (a).

3. APPRENTICES AND TRAINEES

(a) Apprentices shall be permitted to work at less than the predetermined rate for the work they performed (1) when they are employed and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or (2) if a person is employed in his first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio permitted to the contractor as to his entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not a trainee as defined in paragraph (b) of this clause or who is not registered or otherwise employed as stated above, shall be paid the wage rate determined by the Secretary of Labor for the classification of work he actually performed. The Contractor or subcontractor shall furnish to the Contracting Officer written evidence of the registration of his

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program and apprentices as well as the appropriate ratios and wage rates (expressed in percentages of the journeymen hourly rates) for the area of construction, prior to using any apprentices on the contract work. The wage rate paid apprentices shall be not less than the appropriate percentage of the journeymen's rate contained in the applicable wage determination.

(b) Trainees shall be permitted to work at less than the predetermined rate for the work performed when they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification, by the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training. The term "trainee" means a person registered and receiving on-the-job training in a construction occupation under a program which has been approved in advance by the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, as meeting its standards for on-the-job training programs and which has been so certified by the Bureau. The ratio of trainees to journeymen on this contract shall not be greater than the ratio permitted under the plan approved by the Bureau of Apprenticeship and Training. Every trainee must be paid at not less than the rate specified in the approved program for his level of progress. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Bureau of Apprenticeship and Training shall be paid not less than the wage rate determined by the Secretary of Labor for the classification of work he actually performed. The Contractor or subcontractor shall furnish the Contracting Officer written evidence of the certification of his program, the registration of the trainees, and the ratios and wage rates prescribed in that program. In the event the Bureau of Apprenticeship and Training withdraws approval of a training program, the Contractor shall no longer utilize trainees at less than the applicable predetermined rate for work performed until an acceptable program is approved.

(c) The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of this contract.

(d) If at any time the Bureau of Apprenticeship and Training determines, after opportunity for a hearing, that the standards of a training program have not been complied with, or that such a program fails to provide adequate training for participants, the Contractor shall not utilize trainees at less than the predetermined rate for the classification of work actually performed until an acceptable program is approved. If the Contractor brings an appeal pursuant to 29 CFR 5.17 within 30 days of his receipt of a certified letter withdrawing the Bureau of Apprenticeship and Training's approval, the effect of the withdrawal of approval of the program will be delayed until a decision is rendered on the appeal pursuant to 29 CFR 5.17.

4. PAYROLLS AND BASIC RECORDS

(a) The Contractor shall maintain payrolls and basic records relating thereto during the course of the work and shall preserve them for a period of 3 years thereafter for all laborers and mechanics, including apprentices, trainees, watchmen, and guards working at the site of the work. Such records shall contain the name and address of each such employee, his correct classification, rate of pay (including rates of contributing for or costs assumed to provide, fringe benefits), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Contractor has obtained approval from the Secretary of Labor as provided in paragraph (c) of the clause entitled "Davis-Bacon Act", he shall maintain records which show the commitment, its approval, written communication of the plan or program to the laborers or mechanics affected, and the costs anticipated or incurred under the plan or program.

(b) The Contractor shall submit weekly a copy of all payrolls to the Contracting Officer. The Government Prime Contractor shall be responsible for the submission of copies of payrolls of all subcontractors. The copy shall be accompanied by a statement signed by the Contractor indicating that the payrolls are correct and complete, that the wage rates contained therein are not less than those determined by the Secretary of Labor, and that the classifications set forth for each laborer or mechanic, including apprentices and trainees conform with the work he performed. Submission of the "Weekly Statement of Compliance" required under this contract and the Copeland Regulations of the Secretary of Labor (29 CFR Part 3) shall satisfy the requirement for submission of the above statement. The Contractor shall submit also a copy of any approval by the Secretary of Labor with respect to fringe benefits which is required by paragraph (c) of the clause entitled "Davis-Bacon Act". Contractors employing apprentices or trainees under approved programs shall include a notation of the first weekly certified payrolls submitted to the contracting agencies that their employment is pursuant to an approved program and shall identify the program.

(c) The Contractor shall make the records required under this clause available for inspection by authorized representatives of the Contracting Officer and the Department of Labor, and shall permit such representatives to interview employees during working hours on the job.

NOTE: Watchmen and guards appear on payroll records only for purposes of the Contract Work Hours and Safety Standards Act.

5. COMPLIANCE WITH COPELAND REGULATIONS

The Contractor shall comply with the Copeland Regulations of the Secretary of Labor (29 CFR Part 3) which are incorporated herein by reference.

6. WITHHOLDING OF FUNDS

(a) The Contracting Officer may withhold or cause to be withheld from the Government Prime Contractor so much of the accrued payments or advances as may be considered necessary (1) to pay laborers and mechanics, including apprentices, trainees, watchmen, and guards employed by the Contractor or any subcontractor on the work the full amount of wages required by the contract, and (2) to satisfy any liability of the Contractor and any subcontractor for liquidated damages under paragraph (b) of the clause entitled "Contract Work Hours and Safety Standards Act—Overtime Compensation."

(b) If the Contractor or any subcontractor fails to pay any laborer, mechanic, apprentice, trainee, watchman, or guard employed or working on the site of work, all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Government Prime Contractor, take such action as may be necessary to cause suspension of any further payments or advances until such violations have ceased.

7. SUBCONTRACTS

The Contractor agrees to insert the clauses hereof entitled "Davis-Bacon Act," "Contract Work Hours and Safety Standards Act—Overtime Compensation," "Apprentices and Trainees," "Payrolls and Basic Records," "Compliance with Copeland Regulations," "Withholding of Funds," "Subcontracts," and "Contract Termination—Debarment" in all subcontracts. The term "Contractor" as used in such clauses in any subcontract shall be deemed to refer to the subcontractor except in the phrase "Government Prime Contractor."

8. CONTRACT TERMINATION—DEBARMENT

A breach of the clauses hereof entitled "Davis-Bacon Act," "Contract Work Hours and Safety Standards Act—Overtime Compensation," "Apprentices and Trainees," "Payrolls and Basic Records," "Compliance with Copeland Regulations," "Withholding of Funds," and "Subcontracts" may be grounds for termination of the contract, and for debarment as provided in 29 CFR 5.6.

9. DISPUTES CONCERNING LABOR STANDARDS

Disputes arising out of the labor standards provisions of this contract shall be subject to the Disputes clause except to the extent such disputes involve the meaning of classifications or wage rates contained in the wage determination decisions of the Secretary of Labor or the applicability of the labor provisions of this contract which questions shall be referred to the Secretary of Labor in accordance with the procedures of the Department of Labor.

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DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA

(This clause is applicable to all contracts and purchase orders of $10,000 or more.)

(a) The contractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam Era in regard to any position for which the employee or applicant for employment is qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans status in all employment practices such as the following: employment upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(b) The contractor agrees that all suitable employment openings of the contractor which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment of the contractor other than the one wherein the contract is being performed but excluding those of independently operated corporate affiliates, shall be listed at an appropriate local office of the State employment service system wherein the opening occurs. The contractor further agrees to provide such reports to such local office regarding employment openings and hires as may be required.

State and local government agencies holding Federal contracts of $10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service, but are not required to provide those reports set forth in paragraphs (d) and (e).

(c) Listing of employment openings with the employment service system pursuant to this clause shall be made at least concurrently with the use of any other recruitment source or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and nonveterans. The listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the contractor from any requirements in Executive Orders or regulations regarding nondiscrimination in employment.

(d) The reports required by paragraph (b) of this clause shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the contractor has more than one hiring location in a State, with the central office of that State employment service. Such reports shall indicate for each hiring location (1) the number of individuals hired during the reporting period, (2) the number of nondisabled veterans of the Vietnam era hired, (3) the number of disabled veterans of the Vietnam era hired, and (4) the total number of disabled veterans hired. The reports should include covered veterans hired for on-the-job training under 38 USC 1787. The contractor shall submit a report within 30 days after the end of each reporting period wherein any performance is made on this contract identifying data for each hiring location. The contractor shall maintain at each hiring location copies of the reports submitted until the expiration of one year after final payment under the contract, during which time these reports and related documentation shall be made available, upon request, for examination by any authorized representatives of the contracting officer or of the Secretary of Labor. Documentation would include personnel records respecting job openings, recruitment and placement.

(e) Whenever the contractor becomes contractually bound to the listing provisions of this clause, it shall advise the employment service system in each State where it has establishments of the name and location of each hiring location in the State. As long as the contractor is contractually bound to these provisions and has so advised the State system, there is no need to advise the State system of subsequent contracts. The contractor may advise the State system when it is no longer bound by this contract clause.

(f) This clause does not apply to the listing of employment openings which occur and are filled outside of the 50 States, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands.

(g) The provisions of paragraphs (b), (c), (d) and (e) of this clause do not apply to openings which the contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of his own organization or employer-union arrangement for that opening.

(h) As used in this clause: (1) "All suitable employment openings" includes, but is not limited to, openings which occur in the following job categories: production and nonproduction; plant and office; laborers and mechanics; supervisory and nonsupervisory; technical; and executive, administrative, and professional openings as are compensated on a salary basis of less than $25,000 per year. This term includes full-time employment, temporary employment of more than 3 days' duration, and part-time employment. It does not include openings which the contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement nor openings in an educational institution which are restricted to students of that institution. Under the most compelling circumstances an employment opening may not be suitable for listing, including such situations where the needs of the Government cannot reasonably be otherwise supplied, where listing would be contrary to national security, or where the requirement of listing would otherwise not be for the best interest of the Government.

(2) "Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility for serving the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

(3) "Openings which the contractor proposes to fill from within his own organization" means employment openings for which no consideration will be given to persons

outside the contractor's organization (including any affiliates, subsidiaries, and the parent companies) and includes any openings which the contractor proposes to fill from regularly established "recall" lists.

(4) "Openings which the contractor proposes to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings which the contractor proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the contractor and representatives of his employees.

(i) The contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(j) In the event of the contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations relevant orders of the Secretary of Labor issued pursuant to the Act.

(k) The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the contracting officer. Such notice shall state the contractor's obligation under the law to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era for employment, and the rights of applicants and employees.

(l) The contractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the contractor is bound by the terms of the Vietnam Era Veterans Readjustment Assistance Act, and is committed to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam Era.

(m) The contractor will include the provisions of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to the Act, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

UNITED STATES DEPARTMENT OF AGRICULTURE

EMPLOYMENT OF THE HANDICAPPED

(The following clause is applicable to all contracts or purchase orders of $2,500 or more, as required by the regulations of the Secretary of Labor.)

(a) The contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(b) The contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Rehabilitation Act of 1973, as amended.

(c) In the event of the contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

(d) The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor, provided by or through the contracting officer. Such notices shall state the contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

(e) The contractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the contractor is bound by the terms of section 503 of the Act and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

(f) The contractor will include the provisions of this clause in every subcontract or purchase order of $2,500 or more unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the Director, Office of Federal Contract Compliance Programs, may direct to enforce such provisions, including action for noncompliance.

STANDARD FORM 24 JUNE 1964 EDITION GENERAL SERVICES ADMINISTRATION FED. PROC. REG. (41 CFR) 1-16.801	**BID BOND** *(See Instructions on reverse)*	24-103	DATE BOND EXECUTED *(Must not be later than bid opening date)*

PRINCIPAL *(Legal name and business address)*	TYPE OF ORGANIZATION *("X" one)* ☐ INDIVIDUAL ☐ PARTNERSHIP ☐ JOINT VENTURE ☐ CORPORATION STATE OF INCORPORATION

SURETY(IES) *(Name and business address)*

PENAL SUM OF BOND					BID IDENTIFICATION	
PERCENT OF BID PRICE	AMOUNT NOT TO EXCEED				BID DATE	INVITATION NO. SCS-12-AZ-80
	MILLION(S)	THOUSAND(S)	HUNDRED(S)	CENTS	FOR *(Construction, Supplies or Services)*	Construction

KNOW ALL MEN BY THESE PRESENTS, That we, the Principal and Surety(ies) hereto, are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally: *Provided,* That, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety, but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the bid identified above.

NOW, THEREFORE, if the Principal, upon acceptance by the Government of his bid identified above, within the period specified therein for acceptance (sixty (60) days if no period is specified), shall execute such further contractual documents, if any, and give such bond(s) as may be required by the terms of the bid as accepted within the time specified (ten (10) days if no period is specified) after receipt of the forms by him, or in the event of failure so to execute such further contractual documents and give such bonds, if the Principal shall pay the Government for any cost of procuring the work which exceeds the amount of his bid, then the above obligation shall be void and of no effect.

Each Surety executing this instrument hereby agrees that its obligation shall not be impaired by any extension(s) of the time for acceptance of the bid that the Principal may grant to the Government, notice of which extension(s) to the Surety(ies) being hereby waived; provided that such waiver of notice shall apply only with respect to extensions aggregating not more than sixty (60) calendar days in addition to the period originally allowed for acceptance of the bid.

IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this bid bond and have affixed their seals on the date set forth above.

PRINCIPAL			
Signature(s)	1. *(Seal)*	2. *(Seal)*	*Corporate Seal*
Name(s) & Title(s) *(Typed)*	1.	2.	

INDIVIDUAL SURETIES			
Signature(s)	1. *(Seal)*	2. *(Seal)*	
Name(s) *(Typed)*	1.	2.	

CORPORATE SURETY(IES)					
SURETY A	Name & Address		STATE OF INC.	LIABILITY LIMIT	*Corporate Seal*
	Signature(s)	1.	2.		
	Name(s) & Title(s) *(Typed)*	1.	2.		

CORPORATE SURETY(IES) (Continued)					
SURETY B	Name & Address		STATE OF INC.	LIABILITY LIMIT	*Corporate Seal*
	Signature(s)	1.	2.		
	Name(s) & Title(s) *(Typed)*	1.	2.		
SURETY C	Name & Address		STATE OF INC.	LIABILITY LIMIT	*Corporate Seal*
	Signature(s)	1.	2.		
	Name(s) & Title(s) *(Typed)*	1.	2.		
SURETY D	Name & Address		STATE OF INC.	LIABILITY LIMIT	*Corporate Seal*
	Signature(s)	1.	2.		
	Name(s) & Title(s) *(Typed)*	1.	2.		
SURETY E	Name & Address		STATE OF INC.	LIABILITY LIMIT	*Corporate Seal*
	Signature(s)	1.	2.		
	Name(s) & Title(s) *(Typed)*	1.	2.		
SURETY F	Name & Address		STATE OF INC.	LIABILITY LIMIT	*Corporate Seal*
	Signature(s)	1.	2.		
	Name(s) & Title(s) *(Typed)*	1.	2.		
SURETY G	Name & Address		STATE OF INC.	LIABILITY LIMIT	*Corporate Seal*
	Signature(s)	1.	2.		
	Name(s) & Title(s) *(Typed)*	1.	2.		

INSTRUCTIONS

1. This form is authorized for use whenever a bid guaranty is required in connection with construction work or the furnishing of supplies or services. There shall be no deviation from this form without approval by the Administrator of General Services.

2. The full legal name and business address of the Principal shall be inserted in the space designated "Principal" on the face of this form. The bond shall be signed by an authorized person. Where such person is signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of his authority must be furnished.

3. The penal sum of the bond may be expressed as a percentage of the bid price if desired. In such cases, a maximum dollar limitation may be stipulated (e.g., 20% of the bid price but the amount not to exceed _____ dollars).

4. (a) Corporations executing the bond as sureties must be among those appearing on the Treasury Department's list of approved sureties and must be acting within the limitations set forth therein. Where more than a single corporate surety is involved, their names and addresses (city and State) shall be inserted in the spaces (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)", and in the space designated "SURETY(IES)" on the face of this form only the letter identification of the Sureties shall be inserted.

(b) Where individual sureties execute the bond, they shall be two or more responsible persons. A completed Affidavit of Individual Surety (Standard Form 28), for each individual surety, shall accompany the bond. Such sureties may be required to furnish additional substantiating information concerning their assets and financial capability as the Government may require.

5. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Seal"; and, if executed in Maine or New Hampshire, shall also affix an adhesive seal.

6. The name of each person signing this bid bond should be typed in the space provided.

e43—16—83440-1

STANDARD FEDERAL EQUAL EMPLOYMENT
OPPORTUNITY CONSTRUCTION CONTRACT
SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Porgrams, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not refferred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minoirty person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources complied under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc. prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO polciy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct it recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorilites and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minoirty groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a

particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 604.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

SOIL CONSERVATION SERVICE
SUPPLEMENT TO OSHA PART 1926
CONSTRUCTION STANDARDS AND INTERPRETATIONS

The contractor is to comply with OSHA Part 1926, Construction Standards and Interpretations, in effect on the date of issuance of bids and with this supplement.

Requests for waivers from this supplement are to be made to the contracting officer in writing supported by evidence that every reasonable effort has been made to comply with the contractural requirements. The contractor is to hold and save the Soil Conservation Service (Contracting Local Organization in locally awarded contracts) free from any claims or causes of action whatsoever resulting from the contractor or his or her subcontractors proceeding under a waiver or approved adaptation.

Copies of OSHA Part 1926 Construction Standards and Interpretations may be obtained from:

Superintendent of Documents
U. S. Government Printing Office
Washington, D.C. 20402

GENERAL CONTRACTOR REQUIREMENTS

1.1 SAFETY PROGRAM. Each contractor is to demonstrate that he or she has facilities for conducting a safety program commensurate with the work under contract. The contractor is to submit in writing a proposed comprehensive safety program to the contracting officer for approval before the start of construction operations. The program is to specifically state what provisions the contractor proposes to take for the health and safety of all employees.

1.2 PRECONSTRUCTION SAFETY MEETING. Representatives of the contractor are to meet with the contracting officer's authorized representative before the start of construction to discuss safety standards and requirements applicable to the work under contract.

1.3 JOINT SAFETY POLICY COMMITTEE. The contractor is to participate in monthly meetings of a Joint Safety Policy Committee, composed of SCS and contractor supervisory personnel. At these meetings the contractor's project manager and the contracting officer's representative will review the effectiveness of the contractor's safety effort and coordinate safety activities.

1.4 SAFETY PERSONNEL. Each contractor is to designate a competent supervisory employee to carry out the safety program.

1.5 SAFETY MEETINGS. A minimum of one "on-the-job" or "toolbox" safety meeting is to be conducted each week by all field supervisors or formen and attended by all mechanics and laborers at the worksite. The contractor also is to conduct regularly scheduled supervisory safety meetings at least monthly for all levels of job supervision.

1.6 FIRST AID TRAINING. Every contractor foreman must have a Bureau of Mines or American Red Cross first aid certificate. The contractor is to provide first aid instruction to comply with this requirement.

1.7 REPORTS. Each contractor is to maintain an accurate record of, and report to the contracting officer in the manner and on forms prescribed by the contracting officer, all cases of death, occupational disease, or disabling injury arising out of or in the course of employment incident to contract work. All fatal or serious injuries are to be reported immediately to the contracting officer's field representative, and every assistance is to be given in the investigation of the incident, including submission of a comprehensive narrative report to the contracting officer's authorized representative. Other accidental occurrences with serious accident potential such as equipment failures, slides, cave-ins, etc., must also be reported immediately. The contractor is to assist and cooperate fully with the contracting officer's representatives in conducting accident investigations. The contracting officer's authorized representative is to be furnished all information and data pertinent to investigation of an accident.

FIRST AID AND MEDICAL FACILITIES

2.1 CLASS A--FIRST AID FACILITIES (100 or fewer employees).

2.1.1 First Aid Kits. On projects where 100 or fewer workers (total number of employees on all shifts) are employed, 16-unit first aid kits are to be provided at accessible points in the ratio of at least one kit for each 25 employees. The first aid kits are to be moistureproof and dusttight, and the contents of the kits are to be replenished as used.

2.1.2 Emergency First Aid. At least one supervisor qualified to administer emergency first aid must be available on each shift and duly designated by the contractor to care for injured employees.

2.1.3 Communication and Transportation. The contractor is to make necessary arrangements for prompt and dependable communications, transportation, and medical care for injured employees. At least one stretcher and two blankets must be readily available for transporting injured employees.

2.2 FIRST AID AND MEDICAL REPORTS

2.2.1 Type of Records. The contractor is to maintain a first aid treatment and medical record system on all projects. Such records are to include:

(a) a daily treatment log listng chronologically all patients visiting the facility for occupational injuries and illnesses;

(b) cumulative individual injury records;

(c) monthly statistical records of occupational injuries, classified by type and nature of injury; and

(d) required worker's compensation records

2.2.2 Availability of Records. Records are to be readily available to the contracting officer.

2.3 GENERAL

2.3.1 Certification of Insurance. Contractors are to provide the contracting officer or his or her authorized representative with certificates of insurance before the start of operations indicating full compliance with State workmen's compensation statutes.

2.3.2 Signs, and Directional Markings. Adequate identification and directional markers are to be provided to readily denote the location of all first aid stations.

2.3.3 Emergency Lighting. Emergency lighting is to be provided at all first aid stations.

PHYSICAL QUALIFICATION OF EMPLOYEES

3.1 REQUIREMENT. Persons employed throughout the course of the contract are to be physically qualified to perform their assigned duties. Employees must not knowingly be permitted or required to work while their ability or alertness is so impaired by fatigue, illness, or any other reason that it may expose themselves or others to injury.

3.2 MINORS AND WOMEN WORKERS. The contractor is to comply with all applicable Federal and State laws on employment of minors and women.

3.3 HEAVY EQUIPMENT OPERATORS. It is recommended that operators of trucks and heavy construction equipment be given physical examinations to determine if they are physically qualified to perform their assigned work without endangering themselves or others.

3.4 PHYSICAL EXAMINATIONS REQUIRED

3.4.1 Hoist Operators. Operators of material hoists are to be examined and provided with a physician's certificate stating that they are physically qualified to safely operate hoisting equipment before they are assigned to operate a hoist. At least once a year thereafter they shall obtain a physician's certificate of physical fitness. A copy of each certificate is to be submitted to the contracting officer.

3.4.2 Motor Vehicle Operators. Operators of motor vehicles engaged primarily in the transportation of personnel are to be 18 years of age or older and have a valid State operator's permit or license for the equipment being operated. The operator must have passed a physical examination within the past year.

3.4.3 Marine Divers. Divers must be fully qualified by training, experience, and physical condition to perform this type of diving and to perform the work. A current physician's certification of physical fitness to perform diving is required for all diving personnel.

PERSONAL PROTECTIVE EQUIPMENT

4.1 HARD HATS

4.1.1 Hard Hat Areas. "Hard Hat Areas" include all locations where construction work of any nature is in progress and the entire jobsite with the exception of shop interiors, offices, and identified visitor parking areas. All employees (including equipment operators and field mechanics) and others entering the area are required, without exception, to wear hard hats. The contractor is to provide hard hats for visitors entering "Hard Hat Areas."

4.1.2 Posting. Signs at least 3 by 4 feet in size, with the following wording are to be erected at the access to construction areas:

"CONSTRUCTION AREA--HARD HATS REQUIRED
BEYOND THIS POINT"

The signs are to be furnished and erected by the contractor at locations designated by the contracting officer's authorized representative.

4.2 SAFETY GOGGLES (DRILLERS)

4.2.1 Drillers and Helpers. Drillers and helpers operating pneumatic rock drills must wear protective safety goggles.

4.3 SAFETY BELTS AND LINES

4.3.1 Requirement. Employees working from unguarded heights, on steep slopes, or oterhwise subjected to possible falls from heights not protected by fixed scaffolding, guardrails, or safety nets must be secured by safety belts and lifelines.

4.3.2 Lifelines. Lifelines are to be secured to at least two substantial anchorages or structural members.

4.3.3 Inspection and Maintenance. Safety belts, lifelines, and accessories are to be inspected daily and maintained in safe condition.

MACHINERY AND MECHANIZED EQUIPEMENT

5.1 GENERAL

5.1.1 Safe Condition. Before any machinery or mechanized equipment is initially used on the job, it must be inspected and tested by qualified contractor personnel and determined to be in safe operating condition and appropriate for the intended use. Operators are to be instructed to check their equipement daily before use and report any deficiencies to management. Safety equipment installed on machinery is to be used by equipment operators.

5.1.2 Electric-driven Equipment. Electric-driven equipment is to be installed with provision for tagging and/or locking out the controls while under repair. An approved lockout and/or tagout procedure is to be established, prescribing specific responsibilities and safety procedures to be followed by the person or persons performing the repair work. Mixer barrels are to be securely locked out before permitting employees to enter them for cleaning or repair.

5.1.3 Conductors. Conductors rated 440 volts and greater are not to be laid on the ground unless they are heavy-duty armored type or shielded type. Such cables used to supply power to moving equipment must be moved only with the aid of nonconductive safety tongs, and if energized at over 5,000 volts, by worker's wearing tested and approved-type electician's hot sticks or gloves.

5.1.4 Posting for High-Voltage Lines. A notice of the 10-foot limitation required by 1926.550, Subpart N, is to be posted in the operator's cab of cranes, shovels, backhoes, and related equipment.

5.2 HAUL ROADS FOR EQUIPMENT

5.2.1 Road Maintenance. The contractor must maintain haul roads and access roads in a safe condition so as to eliminate or control dust and ice hazards. Wherever dust conditions exist, adequate dust-laying equipment must be available at the jobsite and utilized to prevent dust from obscuring vision.

5.2.2 Single-lane Haul Roads. Single-lane haul roads with two-way traffic is to be provided with adequate turnouts. Where adequate turnouts are not practical, a control system is to be provided to prevent vehicle accidents.

5.2.3 Two-way Haul Roads. On two-way traffic haul roads, arrangements are to be such that vehicles travel on the right side wherever possible. Signs and traffic control devices are to be employed to indicate clearly any variation from a right-hand traffic pattern. The width of the road must be adequate to permit safe passage of opposing traffic considering the type of haulage equipment used.

5.2.4 Design and Construction of Haul Roads. Haul road design criteria and drawings if requested by the contracting officer are to be submitted for the approval of the contracting officer's representative prior to road construction.

5.2.5 Operators. Machinery and mechanized equipment is to be operated only by authorized persons.

5.2.6 Riding on Equipment. Riding on equipment by unauthorized personnel is prohibited. Seating shall be provided for the operator and all passengers.

5.2.7 Getting On or Off Equipment. Getting on or off equipment, such as tractors, cranes, or excavation equipment, while the equipment is in motion is prohibited.

5.2.8 Hours of Operation. Except in emergencies, an equipment operator may not be permitted to operate any mobile or hoisting equipment for more than 12 hours without a continuous 8-hour rest interval.

5.3 POWER CRANES AND HOISTS (TRUCK CRANES, CRAWLER CRANES, TOWER CRANES, GANTRY CRANES, HAMMERHEAD CRANES, DERRICKS, CABLEWAYS, AND HOISTS)

5.3.1 Performance Test. Before initial onsite operation, power cranes, derricks, cableways, and hoists must satisfactorily complete a performance test to demonstrate the equipment's ability to safely handle and maneuver the rated loads.

5.3.2 Performance Test--Power Cranes (Crawler-mounted, truck-mounted, and whell-mounted). The performance test is to be carried out with out-riggers set and with a test load weighing 115 percent of the manufacturer's rating for the boom radius selected by the contractor. The test is to consist of raising, lowering, and braking the load and rotating the test load through 360° at the specified boom angle or radius. Cranes equipped with jibs or boom-tip extensions are to be tested using both the main boom and the jib, with an appropriate test load in each case.

5.3.3 Performance Test--Derricks, Tower Cranes, Cableways, and Hoists. Derricks, gantry cranes, tower cranes, cableways, and hoists, including overhead cranes, are to be performance tested with a test load weighing 115 percent of the manufacturer's rating. In testing cableways, the test load is to be traveled to the upstream and downstream limits of travel and thoroughly performance tested in at least three travel positions, including both limits of travel.

5.3.4 Boom Angle Indicator. OSHA Part 1926.550(a) is supplemented to require that power cranes be provided with a boom angle indicator in good working order.

5.3.5 Crane Test Certification. The performance test required by 5.3.2 or 5.3.3 is fulfilled if the contractor provides the contracting officer a copy of a certificate of inspection made within the past 12 months by a competent person or by a government or private agency satisfactory to the contracting officer.

5.4 ROLLOVER PROTECTIVE STRUCTURES (ROPS).

5.4.1 Rollover Protective Structures. Overhead Protection Part 1926, Subpart W, Sections 1000, 1001, and 1002 are applicable regardless of the year in which the equipment was manufactured and regardless of the struck capacity of the equipment.

5.4.2 Skid-steer and Compactor Equipment. Skid-steer equipment and self-propelled compactor equipment is to be equipped with ROPS as provided by Part 1926.1001.

CONSTRUCTION SPECIFICATION

2. CLEARING AND GRUBBING

1. SCOPE

The work shall consist of the clearing and grubbing of designated areas by removal and disposal of trees, snags, logs, stumps, shrubs and rubbish.

2. MARKING

The limits of the areas to be cleared and grubbed will be marked by means of stakes, flags, tree markings or other suitable methods. Trees to be left standing and uninjured will be designated by special markings placed on the trunks at a height of about six feet above the ground surface.

3. REMOVAL

All trees not marked for preservation and all snags, logs, brush, stumps, shrubs and rubbish shall be removed from within the limits of the marked areas. Unless otherwise specified, all stumps, roots and root clusters having a diameter of one inch or larger shall be grubbed out to a depth of at least two feet below subgrade elevation for concrete structures and one foot below the ground surface at embankment sites and other designated areas.

4. DISPOSAL

Unless otherwise specified, all materials removed from the cleared and grubbed areas shall be burned or buried at locations approved by the Engineer or otherwise disposed of as approved by the Engineer.

5. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the cleared and grubbed area will be measured to the nearest 0.1 acre. Payment for clearing and grubbing will be made for the total area within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the completion of the work.

(Method 2) For items of work for which specific unit prices are established in the contract, the length of the cleared and grubbed area will be measured to the nearest full station (100 feet) along the line designated on the drawings or in the specifications. Payment for clearing and grubbing will be made for the total length within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to completion of the work.

(Method 3) For items of work for which specific unit prices are established in the contract, each tree, stump and snag having a diameter of 4 inches or greater and each log having a diameter of 4 inches or greater and a length of 10 feet or greater will be measured prior to removal. The size of each tree and snag will be determined by measuring its trunk at breast height above the natural ground surface. The size of each log will be determined by measuring the butt and by measuring its length from butt to tip. The size of each stump will be measured at the top. Diameter shall be determined by dividing the measured circumference by 3.14.

Payment for clearing and disposal of each tree, stump and snag having a diameter of 4 inches or greater and each log having a diameter of 4 inches or greater and a length of 10 feet or greater will be made at the contract unit price for its size designation as determined by the following schedule:

Measured Diameter	Size Designation
4 inches to 8 inches	6-inch size
Over 8 inches to 12 inches	10-inch size
Over 12 inches to 24 inches	18-inch size
Over 24 inches to 36 inches	30-inch size
Over 36 inches to 60 inches	48-inch size
Over 60 inches	60-inch size

The sum of such payments shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the work of completely clearing and grubbing the designated areas, including clearing, grubbing and disposal of smaller trees, stumps, snags and logs and brush, shrubs, roots and rubbish.

(Method 4) For items of work for which specific lump sum prices are established in the contract, payment for clearing and grubbing will be made at the contract lump sum price. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to completion of the work.

(Use with all Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 6 of this specification.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 1, Clearing and Grubbing

(1) This item shall consist of clearing and grubbing within the limits of the dam, principal spillway inlet channel, reservoir borrow areas, drain channel between Basin #1 and Basin #2 and vegetative outlet channels as shown on the drawings and staked in the field.

(2) In Section 4, Disposal, Waste materials not burned shall be disposed of by burying in the borrow areas adjacent to the drain channel as shown on the drawings and staked in the field. They shall be covered by a minimum of 18 inches of soil. After disposal, the waste areas shall be smoothed and graded to blend into the surrounding terrain.

(3) Measurement and payment will be by Method 1, and will include compensation for Subsidiary Item, Structure Removal.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 1, Clearing and Grubbing

(1) This item shall consist of clearing and grubbing the limits of the diversion and vegetative outlet channels as shown on the drawings and staked in the field.

(2) In Section 4, Disposal, unburned waste materials shall be disposed of by burying at the waste area on the downstream side of the dike as shown on the drawings. They shall be covered by a minimum of 12 inches of soil.

(3) Measurement and payment will be by Method 2, and will include compensation for Subsidiary Item, Structure Removal.

CONSTRUCTION SPECIFICATION

3. STRUCTURE REMOVAL

1. SCOPE

The work shall consist of the removal, salvage and disposal of structures (including fences) from the designated areas.

2. MARKING

(Method 1) Each structure unit to be removed will be marked by means of stakes, flags, painted markers or other suitable methods.

(Method 2) The limits of the areas from which structures must be removed will be marked by means of stakes, flags or other suitable methods. Structures to be preserved in place or salvaged will be designated by special markings.

3. REMOVAL

(Method 1) All structures designated in the contract for removal shall be removed to the specified extent and depth.

(Method 2) Within the areas so marked all visible structures and attachments and all buried structures located and identified by survey stakes shall be removed to the specified extent and depth.

4. SALVAGE

Structures that are designated to be salvaged shall be carefully removed and neatly placed in the specified storage areas. Salvaged structures that are capable of being disassembled shall be dismantled into individual members or sections. Such structures shall be neatly matchmarked with paint prior to disassembly. All pins, nuts, bolts, washers, plates and other loose parts shall be marked or tagged to indicate their proper locations in the structure and shall be fastened to the appropriate structural member or packed in suitable containers. Materials from fences designated to be salvaged shall be placed outside the work area on the property from which they were removed. Wire shall be rolled into uniform rolls of convenient size. Posts and rails shall be neatly piled.

5. DISPOSAL OF REFUSE MATERIALS

Unless otherwise specified, refuse materials resulting from structure removal shall be burned or buried at locations approved by the Engineer or otherwise disposed of as specified or as approved by the Engineer.

6. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, payment for the removal of each structure unit, except fences, will be made at the contract unit price. Fences removed or removed and salvaged will be measured to the nearest linear foot. Payment for fence removal or removal and salvage will be made at the contract unit prices appropriate to each type and size of fence. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

(Method 2) For items of work for which specific lump sum prices are established in the contract, payment for structure removal will be made at the contract lump sum price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Structure Removal

(1) This item shall consist of structure removal within the construction limits at the following locations:

(a) Sta. 209+00± C/L dam, approx. 120 lin. ft. concrete ditch
(b) Sta. 123+00± C/L drain channel, approx. 325 lin. ft. concrete ditch
(c) Sta. 238+50± C/L dam, approx. 65 lin. ft. concrete ditch
(d) Sta. 149+00± C/L drain channel, approx. 200 lin. ft. concrete ditch
(e) Sta. 271+20± C/L dam, approx. 40 lin. ft. and Sta. 164+00± C/L drain channel, approx. 320 lin. ft., 1¼-inch Arizona Public Service gas line (abandoned).

(2) Marking shall be by Method 2.

(3) Removal shall be by Method 2.

(4) Structures removed shall be disposed of by burying in the borrow areas adjacent to the drain channel as shown on the drawings and staked in the field. They shall be covered by a minimum of 18 inches of soil. After disposal, the waste areas shall be smoothed and graded to blend into the surrounding terrain.

(5) No separate payment will be made for Structure Removal. Compensation for Structure Removal will be included in payment for Bid Item 1, Clearing and Grubbing.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Structure Removal

(1) This item shall consist of structure removal within the construction limits at the following location:

(a) Barbed wire fence at Station 86+81, 4 diversion.

(2) Marking shall be by Method 2.

(3) Removal shall be by Method 2.

(4) Structures removed shall be disposed of by burying in the waste area on the downstream side of the dike as shown on the drawings. They shall be covered by a minimum of 12 inches of soil. After disposal, the waste areas shall be smoothed and graded to blend into the surrounding terrain.

(5) No separate payment will be made for Structure Removal. Compensation for structural removal will be included in payment for Bid Item 1, Clearing and Grubbing.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Structure Removal

(1) This item shall consist of structure removal within the construction limits at the following locations:

(a) Asphalt pavement at Courthouse Road crossing the diversion, Station 2+50 to Station 5+04.86, ℄ Courthouse Road.

(2) Marking shall be by Method 2.

(3) Removal shall be by Method 2.

(4) Structures removed shall be disposed of by burying in the waste area on the downstream side of the diversion dike as shown on the diversion drawings. They shall be covered by a minimum of 12 inches of soil. After disposal, the waste areas shall be smoothed and graded to blend into the surrounding terrain so as not to interfere with the natural drainage pattern.

(5) No separate payment will be made for Structure Removal. Compensation for Structure Removal will be included in Bid Item 1, Structure Excavation.

CONSTRUCTION SPECIFICATION

6. SEEDING AND MULCHING FOR PROTECTIVE COVER

1. SCOPE

The work shall consist of preparing the area for treatment, furnishing and placing seed, mulch, fertilizer, inoculant, soil amendments and asphalt emulsion as specified in the designated areas.

2. MATERIALS

Seed - All seed shall conform to the current rules and regulations of the state where it is being used and from the latest crop available. It shall meet or exceed the standards for purity and germination listed in Section 7.

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

Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percent of noxious weed seed allowable shall be as defined in the current state laws relating to agricultural seeds. Each type of seed shall be delivered in separate sealed containers and fully tagged unless exception is granted in writing by the contracting officer.

Fertilizer - Unless otherwise specified the fertilizer shall be a commercial grade fertilizer or as specified in Section 7. The fertilizer shall meet the standard for grade and quality specified by state law. Where fertilizer is furnished from bulk storage, the Contractor shall furnish a supplier's certification of analysis and weight. When required by the contract, a representative sample of the fertilizer shall be furnished the Government Representative for chemical analysis.

Inoculants - The inoculent for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container or as otherwise specified. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. Two times the amount of the inoculant

recommended by the manufacturer shall be used, except when seed is applied by use of hydraulic seeder, four times the amount of inoculant recommended by the manufacturer shall be used. Seed shall be sown within 24 hours of treatment and shall not remain in the hydraulic seeder longer than 4 hours.

Soil amendments - Lime shall consist of Standard Ground Agricultural Limestone, or approved equivalent. Standard Ground Agricultural Limestone is defined as ground limestone meeting current requirements of the State Department of Agriculture. Agricultural lime or other needed soil amendments will be uniformly applied at the rate specified in Section 7 of this specification.

Asphalt emulsion shall conform to the requirements of ASTM D-977, "Emulsified Asphalt." The emulsified asphalt may be rapid setting, medium setting, or slow setting.

Straw mulch materials shall consist of wheat, oat, or rye straw, hay, grass clippings cut from any native grasses or other plants approved by the Government Representative. The mulch material shall be air dry, reasonably light in color, and shall not be musty, moldy, caked, or otherwise of low quality. The use of mulch that contains noxious weeds will not be permitted. The Contractor shall provide a method satisfactory to the Government Representative for determining weight of mulch furnished.

Other mulch materials - Mulching materials, such as wood cellulose fiber mulch, emulsion type, synthetic fiber mulch, netting, and mesh are other mulching materials that may be required for specialized locations and conditions. These materials, when specified, must be accompanied by the manufacturers' recommendations for methods of application.

3. SEEDING MIXTURES AND DATES OF PLANTING

Seed mixtures per acre rates and date of seeding shall be as specified in Section 7, shown on the vegetating plan, or as otherwise approved by the Government Representative.

4. SEEDED PREPARATION AND TREATMENT

Disturbed areas will be treated with seed, sod, sprigs, mulch, fertilizer, and soil amendments as specified in this construction specifications. Areas to be treated shall be dressed to a reasonably smooth, firm surface. Fertilizer shall be uniformly applied at the rate specified in Section 7 of this specification. The seed mixture or sprigs shall be applied at the rate specified in Section 7 of this specification. Where mulch is needed it shall be uniformly applied at the rate specified in Section 7 of this specification.

On sites where equipment can operate, (generally slopes flatter than 1-½ to 1), the seedbed shall be adequately loosened (4 to 6 inches deep) and smoothed. Disking or cultipacking or both may be necessary as determined by the Engineer.

On sites where equipment cannot operate, the seedbed shall be prepared by hand by scarifying to provide a roughened surface so that boradcast seed will stay in place.

If seeding is to be done immediately following construction, seedbed preparation may not be required except on compacted, polished, or freshly cut areas.

Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance shall be removed or disposed of as directed by the Engineer.

Seedbed preparation shall be suspended when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed as determined by the Engineer.

5. SEEDING, FERTILIZING, MULCHING, AND STABILIZING

All seeding operations shall be performed in such a manner that the seed is applied in the specified quantities uniformly on the designated areas. The method of seed applications shall be as specified in Section 7 and may consist of any combination of: drilling, hydroseeding, pneumatic seeding, and broadcasting seeding. Unless otherwise specified, seeding shall be done within 2 days after final grading is complete.

Fertilizer and soil amendments shall be applied as specified in Section 7. When specified the fertilizer and soil amendments shall be thoroughly incorporated into the soil as soon as possible after being applied.

The rate, amount, and kind of mulching or mesh shall be as specified in Section 7. Mulches shall be applied uniformly to the designated areas, and shall be applied to the seeded areas not later than 2 work days after seeding has been performed. Straw mulch materials shall be stabilized by the use of a disk or by the use of asphalt emulsion. An adequately weighted disk harrow shall have the disks set straight and the harrow shall be used to adequately anchor the straw mulch into the soil.

The asphalt emulsion shall be applied uniformly over the mulch material at the specified rate, or by injecting it into the mulch material as it is being applied. The mesh or netting stabilizing materials shall be applied smoothly but loosley on the designated areas, and the edges shall be buried or securely anchored by means of spikes or staples.

The Contractor shall maintain the mesh or netting areas until all work on the entire contract has been completed and accepted. Maintenance shall consist of the repair of areas damaged by erosion, wind, fire, or other causes. Such areas shall be repaired to reestablish the condition and grade of the soil and shall be refertilized, reseeded, and remulched as directed prior to application of the mesh or netting.

6. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, each area treated as specified will be measured to the nearest 0.1 acre. Payment for treatment will be made at the contract unit price for the designated treatment which shall constitute full compensation for all materials, labor, equipment, tools, and other items necessary and incidental to the completion of the work.

Mesh or netting will be measured to the nearest square yard of surface area covered. Payment will be made at the contract unit price and shall constitute full compensation for all labor, equipment, materials and other items necessary and incidental to the completion of work, including the mesh or netting and necessary anchors.

For items of work for which specific lump sum prices are established in the contract, the quantity of seeding and mulching for protective cover will not be measured for payment. Payment for this item will be made at the contract lump sum price for the item and shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subisdiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in accordance with this specification and the construction details are:

a. Bid Item 2, Seeding

(1) This item shall consist of furnishing and placing seed on all surface areas which are disturbed by construction activities including, but not limited to, the side slopes of the flood retarding structure and Buckeye-Salome Road crossing, the borrow areas, and haul roads.

(2) On slopes flatter than 3 to 1 ripping shall be used to loosen the soil in lieu of disking or cultipacking as required by paragraph two Section 4 SEEDED PREPARATION AND TREATMENT. Ripping shall be on 18 inch centers (maximum) and shall be parallel to the dam where practicable.

(3) Seed shall be applied at the rate of 17.0 pounds of pure live seed (PLS) per acre.

(4) Seed placement will be 1/4 to 1/2 inch deep on slopes flatter than 3 to 1.

(5) Seeding on slopes flatter than 3 to 1 will be done with a rangeland type drill equipped with depth bands and packer wheels. Seeding on slopes of 3 to 1 or steeper may be broadcast or drilled.

(6) Seeding will be done between October 15 and February 15.

(7) Seeding mixture shall be of the species and percentage of mix as shown below.

SEEDING MIXTURE

Genus/Species	Common Name	%Mix	Lbs./Ac.(PLS)
Atriplex polycarpa	Desert Saltbush	3	0.5
Plantago Insularis	Indian Wheat	9	1.5
Encelia farinosa	Brittlebush	15	2.5
Larrea divaricata	Creosote Bush	15	2.5
Atriplex canescenes (dewinged)	Four Wing Saltbush	58	10.0
			17.0

(8) Fertilizer and soil amendments will not be required.

(9) Mulching will not be required.

(10) Payment will be in accordance with Section 6.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in accordance with this specification and the construction details are:

a. Bid Item 2, Seeding

(1) This item shall consist of furnishing and placing seed for replanting all surface areas which are disturbed resulting from construction activities including but not limited to the finished top and side slopes of the dikes; the bottom and side slopes of channels and borrow areas; and haul roads.

(2) The finished surfaces of areas to be seeded shall not be finished to a slick compacted grade but rather shall be left in a condition which will allow the entrapment of seed and moisture to induce vegetation. If, in the opinion of the engineer, the finished surfaces are relatively smooth and in a compacted or polished condition which will not induce the micro-climate conducive to plant growth, the contractor shall rip the surface with a spiked tooth harrow or similiar equipment before placing seed.

(3) Seed shall be applied at the rate of 3.5 pounds pure live seed (PLS) per acre.

(4) Seeding will be broadcast followed by harrowing.

(5) Seeding will be done between October 15 to February 15.

(6) Disking and ripping will not be required.

(7) Seeding mixture shall be of the species and percentage of mix as shown below.

SEEDING MIXTURE

Genus/Species	Common Name	% Mix	Lbs/AC (PLS)
Plantago Insularis	Indian Wheat	40	1.4
Festuca Megalura	Zorro Fescue	11	0.4
Bromus Mollis	Blando Brome	49	1.7
			3.5

(8) Fertilizer and soil amendments will not be required.

(9) Mulching will not be required.

(10) Payment will be in accordance with Section 6.

CONSTRUCTION SPECIFICATION

8. MOBILIZATION

1. SCOPE

The work shall consist of the mobilization of the Contractor's forces and equipment necessary for performing the work required under the contract.

It shall include the purchase of contract bonds; transportation of personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary facilities at the site; and other preparatory work at the site.

It shall not include mobilization for any specific item of work for which payment for mobilization is provided elsewhere in the contract.

The specification covers mobilization for work required by the contract at the time of award. If additional mobilization costs are incurred during performance of the contract as a result of change or added items of work for which the Contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the items of work changed or added.

2. PAYMENT

Payment will be made as the work proceeds, after presentation of invoices by the Contractor showing his own mobilization costs and evidence of the charges of suppliers, subcontractors, and others for mobilization work performed by them. If the total of such payments is less than the contract lump sum for mobilization, the unpaid balance will be included in the final contract payment. Total payment will be the lump sum contract price for mobilization, regardless of actual cost to the Contractor.

Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

Payment of the lump sum contract price for mobilization will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 3 of this specification.

3. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 3, Mobilization

(1) This item shall consist of the mobilization of the contractor's equipment and forces for construction of the Floodwater Retarding Structure.

(2) Measurement and payment will be in accordance with Section 2.

3. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 3, Mobilization

(1) This item shall consist of the mobilization of the contractor's equipment and forces for the construction of the project as shown on the drawings and contained in the specifications.

(2) Measurement and payment will be in accordance with Section 2.

CONSTRUCTION SPECIFICATION

11. REMOVAL OF WATER

1. SCOPE

The work shall consist of the removal of surface water and ground water as needed to perform the required construction in accordance with the specifications. It shall include (1) building and maintaining all necessary temporary impounding works, channels, and diversions, (2) furnishing, installing and operating all necessary pumps, piping and other facilities and equipment, and (3) removing all such temporary works and equipment after they have served their purposes.

2. DIVERTING SURFACE WATER

The Contractor shall build, maintain, and operate all cofferdams, channels, flumes, sumps, and other temporary diversion and protective works needed to divert streamflow and other surface water through or around the construction site and away from the construction work while construction is in progress. Unless otherwise specified, a diversion must discharge into the same natural drainageway in which its headworks are located.

Unless otherwise specified, the Contractor shall furnish to the Engineer, in writing, his plan for diverting surface water before beginning the construction work for which the diversion is required. Acceptance of this plan will not relieve the Contractor of responsibility for completing the work as specified.

3. DEWATERING THE CONSTRUCTION SITE

Foundations, cutoff trenches and other parts of the construction site shall be dewatered and kept free of standing water or excessively muddy conditions as needed for proper execution of the construction work. The Contractor shall furnish, install, operate and maintain all drains, sumps, pumps, casings, wellpoints, and other equipment needed to perform the dewatering as specified. Dewatering methods that cause a loss of fines from foundation areas will not be permitted.

Unless otherwise specified, the Contractor shall furnish to the Engineer, in writing, his plan for dewatering before beginning the construction work for which the dewatering is required. Acceptance of this plan will not relieve the Contractor of responsibility for completing the work as specified.

4. DEWATERING BORROW AREAS

Unless otherwise specified in Section 7, the Contractor shall maintain the borrow areas in drainable condition or otherwise provide for timely and effective removal of surface waters that accumulate, for any reason, within the borrow areas.

5. REMOVAL OF TEMPORARY WORKS

After the temporary works have served their purposes, the Contractor shall remove them or level and grade them to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

Except as otherwise specified, pipes and casings shall be removed from temporary wells and the wells shall be filled to ground level with gravel or other material approved by the Engineer.

6. MEASUREMENT AND PAYMENT

For items of work for which specific lump sum prices are established in the contract, payment for diverting surface water, dewatering construction sites, and dewatering borrow areas will be made at the contract lump sum prices. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Removal of Water

(1) This item shall consist of the temporary diversion of surface water and dewatering of the construction site and borrow areas during the construction period.

(2) No separate payment will be made for removal of water. Compensation for removal of water will be included in payment for Excavation, Bid Items 4 through 6, as appropriate.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Removal of Water

(1) This item shall consist of the temporary diversion of surface water and dewatering of the construction site during the construction period.

(2) No separate payment will be made for removal of water. Compensation for Removal of Water will be included in Bid Item 4, Channel Excavation, Common; Bid Item 5, Channel Excavation, Unclassified; Bid Item 6, Structure Excavation, Common and Bid Item 7, Foundation Excavation, Common.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Removal of Water

(1) This item shall consist of the temporary diversion of surface water and dewatering of the construction site during the construction period.

(2) No separate payment will be made for removal of water. Compensation for removal of water will be included in payment for Bid Item 1, Structure Excavation.

CONSTRUCTION SPECIFICATION

21. EXCAVATION

1. SCOPE

The work shall consist of the excavation required by the drawings and specifications and disposal of the excavated materials.

2. CLASSIFICATION

Excavation will be classified as common excavation or rock excavation in accordance with the following definitions or will be designated as unclassified.

Common excavation shall be defined as the excavation of all materials that can be excavated, transported, and unloaded by the use of heavy ripping equipment and wheel tractor-scrapers with pusher tractors or that can be excavated and dumped into place or loaded onto hauling equipment by means of excavators having a rated capacity of one cubic yard and equipped with attachments (such as shovel, bucket, backhoe, dragline or clam shell) appropriate to the character of the materials and the site conditions.

Rock excavation shall be defined as the excavation of all hard, compacted or cemented materials the accomplishment of which requires blasting or the use of excavators larger than defined for common excavation. The excavation and removal of isolated boulders or rock fragments larger than one cubic yard in volume encountered in materials otherwise conforming to the definition of common excavation shall be classified as rock excavation.

Excavation will be classified according to the above definitions by the Engineer, based on his judgment of the character of the materials and the site conditions.

The presence of isolated boulders or rock fragments larger than one cubic yard in size will not in itself be sufficient cause to change the classification of the surrounding material.

For the purpose of this classification, the following definitions shall apply:

Heavy ripping equipment shall be defined as a rear-mounted, heavy duty, single-tooth, ripping attachment mounted on a tractor having a power rating of 200-300 net horsepower (at the flywheel).

Wheel tractor-scraper shall be defined as a self-loading (not elevating) and unloading scraper having a struck bowl capacity of 12-20 yards.

Pusher tractor shall be defined as a track type tractor having a power rating of 200-300 net horsepower (at the flywheel) equipped with appropriate attachments.

3. UNCLASSIFIED EXCAVATION

Items designated as "Unclassified Excavation" shall include all materials encountered regardless of their nature or the manner in which they are removed. When excavation is unclassified, none of the definitions or classifications stated in Section 2 of this specification shall apply.

4. BLASTING

The transportation, handling, storage, and use of dynamite and other explosives shall be directed and supervised by a person of proven experience and ability in blasting operations.

Blasting shall be done in such a way as to prevent damage to the work or unnecessary fracturing of the foundation and shall conform to any special requirements in Section 12 of this specification.

5. USE OF EXCAVATED MATERIALS

(Method 1) To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of required permanent earth fill or rock fill. The suitability of materials for specific purposes will be determined by the Engineer. The Contractor shall not waste or otherwise dispose of suitable excavated materials.

(Method 2) Suitable materials from the specified excavations may be used in the construction of required earth fill or rock fill. The suitability of materials for specific purposes will be determined by the Engineer.

6. DISPOSAL OF WASTE MATERIALS

(Method 1) All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of at the locations shown on the drawings.

(Method 2) All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of by the Contractor at sites of his own choosing away from the site of the work.

7. BRACING AND SHORING

Excavated surfaces too steep to be safe and stable if unsupported shall be supported as necessary to safeguard the work and workmen, to prevent sliding or settling of the adjacent ground, and to avoid damaging existing improvements. The width of the excavation shall be increased if necessary to provide space for sheeting, bracing, shoring, and other supporting installations. The Contractor shall furnish, place and subsequently remove such supporting installations.

8. STRUCTURE AND TRENCH EXCAVATION

Structure or trench excavation shall be completed to the specified elevations and to sufficient length and width to include allowance for forms, bracing and supports, as necessary, before any concrete or earth fill is placed or any piles are driven within the limits of the excavation.

9. BORROW EXCAVATION

When the quantities of suitable materials obtained from specified excavations are insufficient to construct the specified fills, additional materials shall be obtained from the designated borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas shall be as directed by the Engineer.

Borrow pits shall be excavated and finally dressed in a manner to eliminate steep or unstable side slopes or other hazardous or unsightly conditions.

10. OVEREXCAVATION

Excavation in rock beyond the specified lines and grades shall be corrected by filling the resulting voids with portland cement concrete made of materials and mix proportions approved by the Engineer. Concrete that will be exposed to the atmosphere when construction is completed shall contain not less than 6 sacks of cement per cubic yard of concrete. Concrete that will be permanently covered shall contain not less than 4 1/2 sacks of cement per cubic yard. The concrete shall be placed and cured as specified by the Engineer.

Excavation in earth beyond the specified lines and grades shall be corrected by filling the resulting voids with approved compacted earth fill, except that, if the earth is to become the subgrade for riprap, rock fill, sand or gravel bedding, or drain fill, the voids may be filled with material conforming to the specifications for the riprap, rock fill, bedding or drain fill.

11. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type and class of excavation within the specified pay limits will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Regardless of quantities excavated, the measurement for payment will be made to the specified pay limits, except that excavation outside the specified lines and grades directed by the Engineer to remove unsuitable material will be included, but only to the extent that the unsuitable condition is not a result of the Contractor's operations.

(Method 1) The pay limits shall be as designated on the drawings.

(Method 2) The pay limits shall be defined as follows:

a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated for previous excavation or fill the upper limit shall be modified ground surface resulting from the specified previous excavation or fill.

b. The lower and lateral limits shall be the neat lines and grades shown on the drawings.

(Method 3) The pay limits shall be defined as follows:

a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated for previous excavation or fill the upper limit shall be the modified ground surface resulting from the specified previous excavation or fill.

b. The lower and lateral limits shall be the true surface of the completed excavation as authorized by the Engineer.

(Method 4) The pay limits shall be defined as follows:

a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated for previous excavation or fill the upper limit shall be the modified ground surface resulting from the specified previous excavation or fill.

b. The lower limit shall be at the bottom surface of the proposed structure.

c. The lateral limits shall be 18 inches outside of the outside surfaces of the proposed structure or shall be vertical planes 18 inches outside of and parallel to the footings, whichever gives the larger pay quantity, except as provided in d, below.

d. For trapezoidal channel linings or similar structures that are to be supported upon the sides of the excavation without intervening forms, the lateral limits shall be at the under side of the proposed lining or structure.

e. For the purpose of the definitions in b, c, and d, above, any specified bedding or drain fill directly beneath or beside the structure will be considered to be a part of the structure.

(Use with all Methods) Payment for each type and class of excavation will be made at the contract unit price for that type and class of excavation. Such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to the performance of the work, except that extra payment for backfilling required overexcavation will be made in accordance with the following provisions:

a. Payment for backfilling overexcavation, as specified in Section 10 of this specification, will be made only if the excavation outside specified lines and grades is directed by the Engineer to remove unsuitable material and if the unsuitable condition is not a result of the Contractor's operations. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 12 of this specification.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 12 of this specification.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 4, Channel Excavation, Common

(1) This item shall consist of all excavation required to construct or install the following as shown on the drawings and staked in the field.

(a) The diversion channel between Stations 0+82 and 232+00.

(b) The lateral swales.

(c) The outlet channels for the vegetative conduits.

(d) The access ramps.

(e) The riprap.

(2) In Section 5, Use of Excavated Material, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Material, Method 1 shall apply.

(4) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Removal of Water.

b. Bid Item 5, Channel Excavation, Unclassified

(1) This item shall consist of all excavation required to construct the diversion channel between Station 232+00 and Station 250+00.

(2) In Section 5, Use of Excavated Material, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Material, Method 1 shall apply.

(4) Measurement and payment will be by Method 2 and will include payment for Subsidiary Item, Removal of Water.

c. Bid Item 6, Structure Excavation, Common

(1) This item shall consist of all excavation for vegetative conduits and anti-seep collars, drop structures, weir inlet structures, inlet and outlet structures to vegetative conduits and protective berm to the limits shown on the drawings and staked in the field.

(2) In Section 5, Use of Excavated Material, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Materials, Method 1 shall apply.

(4) Measurement and payment will be by Method 3 and will include compensation for Subsidiary Item, Removal of Water.

d. Bid Item 7, Foundation Excavation, Common

(1) This item shall consist of all foundation excavation within the base area of the diversion dike between the following stations as shown on the drawings and staked in the field.

Station 122+00 and Station 123+00
Station 125+00 and Station 127+00
Station 134+50 and Station 145+00
Station 161+00 and Station 178+50
Station 184+00 and Station 185+50
Station 189+50 and Station 199+50
Station 225+50 and Station 236+50

(2) Excavation shall consist of the removal and disposal of all unconsolidated materials. Approximate depths are shown on the drawings. Final depths will be determined by the Engineer after examination of the materials encountered.

(3) In Section 5, Use of Excavated Materials, Method 1 shall apply.

(4) In Section 6, Disposal of Waste Materials, Method 1 shall apply.

(5) Measurement and payment will be by Method 3 and will include compensation for Subsidiary Item, Removal of Water.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 4, Foundation Excavation, Common

(1) This item shall consist of all required foundation excavation within the base area of the dam between Station 3+00± and Station 272+70± including the cutoff trench as shown on the drawings and staked in the field.

(2) Excavation shall consist of the removal and disposal of all materials resulting from:

(a) Removal of the unconsolidated materials to depths varying generally from zero (0) to eight (8) feet below existing ground.

(b) Cutoff trench excavation to a minimum depth of one (1) foot into cemented soil material.

Approximate depths are shown on the drawings. Final depths will be determined by the Engineer after examination of the materials encountered.

(3) In Section 5, Use of Excavated Materials, Method 1 shall apply.

(4) In Section 6, Disposal of Waste Materials, Method 1 shall apply. Disposal of waste materials shall be at the excavated borrow area adjacent to the drain channel. After waste operations are completed, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern.

(5) Measurement and payment will be by Method 3 and will include payment for removal of water.

b. Bid Item 5, Channel Excavation, Common

(1) This item shall consist of all excavation required to construct the following items including excavation for rock riprap and filter bedding to the lines and grades shown on the drawings.

(a) The principal spillway inlet channel between Station 1+32.50 and Station 34+75, ℄ principal spillway inlet channel.

(b) The drain channel between Station 0+00 and Station 153+00, ℄ drain channel.

(c) Vegetative outlet channels at Stations 60+50, 103+70, 124+10 and 256+00, ℄ of flood retarding structure.

(2) In Section 5, Use of Excavated Materials, Method 1 shall apply.

b. Bid Item 5, Channel Excavation, Common (continued)

(3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. Disposal of waste materials shall be at the excavated borrow area adjacent to the drain channel. After waste operations are completed, the waste fill area shall be smoothed and dressed to blend with the surrounding terrain and not interfere with the natural drainage pattern.

(4) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Removal of Water.

c. Bid Item 6, Structure Excavation, Common

(1) This item shall consist of all common excavation outside the limits of foundation excavation, common, required for the installation of the principal spillway structure and vegetative inlet and outlet structures as shown on the drawings.

(2) In Section 5, Use of Excavated Materials, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. Disposal of waste materials shall be at the excavated borrow area adjacent to the drain channel. After waste operations are completed, the waste fill shall be smoothed and dressed to drain and blend with the surrounding terrain and not interfere with the natural drainage pattern.

(4) Measurement and payment will be by Method 2 and will include payment for removal of water.

d. Subsidiary Item, Borrow Excavation, Common

(1) This item shall consist of all excavation required for obtaining fill materials not available from required excavations to complete the construction of the permanent works.

(2) In Section 5, Use of Excavated Materials, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. Disposal of waste materials shall be at the excavated borrow area adjacent to the drain channel. After waste operations are completed, the waste fill shall be smoothed and dressed to drain and blend with the surrounding terrain and not interfere with the natural drainage pattern.

(4) Completed excavation within the borrow area shall be within the lines and grades shown on the drawings. Borrow area segments shall be terminated at a slope of 4:1.

(5) No separate payment will be made for Borrow Excavation, Common. Compensation for Borrow Excavation, Common will be included in the payment for Earth Fill, Bid Item 8.

12. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 1, Structure Excavation, Common

(1) This item shall consist of all excavation, required for the installation of the Courthouse Road Box Culvert as shown on sheet 22, Saddleback Diversion.

(2) In Section 5, Use of Excavated Materials, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. Disposal of waste materials shall be at the waste area on the downstream side of the Diversion Dike as shown on the Diversion drawings. After waste operations are completed the waste fill area shall be smoothed and dressed to drain and blend with the surrounding terrain and not interfere with the natural drainage pattern.

(4) Measurement and payment will be by Method 2 and will include compensation for Subsidiary Item, Structure Removal and Subisdiary Item, Removal of Water.

b. Subsidiary Item, Borrow Excavation, Common

(1) This item shall consist of all excavation required for obtaining fill materials not available from required excavations to complete the construction of the permanent works.

(2) In Section 5, Use of Excavated Materials, Method 1 shall apply.

(3) In Section 6, Disposal of Waste Materials, Method 1 shall apply. Disposal of waste materials shall be by burying in waste area on the downstream side of the Diversion Dike as shown on the Diversion drawings. After waste operations are completed, the waste fill shall be smoothed and dressed to drain and blend with the surrounding terrain and not interfere with the natural drainage pattern.

(4) Completed excavation within the borrow area shall be within the lines and grades shown on the drawings. Borrow area segments shall be terminated at a slope of 4:1.

(5) No separate payment will be made for Borrow Excavation, Common. Compensation for Borrow Excavation, Common will be included in the payment for Bid Item 3, Earth Fill.

CONSTRUCTION SPECIFICATION

23. EARTH FILL

1. SCOPE

The work shall consist of the construction of earth embankments and other earth fills required by the drawings and specifications.

2. MATERIALS

All fill materials shall be obtained from required excavations and designated borrow areas. The selection, blending, routing and disposition of materials in the various fills shall be subject to approval by the Engineer.

Fill materials shall contain no sod, brush, roots or other perishable materials. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compaction of the fill.

The types of materials used in the various fills shall be as listed and described in the specifications and drawings.

3. FOUNDATION PREPARATION

Foundations for earth fill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.

Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earth fill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earth fill as specified for subsequent layers of earth fill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the earth fill can be compacted against them to effect a good bond between the fill and the abutments.

Rock foundation and abutment surfaces shall be cleared of all loose materials by hand or other effective means and shall be free of standing water when fill is placed upon them. Occasional rock outcrops in earth foundations for earth fill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

Foundation and abutment surfaces shall be not steeper than 1 horizontal to 1 vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earth fill conforming to the specifications for the earth fill to be placed upon the foundation.

4. PLACEMENT

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the Engineer. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

Fill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed the maximum thickness specified. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of fill compacted by manually directed power tampers.

Adjacent to structures, fill shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

Earth fill in dams, levees and other structures designed to restrain the movement of water shall be placed so as to meet the following additional requirements:

a. The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

b. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.

c. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of not less than 2 percent shall be maintained to insure effective drainage, and except as otherwise specified for drain fill zones. If the drawings or specifications require or the Engineer directs that fill be placed at a higher level in one part of an embankment than another, the top surface of each part shall be maintained as specified above.

d. Dam embankments shall be constructed in continuous layers from abutment to abutment except where openings to facilitate construction or to allow the passage of stream flow during construction are specifically authorized in the contract.

e. Embankments built at different levels as described under c or d above shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place shall be stripped of all loose material, and shall be scarified, moistened and recompacted when the new fill is placed against it as needed to insure a good bond with the new fill and to obtain the specified moisture content and density in the junction of the in place and new fill.

5. CONTROL OF MOISTURE CONTENT

During placement and compaction of fill, the moisture content of the materials being placed shall be maintained within the specified range.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement on the fill, if necessary. Uniform moisture distribution shall be obtained by discing, blading or other approved methods prior to compaction of the layer.

Material that is too wet when deposited on the fill shall either be removed or be dried to the specified moisture content prior to compaction.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond it shall be scarified and moistened by sprinkling to an acceptable moisture content prior to placement of the next layer of fill.

6. COMPACTION

Earth fill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction. Each layer of fill shall be compacted as necessary to make the density of the fill matrix not less than the minimum density specified. The fill matrix is defined as the portion of the fill material finer than the maximum particle size used in the compaction test method specified.

Class B compaction. Each layer of fill shall be compacted to a mass density not less than the minimum density specified.

Class C compaction. Each layer of fill shall be compacted by the specified number of passes of the type and weight of roller or other equipment specified, or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel or drum over the entire surface of the layer.

Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping if permitted by the Contracting Officer, or manually directed power tampers or plate vibrators. Heavy equipment shall not be operated within 2 feet of any structure. Vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

The passage of heavy equipment will not be allowed: (1) over cast-in-place conduits prior to 14 days after placement of the concrete; (2) over cradled precast conduits prior to 7 days after placement of the concrete cradle; or (3) over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or 2 feet, whichever is greater.

Compacting of fill adjacent to structures shall not be started until the concrete has attained the strength specified in Section 10 for this purpose. The strength will be determined by compression testing of test cylinders cast by the Engineer for this purpose and cured at the work site in the manner specified in ASTM Method C 31 for determining when a structure may be put into service.

When the required strength of the concrete is not specified as described above, compaction of fill adjacent to structures shall not be started until the following time intervals have elapsed after placement of the concrete.

Structure	Time Interval
Retaining walls and counterforts	14 days
Walls backfilled on both sides simultaneously	7 days
Conduits and spillway risers, cast-in-place (with inside forms in place)	7 days
Conduits and spillway risers, cast-in-place (inside forms removed)	14 days
Conduits, precast, cradled	2 days
Conduits, precast, bedded	1 day
Antiseep collars and cantilever outlet bents	3 days

7. REMOVAL AND PLACEMENT OF DEFECTIVE FILL

Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or removed and replaced by acceptable fill. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control and compaction.

8. TESTING

During the course of the work, the Engineer will perform such tests as are required to identify materials, to determine compaction characteristics, to determine moisture content, and to determine density of fill in place. These tests performed by the Engineer will be used to verify that the fills conform to the requirements of the specifications. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

Densities of fill requiring Class A compaction will be determined by the Engineer in accordance with ASTM Method D 1556 (or by equivalent methods), except that the volume and moist weight of included rock particles larger than those used in the compaction test method specified for the type of fill will be determined and deducted from the volume and moist weight of the total sample prior to computation of density. The density so computed will be used to determine the percent compaction of the fill matrix.

9. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type and compaction class of earth fill within the specified zone boundaries and pay limits will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Unless otherwise specified, no deduction in volume will be made for embedded conduits and appurtenances.

The pay limits shall be as defined below, with the further provision that earth fill required to fill voids resulting from overexcavation of the foundation, outside the specified lines and grades, will be included in the measurement for payment only where such overexcavation is directed by the Engineer to remove unsuitable material and where the unsuitable condition is not a result of the Contractor's operations.

(Method 1) The pay limits shall be as designated on the drawings.

(Method 2) The pay limits shall be the measured surface of the foundation when approved for placement of the fill and the specified neat lines of the fill surface.

(Method 3) The pay limits shall be the measured surface of the foundation when approved for placement of the fill and the measured surface of the completed fill.

(Method 4) The pay limits shall be the specified pay limits for excavation and the specified neat lines of the fill surface.

(Method 5) The pay limits shall be the specified pay limits for excavation and the measured surface of the completed fill.

(Use method 6 or 7 with all method 1 through 5)

(Method 6) Payment for each type and compaction class of earth fill will be made at the contract unit price for that type and compaction class of fill. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work.

(Method 7) Payment for each type and compaction class of earth fill will be made at the contract unit price for that type and compaction class of fill. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work, except furnishing, transporting, and applying water to the foundation and fill materials.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 7, Structure Backfill

(1) This item shall consist of placing and compacting structure backfill, as described in Item 10b. (2), within the limits shown on the drawings.

(2) In Section 6, Compaction, Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the maximum density obtained in compaction tests of the fill materials performed by Method A, ASTM D 698 (Standard Proctor Test).

(3) The maximum size of rock fragments incorporated in the fill shall be two (2) inches.

(4) The maximum thickness of a layer before compaction shall be six (6) inches.

(5) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(6) Measurement and payment will be by Methods 1 and 6. Deduction in volume will be made for embedded conduit and appurtenances.

b. Bid Item 8, Earth Fill

(1) This item shall consist of placing and compacting the earth fill required in the embankment from Station 3+00 to Station 272+70.

(2) The fill materials placed upstream of the drain fill shall consist of silty gravel (GM), silty sand (SM), sandy silt (ML), clayey sand (SC), and sandy or silty clay (CL) in accordance with ASTM D2487. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dry weight basis in accordance with ASTM D1140. These materials shall be obtained from the required excavation and designated borrow areas.

b. Bid Item 8, Earth Fill (continued)

(3) The fill materials placed downstream of the drain fill shall consist of any of the materials described in 10.b. (2) as well as non-plastic materials which may contain less than 15 percent passing the #200 sieve, such as sandy gravel (GW or GP), gravelly sand (SP), sandy silt (ML), and silty sand (SM).

(4) At the option of the contractor, materials encountered which contain less than 15 percent passing the #200 sieve obtained from the required excavation and designated borrow areas may be blended and processed with materials containing greater than 15 percent passing the #200 sieve. To the extent that the resulting processed materials meet the minimum requirements in 10.b. (2), these materials may be placed upstream of the drain fill.

(5) Compaction for earth fill shall be Class A. The materials shall be compacted to at least a minimum of 95 percent of maximum dry density as determined by laboratory procedure outlined in ASTM D698, Method A.

(6) The maximum size rock fragments incorporated in this portion of the fill shall be six (6) inches and the thickness of each layer of fill placed shall not be greater than nine (9) inches before compaction.

(7) The moisture content of the material incorporated in the fill shall be maintained within a range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(8) Measurement and payment will be by Methods 4 and 6 and will include payment for Borrow Excavation.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 8, Structure Backfill

(1) This item shall consist of placing and compacting backfill around vegetative conduits and anti-seep collars, drop spillways, inlet and outlet structures to the vegetative conduits and weir inlet structures as shown on the drawings.

(2) Backfill material shall consist of materials obtained from the required excavations. The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dry weight basis in accordance with ASTM D 1140.

(3) In Section 6, Compaction, Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the optimum dry density as determined by Method A, ASTM D 698.

(4) The maximum size of rock fragments incorporated in the fill shall be two (2) inches.

(5) The maximum thickness of a layer before compaction shall be six (6) inches.

(6) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(7) Measurement and payment will be by Methods 2 and 6. Deduction in volume will be made for embedded conduits and appurtanences.

b. Bid Item 9, Earth Fill

(1) This item shall consist of placing and compacting earth fill to construct the following:

(a) The diversion channel dike between Station 0+82 and Station 235+60.

(b) The protective berm on the east side of the diversion channel from Station 235+00 to 237+13.69.

(c) The weir inlet structures where earth fill is required.

(d) Maintenance access ramps at locations shown on the drawings.

(2) Earth fill materials to be used for this item shall be obtained from the required excavations or other approved sources.

(3) The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dry weight basis in accordance with ASTM D 1140.

(4) In Section 6, Compaction Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the maximum density obtained in compaction tests of the fill materials performed by Method D, ASTM D 698 (Standard Proctor Test).

(5) The maximum size of rock fragments incorporated in the earth fill shall be twelve (12) inches.

(6) The maximum thickness of a layer before compaction shall be eighteen (18) inches.

(7) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage points above the optimum moisture content.

(8) Measurement and payment will be by Methods 4 and 6.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 2, Structure Backfill

(1) This item shall consist of placing and compacting structure backfill as described in Item 10.b. (2) within the limits shown on the drawings at the following locations:

(a) Box culvert at the Courthouse Road Crossing, Station 9+93.31 ℄ diversion shown in the plans for the construction of the Saddleback Diversion.

(b) Corrugated metal arch pipe at the Buckeye-Salome Road Station 113+20.58 ℄ drain channel, shown in the plans for the construction of the Saddleback Flood Retarding Structure.

(2) In Section 6, Compaction, Class A shall apply. The fill matrix shall be compacted to at least 95 percent of the maximum density obtained in compaction tests of the fill materials performed by Method A, ASTM D 698, (Standard Proctor Test).

(3) The maximum size of rock fragments incorporated in the fill shall be two (2) inches.

(4) The maximum thickness of a layer before compaction shall be six (6) inches.

(5) The moisture content of the material incorporated in the fill shall be maintained within the range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(6) Measurement and payment will be by Methods 1 and 6.

b. Bid Item 3, Earth Fill

(1) This item shall consist of placing and compacting the earth fill required in the embankments which form the road crossing ramps over the flood retarding structure at station 204+41.21 on the centerline of the dam and from station 6+90 to station 18+00 along the centerline of Buckeye-Salome Road.

(2) The fill materials shall consist of silty gravel (GM), silty sand (SM), sandy silt (ML), clayey sand (SC) and sandy or silty clay (CL) in accordance with ASTM D 2487.

b. Bid Item 3, Earth Fill (Continued)

The material shall contain a minimum of 15 percent passing the #200 sieve when determined on a dry weight basis in accordance with ASTM D 1140. These materials shall be obtained from the required excavation and designated borrow areas.

(3) Compaction for earth fill shall be Class A. The fill matrix shall be compacted to at least a minimum of 95 percent of maximum dry density as determined by laboratory procedure outlined in ASTM D 698, Method A.

(4) The maximum size rock fragments incorporated in this portion of the fill shall be six (6) inches and the thickness of each layer of fill placed shall not be greater than nine (9) inches before compaction.

(5) The moisture content of the material incorporated in the fill shall be maintained within a range of three (3) percentage points below to one (1) percentage point above the optimum moisture content.

(6) Measurement and payment will be by Methods 2 and 6, and will include compensation for Subsidiary Item, Borrow Excavation.

CONSTRUCTION SPECIFICATION

24. DRAIN FILL

1. SCOPE

The work shall consist of furnishing, placing and compacting drain fill required in the construction of structure drains and filters.

2. MATERIALS

(Method 1) Drain fill materials shall conform to the requirements of Material Specification 521. At least 30 days prior to delivery of the materials to the site the Contractor shall inform the Contracting Officer in writing of the source from which he intends to obtain them. The Contractor shall provide the Engineer free access to the source for the purpose of obtaining samples for testing.

(Method 2) Drain fill materials shall be sand, gravel or crushed stone or mixtures thereof obtained from the specified sources. They shall be selected as necessary to avoid the inclusion of organic matter, clay balls, excessive fine particles or other substances that would interfere with their free-draining properties.

3. BASE PREPARATION

Foundation surfaces and trenches shall be clean and free of organic matter, loose soil, foreign substances, and standing water when the drain fill is placed. Earth surfaces upon or against which drain fill will be placed shall not be scarified.

4. PLACEMENT

Drain fill shall not be placed until the subgrade has been inspected and approved by the Engineer. Drain fill shall not be placed over or around pipe or drain tile until the installation of the pipe or tile has been inspected and approved.

Drain fill shall be placed uniformly in layers not more than 12 inches deep before compaction. When compaction is accomplished by manually controlled equipment, the layers shall be not more than 8 inches deep. The material shall be placed in a manner to avoid segregation of particle sizes and to insure the continuity and integrity of all zones. No foreign materials shall be allowed to become intermixed with or otherwise contaminate the drain fill.

Traffic shall not be allowed to cross over drains at random. Equipment crossovers shall be maintained, and the number and location of such crossovers shall be established and approved prior to the beginning of drain fill placement. Each crossover shall be cleaned of all contaminating materials and shall be inspected and approved by the Engineer before additional drain fill is placed.

Any damage to the foundation surface or to the sides or bottoms of trenches occurring during placement of drain fill shall be repaired before drain fill placement is continued.

The upper surface of drain fill constructed concurrently with adjacent zones of earth fill shall be maintained at an elevation at least one foot above the upper surface of the adjacent fill.

Drain fill over or around pipe or drain tile shall be placed in a manner to avoid any displacement of the pipe or tile in line or grade.

5. CONTROL OF MOISTURE

The moisture content of drain fill materials shall be controlled as specified in Section 9. When the addition of water is required, it shall be applied in such a way as to avoid excessive wetting of adjacent earth fill. Except as specified in Section 9, control of the moisture content will not be required.

6. COMPACTION

Drain fill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction. Each layer of drain fill shall be compacted to a relative density of not less than 70 percent as determined by ASTM Method D 2049-64T.

Class I compaction. Each layer of drain fill shall be compacted by at least 2 passes, over the entire surface, of a steel-drum vibrating roller weighing not less than 5 tons and exerting a vertical vibrating force of not less than 20,000 pounds at least 1200 times per minute, or by an approved equivalent method.

Class II compaction. Each layer of drain fill shall be compacted by one of the following methods or by an approved equivalent method:

a. At least 2 passes, over the entire surface, of a pneumatic-tired roller exerting a pressure of not less than 75 pounds per square inch.

b. At least 4 passes, over the entire surface, of the track of a crawler-type tractor weighing not less than 20 tons.

c. Controlled movement of the hauling equipment so that the entire surface is traversed by not less than one tread track of the loaded equipment.

Class III compaction. No compaction will be required beyond that resulting from the placing and spreading operations.

When compaction other than Class III compaction is specified materials placed in trenches or other locations inaccessible to heavy equipment shall be compacted by means of manually controlled pneumatic or vibrating tampers or by approved equivalent methods.

7. TESTING

The Engineer will perform such tests as are required to verify that the drain fill materials and the drain fill in place meet the requirements of the specifications. These tests are not intended to provide the Contractor with the information he needs to assure that the materials and workmanship meet the requirements of the specifications, and their performance will not relieve the Contractor of the responsibility of performing his own tests for that purpose.

8. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of drain fill within the neat lines shown on the drawings or limits established by the Engineer will be measured and computed to the nearest cubic yard. Where the Engineer directs placement of drain fill outside the neat lines to replace unsuitable foundation material, the volume of such drain fill will be included, but only to the extent that the unsuitable condition is not a result of the Contractor's operations.

Payment for drain fill will be made at the contract unit price for each type of drain fill, complete in place. Except as otherwise specified in Section 9, such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 9 of this specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 9, Drain Fill

(1) This item shall consist of furnishing and placing the drain fill materials in the FRS including drain fill materials adjacent to 6-inch diameter drain pipe in the FRS and around the principal spillway outlet structure as shown on the drawings.

(2) In Section 2, Materials, Method 1 shall apply.

(3) The required gradation of the drain fill shall be:

Sieve Size	Percent Passing (Dry Weight Basis)
3 inches	100
1 inch	80-100
#4	50-75
#40	15-35
#100	5-18
#200	0-3

(4) In Section 6, Comapction, Class II shall apply. Drain fill within two (2) feet of concrete structures shall be compacted by manually controlled equipment approved by the Engineer.

(5) The moisture content shall be maintained in a range to accomplish the specified compaction without bulking or dilatance.

(6) Measurement and payment will be made in accordance with Section 8.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 10, Drain Fill

(1) This item shall consist of furnishing and placing the filter bedding beneath grouted rock riprap and loose rock riprap at the outlet structures of the vegetative conduits as shown on the drawings.

(2) In Section 2. Materials, Method 1 shall apply.

(3) The required gradation of the filter bedding shall be:

SIEVE SIZE	PERCENT PASSING (Dry weight Basis)
3 Inches	100
1 Inch	80-100
#4	50-75
#40	15-35
#100	5-18
#200	0-3

(4) In Section 6, Compaction, Class II shall apply. Filter bedding within two (2) feet of concrete structures shall be compacted by manually controlled equipment approved by the engineer.

(5) The moisture content shall be maintained in a range to accomplish the specified compaction without bulking or dilatance.

(6) Measurement and payment will be in accordance with Section 8.

CONSTRUCTION SPECIFICATION

31. CONCRETE

1. SCOPE

The work shall consist of furnishing, forming, placing, finishing and curing portland cement concrete as required to build the structures named in Section 26 of this specification.

2. MATERIALS

Portland cement shall conform to the requirements of Material Specification 531 for the specified type. One brand only of any type of cement shall be used in any single structure as defined in Section 26.

Aggregates shall conform to the requirements of Material Specification 522 unless otherwise specified. The grading of coarse aggregates shall be as specified in Section 26.

Water used in mixing or curing concrete shall be clean and free from injurious amounts of oil, salt, acid, alkali, organic matter or other deleterious substances.

Air-entraining admixtures shall conform to the requirements of Material Specification 532. If air-entraining cement is used, any additional air-entraining admixture shall be of the same type as that in the cement.

Water-reducing, set-retarding admixtures shall conform to the requirements of Material Specification 533.

Shear plates shall conform to the requirements of Material Specification 581 for structural quality or commercial or merchant quality steel. Structural quality shall be used if specifically designated in the drawings or specifications.

Preformed expansion joint filler shall conform to the requirements of Material Specification 535.

Waterstops shall conform to the requirements of Material Specifications 537 and 538 for the specified kinds.

Curing compound shall conform to the requirements of Material Specification 534.

3. CLASSES OF CONCRETE

(Method 1)

Concrete shall be classified according to the required compressive strength. The strength of the concrete at 28 days shall equal or exceed the Minimum Compressive Strength tabulated below for the class of concrete specified.

Class of Concrete	Minimum Compressive Strength at 28 days (psi)
5000	5000
4000	4000
3000	3000
2500	2500

(Method 2)

Concrete shall be classified as follows:

Class of Concrete	Maximum Net Water Content (gallons/bag)	Minimum Cement Content (bags/cu. yd.)
5000X	5	7
4000X	6	6
3000X	7	5
2500X	8	4 1/2

4. AIR CONTENT AND CONSISTENCY

Unless otherwise specified the air content (by volume) of the concrete at the time of placement shall be:

Maximum Size Aggregate	Air Content (%)
3/8 inch to 1/2 inch	6 to 9
Over 1/2 inch to 1 inch	5 to 8
Over 1 inch to 2 1/2 inches	4 to 7

The consistency of the concrete shall be such as to allow it to be worked into place without segregation or excessive laitance. Unless otherwise specified, the slump shall be:

Type of Structure	Slump (inches)
Massive sections, pavements, footings	2 ± 1/2
Heavy beams, thick slabs, thick walls (over 12 in.)	3 ± 1/2
Columns, light beams, thin slabs, thin walls (12 in. or less)	4 ± 1

5. DESIGN OF THE CONCRETE MIX

(Method 1) (For use with Method 1 in Section 3.)

The Contractor will be responsible for the design of the concrete mixtures. At least 5 days prior to any placement of concrete he shall furnish the Contracting Officer a statement of the materials and mix proportions (including admixtures, if any) he intends to use for each specified class of concrete. The statement shall include evidence satisfactory to the Engineer that the materials and proportions selected will produce concrete of the quality, consistency and strength specified.

The materials and proportions so stated shall constitute the "job mix." After a job mix has been designated, neither the source, character or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the Engineer and establishment of a new job mix supported by evidence, as required for the initial job mix, that the proposed new materials and mix proportions will produce concrete of the quality, consistency, and strength specified.

When specified, a water-reducing, set-retarding admixture shall be used. When conditions are such that the temperature of the concrete at the time of placement is consistently above 75°F, a water-reducing, set-retarding admixture may be used, at the option of the Contractor. The cement content shall be same as that required in the mix without the admixture.

The use of calcium chloride or other accelerators or antifreeze compounds will not be allowed.

Before placing concrete containing a water-reducing, set-retarding admixture, the Contractor shall furnish test results to the Engineer showing that its performance in the job mix meets the requirements of Material Specification 533, Section 4.

(Method 2) (For use with Method 2 in Section 3.)

At least 35 days prior to any placement of concrete the Contractor shall inform the Contracting Officer in writing of the source and grading of aggregates and the brand and type of cement and the brand and type of admixture, if any, he proposes to use for each class of concrete, and shall furnish certifications or other

evidence satisfactory to the Engineer that the proposed materials meet the requirements of the specifications.

When acceptable sources, types and gradings of aggregates are designated in the contract, certifications for such aggregates will not be required.

Job mix proportions and batch weights will be determined by the Engineer. During the course of the work, the Engineer will adjust the job mix proportions and batch weights whenever necessary.

After the job mix has been designated, neither the source, character or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the Engineer.

If such changes are necessary, no concrete containing such new or altered materials shall be placed until the Engineer has designated a revised job mix.

When specified, a water reducing, set-retarding admixture shall be used. When conditions are such that the temperature of the concrete at the time of placement is consistently above 75°F, a water-reducing, set-retarding admixture may be used, at the option of the Contractor. The cement content shall be same as that required in the mix without the admixture.

The use of calcium chloride or other accelerators or antifreeze compounds will not be allowed.

When it is anticipated that a water-reducing, set-retarding admixture will be used, the Contractor shall furnish to the Engineer a sample of the admixture he proposes to use sufficient for the tests required by Material Specification 533, Section 4. Concrete containing the admixture shall not be placed until test results have been obtained showing that its performance in the job mix meets the requirements of Material Specification 533, Section 4.

6. INSPECTING AND TESTING

The following tests will be performed by the methods indicated:

Test	Method (ASTM Designation)
Sampling	C 172[1]
Slump Test	C 143[1]

Test	Method (ASTM Designation)
Air Content	C 231[1] or C 173[1]
Compression Test Specimens	C 31[1] or C 42
Compressive Strength	C 39[2] or C 42
Unit Weight	C 138

[1]Tests of a portion of a batch may be made on samples representative of that portion for any of the following purposes:

(1) Determining uniformity of the batch.

(2) Checking compliance with requirements for slump and air content when the batch is discharged over an extended period of time.

(3) Checking compliance of the concrete with the specifications when the whole amount being placed in a small structure, or a distinct portion of a larger structure, is less than full batch.

[2]For each strength test of specimens made according to ASTM Designation C 31, 3 standard test specimens shall be made. The test result shall be the average of the strengths of the 3 specimens, except that if one specimen in the test shows manifest evidence of improper sampling, molding or testing, it shall be discarded and the strengths of the remaining 2 specimens shall be averaged. Should more than one specimen representing a test show such defects, the entire test shall be discarded.

The Engineer shall have free entry to the plant and equipment furnishing concrete under the contract. Proper facilities shall be provided for the Engineer to inspect materials, equipment and processes and to obtain samples of the concrete. All tests and inspections will be conducted so as not to interfere unnecessarily with the manufacture and delivery of the concrete.

7. HANDLING AND MEASUREMENT OF MATERIALS

Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size will be avoided and that various sizes will not become intermixed before proportioning. Methods of handling and transporting aggregates shall be such as to avoid contamination, excessive breakage, segregation or degradation, or intermingling of various sizes.

Scales for weighing aggregates and cement shall be beam type or springless dial type. They shall be accurate within 1 percent under operating conditions. All exposed fulcrums, clevises and similar working parts of scales shall be kept clean.

The quantities of cement and aggregates in each batch of concrete, as indicated by the scales, shall be within the following percentages of the required batch weights:

Cement - plus or minus 1.0 percent

Aggregates - plus or minus 2.0 percent

Measuring tanks for mixing water shall be of adequate capacity to furnish the maximum amount of mixing water required per batch and shall be equipped with outside taps and valves to provide for checking their calibration unless other means are provided for readily and accurately determining the amount of water in the tank.

Except at otherwise provided in Section 8, cement and aggregates shall be measured as follows:

Cement shall be measured by weight or in bags of 94 lbs. each. When cement is measured by weight, it shall be weighed on a scale separate from that used for other materials, and in a hopper entirely free and independent of the hopper used for weighing the aggregates. When cement is measured in bags, no fraction of a bag shall be used unless weighed.

Aggregates shall be measured by weight. Mix proportions shall be based on saturated, surface-dry weights. The batch weight of each aggregate shall be the required saturated, surface-dry weight plus the weight of surface moisture it contains.

Mixing water shall consist of water added to the batch, ice added to the batch, water occurring as surface moisture on the aggregates and water introduced in the form of admixtures. The added water shall be measured by weight or volume to an accuracy of 1 percent of the required total mixing water. Added ice shall be measured by weight. Wash water shall not be used as a portion of the mixing water for succeeding batches.

Dry admixtures shall be measured by weight, and paste or liquid admixtures by weight or volume, within a limit of accuracy of 3 percent.

8. MIXERS AND MIXING

Concrete may be furnished by batch mixing at the site of the work or by ready-mix methods.

Mixers shall be capable of thoroughly mixing the concrete ingredients into a uniform mass within the specified mixing time and of discharging the mix without segregation. Each mixer or agitator shall bear a manufacturer's rating plate indicating the rated capacity and recommended speeds of rotation, and shall be operated in accordance with these recommendations.

Concrete shall be uniform and thoroughly mixed when delivered to the work. Variations in slump of more than 1 inch within a batch will be considered evidence of inadequate mixing and shall be corrected by changing batching procedures, increasing mixing time, changing mixers or other means. Mixing time shall be within the limits specified below unless the Contractor demonstrates by mixer performance tests that adequate uniformity is obtained by different times of mixing. For this purpose the testing program and uniformity requirements shall be as set forth in ASTM Designation C 94.

No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point.

Batch mixing at the site. For concrete mixed at the site of the work with paving mixers or stationary construction mixers, the time of mixing after all cement and aggregates are in the mixer drum shall be not less than 1-1/2 minutes.

