

FCD-2 POWERLINE FLOODWAY

OF
MARICOPA COUNTY

A310.501

ORIGINAL

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INVITATION FOR BIDS FCD-2
MARCH 6, 1967

APACHE JUNCTION - GILBERT WATERSHED
POWERLINE FLOODWAY

FCD-2 POWERLINE FLOODWAY

CONSTRUCTION CONTRACT

(Signature Form)

CONTRACT NO. FCD #2

DATE OF CONTRACT May 3, 1967

NAME AND ADDRESS OF CONTRACTOR

The Ashton Company, Inc.
P. O. Box 7065
Tucson, Arizona 85713

CHECK APPROPRIATE BOX

- Individual
 Partnership
 Joint Venture
 Corporation, Incorporated
in the State of Arizona

CONTRACTING LOCAL ORGANIZATION

Flood Control District of Maricopa County
3325 West Durango Street
Phoenix, Arizona 85009

CONTRACT FOR (Work to be performed)

Construction of Powerline Floodway

PLACE

Structure is located within the Apache Junction-Gilbert Watershed, beginning approximately 4 miles south of Apache Junction and extending to the northwest corner of Williams Air Force Base, Pinal and Maricopa Counties, Arizona.

CONTRACT PRICE (Express in words and figures)

Seven Hundred Eighty-Five Thousand, Two Hundred Eighty-Eight Dollars and Eighty Cents

\$ 785,288.80

The Contracting Local Organization, represented by the Contracting Officer executing this contract, and the individual, partnership, joint venture, or corporation named above (hereinafter called the Contractor), mutually agree to perform this contract in strict accordance with the following:

General Provisions (Form SCS-43)

Special Provisions

Addenda Nos. 1, 2, & 3 dated March 14, March 22, and April 4, 1967,
Respectively

Bid Schedule

Equal Opportunity Clause

Specifications - Nos. 2, 3B, 4A, 5A, 8B, 9, 12, 14, 17, 22, 25,
100, 101, 102, 103, 104, 106, 107, 110,
117, 119, 121, 122, 127

Drawings - No. 7-E-20598, Sheets 1 through 44

WORK SHALL BE STARTED:

Within 20 calendar days after date
of receipt of notice to proceed.

WORK SHALL BE COMPLETED:

Within 367 calendar days after date
of receipt of notice to proceed.

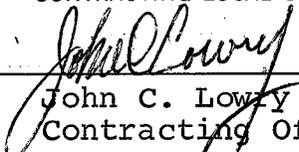
Alterations: The following alterations were made in this contract before it was signed
by the parties hereto:

None

In witness whereof, the parties hereto have executed this contract as of the date entered
on the first page hereof.

Flood Control District of Maricopa County
CONTRACTING LOCAL ORGANIZATION

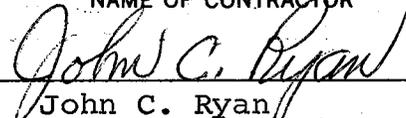
By


John C. Lowry
Contracting Officer
(Official Title)

The Ashton Company, Inc.

NAME OF CONTRACTOR

By


John C. Ryan
Vice-President
(Title)

PAYMENT BOND (See Instructions on reverse)		Date Bond Executed (Must be same or later than date of contract) <p style="text-align: center;">3 May 1967</p>	
Principal (Legal name and business address) THE ASHTON COMPANY, INC., CONTRACTORS AND ENGINEERS #2727 S. Country Club Road Tucson, Arizona		Type of Organization ("X" one) <input type="checkbox"/> Individual <input type="checkbox"/> Partnership <input type="checkbox"/> Joint Venture <input checked="" type="checkbox"/> Corporation	
Surety(ies) (Name(s) and business address(es)) PACIFIC INDEMNITY COMPANY, a corporation duly organized and existing under the laws of the State of California with its principal office at Los Angeles, California		State of Incorporation ARIZONA	
		Penal Sum of Bond	
		Million(s)	Thousand(s) 785
		Hundred(s) 288	Cents 80
		Contract Date 3 May 1967	Contract No. FCD #2
<p>KNOW ALL MEN BY THESE PRESENTS, That we, the Principal and Surety(ies) hereto, are firmly bound to the <u>FLOOD CONTROL DISTRICT OF MARICOPA COUNTY</u>, hereinafter called the Contracting Local Organization, 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.</p> <p>THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into the contract identified above;</p> <p>NOW, THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety(ies) being hereby waived, then the above obligation shall be void and of no effect.</p> <p>IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this payment bond and have affixed their seals on the date set forth above.</p>			
Principal			
Signature(s)	1. THE ASHTON COMPANY, INC., CONTRACTORS AND ENGINEERS BY: <i>John C. Ryan</i> (Seal) (Seal)		
Name(s) & Title(s) (Typed)	1. JOHN C. RYAN, Vice-President 2.		
Corporate Surety(ies)			
SURETY A	Name & Address	PACIFIC INDEMNITY COMPANY State of Inc. CALIF.	
	Signature(s)	1. BY: <i>Helene C. Squire</i> (Seal) (Seal) 2.	
	Name(s) & Title(s) (Typed)	1. Helene C. Squire, Its Attorney-in-fact 2.	

Corporate Surety(ies) (Continued)

Corporate Surety(ies) (Continued)				
SURETY B	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	
SURETY C	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	
SURETY D	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	
SURETY E	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	
SURETY F	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	

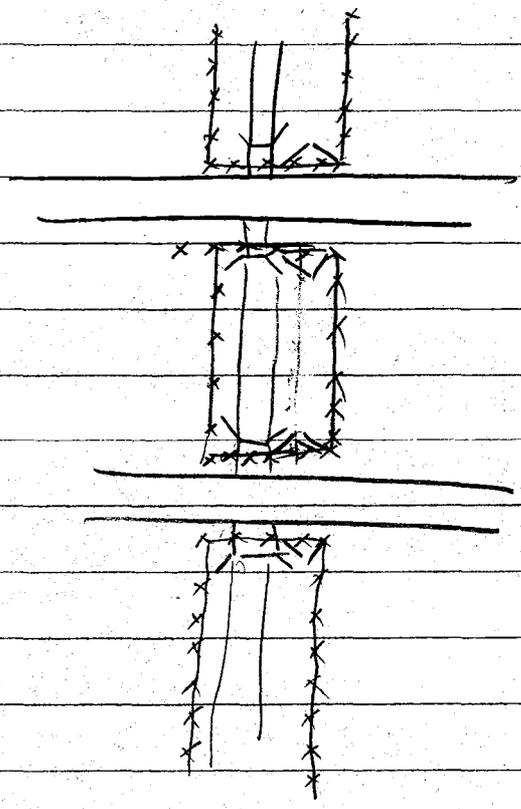
INSTRUCTIONS

1. The full legal name and business address of the Principal shall be inserted in the space designated "Principal" on the face of the 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.

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

3. The person signing the bond for the surety must submit evidence of his authority to act for the surety.

4. The corporate surety must be approved by the state in which the services or supplies are to be delivered or in which construction is to be performed.



Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that the PACIFIC INDEMNITY COMPANY
a corporation of the State of California, by authority of a resolution adopted by its Board of
Directors at a meeting called and held on the 8th day of February, 1966, which said
resolution is still in full force and effect and of which the following is a true and complete copy:

"RESOLVED, that the President or any Vice-President may from time to time appoint Resident Vice-Presidents, Resident
Assistant Secretaries and Attorneys-in-Fact to represent and act for and on behalf of the Company, and either the President, or
any Vice-President, the Board of Directors or the Executive Committee may at any time remove any such Resident Vice-President
or Resident Assistant Secretaries and Attorneys-in-Fact and revoke the power and authority given him; and be it further

"RESOLVED, that Attorneys-in-Fact may be given full power and authority to execute for and in the name and on behalf of
the Company, any and all bonds, recognizances, contracts of indemnity and other writings obligatory in the nature of a bond,
recognizance or conditional undertaking, and any such instrument executed by any such Attorney-in-Fact shall be as binding
upon the Company as if signed by the President and sealed and attested by the Secretary; and be it further

"RESOLVED, that the Attorneys-in-Fact are hereby authorized to verify any affidavit required to be attached to bonds, recog-
nizances or contracts of indemnity, policies of insurance and all other writings obligatory in the nature thereof."

does hereby make, constitute and appoint

HELENE C. SQUIRE

its true and lawful Attorney-in-Fact, with full power and authority to make, execute and deliver, for it, in its
name and in its behalf, as surety any and all bonds and undertakings of suretyship.

And the execution of such bonds or undertakings, in pursuance of these presents, shall be as binding upon
the said Corporation, as fully and amply, to all intents and purposes, as if they had been duly executed and
acknowledged by the regularly elected officers of the said Corporation in their own proper persons.

IN WITNESS WHEREOF, the PACIFIC INDEMNITY COMPANY
has caused these presents to be signed by its Vice-President and its corporate seal to be hereto affixed, duly
attested by its Assistant Secretary, this 20th day of June A.D. 1966

Attest: Elizabeth H. Jones
Assistant Secretary.

By A. A. Christian
Vice-President.

STATE OF CALIFORNIA, }
COUNTY OF LOS ANGELES } ss.:

On this 20th day of June A. D. 1966 before me personally came

.....to me known, who, being by me duly
sworn, did depose and say, that he resides in the City of Los Angeles, California; that he is the Vice-President of the PACIFIC

INDEMNITY COMPANY

the corporation described in and which executed the above instrument; that he knows the seal of said corporation, that the seal affixed
to the said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he signed
his name thereto by like order.

(Notarial Seal)

Marion F. Haire

Notary Public.

My Commission expires November 11, 1967.

STATE OF CALIFORNIA, }
COUNTY OF LOS ANGELES } ss.:

I, Elizabeth H. Jones Assistant Secretary of the PACIFIC
INDEMNITY COMPANY, do hereby certify that the above and foregoing is

correct copy of a Power of Attorney, executed by said PACIFIC INDEMNITY COMPANY
which is still in force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said Company, at the City
of Los Angeles, this 3rd day of May A. D. 1967.

Elizabeth H. Jones
Secretary.

PERFORMANCE BOND (See Instructions on reverse)		Date Bond Executed (Must be same or later than date of contract) <p style="text-align: center;">3 May 1967</p>			
Principal (Legal name and business address) THE ASHTON COMPANY, INC., CONTRACTORS AND ENGINEERS #2727 S. Country Club Road Tucson, Arizona		Type of Organization ("X" one) <input type="checkbox"/> Individual <input type="checkbox"/> Partnership <input type="checkbox"/> Joint Venture <input checked="" type="checkbox"/> Corporation			
		State of Incorporation <p style="text-align: center;">ARIZONA</p>			
Surety(ies) (Name(s) and business address(es)) PACIFIC INDEMNITY COMPANY, a corporation duly organized and existing under the laws of the State of Calif. with its principal office at Los Angeles, California		Penal Sum of Bond			
		Million(s)	Thousand(s) 785	Hundred(s) 288	Cents 80
		Contract Date <p style="text-align: center;">3 May 1967</p>		Contract No. <p style="text-align: center;">FCD #2</p>	
<p>KNOW ALL MEN BY THESE PRESENTS, That we, the Principal and Surety(ies) hereto, are firmly bound to the <u>FLOOD CONTROL DISTRICT OF MARICOPA COUNTY</u>, hereinafter called the <u>(Name of Contracting Local Organization)</u> Contracting Local Organization, 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.</p> <p>THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into the contract identified above;</p> <p>NOW, THEREFORE, if the Principal shall perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Local Organization, with or without notice to the Surety(ies), and during the life of any guaranty required under the contract, and shall also perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety(ies) being hereby waived, then the above obligation shall be void and of no effect.</p> <p>IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this performance bond and have affixed their seals on the date set forth above.</p>					
Principal					
Signature(s)	1. THE ASHTON COMPANY, INC., CONTRACTORS AND ENGINEERS BY: <i>John C. Ryan</i> (Seal)		(Seal)		
Name(s) & Title(s) (Typed)	1. JOHN C. RYAN, Vice-President		2.		

Corporate Surety(ies)

		Name & Address	State of Inc.	Liability Limit
SURETY A		PACIFIC INDEMNITY COMPANY	CALIF.	
	Signature(s)	1. <i>Helene C. Squire</i> BY: <i>Helene C. Squire</i> (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1. Helene C. Squire, Its Attorney-in-fact	2.	
SURETY B	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	
SURETY C	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	
SURETY D	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	
SURETY E	Name & Address		State of Inc.	Liability Limit
	Signature(s)	1. (Seal)	2.	(Seal)
	Name(s) & Title(s) (Typed)	1.	2.	

INSTRUCTIONS

1. 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.

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

3. The person signing the bond for the surety must submit evidence of his authority to act for the surety.

4. The corporate surety must be approved by the state in which the services or supplies are to be delivered or in which construction is to be performed.

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that the PACIFIC INDEMNITY COMPANY
a corporation of the State of California, by authority of a resolution adopted by its Board of
Directors at a meeting called and held on the 8th day of February, 1966, which said
resolution is still in full force and effect and of which the following is a true and complete copy:

"RESOLVED, that the President or any Vice-President may from time to time appoint Resident Vice-Presidents, Resident
Assistant Secretaries and Attorneys-in-Fact to represent and act for and on behalf of the Company, and either the President, or
any Vice-President, the Board of Directors or the Executive Committee may at any time remove any such Resident Vice-President
or Resident Assistant Secretaries and Attorneys-in-Fact and revoke the power and authority given him; and be it further

"RESOLVED, that Attorneys-in-Fact may be given full power and authority to execute for and in the name and on behalf of
the Company, any and all bonds, recognizances, contracts of indemnity and other writings obligatory in the nature of a bond,
recognizance or conditional undertaking, and any such instrument executed by any such Attorney-in-Fact shall be as binding
upon the Company as if signed by the President and sealed and attested by the Secretary; and be it further

"RESOLVED, that the Attorneys-in-Fact are hereby authorized to verify any affidavit required to be attached to bonds, recog-
nizances or contracts of indemnity, policies of insurance and all other writings obligatory in the nature thereof."

does hereby make, constitute and appoint

HELENE C. SQUIRE

its true and lawful Attorney-in-Fact, with full power and authority to make, execute and deliver, for it, in its
name and in its behalf, as surety any and all bonds and undertakings of suretyship.

And the execution of such bonds or undertakings, in pursuance of these presents, shall be as binding upon
the said Corporation, as fully and amply, to all intents and purposes, as if they had been duly executed and
acknowledged by the regularly elected officers of the said Corporation in their own proper persons.

IN WITNESS WHEREOF, the PACIFIC INDEMNITY COMPANY
has caused these presents to be signed by its Vice-President and its corporate seal to be hereto affixed, duly
attested by its Assistant Secretary, this 20th day of June A.D. 1966

Attest: Elizabeth H. Jones
Assistant Secretary.

By A. A. Christian
Vice-President.

STATE OF CALIFORNIA, }
COUNTY OF LOS ANGELES } ss.:

On this 20th day of June A. D. 1966 before me personally came

.....to me known, who, being by me duly

sworn, did depose and say, that he resides in the City of Los Angeles, California; that he is the Vice-President of the PACIFIC

INDEMNITY COMPANY

the corporation described in and which executed the above instrument; that he knows the seal of said corporation, that the seal affixed
to the said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he signed
his name thereto by like order.

(Notarial Seal)

Marion F. Haire

Notary Public.

My Commission expires November 11, 1967.

STATE OF CALIFORNIA, }
COUNTY OF LOS ANGELES } ss.:

I, Elizabeth H. Jones Assistant Secretary of the PACIFIC
INDEMNITY COMPANY, do hereby certify that the above and foregoing is a true and

correct copy of a Power of Attorney, executed by said PACIFIC INDEMNITY COMPANY
which is still in force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said Company, at the City
of Los Angeles, this 3rd day of May A. D. 1967.

Elizabeth H. Jones
Secretary.

GENERAL PROVISIONS
(CONSTRUCTION CONTRACTS)
P.L. 566

1. DEFINITIONS

Terms used or referred to herein are defined as follows:

(a) Contracting Local Organization: The organization or agency awarding the contract.

(b) Contracting Officer: The person who is designated and authorized to enter into and administer this contract on behalf of the Contracting Local Organization or his duly appointed successor or authorized representative.

(c) Engineer: The person or his representative who is responsible for determining that the construction work conforms to the technical requirements as set forth in the drawings and specifications.

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

The Contracting Officer may, at any time, by written order, and without notice to the sureties, make changes in the drawings and/or specifications of this contract if within its general scope. If such changes cause an increase or decrease in the Contractor's cost of, or time required for, performance of the contract, an equitable adjustment shall be made and the contract modified in writing accordingly. Any claim of the Contractor for adjustment under this clause must be asserted in writing within 30 days from the date of receipt by the Contractor of the notification of change unless the Contracting Officer grants a further period of time before the date of final payment under the contract. If the claim is not disposed of by agreement, it shall be decided by the Contracting Officer as provided in Clause 6 of these General Provisions; but nothing provided in this clause shall excuse the Contractor from proceeding with the prosecution of the work

3. CHANGES--Continued

as changed. Except as otherwise provided in this contract, no charge for any extra work or material will be allowed.

4. CHANGED CONDITIONS

The Contractor shall promptly, and before such conditions are disturbed, notify the Contracting Officer in writing of: (a) subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (b) 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 so materially differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of this contract, an equitable adjustment shall be made and the contract modified in writing accordingly. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given notice as above required; or unless the Contracting Officer grants a further period of time before the date of final payment under the contract. If the claim is not disposed of by agreement, it shall be decided by the Contracting Officer as provided in Clause 6 of these General Provisions.

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 Contracting Local Organization 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 Contracting Local Organization 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 Contracting Local Organization 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 Contracting

5. TERMINATION FOR DEFAULT - DAMAGES FOR DELAY - TIME EXTENSIONS--Continued

Local Organization 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 Contracting Local Organization in completing the work.

(c) If fixed and agreed liquidated damages are provided in the contract and if the Contracting Local Organization 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 Contracting Local Organization in its contractual capacity, acts of another contractor in the performance of a contract with the Contracting Local Organization, 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, such an extension is justified.

(e) The rights and remedies of the Contracting Local Organization provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

6. CLAIMS

Any claim by the Contractor arising by virtue of this contract which is not disposed of by agreement shall be submitted in writing, together with any written and oral evidence in support thereof, to the Contracting Officer for decision. Before making a decision the Contracting Officer shall notify the Contractor that any additional written and/or oral evidence in support of the claim may be presented to the Contracting Officer within 30 days from receipt by the Contractor of such notification, or within such further period of time as may be granted by the Contracting Officer. The Contracting Officer shall make his decision in

6. CLAIMS--Continued

writing and mail or otherwise furnish a signed copy thereof to the Contractor. Pending the decision of the Contracting Officer the Contractor shall proceed diligently with the performance of this contract.

7. PAYMENTS TO CONTRACTOR

(a) The Contracting Local Organization will pay the contract price as hereinafter provided.

(b) The Contracting Local Organization 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 any of the remaining progress payments to be made in full. 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 Contracting Local Organization, 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 similar 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 Contracting Local Organization, 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 Contracting Local Organization 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 after the Contractor shall have furnished the Contracting Local Organization with a release, if required, of all claims against the Contracting Local Organization arising by virtue of this contract, other than claims in stated amounts as may be

7. PAYMENTS TO CONTRACTOR--Continued

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, a release may also be required of the assignee.

8. 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.

9. INSPECTION AND ACCEPTANCE

(a) Except as otherwise provided in this contract, inspection and test by the Contracting Local Organization of material and workmanship required by this contract shall be made at reasonable times and at the site of the work, unless the Contracting Officer determines that such inspection or test of material which is to be incorporated in the work shall be made at the place of production, manufacture, or shipment of such material. To the extent specified by the Contracting Officer at the time of determining to make off-site inspection or test, such inspection or test shall be conclusive as to whether the material involved conforms to the contract requirements. Such off-site 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 Contracting Local Organization after

9. INSPECTION AND ACCEPTANCE--Continued
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 Contractor Local Organization not to conform to the contract requirements, unless in the public interest the Contracting Local Organization 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 Contracting Local Organization (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 Clause 5 of these General Provisions.

(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 Contracting Local Organization 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 Contractor shall be charged with any additional cost of inspection when material and workmanship are not ready at the time specified by the Contractor for its inspection.

(e) Should it be considered necessary or advisable by the Contracting Local Organization 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 non-conforming 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 is 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 Contracting Local Organization shall be made as promptly as practicable after completion and inspection of all work required by this contract. 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 Contracting Local Organization's rights under any warranty or guarantee.

10. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall give his personal superintendence to the work or have a competent foreman or superintendent, satisfactory to the Contracting

10. SUPERINTENDENCE BY CONTRACTOR--
Continued

Officer, on the work at all times during progress, with authority to act for him.

11. PERMITS AND RESPONSIBILITIES

The Contractor shall, without additional expense to the Contracting Local Organization, 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.

12. 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 Contracting Local Organization. The Contracting Local Organization 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 Contracting Local Organization are expressly stated in the contract.

13. OTHER CONTRACTS

The Contracting Local Organization may undertake or award other contracts for additional work, and the Contractor shall fully cooperate with such other contractors and Contracting Local Organization 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 Contracting Local Organization employees.

14. PATENT INDEMNITY

Except as otherwise provided, the Contractor agrees to indemnify the Contracting Local Organization 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 Contracting Local Organization of supplies furnished or construction work performed hereunder.

15. ADDITIONAL BOND SECURITY

If any surety upon any bond furnished in connection with this contract becomes unacceptable to the Contracting Local Organization, or if any such surety fails to furnish reports as to his financial condition from time to time as requested by the Contracting Local Organization, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the Contracting Local Organization and of persons supplying labor or materials in the prosecution of the work contemplated by this contract.

16. LAND RIGHTS

(a) Adequate land rights needed in order to perform the work under this contract, as far as can be determined, have been acquired by or on behalf of the Contracting Local Organization. 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 the right of ingress and egress is not defined on the drawings, the Contracting Officer shall designate the right-of-way to be used.

17. RECORDS OF TEST PITS AND BORINGS

The Contracting Local Organization 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.

18. 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 Contracting Local Organization 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.

19. FENCES

(a) Existing fences to be removed by the Contractor are indicated on the drawings. The Contractor shall not be required to replace or relocate such fences. Fences to be salvaged, as indicated on the drawings, shall be removed and the materials salvaged by the Contractor for the landowner.

(b) Permanent fences to be constructed are indicated on the drawings and listed in the bid schedule. The Contractor shall bear all costs for the

19. FENCES--Continued

construction and removal of fences which he requires during construction.

20. WATER

The Contractor shall provide and maintain at his own expense an adequate supply of water suitable for construction purposes.

21. ACCIDENT PREVENTION AND SAFETY MEASURES

The Contractor shall comply with the accident prevention and safety measures in the Manual of Accident Prevention in Construction published by the Associated General Contractors of America, Inc., in effect on the date of issuance of the Invitation for Bids and local and State laws, regulations, and codes relative to safety and sanitation.

22. LIGHTING REQUIREMENTS

When work is carried on between the hours of sunset and sunrise, the construction areas shall be adequately lighted to provide safe working conditions while work is in progress. The lighting plan shall be acceptable to the Contracting Officer.

23. WORKWEEK--CONSTRUCTION SCHEDULE

(a) The Contractor shall, prior to commencement of work, submit to the Contracting Officer for approval the hours and days in which he proposes to carry on the work. The Contractor shall, within 10 days following the commencement of work, prepare and submit to the Contracting Officer for approval a construction schedule showing the order in which the Contractor proposes to carry on the work indicating the periods during which he will perform work on each item listed in the bid schedule. If the Contractor fails to submit the construction schedule within the time herein specified or fails to submit a revised construction schedule within the time specified by the Contracting Officer, the Contracting Officer may withhold approval of progress payment estimates until such time as the Contractor submits the required construction schedule.

(b) If, in the opinion of the Contracting Officer, the Contractor falls behind the 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 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 Contracting Local Organization.

(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 these General Provisions.

24. 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 Contracting Local Organization.

25. SURVEYS

(a) Unless otherwise stated in the Invitation for Bids, the work to be done shall be staked out by the Contracting Local Organization. If the Contracting Local Organization 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 Contracting Local Organization 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 Contracting Local Organization at the Contractor's expense. Stakes removed or destroyed in the due course of the work shall be replaced by the Contracting Local Organization 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.

26. SUSPENSION OF WORK

(a) The Contracting Officer may order suspension of the work in whole or in part for such time as he deems necessary due to weather or such other conditions as he considers unfavorable for the satisfactory prosecution of the work.

(b) When the Contracting Officer orders suspension of the work due to weather or such other conditions as he considers unfavorable for the satisfactory prosecution of the work, 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 designated in the contract and work of an emergency, protective or maintenance nature); and

(2) The hours lost in any one calendar day through such suspension equal one-half or more of the hours in an authorized work day.

(c) 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 provisions of this

26. SUSPENSION OF WORK--Continued

contract, and the contract completion date shall not be extended on account of any such suspension of the work.

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

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

27. CLEAN-UP WORK

(a) During construction the Contractor shall keep the site in an orderly condition, free and clear from all rubbish and debris. Care shall be taken to prevent spillage when hauling is being done on private or public roads and any such spillage or debris resulting from the Contractor's operations shall be immediately cleaned up.

(b) Upon completion of the work the Contractor shall remove from the vicinity of the work all plant, buildings, rubbish, unused materials, concrete forms and other like material belonging to him or used under his direction during the construction, and in the event of his failure to do so, the same may be removed by the Contracting Local Organization at the expense of the Contractor.

28. QUANTITY VARIATIONS

(a) Where the quantity of work shown for an item in the bid schedule, including any modification

28. QUANTITY VARIATIONS--Continued

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.

29. ASSIGNMENT

The Contractor shall not assign in whole or in part this contract without the prior written consent of the Contracting Local Organization. The Contractor shall not assign any moneys due or to become due to him under this contract without the prior written consent of the Contracting Local Organization.

30. FEDERAL, STATE, AND LOCAL TAXES

Except as otherwise provided, contract unit prices shall include all applicable Federal, State, and local taxes.

SPECIAL PROVISIONS

1. 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 Contracting Local Organization in the amount of \$274.00 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 Contracting Local Organization 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 Contracting Local Organization is insufficient to pay in full such liquidated damages, the Contractor shall pay to the Contracting Local Organization the amount necessary to effect payment in full of such liquidated damages.
2. No bid will be accepted or contract awarded unless the contractor is registered under the applicable provisions of Arizona Statutes, with the registrar of contractors of the State of Arizona.
3. Minor Items of Work: The following bid items are designated as minor items of work in this contract (see Clause 26, General Provisions):

Item No. 1 - Clearing and Grubbing

4. In no event will the 5% differential be allowed in evaluating bids as provided by Arizona Revised Statutes 34-241; the provisions of Arizona Revised Statutes 34-244 being applicable.
5. Equipment working between Stations 424+00 and 431+00 and between Stations 446+00 and 452+00 shall be limited to a height of 20' above the surrounding ground during normal work days. Any work in these areas that requires equipment which will exceed 20' above the surrounding ground, will be scheduled on weekends and the work coordinated with the Base operations officer at Williams Air Force Base.
6. The contractor shall schedule and conduct his operations or provide detours to maintain traffic over county or private roads at all times. While working on or adjacent to any public road or street, the contractor shall comply with the requirements of county or state authorities in providing the proper barriers, guards, signs, or flagman for the public safety. All warning devices and the installation thereof shall comply with provisions of the latest revision of the "Traffic Control Manual for Highway Construction and Maintenance" as published by the State of Arizona Highway Department.
7. The contractor shall not disturb legal property survey monuments during construction unless otherwise authorized by the contracting officer and witness markers have been set by the engineer.

Special Provisions - (Continued) -2-

8. The attached drawings are hereby corrected as follows: On sheets 3 through 12 and sheet 17 all reference made to expansion joint pads are hereby deleted. On sheet 3 beginning "Floodway Contract Station 6+53" is hereby corrected to 6+58.3 on the channel profile.
9. The contractor shall schedule and conduct his operation to provide that two of the three ford crossings for emergency vehicles from Williams Air Force Base located at Stations 378+50, 427+95 and 451+00 will be kept open during construction. The contractor may construct temporary crossing alongside the reconstruction sites for the purpose provided that ready access is furnished from the emergency gates.
10. Acceptance by the Contracting Local Organization for segments of one mile or more in length progressing from Station 461+57 to Station 6+58.3 shall be made as promptly as practicable after completion and inspection of all work required by the contract for the specific segments.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
3325 WEST DURANGO STREET, PHOENIX, ARIZONA 85009

March 14, 1967 /

ADDENDUM NO. 1 TO INVITATION NO. FCD-2 SCHEDULED TO BE OPENED AT 2:00 P.M., M.S.T., APRIL 11, 1967, COVERING CONSTRUCTION OF POWERLINE FLOODWAY IN APACHE JUNCTION-GILBERT WATERSHED.

1. Prospective bidders are hereby advised of a change in the point of beginning of the work. The first 20' of riprap work will be performed under another contract. This modification will change the indicated portions of the plans and specifications to read as follows:

<u>Sheet</u>	<u>Item</u>	<u>Change</u>
Special Conditions, Sheet 2	Special Condition No. 8	Change the beginning of work to 6+78.2
Special Conditions Sheet 2	Special Condition No. 10	Change Station 6+58.3 to 6+78.2
Drawings, Sheet 3	Profile	Change beginning of work to read "Begin Floodway Contract Sta 6+78.2, etc.
Drawings, Sheet 15	Plan View	Change beginning of work to read "Begin Floodway Contract Sta 6+78.2"

2. Prospective bidders are hereby advised of a change regarding existing fences along the route of the floodway. The plans and specifications are changed to read as follows:

<u>Sheet</u>	<u>Item</u>	<u>Change</u>
Drawings, Sheets 8, 9, 10	Plan view, cross- sections 214+85 to 261+00, 261+60 to 322+00	The fence along the south side of Sections 23 and 22 is being moved by others and the in- struction to remove and salvage this fence is deleted.
Drawings, Sheet 10	Cross-section 322+00 to 333+00	There is no east- west fence in this reach and the in- struction to remove fence is deleted.

Sheet

Item

Change

Drawings,
Sheets 11, 12, 13

Plan view,
cross-sections
333+00 to 372+80

The fence along
the north side of
Section 28, 29,
and 30 is being
moved by others
and the instruction
to remove and sal-
vage this fence is
deleted.

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

John C. Lowry

John C. Lowry
Contracting Officer



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
3325 WEST DURANGO STREET, PHOENIX, ARIZONA 85009

March 22, 1967

ADDENDUM NO. 2 TO INVITATION NO. FCD-2 SCHEDULED TO BE OPENED AT 2:00 P.M., M.S.T., APRIL 11, 1967, COVERING CONSTRUCTION OF POWERLINE FLOODWAY IN APACHE JUNCTION-GILBERT WATERSHED.

1. Prospective bidders are hereby advised of a change in quantities of welded wire fabric and Floodway lining concrete as contained on sheet 17 of 44 of the construction drawings. The table of Quantities should read:

Concrete Floodway Lining	14,424.4	cu. yds.
Welded Wire Fabric 6x6, 5/5	247,045	lbs.
Welded Wire Fabric 6x6, 6/6	213,169	lbs.

2. Prospective bidders are hereby advised of a change regarding approved construction joints for the concrete lined channel from Sta. 12+10 to Sta. 372+80. On sheet 17 of 44 of the construction drawings the note for "Detail D" should be changed to read: "Paint face of completed concrete section with a heavy coat of asphalt, or install ½" premolded joint filler. Use of other contraction joint types are permitted by approval of the Contracting Officer."

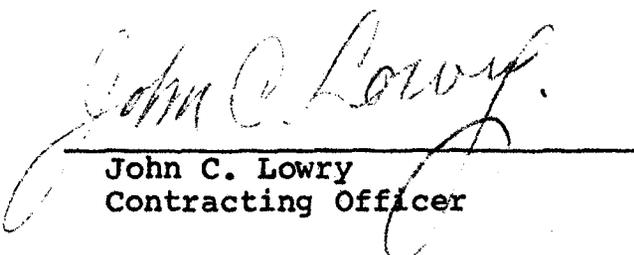
3. Prospective bidders are hereby advised of a change in Quantities for the Bid Schedule Item 3, Item 4, Item 6, and Item 11.

Change Item 3 quantity to read 134,930 c.y.

Change Item 4 quantity to read 63,000 c.y.

Change Item 6 quantity to read 14,581 c.y.

Change Item 11 quantity to read 22,868 Bbls.



John C. Lowry
Contracting Officer

ACKNOWLEDGED:

Bidder: The Ashton Company, Inc.

By: JC Ryan

Title: Vice President

DATE: March 23, 1967.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
3325 WEST DURANGO STREET, PHOENIX, ARIZONA 85009

April 4, 1967

ADDENDUM NO. 3 TO INVITATION NO. FCD-2 SCHEDULED TO BE OPENED AT 2:00 P.M., M.S.T., APRIL 11, 1967, COVERING CONSTRUCTION OF POWERLINE FLOODWAY IN APACHE JUNCTION-GILBERT WATERSHED.

1. Prospective bidders are hereby advised of the following modifications applicable to the specifications pertaining to the work.

a. CONSTRUCTION SPECIFICATION 8B CONCRETE

The Provisions of Section 14 - CONSOLIDATED CONCRETE - apply to formed concrete only. Concrete in channel lining shall be consolidated by electric or pneumatically driven-type vibrators operated at speeds of at least 4000 rpm when immersed in the concrete. Consolidation by external vibration may be used in lieu of internal vibration if in the opinion of the contracting officer the consolidation obtained is equal to that produced by the specified internal vibration.

b. CONSTRUCTION SPECIFICATION 8B

Prospective bidders are hereby advised that Section 26 - Ties & Spacers, is to be interpreted to allow the use of snap ties provided their removal to a depth of 1 inch without injury to the concrete can be made.

c. MATERIAL SPECIFICATION 127, ROCK FOR PERMANENT CONSTRUCTION

Under Item 2, General Requirements, the last sentence of the first paragraph shall be changed to read--"90 percent of all rock shall be of such size and shape that the least dimension of an individual rock fragment shall be not less than one-third the greatest dimension of the fragment."

L. E. Ohsiek

L. E. Ohsiek

Alternate Contracting Officer

ACKNOWLEDGED:

Bidder:

The Ashton Company, Inc.

By:

Title:

Date:

J. Ryan
Vice Pres.
April 7, 1967

REVISED BID SCHEDULE

March 22, 1967

Apache Junction-Gilbert Watershed - Powerline Floodway

ITEM NO.	WORK OR MATERIAL	SPEC. NO.	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1.	Clearing & Grubbing	2	95	Acres	\$ <u>36.00</u>	\$ <u>3420.00</u>
2.	Excavation - Earth Channel	4A	137,250	Cu.Yd.	\$ <u>.30</u>	\$ <u>41,175.00</u>
3.	Excavation - Concrete Channel	4A	134,930	Cu.Yd.	\$ <u>.63</u>	\$ <u>85,005.90</u>
4.	Earth Fill - Channel Dikes	5A	63,000	Cu. Yd.	\$ <u>.33</u>	\$ <u>20,790.00</u>
5.	Earth Fill - Structure Backfill	5A	400	Cu.Yd.	\$ <u>4.00</u>	\$ <u>1600.00</u>
6.	Concrete - Channel	8B	14,581	Cu.Yd.	\$ <u>20.50</u>	\$ <u>298,910.50</u>
7.	Concrete - Misc. Structures	8B	226	Cu.Yd.	\$ <u>62.00</u>	\$ <u>14,012.00</u>
8.	Concrete - Bridges	8B	44	Cu.Yd.	\$ <u>56.00</u>	\$ <u>2464.00</u>
9.	Concrete - Box Culverts	8B	269	Cu.Yd.	\$ <u>51.00</u>	\$ <u>13,719.00</u>
10.	Concrete - Channel Crossings	8B	128	Cu. Yd.	\$ <u>30.00</u>	\$ <u>3840.00</u>
11.	Cement	8B	22,868	Bbls.	\$ <u>4.70</u>	\$ <u>107,479.60</u>
12.	Reinforcing Steel	9	64,360	Lbs.	\$ <u>.16</u>	\$ <u>10,297.60</u>
13.	Welded Wire Fabric	9	461,320	Lbs.	\$ <u>.16</u>	\$ <u>73,811.20</u>
14.	Corrugated Metal Pipe (36" diam.)	12	36	Lin. Ft.	\$ <u>11.00</u>	\$ <u>396.00</u>
14-A.	Corrugated Metal Pipe (24" diam.)	12	56	Lin. Ft.	\$ <u>7.00</u>	\$ <u>392.00</u>
15.	Rock Riprap	17	20,630	Cu.Yd.	\$ <u>5.20</u>	\$ <u>107,276.00</u>
16.	Identification Sign	14	1	Job	\$XXXXXX	\$ <u>700.00</u>

TOTAL BID POWERLINE FLOODWAY...\$ 785,288.80

APPLICABILITY OF THE NONDISCRIMINATION PROVISIONS

The Nondiscrimination Provisions are not applicable to contracts (1) not exceeding \$10,000, except that for standard commercial supplies or raw materials not exceeding \$100,000, (2) where work is to be performed entirely outside the United States and no recruitment of workers within the United States is involved, or (3) specifically exempted by the rules and regulations of the Secretary of Labor.

The bidder agrees, if this bid exceeds \$10,000, TO COMPLY with the Nondiscrimination Provisions applicable to contracts in excess of \$10,000.

The bidder further agrees, if a contract is awarded for less than \$10,000 but is later increased to exceed \$10,000 by bilateral modification, TO COMPLY with the Nondiscrimination Provisions.

NONDISCRIMINATION PROVISIONS

(The following clause is applicable unless this contract is exempt under the rules and regulations of the Secretary of Labor issued pursuant to Executive Order No. 11246 of September 24, 1965 (30 FR 12319)).

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

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, 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, creed, color, 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 nondiscrimination clause.

(2) 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, creed, color, or national origin.

(3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the Contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, 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.

(6) In the event of the Contractor's noncompliance with the nondiscrimination clause of this contract or with any of such 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 Federal financially assisted contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Contractor will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the 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.

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. 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

All materials removed from the cleared and grubbed areas shall be burned or buried at locations approved by the Engineer or otherwise removed from the site.

5. MEASUREMENT AND PAYMENT

(Method 1) For items of work for which specific unit prices are established in the contract, the cleared and grubbed areas will be measured to the nearest 0.1 acre. Payment for clearing and grubbing will be made at the contract unit price and shall 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, each tree, snag and log 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. Diameter shall be determined by dividing the measured circumference by 3.14.

Payment will be made only for clearing, grubbing and disposal of each tree 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.

Payment for clearing, grubbing and disposal of each tree, snag and log will be made at the contract unit price for its size designation as determined by the following schedule:

<u>Measured Diameter</u> <u>(At breast height)</u>	<u>Size</u> <u>Designation</u>
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 summation 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, snags and logs and brush, shrubs, stumps, roots and rubbish.

(Method 3) 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 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 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 therefor are:

A. Bid Item 1. Clearing and Grubbing

1. This item shall consist of the clearing and grubbing of the construction area of the outlet channel within the right of way limits shown on the drawings, except that between stations 215/00 and 372/50 the limits shall be 40 feet from each side of the centerline of the channel.
2. The work shall also include the clearing of grass sod and weeds from areas occupied by earth fill embankment.
3. Measurement and payment shall be made in accordance with Method 1.

CONSTRUCTION SPECIFICATION

3B STRUCTURE REMOVAL

1. SCOPE

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

2. MARKING

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

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

Refuse materials resulting from structure removal shall be burned or buried at locations approved by the Engineer or otherwise removed from the site.

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.

(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.

(Applies To Both 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 construction details therefor are:

A. Subsidiary Item, Structure Removal

1. This item shall consist of removal and salvage of fences.
2. No separate payment will be made for structure removal. Compensation will be included in the payment for Bid Item 1, Clearing and Grubbing.

CONSTRUCTION SPECIFICATION

4A. EXCAVATION

1. SCOPE

The work shall consist of the excavation of all materials necessary for the construction of the work.

2. CLASSIFICATION

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

Common excavation shall be defined as the excavation of all materials that can be excavated, transported, and unloaded by the combined or separate use of heavy ripping equipment and wheel tractor-scrappers and 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 not more than 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.

The class of excavation will be determined by the Engineer on the basis of his determination of the character of the materials to be excavated and the prevailing site conditions.

The presence of isolated boulders or rock fragments larger than one cubic yard in size will not in itself be considered 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 tractor-mounted, heavy duty, single-tooth, ripping attachment mounted on a tractor having a power rating of at least 200 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 at least 12 yards.

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

3. UNCLASSIFIED EXCAVATION

Items of excavation 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. USE OF EXCAVATED MATERIALS

All suitable materials removed from the specified excavations may be used in the construction of the specified earth or rock filled portions of the permanent works. The suitability of materials for specific purposes will be determined by the Engineer.

5. DISPOSAL OF WASTE MATERIALS

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

6. SPECIAL REQUIREMENTS FOR STRUCTURE AND TRENCH EXCAVATION

The side slopes necessary to maintain the stability of excavated surfaces may not necessarily coincide with the pay limits specified for structure excavation or trench excavation. Such works shall be so excavated, braced and supported as to safeguard the work and workmen, to provide the ground adjacent to the excavation will not slide or settle and to prevent damage to adjacent existing improvements. When such bracing and supporting is required, the width of the excavation shall be adjusted to allow for the space occupied by the sheeting, bracing or other supporting installations. The Contractor shall furnish, place and subsequently remove such supporting installations.

Such excavations 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.

7. BORROW EXCAVATION

When the quantities of suitable materials obtained from specified

excavations are insufficient to construct the specified fill portions of the permanent works, additional materials shall be obtained from the designated borrow areas. The Engineer shall designate the extent of borrow pits within the limits of the designated borrow areas and the limits of the depth of cut in all parts of the borrow pits.

Borrow pits shall be excavated and finally dressed in a manner to prevent the creation of residual hazards or unsightly conditions by reason of steep or unstable side slopes.

8. OVEREXCAVATION OF STRUCTURE SUBGRADE

Excavation in rock beyond the limits of the specified cross sections and elevations shall be corrected by filling the resulting voids to the specified contours and elevations with portland cement concrete, Class 2500 or better.

Excavation in earth beyond the limits of the specified cross sections and elevations shall be corrected by filling the resulting voids to the specified contours and elevations with approved compacted earth fill.

9. 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 will be measured within the specified limits 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.

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

(Method 2) The pay limits shall be 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 structure excavation is performed within a trench, channel or roadway or in areas designated for other previous excavation, the upper limit shall be the planes of the bottoms and side slopes of those trenches or channels or the modified ground surface resulting from the previous excavation.

- b. The lower limit shall be the elevation of the bottom of the proposed footings, floor slabs, pipe cradles and bedding except that for structures underlain by a continuous drainage blanket the lower limit shall be the elevation of the bottom of the drainage blanket.
- c. For cradled pipe conduits, box culverts or structures with vertical walls, the lateral limits shall be the vertical planes 18 inches outside of and parallel to the neat lines of the footings, floor slabs or pipe cradles. For structures with sloping sidewalls extending outward beyond the plan limits of the floor slab, the lateral limits shall be the planes of the bottom surfaces of the proposed side walls.
- d. When it is required to perform structure excavation in new embankment or other fill, the upper limit shall be the planes of the upper surfaces of the fill at the time the excavation is made.

(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 other previous excavation the upper limit shall be the modified ground surface resulting from the previous excavation.
- b. The lower and lateral limits shall be the true surface of the completed excavation.

(Method 5) 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 other previous excavation the upper limit shall be the modified ground surface resulting from the previous excavation.
- b. The lower and lateral limits shall be the neat lines and grades shown on the drawings.

(Applies to 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.

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 10 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 therefor are:

A. General

1. All excavated materials for all types of excavation will be unclassified.
2. When it is determined by the Engineer that the subgrade is too wet, unstable or the material is unsuitable for embankment or structure foundations, it shall be removed to the depth and extent determined by the Engineer. Removal of unsuitable materials and refilling of voids resulting therefrom will be paid for only where such unstable subgrade is not the result of inadequate pumping or drainage by the Contractor. Materials used or work performed by the Contractor, beyond contract requirements, in order to stabilize subgrade so that it will withstand travel of the equipment, shall be at the Contractor's own expense. Payment for excavation of such material ordered by the Engineer will be made at the contract unit price for the type of excavation done. Payment for refilling the excavation ordered by the Engineer shall be made at the contract unit price for the type of fill placed.

B. Bid Item 2. Excavation Earth Channel

1. This item shall consist of the excavation of the earth and rock riprap channels as shown on the drawings. It shall include the excavation required for placement of rock riprap in the channel and adjacent to the appurtenant structures.
2. Finished surfaces shall not vary more than 0.2 feet above grade and 0.5 feet below grade.
3. Measurement for payment will be made in accordance with Method 5.

C. Bid Item 3. Excavation Concrete Channel

1. This item consists of the required excavation for the trapezoidal channel from stations 12/10 to 372/80, including all excavation for inlets box culverts, bridges, transitions, SAF structure and pipelines as shown on the drawings. It includes required shaping and finishing of the base for the construction of the concrete

channel, transitions and other appurtenant structures.

2. Before excavating for the concrete channel the area occupied by the concrete channel shall be moistened to a depth equal to the depth of the centerline of the channel and the area occupied by the adjacent channel dikes shall be moistened to a minimum depth of three feet.

No separate payment will be made for watering the specified area. Compensation will be included in the payment for Bid Item 3 Excavation-Concrete Channel.

3. Measurement and payment will be made in accordance with Method 3.

CONSTRUCTION SPECIFICATION

5A EARTH FILL

1. SCOPE

The work shall consist of the construction of all earth fills necessary for construction of the works.

2. MATERIALS

All fill materials shall be obtained from required excavations and designated borrow areas. The selection, blending, routing and disposition of materials within 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 from the materials prior to compaction of the fill.

The types of materials to be used in the various parts of the permanent works are listed and described in the construction details and drawings.

3. PLACEMENT

Fill shall not be placed until the required excavation and preparation of the underlying foundation is completed and inspected and approved by the Engineer.

The fill shall be so constructed that the distribution of materials throughout each specified zone will be essentially homogeneous and free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material in the zone. No fill shall be placed upon a frozen surface nor shall snow, ice or frozen material be incorporated in the fill.

Embankment fill shall be placed in approximately horizontal layers extending the entire length and width of the embankment. Unless otherwise specified, the elevation of the embankment surface shall be increased at approximately the same rate at all points regardless of the number of zones or types of material being placed, except that: (1) the boundary surfaces of drain fills shall be protected as specified in Construction Specification 7, and (2) during construction the surface of the fill shall be maintained with a crown or cross-slope of not less than 2 percent to insure effective surface drainage. Where sectional construction is authorized the additional requirements specified in Section 6 of this specification shall apply.

The thickness of each layer of fill shall be not greater than that required to achieve the specified compaction and in no case shall exceed that specified for the designated type of fill.

Materials placed on the fill by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness prior to compaction.

Adjacent to structures fill shall be placed in a manner adequate to prevent damage to the structure and to allow the structure to gradually and uniformly assume the backfill loads. Hand compacted backfill shall be placed in layers not thicker than 4 inches. The height of the backfill shall be increased at approximately the same rate on all sides of the structure during placement.

4. CONTROL OF MOISTURE CONTENT

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 acceptable moisture content prior to compaction.

If the top surface of the preceding layer of compacted fill or the abutment surfaces in the zone of contact with the fill become too dry to permit suitable bond they shall be scarified and moistened by sprinkling to an acceptable moisture content prior to placement of the next layer of fill.

During placement and compaction of fill, the moisture content of the materials being placed shall be maintained within the specified range.

5. COMPACTION

The Contractor shall furnish and operate the types and kinds of equipment necessary to compact the fill materials in the specified manner or to the specified density.

For the purpose of this specification, compaction requirements are classified as follows:

- a. Class A compaction is the compaction of the fill to such a degree that the fill matrix attains a density at least equal to the specified percentage of the maximum density obtained in compaction tests of the fill matrix. The fill

matrix is defined as that fraction of the fill material having a maximum size equal to that used in the compaction test method specified for the type of fill. The compaction test method and the percent compaction required in each part of the works are specified in the construction details and drawings.

- b. Class P compaction is the compaction of the fill by four passes per layer of fill of a pneumatic tired roller weighing at least 50 tons (static service weight).
- c. Class S compaction is the compaction of the fill by either:
(1) the routing of the hauling and spreading equipment over the fill in such a manner that every point on the surface of each layer of fill will be traversed by not less than one tread track of the loaded equipment traveling in a direction parallel to the main axis of the fill; or,
(2) equivalent methods approved by the Contracting Officer.
- d. Class T compaction is the compaction of the fill by means of a tamping roller. The characteristics of the roller, the number of passes per layer of fill and the towing speed shall be as specified in the construction details.
- e. Class V compaction is the compaction of the fill by four passes per layer of fill of a smooth-wheel vibrating roller at least 72 inches wide, weighing at least one ton (static service weight) per foot of width and capable of exerting a dynamic impact of at least 20,000 pounds at the rate of at least 1200 times per minute.
- f. Class X compaction is the compaction of the fill by either:
(1) four passes per layer of a crawler-type tractor weighing at least 40,000 pounds; (2) two passes per lift of a smooth-wheel vibrating roller at least 72 inches wide, weighing at least one ton (static service weight) per foot of width and capable of exerting a dynamic impact of at least 20,000 pounds at the rate of at least 1200 times per minute; or, (3) two passes of a pneumatic tired roller weighing at least 50 tons (static service weight).

The compaction equipment shall traverse the entire surface of each layer of material the number of times required to accomplish the specified compaction.

Adjacent to structures, compaction of fill shall be accomplished by means of hand tamping or manually directed power tampers or plate vibrators. Heavy equipment, except vibrating rollers, shall not be operated within 2 feet of any structure. Vibrating rollers shall not be operated within 5 feet of any structure.

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.

Compaction of fill adjacent to structures may begin after the expiration of the following minimum time intervals after placement of concrete:

Walls and counterforts	10 days
Conduits, cast-in-place (with inside forms in place)	7 days
Conduits, precast, cradled	2 days
Conduits, precast, bedded	1 day
Antiseep collars and cantilever outlet bents	3 days

6. SPECIAL REQUIREMENTS FOR SECTIONAL CONSTRUCTION OF EMBANKMENTS

When sectional (or phase) construction of embankments is authorized, the work shall be accomplished in the following manner:

Each section of the embankment that is constructed in the first phase shall be so placed that a slope not steeper than 3 feet horizontal to 1 foot vertical is maintained at the end of the embankment section adjacent to the gap in construction or closure section.