The batch shall be so charged into the mixer that some water will enter in advance of the cement and aggregates and all mixing water shall be introduced into the drum before one-fourth of the mixing time has elapsed.

Controls shall be provided to insure that the batch cannot be discharged until the required mixing time has elapsed.

If truck mixers are used, the requirements below for truck mixers and truck-mixed concrete shall apply.

Volumetric batching and continuous mixing at the site. Unless otherwise specified, volumetric batching and continuous mixing at the construction site will be permitted if approved by the Contracting Officer. The batching and mixing equipment shall conform to the requirements of ASTM Specification C 685 and shall be demonstrated prior to placement of concrete, by tests with the job mix, to produce concrete meeting the specified proportioning and uniformity requirements. Concrete made by this method shall be produced, inspected, and certified in conformance with sections 6., 7., 8., 13., and 14. of ASTM Specification C 685.

Ready-mixed concrete. Ready-mixed concrete shall be mixed and delivered to the site of the work by one of the following methods:

a. Truck-mixed concrete--Mixed completely in a truck mixer.

b. Shrink-mixed concrete--Mixed partially in a stationary mixer, and the mixing completed in a truck mixer.

c. Central-mixed concrete--Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in a truck agitator or in a truck mixer operating at agitating speed or in nonagitating equipment.

Truck mixers and agitators shall be equipped with revolution counters by which the number of revolutions of the drum or blades may be readily verified.

When ready-mixed concrete is furnished, the Contractor shall furnish the Engineer a statement-of-delivery ticket showing the time of loading, the revolution counter reading at the time of loading and the quantities of materials used for each load of concrete.

Truck-mixed concrete. When concrete is mixed in a truck mixer loaded to its maximum capacity, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100. If the batch is at least 1/2 cubic yard less than maximum capacity, the number of revolutions at mixing speed may be reduced to not less than 50. Mixing in excess of 100 revolutions shall be at the speed designated by the manufacturer of the equipment as agitating speed. The mixing operation shall begin within 30 minutes after the cement has been added to the aggregates and the water shall be added during mixing. When mixing is begun during or immediately after charging, a portion of the mixing water shall be added ahead of, or with, the other ingredients.

Shrink-mixed concrete. When concrete is partially mixed at a central plant and the mixing is completed in a truck mixer, the mixing time in the central plant mixer shall be the minimum required to intermingle the ingredients and shall be not less than 30 seconds. The mixing shall be completed in a truck mixer and the number of revolutions of the drum or blades at mixing speed shall be not less than 50 nor more than 100. Mixing in excess of 100 revolutions shall be at the speed designated by the manufacturer of the equipment as agitating speed.

Central-mixed concrete. For central-mixed concrete, mixing in the stationary mixer shall meet the same requirements as batching mixing at the site.

When an agitator, or truck mixer used as an agitator, transports concrete that has been completely mixed in a stationary mixer, mixing during transportation shall be at the speed designated by the manufacturer of the equipment as agitating speed.

The use of nonagitating equipment to transport concrete to the site of the work will be permitted only if the consistency and uniformity of the concrete as discharged at the point of delivery meet the requirements of this specification. Bodies of nonagitating hauling equipment shall be so constructed that leakage of the concrete mix, or any part thereof, will not occur. Concrete hauled in open-top vehicles shall be protected against access of rain, and against exposure to the sun of more than 20 minutes when the air temperature is above 75° F.

9. FORMS

Forms shall be of wood, plywood, steel or other approved material and shall be mortar tight. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be coated with a nonstaining form oil before being set into place.

Metal ties or anchorages within the forms shall be equipped with cones, she-bolts or other devices that permit their removal to a depth of at least one inch without injury to the concrete. Ties designed to break off below the surface of the concrete shall not be used without cones.

All edges that will be exposed to view when the structure is completed shall be chamfered, unless finished with molding tools as specified in Section 20.

10. PREPARATION OF FORMS AND SUBGRADE

Prior to placement of concrete the forms and subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar or other harmful substances or coatings. Any oil in the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed. Rock surfaces shall be cleaned by air-water cutting, wet sandblasting or wire brush scrubbing, as necessary, and shall be wetted immediately prior to placement of concrete. Earth surfaces shall be firm and damp. Placement of concrete on mud, dried earth, uncompacted fill or frozen subgrade will not be permitted.

Unless otherwise specified, when concrete is to be placed over drain fill, the contact surface of the drain fill shall be covered with a layer of asphalt-impregnated building paper or polyvinyl sheeting prior to placement of the concrete. Forms for weepholes shall extend through this layer into the drain fill.

Items to be embedded in the concrete shall be positioned accurately and anchored firmly.

Weepholes in walls or slabs shall be formed with nonferrous materials.

11. CONVEYING

Concrete shall be delivered to the site and discharged into the forms within 1-1/2 hours after the introduction of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85° F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes. The Engineer may allow a longer time, provided the setting time of the concrete is increased a corresponding amount by the addition of an approved set-retarding admixture. In any case, concrete shall be conveyed from the mixer to the forms as rapidly as practicable, by methods that will prevent segregation of the aggregates or loss of mortar. Concrete shall not be dropped more than 5 feet vertically unless suitable equipment is used to prevent segregation.

12. PLACING

Concrete shall not be placed until the subgrade, forms and steel reinforcement have been inspected and approved.

The Contractor shall have all equipment and materials required for curing available at the site ready for use before placement of concrete begins.

No concrete shall be placed except in the presence of the Engineer. The Contractor shall give reasonable notice to the Engineer each time he intends to place concrete. Such notice shall be far enough in advance to give the Engineer adequate time to inspect the subgrade, forms, steel reinforcement and other preparations for compliance with the specifications before concrete is delivered for placing.

The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into the corners and angles of the forms and around all reinforcement and embedded items in a manner to prevent segregation of aggregates or excessive laitance. The depositing of concrete shall be regulated so that the concrete may be consolidated with a minimum of lateral movement.

Internal stays and braces, serving temporarily to hold the forms in correct shape and alignment prior to placement of concrete at their locations, shall be removed when the concrete has been placed to an elevation such as to render their service unnecessary.

13. LAYERS

Unless otherwise specified, slab concrete shall be placed to design thickness in one continuous layer. Formed concrete shall be placed in horizontal layers not more than 20 inches thick. Hoppers and chutes, pipes or "elephant trunks" shall be used as necessary to prevent splashing of mortar on the forms and reinforcing steel above the layer being placed.

Successive layers shall be placed at a fast enough rate to prevent the formation of "cold joints." If the surface of a layer of concrete in place sets to the degree that it will not flow and merge with the succeeding layer when vibrated, the Contractor shall discontinue placing concrete and shall make a construction joint according to the procedure specified in Section 15.

If placing is discontinued when an incomplete layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

14. CONSOLIDATING

Unless otherwise specified, concrete shall be consolidated with internal type mechanical vibrators capable of transmitting vibration to the concrete at frequencies not less than 6000 impulses per minute.

The location, manner and duration of the application of the vibrators shall be such as to secure maximum consolidation of the concrete without causing segregation of the mortar and coarse aggregate, and without causing water or cement paste to flush to the surface.

The Contractor shall provide a sufficient number of vibrators to properly consolidate the concrete immediately after it is placed in the work. Vibration shall be applied in the freshly deposited concrete by slowly inserting and removing the vibrator at points uniformly spaced and not farther apart than twice the radius over which the vibration is visibly effective. The vibrator shall extend into the previously placed layer of fresh concrete, at all points, to insure effective bond between layers.

Vibration shall not be applied directly to the reinforcement steel or the forms nor to concrete that has hardened to the degree that it does not become plastic when vibrated.

The use of vibrators to transport concrete in the forms or conveying equipment will not be permitted.

Vibration shall be supplemented by spading and hand tamping as necessary to insure smooth and dense concrete along form surfaces, in corners and around embedded items.

15. CONSTRUCTION JOINTS

Construction joints shall be made at the locations shown on the drawings. If construction joints are needed which are not shown on the drawings, they shall be placed in locations approved by the Engineer.

Where a feather edge would be produced at a construction joint, as in the top surface of a sloping wall, an insert form shall be used so that the resulting edge thickness on either side of the joint is not less than 6 inches.

In walls and columns as each lift is completed, the top surfaces shall be immediately and carefully protected from any condition that might adversely affect the hardening of the concrete.

Steel tying and form construction adjacent to concrete in place shall not be started until the concrete has cured at least 12 hours. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

(Method 1)

Surfaces of construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings, stains or debris by either wet sandblasting after the concrete has gained sufficient strength to resist excessive cutting, or air-water cutting as soon as the concrete has hardened sufficiently to prevent the jet from displacing the coarse aggregates, or both. The surface of the concrete in place shall be cut to expose clean, sound aggregate but not so deep as to undercut the edges of larger particles of the aggregate. After cutting, the surface shall be thoroughly washed to remove all loose material. If the surface is congested by reinforcing steel, is relatively inaccessible, or it is considered undesirable to disturb the concrete before it is hardened, cleaning of the joint by air-water jets will not be permitted and the wet sandblasting method will be required after the concrete has hardened.

(Method 2)

Surfaces of construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings, stains, or debris by washing and scrubbing with a wire brush or wire broom or by other means approved by the Engineer.

(Use with Either Method)

The surfaces shall be kept moist for at least one hour prior to placement of new concrete. The new concrete shall be placed directly on the cleaned and washed surface.

16. EXPANSION AND CONTRACTION JOINTS

Expansion and contraction joints shall be made only at locations shown on the drawings.

Exposed concrete edges at expansion and contraction joints shall be carefully tooled or chamfered, and the joints shall be free of mortar and concrete. Joint filler shall be left exposed for its full length with clean and true edges.

When open joints or weakened plane "dummy" joints are specified, the joints shall be constructed by the insertion and subsequent removal of a wood strip, metal plate or other suitable template in such a manner that the corners of the concrete will not be chipped or broken. The edges of the concrete at the joints shall be finished with an edging tool prior to removal of the joint strips.

Preformed expansion joint filler shall be held firmly in the correct position as the concrete is placed.

17. WATERSTOPS

Waterstops shall be held firmly in the correct position as the concrete is placed. Joints in metal waterstops shall be brazed or welded. Joints in rubber or plastic waterstops shall be cemented, welded or vulcanized as recommended by the manufacturer.

18. REMOVAL OF FORMS

Forms shall be removed only when the Engineer is present and shall not be removed without his approval. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit the concrete to take the stresses due to its own weight uniformly and gradually.

(Method 1)

Forms shall not be removed sooner than the following minimum times after the concrete is placed. These periods represent cumulative number of days and fractions of days, not necessarily consecutive, during which the temperature of the air adjacent to the concrete is above 50°F.

Element	Time
Beams, arches - supporting forms and shoring	14 days
Conduits, deck slabs - supporting (inside) forms and shoring	7 days
Conduits (outside forms), sides of beams, small structures	24 hours

Element	Time
Columns, walls, spillway risers - with side or vertical load	7 days
Columns, walls, spillway risers - with no side or vertical load:	
Concrete supporting more than 30 feet of wall in place above it	7 days
Concrete supporting 20 to 30 feet of wall in place above it[1]	3 days
Concrete supporting not more than 20 feet of wall in place above it[1]	24 hours

[1]Age of stripped concrete shall be at least 7 days before any load is applied other than the weight of the column or wall itself and the forms and scaffolds for succeeding lifts.

(Method 2)

Forms, supports and housings shall not be removed until the concrete has attained the strength specified in Section 26 for this purpose. The strength will be determined by compression testing of test cylinders cast by the Engineer for this purpose and cured at the work site in the manner specified in ASTM Method C 31 for determining form removal time.

19. FINISHING FORMED SURFACES

All concrete surfaces shall be true and even, and shall be free from open or rough spaces, depressions or projections.

Immediately after the removal of forms:

All bulges, fins, form marks or other irregularities which in the judgment of the Engineer will adversely affect the appearance or function of the structure shall be removed. All form bolts and ties shall be removed to a depth at least 1 inch below the surface of the concrete. The cavities produced by form ties and all other holes of similar size and depth shall be thoroughly cleaned and, after the interior surfaces have been kept continuously wet for at least 3 hours, shall be carefully packed with a dry patching mortar (preshrunk) mixed not richer than 1 part cement to 3 parts sand.

Holes left by form bolts or straps which pass through the wall shall be filled solid with mortar.

Patching mortar shall be thoroughly compacted into place to form a dense, well-bonded unit, and the in-place mortar shall be sound and free from shrinkage cracks.

All patched areas shall be cured as specified in Section 21.

20. FINISHING UNFORMED SURFACES

All exposed surfaces of the concrete shall be accurately screeded to grade and then float finished, unless specified otherwise.

Excessive floating or troweling while the concrete is soft will not be permitted.

The addition of dry cement or water to the surface of the screeded concrete to expedite finishing will not be allowed.

Joints and edges on unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

21. CURING

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period or until curing compound is applied as specified below. Moisture shall be maintained by sprinkling, flooding or fog spraying, or by covering with continuously moistened canvas, cloth mats, straw, sand or other approved material. Wood forms (except plywood) left in place during the curing period shall be kept wet. Formed surfaces shall be thoroughly wetted immediately after forms are removed and shall be kept wet until patching and repairs are completed. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged.

Water for curing shall be clean and free from any substances that will cause discoloration of the concrete.

Except as otherwise specified in Section 24, and except for construction joint surfaces, concrete may be coated with curing compound in lieu of the continued application of moisture.

The compound shall be sprayed on the moist concrete surfaces as soon as free water has disappeared, but shall not be applied to any surface until patching, repairs and finishing of that surface are completed.

The curing compound shall be thoroughly mixed immediately before applying, and shall be applied at a uniform rate of not less than one gallon per 150 square feet of surface. It shall form a uniform, continuous, adherent film that shall not check, crack or peel, and shall be free from pin holes or other imperfections.

Curing compound shall not be applied to surfaces requiring bond with subsequently placed concrete, such as construction joints, shear plates, reinforcing steel and other embedded items.

Surfaces subjected to heavy rainfall or running water within 3 hours after the compound has been applied, or surfaces damaged by subsequent construction operations during the curing period shall be resprayed in the same manner as for the original application.

22. REMOVAL OR REPAIR

When concrete is honeycombed, damaged or otherwise defective, the Contractor shall remove and replace the structure or structural member containing the defective concrete, or correct or repair the defective parts. The Engineer will determine the required extent of removal, replacement or repair.

Prior to starting repair work the Contractor shall obtain the Engineer's approval of his plan for making the repair. Such approval shall not be considered a waiver of the Contracting Officer's right to require complete removal of defective work if the completed repair does not produce concrete of the required quality and appearance.

Repair work shall be performed only when the Engineer is present.

Repair of formed surfaces shall be started within 24 hours after removal of the forms.

Except as otherwise approved by the Engineer, the appropriate methods described in Chapter VII of the Concrete Manual, Bureau of Reclamation, U. S. Department of the Interior, shall be used. If approved in writing by the Contracting Officer, proprietary compounds for adhesion or as patching ingredients may be used. Such compounds shall be used in accordance with the manufacturer's recommendations.

Curing as specified in Section 21 shall be applied to repaired areas immediately after the repairs are completed.

23. CONCRETING IN COLD WEATHER

When the atmospheric temperature may be expected to drop below 40°F at the time concrete is delivered to the work site, during placement, or at any time during the curing period, the following provisions also shall apply:

a. The temperature of the concrete at time of placing shall not be less than 50°F nor more than 90°F. The temperature of neither aggregates nor mixing water shall be more than 100°F just prior to mixing with the cement.

b. When the daily minimum temperature is less than 40°F, concrete structures shall be insulated or housed and heated after placement. The temperature of the concrete and air adjacent to the concrete shall be maintained at not less than 50°F nor more than 90°F for the duration of the curing period.

c. Methods of insulating, housing and heating the structure shall conform to "Recommended Practice for Cold Weather Concreting," ACI Standard 306.

d. When dry heat is used to protect concrete, means of maintaining an ambient humidity of at least 40 percent shall be provided unless the concrete has been coated with curing compound as specified in Section 21 or is covered tightly with an approved impervious material.

24. CONCRETING IN HOT WEATHER

When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 90°F at the time of delivery at the work site, during placement, or during the first 24 hours after placement, the following provisions also shall apply;

a. The Contractor shall maintain the temperature of the concrete below 90°F during mixing, conveying, and placing. Methods used shall conform to "Recommended Practice for Hot Weather Concreting," ACI Standard 305.

b. The concrete shall be placed in the work immediately after mixing. Truck mixing shall be delayed until only time enough remains to accomplish it before the concrete is placed.

c. Exposed concrete surfaces which tend to dry or set too rapidly shall be continuously moistened by means of fog sprays or otherwise protected from drying during the time between placement and finishing, and after finishing.

d. Finishing of slabs and other exposed surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay.

e. Concrete surfaces exposed to the air shall be covered as soon as the concrete has hardened sufficiently and shall be kept continuously wet for at least the first 24 hours of the curing period, and for the entire curing period unless curing compound is applied as specified in subsection g, below.

f. Formed surfaces shall be kept completely and continuously wet for the duration of curing period (prior to, during and after form removal) or until curing compound is applied as specified in subsection g, below.

g. If moist curing is discontinued before the end of the curing period, white pigmented curing compound shall be applied immediately, following the procedures specified in Section 21.

25. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, concrete will be measured to the neat lines or pay limits shown on the drawings, and the volume of concrete will be computed to the nearest 0.1 cubic yard. No deduction in volume will be made for chamfers, rounded or beveled edges, or for any void or embedded item that is less than five cubic feet in volume. Where concrete is placed against the sides or bottom of an excavation without intervening forms, drain fill, or bedding, the volume of concrete required to fill voids resulting from overexcavation outside the neat lines or pay limits will be included in the measurement for payment where such overexcavation is directed by the Engineer to remove unsuitable foundation material; but only to the extent that the unsuitable condition is not a result of the Contractor's operations.

(Method 1)

Payment for each item of concrete will be made at the contract unit price for that item. The payment for concrete will constitute full compensation for all labor, materials, equipment, transportation, tools, forms, falsework, bracing and all other items necessary and incidental to completion of the concrete work, such as joint fillers, waterstops, dowels or dowel assemblies and shear plates, but not including reinforcing steel or other items listed for payment elsewhere in the contract.

Measurement and payment for furnishing and placing reinforcing steel will be made as specified in Construction Specification 34.

(Method 2)

Payment for each item of concrete will be made at the contract unit price for that item. The payment for concrete will constitute full compensation for all labor, materials, equipment, transportation, tools, forms, falsework, bracing and all other items necessary and incidental to completion of the concrete work, such as joint fillers, waterstops, dowels or dowel assemblies, and shear plates, but not including furnishing and placing reinforcing steel or furnishing and handling cement or other items listed for payment elsewhere in the contract.

Measurement and payment for furnishing and placing reinforcing steel will be made as specified in Construction Specification 34.

Cement will be measured by dividing the volume of concrete accepted for payment by the yield of the applicable job mix. The yield will be determined by the procedure specified in ASTM Designation C 138. If the amount of cement actually used per batch exceeds the amount in the job mix specified by the Engineer, the measurement will be based on the latter. One barrel of cement will be considered equal to 4 bags or 376 pounds. Payment for each type of cement will be made at the contract unit price for furnishing and handling that type of cement and such payment will constitute full compensation for all materials, labor, equipment, storage, transportation and all other items necessary and incidental to furnishing and handling the cement.

(Use with Either Method)

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 26 of this specification.

26. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 10, Concrete, Class 4000X

(1) This item shall consist of furnishing, forming and placing all concrete required to construct the following:

(a) The principal spillway as shown on sheets 23 through 35.

(b) The vegetative conduit structures at Station 60+50, Station 103+70, Station 124+10 and Station 256+00.

(2) Preformed expansion joint filler shall conform to Material Specifivation 535 and ASTM D 1752 and shall be either Type I or Type II.

(3) Joint sealing compound shall be Type II, Class A conforming to Material Specification 536 and Federal Specification TT-S-227.

(4) Waterstops for vegetative conduits shall be; Class II Type B or E, size designation 16; Class I, Type C, size designation 16 and 23 as shown on sheets 12 and 18, respectively. All other waterstops shall be Class II, Type B or E, size designation 16 or 17.

(5) In Section 3, Classes of Concrete, and Section 5, Design of the Concrete Mix, Method 2 shall apply. Concrete shall be Class 4000X.

(6) Coarse aggregate shall be size No. 67 in accordance with ASTM C 33.

(7) In Section 15, Construction Joins, Method 1 shall apply.

(8) In Section 18, Removal of Forms, Method 1 shall apply.

(9) All exposed surfaces of the principal spillway, vegetative conduits inlets and outlets shall be finished in the following manner:

Upon patching and painting all holes as directed in Section 19, the surface shall be promptly covered with polyethlene film, wet burlap or wet cotton mats. If polyethlene film is used, the film shall be held securely to the surface by means of weights, adhesive or other suitable means. Only white polyethlene film for covering will be acceptable.

a. Bid Item 10, Concrete, Class 4000X. (continued)

When the mortar used in patching and pointing has set sufficiently, the surface shall be uncovered and thoroughly rubbed with either a float or a carborundum stone until the surface is covered with a lather. Cork, wood or rubber floats shall be used only on surfaces sufficiently green to work up such lather, otherwise a carborundum stone shall be used. During the rubbing process, a thin grout composed of one (1) part cement and one (1) part of fine sand may be used to facilitate producing a satisfactory lather; however, this grout shall not be used in quantities sufficient to cause a plaster coating to be left on the finished surface. A portion of the required cement for grout shall be white as required to match the color of the surrounding concrete. Rubbing shall continue until irregularities are removed and there is no excess material. At that time a light dust appears, the surface shall be brushed or sacked. Brushing or sacking shall be carried in one direction so as to produce a uniform texture.

(10) Curing compound shall be Type 1-D conforming to Material Specification 534 and ASTM C 309.

(11) Measurement and payment will be by Method 2.

b. Bid Item 11, Cement

(1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item 10, Concrete, Class 4000X.

(2) Cement shall be Type II or IIA.

(3) Measurement and payment will be by Method 2.

c. Subsidiary Item, Concrete Class 2500

(1) This item shall consist of furnishing forming and placing all concrete to construct the following:

(a) Barbed wire post anchors.

(b) Post anchors for identification sign.

(c) Gate lift and gate stem pedestals.

(2) In Section 3, Classes of Concrete, and Section 5, Design of Concrete Mix, Method 1 shall apply. Concrete shall be Class 2500.

(3) Coarse aggregate shall be size No. 67 in accordance with ASTM C 33.

(4) Cement shall be Type II or IIA.

(5) In Section 18, Removal of Forms, Method 1 shall apply.

c. Subsidiary Item, Concrete Class 2500 (continued)

(6) No separate payment will be made for Concrete Class 2500. Compensation for Concrete Class 2500 will be included in Bid Item 15, 12-inch x 12-inch Slide Gates; Bid Item 17, Identification Sign and Bid Item 19, 4-Strand Barbed Wire Fence.

26. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 11, Concrete, Class 4000X

(1) This item shall consist of furnishing, forming and placing all concrete required to construct the vegetative conduit inlets, outlets, cradles and anti-seep collars.

(2) Preformed expansion joint filler shall conform to Material Specification 535 and ASTM D 1752 and shall be either Type 1 or Type II.

(3) Joint sealing compound shall be Type II, Class A conforming to Material Specification 536 and Federal Specification TT-S-227.

(4) Waterstops shall be Class II, Type B or E, size designation as shown on the drawings.

(5) In Section 3, Classes of Concrete and Section 5, Design of the Concrete Mix, Method 2 shall apply. Concrete shall be Class 4000X.

(6) Coarse aggregate shall be size No. 67 in accordance with ASTM C 33.

(7) In Section 15, Construction Joints, Method 1 shall apply.

(8) In Section 18, Removal of Forms, Method 1 shall apply.

(9) All exposed surfaces of the vegetative conduit inlets and outlets shall be finished in the following manner:

Upon patching and pointing all holes as directed in Section 19, the surface shall be promptly covered with polyethylene film, wet burlap or wet cotton mats. If polyethylene film is used, the film shall be held securely to the surface by means of weights, adhesive or other suitable means. Only white polyethylene film for covering will be acceptable.

When the mortar used in patching and pointing has set sufficiently, the surface shall be uncovered and thoroughly rubbed with either a float or a carborundum stone until the surface is covered with a lather. Cork, wood or rubber floats shall be used only on surfaces sufficiently green to work up such lather; otherwise a carborundum stone shall be used. During the rubbing process, a

thin grout composed of one (1) part cement and one (1) part of fine sand may be used to facilitate producing a satisfactory lather; however, this grout shall not be used in quantities sufficient to cause a plaster coating to be left on the finished surface. A portion of the required cement for grout shall be white as required to match the color of the surrounding concrete. Rubbing shall continue until irregularities are removed and there is no excess material. At the time a light dust appears, the surface shall be brushed or sacked. Brushing or sacking shall be carried in one direction so as to produce a uniform texture.

(10) Curing compound shall be Type I-D conforming to Material Specification 534 and ASTM C 309.

(11) Measurement and payment will be by Method 2.

b. Bid Item 12, Cement

(1) This item shall consist of furnishing and handling all cement required to construct the concrete items in Bid Item 11 and Subsidiary Item, Concrete Class 2500.

(2) Cement shall be Type II or IIA.

(3) Measurement and payment will be by Method 2.

c. Subsidiary Item, Concrete Class 2500

(1) This item shall consist of furnishing, forming and placing all concrete to construct the following:

(a) Barbed wire post anchors and sag weights.

(b) Post anchors for identification sign.

(2) In Section 3, Classes of Concrete and Section 5, Design of Concrete Mix, Method 1 shall apply. Concrete shall be Class 2500.

(3) Coarse aggregate shall be size No. 67 in accordance with ASTM C 33.

(4) Cement shall be Type II or IIA.

(5) In Section 18, Removal of Forms, Method 1 shall apply.

(6) No separate payment will be made for Concrete Class 2500. Compensation for Concrete Class 2500 will be included in Bid Item 20, 4-Strand Barbed Wire Fence and Bid Item 19, Identification Sign.

26. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 4, Concrete

(1) This item shall consist of furnishing, forming and placing all concrete required to construct the box culvert at Courthouse Road.

(2) Preformed expansion joint filler shall conform to Material Specification 535 and ASTM D 994.

(3) Joint sealing compound shall be Type II, Class A, conforming to Material Specification 536 and Federal Specification TT-S-227.

(4) No waterstops will be required.

(5) In Section 3, Classes of Concrete and Section 5, Design of the Concrete Mix, Method 1 shall apply. Concrete shall be Class 2500. Minimum cement content per cubic yard shall be six (6) bags.

(6) In Section 15, Construction Joints, Method 1 shall apply.

(7) In Section 18, Removal of Forms, Method 1 shall apply.

(8) All exposed surfaces of the box culvert shall be finished in the following manner:

Upon patching and pointing all holes as directed in Section 19, the surface shall be promptly covered with polyethlene film, wet burlap or wet cotton mats. If polyethlene film is used, the film shall be held securely to the surface by means of weights, adhesive or other suitable means. Only white polyethlene film for covering will be acceptable.

When the mortar used in patching and pointing has set sufficiently, the surface shall be uncovered and thoroughly rubbed with either a float or a carborundum stone until the surface is covered with a lather. Cork, wood or rubber floats shall be used only on surfaces sufficiently green to work up such lather, otherwise a carborundum stone shall be used. During the rubbing process, a thin grout composed of one (1) part cement and one (1) part of fine sand may be used to facilitate producing a satisfactory lather; however, this grout shall not be used in quantities sufficient to cause a plaster coating to be left on the finished surface. A portion of the required cement for the grout shall be white as required to match the color of the surrounding concrete. Rubbing shall continue until irregularities are removed and there is no excess material. At that time, a light dust appears, the surface shall be brushed or sacked. Brushing or sacking shall be carried in one direction so as to produce a unform texture.

(9) Curing compound shall be Type 1-D, conforming to Material Specification 534 and ASTM C 309.

(10) Measurement and payment will be by Method 2.

CONSTRUCTION SPECIFICATION

34. STEEL REINFORCEMENT

1. SCOPE

The work shall consist of furnishing and placing steel reinforcement for reinforced concrete or pneumatically applied mortar.

2. MATERIALS

Steel reinforcement shall conform to the requirements of Material Specification 539. Before reinforcement is placed the surfaces of the bars and fabric and any metal supports shall be cleaned to remove any loose, flaky rust, mill scale, oil, grease or other coatings or foreign substances. After placement the reinforcement shall be maintained in a clean condition until it is completely embedded in the concrete.

3. BAR SCHEDULE, LISTS AND DIAGRAMS

Any supplemental bar schedules, bar lists or bar-bending diagrams required to accomplish the fabrication and placement of reinforcement shall be provided by the Contractor. Prior to placement of reinforcement, the Contractor shall furnish three prints or copies of any such lists or diagrams to the Contracting Officer. Acceptance of the reinforcement will not be based on approval of these lists or diagrams but will be based on inspection of the reinforcement after it has been placed.

4. BENDING

Reinforcement shall be cut and bent in compliance with the requirements of the American Concrete Institute Standard 315. Bars shall not be bent or straightened in a manner that will injure the material. Bars with kinks, cracks or improper bends will be rejected.

5. SPLICING BAR REINFORCEMENT

Unless otherwise specified on the drawings, splices of reinforcing bars shall provide an overlap equal to at least 30 times the diameter of the smaller bar in the splice but not less than 12 inches.

6. SPLICING WELDED WIRE FABRIC

Welded wire fabric shall be spliced in the following manner:

a. Adjacent sections shall be spliced end to end by either:

(1) Overlapping the two pieces of fabric one full mesh (measured from the ends of the longitudinal wires in one piece to the ends of the longitudinal wires in the other piece) and securing the two pieces together with wire ties placed at intervals of 18 inches; or,

(2) Overlapping the two pieces of fabric so that the end crosswire of each piece comes in contact with the next-to-end crosswire of the other piece and securing the two pieces together only as required to keep the fabric in place and to prevent it from curling.

b. Adjacent sections of fabric shall be spliced side to side by either:

(1) Placing the two selvage wires (the longitudinal wires at the edges of the fabric) one along side and overlapping the other and securing the two pieces together with wire ties placed at intervals of 3 feet; or,

(2) Placing each selvage wire in the middle of the first mesh of the other section of fabric and securing it to the other section at intervals of 10 feet by means of wire ties placed on the selvage wires alternately at intervals of 5 feet.

(3) Placing each selvage wire in contact with the next-to-edge longitudinal wire and securing them together only as required to keep the fabric in place or to prevent it from curling.

7. PLACING

Reinforcement shall be accurately placed and secured in position in a manner that will prevent its displacement during the placement of concrete. Tack welding of bars will not be permitted. Metal chairs, metal hangers, metal spacers and concrete chairs

may be used to support the reinforcement. Metal hangers, spacers and ties shall be placed in such a manner that they will not be exposed in the finished concrete surface. The legs of metal chairs that may be exposed at the lower face of slabs or beams shall be galvanized as specified for iron and steel hardware in Material Specification 582. Precast concrete chairs shall be manufactured of the same class of concrete as that specified for the structure and shall have tie wires securely anchored in the chair or a V-shaped groove at least 3/4 inch in depth molded into the upper surface to receive the steel bar at the point of support. Precast concrete chairs shall be moist at the time concrete is placed.

Reinforcement shall not be placed until the prepared site has been inspected and approved by the Engineer. After placement of the reinforcement, concrete shall not be placed until the reinforcement has been inspected and approved by the Engineer.

8. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the weight of reinforcement placed in the concrete in accordance with the drawings will be determined to the nearest pound by computation from the placing drawings. Measurement of hooks and bends will be based on the requirements of ACI Standard 315. Computation of weights of reinforcement will be based on the unit weights established in Tables 34-1, 34-2, and 34-3. The area of welded wire fabric reinforcement placed in the concrete in accordance with the drawings will be determined to the nearest square foot by computation from the placing drawings with no allowance for laps. The weight of steel reinforcing in extra splices or extra-length splices approved for the convenience of the Contractor or the weight of supports and ties will not be included in the measurement for payment.

Payment for furnishing and placing reinforcing steel will be made at the contract unit price. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work including preparing and furnishing bar schedules, lists or diagrams; furnishing and attaching ties and supports; and furnishing, transporting, cutting, bending, cleaning and securing all reinforcement.

(Method 2) For items of work for which specific unit prices are established in the contract, the weight of bar reinforcement placed in the concrete in accordance with the drawings will be determined

to the nearest pound by computation from the placing drawings. Measurement of hooks and bends will be based on the requirements of ACI Standard 315. Computation of weights of bar reinforcement will be based on the unit weights established in Table 34-1. The weight of steel reinforcing in extra splices or extra-length splices approved for the convenience of the Contractor or the weight of supports and ties will not be included in the measurement for payment.

The area of welded wire fabric reinforcement placed in the concrete in accordance with the drawings will be determined to the nearest square foot by computation from the placing drawings with no allowance for laps.

Payment for furnishing and placing bar reinforcing steel will be made at the contract unit price for bar reinforcement. Payment for furnishing and placing welded wire fabric reinforcing steel will be made at the contract unit price for welded wire fabric reinforcement. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work including preparing and furnishing bar schedules, lists or diagrams; furnishing and attaching ties and supports; and furnishing, transporting, cutting, bending, cleaning and securing all reinforcement.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in Section 9 of this specification.

TABLE 34-1. STANDARD REINFORCING BARS

Bar Size No.	2	3	4	5	6	7	8	9	10	11
Wt. (lb./ft.)	0.167	0.376	0.668	1.043	1.502	2.044	2.670	3.400	4.303	5.313

TABLE 34-2. RECTANGULAR WELDED WIRE FABRIC [1]

Style Designation	Wt. in Lb. Per 100 Sq. Ft.	Style Designation	Wt. in Lb. Per 100 Sq. Ft.	Style Designation	Wt. in Lb. Per 100 Sq. Ft.
24-1414	16	312- 711	39	48- 912	23
212- 04	169	312- 812	32	48-1012	20
212- 15	144	412- 26	69	48-1112	17
212- 26	124	412- 37	59	48-1212	14
212- 37	107	412- 48	51	48-1214	12
212- 48	91	412- 59	43	612-3/04	91
212- 59	77	412- 610	36	612-2/04	78
212- 610	66	412- 711	31	612- 00	81
212- 711	56	412- 810	27	612- 03	72
312- 04	119	412- 812	25	612- 11	69
312- 15	102	412- 912	22	612- 14	61
312- 26	87	412-1012	19	612- 22	59
312- 37	75	412-1112	16	612- 25	52
312- 48	64	412-1212	13	612- 33	51
312- 59	54	48- 711	33	612- 44	44
312- 610	46	48- 812	27	612- 66	32
				612- 77	27

[1]Style designation is defined in ACI Standard 315 of the American Concrete Institute.

TABLE 34-3. SQUARE WELDED WIRE FABRIC[1]

Style Designation	Wt. in Lb. Per 100 Sq. Ft.	Style Designation	Wt. in Lb. Per 100 Sq. Ft.
2 x 2 - 10/10	60	4 x 4 - 14/14	11
2 x 2 - 12/12	37	6 x 6 - 0/0	107
2 x 2 - 14/14	21	6 x 6 - 1/1	91
2 x 2 - 16/16	13	6 x 6 - 2/2	78
3 x 3 - 8/8	58	6 x 6 - 3/3	68
3 x 3 - 10/10	41	6 x 6 - 4/4	58
3 x 3 - 12/12	25	6 x 6 - 4/6	50
3 x 3 - 14/14	14	6 x 6 - 5/5	49
4 x 4 - 4/4	85	6 x 6 - 6/6	42
4 x 4 - 6/6	62	6 x 6 - 7/7	36
4 x 4 - 8/8	44	6 x 6 - 8/8	30
4 x 4 - 10/10	31	6 x 6 - 9/9	25
4 x 4 - 12/12	19	6 x 6 - 10/10	21
4 x 4 - 13/13	14		

[1]Style designation is defined in ACI Standard 315 of the American Concrete Institute.

ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 12, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of reinforced concrete under this contract.

(2) Measurement and payment will be by Method 1.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 13, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of reinforced concrete under this contract.

(2) Measurement and payment will be by Method 1.

ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 5, Steel Reinforcement

(1) This item shall consist of furnishing and installing all steel reinforcement required in the construction of reinforced concrete under this contract.

(2) Measurement and payment will be by Method 1.

CONSTRUCTION SPECIFICATION

42. CONCRETE PIPE CONDUITS AND DRAINS

1. SCOPE

The work shall consist of furnishing and installing concrete pipe or concrete drain tile and the necessary fittings as shown on the drawings.

2. MATERIALS

Reinforced concrete pressure pipe shall conform to the requirements of Material Specification 541 for the type and strength specified.

Concrete culvert pipe shall conform to the requirements of Material Specification 542 for the kind of pipe specified.

Concrete irrigation pipe, drainage pipe and drain tile shall conform to the requirements of Material Specification 543 for the kind of pipe or tile specified.

Pipe fittings shall conform to the requirements of the applicable pipe specifications.

Sealing compound for filling rubber gasket joints shall conform to the requirements of Material Specification 536.

Hot-pour joint sealer shall conform to the requirements of Federal Specification SS-S-169.

Cold-applied sealing compound shall conform to the requirements of Federal Specification SS-S-168.

Preformed sealing compound shall conform to the requirements of Interim Federal Specification SS-S-00210.

Joint packing shall conform to the requirements of Federal Specification HH-P-119 for mastic sealed joints and Federal Specification HH-P-117 for cement mortar sealed joints.

Preformed expansion joint filler shall conform to the requirements of Material Specification 535.

LAYING AND BEDDING

Pipe and tile shall be laid to the line and grade shown on the drawings. Pipe shall be laid with the bell or groove at the upstream end of each section.

a. Concrete Cradles or Bedding. Pipe to be cradled or bedded on concrete shall be set to the specified line and grade and temporarily supported on precast concrete blocks or wedges until the cradle or bedding concrete is placed. Concrete blocks or wedges used to temporarily support the pipe during placement of bedding or cradle shall be of a class of concrete equal to or better than that used in the bedding or cradle.

b. Earth, Sand, or Gravel Bedding. The pipe shall be firmly and uniformly bedded throughout its entire length to the depth and in the manner specified on the drawings. The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about a vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

Elliptical pipe and pipe with elliptical or quadrant reinforcement shall be laid so that the vertical axis, as indicated by markings on the pipe, is in a vertical position.

4. JOINTS

Pipe joints shall conform to the details shown on the drawings and to the requirements of Section 5 and 6 of this specification applicable to the type of joint specified. Except where unsealed joints are indicated, pipe joints shall be sound and watertight at the pressure specified.

5. JOINING BELL AND SPIGOT PIPE

a. Rubber Gasket Joint, Pressure Pipe. Just before the joint is connected the connecting surfaces of the spigot and the bell or coupling band, sleeve or collar shall be thoroughly cleaned and dried, and the rubber gasket and the inside surface of the bell or coupling band, sleeve or collar shall be lubricated with a light film of soft vegetable soap compound (flax soap). The rubber gasket shall be stretched uniformly as it is placed in the spigot groove to insure a uniform volume of rubber around the circumference of the pipe.

(Method 1) The joint shall be connected by means of a pulling or jacking force so applied to the pipe that the spigot enters squarely into the bell.

(Method 2) The joint shall be connected in accordance with the manufacturer's recommendations.

(Use with Either Method) When the spigot has been seated to within 1/2 inch of its final position, the position of the gasket in the joint shall be checked around the entire circumference of the pipe by means of metal feeler gage. In any case where the gasket is found to be displaced, the joint shall be disengaged and properly reconnected. After the position of the gasket has been checked, the spigot shall be completely pulled into the bell and the section of the pipe shall be adjusted to line and grade.

b. Rubber Gasket Joints, Sewer and Culvert Pipe or Irrigation Pipe. The pipe shall be joined in accordance with the gasket manufacturer's recommendations except as otherwise specified.

c. Mastic Sealed Joints. At the time of assembly the inside surfaces of the bell and the outside surfaces of the spigot shall be clean, dry and primed as recommended by the manufacturer of the sealing compound. A closely twisted gasket of joint packing of the diameter required to support the spigot at the proper grade and to make the joint concentric shall be made in one piece of sufficient length to pass around the pipe and lap at the top. The gasket shall be laid in the bell throughout the lower third of the circumference. The end of the spigot shall be laid on the gasket and the spigot shall be fully inserted into the bell so that the pipe sections are closely fitted and aligned. The gasket then shall be lapped at the top of the pipe and thoroughly packed into the annular space between the bell and the spigot.

(1) Hot-Pour Joint Sealer. The sealing compound shall be heated to within the temperature range recommended by the manufacturer and shall not be overheated or subjected to prolonged heating. After the joint is assembled, with the pipe in its final location, a suitable joint runner shall be placed around the joint with an opening left at the top. Molten sealing compound shall be poured into the joint as rapidly as possible without entrapping air until the annular space between bell and spigot is completely filled. After the compound has set, the runner may be removed. Alternate joints may be poured before the pipe is lowered into the trench. In this case, the joint shall be poured with the pipe in a vertical position without the use of the runner. The compound shall have thoroughly set before the pipe is placed in the trench, and the pipe shall be handled so as to cause no deformation of the joint during placement.

(2) Cold-Applied Sealing Compound. The annular space between bell and spigot shall be completely filled with the sealing compound. The compound shall be mixed on the job in accordance with the manufacturer's recommendations and in relatively small quantities so that setting will not be appreciable before application.

(3) Preformed Sealing Compound. Joint packing will not be required, except as recommended by the manufacturer of the sealing compound. Preformed strips or bands of the sealing compound shall be applied to the bell and spigot prior to assembly of the joint in accordance with the manufacturer's recommendations. Any compound extruded from the interior side of the joint during assembly shall be trimmed even with the interior surface of the pipe.

d. Cement Mortar Sealed Joints. Cement mortar for joints shall consist of one part by weight of portland cement and two parts by weight of fine sand with enough water added to produce a workable consistency. At the time of assembly the inside surface of the bell and the outside surface of the spigot shall be clean and moist.

(1) With Packing. A closely twisted gasket of joint packing of the diameter required to support the spigot at the proper grade and to make the joint concentric shall be made in one piece of sufficient length to pass around the pipe and lap at the top. The gasket shall be saturated with neat cement grout, laid in the bell throughout the lower third of the circumference and covered with mortar. The end of the spigot shall be fully inserted into the bell so that the pipe sections are closely fitted and aligned. A small amount of mortar shall be placed in the annular space throughout the upper two-thirds of the circumference. The gasket then shall be lapped at the top of the pipe and thoroughly packed into the annular space between the bell and the spigot. The remainder of the annular space then shall be filled completely with mortar and beveled off at an angle of approximately forty-five (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. After the mortar has set slightly, the joint shall be wiped inside the pipe. In pipe too small for a man to work inside, wiping may be done by dragging an approved swab through the pipe as the work progresses.

(2) Without Packing. The lower portion of the bell shall be filled with stiff mortar of sufficient thickness to make the inner surface of the abutting sections flush. The spigot end of the pipe to be joined shall be fully inserted into the bell so that the sections are closely fitted and aligned. The remaining annular space between the bell and spigot shall then be filled with mortar and the mortar neatly beveled off at an angle of approximately forty-five (45) degrees with the outside of the bell. After the mortar has set slightly, the joint shall be wiped inside the pipe. In pipe too small for a man to work inside, wiping may be done by dragging an approved swab through the pipe as the work progresses.

e. Unsealed Joints. When unsealed joints are specified, they shall conform to the details shown on the drawings.

6. JOINING TONGUE AND GROOVE PIPE

a. Cement Mortar Sealed Joint. Mortar shall be as specified for bell and spigot joints. The tongue end of the section being placed shall be covered with mortar and firmly pressed into the groove of the laid section in such a manner that the tongue fits snugly and truly in the groove and that mortar is squeezed out both on the interior and exterior of the joint. Care shall be taken that no mortar falls from the groove end during the abutting operation. Immediately after the pipe sections have been abutted, exposed external surface mortar shall be pressed into the joint and any excess mortar removed, after which the interior surface of the joint shall be carefully pointed and brushed smooth, and all surplus mortar removed.

b. Mastic Sealed Joints. Strips or bands of preformed sealing compound shall be applied to the tongue and groove prior to assembly of the joint in accordance with the manufacturer's recommendations. Any compound extruded from the interior side of the joint during assembly shall be trimmed even with the interior surface of the pipe.

c. Rubber Gasket Joints. The pipe shall be joined in accordance with the gasket manufacturer's recommendations except as otherwise specified.

d. Unsealed Joints. When unsealed joints are specified, they shall conform to the details shown on the drawings.

7. BANDING

When external mortar bands are specified, they shall conform to the details shown on the drawings.

8. CURING MORTAR JOINTS AND BANDS

The external surfaces of mortar joints shall be covered with moist earth, sand, canvas, burlap or other approved materials and shall be kept moist for 10 days or until the pipe is backfilled.

Water shall not be turned into the conduit within 24 hours after the joints are finished. Hydrostatic pressure shall not be applied to the conduit prior to 14 days after the joints are finished.

9. PRESSURE TESTING

(Method 1) Pressure testing of the completed conduit will not be required.

(Method 2) Prior to the placement of concrete or earth fill around the conduit, the conduit shall be tested for leaks in the following manner: The ends of the conduit shall be plugged and a standpipe with a minimum diameter of two (2) inches shall be attached to the upstream plug. The conduit shall be braced at each end to prevent slippage. The conduit and the standpipe shall be filled with water. The water level in the standpipe shall be maintained, by continuous pumping, a minimum of 10 feet above the invert of the upstream end of the conduit for a period of not less than two hours. Any leaks shall be repaired and the conduit shall be retested as described above. The procedure shall be repeated until the conduit is watertight.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leaks.

(Method 3) Prior to the placement of concrete or earth fill around the conduit, the conduit shall be tested at the specified test pressure for a period of at least 2 hours. Any leaks shall be repaired and the conduit shall be retested. The procedure shall be repeated until the conduit is watertight.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leaks.

10. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe or tile will be determined to the nearest foot by measurement of the laid length along the invert centerline of the conduit. Payment for each kind, size, and class of pipe or tile will be made at the contract unit price for that kind, size, and class. Such payment will constitute full compensation for furnishing, transporting and installing the pipe or tile complete in place.

(Method 2) For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe or tile will be determined as the sum of the nominal laying lengths of the sections used. Payment for each kind, size, and class of pipe or tile will be made at the contract unit price for that kind, size, and class. Such payment will constitute full compensation for furnishing, transporting and installing the pipe or tile complete in place.

(Use with Either Method). Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 11 of this specification.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 14, 12-Inch Diameter Reinforced Concrete Pipe

(1) This item shall consist of the furnishing and installing of the 12-inch diameter reinforced concrete pipe for the vegetative conduits to the lines and grades as shown on the drawings.

(2) In Section 2, Materials, Materials Specification 542 shall apply.

(3) The pipe shall be round reinforced concrete pipe, Class V and shall conform to the requirements of ASTM Specification C-76.

(4) In Section 5, Joining Bell and Spigot Pipe, the pipe shall be equipped with rubber gasket joints and shall be constructed in accordance with Method 1.

(5) Measurement and payment will be by Method 1.

b. Bid Item 15, 21-Inch Diameter Reinforced Concrete Pipe

(1) This item shall consist of the furnishing and installing of the 21-inch diameter reinforced concrete pipe for the vegetative conduits as shown on the drawings and staked in the field.

(2) In Section 2, Materials, Materials Specification 542 shall apply.

(3) The pipe shall be round reinforced concrete pipe, Class V and shall conform to the requirements of ASTM Specification C-76.

(4) In Section 5, Joining Bell and Spigot Pipe, the pipe shall be equipped with rubber gasket joints and shall be constructed in accordance with Method 1.

(5) Measurement and payment will be by Method 1.

CONSTRUCTION SPECIFICATION

44. ASBESTOS-CEMENT PIPE CONDUITS AND DRAINS

1. SCOPE

The work shall consist of furnishing and installing asbestos-cement pipe and the necessary fittings as shown on the drawings.

2. MATERIALS

Pipe, fittings, and gaskets shall conform to the requirements of Material Specification 545 for the kind of pipe specified.

3. LAYING AND BEDDING

Pipe shall be laid to the line and grade shown on the drawings.

a. Concrete Cradle or Bedding. Pipe to be cradled or bedded on concrete shall be set to the specified line and grade and temporarily supported on concrete blocks or wedges until the cradle or bedding concrete is placed.

b. Earth, Sand, or Gravel Bedding. The pipe shall be firmly and uniformly bedded throughout its entire length to the depth and in the manner specified on the drawings. The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about the vertical centerline. Perforations shall be clear of any obstructions when the pipe is laid.

4. JOINTS

Pipe joints shall conform to the details shown on the drawings and, except where unsealed joints are indicated, shall be sound and watertight at the pressures specified.

Pipe shall be installed and joined in accordance with the manufacturer's recommendations except as otherwise specified.

5. PRESSURE TESTING

(Method 1) Pressure testing of the completed conduit will not be required.

(Method 2) Prior to the placement of concrete or earth fill around the conduit, the conduit shall be tested for leaks in the following manner: The ends of the conduit shall be plugged and a standpipe with a minimum diameter of two (2) inches shall be attached to the upstream plug. The conduit shall be braced at each end to prevent slippage. The conduit and the standpipe shall be filled with water. The water level in the standpipe shall be maintained by continuous pumping, a minimum of 10 feet above the invert of the upstream end of the conduit for a period of not less than two hours. Any leaks shall be repaired and the conduit shall be retested as described above. The procedure shall be repeated until the conduit is watertight.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leaks.

(Method 3) Prior to the placement of concrete or earth fill around the conduit, the conduit shall be tested at the specified test pressure for a period of at least 2 hours. Any leaks shall be repaired and the conduit shall be retested. The procedure shall be repeated until the conduit is watertight.

The pipe joints shall show no leakage. Damp spots developing on the surface of the pipe will not be considered as leaks.

6. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the quantity of each kind, size and class of pipe will be determined to the nearest foot by measurement of the laid length of pipe along the invert centerline of the conduit. Payment for each kind, size, and class of pipe will be made at the contract unit price for that kind, size, and class of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe complete in place.

(Method 2) For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe will be determined as the sum of the nominal laying lengths of the pipe sections used. Payment for each kind, size, and class of pipe will be made at the contract unit price for that kind, size, and class of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe complete in place.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in accordance with this specification and the construction details are:

a. Bid Item 13, 6-Inch Diameter Drain Pipe

(1) These items shall consist of furnishing and installing all the 6-inch diameter perforated and non-perforated asbestos-cement pipe, including cast iron fittings, for the following, as shown on the drawings.

(a) Principal spillway conduit drain.

(b) Principal spillway outlet drain.

(c) Embankment drain fill outlets.

(2) The pipe shall be asbestos cement pressure pipe conforming to material Specification 545 and ASTM C 296; Type II, Class 200. Perforated pressure pipe shall conform to the requirements of ASTM Specification C 508.

(3) In Section 5, Pressure Testing, Method 1 shall apply.

(4) Measurement and payment will be by Method 2.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 16, 6-Inch Diameter Drain Pipe

(1) This item shall consist of furnishing and installing all the 6-inch diameter perforated and non-perforated asbestos-cement pipe, including cast iron fittings, under the drop structures, as shown on the drawings.

(2) The pipe shall be asbestos cement pressure pipe conforming to material Specification 545 and ASTM C 296; Type II, Class 200. Perforated pressure pipe shall conform to the requirements of ASTM Specification C 508.

(3) In Section 5, Pressure Testing, Method 1 shall apply.

(4) Measurement and payment will be by Method 2.

CONSTRUCTION SPECIFICATION

51. CORRUGATED METAL PIPE CONDUITS

1. SCOPE

The work shall consist of furnishing and placing circular, arched or eliptical corrugated metal pipe and the necessary fittings.

2. MATERIALS

Pipe and fittings shall conform to the requirements of Material Specification 551 or Material Specification 552, whichever is specified.

3. LAYING AND BEDDING THE PIPE

Unless otherwise specified, the pipe shall be installed in accordance with the manufacturer's recommendations. The pipe shall be laid with the outside laps of circumferential joints pointing upstream and with longitudinal laps at the sides at about the vertical midheight of the pipe. Field welding of corrugated galvanized iron or steel pipe will not be permitted. Unless otherwise specified, the pipe sections shall be jointed with standard coupling bands. The pipe shall be firmly and uniformly bedded throughout its entire length to the depth and in the manner specified on the drawings.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about a vertical center line. Perforations shall be clear of any obstructions at the time the pipe is laid.

The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

4. STRUTTING

When required, struts or horizontal ties shall be installed in the manner specified on the drawings. Struts and ties shall remain in place until the backfill has been placed to a height of 5 feet above the top of the pipe, or has been completed if the finished height is less than 5 feet above the top of the pipe, at which time they shall be removed by the Contractor.

5. HANDLING THE PIPE

The Contractor shall furnish such equipment as is necessary to place the pipe without damaging the pipe or coatings. The pipe shall be transported and handled in such a manner as to prevent bruising, scaling, or breaking of the spelter coating or bituminous coating.

6. REPAIR OF DAMAGED COATINGS

Any damage to the zinc coating shall be repaired by thoroughly wire brushing the damaged area, removing all loose and cracked coating, removing all dirt and greasy material with solvent, and painting with two coats of zinc dust-zinc oxide primer conforming to the requirements of Federal Specification TT-P-641, Type III, or zinc dust paint conforming to the requirements of Military Specification MIL-P-21035. If the coating is damaged in any individual area larger than 12 square inches, or if more than 0.2 percent of a total surface area of a length of pipe is damaged, the length will be rejected.

Breaks or scuffs in bituminous coatings that are less than 36 square inches in area shall be repaired by the application of two coats of hot asphaltic paint or a coating of cold-applied bituminous mastic. The repair coating shall be at least 0.05 inches thick after hardening and shall bond securely and permanently to the pipe. The material shall meet the physical requirements for bituminous coatings contained in the references cited in Material Specifications 551 and 552. Whenever individual breaks exceed 36 square inches in area or when the total area of breaks exceeds 0.5 percent of the total surface area of the pipe, the pipe will be rejected.

Bituminous coating damaged by welding of coated pipe or pipe fittings shall be repaired as specified in this section for breaks and scuffs in bituminous coatings.

7. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract the quantity of each type, class, size and gage of pipe will be determined to the nearest 0.1 foot by measurement of the laid length of pipe along the centerline of the pipe. Payment for each type, class, size and gage of pipe will be made at the contract unit price for that type, class, size and gage of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe and fittings and all other items necessary and incidental to the completion of the work.

(Method 2) For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gage of pipe will be determined as the sum of the nominal laying lengths of the pipe sections and fittings used. Payment for each type, class, size and gage of pipe will be made at the contract unit price for that type, class, size and gage of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe and fittings and all other items necessary and incidental to the completion of the work.

(Method 3) For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gage of pipe will be determined to the nearest 0.1 foot by measurement of the laid length of pipe along the centerline of the pipe. Payment for each type, class, size and gage of pipe will be made at the contract unit price for that type, class, size and gage of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe and fittings and all other items necessary and incidental to the completion of the work except items designated as "special fittings." Payment for special fittings will be made at the contract lump sum price for special fittings (CMP).

(Method 4) For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gage of pipe will be determined as the sum of the nominal laying lengths of the pipe sections and fittings used. Payment for each type, class, size and gage of pipe will be made at the contract unit price for that type, class, size and gage of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe and fittings and all other items necessary and incidental to the completion of the work except items designated as "special fittings." Payment for special fittings will be made at the contract lump sum price for special fittings (CMP).

(Method 5) For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gage of pipe will be determined to the nearest 0.1 foot by measurement of the laid length of pipe along the centerline of the pipe. Payment for each type, class, size and gage of pipe will be made at the contract unit price for that type, class, size and gage of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe, including the necessary fittings and all other items necessary and incidental to the completion of the work except the special

fittings and appurtenances listed separately in the bid schedule. Payment for each special fitting and appurtenance will be made at the contract unit price for that type and size of fitting or appurtenance.

(Method 6) For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gage of pipe will be determined as the sum of the nominal laying lengths of the pipe sections used. Payment for each type, class, size and gage of pipe will be made at the contract price for that type, class, size and gage of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe, including the necessary fittings and all other items necessary and incidental to the completion of the work except the special fittings and appurtenances listed separately in the bid schedule. Payment for each special fitting and appurtenance will be made at the contract unit price for that type and size of fitting or appurtenance.

(Method 7) For items of work for which specific lump sum prices are established in the contract, payment for corrugated metal pipe structures will be made at the contract lump sum prices. Such payment will constitute full compensation for furnishing, fabricating, transporting, and installing the pipe, fittings, and appurtenances, and all other items necessary and incidental to completion of the work, including, except as otherwise specified, required excavation, dewatering, and backfilling.

(Use with All Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 8 of this specification.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 6, 65" x 40" Corrugated Metal Pipe Arch

(1) This item shall consist of the furnishing and installing of 65" x 40" corrugated metal pipe arch, steel end sections and fittings, under the Buckeye-Salome Road at the intersection of the drain channel as shown on the drawings.

(2) In Section 2, Maaterials Specification 551 shall apply.

(3) The pipe shall be zinc-coated 12 gage, Class I or II. The pipe shall be uniformly bituminous coated on the outside only to a minimum thickness of 0.05 inch, measured on the crests of the corrugations.

(4) Steel end section shall be flared and of the same gage, class and coating as the pipe.

(5) Measurement and payment will be by Method 7.

CONSTRUCTION SPECIFICATION

61. LOOSE ROCK RIPRAP

1. SCOPE

The work shall consist of the construction of loose rock riprap revetments and blankets, including filter layers or bedding where specified.

2. MATERIALS

Rock for loose rock riprap shall conform to the requirements of Material Specification 523 or, if so specified, shall be obtained from designated sources.

Rock from designated sources shall be excavated, selected and handled as necessary to meet the quality and grading requirements in Section 9 of this specification. The rock shall conform to the specified grading limits when installed in the riprap.

Filter material shall conform to the requirements of Material Specification 521 unless otherwise specified.

Bedding shall be obtained from the designated sources and shall be selected to meet the quality and grading requiremtnts in Section 9 of this specification.

At least 30 days prior to delivery of material from other than designated sources, the Contractor shall notify the Contracting Officer in writing of the sources from which he intends to obtain the material. The Contractor shall provide the Engineer free access to the sources for the purpose of obtaining samples for testing.

3. SUBGRADE PREPARATION

The subgrade surfaces on which the riprap or bedding course is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall conform to the requirements of the specified class of fill.

Riprap shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by the Engineer.

4. EQUIPMENT-PLACED ROCK RIPRAP

The rock shall be placed by equipment on the surfaces and to the depths specified. The riprap shall be constructed to the full course thickness of one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock shall be delivered and placed in a manner that will insure that the riprap in place shall be resonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks.

Riprap shall be placed in a manner to prevent damage to structures. Hand placing will be required to the extent necessary to prevent damage to the permanent works.

5. HAND-PLACED RIPRAP

The rock shall be placed by hand on the surfaces and to the depths specified. It shall be securely bedded with the larger rocks firmly in contact one to another. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on edge.

6. FILTER LAYERS OR BEDDING

When the drawings specify filter layers or bedding beneath riprap, the filter or bedding material shall be spread uniformly on the prepared subgrade surfaces to the depth specified. Compaction of filter layers or bedding will not be required, but the surface of such layers shall be finished reasonably free of mounds, dips or windrows.

7. TESTING

The Engineer will perform such tests as are required to verify that the riprap, filter, and bedding materials and the completed work meet the requirements of the specifications. These tests are not intended to provide the Contractor with the information he needs to assure that the materials and workmanship meet the requirements of the specifications, and their performance will not relieve the Contractor of the responsibility of performing his own tests for that purpose.

8. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the volume of each type of riprap, including filter layers and bedding, will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. Payment for each type of riprap, including filter layers and bedding, will be made at the contract unit price for that type of riprap. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

(Method 2) For items of work for which specific unit prices are established in the contract, the volume of each type of riprap and the volume of each type of filter layer or bedding will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

(Method 3) For items of work for which specific units prices are established in the contract, the quantity of each type of riprap placed within the specified limits will be measured to the nearest ton by actual weight, and the volume of each type of filter layer or bedding will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. For each load of rock placed as specified, the Contractor shall furnish to the Engineer a statement-of-delivery ticket showing the weight, to the nearest 0.1 ton, of rock in the load.

Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

(Method 4) For items of work for which specific unit prices are established in the contract, the quality of each type of riprap placed within the specified limits will be measured to the nearest ton by actual weight, and the volume of each type of filter

material or bedding delivered and placed within the specified limits will be measured to the nearest cubic yard by measurement of the hauling equipment. For each load of material placed as specified, the Contractor shall furnish to the Engineer a statement-of-delivery ticket showing the weight, to the nearest 0.1 ton, or rock in the load; or the volume, to the nearest 0.1 cubic yard, of filter material or bedding in the load.

Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to completion of the riprap, filter layers and bedding.

(Use with All Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 9 of this specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 14, Loose Rock Riprap

(1) This item shall consist of the furnishing and placing of loose rock riprap including filter bedding at the following structures as shown on the drawings.

(a) Principal spillway outlet.

(b) Vegetative conduit outlets.

(2) The rock shall be graded as follows:

Particle Size (Inch)	Percent Passing (by dry wt.)
15	100
12	70-100
9	75-80
6	50-75
4	0-50
1	20 (maximum)

(3) Rock shall be either hand or equipment placed.

(4) Filter bedding shall meet the gradation of Bid Item 9, Drain Fill.

(5) Measurement and payment will be by Method 1.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 17, Loose Rock Riprap

(1) This item shall consist of the furnishing and placing of the loose rock riprap as shown on the drawings.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by dry wt.)
15	100
12	70-100
9	75-80
6	50-75
4	0-50
1	20 maximum

(3) Rock shall be either hand or equipment placed.

(4) Measurement and payment will be by Method 1.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 7, Loose Rock Riprap

(1) This item shall consist of the furnishing and placing of loose rock riprap at the 479th Avenue dip crossing as shown on sheet 25, Saddleback Diversion drawing.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by dry wt.)
15	100
12	70-100
9	75-80
6	50-75
4	0-50
1	20 Maximum

(3) Rock shall be either hand or equipment placed.

(4) Measurement and payment will be by Method 1.

CONSTRUCTION SPECIFICATION

71. WATER CONTROL GATES

1. SCOPE

The work shall consist of furnishing and installing water control gates including gate stems, hoists, lifts and other appurtenances.

2. MATERIALS

The gates furnishes shall conform to the requirements specified in Section 8 or on the drawings. All gates shall be furnished complete with hoisting equipment and other specified appurtenances.

3. INSTALLING GATES

The Contractor shall install the gates in a manner that will prevent leakage around the seats and binding of the gates during operation.

Surfaces of metal against which concrete will be placed shall be free from oil, grease, loose mill scale, loose paint, surface rust, and other debris or objectionable coatings.

Anchor bolts, thimbles and spigot frames shall be secured in true position in the forms and held in alignment during the placement of concrete.

Concrete surfaces against which rubber seals will bear or against which flat frames or plates are to be installed shall be finished to provide a smooth and uniform contact surface.

When a flat frame is installed against concrete, a layer of bedding mortar shall be placed between the frame and the concrete.

When a gate is attached to a wall thimble, a mastic or resilient gasket shall be applied between the gate frame and the thimble, in accordance with the recommendation of the gate manufacturer.

For radial gates, wall plates, sills and pin brackets shall be adjusted and fastened by grouting and bolting after the gates have been completely assembled in place.

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4. INSTALLING HOISTS AND LIFTS

Gate stems, stem guides and gate lifts shall be carefully aligned so that the stem shall be parallel to the guide bars or angles on the gate frame after installation.

Radial gate hoists shall be installed in correct alignment with relation to the gate shaft.

5. RADIAL GATE SEALS

The rubber seals on radial gates shall be installed so that the seals contact the walls or wall plates throughout their entire length when the gates are closed.

6. OPERATIONAL TESTS

After the gate and hoist (or lift) have been installed, they shall be cleaned, lubricated and otherwise serviced by the Contractor in accordance with the manufacturer's instructions. The Contractor shall test the gate and hoist by operating the system several times throughout its full range of operation. He shall make any changes and adjustments necessary to insure satisfactory operation of the gate system.

7. MEASUREMENT AND PAYMENT

The number of each type, size and class of gate will be counted. Payment for furnishing and installing each type, size and class of gate shall be made at the contract unit price for that type, size and class of gate. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work including furnishing and installing anchor bolts and all specified appurtenances and fittings.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in Section 8 of this specification.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 15, 12-Inch x 12-Inch Slide Gates

(1) This item shall consist of furnishing and installing the 12-inch x 12-inch slide gate and appurtenances at Stations 60+50 and 256+00 as shown on the drawings.

(2) The slide gate assembly shall be defined as the self-contained gate, complete with frame, rising stem, stem guides, handwheel, life nut, anchor bolts and all other miscellaneous hardware required to complete the installation.

(3) The gate shall be spigot back type slide gate and shall conform to the requirements in Material Specification 573. The gate shall be Type MHS-1, Class 16-0.

(4) The gate stem shall be one and one-eighth (1 - 1/8) inch diameter stainless steel and carbon steel as shown on the drawings.

(5) In Section 11, Painting, painting of the gate will not be required.

(6) Measurement and payment will be made in accordance with Section 7 and will include payment for gate lift and gate stem pedestals, Subsidiary Item, Concrete Class 2500.

CONSTRUCTION SPECIFICATION

81. METAL FABRICATION AND INSTALLATION

1. SCOPE

The work shall consist of furnishing, fabricating and erecting metalwork, including the metal parts of composite structures.

2. MATERIALS

Unless otherwise specified, materials shall conform to the requirements of Material Specification 581. Steel shall be structural quality unless otherwise specified. Castings shall be thoroughly cleaned and subjected to careful inspection before installation. Finished surfaces shall be smooth and true to assure proper fit. Galvanizing shall conform to the requirements of Material Specification 582.

3. FABRICATION

Fabrication of structural steel shall conform to the requirements of Section 1.23 of the "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (Riveted, Bolted and Arc-Welded Construction)," American Institute of Steel Construction.

Fabrication of structural aluminum shall conform to the requirements in the Aluminum Construction Manual, "Specifications for Aluminum Structures," Section 6 and Section 7, The Aluminum Association, November 1967.

4. ERECTION

The frame of metal structures shall be carried up true and plumb. Temporary bracing shall be placed wherever necessary to resist all loads to which the structure may be subjected, including those applied by the installation and operation of equipment. Such bracing shall be left in place as long as may be necessary for safety.

As erection progresses the work shall be securely bolted up, or welded, to resist all dead load, wind and erection stresses. The Contractor shall furnish such fitting up bolts, nuts and washers as may be required.

No riveting or welding shall be done until as much of the structure as will be stiffened thereby has been properly aligned.

Rivets driven in the field shall be heated and driven with the same care as those driven in the shop.

All field welding shall be done in conformance to the requirements for shop fabrication, except those that expressly apply to shop conditions only.

Galvanized items shall not be cut, welded or drilled after the zinc coating is applied.

5. PROTECTIVE COATINGS

Items specified to be galvanized shall be completely fabricated for field assembly before the application of the zinc coatings.

Items specified to be painted shall be painted in conformance to the requirements of Construction Specification 82 for the specified paint systems.

6. MEASUREMENT AND PAYMENT

(Method 1) The work will not be measured. Payment for metal fabrication and installation will be made at the contract lump sum price. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work, including connectors and appurtenances such as rivets, bolts, nuts, pins, studs, washers, hangers and weld metal.

(Method 2) The weight of metal installed complete in place shall be determined to the nearest pound. Unless otherwise provided, the weight of metal shall be computed by the method specified in Section 3 of the "Code of Standard Practice for Steel Buildings and Bridges," American Institute of Steel Construction, except that the following unit weights shall also be used, as appropriate, as the basis of computation:

Material	Unit Weight Pounds per Cubic Foot
Aluminum alloy	173.0
Bronze or copper alloy	536.0
Iron, malleable	470.0
Iron, wrought	487.0

Payment for furnishing, fabricating and installing metalwork will be made at the contract unit price for the specified types of metals. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work.

(Method 3) The work will not be measured. Payment for furnishing, fabricating and installing each item of metalwork will be made at the contract price for that item. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work, including connectors and appurtenances such as rivets, bolts, nuts, pins, studs, washers, hangers and weld metal.

(Use with all Methods) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 16, Metalwork

(1) This item shall consist of supplying, fabricating and installing the following:

(a) Trash racks for vegetative conduits, as shown on the drawings.

(b) Small animal guards for the SAF basin as shown on the drawings.

(c) Twelve (12)-inch diameter steel pipe liner for the vegetative conduits as shown on the drawings.

(2) The trash racks shall be fabricated of structural steel conforming to the requirements of ASTM Specification A 36 to the sizes and dimensions shown on the drawings. Metalwork to be painted shall be the trash racks on vegetative inlets at Stations 60+50, 103+10, 124+10, and Station 256+00, ℄ flood retarding structure, exposed metal on the riser inlet gate assemblies at Station 60+50 and Station 256+100, ℄ flood retarding structure, except those metal surfaces which are galvanized or stainless steel.

(3) Painting shall be in accordance with Construction Specification 82.

(4) The small animal guards shall be fabricated as shown on the drawings and shall be galvanized after fabrication in accordance with Material Specification 582.

(5) Measurement and payment will be by Method 1 and will include compensation for Subsidiary Item, Cleaning and Painting.

b. Bid Item 17, Identification Sign

(1) This item shall consist of the fabrication and installation of the identification sign as shown on the drawings and as directed by the engineer.

(2) Painting shall be in accordance with Construction Specification 82.

(3) Measurement and payment will be by Method 3 and shall include compensation for post anchors, Subsidiary Item, Concrete Class 2500.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 18, Metalwork

(1) This item shall consist of supplying, fabricating and installing the trash racks and steel liners for vegetative conduits.

(2) The trash racks shall be fabricated of structural steel conforming to the requirements of ASTM Specification A 36 to the sizes and dimensions shown on the drawings.

(3) Painting of trash racks shall be in accordance with the construction Specification 82.

(4) Measurement and payment will be by Method 1, and shall include compensation for Subsidiary Item, Cleaning and Painting Metalwork.

b. Bid Item 19, Identification Sign

(1) This item shall consist of the fabrication and installation of the identification sign as shown on the drawings and as directed by the Engineer.

(2) Painting shall be in accordance with Construction Specification 82.

(3) Measurement and payment will be by Method 3 and will include compensation for post anchors, Subsidiary Item, Concrete Class 2500.

CONSTRUCTION SPECIFICATION

82. CLEANING AND PAINTING METALWORK

1. SCOPE

The work shall consist of cleaning metal surfaces and applying paints and protective coatings.

2. PAINTS

For the purposes of this specification paints shall be designated by types as defined below:

Type 1 paint shall conform to the requirements of Federal Specification TT-P-86, Type IV, Red Lead Base Paint.

Type 2 paint shall conform to the requirements of Federal Specification TT-P-86, Type II or Type III, Red Lead Base Paint.

Type 3 paint shall conform to the requirements of Federal Specification TT-P-86, Type I, Red Lead Base Paint.

Type 4 paint shall conform to the requirements of Federal Specification TT-P-636, Synthetic Primer.

Type 5 paint shall be prepared by mixing aluminum paste conforming to the requirements of Federal Specification TT-P-320, Type II, Class 2 with phenolic resin spar varnish conforming to the requirements of Federal Specification TT-V-119 at the rate of two pounds of aluminum paste per gallon of varnish. The paint shall be mixed at the time of use.

Type 6 paint shall be prepared by mixing aluminum paste conforming to Federal Specification TT-P-320, Type II, Class 2 with mixing varnish conforming to the requirements of Federal Specification TT-V-81, Type II, Class B (Class 2) at the rate of two pounds of aluminum paste per gallon of varnish. The paint shall be mixed at the time of use.

Type 7 paint shall conform to the requirements of Federal Specification TT-E-489, Class A, Alkyd Gloss Enamel.

Type 8 paint shall conform to the requirements of Federal Specification TT-E-529, Alkyd Semi-Gloss Enamel.

Type 9 paint shall conform to the requirements of Federal Specification TT-P-641, Type I or Type II, Zinc Dust-Zinc Oxide Primer.

Type 10 paint shall conform to the requirements of Federal Specification TT-P-641, Type III, Zinc Dust-Zinc Oxide Primer.

Type 11 paint shall conform to the requirements of Material Specification 583. The paint shall be mixed at the time of use.

Paints of Types 1, 2, 3, 5 and 6 may be thinned with mineral spirits as necessary for proper application but the amount of thinner used shall not exceed one pint per gallon of paint. Other paints may be thinned in accordance with the manufacturer's instructions only if such thinning is approved by the Engineer.

When tinting is required, it shall be accomplished by the addition of pigment-in-oil tinting colors conforming to the requirements of Federal Specification TT-P-381.

Mineral spirits shall conform to the requirements of Federal Specification TT-T-291, Grade 1, Light Thinner.

3. SURFACE PERPARATION

Surfaces to be painted shall be thoroughly cleaned prior to the application of the paint. For the purposes of this specification methods of surface preparation shall be designated as defined below:

Method 1 surface preparation shall consist of the removal of all grease and oil by means of steam cleaning or solvent cleaning methods and removal of all dirt, rust, mill scale and other coatings by means of sandblasting, grit blasting or pickling. The finished surface shall uniformly expose the base metal and shall present an etched, but not polished or peened, appearance. Not more than 5 percent of the surface may exhibit very light shadows, light streaks, or slight discolorations caused by rust stain, mill scale oxides, or slight, tight residues of paint or coating.

Method 2 surface preparation shall consist of the removal of all grease and oil by means of steam cleaning or solvent cleaning and the removal of all dirt, surface rust and loose scale by means of wire brushing, flame cleaning, use of rotary abrading tools or light sandblasting.

Method 3 surface preparation shall consist of the treatment of the surface with a dilute acid solution. The surface shall be thoroughly wetted with a dilute (about 5 percent strength) phosphoric acid solution. After the acid has dried, the surface shall be thoroughly rinsed with clear water and allowed to dry. Dirt, grease and oil shall be removed from the surface by solvent cleaning prior to the acid treatment.

Cleaning solvent shall be mineral spirits. Cleaning cloths and solvents shall be discarded before they become contaminated to the extent that a greasy film would remain on the surface being cleaned. The final cleaning and wiping shall be done with clean solvent and clean cloths. Grit blasting shall be accomplished using compressed air blast nozzles and grit made of steel, malleable iron or cast iron crushed shot. Abrasives used shall have a maximum particle size that will pass the No. 16 sieve (U. S. Standard) and a minimum size that will be retained on the No. 50 sieve (U. S. Standard). The equipment used for sandblasting shall be equipped with adequate separators and traps to insure that the compressed air shall be free of detrimental amounts of water and oil. Blast cleaned surfaces shall be brushed, blown or vacuum cleaned to remove any trace of blast products or abrasives prior to painting.

Surfaces that are not to be painted immediately after cleaning shall be treated with one brush coat of metal conditioner conforming to the requirements of Military Specification MIL-M-10578, except that surfaces cleaned by pickling in phosphoric acid solution shall not require such treatment.

Surfaces shall be thoroughly dry when paint is applied.

No field coats of paint shall be applied until the prepared surfaces have been inspected and approved by the Engineer.

4. PAINT SYSTEMS

For the purposes of this specification, systems of preparing and painting metalwork will be designated as defined below:

Paint System A shall consist of the preparation of the surfaces to be painted by Method 1 and the application of two priming coats of Type 1 paint and two or more top coats of Type 5 paint as necessary to provide a total dry paint film thickness of 6 mils.

Paint System B shall consist of the preparation of the surfaces to be painted by Method 1 and the application of one priming coat of Type 1 paint and two top coats of Type 5 paint.

Paint System C shall consist of the preparation of the surfaces to be painted by Method 2 and the application of one priming coat of Type 2, Type 3 or Type 4 paint and two top coats of Type 6 paint.

Paint System D shall consist of the preparation of the surfaces to be painted by Method 2 and the application of one priming coat of Type 2 paint and two top coats of Type 7 paint.

Paint System E shall consist of the preparation of the surfaces to be painted by Method 2 and the application of one priming coat of Type 2 paint and two top coats of Type 8 paint.

Paint System F shall consist of the preparation of the surfaces to be painted by Method 3 and the application of two coats of Type 9 paint.

Paint System G shall consist of the preparation of the surfaces to be painted by Method 3 and the application of two coats of Type 10 paint.

Paint System H shall consist of the preparation of the surfaces to be painted by Method 1 and the application of four or more coats of Type 1 paint as necessary to provide a total dry paint film thickness of 6 mils.

Paint System I shall consist of the preparation of the surfaces to be painted by Method 1 and the application of two or more coats of Type 11 paint as necessary to provide a total dry paint film thickness of at least 16 mils.

5. APPLICATION OF PAINT

Surfaces shall be painted immediately after preparation (or within two days after preparation and treatment with metal conditioner) with at least one coat of the type of priming paint required by the specified paint system. Surfaces not required to be painted shall be protected against contamination and damage during the cleaning and painting operation.

Paints shall be thoroughly mixed at the time of application.

After erection or installation of the metalwork, all damage to shop applied coats shall be repaired and all bolts, nuts, welds and field rivet heads shall be cleaned and painted with one coat of the specified priming paint.

Except on surfaces accessible only to spray equipment, initial priming coats shall be applied by brush. All other coats may be applied by brush or spray. Each coat shall be applied in such a manner as to produce a paint film of uniform thickness with a rate of coverage within the limits recommended by the paint manufacturer.

The drying time between coats shall be as prescribed by the manufacturer of the paint but not less than that required for the paint film to dry through. The elapsed time between the application of the first and second prime coats of Paint System A shall not exceed 60 hours. In the application of Paint System I, if, for any reason, the first coat dries hard before the second coat is applied or the elapsed time between coats exceeds 48 hours, the method of application must be modified in any of the following ways: (1) the first coat must be wiped down with MIBK with the application of the second coat following the wipedown by not more than 6 feet; or (2) the first coat must be lightly brush blasted or given a fog coat of the paint before application of the full second coat; or (3) a special bonding additive supplied by the paint manufacturer must be mixed with the paint applied in the second coat.

The finished surface of each coat shall be free from runs, drops, ridges, laps or excessive brushmarks and shall present no variation in color, texture and finish.

The surface of each dried coat shall be cleaned as necessary before application of the next coat.

Except for Paint System I, the first coat of each two-coat system shall be tinted for contrast. The first coat of red-lead paint shall be tinted by the addition of 3 ounces per gallon of 1B

black pigment. The first coat of machinery paint shall be tinted off color with 3 ounces per gallon of a pigment suitable to the color of the paint.

6. ATMOSHPERIC CONDITIONS

Paint shall not be applied when the temperature of the item to be painted or of the surrounding air is less than 50°F. For Paint System I, the temperature of the coated surface must be maintained at not less than 50°F for 6 hours after the application of each coat. Painting shall be done only when the humidity and temperature of the surrounding air and the temperature of the metal surfaces are such that evaporation rather than condensation will result during the period of time required for application and drying. Surfaces protected from adverse atmospheric conditions by special cover, heating or ventilation shall remain so protected until the paint is dry.

7. TESTS

Acceptance of dry paint film thickness for Paint Systems A, H, and I will be based on the measurement of paint film thickness by means of an Elcometer or other suitable dry film thickness gage.

8. PAYMENT

For items of work for which specific lump sum prices are established in the contract, payment for painting metalwork will be at the contract lump sum price. Such payment will constitute full compensation for furnishing, preparing and applying all materials and for the cleaning, painting and coating of metalwork including labor, tools, equipment and all other items necessary and incidental to the completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 9 of this specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary Item, Cleaning and Painting

(1) This item shall consist of cleaning and painting the designated metal items in Bid Item 16 and the Identification Sign, Bid Item 17.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Paint Systems, Paint System A shall apply for the trash rack in Bid Item 16 and Paint System E (except that Type 4 paint shall be used in place of Type 1 paint for the priming coat) shall apply for the Identification Sign, Bid Item 17. The two (2) top coats of paint on the identification sign shall be white and the letters painted with a dark green enamel.

(4) No separate payment will be made for cleaning and painting. Compensation for this work will be included in the payment for Bid Item 16, Metalwork; and Bid Item 17, Identification Sign.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with the specifications and the construction details are:

a. Subsidiary Item, Cleaning and Painting Metalwork

(1) This item shall consist of cleaning and painting the trash racks in Bid Item 18 and the Identification Sign, Bid Item 19.

(2) In Section 3, Surface Preparation, Method 2 shall apply.

(3) In Section 4, Paint Systems, Paint System A shall apply for the trash guard assembly in Bid Item 18 and Paint System E (except that Type 4 paint shall be used in place of Type 2 paint for the priming coat) shall apply for the Identification Sign, Bid Item 19. The two (2) top coats of paint on the identification sign shall be white and the letters painted with a dark green enamel.

(4) No separate payment will be made for cleaning and painting. Compensation for this work will be included in the payment for Bid Item 18, Metalwork and Bid Item 19, Identification Sign.

CONSTRUCTION SPECIFICATION

91. CHAIN LINK FENCE

1. SCOPE

The work shall consist of furnishing and installing chain link fencing complete with all posts, braces, gates and all other appurtenances.

2. MATERIALS

Chain-link fence fabric, fence posts, top rails, braces, gates and accessories shall conform to the requirements of Federal Specification RR-F-191. Types, classes, and materials shall be as follows except as otherwise specified.

Fabric: Type I, 2-inch mesh, 9-gage, minimum weight of zinc coating - 1.8 ounces per square foot.

Barbed Wire: Zinc-coated steel.

Posts: Type I, Class 1, zinc-coated.

Top Rails: Type II, Class 1, zinc-coated.

Braces: Zinc-coated steel.

Gates: Type I, zinc-coated steel.

3. INSTALLING FENCE POSTS

Unless otherwise specified, line posts shall be placed at intervals of 10 feet measured from center to center of adjacent posts. In determining the post spacing, measurement will be made parallel with the ground surface.

Post will be set in concrete backfill in the manner shown on the drawings.

Posts set in the tops of concrete walls shall be grouted into preformed holes to a depth of 12 inches.

All corner posts, end posts, gate posts, and pull posts shall be embeded, braced and trussed as shown on the drawings.

4. INSTALLING WIRE FABRIC

Fencing fabric shall not be stretched until at least 4 days after the posts are grouted into walls or 14 days after the posts are set in the concrete backfill.

Fencing shall be installed on the side of the posts designated on the drawings.

The fabric shall be stretched taut and securely fastened, by means of tie clips, to the posts at intervals not exceeding 15 inches and to the top rails or tension wires at intervals not exceeding 2 feet. Care shall be taken to equalize the tension on each side of each post.

Barbed wire shall be installed as shown on the drawings and shall be pulled taut and fastened to each post with tie wires or metal tie clips.

5. MEASUREMENT AND PAYMENT

(Method 1) The length of fence will be measured to the nearest 0.1 foot along the fence, including gates. Payment will be made at the contract unit price for the specified height of fence. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work.

(Method 2) The length of fence will be measured to the nearest 0.1 foot along the fence, excluding gate openings. Payment will be made at the contract unit price for the specified height of fence. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work except furnishing, fabricating and installing gates. Payment for furnishing, fabricating and installing each type and size of gate will be made at the contract unit price for that type and size of gate.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 6 of this specification.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 18, 6-Foot Chain Link Fence

(1) This item shall consist of furnishing and installing the chain link fence, including all sleeves and appurtenances, around the inlet and the outlet of the principal spillway as shown on the drawings.

(2) The chain link fencing shall be 9 gauge, Type I, Grade A, having a two (2)-inch mesh and a nominal height of six (6) feet. The fence shall have an industrial type top with three (3) lines of zinc coated steel barbed wire which is to be of the four (4) point pattern composed of two (2) strands of 12 1/2 gauge line wires with 14 gauge barbs spaced on approximately five (5)-inch centers.

(3) Measurement and payment will be by Method 1.

CONSTRUCTION SPECIFICATION

92. FARM FIELD FENCES

1. SCOPE

The work shall consist of furnishing and installing farm field fences, including gates and fittings.

2. MATERIALS

Materials for farm field fences shall conform to the requirements of Material Specification 591. All wooden posts shall be of the same species.

3. SETTING POSTS

Concrete or wood posts shall be set in holes and backfilled with earth except where otherwise specified. Steel posts shall be driven unless otherwise specified.

Posts holes shall be at least 6 inches larger than the diameter or side dimension of the posts.

Earth backfill around posts shall be thoroughly tamped in layers not thicker than 4 inches and shall completely fill the post hole up to the ground surface. Concrete backfill around posts shall be rodded into place in layers not thicker than 12 inches and shall completely fill the post hole up to the ground surface. Backfill, either earth or concrete, shall be crowned up around posts at the ground surface.

No stress shall be applied to posts set in concrete until at least 24 hours after the concrete has set.

4. CORNER ASSEMBLY

Unless otherwise specified, corner assemblies shall be installed at all points where the fence alignment changes 15 degrees or more.

5. END PANELS

End panels shall be built at gates and fence ends.

6. PULL POST ASSEMBLY

Pull post assemblies shall be installed at the following locations:

a. In straight fence sections, at intervals of no more than 660 feet.

b. At any point where the vertical angle described by two adjacent reaches of wire is upward and exceeds 10 degrees (except as provided in Section 9 of this specification).

c. At the beginning and end of each curve.

7. ATTACHING FENCING TO POSTS

The fencing shall be stretched and attached to posts as follows:

a. The fencing shall be placed on the side of the post opposite the area being protected, except on curves.

b. The fencing shall be placed on the outside of curves.

c. The fencing shall be fastened to each end post, corner post and pull post by wrapping each horizontal strand around the post and tying it back on itself with not less than three tightly wound wraps.

d. The fencing shall be fastened to wooden line posts by means of staples. Woven wire fencing shall be attached at alternate horizontal strands. Each strand of barbed wire shall be attached to each post. Staples shall be driven diagonally with the grain of the wood and at a slight downward angle and shall not be driven so tightly as to bind the wire against the post.

e. The fencing shall be fastened to steel or concrete line posts with either two turns of 14 gage galvanized steel or iron wire or the post manufacturer's special wire clips.

f. Wire shall be spliced by means of a Western Union splice or by suitable splice sleeves applied with a tool designed for the purpose. The Western Union splice shall have not less than 8 wraps of each end about the other. All wraps shall be tightly wound and closely spaced. Splices made with splice sleeves shall have a tensile strength not less than 80 percent of the strength of the wire.

8. STAYS

Stays shall be attached to the fencing in a manner to insure maintenance of the proper spacing of the fence wire strands.

9. CROSSINGS AT DEPRESSIONS AND WATERCOURSES

Where fencing is installed across small depressions or watercourses, either of the following methods of installation shall be used:

a. If the fence wire is installed parallel to the ground surface, the line posts subject to upward pull shall be anchored by means of extra embedment or by special anchors as detailed on the drawings.

b. If the wire fence is installed with the top wire straight and parallel to the ground surface on either side of the depression, extra length posts shall be used to allow normal post embedment. Unless otherwise specified, excess space between the bottom of the fence and the ground shall be closed with extra strands of barbed wire.

10. MEASUREMENT AND PAYMENT

(Method 1) The length of each type and kind of fence will be measured to the nearest foot along the profile of the fence, including gate openings. Payment for each type and kind of fence will be made at the contract unit price for that type and kind of fence. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work including fabricating and installing gates.

(Method 2) The length of each type and kind of fence will be measured to the nearest foot along the profile of the fence, excluding gate openings. Payment for each type and kind of fence will be made at the contract unit price for that type and kind of fence. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work, except fabricating and installing gates. Payment for each type and size of gate will be made at the contract price each for fabricating and installing that type and size of gate.

(Use with Either Method) Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 11 of this specification.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 19, 4-Strand Barbed Wire Fence

(1) This item shall consist of furnishing and installing barb wire fences, including gates, post anchors and appurtenances as shown on the drawings and staked in the field.

(2) The barbed wire shall be Type I, with two (2) strands of 12 1/2 gauge line wires with 14 gauge barbs spaced on approximately five (5) inch centers in accordance with Material Specification 591 and Federal Specification RR-F-221/1.

(3) The smooth wire shall be Type I, with two (2) strands of 12 1/2 gauge line wires without barbs in accordance with Material Specification 591 and Federal Specification RR-F-221/1.

(4) Gates, corner, pull and end post assemblies shall be as shown on the drawings. Line posts shall be Type 1, Style 1, painted in accordance with Material Specification 591 and Federal Specification RR-F-221/3.

(5) Chains shall be welded, case hardened straight link pattern of 5/16 inch stock diameter, 18 inches long. Padlocks shall have brass casing 1 3/4 inches wide, five (5) pin tumbler lock mechanisms, 5/16 inch diameter shackles, 15/16 inch clear and master keyed with one (1) key.

(6) Concrete for post anchors shall be Class 2500.

(7) Measurement and payment will be by Method 1 and will include compensation for post anchors, Subsidiary Item, Concrete Class 2500.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 20, 4-Strand Barbed Wire Fence

(1) This item shall consist of furnishing and installing barb wire fences, including gates, post anchors, sag weights, chains and padlocks between Station 0+82 and 251+00.

(2) Locked gate assemblies shall be installed at the locations shown on the drawings.

(3) The barbed wire shall be Type I, with two (2) strands of 12 1/2-gauge line wires with 14-gauge barbs spaced on approximately five (5)-inch centers in accordance with Material Specification 591 and Federal Specification RR-F-221/1.

(4) The smooth wire shall be Type I, with two (2) strands of 12 1/2 gauge line wires without barbs in accordance with Material Specification 591 and Federal Specification RR-F-221/1.

(5) Chains shall be welded, case hardened straight link pattern of 5/16-inch stock diameter, 18 inches long. Padlocks shall have brass casing 1-3/4 inches wide, five (5)-pin tumbler lock mechanisms, 5/16-inch diameter shackles, 15/16-inch clear and master keyed with one (1) key.

(6) Gates, corner, pull and end post assemblies shall be as shown on the drawings. Line posts shall be Type I, Style I, painted in accordance with Material Specification 591 and Federal Specification RR-F-221/3.

(7) All other materials shall conform to Federal Specification RR-F-221/1, Section 1.2, Type I classification.

(8) Concrete for post anchors and sag weights shall be Class 2500.

(9) Measurement and payment will be by Method 1 and will include compensation for post anchors and sag weights, Subsidiary Items, Concrete Class 2500.

CONSTRUCTION SPECIFICATION

200. GROUTED ROCK RIPRAP

1. SCOPE

The work shall consist of furnishing, transporting and placing rock and concrete grout in the construction of grouted rock riprap sections.

2. MATERIALS

Rock used in grouted rock riprap construction shall conform to the requirements of Material Specification 523. At least 30 days prior to delivery of rock, the Contractor shall designate in writing the source from which he intends to obtain the rock. The Contractor shall provide the Engineer free access to the source for the purpose of obtaining samples for testing. The size and grading of the rock shall be as specified in the construction details.

Drain materials, when specified, shall conform to the requirements of Material Specification 521.

Portland cement shall conform to the requirements of Material Specification 531 for the specified type. The temperature of the cement at the time it is introduced into the mixture shall not exceed 170° F.

Aggregates shall conform to the requirements of Material Specification 522.

Water shall be clean and free from injurious amounts of oils, acid, alkali, organic matter or other deleterious substances.

Air-entraining admixtures shall conform to the requirements of Material Specification 532.

Curing compound shall conform to the requirements of Material Specification 534.

Other admixtures, when required, shall be as specified in the construction details.

3. SUBGRADE PREPARATION

Riprap or filter shall not be placed until the subgrade surfaces have been inspected and approved by the Engineer.

4. FILTER LAYERS OR BEDDING

When filter layers or bedding beneath the riprap is specified, the drain material shall be spread uniformly on the prepared subgrade

surfaces to the depth shown on the drawings. Compaction of drain material will not be required but the surface of such layers shall be finished reasonably free of mounds, dips or windrows.

5. PLACING ROCK

The rock shall be placed on the surfaces and to the depths specified in such a manner as to avoid displacement of the underlying materials. The rock may be equipment or hand placed as necessary to produce a surface in which the tops of the individual rocks do not vary more than the specified deviation from the neat lines shown on the drawings. Double decking of thin, flat rocks to bring the surface up to the required grade will not be permitted.

6. AIR CONTENT AND CONSISTENCY

The air content (by volume) of the grout mixture at the time of placement shall be 5 to 7 percent.

The consistency of the grout mixture shall be so maintained that the grout may be readily placed without segregation of materials or excessive laitance. Unless otherwise specified, the slump shall be within the range of six (6) to ten (10) inches.

7. DESIGN OF THE GROUT MIX

The Contractor shall be responsible for proportioning the mix.

The grout shall consist of Portland cement, fine and coarse aggregate, water and an air-entraining agent. The cement content shall be 5 1/2 bags per cubic yard unless otherwise specified. The maximum nominal size of coarse aggregate shall be 3/4 inch.

Prior to placement of grout, the Contractor shall furnish the Engineer a statement of the mix proportions. After the job mix has been so stated, neither the source or character of the aggregates nor the type or brand of cement will be changed without prior approval by the Engineer

8. INSPECTING AND TESTING FRESH GROUT

The Engineer will inspect and test grout during the course of the work. Sampling of fresh grout will be done by the methods prescribed in ASTM Designation C 172. The volume of each batch will be determined by the methods prescribed in ASTM Designation C 138.

The Engineer shall have free entry to all parts of the Contractor's plant and equipment which concern mixing and placing the grout while work on the contract is being performed. Proper facilities shall be provided for the Engineer to inspect materials and processes used in

mixing and placing the grout as well as for securing samples of the grout mix. All tests and inspections shall be so conducted as not to interfere unnecessarily with the mixing and placing of the grout.

When ready-mixed grout is furnished, the Contractor shall furnish to the Engineer a statement of delivery ticket for each batch delivered to the job site. The ticket shall show the total weights in pounds of cement, water and fine and coarse aggregates, amount of air-entraining agent, time of loading and the revolution counter reading at the time of batching.

9. PLACING GROUT

The rock riprap shall be flushed with water to remove the fines from the rock prior to placing the grout. The rock shall be kept moist just ahead of the actual placing but the grout shall not be placed in standing or flowing water. Grout placed on inverts or other nearly level areas may be placed in one course. On slopes, the grout shall be placed in two (2) courses in successive lateral strips approximately ten (10) feet in width starting at the toe of the slope and progressing to the top. The grout shall be delivered to the place of final deposit by approved means and discharged directly on the surface of the rock, using a splash plate of metal or wood to prevent displacement of the rock directly under the discharge. The flow of grout shall be directed with brooms, spades or baffles to prevent it from flowing excessively along the same path and to assure that all intermittent spaces are filled. Sufficient barring shall be done to loosen tight pockets of rock and otherwise aid the penetration of grout so that all voids shall be filled and the grout fully penetrates the rock blanket. All brooming on slopes shall be uphill and after the grout has stiffened, the entire surface shall be rebroomed to eliminate runs and to fill voids caused by sloughing.

After completion of any strip or panel, no workman or other load shall be permitted on the grouted surface for a period of twenty-four (24) hours. The grouted surface shall be protected from injurious action by the sun; shall be protected from rain, flowing water and mechanical injury; and shall be cured in the manner specified for concrete in Construction Specification 31.

10. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the volume of grouted rock riprap, including filter layers or bedding, will be determined from the specified thickness shown on the drawings and the area on which acceptable placement has been made. Payment for grouted rock riprap will be made at the contract unit price. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the grouted rock riprap and filter layers or bedding.

(Method 2) For items of work for which specific unit prices are established in the contract, the volume of riprap and the volume of filter layers or bedding will be determined from the specified thickness shown on the drawings and the area on which acceptable placement has been made. The volume of grout will be determined from the calculated batch volume and the number of mixed batches delivered to the site and acceptably placed in the work. Payment for riprap; filter or bedding material; and concrete grout will be made at the contract unit price for each item. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 11 of this specification.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 20, Grouted Rock Riprap

(1) This item shall consist of the furnishing and placing of grouted rock riprap and filter bedding at the following locations as shown on the drawings and staked in the field between Station 0+00 and Station 0+11.50 and between Station 1+19 and Station 1+52.50 as measured along the centerline of the Principal Spillway.

(2) The rock shall be graded as follows:

Particle Size (Inch)	Percent Passing (By Dry Weight)
15	100
12	70-100
9	75-80
6	50-75
4	0-50

(3) Rock shall be either hand or equipment placed.

(4) Filter bedding shall meet the gradation of Bid Item 9, Drain Fill.

(5) Cement shall be Type II or IIA.

(6) Measurement and payment will be by Method 1.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 21, Grouted Rock Riprap

(1) This item shall consist of the furnishing and placing of grouted riprap at the following locations as shown on the drawings at drop structures, weir inlet structures, channel sections between Stations 0+82 and 9+31.91; and 10+26.41 and 10+56.

(2) The rock shall be graded as follows:

Particle Size (inches)	Percent Passing (by dry wt.)
15	100
12	70-100
9	75-80
6	50-75
4	0-50

(3) Rock shall be either hand or equipment placed.

(4) Cement shall by Type II or IIA.

(5) Measurement and payment will be by Method 1.

11. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 8, Grouted Rock Riprap

(1) This item shall consist of the furnishing and placing of grouted rock riprap and filter bedding at the following locations as shown on the drawings: Buckeye-Salome Road crossing the drain channel, and the Courthouse Road crossing the diversion channel.

(2) The rock shall be graded as follows:

Particle Size (inch)	Percent Passing (by dry wt.)
15	100
12	70-100
9	75-80
6	50-75
4	0-50

(3) Rock shall be either hand or equipment placed.

(4) Cement shall by Type II or IIA.

(5) Filter bedding shall meet the following graduation:

Sieve Size	Percent Passing (by dry wt.)
3 inches	100
1 inch	80-100
# 4	50-75
# 40	15-35
#100	5-18
#200	0-3

(6) Measurement and payment will be by Method 1.

CONSTRUCTION SPECIFICATION

201. TREATMENT OF ROCK SURFACES

1. SCOPE

The work shall consist of preparing and cleaning the designated rock surfaces, including the specified dental excavation, and the furnishing and placing of the specified treatment material prior to the placement of earth backfill. Treatment materials will consist of concrete, cement grout or sand-cement grout as specified or designated by the Engineer.

2. PREPARATION AND CLEANING

After excavation of the overburden has been completed the rock surfaces shall be thoroughly cleaned and dewatered. All loose rock, ledges, and overhangs exposed during preparation of the rock surfaces shall be excavated. Surfaces exceeding the slope limitations specified in the construction details shall be eliminated by excavation or by filling with concrete as described in Section 7.

Dental excavation shall consist of the removal of all soil and soft or loose rock from cracks, fissures, holes and solution channels exposed during the excavation. The extent of the dental excavation shall be as shown on the drawings, or as determined by the Engineer.

The surfaces shall be cleaned by air-water cutting, water jetting, wire brush scrubbing, or other methods as necessary to obtain an acceptable surface. No surface treatment material shall be placed until rock surfaces have been inspected and approved by the Engineer.

Rock surfaces shall be free of standing or running water during the placement of the surface treatment material.

3. DESIGN OF SURFACE TREATMENT MATERIAL

The mix proportions for the specified treatment material, shall be as specified in the construction details. During the course of the work the Engineer will require adjustment of the mix proportions whenever necessary. After the mix has been designated, it shall not be changed without the approval of the Engineer.

4. MATERIALS

Portland cement shall conform to the requirements of Material Specification 531 for the specified type.

Aggregates shall conform to the requirements of Material Specification 522, except that the grading for coarse aggregate shall be as specified in the construction details.

Water shall be clear and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

Admixtures, when specified, shall be of the type and quality specified in the construction details.

5. MEASURING OF MATERIALS

Cement shall be measured by weight or by bag count (94 lbs. each). No fraction of a bag shall be used unless weighed.

Aggregate shall be measured by weight. Batch weights shall be based on dry materials.

Water shall be measured by volume or by weight.

6. MIXERS AND MIXING

The mixer, when loaded to capacity, shall be capable of combining the ingredients of the concrete into a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity.

Mixers shall be operated within the limits of the manufacturer's guaranteed capacity and speed of rotation.

The time of mixing after all cement and aggregates are in the mixer drum shall be not less than one minute for mixers having a capacity of one cubic yard or less. For mixers of larger capacities, the minimum time shall be increased fifteen seconds for each cubic yard or fraction thereof of additional capacity. The batch shall be so charged into the mixer that some water will enter in advance of cement and aggregate, and all mixing water shall be introduced into the drum before one-fourth of the mixing time has elapsed.

When ready-mixed concrete is furnished, the Contractor shall

furnish to the Engineer a delivery ticket showing the time of loading and the quantities of materials used for each load of concrete.

7. CONVEYING AND PLACING

Under ordinary conditions the materials shall be delivered and in place within 1-1/2 hours after the introduction of the cement to the aggregates. Vertical drops in excess of 5 feet will not be permitted except where suitable equipment is used that prevents segregation of aggregates.

All cracks, fissures, solution channels and other surfaces within the designated area shall be treated as shown on the drawings. Surfaces to receive treatment material shall be wetted immediately prior to treatment.

Concrete shall be filled against any specified remaining rock surfaces that exceed the slope limitations and shall be shaped so that no portion of the finished surface exceeds these limitations.

Material placed in cracks, fissures, and solution channels shall be consolidated by vibration, spading or tamping as necessary to assure complete filling of the opening.

8. CURING AND PROTECTION

The surfaces of the treatment material that are exposed to air shall be moist cured or coated with curing compound. Curing compounds shall be applied as recommended by the manufacturer. When moist curing is used the surfaces shall be kept continuously moist for 5 days or until covered by backfilling operations.

Backfilling operations shall not be started until 24 hours after placement of the treatment material.

No backfill material shall be placed until the treated surfaces have been inspected and approved by the Engineer.

Surface treatment materials shall not be placed when the daily minimum temperature is less than 40° F unless facilities are provided to insure that the temperature of the materials is maintained at not less than 50° F nor more than 90° F during placement and the curing period.

9. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the area of rock surfaces to be prepared and cleaned will be measured to the nearest square yard within the limits established by the Engineer. The volume of surface treatment material placed within the limits established by the Engineer will be computed to the nearest 0.1 cubic yard by using the combined weight of materials, exclusive of water, and dividing by a unit weight of 150 pounds per cubic foot.

Payment will be made at the contract unit price for surface preparation and cleaning. Payment will be made at the contract unit price for surface treatment materials. Such payment shall constitute full compensation for all labor, materials, equipment and incidentals required to complete the work.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and construction details are:

a. Bid Item 21, Grouting Rock Surfaces

(1) This item shall consist of preparing the rock surfaces at the bottom surface of the cutoff trench generally between Station 106+00 and Station 110+00. If foundation excavation at the bottom surface of the trench reveals fanglomerate or igneous rock which evidences voids such as surface fractures, holes, cracks or fissures as determined by the Engineer, the contractor shall fill the voids by dental grouting.

(2) In Section 3, Design of Surface Treatment Material, the mix proportions shall be as follows:

Mix Proportions (lbs./cu.yd.)

Cement	Sand	Gravel
658	1645	1715

(3) Cement shall be Type II or IIA.

(4) Gradation of coarse aggregate shall conform to ASTM C-33, No. 7.

(5) Except for small local areas, the slope of the finished surface shall not be steeper than 12 horizontal to 0.5 vertical. Steeper surfaces extending not more than two (2) feet, measured vertically, will be permitted.

(6) Measurement and payment will be according to Section 9.

b. Bid Item 22, Surface Preparation and Cleaning

(1) This item shall consist of preparing and cleaning the rock surfaces required to grout rock surfaces in Bid Item 21.

(2) Measurement and payment will be according to Section 9.

CONSTRUCTION SPECIFICATION

400 PAVEMENT REPLACEMENT

1. SCOPE

The work shall consist of replacement of existing road pavement after the installation of the permanent works at Courthouse Road and Buckeye-Salome Road.

2. APPLICABLE STANDARD SPECIFICATIONS

All the work specified herein shall comply with the requirements of the following referenced specifications, including revisions, except as modified herein.

UNFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

Maricopa Association of Governments
July 1, 1974 Arizona

3. GENERAL

Type and time of construction required at roads subject to interference by the contract work shall be determined by those authorities responsible for maintenance of such roads. The authority within the project limits is:

Maricopa County Highway Department
3335 West Durango Road
Phoenix, Arizona 85009

It shall be the responsibility of the contractor to determine the nature and extent of all such requirements.

4. EARTHWORK

Base material shall be compacted to the grading plane of the existing road base or to the grading plane of the road base as shown on the drawings, whichever depth is greater. Embankment for shoulders and other untraveled poritons of the roadway shall be compacted to the lines and grades as shown on the drawings or as directed by the engineer.

5. UNTREATED BASE

The untreated base shall be installed in accordance with Section 310 of the referenced specifications. The base material shall be crushed aggregate in accordance with Section 702.

Harquahala Valley Watershed
Saddleback FRS & Diversion
Flood Control District of Maricopa County

6. BITUMINOUS PRIME COAT

The bituminous prime coat shall be installed in accordance with Section 315. Materials shall conform to the requirements of Section 712 and Table 712-2 for Grade MC 70. The liquid asphalt shall be applied at the rate of 0.5 gallon per square yard of surface.

7. ASPHALT CONCRETE PAVEMENT

The asphalt concrete pavement shall be installed in accordance with Section 321. Materials shall conform with the requirements of Section 710, except no mineral filler or blending sand will be required. Asphalt shall be AR 4000 and conform to the requirements of Section 711. The mineral aggregate shall meet the grading requirements within the range of specified tolerances for mix designation C-3/4.

8. PRESERVATIVE SEAL FOR ASPHALT CONCRETE

The preservative seal shall be installed in accordance with Section 334. The material shall conform to Section 718 and shall be applied at the rate of 0.07 of a gallon of diluted mixture per square yard.

9. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the dimensions of the surface of the pavement replacement will be measured to the neat lines shown on the drawing and the surface area will be computed to the nearest square yard. Payment will be made at the contract price for pavement replacement. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the work.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 9, Pavement Replacement - Courthouse Road

(1) This item shall consist of the replacement of the existing asphalt concrete pavement including the untreated base and preservative seal within the following limits as shown on the drawings and staked in the field between Station 2+50 and Station 5+03.89 center Courthouse Road.

(2) Untreated base aggregate shall be placed in one (1) lift of six (6)-inch layer thickness.

(3) Measurement and payment will be made in accordance with Section 9, Measurement and Payment.

b. Bid Item 10, Untreated Base - Buckeye-Salome Road and 479th Avenue

(1) This item shall consist of the replacement of the existing untreated base aggregate within the limits of Station 6+90 and Station 18+00 centerline Buckeye-Salome Road and Station 6+50 and Station 15+00 centerline 479th Avenue.

(2) Untreated base aggregate shall be placed in one (1) lift of six (6)-inch layer thickness.

(3) Measurement and payment will be made in accordance with Section 9, Measurement and Payment.

MATERIAL SPECIFICATIONS FOR SADDLEBACK FRS AND DIVERSION

521. Aggregates for Drain Fill and Filters
522. Aggregate for Portland Cement Concrete
523. Rock for Riprap
531. Portland Cement
532. Air-Entraining Admixtures (for Concrete)
533. Water-Reducing and Set-Retarding Admixtures for Portland Cement Concrete
534. Curing Compound (for Concrete)
535. Preformed Expansion Joint Filler
536. Sealing Compound for Joints in Concrete and Concrete Pipe
537. Non-metallic Waterstops
538. Metal Waterstops
539. Steel Reinforcement (for Concrete)
542. Concrete Culvert Pipe
545. Asbestos-Cement Pipe
551. Zinc-coated Iron or Steel Corrugated Pipe
573. Slide Gates (Sluice Gates), Metal, Heavy Duty
581. Metal
582. Galvanizing
583. Coal Tar-Epoxy Paint (Formula C-200)
591. Farm Field Fencing Materials

MATERIAL SPECIFICATION

521. AGGREGATES FOR DRAIN FILL AND FILTERS

1. SCOPE

This specification covers the quality of mineral aggregates for the construction of drain fill and filters.

2. QUALITY

Drain fill and filter aggregates shall be sand, gravel or crushed stone or mixtures thereof. They shall be composed of clean, hard, durable mineral particles free from organic matter, clay balls, soft particles or other substances that would interfere with their free-draining properties. Not more than 15 percent, by weight, shall be flat, elongated particles.

Aggregates of crushed limestone shall be thoroughly washed and screened. Coarse aggregates containing crushed limestone shall have not more than 3 percent, by weight, of particles finer than the No. 4 sieve. Crushed limestone shall not be used for fine aggregates except in combination with other materials such that not more than 5 percent of the portion finer than the No. 4 sieve shall be crushed limestone.

Aggregates shall be tested for soundness according to ASTM Method C 88, and shall have a weighted average loss in five cycles of not more than 12 percent when sodium sulfate is used or 18 percent when magnesium sulfate is used.

3. GRADING

Drain fill and filter aggregates shall conform to the specified grading limits after being placed in the work, and after being compacted if compaction is specified. Grading shall be determined by ASTM Method C 136, but the percentage of material finer than a No. 200 sieve shall be not more than 3 percent when determined by ASTM Method C 117.

4. STORING AND HANDLING

Drain fill and filter aggregates shall be stored and handled by methods that prevent segregation of particle sizes or contamination by mixing with other materials.

MATERIAL SPECIFICATION

522. AGGREGATE FOR PORTLAND CEMENT CONCRETE

1. SCOPE

This specification covers the quality of fine aggregate and coarse aggregate for use in the manufacture of portland cement concrete.

2. QUALITY

Aggregate shall conform to the requirements of ASTM Specification C-33 for the specified sizes. Aggregates that fail to meet any requirement may be accepted only when: (1) the specified alternate conditions of acceptance can be proved prior to the use of the aggregates on the job and within a period of time such that no work under the contract will be delayed by the requirements of such proof; or, (2) the specification for concrete expressly contains a provision of special mix requirements to compensate for the effects of the deficiencies.

3. REACTIVITY WITH ALKALIES

The potential reactivity of aggregates with the alkalies in cement shall be evaluated by petrographic examination and, where applicable, the chemical method of test, ASTM Designation C 289, or by the results of previous tests or service records of concrete made from similar aggregates from the same source. The standards for evaluating potential reactivity shall be as described in ASTM Specification C 33, Appendix A1.

Aggregates indicated by any of the above to be potentially reactive shall not be used, except under one of the following conditions:

a. Applicable test results of mortar bar tests, made according to ASTM Method C 227, are available which indicate an expansion of less than 0.10 percent at six months in mortar bars made with cement containing not less than 0.8 percent alkalies expressed as sodium oxide; or

b. Concrete made from similar aggregates from the same source has been demonstrated to be sound after 3 years or more of service under conditions of exposure to moisture and weather similar to those anticipated for the concrete under these specifications.

Aggregates indicated to be potentially reactive, but within acceptable limits as determined by mortar bar test results or service records, shall be used only with "low alkali" cement, containing less than 0.60 percent alkalies expressed as sodium oxide.

4. STORING AND HANDLING

Aggregate of each class and size shall be stored and handled by methods that prevent segregation of particle sizes or contamination by intermixing with other materials.

MATERIAL SPECIFICATION

523. ROCK FOR RIPRAP

1. SCOPE

This specification covers the quality of rock to be used in the construction of rock riprap.

2. QUALITY

Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments shall be angular to subrounded in shape. The least dimension of an individual rock fragment shall be not less than one-third the greatest dimension of the fragment.

Except as provided below, the rock shall have the following properties:

a. Bulk specific gravity (saturated surface-dry basis) not less than 2.5.

b. Absorption not more than 2 percent.

c. Soundness: Weight loss in 5 cycles not more than 10 percent when sodium sulfate is used or 15 percent when magnesium sulfate is used.

The bulk specific gravity and absorption shall be determined by ASTM Method C 127. The test for soundness shall be performed by ASTM Method C 88 for coarse aggregate modified as follows:

The test sample shall not be separated into fractions. It shall consist of 5000 $\pm$ 300 grams of rock fragments, reasonably uniform in size and shape and weighing approximately 100 grams each, obtained by breaking the rock and selecting fragments of the required size.

After the sample has been dried, following completion of the final test cycle and washing to remove the sodium sulfate or magnesium sulfate, the loss of weight shall be determined by subtracting from the original weight of the sample the final weight of all fragments which have not broken into three or more pieces.

The report shall show the percentage loss of weight and the results of the qualitative examination.

Rock that fails to meet the requirements stated in a, b, and c above, may be accepted only if similar rock from the same source has been demonstrated to be sound after 5 years or more of service under conditions of weather, wetting and drying, and erosive forces similar to those anticipated for the rock to be installed under this specification..

3. GRADING

The rock shall conform to the specified grading limits after it has been placed in the riprap.

MATERIAL SPECIFICATION

531. PORTLAND CEMENT

1. SCOPE

This specification covers the quality of portland cements.

2. QUALITY

Portland cement shall conform to the requirements of ASTM Specification C 150 for the specified types of cement, except that, when Type I portland cement is specified, Type IS portland blast-furnace slag cement or Type IP portland-pozzolan cement conforming to the requirements of ASTM Specification C 595 may be used unless prohibited in the specifications.

If air-entraining cement is to be used, the Contractor shall furnish the manufacturer's written statement giving the source, amount and brand name of the air-entraining addition.

3. STORAGE AT THE CONSTRUCTION SITE

Cement shall be stored in such a manner as to be protected from weather, dampness or other destructive agencies. Cement that is partially hydrated or otherwise damaged will be rejected.

MATERIAL SPECIFICATION

532. AIR-ENTRAINING ADMIXTURES (FOR CONCRETE)

1. SCOPE

This specification covers the quality of air-entraining admixtures for concrete.

2. QUALITY

Air-entraining admixtures shall conform to the requirements of ASTM Specification C 260, except that the relative durability factor in the freezing and thawing test shall be not less than 95.

MATERIAL SPECIFICATION

533. WATER-REDUCING AND SET-RETARDING ADMIXTURES FOR PORTLAND CEMENT CONCRETE

1. SCOPE

This specification covers the quality of water-retarding and set-retarding admixtures for portland cement concrete.

2. QUALITY

Water-reducing and set-retarding admixtures shall conform to the requirements of ASTM Specification C 494, except that resistance to freezing and thawing shall be determined in all cases, and the minimum relative durability factor shall be 95.

3. TYPES

Admixtures shall be Type A, Water-Reducing or Type D, Water-Reducing and Retarding, as defined in ASTM Specification C 494.

4. PERFORMANCE IN THE JOB MIX

When added in the manner and amount recommended by the manufacturer to the concrete used on the job, with no change in the cement content or proportions of the aggregates, admixtures shall have the following effects:

Type A or Type D: The water content at the required slump shall be at least 5 percent less with the admixture than without. The air content shall remain within the range specified, but shall not exceed 8 percent in any case.

Type D: The time of initial setting, determined as prescribed in ASTM C 494, shall be from 1 to 3 hours longer with the admixture than without.

MATERIAL SPECIFICATION

534. CURING COMPOUND (FOR CONCRETE)

1. SCOPE

This specification covers the quality of liquid membrane-forming compounds suitable for spraying on concrete surfaces to retard the loss of water during the curing process.

2. QUALITY

The curing compound shall meet the requirements of ASTM Specification C 309.

Unless otherwise specified the compound shall be Type 2.

3. DELIVERY AND STORAGE

All curing compound shall be delivered to the site of the work in the original container bearing the name of the manufacturer and the brand name. The compound shall be stored in a manner to prevent damage to the containers and to protect water-emulsion types from freezing.

MATERIAL SPECIFICATION

535. PREFORMED EXPANSION JOINT FILLER

1. SCOPE

This specification covers the quality of preformed expansion joint fillers for concrete.

2. QUALITY

Preformed expansion joint filler shall conform to the requirements of ASTM Specification D 1752, Type I, Type II or Type III, unless bituminous type is specified. Bituminous type preformed expansion joint filler shall conform to the requirements of ASTM Specification D 994.

MATERIAL SPECIFICATION

536. SEALING COMPOUND FOR JOINTS IN CONCRETE AND CONCRETE PIPE

1. SCOPE

This specification covers the quality of sealing compound for filling joints in concrete pipe and concrete structures.

2. TYPE

The compound shall be a cold-application mastic, single component or multiple component type.

The single component type shall be a ready-mixed nondrying compound furnished in troweling consistency or in preformed rope or strip form.

The multiple component type shall be composed of two or more substances that are to be mixed prior to application.

3. QUALITY

Sealing compound shall conform to the requirements of one of the following specifications:

ASTM Specification D 1850; Concrete Joint Sealer, Cold-Application Type. Penetration, determined as specified in ASTM D 1850, shall be not greater than 120.

Federal Specification SS-S-00210; Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints.

Federal Specification TT-S-227; Sealing Compound; Rubber Base, Two Component (For Calking, Sealing and Glazing in Building Construction), Type II.

4. COMPOSITION AND PROPERTIES

The compound, if used for pipe having rubber gaskets, shall have a composition such that it will not cause deterioration of the rubber gaskets.

The compound shall be capable of being applied at a temperature of 70°F and shall be of such nature that it will adhere to dry, dust free concrete when applied either directly or over a suitable primer. After curing it shall be a resilient, adhesive material that is capable of filling joints to prevent the entry of concrete or earth during the bedding, cradling or backfilling operations.

MATERIAL SPECIFICATION

537. NON-METALLIC WATERSTOPS

1. SCOPE

This specification covers non-metallic waterstops for use in joints of concrete structures.

2. CLASSIFICATION

a. Classes. Non-metallic waterstops shall be of the following classes, as specified:

Class I shall be made of either natural or synthetic rubber.

Class II shall be made of vinyl chloride polymer or copolymer.

b. Types. Non-metallic waterstops may be either split or solid and shall conform to the following types, as specified (see Figure 1):

Type A shall have ribbed anchor flanges and a smooth web. Flanges may be of uniform thickness or may have either a converging or a diverging taper toward the edges.

Type B shall have ribbed anchor flanges and a smooth web containing a hollow tubular center bulb having: (1) a wall thickness equal to at least one-half the web thickness and (2) the inside diameter (D) specified in the contract. Flanges may be of uniform thickness or may have either a converging or a diverging taper toward the edges.

Type C shall have a single, circular, bulb-type anchor flange at each edge and a smooth web.

Type D shall have a single, circular, bulb-type anchor flange at each edge and a smooth web containing a hollow tubular center bulb having: (1) a wall thickness equal to at least one-half the thickness of the web and (2) the inside diameter (D) specified in the contract.

Type E shall have ribbed anchor flanges and a web molded or extruded in the form of a round or U-shaped bulb of the dimensions specified in the contract. The web bulb shall be connected at the open end of the "U" by a thin membrane (having a thickness of not less than 1/64-inch or more than 1/5 the web thickness) designed to: (1) prevent infiltration of wet concrete into the bulb and (2) tear when expansion of the joint occurs. Flanges may be of uniform thickness or may have either a converging or a diverging taper toward the edges. Auxilliary positioning or nailing flanges may be provided so long as they do not interfere with the functioning of the web bulb.

Type F shall have ribbed anchor flanges with at least two extra heavy ribs (designed to resist displacement of the waterstop during placement of concrete) on each flange and a smooth web having a positioning or nailing flange attached at the center.

Type G shall be of special design conforming to the details shown on the drawings.

c. Sizes. Waterstops of Types A through F shall be of the sizes listed herein, as specified (see Table 1). Type G waterstops shall have the dimensions shown on the drawings.

3. PHYSICAL REQUIREMENTS

The extruded or molded materials shall exhibit the properties specified herein when tested by the methods specified in Section 4 of this specification.

a. Class I Waterstops

(1) The hardness (Shore A durometer) shall be not less than 60.

(2) The specific gravity shall be not more than 1.2.

(3) The tensile strength shall be not less than 2500 pounds per square inch.

(4) The ultimate elongation shall be not less than 450 percent.

(5) The compression set shall be not more than 30 percent.

(6) The water absorption (by weight) shall be not more than 5 percent.

(7) The decrease in tensile strength and ultimate elongation after aging shall be not more than 20 percent.

(8) There shall be no sign of failure due to brittleness at a temperature of minus 35°F.

b. Class II Waterstops

(1) The hardness (Shore A durometer) shall be not less than 60.

(2) The specific gravity shall be not more than 1.4.

(3) The tensile strength shall be not less than 1400 pounds per square inch.

(4) The ultimate elongation of the web shall be not less than 280 percent and that of the flanges shall be not less than 200 percent.

(5) The water absorption (by weight) shall be not more than one percent.

(6) There shall be no sign of failure due to flange brittleness at a temperature of 0°F. nor of web brittleness at a temperature of minus 35°F.

(7) The decrease in either tensile strength or ultimate elongation after accelerated extraction shall be not greater than 15 percent.

(8) As a result of the effects of alkalies:

(a) After immersion for 7 days, the sample shall exhibit no loss of weight and not more than 0.25 percent increase in weight, and the hardness (Shore A) of the treated sample shall differ from that of the untreated sample by not more than plus 5 points or minus 5 points.

(b) After immersion for 30 days, the sample shall exhibit no loss of weight and not more than 0.40 percent increase in weight, and the dimensions of the treated sample shall not differ from those of the untreated sample by more than one percent.

4. TEST METHODS

Testing shall be done by the methods cited herein. All cited test methods are included in Federal Test Method Standard No. 601.

a. Hardness shall be determined by Method 3021.

b. Specific gravity shall be determined by Method 14011.

c. Tensile strength shall be determined by Method 4111.

d. Ultimate elongation shall be determined by Method 4121.

e. Compression set shall be determined by Method 3311.

f. Water absorption shall be determined by Method 6631.

g. Tensile strength and ultimate elongation after aging shall be determined by Method 7111.

h. Brittleness shall be determined by Method 5311.

i. Accelerated extraction shall be accomplished by Method 6111 under the following conditions:

(1) Samples shall be not less than 1/16-inch nor more than 1/8-inch in thickness;

(2) The immersion medium shall be a solution made by dissolving 5 grams of chemically pure sodium hydroxide and 5 grams of chemically pure potassium hydroxide in one liter of distilled water;

(3) The samples shall be immersed in the medium for 14 days at a temperature of $145^{\circ} \pm 5^{\circ}F$;

(4) During the immersion period, air shall be gently bubbled through the medium from a 1/4-inch glass tube at a rate of about one bubble per second;

(5) Fresh medium shall be susbtituted every day;

(6) Samples need not be dipped in acetone.

j. The effects of alkalies shall be determined by Method 6251 under the following conditions:

(1) Samples shall be not more than 1/4-inch in thickness;

(2) The immersion medium shall be as described in (i), above;

(3) Fresh medium shall be substituted every 7 days.

(4) The samples shall be immersed in the medium for a period of 30 days;

(5) Samples need not be dipped in acetone.

5. CONDITION

Waterstops shall be extruded or molded in such a manner that the material is dense and homogeneous throughout and free from voids, tears, thins, indentations, or other imperfections. Unless otherwise specified, waterstops shall be symetrical in shape and uniform in dimensions and shall be furnished in continuous strips at least 50 feet long. Factory splices shall have a tensile strength equal to at least one-half that of the unspliced section.

6. PACKAGING AND STORING

Waterstops shall be package and stored by methods that will protect them from prolonged exposure to direct sunlight or excessive heat.

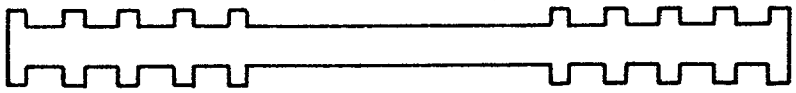
TABLE 1. SIZES OF WATERSTOPS

Size Designation	Web Thickness (T) (Inches)	Width (W) (Inches)
1	1/16	5 1/4
2	3/32	3 3/4
3	3/32	4
4	3/32	5 1/4
5	3/32	6
6	1/8	4
7	1/8	5 1/4
8	1/8	6
9	5/32	4
10	5/32	4 1/2
11	5/32	9
12	3/16	4
13	3/16	5
14	3/16	6
15	3/16	9
16	1/4	6
17	1/4	9
18	3/8	5
19	3/8	6
20	3/8	9
21	1/2	6
22	1/2	9
23	1/2	12

FIGURE 1

TYPES OF NON-METALLIC WATERSTOPS

TYPE A



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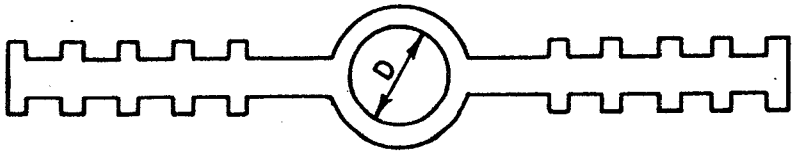

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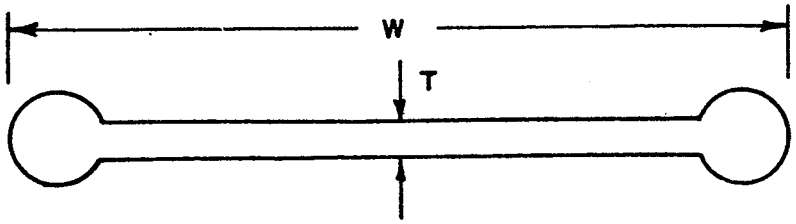

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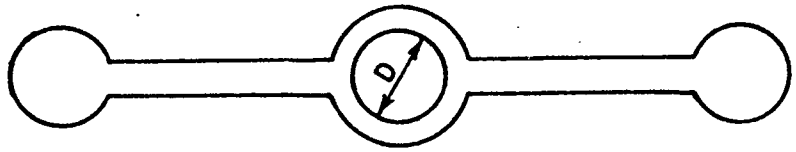
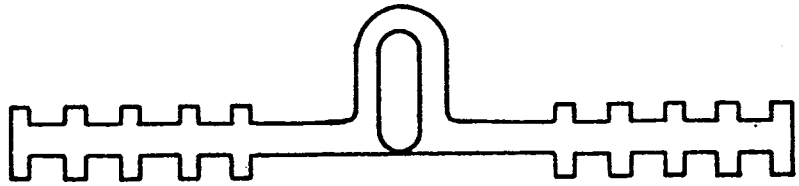
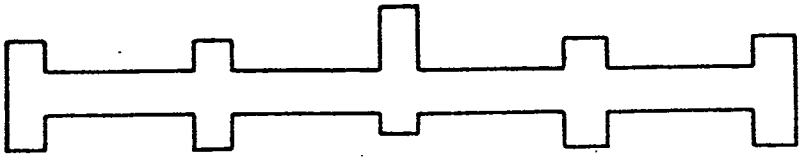


TYPE E



TYPE F



(537-7)

MATERIAL SPECIFICATION

538. METAL WATERSTOPS

1. SCOPE

This specification covers the quality of materials for metal waterstops.

2. MATERIALS

Metal waterstops shall be made of copper, wrought iron or galvanized steel as specified. Waterstops that require forming of the metal involving sharp bends shall be made of copper which shall be soft enough to stand being bent cold through 180 degrees at an inside radius equal to its thickness without cracking.

3. QUALITY

Metal for waterstops shall conform to the requirements of the applicable ASTM standard specifications below:

Copper - ASTM Specification B 152

Zinc-coated (Galvanized) steel - ASTM Specification A 526

MATERIAL SPECIFICATION

539. STEEL REINFORCEMENT (FOR CONCRETE)

1. SCOPE

This specification covers the quality of steel reinforcement for reinforced concrete.

2. QUALITY

All reinforcement shall be free from rust, oil, grease, paint or other deleterious matter.

Steel bars for concrete reinforcement requiring bends shall be deformed billet-steel bars conforming to ASTM Specification A 615, Grade 40 or Grade 60.

Straight steel bars shall be deformed bars conforming to one of the following specifications:

Deformed Billet-Steel Bars for Concrete Reinforcement (Grade 40 or Grade 60) - ASTM Designation A 615.

Rail-Steel Deformed Bars for Concrete Reinforcement (Grade 50 or Grade 60) - ASTM Designation A 616.

Axle-Steel Deformed Bars for Concrete Reinforcement (Grade 40 or Grade 60) - ASTM Designation A 617.

Fabricated steel bar mats shall conform to the requirements of ASTM Specification A 184.

Welded steel wire fabric reinforcement shall conform to the requirements of ASTM Specification A 185.

Welded deformed steel wire fabric for concrete reinforcement shall conform to the requirements of ASTM Specification A 497.

Cold-drawn steel wire reinforcement shall conform to the requirements of ASTM Specification A 82.

Deformed steel wire for concrete reinforcement shall conform to the requirements of ASTM Specification A 496.

3. DIMENSIONS OF WELDED WIRE FABRIC

Gages, spacing and arrangement of wires in welded steel wire fabric shall be as defined in ACI Standard 315 of the American Concrete Institute for the specified style designations.

4. STORAGE

Steel reinforcement stored at the site of the work shall be stored above the ground surface on platforms, skids or other supports and shall be protected from mechanical injury and corrosion.

MATERIAL SPECIFICATION

542. CONCRETE CULVERT PIPE

1. SCOPE

This specification covers the quality of nonreinforced and reinforced concrete culvert pipe.

2. NONREINFORCED PIPE

Nonreinforced concrete culvert pipe shall conform to the requirements of ASTM Specifications C 14 for the class of pipe specified.

3. REINFORCED PIPE

a. Round pipe. Round reinforced concrete culvert pipe shall conform to the requirements of ASTM Specifications C 76 for the class of pipe specified.

b. Arch pipe. Reinforced concrete arch culvert pipe shall conform to the requirements of ASTM Specifications C 506 for the class of pipe specified.

c. Elliptical pipe. Reinforced concrete elliptical culvert pipe shall conform to the requirements of ASTM Specifications C 507 for the class of pipe specified.

4. RUBBER GASKET JOINTS

When rubber gasket joints are specified, the joints and gaskets shall conform to the requirements of ASTM Specifications C 443.

MATERIAL SPECIFICATION

545. ASBESTOS-CEMENT PIPE

1. SCOPE

This specification covers the quality of asbestos-cement pipe and fittings.

2. PRESSURE PIPE

Pressure pipe and couplings shall conform to the requirements of ASTM Specification C 296 for the specified class and type of pipe. Type I or Type II pipe shall be furnished unless otherwise specified.

Fittings other than couplings shall: (1) be cast iron or ductile iron pressure fittings compatible with the type of pipe furnished, (2) be of the all-bell, rubber-ring-connecting type with gasket retainer grooves cast or machined in the inner surfaces of the bells, and (3) otherwise conform to the requirements of AWWA Standard C110 (American National Standard A21.10). Gaskets shall conform to the requirements of ASTM Specification D 1869.

When perforated pressure pipe is specified, the number, size, location and spacing of perforations shall conform to the requirements of ASTM Specification C 508.

3. IRRIGATION PIPE

Irrigation pipe and couplings shall conform to the requirements of ASTM Specification C 296, except that lower strength will be allowed, as follows: The rated working pressure shall be not less than 75 pounds per square inch, the hydrostatic proof pressure shall be not less than 225 pounds per square inch, and the flexural proof loads and minimum crushing strengths shall be as tabulated below. Pipe and asbestos-cement fittings shall meet the chemical requirements for Type I or Type II pipe unless otherwise specified.

Applied Flexural Proof Loads	
Nominal Size inches	Total Applied Load, lb.
4	1000
6	2000
8	3700

Minimum Crushing Loads	
Nominal Size inches	Crushing Strength per Lin. Ft., lb.
4	1900
6	1400
8	1650
10	1900
12	2200
14	2600
16	2750
18	2900
20	3100
24	3500
30	4100
36	5000

4. NONPRESSURE PIPE

Nonpressure pipe and couplings shall conform to the requirements of ASTM Specification C 428 or C 644 for the specified class and type of pipe. Type I or Type II pipe shall be furnished unless otherwise specified.

Fittings other than couplings shall meet the same physical and chemical requirements as the pipe and couplings.

When perforated nonpressure pipe is specified, the number, size, location and spacing of perforations shall conform to the requirements of ASTM Specification C 508.

5. PERFORATED UNDERDRAIN PIPE

Perforated underdrain pipe, couplings and fittings shall conform to the requirements of ASTM Specification C 508, except that flexible couplings recommended by the pipe manufacturer will be allowed unless otherwise specified.

MATERIAL SPECIFICATION

551. ZINC-COATED IRON OR STEEL CORRUGATED PIPE

1. SCOPE

This specification covers the quality of zinc-coated iron or steel corrugated pipe and fittings.

2. PIPE

Zinc-coated or steel corrugated pipe and fittings shall conform to the requirements of Interim Federal Specification WW-P-405 for the specified classes and shapes of pipe, and to the following additional requirements:

a. Unless otherwise specified, circumferential shop riveted seams shall have a maximum rivet spacing of 6 inches, except that 6 rivets will be sufficient for 12-inch diameter pipe;

b. When close riveted pipe is specified: (1) the pipe shall be fabricated so that the rivet spacing in the circumferential seams shall not exceed 3 inches, except that 12 rivets will be sufficient to secure the circumferential seams in 12-inch pipe, and (2) in those portions of the longitudinal seams that will be covered by the coupling bands the rivets shall have finished flat heads or the rivets and holes shall be omitted and the seams shall be connected by welding to provide a minimum of obstruction to the seating of the coupling bands.

c. Double riveting or double spot welding of pipe less than 42 inches in diameter may be required. When double riveting or double spot welding is specified, the riveting or welding shall be done in the manner specified for pipe 42 inches or greater in diameter.

3. COATINGS

Coatings shall conform to the requirements of Interim Federal Specification WW-P-405 for the specified types of coatings.

MATERIAL SPECIFICATION

573. SLIDE GATES (SLUICE GATES), METAL, HEAVY DUTY

1. SCOPE

This specification covers the quality of heavy duty, metal slide gates (sluice gates) for water control.

2. CLASS AND TYPE OF GATE

The class of gate will be expressed as a numerical symbol composed of the seating head and unseating head which the gate must be built to withstand. The two numbers will be separated by a hyphen with the seating head listed first. For this purpose the heads shall be expressed in terms of feet of water.

Gates shall be of the specified types as defined below:

Type MHS-1 gates shall have gray cast iron slides, frames, guides and yokes and shall be fitted with: (1) bronze seat facings, bronze wedges and wedge blocks or wedge seat facings, and bronze stem blocks or thrust nuts, (2) bronze or stainless steel fasteners, and (3) cold rolled steel stems, except that stems shall be stainless steel where so specified.

Type MHS-2 gates shall have gray cast iron slides, frame, guides, and yokes and shall be fitted with: (1) stainless steel seat facings, wedges, wedge seat facings, stems and fasteners, and (2) austenitic cast iron stem blocks or thrust nuts.

Type MHS-3 gates shall have austenitic gray cast iron slides, frames, guides and yokes and shall be fitted with: (1) nickel-copper alloy seat facings, wedges, wedge seat facings, stems and fasteners, and (2) austenitic cast iron stem blocks or thrust nuts.

3. QUALITY OF MATERIALS

Materials in slide gates and appurtenances shall conform to the requirements of the applicable specifications listed below for the alloy, grade, type, or class of material and the condition and finish appropriate to the structural and operational requirements:

Material	Specifications (ASTM, except as noted)
Gray cast iron	A 48, Class 30, or A 126, Class B
Austenitic gray cast iron	A 436
Cold rolled steel	A 108
Stainless steel	A 167, A 276, or A 582, Type 302, 303, 304, or 304 L
Naval bronze	B 21
Phosphor bronze	B 103 or B 139
Manganese bronze	B 138 or B 584
Silicon bronze	B 98 or B 584
Nickel-copper alloy plate, sheet, strip	B 127
Nickel-copper alloy rod, bar	B 164
Nickel-copper alloy castings	Federal Specification QQ-N-288
Rubber for gaskets and seals	D 2000

4. FRAME (OR SEAT)

The frame shall be cast iron and of the specified type. The front face shall be machined to receive the gate guides and the rear face shall be machined as required to match the specified attaching means. A dovetailed groove shall be machined on the perimeter of the front face to receive the seat facing.

5. GATE SLIDE

The gate slide shall be cast iron, rectangular in shape and shall have horizontal and vertical stiffening ribs of sufficient section

to withstand the seating and unseating heads expressed by the gate class designation, as defined in Section 2 of this specification. A dovetailed groove shall be machined on the perimeter of the slide face to receive the seat facing.

Tongues shall be machined on the vertical sides of the slide along its entire height to match the guide grooves with a maximum clearance of 1/16 inch for gates smaller than 54 inches by 54 inches and 1/8 inch for larger gates.

A nut pocket with reinforcing ribs shall be integrally cast on the vertical centerline and above the horizontal centerline of the slide. The pocket shall be of a shape adequate to receive a flat-backed thrust nut or stem block and shall be built to withstand the opening and closing thrust of the stem.

6. GATE GUIDES

The gate guides shall be cast iron and shall be built to withstand the total thrust of the gate slide due to water pressure and wedge action.

Grooves shall be machined to receive the tongue on the gate slide throughout the entire length of the guide.

The guides shall be of such length as to retain at least one-half the height of the gate slide when the gate is fully opened.

7. WEDGES AND WEDGE SEATS (OR BLOCKS)

Pads for supporting wedges, wedge seats and wedge loops (or stirrups) shall be cast as integral parts of the gate frame, slide, or guides and shall be accurately machined to receive those parts.

Wedges and wedge seats shall have machine finished bearing surfaces. They shall be fastened to the gate slide, frame or guides by means of suitable studs, screws, or bolts and shall be firmly locked in place after adjustment. Each interacting set of wedge and wedge seat shall be adjustable as needed to insure accurate and effective contact.

8. SEAT FACING

Facings shall be pressed or impacted into the machined dovetailed grooves on the gate slide and frame and machined to a smooth finish to insure proper watertight contact.

9. YOKE

When a self-contained gate is specified, the yoke shall be of such design as to capably withstand the loads resulting from operation of the gate. The yoke shall be provided with machined pads for connecting to the ends of the gate guides and to receive the stem thrust cap or handwheel lift.

10. FLUSH BOTTOM SEAL

When a flush bottom sealing gate is specified, a solid, square-corner type rubber seal shall be provided at the bottom of the gate opening. It shall be securely fastened either to the bottom of the slide or to the frame. Metal surfaces bearing on the rubber seal shall be smooth and rounded as necessary to prevent cutting of the seal during gate operation.

11. FASTENERS

All anchor bolts, assembly bolts, screws, nuts, and other fasteners shall be of ample section to withstand the forces created by operation of the gate while subjected to the specified seating and unseating heads. Quality and size of fasteners shall be as recommended by the gate manufacturer. Anchor bolts shall be furnished with two nuts to facilitate installation.

12. GATE STEM AND LIFT (OR HOIST)

The gate stem and lift (or hoist) shall be of the specified type, size and capacity and, if hand operated, shall be capable of moving the gate slide under normal conditions, after it is unseated from its wedging device, with a pull on the handwheel or crank of not more than 25 pounds with the specified seating or unseating head of water against the gate.

The stem shall be furnished in sections as necessary to permit reasonable ease in installation. Couplings shall be bolted, pinned or keyed to the stem. The stem shall be furnished with rolled or machine-cut right-hand 29° Acme threads of sufficient length to completely open the gate. The threads shall be smooth and of uniform lead and cross section, such that the nut can travel the full length without binding or excessive friction. The stem shall be threaded for connection to the stem block or thrust nut on the gate slide.

The lift shall be compatible with the type of stem furnished. Unless otherwise specified, the lift nut shall be cast manganese bronze and shall be fitted with ball or roller thrust bearings designed to withstand the normal thrust developed during opening

and closing of the gate at the maximum operating heads. All gears, sprockets and pinions shall be machine-cut, with ratios and strength adequate to withstand operating loads. Sufficient grease fittings shall be provided to allow lubrication of all moving parts. An arrow and the word "open" shall be cast on the rim of the hand-wheel or on the lift housing to indicate the direction of opening. Unless otherwise specified, the lift for a non-rising-stem gate shall be provided with an indicator capable of showing both when the gate is fully open and when it is fully closed.

Provision shall be made to prevent stem rotation within stem block or thrust nut at the connection with the gate slide.

Stop collars shall be provided on rising stems to prevent over-travel in opening and closing the gate.

13. STEM GUIDES

Unless otherwise specified, stem guides shall be cast iron with bronze bushed collars and fully adjustable in two directions.

14. WALL THIMBLE

When a wall thimble is specified, it shall be of the same cast iron used in the gate frame and of the section, type, and depth specified. The front flange shall be machined to match the gate frame and drilled and tapped to accurately receive the gate attachment studs.

Gaskets or mastic to be installed between the thimble and the gate frame shall conform to the recommendation of the gate manufacturer and shall be furnished with the thimble.

15. INSTALLATION INSTRUCTIONS

The Contractor shall supply the manufacturer's complete installation data, instructions for adjustments and drawings or templates showing the location of anchor bolts for each gate.

16. PAINTING

When specified, gates and accessories shall be painted by the designated systems.

17. CERTIFICATION

The material certification shall include the name of the manufacturer, the manufacturer's model number (for standard catalog items) or the seating and unseating heads for which the gate is designed together with such drawings and specifications as may be necessary to show that the gate conforms to the requirements of this specification.

MATERIAL SPECIFICATION

581. METAL

1. SCOPE

This specification covers the quality of steel and aluminum alloys.

2. STRUCTURAL STEEL

Structural steel shall conform to the requirements of ASTM Specification A 36.

High-strength low-alloy structural steel shall conform to ASTM Specification A 242 or A 588.

Carbon steel plates of structural quality to be bent or formed cold shall conform to ASTM Specification A 283, Grade C.

Carbon steel sheets of structural quality shall conform to ASTM Specification A 570, Grade D or A 611, Grade D.

Carbon steel strip of structural quality shall conform to ASTM Specification A 570, Grade C.

3. COMMERCIAL OR MERCHANT QUALITY STEEL

Commercial or merchant quality steel shall conform to the requirements of the applicable ASTM specifications listed below:

Product	ASTM Specification
Carbon steel bars	A 575, Grade M 1015 to Grade M 1031
Carbon steel sheets	A 569
Carbon steel strip	A 569
Zinc-coated carbon steel sheets	A 526

4. ALUMINUM ALLOY

Aluminum alloy products shall conform to the requirements of the applicable ASTM specifications listed below. Unless otherwise specified, Alloy 6061-T6 shall be used.

Product	ASTM Specification
Standard structural shapes	B 308
Extruded structural pipe and tube	B 429
Extruded bars, rods, shapes and tubes	B 221
Drawn seamless tubes	B 210
Rolled or cold-finished bars, rods and wire	B 211
Sheet and plate	B 209

5. BOLTS

Steel bolts shall conform to the requirements of ASTM Specification A 307. If high-strength bolts are specified they shall conform to the requirements of ASTM Specification A 325.

When galvanized or zinc-coated bolts are specified, the zinc coating shall conform to the requirements of ASTM Specification A 153; except that bolts 1/2 inch or less in diameter may be coated with electrodeposited zinc or cadmium coating conforming to the requirements of ASTM Specification A 164, Type RS, or ASTM Specification A 165, Type TS, unless otherwise specified.

6. RIVETS

Unless otherwise specified, steel rivets shall conform to the requirements of ASTM Specification A 502, Grade 1.

Unless otherwise specified, aluminum alloy rivets shall be Alloy 6061-T6 conforming to the requirements of ASTM Specification B 316.

7. WELDING ELECTRODES

Steel welding electrodes shall conform to the requirements of American Welding Society specification AWS A5.1, "Specification for Mild Steel Covered Arc-Welding Electrodes," except that they shall be uniformly and heavily coated (not washed) and shall be of such a nature that the coating will not chip or peel while being used with the maximum amperage specified by the manufacturer.

Aluminum welding electrodes shall conform to the requirements of American Welding Society specification AWS A5.10, "Specification for Aluminum and Aluminum-Alloy Welding Rods and Bare Electrodes."

MATERIAL SPECIFICATION

582. GALVANIZING

1. SCOPE

This specification covers the quality of zinc coatings applied to iron and steel products.

2. QUALITY

Zinc coatings shall conform to the requirements of the following specifications.

Zinc coatings on products fabricated from rolled, pressed, and forged steel shapes, plates, bars, and strip, 1/8 inch thick and heavier shall conform to ASTM Specification A 123.

Zinc coatings on assembled steel products shall conform to the requirements of ASTM Specification A 386 and shall be applied in conformance with the Recommended Practice for Providing High Quality Zinc Coatings (Hot-Dip) on Assembled Products (ASTM Designation A 385).

Zinc coatings on iron and steel hardware shall conform to the requirements of ASTM Specification A 153 except that bolts, screws and other fasteners 1/2 inch or less in diameter may be coated with electrodeposited zinc or cadmium coating conforming to the requirements of ASTM Specification A 164, Type RS, or ASTM Specification A 165, Type TS, unless otherwise specified.

MATERIAL SPECIFICATION

583. COAL TAR-EPOXY PAINT (FORMULA C-200)

1. SCOPE

This specification covers the quality of a coal tar polyamide epoxy paint suitable for use on structural steel or concrete. (Note: Coatings compounded from coal tar and epoxy resins are the subject of U.S. Patent No. 2,765,288 held by the U.S.S. Chemicals, a Division of United States Steel Corporation, Pittsburgh, Pennsylvania, 15230.)

2. COMPOSITION AND PROCESSING

a. Composition. The paint shall be a two-component system containing the pitch, filler and catalyst in one component and the resin in another. The components shall contain the following types and proportions of ingredients:

(1) COMPONENT A

Ingredient	% by Wt.	Gallons (absolute) in 38.5 lb. batch
Coal Tar Pitch	35.0	1.28
Polyamide Resin	11.5	0.55
Magnesium Silicate	31.0	0.51
Xylene	18.7	1.00
Ethyl Alcohol (95%-denatured)	1.0	0.06
Gelling Agent	1.5	0.04
Catalyst	1.3	0.06
	100.0	3.50 gallons

(2) COMPONENT B

Epoxy Resin (100% nonvolatile)	9.7 pounds	1.0 gallon

b. Processing. Magnesium silicate and gelling agent shall be thoroughly dispersed in Component A by means of grinding equipment capable of developing substantial shear values. Gellant shall be mixed with an equal weight of magnesium silicate and then dampened by stirring-in all of the alcohol;

the resultant mixture shall be added to and thoroughly dispersed into Component A. (The viscosity of Component A will be markedly influenced by the degree of dispersion of gellant and magnesium silicate.)

c. Quality of Ingredients. Ingredient materials shall exhibit the following properties:

(1) Coal Tar Pitch. Coal tar pitch shall have the following characteristics:

	Minimum	Maximum
B & R softening point, degree C (Method ASTM D 36)	70	75.0
Ash, percent by weight (Method ASTM D 3176)		0.5
Benzene insolubles, percent by weight (Method ASTM D 367)		18.0
Volatiles, percent by weight		
Under 250 degrees C		0.0
Under 300 degrees C		5.0

(2) The Gellant. The gellant or thixothrophy-producing additive for coal tar-epoxy paint shall be an organic derivative of magnesium montmorillonite for use in low polarity hydrocarbons. It shall be a creamy white powder having a bulking value of 15 $\pm$ 0.2 lbs. per gallon and water content of 3.0% maximum (Bentone 38, National Lead Company has these properties.)

(3) The Catalyst. The catalyst shall be 3, 4, 6 Tri-(Dimethylamino methyl) phenol. (DMP-30 Rohm and Haas Company is such a chemical.)

(4) Epoxy Resin. Epoxy resin shall be a diepoxide condensation product of bisphenol A and epichlorohydrin with terminal epoxide group with the following properties:

	Minimum	Maximum
Nonvolatile content	99	
Epoxide equivalent	180	200

	Minimum	Maximum
Color, Gardner		5
Viscosity, 25°C, Brookfield, Poises	100	160
Specific Gravity 25°C/25°C	1.15	1.18

(5) Polyamide Resin. Polyamide resin shall be a condensation product of dimerized fatty acid and polyamines with the following characteristics:

Amine Value	330-360
Color, Gardner	12 maximum
Specific Gravity 25°C/25°C	0.96-0.98
Viscosity, Poises, 75°C, Brookfield	7-9
Nonvolatile content, percent	97

(6) Xylene. Xylene shall conform to Federal Specification TT-X-916b, "Xylene (for use in organic coatings)."

(7) Ethyl Alcohol. Ethyl alcohol (95% denatured) shall conform to Federal Specification O-E-760b, and Amendment 2, "Ethyl Alcohol (Ethanol); Denatured Alcohol; and Proprietary Solvent," Grade III or IV.

(8) Magnesim Silicate. Magnesium silicate shall conform to Federal Specification TT-P-403, "Pigment, Magnesium Silicate, Dry," Medium Oil Absorption.

3. PHYSICAL REQUIREMENTS

When tested by the methods described in Section 4:

a. Component A shall exhibit the following properties:

(1) Viscosity, poises (Brookfield)	160 maximum
(2) Nonvolatile residue, percent	78 minimum

b. The mixed paint shall exhibit the following properties:

(1) Sag, 12 mil wet film	None
(2) Pot life at 77° ± 3°F, hours	4 minimum

c. The cured film shall exhibit the following properties:

(1) Penetration, 200 grams, 5 seconds, 77°F, hundredth centimeter units	3 maximum
(2) Odor after 48 hours curing	Pass test
(3) Flexibility on ½-inch mandrel	Pass test
(4) Adhesion	No delamination

4. TEST METHODS

a. Viscosity of Component A. Fill a container having a diameter and a height of not less than 3 and 3-3/4 inches respectively to a depth of not less than 3 inches with a representative sample of Component A. Set up a Model RVT or RVF-100 Brookfield Synochro-Electric Viscometer with a No. 7 spindle and with guard removed. Bring the sample to a temperature of 25°C and stir vigorously for 2 minutes with a stiff spatula. Immediately after stirring, lower the viscometer until the spindle is immersed until ½ of the "neck" mark is covered. Run the viscometer at 100 r.p.m. for 1 minute and take a reading of the position of the pointer on the dial. If the dial reading is 40 or less, the viscosity shall be considered to be 160 Poises or less. If the reading is over 40, immediately start the motor and take additional readings at 1-minute intervals. If no readings of 40 or less are obtained out of 10 readings, taken at 1-minute intervals, the viscosity of the material shall be considered to be over 160 Poises.

b. Nonvolatile Content of Component A. Place a short length of stiff wire such as a partially-straightened paper clip into a small disposable aluminum dish of about 2 inches diameter and weigh to the nearest 0.1 milligram. As rapidly as possible, place between 2 and 3 grams of Component A into the dish and weigh immediately to the nearest 0.1 milligram. After weighing, spread the material over the bottom of the dish. Heat the dish, wire and contents in a well-ventilated

convection-type oven maintained at 105° ± 2°C, for 3 hours. After the material has been in the oven for a few minutes, and periodically thereafter, stir the material. Cool in a desiccator, weigh to the nearest 0.1 milligram and calculate the percentage nonvolatile.

c. Sag Test of Coal Tar-Epoxy Paint. Prepare approximately one pint of the material by thoroughly mixing 100 ml. of Component B into 350 ml. of Component A. Determine its viscosity immediately after mixing, using the same procedure as for Component A above but employing a No. 6 spindle. If the material produces a scale reading of more than 80, at 100 r.p.m. after 5 readings taken at 1-minute intervals, reduce the viscosity by adding xylene in small increments until a reading not greater than 80 is obtained. Press a strip of 1-inch masking tape across the full width of a solvent cleaned 3" x 6" cold-rolled steel panel. The tape should be parallel to and centered on the shorter axis of the panel. Within 30 minutes after mixing, apply the material to the panel to a wet film thickness of at least 12 mils as determined by an Interchemical wet film thickness gage. The application may be made with a doctor blade having a gap of approximately 25 mils or by brush. Immediately after applying the material, carefully remove the masking tape and stand the panel in a vertical position with the bare strip horizontal. Examine the panel after four hours. Sagging or running of the coating into the bare area shall constitute failure of the material to pass the sag test.

d. Penetration Test on Coal Tar-Epoxy Film. Select and solvent spray-clean two 3" x 6" steel panels in accordance with Method 2011 of Federal Test Method Standard 141. Draw down, in accordance with Method 2161, a coat of the paint mixed (including any thinning) for the sag test. Allow the film to dry 18 to 24 hours in a horizontal position at 77° ± 3°F and at a relative humidity of not over 60%. Apply a second coat over and at right angles to the first, using freshly mixed paint prepared identically to that used for the first coat. The draw-down applicator(s) shall be such as to provide a total dry-film thickness for the two coats of 23 ± 3 mils and the coats shall be of approximately equal thickness. Allow the second coat to dry in a horizontal position for 120 hours at 77° ± 3°F. After 72 hours of curing, and daily thereafter, clamp the panel onto the table of a penetrometer (ASTM D5) so that the needle is over an area which is within the prescribed thickness range (as measured by Method 6181) and determine

the penetration, using a total load of 200 grams applied for 5 seconds at 77°F. The average of the 3 lowest out of 5 penetration readings, all taken within a 1 centimeter square, shall not exceed 3/100 of a centimeter after 120 hours of curing.

e. Flexibility of Coal Tar-Epoxy Film. Sandblast 3 steel panels (similar to those used in the penetration test) at low pressure with clean, 30 to 50 mesh, non-metallic abrasive until a uniform, gray-white surface, with well developed anchor pattern, is achieved. (Note: It may be necessary to blast both sides of panel, in stages, to avoid warping.) Blow off dust with a clean air blast. Immediately after recoating of the penetration test panel, apply 10 to 12 mils (wet thickness as determined with an Interchemical gage) of the same material to the flexibility test panels in accordance with Method 2161, Federal Test Method Standard No. 141. Allow the film to cure in the horizontal position for 120 hours at 77° ± 3°F or for a period equal to that required to reach a penetration of 3/100 centimeter on the penetration test panel, whichever occurs first. With film side up, and in a time interval of approximately 1 second, bend each of the flexibility panels double over a 1/2-inch diameter mandrel. Cracks in any of the panels visible to the naked eye shall constitute failure except that edge cracks extending no further than 1/2 inch or small local fissures emanating from air bubbles, craters and similar imperfections shall be disregarded.

f. Adhesion of Coal Tar-Epoxy Film. Test the adhesion of the coating on an unbroken area of the flexibility panel with a sharp knife after the panel has cured 120 hours. It shall strongly resist being removed from the metal. Also, test the intercoat adhesion of the film on a penetration panel after 120 hours curing, with a knife. Any delamination of the two coats shall constitute failure.

g. Pot Life Test of Coal Tar-Epoxy Paint. Mix 100 ml. of Compound "B" into 350 ml. of Component "A" both of which have been brought to a temperature of 77° ± 3°F before mixing. Pour the material into a pint tin can, seal tightly and maintain at 77° ± 3°F. Examine the material in four hours from the time it was mixed. For its pot life to be considered satisfactory, the mixed material must still be in a fluid condition and when thinned with no more than 100 ml. of xylene shall be lump-free and brushable.

h. Odor of Dried Coal Tar-Epoxy Film. Examine the paint film or one of the flexibility panels for odor after it has been cured for 48 hours. The film shall be free of any odor except for a faint odor of xylene.

5. PACKAGING

Three and one-half gallons of Component A shall be packaged in a standard 5-gallon container with a lug-type, removable lid. Component B shall be packaged to the full mark in a one-gallon, friction-lid container. In addition to other labelling requirements, each of the 5-gallon containers shall bear instructions for properly mixing the two components immediately prior to use.

MATERIAL SPECIFICATION

591. FARM FIELD FENCING MATERIALS

1. SCOPE

This specification covers the quality of materials used in the construction of farm field fences.

2. WIRE GAGE

When the size of steel wire is designated by gage number, the diameter shall be as defined for U. S. Steel Wire Gage.

3. FENCING

Barbed wire, woven wire and wire netting fencing shall conform to the requirements of Federal Specification RR-F-221 for the specified types and styles of fencing. Barbed wire and woven wire shall have zinc coating of at least 0.50 ounce per square foot of wire surface unless otherwise specified.

4. STAYS, FASTENERS, AND TENSION WIRE

Stays and fasteners shall conform to the requirements of Federal Specification RR-F-221 unless otherwise specified. Tension wires shall have a tensile strength not less than 58,000 pounds per square inch. Stays, fasteners and tension wire shall have Class 3 zinc coating as specified in ASTM Specification A 641.

5. WOOD FENCE POSTS AND BRACES

Wood posts shall be of black locust, red cedar, osage orange (Bois d'Arc), redwood, pressure treated pine or other wood of equal life or strength. At least half the diameter or diagonal dimension of red cedar or redwood posts shall be in heartwood. Pressure treatment shall conform to Material Specification 585. The posts shall be sound, new, free from decay, with all limbs trimmed substantially flush with the body. They shall be substantially straight throughout their length.

Wood braces shall be of material equal to or better than construction grade Douglas fir. They shall be pressure treated in conformance with Material Specification 585.

6. STEEL FENCE POSTS AND BRACES

Steel fence posts and braces shall conform to the requirements of Federal Specification RR-F-221. Posts with punched tabs for fastening the wires shall not be used.

7. CONCRETE FENCE POSTS

Concrete fence posts shall be manufactured to the specified requirements of size, shape, and strength.

8. PANEL GATES

Panel gates shall be the specified types, sizes, and quality and shall include the necessary fittings. The fittings shall consist of not less than two hinges and two latches or galvanized chains for fastening. Latches shall be of such design that a padlock may be used for locking. All fittings shall be equivalent to the gate manufacturer's standard.

9. WIRE GATES

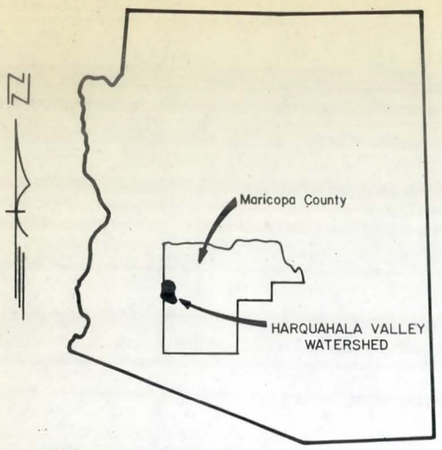
Wire gates shall be the type shown on the drawings, constructed in accordance with these specifications at the locations and to the dimensions shown on the drawings. The materials shall conform to the kinds, grades, and sizes specified for new fence, and shall include the necessary fittings and stays.

10. STAPLES

Staples used to fasten fence wire to wood posts shall be 9-gage galvanized wire with a minimum length of 1½ inches for soft woods and a minimum length of one inch for close-grain hardwoods.

11. GALVANIZING

All iron and steel fencing materials, except as otherwise specified, shall be zinc coated by the hot dip process, except that clips, bolts, and other small hardware may be protected by electrodeposited zinc or cadmium coating.



INDEX OF DRAWINGS

HARQUAHALA VALLEY WATERSHED
PROTECTION AND FLOOD PREVENTION PROJECT

MARICOPA COUNTY ARIZONA

PLANS FOR THE CONSTRUCTION OF

SADDLEBACK FLOODWATER RETARDING STRUCTURE

PREPARED FOR THE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
BUCKEYE-ROOSEVELT NATURAL RESOURCE CONSERVATION DISTRICT
WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT

BY

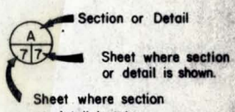
SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

GENERAL NOTES

1. Correlation of material between test holes is inferred. Thickness of loose surface material may vary, and the occurence of other soil units is possible.
2. All existing conditions are to be verified in the field, prior to construction and any adjustment from drawings to be made as directed by the engineer.
3. All utilities as shown on plan are approximate. It shall be the responsibility of the contractor to field verify locations of all utilities and to coordinate construction with the respective utility companies.
4. Elevations are in feet above mean sea level U.S.G.S. datum.
5. All stationing refers to centerline of construction and is the measured horizontal distance.
6. All soil classification symbols shown are based on the Unified Soil Classification system. Field identification was used except where indicated by an asterisk (*). This denotes laboratory classification. Logs and descriptions are abridged. Complete drilling logs, laboratory reports and geology report are available for inspection at the project office.
7. Blow count indicated is the results of standard penetration tests made with a split spoon sampler. Results are expressed as blows per one half (½) foot.

STRUCTURAL NOTES

1. Exposed concrete edges shall be chamfered one inch or rounded.
2. Reinforcing bar spacing is center to center of bars. Bar cover is clear distance between surface of bar and face of concrete and shall be two inches for formed and top surfaces and three inches for surfaces placed against the earth unless otherwise shown.
3. In sections with a single mat of reinforcing, the steel shall be positioned in the center of the section unless otherwise shown.
4. Bar splices shall be lapped a minimum of 30 bar diameters of the smaller bar but not less than 12 inches, unless specifically shown otherwise.
5. All exposed metal including anchor bolts, nuts, washers, etc. shall be galvanized unless otherwise noted.



PRC TOUPS CORPORATION
4131 N. 24 STREET
PHOENIX, ARIZONA

Registered Professional Engineer (Civil) CERTIFICATE NO. 10518 ASOK C. PATEL Date Signed 3/19/79 ARIZONA U.S.A.

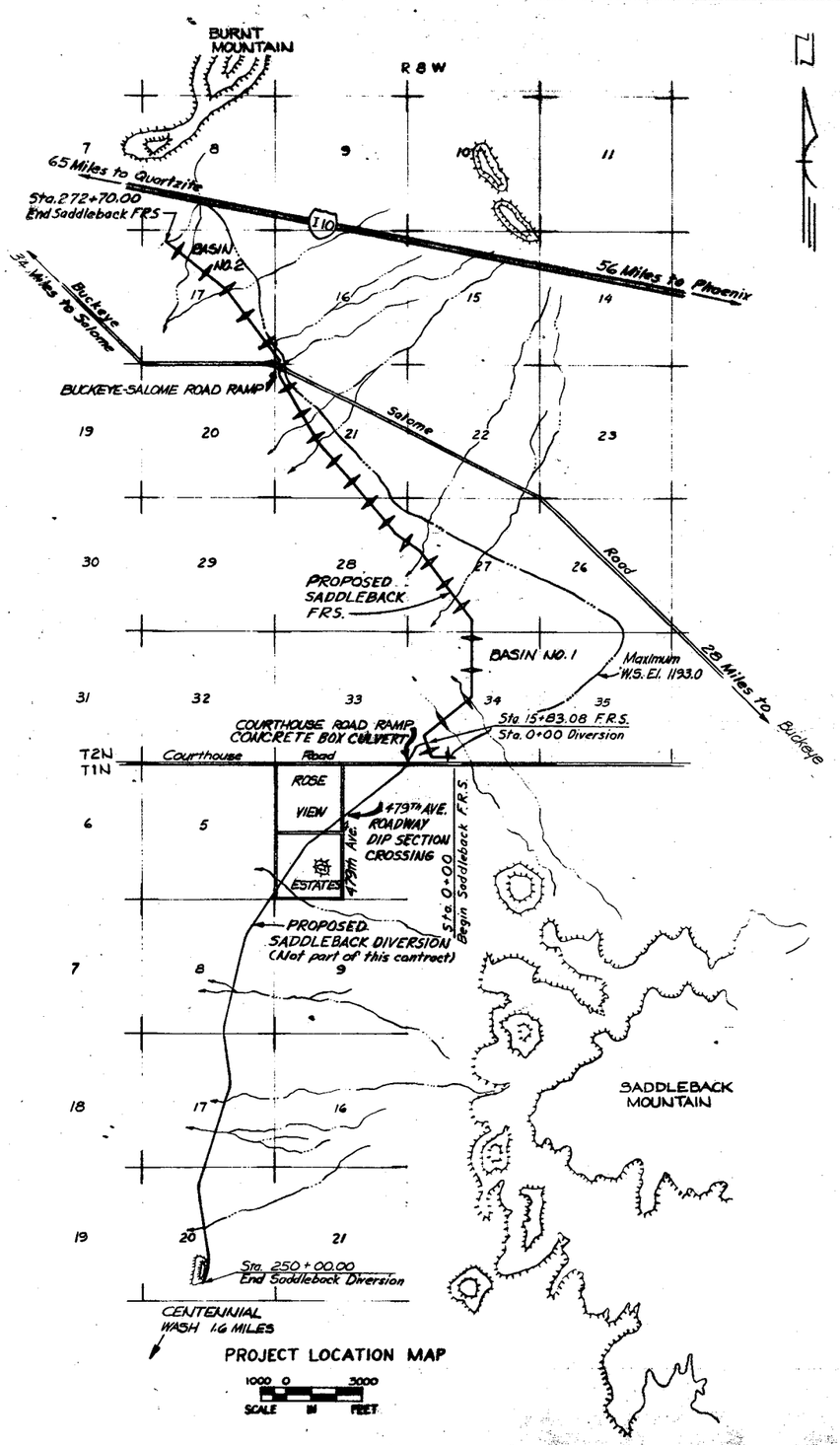
Registered Professional Engineer (Civil) CERTIFICATE NO. 9349 EDWARD C. LAIN JR. Date Signed 3/19/79 Arizona U.S.A.

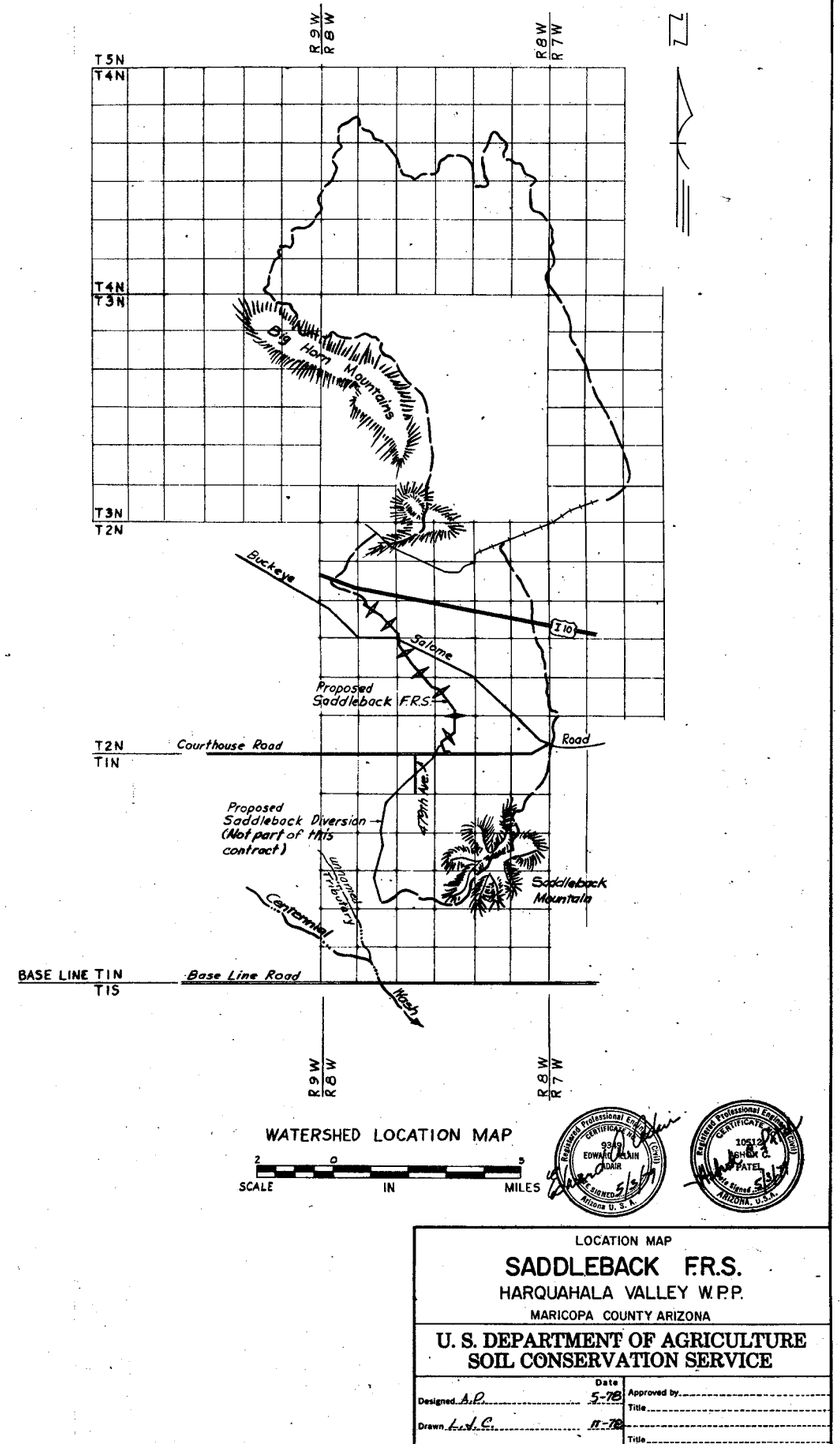
WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT
APPROVED
DATE 5/22/79 Sam W. Gale
Chairman - Board of Supervisors

BUCKEYE-ROOSEVELT NATURAL RESOURCE CONSERVATION DISTRICT
APPROVED
DATE John E. Fonnes
Chairman-Board of Supervisors

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
APPROVED
DATE 5-14-79 Hubert Stovall
Chief Engineer and General Manager

REVISIONS	
6-80	Revised Buckeye-Salome Road alignment - sheets 9, 20, 21 & 41 Revised fence details - shee
Date	Description





LOCATION MAP

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed A.P.	5-78	Approved by	
Drawn L.V.C.	11-78	Title	
Traced		Title	
Checked E.A.A.	11-78	Sheet No 2 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

FORM SCS-313C

GATE SCHEDULE	
℄ Dam Station	Offset
0+20± to 0+96±	70' lt.
49+64± to 83+83±	220' rt.
99+85 ℄ 100+15	7' lt. to 7' rt.
149+85 ℄ 150+15	7' lt. to 7' rt.
203+58±	30' rt. to 104' rt.
205+83±	146' rt. to 160' rt.
204+08±	7' lt. to 7' rt.
204+82±	7' lt. to 7' rt.
248+85	7' lt. to 7' rt.
248+15	7' lt. to 7' rt.
272+70±	7' lt. to 7' rt.

Note: See sheets 4 to 10 for fence location.

N 925,000 E 145,000 — N 920,000 E 150,000 — N 915,000 E 155,000 — N 910,000 — N 905,000 E 160,000

E 140,000 N 925,000 — E 135,000 N 900,000

R/W — Maximum W.S. El. 1193.0 — Dirt trails — Ditch — Road — Buckeye — Powerline

BASIN NO. 2 — BASIN NO. 1

℄ Dam

N 37°14'24" W — N 50°07'32" W — N 00°52'59" W — N 28°50'05" W — N 39°48'46" W — N 55°00'29" W — N 57°40'34" W — N 00°00'00" W

A.P.10 Sta. 241+61.54
N 917,354.56
E 139,714.16

A.P.9 Sta. 207+05.14
N 914,602.90
E 141,805.82

A.P.8 Sta. 201+23.14
N 914,023.97
E 141,814.79

A.P.7 Sta. 134+36.92
N 911,405.00
E 143,255.00

A.P.6 Sta. 121+21.30
N 907,506.00
E 146,760.00

A.P.5 Sta. 109+10.64
N 906,860.00
E 147,460.00

A.P.4 Sta. 74+99.30
N 904,160.00
E 149,545.00

A.P.3 Sta. 43+39.30
N 901,000.00
E 149,545.00

A.P.2 Sta. 18+83.08
N 899,500.00
E 147,600.00

A.P.1 Sta. 9+48.14
N 898,618.36
E 147,911.17

End Saddleback Dam
Sta. 272+70.00
N 919,347.42
E 137,328.52

Begin Stationing
Sta. 0+00
N 898,606.36
E 148,859.23

Saddleback Dam
Sta. 8+00

N 19°26'24" W
965.83'

N 35°24'37" E

Triangulation stations: 917 1139.98 — 919 1201.16 — 918 1183.88 — 920 1173.96 — 916 1204.86 — 915 1203.85 — 921 1182.09

R/W for Saddleback Diversion - not part of this contract.

LEGEND
AP — Angle point
R/W — Right of way

SCALE 1"= 1000'

CONTOUR INTERVAL 5 FEET

USDA-SCS-PORTLAND, OR. 1979

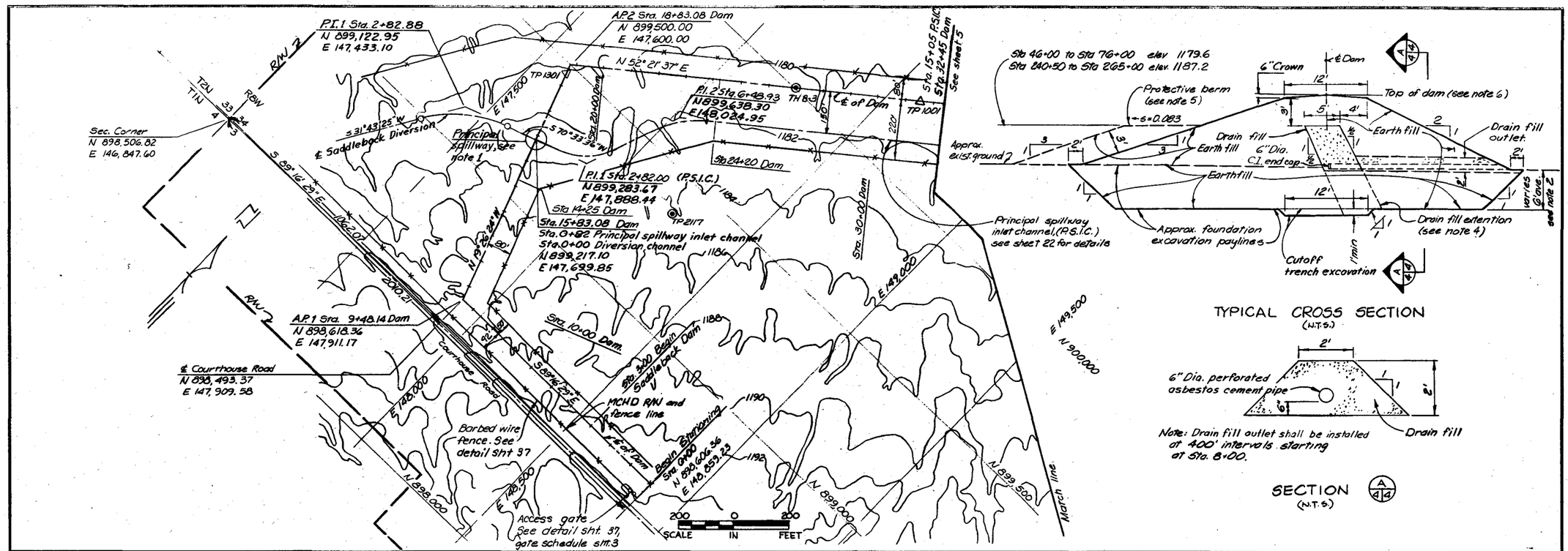
RIGHT OF WAY ACQUISITION

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed A.P.	5-78	Approved by	
Drawn L.A.C.	11-78	Title	
Traced		Title	
Checked F.A.A.	11-78	Sheet No. 3 of 91	Drawing No. 7-E-24039


P.I.1 Sta. 2+82.88
N 899,122.95
E 147,433.10
A.P.2 Sta. 18+83.08 Dam
N 899,500.00
E 147,600.00
N 52° 21' 37" E
P.I. 2 Sta. 6+48.93
N 899,638.30
E 148,024.95
Sta. 15+05 P.S.I.C.
Sta. 32+45 Dam
See sheet 5
TH B-3
℄ of Dam
TP 1001
TP 1301
E 147,500
Sec. Corner
N 898,506.82
E 146,847.60
T2N
T1N
R3W
R2W
33
4
3
S 31° 43' 25" W
℄ Saddleback Diversion
Principal spillway, see note 1
S 70° 33' 36" W
282.20 M.D.M.
Sta 24+20 Dam
P.I. 1 Sta 2+82.00 (P.S.I.C.)
N 899,283.67
E 147,888.44
TP 2117
Sta 14+25 Dam
Sta. 15+83.08 Dam
Sta. 0+82 Principal spillway inlet channel
Sta. 0+00 Diversion channel
N 899,217.10
E 147,699.85
S 89° 16' 29" E
1062.07
N 19° 26' 28" W
90'
Sta. 30+00 Dam
E 149,000
E 149,500
N 900,000
NORTH
RAN 2
A.P.1 Sta. 9+48.14 Dam
N 898,618.36
E 147,911.17
2000.21
42.58'
Sta. 10+00 Dam.
Courthouse Road
S 89° 16' 29" E
℄ Courthouse Road
N 898,493.37
E 147,909.58
E 148,000
Sta. 3+00 Begin Saddleback Dam
MCHD R/W and fence line
Barbed wire fence. See detail Sht 37
℄ of Dam
Begin Diversion Sta. 0+00
N 898,606.36
E 148,859.23
N 898,000
E 148,500
N 899,000
N 899,500
Access gate See detail sht. 37, gate schedule sht. 3
200 0 200
SCALE IN FEET
Sta 46+00 to Sta 76+00 elev. 1179.6
Sta 840+50 to Sta 865+00 elev. 1187.2
6" Crown
℄ Dam
Protective berm (see note 5)
Top of dam (see note 6)
s=0.083
Drain fill
Earth fill
6" Dia. C.I. end cap
Earth fill
Drain fill outlet
Approx. exist. ground
Earthfill
Approx. foundation excavation paylines
Drain fill extention (see note 4)
Cutoff trench excavation
1 min
Varies (see note 2)
Principal spillway inlet channel, (P.S.I.C.) see sheet 22 for details
TYPICAL CROSS SECTION
(N.T.S.)
6" Dia. perforated asbestos cement pipe
Drain fill
Note: Drain fill outlet shall be installed at 400' intervals starting at Sta. 8+00.
SECTION
(N.T.S.)
NOTES
1. Principal spillway layout and details are shown on sheets 22 to 25.
2. Foundation excavation limits as shown is approximate. Final limits will be determined by the engineer after completion of the cutoff trench excavation.
3. See sheet 37 for details and tops of Ext. A's. T=50 & T=55.
4. Drain fill material shall be extended to foundation excavation limit from Sta 15+00 to Sta 16+00, Sta 100+00 to Sta 101+00 and Sta 430+00 to Sta 434+70.
5. Protective berms shall be constructed from Sta 42+00 to Sta 76+00 and from Sta 840+00 to Sta 865+00 as shown on typical cross section this sheet.
6. Top of dam = 1193.0 from approximate Sta 3+30 to Sta 20+00, elev. 1195.85 from Sta 20+00 to Sta 22+00, and elev. 1194.0 from Sta 431+37 to approximate Sta 434+70. Camber as shown on the profile.
0+00 5+00 10+00 15+00 20+00 25+00 30+00
Sta 15+83.08 Principal spillway inlet channel (P.S.I.C.) Sta 0+00 Diversion channel Sta 0+82 Saddleback Diversion
Top of dam elev 1193
Top of dam elev 1195.85
Top of dam elev 1194
Approx. foundation excavation limit ℄ Top of dam elev. as shown
Approx. exist. ground line ℄ Dam
Principal spillway inlet channel (P.S.I.C.) See sheet 22
Sta 15+83.08 Principal spillway inlet channel (P.S.I.C.) Sta 0+00 Diversion channel Sta 0+60 Saddleback Diversion
Sta 15+05 P.S.I.C. Sta 32+45 Dam
Sta 30+00 Dam
Sta 24+20 Dam
Sta 14+25 Dam
Sta 10+00 Dam
Sta 3+00 Saddleback Dam
Begin Sta 0+00
Sta 434+70
Sta 431+37
Sta 430+00
Sta 424+70
Sta 422+70
Sta 420+00
Sta 415+00
Sta 410+00
Sta 405+00
Sta 400+00
Sta 395+00
Sta 390+00
Sta 385+00
Sta 380+00
Sta 375+00
Sta 370+00
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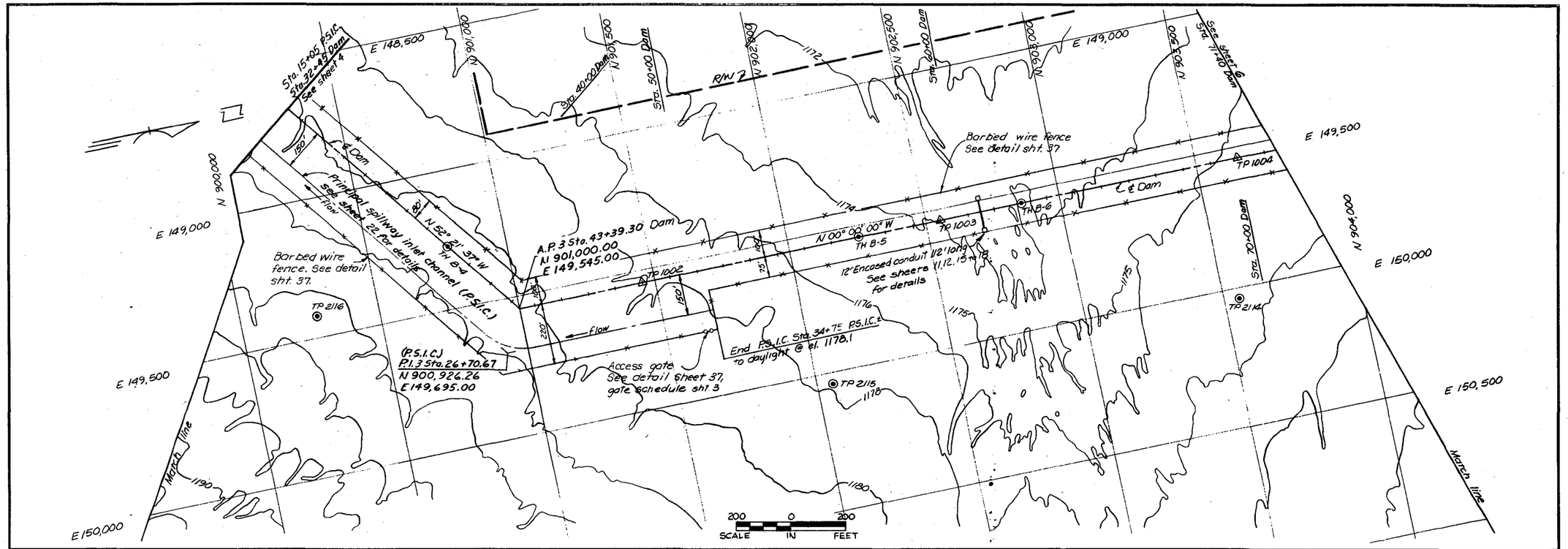
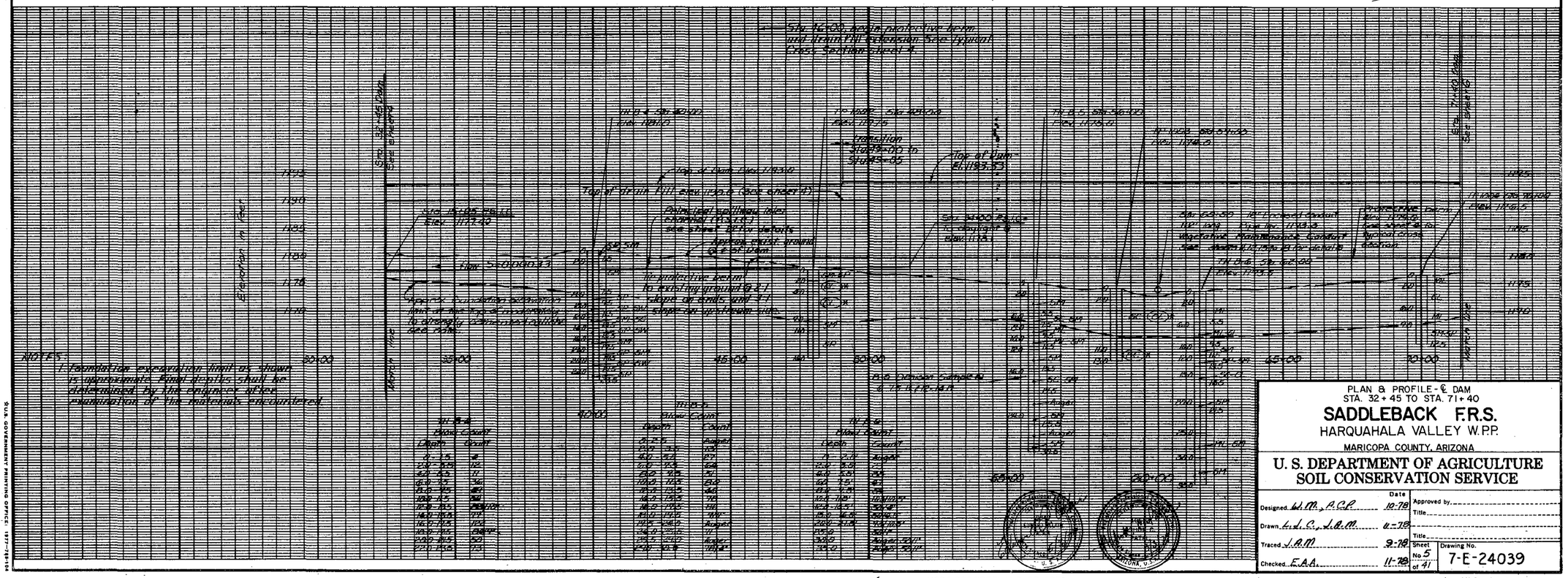
Sta 65+00
Sta 60+00
Sta 55+00
Sta 50+00
Sta 45+00
Sta 40+00
Sta 35+00
Sta 30+00
Sta 25+00
Sta 20+00
Sta 15+00
Sta 10+00
Sta 5+00
Sta 0+00
PLAN & PROFILE - ℄ DAM
STA. 0+00 TO STA. 32+45
SADDLEBACK F.R.S.
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Designed W.M., A.P. 6-78
Drawn W.M., L.L.C., D.R.B. 11-78
Traced W.M. 6-78
Checked E.A.A. 11-78
Approved by
Title
Sheet No. 4 of 41
Drawing No. 7-E-24039
SCS-ENG-317, Rev. 5-69
USDA-SCS-PORTLAND, OR. 1979
U.S. GOVERNMENT PRINTING OFFICE: 1977-735-164





NOTES:

1. Foundation excavation limit as shown is approximate. Final depths shall be determined by the engineer after examination of the materials encountered.