Prior to placement of the closure sections the surfaces of completed fills and excavations that will be in contact with the closure fill shall be stripped of all loose material, scarified, moistened and recompacted as necessary.

During placement of the closure fill each layer shall be spread in a manner that will insure good bond between the two sections of fill when the new fill is compacted.

7. REMOVAL AND REPLACEMENT 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 bottoms of such excavations shall be finished flat or gently curving and at the sides of such excavations the adjacent sound fill shall be trimmed to a slope not steeper than 3 feet horizontal to 1 foot vertical extending from the bottom of the excavation to the fill surface. Replacement of fill shall be accomplished in the manner specified for closure section in Section 6 of this specification.

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 by the methods prescribed in ASTM Designation 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 will be measured within the specified zone boundaries or limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. In embankments, no deduction in volume will be made for embedded pipe conduits less than 36 inches in diameter.

(Method 1) The quantity of earth fill will be measured as the computed volume of fill placed between the measured surfaces of the specified excavations and the measured surfaces of the completed fill.

(Method 2) The quantity of earth fill will be measured as the computed volume of fill placed between the measured surfaces of the specified excavations and the specified neat lines of the fill surface.

(Method 3) The quantity of earth fill will be measured as the computed volume of earth fill placed between the specified pay limits for excavation and the measured surfaces of the completed fill.

(Method 4) The quantity of earth fill will be measured as the computed volume of fill placed between the specified pay limits of excavation and the specified neat lines of the fill surface.

(Applies To All Methods)

Payment for each type and compaction class of earth fill 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 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 10 of this specification.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

A. General

1. Maximum dry density and optimum moisture of fill materials will be determined by laboratory procedures outlined in A.S.T.M. Designation D698 Method A.
2. During compaction and filling operations, the surface of the fill and the materials being placed shall be maintained within a moisture content range of 3 percent below and 3 percent above optimum.
3. The maximum size of rock fragments incorporated in the fill shall be six inches.
4. Sectional construction of all embankments will be permitted.

B. Bid Item 4. Earth Fill Channel Dike Embankments

1. This item shall consist of the earth fill required for the channel dikes along the outlet channel. Any overfill on channel dikes permitted by the Engineer over that shown on the drawings or staked in the field will be considered waste fill.
2. The compaction of earth fill for channel dikes shall be Class A and to be compacted to 90% of maximum dry density.
3. Measurement and payment will be made in accordance with Method 2.

C. Bid Item 5. Structure Backfill

1. This item of work shall consist of the backfill for the inlet transition at station 11+50; the vertical walls of the channel inlets at stations 89+00, 214+50, 261+00; box culverts and transitions at stations 75+38 and 321+14; bridges at stations 184+20 and 347+50; the SAF Basin and transition at station 373+00; and the pipe inlet at station 426+70.
2. Materials shall be placed and spread in layers not more than four (4) inches thick after compaction.
3. The compaction of earth fill for backfill shall be Class A

and be compacted to 90 percent of maximum dry density.

4. Measurement and payment will be made in accordance with Method 3.

D. Subsidiary Item. Waste Fill

1. This item shall consist of the disposal of excess and unsuitable material from all excavations.
2. Unless otherwise authorized by the Engineer, waste material shall be placed and spread in disposal areas so that the finished surface slopes away from the channel and channel ways are provided to the channel inlets. Finished surfaces shall be left in a smooth condition.
3. No compaction will be required for waste material.
4. No separate payment will be made for waste fill. Compensation will be included in the payment for Bid Items 2 through 4, Excavation.

CONSTRUCTION SPECIFICATION

8B CONCRETE

1. SCOPE

The work shall consist of furnishing, forming, placing, finishing and curing portland cement concrete as required in the construction of the work.

2. CLASSES OF CONCRETE

Concrete shall be classified as follows:

<u>Class of Concrete</u>	<u>Compressive Strength at 28 days (p.s.i.)</u>	<u>Maximum Net Water Content (gallons/bag)</u>	<u>Minimum Cement Content (bags/cu.yd.)</u>
5000	5000	---	---
4000	4000	---	---
3000	3000	---	---
2500	2500	---	---
5000X	----	5	7
4000X	----	6	6
3000X	----	7	5
2500X	----	8	4½

For the concrete to conform to the strength requirements of these specifications, the average of all the strength tests representing each class of concrete, as well as the average of any 5 consecutive strength tests representing each class of concrete, shall be equal to or greater than the specified strength and no strength test shall have a value less than 80 percent of the specified strength.

3. AIR CONTENT AND CONSISTENCY

The air content (by volume) of the concrete at the time of placement shall be:

<u>Maximum Size Aggregate</u>	<u>Air Content (%)</u>
3/8 inch to 1/2 inch	6-1/2 to 8-1/2
Over 1/2 inch to 1 inch	5 to 7
Over 1 inch to 2-1/2 inches	4 to 6

The consistency of the concrete shall be such as to allow the concrete to be worked into place without segregation or excessive laitance. Unless otherwise specified, the slump shall be:

<u>Type of Structure</u>	<u>Slump (Inches)</u>
Massive sections, pavements and floors	2" ± 1/2"
Heavy slabs, beams, walls (over 12 in.)	3" ± 1/2"
Columns, light beams, thin slabs, thin walls (less than 12 in.)	4" ± 1/2"

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. Such admixtures shall conform to the requirements of Material Specification 121. The cement content of the retarded mix shall be the same as that required in the mix if no admixture were used.

4. DESIGN OF THE CONCRETE MIX

For Class 5000, Class 4000, Class 3000 and Class 2500 concrete the Contractor will be responsible for the design of the concrete mixtures. Prior to any placement of concrete he shall furnish the Engineer a statement of the mix proportions (including admixtures, if any) for each specified class of concrete. The statement shall include reports of laboratory tests (performed not more than 90 days previously) showing that the proportions selected will produce concrete of adequate quality, strength and consistency. After the job mix has been so stated, neither the source, character or grading of the aggregates nor the type or brand of cement shall be changed without prior notice to the Engineer. For this purpose, proof of strength shall be based on at least three (3) strength tests (nine cylinders) of specimens prepared by the methods specified in either ASTM Designation C31 or Test Method 231, Federal Specification SS-R-406. In the event that such changes are necessary, no concrete containing such new or altered materials shall be placed until the Engineer has approved the revised job mix.

For concrete of Classes 5000X, 4000X, 3000X or 2500X, the combined aggregates shall be of such composition of sizes that the weight of the fine aggregate shall be not less than 30 percent nor more than 50 percent of the total weight of combined aggregates. During the course of the work, the Engineer may require changes in the water content or cement content, or both, as needed to insure proper strength. When such revisions are directed, the

Contractor is responsible for adjusting the proportions of aggregates as needed to insure the proper consistency and yield. After the job mix has been designated, neither the source, character or grading of the aggregates nor the type or brand of cement shall be changed without prior notice to the Engineer. In the event that such changes are necessary, no concrete containing such new or altered materials shall be placed until the Engineer has designated a revised mix.

5. INSPECTING AND TESTING FRESH CONCRETE

The Engineer will inspect and test concrete at the time of delivery by any of the following methods:

	<u>ASTM Designation</u>	<u>Fed. Spec. SS-R-406 Method No.</u>
Sampling	C 172 ¹	---
Slump test	---	232.0 ¹
Air Content	C 231 ¹ or C 173 ¹	233.0 ¹
Test Cylinders	C 31	---
Compressive Strength	C 39 ²	229.0 ²
Unit Weight	---	233.0

¹ Except that for the purpose of determining uniformity of consistency or when the time required to discharge a batch exceeds 30 minutes, individual samples shall be taken separately as needed.

² For each strength test, 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 a 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 at all times while work on the contract is being performed, to all parts of the manufacturer's plant and equipment which concern the manufacture of the material ordered. Proper facilities shall be provided for the Engineer to inspect ingredients and processes used in the manufacture and delivery of the concrete as well as for securing samples to determine

whether the concrete is being furnished in accordance with these specifications. All tests and inspections shall be so conducted as not to interfere unnecessarily with the manufacturing and delivery of the concrete.

6. CONCRETE MATERIALS

Portland cement shall conform to the requirements of Material Specification 100 for the specified type. One brand only of any type of cement shall be used. The temperature of the cement at the time it is introduced into the mixer shall not exceed 170°F.

Aggregates shall conform to the requirements of Material Specification 101 unless otherwise specified. The size grading of coarse aggregates shall be as specified in the construction details.

Water shall be clean and free from injurious amounts of oil, acid alkali, organic matter or other deleterious substances. The water shall be subject to comparison with distilled water by means of soundness, time-of-setting, and strength tests of specimens made of 1:3 mortar consisting of cement of standard quality, standard sand and water (one series of specimens mixed with distilled water; another, mixed with the water being tested). Any indication of unsoundness, marked change in time-of-setting, or a reduction of more than 10 percent in strength from results obtained with specimens mixed with distilled water shall be sufficient cause for rejection of the water under test.

Air-entraining admixtures shall conform to the requirements of Material Specification 122.

Water-reducing, set-retarding admixtures shall conform to the requirements of Material Specification 121.

7. MEASURING CONCRETE MATERIALS

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.

Aggregate shall be measured by weight. Batch weights shall be based on dry materials and shall be the required weights of dry materials plus the total weight of moisture (both absorbed and surface) contained in the aggregate.

Water shall be measured by volume or by weight. The device for the measurement of the water shall be readily adjustable and shall

be capable of being set to deliver the required amount and to cut off the flow automatically when this amount has been discharged. Under all operating conditions, the device shall have an accuracy within one percent of the quantity of water required for the batch. The device shall be so arranged that the measurements will not be affected by variable pressures in the water supply line. Measuring tanks shall be of adequate capacity to furnish the maximum mixing water required 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. 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 three percent. When admixtures are used in small quantities in proportion to the cement, as in the case of air-entraining admixtures, mechanical dispensing equipment may be used.

8. BATCHING PLANT

Bins with adequate separate compartments for fine aggregates and for each required size of coarse aggregate shall be provided in the batching plant. Each compartment shall be designed to discharge efficiently and freely into the weighing hopper. Means of control shall be provided so that, as the quantity desired in the weighing hopper is being approached, the material may be added slowly and shut off with precision. Weighing hoppers shall be constructed so as to eliminate accumulations of tare materials and to discharge fully. A port or other opening for removing an overload of any of the several materials from the hopper shall be provided.

Scales for weighing aggregates and cement shall be of either the beam type or the springless dial type. They shall be accurate within one percent under operating conditions. Ten 50-pound weights shall be available for checking accuracy. All exposed fulcrums, clevises, and similar working parts of scales shall be kept clean. When beam-type scales are used, provision shall be made for indicating to the operator that the required load in the weighing hopper is being approached; the device shall indicate at least the last 200 lbs. of load and 50 lbs. overload. All weighing and indicating devices shall be in full view of the operator while charging the hopper and he shall have convenient access to all controls.

For jobs requiring the on-job mixing of small batches of concrete in portable construction mixers, a batching plant will not be required. Materials shall be stockpiled and batched by methods that will: (1) prevent segregation or contamination of aggregates and (2) insure accurate proportioning of the ingredients of the mix. When the quantity of concrete required at any given location exceeds 25 cubic yards, the Contractor shall provide aggregate bins.

9. CONCRETE MIXERS AND AGITATORS

Mixers may be central-plant mixers or truck mixers. Agitators may be truck agitators and truck mixers operated at a speed of rotation designated by the manufacturer as agitating speed. Each designated by the manufacturer as agitating speed. Each mixer and/or agitator shall have attached thereto, in a prominent place, a metal plate or plates on which is plainly marked the various uses for which the equipment is designed, the manufacturer's rated capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum or blades. Central-plant mixers shall be equipped with an acceptable timing device that will not permit the batch to be discharged until the specified mixing time has elapsed. Truck mixers shall be equipped with reset counters, or electrically actuated counters, by which the number of revolutions of the drum or blades may be readily verified.

The mixer, when loaded to capacity, shall be capable of combining the ingredients of the concrete within the specified time into a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity. The agitator, when loaded to capacity, shall be capable of maintaining the mixed concrete in a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity. The Engineer will, from time to time, make slump tests of individual samples taken at approximately the beginning, the midpoint and end of a load and if the slumps differ by more than two inches, the mixer or agitator shall not be used unless the condition is corrected. All mechanical details of the mixer or agitator, such as water measuring and discharge apparatus, condition of blades, speed of rotation of the drum, general mechanical condition of the unit and clearance of the drum, shall be checked before a further attempt to use the unit will be permitted.

Mixers and agitators shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or to wear of blades. The pick-up and throw-over blades shall be replaced when any part of section indicates wear in excess of one inch from the original height of the manufacturer's design. A copy of the manufacturer's design showing dimensions and arrangements of blades shall be available to the Engineer at the plant at all times.

10. MIXING AND AGITATING CONCRETE

Mixers and agitators shall be operated within the limits of the manufacturer's guaranteed capacity and speed of rotation. Maximum capacities, expressed as percentages of the gross volume of the drum or container, shall not exceed 63.25 percent for truck mixing, 70 percent for shrink mixing, and 80 percent for agitating.

When concrete is mixed at a central plant 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. If dual-drum mixers are used, the time consumed in transferring the batch from one drum to the other shall not be included as part of the mixing time. 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 the 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. When mixing is begun during or immediately after charging, a portion of the mixing water not in excess of that required to produce the minimum acceptable slump shall be added ahead of, or with, the other ingredients.

When concrete is partially mixed at a central plant and the mixing is completed in a truck mixer (shrink mix), 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.

When an agitator, or a 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.

When ready-mixed concrete is furnished, the Contractor shall furnish to the Engineer a statement of delivery ticket showing the time of loading, the revolution counter reading at the time of batching, and the quantities of materials used for each load of concrete.

11. PREPARATION OF FORMS AND SUBGRADE

Prior to placement of concrete the forms and subgrade shall be cleaned and free of chips, sawdust, debris, water, extraneous oil, mortar, or other objectional or deleterious substances or coatings. Faults or seams in rock shall be cleaned to a depth of 12 inches and to firm rock on the sides. Rock surfaces shall

be cleaned by air-water cutting, wet sand blasting or wire brush scrubbing, as necessary, and shall be wetted immediately prior to placement of concrete. Earth surfaces shall be clean, firm and damp. Placement of concrete on mud, dried earth or uncompacted fill will not be permitted.

When concrete is to be placed over a drain 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 must be set in a manner that insures their extension through protective layers.

Forms for exposed surfaces shall be coated with a non-staining form oil. Forms shall be oiled before placement to prevent excess oil from splashing or dripping onto steel or construction joints. After oiling forms, excess oil shall be removed. Any oil on the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed.

Items to be embedded in the concrete shall be positioned accurately and firmly anchored to prevent displacement during placement of concrete.

Weepholes in walls or slabs shall be formed with nonferrous pipe.

12. CONVEYING CONCRETE

Under ordinary conditions the 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 degrees F. or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes unless an amount of an approved set retarding admixture sufficient to compensate for a longer delay in placement has been included in the mix. 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. In the conveying and placing of concrete, vertical drops in excess of 5 feet will not be permitted except where suitable equipment is used that prevents segregation of aggregates.

13. PLACING CONCRETE

No concrete shall be placed until the subgrade, forms and reinforcing steel have been inspected and approved. No concrete shall be placed except in the presence of the Engineer. The Contractor shall give reasonable notice to the Engineer of his intention to place concrete.

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 so regulated 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. These temporary members shall be entirely removed from the forms and not buried in the concrete.

14. CONSOLIDATING CONCRETE

The concrete shall be consolidated by means of internal type mechanical vibrators capable of transmitting vibration to the concrete at frequencies not less than 6000 impulses per minute. The intensity of vibration shall be such as to visibly affect a mass of concrete with 1-inch slump over a radius of at least 18 inches. Vibrators shall be applied vertically to the concrete at points uniformly spaced and not farther apart than 18 inches. They shall be inserted and removed slowly and at a uniform rate of movement. The vibration at any one point shall be of sufficient duration and intensity to thoroughly consolidate the concrete but not so long as to cause segregation or localized grout pockets.

The Contractor shall provide a sufficient number of vibrators to properly consolidate each batch immediately after it is placed in the forms. Vibration shall be applied at the point of deposit and in the areas of freshly deposited concrete. Vibration shall not be applied directly or through reinforcement to sections or layers of concrete that have hardened to the degree that the concrete ceases to be plastic under vibration. 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 surfaces and dense concrete along form surfaces, in corners and around embedded items.

15. LAYERS

Formed concrete shall be placed in horizontal layers not more than 20 inches in thickness. All slab concrete shall be placed in one continuous layer to design thickness unless otherwise specified. Each layer shall be consolidated to insure monolithic bond with the preceding layer. Whenever possible each layer shall be placed and consolidated before the preceding layer has taken initial set. If

initial set begins between two consecutive batches the Contractor shall discontinue the placing of concrete and shall shape and prepare the top surface of the last layer in the same manner as for Construction Joints, Section 16 of this specification. When less than a complete horizontal layer is placed in one operation it shall be terminated in a vertical bulkhead. Where a feather edge might be produced at a construction joint, as in the top surface of a sloping wall, an insert form shall be used to block out a portion of the layer so that the resulting edge thickness in the next layer is not less than 6 inches.

Prior to the placement of the next lift all accumulations of mortar splashed upon the reinforcing steel and forms shall be removed. Dried mortar chips and dust shall not be puddled into unset concrete.

16. CONSTRUCTION JOINTS

Construction joints shall be made only at locations shown on the drawings. If locations of such joints are not shown on the drawings, or in case of emergency, construction joints shall be placed in locations selected by the Engineer. As each lift is completed the top surface shall be immediately and carefully protected from any condition that will adversely affect the hardening of the concrete. New concrete shall not be placed against a construction joint until at least 12 hours after completion of the preceding lift. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. Shear plates shall conform to the requirements of Material Specification 117 for structural carbon steel plates.

Construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings, stains or debris by means of washing and scrubbing with a wire brush or wire broom and shall be kept clean and damp until the new concrete is placed. The new concrete shall be placed directly on the cleaned and washed surface.

17. EXPANSION AND CONTRACTION JOINTS

Expansion and contraction joints shall be made only at locations shown on the drawings. When open 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 open 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. Preformed expansion joint filler shall conform to the requirements of Material Specification 106 for the specified types and classes.

All expansion and contraction joints shall be carefully tooled or formed and free of all mortar and concrete. The joint filler shall be left exposed for its full length with clean and true edges.

18. WATERSTOPS

Waterstops shall be held firmly in the correct position as the concrete on one side of the joint is placed. All 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. Waterstops shall conform to the requirements of Material Specification 107 for the specified kinds.

19. FINISHING FORMED SURFACES

Immediately after the removal of the forms:

a. All fins and irregular projections shall be removed from all surfaces to be exposed to air or water in the finished structure.

b. On all surfaces, the holes produced by the removal of form ties, cone-bolts, and she-bolts shall be prepared and filled in the following manner:

(1) The interior surfaces of the holes shall be cleaned of all defective concrete and roughened to the degree required to assure an effective bond. The interior surfaces of the holes shall be kept continuously wet (by means of wet packings of burlap or caulking cotton) for at least three hours prior to the placement of the concrete filling. Immediately prior to the placement of the concrete filling the hole must be thoroughly cleaned so as to leave a surface completely free of chipping dust and all other foreign material.

(2) The holes shall be filled with a dry-pack mortar consisting of one part portland cement, 3 parts sand that will pass a No. 16 sieve, and water just sufficient to produce a consistency such that the filling is at the point of becoming rubbery when the material is solidly packed. The dry pack mortar shall be placed in layers having a compacted thickness of about 3/8 inch. Each layer shall be solidly compacted over its entire surface by means of a hardwood stick and a hammer. The surface of each layer shall be scratched to facilitate bonding with the next layer. One layer may follow another immediately unless appreciable rubberiness develops, in which

case placement shall be delayed 30 to 40 minutes. Under no circumstances shall alternate layers of wet and dry material be used. The holes shall not be over filled. The resulting surfaces shall be true and uniform in texture and color.

(3) Steel finishing tools shall not be used. Water shall not be added to the surface during finishing.

c. All other defects shall be corrected as prescribed in Section 21 of this specification.

20. FINISHING UNFORMED SURFACES

After the concrete has been consolidated it shall be given a wood float finish. When the floating has been completed and the excess water removed, the Contractor shall test the surface for trueness by means of a straightedge.

21. REMOVAL OR REPAIR OF CONCRETE

When concrete fails to conform to the requirements of this specification or is honeycombed, damaged or otherwise defective the Contracting Officer will direct the Contractor to remove and replace the structure or structural member containing the defective concrete or, where feasible, to correct or repair the defective parts. The corrective action required and the required extent of removal, replacement or repair will be determined by the Engineer in consideration of the extent of the defects noted and the effect of partial removals and repairs on the structural integrity and appearance of the structure.

When repair of defective concrete is authorized by the Contracting officer the following provisions shall apply to the conduct of the work:

- a. The Contractor shall begin the repair of formed concrete within 24 hours after removal of the forms.
- b. Prior to starting the repair work the Contractor shall obtain the Engineer's approval of his plan for effecting the repair.
- c. The Contractor shall perform the repair work only in the presence of the Engineer.
- d. In reinforced concrete, defects that are not deeper than the reinforcing steel and that have a surface area less than 0.5 square foot and a least surface dimension not greater than 1.25 times the depth of the defect shall be repaired by the method prescribed in Section 19.

- e. In plain concrete, defects that are not deeper than 4 inches, do not extend entirely through the concrete section, and that have a surface area less than one square foot and a least surface dimension not greater than 1.25 times the depth of the defect shall be repaired by the method prescribed in Section 19.
- f. All other defects shall be repaired by the appropriate methods prescribed in Chapter VII of the Concrete Manual, Bureau of Reclamation, U. S. Department of Interior.

22. MOIST CURING

Concrete surfaces exposed to air shall be kept continuously moist throughout the curing period by means of sprinkling, flooding or fog spraying or by means of covering with continuously moistened canvas, burlap, straw, sand or other approved material. Where wooden forms (except plywood) are used and left in place during curing, the wood shall be kept wet. Water for curing shall be clean and free from any substances that will cause discoloration of the concrete. Construction joints or other surfaces on which concrete is to be placed shall be moist cured.

23. USE OF CURING MEMBRANE

Except when the requirements of Section 29 of this specification apply, the concrete may be coated with a curing compound conforming to the requirements of Material Specification 104 in lieu of moist curing. The compound shall be applied to unformed surfaces as soon as free water has disappeared. Formed surfaces shall be thoroughly wetted after removal of forms and kept wet until necessary repair of the concrete surface is completed. Curing compound shall not be applied to any concrete surface until all repairs and finishing are completed.

All surfaces to which bond is required, such as construction joints, shear plates, reinforcing steel and other embedded items, shall be protected from the application of the compound.

The compound shall be applied in a two-coat continuous operation. Each coat shall be sprayed on at a uniform rate of not less than one gallon of compound per 200 square feet of concrete surface. The second coat shall be applied at approximately right angles to the direction of application of the first coat. The membrane shall be protected from damage during the curing period. Surfaces that are subjected to heavy rainfall or running water within 3 hours after the membrane is applied or otherwise damaged during the curing period shall be resprayed in the same manner as for the original application.

24. LENGTH OF THE CURING PERIOD

Curing shall begin as soon as the concrete has set. The length of the curing period shall be determined by the average minimum daily temperature recorded during the curing period.

<u>Average Minimum Daily Temp. (°F)</u>	<u>Minimum Length of Curing Period</u>
70° of higher	5 days
60°	6 days
50°	7 days
40°	9 days
Less than 40°	See Section 28

25. FORMS

Forms shall be of wood, plywood, steel or other approved material and shall be built mortar tight and of sufficient rigidity to prevent distortion by the pressure of the concrete or other construction loads. The forms and associated falsework shall be substantial and unyielding and shall be so designed that the finished concrete will conform to the specified dimensions and contours. The design of the forms shall take into account the effect of vibration of the concrete as it is placed.

Forms shall be constructed and maintained so as to prevent warping and separation and the opening of joints due to shrinkage of lumber or yielding of metal. Forms for exposed surfaces shall be made of dressed lumber, metal or plywood of uniform thickness and the form surfaces shall be smooth and free from holes, dents, sags or other irregularities.

26. TIES AND SPACERS

Metal ties or anchorages within the forms shall be equipped with cones and shall be so constructed as to permit their removal to a depth of at least one inch without injury to the concrete. Wire form ties or wooden spacers will not be permitted.

27. REMOVAL OF FORMS

Forms shall not be removed without the approval of the Engineer. Form removal shall be accomplished in the presence of the Engineer by methods adequate to prevent damage to the concrete. Supports shall be removed in such a manner as to permit the

concrete to uniformly and gradually take the stresses due to its own weight. Forms shall not be removed before the expiration of the following minimum time intervals after placement of the concrete, exclusive of days when the minimum temperature is below 40°F:

<u>Element</u>	<u>Time</u>
Arch or beam centering	14 days
Deck slabs; conduits (inside forms)	14 days
Conduits (outside forms)	3 days
Columns, bearing walls	7 days
Walls, non-bearing	24 hours
Sides of beams	24 hours

28. CONCRETING IN COLD WEATHER

Concrete shall not be mixed nor placed when the daily minimum atmospheric temperature is less than 40°F unless facilities are provided to insure the adequate protection of the concrete.

The temperature of the concrete at the time of placing shall be not less than 50°F nor more than 90°F. The temperature of all aggregates and mixing water shall be not more than 150°F when introduced into the mixer.

When the daily minimum temperature is less than 40°F, the structures must be insulated or housed and heated for the duration of the placement and curing period and the temperature of the concrete and air within the enclosure shall be maintained at not less than 50° nor more than 90°F.

Methods of insulating, housing and heating the structure shall conform to the "Recommended Practice for Winter Concreting," ACI Standard No. 604.

During conveyance of the concrete from the mixer to the place of deposit the concrete shall be protected by means of insulated or heated containers as necessary to maintain the temperature of the concrete at not less than 50°F nor more than 90°F.

The use of accelerators or antifreeze compounds will not be allowed.

When dry heat is used to protect curing concrete, means of maintaining ambient humidity shall be provided.

29. 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 at any time during the curing period the following provisions shall also apply to the conduct of the work:

- a. The Contractor shall apply effective means to maintain the temperature of the concrete below 90°F during mixing, conveying, and placing. Such means shall conform to the "Recommended Practice for Hot Weather Concreting," ACI Standard No. 605.
- 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. Concrete surfaces exposed to the air shall be continuously moistened by means of fog sprays during the periods of time between placement and finishing and between finishing and the application of moist curing methods.
- d. Finishing of slabs and other flat surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay. Curing methods shall be applied as soon as the concrete has hardened sufficiently to allow the placement of the cover and the application of water.
- e. Concrete surfaces exposed to the air shall be covered and kept continuously wet during at least the first 36 hours of the curing period. After 36 hours, the Contractor may elect to apply curing compound in lieu of further moist curing.
- f. Steeply sloping and vertical formed surfaces shall be kept completely and continuously wet prior to and during form removal by the application of water to the top surfaces in such a manner that it will pass down between the form and the concrete. Forms shall not be removed for at least 36 hours after the concrete has hardened. White pigmented curing compound shall be applied as soon as the forms are removed.

30. 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

shown on the drawings, and the volume of each type and class of concrete will be computed to the nearest 0.1 cubic yard. Measurement of concrete placed against the sides of an excavation without the use of intervening forms will be made only to the neat lines or pay limits shown on the drawings. 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.

(Method 1) Payment for each type and class of concrete will be made at the contract unit price for that type and class of concrete. The payment for concrete shall constitute full compensation for all labor, materials, equipment, transportation, tools, forms, falsework, bracing and all other items necessary and incidental to the completion of the concrete work such as joint fillers, waterstops, dowels or dowel assemblies and shear plates but not including reinforcing steel. Methods of payment for furnishing and placing reinforcing steel are included in Construction Specification 9.

(Method 2) Payment for each type and class of concrete will be made at the contract unit price for furnishing and placing that type and class of concrete. The payment for concrete shall constitute full compensation for all labor, materials, equipment, transportation, tools, forms, falsework, bracing and all other items necessary and incidental to the 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.

Measurement of and payment for furnishing and placing reinforcing steel will be made as specified in Construction Specification 9.

Measurement of bagged cement will be the actual count of the number of bags of cement used at the mixer. Measurement of bulk cement will be the summation of the batch weights of cement used at the mixer. One barrel will be considered equivalent to four bags of bagged cement or 376 pounds of bulk cement. 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 the furnishing and handling of the cement.

Payment will be made only for cement used in concrete accepted for payment.

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 31 of this specification.

3. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

A. Materials

1. All concrete shall be Class 3000X. The Engineer will be responsible for the design of the concrete mix.
2. Cement shall be Type II, or Type III where high early strength is required and approval is given by the Engineer.
3. Maximum size of coarse aggregate shall be Size No. 467 (1 - 1/2 to No. 4) for structures other than the channel, and Size 67 (3/4 to No. 4) for use in the channel lining.
4. Regardless of the source, all aggregates shall be thoroughly and uniformly washed.

B. Bid Item 6. Concrete, Channel

1. This item consists of the reinforced concrete required for the construction of the trapezoidal channel between stations 12+10 and 372+80. At inlets it includes the bottom and sloping sides of the channel but not the inlet itself. It includes the sections of channel under bridges but does not include bridges, box culverts or the appurtenant transitions.
2. Measurement and payment will be made in accordance with Method 2. No deduction in volume of concrete will be made for the space occupied by the reinforcing steel.

C. Bid Item 7. Concrete Structures

1. This item consists of the reinforced concrete required for the construction of the inlet transition structure at station 11+50 to 12+10, inlets at stations 89+00, 214+50, 261+00; and transition and SAF structure at station 373+00.
2. Measurement and payment will be made in accordance with Method 2. No deduction in volume of concrete will be made for the space occupied by the reinforcing steel.

D. Bid Item 8. Concrete, Bridges

1. This item consists of the reinforced concrete required for construction of the bridges at stations 184+20 and 347+50. It does not include the sections of concrete channel under the bridges.

2. Measurement and payment will be made in accordance with Method 2. No deduction in volume of concrete will be made for the space occupied by the reinforcing steel.

E. Bid Item 9. Concrete Box Culverts

1. This item consists of the reinforced concrete required for the construction of the box culverts and appurtenant transitions at stations 75/38 and 321/14.
2. Measurement and payment will be made in accordance with Method 2. No deduction in volume of concrete will be made for the space occupied by the reinforcing steel.

F. Bid Item 10. Concrete Channel Crossings

1. This item consists of the concrete required for the construction of the channel crossings at stations 378/50, 427/95, and 451/00.
2. Before placing the concrete slab, the base shall be moistened and compacted with manually directed power tamper or by other equipment approved by the Engineer.
3. Measurement and payment will be made in accordance with Method 2.

G. Bid Item 11. Cement

1. This item consists of furnishing cement used in concrete paid for under Bid Items 6, 7, 8, 9 and 10.
2. Measurement and payment for cement will be made in accordance with Method 2. To compute the actual amount of cement used in the concrete accepted for payment, the difference between the yardage of concrete delivered to the job and the yardage of concrete accepted for payment will be multiplied by the amount of cement per cubic yard and deducted from the actual measured quantity of cement measured at the plant. The volume of concrete per batch and the amount of cement per cubic yard will be determined by the Engineer by tests made in accordance with ASTM Designation C138. No payment will be made for additional cement added for the convenience of the contractor.

CONSTRUCTION SPECIFICATION

9. PLACING 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 103. 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 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. 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. 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 119. 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 9-1, 9-2, and 9-3. 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 9-1. 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.

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.

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.

SCS-WEST

TABLE 9-1. 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 9-2. RECTANGULAR WELDED WIRE FABRIC

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

(9-5)

11-5-64

TABLE 9-3. SQUARE WELDED WIRE FABRIC

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		

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

A. Bid Item 12. Reinforcing Steel; Bid Item 13. Welded Wire Fabric

1. This item consists of the furnishing and placing of reinforcing steel and welded wire fabric in all reinforced concrete structures as shown on the drawings.
2. Measurement and payment will be made in accordance with Method 1. For payment computations, the total area of the welded wire fabric shall be computed as area of concrete reinforced as shown on the drawings plus five percent added for splices.

CONSTRUCTION SPECIFICATION

12. CORRUGATED METAL PIPE CONDUITS

1. SCOPE

The work shall consist of furnishing and placing circular, arched or elliptical corrugated metal pipe and the necessary fittings.

2. MATERIALS

Pipe and fittings shall conform to the requirements of Material Specification 110 or Material Specification 131, 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 joined 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.

4. BACKFILL

Earth backfill shall be placed in the manner specified in Construction Specification 5 for fill adjacent to structures. Special care shall be taken to prevent lifting the pipe from the bedding by pressures exerted by tamping material under the haunches of the pipe.

5. 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 at which time they shall be removed by the Contractor.

6. 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.

7. REPAIR OF DAMAGED COATINGS

Breaks or scuffs in bituminous coatings that are less than 36 square inches in area may be repaired by the application of two coats of hot asphaltic paint conforming to the requirements for bituminous coatings contained in the references cited in Material Specifications 110 and 131. 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.

8. 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 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 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, 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.

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 the specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

A. Bid Item 14 and 14A. Corrugated Metal Pipe

1. This item consists of the furnishing and placing of the corrugated metal pipe inlet at stations 310+00, 320+00 and 426 +50.
2. The pipe and fittings shall conform to the requirements of Material Specification 110. The pipe shall be Class I or II (annular or helical corrugations), Shape I (circular), Type A Coating (fully bituminous coated) as specified in Federal Specification WW-P-00405. Size and gage shall be as shown on the drawings.
3. Measurement and payment will be made in accordance with Method 1.

CONSTRUCTION SPECIFICATION

17. LOOSE ROCK RIPRAP

1. SCOPE

The work shall consist of furnishing, transporting and placing rock in the construction of loose rock riprap revetments and blankets.

2. MATERIALS

The rock used in the construction of loose rock riprap revetments shall conform to the requirements of Material Specification 127. When filter layers or bedding layers are specified, the materials for such layers shall conform to the requirements of Material Specification 105. Spalls shall be composed of small fragments of the same type of rock as used in the riprap. At least 30 days prior to delivery of rock, filter materials or bedding materials, the Contractor shall designate in writing the source from which he intends to obtain the materials. The Contractor shall provide the Engineer free access to the source for the purpose of obtaining samples for testing.

3. SUBGRADE PREPARATION

Riprap shall not be placed until 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 in 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 reasonably 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 with the greatest dimension

placed across the slope. Vertical joints between rocks shall be staggered. Spaces between the larger rocks shall be filled with smaller rocks and spalls. The 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. 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.

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 construction details therefor are:

A. Bid Item 15. Loose Rock Riprap

1. This item consists of the furnishing and placing of rock riprap on the sides of the earth sections of outlet channel, at channel junctions and adjacent to structures, as shown on the drawings.
2. The size of the rock shall conform to the sizes shown in the table below:

<u>Screen Opening</u> <u>Inches</u>	<u>Percent Passing</u> <u>By Weight</u>
15	100
12	50-75
8	30-60
3	10-30
1 - 1/2	0-10

3. The rock shall be placed by equipment in accordance with Section 4 of this specification.
4. The tolerance for placing riprap shall be that the average top surface of the exposed rock shall not be more than three inches above or six inches below specified lines measuring perpendicular to the surface, provided the thickness of the riprap is not less than indicated on the drawings. Rocks over nine inches in diameter that extend over nine inches above the average surface of the riprap shall be removed or embedded. The top edge of the riprap may be covered with earth and sloped to the top of the embankment in lieu of finishing the top edge to the above tolerances.
5. The rock shall conform to the tests required for riprap as specified in Material Specification 127 except that before making the abrasion test as specified, the sized sample shall be run through 200 revolutions of the Los Angeles abrasion machine. The rock sample shall then be removed, cleaned and dried and the standard test performed on the prepared sample.
6. Measurement and payment shall be made in accordance with Method 2. The specified limits for payment will be the neat lines and grades as shown on the drawings.

CONSTRUCTION SPECIFICATION

14. METAL FABRICATION AND INSTALLATION

1. SCOPE

The work shall consist of furnishing, fabricating and erecting metal work, including the metal parts of composite structures.

2. QUALITY OF MATERIALS

Unless otherwise specified, materials shall conform to the requirements of Material Specification 117. 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 119.

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 of the American Society of Civil Engineers Specifications for Structures of Aluminum Alloy applicable to the alloys specified for use in the work.

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 22 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:

<u>Material</u>	<u>Unit Weight</u> <u>Pounds per Cubic Foot</u>
Aluminum, cast or rolled	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.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

A. Bid Item 16. Identification Sign

1. This item shall consist of the fabricating and erecting of the identification sign as shown on the drawings.
2. Structural steel shapes and plate shall be Grade B conforming to the requirements of Federal Specification QQ-S-741. The steel sheet for the face of the sign shall conform to ASTM Designation A415.
3. Measurement and payment will be made in accordance with Method 3. Payment shall include full payment for all metal work, painting and concrete required for the construction of the identification sign as shown on the drawings.

CONSTRUCTION SPECIFICATION

22. 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 B 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 B with mixing varnish conforming to the requirements of Federal Specification TT-V-81, Type II, Class B 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 139. 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 PREPARATION

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 before 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 damages 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. ATMOSPHERIC 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. CERTIFICATION AND TESTS

The material certification shall include material identification, quantity, batch number and certified results of tests performed by the manufacturer or other laboratory covering all of the requirements of the specifications under which the material is furnished.

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 made 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 the specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

A. Subsidiary Item. Painting

1. This item shall consist of the painting of all exposed surfaces of the identification sign under Bid Item 15.
2. Paint application shall be in accordance with Paint System C. In addition the face of the sign shall be painted with two coats of white enamel conforming to Type 7. The letters shall be painted with dark green enamel conforming to Type 7.
3. No separate payment will be made for painting. Compensation for painting will be included in the payment for Identification Sign, Bid Item 15.

CONSTRUCTION SPECIFICATION

25. REMOVAL OF WATER

1. SCOPE

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

2. DIVERTING SURFACE WATER

The Contractor shall provide impounding works or diversions suitable to control and pass the streamflow and other surface waters through or around the site of the permanent works and borrow areas during construction. Unless otherwise specified, a diversion must discharge into the same natural drainageway in which its headworks are located.

3. DEWATERING THE SITE OF THE PERMANENT WORKS

The Contractor shall furnish, install, operate and maintain all facilities and equipment necessary to remove water from the various parts of the works during construction. Dewatering shall be accomplished in a manner that will result in all construction work being performed in the dry, except: (1) excavation that can be done under water to the specified limits and tolerances without adversely affecting any other part of the work; (2) any operation specifically exempted elsewhere in the contract. Dewatering of foundations shall be accomplished by methods that will prevent loss of fines from the foundation materials.

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 to the flow of water to and through the spillways and outlet works or any other interference with the operation, or access to, the permanent works.

6. MEASUREMENT AND PAYMENT

For items of work for which specific prices are established in the contract, payment for diverting and dewatering will be made at the contract 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.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

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

A. Subsidiary Item: Diversion of Streamflow and Dewatering of the Worksite.

1. This item shall consist of the maintaining of the temporary diversion indicated on the drawings at station 11/50 and any dewatering that may be required from local runoff or any other source that may occur during the construction of the channel and appurtenances.
2. Diversion of streamflow and dewatering of the work site will be considered a subsidiary to other related items of work and will not be paid for as a separate item and the cost therefor will be considered as included in the contract price paid for other related items of work.

MATERIAL SPECIFICATION

100. PORTLAND CEMENT

1. SCOPE

This specification covers the quality of portland cements.

2. QUALITY

Portland cement shall conform to the requirements of Federal Specification SS-C-192, for the specified types of cement, except that, whenever Type I portland cement is specified, portland blast furnace slag cement conforming to the requirements of Federal Specification SS-C-197 may be used in lieu thereof.

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.

4. INSPECTION, TESTING AND CERTIFICATION

Portland cement shall be inspected and tested by the methods prescribed in Federal Specification SS-C-192. For quantities of cement less than 300 barrels, the material certification shall include the manufacturer's certified statement of results of typical tests for chemical composition, compressive strength and autoclave expansion for each type of cement specified. For quantities of cement of 300 barrels or more, the material certification shall include the manufacturer's certified inspection record of examination and testing of the cement furnished. When the quantity of cement furnished exceeds 300 barrels the Contractor shall inform the Contracting Officer in writing, and prior to delivery of cement to the work site, concerning the mill (or mills) from which the cement will be obtained and the purchase order number, contract number or other designation that will identify the cement to be used by the Contractor. The manufacturer's certified inspection record shall identify the cement by the same designation.

(100-1)

MATERIAL SPECIFICATION

101. 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 Federal Specification SS-A-281 for the specified classes and sizes.

3. 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.

4. INSPECTION AND TESTING

Aggregate shall be inspected and tested by the methods prescribed in Federal Specification SS-A-281.

(101-1)

MATERIAL SPECIFICATION

102. JOINT COMPOUND FOR CONCRETE AND CLAY PIPE

1. SCOPE

This specification covers the quality of joint compound for filling joints in concrete pipe and clay pipe.

2. TYPE

The compound shall be a cold-application mastic, single component or multiple component type.

3. COMPOSITION AND PROPERTIES

The compound shall have a composition such that it will not cause deterioration of rubber gaskets and, after curing, shall be a resilient, adhesive material that is capable of filling pipe joints to prevent the entry of concrete or earth during the bedding, cradling or backfilling operations. It shall be capable of being applied at a temperature of 70°F.

- a. The single component type shall be a ready-mixed non-drying compound furnished in troweling consistency or in preformed rope or strip form.
- b. The multiple component type shall be composed of two or more substances that are to be mixed prior to application. The substances shall be of such a character that a homogeneous preparation can readily be obtained by combining the separate substances by mechanical or manual stirring without heating the blended material above 100°F. immediately after preparation for use and shall remain in a condition suitable for application for at least 1 hour.

4. ADHESION TO CONCRETE

After curing, the compound shall be of such nature that it will adhere to dry, dust free concrete when applied either directly or over a suitable primer.

5. BOND

After curing, at least 2 of 3 samples of the compound shall not develop a crack, separation or other opening that is at any point deeper than 1/4 inch, in the compound or between the compound and the mortar block, when tested by the method specified in Section 7.

6. FLOW

After curing, the compound shall not show a flow in excess of 0.5 centimeter when tested by the method specified in Section 7.

7. SAMPLING, TESTING AND CERTIFICATION

Joint compound shall be sampled and tested by the methods specified in Federal Specification SS-R-406, Method 223.12, except that the extension test shall be conducted at a temperature not higher than 17°F. The material certification shall include the manufacturer's certified statement of results of typical bond tests and flow tests.

MATERIAL SPECIFICATION

103. 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 bar reinforcement shall conform to the requirements of Federal Specification QQ-S-632, Type II, Grade C.

Welded steel wire fabric reinforcement shall conform to the requirements of Federal Specification RR-W-375.

Cold-drawn steel wire reinforcement shall conform to the requirements of Federal Specification QQ-W-418.

Tie wire shall be cold-drawn black annealed wire and shall have a tensile strength of not less than 40,000 pounds per square inch.

3. 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.

4. INSPECTION, TESTING AND CERTIFICATION

Steel reinforcement shall be inspected and tested by the methods prescribed in the specifications cited herein. The material certification shall include the manufacturer's certified statement of results of typical tests for chemical composition, tensile strength, weld strength and bending properties as applicable to the type of material furnished.

MATERIAL SPECIFICATION

104. 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 Designation 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, the brand name and the manufacturer's batch number. The compound shall be stored in a manner such as to prevent damage to the containers and to protect water-emulsion types from freezing.

4. TESTING AND CERTIFICATION

Testing of curing compounds shall be done in accordance with ASTM Designation C 156. The material certification shall include the manufacturer's certified statement of results of typical tests for durability, reactance with concrete, drying time and moisture retention.

(104-1)

MATERIAL SPECIFICATION

106. PREFORMED EXPANSION JOINT FILLER

1. SCOPE

This specification covers the quality of preformed expansion joint fillers for concrete.

2. REQUIREMENTS

Preformed expansion joint filler shall conform to the requirements of Federal Specification HH-F-341 for the specified type and class of filler.

3. INSPECTION, TESTING AND CERTIFICATION

The joint filler shall be inspected and tested by the methods prescribed in Federal Specification HH-F-341. The material certification shall include the manufacturer's certified statement of results of typical tests of recovery, compression, extrusion, insolubility and expansion.

MATERIAL SPECIFICATION

107. WATERSTOPS

1. SCOPE

This specification covers the quality of materials from which waterstops can be fabricated or premolded. Waterstops shall be either copper, galvanized steel, galvanized iron, wrought iron, polyvinyl chloride plastic or rubber as specified.

2. COPPER

Copper sheets or strips used for waterstops shall conform to the requirements of ASTM Designation B 248.

3. STEEL

Galvanized iron or steel sheets used for waterstops shall conform to the requirements of Federal Specification QQ-S-775.

4. WROUGHT IRON

Wrought iron sheets used for waterstops shall conform to ASTM Designation A 162.

5. PLASTIC OR RUBBER

Non-metallic waterstops shall be either natural or synthetic rubber or vinyl chloride polymer or copolymer and shall exhibit the following properties when tested by the prescribed method of Federal Test Method Standard No. 601:

- a. The hardness (Shore A durometer) shall be 60 to 70 when tested by Method 3021;
- b. The tensile strength shall be at least 1400 pounds per square inch when tested by Method 4111;
- c. The ultimate elongation shall be at least 300 percent when tested by Method 4121;
- d. The compression set shall be not more than 30 percent when tested by Method 3311;
- e. The water absorption (by weight) shall be not more than 10 percent when tested by Method 6631;

- f. The decrease in tensile strength after aging shall be not more than 15 percent when tested by Method 7221;
- g. The decrease in ultimate elongation shall be not more than 20 percent when tested by Method 7221;
- h. There shall be no sign of failure due to brittleness at a temperature of minus 35° F. when tested by Method 5311.

6. INSPECTION, TESTING AND CERTIFICATION

Waterstops shall be inspected and tested by the methods prescribed in the specifications and standards cited herein. The material certification shall include the manufacturer's certified statement of results of typical tests applicable to the type of waterstop furnished.

MATERIAL SPECIFICATION

110. 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 iron or steel corrugated pipe and fittings shall conform to the requirements of Interim Federal Specification WW-P-00405 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-00405 for the specified types of coatings.

(110-1)

4. INSPECTION, TESTING AND CERTIFICATION

The pipe shall be inspected and tested by the methods specified in Interim Federal Specification WW-P-00405, except that:

- a. The Engineer shall have free access to the shop for inspection purposes, and every facility shall be extended to him for this purpose; and
- b. Field inspection by the Engineer will include an examination of the pipes for deficiencies in lengths of sheets used, nominal specified diameters, net length of finished pipe, and any evidence of poor workmanship, and may include the taking of samples for chemical analysis and determination of weight of zinc coating.

For the purpose of inspection, the Contractor shall furnish to the Engineer an itemized statement of the sizes and lengths of pipe in each shipment.

The material certification shall include: (1) the sheet manufacturer's statement of typical chemical analysis of the base metal and certified results of typical weight of zinc coating tests, and, (2) the fabricator's certified results of typical coating tests and weld strength tests, if applicable.

(110-2)

MATERIAL SPECIFICATION

117. STRUCTURAL METAL

1. SCOPE

This specification covers the quality of structural steel, structural iron and structural aluminum.

2. STRUCTURAL STEEL AND IRON

Unless otherwise specified, structural steel and iron products shall conform to the requirements of the following specifications:

- a. Structural carbon steel plates, shapes and bars shall conform to the requirements of Federal Specification QQ-S-741;
- b. Structural quality, hot-rolled carbon steel sheets shall conform to the requirements of Federal Specification QQ-S-699;
- c. Low carbon steel sheets and strips shall conform to the requirements of Federal Specification QQ-S-698.
- d. Zinc coated carbon steel sheets shall conform to the requirements of Federal Specification QQ-S-775;
- e. Steel castings shall conform to the requirements of Federal Specification QQ-S-681 for the specified classes of castings.
- f. Grey iron castings shall conform to the requirements of Federal Specification QQ-I-652 for the specified grades of castings.
- g. Malleable iron castings shall conform to the requirements of Federal Specification QQ-I-666 for the specified grades of castings.

3. STRUCTURAL ALUMINUM

Structural aluminum products shall conform to the requirements of ASTM Designation B 308 and the specifications included therein for the specified types and alloys.

(117-1)

4. BOLTS

Bolts shall conform to the requirements of Federal Specification FF-B-575 for the specified types, grades, classes and conditions of bolts.

5. RIVETS

Unless otherwise specified, steel rivets shall conform to the requirements of ASTM Designation A 141.

6. WELDING ELECTRODES

Steel welding electrodes shall conform to the requirements of ASTM Designation A 233 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. Bare electrodes shall be used to weld metal that is to be galvanized. Aluminum welding electrodes shall conform to the requirements of ASTM Designation B 285 for the specified classification.

7. INSPECTION, TESTING AND CERTIFICATION

Structural metals shall be inspected and tested by the methods prescribed in the specifications cited herein. The material certification shall include the manufacturer's certified copy of typical inspection records of examinations and tests.

(117-2)

MATERIAL SPECIFICATION

119. GALVANIZING

1. SCOPE

This specification covers the quality of zinc coatings applied to iron and steel products by the hot-dip process (galvanizing). This specification applies only to those products not covered in other material specifications.

2. QUALITY OF ZINC

The zinc used for coating shall be prime western spelter conforming to the requirements of ASTM Designation B 6.

3. QUALITY OF COATING

Zinc coatings shall conform to the requirements of the following specifications for the established classes of materials or, where applicable, the specified classes of coatings.

- a. Zinc coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strip shall conform to the requirements of ASTM Designation A 123;
- b. Zinc coatings on iron and steel hardware shall conform to the requirements of ASTM Designation A 153;
- c. Zinc coatings on assembled steel products shall conform to the requirements of ASTM Designation A 386.

4. INSPECTION, TESTING AND CERTIFICATION

Zinc coatings shall be inspected and tested by the methods prescribed in the specifications cited herein. The material certification shall include the manufacturer's certified statement of results of typical weight of zinc coating tests.

(119-1)

MATERIAL SPECIFICATION

121. WATER-REDUCING, SET-RETARDING ADMIXTURES FOR PORTLAND CEMENT CONCRETE

1. SCOPE

This specification covers the quality of water-reducing, set-retarding admixtures for portland cement concrete.