TH B-4
Blow Count

Depth	Count
0 - 1.5	4
2.0 - 3.5	12
4.0 - 5.5	11
6.0 - 7.5	36
8.0 - 9.5	[illegible]
10.0 - 11.5	[illegible]
12.0 - 13.5	[illegible]
14.0 - 15.5	77
16.0 - 17.5	122
18.0 - 19.5	[illegible]
20.0 - 21.5	50
22.0 - 23.5	73

TH B-5
Blow Count

Depth	Count
0 - 2.5	Auger
2.0 - 3.5	13
4.0 - 5.5	27
6.0 - 7.5	64
8.0 - 9.5	51
10.0 - 11.5	29
12.0 - 13.5	46
14.0 - 15.5	78
16.0 - 17.5	88
18.0 - 19.5	[illegible]
19.5 - 24.0	Auger
24.0 - 25.5	71
25.5 - 29.0	Auger
29.0 - 30.0	[illegible]

TH B-6
Blow Count

Depth	Count
0 - 2.0	Auger
2.0 - 3.5	23
4.0 - 5.5	35
6.0 - 7.5	41
8.0 - 9.5	[illegible]
10.0 - 11.5	[illegible]
12.0 - 13.5	[illegible]
15.0 - 16.5	[illegible]
20.0 - 21.0	[illegible]
25.0	[illegible]
30.0	Auger 50/1"
35.0	Auger 50/1"

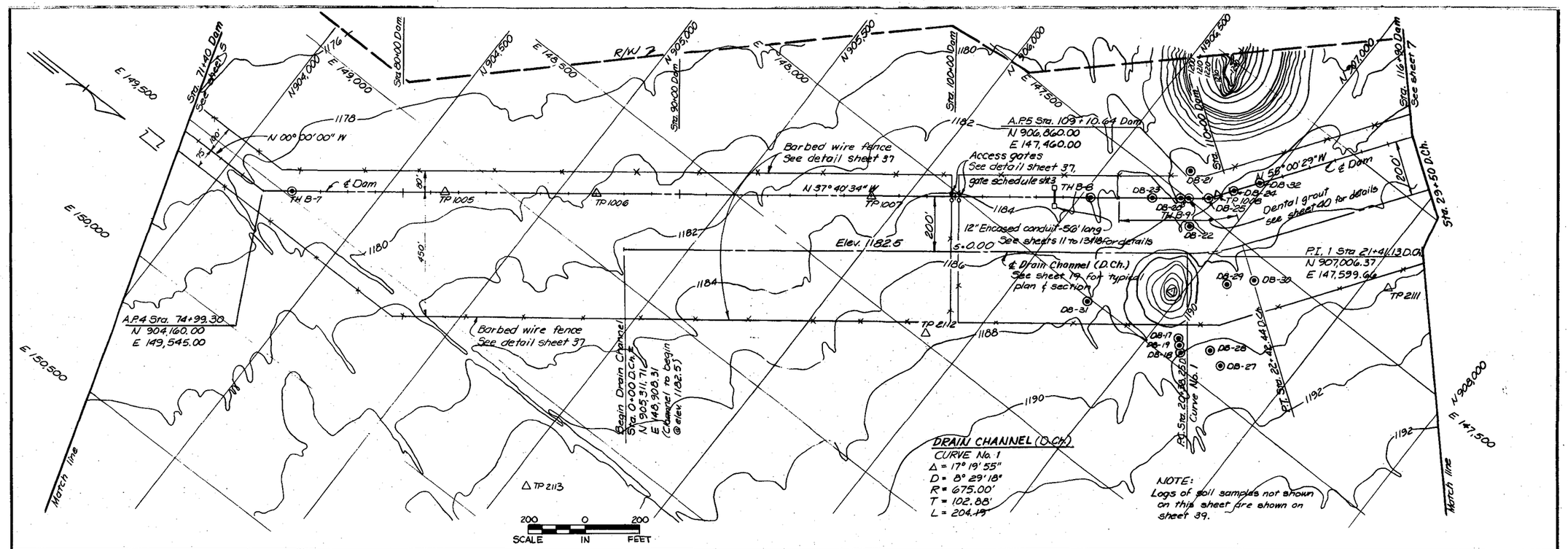
PLAN & PROFILE - ℄ DAM
STA. 32 + 45 TO STA. 71 + 40

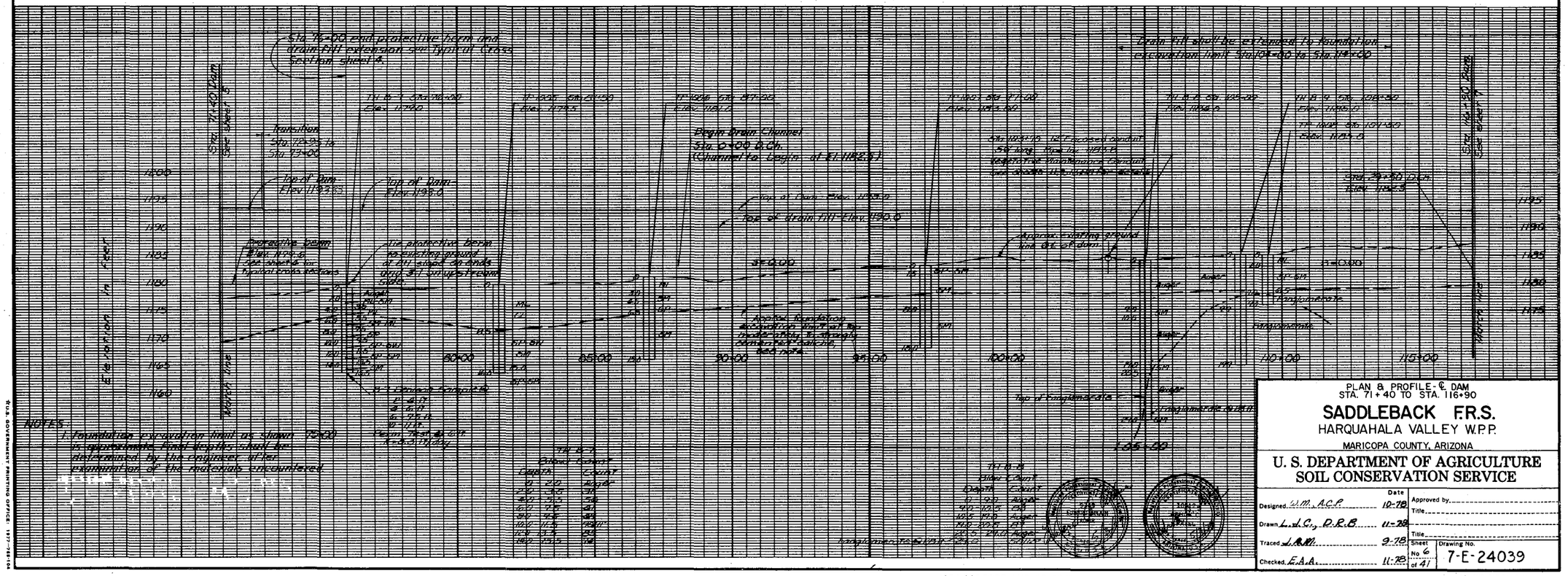
SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed W.M., A.C.P.	10-78	Approved by
Drawn L.L.C., J.A.M.	11-78	Title
Traced J.A.M.	9-78	Title
Checked E.A.A.	11-78	Sheet No 5 of 41 — Drawing No. 7-E-24039





NOTES

1. Foundation excavation limit as shown is approximate. Final depths shall be determined by the engineer after examination of the materials encountered.

PLAN & PROFILE - ℄ DAM
STA. 71 + 40 TO STA. 116+90

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

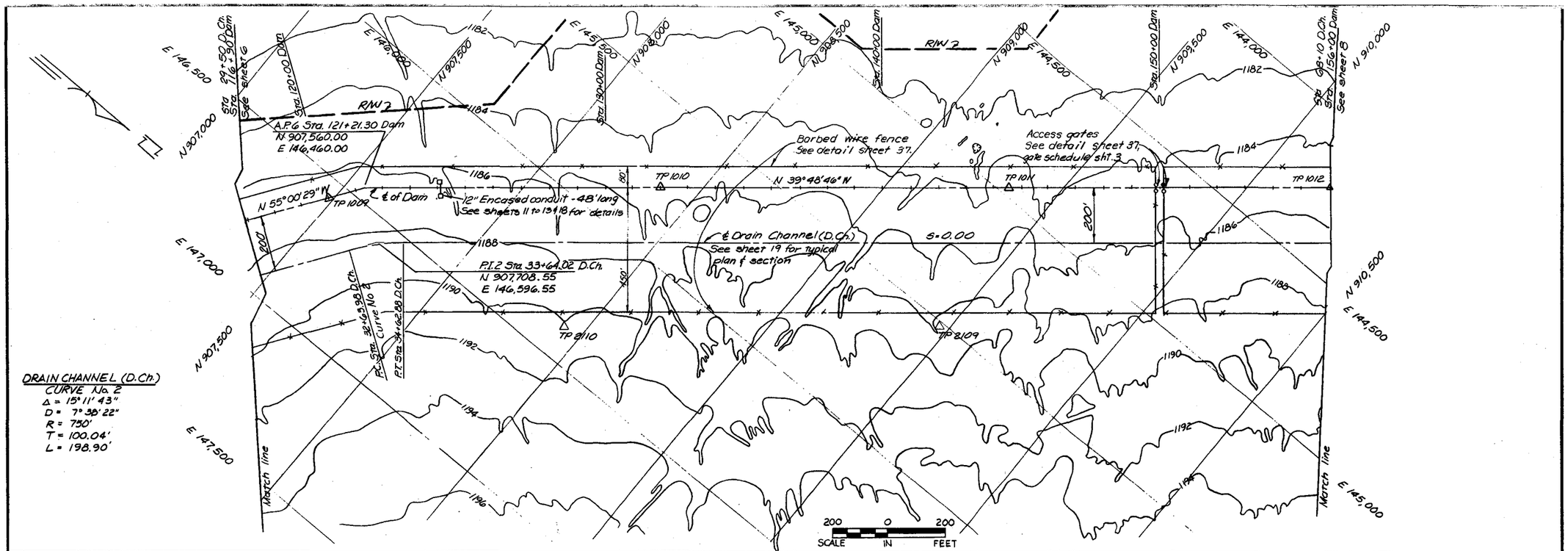
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed W.M., A.C.P.	10-78	Approved by	
Drawn L.J.C., D.R.B.	11-78	Title	
Traced J.A.M.	9-78	Title	
Checked E.A.A.	11-78	Sheet No. 6 of 41	Drawing No. 7-E-24039

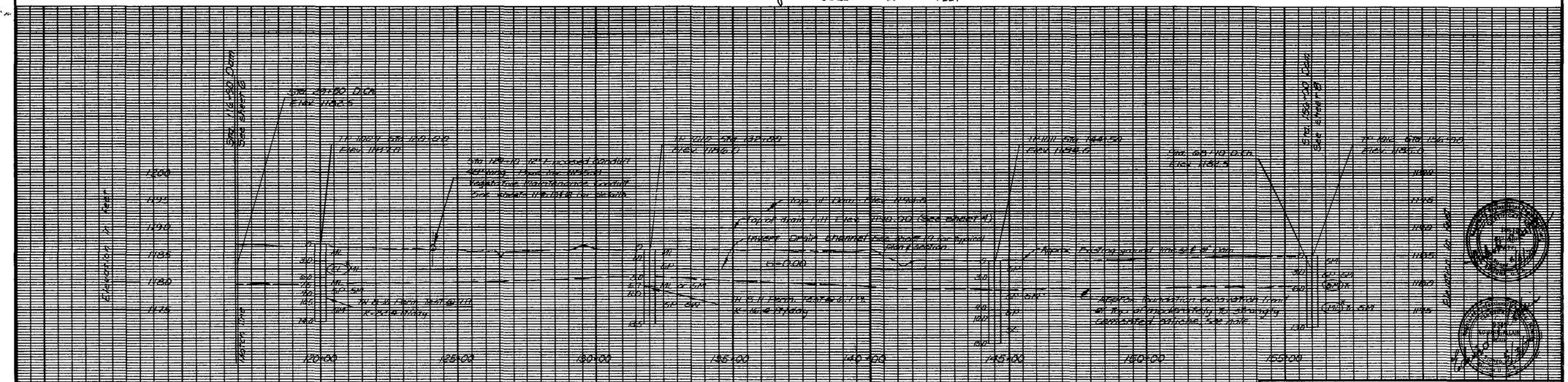
USDA-SCS-PORTLAND, OR. 1979

SCS-ENG-317, Rev. 5-69

U.S. GOVERNMENT PRINTING OFFICE: 1977-781-104



DRAIN CHANNEL (D.Ch.)
CURVE No. 2
Δ = 15° 11' 43"
D = 7° 38' 22"
R = 750'
T = 100.04'
L = 198.90'



NOTE:
Foundation excavation lines are shown in approximate. Final depths will be determined by the engineer after examination of the materials encountered.

PLAN & PROFILE - ℄ DAM
STA. 116+90 TO STA. 156+00

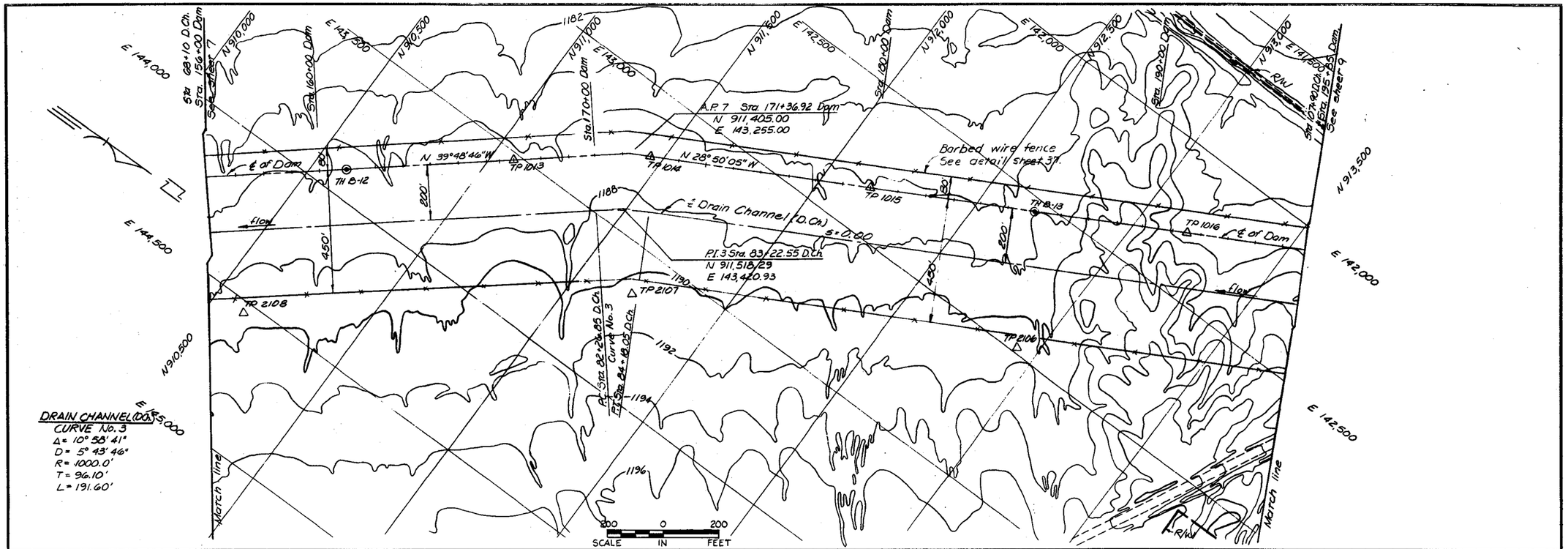
SADDLEBACK F.R.S.

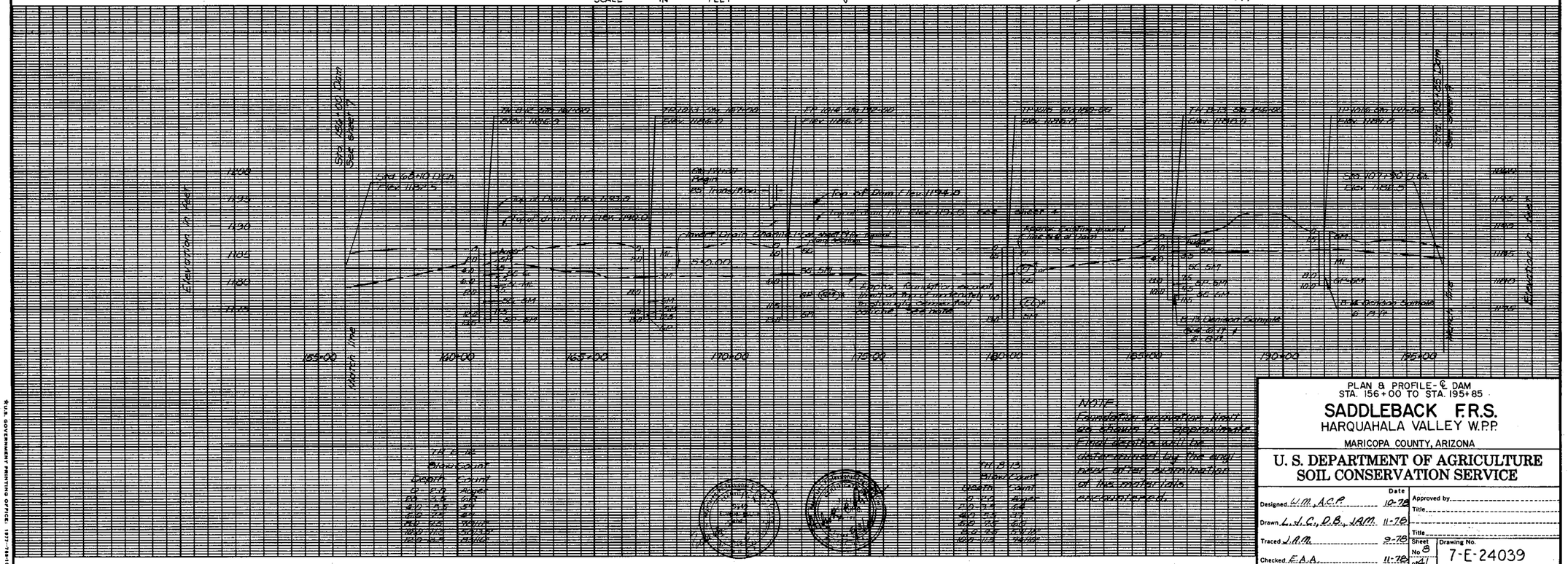
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed W.M., A.C.P.	10-78	Approved by	
Drawn L.J.C., D.B., J.A.M.	11-78	Title	
Traced J.A.M.	9-78	Title	
Checked E.A.S.	11-78	Sheet No. 7 of 41	Drawing No. 7-E-24039

U.S. GOVERNMENT PRINTING OFFICE: 1977—781-104





NOTE:
Foundation preparation work as shown is approximate. Final depths will be determined by the engineer after examination of the completed excavation.

PLAN & PROFILE - ℄ DAM
STA. 156+00 TO STA. 195+85

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

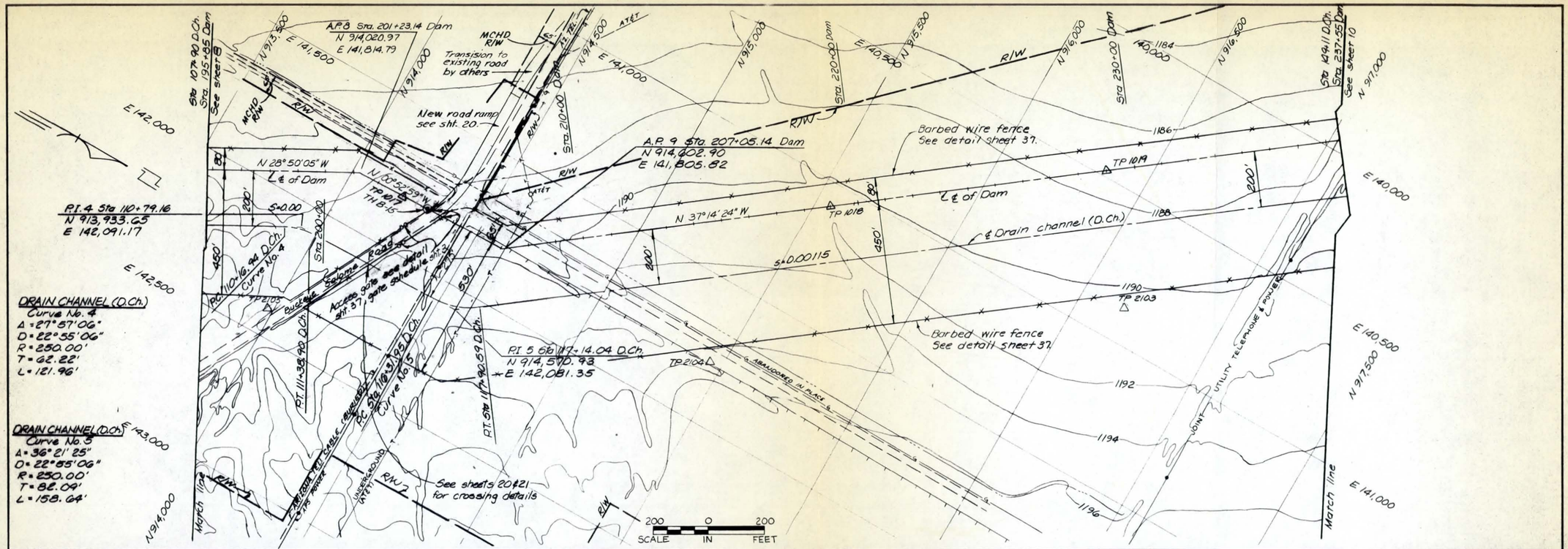
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

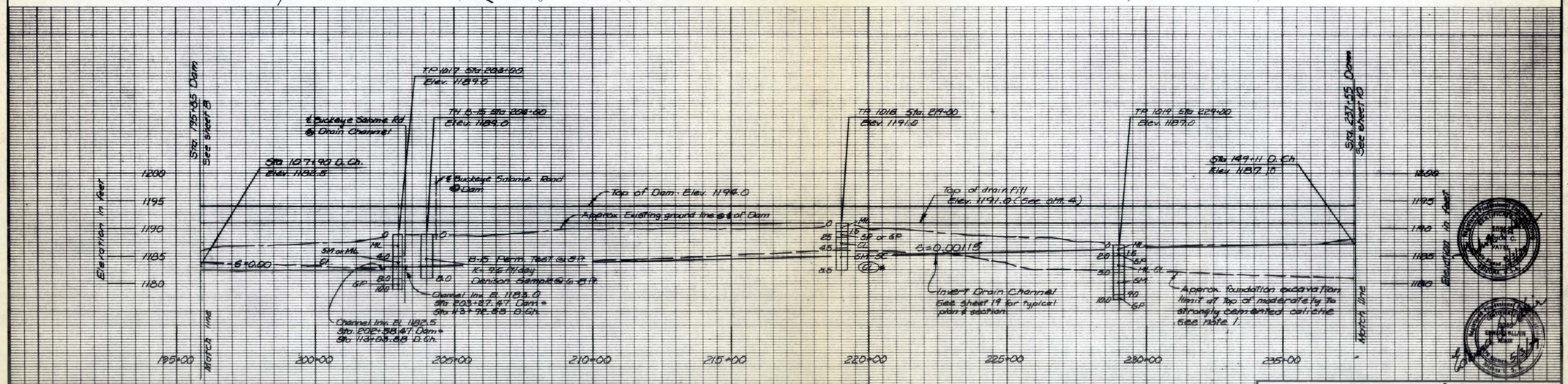
Designed W.M., A.C.P.	10-78	Approved by	
Drawn L.J.C., D.B., J.A.M.	11-78	Title	
Traced J.A.M.	2-78	Sheet No. 8 of 41	Drawing No. 7-E-24039
Checked E.A.A.	11-78		

USDA-SCS-PORTLAND, OR. 1979

SCS-ENG-317, Rev. 5-69

U.S. GOVERNMENT PRINTING OFFICE: 1977-748-104





Date	Revision	By
6-80	Rev. road alignment	L℄

NOTES
1. Foundation excavation limit as shown is approximate. Final depths will be determined by the engineer after examination of the materials encountered.
2. See sheets 20 & 21 for utility information.
3. See sheets 20 & 21 for Buckeye-Salome Road.

PLAN & PROFILE - ℄ DAM
STA. 195 + 85 TO STA. 237+55

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

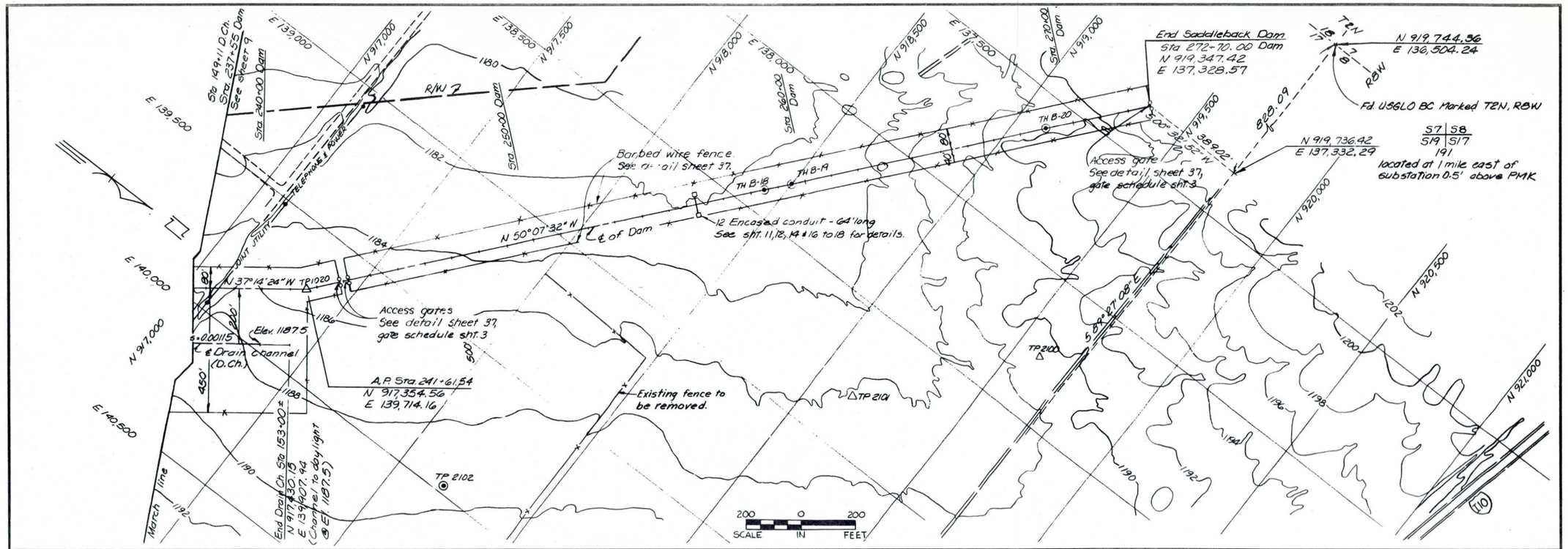
MARICOPA COUNTY, ARIZONA

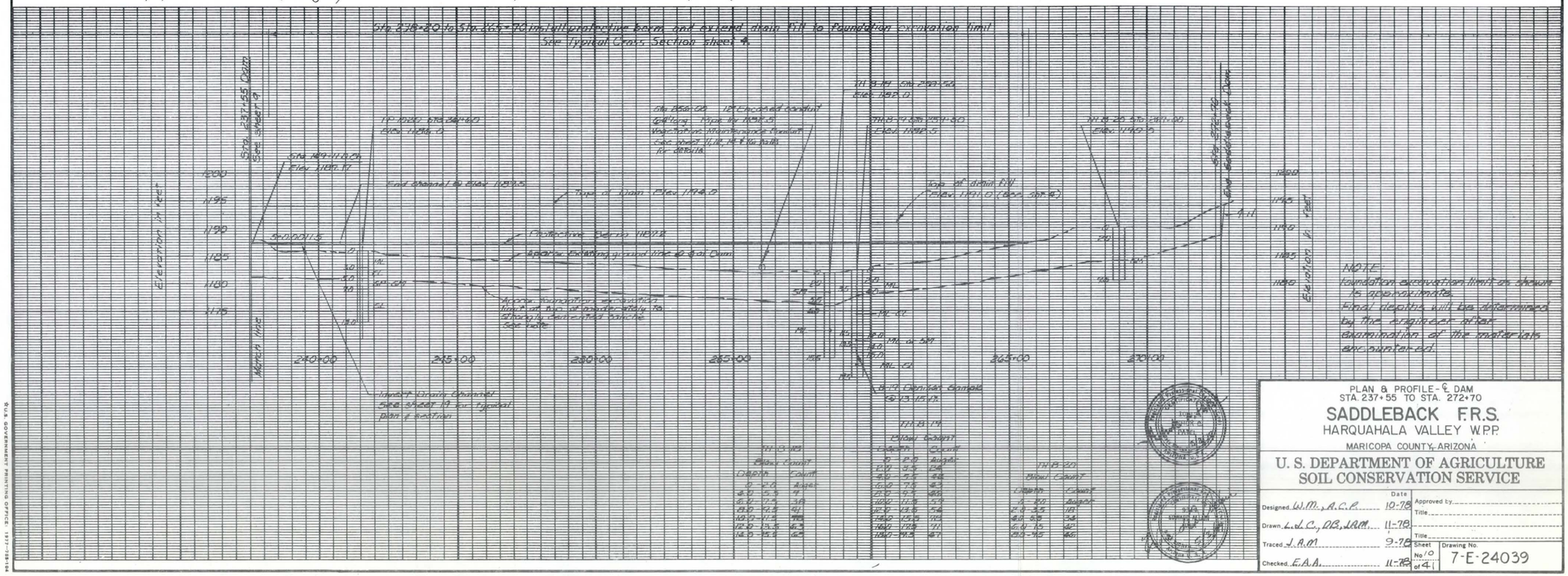
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date		
Designed	W.M. A.C.P.	10-78	Approved by	
Drawn	L.J.C., P.B., J.A.M.	11-78	Title	
Traced	J.A.M.	9-78	Sheet No. 9 of 41	Drawing No. 7-E-24039
Checked	E.A.A.	11-78	Title	

SCS-ENG-317, Rev. 3-69

U.S. GOVERNMENT PRINTING OFFICE: 1977—785-705


Sta 149+11.0 Ch.
Sta 237+55 Dam
See sheet 9
Sta 240+00 Dam
Sta 250+00 Dam
Sta 260+00 Dam
Sta 270+00 Dam
End Saddleback Dam
Sta 272+70.00 Dam
N 919,347.42
E 137,328.57
N 919,744.36
E 136,504.24
RBW
Fd. USGLO BC Marked T2N, R8W
S7 | S8
S19 | S17
191
located at 1 mile east of substation 0.5' above PMK
N 919,736.42
E 137,332.29
828.09
S 39° 52' W
R/W ℄
Barbed wire fence
See detail sheet 37
TH B-20
TH B-18
TH B-19
12 Encased conduit - 64' long
See sht. 11, 12, 14 & 16 to 18 for details.
N 50°07'32" W
℄ of Dam
Access gate
See detail sheet 37,
gate schedule sht. 3
Access gates
See detail sheet 37,
gate schedule sht. 3
N 37°14'24" W TP 1020
Elev. 1187.5
S=0.00115
℄ Drain Channel
(D.Ch.)
A.P. Sta. 241+61.54
N 917,354.56
E 139,714.16
Existing fence to
be removed.
TP 2101
TP 2102
TP 2100
S 84°27'08" E
End Drain Ch. Sta 153+00 ±
N 917,430.15
E 139,907.94
(Channel to daylight
@ El. 1187.5)
March line
Telephone & Power
Cut Utility
E 139,000
E 138,500
E 138,000
E 137,500
N 917,000
N 917,500
N 918,000
N 918,500
N 919,000
N 919,500
N 920,000
N 920,500
N 921,000
E 139,500
E 140,000
E 140,500
1180
1182
1184
1186
1188
1190
1192
1194
1196
1198
1200
1202
200 0 200
SCALE IN FEET


Sta. 238+20 to Sta. 265+70 Impl. protective berm and extend drain fill to foundation excavation limit
See Typical Cross Section sheet 9
Sta 237+55 Dam
See sheet 9
Sta 149+11.0 Ch.
Elev. 1189.0
TP 1020 Sta 236+60
Elev. 1196.0
End channel @ Elev. 1189.5
Top of Dam Elev. 1194.0
Protective Cover to 1187.2
Approx. Existing ground line to Sta Dam
Approx. foundation excavation
limit with min. of double-staggered
row of 24" dia. pipe
See note
Impl. Drain Channel
See sheet 17 for typical
plan & section
Sta 250+00 12" Encased conduit
Corrugated Pipe for N.S.F.S.
Vegetative Maintenance Conduit
See sheet 11, 12, 14 & 16 to 18
for details
TH B-18 Sta 259+50
Elev. 1192.0
TH B-19 Sta 259+50
Elev. 1192.5
TH B-20 Sta 271+00
Elev. 1192.5
Top of drain fill
Elev. 1191.0 (Sta 265+80)
Sta 270+00 Dam
Sta 260+00 Dam
Elev. 1194.0
Elev. 1192.0
Elev. 1189.5
Elev. 1187.2
Elev. 1187.5
Elev. 1196.0
Elev. 1194.0
Elev. 1192.5
Elev. 1191.0
Elev. 1189.5
Elev. 1187.5
Elev. 1187.2
March line
Sta 240+00
Sta 245+00
Sta 250+00
Sta 255+00
Sta 260+00
Sta 265+00
Sta 270+00
1200
1195
1190
1185
1180
1175
NOTE
Foundation excavation limit as shown
is approximate.
Final depths will be determined
by the engineer after
examination of the materials
encountered.
TH B-18
Depth | Count
0 - 5.0 | Augers
5.0 - 7.5 | 3
7.5 - 10.0 | 4
10.0 - 12.5 | 41
12.5 - 15.0 | 63
15.0 - 17.5 | 62
17.5 - 20.0 | 62
20.0 - 22.5 | 62
22.5 - 25.0 | 62
25.0 - 27.5 | 62
27.5 - 30.0 | 62
TH B-19
Blow Count
Depth | Count
0 - 5.0 | Augers
5.0 - 7.5 | 5
7.5 - 10.0 | 4
10.0 - 12.5 | 41
12.5 - 15.0 | 63
15.0 - 17.5 | 62
17.5 - 20.0 | 62
20.0 - 22.5 | 62
22.5 - 25.0 | 62
25.0 - 27.5 | 62
27.5 - 30.0 | 62
TH B-20
Blow Count
Depth | Count
0 - 5.0 | Augers
5.0 - 7.5 | 18
7.5 - 10.0 | 46
10.0 - 12.5 | 62
12.5 - 15.0 | 62
15.0 - 17.5 | 62
17.5 - 20.0 | 62
20.0 - 22.5 | 62
22.5 - 25.0 | 62
25.0 - 27.5 | 62
27.5 - 30.0 | 62
Typical Density Sample
@ 13.15.19
PLAN & PROFILE - ℄ DAM
STA. 237+55 TO STA. 272+70
SADDLEBACK F.R.S.
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Designed W.M., A.C.P. 10-78
Drawn L.L.C., D.B., L.R.M. 11-78
Traced J.A.M. 9-78
Checked E.A.A. 11-78
Date
Approved by
Title
Sheet No. 10 of 41
Drawing No. 7-E-24039
USDA-SCS-PORTLAND, OR. 1979
SCS-ENG-317, Rev. 5-69
U.S. GOVERNMENT PRINTING OFFICE: 1981—781-104

VEGETATIVE MAINTENANCE CONDUIT DATA

FRS Station	A Top of dam elev.	B Inlet Structure elev.	C Inlet pipe invert elev.	D Collar Spacing	No. of Collars	E Length of 12" encased conduit	F Outlet pipe invert elev.	G Outlet structure elev.	H End riprap channel	Remarks *
60+50	1193.0	1172.8	1173.3	14'-0"	3	112'	1171.8	1170.1	1172.0	Riser unit III (2'-3")
103+70	1193.0	1183.3	1183.8	13'-0"	1	56'	1182.8	1181.1	1183.0	Inlet structure Unit I
124+10	1193.0	1185.3	1185.8	10'-0"	1	48'	1184.8	1183.1	1185.0	Inlet structure Unit I
256+00	1194.0	1182.0	1182.5	11'-0"	2	64'	1181.8	1180.1	1182.0	Riser unit II (3'-9")

*Inlet structure @ Sta 103+70 and 124+10 are standard size C structures. See sheet 13 for details. Inlet structure @ Sta 60+50 and 256+00 are special riser units. See sheets 14 and 15 for details.

VEGETATIVE MAINTENANCE CONDUIT

Conduit @ Sta 60+50, ℄ Dam = 100+00 conduit

Conduit Station	Camber	Elev.	
0+38.6	0	1173.30	(Inlet structure)
0+54.6	.06	1173.15	
0+70.6	.11	1172.99	
0+86.6	.13	1172.80	
1+02.6	.14	1172.60	
1+18.6	.12	1172.37	
1+34.6	.08	1172.12	
1+50.6	0	1171.80	(Outlet structure)

Conduit @ Sta 103+70, ℄ Dam = 100+00 conduit

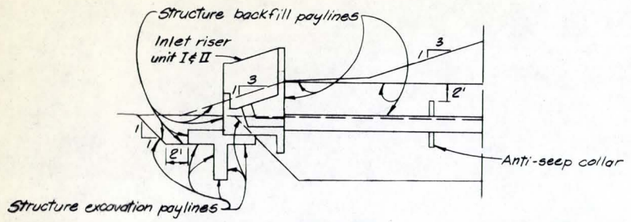
Conduit Station	Camber	Elev.	
0+71.9	0	1183.80	(Inlet structure)
0+87.9	.05	1183.56	
1+03.9	.07	1183.29	
1+19.9	.04	1182.97	
1+27.9	0	1182.80	(Outlet structure)

Conduit @ Sta 124+10, ℄ Dam = 100+00 conduit

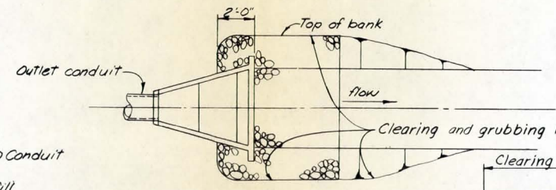
Conduit Station	Camber	Elev.	
0+77.6	0	1185.80	(Inlet structure)
0+93.6	.07	1185.54	
1+09.6	.05	1185.19	
1+25.6	0	1184.80	(Outlet structure)

Conduit @ Sta 256+00, ℄ Dam = 100+00 conduit

Conduit Station	Camber	Elev.	
0+62.6	0	1182.50	(Inlet structure)
0+78.6	.08	1182.41	
0+94.6	.10	1182.26	
1+10.6	.08	1182.07	
1+26.6	0	1181.80	(Outlet structure)

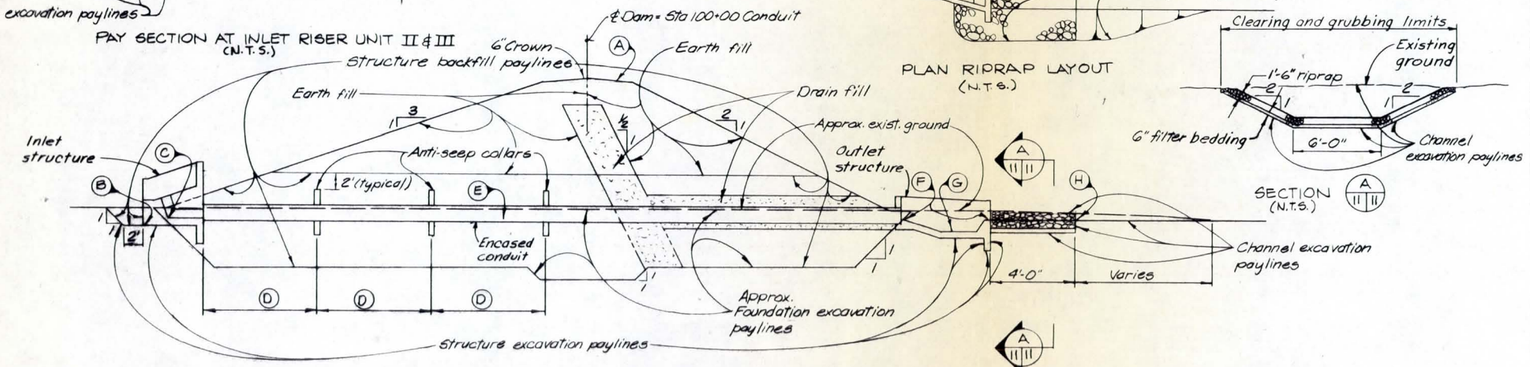


PAY SECTION AT INLET RISER UNIT II & III (N.T.S.)

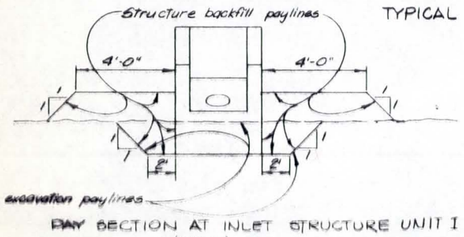


PLAN RIPRAP LAYOUT (N.T.S.)

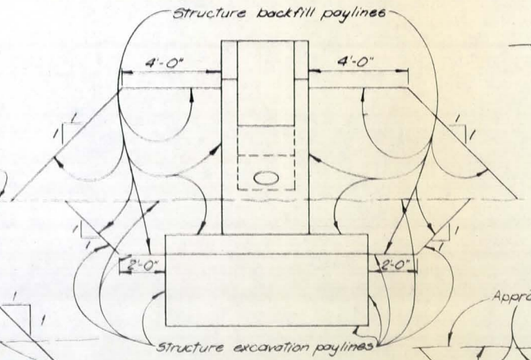
SECTION (N.T.S.)



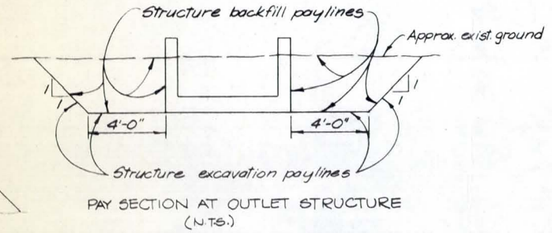
TYPICAL CROSS SECTION AT VEGETATIVE MAINTENANCE CONDUIT (N.T.S.)



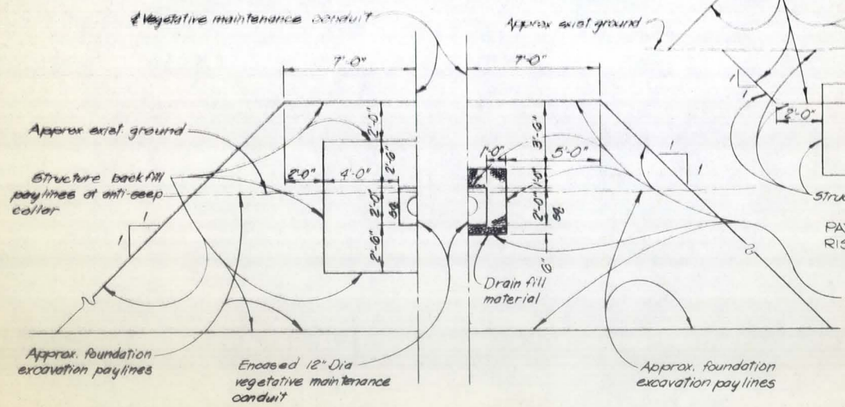
PAY SECTION AT INLET STRUCTURE UNIT I (N.T.S.)



PAY SECTION AT INLET RISER UNIT II & III (N.T.S.)

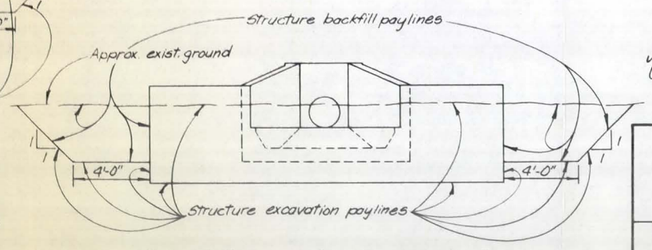


PAY SECTION AT OUTLET STRUCTURE (N.T.S.)



PAY SECTION AT ANTI-SEEP COLLAR (N.T.S.)

PAY SECTION AT CONDUIT (Downstream side of drain filter) (N.T.S.)



PAY SECTION AT OUTLET STRUCTURE WITH WING WALL (N.T.S.)

Note: See following sheets for details;

Encased conduit and Anti-seep collar	Sheet 12
Inlet structure unit I	" 13
Inlet riser unit II	" 14
Inlet riser unit III	" 15
Outlet structure	" 18

Registered Professional Engineer — Certificate No. 9589 — Edward G. Delain — Date Signed 5/3/79 — Arizona U.S.A.

Registered Professional Engineer — Certificate No. 10811 — Dilip S. Patel — Date Signed 5/3/79 — Arizona U.S.A.

Date	Revision	By
6-80	Corrected reference sheets for Units I, II & III	L.C.

VEGETATIVE MAINTENANCE CONDUIT DATA AND PAYLIMITS

SADDLEBACK FRS

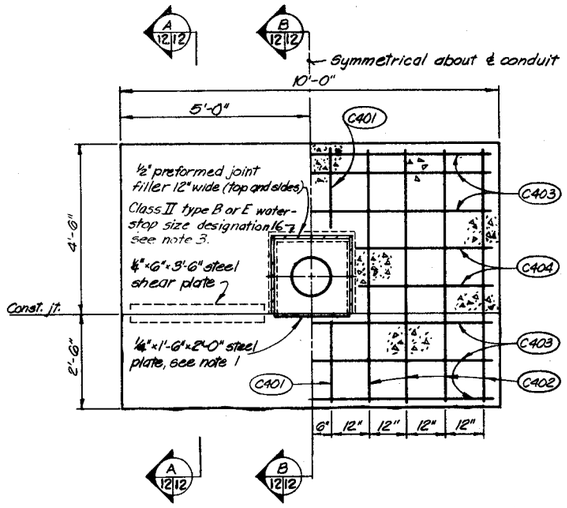
HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

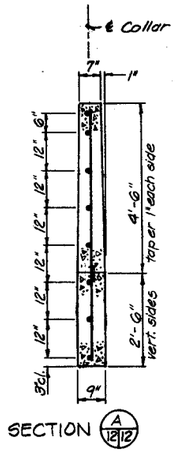
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

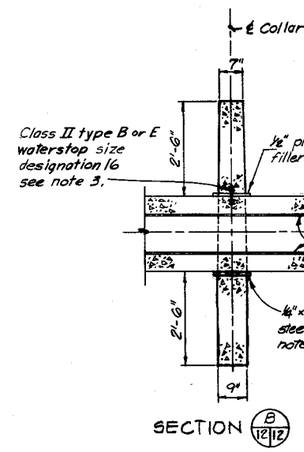
	Date		
Designed G.S.	8-79	Approved by	
Drawn L.J.C., D.K.B.	10-79	Title	
Traced		Title	
Checked G.S., E.D.A.	2-79	Sheet No. 11 of 41	Drawing No. 7-E-24039

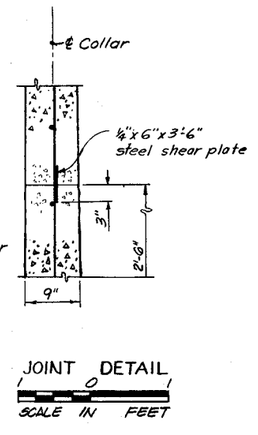
FORM SCS-313C



ELEVATION







JOINT DETAIL

SCALE IN FEET

ANTI-SEEP COLLAR DETAILS

2 1 0 2

SCALE IN FEET

STEEL SCHEDULE

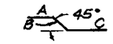
Location	Mark	Size	Quan	Length	Type	A	B	C	Total Length
ANTI SEEP COLLAR									
collar	C401	4	4	2'-0"	str.				8'-0"
"	C402	4	3	6'-6"	str.				52'-0"
"	C403	4	6	9'-6"	str.				57'-0"
"	C404	4	2	3'-6"	str.				7'-0"
ENCASED CONDUIT (12" DIA.)									
conduit barrel	C405	4	*	6'-6"	T1	3"	1'-6"	1'-6"	*
conduit bell	C406	4	2	11'-0"	T1	6"	2'-6"	2'-6"	22'-0"
" "	C501	5	8	3'-5"	SPB	8"	9"	2'-0"	27'-4"
conduit barrel	C502	5	8	*	Str.				*

*The quantity of C405 and length of C502 vary with the length of conduit section per table below.

			8' section			16' section		
Mark	Size	Type	Quan.	Length	Total Length	Quan.	Length	Total Length
C405	4	T1	8	6'-6"	52'-0"	16	6'-6"	110'-6"
C502	5	Str	8	7'-4"	58'-8"	8	15'-4"	122'-8"

QUANTITES		
Location	Material	
Anti-seep collar	Reinf. st'l.	580 lbs
	Concrete	11.4 cuyd.
Encased conduit	Reinf. st'l.	4007 lbs
	Concrete	37 cu.yd.

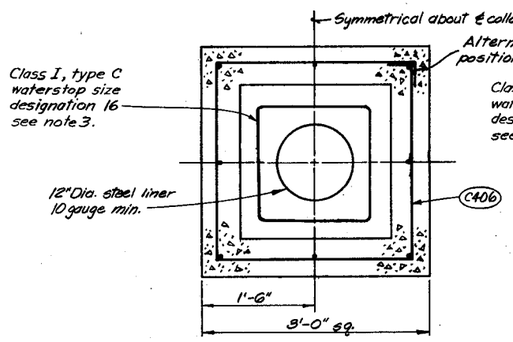
Str.



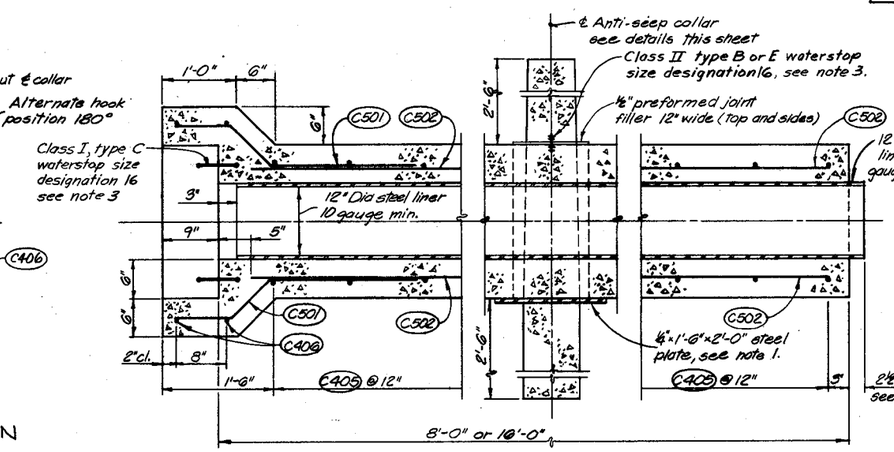
SPB

T1

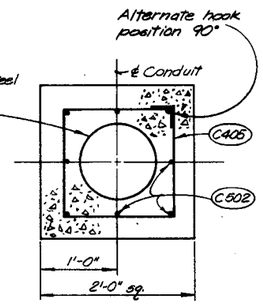
BAR TYPES



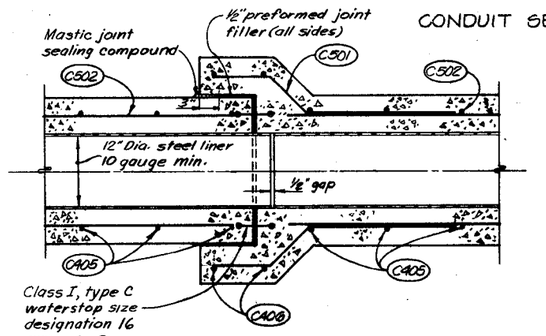
BELL END ELEVATION
(upstream end)



CONDUIT SECTIONAL ELEVATION



SPIGOT END ELEVATION
(downstream end)



JOINT ASSEMBLY DETAIL

ENCASED CONDUIT DETAILS

1 0 1

SCALE IN FEET

NOTES:

1. Where encased conduit is to be placed on collar bottom, ¼"×1'-6"×2'-0" steel plate shall be installed, as shown, with one layer heavy, smooth surface, asphalt treated, roofing felt. each side. Approx. weight to be 55 lbs per square.
2. Collar details shown are for earth foundation. For rock foundation, found bottom of cradle on rock line and key collar into rock 6" or as directed by the engineer.
3. Waterstop shall be installed per manufactures recomendations.
4. Steel liner shall extend 2½" beyond end of encasement on all conduit sections except those sections which connect to P.W.D. outlet structures where extension shall be 8".
5. All exposed edges of encased conduit shall be chamfered ¾". Exposed edges on anti-seep collar shall be finished in accordance with Structural Note 1, sheet 1.

Registered Professional Engineer (Civil) Certificate No. 9881 Edward Allain Adair Signed Arizona U.S.A. 6/5/79

Registered Professional Engineer (Civil) Certificate No. 10509 Ashok C. Patel Date Signed 5/31/79 Arizona, U.S.A.

ENCASED VEGETATIVE MAINTENANCE CONDUIT AND ANTI-SEEP COLLAR DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

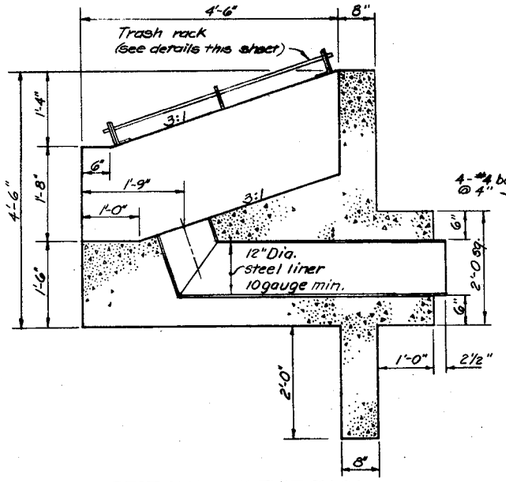
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

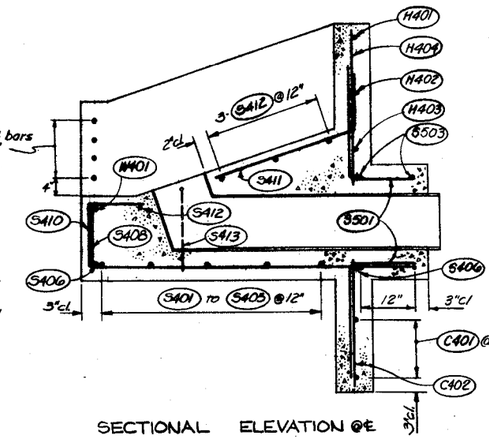
	Date		
Designed G.S.	2-79	Approved by	
Drawn L.J.C.	2-79	Title	
Traced		Title	
Checked G.S. E.A.A.	3-79	Sheet No. 12 of 41	Drawing No. 7-E-24039

FORM SCS-313C

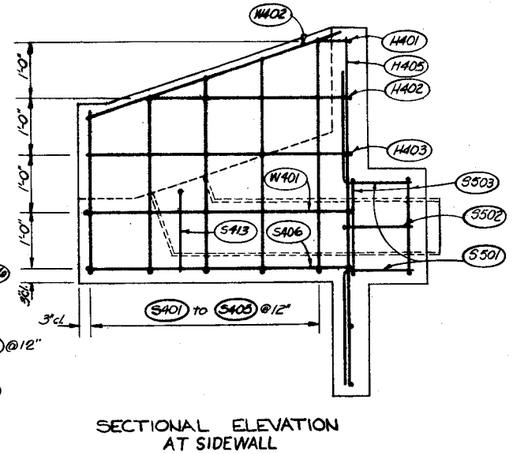
USDA-SCS-PORTLAND, OR 1979



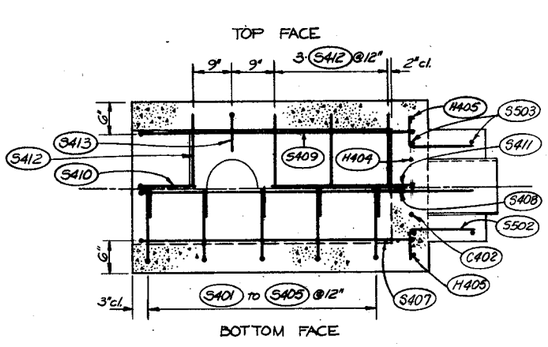
SECTIONAL ELEVATION ℄



SECTIONAL ELEVATION ℄

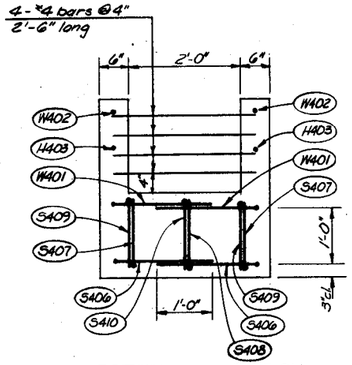


SECTIONAL ELEVATION AT SIDEWALL

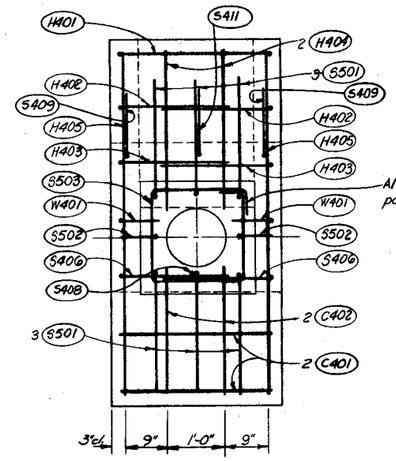


BOTTOM FACE

PLAN



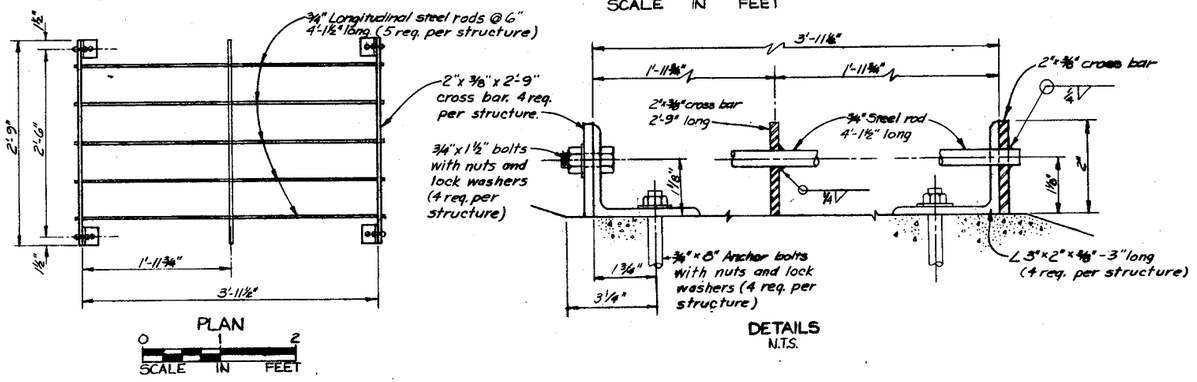
UPSTREAM ELEVATION



DOWNSTREAM ELEVATION

INLET STRUCTURE DETAILS

SCALE IN FEET



PLAN

SCALE IN FEET

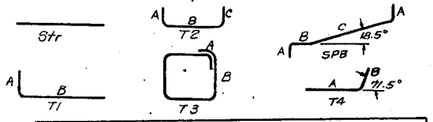
DETAILS
N.T.S.

TRASH RACK DETAILS

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
INLET STRUCTURE - UNIT I									
Bottom slab	S401	4	2	4'-6"	T1	1'-9"	2'-9"		9'-0"
" "	S402	4	2	4'-9"	T1	1'-9"	3'-0"		9'-6"
" "	S403	4	2	5'-1"	T1	1'-9"	3'-4"		10'-2"
" "	S404	4	2	5'-5"	T1	1'-9"	3'-8"		11'-0"
" "	S405	4	2	5'-9"	T1	1'-9"	4'-0"		11'-6"
" "	S406	4	2	8'-0"	T2	1'-9"	4'-6"	1'-9"	16'-0"
" "	S407	4	2	5'-9"	T1	1'-0"	4'-9"	-	11'-6"
" "	S408	4	1	6'-9"	T1	1'-0"	5'-9"		6'-9"
" "	S409	4	2	6'-9"	SPB	1'-0"	9"	4'-0"	13'-6"
Top slab	S410	4	1	1'-9"	T1	1'-0"	9"		1'-9"
" "	S411	4	1	3'-6"	T4	2'-6"	1'-0"		3'-6"
" "	S412	4	4	2'-6"	Str.				10'-0"
" "	S413	4	2	1'-8"	T1	8"	1'-0"		3'-4"
Headwall	H401	4	1	3'-6"	T2	6"	2'-6"	6"	3'-6"
"	H402	4	2	5'-3"	T1	1'-9"	3'-6"		10'-6"
"	H403	4	2	6'-3"	T2	1'-9"	4'-6"		12'-6"
"	H404	4	2	2'-9"	Str.				5'-6"
"	H405	4	2	6'-0"	Str.				12'-0"
Cutoff wall	C401	4	2	2'-6"	Str.				5'-0"
" "	C402	4	2	2'-3"	Str.				4'-6"
Sidewall	W401	4	2	6'-11"	T2	1'-9"	4'-6"	8"	13'-10"
"	W402	4	2	4'-6"	Str.				9'-0"
Spigot	S501	5	6	3'-2"	T1	1'-2"	2'-0"		19'-0"
"	S502	5	2	1'-8"	T1	1'-2"	6"		3'-4"
"	S503	5	2	7'-0"	T3	6"	1'-6"	1'-6"	14'-0"

Note: Steel listed is for one structure. Two structures required, Sta 105+10 and Sta 124+10.



QUANTITIES			
Material	Per unit	No unit	total
Reinforcement steel	167 lbs.	2	334 lbs.
Concrete class 4000	1.69 C.Y.	2	3.38 C.Y.

NOTES:

1. See sheet 11 for structure location and position.
2. Material for trash rack in addition to that shown on Trash Rack Details consists of 4 - #4 bars - 2'-6" long placed as shown on Upstream Elevation.

INLET STRUCTURE UNIT I AND TRASH RACK DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

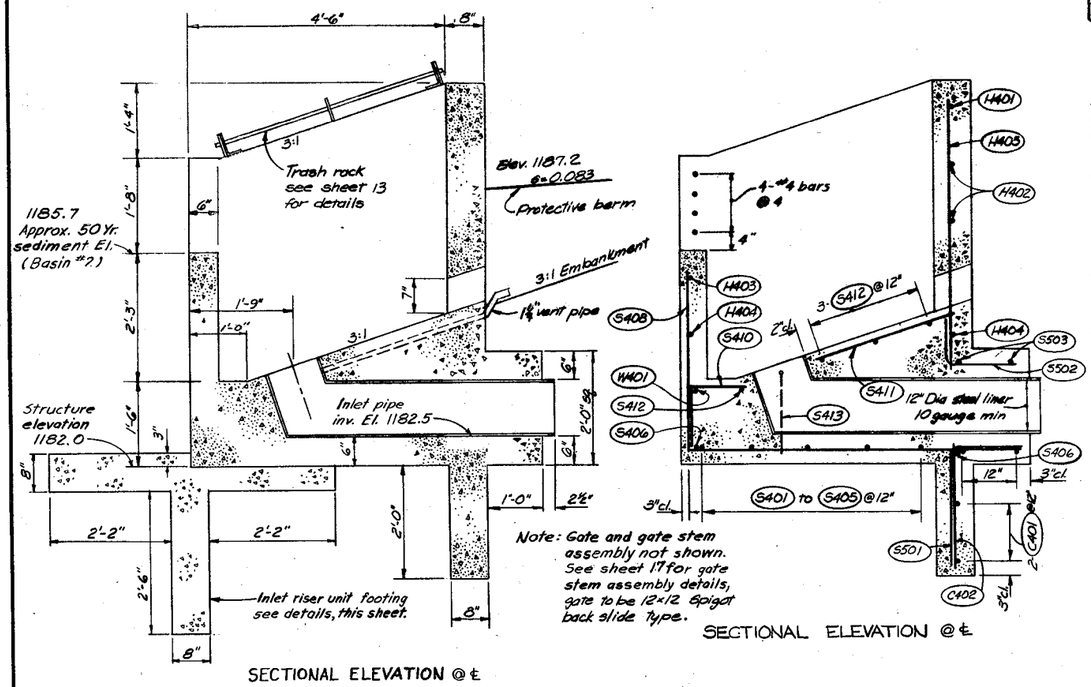
MARICOPA COUNTY, ARIZONA

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed G.S.	6-78	Approved by	
Drawn L.V.C., D.B.	7-78	Title	
Traced		Title	
Checked G.S.	10-78	Sheet No 13 of 41	Drawing No. 7-E-24039

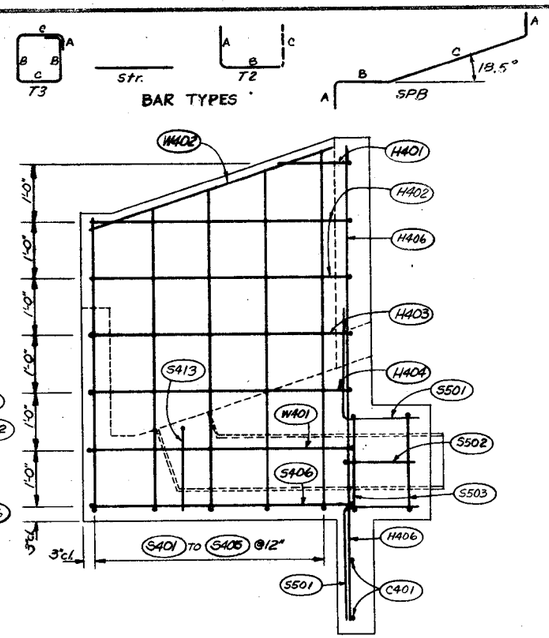
SCS-ENG-313C (REV. 6-78)

USDA-SCS-PORTLAND, OR. 1979



SECTIONAL ELEVATION @ ℄

SECTIONAL ELEVATION @ ℄

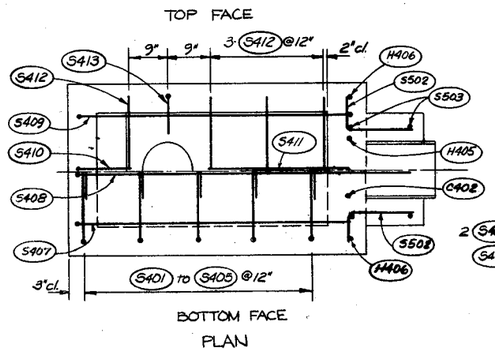


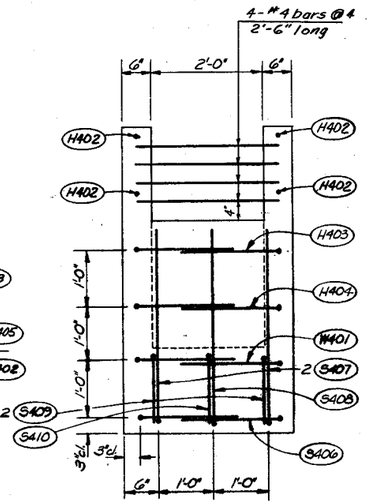
SECTIONAL ELEVATION AT SIDEWALL

QUANTITIES		
Material	Riser	Footing
Reinf. Stl.	214 lbs.	141 lbs.
Concrete	2.2 cuyd.	1.1 cuyd.

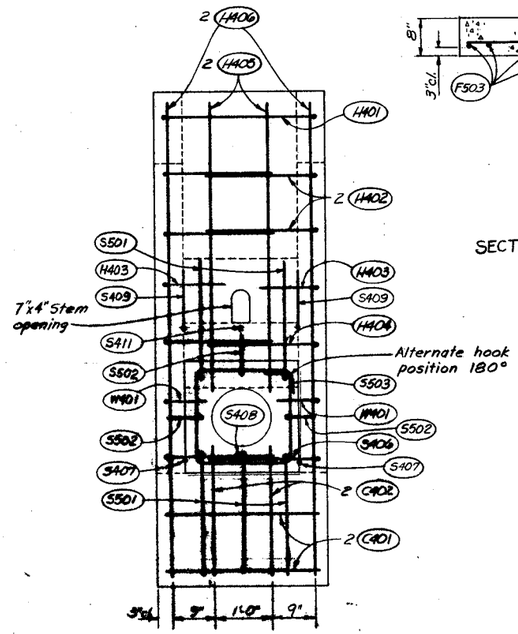
STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
INLET RISER - UNIT II (1 REQUIRED)									
Bottom slab	S401	4	2	6'-9"	T2	1'-9"	5'-0"		13'-6"
" "	S402	4	2	7'-0"	T2	1'-9"	5'-3"		14'-0"
" "	S403	4	2	7'-4"	T2	1'-9"	5'-7"		14'-8"
" "	S404	4	2	7'-8"	T2	1'-9"	5'-11"		15'-4"
" "	S405	4	2	8'-0"	T2	1'-9"	6'-3"		16'-0"
" "	S406	4	2	8'-1"	T2	1'-9"	4'-7"	1'-9"	16'-2"
" "	S407	4	2	7'-11"	T2	3'-4"	4'-7"		15'-10"
" "	S408	4	1	8'-11"	T2	3'-4"	5'-7"		8'-11"
" "	S409	4	2	6'-10"	SPB	1'-0"	9"	4'-1"	13'-8"
Top slab	S410	4	1	1'-9"	T2	1'-0"	9"		1'-9"
" "	S411	4	1	2'-9"	Str.				2'-9"
" "	S412	4	4	2'-6"	Str.				10'-0"
" "	S413	4	2	1'-10"	T2	6"	1'-9"		3'-8"
Headwall	H401	4	1	5'-0"	T2	1'-3"	2'-6"	1'-3"	5'-0"
"	H402	4	4	6'-4"	T2	4'-7"	1'-9"		25'-4"
"	H408	4	2	7'-4"	T2	1'-9"	4'-7"	1'-0"	14'-8"
"	H404	4	2	8'-1"	T2	1'-9"	4'-7"	1'-9"	16'-2"
"	H405	4	2	5'-0"	Str.				10'-0"
"	H406	4	2	8'-4"	Str.				16'-8"
Sidewall	W401	4	2	7'-1"	T2	1'-9"	4'-7"	9"	14'-2"
"	W402	4	2	4'-6"	Str.				9'-0"
Cutoff wall	C401	4	2	2'-6"	Str.				5'-0"
" "	C402	4	2	2'-0"	Str.				4'-0"
Spigot	S501	5	5	3'-2"	T2	1'-2"	2'-0"		15'-10"
"	S502	5	3	1'-8	T2	1'-2"	6"		5'-0"
"	S503	5	2	7'-0"	T3	6"	1'-6"	1'-6"	14'-0"
RISER UNIT FOOTING (2 Required) Steel listed is for 2 Ftgs.									
Footing	F501	5	18	4'-9"	T2	2'-3"	2'-6"		85'-6"
"	F502	5	18	3'-0"	Str.				54'-0"
"	F503	5	20	6'-6"	Str.				130'-0"

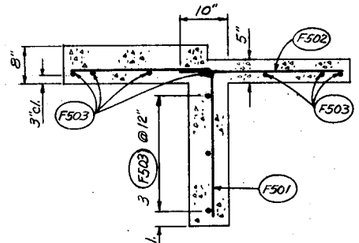




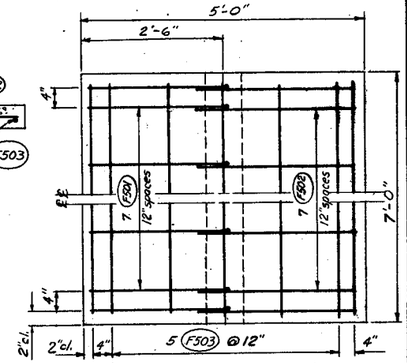
UPSTREAM ELEVATION



DOWNSTREAM ELEVATION



SECTIONAL ELEVATION



PLAN

INLET RISER UNIT FOOTING

INLET STRUCTURE DETAILS

SCALE IN FEET

USDA-SCS PORTLAND, OR. 1979

INLET RISER UNIT II STRUCTURAL DETAILS
STA. 256+00

SADDLEBACK F.R.S.

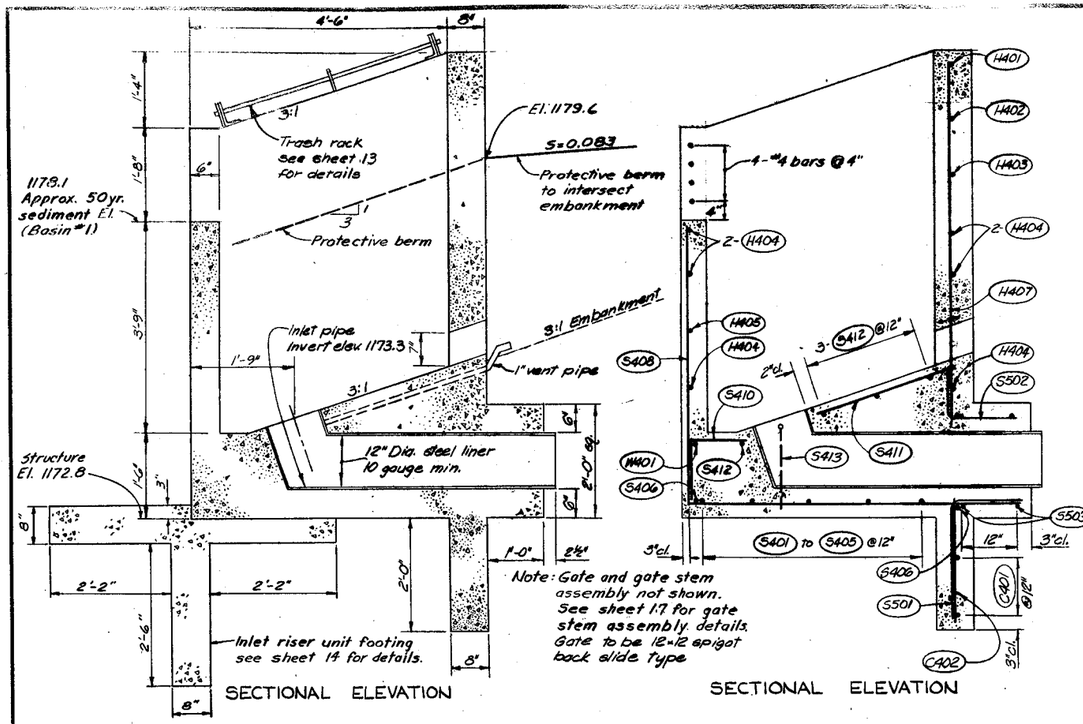
HARQUAHALA VALLEY W.P.P.

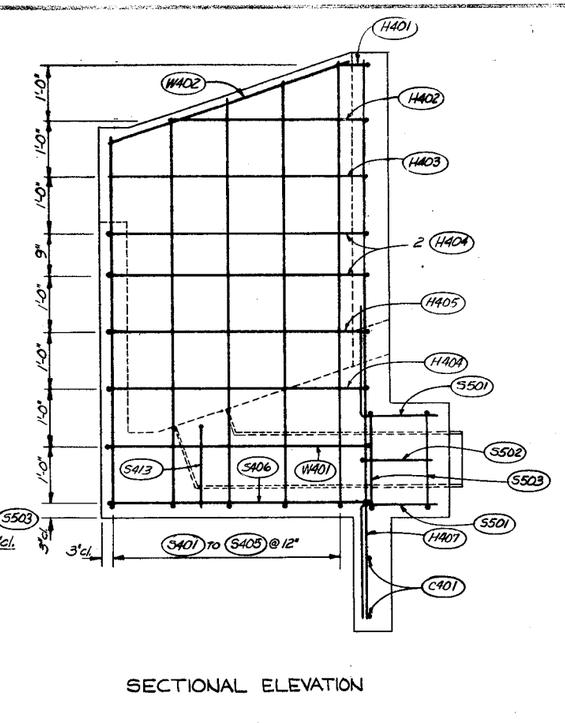
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed G.S.	6-78	Approved by
Drawn L.V.C.	7-78	Title
Traced		Title
Checked G.S.	10-78	Sheet No. 14 of 41
		Drawing No. 7-E-24039

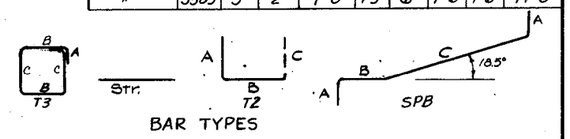
SCS-ENG-813C (REV. 6-75)



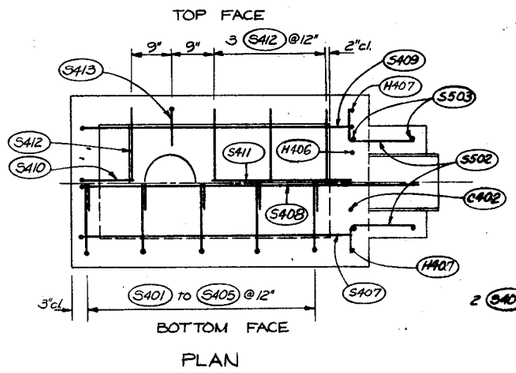


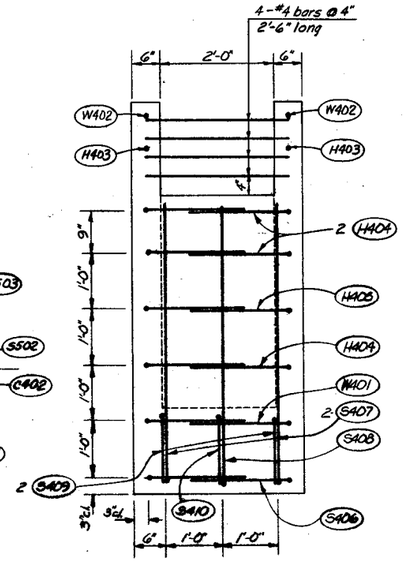
STEEL SCHEDULE

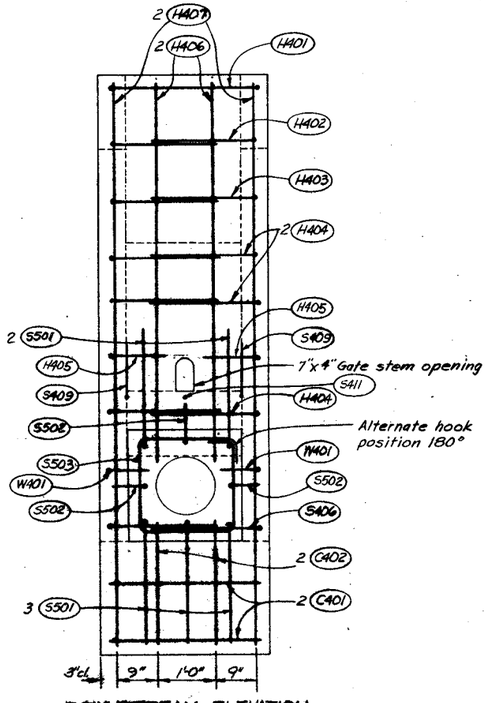
Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
INLET RISER UNIT II									
Bottom slab	S401	4	2	8'-3"	T2	1'-9"	6'-6"		16'-6"
" "	S402	4	2	8'-6"	T2	1'-9"	6'-9"		17'-0"
" "	S403	4	2	8'-9"	T2	1'-9"	7'-0"		17'-6"
" "	S404	4	2	9'-0"	T2	1'-9"	7'-3"		18'-0"
" "	S405	4	2	9'-3"	T2	1'-9"	7'-6"		18'-6"
" "	S406	4	2	5'-7"	T2	1'-9"	4'-7"	1'-9"	11'-2"
" "	S407	4	2	9'-4"	T2	4'-9"	4'-7"		18'-8"
" "	S408	4	1	10'-5"	T2	4'-9"	5'-8"		10'-5"
" "	S409	4	2	6'-6"	SPB	1'-0"	9"	4'-9"	13'-0"
" "	S410	4	1	1'-9"	T2	1'-0"	9"		1'-9"
Top slab	S411	4	1	2'-6"	Str.				2'-6"
" "	S412	4	4	2'-6"	Str.				10'-0"
" "	S413	4	2	1'-9"	T2	6"	1'-3"		3'-6"
Headwall	H401	4	1	3'-6"	T2	6"	2'-6"	6"	3'-6"
"	H402	4	2	5'-0"	T2	3'-6"	1'-9"		10'-0"
"	H403	4	2	6'-4"	T2	4'-7"	1'-9"		12'-8"
"	H404	4	6	8'-1"	T2	1'-9"	4'-7"	1'-9"	46'-6"
"	H405	4	2	7'-4"	T2	1'-9"	4'-7"	1'-8"	14'-8"
"	H406	4	2	6'-9"	Str.				13'-6"
"	H407	4	2	9'-10"	Str.				19'-8"
Sidewall	W401	4	2	7'-1"	T2	1'-9"	4'-7"	9"	14'-2"
"	W402	4	2	4'-6"	Str.				9'-0"
Cutoff wall	C401	4	2	2'-6"	Str.				5'-0"
" "	C402	4	2	2'-3"	Str.				4'-6"
Spigot	S501	5	5	3'-2"	T2	1'-2"	2'-0"		15'-10"
"	S502	5	3	1'-8"	T2	1'-2"	6"		5'-0"
"	S503	5	2	7'-0"	T3	6"	1'-6"	1'-6"	14'-0"



BAR TYPES







INLET STRUCTURE DETAILS

SCALE 0 1 2 3 FEET

QUANTITIES		
Material	Riser	Footing
Reinf. st'l.	253 lbs.	139 lbs.
Concrete	2.6 cu.yd.	1.1 cu.yd.

NOTES:
1. Footing details and steel schedule are shown on sheet 14

INLET RISER UNIT III STRUCTURAL DETAILS
STA. 60+50

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
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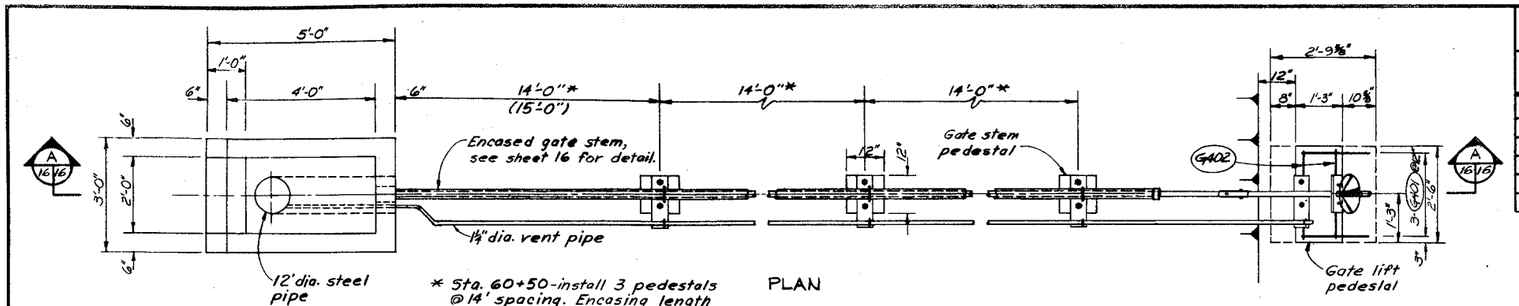
Drawn L.V.C.	7-78	Title	
Traced		Title	
Checked G.S.	10-78	Sheet No. 17 of 41	Drawing No. 7-E-24039

SCS-ENG-313C (REV. 6-75)

USDA SCS PORTLAND, OR 1979



PLAN

* Sta. 60+50 - install 3 pedestals @ 14' spacing. Encasing length approx. 58', stem length approx. 61.5'
Sta. 256+00 - install 1 pedistal @ 15' from inlet structure. Encasing length approx. 29', stem length approx. 32.5'

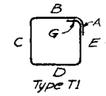
Exact lengths of stem and encasement to be determined in the field at the time of installation.

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	D	E	G	Total Length
Gate lift pedestal	G401	4	3	3'-0"	2	1'-0"	2'-0"					9'-0"
" " "	G402	4	4	1'-9"	Str.							7'-0"
Stem pedestal	P401	4	2	2'-6"	Str.							5'-0"
" "	P402	4	2	2'-3"	Str.							4'-6"
" "	P403	4	3	3'-6"	T1	0'-3"	0'-9"	0'-9"	0'-9"	0'-9"	0'-3"	10'-6"

Str.