2. TYPES

The admixture shall be in liquid or powder form and shall be one of the following types:

- a. A calcium, sodium, potassium or ammonium salt of lignosulfonic acid;
- b. A hydroxylated carboxylic acid or its salt; or,
- c. A carbohydrate.

3. BASIS OF ACCEPTANCE

The basis of acceptance shall be the effect of the admixture on the properties of concrete as specified in Section 4 of this specification and as determined by the methods specified in Section 5 of this specification.

4. REQUIREMENTS

When added to concrete in powder or liquid form, in the manner prescribed by its manufacturer and in sufficient amount to retard the setting time not less than 50 percent, the retarding admixture shall cause the concrete to have the following properties in comparison with those of the reference (non-retarded) concrete:

- a. The water content for equal slump shall be decreased at least 5 percent;
- b. The air content of the retarded concrete, with or without an air-entraining admixture, shall not exceed 8 percent;
- c. The compressive strength at 28 days shall be increased at least 10 percent;
- d. The relative durability factor for the freezing and thawing test shall be not less than 95.

(121-1)

The reference concrete shall conform to the requirements of Class 3000X, as defined in Construction Specification 8, or an approved equivalent mix. Cement shall conform to the requirements of Material Specification 100. Aggregates shall conform to the requirements of Material Specification 101.

The retarded mix and the reference mix shall have equal cement content.

For determining setting time, it will be assumed that initial set is indicated by a penetration resistance of 500 pounds per square inch as measured by a Proctor-type penetrometer.

5. TESTS

Testing shall be accomplished by the use of the following standard test methods:

	<u>Method</u>
Sampling fresh concrete	ASTM C 172
Making and curing cylinders	Fed. Spec. SS-R-406, Method 231.0
Slump	Fed. Spec. SS-R-406, Method 232.0
Air content	ASTM C 231
Compressive strength	Fed. Spec. SS-R-406, Method 229.0
Freezing and thawing	Fed. Spec. SS-R-406, Method 234.1

6. CERTIFICATION

The material certification shall include the manufacturer's certified statement of results of typical tests for the admixture's effect on water content, air content, compressive strength and durability factor of concrete.

MATERIAL SPECIFICATION

122. 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 Designation C 260.

3. TESTING AND CERTIFICATION

Air entraining admixtures shall be tested by the methods prescribed in ASTM Designation C 260. The material certification shall include the manufacturer's certified statement of results of typical tests for the admixture's effect on bleeding, compressive strength and durability factor of concrete.

(122-1)

MATERIAL SPECIFICATION

127. ROCK FOR PERMANENT CONSTRUCTION

1. SCOPE

This specification covers the quality of rock to be used in the construction of permanent works.

2. GENERAL REQUIREMENTS

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.

Representative samples of the rock shall conform to the requirements specified herein for the designated type of rock construction when tested by the methods specified in Section 5 of this specification.

3. ADDITIONAL REQUIREMENTS FOR RIPRAP

Rock for riprap shall also conform to the following requirements:

- a. The bulk specific gravity (in the saturated, surface dry condition) shall be not less than 2.5.
- b. The soundness shall be such that the weight loss shall be not more than 10 percent after 5 cycles when tested by the sodium sulphate soundness test method.
- c. The resistance to abrasion shall be such that the weight loss shall be not more than 35 percent when tested in the Los Angeles abrasion machine.

4. ADDITIONAL REQUIREMENTS FOR ROCK FILL

Rock for embankment or blankets for slope protection shall also conform to the following requirements:

- a. The bulk specific gravity (in the saturated, surface dry condition) shall be not less than 2.4.

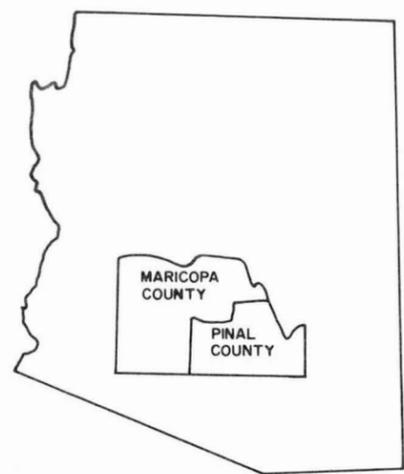
- b. The soundness shall be such that the weight loss shall be no more than 20 percent after 5 cycles when tested by the sodium sulphate soundness test method.
- c. The resistance to abrasion shall be such that the weight loss shall be not more than 40 percent when tested in the Deval abrasion machine.

5. SAMPLING AND TESTING

Methods of sampling and testing shall conform to the standard methods contained in Federal Specification SS-R-406, as follows:

	<u>Method No.</u>
Sampling	101.01
Soundness	203.01
Abrasion (Deval)	208.0
Abrasion (Los Angeles)	208.11
Specific gravity	209.0

(127-2)



APACHE JUNCTION-GILBERT WATERSHED PROTECTION AND FLOOD PREVENTION PROJECT

MARICOPA & PINAL COUNTIES, ARIZONA

PLANS FOR THE CONSTRUCTION OF POWERLINE FLOODWAY

INDEX OF DRAWINGS

DRWG. NO.	SHT. NO.	TITLE
7-E-20598	1	INDEX OF DRAWINGS
	2	LOCATION MAP
	3	PLAN PROFILE STA 6458.2 TO STA 45400
	4	PLAN PROFILE STA 45400 TO STA 85400
	5	PLAN PROFILE STA 85400 TO STA 125400
	6	PLAN PROFILE STA 125400 TO STA 165400
	7	PLAN PROFILE STA 165400 TO STA 205400
	8	PLAN PROFILE STA 205400 TO STA 245400
	9	PLAN PROFILE STA 245400 TO STA 285400
	10	PLAN PROFILE STA 285400 TO STA 325400
	11	PLAN PROFILE STA 325400 TO STA 365400
	12	PLAN PROFILE STA 365400 TO STA 405400
	13	PLAN PROFILE STA 405400 TO STA 445400
	14	PLAN PROFILE STA 445400 TO STA 467450
	15	FLOODWAY DETAILS STA 6458.2 TO STA 11450
	16	TRANSITION STA 11450
	17	DETAILS OF CONCRETE LINED CHANNEL
	18	WEIR INLET STA 89400
	19	WEIR INLET STA 89400
	20	WEIR INLET STA 214450
	21	WEIR INLET STA 214450
	22	WEIR INLET STA 261400
	23	WEIR INLET STA 261400
	24	DETAILS OF FORD CROSSING STA 378450
	25	TRANSITION AND SAF BASIN STA 373400
	26	TRANSITION TO SAF BASIN STA 373400
	27	TRANSITION TO SAF BASIN STA 373400
	28	DETAILS OF SAF BASIN
	29	DETAILS OF SAF BASIN
	30	DETAILS OF SAF BASIN
	31	FLOODWAY DETAILS STA 430400
	32	VINEYARD ROAD TRANSITIONS
	33	VINEYARD ROAD TRANSITIONS
	34	ELLSWORTH ROAD TRANSITIONS
	35	ELLSWORTH ROAD TRANSITIONS
	36	VINEYARD ROAD BOX CULVERT
	37	ELLSWORTH ROAD BOX CULVERT
	38	PRIVATE BRIDGE CROSSING STA 184420
	39	PRIVATE BRIDGE CROSSING STA 347450
	40	IDENTIFICATION SIGN
	41	PLAN - GEOLOGIC INVESTIGATION
	42	PROFILE GEOLOGIC INVESTIGATION
	43	PROFILE GEOLOGIC INVESTIGATION
	44	PROFILE GEOLOGIC INVESTIGATION

STRUCTURAL NOTES

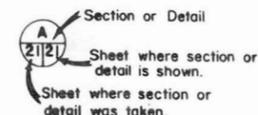
1. All exposed concrete edges shall be chamfered 3/4 inch or rounded.
2. Indicated reinforcing bar spacing is center to center of bars, bar cover is clear distance between surface of bar and face of concrete, and shall be 2" for formed and top surfaces and 3" for surfaces poured against earth, unless otherwise shown.
3. In sections having a single mat of reinforcing, the steel shall be positioned in the center of the section unless otherwise shown.
4. All bar splices not shown on the drawings shall be staggered with bars lapped a min. of 30" dia. of the smallest bar.
5. Quantities are for bid purposes only. Contractor will be responsible for the furnishing and placing of all materials.

GENERAL NOTES

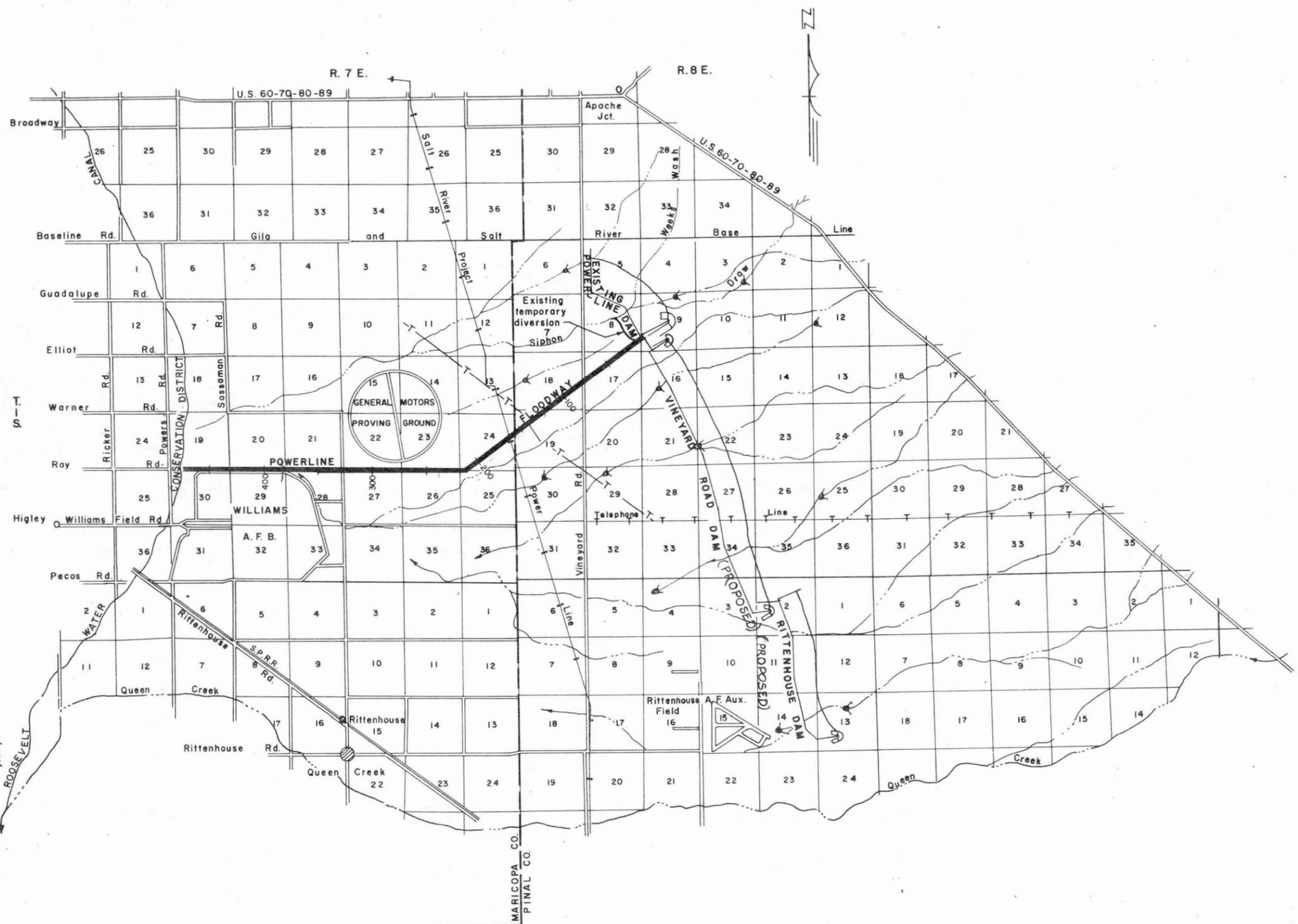
1. Elevations are shown in feet above mean sea level datum.
2. All stationing refers to centerline of construction and is the measured horizontal distance.
3. Subsurface utility lines which lie within excavations limits, unless otherwise noted, will be removed or relocated by the owner thereof or abandoned in place.
4. Utility poles which lie within the construction limits or within reservoir or borrow areas will be removed or relocated by the owners thereof unless otherwise noted.

DESIGN DATA

Class 3,000 concrete
 $f'_c = 3,000$ psi
 $f_c = 1,200$ psi
 $f_s = 20,000$ psi
 $n = 9$
 $V_c = 60$

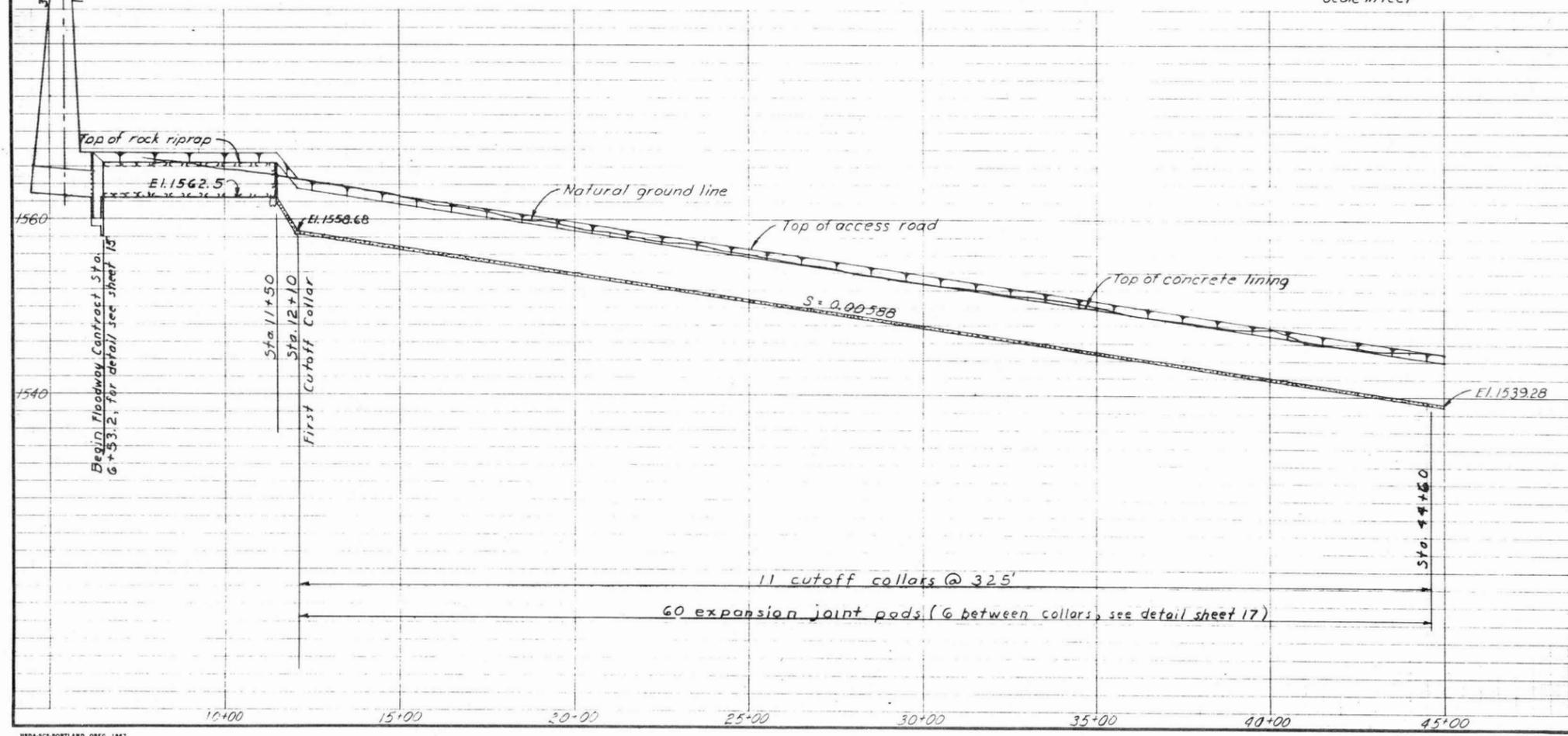
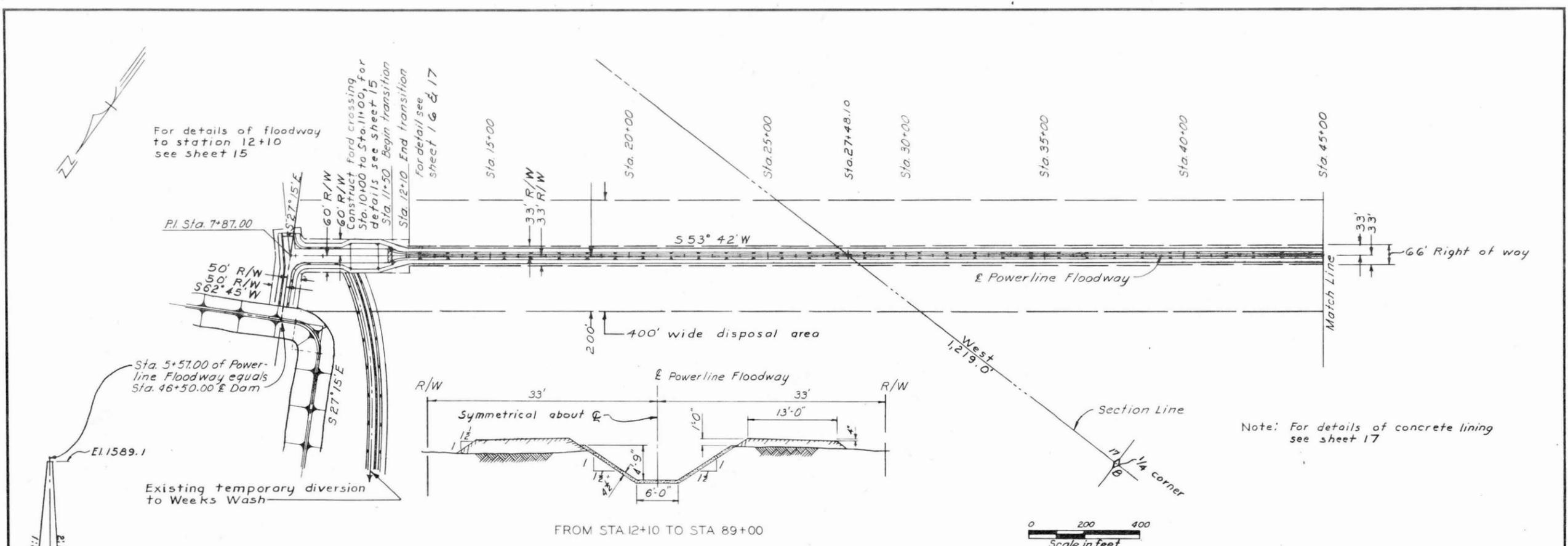


INDEX OF DRAWINGS			
APACHE JUNCTION - GILBERT W.P.P.			
MARICOPA & PINAL COUNTIES, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed	Date	Approved by	<i>E. J. [Signature]</i>
Drawn		Title	HEAD OF UNIT
Traced			<i>[Signature]</i>
Checked			STATE CONSERVATION ENGINEER
	1-67	Sheet No.	7-E-20598
		of 44	

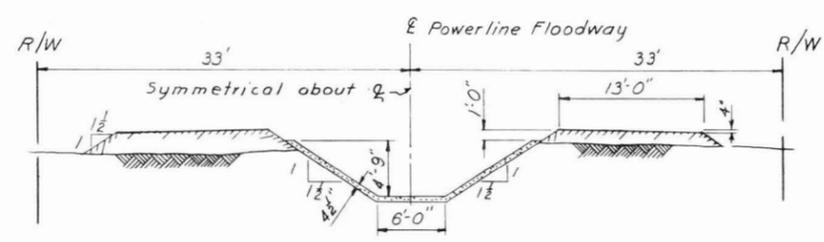
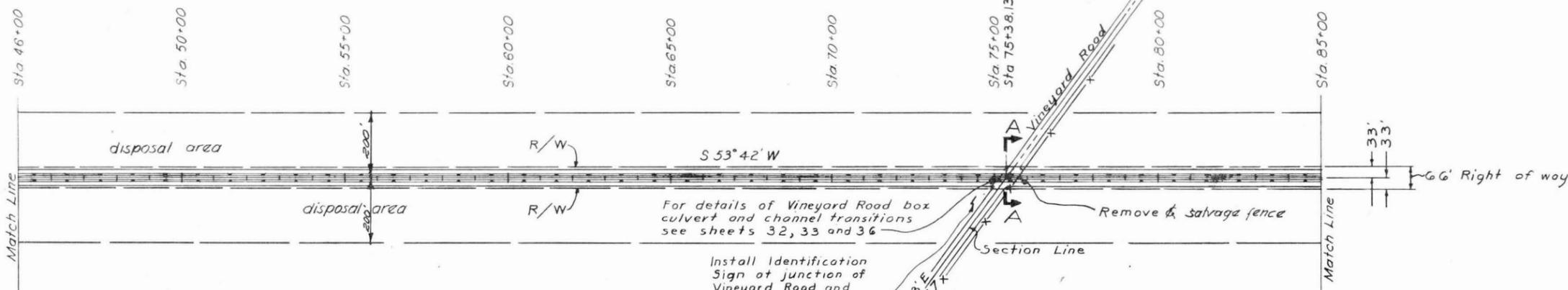


LOCATION MAP
 Scale in miles
 0 1 2 3

LOCATION MAP			
POWERLINE FLOODWAY			
APACHE JUNCTION-GILBERT W. P. P.			
MARICOPA & PINAL COUNTIES, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	GEO. WATT	Date	
Drawn	G. D. H.	2-11-66	Approved by <i>[Signature]</i> Title <i>[Signature]</i>
Traced			Title 6-10-66
Checked	<i>[Signature]</i>	1-67	Sheet No. 2 Drawing No. 7-E-20598

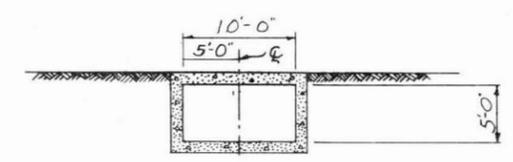


PLAN & PROFILE POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W.P.P. MARICOPA & PINAL COUNTIES, ARIZONA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed	G. W.	Date	Approved by
Drawn	G. D. H.	3-21-66	Title
Traced			Title
Checked			Sheet No. 3 of 44
			Drawing No. 7-E-20598

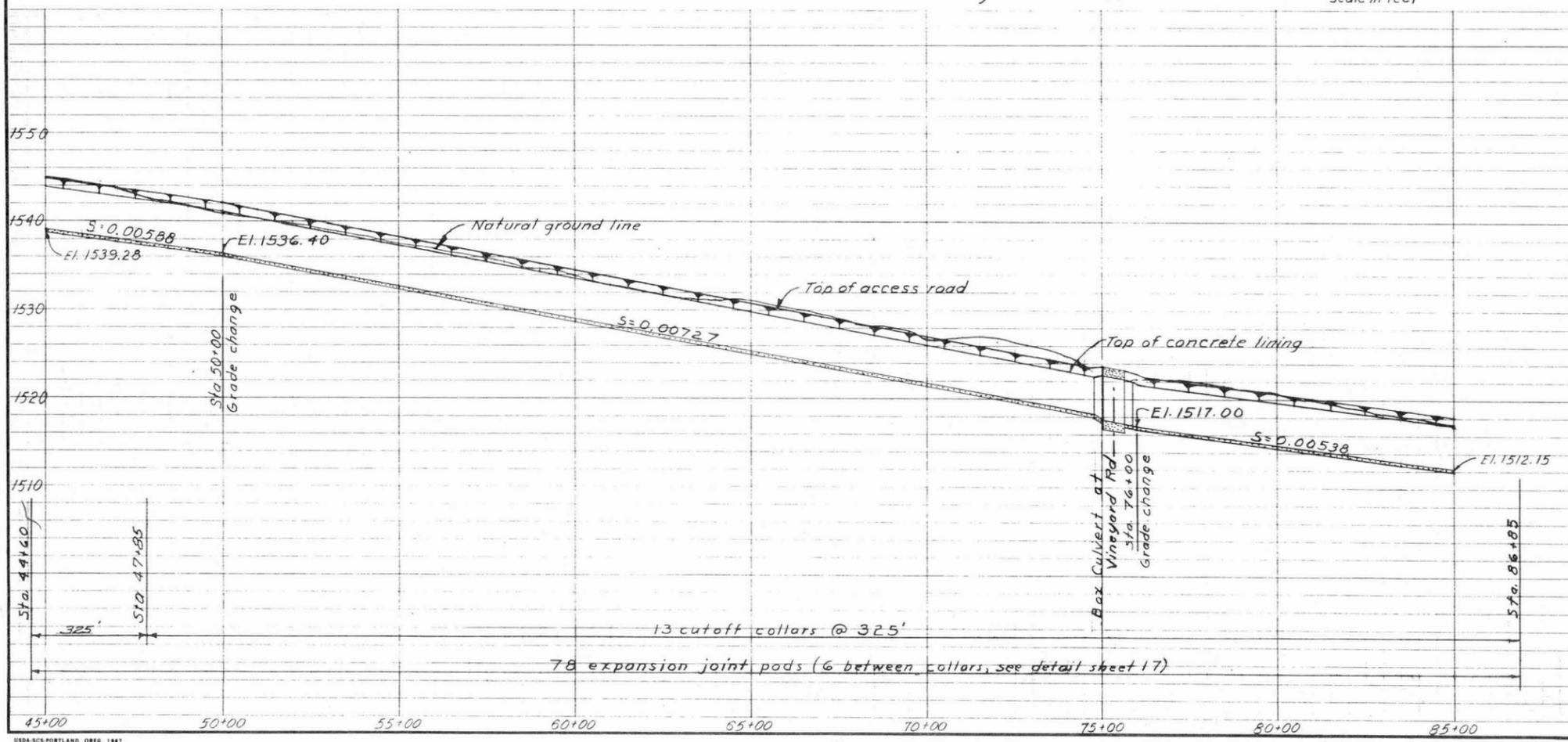


FROM STA 12+10 TO STA 89+00

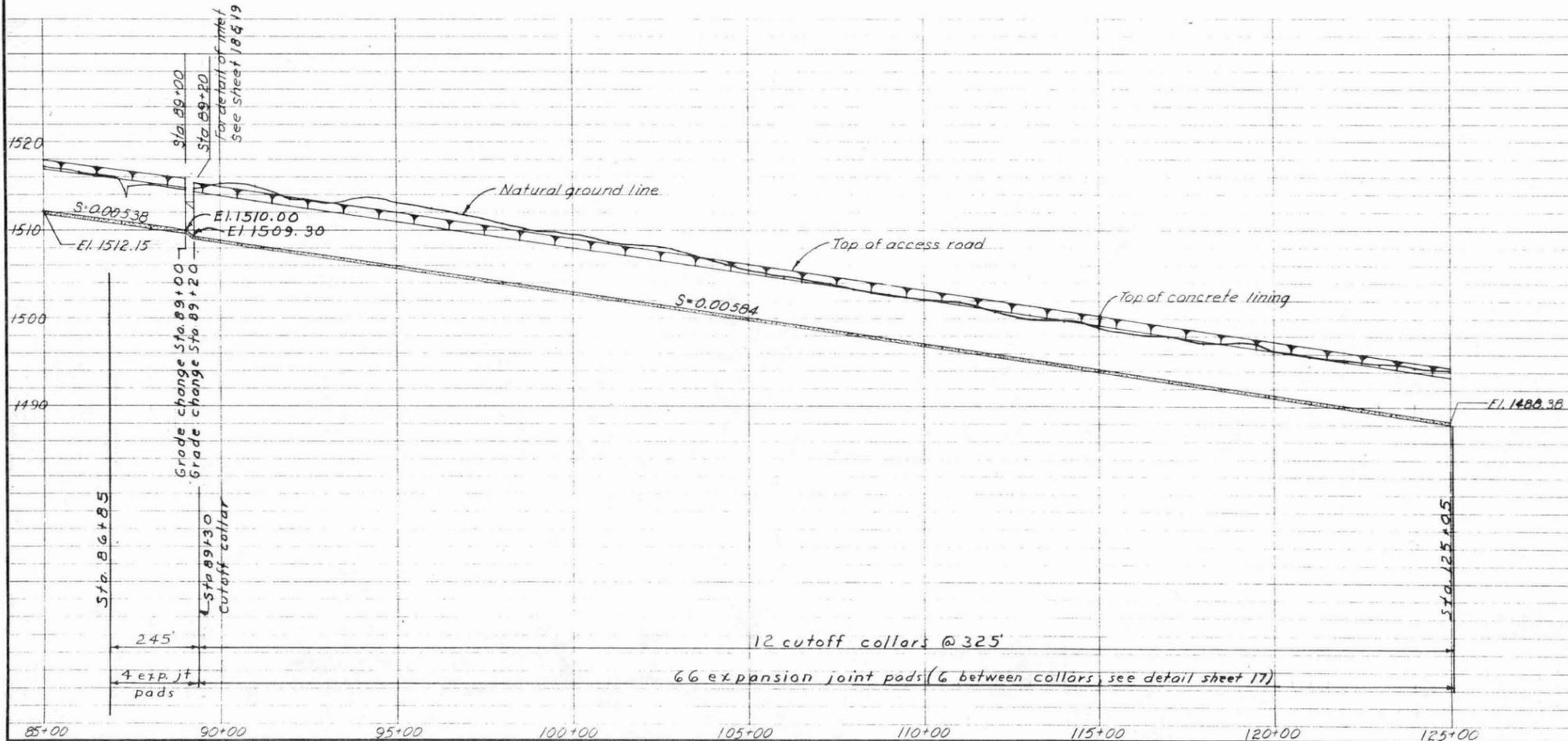
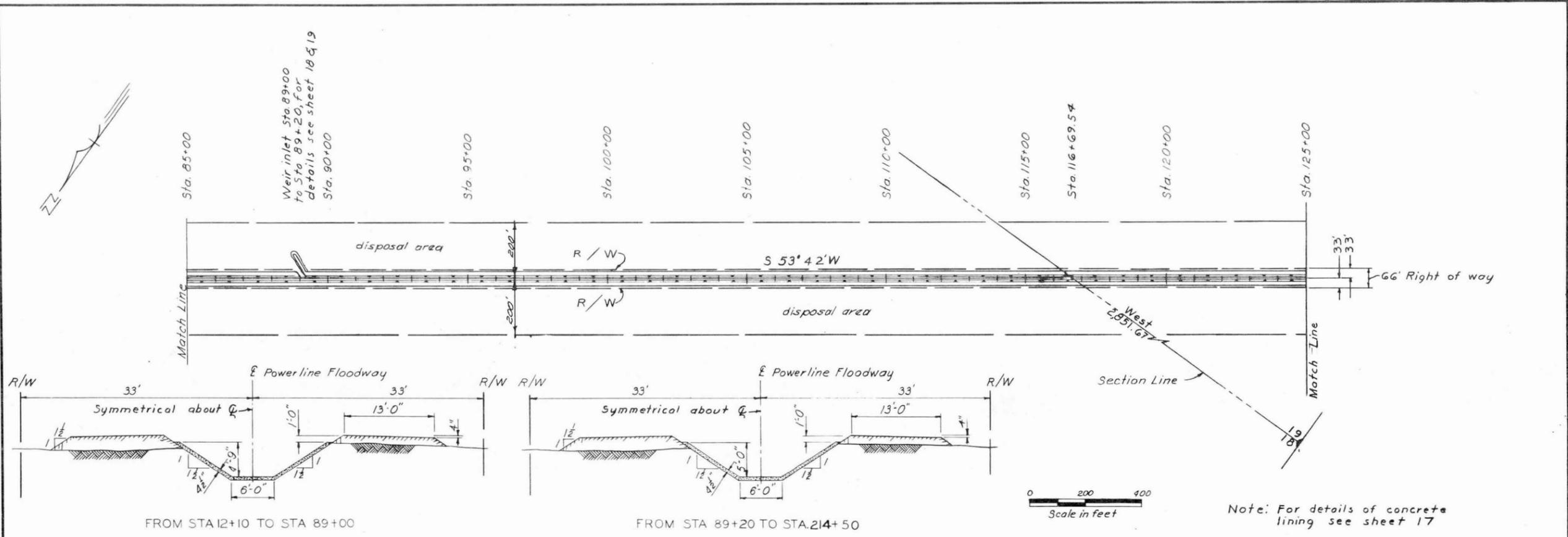
Note: For details of concrete lining see sheet 17



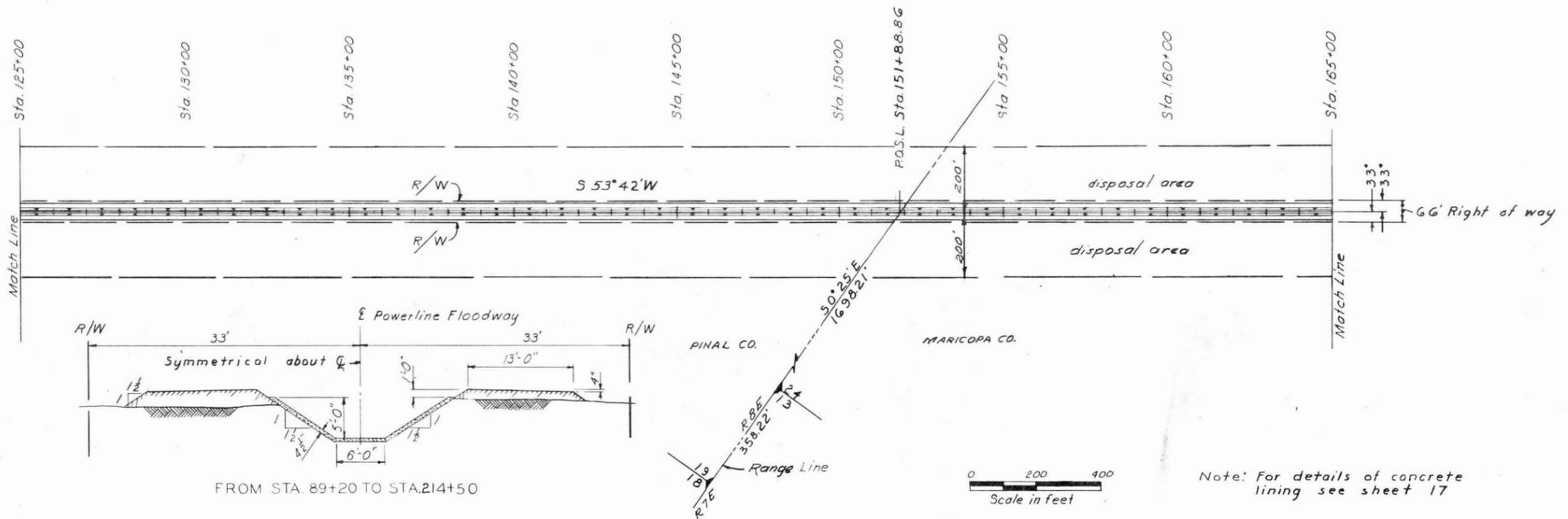
SECTION A-A (VINEYARD ROAD)



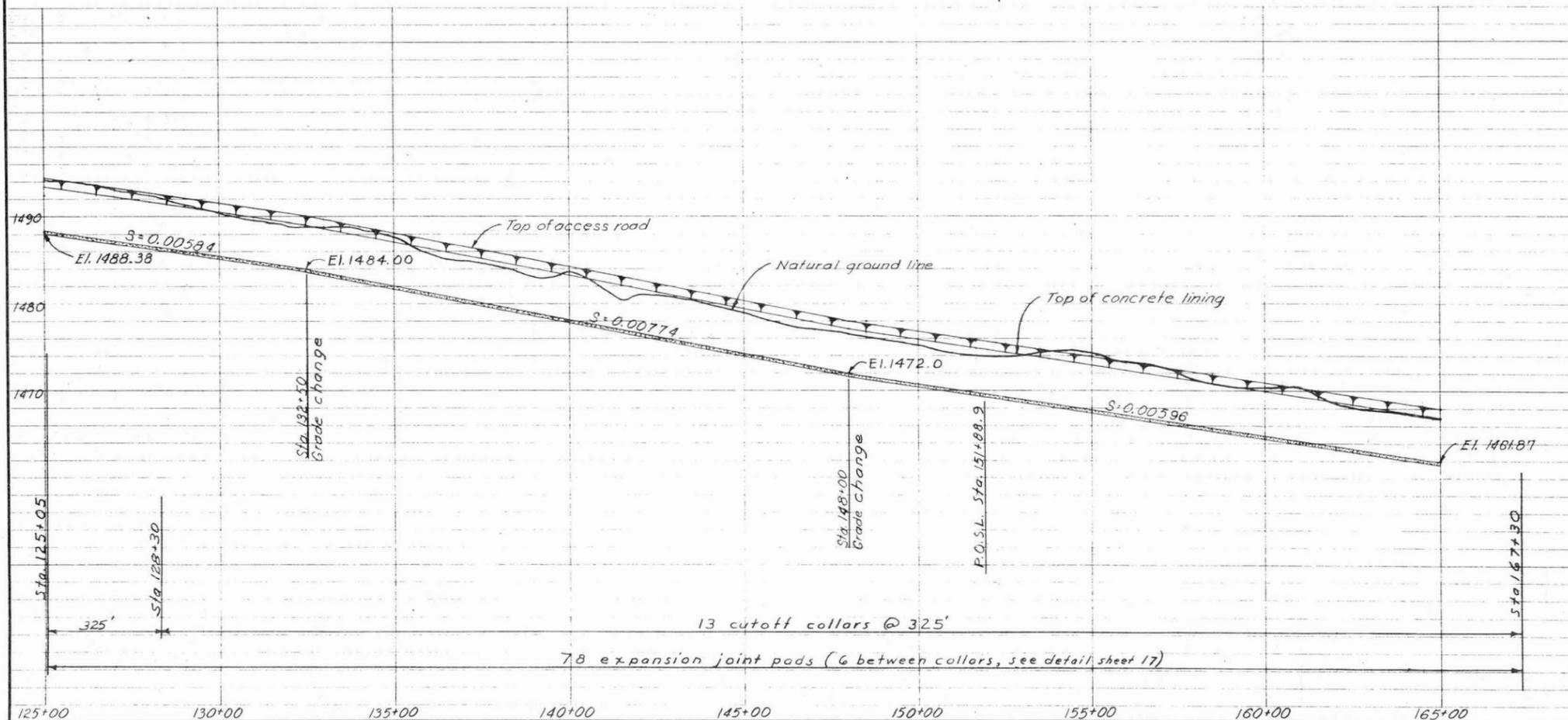
PLAN & PROFILE POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W.P.P. MARICOPA & PINAL COUNTIES, ARIZONA U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE					
Designed	G. W.	Date	3-21-66	Approved by	
Drawn	G. D. H.			Title	
Traced				Title	
Checked				Sheet No. 4 of 4	Drawing No. 7-E-20598



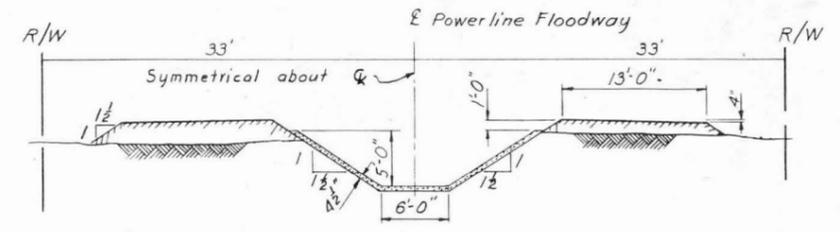
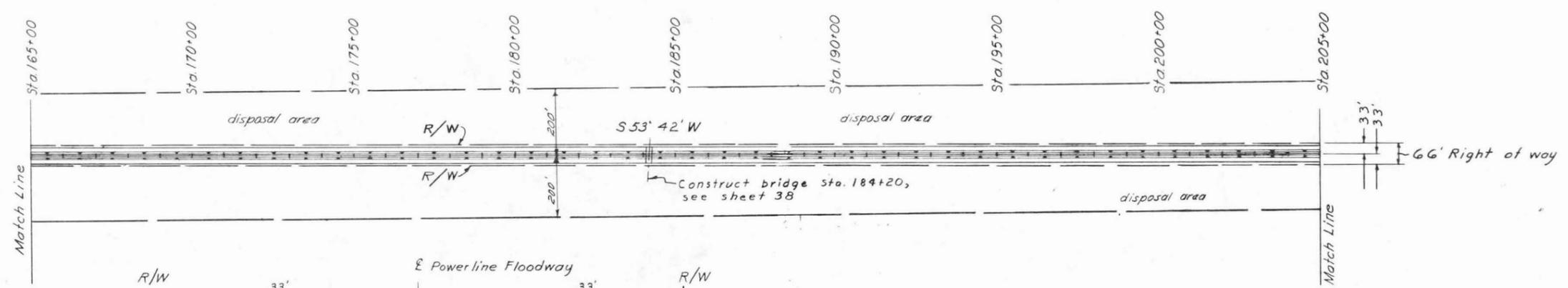
PLAN & PROFILE POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W. P. P. MARICOPA & PINAL COUNTIES, ARIZONA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed	G. W.	Date	3-21-66
Drawn	G. D. H.	Traced	
Checked		Sheet No.	5 of 44
		Drawing No.	7-E-20598



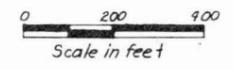
Note: For details of concrete lining see sheet 17



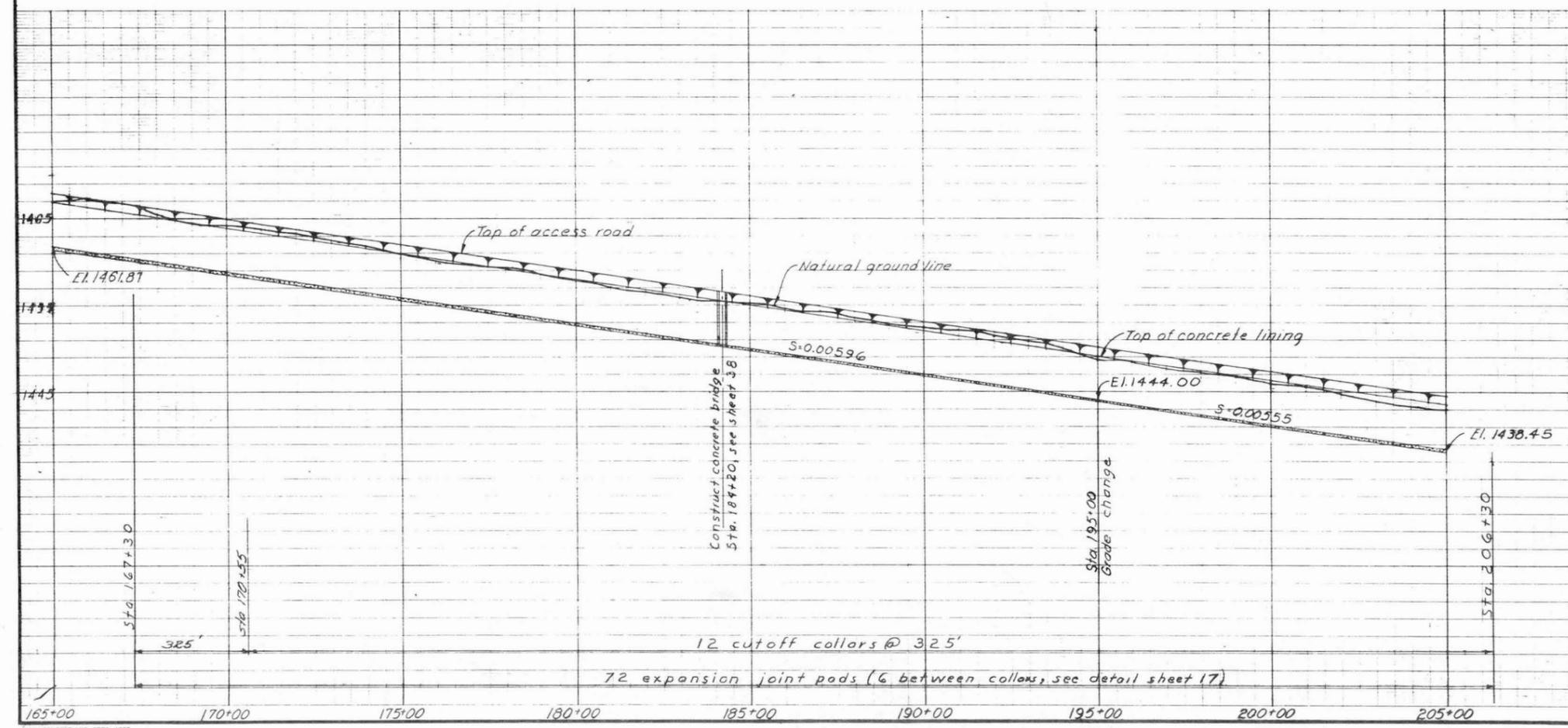
PLAN & PROFILE POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W.P.P. MARICOPA & PINAL COUNTIES, ARIZONA U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed:	G. W.	Date:	3-21-66
Drawn:	G.D.H.	Traced:	
Checked:		Sheet No.:	6 of 44
		Drawing No.:	7-E-20598



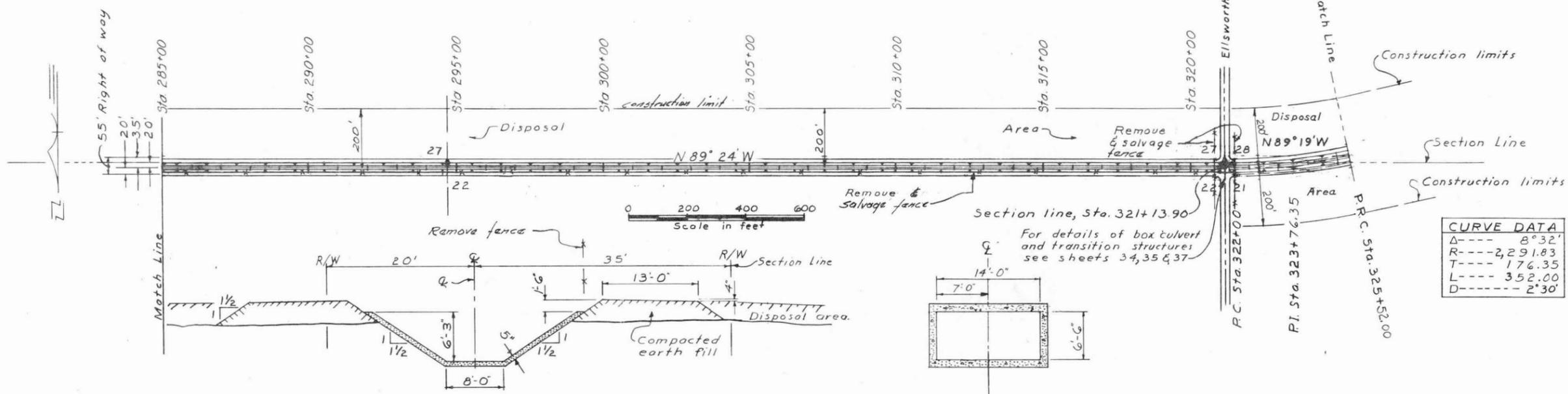
FROM STA. 89+20 TO STA. 214+50



Note: For details of concrete lining see sheet 17



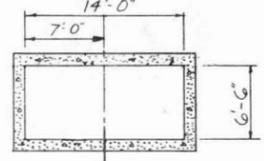
PLAN & PROFILE POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W. P. P. MARICOPA & PINAL COUNTIES, ARIZONA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE		
Designed	Date	Approved by
Drawn	G.D.H.	3-21-66
Traced		
Checked		
Sheet No. 7 of 7	Drawing No. 7-E-20598	



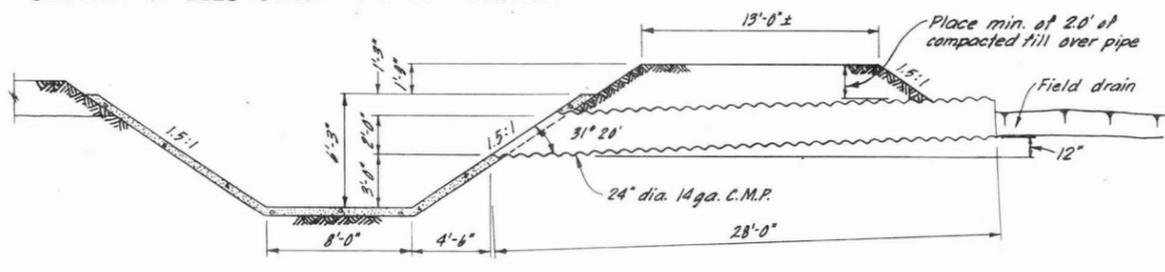
CURVE DATA	
Δ	8° 32'
R	2,291.83
T	176.35
L	352.00
D	2° 30'

NOTE: For typical section of channel upstream from Sta. 322+00 see sheet, 9 FROM STA. 322+00 TO STA. 333+00

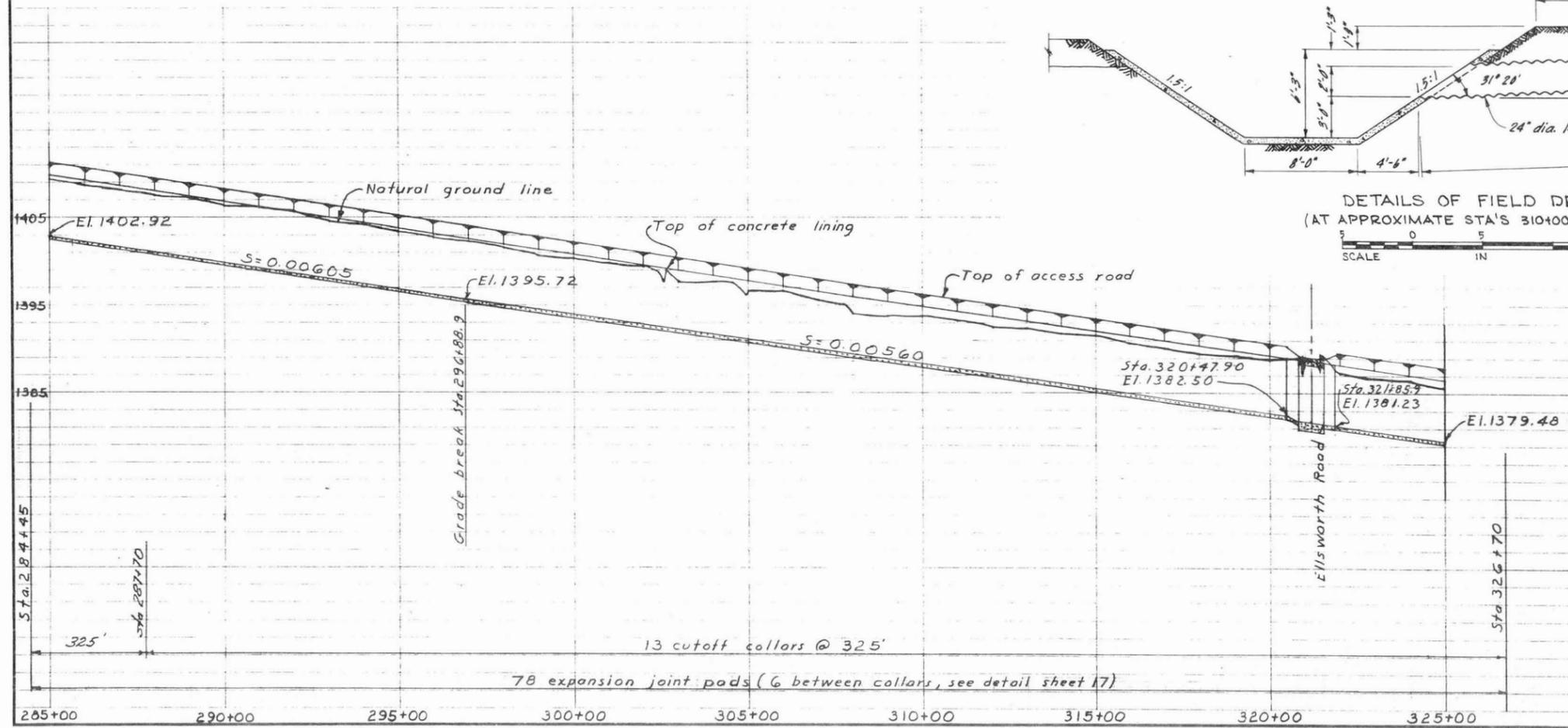
SECTION OF ELLSWORTH ROAD BOX CULVERT



Note: For details of concrete lining see sheet 17



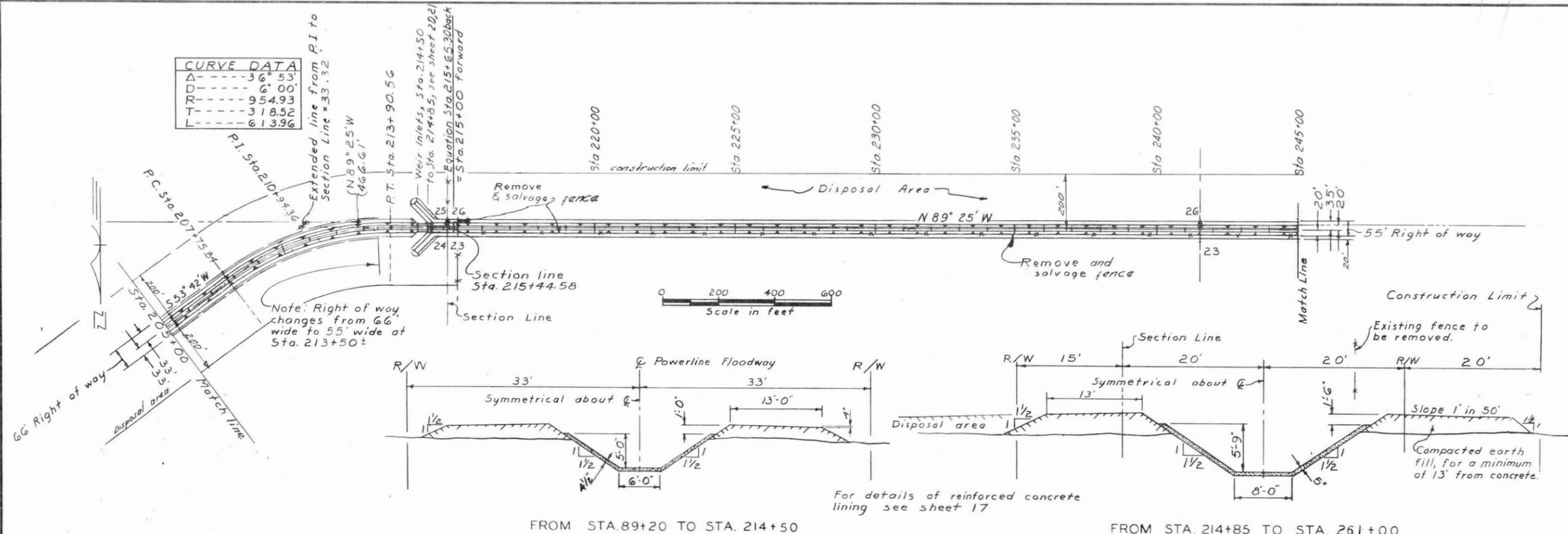
DETAILS OF FIELD DRAIN (AT APPROXIMATE STA'S 310+00 & 320+00)



PLAN & PROFILE
POWERLINE FLOODWAY
 APACHE JUNCTION - GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES, ARIZONA
 U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

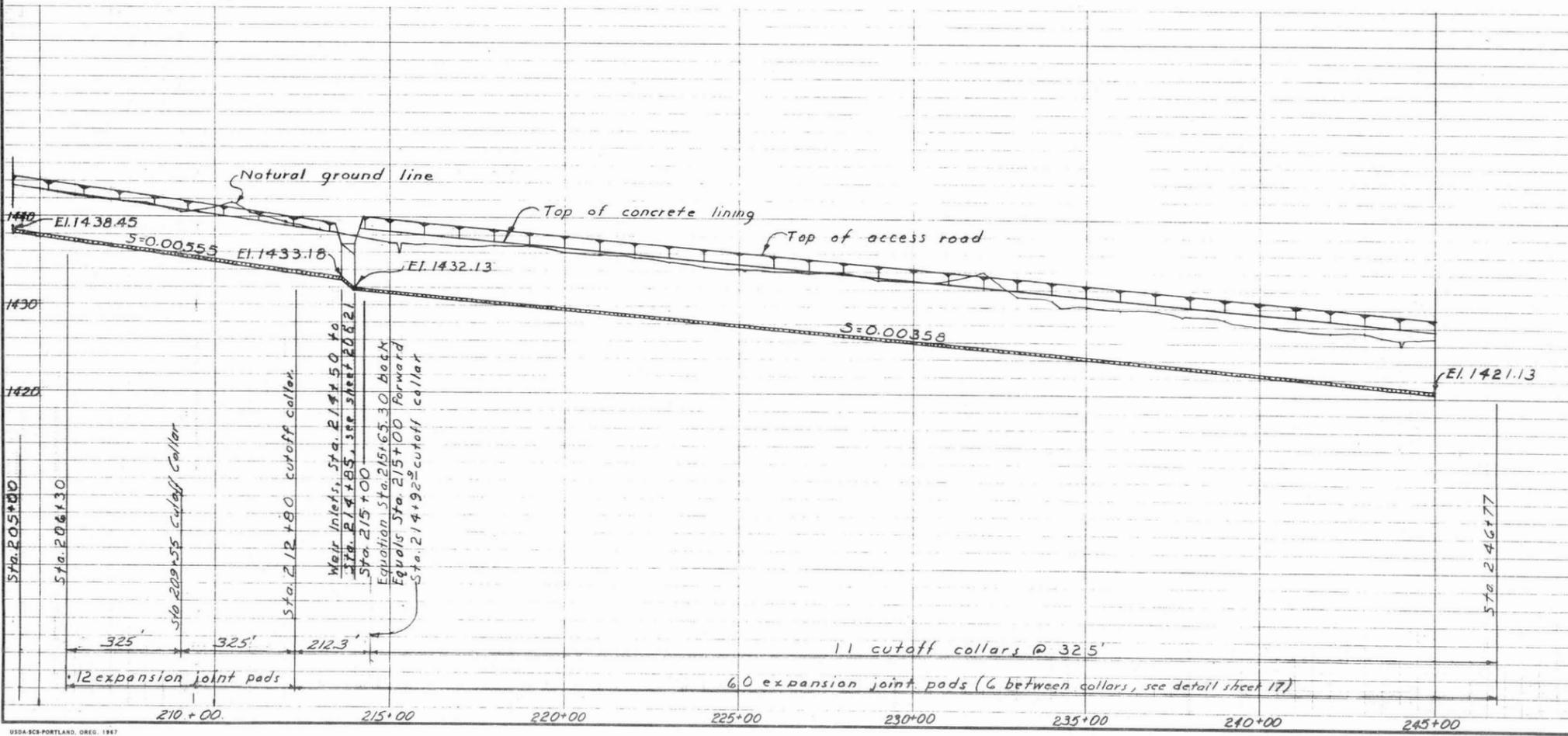
Designed	Date	Approved by
Drawn		Title
Traced		Title
Checked		Sheet No. 10 of 44
		Drawing No. 7-E-20598

CURVE DATA	
Δ	36° 53'
D	66° 00'
R	954.93
T	318.52
L	613.96



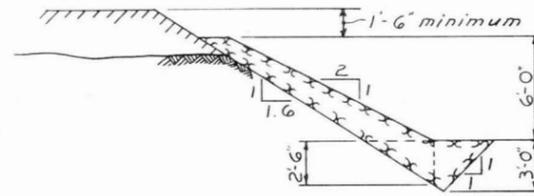
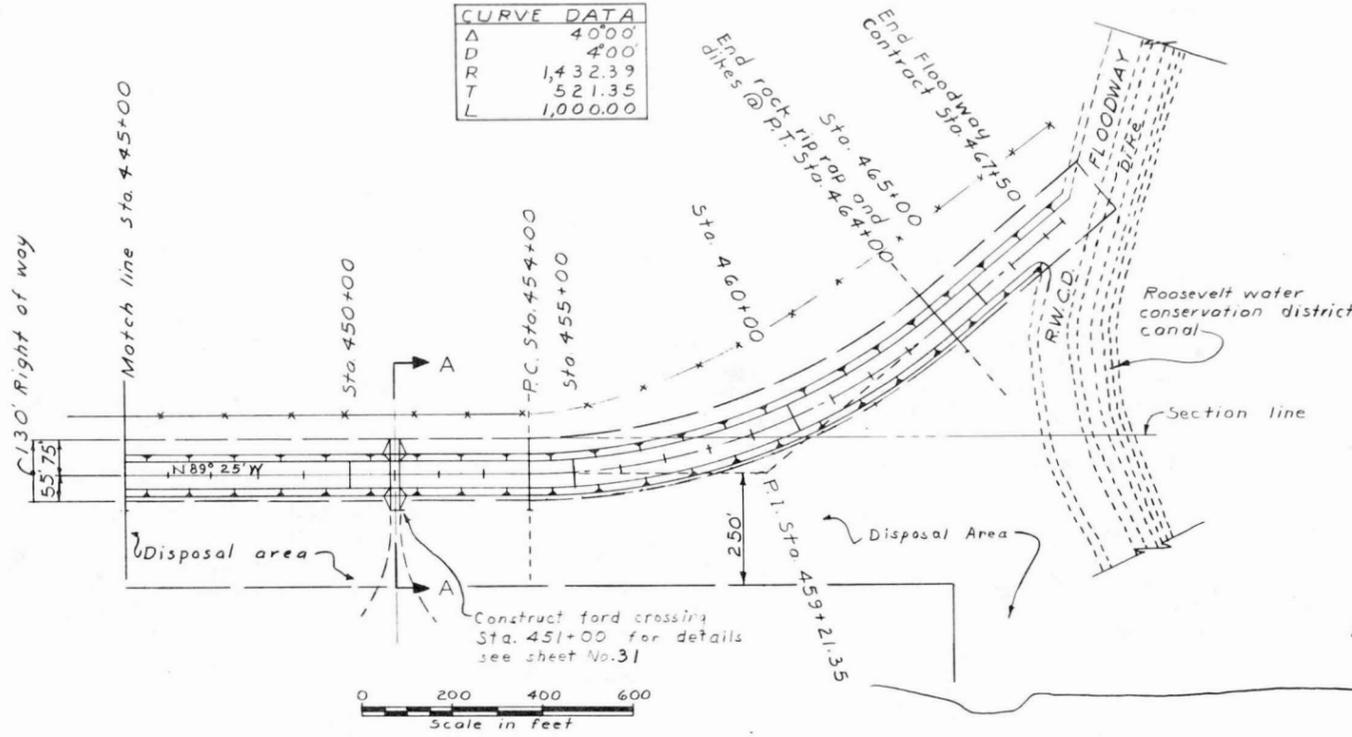
FROM STA. 89+20 TO STA. 214+50

FROM STA. 214+85 TO STA. 261+00

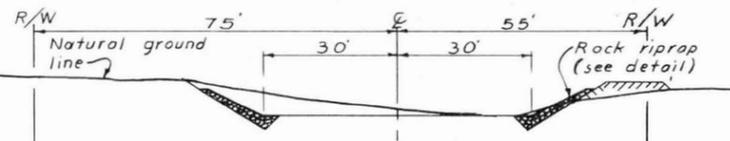


PLAN & PROFILE POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W. P. P. MARICOPA & PINAL COUNTIES, ARIZONA U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE		
Designed	Date	Approved by
Drawn	3-14-66	Title
Traced		Title
Checked		Sheet
		Drawing No.
		No. 7-E-20598
		of 49

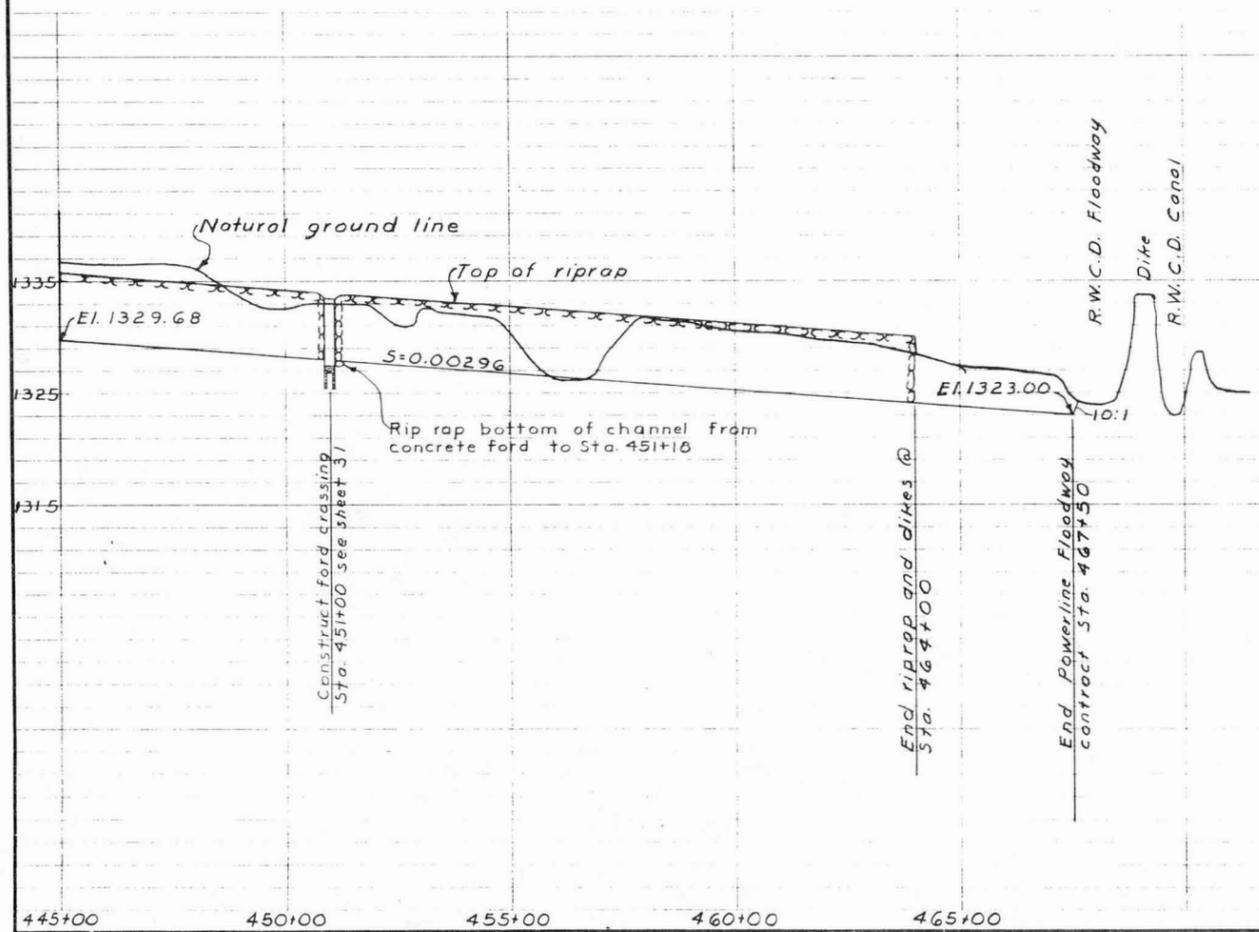
CURVE DATA	
Δ	40°00'
D	400'
R	1,432.39'
T	521.35'
L	1,000.00'



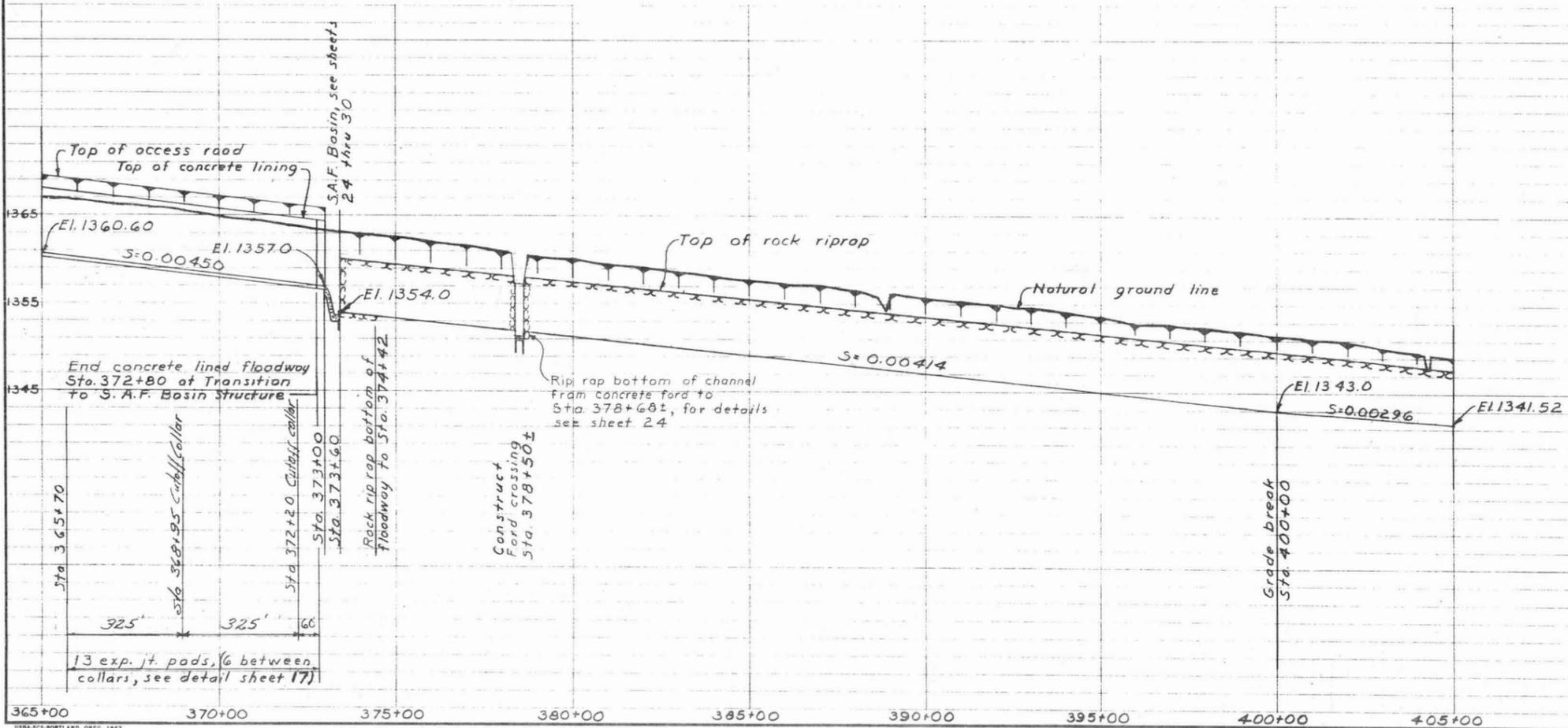
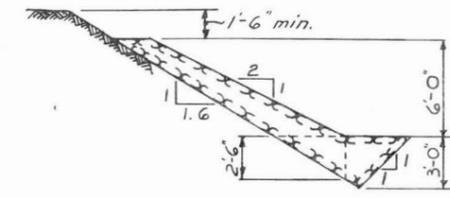
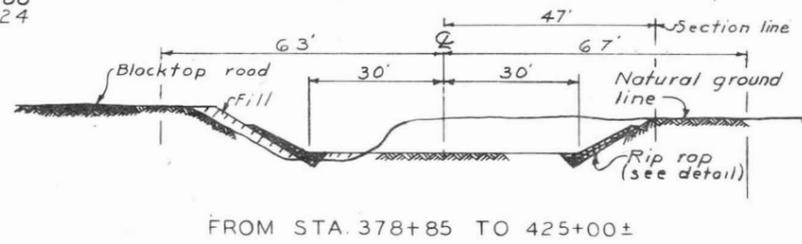
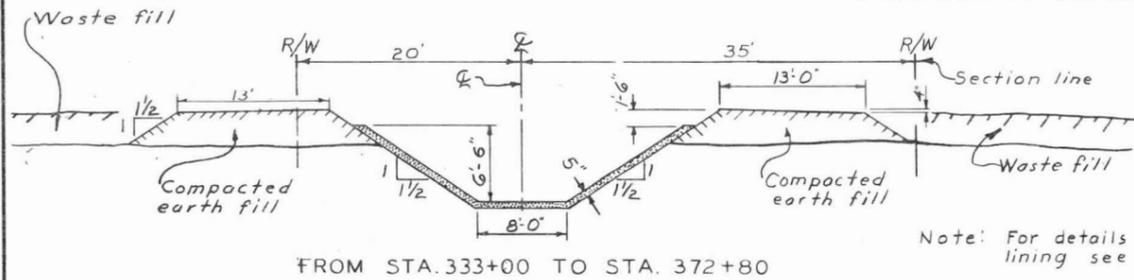
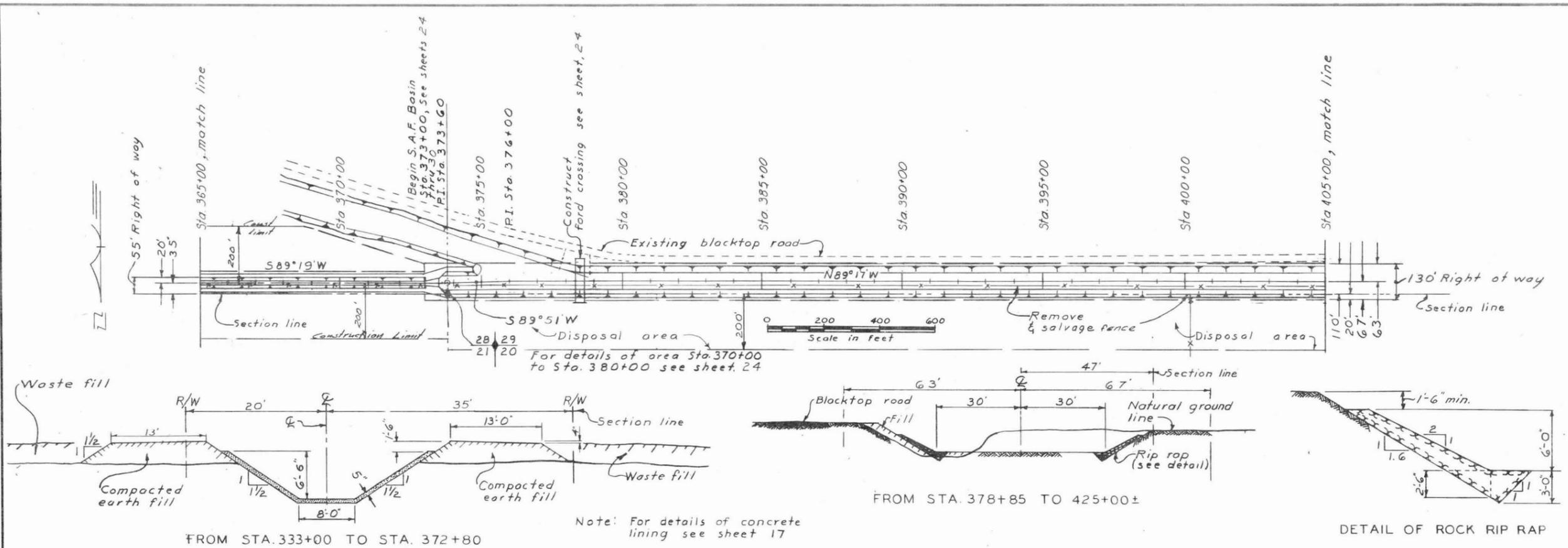
DETAIL OF ROCK RIPRAP



FROM STA. 425+00± TO END

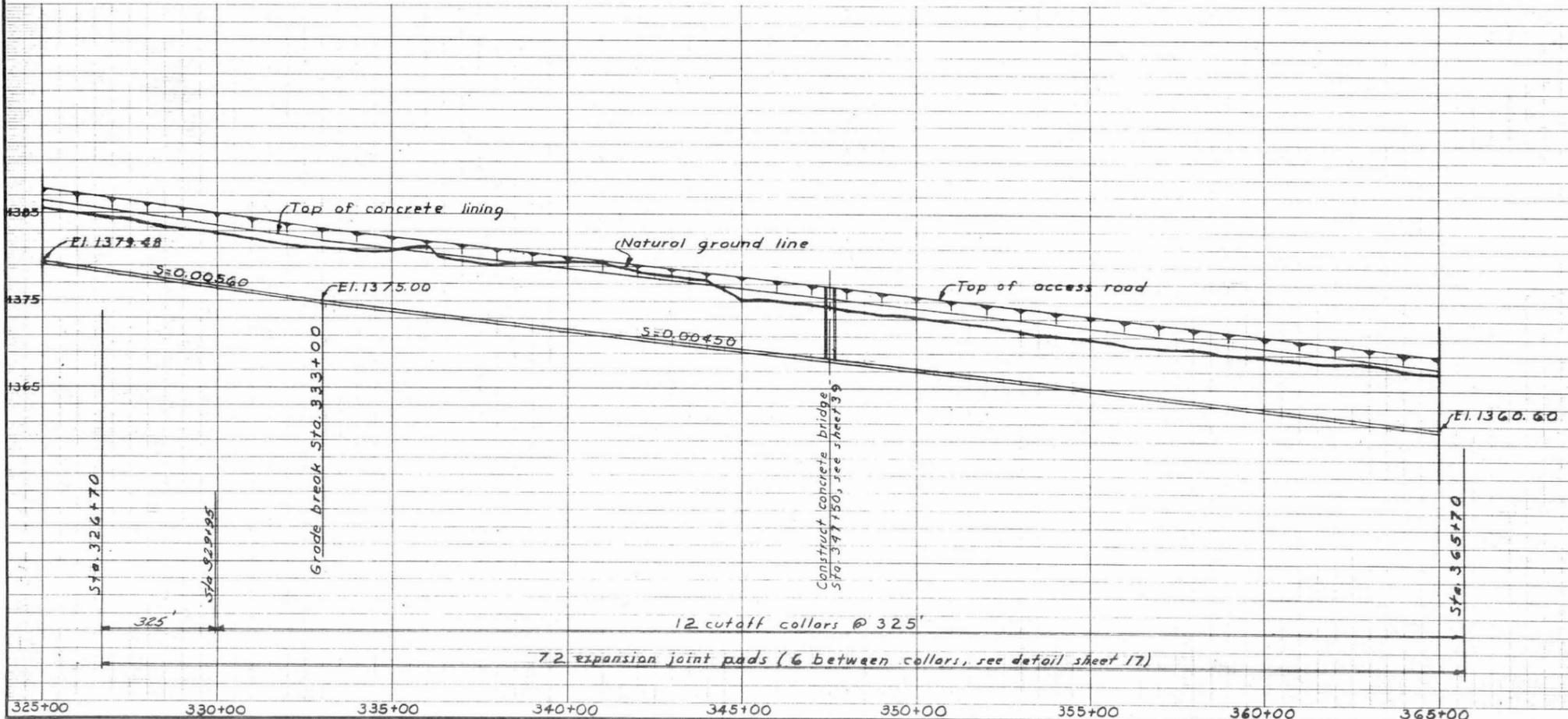
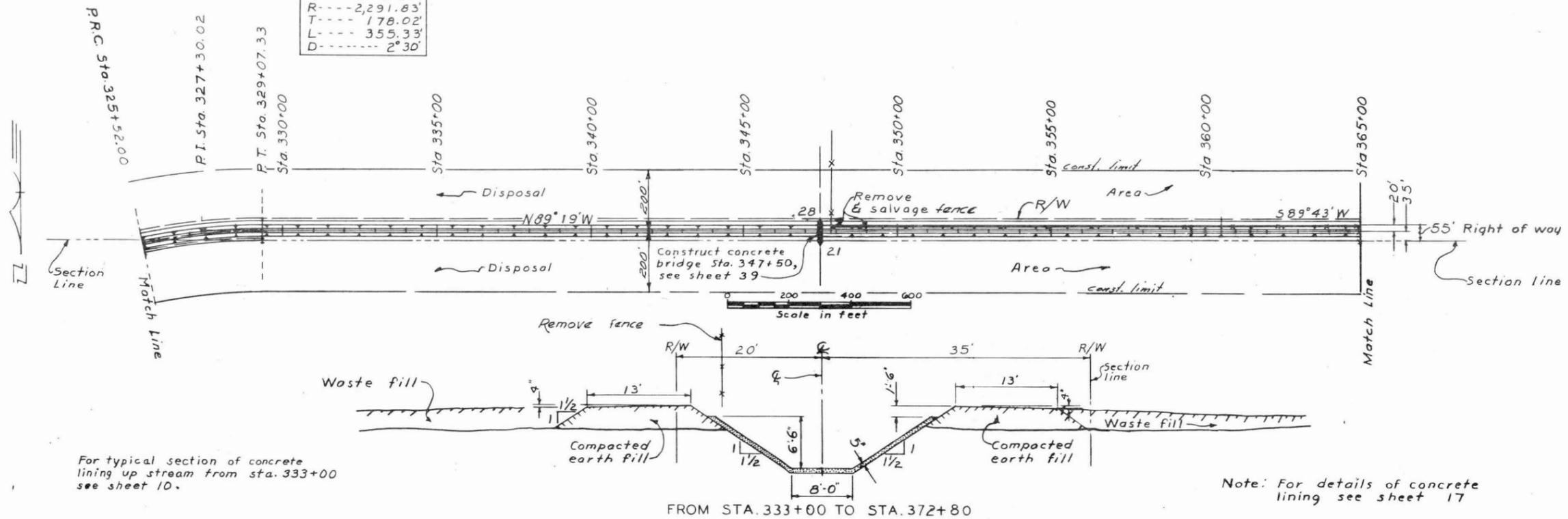


PLAN & PROFILE		
POWERLINE FLOODWAY		
APACHE JUNCTION-GILB RT W. P. P.		
MARICOPA & PINAL COUNTIES, ARIZONA		
U. S. DEPARTMENT OF AGRICULTURE		
SOIL CONSERVATION SERVICE		
Designed	Date	Approved by
Drawn		Title
G.D.H.	3-29-66	
Traced		Title
Checked		Sheet No. / Drawing No.
		1-67 / 7-E-20598

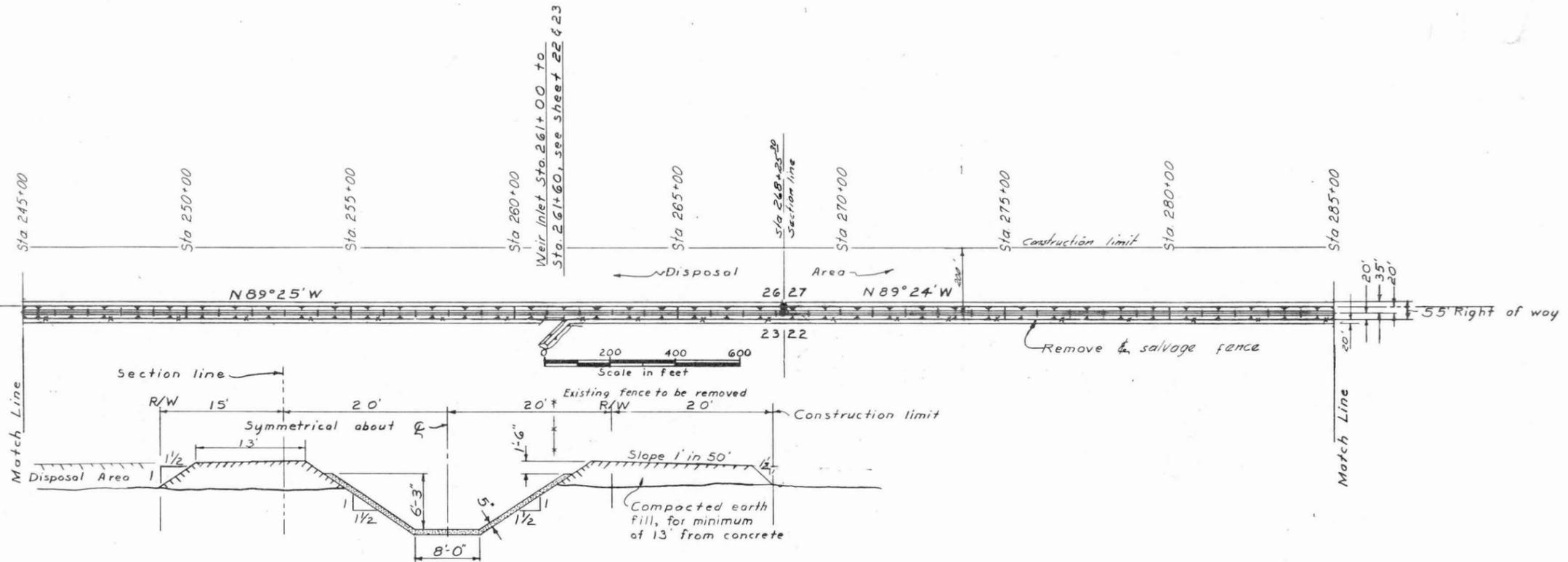


PLAN & PROFILE POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W.P.P. MARICOPA & PINAL COUNTIES, ARIZONA U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE		
Designed	Date	Approved by
Drawn	G.D.H.	3-23-66
Traced		
Checked		
Sheet No. 12 of 49	Drawing No. 7-E-20598	

CURVE DATA	
Δ	8°37'
R	2,291.83'
T	178.02'
L	355.33'
D	2°30'

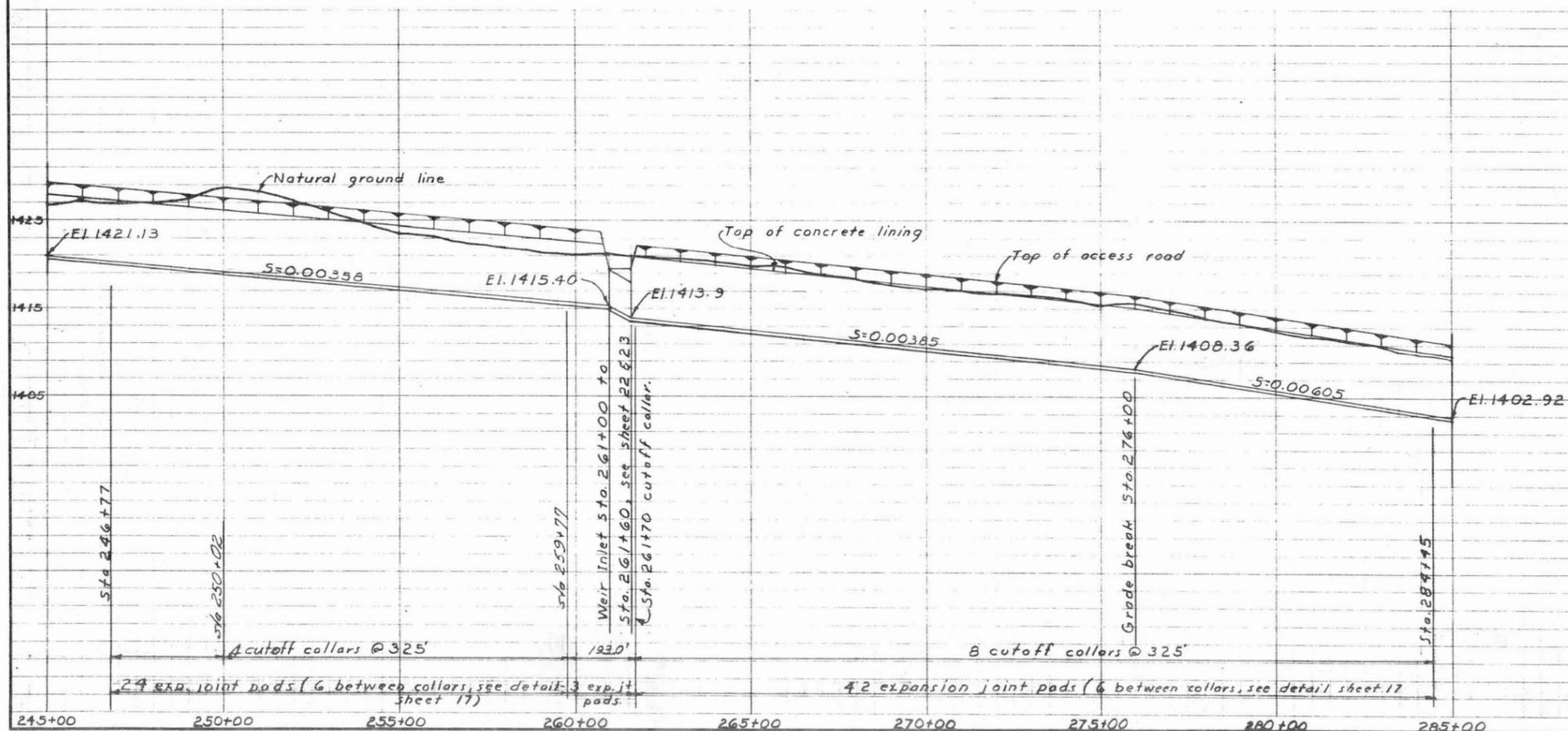


PLAN & PROFILE			
POWERLINE FLOODWAY			
APACHE JUNCTION - GILBERT W. P. P.			
MARICOPA & PINAL COUNTIES, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	Date	Approved by	
Drawn	G. D.H.	3-22-66	Title
Traced			Title
Checked			Title
Sheet No. 11	Drawing No.	7-E-20598	

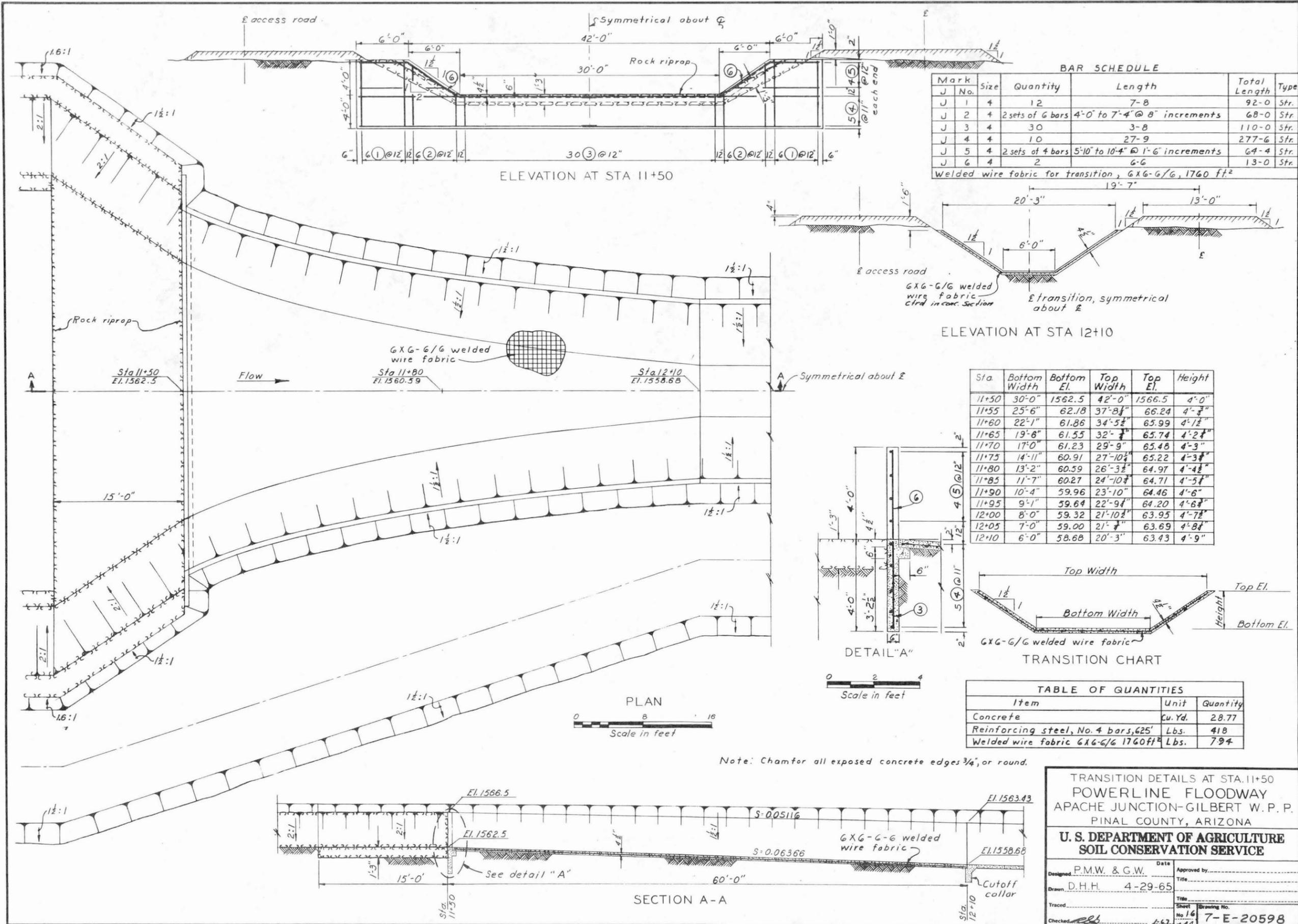


FROM STA. 261+60 TO STA. 322+00

Note: For details of concrete lining see sheet 17



PLAN & PROFILE POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W.P.P. MARICOPA & PINAL COUNTIES, ARIZONA U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed	G. W.	Date	Approved by
Drawn	G.D.H.	3-16-66	Title
Traced			Title
Checked			Sheet No. 9 of 34
			Drawing No. 7-E-20598



BAR SCHEDULE

Mark	Size	Quantity	Length	Total Length	Type
J 1	4	12	7-8	92-0	Str.
J 2	4	2 sets of 6 bars	4'-0" to 7'-4" @ 8" increments	68-0	Str.
J 3	4	30	3-8	110-0	Str.
J 4	4	10	27-9	277-6	Str.
J 5	4	2 sets of 4 bars	5'-10" to 10'-4" @ 1'-6" increments	64-4	Str.
J 6	4	2	6-6	13-0	Str.

Welded wire fabric for transition, 6X6-G/6, 1760 ft²

Sta	Bottom Width	Bottom El.	Top Width	Top El.	Height
11+50	30'-0"	1562.5	42'-0"	1566.5	4'-0"
11+55	25'-6"	62.18	37'-8"	66.24	4'-3"
11+60	22'-1"	61.86	34'-5"	65.99	4'-1"
11+65	19'-8"	61.55	32'-3"	65.74	4'-2"
11+70	17'-0"	61.23	29'-9"	65.48	4'-3"
11+75	14'-11"	60.91	27'-10"	65.22	4'-3"
11+80	13'-2"	60.59	26'-3"	64.97	4'-4"
11+85	11'-7"	60.27	24'-10"	64.71	4'-5"
11+90	10'-4"	59.96	23'-10"	64.46	4'-6"
11+95	9'-1"	59.64	22'-9"	64.20	4'-6"
12+00	8'-0"	59.32	21'-10"	63.95	4'-7"
12+05	7'-0"	59.00	21'-7"	63.69	4'-8"
12+10	6'-0"	58.68	20'-3"	63.43	4'-9"

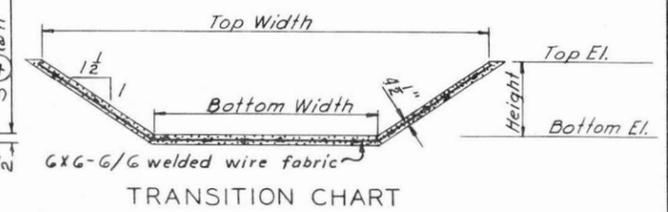


TABLE OF QUANTITIES

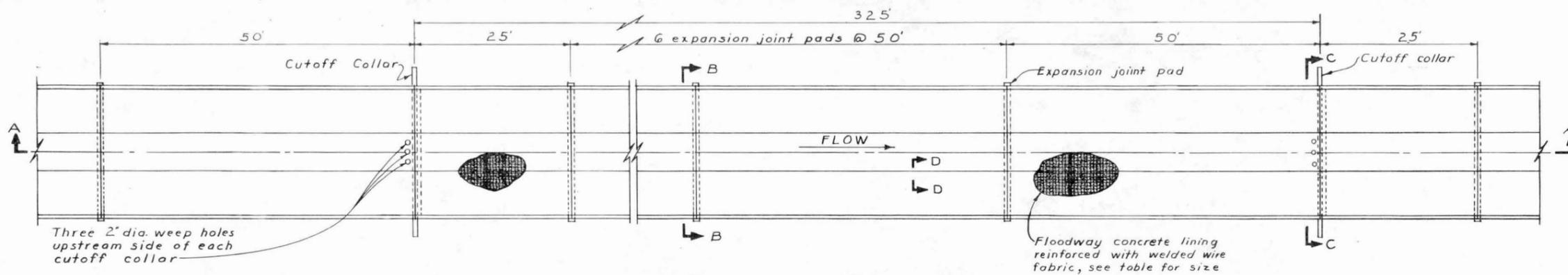
Item	Unit	Quantity
Concrete	Cu. Yd.	28.77
Reinforcing steel, No. 4 bars, 625'	Lbs.	418
Welded wire fabric 6X6-G/6 1760ft ²	Lbs.	794

Note: Chamfer all exposed concrete edges 3/4" or round.

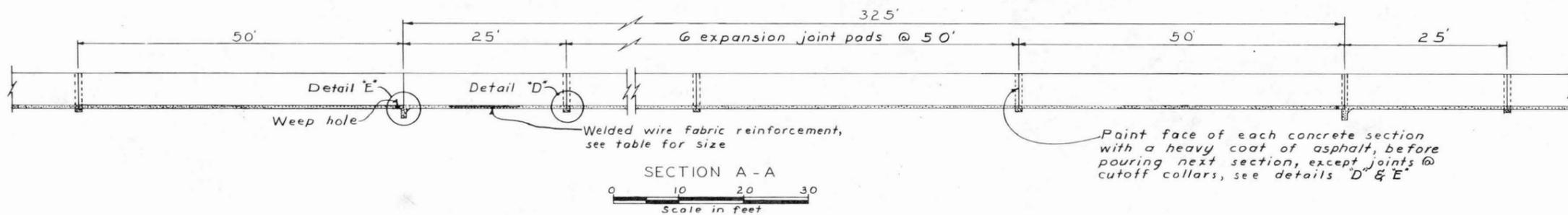
TRANSITION DETAILS AT STA. 11+50
POWERLINE FLOODWAY
APACHE JUNCTION-GILBERT W. P. P.
PINAL COUNTY, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE**

Designed: P.M.W. & G.W.	Date: _____	Approved by: _____
Drawn: D.H.H.	4-29-65	Title: _____
Traced: _____	_____	_____
Checked: <i>elb</i>	4-27	Sheet No. 16 of 44
		Drawing No. 7-E-20598

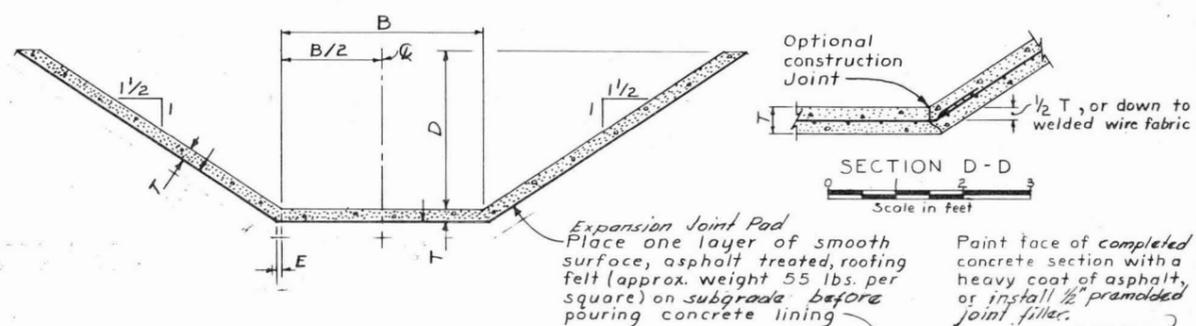


TYPICAL SECTION-PLAN OF CONCRETE LINING



SECTION A - A

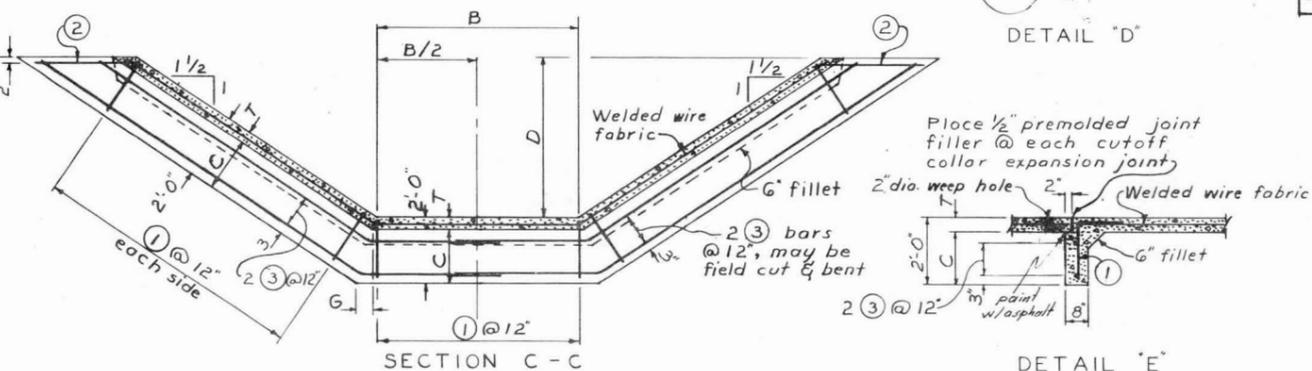
Scale in feet



SECTION B - B

SECTION D - D

Paint face of completed concrete section with a heavy coat of asphalt, or install 1/2" premolded joint filler.