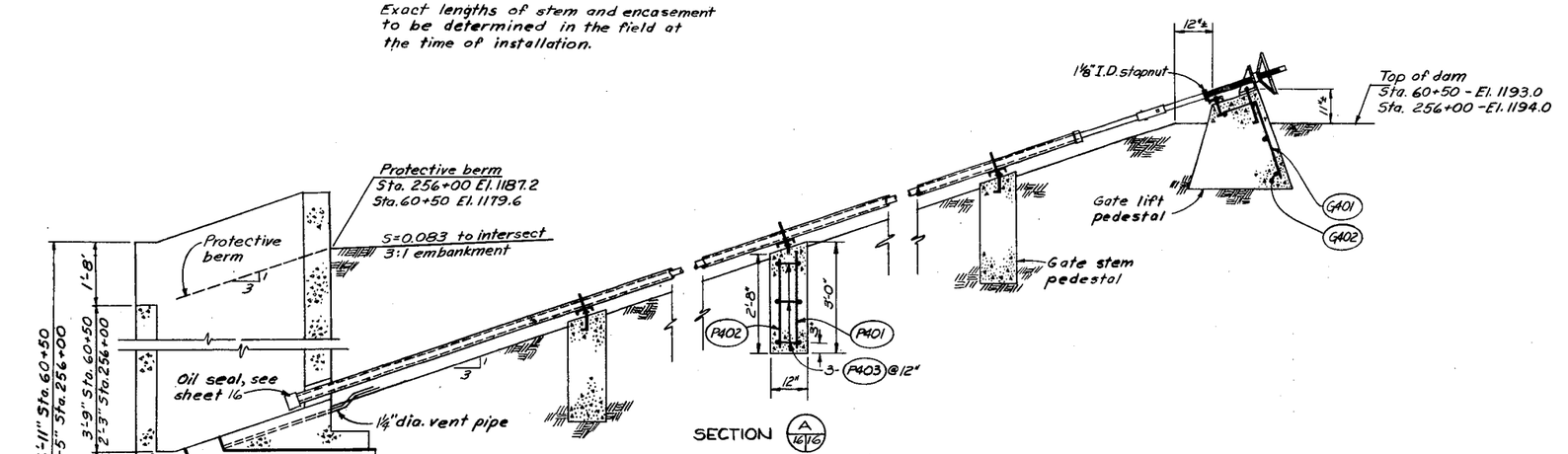
Type 2



Type T1

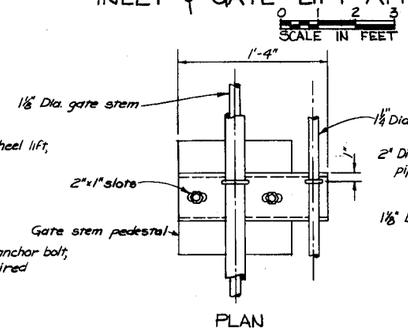
QUANTITES

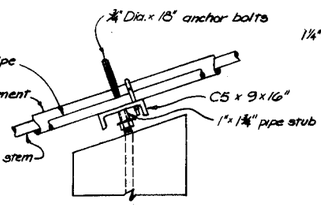
Location	Material	
Sta. 60+50	Reinf. Stl.	51 lbs.
	Concrete	.8 cu. yd.
Sta. 256+00	Reinf. Stl.	25 lbs.
	Concrete	.6 cu. yd.

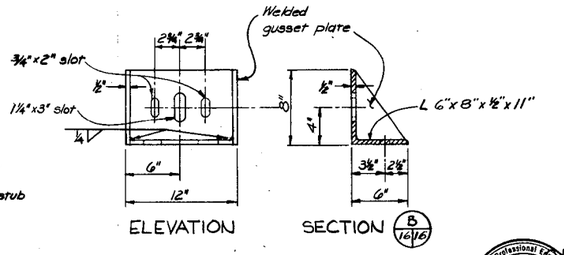


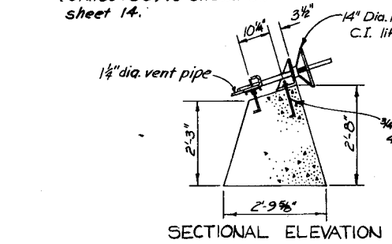
INLET & GATE LIFT APPURTENANCES

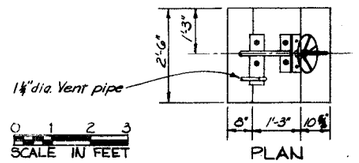
Note: 12" slide gate not shown, see sheet 16. Inlet riser unit I (Sta. 256+00) and riser footing are shown on sheet 13. Riser unit II (Sta. 60+50) is shown on sheet 14.



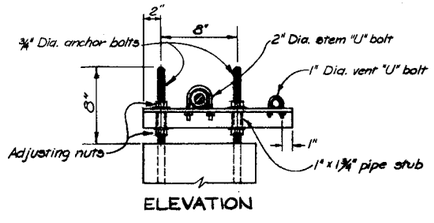




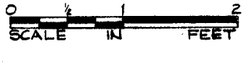


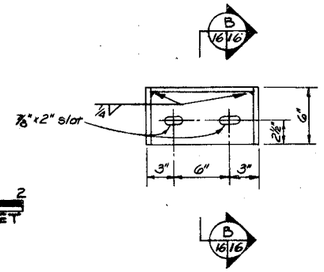


GATE LIFT PEDESTAL



GATE STEM GUIDE





HANDWHEEL BRACKET

GATE LIFT & APPURTENANCES DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

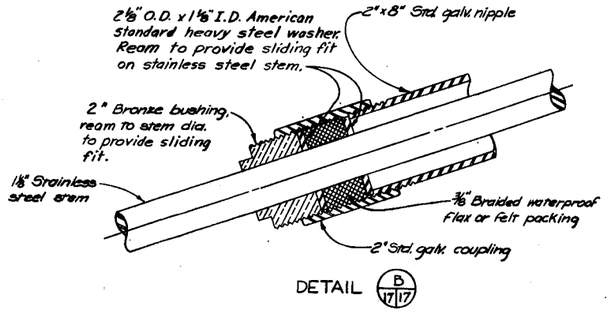
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

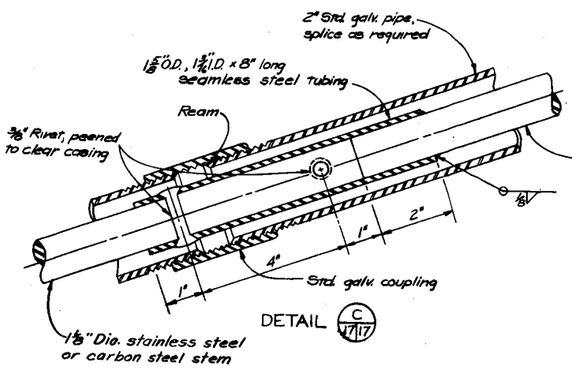
	Date		
Designed G.S.	6-78	Approved by	
Drawn J.A.M., L.V.C.	9-78	Title	
Traced		Title	
Checked G.S.	10-78	Sheet No 16 of 41	Drawing No. 7-E-24039

SCS-ENG-313C (REV. 6-75)

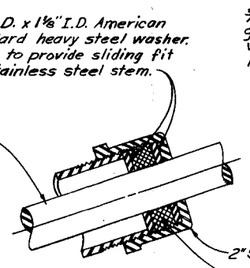
USDA-SCS-PORTLAND, OR. 1979



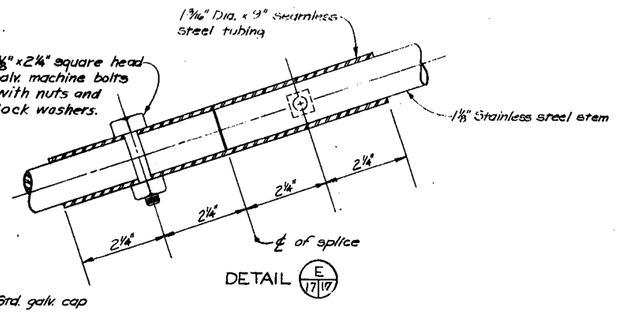
DETAIL (B 17|17)



DETAIL (C 17|17)



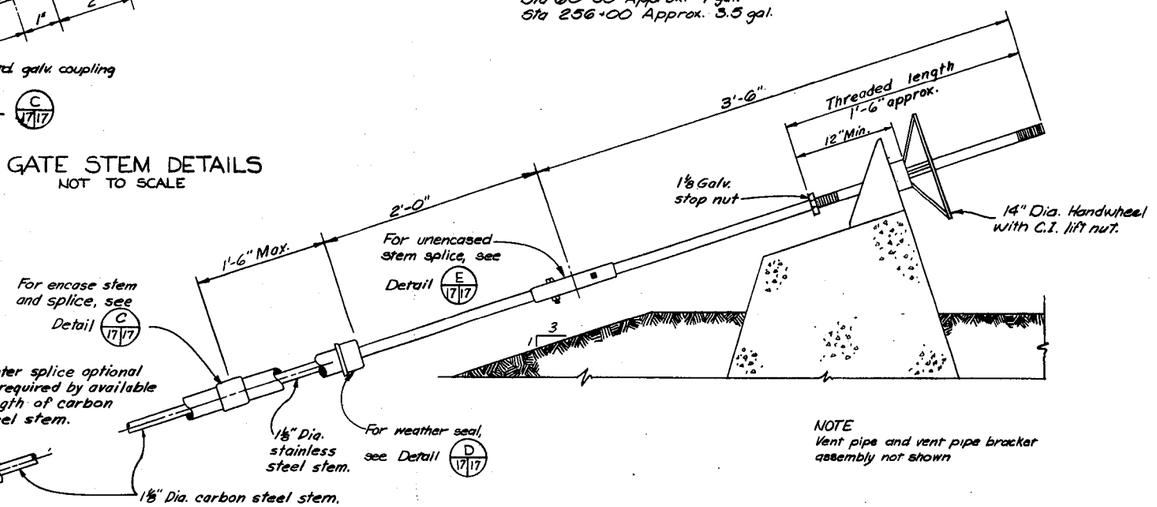
DETAIL (D 17|17)



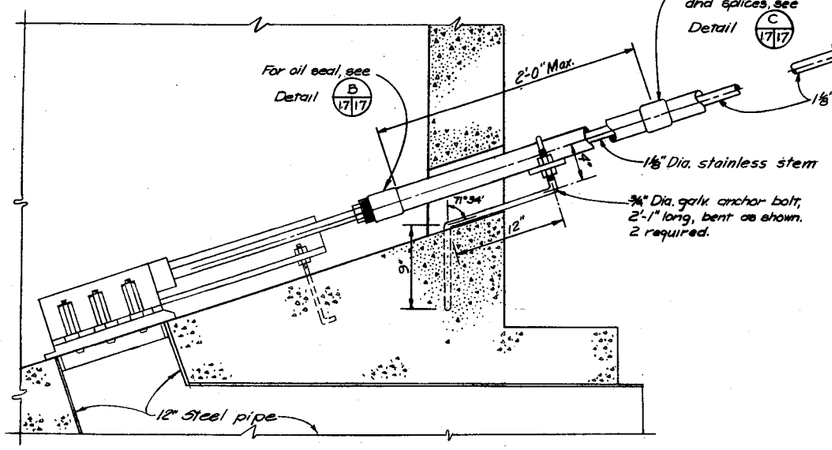
DETAIL (E 17|17)

Note: Encasement to be filled with SAE 20 motor oil.
Sta 60+50 Approx. 7 gal.
Sta 256+00 Approx. 3.5 gal.

GATE STEM DETAILS
NOT TO SCALE

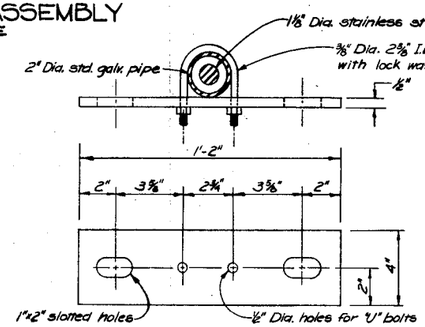


NOTE
Vent pipe and vent pipe bracket assembly not shown



NOTE: 12"x12" Spigot back slide gate and associated hardware to be in accordance with manufacture specifications.

GATE STEM ASSEMBLY
NOT TO SCALE



DETAIL (A 17|17)

SCALE 0 3 6 9 12 IN INCHES

NOTE
1. For gate stem installation location and position see sheet 16.

Registered Professional Engineer — Certificate No. 9460 — Edward Allen Lowe — Arizona U.S.A. — Signed 5/31/78

Registered Professional Engineer — Certificate No. 10518 — Ashok C. Patel — Arizona U.S.A. — Signed 5/31/78

GATE STEM ASSEMBLY DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed G.S.	6-78	Approved by	
Drawn JAM, L.C.	9-78	Title	
Traced		Title	
Checked G.S.	10-78	Sheet No 17 of 41	Drawing No. 7-E-24039

SCS-ENG-313C (REV. 6-78)

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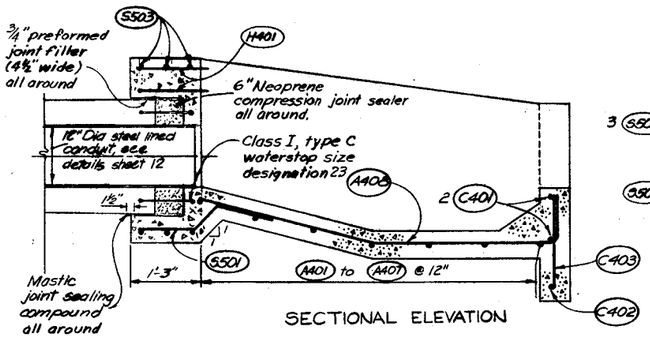
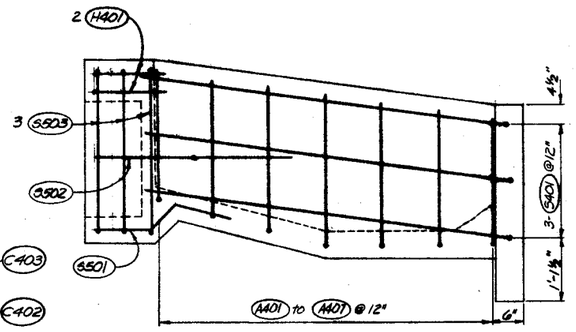
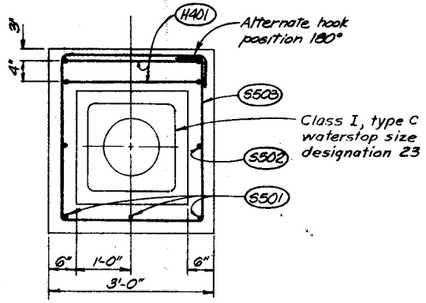


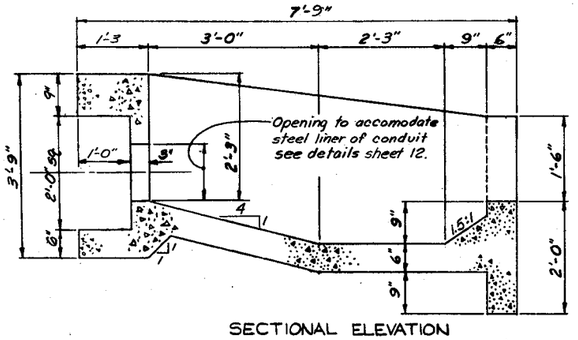
SECTIONAL ELEVATION



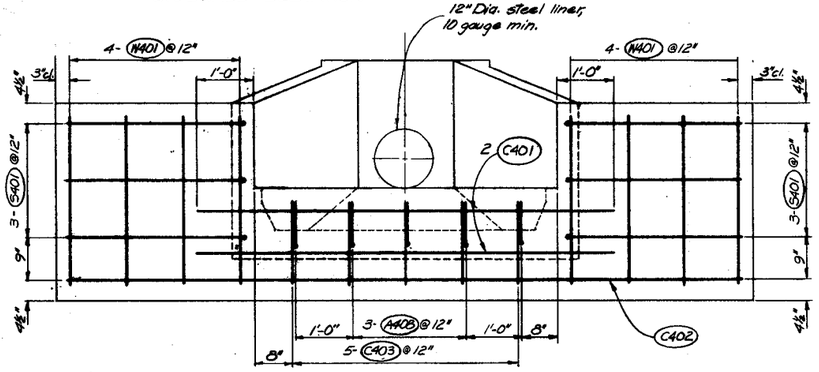
SIDEWALL ELEVATION



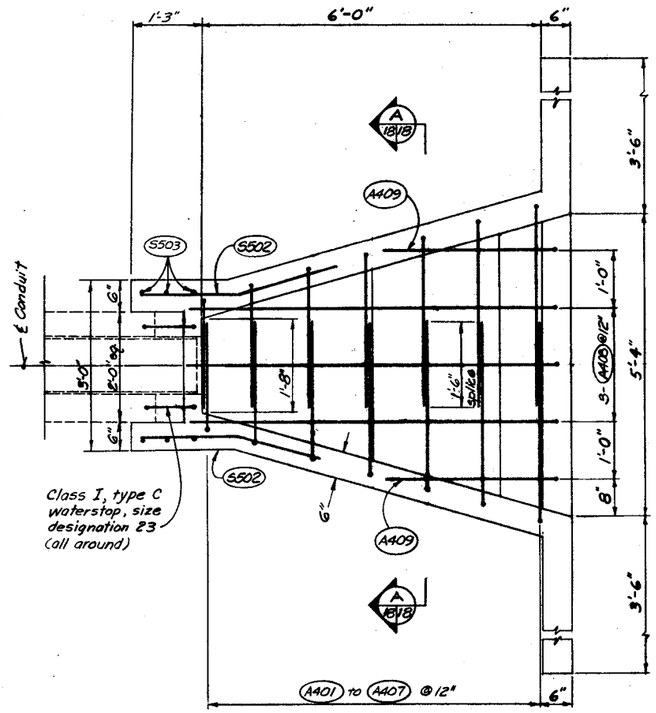
HEADWALL ELEVATION



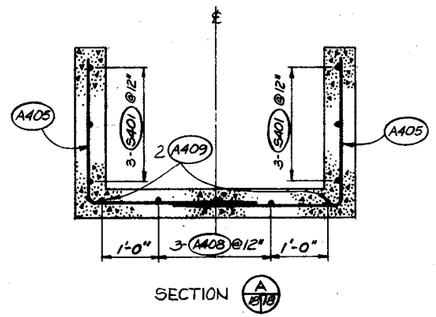
SECTIONAL ELEVATION



WINGWALL ELEVATION



PLAN

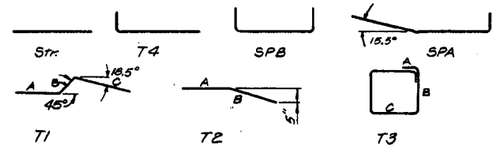


SECTION A 18/18

0 1 2 3
SCALE IN FEET

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
P.W.D. BASIN SIZE C									
Apron	A401	4	2	4'-3"	T1	2'-3"	2'-0"		8'-6"
"	A402	4	2	4'-9"	T4	2'-6"	2'-3"		9'-6"
"	A403	4	2	8'-0"	T4	2'-6"	2'-6"		10'-0"
"	A404	4	2	5'-6"	T4	2'-9"	2'-9"		11'-0"
"	A405	4	2	5'-6"	T4	2'-6"	3'-0"		11'-0"
"	A406	4	2	5'-9"	T4	2'-6"	3'-3"		11'-6"
"	A407	4	2	5'-9"	T4	2'-3"	3'-6"		11'-6"
"	A408	4	3	7'-0"	SPA	3'-0"	3'-3"	9"	21'-0"
"	A409	4	2	4'-0"	T4	3'-3"	9"		8'-0"
Headwall	H401	4	2	5'-0"	SPB	1'-3"	2'-6"	1'-3"	10'-0"
Sidewall	S401	4	6	9'-6"	SPB	3'-0"	6'-6"		57'-0"
Cutoff wall	C401	4	2	7'-3"	Str.				14'-6"
"	C402	4	1	12'-0"	Str.				12'-0"
"	C403	4	5	1'-6"	Str.				7'-6"
Wingwall	W401	4	8	3'-0"	Str.				24'-0"
Spigot	S501	5	3	2'-9"	T1	1'-0"	8"	1'-0"	8'-3"
"	S502	5	2	3'-6"	T2	1'-9"	1'-9"		7'-0"
"	S503	5	3	11'-0"	T3	6"	2'-6"	2'-6"	33'-0"



BAR TYPES

QUANTITIES

Material	Per unit	No unit	Total
Reinforcement steel	202 lbs.	4	808 lbs.
Concrete	2.08 cu.yd.	4	8.3 cu.yd.

NOTES:
1. See sheet 11 for outlet structure location, position and riprap placement.

Registered Professional Engineer — Certificate No. 9866 — Edmund Allan Jones — State of Arizona U.S.A. — Signed 5/3/78

Registered Professional Engineer — Certificate No. 10519 — Nasik C. Patel — State of Arizona U.S.A. — Signed 5/3/78

P.W.D. OUTLET BASIN SIZE C.

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

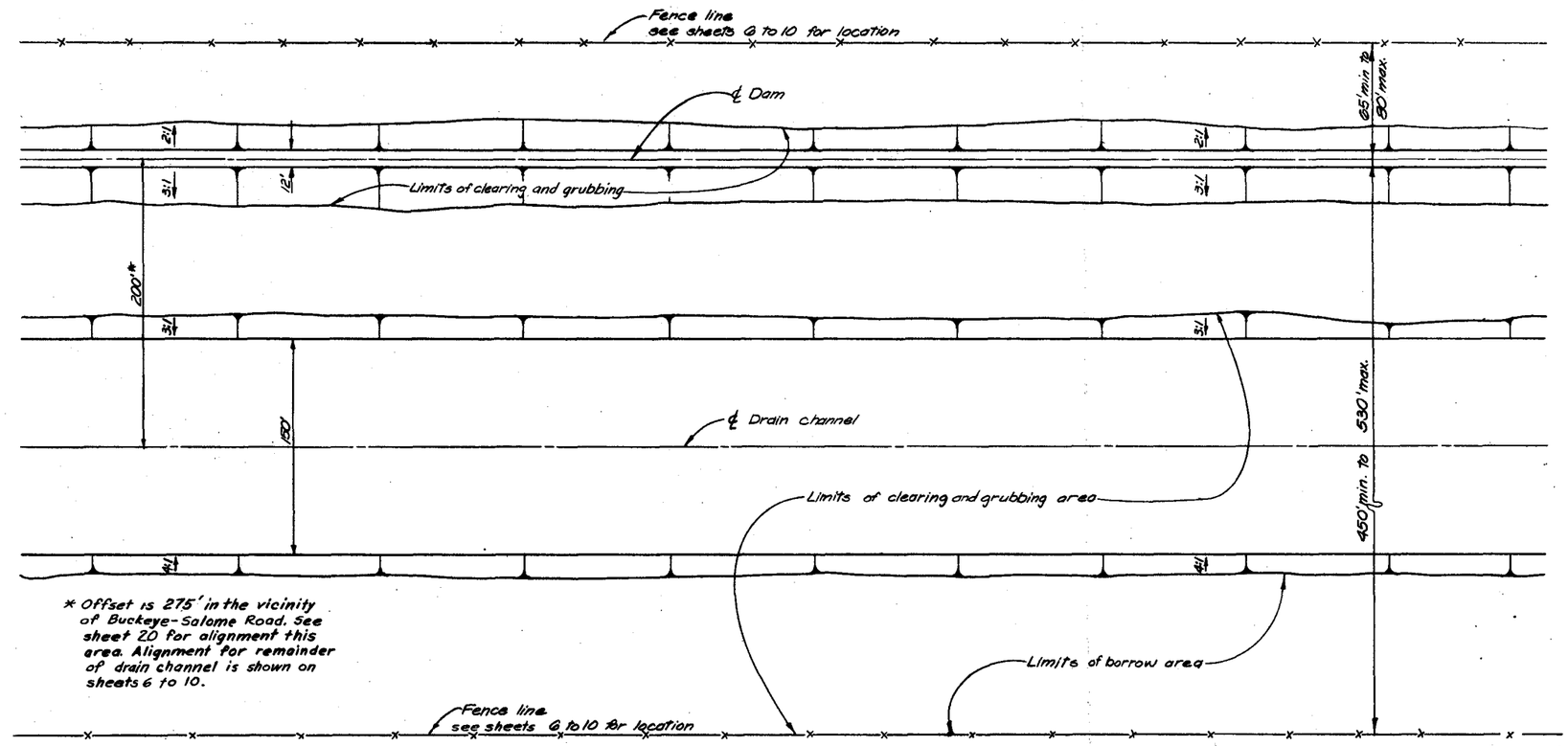
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed G.S.	6-78	Approved by	
Drawn L.N.C.	10-78	Title	
Traced		Title	
Checked G.S.	10-78	Sheet No 18 of 41	Drawing No. 7-E-24039

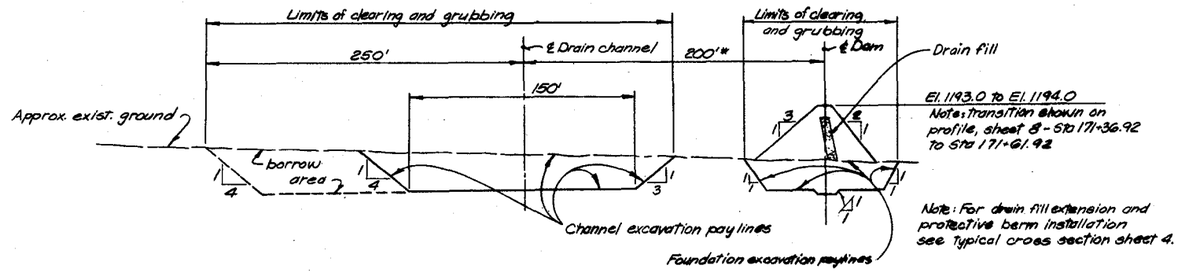
SCS-ENG-313C (REV. 6-75)

USDA-SCS-PORTLAND, OR. 1979



TYPICAL PLAN

SCALE IN FEET



TYPICAL SECTION
(N.T.S.)

TYPICAL PLAN AND SECTION
DRAIN CHANNEL

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed A.P.	7-78	Approved by	
Drawn L.V.C.	10-78	Title	
Traced		Title	
Checked A.P.	2-79	Sheet No 19 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR 1979

SCS-ENG-313C (REV. 6-78)

N913,500
E143,000

Elev. 1182.50 & Drain Channel (D.Ch.) 2 Flow
G = 0.00

Fence line, see details sheet 37

Limits of borrow area

Fence line see details sheet 37

1194
1192
1196
1198
1200
1184
1186
1182

450'
200'
150'
530'
60'
65'

12'
2:1
3:1
4:1

R/W

S 63°17'11"E

PC. Sta. 110+16.94 D.Ch.
Curve No 4

PT. Sta. 111+38.90 D.Ch.

Sta. 18+00 End ramp

Buckeye

Side slopes in this area, see note 1.

Fence line

Sta. 20+00
N 913,983.95
E 142,515.42

Sta 15+80.47 Buckeye-Salome Rds
Sta 113+42.58 D.Ch.
5-65"x40' CMPA
Skew = 27°36'00" (Rt. Fwd)
Length = 75'(37' Lt., 38' Rt.)
Inv. N&S = 1183.0
Miter South ends to conform to 2:1 slope. Install Std end section at North ends. Place grouted riprap on upstream & downstream slopes* (See typical section sheet 21

Maintenance access ramps Sta. 115+00

Access gates, see details sht 37

Relocated ARIZONA TELEPHONE CABLE (underground)

ARIZONA PUBLIC SERVICE POWER

Relocated power pole and conductors (see notes 2 & 4)

PC Sta. 116+31.95 D.Ch.
Curve No. 5

Fence line see details sheet 37

AT&T Underground

Relocated cable (see notes 2 & 4)

PT Sta. 117+14.04 D.Ch.

PT. 5 Sta. 117+14.04 D.Ch.
N 914,570.93
E 142,081.35

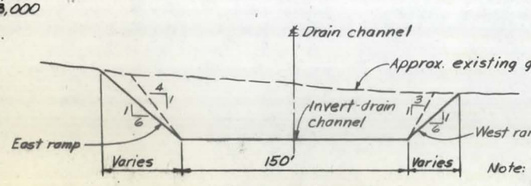
Limits of borrow area

Fence line see details sheet 37.

Drain Channel (D.Ch.)
Curve No. 5
Δ = 36°21'25"
D = 22°55'06"
R = 250.00'
T = 82.09'
L = 158.64'

*CMPA to be of 12 gage with galvanized inside and out and bituminous coated outside only.

N915,000
E143,000



TYPICAL SECTION
MAINTENANCE ACCESS RAMPS
Sta. 112+00 D.Ch. & Sta. 115+00 D.Ch.

Note: Sides of access ramps to be tied to channel bank with 20' wide transition.

Elev. 1182.50 & Drain Channel (D.Ch.) 2 Flow

Fence line, see details sheet 37

Section Line

R/W

MCHD R/W

483rd Ave. ROAD A

℄ Dam

Top of dam elev. 1194.0

N 29°50'05"W

AP8 Sta. 201+23.14
N 914,020.97
E 141,814.79

PI 4 Sta. 110+79.16 (D.Ch.)
N 913,933.65
E 142,091.17

Sta. 113+03.58
Inv. Elev. 1182.5

275' Grouted riprap

Drain Channel (D.Ch.)
Curve No 4
Δ = 27°57'06"
D = 22°55'06"
R = 250.00'
T = 62.22'
L = 121.96'

Sta 12+10.17 Buckeye - Salome Rd. Bk. Tan. =
Sta 204+41.21 Dam

Side slopes, this area see note 1.

PC Sta 10+08.68

Sta. 7+00
Begin ramp

Project identification sign see details, sheet 38.

R/W

S 82°24'48"E

Existing road

Section line

Transition to existing county road (by others)

MCHD R/W (65')

Section Line

Overhead power line (69 Kv. used as 12.5 kv. (A.P.S.)

ARIZONA TEL. CABLE (underground)

Gas (abandoned) (A.P.S.)

Underground AT&T

tel. junction box

P.I.1 Sta. 11+22.68
N 914,379.24
E 141,729.94

Curve No. 1 (Buckeye-Salome)
Δ = 26°07'33"
D = 11°27'33"
R = 500.00'
T = 116.02'
L = 228.00

AP9 Sta. 207+05.14
N 914,602.90
E 141,805.82

Underground (AT&T)

APS gas - abandoned in place (see notes 2 & 4)

Fence line, see details sheet 37.

℄ Drain channel (D.Ch.)

N 37°14'24"W

℄ Dam

Top of dam elevation = 1194.0

483rd Avenue north of Buckeye-Salome Rd. shall be abandoned within right-of-way limits of Maricopa County Flood Control District.

AP8 STA. 201+23.14
N 914,020.97
E 141,814.79

N 11°58'55"W - 399.45'

N913,500
E140,300

21 | 20 | 16 | 17 SE cor. Sec. 17- T2N, R8W

N 21°08'56"E - 204.99'

AP9 STA. 207+05.14
N 914,602.90
E 141,805.82

SECTION CORNER TIE
N.T.S.

Shaded area represents limit of road work.

NOTES:

1. Side slopes along Buckeye-Salome Road, east of drain channel and west of 483rd. Ave. shall be warped as necessary to tie to existing bank so as to provide drainage as indicated on plan.
2. All overhead and underground utility relocations have been accomplished by the respective utility companies
3. Centerline stationing on channel and Buckeye-Salome Road are approximate. Field verification of the intersection shall be made prior to construction.
4. See sheet 41 for utility location information.

Date	Revision	By
6-80	Rev. road alignment	L.C.

SCALE 1" = 100 FEET

PLAN - BUCKEYE SALOME ROAD CROSSING

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

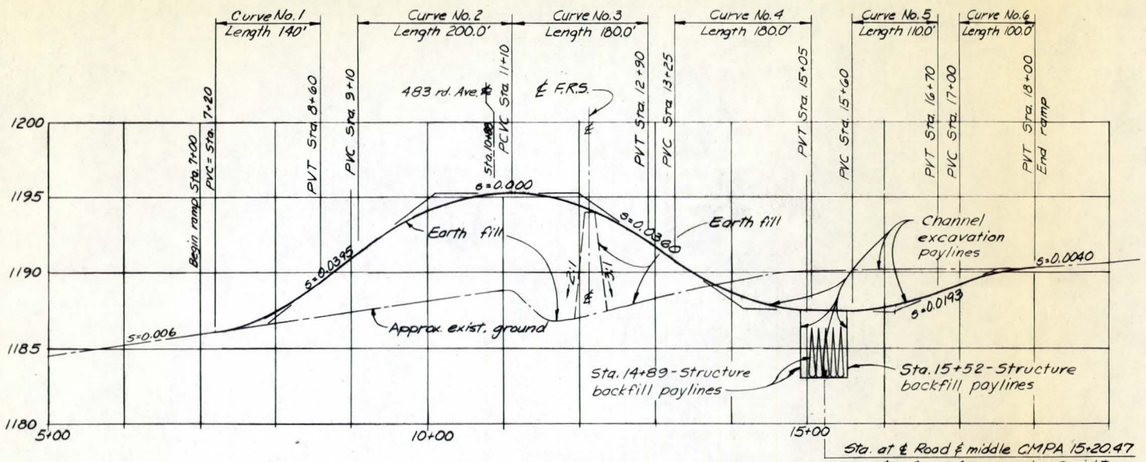
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed	A.P., W.K.	6-78	Approved by
Drawn	S.A.M., L.J.C.	9-78	Title
Traced			Title
Checked	E.A.A.	10-78	Sheet No. 20 of 41

Drawing No. 7-E-24039

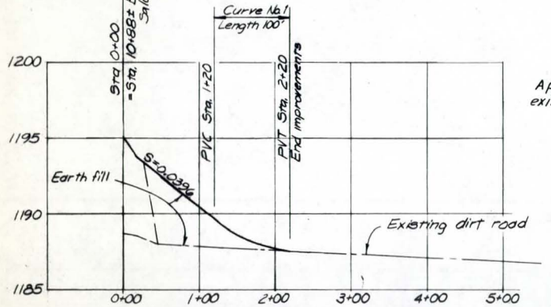
SCS-ENG-511C (REV. 6-78)



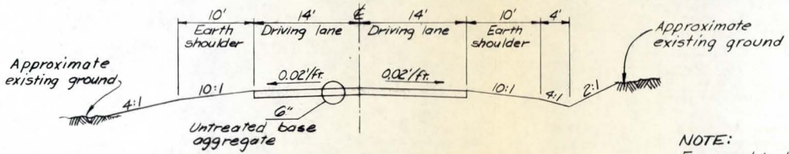
PROFILE ON ℄ BUCKEYE-SALOME ROAD

ROADWAY GRADE TABULATIONS
BUCKEYE-SALOME RD.

Station	Edge Lt. Shldr.	Left E	℄ Elev.	Right E	Edge Rt. Shldr.	Remarks	Station	Edge Lt. Shldr.	Left E	℄ Elev.	Right E	Edge Rt. Shldr.	Remarks
7+00	84.72	85.72	86.00	85.72	84.72		12+36.68	94.26	94.47	93.64	92.81	91.81	P.T.
7+20	84.85	85.85	86.13	85.85	84.85		12+50	93.77	94.01	93.28	92.55	91.55	
7+50	85.14	86.14	86.42	86.14	85.14		12+75	92.77	93.07	92.52	91.97	90.97	
7+75	85.54	86.54	86.82	86.54	85.54		12+90	92.10	92.44	92.00	91.56	90.56	
7+90	85.85	86.85	87.13	86.85	85.85		13+00	91.78	92.01	91.64	91.27	90.27	
8+06.70	86.27	87.27	87.55	87.27	86.27	NORMAL CROWN	13+12.66	90.86	91.46	91.18	90.90	89.90	CROWN OUT
8+25	86.97	87.90	88.08	87.76	86.76		13+25	90.60	91.02	90.74	90.46	89.64	
8+56.70	88.39	89.19	89.19	88.91	87.91	REMOVE REVERSE CROWN	13+50	89.93	90.18	89.90	89.62	88.97	
8+60	88.54	89.33	89.32	89.04	88.04		13+75	89.39	89.47	89.19	88.91	88.43	
8+75	90.23	90.98	89.91	89.63	88.63		14+00	88.98	88.88	88.60	88.32	88.02	
9+00	90.36	91.05	90.89	90.61	89.61		14+15	88.79	88.59	88.31	88.08	87.83	
9+10	90.82	91.48	91.28	91.00	90.00		14+25	88.62	88.42	88.14	87.86	87.66	
9+25	91.49	92.11	91.86	91.58	90.58		14+50	88.28	88.08	87.80	87.52	87.32	
9+32.70	91.81	92.41	92.13	91.85	90.85	CROWN OUT	14+75	88.07	87.87	87.59	87.31	87.11	
9+50	92.59	93.10	92.70	92.30	91.30		15+00	87.98	87.78	87.50	87.22	87.02	
9+75	93.63	94.01	93.43	92.85	91.85		15+05	87.98	87.78	87.50	87.22	87.02	
10+00	94.55	94.80	94.04	93.28	92.28		15+60	87.98	87.78	87.50	87.22	87.02	
10+08.68	94.83	95.04	94.22	93.40	92.40	P.C.	15+75	88.00	87.80	87.52	87.24	87.04	
10+10	94.87	95.08	94.25	93.42	92.42		16+00	88.12	87.92	87.64	87.36	87.16	
10+25	95.26	95.47	94.53	93.59	92.59		16+15	88.24	88.04	87.76	87.48	87.28	Crown out
10+50	95.79	95.99	94.88	93.77	92.77		16+25	88.20	88.11	87.87	87.59	87.32	
10+75	96.21	96.41	95.12	93.83	92.83		16+50	88.18	88.36	88.21	87.93	87.48	
10+84.68	96.34	96.54	95.17	93.80	92.80	FULL SUPER	16+70	88.24	88.64	88.56	88.28	87.68	
10+88	96.35	96.55	95.18	93.81	92.81		16+91.67	88.34	88.90	88.90	88.70	87.94	Remove adv. horse crown
11+00	96.40	96.60	95.23	93.86	92.86		17+00	88.36	89.09	89.14	88.86	88.04	
11+10	96.41	96.61	95.24	93.87	92.87		17+25	88.38	89.38	89.57	89.29	88.39	
11+25	96.39	96.59	95.22	93.85	92.85		17+41.67	88.53	89.53	89.81	89.53	88.53	Normal crown
11+50	96.25	96.45	95.08	93.71	92.71		17+50	88.63	89.63	89.91	89.63	88.63	
11+60.68	96.15	96.35	94.98	93.61	92.61	FULL SUPER	17+75	88.87	89.87	90.15	89.87	88.87	
11+75	95.89	96.09	94.82	93.55	92.55		18+00	89.02	90.02	90.30	90.02	89.02	
12+00	95.32	95.52	94.43	93.34	92.34								
12+25	94.62	94.83	93.92	93.01	92.01								

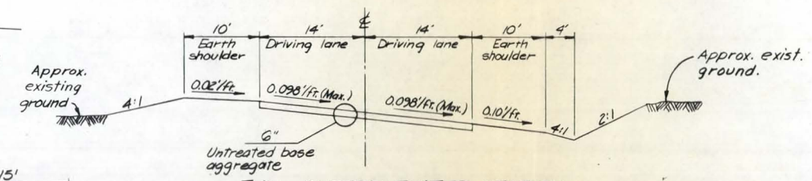


PROFILE ON ℄ ROAD "A"



NORMAL ROADWAY SECTION
BUCKEYE-SALOME ROAD

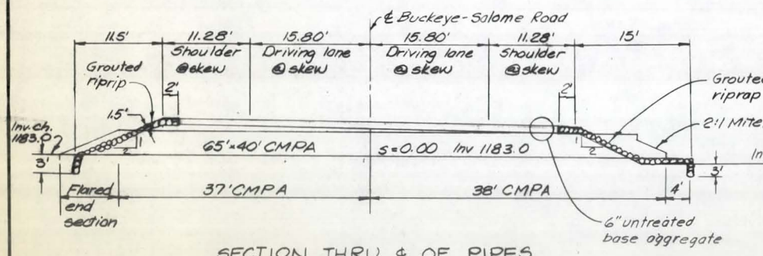
NOTE:
For complete listing of road and shoulder elevations see Roadway Grade Tabulations this sheet.



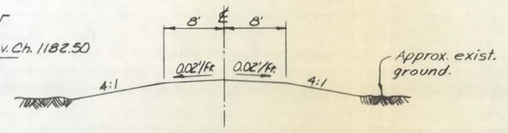
FULL SUPERELEVATED SECTION
BUCKEYE-SALOME ROAD

ROADWAY GRADE TABULATIONS
ROAD "A" (483 rd AVE)

Station	℄ Elev.	Remarks
0+00	1195.18	℄ Proposed road - Buckeye-Salome Road
0+16	93.81	Begin improvements - Rt. edge prop. road Buckeye-Salome Rd
0+50	92.46	
1+00	90.48	
1+20	89.69	PVC Curve No. 1
1+25	89.49	
1+50	88.67	
1+70	88.17	PVI Curve No. 1
1+75	88.08	
2+00	87.70	
2+20	87.59	PVT Curve No. 1 - End improvements



SECTION THRU ℄ OF PIPES
(N.T.S.)



TYPICAL SECTION
ROAD "A"

TYPICAL SECTIONS
(N.T.S.)

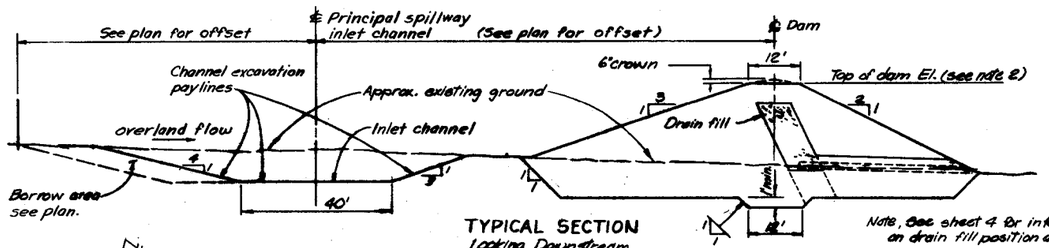
6-80	Rev. Profiles & Grade Tables	L.C.
Date	Revision	By

PROFILE & SECTIONS
BUCKEYE SALOME ROAD CROSSING
SADDLEBACK F.R.S.
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

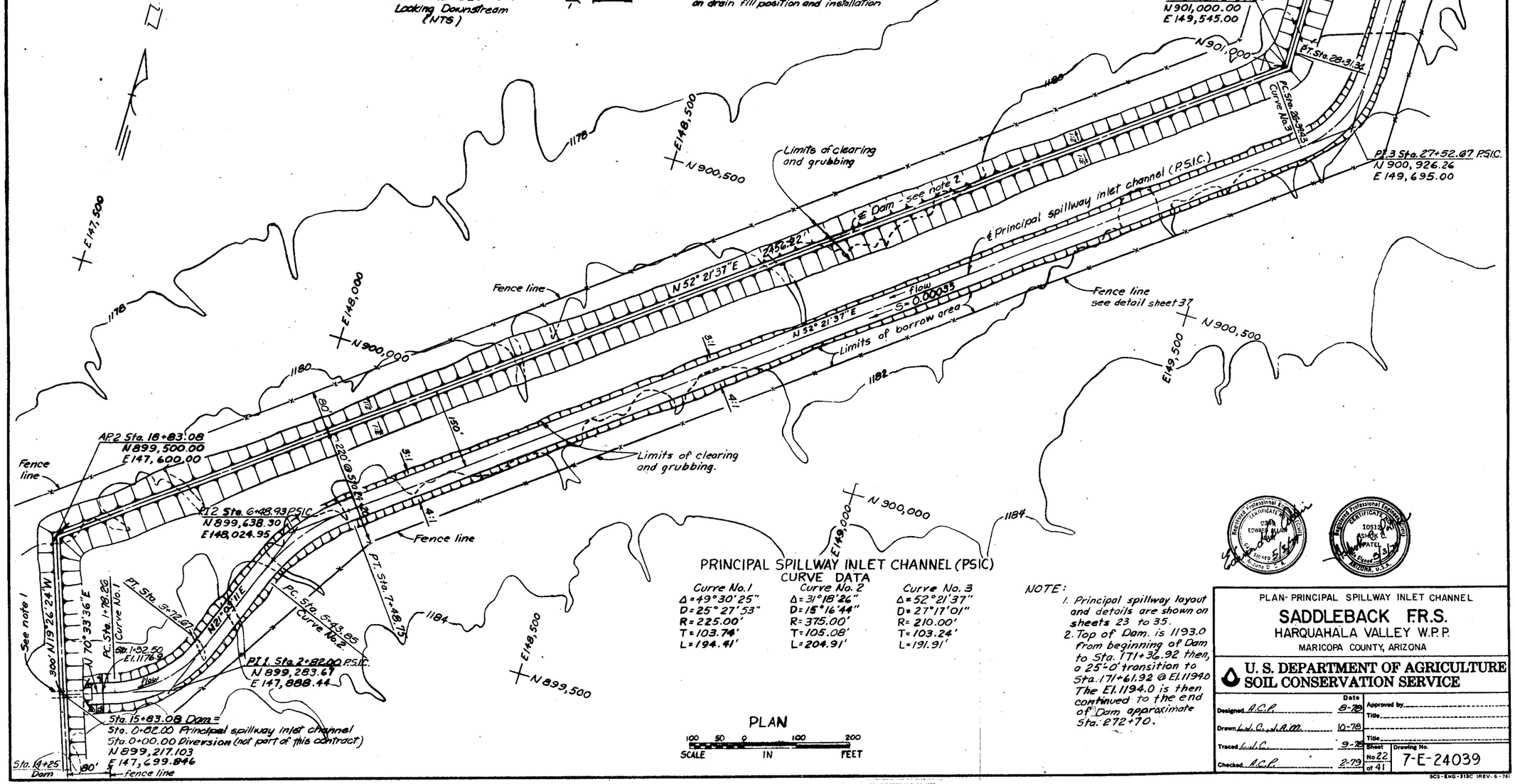
Designed W.K.	Date 8-78	Approved by	
Drawn L.A.M., D.B.	9-78	Title	
Traced		Title	
Checked E.A.A.	10-78	Sheet No. 21 of 41	Drawing No. 7-E-24039

SCS-ENG-113C (REV. 6-78)



TYPICAL SECTION
Looking Downstream
(NTS)

Note, See sheet 4 for information on drain fill position and installation



PLAN
SCALE 100 50 0 100 200 IN FEET

PRINCIPAL SPILLWAY INLET CHANNEL (PSIC)
CURVE DATA

Curve No. 1	Curve No. 2	Curve No. 3
Δ = 49° 30' 25"	Δ = 31° 18' 26"	Δ = 52° 21' 37"
D = 25° 27' 53"	D = 15° 16' 44"	D = 27° 17' 01"
R = 225.00'	R = 375.00'	R = 210.00'
T = 103.74'	T = 105.08'	T = 103.24'
L = 194.41'	L = 204.91'	L = 191.91'

NOTE:
1. Principal spillway layout and details are shown on sheets 23 to 35.
2. Top of Dam. is 1193.0 from beginning of Dam to Sta. 171+32.92 then, a 25'-0' transition to Sta. 171+61.92 @ El. 1194.0 The El. 1194.0 is then continued to the end of Dam approximate Sta. 272+70.

Registered Professional Engineer's Certificate No. 9363 EDWARD KLAN Signed 5/3/79 Arizona U.S.A.

Registered Professional Engineer's Certificate No. 10512 ASHOK C. PATEL Signed 5/3/79 Arizona U.S.A.

PLAN- PRINCIPAL SPILLWAY INLET CHANNEL

SADDLEBACK F.R.S.

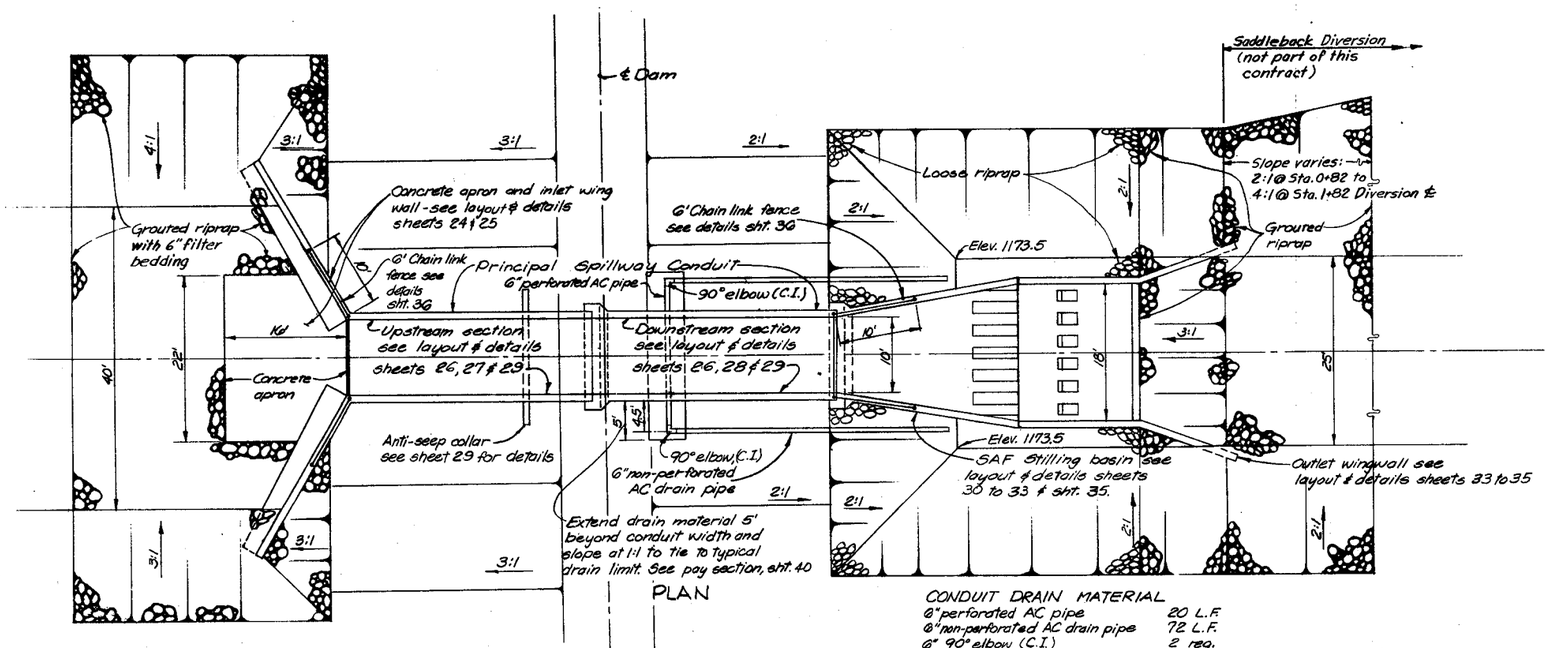
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

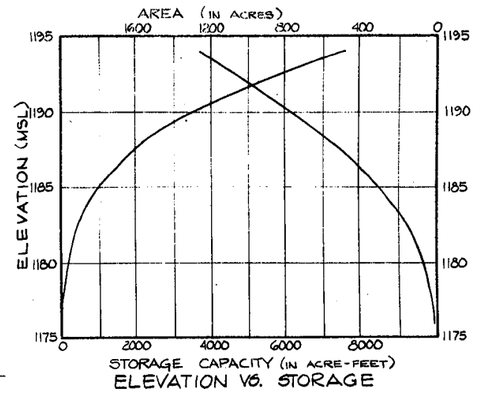
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

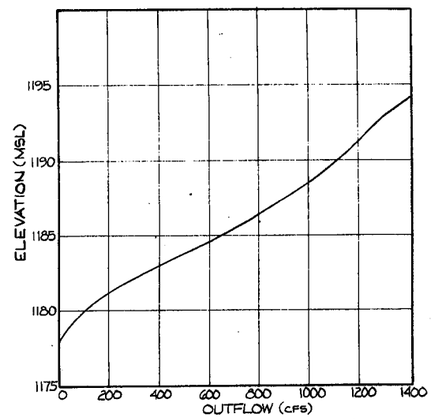
	Date		
Designed A.C.P.	8-78	Approved by	
Drawn L.w.l. C. J.A.M.	10-78	Title	
Traced L.w.l.C.	9-78	Title	
Checked A.C.P.	2-79	Sheet No. 22 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

SCS-ENG-313C (REV. 6-78)







*Stations along Principal Spillway are perpendicular from Dam at Sta 15+83.08.

PRINCIPAL SPILLWAY LAYOUT

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

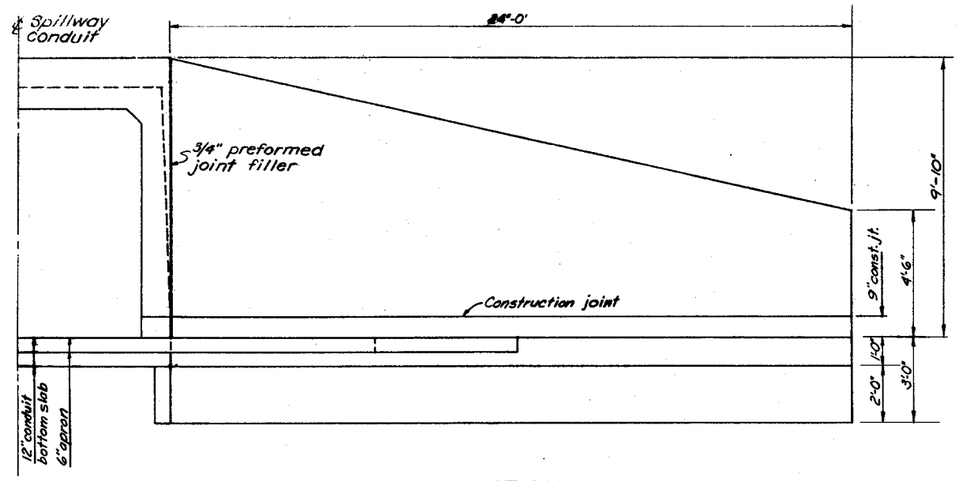
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

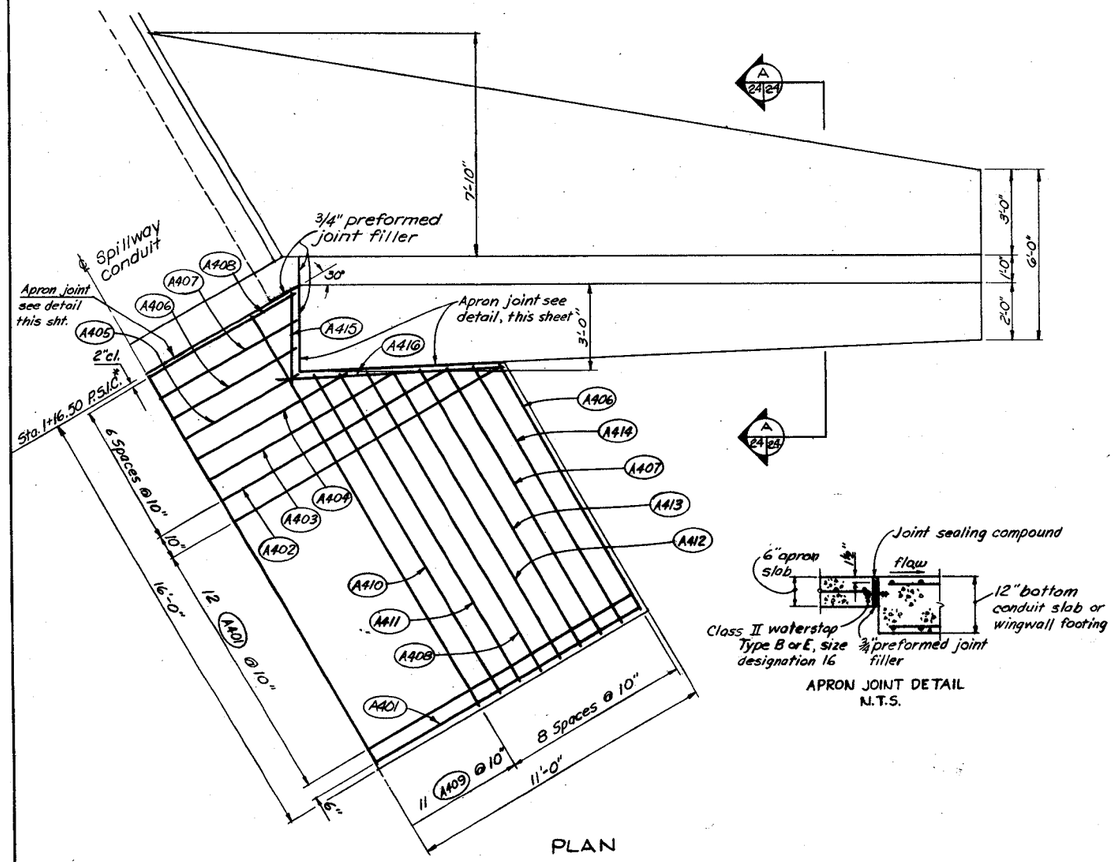
Designed A.P.	Date 8-78	Approved by	
Drawn JAM, L.V.C.	10-78	Title	
Traced		Title	
Checked A.L.	2-79	Sheet No. 23 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR 1979

FORM SCS-313C



ELEVATION



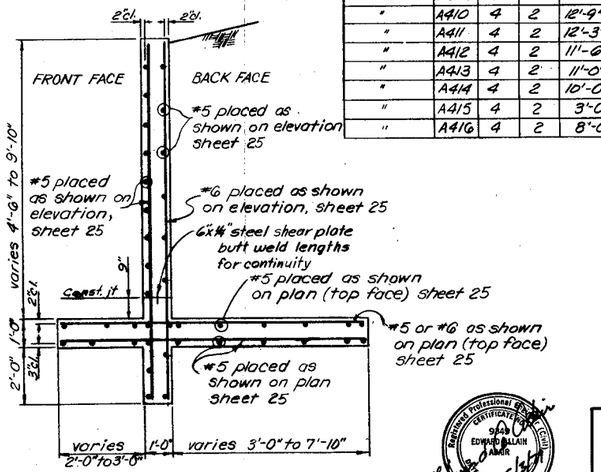
PLAN

APRON JOINT DETAIL
N.T.S.

* Sta. is on principal spillway inlet channel, perpendicular to Sta. 15+83.08 Dam. For layout this area sheet 23.

SCALE IN FEET 0 1 2 3 4

QUANTITIES		
Location	Material	
Inlet wingwall	Reinf. st'l.	2144 lbs.
	Concrete	18.1 cuyd.
Inlet apron	Reinf. st'l.	494 lbs.
	Concrete	5.7 cu.yd.
Wingwall footing	Reinf. st'l.	1992 lbs.
	Concrete	14.5 cu.yd.



SECTION A 24 24

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Total Length
PRINCIPAL SPILLWAY INLET WINGWALL					
Front Face	W501	5	6	11'-9"	70'-6"
" "	W502	5	6	11'-0"	66'-0"
" "	W503	5	6	10'-3"	61'-6"
" "	W504	5	6	9'-9"	58'-6"
" "	W505	5	6	9'-0"	54'-0"
" "	W506	5	6	8'-6"	51'-0"
" "	W507	5	6	7'-9"	46'-6"
" "	W508	5	6	7'-0"	42'-0"
Front & Back	W509	5	28	23'-6"	658'-0"
Front Face	W510	5	2	20'-6"	41'-0"
" "	W511	5	2	16'-3"	32'-6"
" "	W512	5	2	11'-6"	23'-0"
" "	W513	5	2	7'-0"	14'-0"
" "	W514	5	2	2'-9"	5'-6"
Front & Back	W515	5	4	24'-3"	97'-0"
Back Face	W516	5	2	16'-6"	33'-0"
" "	W517	5	2	10'-0"	20'-0"
" "	W518	5	2	4'-0"	8'-0"
Back Face	WG01	6	2	12'-3"	24'-6"
" "	WG02	6	4	11'-9"	47'-0"
" "	WG03	6	4	11'-0"	44'-0"
" "	WG04	6	4	10'-6"	42'-0"
" "	WG05	6	4	9'-9"	39'-0"
" "	WG06	6	4	9'-0"	36'-0"
" "	WG07	6	4	8'-6"	34'-0"
" "	WG08	6	4	7'-9"	31'-0"
" "	WG09	6	4	7'-0"	28'-0"
" "	WG10	6	22	5'-9"	138'-0"
PRINCIPAL SPILLWAY INLET APRON					
Apron	A401	4	13	21'-8"	281'-8"
"	A402	4	1	18'-3"	18'-3"
"	A403	4	1	15'-0"	15'-0"
"	A404	4	1	12'-0"	12'-0"
"	A405	4	1	8'-9"	8'-9"
"	A406	4	3	9'-9"	29'-3"
"	A407	4	3	10'-6"	31'-6"
"	A408	4	3	11'-9"	35'-3"
"	A409	4	11	15'-6"	170'-6"
"	A410	4	2	12'-9"	25'-6"
"	A411	4	2	12'-3"	24'-6"
"	A412	4	2	11'-6"	23'-0"
"	A413	4	2	11'-0"	22'-0"
"	A414	4	2	10'-0"	20'-0"
"	A415	4	2	3'-0"	6'-0"
"	A416	4	2	8'-0"	16'-0"

Location	Mark	Size	Quan.	Length	Total Length
INLET WINGWALL FOOTING					
Bottom Face	F501	5	2	2'-0"	4'-0"
" "	F502	5	2	4'-3"	8'-6"
" "	F503	5	2	6'-9"	13'-6"
" "	F504	5	2	10'-6"	21'-0"
" "	F505	5	2	10'-0"	20'-0"
" "	F506	5	2	9'-9"	19'-6"
" "	F507	5	2	9'-6"	19'-0"
" "	F508	5	2	9'-0"	18'-0"
" "	F509	5	2	8'-9"	17'-6"
" "	F510	5	2	8'-6"	17'-0"
" "	F511	5	2	8'-3"	16'-6"
" "	F512	5	2	7'-9"	15'-6"
" "	F513	5	2	7'-6"	15'-0"
" "	F514	5	2	7'-3"	14'-6"
" "	F515	5	2	6'-9"	13'-6"
" "	F516	5	2	6'-6"	13'-0"
" "	F517	5	2	6'-3"	12'-6"
" "	F518	5	2	6'-0"	12'-0"
Top & Bottom	F519	5	2	5'-9"	11'-6"
" "	F520	5	8	4'-0"	32'-0"
" "	F521	5	6	3'-9"	22'-6"
Top & Bottom	F522	5	4	10'-0"	40'-0"
" "	F523	5	4	29'-0"	116'-0"
Bottom only	F524	5	2	6'-6"	13'-0"
" "	F525	5	2	15'-0"	30'-0"
Bottom only	F526	5	2	23'-9"	47'-6"
Top & Bottom	F527	5	4	25'-0"	100'-0"
Top & Bottom	F528	5	6	24'-3"	145'-6"
" "	F529	5	8	23'-6"	188'-0"
Bottom only	F530	5	2	19'-0"	38'-0"
Top Face	F531	5	2	2'-3"	4'-6"
" "	F532	5	2	4'-0"	8'-0"
" "	F533	5	2	5'6"	11'-0"
" "	F534	5	4	7'-0"	28'-0"
" "	F535	5	6	10'3"	61'-6"
" "	F536	5	4	9'-9"	39'-0"
" "	F537	5	4	9'-6"	38'-0"
" "	F538	5	4	9'-0"	36'-0"
" "	F539	5	4	8'-6"	34'-0"
" "	F540	5	4	8'-3"	33'-0"
" "	F541	5	4	7'-9"	31'-0"
" "	F542	5	4	7'-3"	29'-0"
" "	F543	5	4	6'-9"	27'-0"
" "	F544	5	4	6'-6"	26'-0"
" "	F545	5	4	6'-0"	24'-0"
" "	F546	5	4	5'-9"	23'-0"
" "	F547	5	2	23'-9	47'-6"
" "	F548	5	2	16'-0"	32'-0"
" "	FG01	6	2	1'-6"	3'-0"
" "	FG02	6	2	3'-0"	6'-0"
" "	FG03	6	2	4'-6"	9'-0"
" "	FG04	6	2	6'-3"	12'-6"
" "	FG05	6	4	7'-6"	30'-0"
" "	FG06	6	4	7'-3"	29'-0"
" "	FG07	6	4	7'-0"	28'-0"
" "	FG08	6	4	6'-9"	27'-0"
" "	FG09	6	2	6'-6"	13'-0"

INLET WINGWALL AND APRON LAYOUT

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

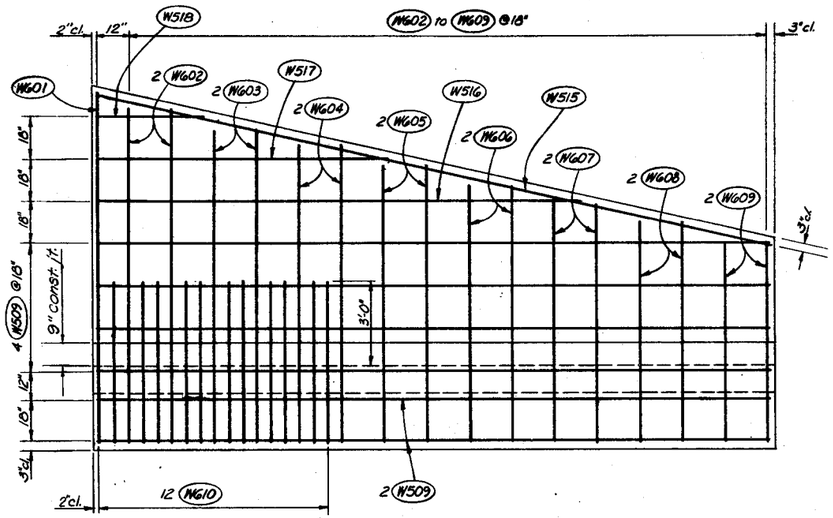
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

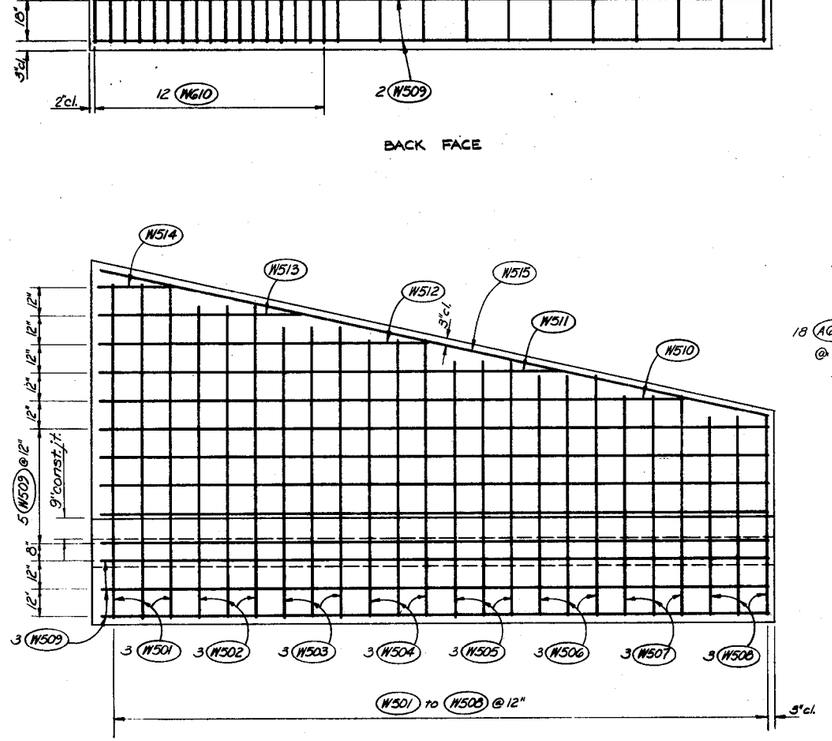
	Date		
Designed G.S.	8-78	Approved by	
Drawn L.J.C., jr. A.M.	9-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 24 of 41	Drawing No. 7-E-24039

USDA SCS-PORTLAND, OR. 1973

FORM SCS-313C

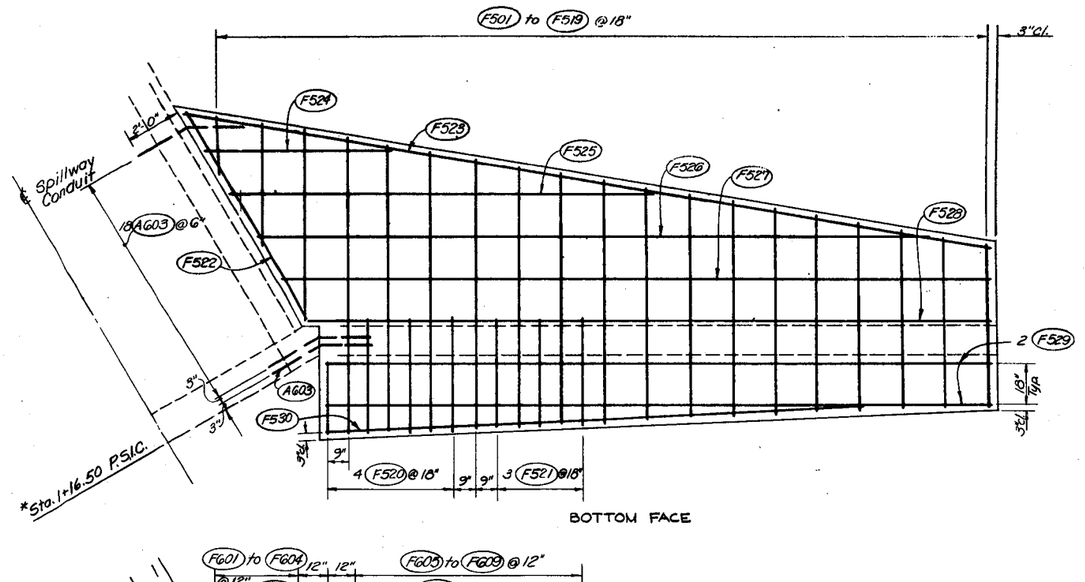


BACK FACE

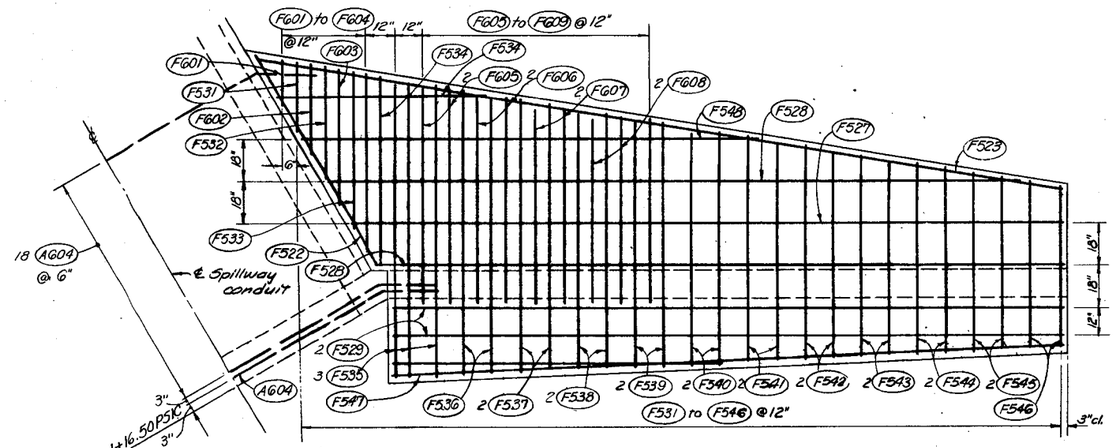


FRONT FACE

WINGWALL ELEVATION



BOTTOM FACE



TOP FACE

FOOTING PLAN

Note: See sheet 24 for steel schedule

*Sta. is on principal spillway inlet channel, perpendicular to Sta. 15+83.08 Dam. For layout this area see sheet 23.

1 0 1 2 3 4

SCALE IN FEET

PRINCIPAL SPILLWAY INLET WINGWALL DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

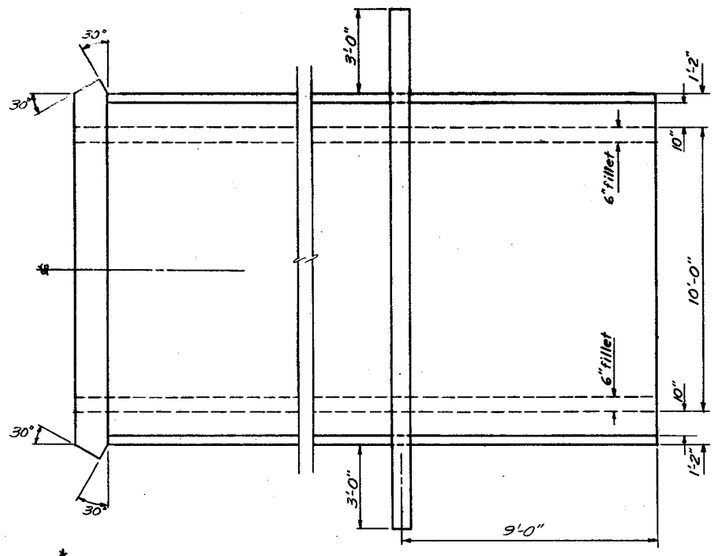
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

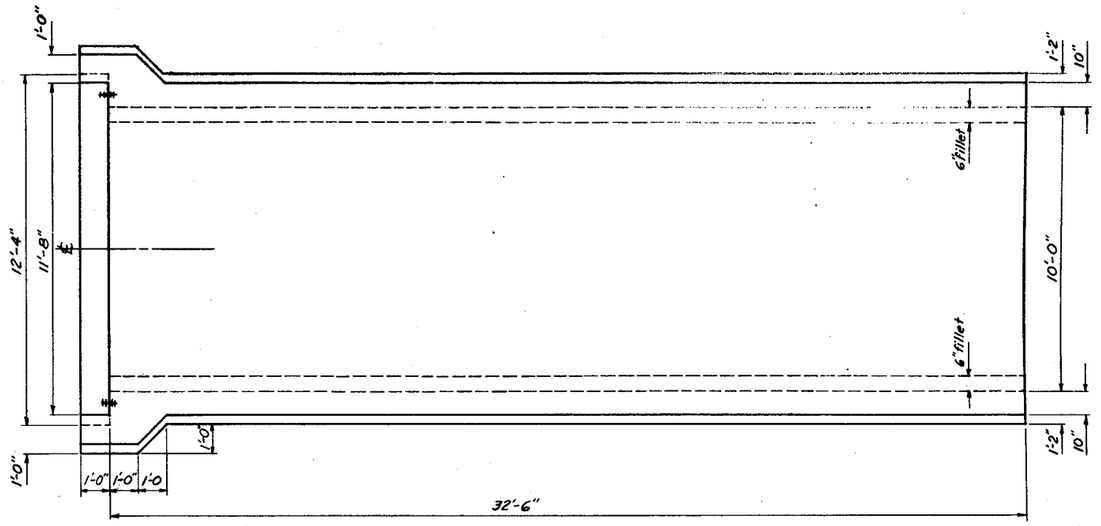
	Date		
Designed G.S.	8-78	Approved by	
Drawn J.A.M. L.V.C.	9-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 25 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

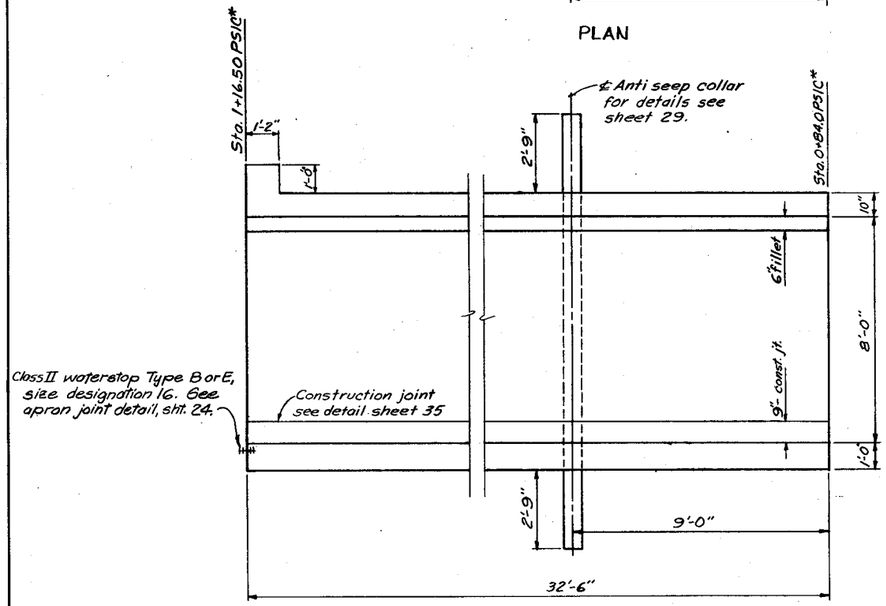
FORM SCS-313C



PLAN



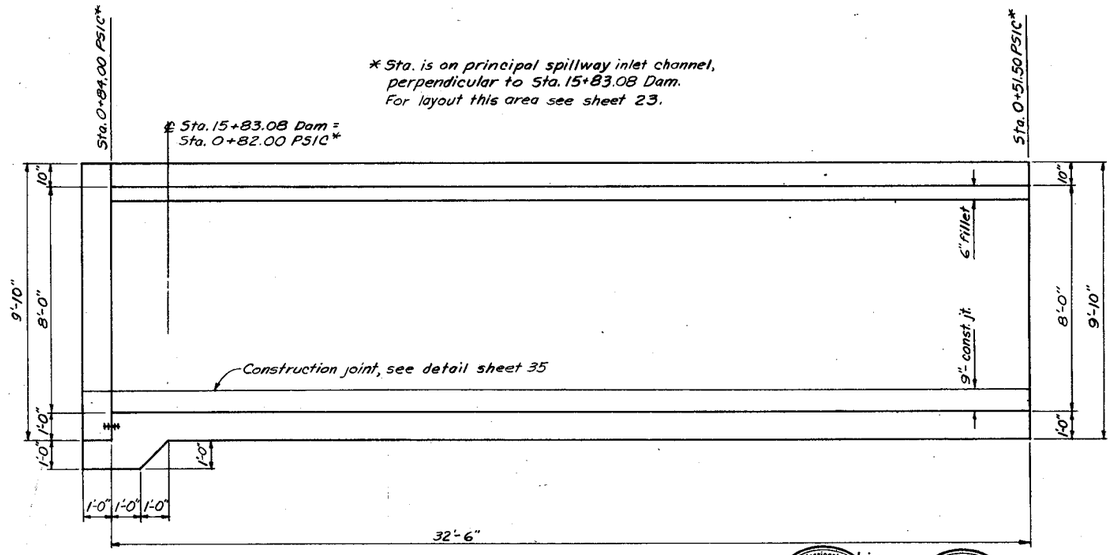
PLAN



ELEVATION

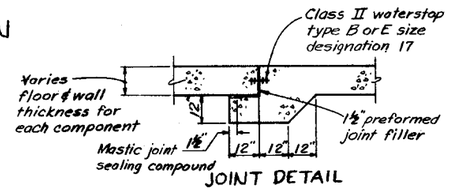
UPSTREAM CONDUIT SECTION

* Sta. is on principal spillway inlet channel, perpendicular to Sta. 15+83.08 Dam. For layout this area see sheet 23.



ELEVATION

DOWNSTREAM CONDUIT SECTION



JOINT DETAIL

SCALE IN FEET 0 1 2 3

Registered Professional Engineer — Certificate — Edward Allain Moir — Signed 6/5/79 — Arizona U.S.A.

Registered Professional Engineer (Civil) — Certificate — Mahesh C. Patel — Signed 6/5/79 — Arizona U.S.A.

PRINCIPAL SPILLWAY CONDUIT LAYOUT

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

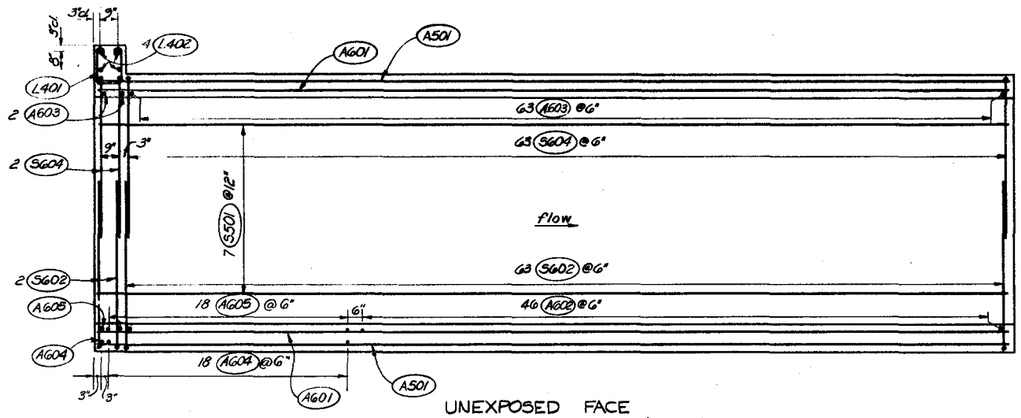
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

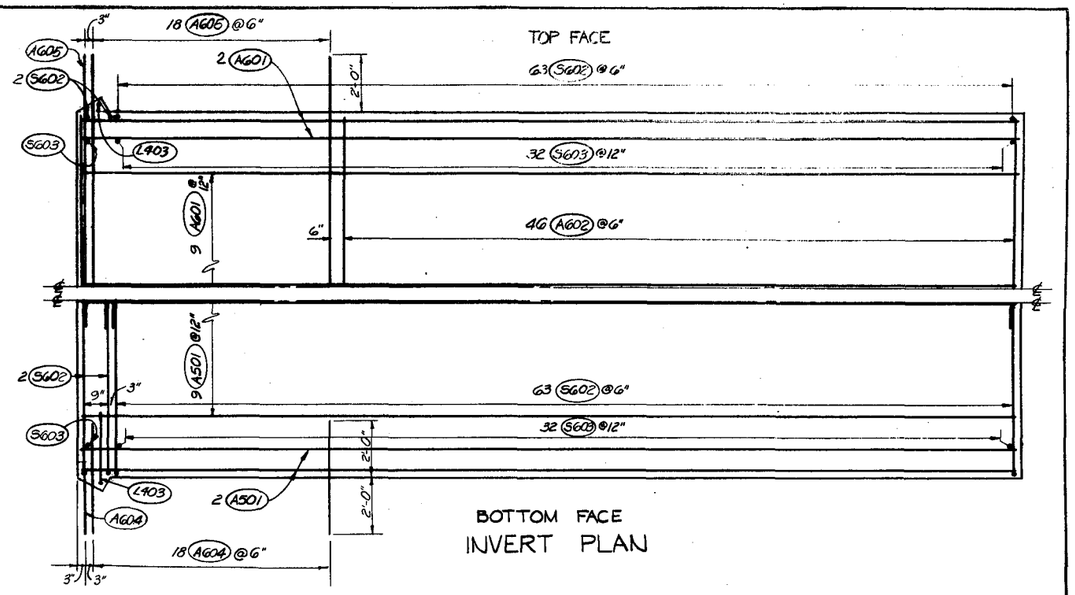
Designed G.S.	Date 8-78	Approved by	
Drawn L.V.C.	9-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No 26 of 41	Drawing No. 7-E-24039

FORM SCS-313C

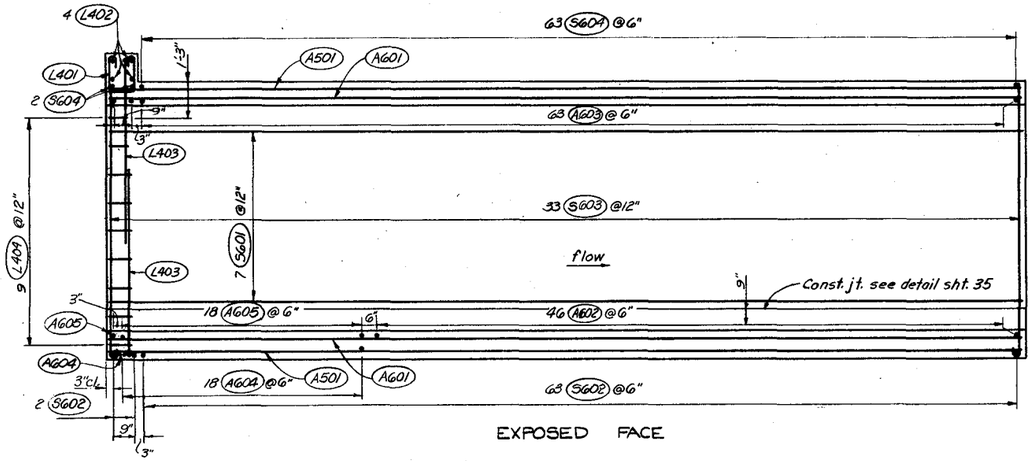
USDA-SCS-PORTLAND, OR. 1979



UNEXPOSED FACE

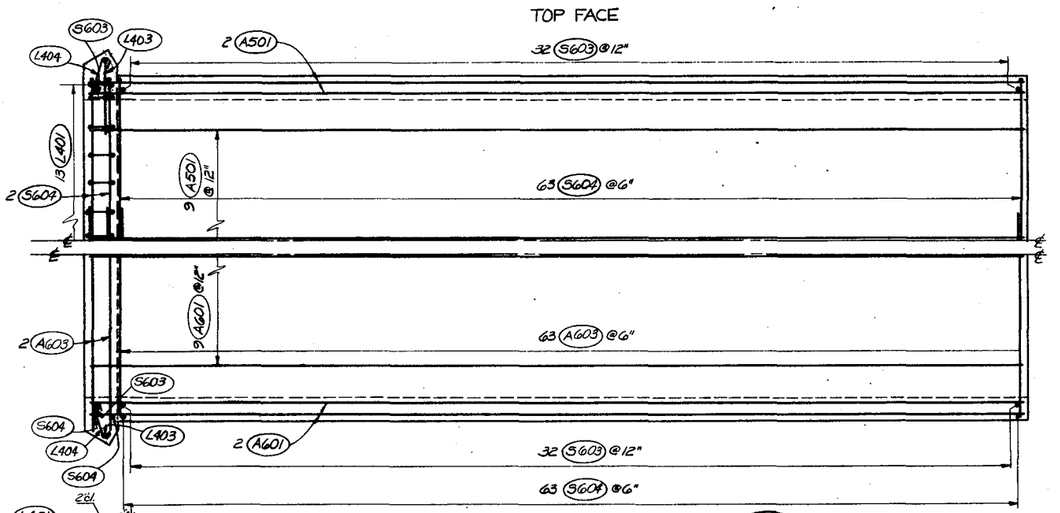


BOTTOM FACE
INVERT PLAN



EXPOSED FACE

ELEVATION



BOTTOM FACE
CROWN PLAN

Upstream end of upstream section of spillway conduit

LIP DETAIL

NOTE: See sheet 29 for steel schedule.

SCALE 1 0 1 2 3 4 5 IN FEET

Arizona Professional Engineering Registration — Certificate No. 9048 — Edward C. Jamar — Date Signed 5/3/79

Arizona Professional Engineering Registration — Certificate No. 10512 — Girish C. Patel — Date Signed 6/1/79 — Arizona, U.S.A.

PRINCIPAL SPILLWAY CONDUIT DETAILS
(UPSTREAM SECTION)

SADDLEBACK F.R.S.

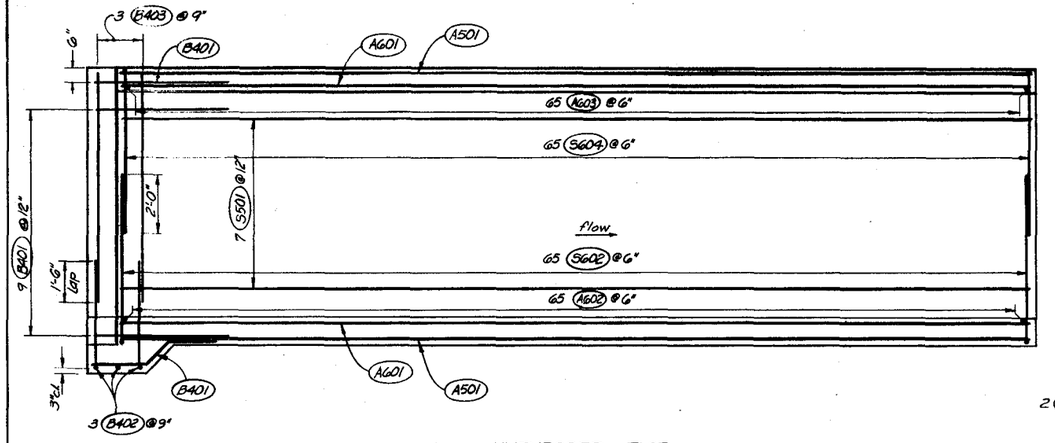
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

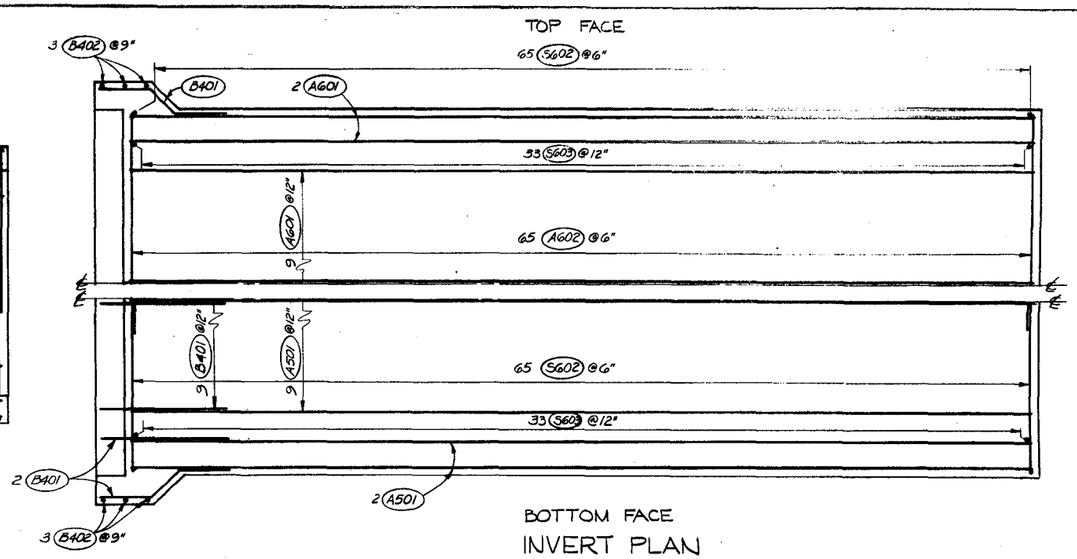
Designed G.S.	Date 8-78	Approved by	
Drawn L.J.C., J.A.M.	9-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 27 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

FORM SCS-313C



UNEXPOSED FACE



BOTTOM FACE

INVERT PLAN

EXPOSED FACE

ELEVATION

BOTTOM FACE

CROWN PLAN

NOTE: See sheet 29 for steel schedule.