SECTION C - C

DETAIL D

Scale in feet

TABLE OF DIMENSIONS FOR LINING AND APPURTENANCES

Location Station to Station	Description	Elevation From To	B	C	D	E	G	T	Welded wire fabric size
12+10 89+00	Concrete Lined Floodway	1558.68 - 1510.0	6-0	1-7/2	4-9	0-1 3/8	0-5/8	0-4 1/2	6 X 6 - 6/6
@ 75+36.13	Vineyard Road Bridge	1518.0	6-0		4-9				6 X 6 - 6/6
89+00 89+20	Weir Inlet	1510.0 - 1509.3							6 X 6 - 6/6
89+20 214+50	Concrete Lined Channel	1509.3 - 1433.18	6-0	1-7/2	5-0	0-1 3/8	0-5/8	0-4 1/2	6 X 6 - 6/6
214+50 214+85	Weir Inlet	1433.18 - 1432.13							6 X 6 - 5/5
214+85 261+00	Concrete Lined Channel	1432.13 - 1415.4	8-0	1-7	5-9	0-1 1/2	0-5/4	0-5	6 X 6 - 5/5
261+00 261+60	Weir Inlet	1415.4 - 1413.9							6 X 6 - 5/5
261+60 333+00	Concrete Lined Channel	1413.9 - 1375.0	8-0	1-7	6-3	0-1 1/2	0-5/4	0-5	6 X 6 - 5/5
321+00 321+20	Ellsworth Road Bridge	1383.2	8-0		6-3				6-6 - 5/5
333+00 372+80	Concrete Lined Channel	1375.0 - 1357.0	8-0	1-7	6-6	0-1 1/2	0-5/4	0-5	6-6 - 5/5

CUTOFF COLLAR BAR SCHEDULE

Mark	Size	Quantity	Length	Total Length	Type	A	B
K 1	4	3,334	2-6	8,335-0	2	1-3	1-3
K 2	4	228	3-0	684-0	Str		
K 3	4	456	Varies	7,540-0	19		

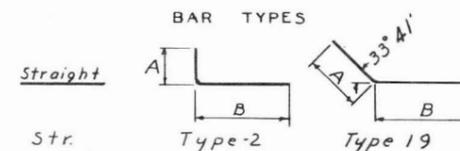
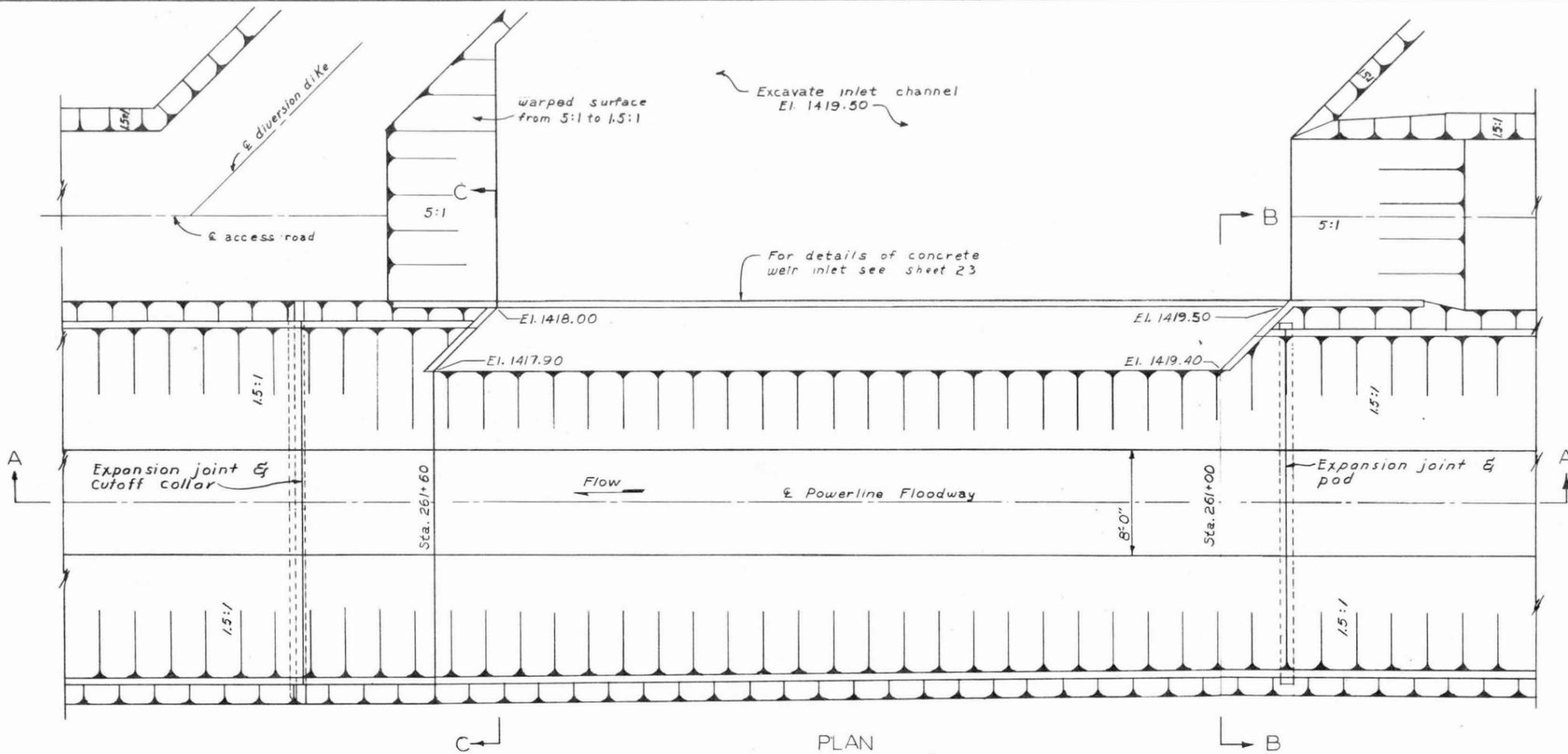


TABLE OF QUANTITIES

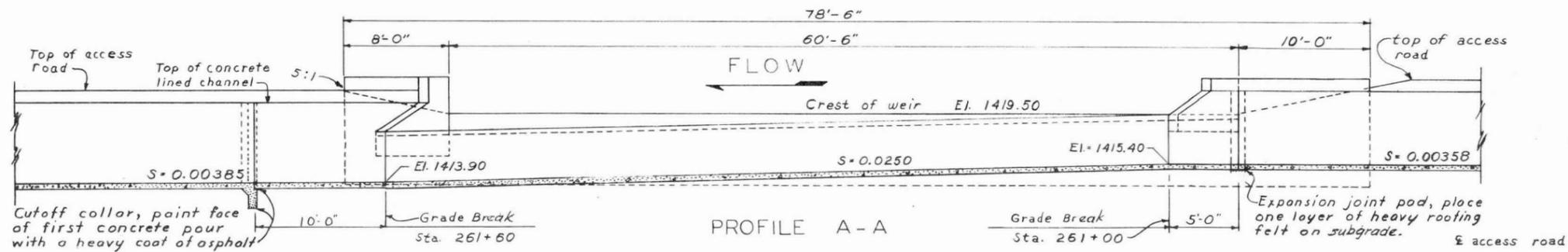
Item (location or size)	Unit	Quantity
Concrete, Floodway Lining	Cu.Yd.	14,812.40
Concrete, Expansion Jt. Pads	Cu.Yd.	348.88
Concrete, Cutoff Collars	Cu.Yd.	156.71
Welded Wire Fabric, 6X6, 5/5	Lbs.	326,902
Welded Wire Fabric, 6X6, 6/6	Lbs.	223,883
Reinforcing Bars	Lbs.	11,062

DETAILS OF CONCRETE LINED CHANNEL
POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES, ARIZONA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

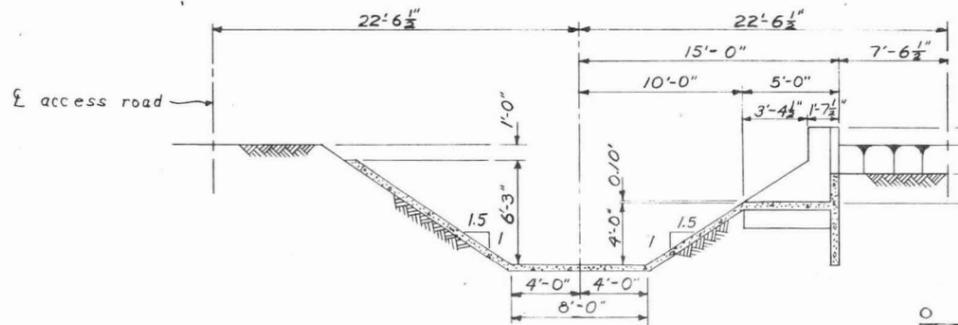
Designed: G.W. Date: _____ Approved by: _____
 Drawn: G.D.H. 5-16-66 Title: _____
 Traced: _____ Title: _____
 Checked: _____ L.K.T. No. 7 Drawing No. 7-E-20598
 of 4



PLAN



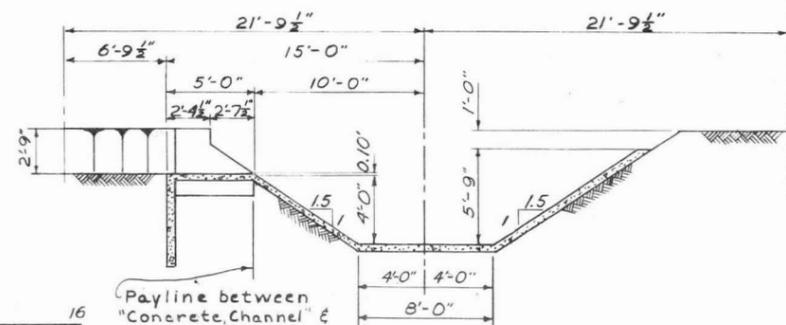
PROFILE A-A



SECTION C-C

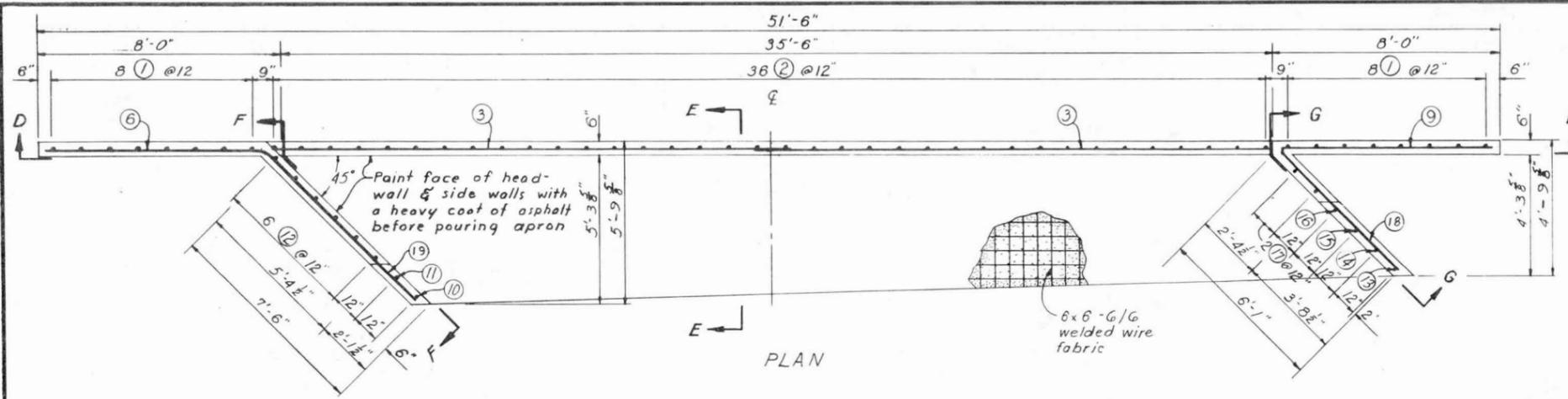


Scale in feet



SECTION B-B

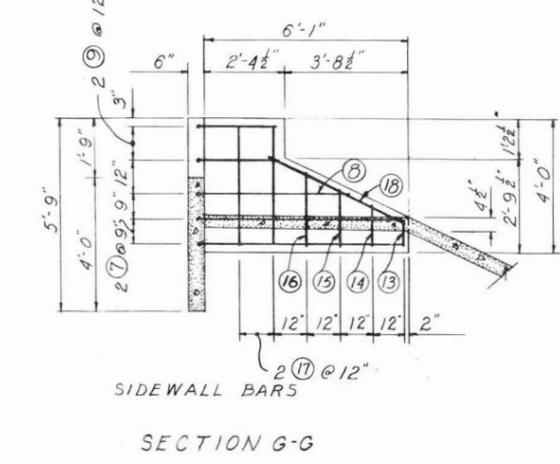
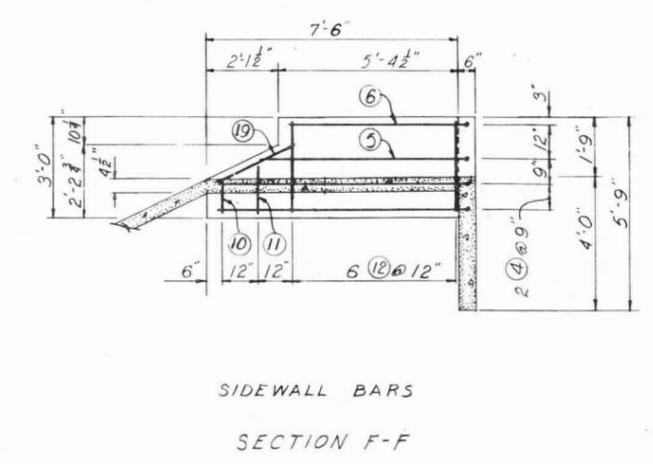
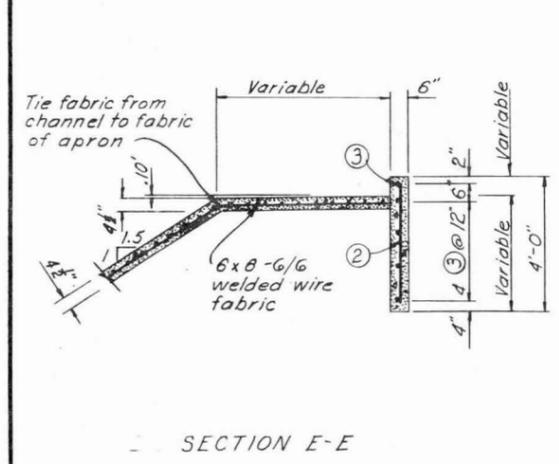
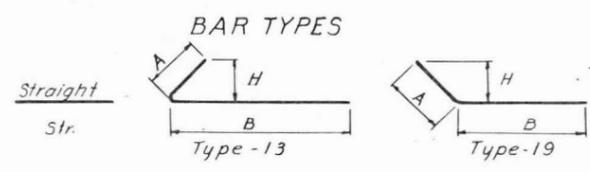
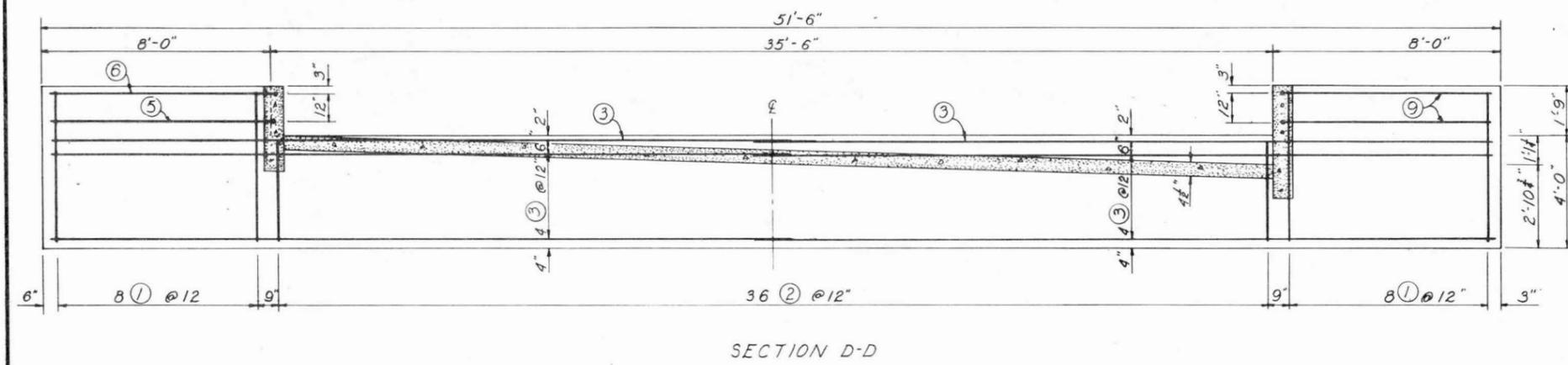
WEIR INLET STATION 261+00	
POWERLINE FLOODWAY APACHE JUNCTION-GILBERT W.P.P. MARICOPA & PINAL COUNTIES, ARIZ.	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed: GW	Date: _____
Drawn: DHF	Approved by: _____
Traced: _____	Title: _____
Checked: _____	Sheet: 22 of 44
	Drawing No. 7-E-20598



BAR SCHEDULE

Mark	Size	Quantity	Length	Total Length	Type	A	B	H
E 1	4	32	5-3	168-0	Str.			
E 2	4	72	3-8	252-0	Str.			
E 3	4	20	26-6	530-0	Str.			
E 4	4	4	9-3	37-0	19	1-9	7-6	1-3
E 5	4	2	13-6	27-0	19	6-0	7-6	4-5
E 6	4	2	13-0	26-0	19	5-6	7-6	3-10 1/2
E 7	4	4	7-9	31-0	13	1-9	6-0	1-3
E 8	4	2	11-9	23-6	13	4-3	7-6	3-0
E 9	4	4	9-9	39-0	13	2-3	7-6	1-7
E 10	4	2	1-0	2-0	Str.			
E 11	4	2	1-6	3-0	Str.			
E 12	4	12	2-6	30-0	Str.			
E 13	4	2	0-9	1-6	Str.			
E 14	4	2	1-3	2-6	Str.			
E 15	4	2	1-9	3-6	Str.			
E 16	4	2	2-3	4-6	Str.			
E 17	4	4	3-6	14-0	Str.			
E 18	4	2	4-6	9-0	Str.			
E 19	4	2	2-6	5-0	Str.			

6x6-G/G welded wire fabric 340 sq'



- Notes:**
- All exposed concrete edges shall be chamfered 3/4", or rounded.
 - All bar dimensions are out to out of bar.
 - Radius of bends equals seven times the bar diameter.
 - Sidewalls and headwall may be poured monolithically and the apron poured last.
 - Structure shown is the left weir inlet, the right inlet is identical.
 - Quantities given are for the two weir inlets.



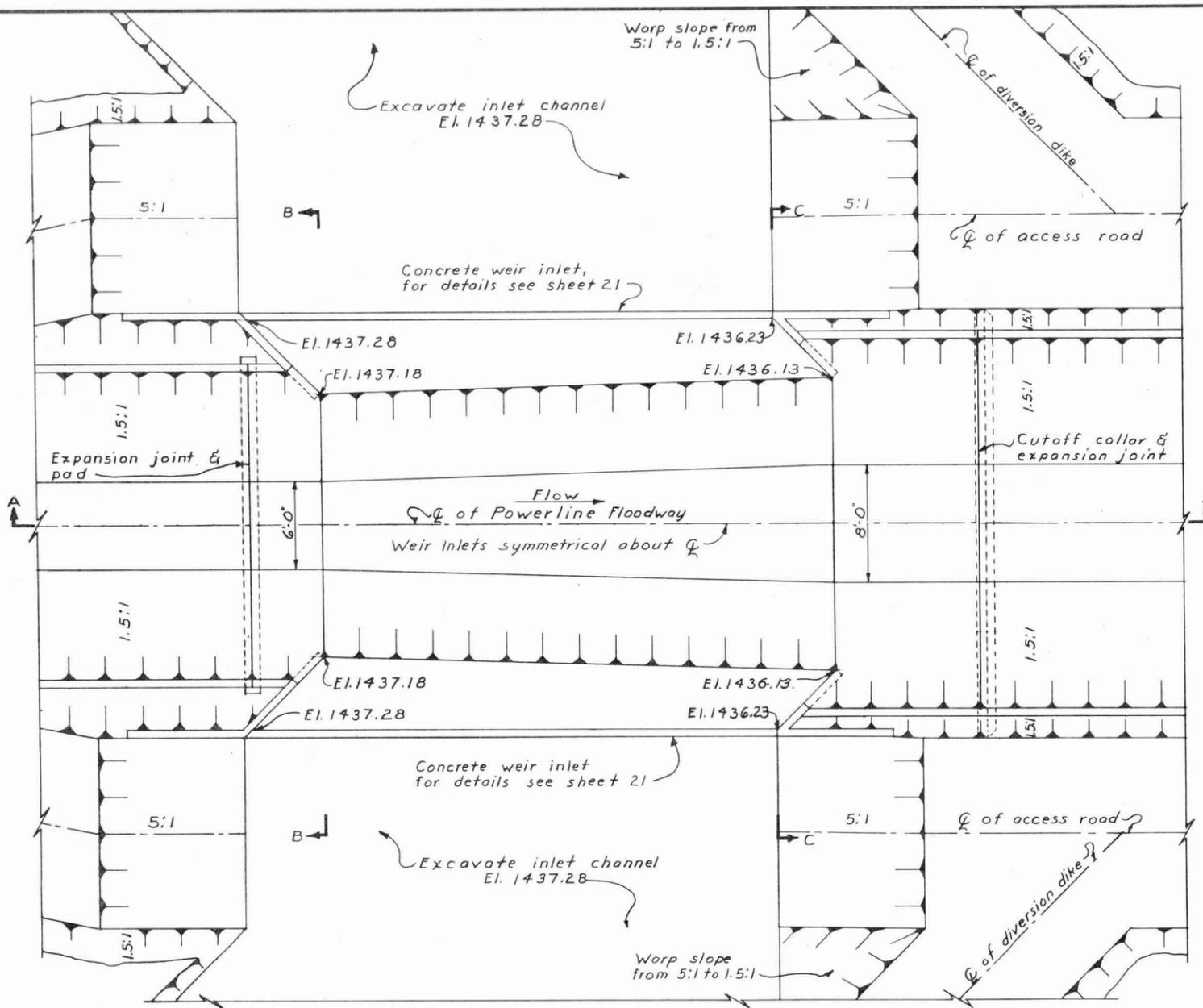
QUANTITIES TABLE

Item	Lin. ft	Lbs
No. 4 bars	1208.5	808
6x6-G/G fabric		154
Total weight		962
Concrete		14.70 cu. yds.

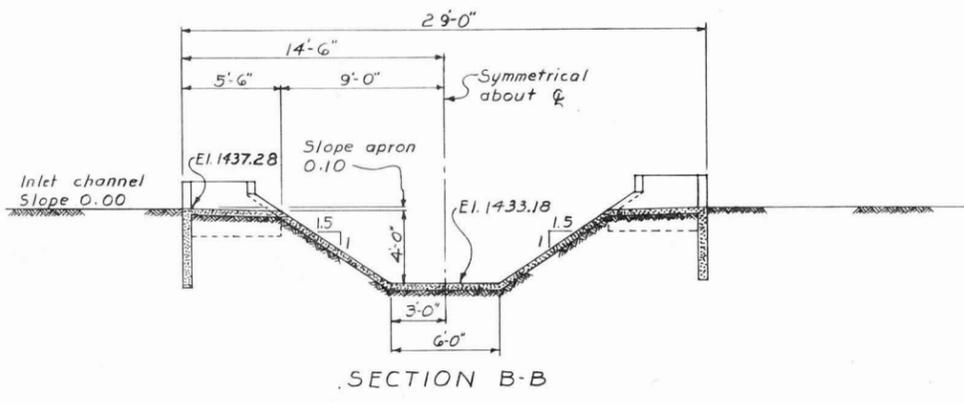
WEIR INLETS STATION 214+50
POWERLINE FLOODWAY
APACHE JUNCTION-GILBERT W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE**

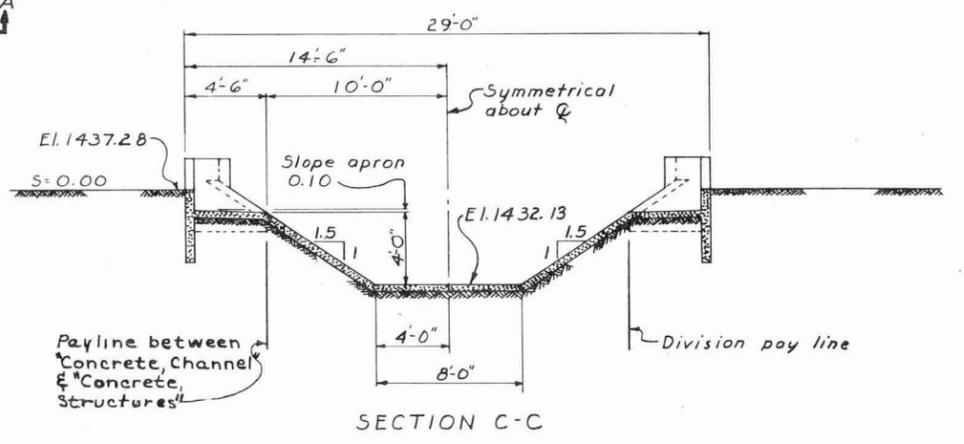
Designed G.W. & G.D.H.	Date	Approved by
Drawn D.H.H. & G.D.H.	7-15-65	Title
Traced	Sheet	Sheet
Checked	No. 21	7-E-20598



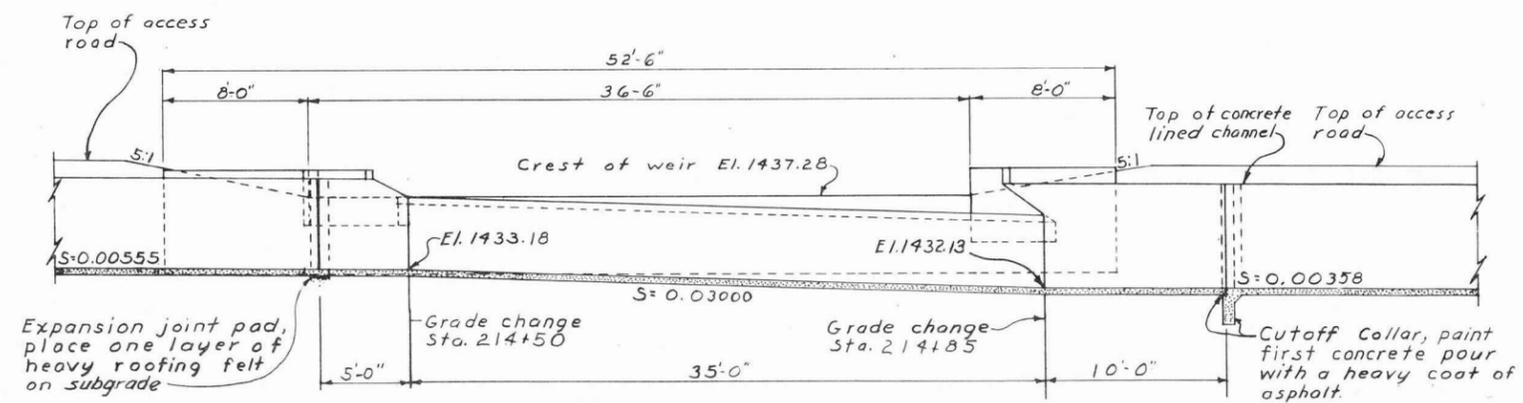
PLAN



SECTION B-B



SECTION C-C



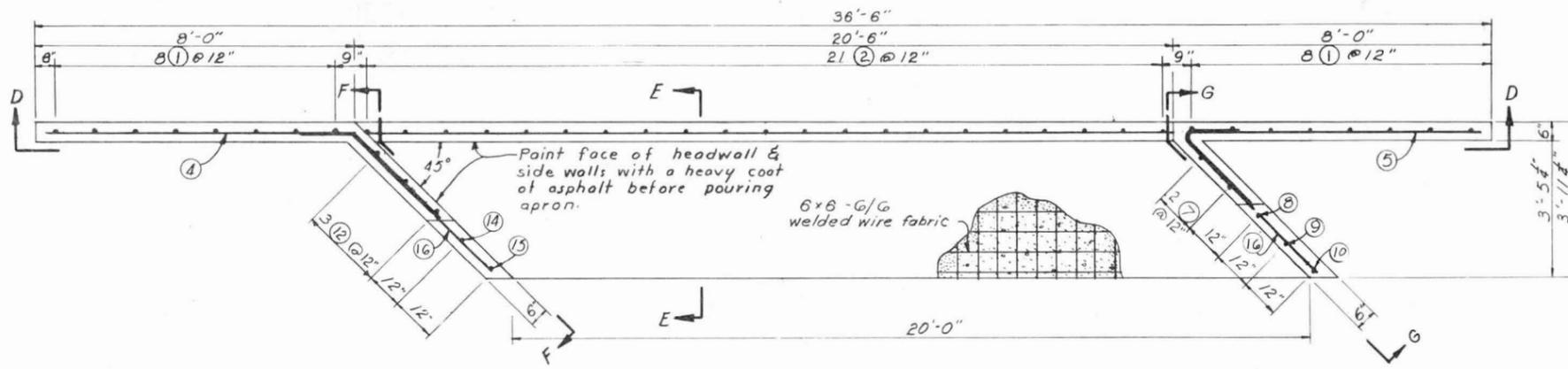
PROFILE A-A



WEIR INLET STATION 214+50
 POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES, ARIZONA

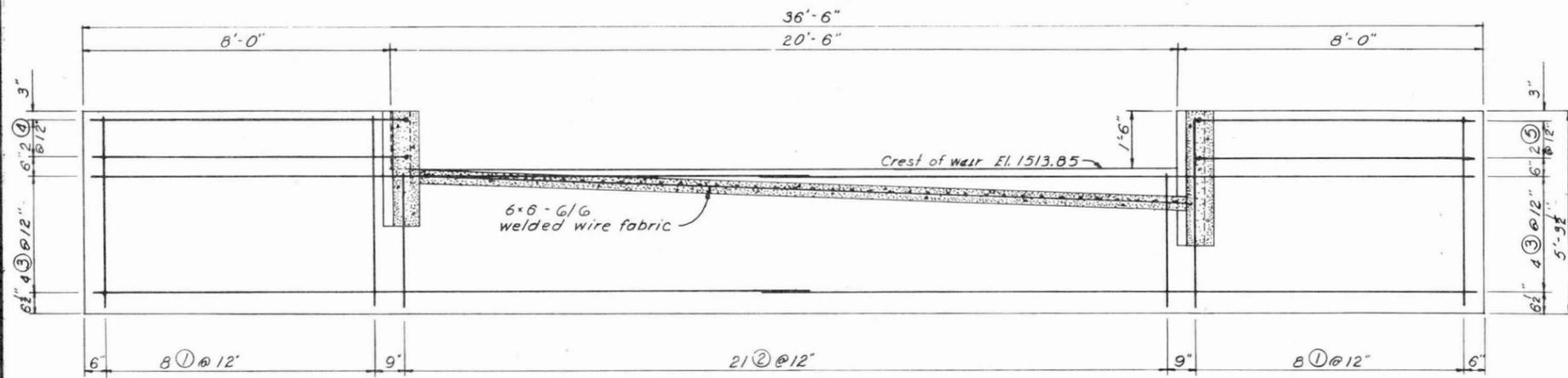
**U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE**

Designed	G. W. & G.D.H.	Date	
Drawn	G. D. H.	6-10-1965	Approved by
Traced			Title
Checked			Sheet No. 20 of 44
			Drawing No. 7-E-20598

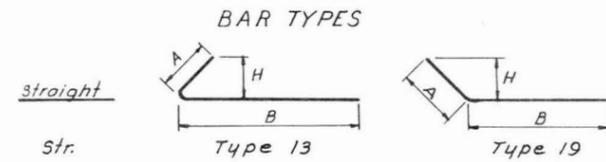


PLAN

Mark	No.	Size	Quantity	Length	Total Length	Type	A	B	H
D	1	4	16	4-9	76-0	Str.			
D	2	4	21	3-6	73-6	Str.			
D	3	4	8	18-9	150-0	Str.			
D	4	4	2	10-6	21-0	19	2-9	7-9	1-11/2
D	5	4	2	9-9	19-6	13	2-3	7-6	1-7
D	6	4	2	6-3	12-6	13	1-3	5-0	0-10/8
D	7	4	2	3-0	6-0	Str.			
D	8	4	1	2-0	2-0	Str.			
D	9	4	1	1-6	1-6	Str.			
D	10	4	1	1-0	1-0	Str.			
D	11	4	2	6-0	12-0	19	1-3	4-9	0-10/8
D	12	4	3	2-6	7-6	Str.			
D	14	4	1	1-9	1-9	Str.			
D	15	4	1	1-3	1-3	Str.			
D	16	4	3	3-0	9-0	Str.			
79 sq. ft. 6x6 -G/G welded wire fabric									



SECTION D-D

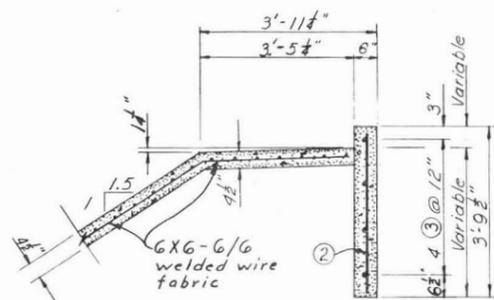
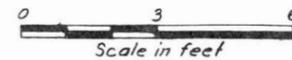


QUANTITIES TABLE

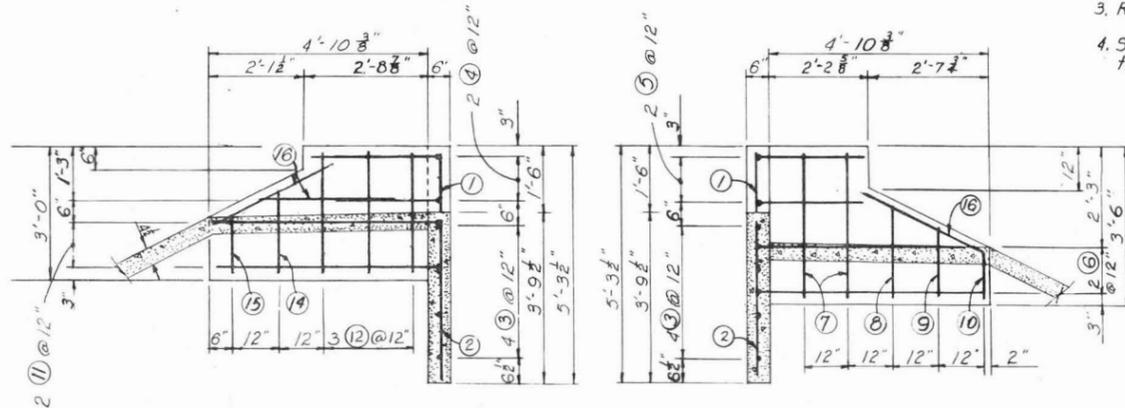
Item	Lin. ft.	Lbs.
No. 4 bars	394.5	264
6x6-G/G fabric		35
Total weight		299
Concrete		4.44 cu. yds.

NOTES:

- All exposed concrete edges shall be chamfered $\frac{3}{8}$ " or rounded.
- All bar dimensions are out to out of bar.
- Radius of bends equals seven times the bar diameter.
- Sidewalls and headwall may be poured monolithically and the apron poured last.



SECTION E-E



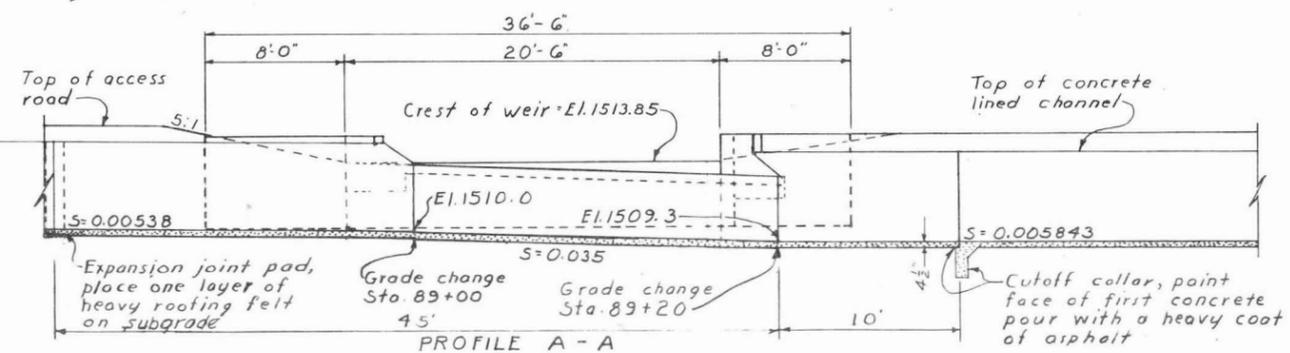
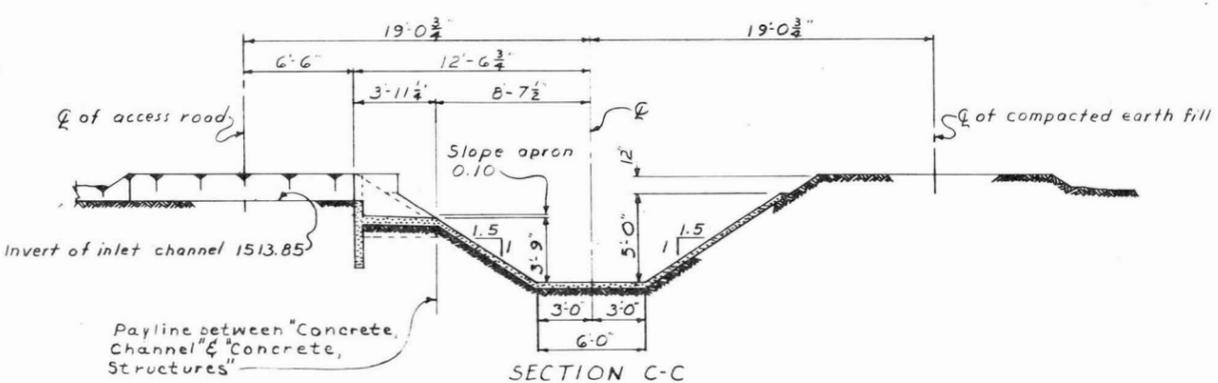
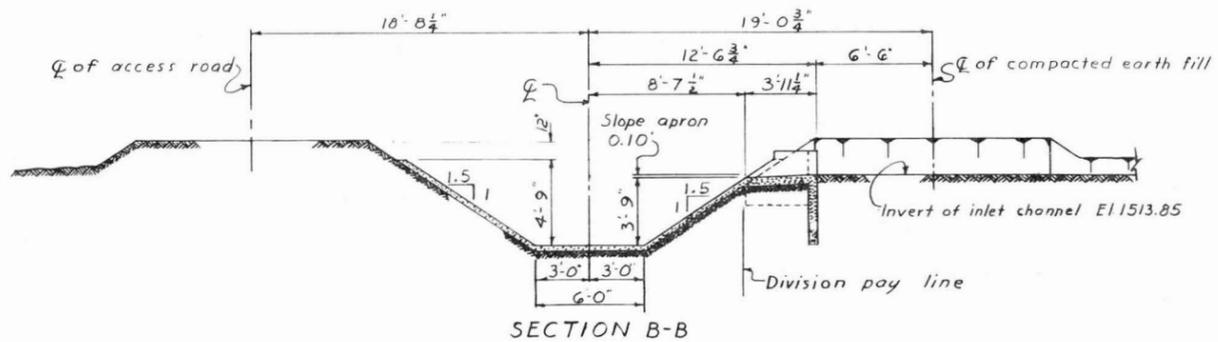
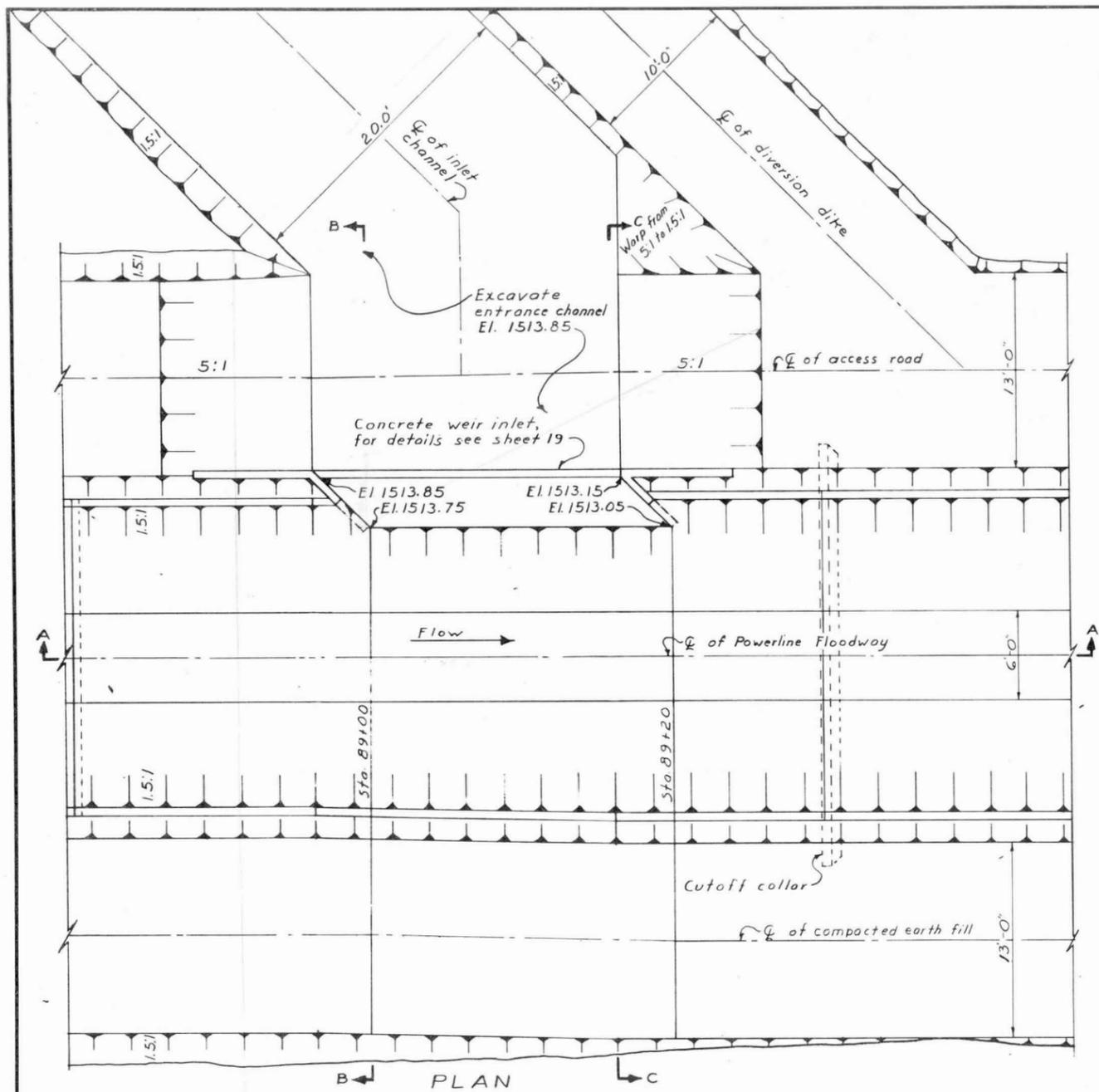
SECTION F-F

SECTION G-G

WEIR INLET STATION 89+00
POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES, ARIZONA

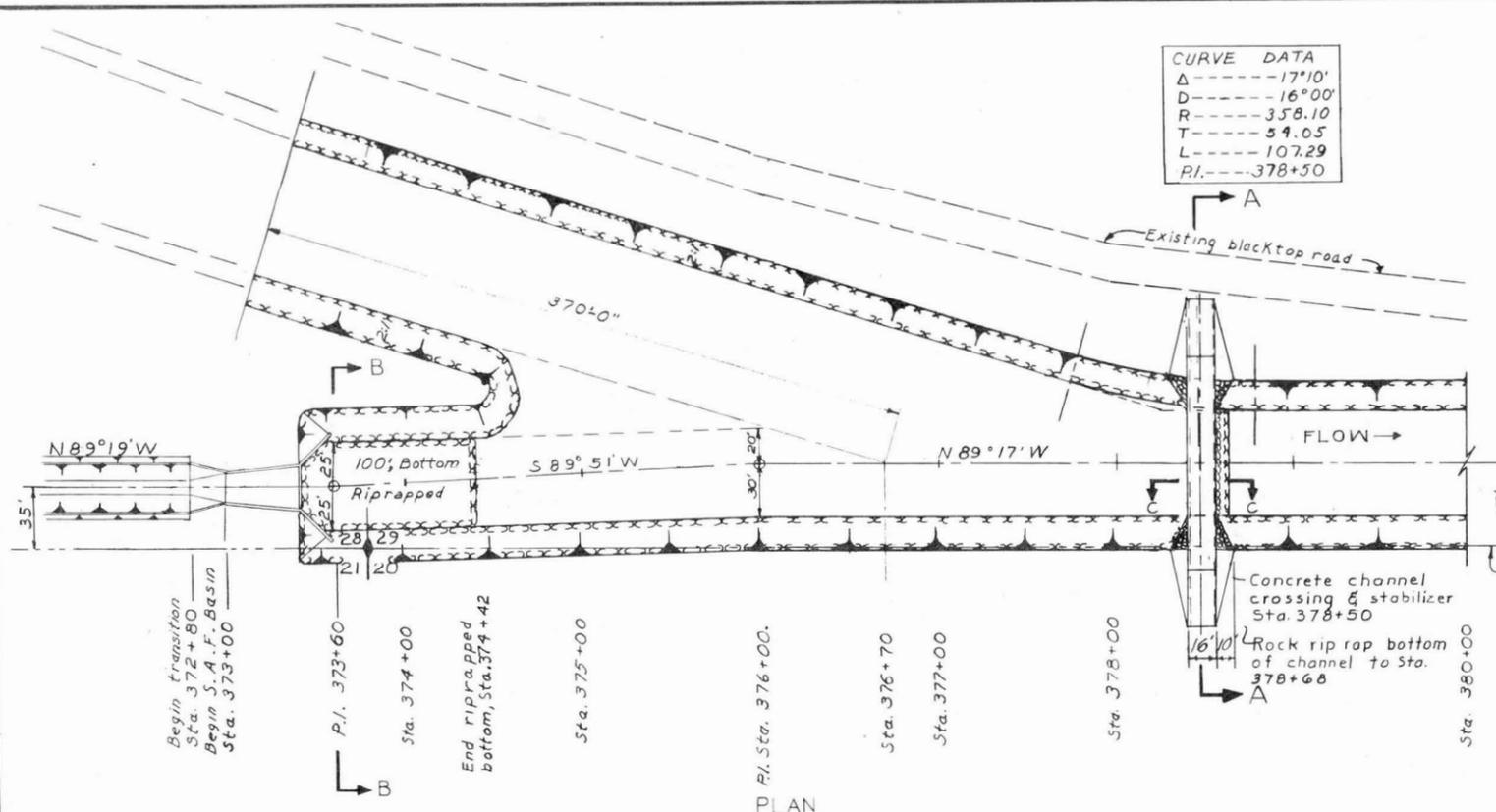
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: G. W. Date: _____ Approved by: _____
 Drawn: D.H.H. 6-28-1965 Title: _____
 Traced: _____ Sheet: _____ Drawing No.: _____
 Checked: _____ 1-47 No. 19 of 44 **7-E-20598**

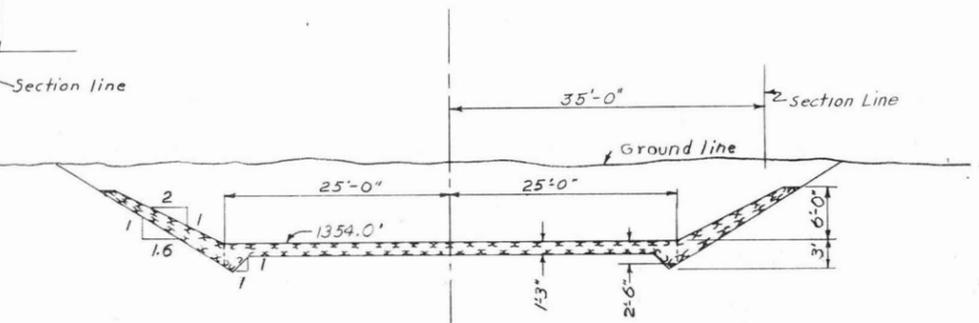


WEIR INLET STATION 89+00	
POWERLINE FLOODWAY	
APACHE JUNCTION-GILBERT W.P.P.	
MARICOPA & PINAL COUNTIES ARIZONA	
U. S. DEPARTMENT OF AGRICULTURE	
SOIL CONSERVATION SERVICE	
Designed G. W.	Date
Drawn G. D. H.	5-26-1965
Traced	Checked
Approved by	Title
Sheet No. 18	Drawing No. 7-E-20598
of 44	