SCALE 1 0 1 2 3 4 5 IN FEET

PRINCIPAL SPILLWAY CONDUIT DETAILS
(DOWNSTREAM SECTION)

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

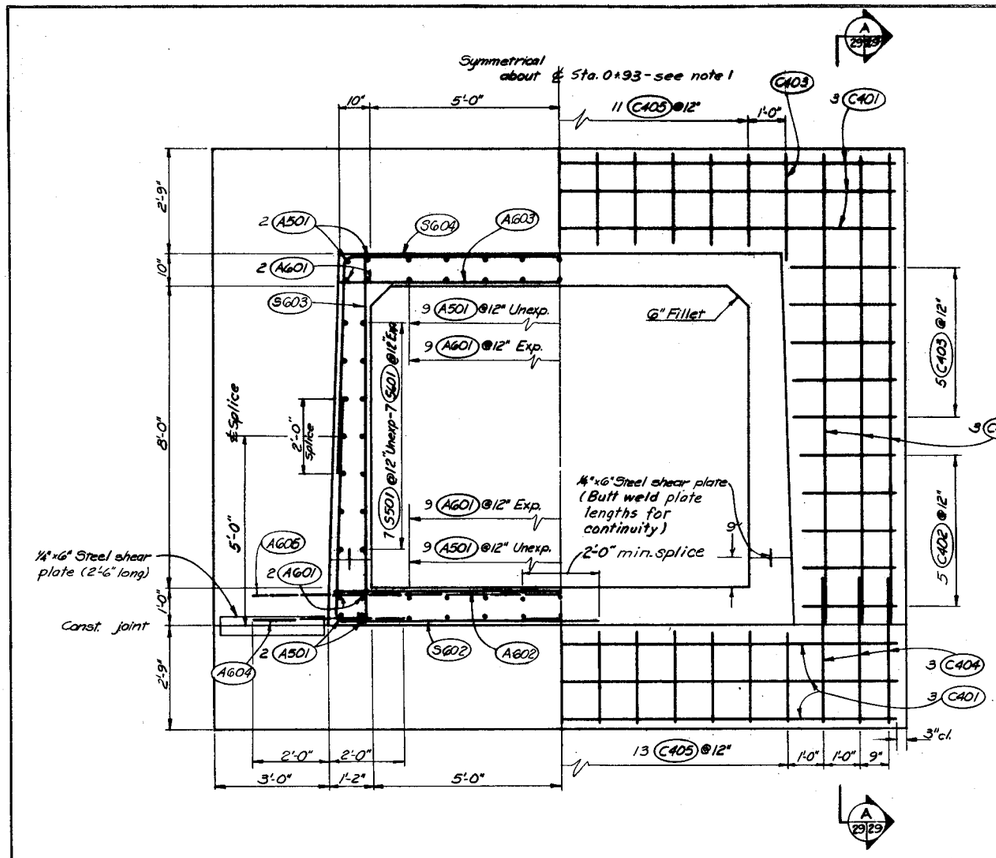
MARICOPA COUNTY, ARIZONA

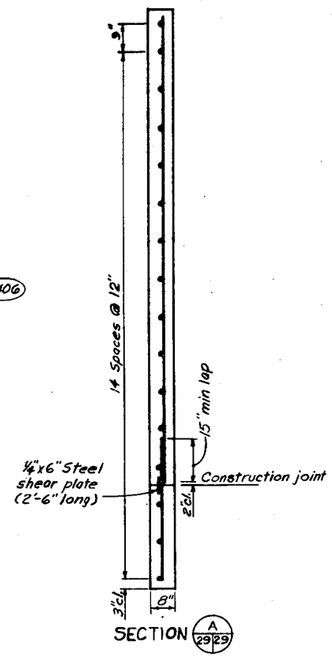
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed G.S.	Date 8-78	Approved by	
Drawn LJC, JAM	9-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No 28 of 41	Drawing No. 7-E-24039

USDA SCS-PORTLAND, OR. 1979

FORM SCS-313C





SECTION A 29 29

ANTI SEEP COLLAR

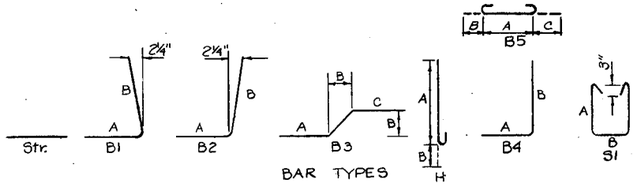
SCALE 0 1 2 3 4 IN FEET

QUANTITIES		
Location	Material	
Anti seep collar	Reinf. st'l.	211.4 lbs.
	Concrete	4.0 cu.yd.
Spillway conduit (downstream)	Reinf. st'l.	11,667 lbs.
	Concrete	49.8 cu.yd.
spillway conduit upstream	Reinf. st'l.	11,896 lbs
	Concrete	47.0 cu.yd.

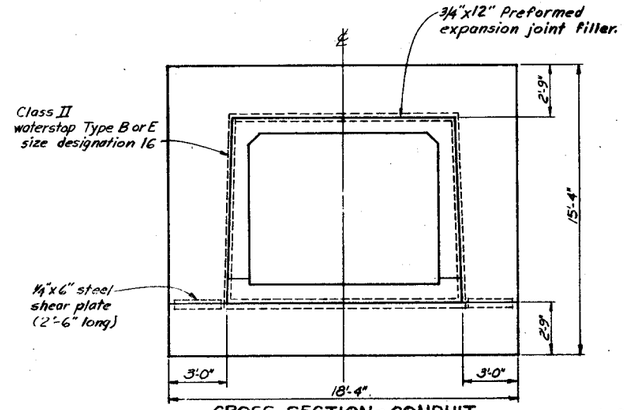
STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
PRINCIPAL SPILLWAY CONDUIT ANTISEEP COLLAR									
Collar	C401	4	6	17'-10"	Str.				107'-0"
"	C402	4	10	2'-6"	Str.				25'-0"
"	C403	4	12	2'-9"	Str.				33'-0"
"	C404	4	6	4'-0"	Str.				24'-0"
"	C405	4	24	2'-3"	Str.				54'-0"
"	C406	4	6	12'-3"	Str.				73'-6"
PRINCIPAL SPILLWAY CONDUIT - DOWNSTREAM SECTION									
Invert and Crown Slab	A501	5	26	32'-0"	Str.				832'-0"
" "	A601	6	26	32'-0"	Str.				832'-0"
Invert slab	A602	6	65	12'-0"	Str.				780'-0"
Invert Slab & Side wall	S602	6	130	13'-0"	B1	7'-0"	6'-0"		1690'-0"
Sidewall	S603	6	66	10'-1"	H	9'-5"	8"		665'-6"
"	S601	6	14	32'-0"	Str				448'-0"
"	S501	5	14	32'-0"	Str				448'-0"
Sidewall & Crown Slab	S604	6	130	12'-4"	B2	5'-8"	6'-8"		1603'-4"
Crown slab	A603	6	65	11'-4"	Str				736'-8"
Conduit bell	B401	4	35	4'-6"	B3	1'-9"	1'-0"	1'-9"	157'-6"
"	B402	4	6	11'-3"	B1	3'-9"	8'-0"		70'-6"
"	B403	4	6	8'-3"	Str				49'-6"
PRINCIPAL SPILLWAY CONDUIT- UPSTREAM SECTION									
Invert and Crown Slab	A501	5	26	32'-0"	Str.				832'-0"
" "	A601	6	26	32'-0"	Str.				832'-0"
Invert slab	A602	6	46	12'-0"	Str.				552'-0"
* "	A605	6	19	16'-4"	Str				310'-4"
* "	A604	6	38	4'-0"	Str				152'-0"
Invert Slab & Sidewall	S602	6	130	13'-0"	B1	7'-0"	6'-0"		1690'-0"
Sidewall	S603	6	66	10'-1"	H	9'-5"	8"		665'-6"
"	S601	6	14	32'-0"	Str				448'-0"
"	S501	5	14	32'-0"	Str				448'-0"
Sidewall & Crown Slab	S604	6	130	12'-4"	B2	5'-8"	6'-8"		1603'-4"
Crown slab	A603	6	65	11'-4"	Str				736'-8"
Lip	L401	4	13	3'-9"	S1	1'-3"	9"		48'-9"
"	L402	4	4	11'-3"	Str				45'-0"
"	L403	4	4	9'-0"	B4	2'-6"	6'-6"		36'-0"
"	L404	4	18	2'-1"	B5	1'-3"	5"	5"	37'-6"

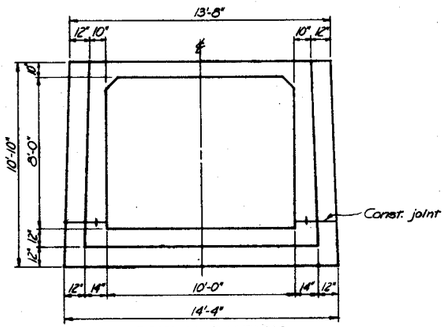
* A603 and A604, upstream section only, shall be cold field bent to align with inlet wingwall footing steel. See footing plan (top and bottom) sheet 25.



BAR TYPES



CROSS SECTION - CONDUIT AT ANTI SEEP COLLAR (Sta. 0+93.00) - see note 1



END ELEVATION (Sta. 0+85) - see note 1 (Looking downstream)

SCALE 1 0 1 2 3 4 IN FEET

Note:
1. See sheet 23 for principal spillway layout and stationing.

Registered Professional Engineer CERTIFICATE NO. 9306 EDWARD ALLAN JOHN 5/31/79 Arizona U.S.A.

Registered Professional Engineer CERTIFICATE NO. 10516 ASHOK C. PATEL 5/31/79 ARIZONA, U.S.A.

PRINCIPAL SPILLWAY CONDUIT AND ANTI-SEEP COLLAR DETAIL

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

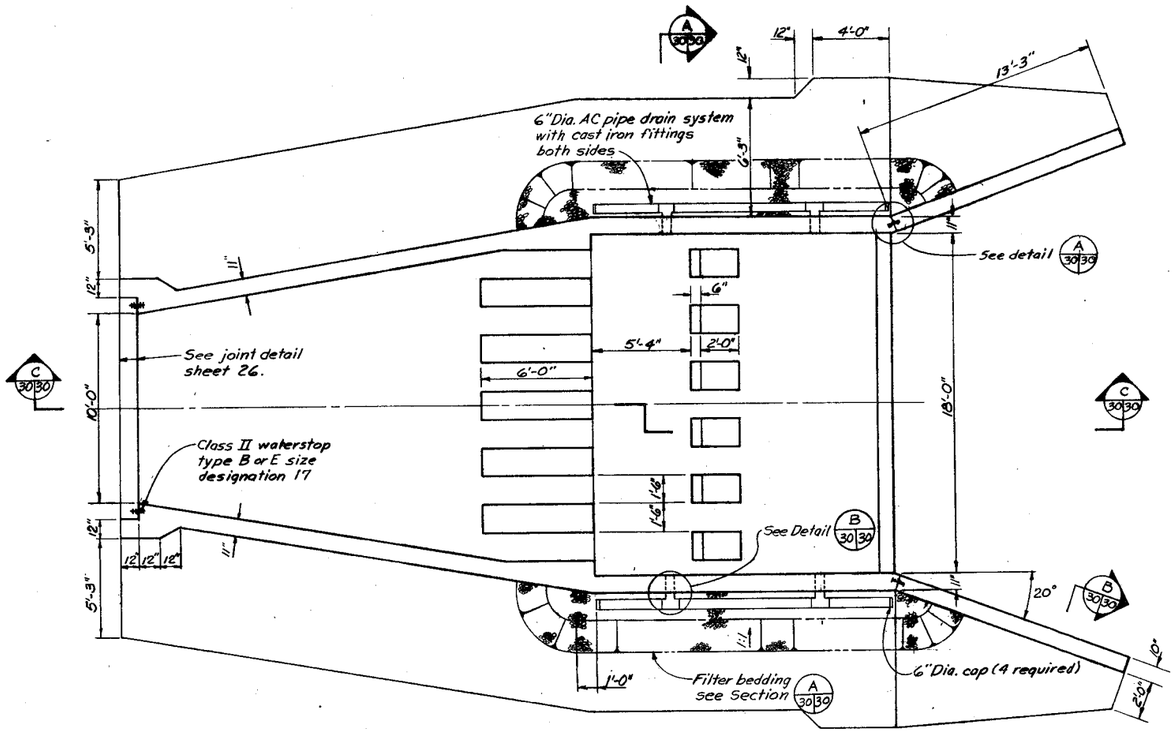
MARICOPA COUNTY, ARIZONA

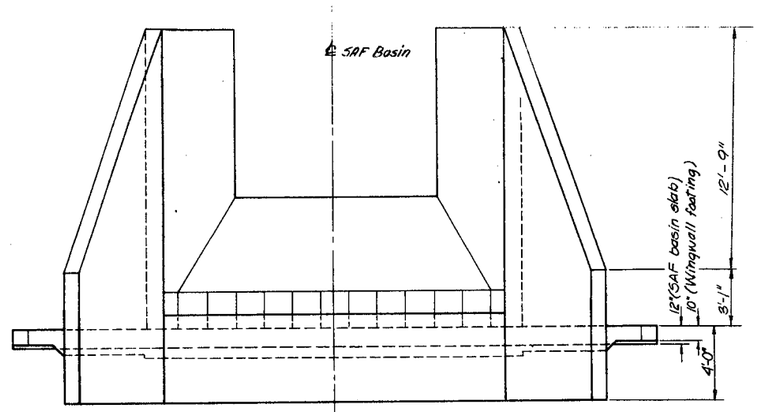
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Designed G.S.	Date 8-78	Approved by	
Drawn LJC, JAM	10-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 29 of 41	Drawing No. 7-E-24039

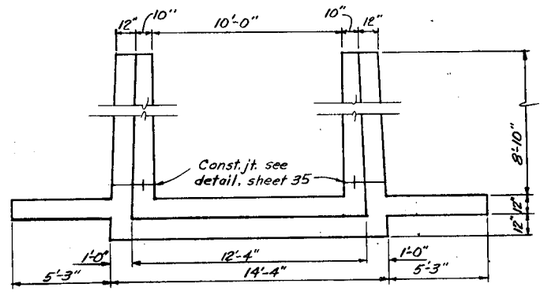
FORM SCS-313C

USDA-SCS-PORTLAND, OR. 1979



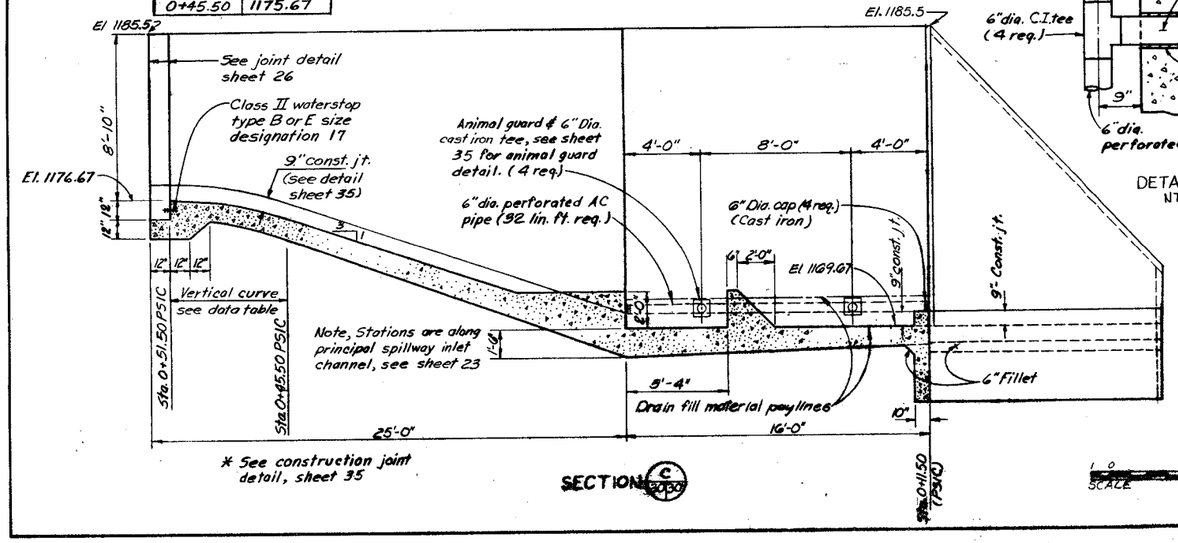


END ELEVATION
STA. 0+11.50
(Looking upstream)

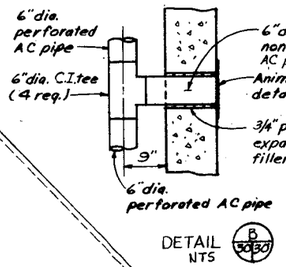


END ELEVATION
STA. 0+52.50
(Looking downstream)

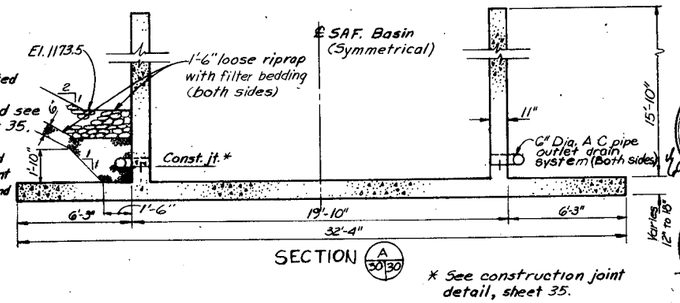
Vertical curve data	
Station	Elevation
0+51.50	1176.67
0+50.50	1176.64
0+49.50	1176.56
0+48.50	1176.41
0+47.50	1176.23
0+46.50	1175.97
0+45.50	1175.67



SECTION C 30/30

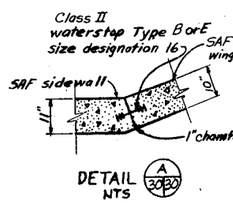


DETAIL B 30/30
NTS

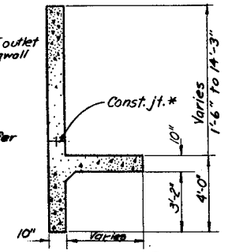


SECTION A 30/30

* See construction joint detail, sheet 35.



DETAIL A 30/30
NTS



SECTION B 30/30

SCALE 0 5 10 IN FEET

SAF STILLING BASIN LAYOUT

SADDLEBACK F.R.S.

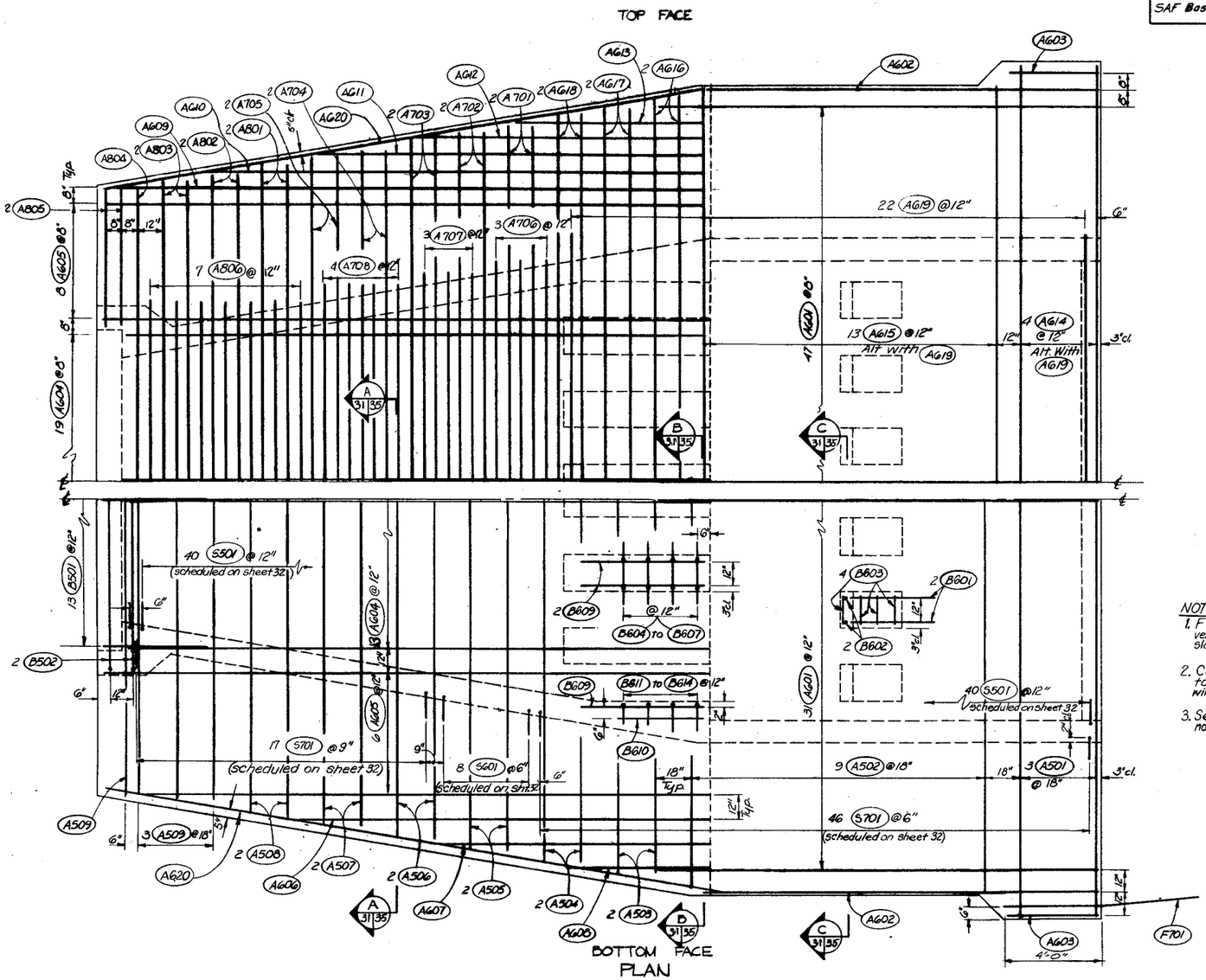
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

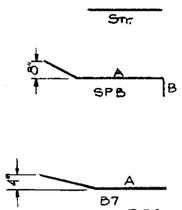
Designed A.P.	Date 9-78	Approved by	
Drawn JAM, L.J.C.	10-78	Title	
Traced		Title	
Checked A.P.	2-79	Sheet No 30 of 41	Drawing No. 7-E-24039

FORM SCS-313C

USDA SCS-PORTLAND, OR 1979



QUANTITIES		
Location	Material	
SAF Basin	Reinf. st'l.	202001bs.
	Concrete	98 cuyd.



BAR TYPES

NOTES:

1. F701 shall be placed in the vertical center of SAF Basin slab.
2. C501 shall be cold field bent to align with SAF outlet wingwall cutoff wall steel.
3. See sheet 33 for Bar Types not shown on this sheet.

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
SAF STILLING BASIN									
Bottom of slab	A501	5	3	34'-0"	Str.				102'-0"
" "	A502	5	9	32'-0"	Str.				288'-0"
" "	A503	5	2	30'-6"	Str.				61'-0"
" "	A504	5	2	29'-6"	Str.				59'-0"
" "	A505	5	2	28'-6"	Str.				57'-0"
" "	A506	5	2	27'-6"	Str.				55'-0"
" "	A507	5	2	26'-6"	Str.				53'-0"
" "	A508	5	2	25'-6"	Str.				51'-0"
" "	A509	5	1	24'-0"	Str.				36'-0"
Top & Bottom	A601	6	78	19'-0"	SPB	16'-0"	1'-0		1482'-0"
" "	A602	6	4	16'-0"	Str.				64'-0"
" "	A603	6	4	3'-6"	Str.				14'-0"
" "	A604	6	32	25'-0"	Str.				800'-0"
" "	A605	6	28	26'-0"	Str.				728'-0"
" "	A606	6	2	17'-0"	Str.				34'-0"
" "	A607	6	2	12'-6"	Str.				25'-0"
" "	A608	6	2	6'-6"	Str.				13'-0"
" "	A609	6	2	25'-0"	Str.				50'-0"
" "	A610	6	2	21'-0"	Str.				42'-0"
" "	A611	6	2	16'-9"	Str.				33'-6"
" "	A612	6	2	12'-6"	Str.				25'-0"
" "	A613	6	2	8'-9"	Str.				17'-6"
" "	A614	6	4	34'-0"	Str.				136'-0"
" "	A615	6	13	32'-0"	Str.				416'-0"
" "	A616	6	2	31'-6"	Str.				63'-0"
" "	A617	6	2	30'-6"	Str.				61'-0"
" "	A618	6	2	29'-6"	Str.				59'-0"
" "	A619	6	22	20'-0"	Str.				440'-0"
Top & Bottom	A620	6	4	26'-3"	Str.				105'-0"
Basin Slab & Wingwall Ftg.	F701	7	2	8'-0"	B7				16'-0"
Slab - top face	A701	7	2	29'-0"	Str.				58'-0"
" " "	A702	7	2	28'-6"	Str.				57'-0"
" " "	A703	7	2	28'-0"	Str.				56'-0"
" " "	A704	7	2	27'-0"	Str.				54'-0"
" " "	A705	7	2	26'-6"	Str.				53'-0"
" " "	A706	7	3	18'-0"	Str.				54'-0"
" " "	A707	7	3	17'-0"	Str.				51'-0"
" " "	A708	7	4	16'-0"	Str.				64'-0"
" " "	A801	8	2	26'-0"	Str.				52'-0"
" " "	A802	8	2	25'-0"	Str.				50'-0"
" " "	A803	8	2	24'-6"	Str.				49'-0"
" "	A804	8	1	24'-0"	Str.				24'-0"
" "	A805	8	4	5'-6"	Str.				22'-0"
" "	A806	8	7	14'-6"	Str.				101'-6"

SAF STILLING BASIN-SLAB DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

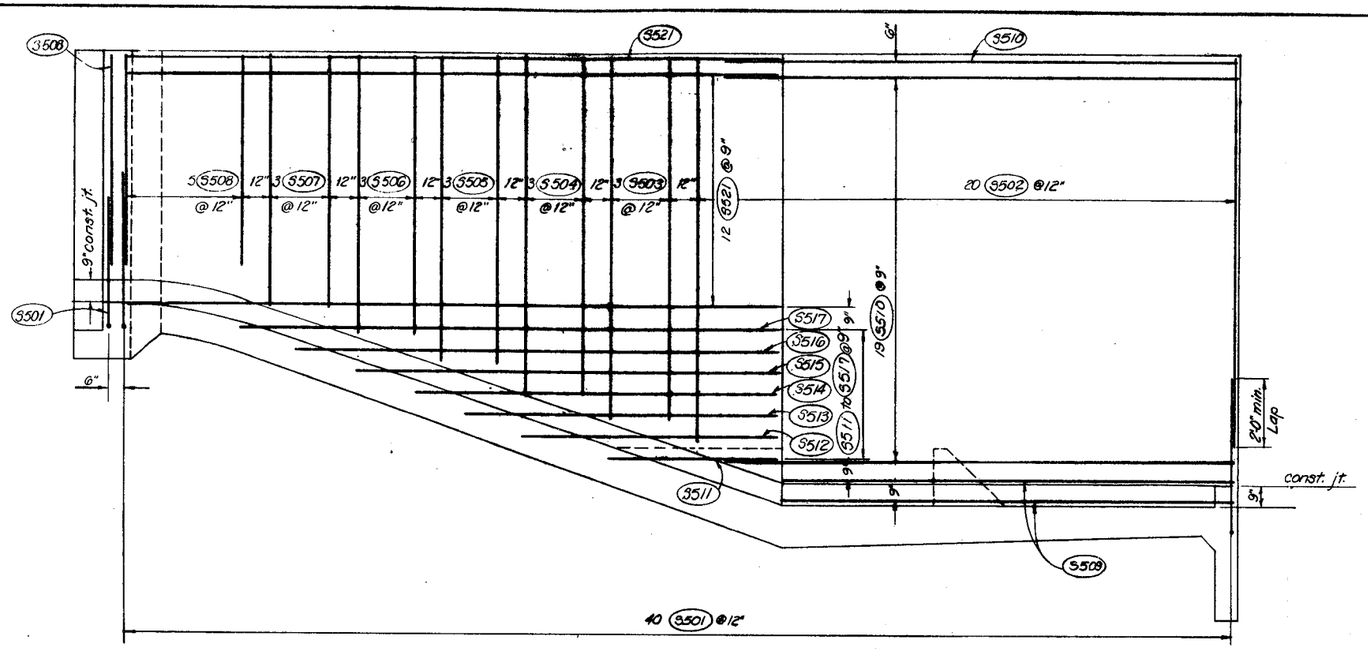
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

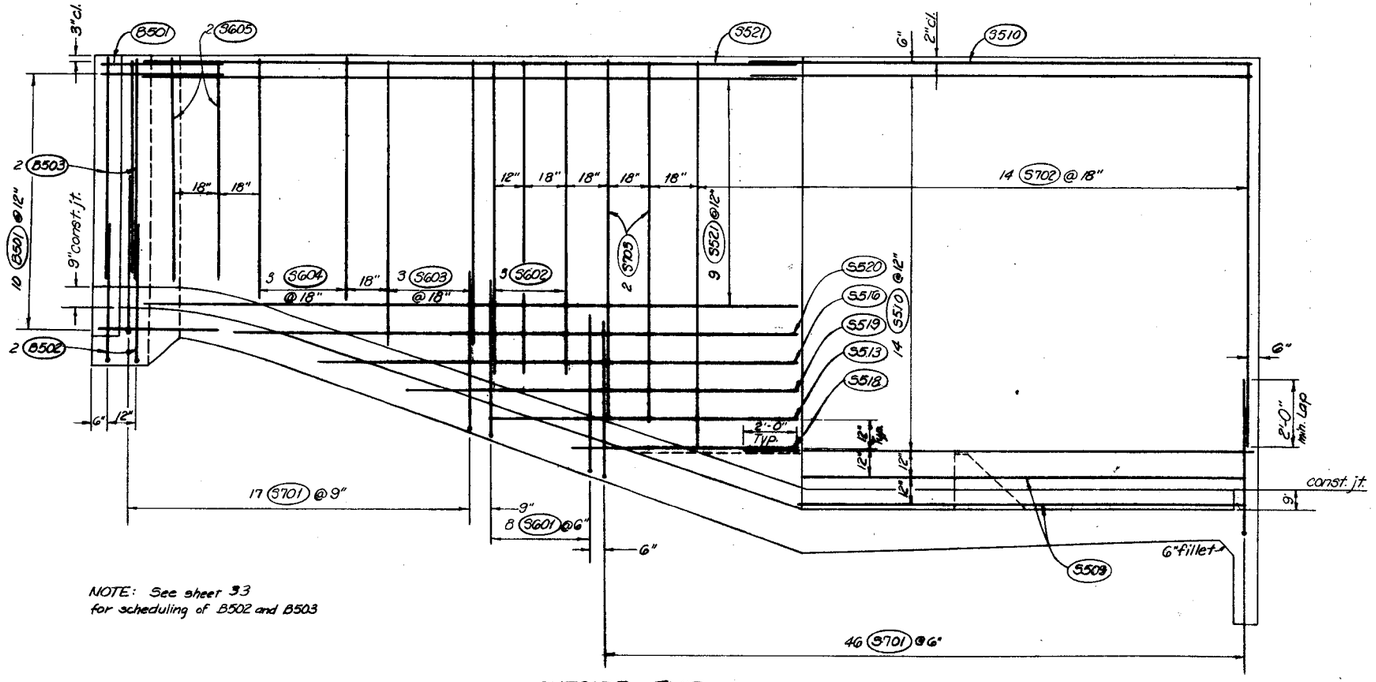
	Date		
Designed G.S.	8-78	Approved by	
Drawn J.A.M./J.L.C.	10-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 31 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

FORM SCS-313C



INSIDE FACE



NOTE: See sheet 33
for scheduling of B502 and B503

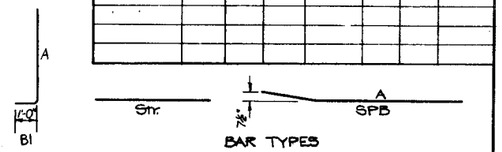
OUTSIDE FACE

SIDEWALL ELEVATION

SCALE IN FEET

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	Total Length
SAF STILLING BASIN - SIDEWALLS							
Each face	3501	5	82	6'-6"	B1	5'-6"	533'-0"
" "	3502	5	40	13'-6"	Str.		540'-0"
" "	3503	5	6	12'-9"	Str.		76'-6"
" "	3504	5	6	11'-9"	Str.		70'-6"
" "	3505	5	6	10'-9"	Str.		64'-6"
" "	3506	5	6	9'-9"	Str.		58'-6"
" "	3507	5	6	8'-9"	Str.		52'-6"
" "	3508	5	12	7'-3"	Str.		87'-0"
" "	3509	5	8	15'-9"	Str.		126'-0"
" "	3510	5	70	17'-9"	SPB	15'-9"	1242'-6"
" "	3511	5	2	6'-0"	Str.		12'-0"
" "	3512	5	2	9'-0"	Str.		18'-0"
" "	3513	5	4	11'-0"	Str.		44'-0"
" "	3514	5	2	13'-0"	Str.		26'-0"
" "	3515	5	2	15'-0"	Str.		30'-0"
" "	3516	5	4	17'-0"	Str.		68'-0"
" "	3517	5	2	19'-0"	Str.		38'-0"
Outside face	3518	5	2	8'-0"	Str.		16'-0"
" "	3519	5	2	14'-0"	Str.		28'-0"
" "	3520	5	2	20'-0"	Str.		40'-0"
Each face	3521	5	44	23'-0"	Str.		1012'-0"
Outside face	3601	6	16	6'-6"	B1	5'-6"	104'-0"
" "	3602	6	6	11'-0"	Str.		66'-0"
" "	3603	6	6	10'-0"	Str.		60'-0"
" "	3604	6	6	8'-3"	Str.		49'-6"
" "	3605	6	4	7'-9"	Str.		31'-0"
" "	3701	7	126	6'-6"	B1	5'-6"	819'-0"
" "	3702	7	28	13'-6"	Str.		378'-0"
" "	3703	7	4	12'-6"	Str.		50'-0"



BAR TYPES

SAF STILLING BASIN SIDE WALL DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

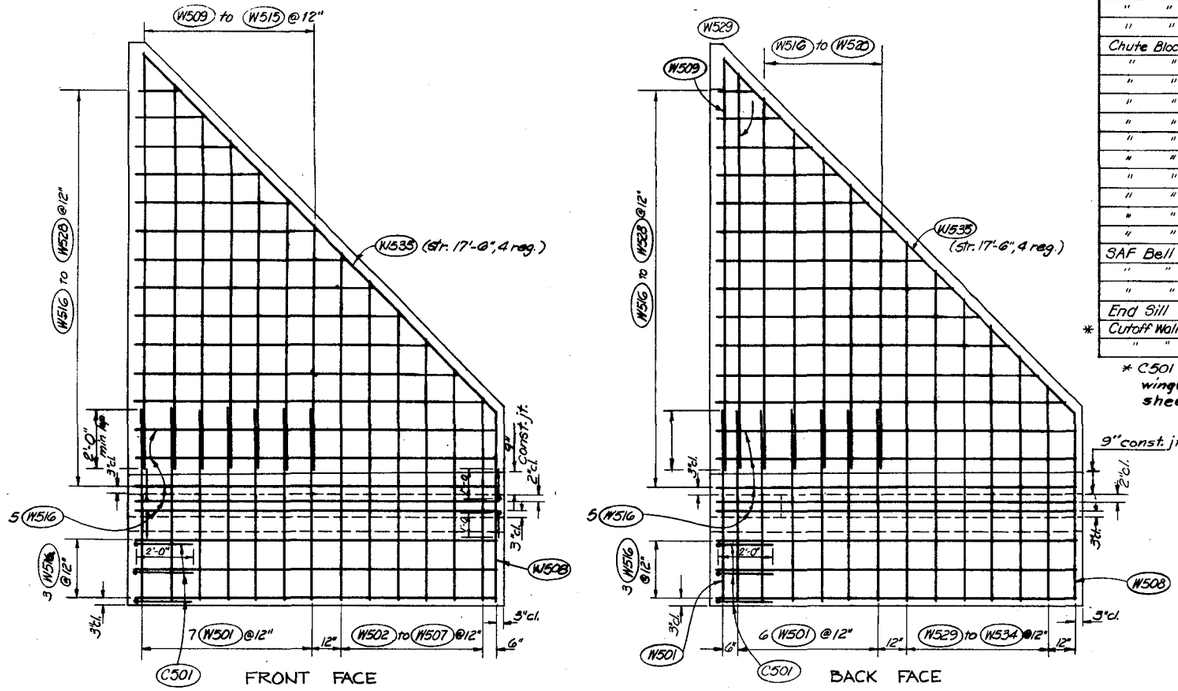
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

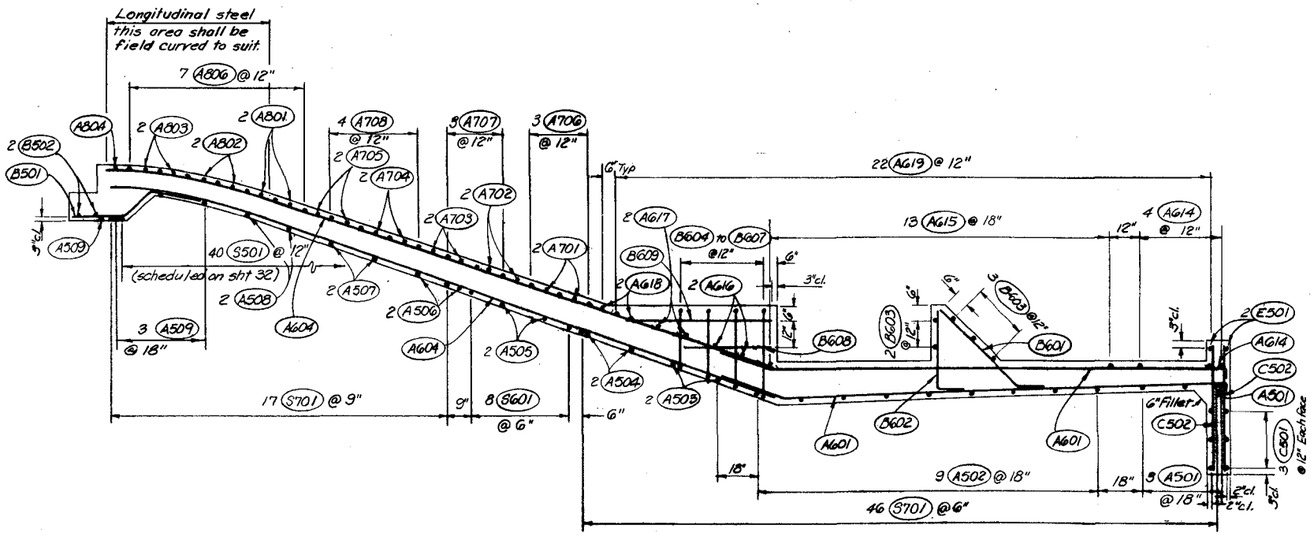
Designed G.S.	Date 8-78	Approved by	
Drawn JAM, L.J.C.	10-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 32 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

FORM SCS-313C



OUTLET WINGWALL ELEVATION



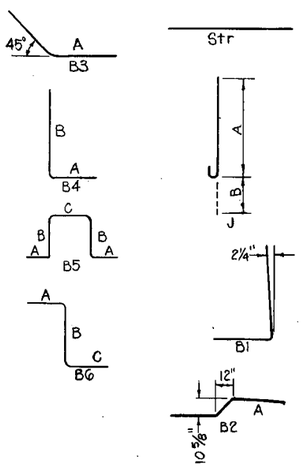
SAF BASIN SECTIONAL ELEVATION

SCALE IN FEET 0 1 2 3 4

STEEL SCHEDULE

Location	Mark	Size	Quan	Length	Type	A	B	C	Total Length
SAF STILLING BASIN									
Baffel Block	BG01	6	12	4'-9"	B3	1'-0"	3'-9"		57'-0"
" "	BG02	6	12	3'-6"	B4	1'-0"	2'-6"		42'-0"
" "	BG03	6	30	1'-0"	Str				30'-0"
Chute Block	BG04	6	5	3'-9"	B5	9"	2'-0"	1'-0"	18'-9"
" "	BG05	6	5	4'-0"	B5	9"	2'-3"	1'-0"	20'-0"
" "	BG06	6	5	4'-3"	B6	9"	2'-6"	1'-0"	21'-3"
" "	BG07	6	5	4'-9"	B5	9"	3'-0"	1'-0"	23'-9"
" "	BG08	6	12	3'-0"	Str				36'-0"
" "	BG09	6	12	5'-0"	Str				60'-0"
" "	BG10	6	2	3'-6"	Str				7'-0"
" "	BG11	6	2	3'-9"	B6	9"	2'-0"	1'-0"	7'-6"
" "	BG12	6	2	4'-0"	B6	9"	2'-3"	1'-0"	8'-0"
" "	BG13	6	2	4'-6"	B6	1'-0"	2'-6"	1'-0"	9'-0"
" "	BG14	6	2	5'-0"	B6	1'-0"	3'-0"	1'-0"	10'-0"
SAF Bell	B501	5	35	4'-10"	B2	1'-9"			169'-2"
" "	B502	5	4	12'-9"	B1	8'-0"	4'-9"		51'-0"
" "	B503	5	4	7'-9"	Str				31'-0"
End Sill	E501	5	2	19'-4"	Str				38'-8"
* Cutoff Wall	C501	5	6	24'-0"	Str				144'-0"
" "	C502	5	52	4'-3"	Str				221'-0"

* C501 shall be cold field bent to align with outlet wingwall cutoff steel, see cutoff wall elevation sheet 31.



BAR TYPES

STEEL SCHEDULE

Location	Mark	Size	Quan	Length	Type	A	B	Total Length
SAF STILLING BASIN OUTLET WINGWALL & FOOTING								
Wingwall	W501	5	28	6'-9"	Str.			189'-0"
"	W502	5	2	12'-3"	Str.			24'-6"
"	W503	5	2	11'-3"	Str.			22'-6"
"	W504	5	2	10'-3"	Str.			20'-6"
"	W505	5	2	9'-0"	Str.			18'-0"
"	W506	5	2	8'-0"	Str.			16'-0"
"	W507	5	2	7'-0"	Str.			14'-0"
"	W508	5	4	6'-9"	Str.			27'-0"
"	W509	5	4	14'-6"	Str.			58'-0"
"	W510	5	2	13'-6"	Str.			27'-0"
"	W511	5	2	12'-6"	Str.			25'-0"
"	W512	5	2	11'-6"	Str.			23'-0"
"	W513	5	2	10'-6"	Str.			21'-0"
"	W514	5	2	9'-6"	Str.			19'-0"
"	W515	5	2	8'-6"	Str.			17'-0"
"	W516	5	34	12'-9"	Str.			433'6"
"	W517	5	6	12'-3"	Str.			73'-6"
"	W518	5	6	11'-3"	Str.			67'-6"
"	W519	5	6	10'-3"	Str.			61'-6"
"	W520	5	6	9'-3"	Str.			55'-6"
"	W521	5	4	8'-3"	Str.			33'-0"
"	W522	5	4	7'-3"	Str.			29'-0"
"	W523	5	4	6'-3"	Str.			25'-0"
"	W524	5	4	5'-3"	Str.			21'-0"
"	W525	5	4	4'-3"	Str.			17'0"
"	W526	5	4	3'-3"	Str.			13'-0"
"	W527	5	4	2'-3"	Str.			9'-0"
"	W528	5	4	1'-3"	Str.			5'-0"
"	W529	5	2	12'-6"	Str.			25'-0"
"	W530	5	2	11'-6"	Str.			23'-0"
"	W531	5	2	10'-6"	Str.			21'-0"
"	W532	5	2	9'-6"	Str.			19'-0"
"	W533	5	2	8'-6"	Str.			17'-0"
"	W534	5	2	7'-6"	Str.			15'-0"
Footing	F501	5	4	2'-1"	J	1'-6"	7"	8'-4"
"	F502	5	4	4'-10"	J	4'-3"	7"	19'-4"
"	F503	5	2	7'-10"	J	7'-3"	7"	15'-8"
"	F504	5	4	7'-4"	J	6'-9"	7"	29'-4"
"	F505	5	2	6'-10"	J	6'-3"	7"	13'-8"
"	F506	5	2	6'-7"	J	6'-0"	7"	13'-2"
"	F507	5	2	6'-1"	J	5'-6"	7"	12'-2"
"	F508	5	2	5'-0"	Str.			10'-0"
"	F509	5	2	4'-6"	Str.			9'-0"
"	F510	5	4	4'-3"	Str.			17'-0"
"	F511	5	4	3'-9"	Str.			15'-0"
"	F512	5	4	3'-3"	Str.			13'-0"
"	F513	5	6	2'-6"	Str.			15'-0"
"	F514	5	8	12'-8"	Str.			101'-4"
"	F515	5	4	12'-3"	Str.			49'-0"
"	F516	5	4	11'-0"	Str.			44'-0"
"	F517	5	4	8'-0"	Str.			32'-0"
"	F518	5	6	5'-3"	Str.			31'-6"
"	F519	5	8	3'-0"	Str.			24'-0"
"	F520	5	2	1'-6"	Str.			3'-0"
"	F521	5	2	5'-9"	Str.			11'-6"
"	F522	5	2	7'-0"	Str.			14'-0"
"	F523	5	2	6'-6"	Str.			13'-0"
"	F524	5	2	6'-0"	Str.			12'-0"
"	F525	5	2	5'-6"	Str.			11'-0"
"	F526	5	2	4'-9"	Str.			9'-6"

PROFILE - SAF STILLING BASIN
ELEVATIONS - OUTLET WINGWALL

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

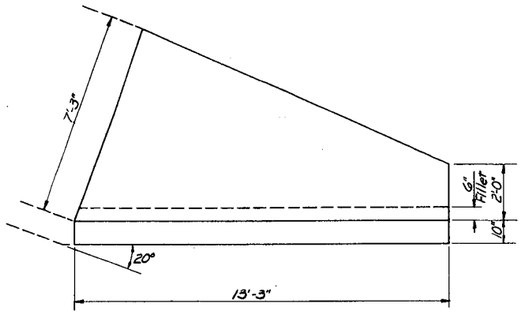
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

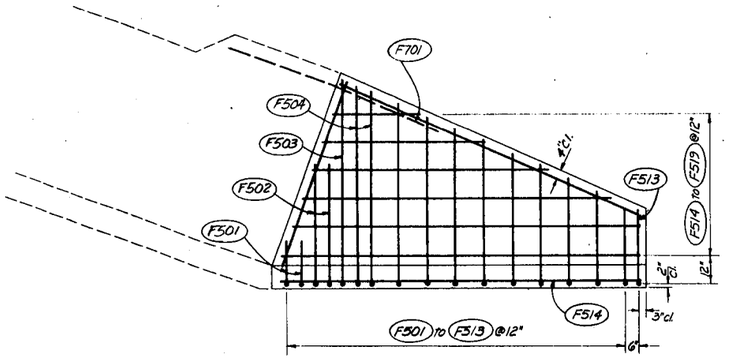
Designed G.S.	Date 8-78	Approved by	
Drawn J.A.M., L.V.C.	10-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 33 of 41	Drawing No. 7-E-24039

USDA SCS-PORTLAND, OR. 1979

FORM SCS-313C

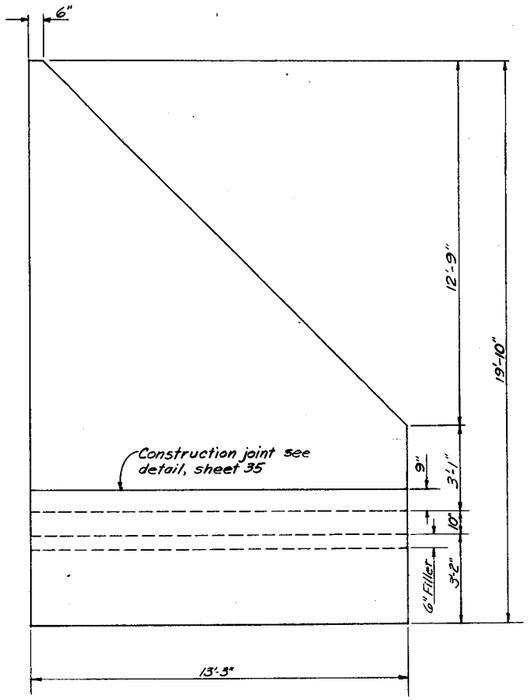


PLAN



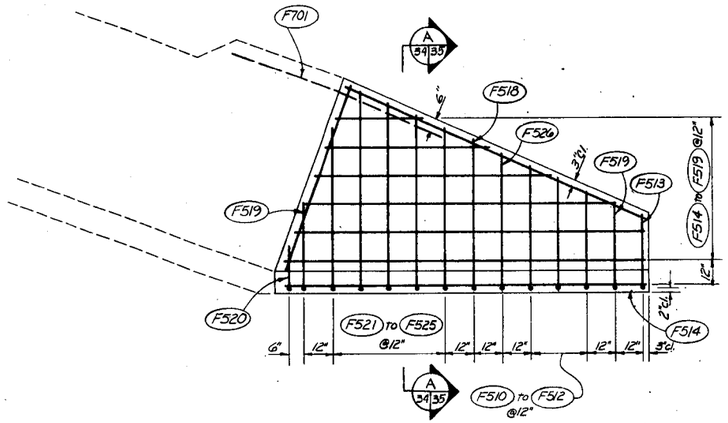
TOP FACE

Note: For steel schedule see sheet 33



ELEVATION

OUTLET WINGWALL



BOTTOM FACE

OUTLET WINGWALL FOOTING PLAN

SCALE IN FEET 0 1 2 3 4 5

Registered Professional Engineer CERTIFICATE NO. 9961 EDWARD LAVIN LOW REGISTERED ARIZONA U. S. A.

Registered Professional Engineer CERTIFICATE NO. 10512 SHIRISH G. PATEL ARIZONA U.S.A.

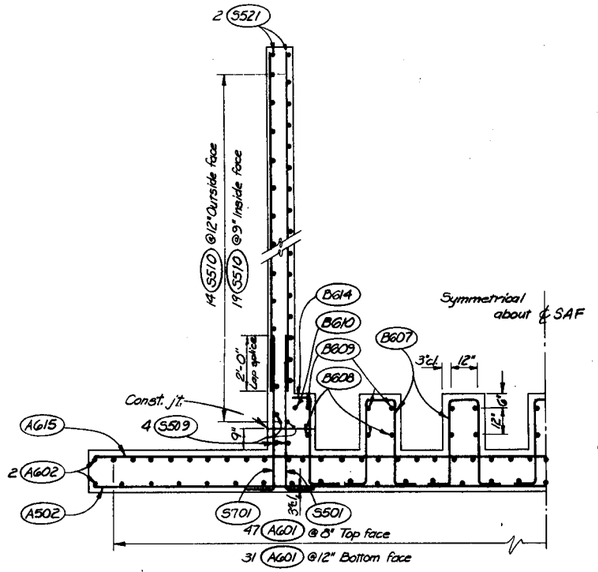
PRINCIPAL SPILLWAY OUTLET
WINGWALL AND FOOTING DETAILS
SADDLEBACK F.R.S.
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

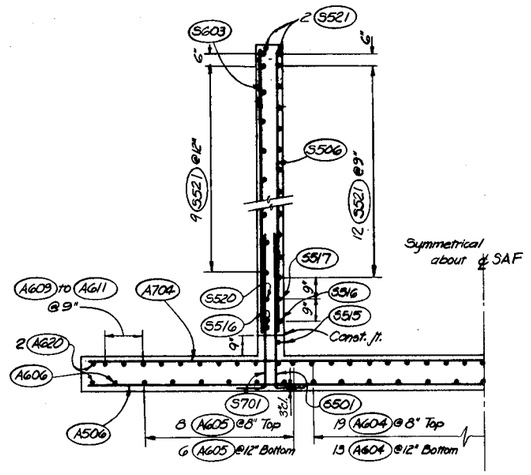
	Date		
Designed G.S.	8-78	Approved by	
Drawn J.A.M., J.W.C.	10-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 34 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

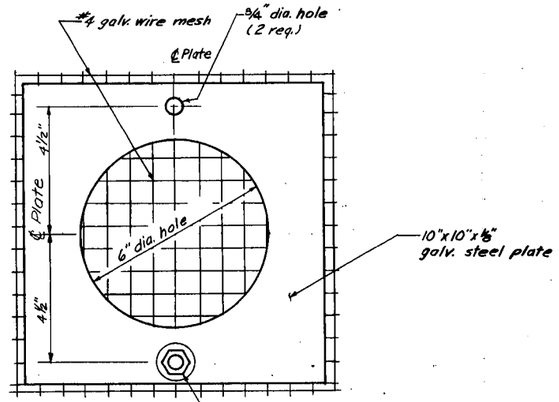
FORM SCS-313C



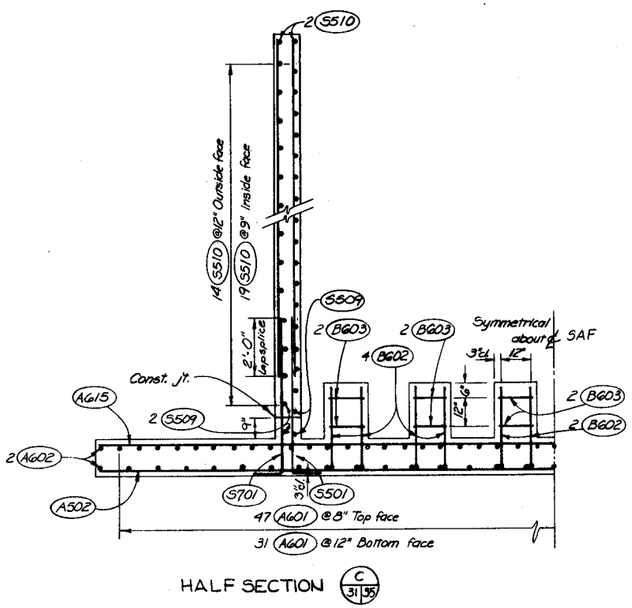
HALF SECTION B 31|35



HALF SECTION A 31|35

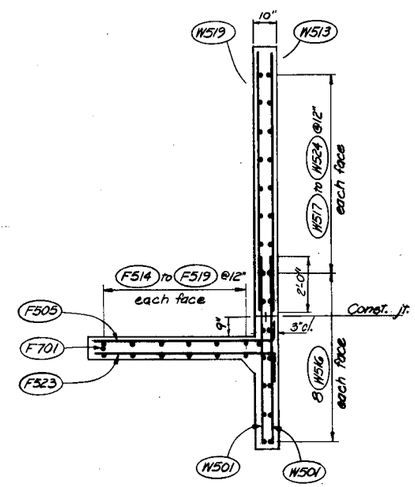


ANIMAL GUARD DETAIL
(4 Required)
N.T.S.



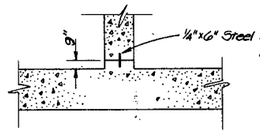
HALF SECTION C 31|35

Note: For sidewall steel schedule, see sheet 32. For remaining steel schedules, see sheet 31.



SECTION A 34|35

Note: For wingwall and footing steel schedules, see sheet 33.



CONSTRUCTION JOINT DETAIL
(N.T.S.)

0 1 2 3 4
SCALE IN FEET

SAF STILLING BASIN - SECTIONS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

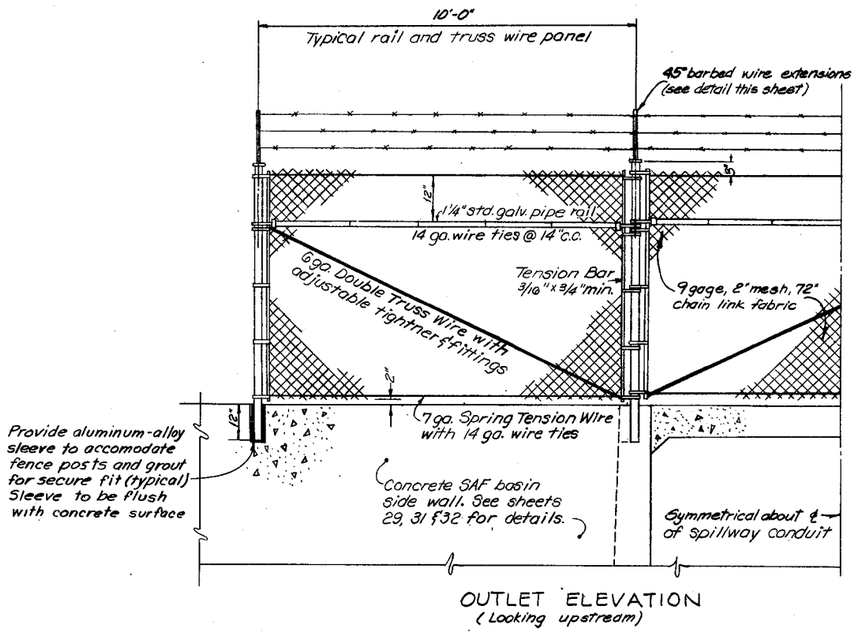
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

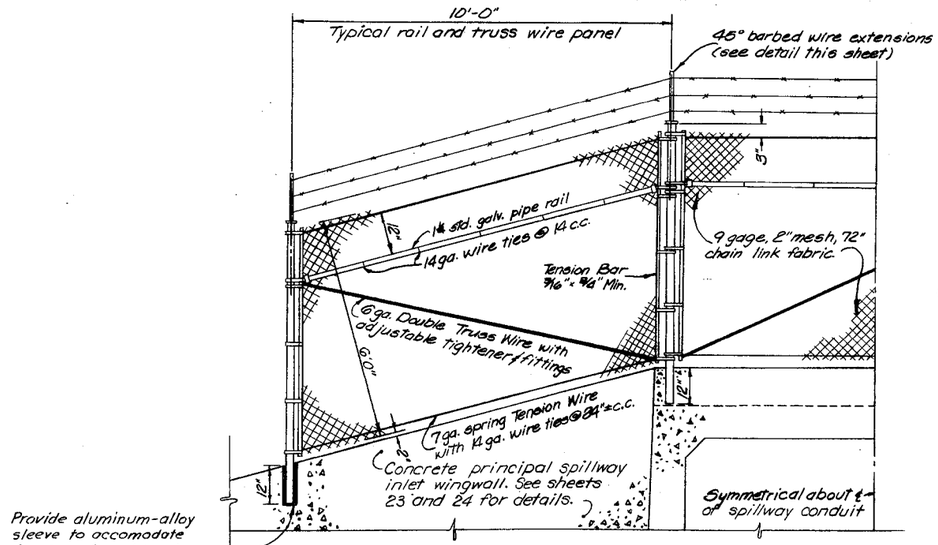
	Date		
Designed G.S.	8-78	Approved by	
Drawn JAM	10-78	Title	
Traced		Title	
Checked G.S.	2-78	Sheet No. 35 of 41	Drawing No. 7-E-24039

FORM SCS-313C

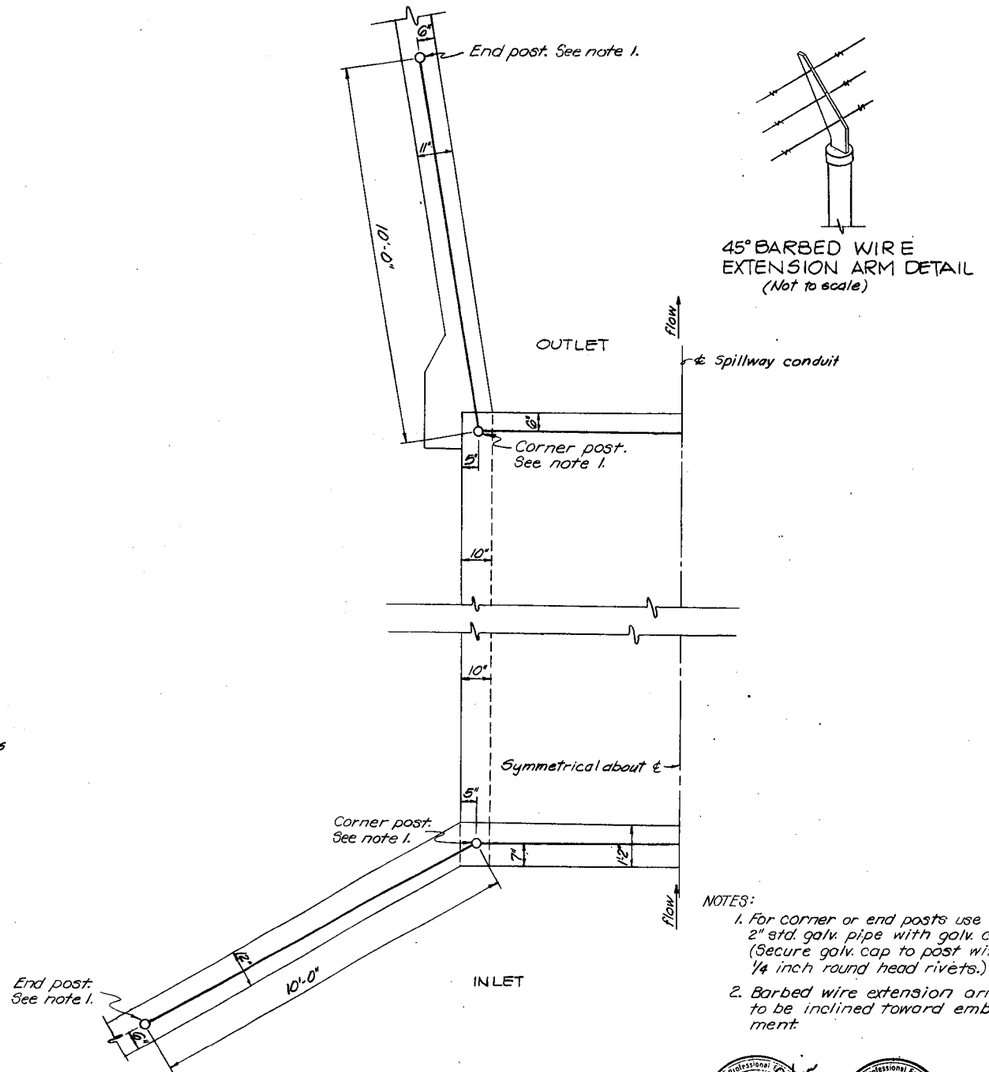
USDA-SCS-PORTLAND, OR 1979



OUTLET ELEVATION
(Looking upstream)



INLET ELEVATION
(Looking downstream)



NOTES:

1. For corner or end posts use 2" std. galv. pipe with galv. cap. (Secure galv. cap to post with 1/4 inch round head rivets.)
2. Barbed wire extension arm to be inclined toward embankment.

2 1 0 2
SCALE IN FEET

CHAIN LINK FENCE DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

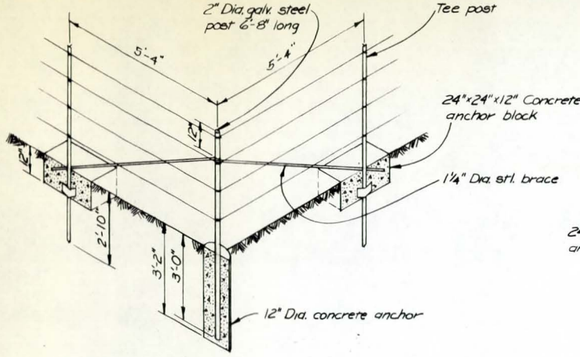
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

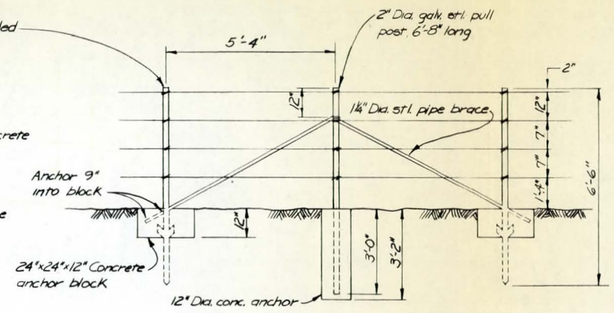
Designed L.W.C.	Date 9-78	Approved by	
Drawn P.E.T., D.B.	9-78	Title	
Traced		Title	
Checked M.P.	2-79	Sheet No. 36 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

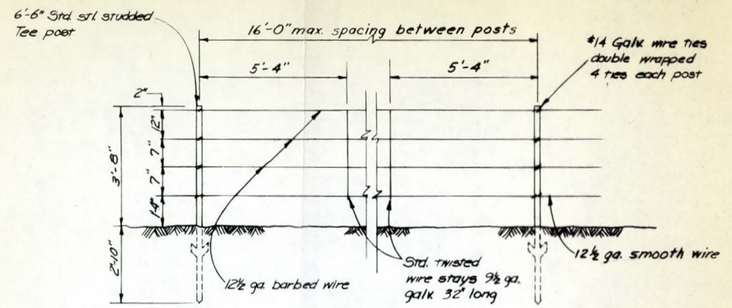
FORM SCS-313C



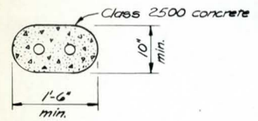
END OR CORNER POST ASSEMBLY



PULL POST OR CHANGE IN GRADE ASSEMBLY

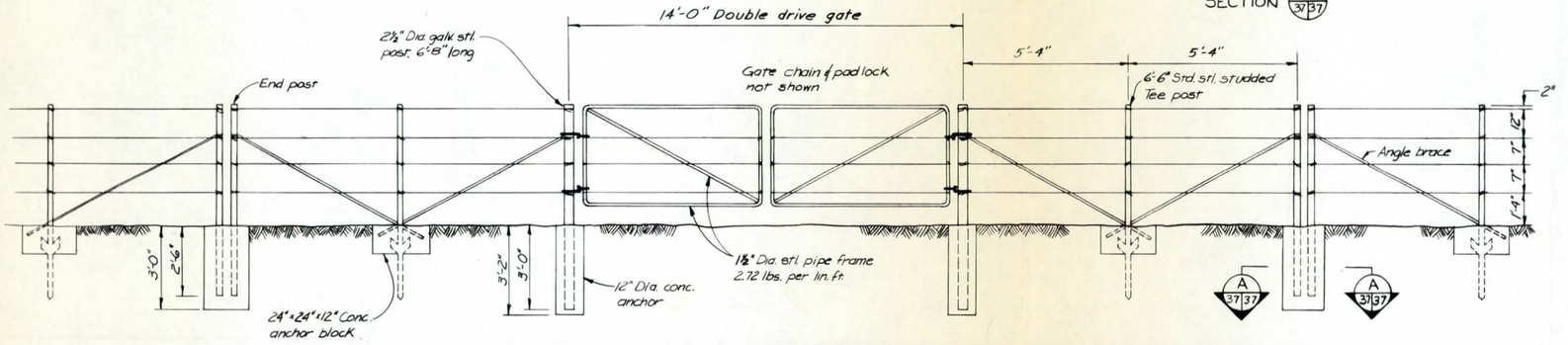


LINE POST ASSEMBLY

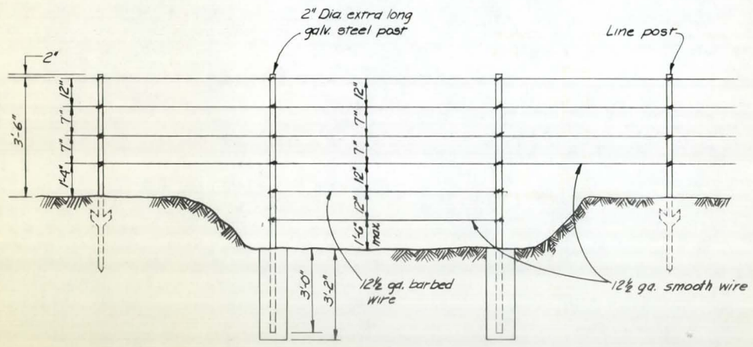


SECTION A 37/37

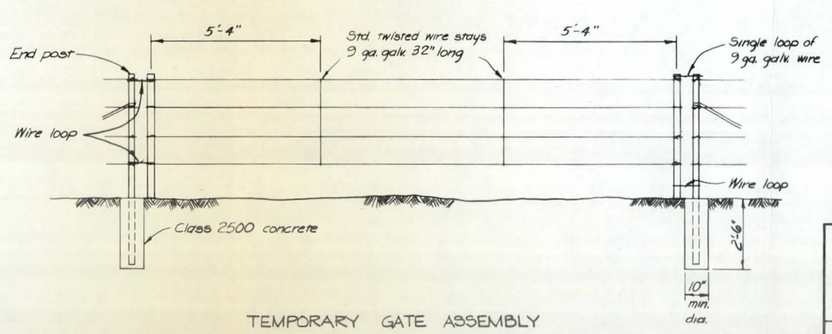
NOTE: See sheet 3 for gate schedule.



PERMANENT ACCESS GATE AND POST ASSEMBLY



WASH OR DEPRESSION CROSSING ASSEMBLY



TEMPORARY GATE ASSEMBLY

FENCING DETAILS

NOT TO SCALE

Date	Revision	By
6-80	Changed bottom wire (barbed to smooth), decreased fence height and wire spacing.	L.C.

BARBED WIRE FENCE DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed A.P.	Date 6-79	Approved by	
Drawn L.R.M.	6-79	Title	
Traced		Title	
Checked A.P.	6-79	Sheet No. 37 of 41	Drawing No. 7-E-24039

SCS-ENG-313C (REV. 6-78)

HARQUAHALA VALLEY WATERSHED

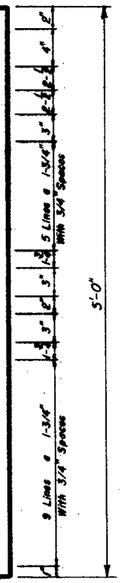
SADDLEBACK FLOODWATER RETARDING DAM

DRAINAGE AREA	22.26 SQ. MILES
FLOOD WATER RETARDING STORAGE	3620 ACRE FT.
WATER SURFACE AREA	760 ACRES
MAXIMUM HEIGHT OF DAM	20.8 FEET
VOLUME OF FILL	690,000 CUBIC YDS.

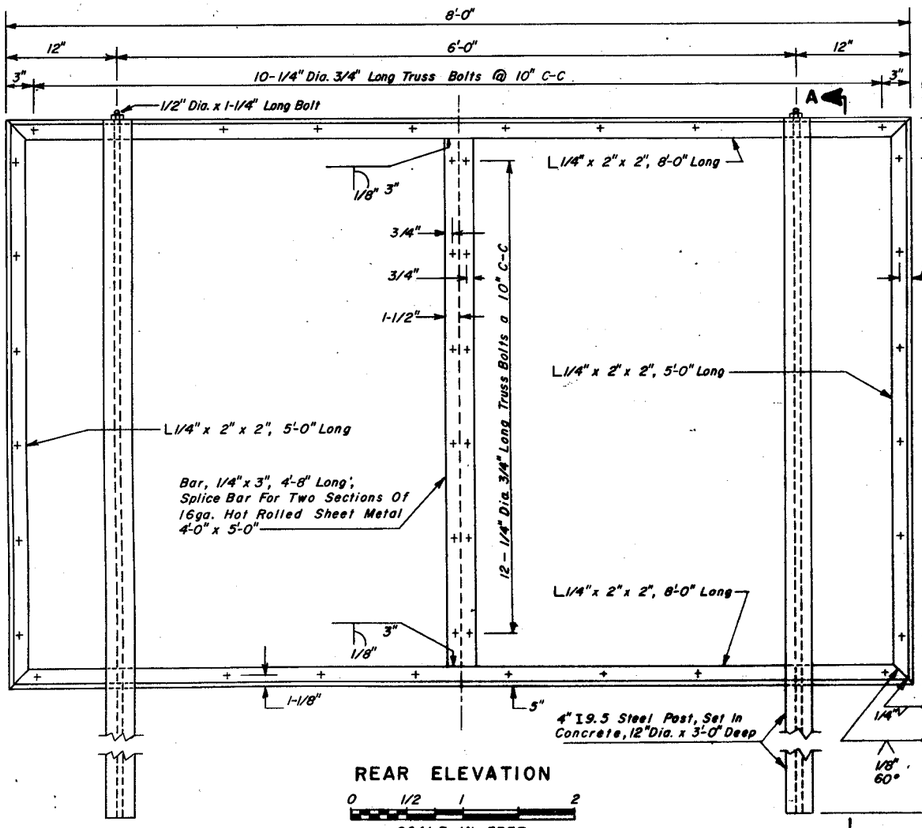
BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

BY

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
BUCKEYE-ROOSEVELT NATURAL RESOURCE CONSERVATION DISTRICT
WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT
WITH THE ASSISTANCE OF
SOIL CONSERVATION SERVICE
OF THE
U.S. DEPARTMENT OF AGRICULTURE
1979



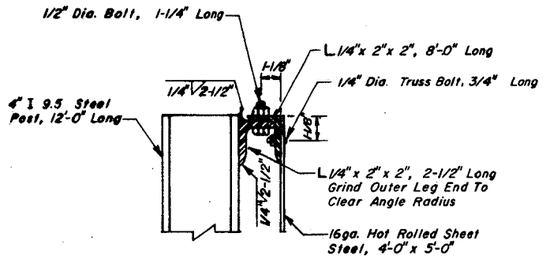
LETTERING LAYOUT



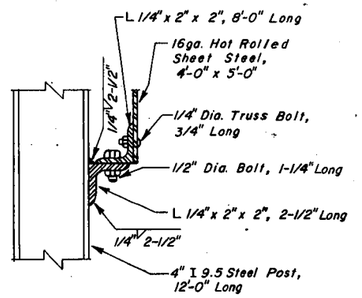
REAR ELEVATION

0 1/2 1 2
SCALE IN FEET

SECTION A-A



DETAIL "A"



DETAIL "B"

0 1/2 1
SCALE IN FEET

Detail "A"

Detail "B"

16ga. Hot Rolled Sheet Steel, 4'-0" x 5'-0", Two Required

NOTE:

1. All bolts shall be installed with lock washers
2. All bolts, nuts, and washers to be galvanized
3. Approved spot or tack welding may be substituted for for truss bolts in securing sign sheet steel sections to frame
4. Frame and base coat for sign shall be painted in accordance with the specifications.
5. All parts shall be painted with base coat before assembly
6. Background of sign shall be painted with an approved white enamel
7. Letters shall be painted with an approved dark green enamel
8. Field location of sign is shown on sheet 20.

Registered Professional Engineer — Certificate No. 9363 — Edward L. Jin — Arizona — Signed 5/5/79 — Arizona U.S.A.

Registered Professional Engineer — Certificate No. 10512 — Ashok A. Mantel — Signed 4/3/79 — Arizona U.S.A.

IDENTIFICATION SIGN

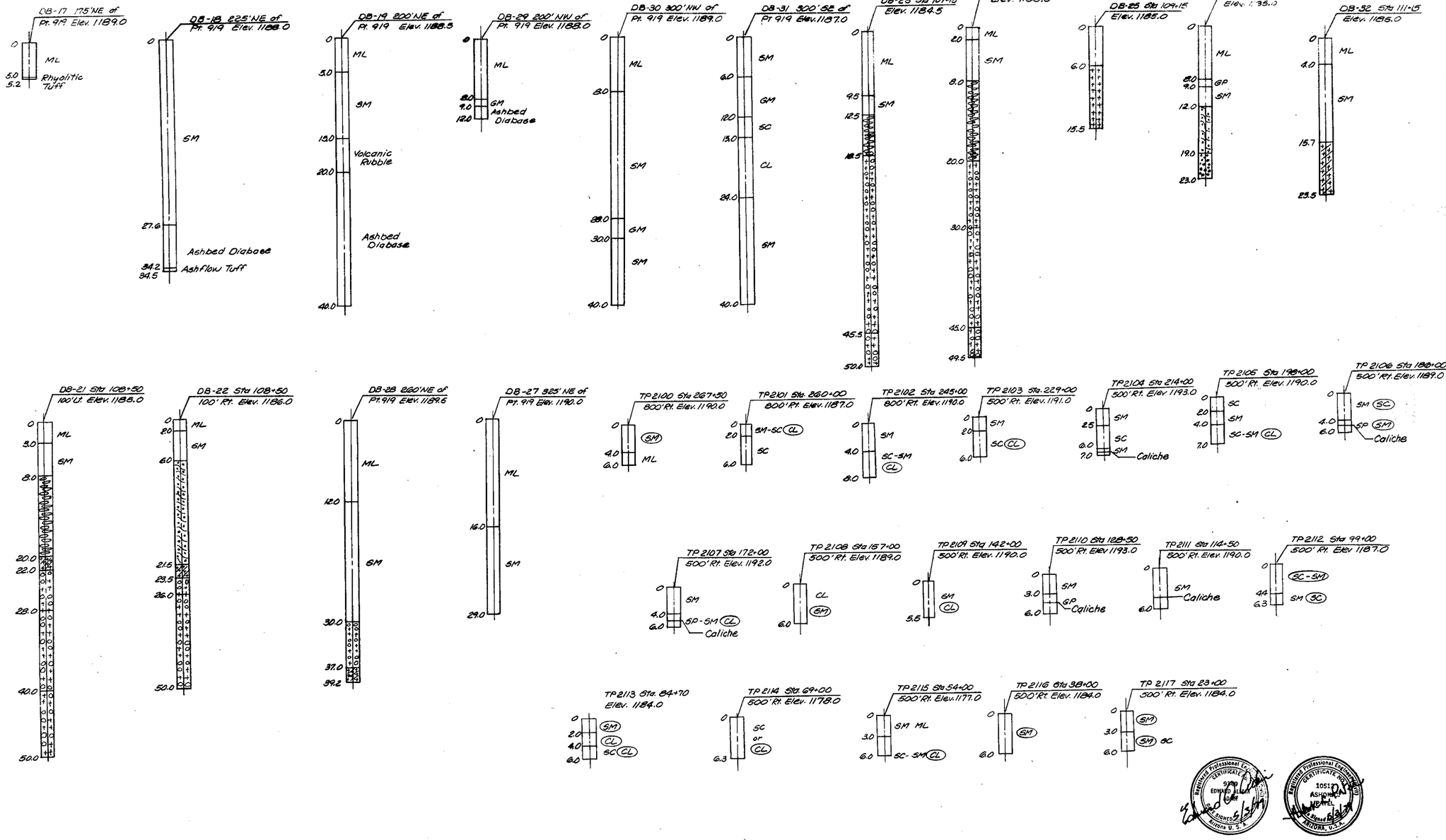
SADDLEBACK F.R.S.
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed SOIL CONSERVATION SERVICE		Approved by:
Drawn SCS, L.J.C.	7-78	Title
Traced L.J.C.	7-78	Title
Checked A.P., E.A.A.	7-78	Sheet No. 38 of 41 — Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR 1979

FORM SCS-313C



LOG OF ADDITIONAL TEST HOLES & TEST PITS.

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

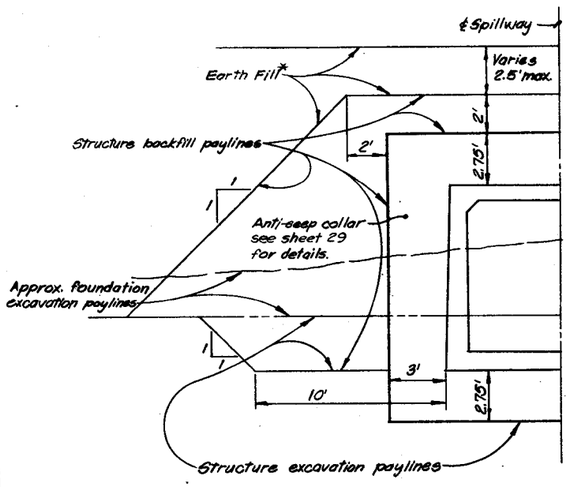
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed		Approved by	
Drawn D.B.	7-78	Title	
Traced D.B.	7-78	Title	
Checked A.P.	8-78	Sheet No. 39 of 41	Drawing No. 7-E-24039

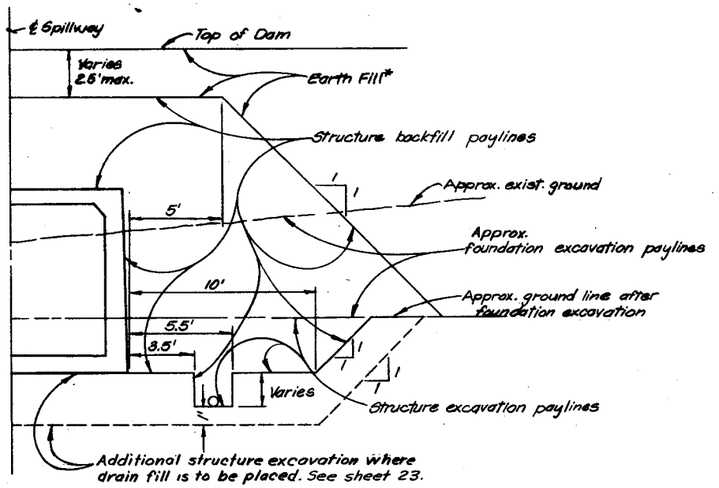
FORM SCS-313 C

USDA-SCS-PORTLAND, OR. 1979

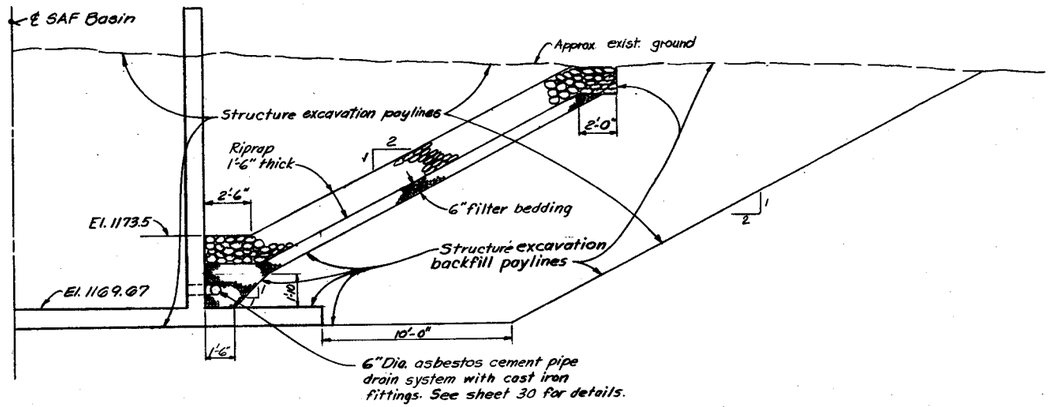


PRINCIPAL SPILLWAY
AT ANTI-SEEP COLLAR
STA. 0+93.00

* For earth fill types see Typical Cross Section sheet 4



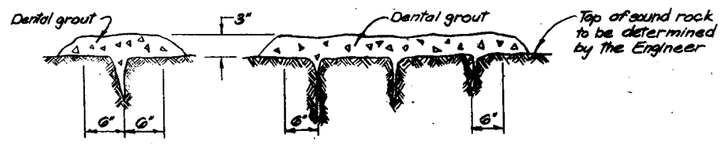
PRINCIPAL SPILLWAY
WITH DRAIN SYSTEM
STA. 0+74.=



PRINCIPAL SPILLWAY
SAF OUTLET
STA. 0+13±

PAY SECTIONS

4 3 2 1 0 4
SCALE IN FEET



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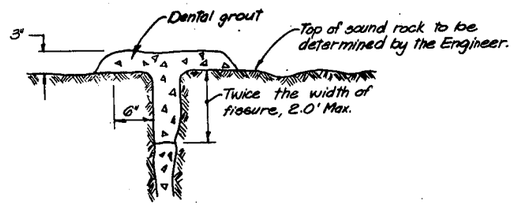
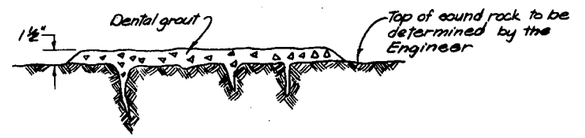
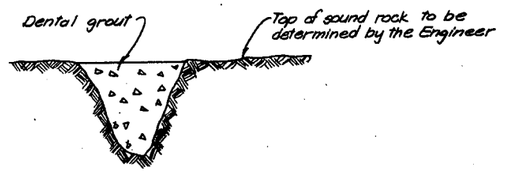


FISSURES



TYPICAL SURFACE FRACTURES



HOLE OR SOLUTION CHANNELS

TYPICAL TREATMENT OF ROCK SURFACE
(N.T.S.)

PAY LIMITS AND MISCELLANEOUS DETAILS

SADDLEBACK F.R.S.

HARQUAHALA VALLEY W.P.P.

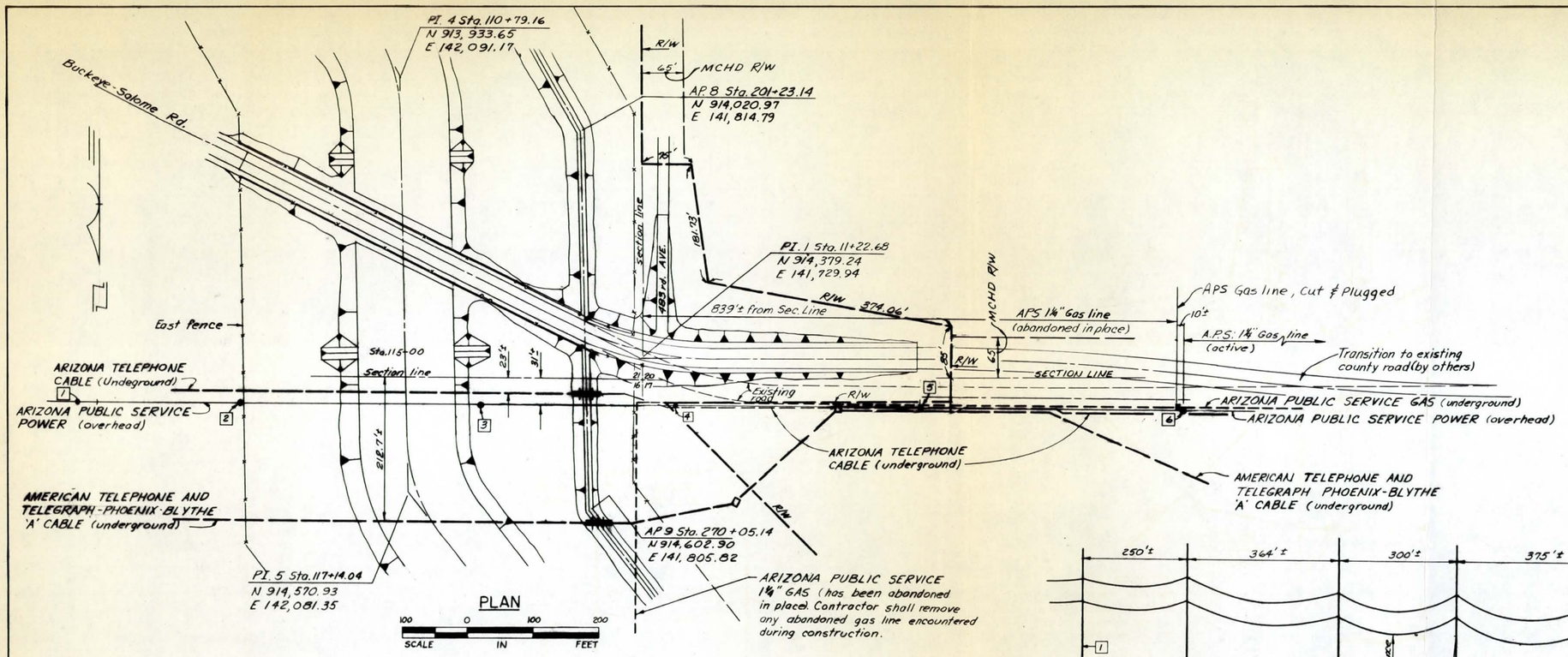
MARICOPA COUNTY, ARIZONA

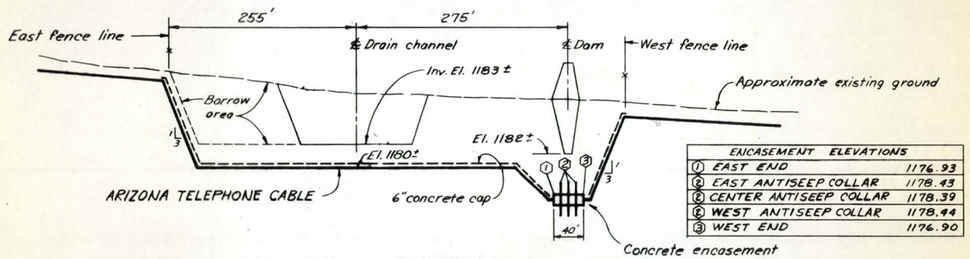
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed A.P.	6-78	Approved by	
Drawn A.B., L.V.C.	7-78	Title	
Traced		Title	
Checked A.P.	2-79	Sheet No. 40 of 41	Drawing No. 7-E-24039

USDA-SCS-PORTLAND, OR. 1979

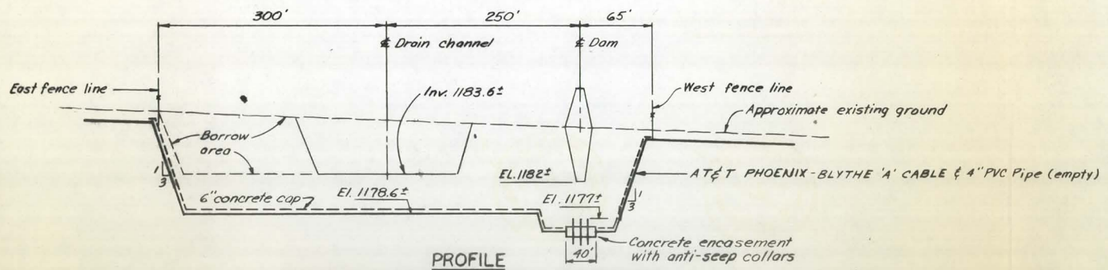
FORM SCS-313C



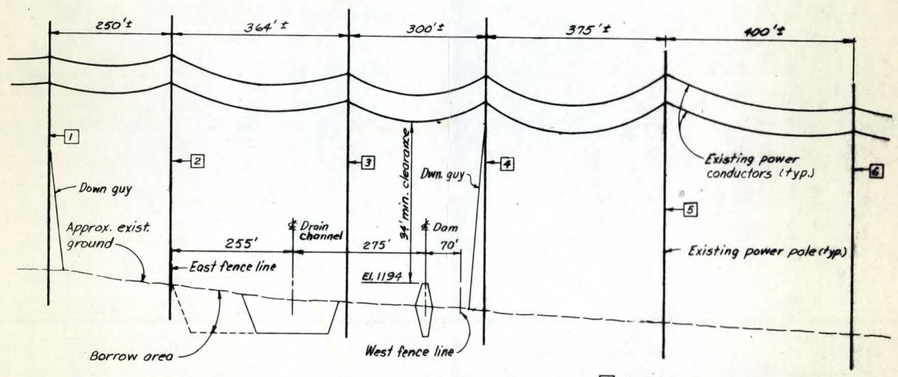


ENCASEMENT ELEVATIONS	
① EAST END	1176.93
② EAST ANTISEEP COLLAR	1178.43
③ CENTER ANTISEEP COLLAR	1178.39
④ WEST ANTISEEP COLLAR	1178.44
⑤ WEST END	1176.90

PROFILE
ARIZONA TELEPHONE
(Looking south)



PROFILE
AMERICAN TELEPHONE AND TELEGRAPH
(Looking south)



[4] Indicates pole number see plan.

PROFILE
APS OVERHEAD POWER
N.T.S.
(Looking south)

NOTES:
1. All utility locations are approximate unless otherwise noted.

UTILITY RELOCATION
NOT PART OF THIS CONTRACT.
FOR INFORMATION ONLY.

LOCATION:
This utility crossing area is along Buckeye-Salome Road near N.E. Corner of Section 20 T2N-R8W, see sheets 9 & 20.

Date	Revision	By
6-80	Rev. road alignment	LC

Registered Professional Engineer CERTIFICATE 9349 EDWARD A. LLEWELLYN Phoenix Arizona U.S.A. 5/28/80

Registered Professional Engineer CERTIFICATE 12834 WOODROW S. SCOUTTEN, JR. Phoenix Arizona U.S.A. 5/28/80

UTILITY CROSSINGS - BUCKEYE SALOME ROAD
SADDLEBACK F.R.S.
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed		Approved by	
Drawn	L.V.C. 5-80	Title	
Traced		Title	
Checked	W.C.S. 5-80	Sheet No. 41 of 41	Drawing No. 7-E-24039

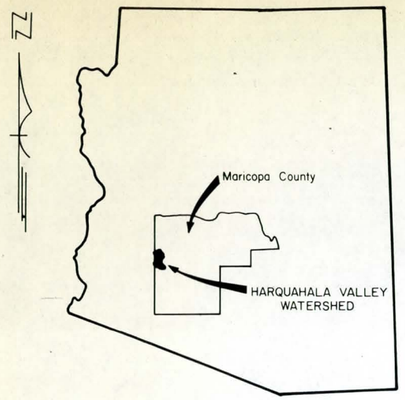
FORM SCS-313C

HARQUAHALA VALLEY WATERSHED
PROTECTION AND FLOOD PREVENTION PROJECT

MARICOPA COUNTY ARIZONA

PLANS FOR THE CONSTRUCTION OF

SADDLEBACK DIVERSION



PREPARED FOR THE

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
BUCKEYE-ROOSEVELT NATURAL RESOURCE CONSERVATION DISTRICT
WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT

BY

SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

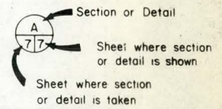
INDEX OF DRAWINGS

GENERAL NOTES

1. Correlation of material between test holes is inferred. Thickness of loose surface material may vary and the occurence of other soil units is possible.
2. All existing conditions are to be verified in the field prior to construction and any adjustment from drawings to be made as directed by the engineer.
3. All utilities as shown on plan are approximate. It shall be the responsibility of the contractor to field verify locations of all utilities and to coordinate construction with the respective utility companies.
4. Elevations are in feet above mean sea level U.S.G.S. datum.
5. All stationing refers to centerline of construction and is the measured horizontal distance.
6. All soil classification symbols shown are based on the Unified Soil Classification system. Field identification was used except where indicated by an asterisk (*). This denotes laboratory classification. Logs and descriptions are abridged. Complete drilling logs, laboratory reports and geology report are available for inspection at the project office

STRUCTURAL NOTES

1. Exposed concrete edges shall be chamfered one inch or rounded.
2. Reinforcing bar spacing is center to center of bars. Bar cover is clear distance between surface of bar and face of concrete and shall be two inches for formed and top surfaces and three inches for surfaces placed against the earth unless otherwise shown.
3. In sections with a single mat of reinforcing, the steel shall be positioned in the center of the section unless otherwise shown.
4. Bar splices shall be lapped a minimum of 30 bar diameters of the smaller bar but not less than 12 inches, unless specifically shown otherwise.
5. All exposed metal including anchor bolts, nuts, washers, etc. shall be galvanized unless otherwise noted.



PRC TOUPS CORPORATION
4131 N. 24 STREET
PHOENIX, ARIZONA

Registered Professional Engineer — Certificate No. 10512 — Arizona U.S.A. — Signed 3/19/79

Registered Professional Engineer — Certificate No. 9347 — Edward L. Ahn — Signed 3/19/79 — Arizona U.S.A.

WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT
APPROVED
DATE 3/22/79 Chairman - Board of Supervisors

BUCKEYE-ROOSEVELT NATURAL RESOURCE CONSERVATION DISTRICT
APPROVED
DATE John E Fannin Chairman - Board of Supervisors

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
APPROVED.
DATE 5-14-79 Chief Engineer and General Manager

REVISIONS		
6-80	Rev. fence details-Sheet 27	LC
Date	Description	By

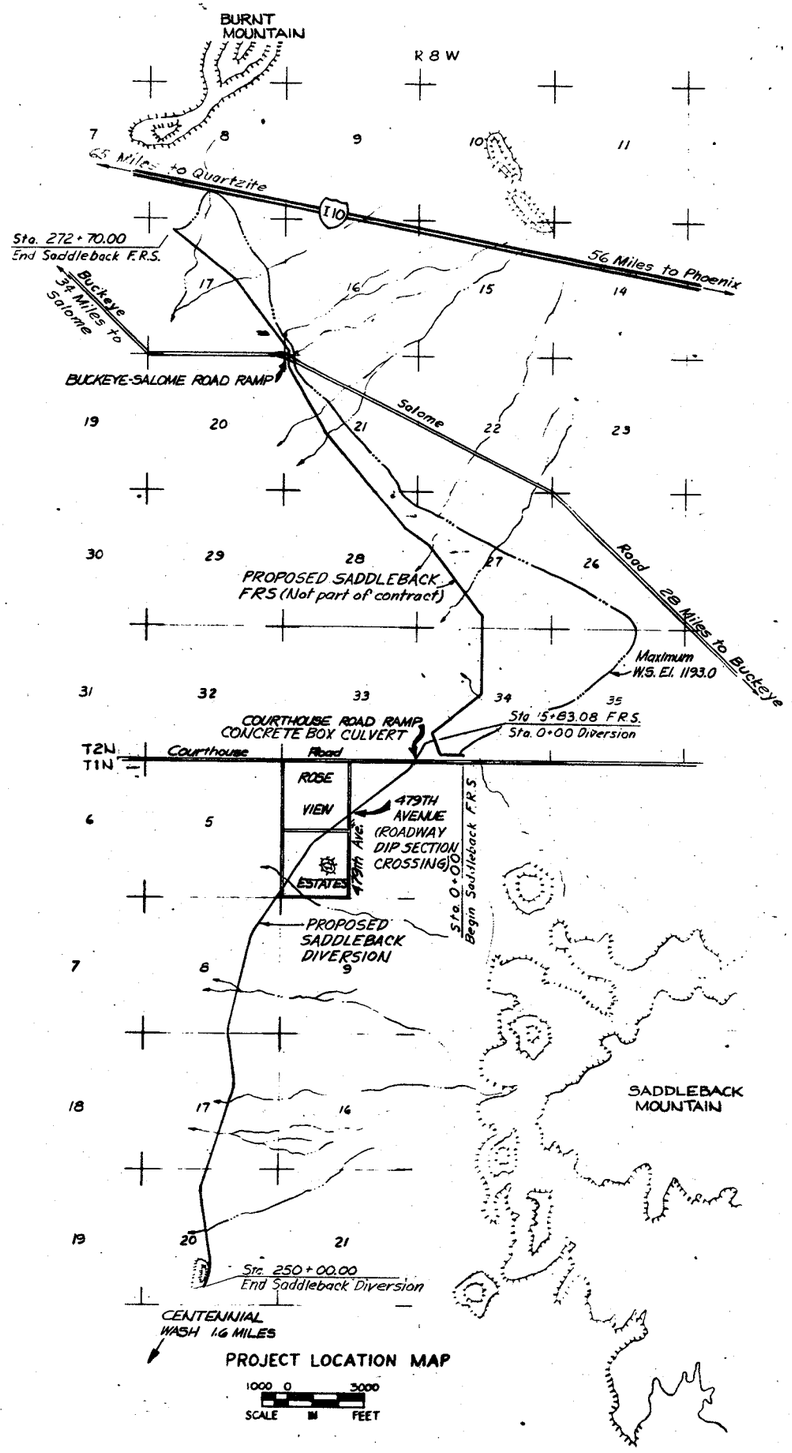
INDEX OF DRAWINGS
SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY ARIZONA

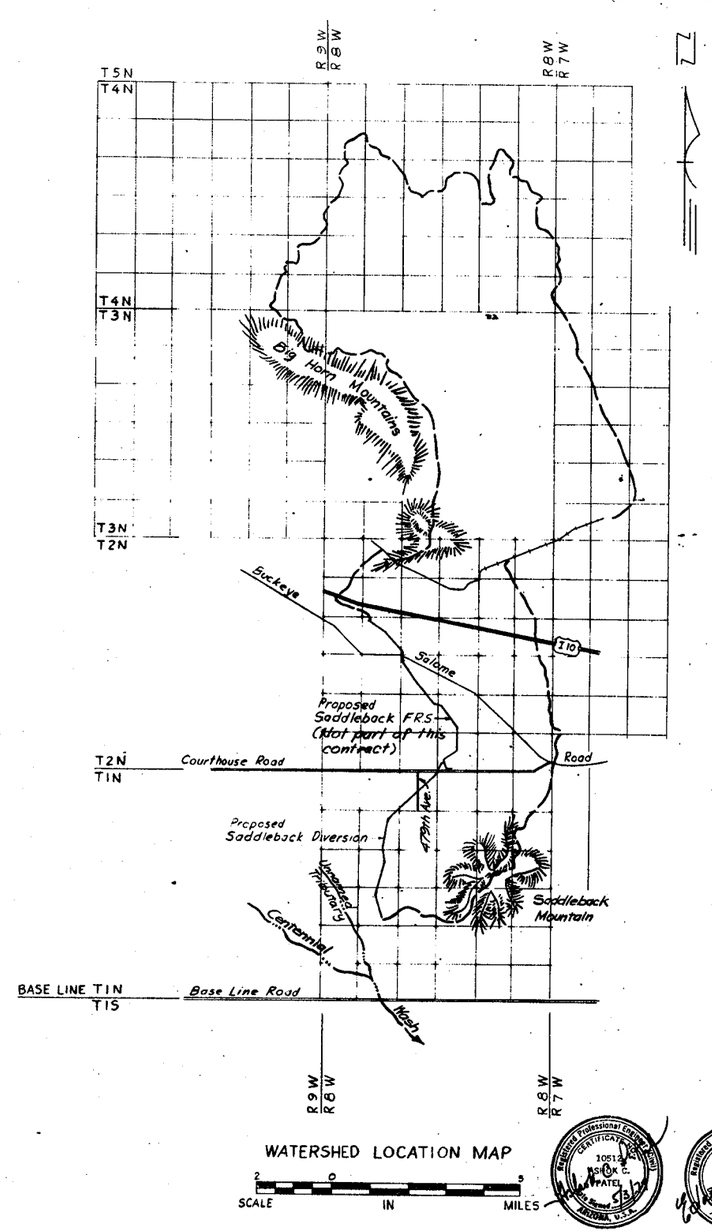
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date
Designed	P.R.C. TOUPS CORPORATION	2-79
Drawn	P.R.C. TOUPS CORPORATION	2-79
Traced	L.J.C.	2-79
Checked	A.P., E.A.A.	2-79

Approved by Ralph M Cannon for — Title STATE CONS. ENGINEER
Title Head Engin. Staff 4/79
Sheet No 1 of 29
Drawing No. 7-E-24040

SCS-ENG-313C (REV. 6-79)





LOCATION MAP

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed		Approved by	
Drawn L.L.C., J.A.M.	6-76	Title	
Traced		Title	
Checked A.P., E.R.A.	11-76	Sheet No 2 of 2	Drawing No. 7-E-24040

USDA SCS PORTLAND, OR 1975

FORM SCS-353C

N 900,000 N 895,000 N 890,000 E 150,000 N 885,000 N 880,000 E 145,000

E 150,000 N 905,000 E 145,000 E 140,000 E 135,000 E 130,000 N 890,000

RIGHT OF WAY DATA TABLE		
Diversion Station	Offset Left	Offset Right
(P.T.) 16+70.09	140	200
27+00	110	
45+50		252
46+00		325
47+50		256
(P.C.) 60+37.15	145	280
(P.T.) 65+17.61	145	280
70+00	165	
(P.C.) 100+69.43	195	330
(P.T.) 115+94.68	195	420
(P.C.) 140+90.92	230	480
(P.T.) 149+10.85	230	500
(P.C.) 159+47.27	245	520
(P.T.) 177+40.81	245	560
(P.C.) 202+74.10	280	595
(P.T.) 220+32.64	255	595
229+00	210	595
230+30	210	595
233+85	220	
235+90	480	
237+70		370
248+80	560	
250+70	270'	490'

GATE SCHEDULE			
℄ Diversion Station	Offset Left	Offset Right	Type
9+72± to 9+79±		31' to 42'	Access
10+69± to 10+77±		61' to 73'	"
45+93± to 46+02±		202' to 190'	"
46+55± to 46+55±		253' to 239'	"
47+05± to 47+60±	65'	60'	Flood
48+10± to 51+18±	85'	42'	"
110+70	105'	100'	"
110+70		121' to 135'	Access
111+00	105'	100'	Flood
111+00		121' to 135'	Access
139+85	120'	116'	Flood
139+85		142' to 156'	Access
140+15	120'	116'	Flood
140+15		142' to 156'	Access
204+85	160'	155'	Flood
204+85		178' to 192'	Access
205+15	160'	155'	Flood
205+15		178' to 192'	Access
243+93± to 244+07±	270'		"
250+70± to 251+00±	270'	280	Flood

Note: See sheets 5 to 11 for fence location.

Sta 0+00 Diversion
N 899,217.10
E 147,699.85

P.I. 1 Sta 2+82.88
N 899,122.95
E 147,433.10

P.I. 2 Sta. 14+82.08
N 898,088.75
E 146,801.32

A.P. Sta. 7+59.70
N 898,706.30
E 147,175.66

A.P. Sta 10+59.70
N 898,448.62
E 147,022.38

A.P. Sta. 25+00.32
N 897,473.85
E 145,984.00

P.I. 3 Sta. 62+78.58
N 895,176.06
E 142,984.77

A.P. Sta. 86+91.87
N 893,295.220
E 141,486.198

P.I. 4 Sta. 108+49.88
N 891,598.28
E 140,185.51

P.I. 5 Sta. 145+03.60
N 887,950.27
E 139,584.58

P.I. 6 Sta. 168+58.47
N 885,610.18
E 139,892.69

P.I. 7 Sta. 211+68.62
N 881,470.65
E 138,592.13

Dip crossing see sht. 66 & 24 47th Ave

Saddleback F.R.S.

S 70°33'36" W

S 63°38'16" W

S 53°02'41" W

S 63°40'47" W

S 38°30'38" W

S 08°36'17" W

S 07°20'32" E

S 17°20'31" W

RIGHT OF WAY ACQUISITION

SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed C.K.S., D.E.W.	6-78	Approved by
Drawn L.J.C., J.A.M.	8-78	Title
Traced		Title
Checked A.L., E.E.A.	11-78	Sheet No. 3 of 29

Drawing No. 7-E-24040

AERIAL MAPPING COMPANY, INC. PHOENIX, ARIZONA

1000 0 1000 2000 3000

SCALE 1" = 1000'

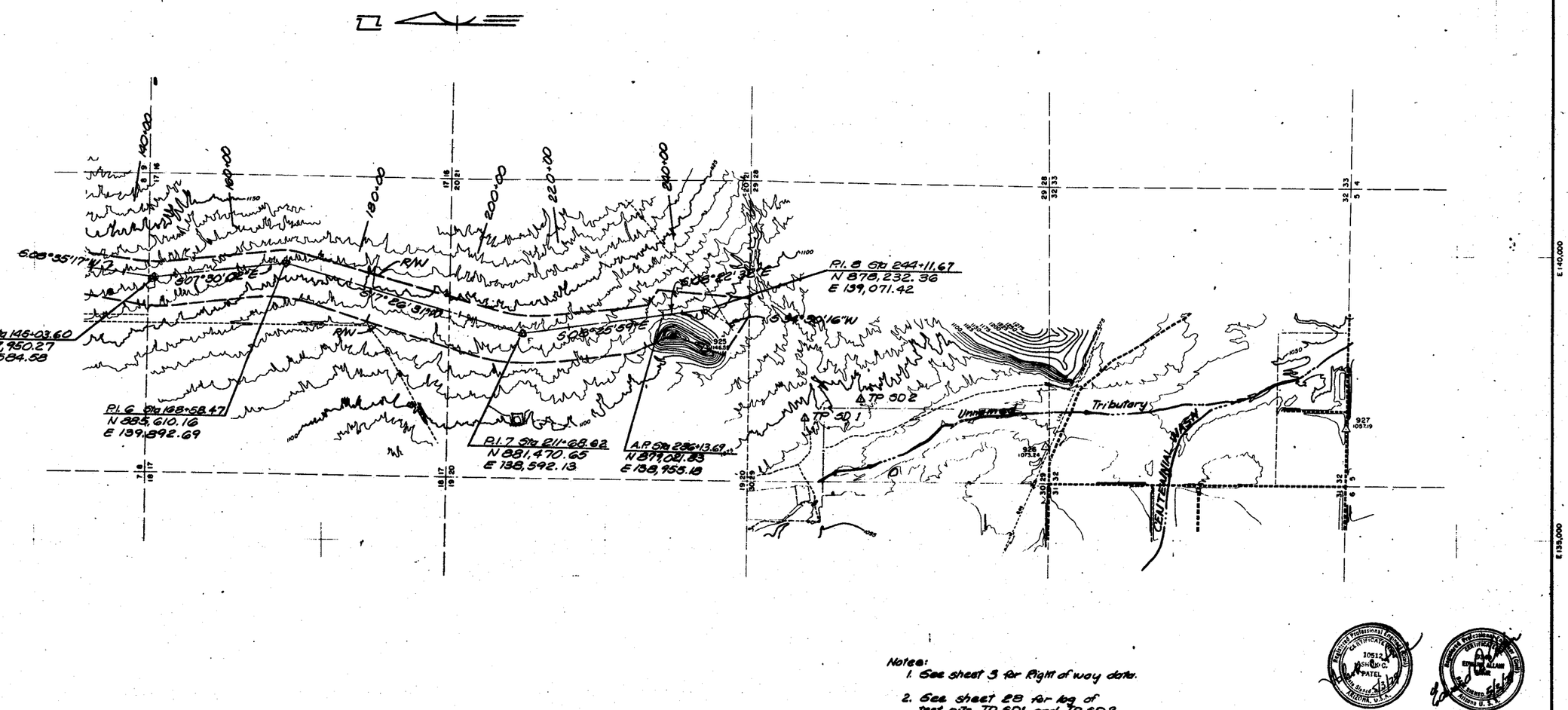
CONTOUR INTERVAL 5 FEET

USDA SCS PORTLAND, OR 1979

DIKE EXCAVATION SCHEDULE

Stations	*Approx. Depth	Bottom Width
123+00 to 125+00	5'	12'
125+00 to 127+00	5'	12'
134+50 to 145+00	5'	12'
161+00 to 178+50	4'	12'
134+00 to 185+50	5'	12'
189+50 to 199+50	4'	12'
225+50 to 236+50	5'	12'

*Final dike foundation to extend into caliche or firm material as directed by the Engineer.



Notes:
1. See sheet 3 for Right of way data.
2. See sheet 28 for log of test pits TP SO1 and TP SO2.

AERIAL MAPPING COMPANY, INC. PHOENIX, ARIZONA

RIGHT OF WAY ACQUISITION

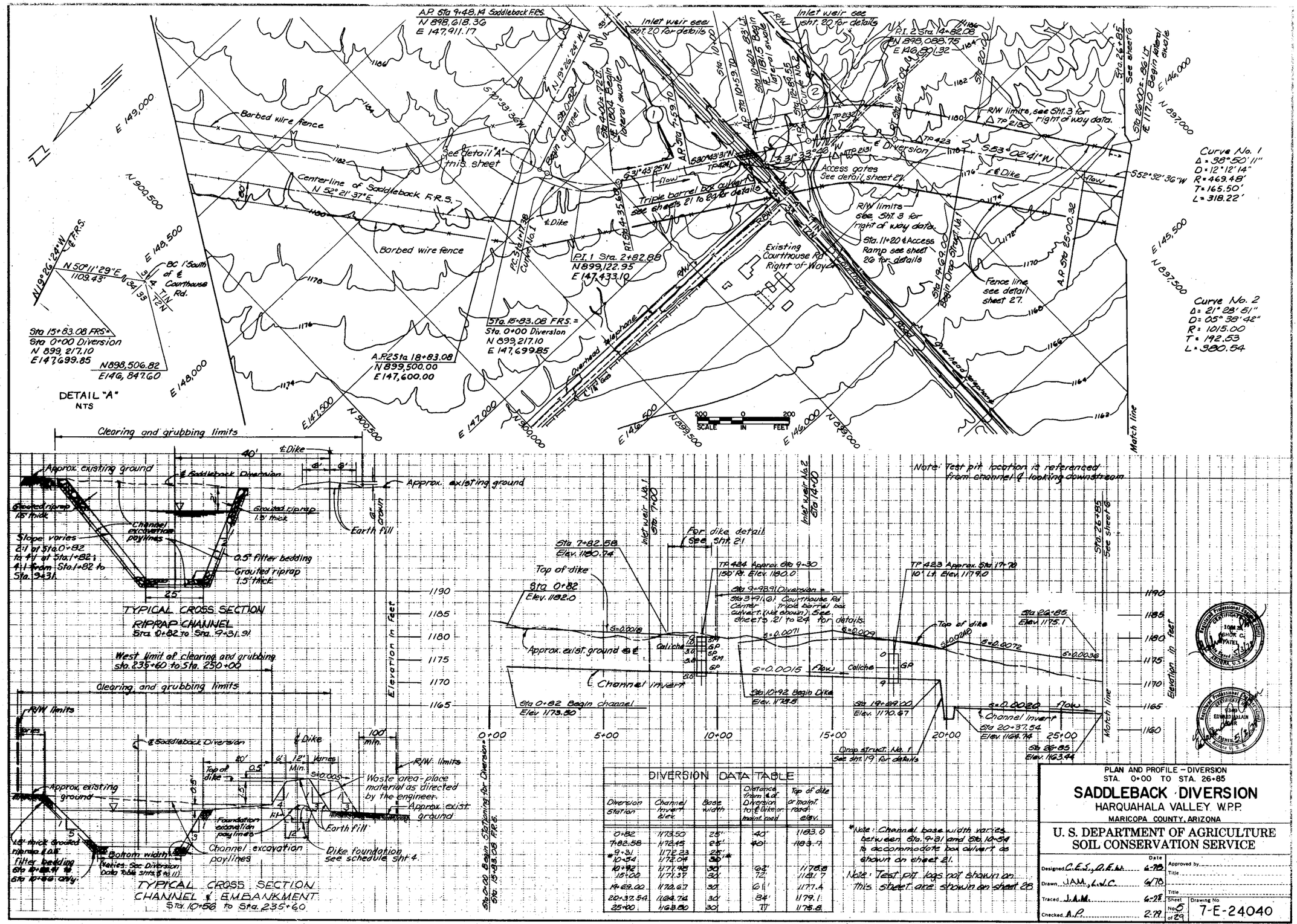
SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

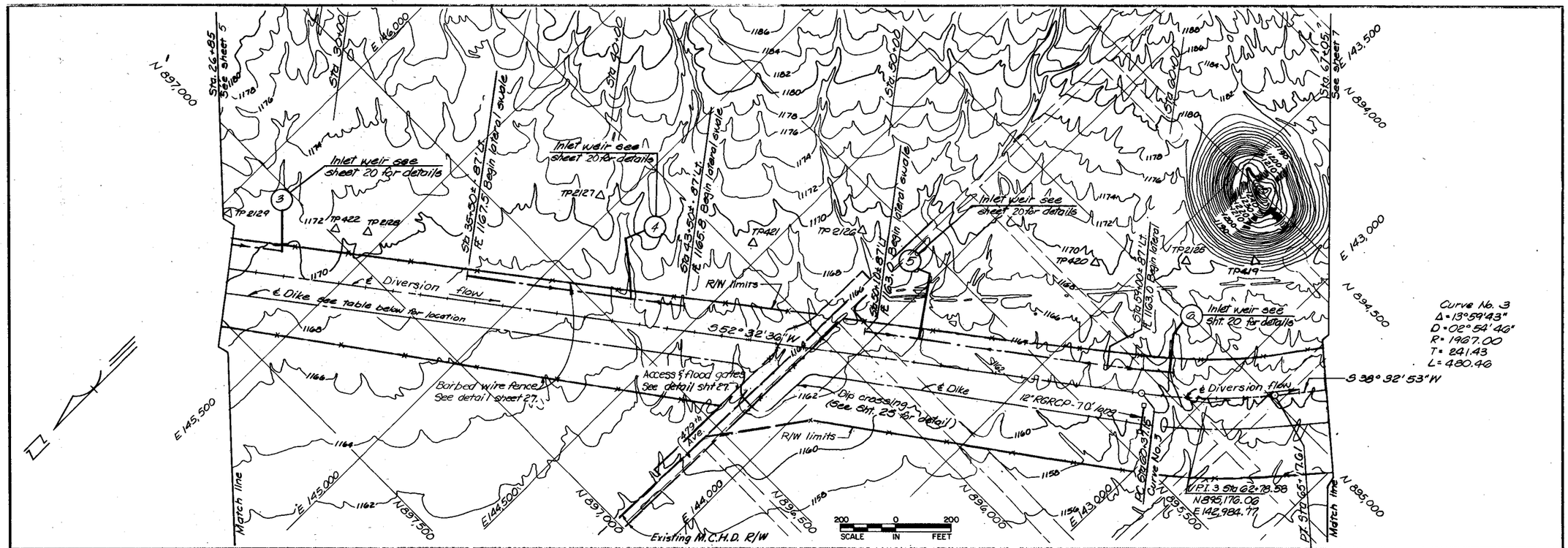
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

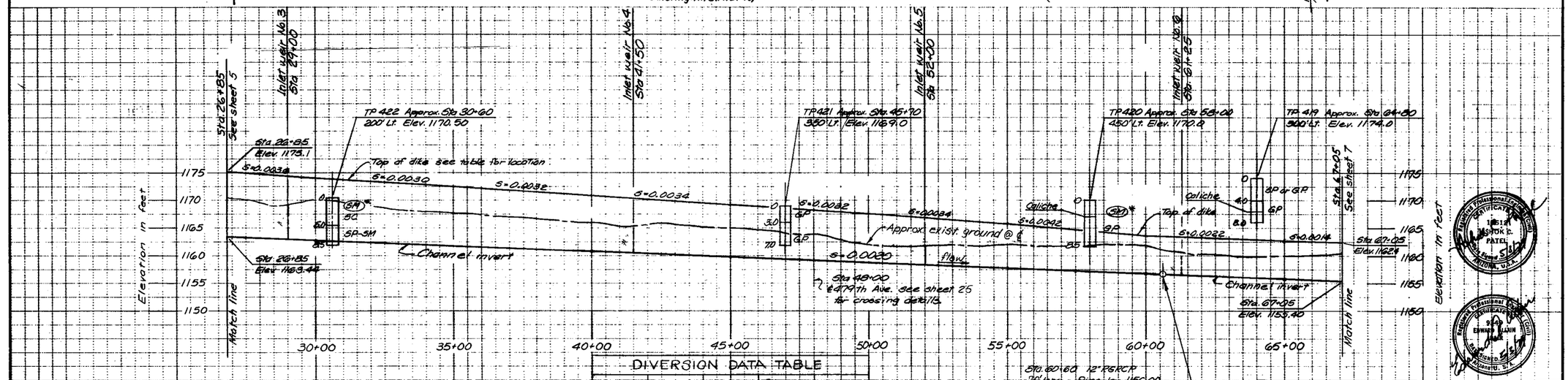
	Date	
Designed C.E.S., D.E.W.	6-78	Approved by
Drawn L.A.C.	6-78	Title
Traced		Title
Checked A.P., E.D.A.	11-78	Sheet No. 4 of 28 — Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR 1979



Diversion Station	Channel invert elev.	Base width	Distance from ℄ of Diversion to ℄ Dike or maint. road	Top of dike or maint. road elev.
0+82	1173.50	25'	40'	1183.0
7+82.58	1178.15	25'	40'	1183.7
9+31	1178.23	25'		
*10+54	1178.04	30'		
10+92	1177.98	30'	62'	1178.8
15+00	1171.39	30'	72'	1181.7
19+69.00	1172.67	30'	61'	1177.4
20+37.54	1164.74	30'	84'	1179.1
25+00	1163.80	30'	77'	1175.8





DIVERSION DATA TABLE

Diversion Station	Channel invert elev.	Base width	Distance from ℄ of diversion to ℄ dike	Top of dike elev.
30+00	1162.8	38.75	79'	1174.0
35+00	1161.8	47.60	82'	1172.5
40+00	1160.8	56.25	84'	1170.9
45+00	1159.8	65.00	95'	1169.2
50+00	1158.8	73.75	95'	1167.6
55+00	1157.8	82.50	95'	1165.9
60+00	1156.8	91.25	95'	1164.8
65+00	1155.8	100.00	97'	1162.7

Sta 60+60 12" RGRCP 70' long Pipe Inv. 1156.00 Vegetative Maintenance Conduit See sheets 12, 13, 15, 17 & 20 for details

Notes:
1. Test pit location is referenced from channel ℄ looking downstream.
2. Test pit logs not shown on this sheet are shown on sheet 28.
3. See sheet 4 for dike foundation excavation schedule.

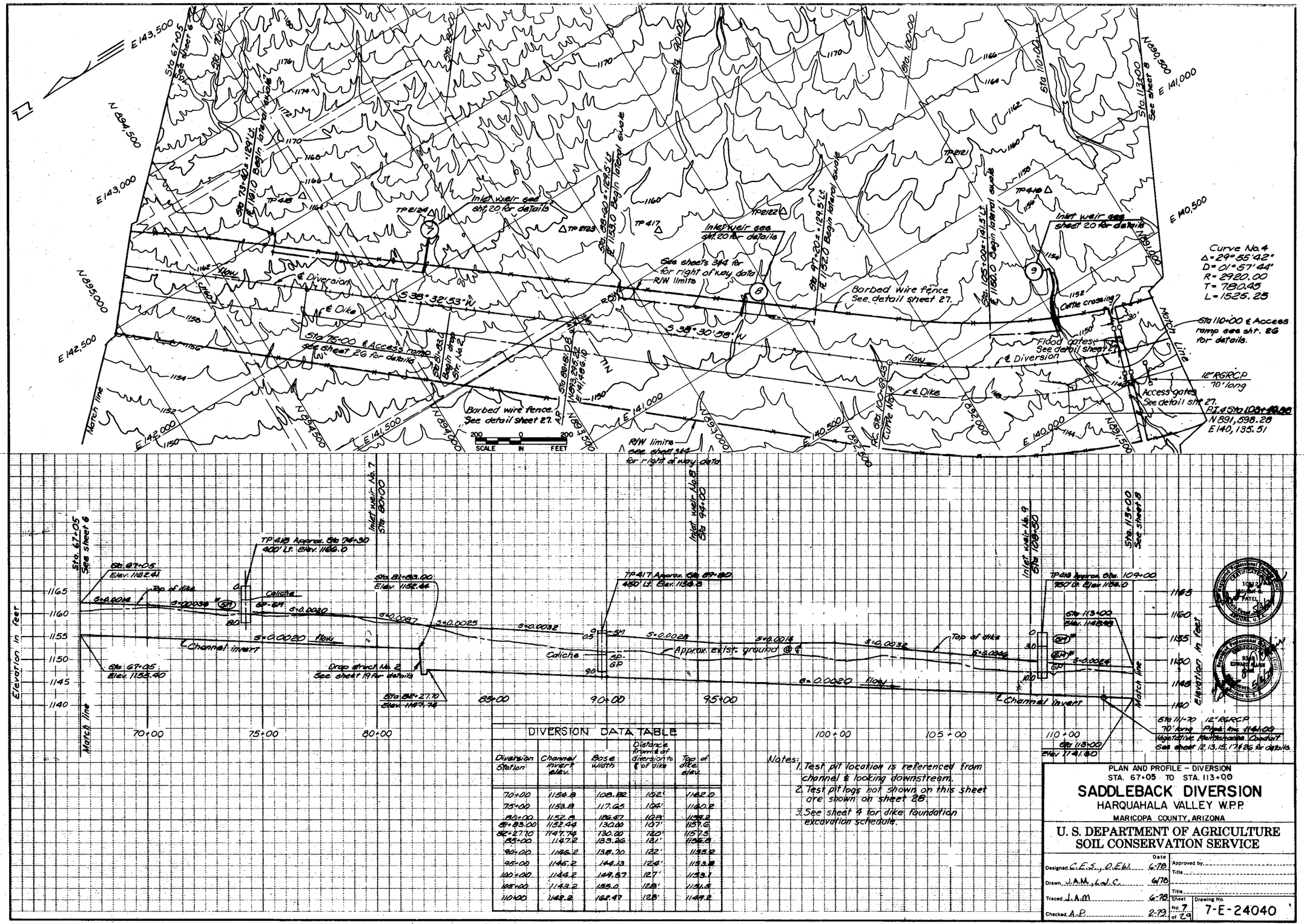
PLAN AND PROFILE – DIVERSION
STA. 26+85 TO STA. 67+05

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed C.E.S., D.E.W.	6-78	Approved by	
Drawn J.A.M., L.W.C.	6/78	Title	
Traced J.A.M.	6-78	Title	
Checked A.P.	8-79	Sheet No 6 of 29	Drawing No. 7-E-24040



DIVERSION DATA TABLE

Diversion Station	Channel invert elev.	Base width	Distance from ℄ of diversion to ℄ of dike	Top of dike elev.
70+00	1156.8	108.82	102'	1162.0
75+00	1153.8	117.05	104'	1160.2
80+00	1152.8	126.47	103'	1159.2
81+83.00	1152.44	130.00	107'	1157.6
82+27.70	1147.74	130.00	120'	1157.5
85+00	1147.2	133.26	121'	1156.8
90+00	1146.2	138.20	122'	1155.2
95+00	1145.2	144.13	124'	1154.2
100+00	1144.2	149.57	127'	1153.1
105+00	1143.2	155.0	128'	1151.5
110+00	1142.2	162.47	128'	1149.2

Notes:
1. Test pit location is referenced from channel ℄ looking downstream.
2. Test pit logs not shown on this sheet are shown on sheet 28.
3. See sheet 4 for dike foundation excavation schedule.

PLAN AND PROFILE – DIVERSION
STA. 67+05 TO STA. 113+00

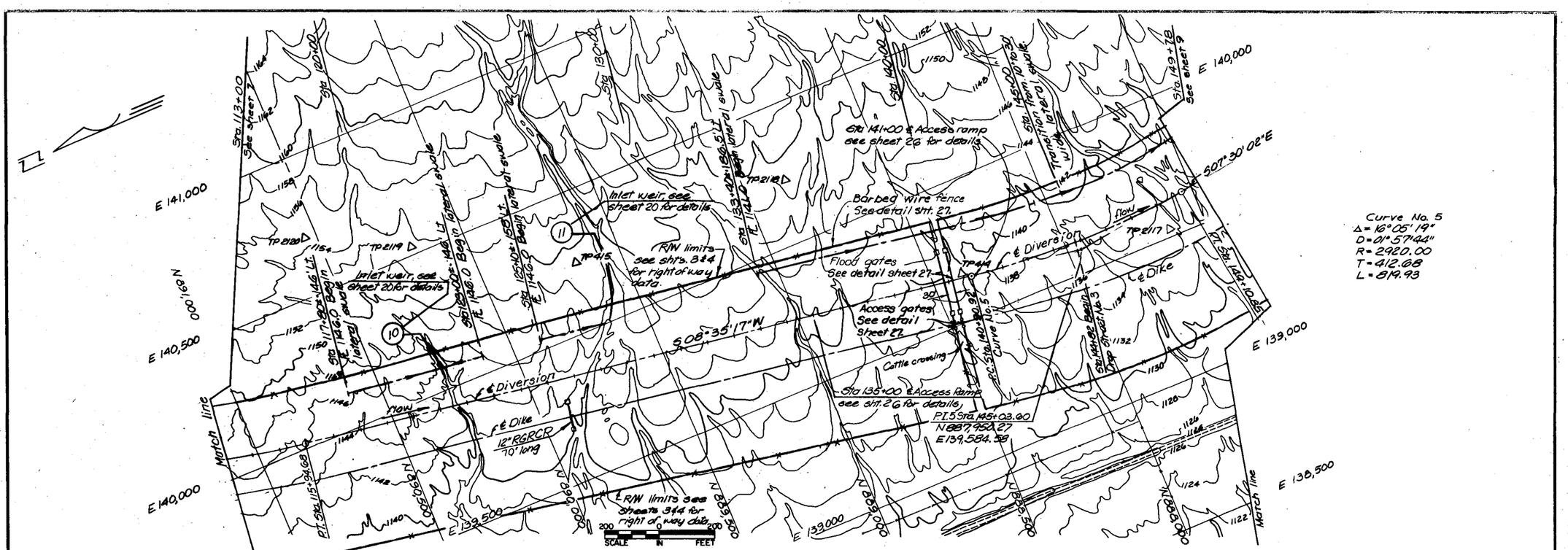
SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

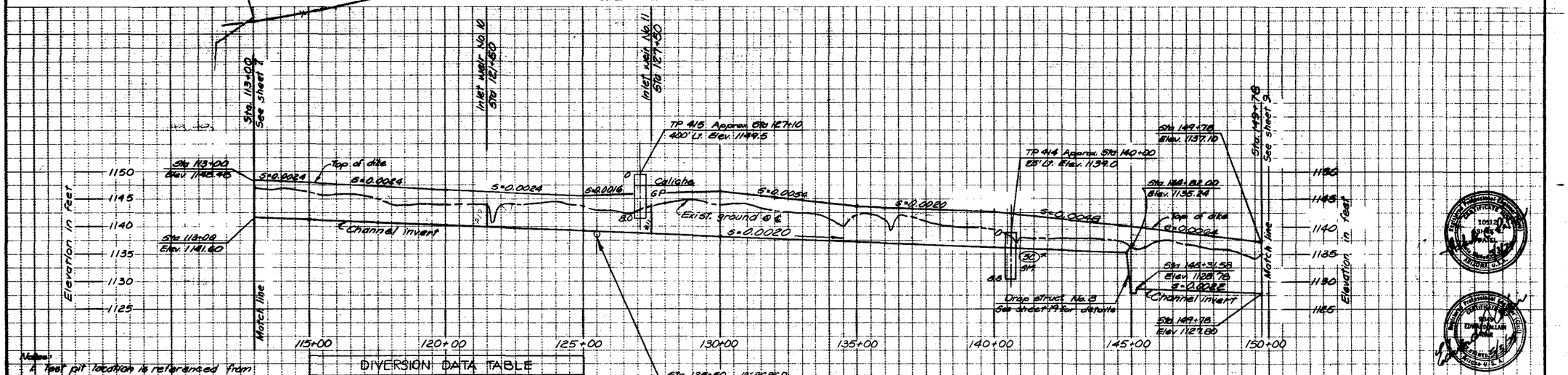
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed C.E.S., O.E.W.	Date 6-78	Approved by	
Drawn J.A.M., L.J.C.	6-78	Title	
Traced J.A.M.	6-78	Title	
Checked A.P.	2-79	Sheet No. 7 of 29	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR 1979

FORM SCS – 317 (NOV. 1966)





Notes:
1. Test pit location is referenced from channel ℄ looking downstream. Test pit logs not shown on this sheet are shown on sheet 28.
2. See sheet 4 for dike foundation excavation schedule.

DIVERSION DATA TABLE

Diversion Station	Channel Invert Elev.	Base width	Distance from ℄ of diversion to ℄ dike	Top of dike Elev.
113+00	1141.20	149.94	131'	1149.0
120+00	1140.20	177.41	135'	1146.8
125+00	1139.20	188.69	138'	1145.6
130+00	1138.20	192.36	147'	1146.4
135+00	1137.20	194.83	145'	1143.7
140+00	1136.20	207.30	149'	1142.7
144+82.00	1135.24	215.00	149'	1140.4
145+31.58	1128.78	215.00	167'	1140.1
150+00	1127.75	221.59	185'	1137.1

PLAN AND PROFILE – DIVERSION
STA. 113+00 TO STA. 149+78

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

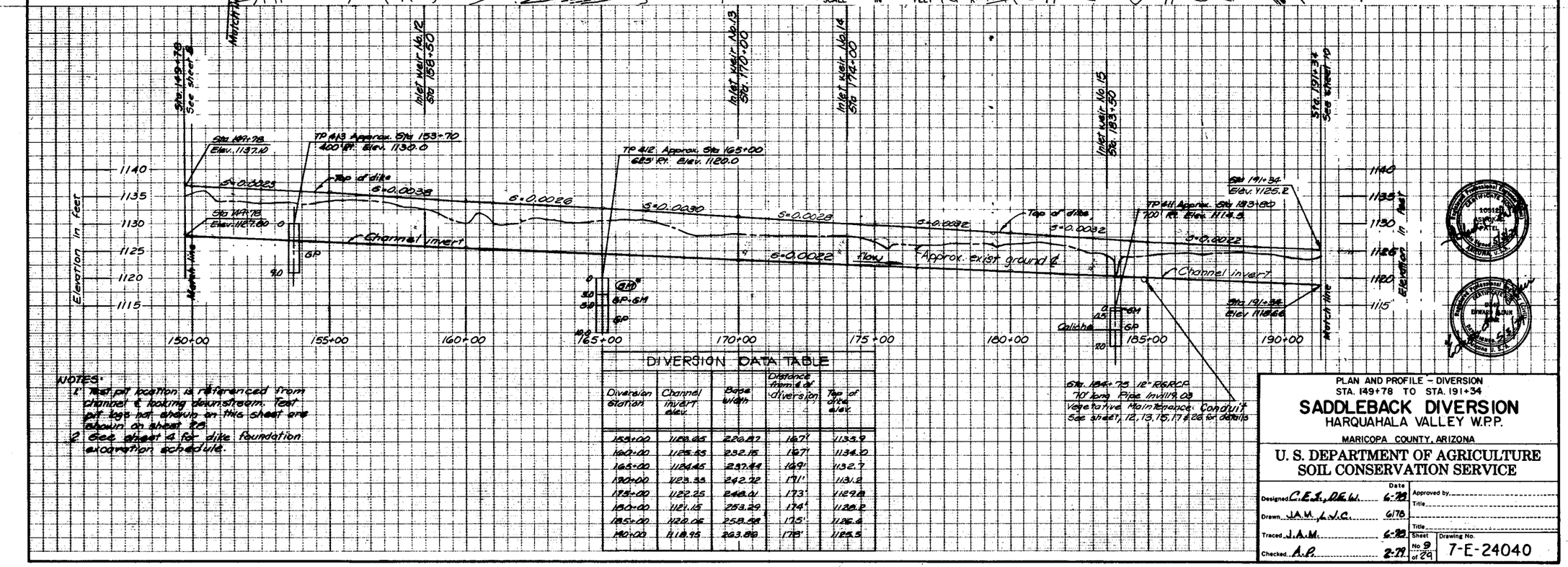
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed C.E.S., D.E.W.	6-76	Approved by	
Drawn J.A.M., L.J.C.	6/76	Title	
Traced J.A.M.	6-76	Title	
Checked A.L.	2-77	Sheet No. 8 of 29	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR. 1979

FORM SCS – 317 (NOV. 1966)



NOTES:
1. Test pit location is referenced from channel ℄ looking downstream. Test pit logs not shown on this sheet are shown on sheet 20.
2. See sheet 4 for dike foundation excavation schedule.

DIVERSION DATA TABLE

Diversion station	Channel invert elev.	Base width	Distance from ℄ of diversion	Top of dike elev.
155+00	1129.65	220.87	167'	1135.9
160+00	1125.45	232.15	167'	1134.0
165+00	1124.45	237.44	169'	1132.7
170+00	1123.35	242.72	171'	1131.2
175+00	1122.25	248.01	173'	1129.8
180+00	1121.15	253.29	174'	1128.2
185+00	1120.05	258.58	175'	1126.6
190+00	1118.95	263.86	176'	1125.5

PLAN AND PROFILE – DIVERSION
STA. 149+78 TO STA. 191+34

SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.

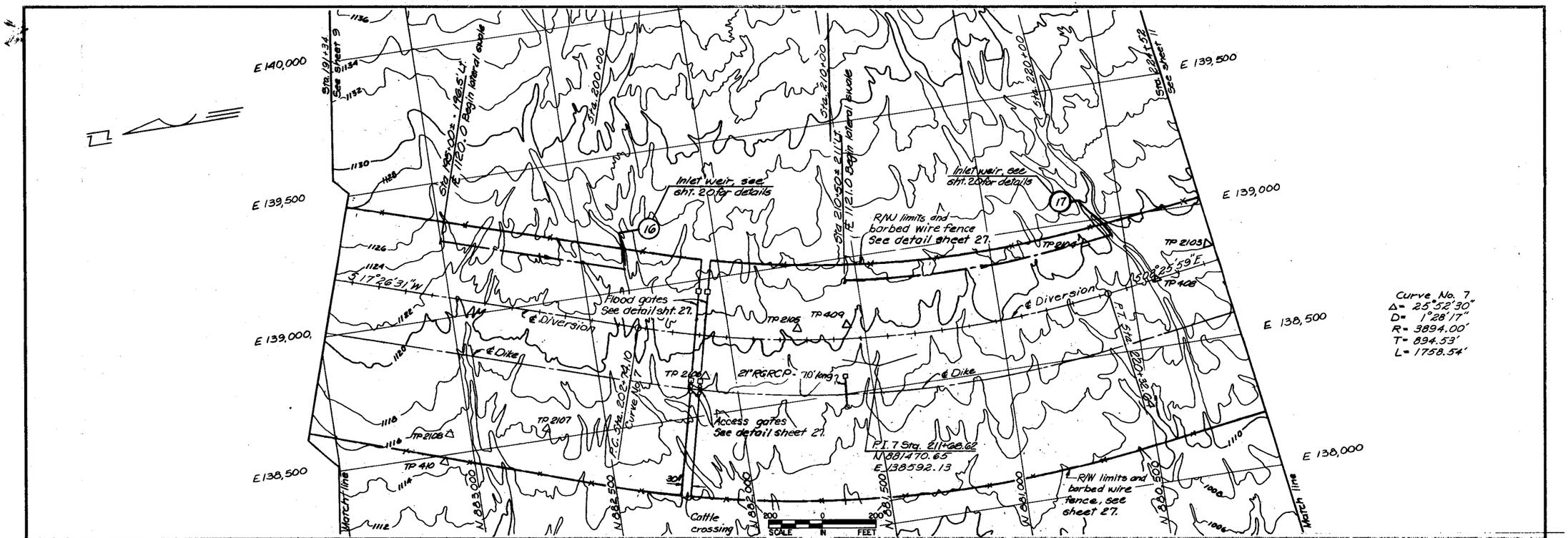
MARICOPA COUNTY, ARIZONA

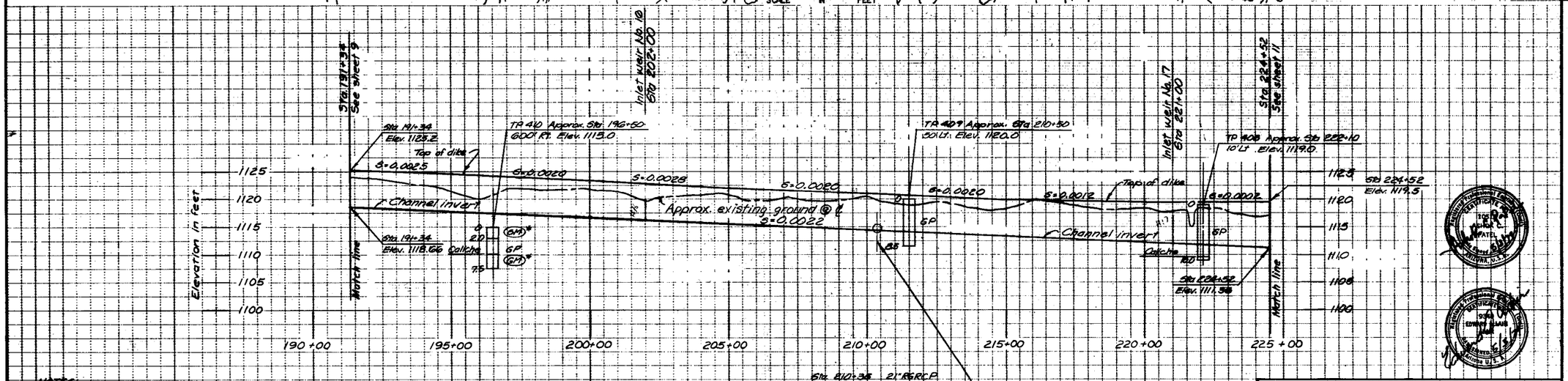
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed C.E.S., D.E.W.	6-78	Approved by	
Drawn J.A.M., L.V.C.	6/78	Title	
Traced J.A.M.	6-78	Title	
Checked A.P.	2-79	Sheet No. 9 of 29	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR. 1979

FORM SCS – 317 (NOV. 1966)





NOTES:
1. Test pit location is referenced from channel ℄ looking downstream. Test pit logs not shown on this sheet are shown on sheet 28.
2. See sheet 4 for dike foundation excavation schedule.

DIVERSION DATA TABLE

Diversion Station	Channel Invert Elev.	Base width	Distance from ℄ of diversion to ℄ dike	Top of dike elev.
195+00	1119.85	269.15	180'	1124.4
200+00	1116.75	274.43	183'	1123.4
205+00	1115.65	279.72	185'	1122.0
210+00	1114.55	285.00	188'	1121.0
215+00	1113.45	287.77	190'	1120.0
220+00	1112.35	290.53	192'	1119.4

PLAN AND PROFILE – DIVERSION
STA. 191+34 TO STA. 224+52

SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.

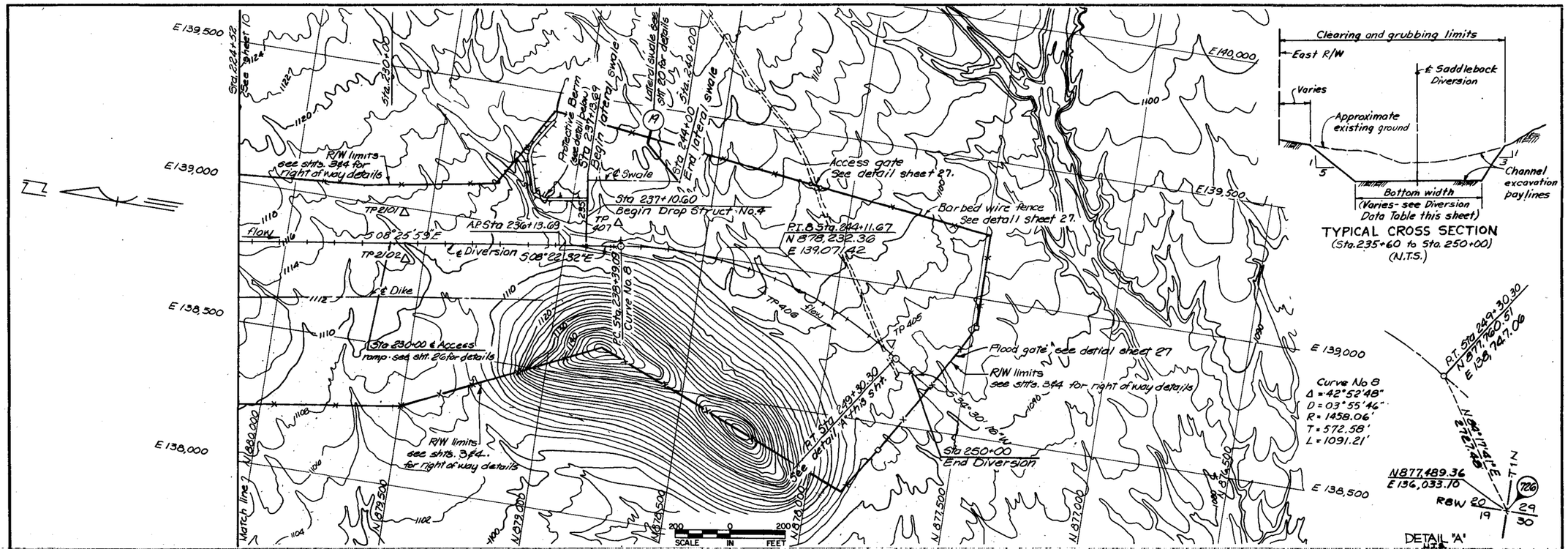
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed C.E.S., D.E.W.	6-78	Approved by	
Drawn J.A.M., J.L.C.	6/78	Title	
Traced J.A.M.	6-78	Title	
Checked A.P.	2-79	Sheet No. 10 of 29	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR. 1979

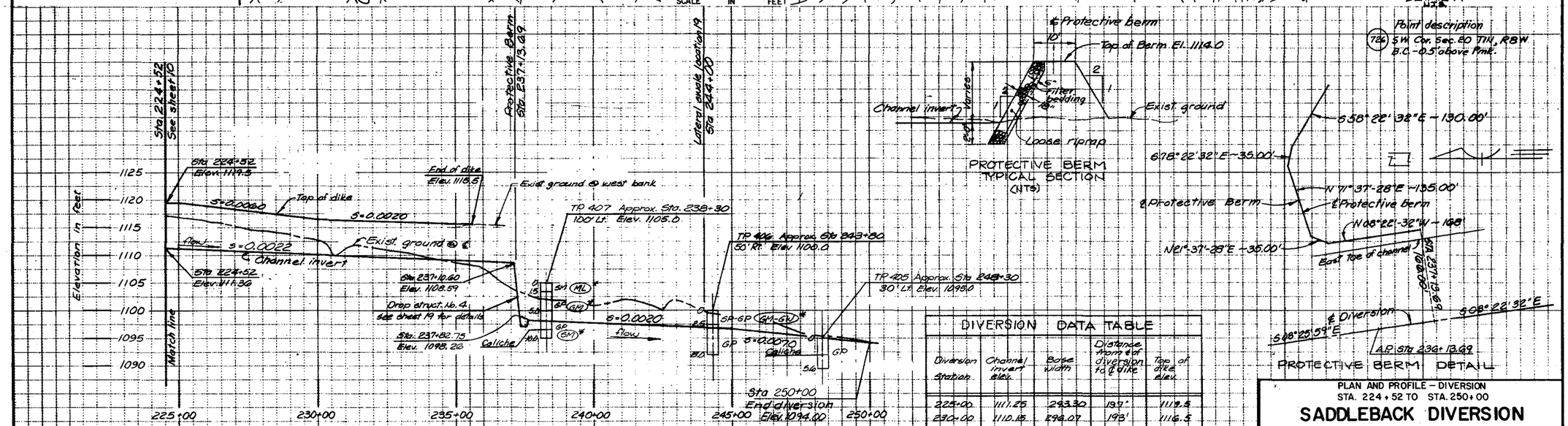
FORM SCS – 317 (NOV. 1966)



TYPICAL CROSS SECTION
(Sta. 235+60 to Sta. 250+00)
(N.T.S.)

DETAIL "A"
N.T.S.

Point description
(786) S.W. Cor. Sec. 20 T1N, R8W
B.C. -0.5' above Pmt.



DIVERSION DATA TABLE				
Diversion Station	Channel invert elev.	Base width	Distance from ℄ of diversion to ℄ Dike	Top of dike Elev.
225+00	1111.25	293.30	197'	1119.5
230+00	1110.85	298.07	193'	1116.5
235+00	1109.05	298.83	195'	1115.5
237+10.60	1108.59	300.00		
237+82.75	1098.26	300.00		
239+00	1098.0	331.73		
241+00	1097.6	377.38		
243+00	1097.2	423.04		
245+00	1096.8	468.69		
247+00	1095.4	514.35		
250+00	1094.0	560.00		

Note 1. Test pit logs not shown on this sheet are shown sheet 28
Test pit location is referenced from channel ℄ looking downstream.
2. See sheet 4 for dike foundation excavation schedule.

PLAN AND PROFILE – DIVERSION
STA. 224+52 TO STA. 250+00

SADDLEBACK DIVERSION

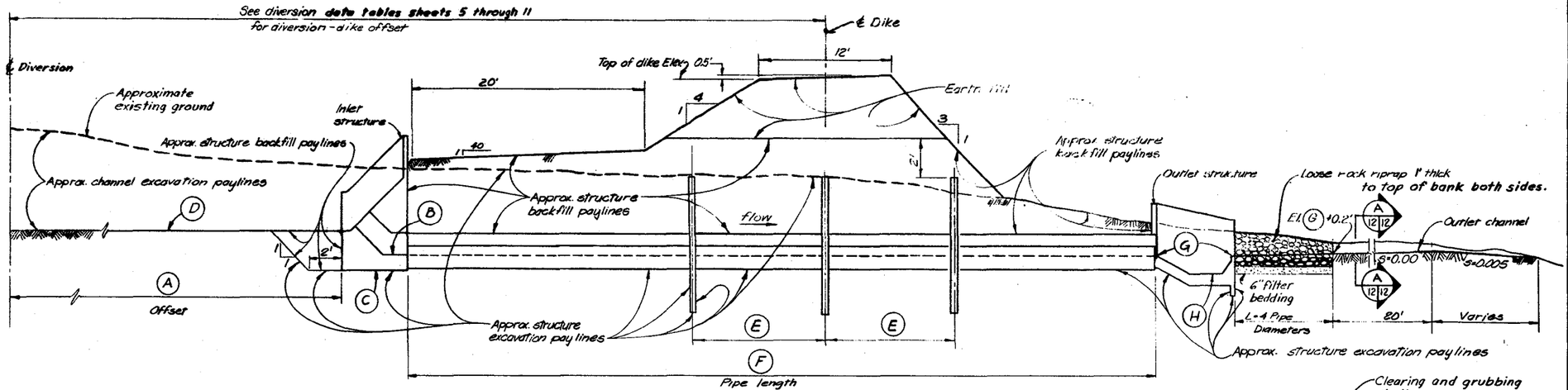
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

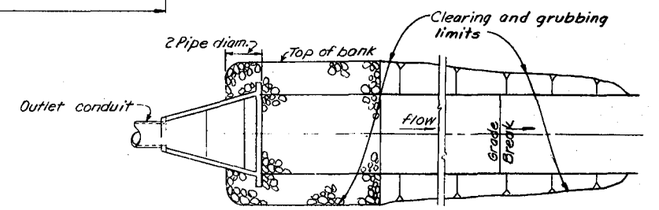
Designed C.E.S., D.E.W.	6-78	Approved by	
Drawn J.A.M., L.J.C.	6/78	Title	
Traced J.A.M.	6-78	Title	
Checked A.P.	2-79	Sheet No. 11 of 29	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR. 1979

FORM SCS – 317 (NOV. 1966)



TYPICAL VEGETATIVE MAINTENANCE CONDUIT CROSS-SECTION
NOT TO SCALE

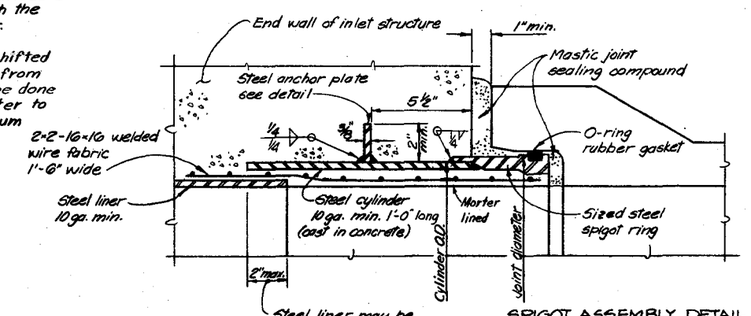


PLAN RIPRAP LAYOUT
NOT TO SCALE

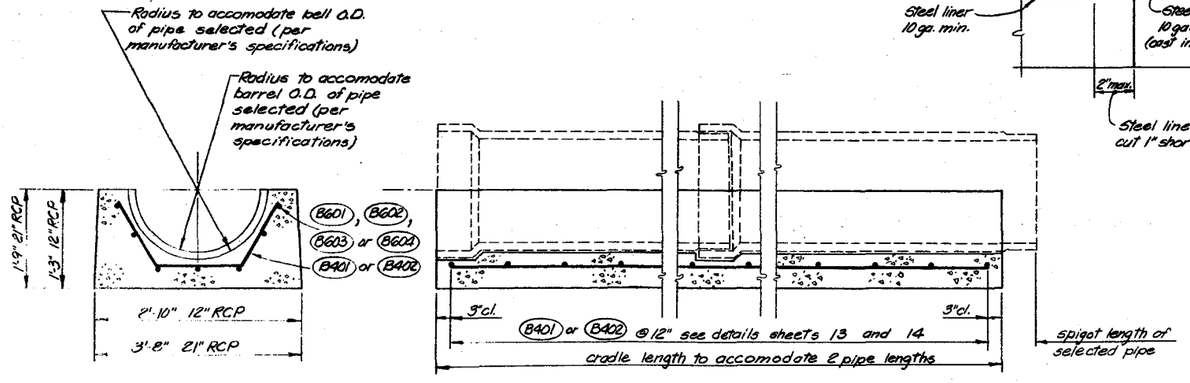
VEGETATIVE MAINTENANCE CONDUIT DATA										
Station	(A) Offset	(B) Inlet pipe invert el.	(C) Inlet structure el.	(D) Channel invert el.	(E) ** Collar spacing	No. of Collars	(F) * Pipe length	(G) Outlet pipe invert el.	(H) Outlet structure el.	Pipe diameter
60+60	00+52.80	1156.00	1155.50	1156.68	12'	3	70'	1155.80	1155.05	12"
111+70	00+67.84	1141.00	1140.50	1141.80	12'	3	"	1140.80	1140.05	12"
125+50	00+71.75	1138.00	1137.50	1138.98	12'	3	"	1137.80	1137.05	12"
184+75	00+90.95	1119.03	1118.53	1120.03	12'	3	"	1117.00	1116.25	12"
210+35	00+96.11	1114.00	1113.50	1114.39	12'	3	"	1113.80	1112.63	21"

* 70' pipe length is approximate length may be adjusted to accomodate available pipe lengths with the approval of the engineer.

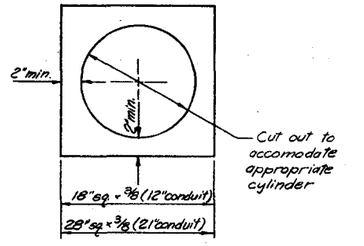
** Anti-seep collar spacing may be shifted to provide a 2'-0" minimum space from pipe joint. Any shifting shall be done so as to maintain collar center to center spacing of 10'-0" minimum and 25'-0" maximum.



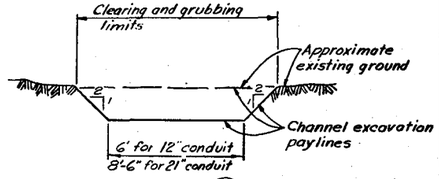
SPIGOT ASSEMBLY DETAIL
(N.T.S.)



CRADLE DETAILS
NOT TO SCALE



ANCHOR PLATE DETAIL
(N.T.S.)



SECTION (A 12|12)
NTS

Registered Professional Engineer Certificate No. 9328 Edwin Lalain Adair Arizona U.S.A. — Registered Professional Engineer Certificate No. 10514 Ashok C. Patel Arizona U.S.A.

VEGETATIVE MAINTENANCE CONDUIT DETAILS

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

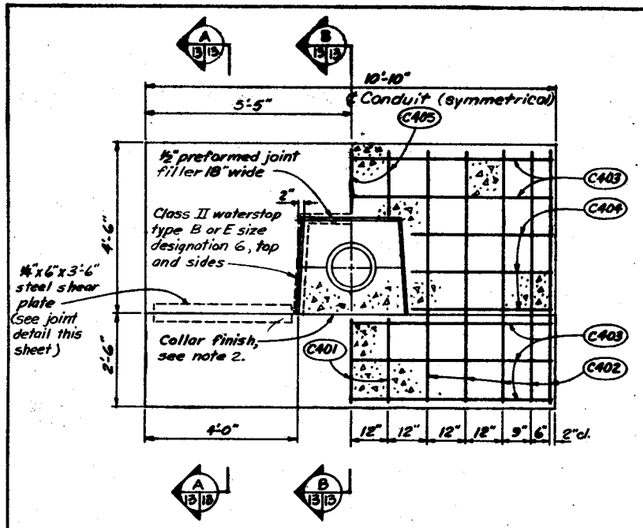
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

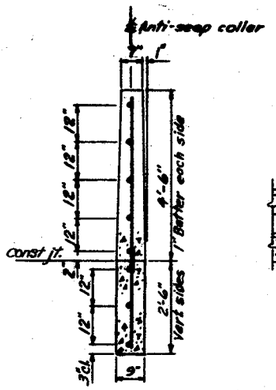
	Date		
Designed G.S.	10-78	Approved by	
Drawn J.A.M.	10-78	Title	
Traced		Title	
Checked G.S.	11-78	Sheet No. 12 of 29	Drawing No. 7-E-24040

FORM SCS-313C

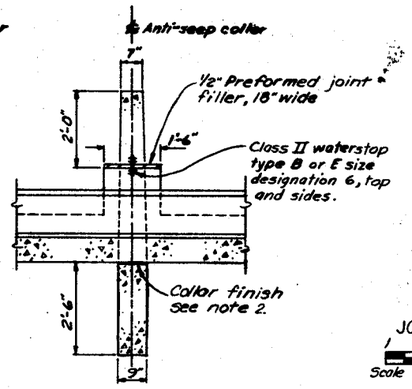
USDA-SCS-PORTLAND, OR. 1979



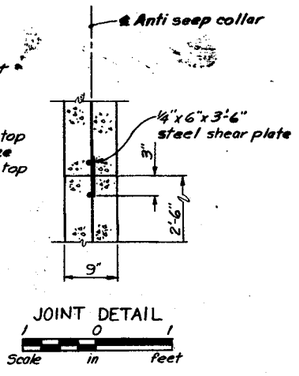
ELEVATION



SECTION (A 13|13)



SECTION (B 13|13)

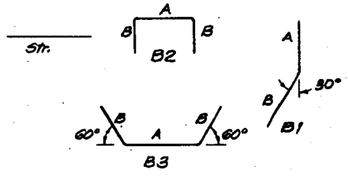


JOINT DETAIL

Scale 0 in feet

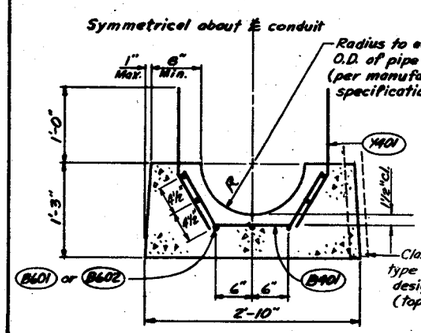
STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	Total Length
ANTI-SEEP COLLAR								
Collar Bottom	C401	4	3	2'-0"	Str			6'-0"
"	C402	4	10	6'-6"	Str			65'-4"
"	C403	4	5	10'-6"	Str			52'-6"
Collar Top	C404	4	6	3'-6"	Str			21'-0"
" "	C405	4	3	1'-6"	Str			4'-6"
YOKE (PLACED AT COLLAR)								
Yoke	Y401	4	4	2'-0"	B1	1'-0"	1'-0"	8'-0"
"	Y402	4	2	3'-9"	B2	1'-9"	1'-0"	7'-6"
"	Y403	4	9	1'-2"	Str			10'-6"
16'-0" SECTION OF CRADLE - See Note 4								
Cradle	B401	4	16	2'-6"	B3	1'-0"	0'9"	40'-0"
"	B601	6	7	15'-6"	Str			108'-6"
8'-0" SECTION OF CRADLE - See Note 4								
Cradle	B401	4	8	2'-6"	B3	1'-0"	0'9"	20'-0"
"	B602	6	7	7'-6"	Str			52'-6"

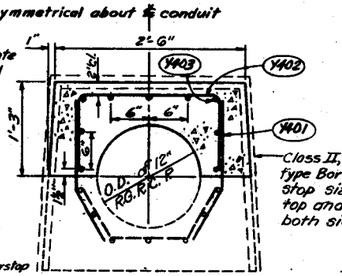


ANTI-SEEP COLLAR DETAILS

Scale 0 in 5 feet



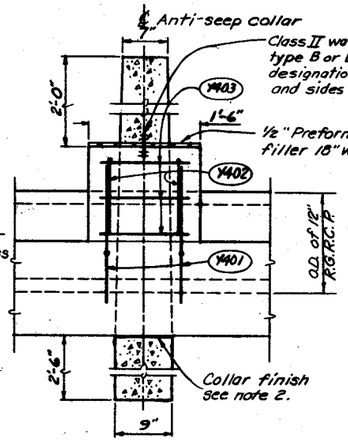
PAY SECTION AT CONDUIT



YOKE AND CRADLE DETAILS

Scale 0 in 2 feet

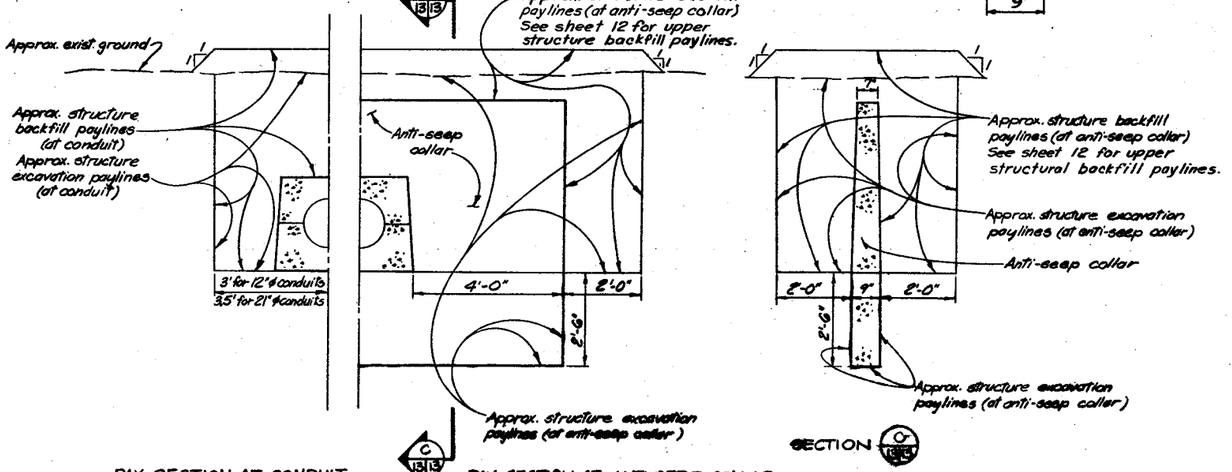
PAY SECTION AT ANTI-SEEP COLLAR



SECTION (C 13|13)

PAY SECTIONS

N.T.S.



NOTES:

1. See sheet 12 for location of anti-seep collars.
2. Where cradle is to be placed, the collar finish shall be true and smooth with one layer of heavy, smooth surface, asphalt treated, roofing felt. Approximate weight 55 lbs per square.
3. Details shown are for earth foundation. For rock foundation, found bottom of cradle on rock line and key collar into rock 6" or as directed by the engineer.
4. Cradle steel schedule is for pipe length of 8 feet. Other alternative pipe lengths may be used with the cradle steel schedule adjusted to accommodate them with the approval of the engineer.
5. Bottom section of the anti-seep collar may be placed in a neat trench or in conventional forms, if conditions warrant, with the approval of and as directed by the engineer.

Registered Professional Engineer — Certificate No. 9316 — Edward G. Lain — Arizona U.S.A. — 5/5/79

Registered Professional Engineer — Certificate No. 10510 — Ashok C. Patel — Arizona U.S.A. — 5/3/79

12" DIA. VEGETATIVE MAINTENANCE CONDUIT DETAILS

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

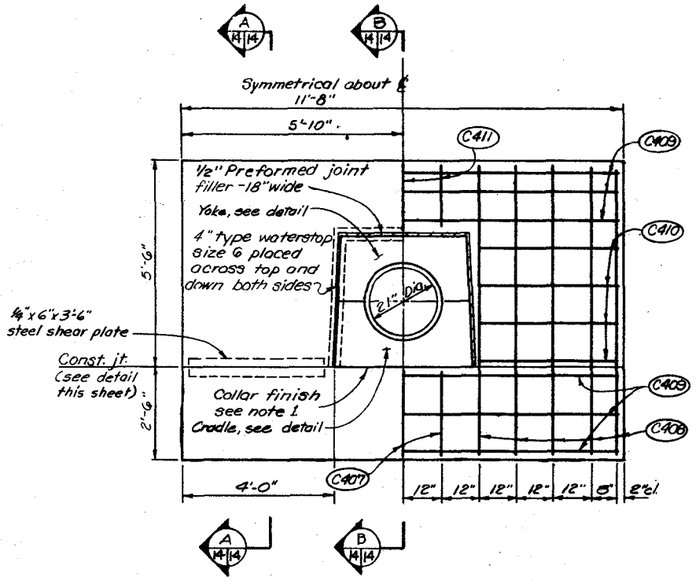
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

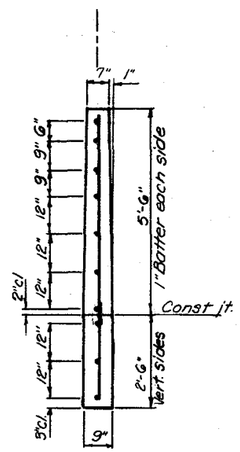
	Date		
Designed G.S.	2-79	Approved by	
Drawn L.J.C.	2-79	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No. 13 of 24	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR. 1979

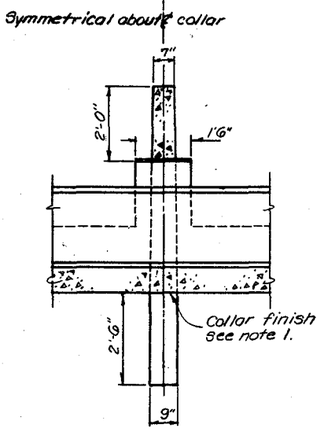
FORM SCS-313C



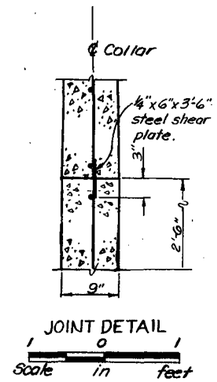
ELEVATION



SECTION A 14|14



SECTION B 14|14

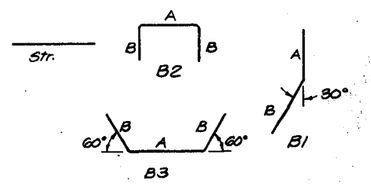


JOINT DETAIL

1 0 1
Scale in feet

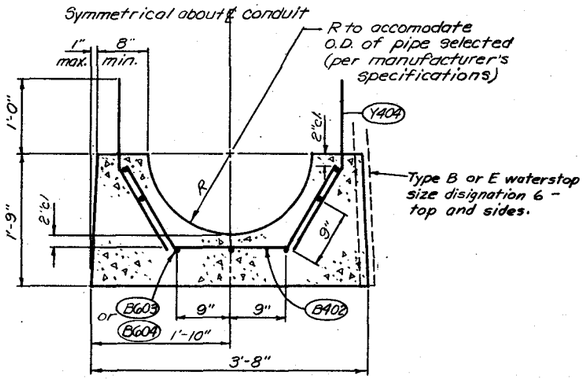
STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	Total Length
ANTI-SEEP COLLAR (21" DIA CONDUIT)								
Collar Bottom	C407	4	3	2'-0"	Str			6'-0"
" "	C408	4	10	7'-6"	Str			75'-0"
Top & Bottom	C409	4	6	11'-2"	Str			67'-0"
Collar Top	C410	4	8	3'-6"	Str			28'-0"
" "	C411	4	3	1'-0"	Str			4'-6"
YOKE (PLACED AT COLLAR)								
Yoke	Y404	4	4	2'-7"	B1	1'-2"	1'-5"	10'-4"
"	Y405	4	2	5'-10"	B2	2'-10"	1'-5"	11'-8"
"	Y406	4	13	1'-2"	Str			15'-2"
16'-0" Section of Cradle - See Note 4.								
Cradle	B402	4	16	4'-0"	B3	1'-0"	1'-3"	64'-0"
"	B603	6	7	15'-6"	Str.			108'-6"
8'-0" Section of Cradle - See Note 4								
Cradle	B402	4	8	4'-0"	B3	1'-0"	1'-3"	32'-0"
"	B603	6	7	7'-6"	Str.			52'-6"

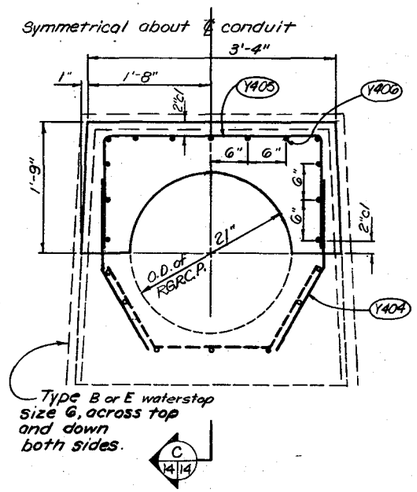


ANTI-SEEP COLLAR DETAILS

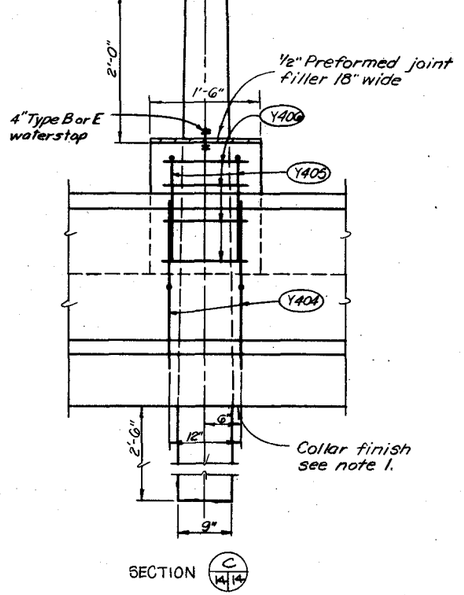
1 0 5
Scale in feet



CRADLE DETAIL



YOKE DETAIL



SECTION C 14|14

YOKE AND CRADLE DETAILS

1 0
Scale in feet

NOTES:

1. Where cradle is to be placed, the collar finish shall be true and smooth with one layer of heavy, smooth surface, asphalt treated roofing felt. Approximate weight 55 lbs. per square.
2. Details shown are for earth foundation. For rock foundation found bottom of cradle on rock line and key collar into rock 6" or as directed by the engineer.
3. Cradle steel schedule is for pipe length of 8 feet. Other alternative pipe lengths may also be used with the cradle steel schedule adjusted to accommodate them with the approval of the engineer.
4. Bottom section of the anti-seep collar may be placed in a neat trench or in conventional forms, if conditions warrant, with the approval of and as directed by the engineer.
5. See sheet 12 for location of anti-seep collars.

Registered Professional Engineer — Certificate No. 9961 — Edward Alonn — Expires 6/30/79 — Arizona U.S.A.

Registered Professional Engineer — Certificate No. 10512 — Ashok B. Patel — Expires 6/30/79 — Arizona U.S.A.

21" DIA. VEGETATIVE MAINTENANCE CONDUIT DETAILS

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

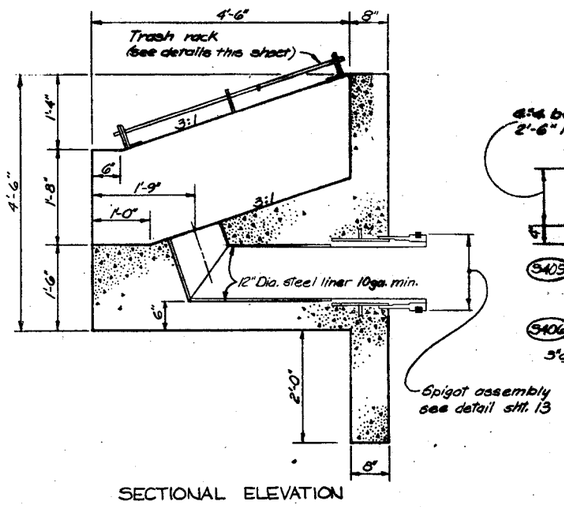
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

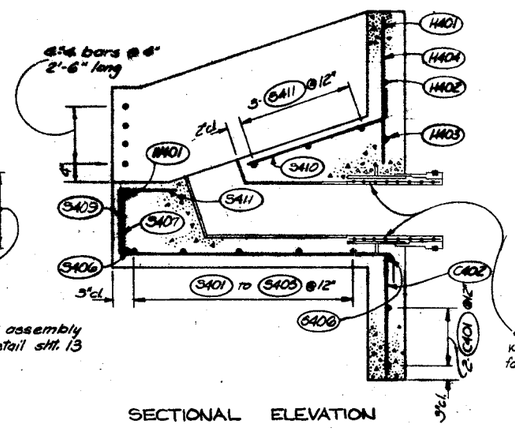
	Date		
Designed G.S.		Approved by	
Drawn L.v.C.	2-79	Title	
Traced		Title	
Checked G.S.		Sheet No. 14 of 25	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR. 1979

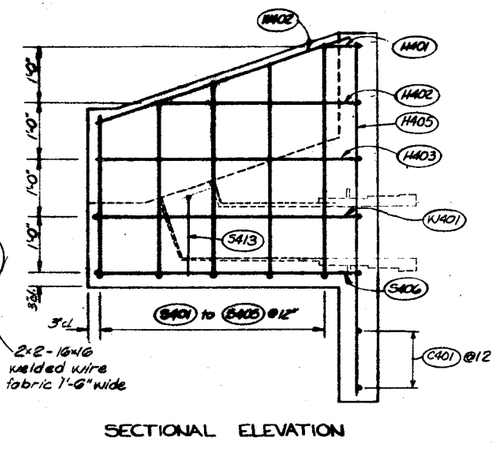
FORM SCS-313C



SECTIONAL ELEVATION



SECTIONAL ELEVATION



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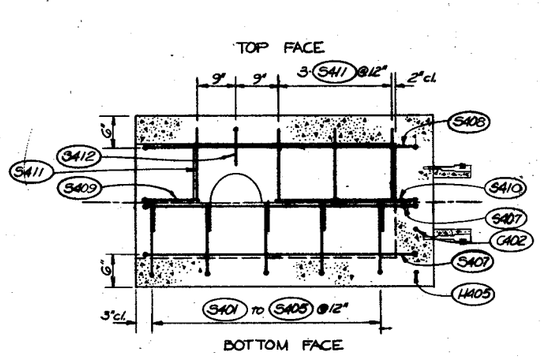
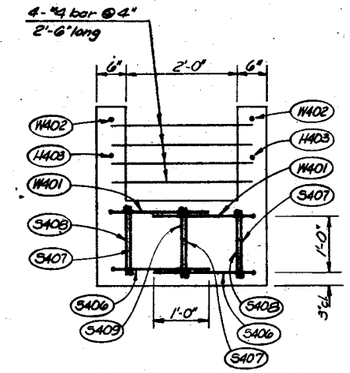
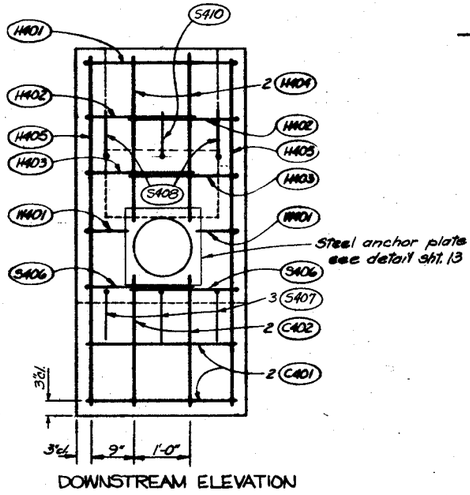


BOTTOM FACE

PLAN



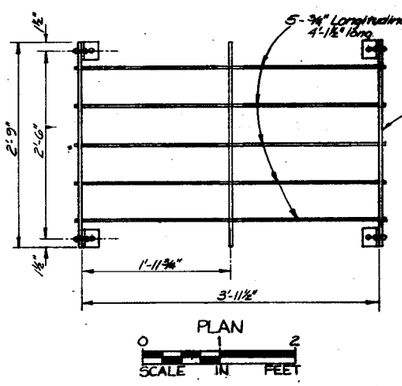
UPSTREAM ELEVATION



DOWNSTREAM ELEVATION

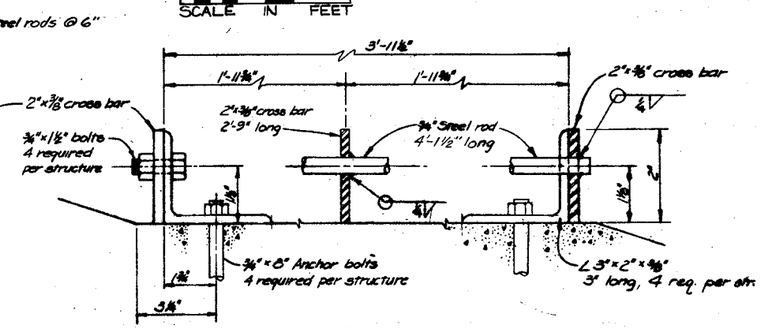
INLET STRUCTURE DETAILS

SCALE IN FEET 0 1 2 3



PLAN

SCALE IN FEET 0 1 2



DETAILS

TRASH RACK DETAILS

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
INLET STRUCTURE UNIT I									
Bottom slab	S401	4	2	4'-6"	2	1'-9"	2'-9"		9'-0"
" "	S402	4	2	4'-9"	2	1'-9"	3'-0"		9'-6"
" "	S403	4	2	5'-0"	2	1'-9"	3'-6"		10'-0"
" "	S404	4	2	5'-6"	2	1'-9"	3'-9"		11'-0"
" "	S405	4	2	5'-9"	2	1'-9"	4'-0"		11'-6"
" "	S406	4	2	8'-1"	2	1'-9"	4'-7"	1'-9"	16'-2"
" "	S407	4	3	6'-7"	1	1'-0"	4'-7"	1'-0"	19'-5"
" "	S408	4	2	6'-9"	SPB	1'-0"	9"	4'-0"	13'-6"
Top slab	S409	4	1	1'-9"	2	1'-0"	9"		1'-9"
" "	S410	4	1	3'-6"	3	2'-6	1'-0"		3'-6"
" "	S411	4	4	2'-6"	Str.				10'-0"
" "	S412	4	2	1'-9"	2.	6"	1'-3"		3'-6"
Headwall	H401	4	1	3'-8"	2	7"	2'-6"	7"	3'-8"
"	H402	4	2	5'-4"	2	1'-9"	3'-7"		10'-8"
"	H405	4	2	6'-4"	2	1'-9"	4'-7"		12'-8"
"	H404	4	2	3'-0"	Str.				6'-0"
	H405	4	2	6'-0"	Str.				12'-0"
Cutoff wall	C401	4	2	2'-6"	Str.				5'-0"
" "	C402	4	2	2'-3"	Str.				4'-6"
Sidewall	W401	4	2	7'-1"	2	1'-9"	4'-7"	9"	14'-2"
"	W402	4	2	4'-6"	Str.				9'-0"

A / B Type 3

A B C Type 1

Str

A C B Type 2

A B C 18.5° SPB

Note: Steel is for one structure.

QUANTITIES

Material	Per unit	No. units.	Total
Reinforcement steel	132 lbs.	4	528 lbs.
Concrete class 4000	1.6 c.y.	4	6.4 c.y.

NOTES:

1. See sheet 12 for location and position of inlet structures.
2. Material for trash rack in addition to that shown on trash rack details consists of 4-#4 bars -2'-6" long placed as shown on upstream elevation.