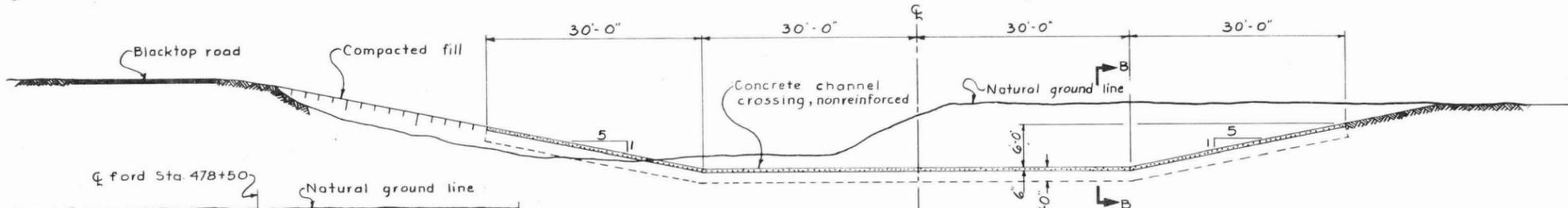
CURVE DATA	
Δ	17°10'
D	16°00'
R	358.10
T	54.05
L	107.29
P.I.	378+50



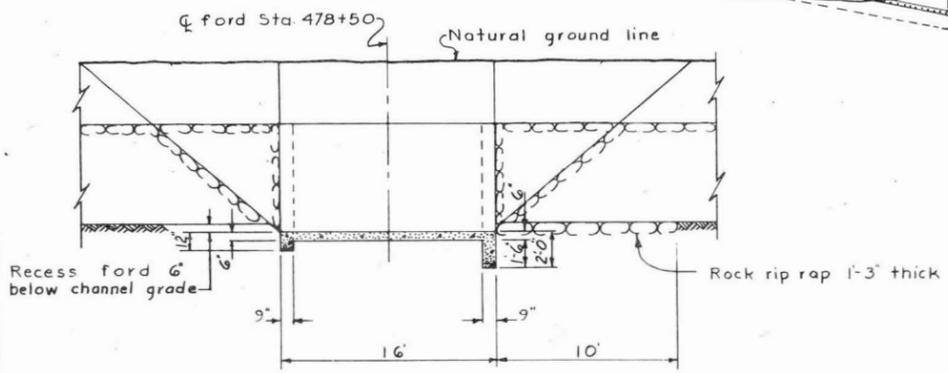
PLAN
Scale in feet



SECTION B-B
STA. 373+60



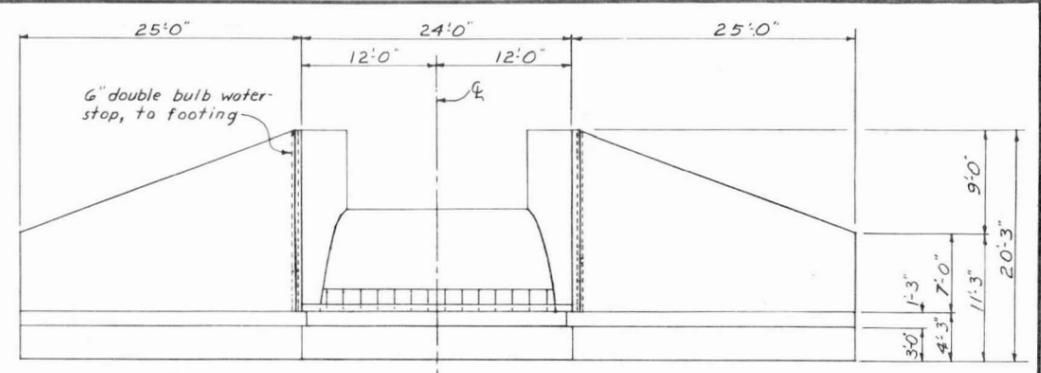
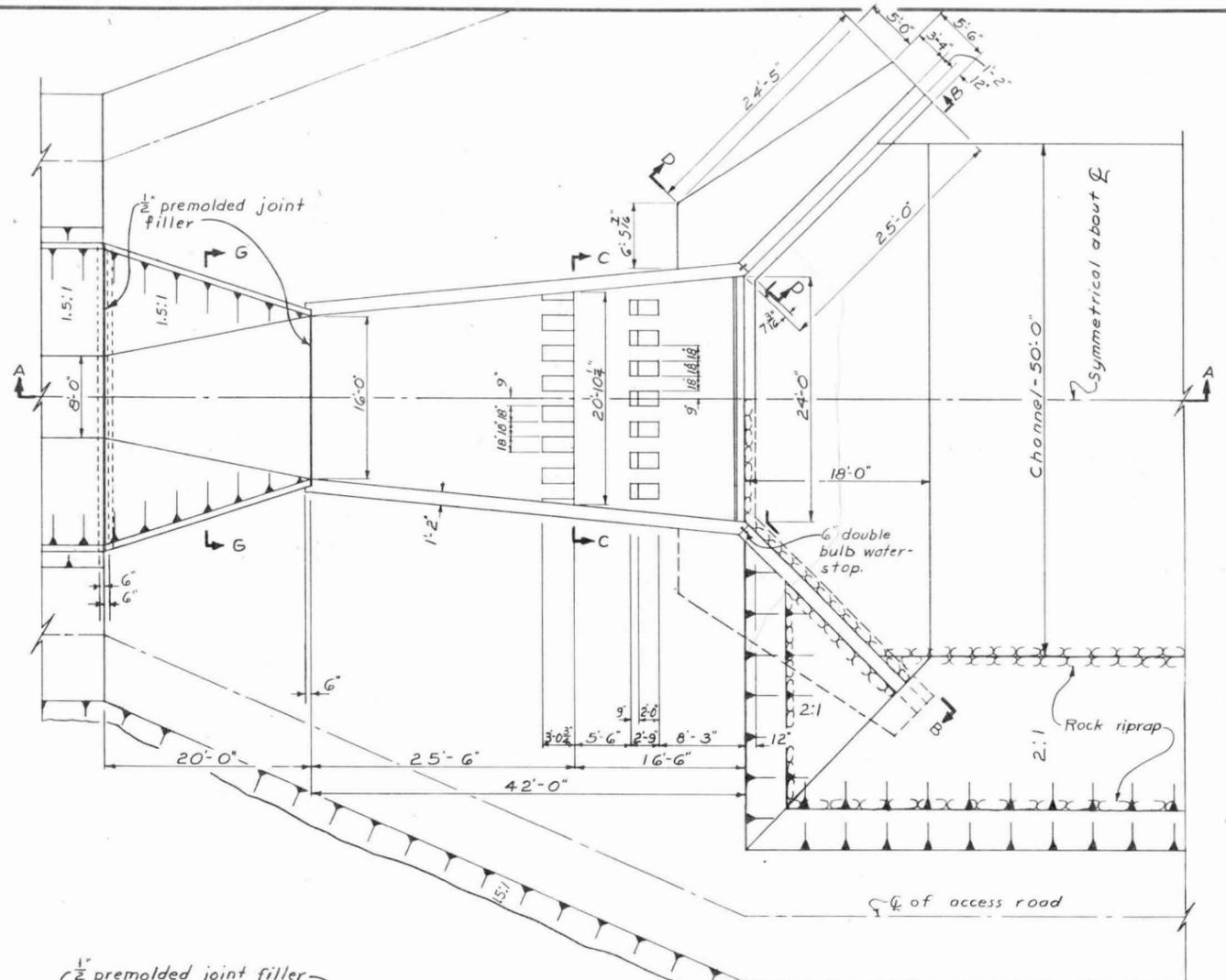
SECTION A-A
Scale in feet



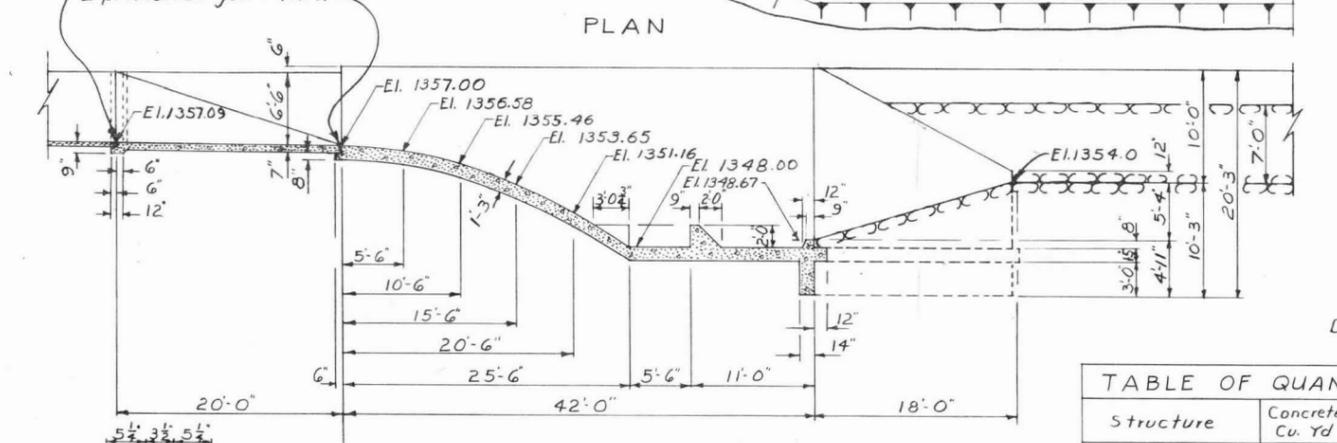
SECTION C-C
Scale in feet

Volume of concrete in channel crossing 42.67 Yd³

DETAILS OF FORD CROSSING STA. 378+50 POWERLINE FLOODWAY APACHE JUNCTION - GILBERT W.P.P. MARICOPA & PINAL COUNTIES, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed G.W.	Date 3-29-66	Approved by _____	
Drawn D.F.	Title _____		
Traced _____	Sheet No. 24	Drawing No. _____	
Checked _____	1:47	7-E-20598	

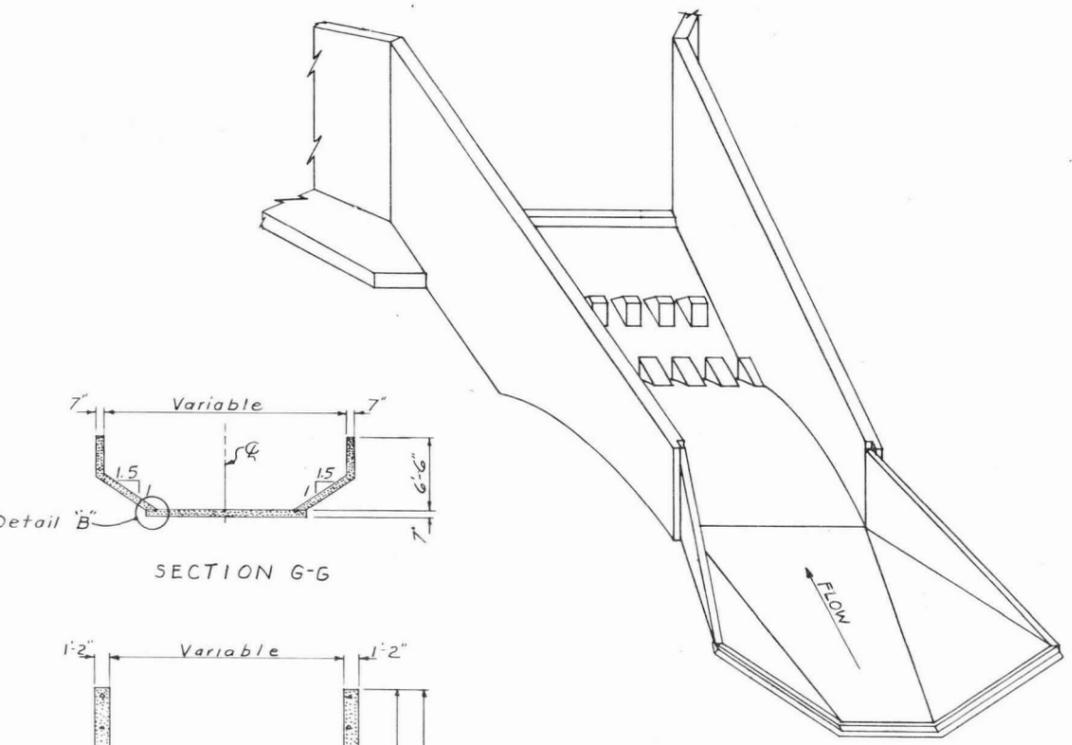


ELEVATION B-B

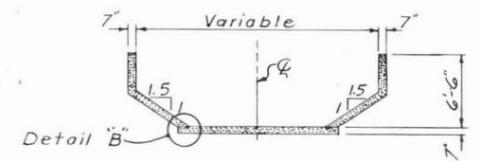


PLAN

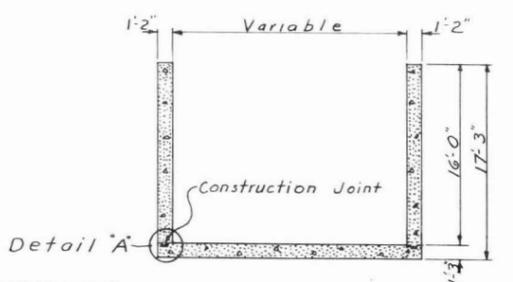
SECTION A-A



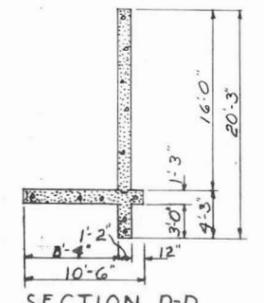
OBLIQUE VIEW OF S.A.F. BASIN AND TRANSITION



SECTION G-G



SECTION C-C

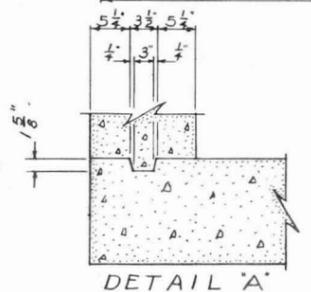


SECTION D-D

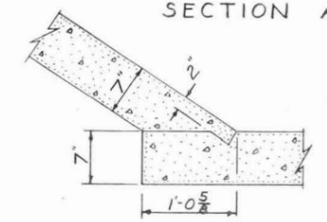


TABLE OF QUANTITIES		
Structure	Concrete Cu. Yd	Reinforcing Steel, Lbs
Transition to S.A.F.	14.32	1,157
S.A.F. Basin	149.90	21,208
Totals	164.22	22,365

NOTE:
1. All exposed concrete edges shall be chamfered 1/4".



DETAIL A



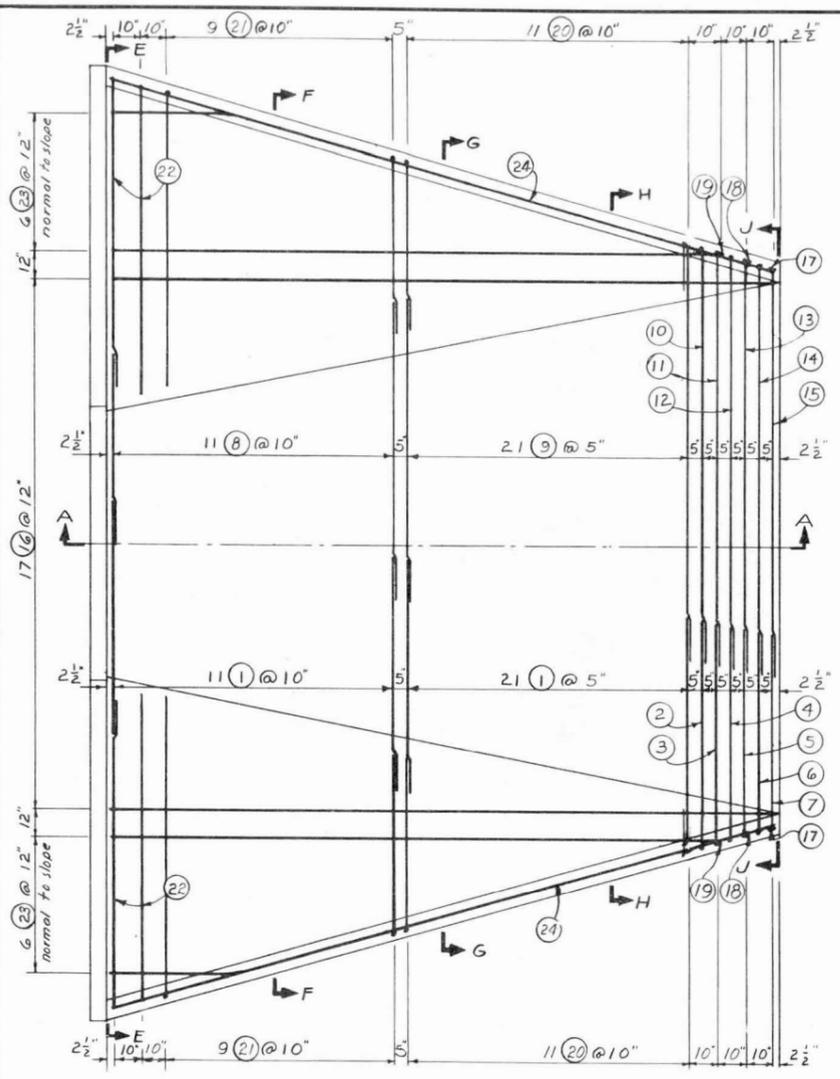
DETAIL B

Not to Scale

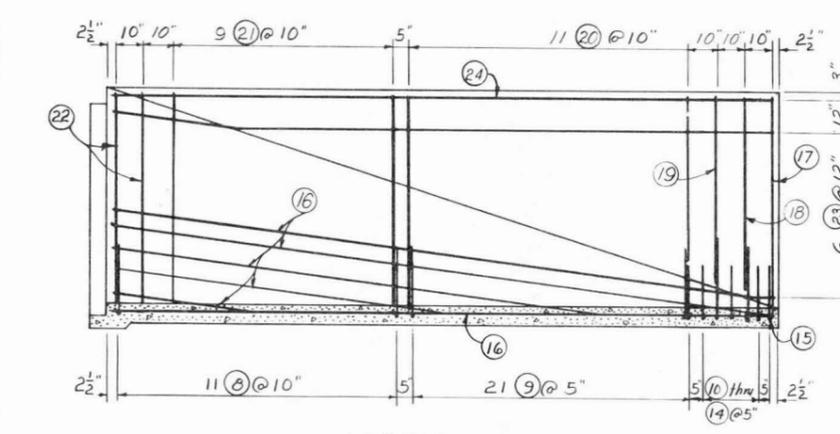
TRANSITION & S.A.F. BASIN STATION 373+00
POWERLINE FLOODWAY
APACHE JUNCTION-GILBERT W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE**

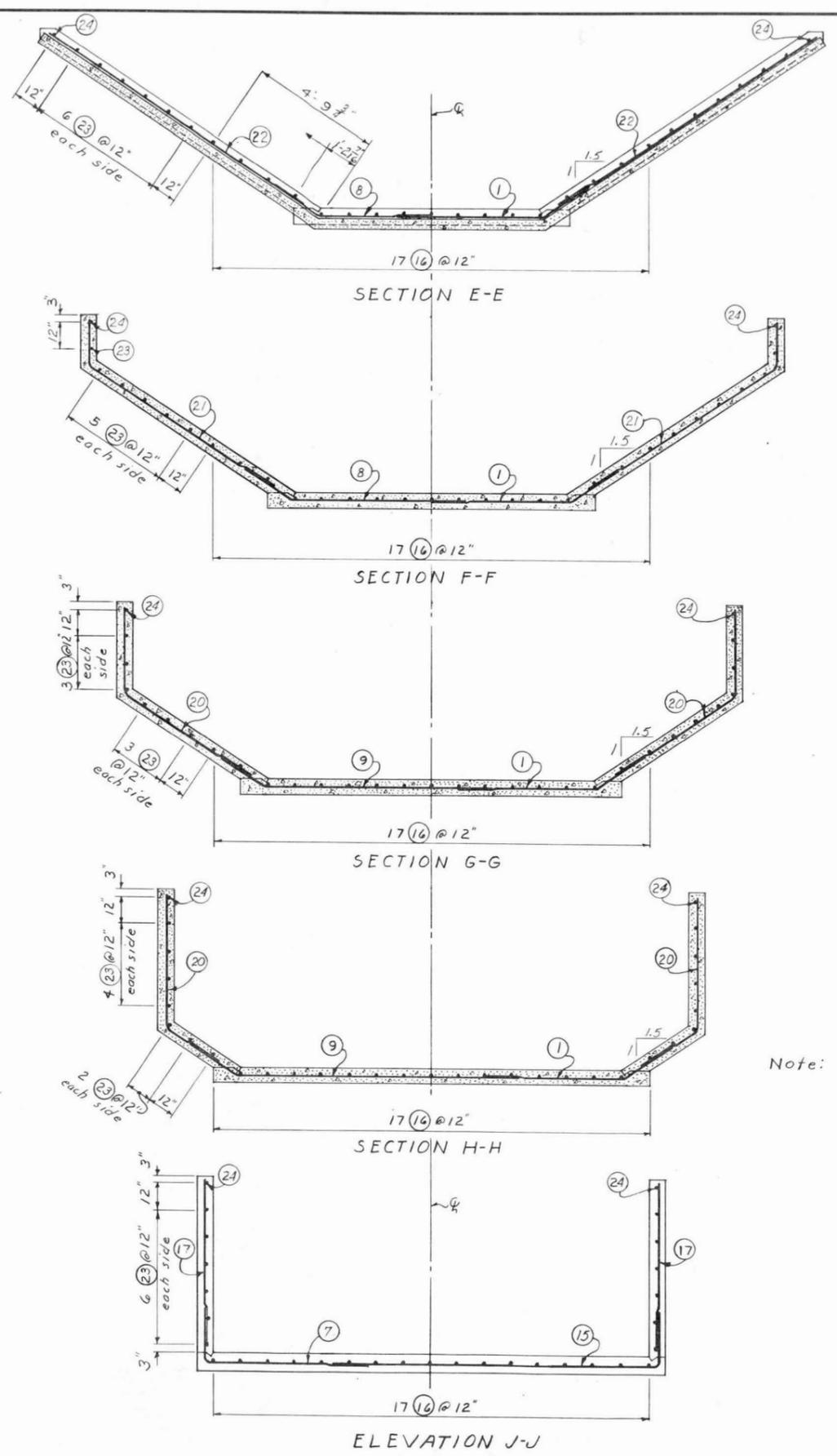
Designed by G.W. & G.D.H. Date _____ Approved by _____
Drawn by G.D.H. 6-21-1965 Title _____
Traced _____ Title _____
Checked by _____ 1-67 No. 25 Drawing No. 7-E-20598
of 4



PLAN



SECTION A-A



ELEVATION J-J

Note: Bars No. G(6) and G(23) will be field bent.



DETAILS OF TRANSITION TO S.A.F BASIN
 POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

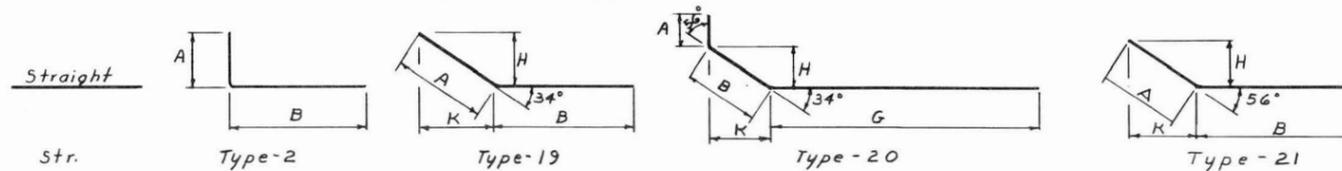
Designed G. W. & G. D. H.	Date	Approved by
Drawn G. D. H.	7-19-1965	Title
Traced		Title
Checked	J. K. J.	Sheet No. 25 of 44
		Brawing No. 7-E-20598

BAR SCHEDULE

Location	Mark		Size	Quantity	Length	Total Length	Type	A	B	G	H	K
	G	No.										
Apron	G	1	4	32	7-3	232-0	19	2-0	5-3		1-1/2"	1-8"
"	G	2	4	1	8-3	8-3	20	1-6	1-6	5-3	0-10"	1-3"
"	G	3	4	1	7-0	7-0	20	0-6	1-3	5-3	0-8 1/2"	1-0 1/2"
"	G	4	4	1	7-9	7-9	20	1-6	1-0	5-3	0-6 1/2"	0-10"
"	G	5	4	1	6-9	6-9	20	0-9	0-9	5-3	0-5"	0-7 1/2"
"	G	6	4	1	7-6	7-6	2	1-6	6-0			
"	G	7	4	1	7-3	7-3	2	1-6	5-9			
"	G	8	4	11	6'-4" to 9'-8" @ 4" increments	88-0	19	2-0	4'-4" to 7'-8" @ 4" increments		1-1/2"	1-8"
"	G	9	4	21	9'-10" to 13'-2" @ 2" increments	241-6	19	2-0	7'-10" to 11'-2" @ 2" increments		1-1/2"	1-8"
"	G	10	4	1	14-4	14-4	20	1-6	1-6	11-4	0-10"	1-3"
"	G	11	4	1	13-3	13-3	20	0-6	1-3	11-6	0-8 1/2"	1-0 1/2"
"	G	12	4	1	14-2	14-2	20	1-6	1-0	11-8	0-6 1/2"	0-10"
"	G	13	4	1	13-4	13-4	20	0-9	0-9	11-10	0-5"	0-7 1/2"
"	G	14	4	1	13-8	13-8	2	1-6	11-10			
"	G	15	4	1	13-6	13-6	2	1-6	12-0			
"	G	16	4	17	19-9	335-9	Str.					
Side Walls	G	17	4	2	6-3	12-6	Str.					
"	G	18	4	2	5-9	11-6	Str.					
"	G	19	4	2	5-6	11-0	Str.					
* " "	G	20	4	2 sets of 11 bars	6'-8 1/2" to 8'-9 1/2" @ 2 1/2" increments	170-6	21	5'-5 1/2" to 2'-9" @ 3 1/4" increments	1'-3" to 6'-0 1/2" @ 5 1/4" increments			
* " "	G	21	4	2 sets of 9 bars	8'-11 1/4" to 10'-7 1/4" @ 2 1/2" increments	175-10 1/2"	21	2'-8" to 0'-6" @ 3 1/4" increments	6'-3 1/4" to 10'-1 1/4" @ 5 1/4" increments			
"	G	22	4	4	11-3	45-0	Str.					
"	G	23	4	12	20-0	240-0	Str.					
"	G	24	4	2	20-6	41-0	Str.					

Total length of No. 4 bars = 1731.4' = 1,157 lbs.

BAR TYPES

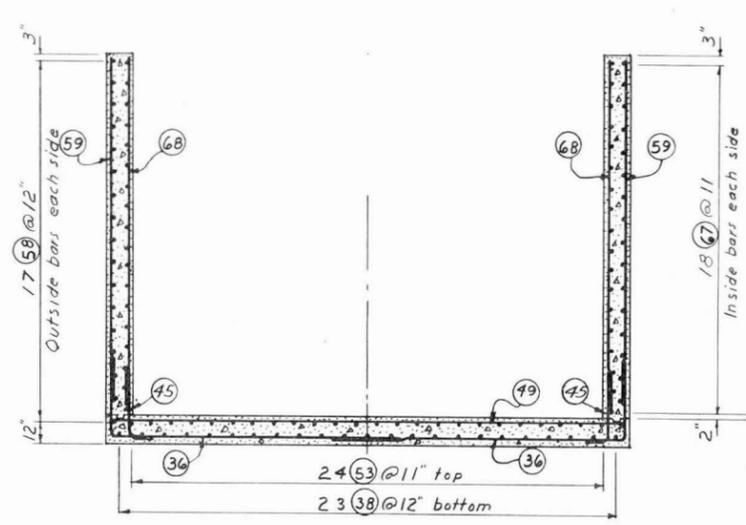
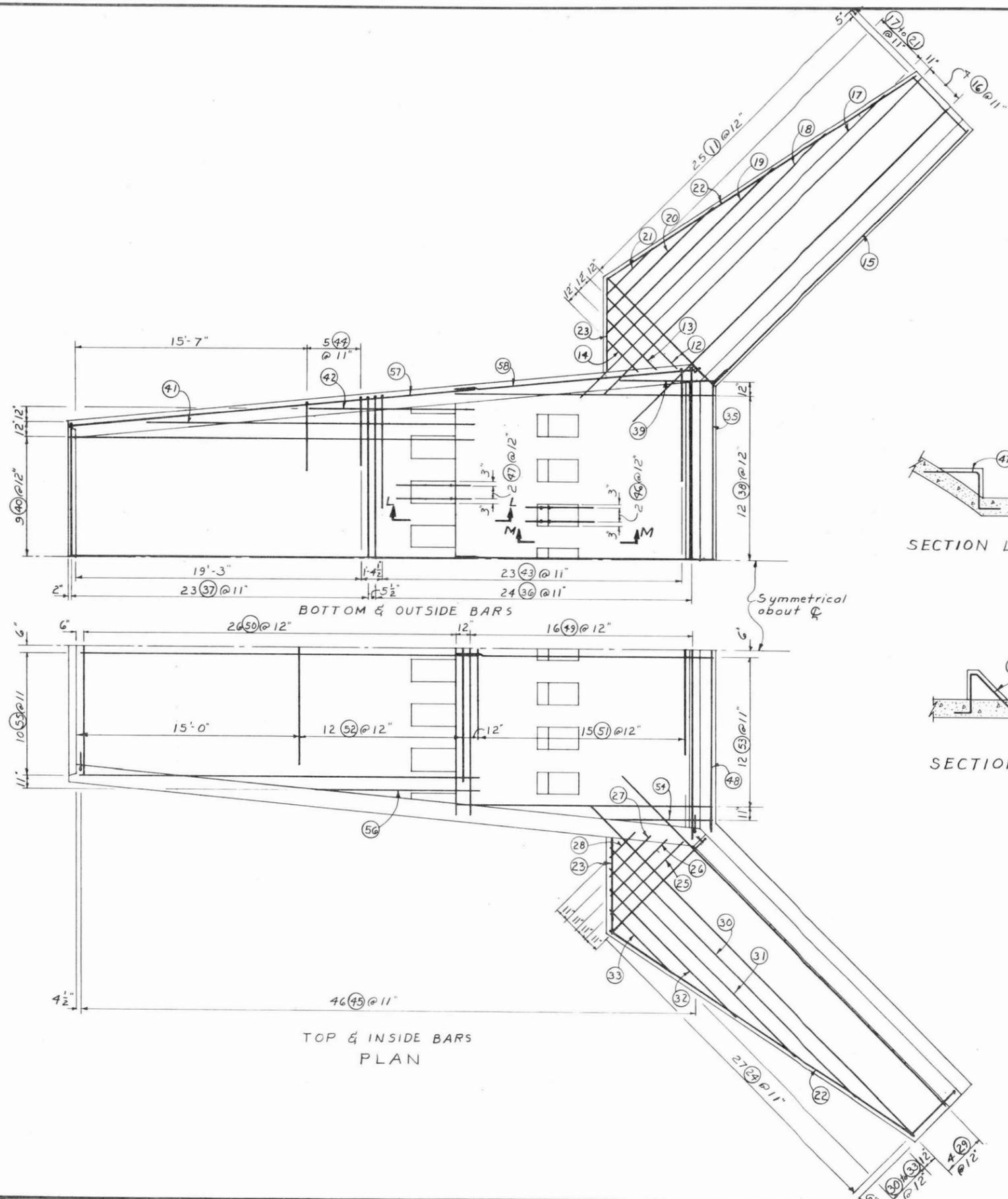


- NOTES: 1. All bar dimensions are out to out of bar.
 2. Radius of bends equals seven times the bar diameter.
 3. Bars G(16) & G(23) will be field bent.
 * Bars G(20) & G(21), H & K will be computed in shop.

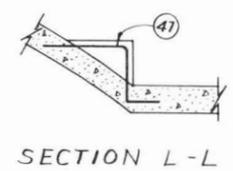
DETAILS OF TRANSITION TO S.A.F. BASIN
 POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES ARIZONA

**U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE**

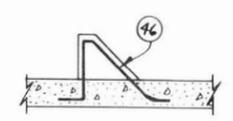
Designed: G.W. & G.D.H.	Date: 8-2-65	Approved by: _____	Title: _____
Drawn: G.D.H.			
Traced: _____		Sheet: 27	Drawing No. 7-E-20598
Checked: _____	1-67	of 44	



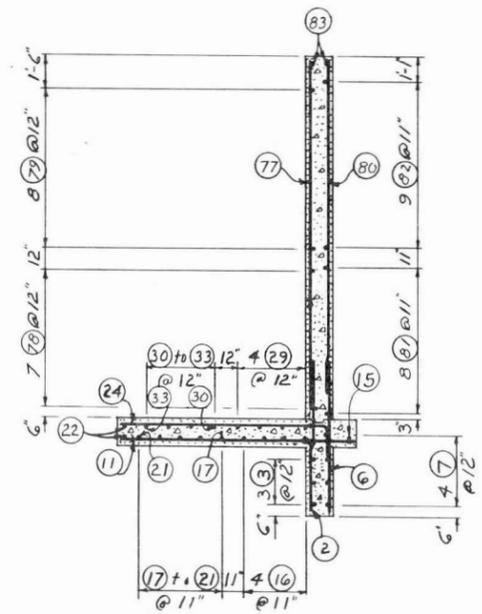
SECTION C-C



SECTION L-L



SECTION M-M



SECTION D-D



DETAILS OF S.A.F. BASIN
POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed by G. W.	Date	Approved by
Drawn by C. D. H.	8-2-65	Title
Traced		Title
Checked	1:47	Sheet No. 28 Drawing No. 7-E-20598

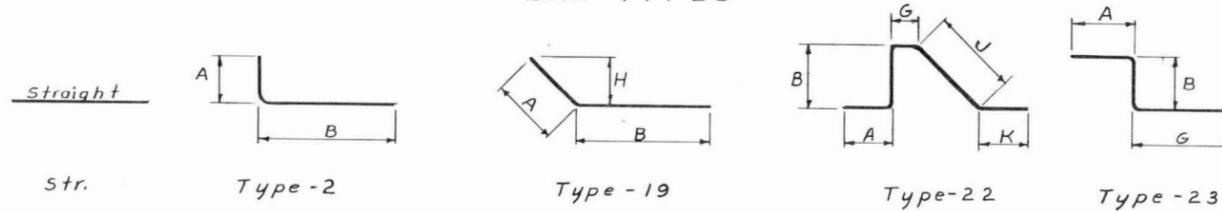
S. A. F. BASIN BAR SCHEDULE

Location	Mark H No.	Size	Quantity	Length	Total Length	Type	A	B	G	H
Toe Wall	H 1	6	22	6-6	143-0	Str.				
"	H 2	8	32	6-6	208-0	"				
"	H 3	4	6	25-0	150-0	"				
"	H 4	4	24	3-9	90-0	"				
"	H 5	4	6	14-3	85-6	19	1-3	13-0		0-10 1/2
"	H 6	5	54	6-0	324-0	Str.				
"	H 7	4	8	24-9	198-0	"				
"	H 8	4	24	4-6	108-0	"				
"	H 9	4	8	14-0	112-0	19	1-3	12-9		0-10 1/2
"	H 10	4	2	13-0	26-0	Str.				
Wing wall footings	H 11	4	2 sets of 25 bars	5-0 to 10-0 @ 1/2" increments	375-0	"				
"	H 12	4	2	6-6	13-0	"				
"	H 13	4	2	4-6	9-0	"				
"	H 14	4	2	3-0	6-0	"				
"	H 15	4	2	24-3	48-6	"				
"	H 16	4	8	30-0	240-0	"				
"	H 17	4	2	29-0	58-0	"				
"	H 18	4	2	20-9	41-6	"				
"	H 19	4	2	15-9	31-6	"				
"	H 20	4	2	10-0	20-0	"				
"	H 21	4	2	4-6	9-0	"				
"	H 22	4	4	24-9	99-0	"				
"	H 23	4	4	6-3	25-0	"				
"	H 24	8	2 sets of 27 bars	5-0 1/2 to 10-3 @ 2 1/4" increments	403-10 1/2	2	1-3	3-9 1/2 to 9-0 @ 2 1/4" increments		
"	H 25	5	2	7-0	14-0	Str.				
"	H 26	5	2	5-6	11-0	"				
"	H 27	5	2	4-0	8-0	"				
"	H 28	5	2	2-6	5-0	"				
"	H 29	7	8	31-0	248-0	"				
"	H 30	5	2	23-6	47-0	"				
"	H 31	5	2	17-9	35-6	"				
"	H 32	5	2	12-0	24-0	"				
"	H 33	5	2	6-0	12-0	"				
"	H 34	8	18	7-3	130-6	2	1-3	6-0		
Apron	H 35	4	2	13-9	27-6	19	1-3	12-6		0-10 1/2
"	H 36	8	2 sets of 24 bars	15-9 to 17-8 @ 1" increments	802-0	2	3-6	12-3 to 14-2 @ 1" increments		
"	H 37	6	2 sets of 23 bars	13-6 to 15-4 @ 1" increments	663-2	2	3-6	10-0 to 11-10 @ 1" increments		
"	H 38	4	23	17-3	396-9	Str.				
"	H 39	4	2	6-0	12-0	"				
"	H 40	4	17	30-0	510-0	"				
"	H 41	4	2	23-6	47-0	"				
"	H 42	4	2	12-6	25-0	"				
"	H 43	8	46	13-6	621-0	2	6-0	7-6		
"	H 44	6	10	8-0	80-0	2	3-6	4-6		
"	H 45	5	92	4-3	391-0	2	3-0	1-3		
"	H 46	5	14	9-0	126-0	22	1-0	2-8		
"	H 47	5	14	8-0	112-0	23	1-6	2-6	0-4	
"	H 48	4	1	25-0	25-0	Str.			4-0	
"	H 49	7	16	22-8 to 25-9 1/2 @ 2 1/4" increments	385-2	"				
"	H 50	6	26	17-6 to 22-2 @ 2 1/4" increments	515-11	"				
"	H 51	6	15	11-2 to 13-9 1/2 @ 1 1/2" increments	187-2	"				
"	H 52	6	12	15-11 to 18-0 @ 2 1/4" increments	203-6	"				
"	H 53	5	24	17-3	414-0	"				
"	H 54	5	2	7-0	14-0	"				
"	H 55	5	20	28-9	575-0	"				
"	H 56	5	2	11-0	22-0	"				
"	H 57	5	2	29-0	58-0	"				
Side Walls	H 58	4	34	16-0	544-0	"				
"	H 59	6	36	15-0	540-0	"				
"	H 60	4	2 sets of 6 bars	2-4 to 11-1 @ 1-9" increments	80-6	"				
"	H 61	4	2	14-0	28-0	"				
"	H 62	4	2	17-0	34-0	"				
"	H 63	4	16	27-3	436-0	"				
"	H 64	6	2 sets of 6 bars	12-4 to 15-3 @ 7" increments	165-6	Str.				
"	H 65	6	2 sets of 11 bars	8-0 to 12-2 @ 5" increments	221-10	Str.				

CONTINUATION

Location	Mark H NO.	Size	Quantity	Length	Total Length	Type	A	B	G	H
Side Walls	H 66	6	2 sets of 12 bars	6-4 1/2 to 7-9 @ 1 1/2" increments	169-6	Str.				
"	H 67	5	36	16-0	576-0	"				
"	H 68	5	36	15-6	558-0	"				
"	H 69	5	2 sets of 6 bars	3-6 to 11-0 @ 1-6" increments	87-0	"				
"	H 70	5	2	13-9	27-6	"				
"	H 71	5	2	16-9	33-6	"				
"	H 72	5	2	20-9	41-6	"				
"	H 73	5	16	27-0	432-0	"				
"	H 74	5	2 sets of 7 bars	12-0 to 15-0 @ 6" increments	189-0	"				
"	H 75	5	2 sets of 9 bars	8-6 to 11-5 1/2 @ 4 1/2" increments	180-0	"				
"	H 76	5	2 sets of 12 bars	6-6 to 7-10 1/2 @ 1 1/2" increments	172-6	"				
Wing Walls	H 77	6	2 sets of 27 bars	6-6 to 15-2 @ 4" increments	585-0	"				
"	H 78	4	14	23-9	332-6	"				
"	H 79	4	2 sets of 8 bars	3-3 to 21-11 @ 2-8" increments	201-4	"				
"	H 80	5	2 sets of 27 bars	6-9 to 15-5 @ 4" increments	598-6	"				
"	H 81	5	16	23-9	380-0	"				
"	H 82	5	2 sets of 9 bars	2-0 to 22-0 @ 2-6" increments	216-0	"				
"	H 83	4	4	25-6	102-0	Str.				

BAR TYPES



- NOTES: 1. Bars H(40), H(41), H(42), H(55), H(56) & H(57) will be field bent.
 2. All bar dimensions are out to out of bar.
 3. Radius of bends equals seven times the bar diameter for sizes 4 through 7 and eight times the bar diameter for size 8.
 4. Place bars 2" clear from face of concrete, except as shown, and place apron bars 3" clear from ground surface.

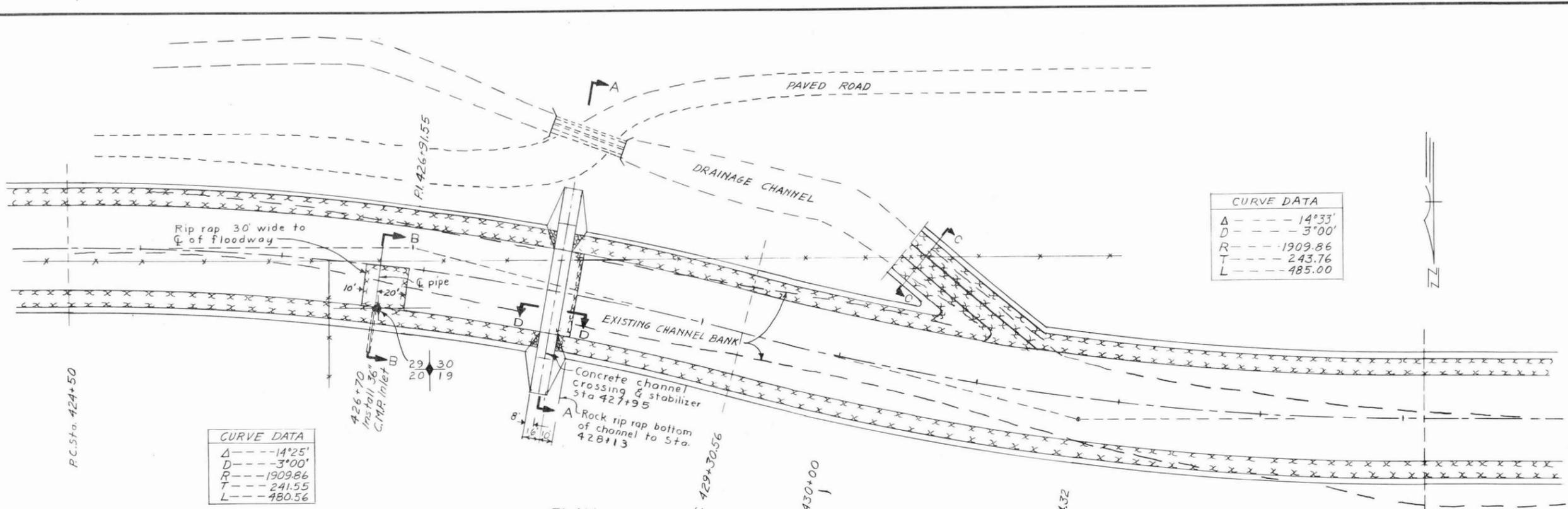
BAR TOTALS

Size	Length in feet	Weight in lbs.
4	4,465.58	2,983
5	5,684.00	5,929
6	3,474.57	5,219
7	633.17	1,295
8	2,165.38	5,782
Total		21,208

DETAILS OF S. A. F. BASIN
 POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES ARIZONA

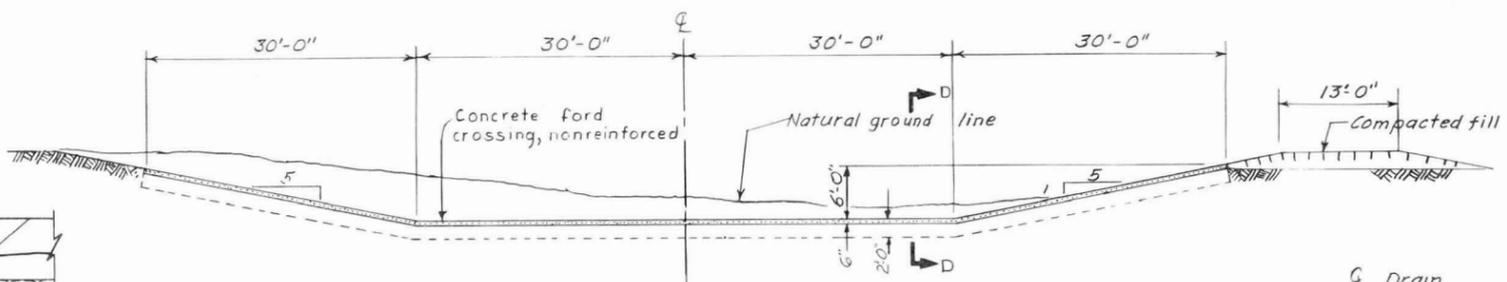
U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed by G. W.	Date 8-2-65	Approved by Title
Drawn by G. D. H.		Title
Traced by		Sheet No. 30 of 48
Checked by	467	Drawing No. 7-E-20598



Δ	14°25'
D	3°00'
R	1909.86
T	241.55
L	480.56

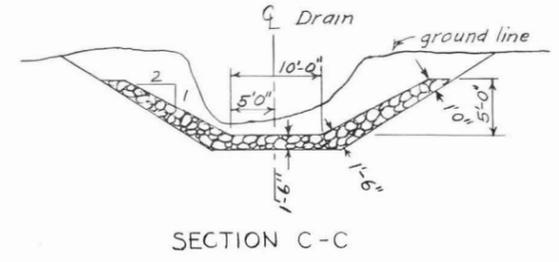
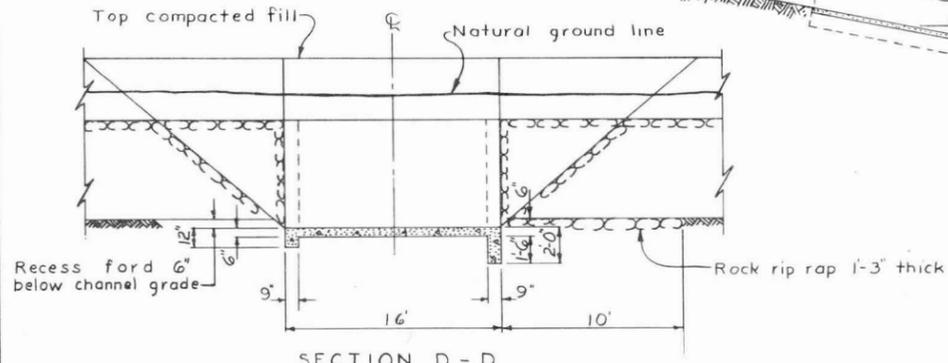
Δ	14°33'
D	3°00'
R	1909.86
T	243.76
L	485.00



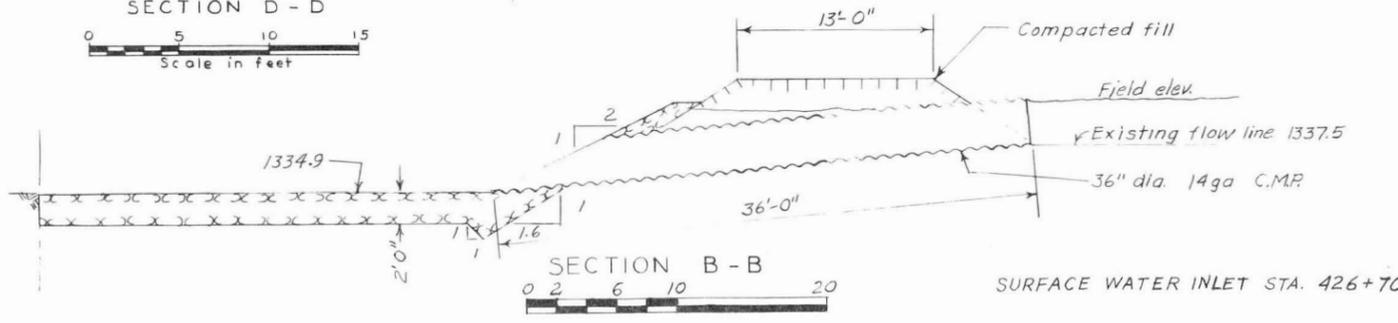
SECTION A-A

Details of channel crossing Stations 427+95 and 451+00

Scale in feet



SECTION C-C

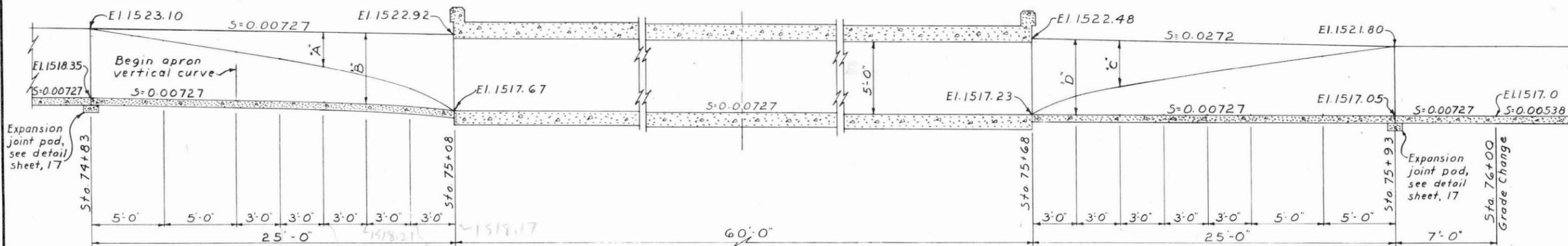
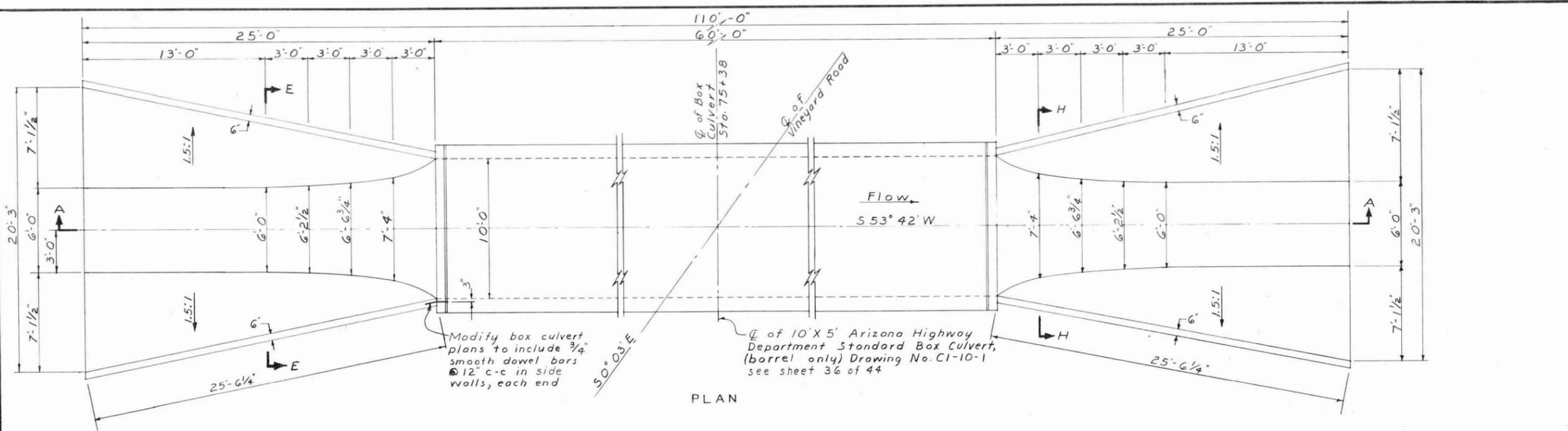


Volume of concrete in channel crossing 42.67 Yds³ each crossing

DETAILS OF FLOODWAY STA. 430+00
 POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed G.W.	Date 3-30-66	Approved by
Drawn G.W.	Title 7-7-66	
Traced	Sheet No. 31	Drawing No.
Checked	of 44	7-E-20598



TRANSITION TABLE OF DIMENSIONS

Station	Sidewall Top El.	Sidewall Depth "A"	Total Depth "B"
74+83	1523.10	0	4.75
74+88	1523.06	0.69	4.75
74+93	1523.03	1.36	4.75
74+96	1523.01	1.80	4.76
74+99	1522.98	2.31	4.81
75+02	1522.96	2.93	4.88
75+05	1522.94	3.70	5.00
75+08	1522.92	5.25	5.25

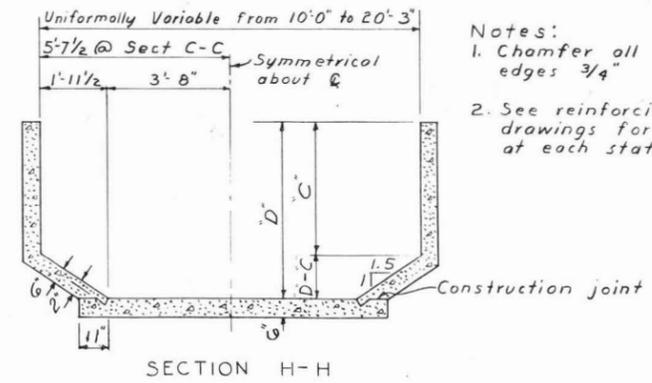
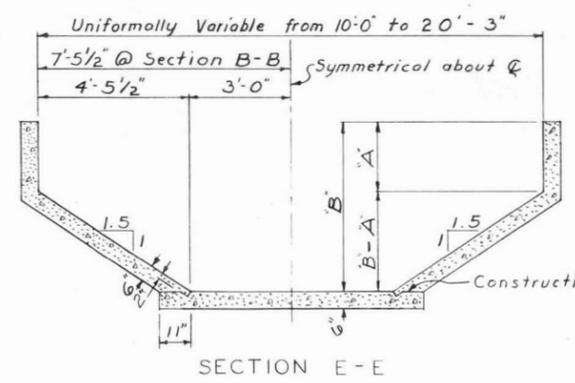
TABLE OF QUANTITIES

Structure	Concrete Cu.Yd	Reinforcing Steel Lbs.
Upstream Transition	10.25	857
Downstream Transition	10.37	857

TRANSITION TABLE OF DIMENSIONS

Station	Floor El.	Sidewall Top El.	Sidewall Depth "C"	Total Depth "D"
75+68	1517.23	1522.48	5.25	5.25
75+71	1517.21	1522.40	3.90	5.19
75+74	1517.19	1522.32	3.18	5.13
75+77	1517.16	1522.24	2.58	5.07
75+80	1517.14	1522.15	2.04	5.01
75+83	1517.12	1522.07	1.56	4.95
75+88	1517.08	1521.94	0.78	4.85
75+93	1517.05	1521.80	0	4.75

- Notes:
1. Chamfer all exposed concrete edges 3/4"
 2. See reinforcing steel placement drawings for sections taken at each station given in tables.



VINEYARD ROAD TRANSITIONS

POWERLINE FLOODWAY

APACHE JUNCTION-GILBERT W.P.P.

MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE

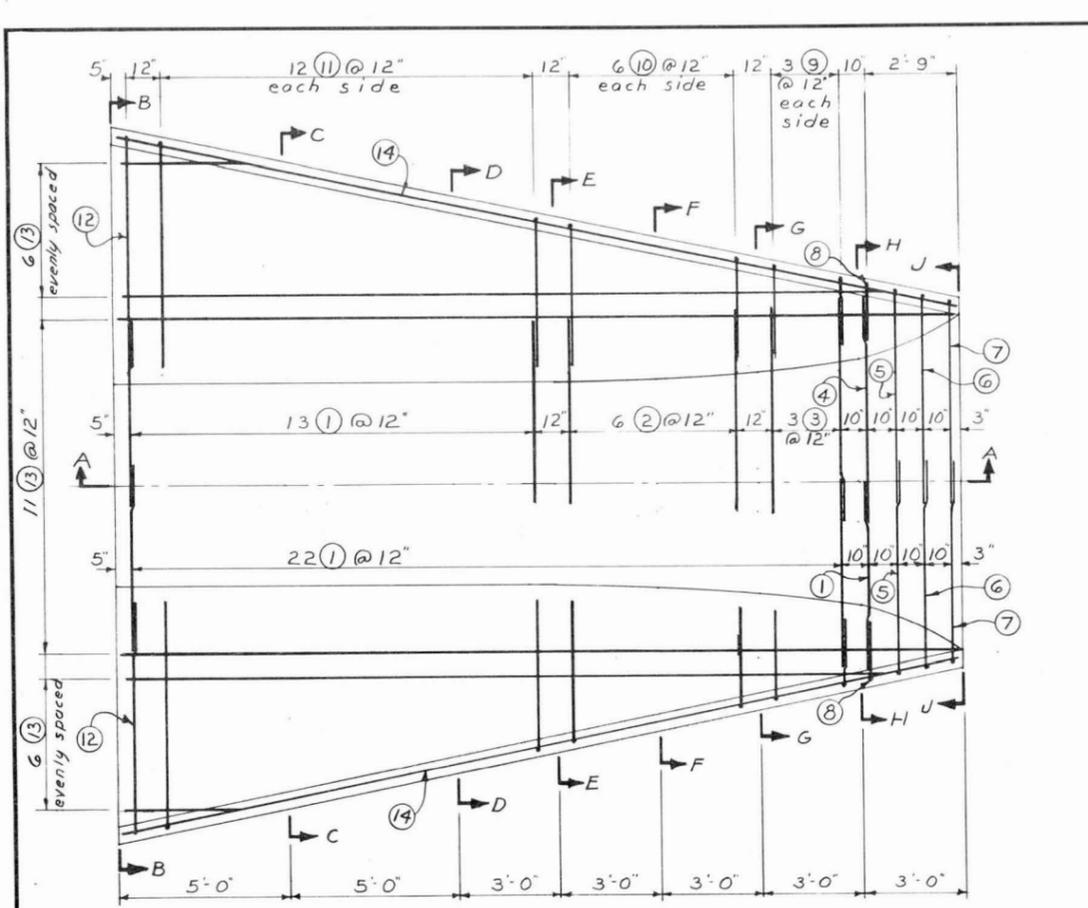
SOIL CONSERVATION SERVICE

Designed: G. W. Date: _____ Approved by: _____

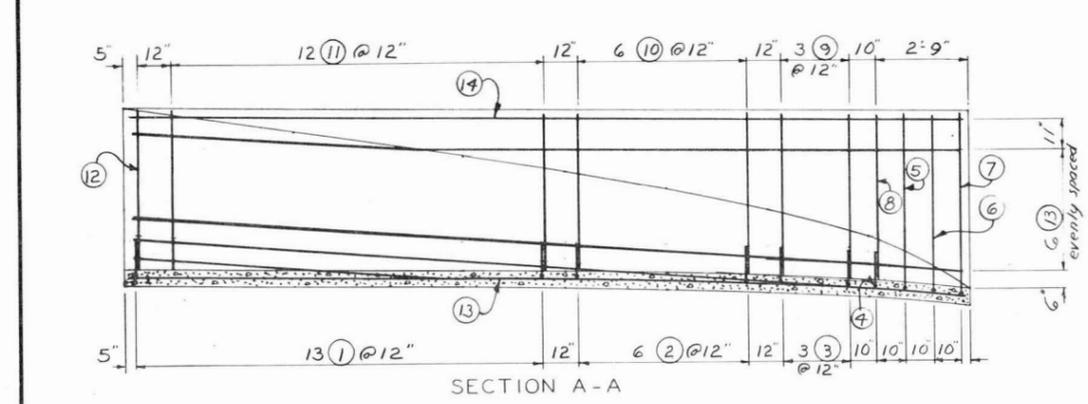
Drawn: C. D. H. 6-7-66 Title: _____

Traced: _____ Title: _____

Checked: G. W. 1-27-67 Sheet No. 32 Drawing No. 7-E-20598 of 44

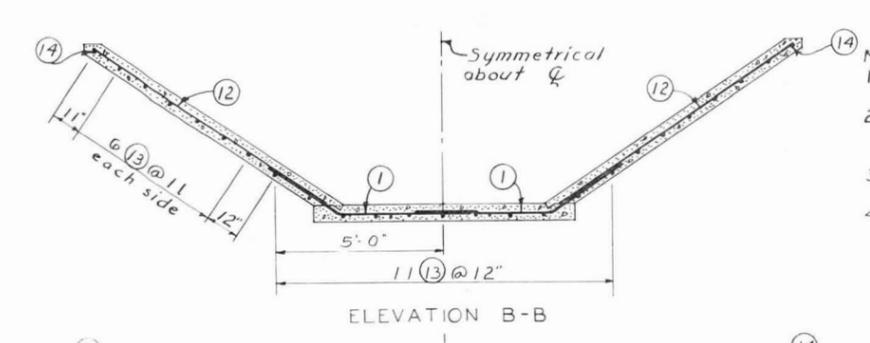


PLAN

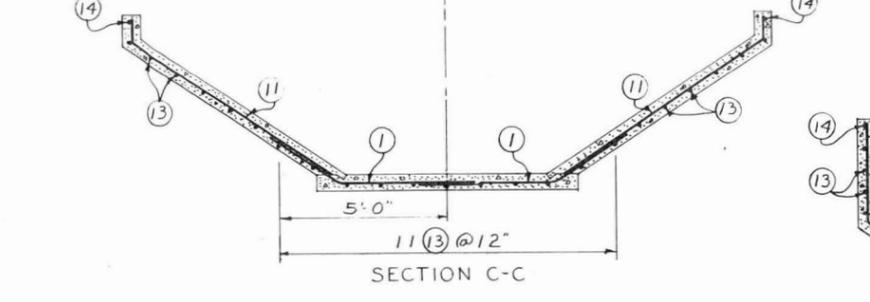


SECTION A-A

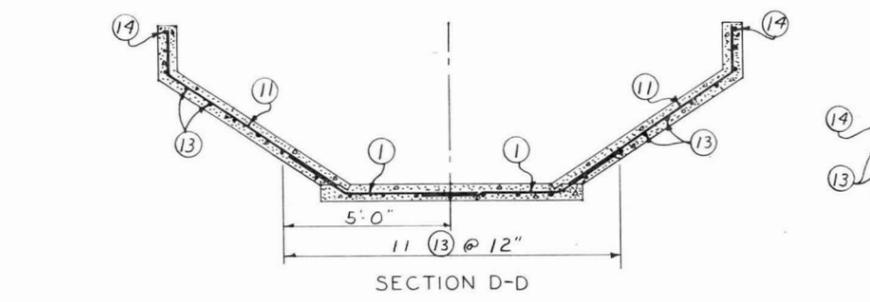
BAR SCHEDULE											
Location	Mark	Size	Quantity	Length	Total Length	Type	A	B	G	H	K
	K	No.									
Transverse apron	K	1	4	72	5-9	414-0	19	2-0			1-1 1-8
"	K	2	4	12	6-9	81-0	19	2-0			1-1 1-8
"	K	3	4	6	6-0	36-0	19	2-0			1-1 1-8
"	K	4	4	2	7-3	14-6	19	2-0			1-1 1-8
"	K	5	4	4	10-9	43-0	21	4-1			1-1 1-7 1/2
"	K	6	4	4	11-0	44-0	21	4-7			5-1 0-9 1-1
"	K	7	4	4	11-3	45-0	2	5-3			
side walls	K	8	4	4	5-9	23-0	20	1-11			1-1 1-7 1/2
"	K	9	4	4 sets of 3 bars	5-11 to 6-2 @ 1 1/2" increments	72-6	20	2-5 to 3-2 @ 4 1/2" increments			3-6 to 3-0 @ 3" increments
"	K	10	4	4 sets of 6 bars	6-11 to 6-3 @ 0 1/2" increments	158-0	20	1-11 to 2-9 @ 2" increments			5-0 to 3-6 @ 3" increments
"	K	11	4	4 sets of 12 bars	8-3 to 6-10 1/2 @ 1 1/2" increments	363-0	20	0-3 to 1-7 1/2 @ 1 1/2" increments			8-0 to 5-3 @ 3" increments
Longitudinal	K	12	4	4	8-3	33-0	Str.				
"	K	13	4	4	24-9	1138-6	Str.				
"	K	14	4	4	25-0	100-0	Str.				



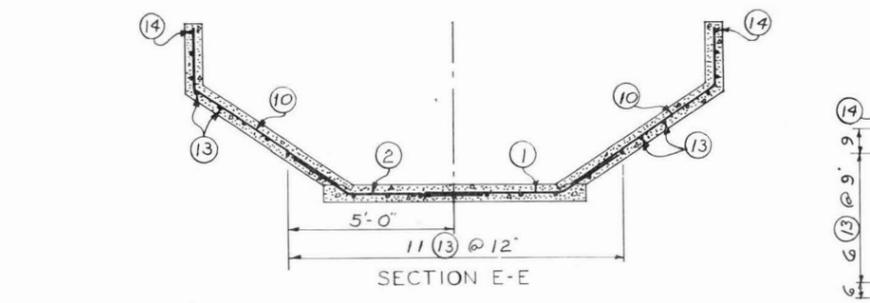
ELEVATION B-B



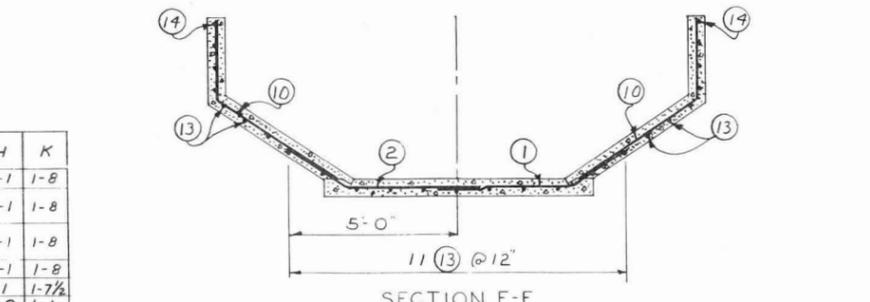
SECTION C-C



SECTION D-D

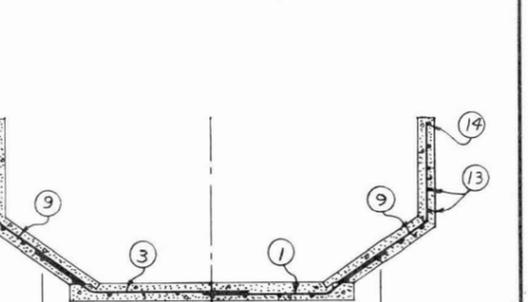


SECTION E-E

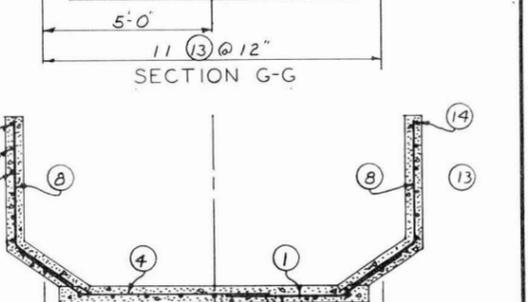


SECTION F-F

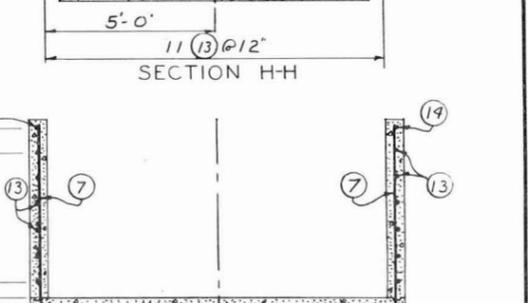
Notes:
 1. All bar dimensions are out to out of bar.
 2. Radius of bends equals seven times the bar diameter.
 3. Bar K(3) will be field bent.
 4. Reinforcing steel in inlet and outlet identical. Bar Schedule includes bars for both structures.



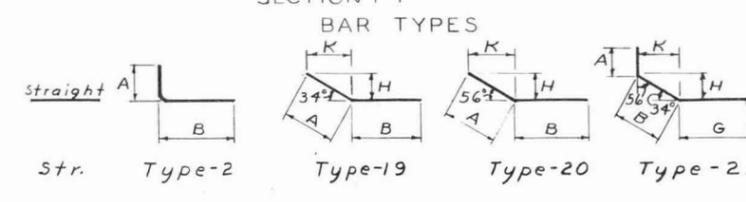
SECTION G-G



SECTION H-H

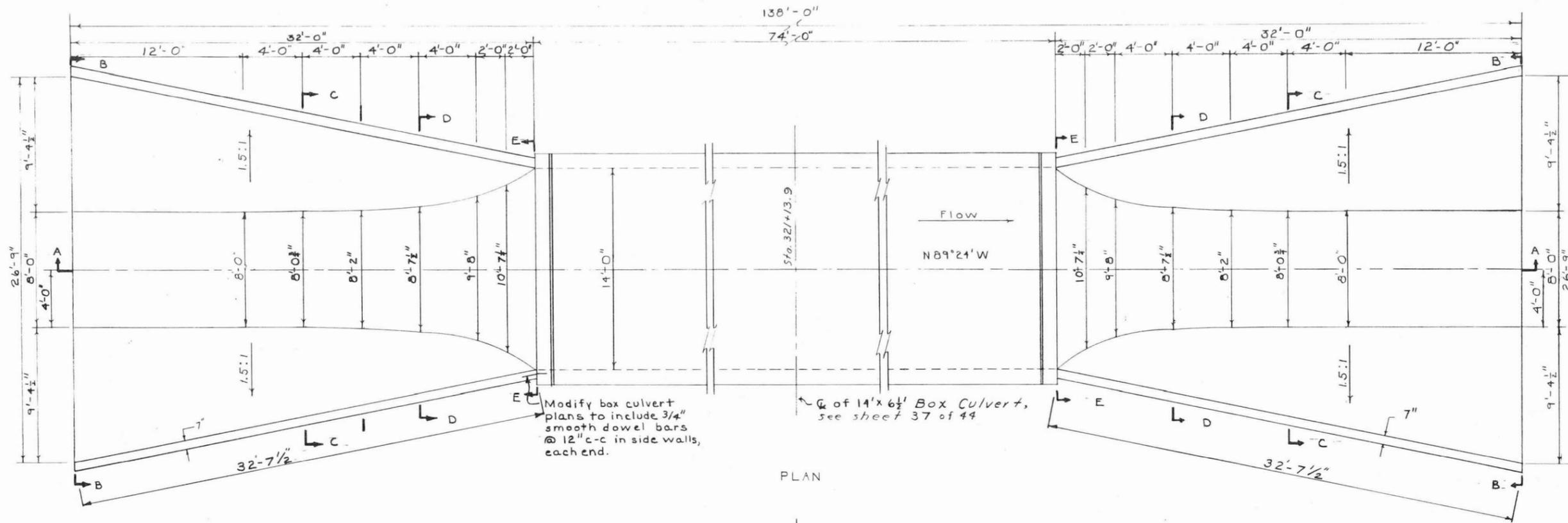


ELEVATION J-J

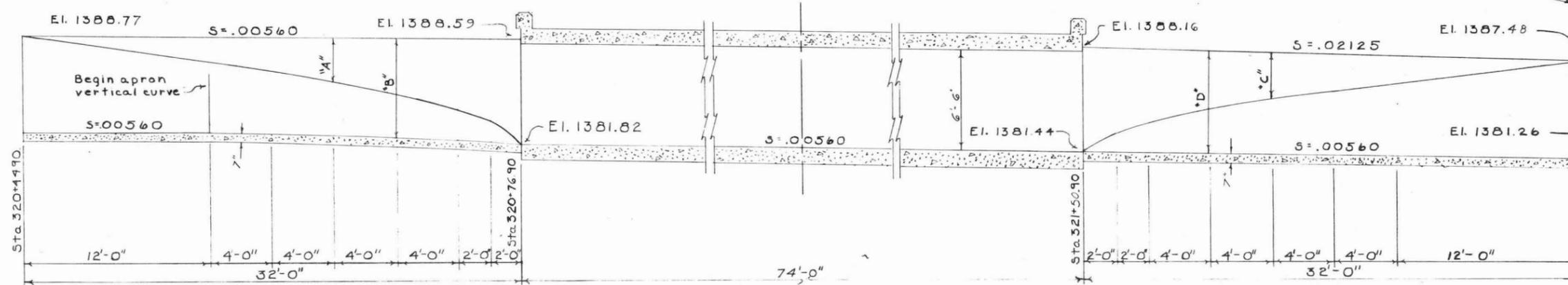


VINEYARD ROAD UP&DN-STR. TRANSITION
 POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES, ARIZONA
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed G. W. Date _____ Approved by _____
 Drawn G. D. H. 6-8-66 Title _____
 Traced _____ Title _____
 Checked G. W. 1-7-67 Sheet No. 33 Drawing No. 7-E-20598
 of 44



PLAN

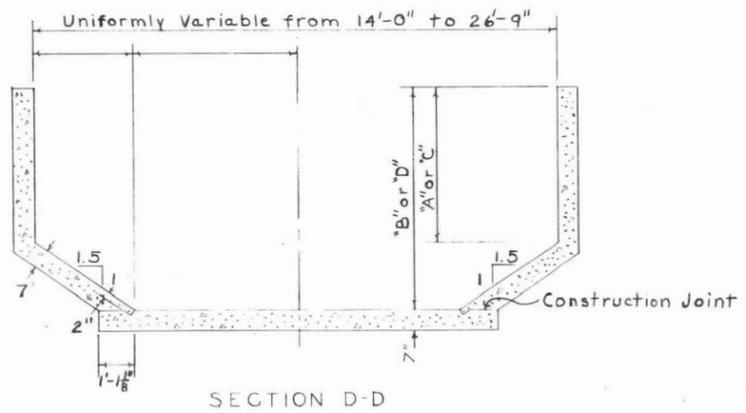


SECTION A-A

Station	Sidewall Top El.	Floor El.	Sidewall Depth 'A'	Total Depth 'B'
* 320+44.9	1388.77	1382.50	0.00	6.25
320+48.9	1388.75	1382.48	0.54	6.25
320+52.9	1388.73	1382.46	1.09	6.25
320+56.9	1388.70	1382.43	1.63	6.25
* 320+60.9	1388.68	1382.38	2.18	6.28
320+64.9	1388.66	1382.28	2.81	6.36
320+68.9	1388.64	1382.17	3.60	6.45
320+72.9	1388.61	1382.03	4.58	6.56
320+74.9	1388.60	1381.93	5.25	6.65
* 320+76.9	1388.59	1381.82	6.75	6.75

Station	Sidewall Top El.	Floor El.	Sidewall Depth 'C'	Total Depth 'D'
* 321+50.9	1388.16	1381.44	6.75	6.75
321+52.9	1388.12	1381.43	5.32	6.72
321+54.9	1388.07	1381.41	4.71	6.69
321+58.9	1387.99	1381.40	3.77	6.62
321+62.9	1387.90	1381.37	3.02	6.56
* 321+66.9	1387.82	1381.35	2.40	6.50
321+70.9	1387.73	1381.32	1.82	6.44
321+74.9	1387.65	1381.31	1.21	6.37
321+78.9	1387.56	1381.28	0.60	6.31
* 321+82.9	1387.48	1381.26	0.00	6.25

Notes:
 1. Chamfer all exposed concrete edges 3/4".
 2. See reinforcing steel placement drawings for sections taken at each station marked with an *.

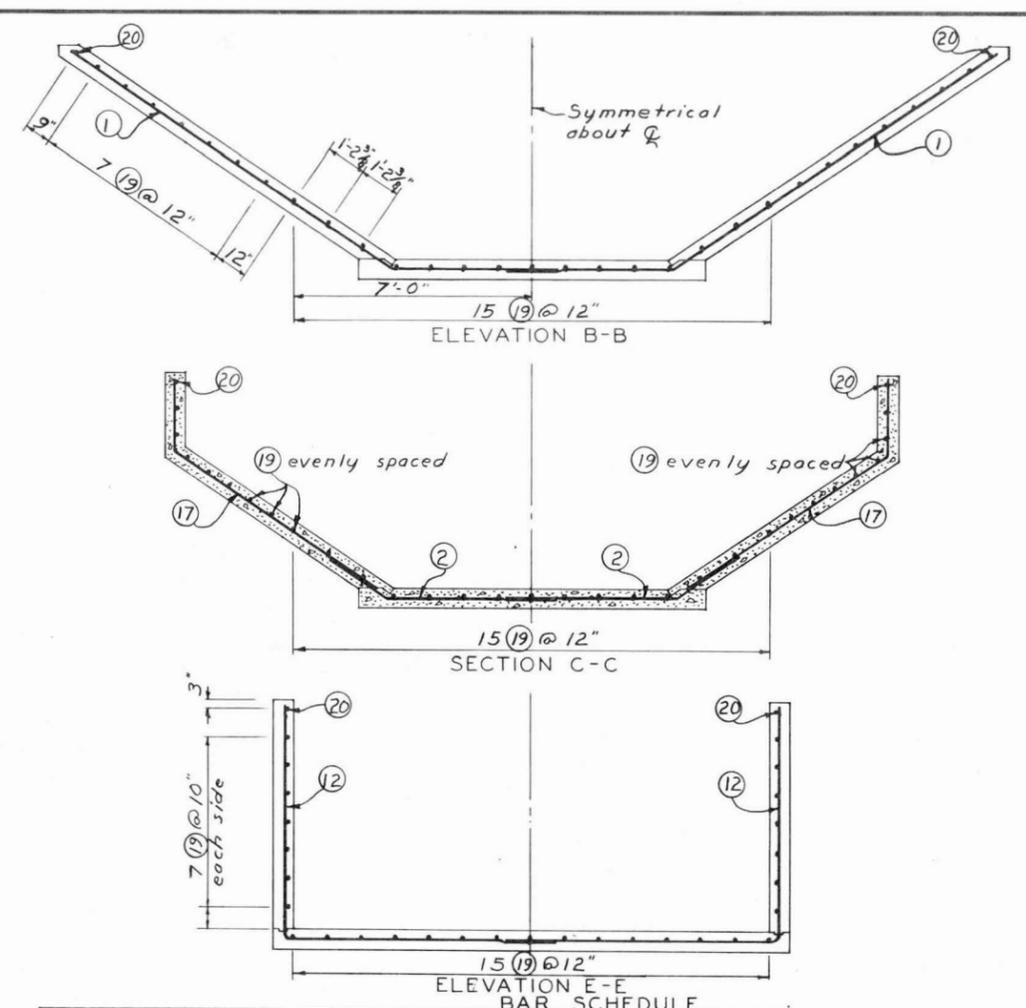
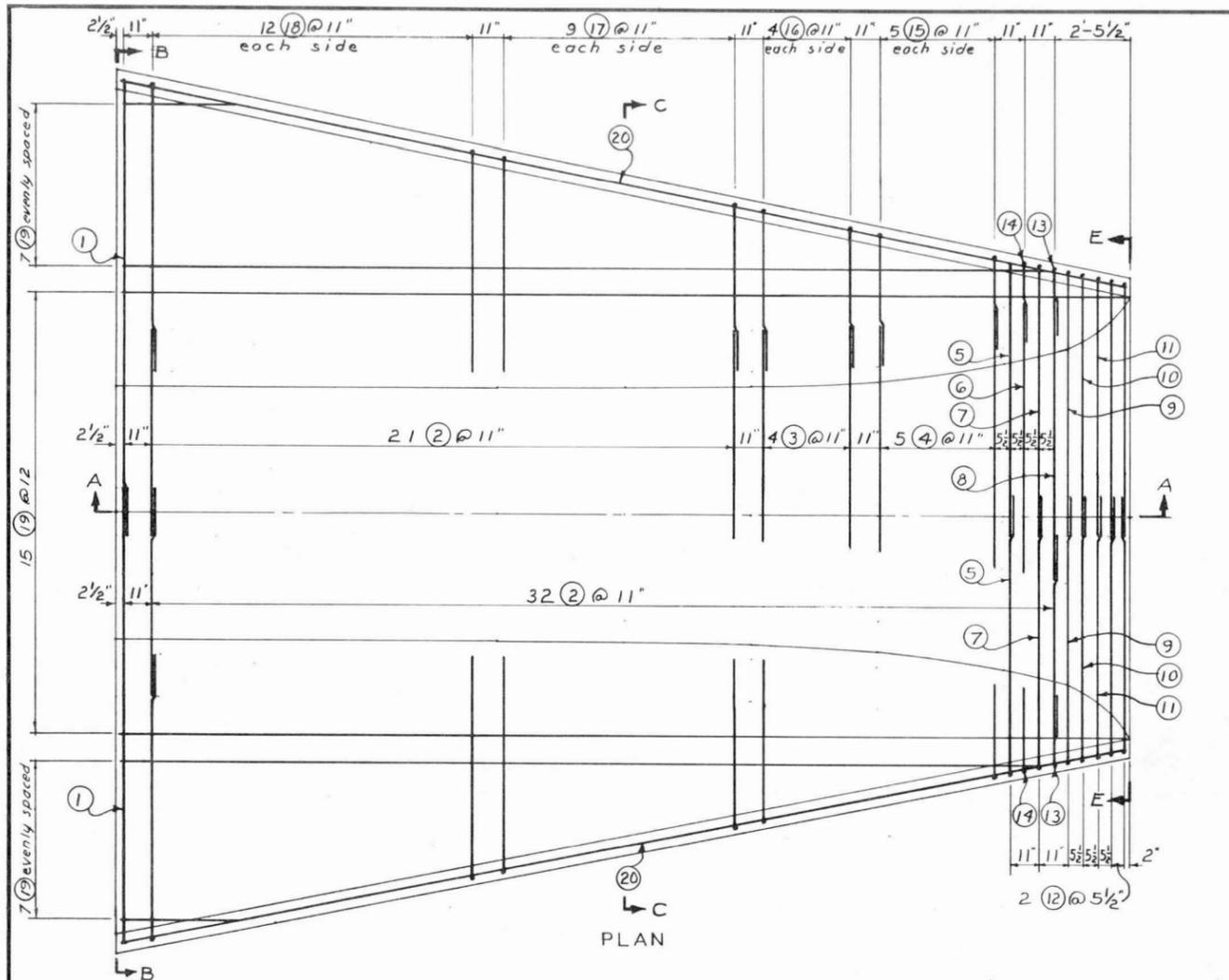


SECTION D-D

Structure	Concrete Cu. Yd.	Reinforcing Steel Lbs.
Upstream Transition	21.12	1,489
Downstream Transition	21.32	1,489

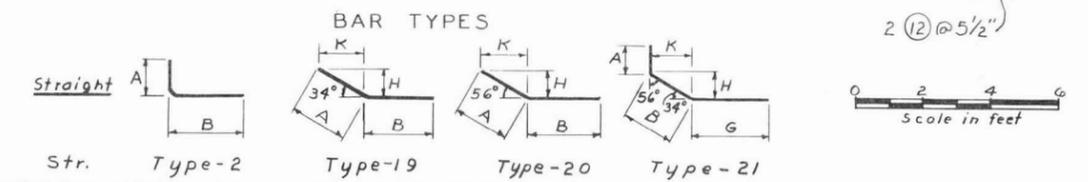
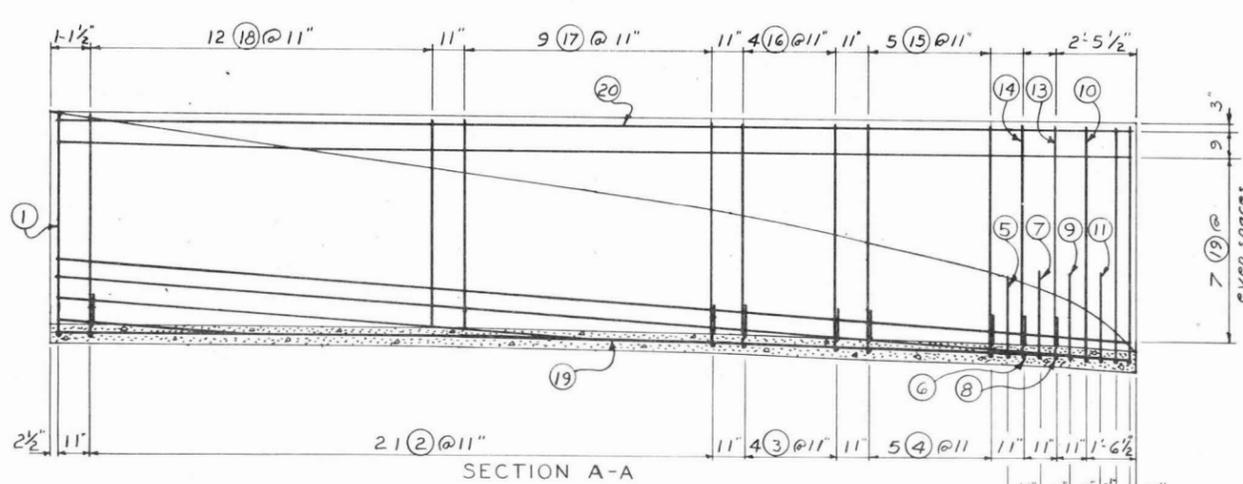
ELLSWORTH ROAD TRANSITIONS
 POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W.P.P.
 MARICOPA & PINAL COUNTIES, ARIZONA
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed: G.W. Date: _____ Approved by: _____
 Drawn: D.R.M. 6-20-66 Title: _____
 Traced: _____
 Checked: G.W. 1-67 Sheet No. 34 Drawing No. 7-E-20598
 of 49



BAR SCHEDULE

Mark No.	Size	Quantity	Length	Total Length	Type	A	B	G	H	K
L 1	4	4	16-6	66-0	19	5-0	11-6		2-9	4-2
L 2	4	10	6-9	715-6	19	2-0	4-9		1-1	1-8
L 3	4	8	7-3	58-0	19	2-0	5-3		1-1	1-8
L 4	4	10	8-3	82-6	19	2-0	6-3		1-1	1-8
L 5	4	4	9-3	37-0	19	3-9	5-6		2-1	3-1/2
L 6	4	2	8-9	17-6	19	2-0	6-9		1-1	1-8
L 7	4	4	9-9	39-0	21	0-8	3-4	5-9	1-10	2-9
L 8	4	2	9-0	18-0	19	2-0	7-0		1-1	1-8
L 9	4	4	9-9	39-0	21	1-0	2-9	6-0	1-6	2-3
L 10	4	4	14-3	57-0	21	5-5	2-3	6-7	1-3	1-10 1/2
L 11	4	4	9-9	39-0	21	1-4	1-8	6-9	0-11	1-4 1/2
L 12	4	8	15-0	120-0	2	6-10	8-2			
L 13	4	4	7-6	30-0	20	2-6	5-0		2-1	1-4 1/2
L 14	4	4	7-9	31-0	20	2-11	4-10		2-5	1-7 1/2
L 15	4	4 sets of 5 bars	7-10 to 8-6 @ 2" increments	163-4	20	3-4 to 4-10 @ 4 1/2" increments	4-6 to 3-8 @ 2 1/2" increments			
L 16	4	4 sets of 4 bars	9-0 to 8-3 @ 3" increments	138-0	20	3-0 to 3-3 @ 1" increments	6-0 to 5-0 @ 4" increments			
L 17	4	4 sets of 9 bars	9-10 to 9-0 @ 1 1/4" increments	339-0	20	1-9 to 2-9 @ 1 1/2" increments	8-1 to 6-3 @ 2 3/4" increments			
L 18	4	4 sets of 12 bars	10-10 to 9-11 @ 1" increments	498-0	20	0-3 to 1-7 1/2 @ 1 1/2" increments	10-7 to 8-3 1/2 @ 2 1/2" increments			
L 19	4	58	31-9	1841-6	Str.					
L 20	4	4	32-3	129-0	Str.					



- Notes:
- All bar dimensions are out to out of bar.
 - Radius of bends equals seven times the bar diameter.
 - Bar L(19) will be field bent.
 - Reinforcing steel is identical for inlet and outlet Transition Structures. Bar Schedule includes Bars for both structures.

ELLSWORTH ROAD UP & DN. STR. TRANSITIONS

POWERLINE FLOODWAY
APACHE JUNCTION-GILBERT W.P.P.
MARICOPA & PINAL COUNTIES ARIZONA

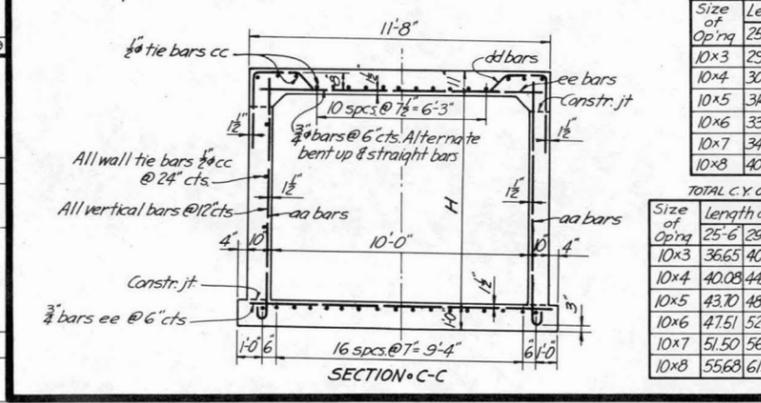
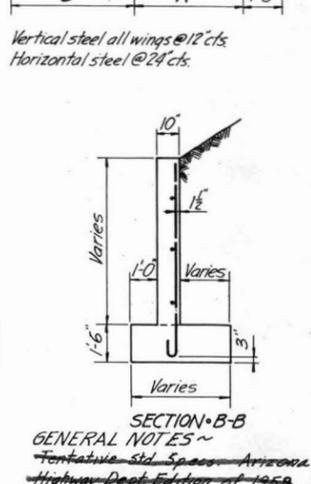
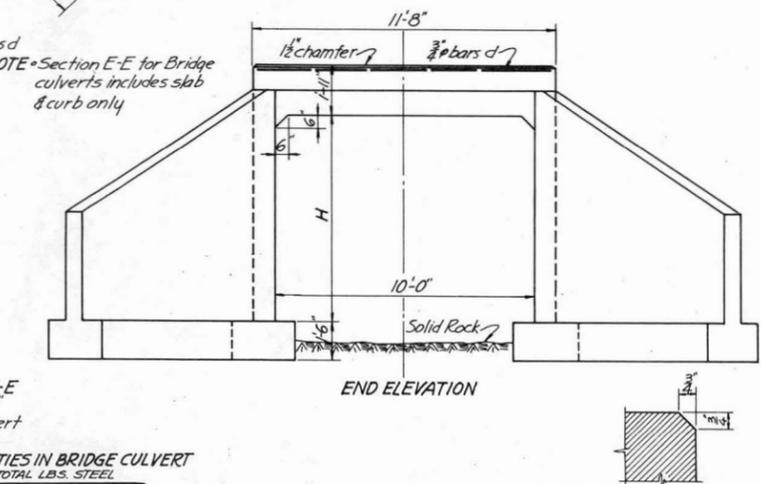
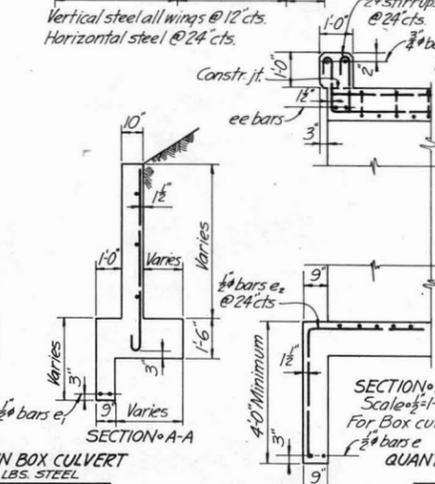
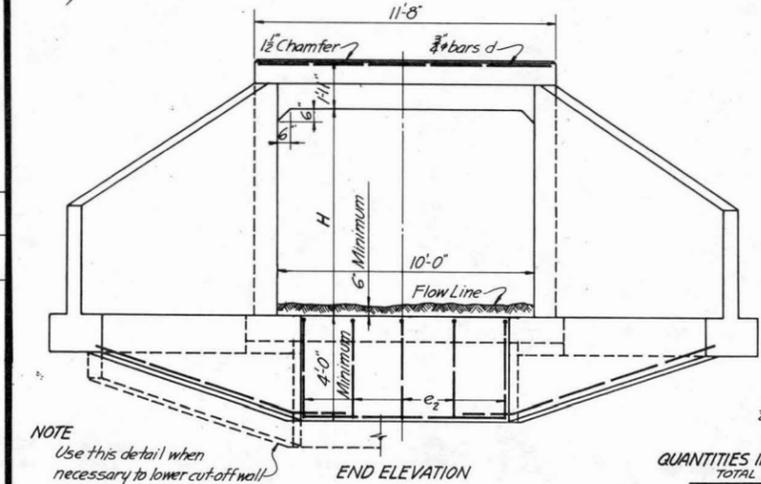
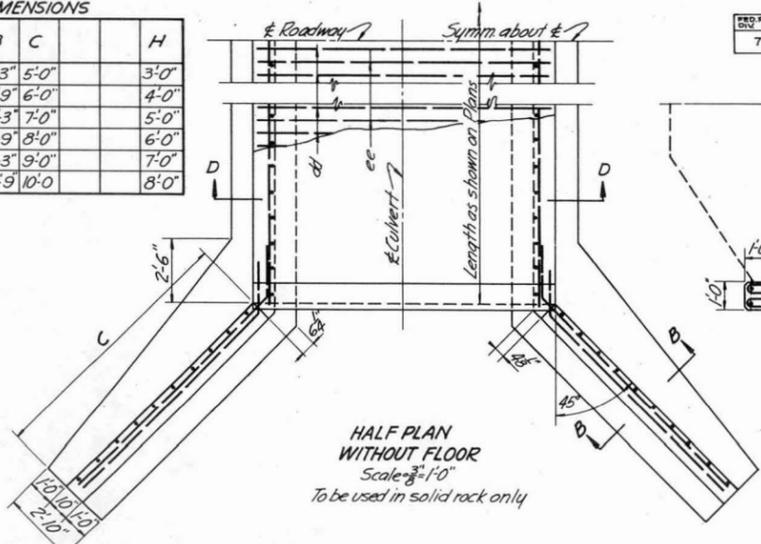
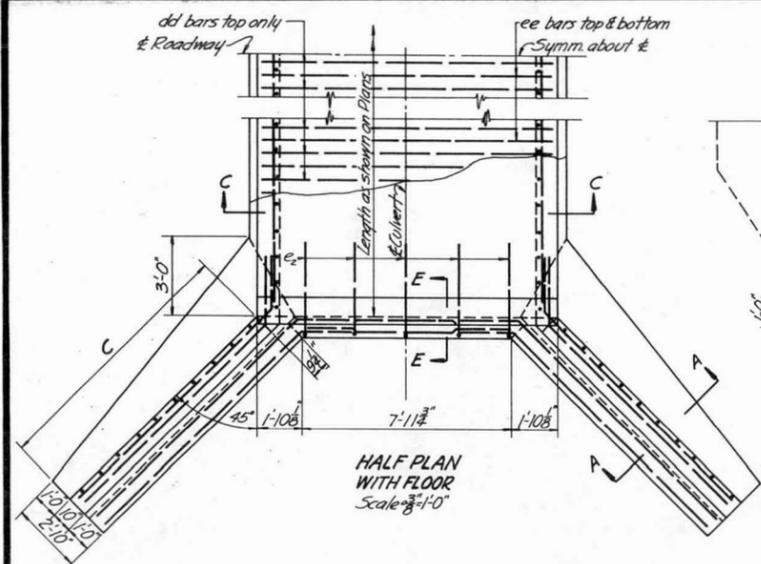
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed: G. W.	Date: 6-20-66	Approved by: _____
Drawn: G. D. H.	Title: _____	_____
Traced: _____	Sheet No. 35 of 44	Drawing No. 7-E-20598
Checked: G. W.	1-67	_____

PRO. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
7	ARIZONA	80-B	19		

DIMENSIONS

Size of Opn	A	B	C	H
10x3	1'-8"	2'-3"	5'-0"	3'-0"
10x4	2'-2"	2'-9"	6'-0"	4'-0"
10x5	2'-8"	3'-3"	7'-0"	5'-0"
10x6	3'-2"	3'-9"	8'-0"	6'-0"
10x7	3'-8"	4'-3"	9'-0"	7'-0"
10x8	4'-2"	4'-9"	10'-0"	8'-0"



QUANTITIES IN BOX CULVERT

Size of Opn	Length of Culvert	TOTAL LBS. STEEL
10x3	25'-6"	2915
10x3	29'-6"	3315
10x3	33'-6"	3720
10x4	25'-6"	3020
10x4	29'-6"	3430
10x4	33'-6"	3840
10x5	25'-6"	3345
10x5	29'-6"	3565
10x5	33'-6"	3980
10x6	25'-6"	3315
10x6	29'-6"	3745
10x6	33'-6"	4180
10x7	25'-6"	3450
10x7	29'-6"	3890
10x7	33'-6"	4330
10x8	25'-6"	4070
10x8	29'-6"	4565
10x8	33'-6"	5060

QUANTITIES IN BRIDGE CULVERT

Size of Opn	Length of Culvert	TOTAL LBS. STEEL
10x3	25'-6"	1870
10x3	29'-6"	2125
10x3	33'-6"	2375
10x4	25'-6"	1970
10x4	29'-6"	2230
10x4	33'-6"	2495
10x5	25'-6"	2090
10x5	29'-6"	2360
10x5	33'-6"	2630
10x6	25'-6"	2255
10x6	29'-6"	2535
10x6	33'-6"	2820
10x7	25'-6"	2385
10x7	29'-6"	2690
10x7	33'-6"	2970
10x8	25'-6"	2995
10x8	29'-6"	3345
10x8	33'-6"	3690

QUANTITIES IN CONCRETE

Size of Opn	Length of Culvert	Concr. in cu. ft.	Lbs. St. per lin. ft. of Bbl.
10x3	25'-6"	36.65	40.84
10x3	29'-6"	45.02	104.7
10x3	33'-6"	117.7	117.7
10x4	25'-6"	40.08	44.52
10x4	29'-6"	48.96	110.9
10x4	33'-6"	117.1	122.0
10x5	25'-6"	43.70	48.38
10x5	29'-6"	53.07	123.3
10x5	33'-6"	125.4	125.4
10x6	25'-6"	47.51	52.44
10x6	29'-6"	61.86	129.4
10x6	33'-6"	127.6	127.6
10x7	25'-6"	51.50	56.68
10x7	29'-6"	66.53	135.6
10x7	33'-6"	141.6	141.6

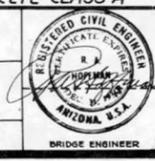
NOTE: Use this detail when necessary to lower cut-off wall.