Registered Professional Engineer — Certificate No. 10512 — Ashok M. Patel — Tempe, Arizona U.S.A. — 5/31/79

Registered Professional Engineer — Certificate No. 9999 — Edward Allain Amir — Phoenix, Arizona U.S.A. — 5/31/79

INLET STRUCTURE UNIT I AND TRASH RACK DETAILS

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

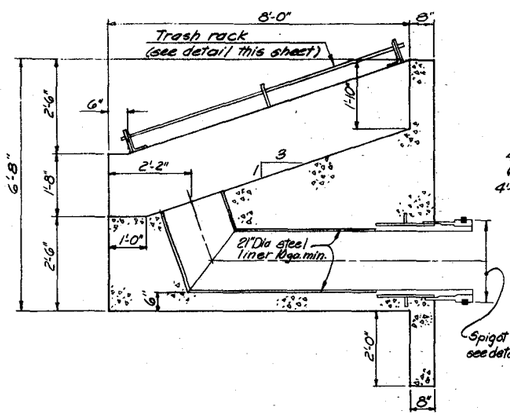
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

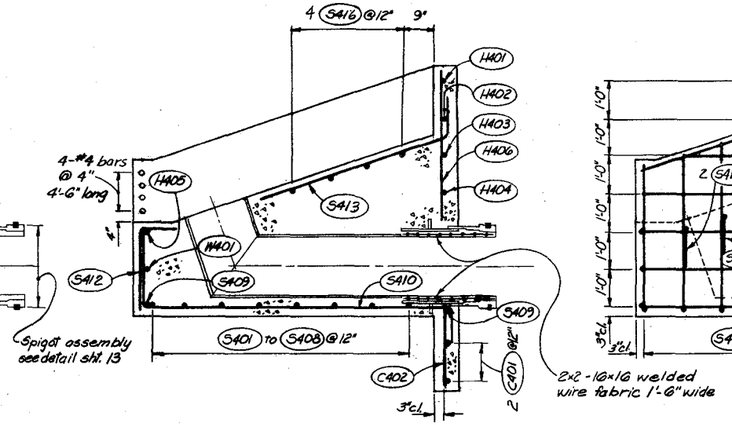
Designed G.S.	Date 8-78	Approved by	
Drawn L.J.C.	9-78	Title	
Traced		Title	
Checked G.S.	8-79	Sheet No. 13 of 29	Drawing No. 7-E-24040

SCS-ENG-5196 (REV. 6-78)

USDA-SCS PORTLAND, OR. 1979



SECTIONAL ELEVATION



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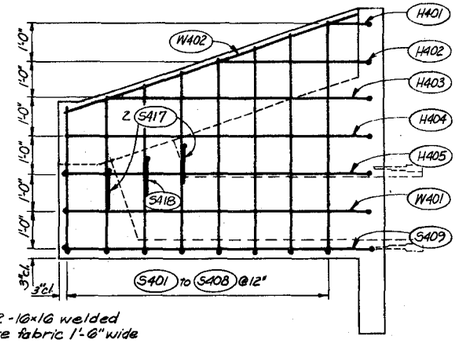

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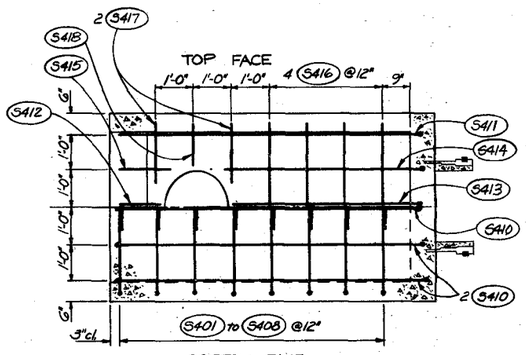
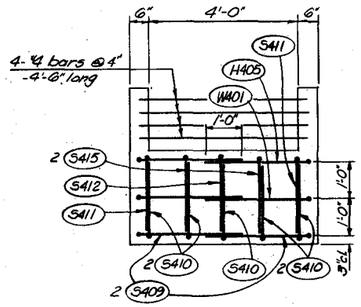
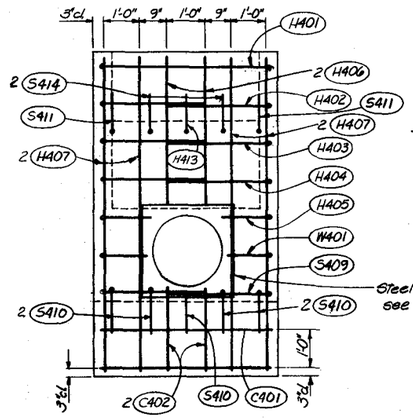


BOTTOM FACE

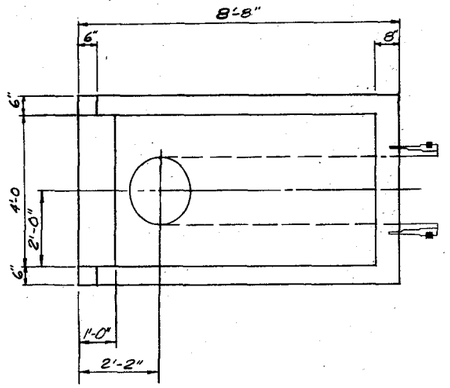
PLAN



UPSTREAM ELEVATION



DOWNSTREAM ELEVATION

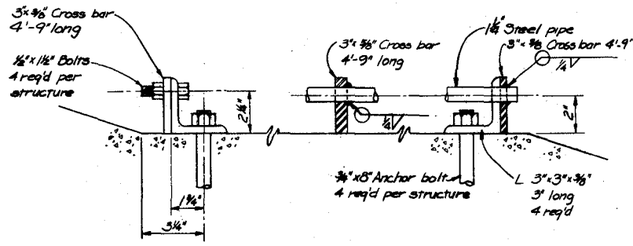


PLAN

SCALE 0 1 2 3 4 IN FEET

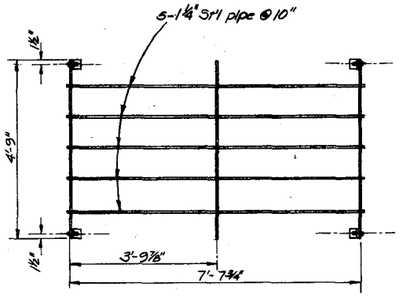
INLET STRUCTURE DETAILS

SCALE 1 0 1 2 3 4 IN FEET



DETAILS

SCALE 0 1 2 3 6 9 12 INCHES



PLAN

SCALE 1 0 1 2 3 4 IN FEET

TRASH RACK

STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
P.W.D. INLET STRUCTURE - UNIT II									
Bottom slab	S401	4	2	6'-6"	2	2'-9"	3'-9"		13'-0"
" "	S402	4	2	6'-9"	2	2'-9"	4'-0"		13'-6"
" "	S403	4	2	7'-1"	2	2'-9"	4'-7"		14'-2"
" "	S404	4	2	7'-5"	2	2'-9"	4'-8"		14'-10"
" "	S405	4	2	7'-9"	2	2'-9"	5'-0"		15'-6"
" "	S406	4	2	8'-1"	2	2'-9"	5'-4"		16'-2"
" "	S407	4	2	8'-5"	2	2'-9"	5'-8"		16'-10"
" "	S408	4	2	8'-9"	2	2'-9"	6'-0"		17'-6"
" "	S409	4	2	13'-8"	2	2'-9"	8'-2"	2'-9"	27'-4"
" "	S410	4	5	11'-1"	1	2'-0"	8'-1"	1'-0"	55'-5"
Top slab	S411	4	2	12'-2"	SPB	2'-0"	0'-9"	7'-8"	24'-4"
" "	S412	4	1	2'-9"	2	2'-0"	0'-9"		2'-9"
" "	S413	4	1	6'-3"	3	5'-3"	1'-0"		6'-3"
" "	S414	4	2	6'-6"	3	5'-6"	1'-0"		13'-0"
" "	S415	4	2	3'-3"	2	2'-0"	1'-3"		6'-6"
" "	S416	4	4	4'-6"	Str.				18'-0"
" "	S417	4	4	2'-6"	2	1'-6"	1'-0"		10'-0"
" "	S418	4	2	2'-0"	2	1'-0"	1'-0"		4'-0"
Headwall	H401	4	1	6'-6"	2	1'-0"	4'-6"	1'-0"	6'-6"
"	H402	4	2	6'-9"	2	2'-9"	4'-0"		13'-6"
"	H403	4	2	9'-9"	2	2'-9"	7'-0"		19'-6"
"	H404	4	2	10'-10"	2	2'-9"	8'-1"		21'-8"
"	H405	4	2	12'-1"	2	2'-9"	8'-1"	1'-3"	24'-2"
"	H406	4	2	3'-9"	Str.				7'-6"
"	H407	4	4	8'-3"	Str.				33'-0"
Sidewall	W401	4	2	11-10"	2	2'-9"	8'-1"	1'-0"	23'-8"
"	W402	4	2	8'-3"	Str.				16'-6"
Cutoff wall	C401	4	2	4'-6"	Str.				9'-0"
" "	C402	4	2	2'-0"	Str.				4'-0"

A B Type 3

A B C Type 1

Str. A B C Type 2

A B C 1.9" 135° SPB

QUANTITIES	
Material	Per unit
Reinforcement steel	313 lbs
Concrete class 4000	4.72 c.y.

NOTES:
1. See sheet 12 for location and position of inlet structure.
2. Material for trash rack in addition to that shown on trash rack details consists of 4-#4 bars placed as show on upstream elevation.

Registered Professional Engineer Certificate No. 10513 Edmund Malain Adair Arizona U.S.A. 5/31/79

Registered Professional Engineer Certificate No. 10513 Ashok C. Patel Arizona U.S.A. 5/31/79

INLET STRUCTURE UNIT II AND TRASH RACK DETAILS

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

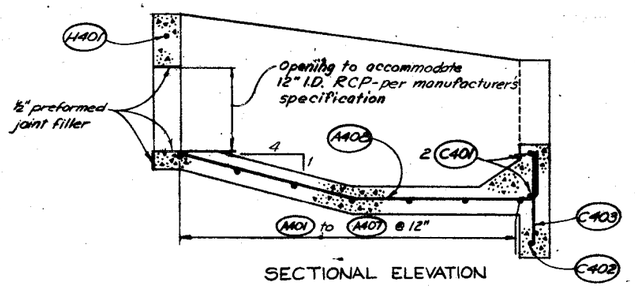
MARICOPA COUNTY, ARIZONA

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

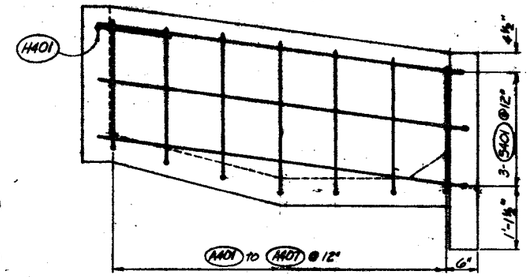
	Date		
Designed G.S.	10-78	Approved by	
Drawn L.J.C.	10-78	Title	
Traced		Title	
Checked G.S.	10-78	Sheet No. 16 of 29	Drawing No. 7-E-24040

SCS-ENG-313C (REV. 6-75)

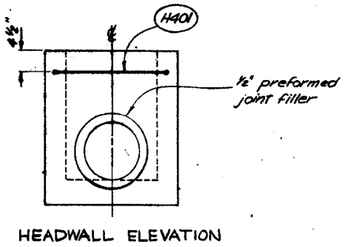
USDA SCS PORTLAND, OR. 1979



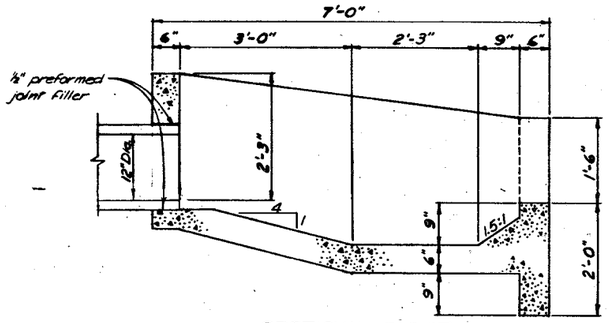
SECTIONAL ELEVATION



SIDEWALL ELEVATION



HEADWALL ELEVATION



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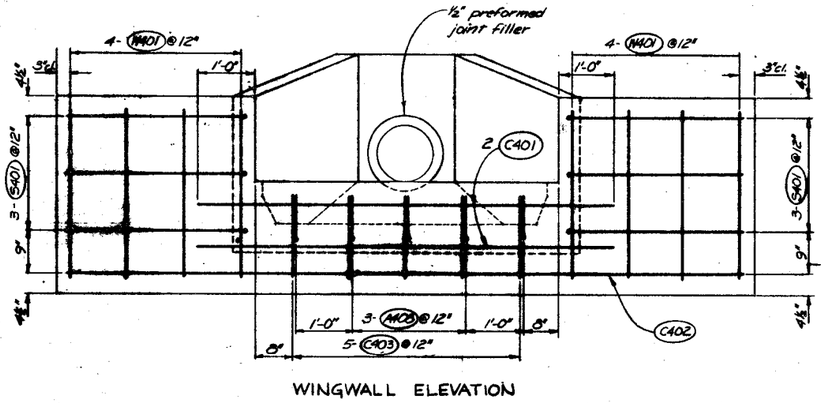
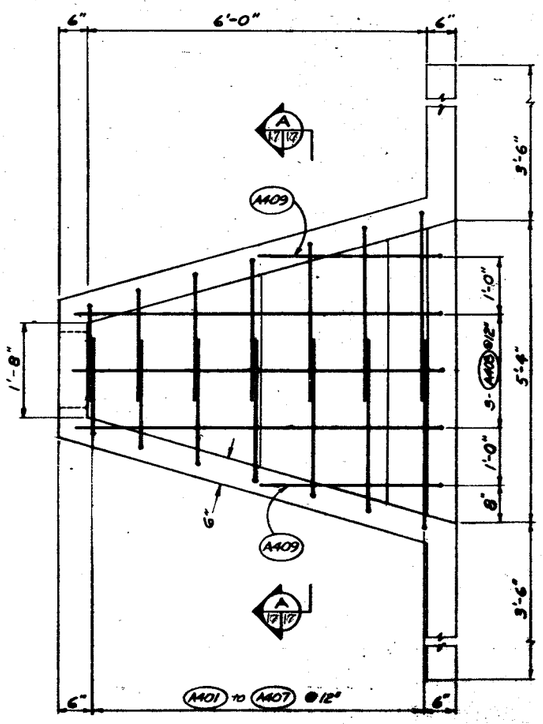
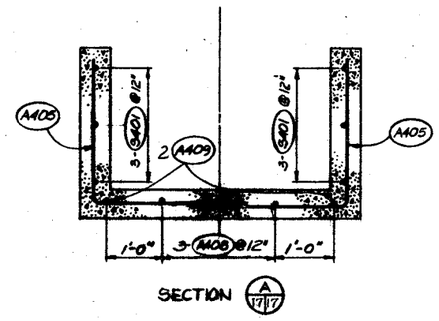


WINGWALL ELEVATION



PLAN



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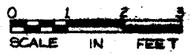
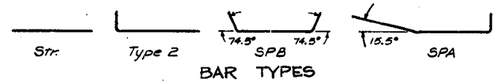


STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
P.W.D. OUTET STRUCTURE SIZE C									
Apron	A401	4	2	4'-0"	2	2'-3"	1'-9"		8'-0"
"	A402	4	2	4'-6"	2	2'-6"	2'-0"		9'-0"
"	A403	4	2	4'-9"	2	2'-6"	2'-3"		9'-6"
"	A404	4	2	5'-3"	2	2'-9"	2'-6"		10'-6"
"	A405	4	2	5'-3"	2	2'-9"	2'-9"		10'-6"
"	A406	4	2	5'-6"	2	2'-6"	3'-0"		11'-0"
"	A409	4	2	5'-6"	2	2'-3"	3'-3"		11'-0"
"	A408	4	3	7'-0"	SPA	3'-0"	3'-3"	9"	21'-0"
"	A409	4	2	4'-0"	2	3'-3"	9¾"		8'-0"
Headwall	H401	4	1	4'-6"	SPB	1'-3"	2'-0"	1'-3"	4'-6"
Sidewall	S401	4	6	9'-6"	SPB	3'-0"	6'-6"		57'-0"
Cutoff wall	C401	4	2	7'-3"	Str.				14'-6"
"	C402	4	1	12'-0"	Str.				12'-0"
"	C403	4	5	1'-6"	Str.				7'-6"
Wingwall	W401	4	8	3'-0"	Str.				24'-0"



BAR TYPES

QUANTITIES

Material	Per unit	No. unit	Total
Reinforced steel	146 lbs	4	584 lbs.
Concrete class 4000	1.90 c.y.	4	7.60 c.y.

NOTE:
1. See sheet 12 for location and position of outlet structures.
2. See sheet 12 for riprap placement

P.W.D. OUTLET STRUCTURE SIZE .C

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

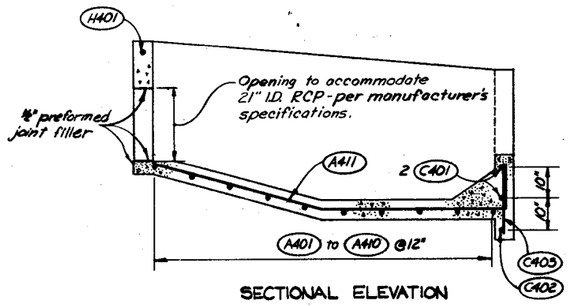
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed G.S.	8-78	Approved by	
Drawn L.J.C.	10-78	Title	
Traced		Title	
Checked G.S.	2-79	Sheet No 17 of 24	Drawing No. 7-E-24040

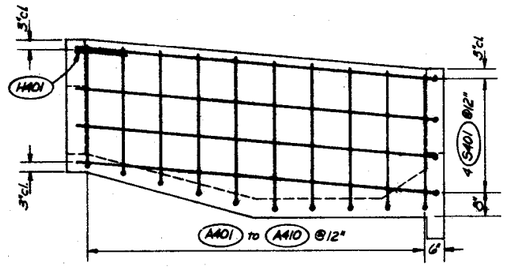
USDA-SCS-PORTLAND, OR 1979

SCS-ENG-313C (REV. 6-78)

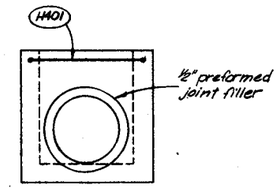
4-18



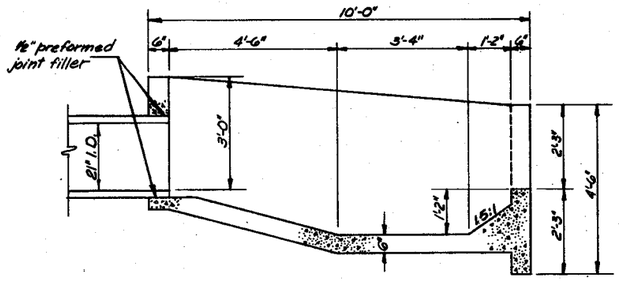
SECTIONAL ELEVATION



SIDEWALL ELEVATION



HEADWALL ELEVATION



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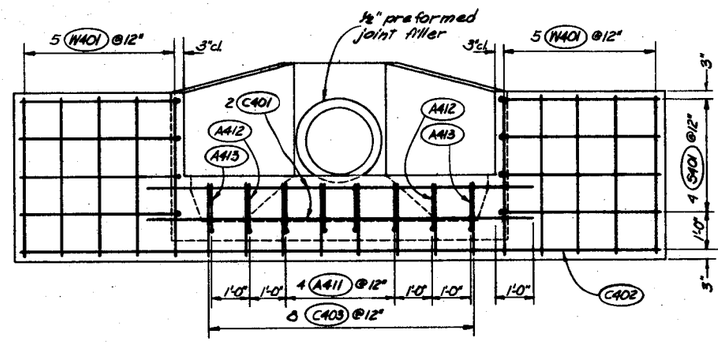
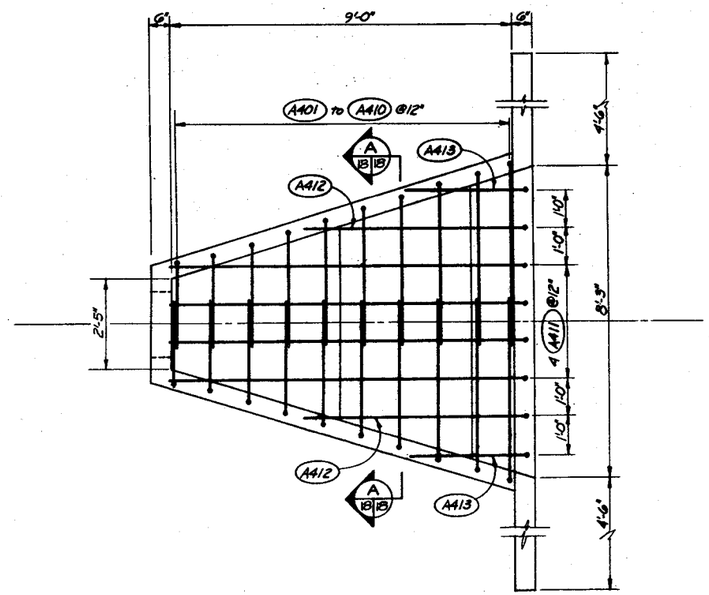
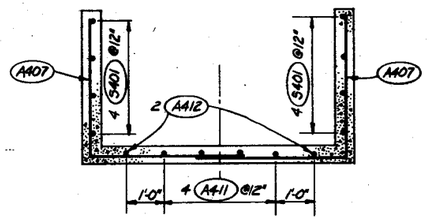


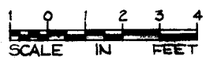
WINGWALL ELEVATION



PLAN

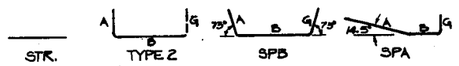


SECTION A



STEEL SCHEDULE

Location	Mark	Size	Quan.	Length	Type	A	B	C	Total Length
P.W.D. OUTLET STRUCTURE SIZE D									
Apron	A401	4	2	5'-3"	2	2'-3"	3'-0"		10'-6"
"	A402	4	2	5'-6"	2	2'-3"	3'-3"		11'-0"
"	A403	4	2	6'-0"	2	2'-6"	3'-6"		12'-0"
"	A404	4	2	6'-6"	2	3'-0"	3'-6"		13'-0"
"	A405	4	2	7'-0"	2	3'-3"	3'-9"		14'-0"
"	A406	4	2	7'-3"	2	3'-6"	3'-9"		14'-6"
"	A407	4	2	7'-6"	2	3'-9"	3'-9"		15'-0"
"	A408	4	2	7'-9"	2	4'-0"	3'-9"		15'-6"
"	A409	4	2	7'-9"	2	4'-3"	3'-6"		15'-6"
"	A410	4	2	8'-3"	2	4'-9"	3'-6"		16'-6"
"	A411	4	4	10'-6"	SPA	4'-6"	4'-9"	1'-3"	42'-0"
"	A412	4	2	7'-3"	SPA	1'-3"	4'-9"	1'-3"	14'-6"
"	A413	4	2	4'-0"	2	2'-9"	1'-3"		8'-0"
Headwall	H401	4	1	5'-3"	SPB	1'-3"	2'-9"	1'-3"	5'-3"
Sidewall	S401	4	8	13'-6"	SPB	4'-0"	9'-6"		108'-0"
Cutoff wall	C401	4	2	10'-3"	Str.				20'-6"
" "	C402	4	1	16'-9"	Str.				16'-9"
" "	C403	4	8	1'-9"	Str.				14'-0"
Wingwall	W401	4	10	4'-0"	Str.				40'-0"



QUANTITIES

Material	Per unit	No. unit	Total
Reinforced steel	274 lbs.	1	274 lbs
Concrete class 4000	3.6 c.y.	1	3.6 c.y.

NOTE:
1. See sheet 12 for location and position of outlet structures.
2. See sheet 12 for riprap placement.

P.W.D. OUTLET STRUCTURE SIZE D

SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

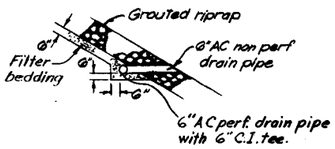
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed G.S.	10-78	Approved by
Drawn L.J.C.	10-78	Title
Traced		Title
Checked G.S.	10-78	Sheet No 18 of 29 — Drawing No. 7-E-24040

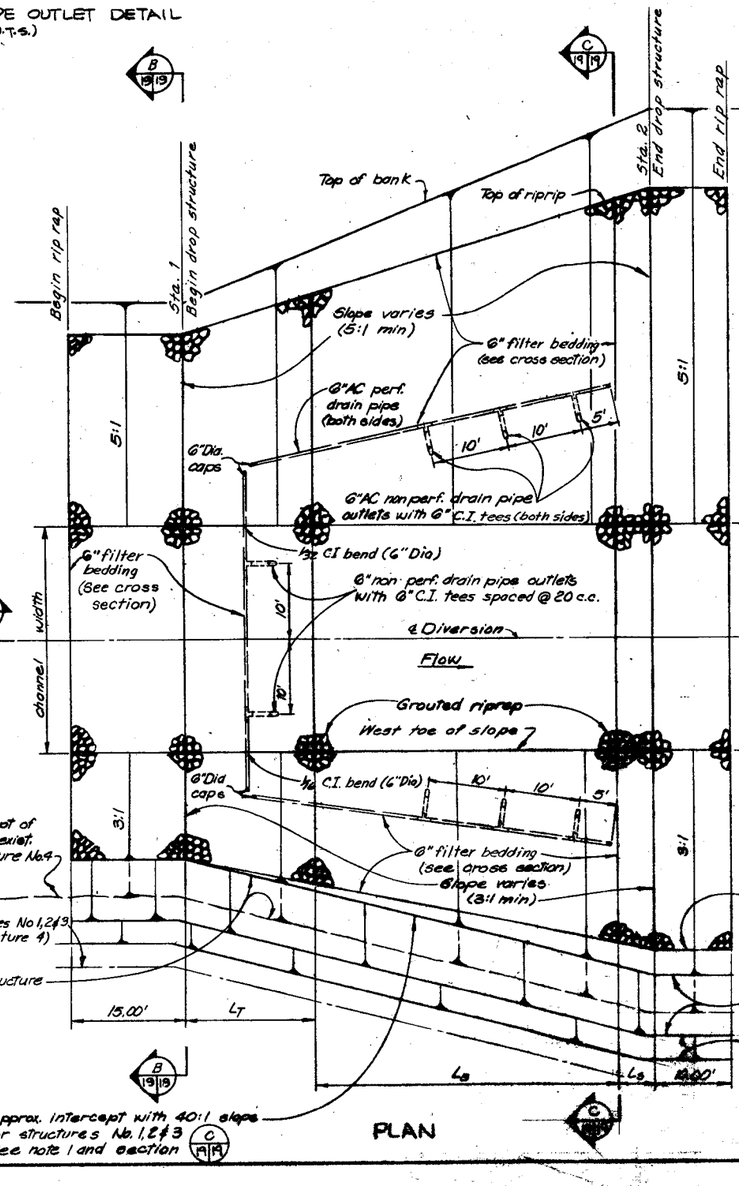
SCS-ENG-313C (REV. 6-78)

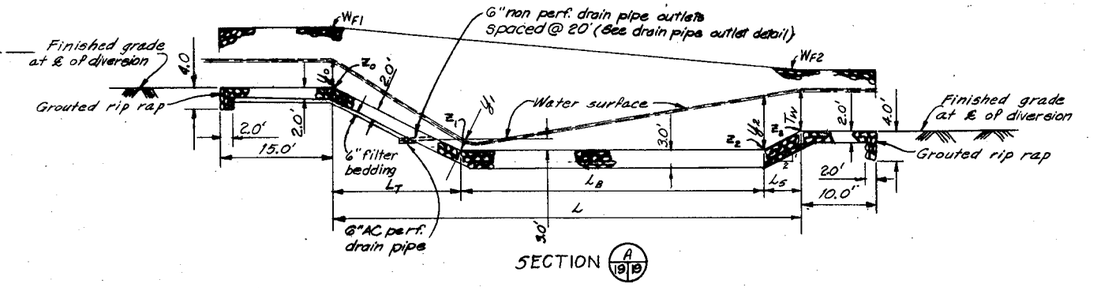
USDA-SCS-PORTLAND, OR. 1979

DROP STRUCTURE	L_B	L_S	L_T	L	T_W	y_0	y_1	y_2	Z_0	Z_1	Z_2	Z_3	W_{F1}	W_{F2}	CHANNEL WIDTH	STA. 1	STA. 2
1	46.00'	5.34'	17.20'	68.54'	5.20'	3.70'	1.44'	7.88'	1170.67	1162.07	1162.07	1164.74	1175.37	1171.44	30.00'	19+69.00	20+37.54
2	28.50'	3.40'	12.80'	44.70'	3.40'	2.20'	1.75'	4.85'	1152.44	1146.04	1146.04	1147.74	1155.64	1152.64	130.00'	81+83.00	82+27.70
3	30.50'	3.08'	16.00'	49.58'	3.40'	2.20'	1.67'	4.98'	1135.24	1127.24	1127.24	1128.78	1138.44	1133.68	215.00	144+82.00	145+31.58
4	38.00'	6.75'	27.40'	72.15'	3.15'	2.30'	1.61'	6.06'	1108.59	1194.89	1094.89	1098.26	1111.89	1102.91	300.00'	237+10.60	237+82.75

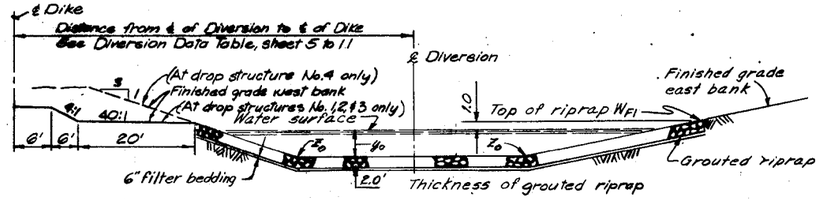


DRAIN PIPE OUTLET DETAIL
(N.T.S.)



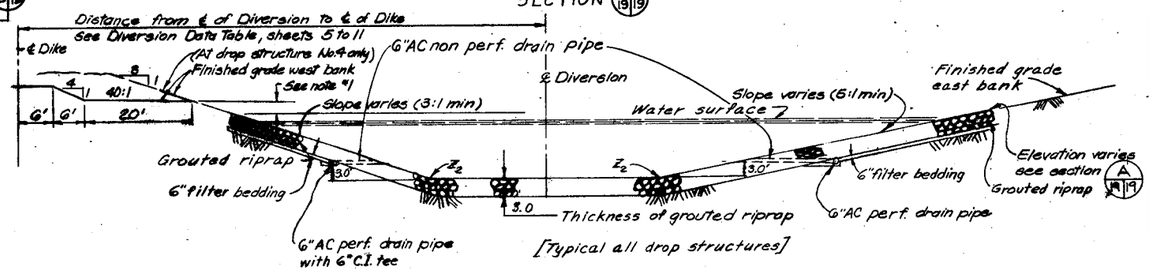


SECTION (A 19 19)



[Typical all drop structures]

SECTION (B 19 19)



[Typical all drop structures]

SECTION (C 19 19)

Notes:
1. Depth varies for structure No. 1, 2 & 3 continue at same slope, without riprap protection, to 40:1 slope as located by information given above.
2. All pipe, perforated and non perforated, shall be asbestos cement. All fittings, bends, tees, caps shall be cast iron.

(Not to scale)

DROP STRUCTURE DETAILS

SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.

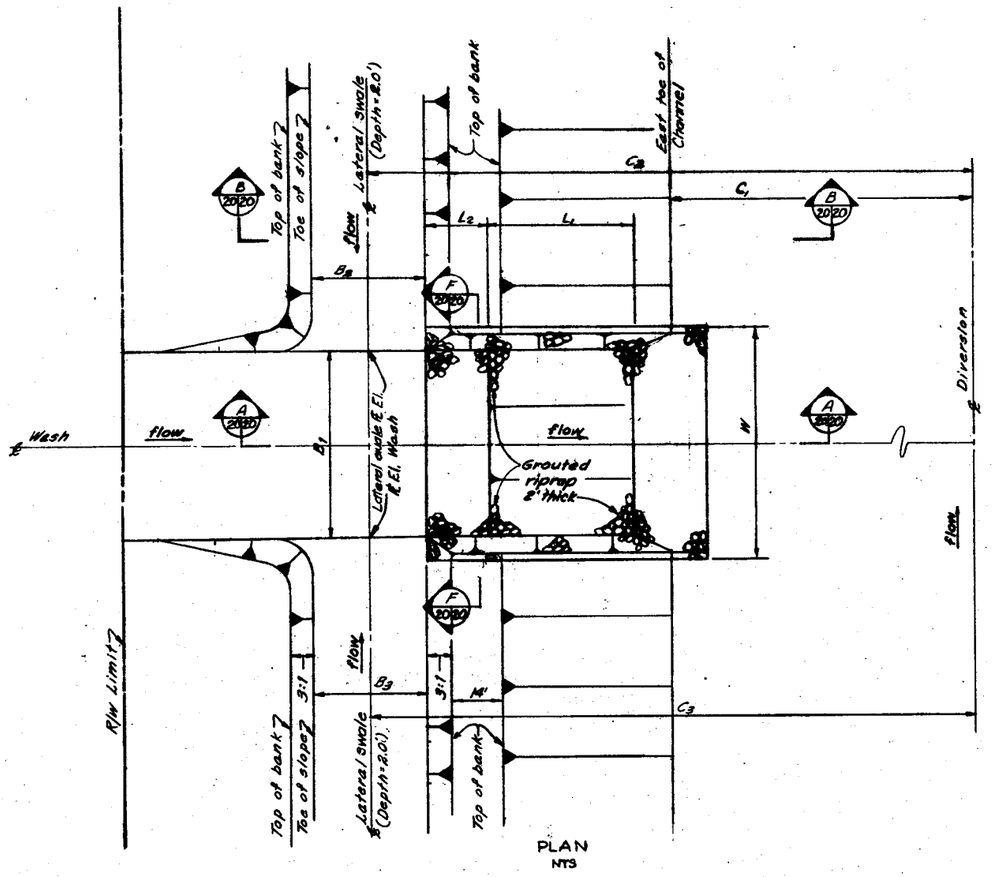
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed C.E.S., A.C.P.	Date 8-78	Approved by	
Drawn J.B., D.B.L., L.C.	9-78	Title	
Traced		Title	
Checked G.S.	8-79	Sheet No. 19 of 29	Drawing No. 7-E-24040

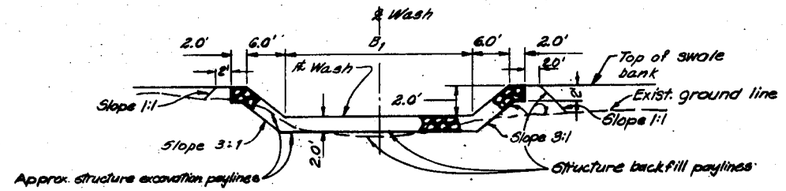
USDA-SCS PORTLAND, OR. 1979

FORM SCS-313C

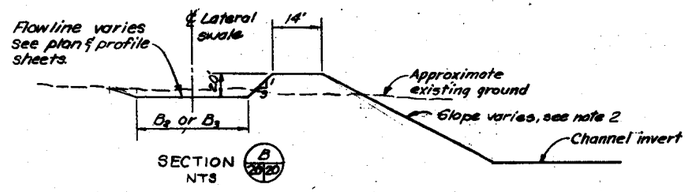


Location Point	Approx. Station Along ℄	℄ Lateral Swale Elev.	℄** Wash Elev.	Schedule Of Inlet Structures Dimensions (Ft) B_1	B_2	B_3	C_1	C_2	C_3	L_1	L_2	W	Q cfs
1*	7+00	1179.00	1179.00	60	—	10	12.5	—	72	31	20	76	780
2	14+00	1178.00	1178.00	22	—	10	15	—	83	38	20	38	360
3	29+00	1169.50	1169.50	10	—	10	18.5	—	86	37.5	20	26	180
4	41+50	1165.00	1165.00	10	10	10	29.5	87	87	28	20	26	180
5	52+00	1162.00	1162.00	12	10	10	38.5	87	87	18	20	28	210
6	61+25	1160.00	1160.00	10	—	10	35	—	87	18	20	26	180
7	80+00	1158.00	1158.00	45	—	20	63	—	129	31	20	61	1020
8	94+00	1150.00	1150.00	10	10	10	71.5	129.5	129.5	28	20	26	205
9	108+50	1147.60	1147.60	45	—	10	80.5	—	141.5	31	20	61	545
10	121+50	1144.00	1144.00	35	10	10	90	146	146	26	20	51	565
11	127+50	1144.00	1144.00	12	—	10	95	—	158	33	20	28	185
12	158+50	1132.00	1132.00	45	—	30	115.5	—	186.5	31	20	61	830
13	170+00	1129.00	1129.00	25	—	20	122	—	191.5	34.5	20	41	470
14	174+00	—	1127.00	10	—	—	124	—	—	25	20	26	180
15	183+50	1124.00	1124.00	15	—	10	128.5	—	184.5	23.5	20	31	255
16	202+00	1120.00	1120.00	50	—	20	138	—	196.5	23.5	20	66	800
17	221+00	1117.00	1117.00	45	—	20	145.5	—	211	30.5	20	61	805
18***	224+00	1106.0	1106.0	—	—	10	—	—	210	—	—	—	25

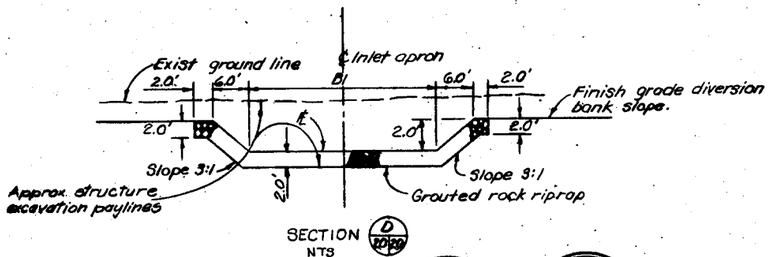
* Structure №1 is located in grouted riprapped section of diversion.
** ℄ Elevation may require compacted fill to provide two feet depth inlet weir cross section. Compacted fill to be in accordance with specifications.
*** Structure No. 18 consists of a lateral swale only. No inlet structure is provided.



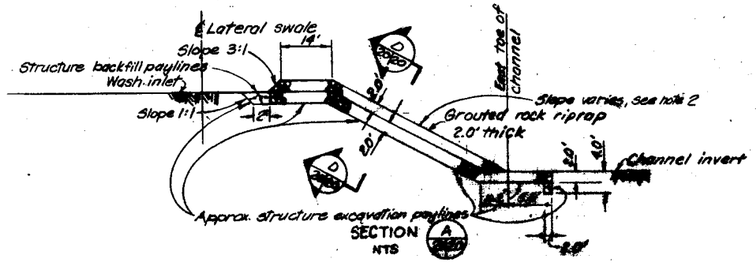
SECTION (F 20+20) NTS



SECTION (B 20+20) NTS



SECTION (D 20+20) NTS



SECTION (A 20+20) NTS

NOTE:
1. Lateral swale stationing, as shown on sheets 5 to 11, are approximate. Actual length of lateral swale to be determined in the field at the time of construction by the engineer.
2. Slope is 4:1 for location Pt. No. 1 and 5:1 for all others.

INLET WEIR DETAILS

SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed	C.E.S.	9-78	Approved by
Drawn	J.B., L.J.C.	9-78	Title
Traced			Title
Checked	A.P.	2-79	Sheet No. 20 of 24 — Drawing No. 7-E-24040

FORM SCS-313C

USDA-SCS-PORTLAND, OR. 1979

UTILITY LOCATION DATA			
Pt. No.	North Coord.	East Coord.	Description
1	898,469.48	146,981.71	Telephone Pole
2	898,471.15	146,814.21	" "
3	898,449.00	146,813.89	" "
4	898,538.07	146,815.62	Power Pole
5	898,537.27	146,879.07	Brace Pole (Power)
6	898,537.05	146,901.83	Power Pole

Fence line

A.P. Sta. 10+59.70

N 898,400
E 147,200

Install grouted rip-rap to elev 1178.0

Sta 3+91.61 Courthouse Rd. =
Sta 9+93.91 Diversion Channel
Center Line triple 10'x6' box culvert
Skew = 30° (Left Forward)
Length = 65' (32.50' Lt & Rt.)
Inv. (North) = 1172.15
Inv. (South) = 1172.05
See sheets 22, 23 & 24 for details

R/W
Exist. top of bank
Telephone line (overhead)
R/W and fence line
1182
Ex. El 82.9
Ex. El 81.1
Ex. El 80.8
Ex. El 80.6
℄ Prop. ditch 74.4
Top of wingwall El. 77.72
Top of wingwall El. 77.26
El. 76.9
Top of parapet El. 79.42
El. 77.4
℄ Ex. Ditch 81.9
Ex. 82.6
Ex. Shldr. 81.8
℄ Ex. Ditch 80.2
℄ Ex. Ditch 79.8
℄ Prop. Ditch 79.2
Shldr. 81.04
Shldr. 80.84
Shldr. 79.93
Shldr. 79.45
Shldr. 79.16
Conc. Bridge Rail
Ex. P 83.26
Edge of exist. pvmt.
Ex. P 82.88
P 82.04
P 81.93
P 81.84
P 80.10
Ex. P 78.43
Ex. P 78.21
℄ Courthouse road
2 Ex. P 83.57
Ex. P 79.59
S 39° 16' 29" E
Sta 5+04.86 End Pvmt. Ex. P 79.76 replacement
Ex. P 78.38
See Detail "A" this sheet
570 2+50.00
Begin Pvmt. Replacement
Edge of exist. pvmt.
Ex. P 83.31
P 81.64
P 80.46
Ex. P 78.19
Ex. 82.2
Ex. 82.9 Ex. Shldr. Line
Prop. Shldr. Line
Shldr. 81.04
Shldr. 80.62
P 79.71
Shldr. 79.46
Shldr. 79.16
Ex. 79.2
Power line
℄ Ex. Ditch 82.6
℄ Ex. Ditch 81.8
℄ Prop. Ditch 80.0
Ex. El. 83.3
Ex. El. 82.3
Top of parapet El. 79.52
Top of wingwall El. 79.62
Top of wingwall El. 77.36
El. 77.0
El. 77.5
℄ Prop. ditch El. 79.7
℄ Prop. ditch El. 79.8
Top of wingwall El. 77.82
Project identification sign, see sheet 29 for details
Access gate, see detail sheet 27
Curve Data
PI 1 Sta. 0+37.78
P.C. Sta. 0+24.00
P.T. Sta. 0+50.91
Δ = 30° 00' 00"
D = 111° 27' 03"
R = 51.41'
T = 13.78'
L = 26.92
R/W and fence line
1180
R/W and fence line (see fence details sheet 27)
Grouted riprap
Inv. of box culvert El. 72.16
Inv. of box culvert El. 72.05
End grouted riprap Sta. 10+56
Access gate see details, sheet 27
Pt. 1 Sta. 0+37.78
Curve Data
PI Sta 0+38.76
PC 0+24.00
PT 0+52.74
Δ = 32° 17' 20"
D = 112° 20' 41"
R = 51.00'
T = 14.76
L = 28.74
12+00
℄ Diversion
Flow
See sheets 5 to 11 for offset data
℄ Dike
11+00
5:1
3:1
4:1
2:1
S 31° 33' 46" W
N 898,400
E 146,900
S 30° 43' 31" W
N 30° 43' 31" E 64'
N 15° 43' 31" E 30'
N 30° 43' 31" E 50'
N 50° 43' 31" E
S = 0.1236
N 45° 43' 31" E 50'
Slope varies
Grouted riprap
9.00
72.39
72.42
72.45
72.48
72.51
72.54
72.57
72.60
72.63
72.66
72.69
72.72
72.75
72.78
72.81
72.84
72.87
72.90
72.93
72.96
72.99
73.02
73.05
73.08
73.11
73.14
73.17
73.20
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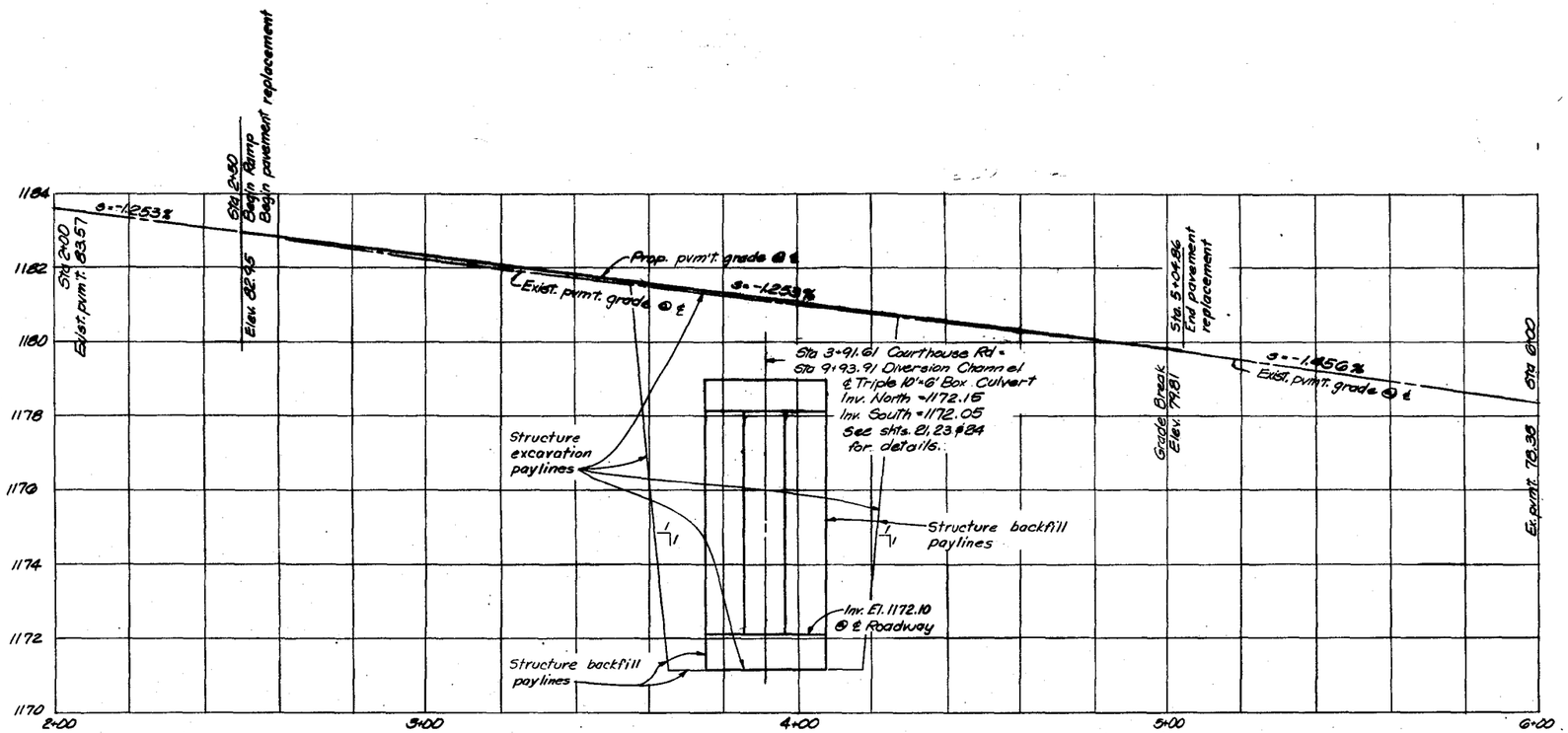
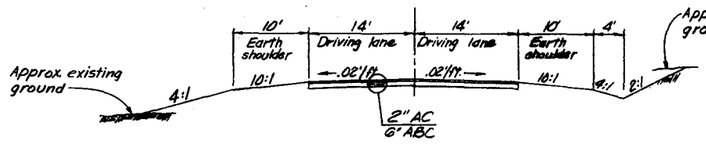
73.56



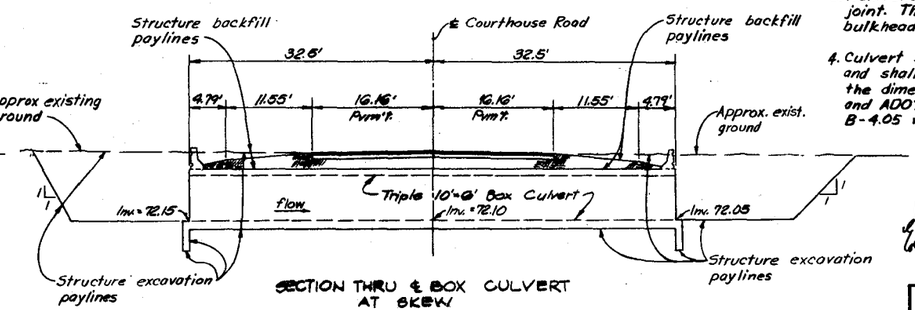
PROFILE ON ℄ COURTHOUSE RD.



TYPICAL ROADWAY SECTION

10 0 10

SCALE IN FEET



SECTION THRU ℄ BOX CULVERT AT SKEW

10 0 10

SCALE IN FEET

NOTES:

1. Construction of box culvert shall be per Standard Specifications, Arizona Department of Transportation (ADOT.) edition of 1969, revised to date.
2. All construction joints shall be formed in top slab and walls (optional in floor slab) spaced not more than 38'-6" apart unless shown otherwise.
3. Reinforcing steel shall project 1'-6" thru the joint. The joint shall be made with ¼" plywood bulkhead which shall be left in place.
4. Culvert shown is ADOT. Standard 30° skew triple 10'×6' box and shall be located as shown and constructed to the dimensions and grade shown on these drawings and ADOT. Standard Drawings B-1.01, B-2.04 and B-4.05 where applicable.

PROFILE - COURTHOUSE ROAD CROSSING

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

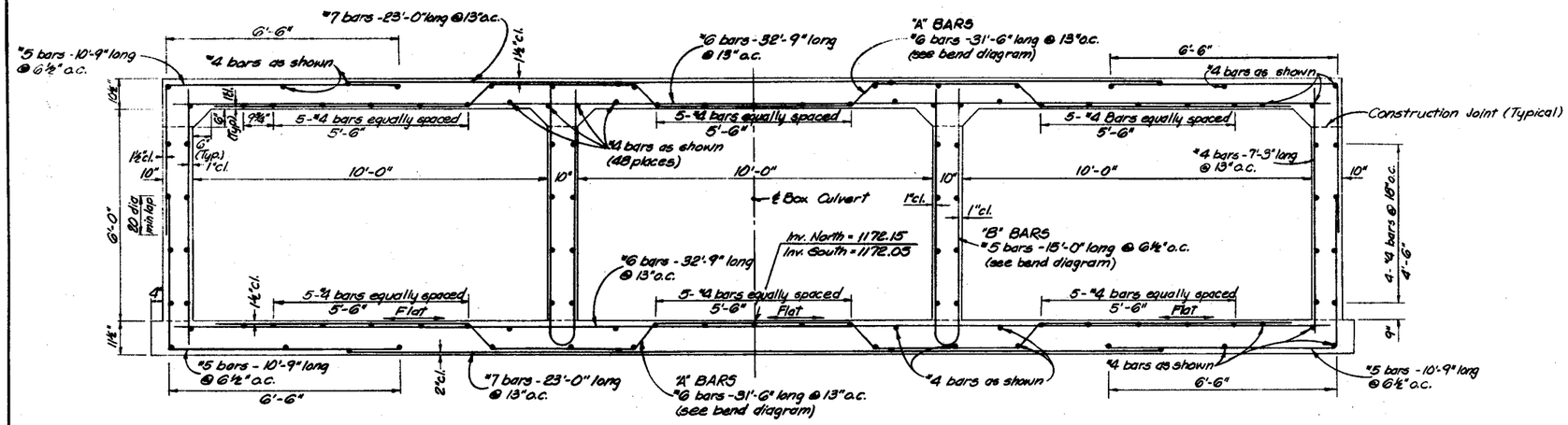
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

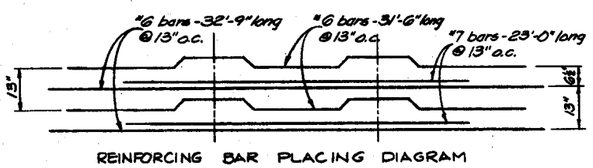
	Date		
Designed W.K.	9-78	Approved by	
Drawn J.N.C., D.B., J.A.M.	10-78	Title	
Traced J.A.M.	10-78	Title	
Checked A.P., E.A.A.	11-78	Sheet No 22 of 29	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR. 1979

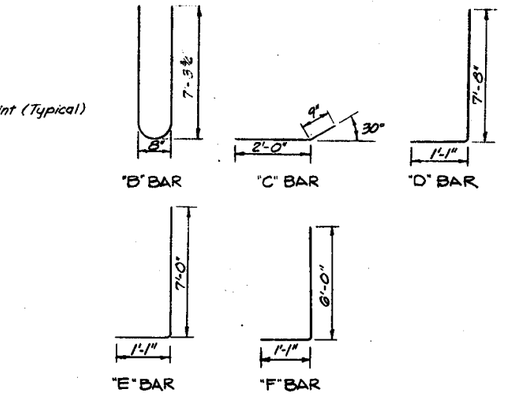
FORM SCS-313C

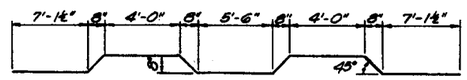


TYPICAL . SECTION



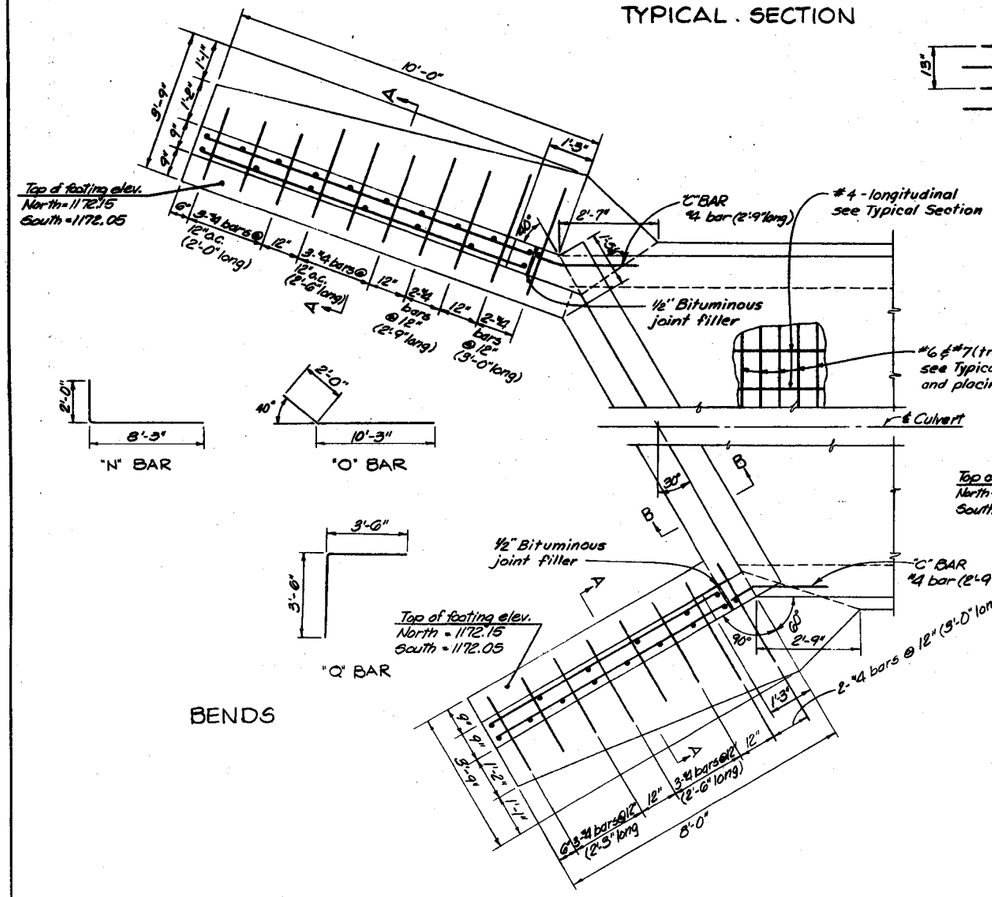
REINFORCING BAR PLACING DIAGRAM





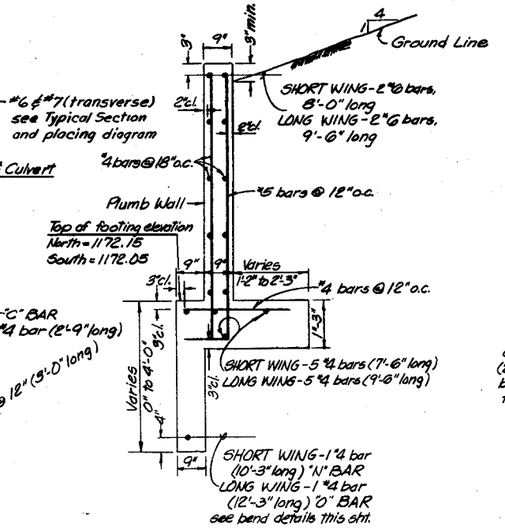
"A" BAR

BENDS

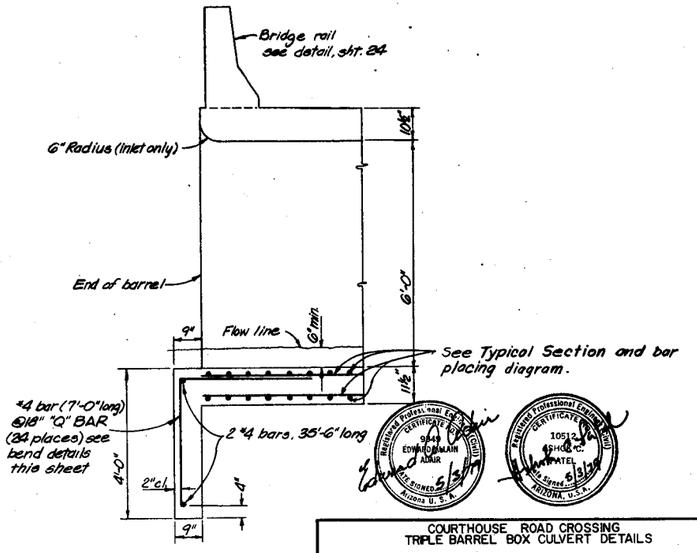


PLAN VIEW

BENDS



SECTION A-A



SECTION B-B

2 1 0 2
SCALE IN FEET

COURTHOUSE ROAD CROSSING
TRIPLE BARREL BOX CULVERT DETAILS

SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.P.P.

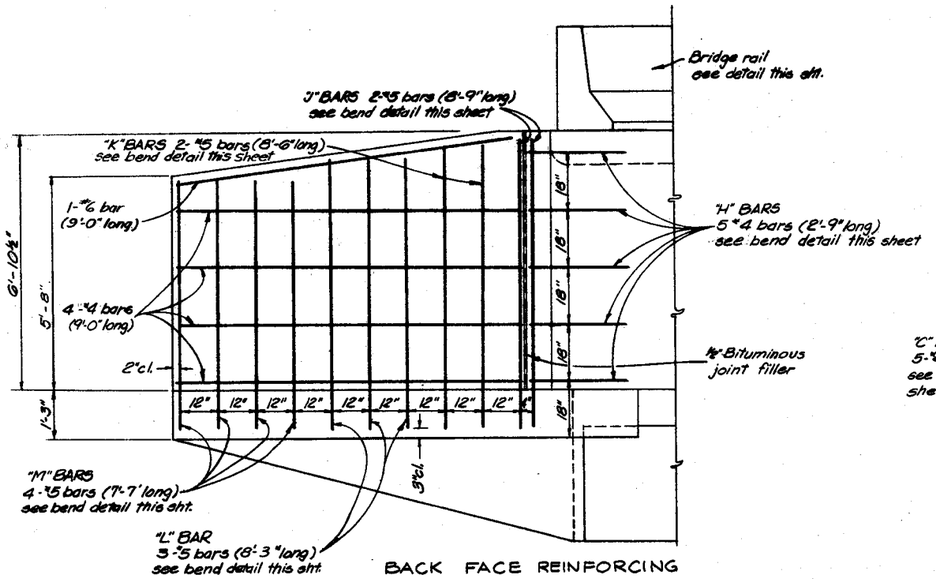
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

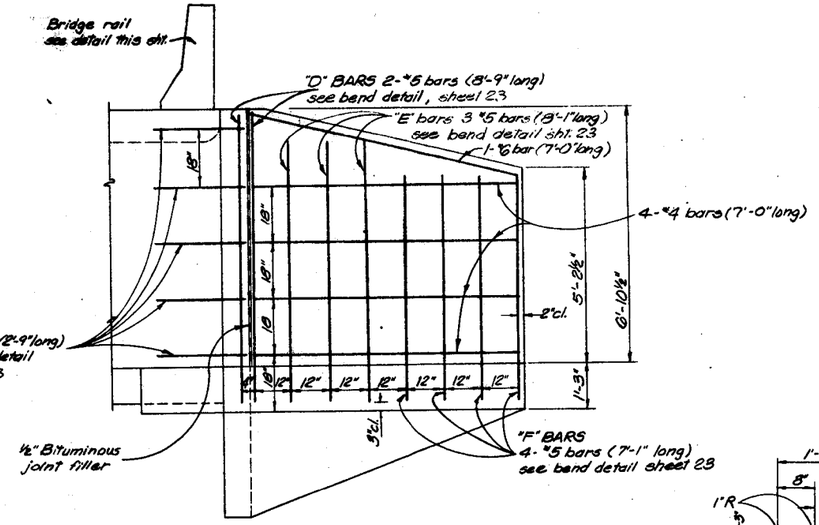
	Date		
Designed W.W.K.	9-78	Approved by	
Drawn L.V.C., D.B., J.A.P.	10-78	Title	
Traced W.A.M.	10-78	Title	
Checked A.P., E.A.A.	11-78	Sheet No. 23 of 24	Drawing No. 7-E-24040

USDA-SCS-PORTLAND, OR. 1979

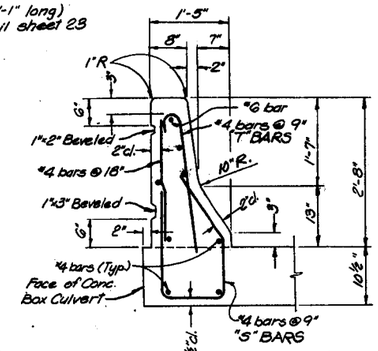
FORM SCS-313C



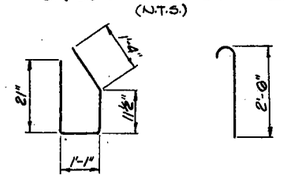
BACK FACE REINFORCING



BACK FACE REINFORCING

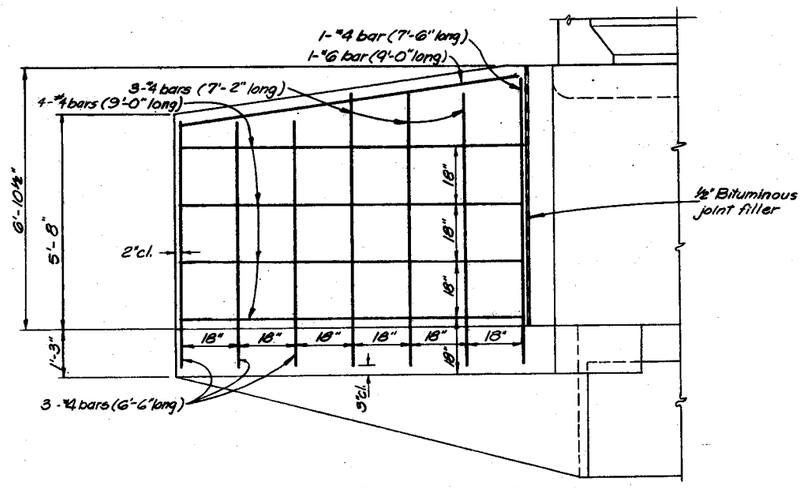


BRIDGE RAIL DETAIL
(N.T.S.)



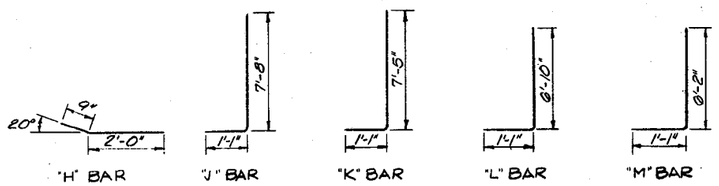
"S" BAR "T" BAR

BENDS

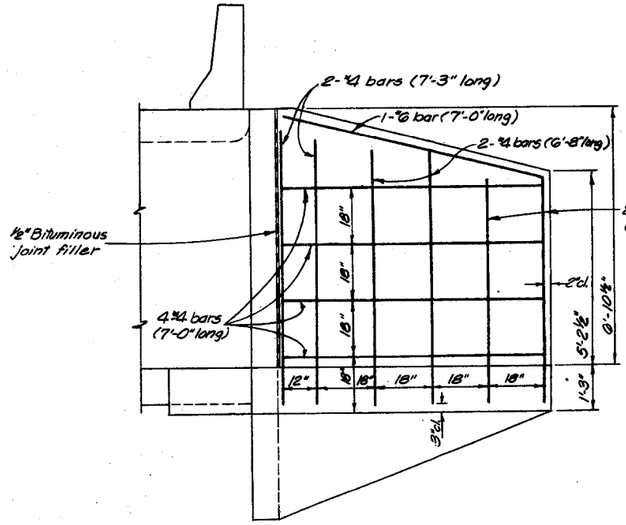


FRONT FACE REINFORCING

LONG WING ELEVATION

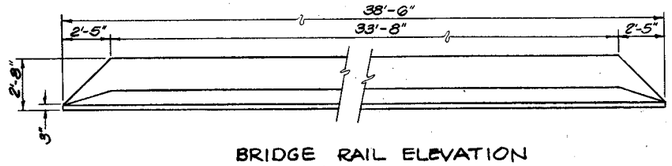


BENDS



FRONT FACE REINFORCING

SHORT WING ELEVATION



BRIDGE RAIL ELEVATION
(N.T.S.)

COURTHOUSE ROAD CROSSING
INLET AND OUTLET WINGWALL DETAILS

SADDLEBACK DIVERSION

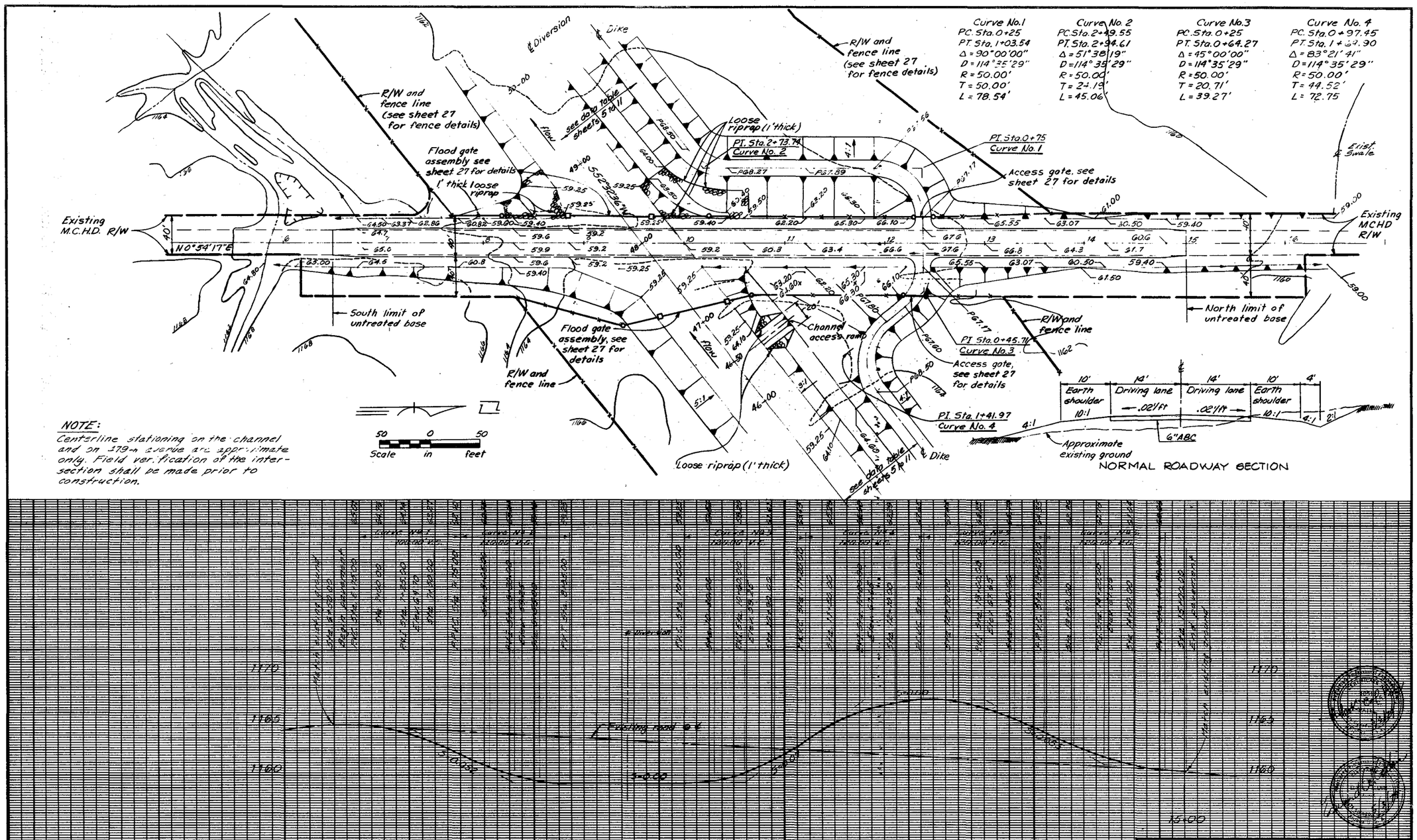
HARQUAHALA VALLEY W.P.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed W.K.	9-78	Approved by	
Drawn L.J.C., D.B., J.A.M.	10-78	Title	
Traced J.A.M.	10-78	Title	
Checked A.P. E.A.A.	11-78	Sheet No. 24 of 27	Drawing No. 7-E-24040

FORM SCS-313C

USDA-SCS-PORTLAND, OR. 1979



PLAN & PROFILE 479th. AVENUE CROSSING

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

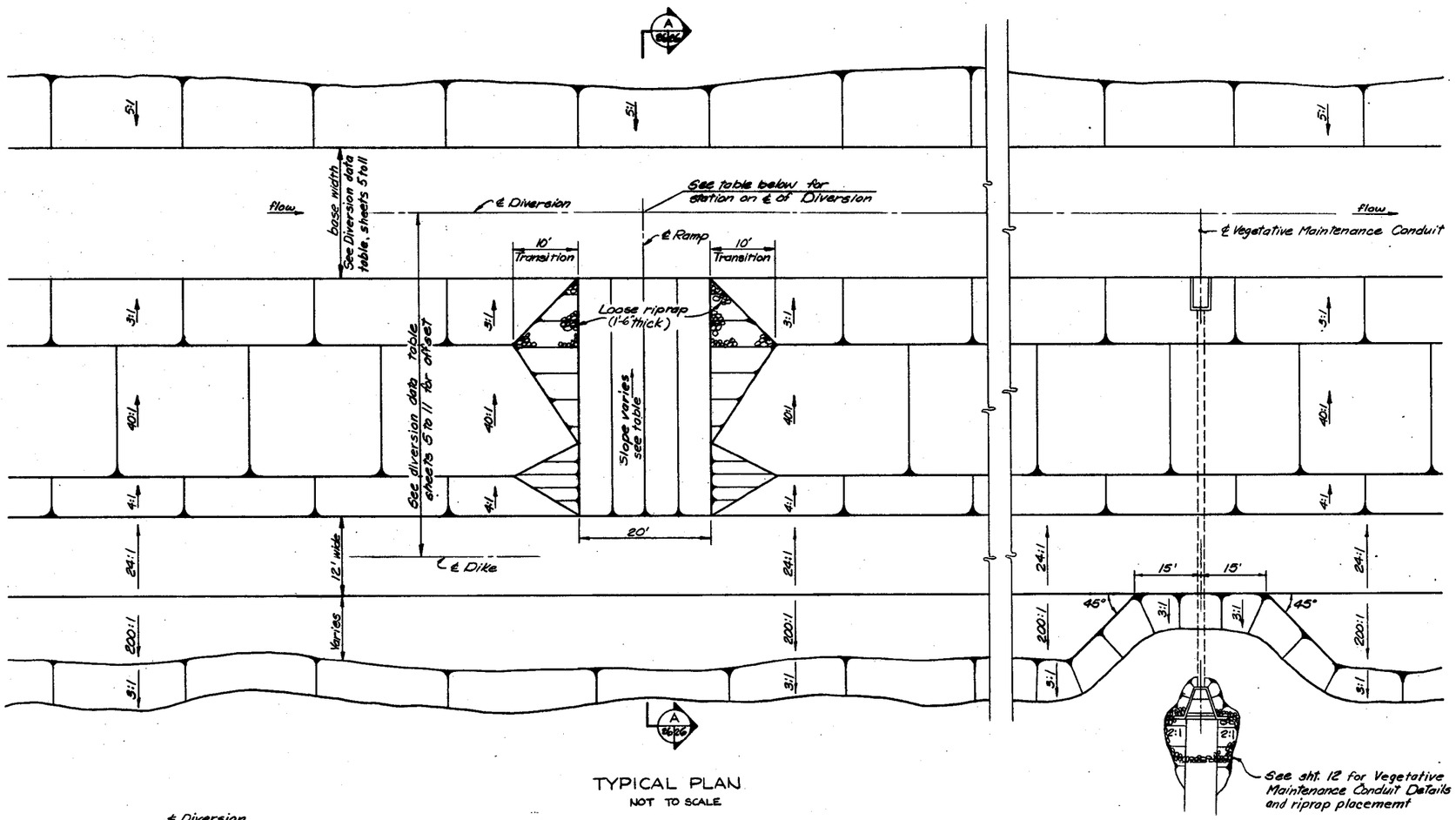
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

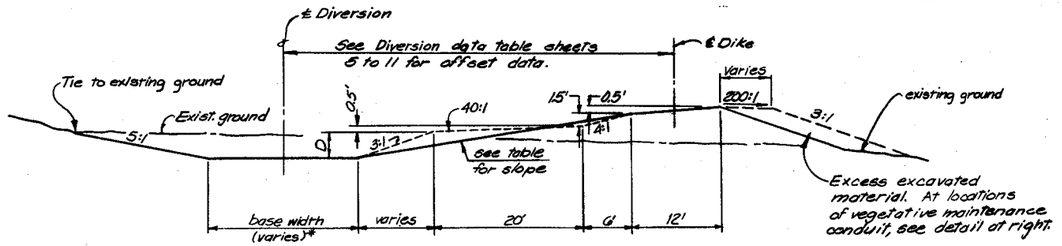
Designed W.K.	Date 9-78	Approved by	
Drawn J.A.M., L.J.C.	10-78	Title	
Traced J.A.M.	10-78	Sheet No. 25 of 29	Drawing No. 7-E-24040
Checked A.L., E.A.A.	11-78		

U.S. GOVERNMENT PRINTING OFFICE: 1977—785-104

USDA-SCS-PORTLAND, OR. 1979



TYPICAL PLAN
NOT TO SCALE



SECTION A 26/26
NOT TO SCALE

ACCESS RAMP LOCATION DATA			
Ramp No.	Station	D (depth ft)	Ramp slope
1	11+20	5.0	5.9:1
2	75+00	4.5	6.1:1
3	110+00	5.0	5.9:1
4	135+00	4.2	6.2:1
5	141+00	4.0	6.3:1
6	180+00	5.0	5.9:1
7	230+00	4.5	6.1:1

TYPICAL MAINTENANCE ACCESS RAMP AND DIKE LAYOUT AT VEGETATIVE MAINTENANCE CONDUIT OUTLET

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

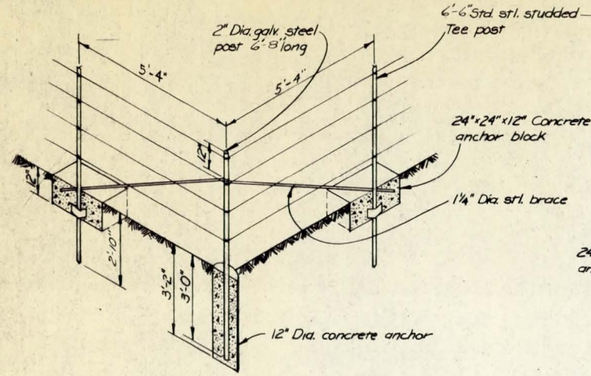
MARICOPA COUNTY, ARIZONA

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

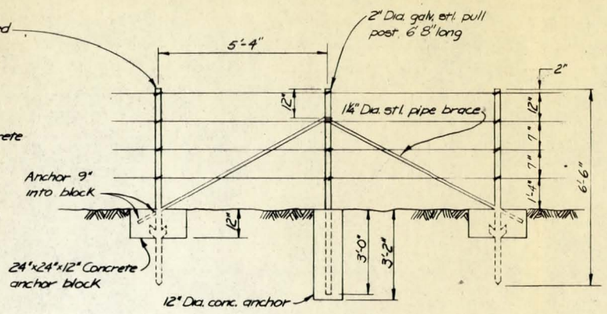
	Date		
Designed G.S.	8-78	Approved by	
Drawn L.J.C., D.B.	9-78	Title	
Traced D.B.	9-78	Title	
Checked G.S.	2-79	Sheet No 26 of 29	Drawing No. 7-E-24040

SCS-ENG-313C (REV. 6-75)

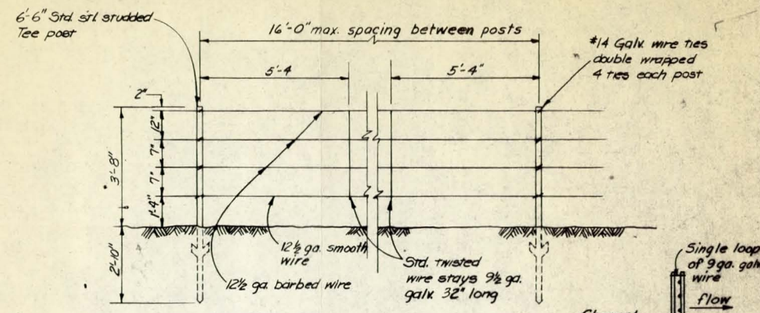
USDA-SCS PORTLAND, OR. 1979



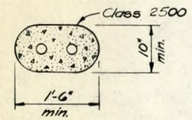
END OR CORNER POST ASSEMBLY



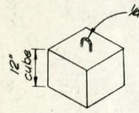
PULL POST OR CHANGE IN GRADE ASSEMBLY



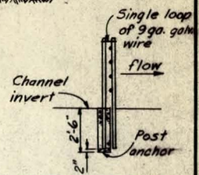
LINE POST ASSEMBLY



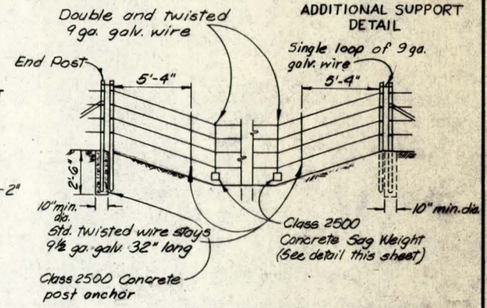
SECTION A 27/27



SAG WEIGHT DETAIL



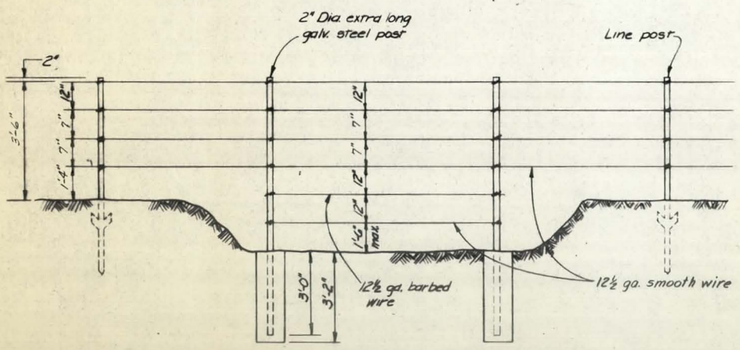
ADDITIONAL SUPPORT DETAIL



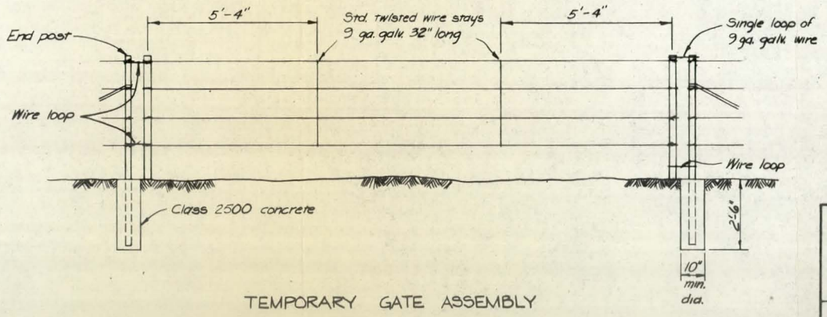
Note, Where flood gate spans exceed 150', additional fence supports shall be installed such that distance between supports shall not be less than 50' nor more than 75'.

FLOOD GATE ASSEMBLY
(For gate schedule see sht. 3.)

PERMANENT ACCESS GATE AND POST ASSEMBLY



WASH OR DEPRESSION CROSSING ASSEMBLY



TEMPORARY GATE ASSEMBLY

FENCING DETAILS
NOT TO SCALE

Date	Revision	By
6-80	Changed bottom wire (barbed to smooth), decreased fence height and wire spacing.	LC

Registered Professional Engineer — Certificate No. 9349 — Edward Lewin Blair — Arizona U.S.A. — 5/3/79

Registered Professional Engineer — Certificate No. 10514 — Bhupendra C. Patel — Arizona U.S.A. — 5/3/79

FENCING DETAILS

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

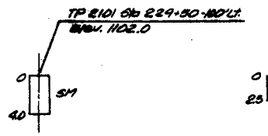
MARICOPA COUNTY, ARIZONA

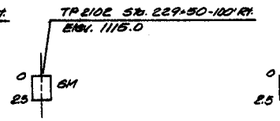
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

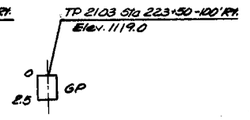
	Date	
Designed A.P.		Approved by
Drawn L.J.C., J.A.M.	9-78	Title
Traced J.A.M.	9-78	Title
Checked A.P., G.S.	10-78	Sheet No 27 of 29 — Drawing No. 7-E-24040

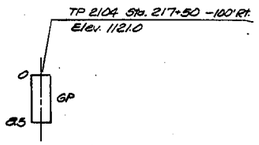
SCS-ENG-315C (REV. 6-78)

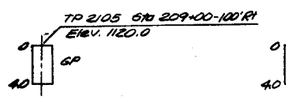
7-26

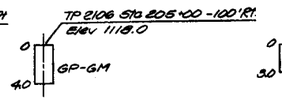


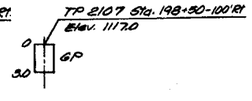


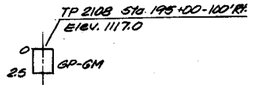


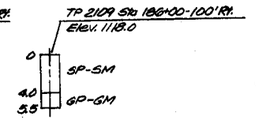


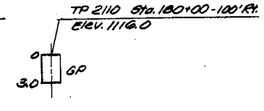


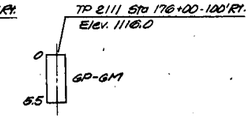


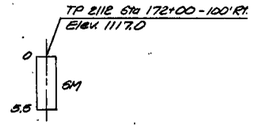


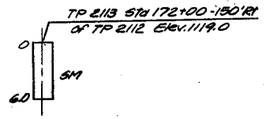


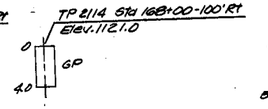


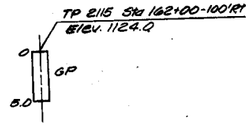


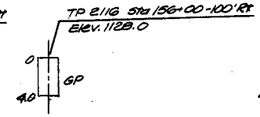


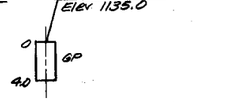


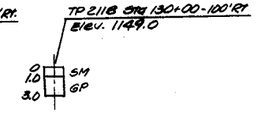


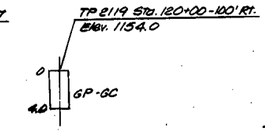


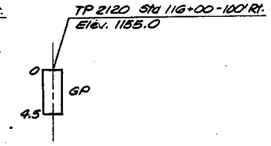


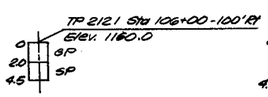


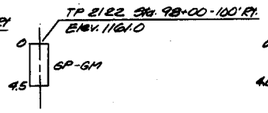


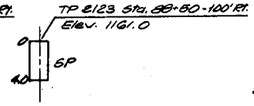


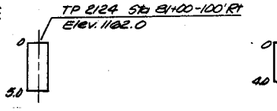


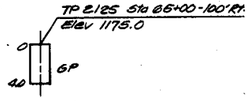


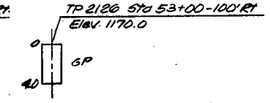


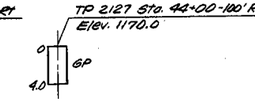


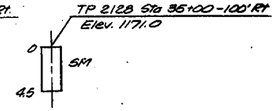


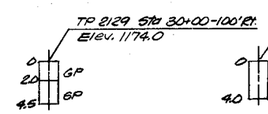


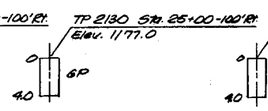


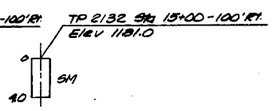


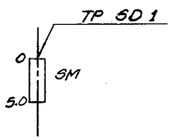


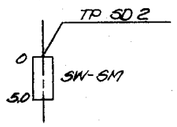












LOG OF ADDITIONAL TEST HOLES & TEST PITS

SADDLEBACK DIVERSION

HARQUAHALA VALLEY W.P.P.

MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date		
Designed		Approved by	
Drawn D.B.	11-78	Title	
Traced		Title	
Checked		Sheet No. 28 of 29	Drawing No. 7-E-24040

USDA-SCS PORTLAND, OR. 1979

FORM SCS-313C

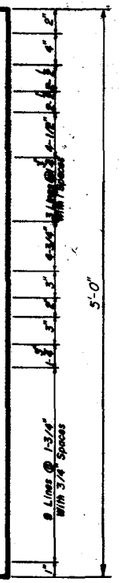
HARQUAHALA VALLEY WATERSHED

SADDLEBACK FLOODWATER DIVERSION CHANNEL

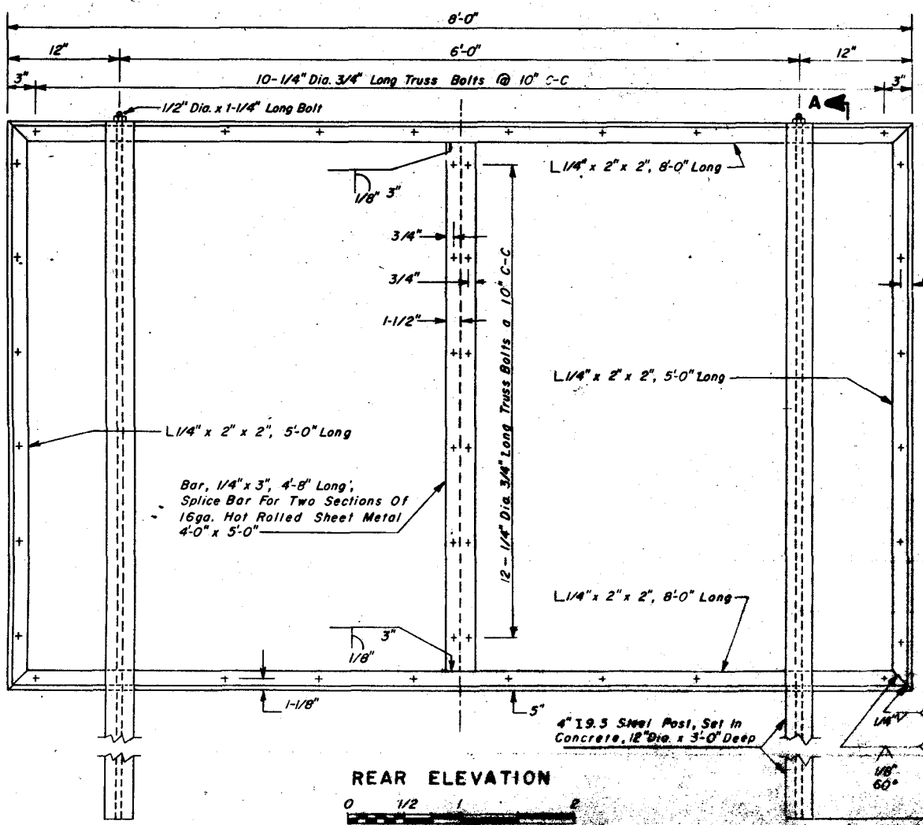
DRAINAGE AREA	9.65 SQUARE MILES
DIVERSION CHANNEL LENGTH	4.7 MILES
VOLUME OF EXCAVATION	1,050,000 CUBIC YARDS

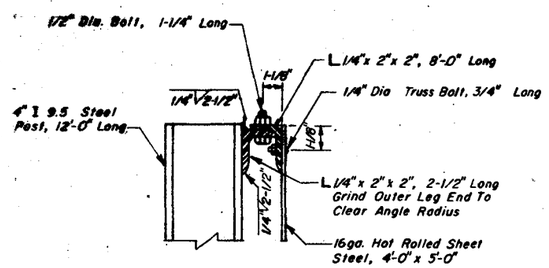
BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

BY
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
BUCKEYE-ROOSEVELT NATURAL RESOURCE CONSERVATION DISTRICT
WICKENBURG NATURAL RESOURCE CONSERVATION DISTRICT
WITH THE ASSISTANCE OF
SOIL CONSERVATION SERVICE
OF THE
U.S. DEPARTMENT OF AGRICULTURE
1979

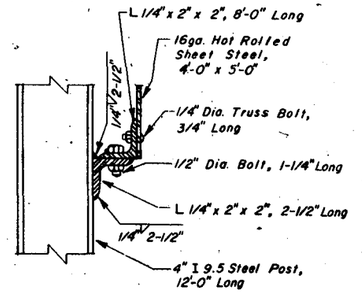


LETTERING LAYOUT





DETAIL "A"



DETAIL "B"

0 1/2 1
SCALE IN FEET

NOTE:

1. All bolts shall be installed with lock washers.
2. All bolts, nuts, and washers to be galvanized.
3. Approved spot or tack welding may be substituted for for truss bolts in securing sign sheet steel sections to frame.
4. Frame and base coat for sign shall be painted in accordance with the specifications.
5. All parts shall be painted with base coat before assembly.
6. Background of sign shall be painted with an approved white enamel.
7. Letters shall be painted with an approved dark green enamel.
8. Location of sign is shown on sheet 21.

IDENTIFICATION SIGN
SADDLEBACK DIVERSION
HARQUAHALA VALLEY W.R.P.
MARICOPA COUNTY, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed SOIL CONSERVATION SERVICE	Date	Approved by	
Drawn S.C.S., L.J.C.	2-79	Title	
Traced L.J.C.	2-79	Title	
Checked A.P., E.A.A.	3-79	Sheet No. 29 of 29	Drawing No. 7-E-24040

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