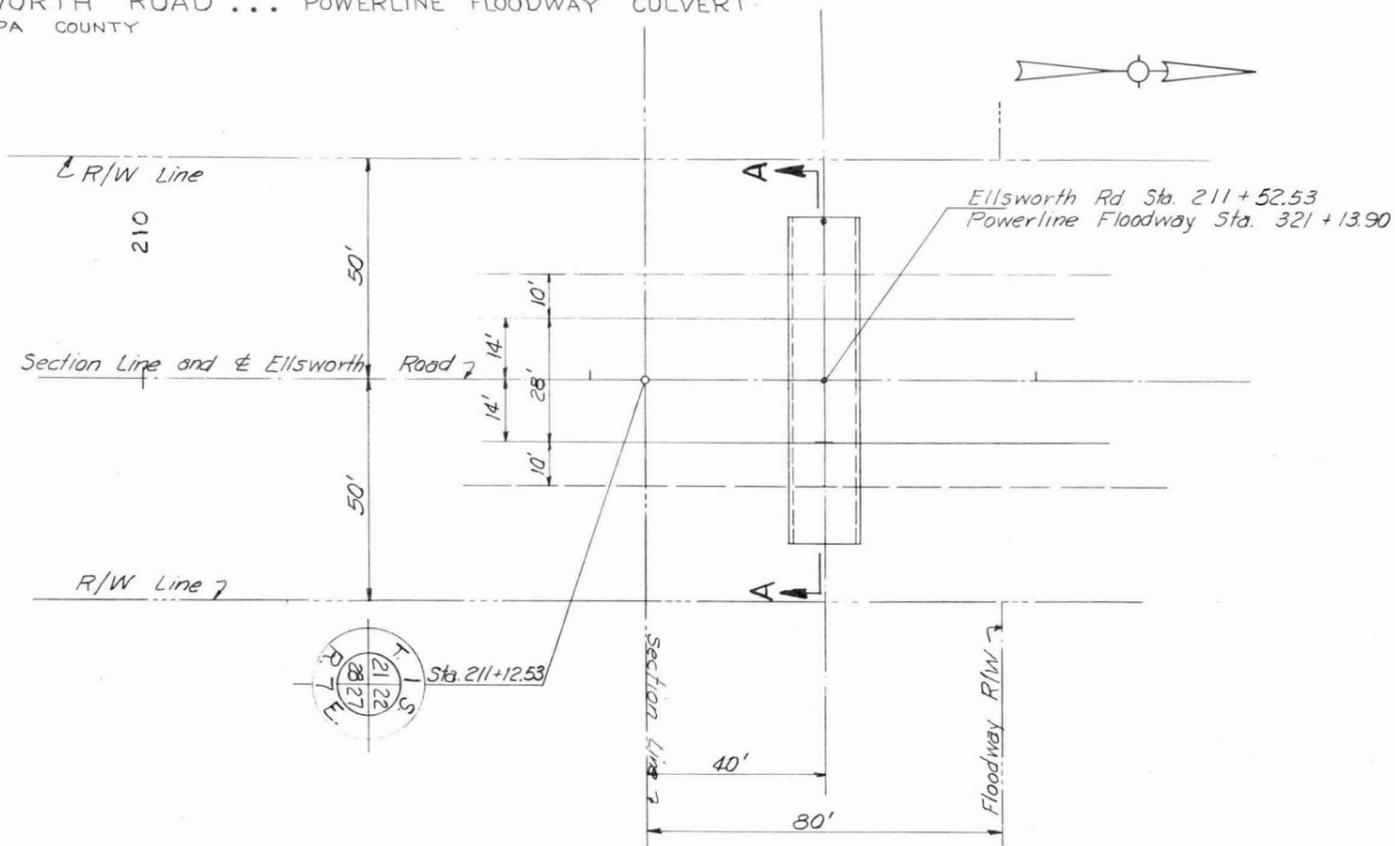
SEE STD. CI-10-S FOR ALL STEEL LISTS AND BEND DIAGRAMS

Revision April 8, 1937. Curb steel changed from 1/2" to 3/4". On all projects after this date add 10% to quantities in tables. Revision June 1, 1941 - See Std. CI-10-5

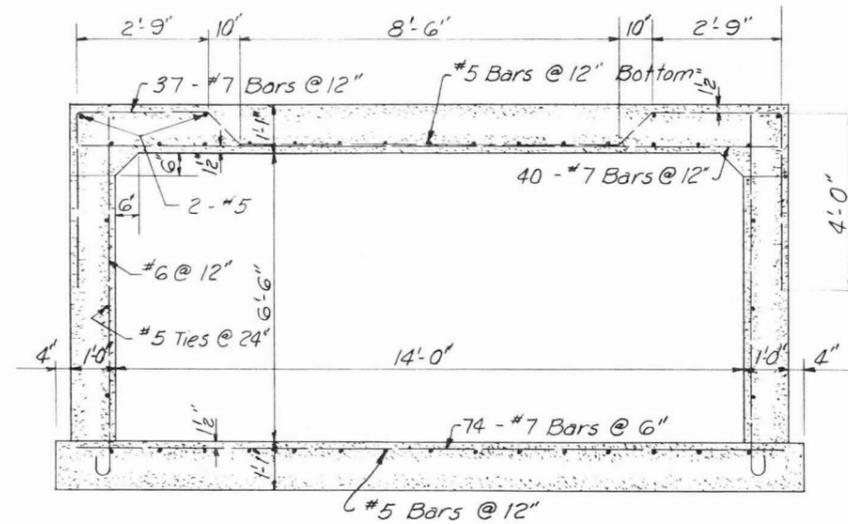
GENERAL NOTES: Chamfer all exposed corners unless otherwise noted. Loading Class H20-516-1944. Reinforcing steel shall be intermediate grade. ASTM A15 & A305. Maximum fill 12'-0".

LAYOUT	DATE	ARIZONA HIGHWAY DEPARTMENT
DESIGN		BRIDGE DIVISION
DRAWN	M.A.R. 5-5-30	STANDARD
TRACED	J.H.A. 11-21-30	
CHECKED	H.D.L.R.C.W. 10-13-30	
DATE	11-27-48	
SHEET NO.	36 OF 44	BRIDGE NUMBER
		DRAWING NUMBER
		BRIDGE ENGINEER

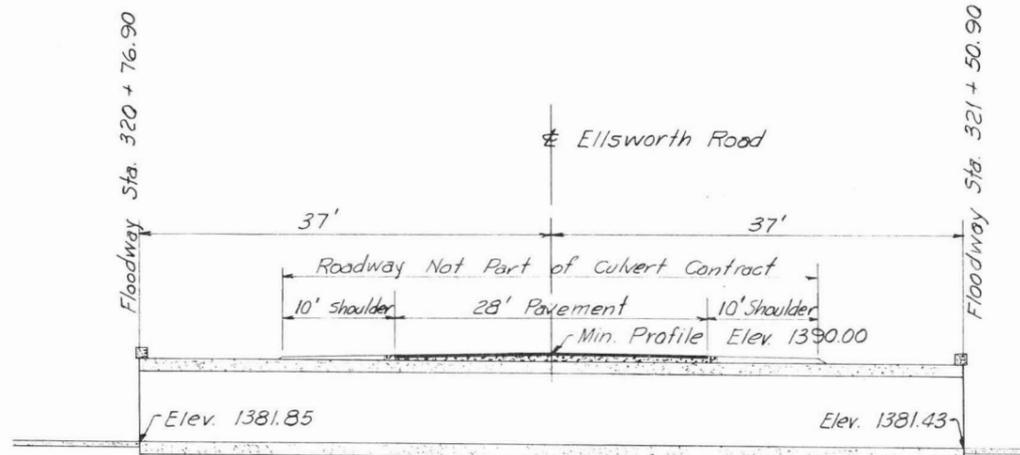




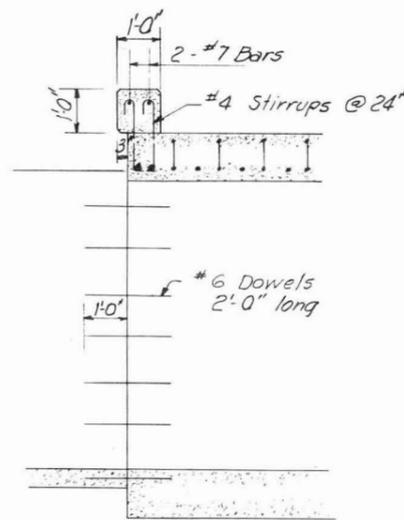
LOCATION PLAN
1" = 20'



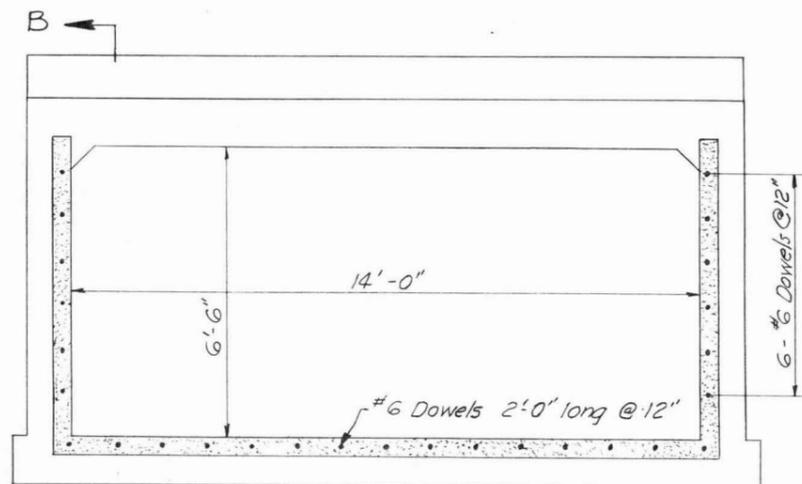
TYPICAL SECTION
1/2" = 1'-0"



SECTION A-A
1/2" = 1'-0"



SECTION B-B
1/2" = 1'-0"

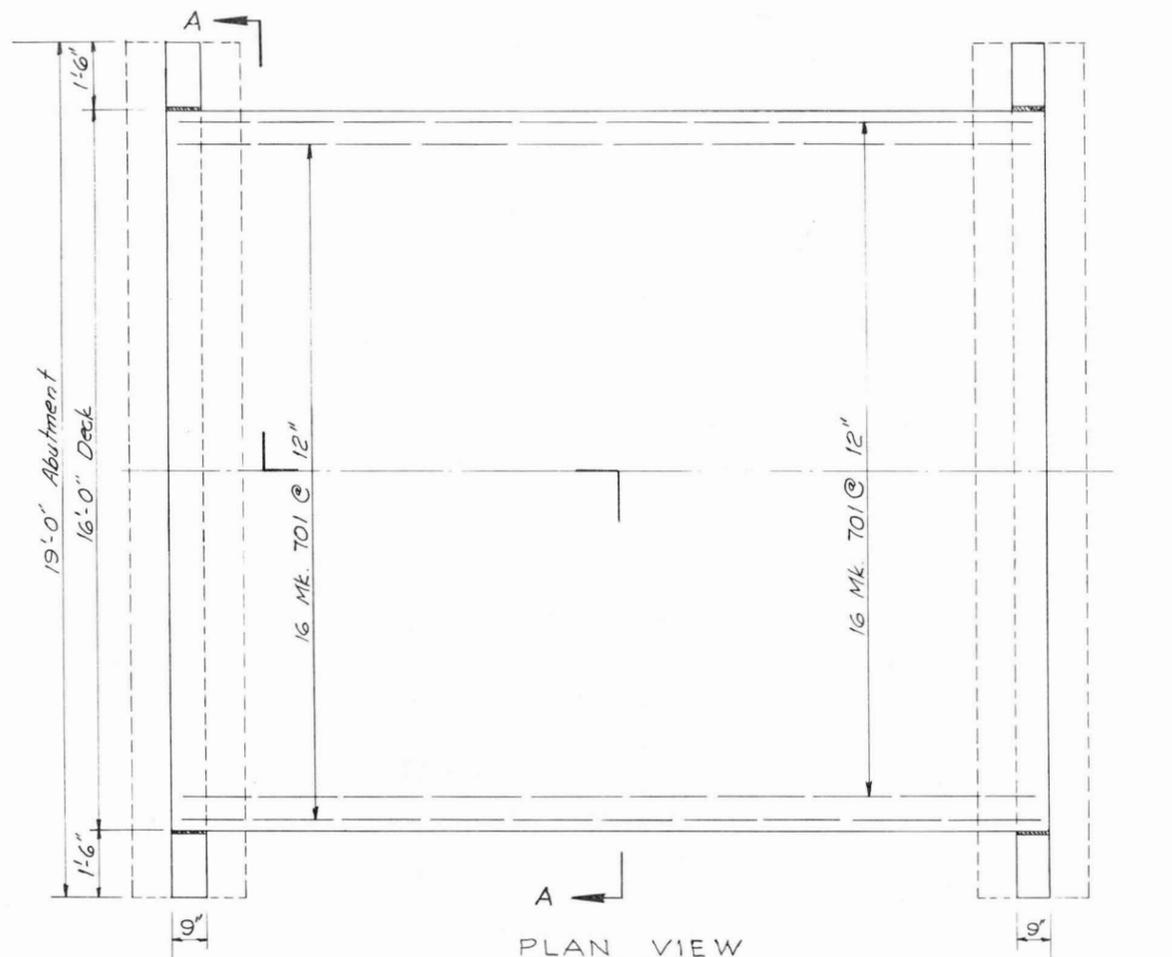


END VIEW
1/2" = 1'-0"

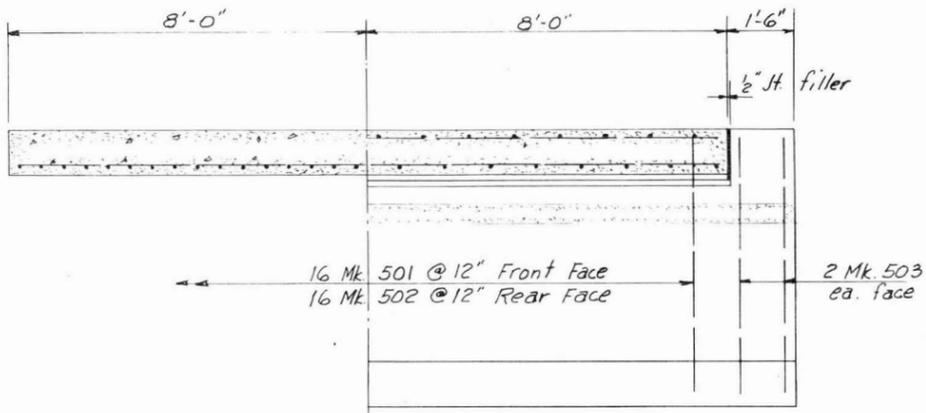
GENERAL NOTES
Design Specs. AASHTO 1961
Loading Class H20-516-1944
 $f_s = 20,000$ $f_c = 1000$ $n = 12$
Reinforcing steel shall be intermediate grade conforming to ASTM A15 & A305.
Chamfer exposed corners $\frac{3}{8}$ "

ESTIMATED QUANTITIES
Concrete 135 C.Y.
Reinf. Steel 11,000 Lbs.



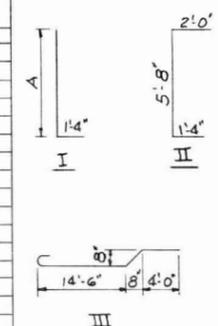


PLAN VIEW



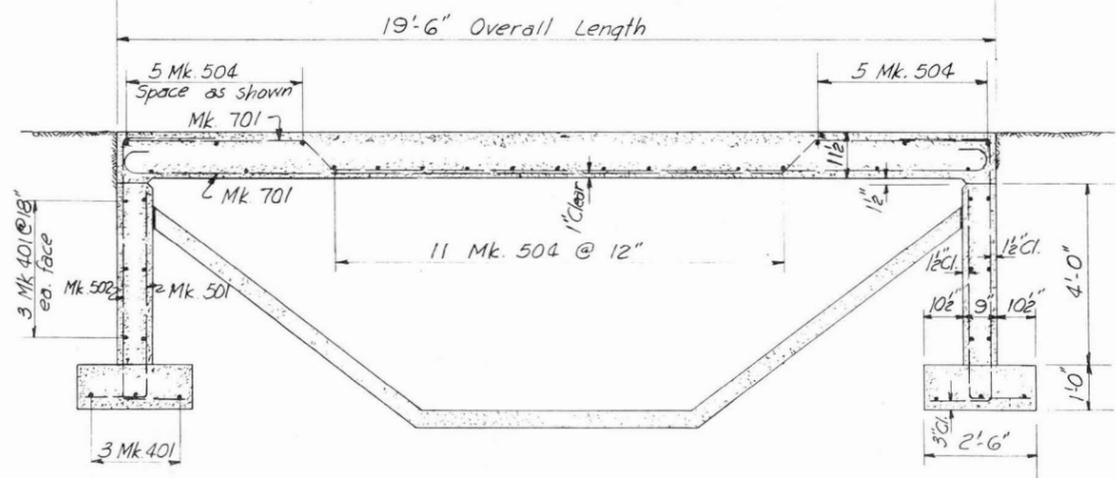
SECTION A-A

REINFORCEMENT SCHEDULE						
MARK	SIZE	NO. REQ'D	LENGTH	TYPE	DIMENSION	
					A	B
401	4	18	18'-6"	STR.		
501	5	32	5'-11"	I	4'-7"	
502	5	32	9'-0"	II		
503	5	16	7'-0"	I	5'-8"	
504	5	21	15'-8"	STR.		
701	7	32	20'-2"	III		



ESTIMATED QUANTITIES

CONCRETE ($f'_c = 2500$ psi) 19 C.Y.
REINFORCING STEEL 2500 LBS.



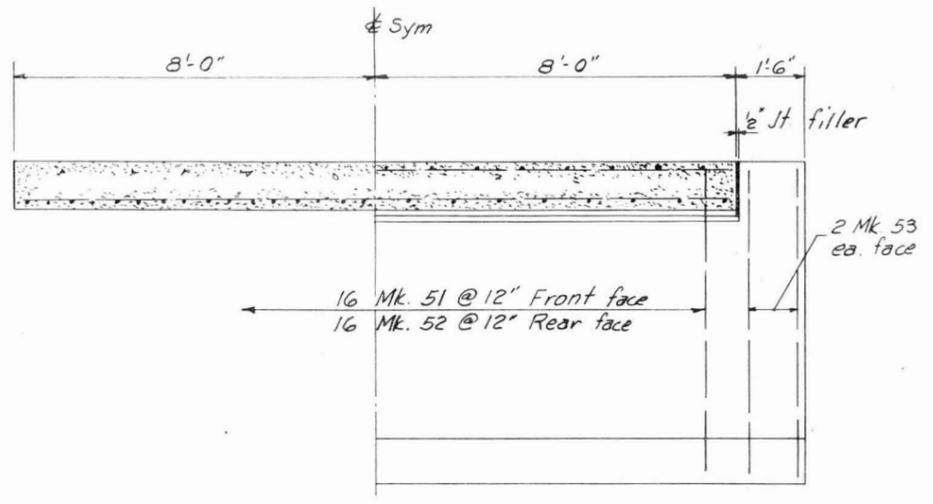
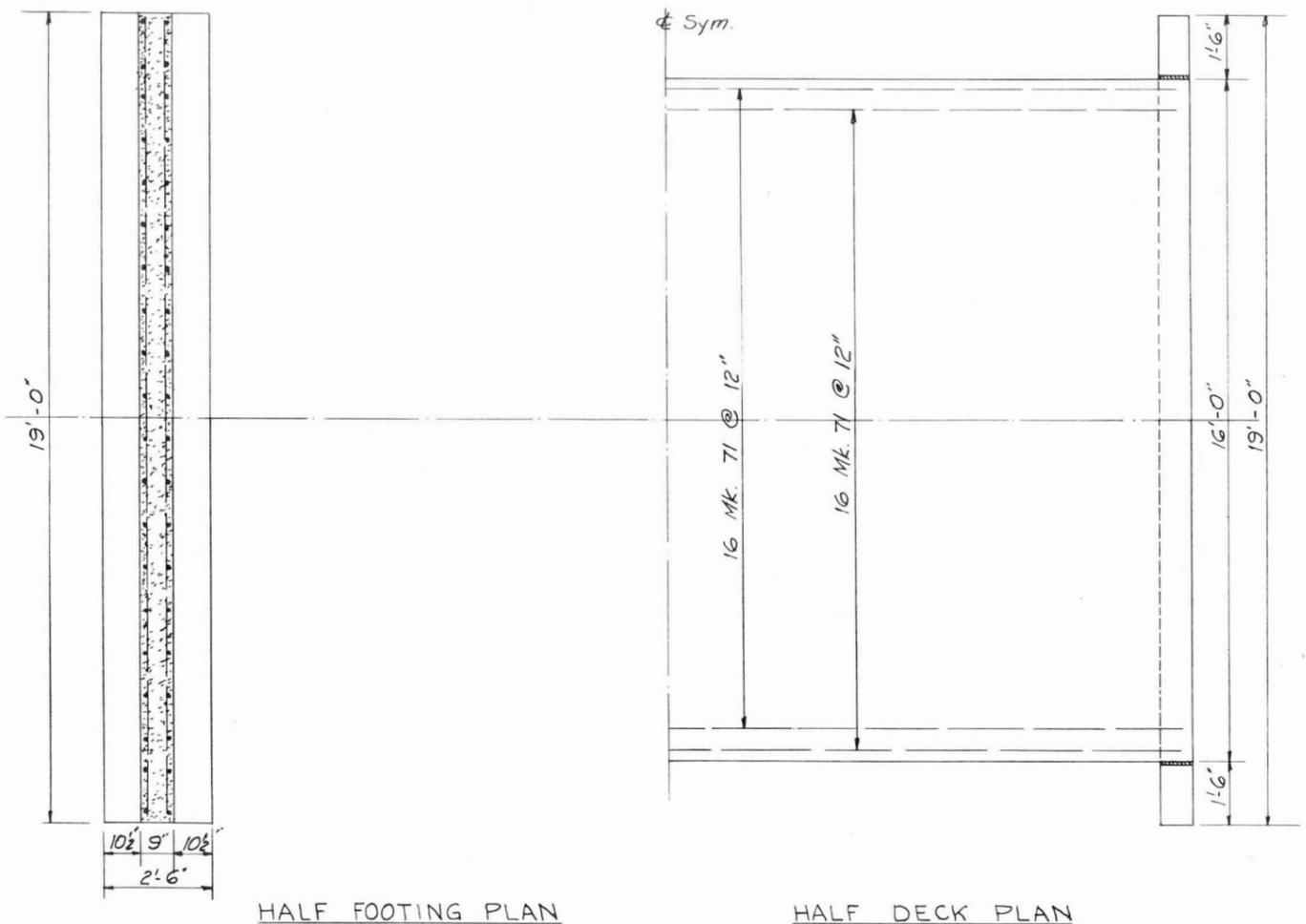
LONGITUDINAL SECTION



POWERLINE FLOODWAY
19 FT. BRIDGE FOR PRIVATE CROSSINGS

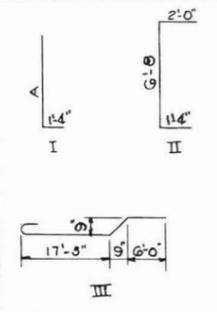
DRAWN BY: CRH SCALE: 1/2"=1'-0"
DATE: JULY 1966 Sheet 38 of 44

7-E-20598

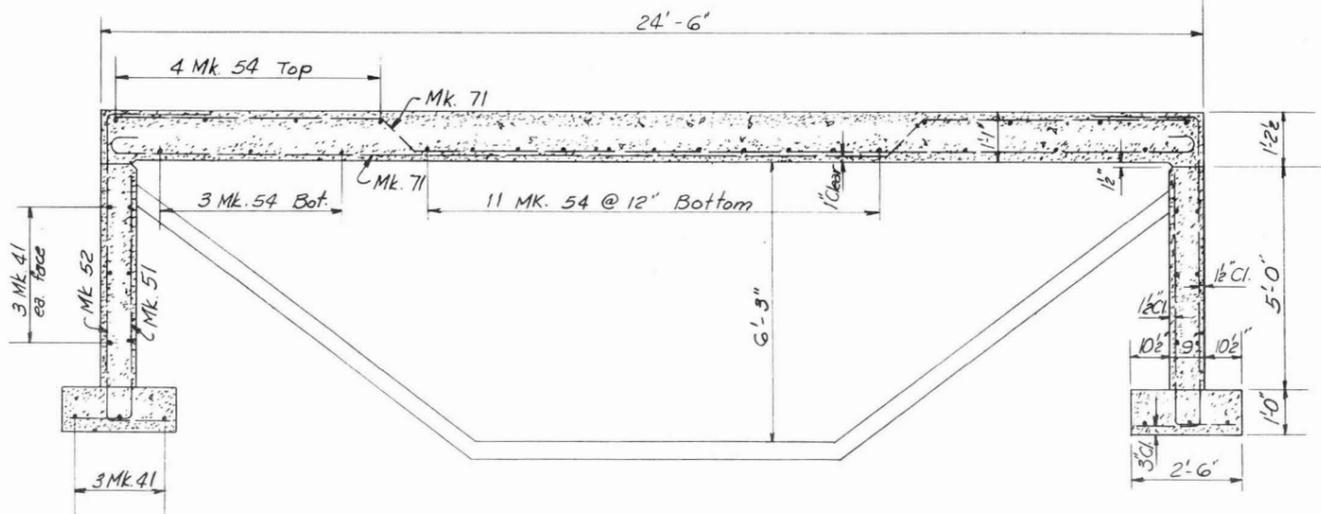


HALF MIDSPAN SECTION HALF ABUTMENT ELEVATION

MARK	SIZE	NO. REQ'D	LENGTH	TYPE	DIMENSION	
					A	B
41	4	18	18'-6"	STR.		
51	5	32	6'-11"	I	5'-7"	
52	5	32	10'-0"	II		
53	5	16	8'-0"	I	6'-8"	
54	5	25	15'-8"	STR.		
71	7	32	25'-0"	III		



ESTIMATED QUANTITIES
 CONCRETE ($f'_c = 2500 \text{ psi}$) 25 C.Y.
 REINFORCING STEEL 3000 LBS.



LONGITUDINAL SECTION



POWERLINE FLOODWAY
 24 FT. BRIDGE FOR PRIVATE CROSSINGS

DRAWN BY: CRH SCALE: 1/2" = 1'-0"
 DATE: Nov. 1966 Sheet 39 of 44
 7-E-2059B

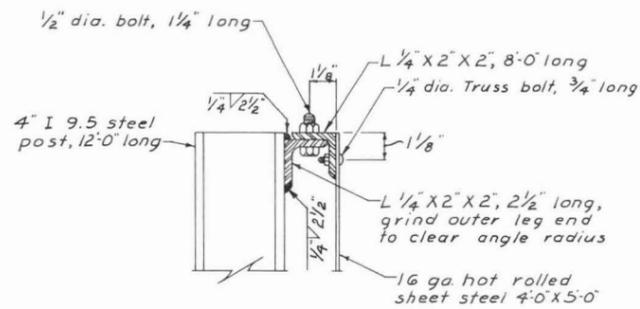
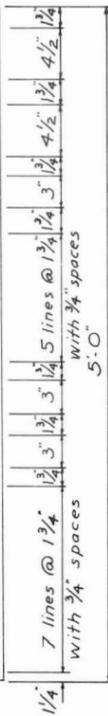
APACHE JUNCTION-GILBERT WATERSHED PROJECT FLOODWATER RETARDING DAM & CHANNEL

DRAINAGE AREA 31,750 ACRES
 FLOODWATER RETARDING STORAGE 4,020 ACRE FT.
 HEIGHT OF DAM 28 FEET
 VOLUME OF FILL 820,500 CUBIC YD.
 LENGTH OF LINED CHANNEL 45,940 FEET

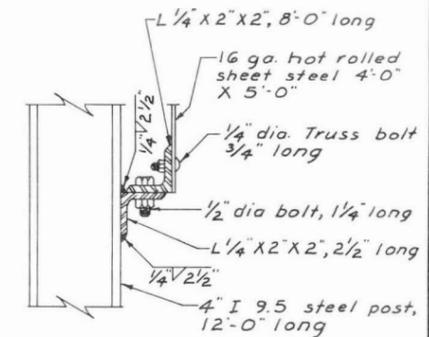
BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 AND EAST MARICOPA S.C.D. AND PINAL COUNTY
 WITH THE ASSISTANCE OF
 SOIL CONSERVATION SERVICE
 OF THE
 U. S. DEPARTMENT OF AGRICULTURE
 1966

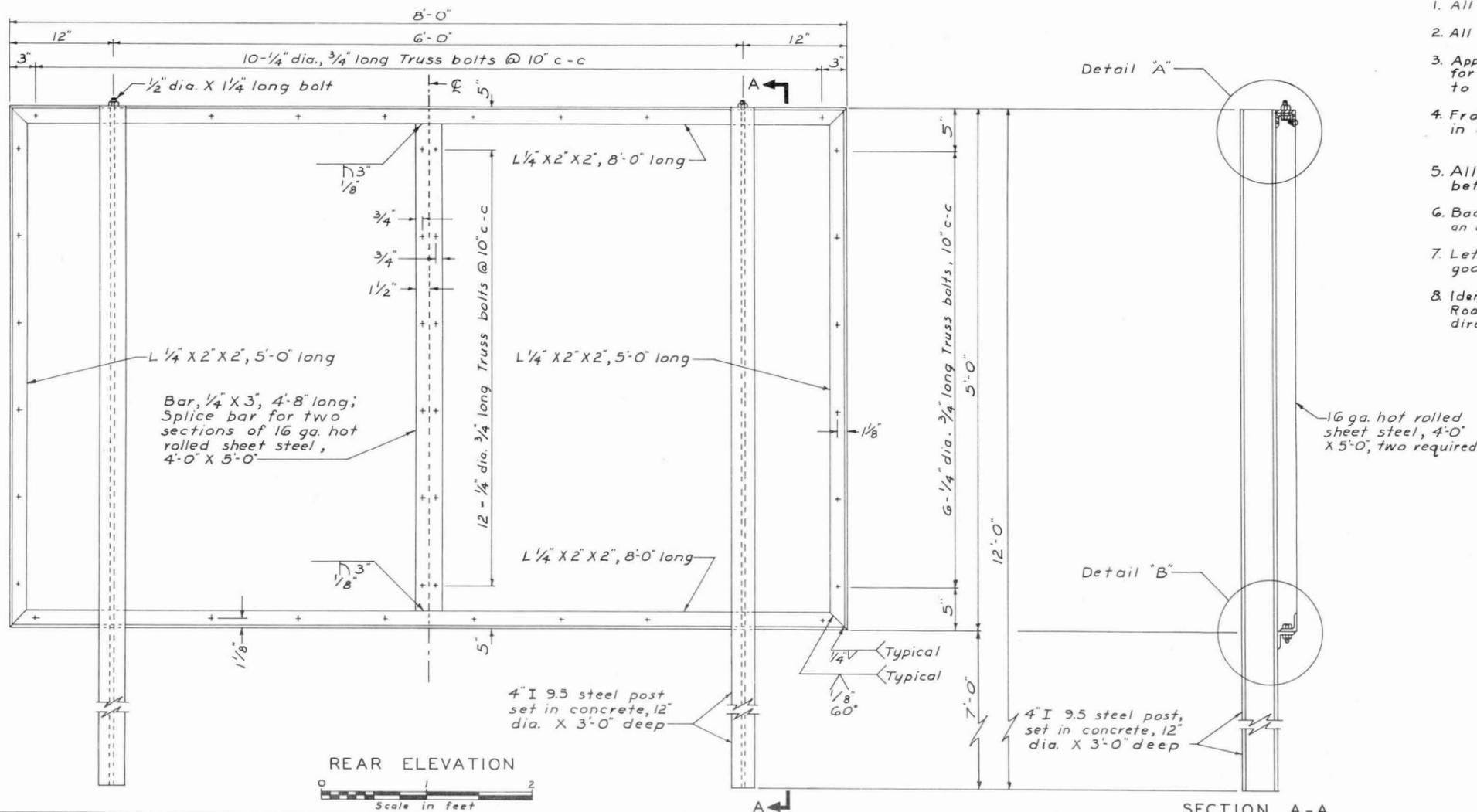
LETTERING LAYOUT



DETAIL "A"



DETAIL "B"



REAR ELEVATION



SECTION A-A

NOTES:

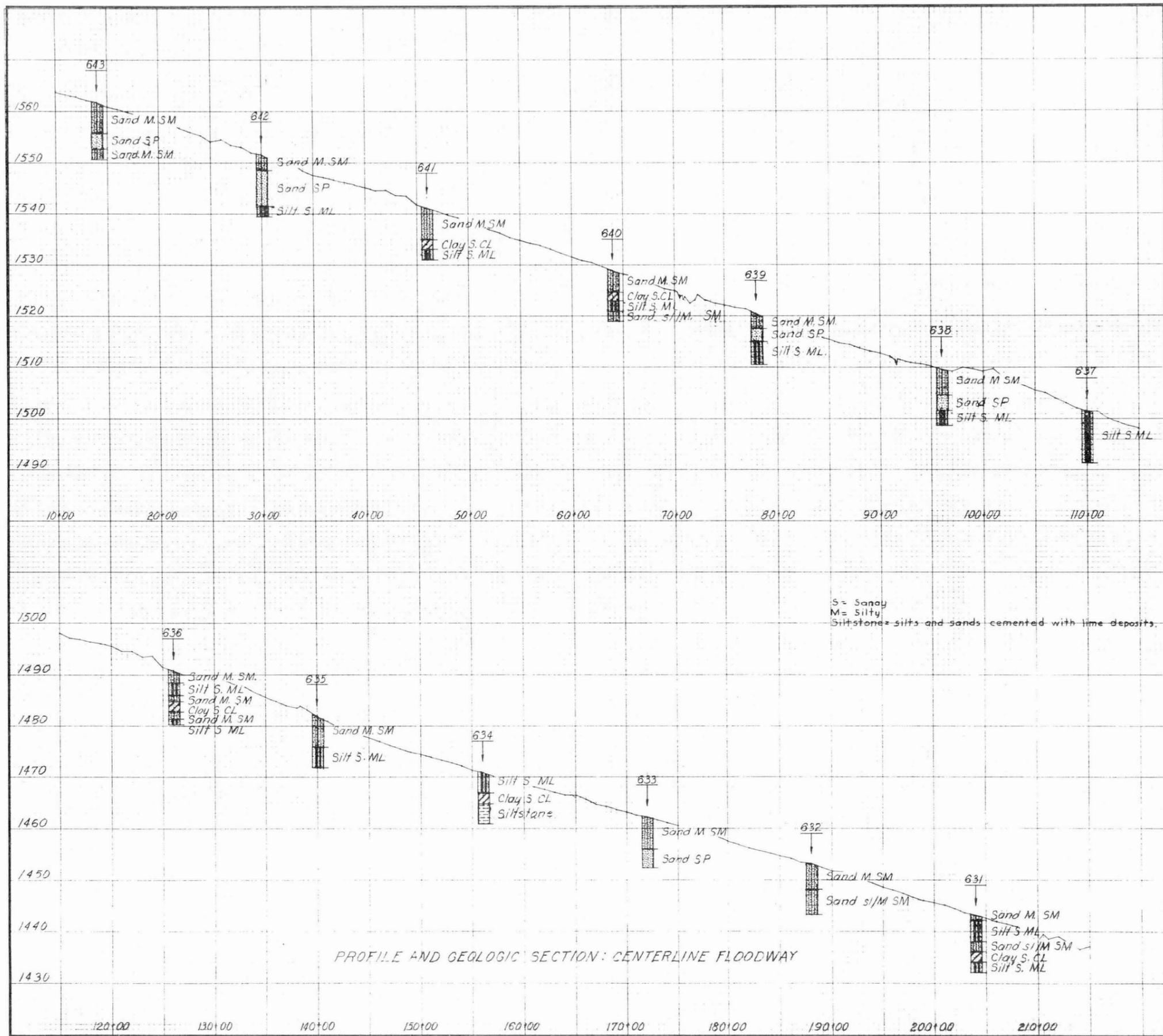
1. All bolts shall be installed with lock washers.
2. All bolts, nuts, and washers to be galvanized.
3. Approved spot or tack welding may be substituted for truss bolts in securing sign sheet steel sections to frame.
4. Frame and base coat for sign shall be painted in accordance with the specifications.
5. All parts shall be painted with base coat before assembly.
6. Background of sign shall be painted with an approved good quality white enamel.
7. Letters shall be painted with an approved good quality dark green enamel.
8. Identification sign shall be located at the Vineyard Road and Powerline Floodway intersection as directed by the engineer.

APACHE JUNCTION-GILBERT IDENTIFICATION SIGN			
POWERLINE FLOODWAY			
APACHE JUNCTION-GILBERT W. P. P.			
MARICOPA & PINAL COUNTIES, ARIZONA			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed G. WATT	Date	Approved by	
Drawn G. HANLEY 7-13-66		Title	
Traced		Title	
Checked		Sheet No. 40	Drawing No. 7-E-20598
		of 44	



PLAN OF FLOODWAY

PLAN FOR GEOLOGIC INVESTIGATION	
POWERLINE FLOODWAY	
APACHE JUNCTION-GILBERT W. P. P.	
MARICOPA & PINAL COUNTIES, ARIZONA	
U. S. DEPARTMENT OF AGRICULTURE	
SOIL CONSERVATION SERVICE	
Designed _____	Date _____
Drawn _____	Approved by _____
Traced _____	Title _____
Checked _____	Sheet _____
	Drawing No. 7-E-20598
	No. 41 of 52



LEGEND

SYMBOLS

UNCONSOLIDATED MATERIAL

gravel	sand	silt	clay	cobbles, boulders
gravel, sandy	sand, gravelly	silt, gravelly	clay, gravelly	peat
gravel, silty	sand, silty	silt, sandy	clay, sandy	gypsi-ferous *
gravel, clayey	sand, clayey	silt, clayey	clay, silty	calcar-eous *
gravel, sand, silt	sand, silt, clay	organic silt	organic clay	

* to be added to Standard Symbol when significant amounts of dispersed gypsum or calcified zones are present in the section.

CONSOLIDATED MATERIAL

Sedimentary Rocks

shale	sandstone	limestone	chalk	coal
calcareous shale	calcareous sandstone	cherty limestone	marl	gypsum
sandy shale	shaly sandstone	sandy limestone	chert	conglom-erate
siltstone	breccia	dolomite		

Metamorphic Rocks

quartzite	slate	intrusive	extrusive
gneiss	schist	pyroclastic	
marble	soapstone	taic	serpentine

Igneous Rocks

Undifferentiated

Other Symbols

- hole logged only
- ⊙ hole sampled
- ↘ dip and strike
- pit or trench

ABBREVIATIONS

aq aquifer	fri friable
cav. cavities	lam laminated
CL centerline	mas massive
con concretions	TD total depth
US undisturbed samples	v. very
DS disturbed samples	w/ with
dip dipping	wea weathered
frac fractured	WL (date) groundwater level on a specified date

TEST HOLE NUMBERING SYSTEM

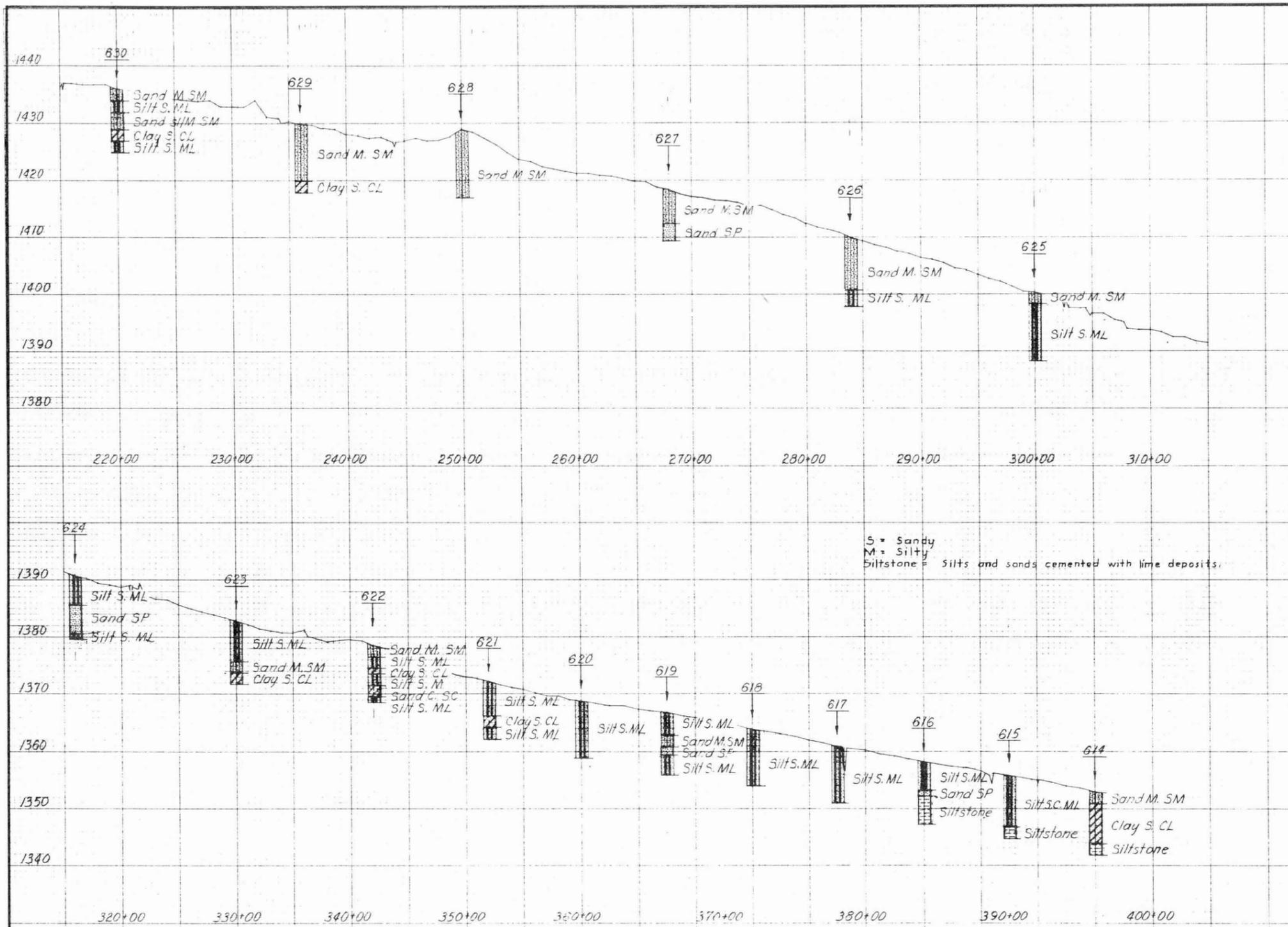
Centerline of dam	1 - 99
Borrow area	101 - 199
Emergency spillway	201 - 299
Centerline of outlet structure	301 - 399
Stream channel	401 - 499
Relief wells	501 - 599 601 - 699 701 - 799

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

GW	Well graded gravels; gravel-sand mixtures
GP	Poorly graded gravels
GM	Silty gravels; gravel-sand-silt mixtures
GC	Clayey gravels; gravel-sand-clay mixtures
SW	Well graded sands; sand-gravel mixtures
SP	Poorly graded sands
SM	Silty sand
SC	Clayey sands; sand-clay mixtures
ML	Silts; silty, v. fine sands; sandy or clayey silts
CL	Clays of low to medium plasticity; silty, sandy or gravelly clays
CH	Inorganic clays of high plasticity; fat clays
MH	Elastic silts; micaceous or diatomaceous silts
OL	Organic silts and organic silty clays of low plasticity
OH	Organic clays of medium to high plasticity

PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W. P. P.
 MARICOPA & PINAL COUNTIES, ARIZONA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Investigated by W. F. MILDNER Date 12-28-64 Approved by _____
 Title Geologist Title _____
 Checked by _____ Title _____
 Sheet 42 Drawing No. _____
 of 44 7-E-20598



LEGEND

SYMBOLS

UNCONSOLIDATED MATERIAL

gravel	sand	silt	clay	cobbles, boulders
gravel, sandy	sand, gravelly	silt, gravelly	clay, gravelly	peat
gravel, silty	sand, silty	silt, sandy	clay, sandy	gypsi-ferous *
gravel, clayey	sand, clayey	silt, clayey	clay, silty	calcareous *
gravel, sand, silt	sand, silt, clay	organic silt	organic clay	

* to be added to Standard Symbol when significant amounts of dispersed gypsum or calcified zones are present in the section.

CONSOLIDATED MATERIAL

Sedimentary Rocks

shale	sandstone	limestone	chalk	coal
calcareous shale	calcareous sandstone	cherty limestone	marl	gypsum
sandy shale	shaly sandstone	sandy limestone	chert	conglomerate
siltstone	breccia	dolomite		

Metamorphic Rocks

quartzite	slate	igneous Rocks	
gneiss	schist	intrusive	extrusive
marble	soapstone	pyroclastic	
	talc	Undifferentiated	
	serpentine		

Other Symbols

- hole logged only
- ⊙ hole sampled
- ↘ dip and strike
- pit or trench

ABBREVIATIONS

aq aquifer	fri friable
cav. cavities	lam laminated
CL centerline	mas massive
con concretions	TD total depth
US undisturbed samples	v. very
DS disturbed samples	w/ with
dip dipping	wea weathered
frac fractured	WL (date) groundwater level on a specified date

TEST HOLE NUMBERING SYSTEM

Centerline of dam	1 - 99
Borrow area	101 - 199
Emergency spillway	201 - 299
Centerline of outlet structure	301 - 399
Stream channel	401 - 499
Relief wells	501 - 599
	601 - 699
	701 - 799

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

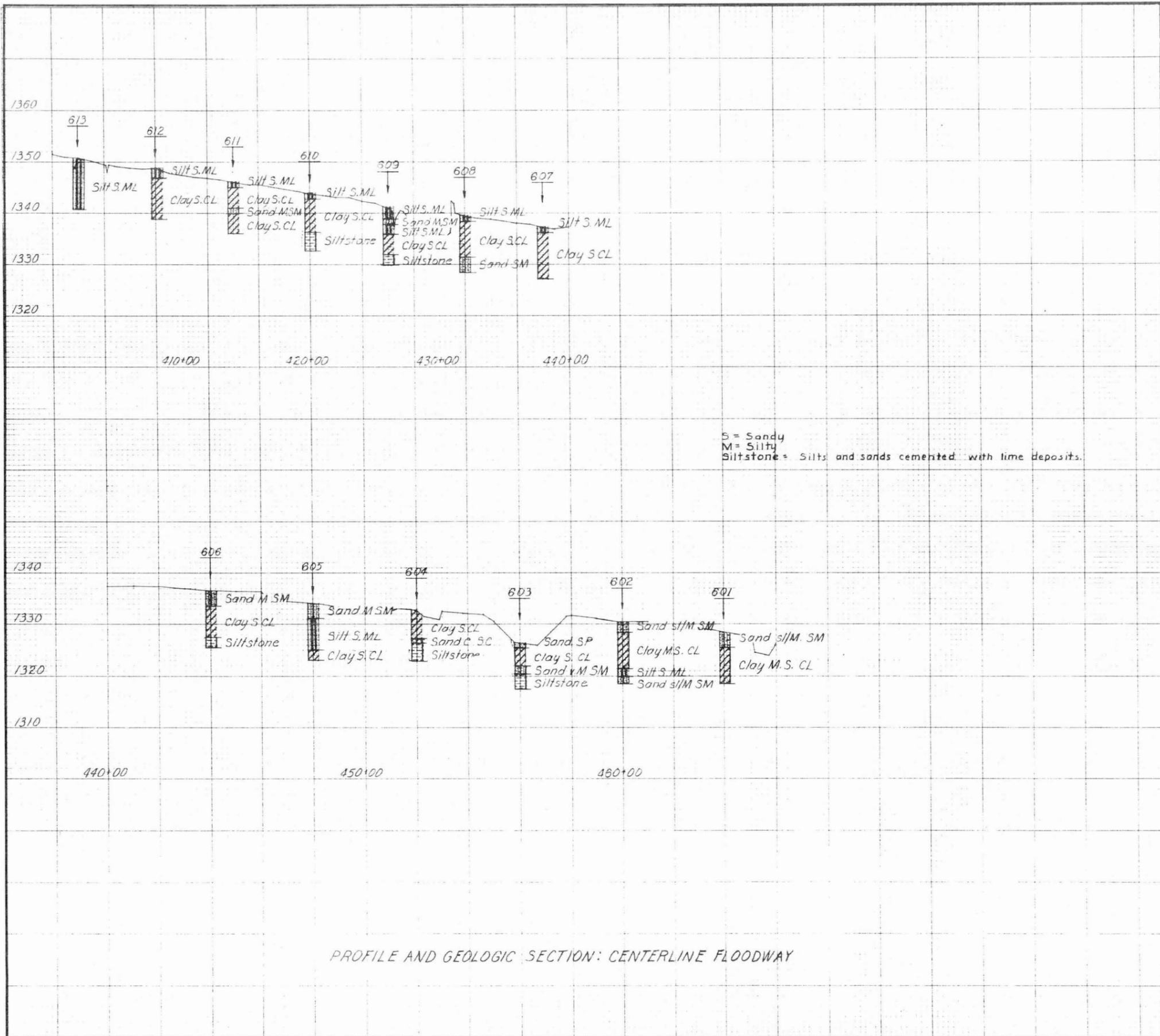
GW	Well graded gravels; gravel-sand mixtures
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OL	Organic silts and organic silty clays of low plasticity
OH	Organic clays of medium to high plasticity

PROFILE AND GEOLOGIC SECTION: CENTERLINE FLOODWAY

PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W. P. P.
 MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Investigated by <i>W. F. MILDNER</i>	Date <i>12-28-64</i>	Approved by	Title
Checked by			
		Sheet No. <i>43</i>	Drawing No. <i>7-E-20598</i>



S = Sandy
 M = Silty
 Siltstone = Silts and sands cemented with lime deposits.

LEGEND

SYMBOLS

UNCONSOLIDATED MATERIAL

gravel	sand	silt	clay	cobbles, boulders
gravel, sandy	sand, gravelly	silt, gravelly	clay, gravelly	peat
gravel, silty	sand, silty	silt, sandy	clay, sandy	gypsi-ferous *
gravel, clayey	sand, clayey	silt, clayey	clay, silty	calcareous *
gravel, sand, silt	sand, silt, clay	organic silt	organic clay	

* to be added to Standard Symbol when significant amounts of dispersed gypsum or calcified zones are present in the section.

CONSOLIDATED MATERIAL

Sedimentary Rocks

shale	sandstone	limestone	chalk	coal
calcareous shale	calcareous sandstone	cherty limestone	marl	gypsum
sandy shale	shaly sandstone	sandy limestone	chert	conglomerate
siltstone	breccia	dolomite		

Metamorphic Rocks

quartzite	slate
gneiss	schist
marble	soapstone talc serpentine

Igneous Rocks

intrusive	extrusive
pyroclastic	
Undifferentiated	

Other Symbols

● hole logged only	↘ dip and strike
⊙ hole sampled	○ pit or trench

ABBREVIATIONS

- | | |
|------------------------|---|
| aq aquifer | fri friable |
| cav. cavities | lam laminated |
| cl centerline | mas massive |
| con concretions | TD total depth |
| US undisturbed samples | v. very |
| DS disturbed samples | w/ with |
| dip dipping | wea weathered |
| frac fractured | WL (date) groundwater level on a specified date |

TEST HOLE NUMBERING SYSTEM

- | | |
|--------------------------------|-----------|
| Centerline of dam | 1 - 99 |
| Borrow area | 101 - 199 |
| Emergency spillway | 201 - 299 |
| Centerline of outlet structure | 301 - 399 |
| Stream channel | 401 - 499 |
| Relief wells | 501 - 599 |
| | 601 - 699 |
| | 701 - 799 |

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

- | | |
|----|---|
| GW | Well graded gravels; gravel-sand mixtures |
| GP | Poorly graded gravels |
| GM | Silty gravels; gravel-sand-silt mixtures |
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| OH | Organic clays of medium to high plasticity |

PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
POWERLINE FLOODWAY
 APACHE JUNCTION-GILBERT W. P. P.
 MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Investigated by <i>W. F. MILDNER</i>	Date <i>12-28-69</i>	Approved by	Title
Checked by	Title	Sheet No. <i>24</i>	Drawing No. <i>7-E-20598</i>
Title		of <i>24</i>	

PROFILE AND GEOLOGIC SECTION: CENTERLINE FLOODWAY