

FLOODWATER RETARDING DAM NO. 3 SANDERSON CANYON WATERSHED PROJECT BREWSTER, PECOS & TERRELL COUNTIES, TEXAS

DRAINAGE AREA 5088 ACRES
TOTAL STORAGE 1429 AC.FT.
HEIGHT OF DAM 39 FEET
VOLUME OF FILL 440,036 CU. YDS.

SPONSORED BY
RIO GRANDE-PECOS RIVER, BIG BEND AND TRANS-PECOS SOIL AND WATER CONSERVATION DISTRICTS
TERRELL, PECOS AND BREWSTER COUNTY COMMISSIONERS COURTS

COOPERATING WITH
SOIL CONSERVATION SERVICE
OF THE
U.S. DEPARTMENT OF AGRICULTURE
1979

AS BUILT PLANS
CONTRACT NO. 50-7442-4-2802
CONTRACTOR West Texas Roads, Inc.
CONSTRUCTION COMMENCED 3/13/84
GOV. REPRESENTATIVE Billy J. Gunter
GOV. INSPECTOR Frank B. Tyl
BID PRICE \$1,094,289.55
FINAL PRICE \$1,138,009.66
CONSTRUCTION COMPLETED 4/9/85

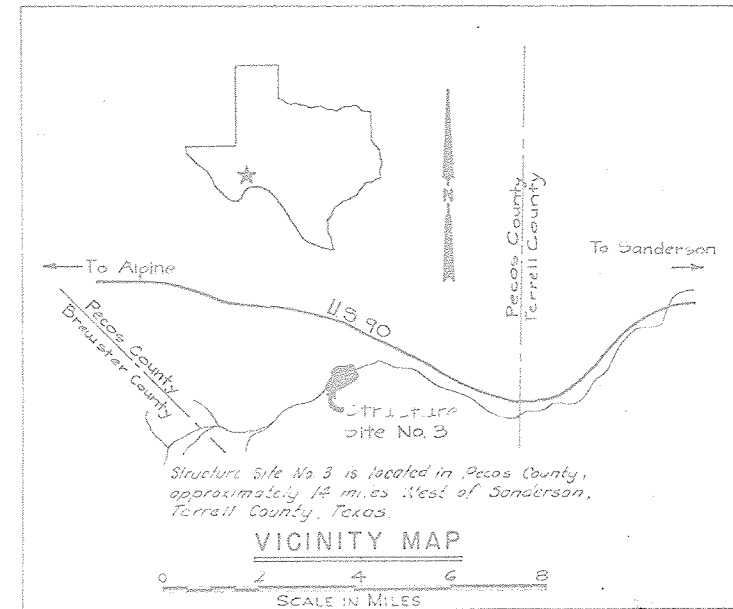
CONSTRUCTION DRAWINGS APPROVED

Benham Blair
STATE CONSERVATION ENGR. S.C.S. DATE 9-17-79
TEMPLE, TEXAS

John E. Olson, P.E.
BENHAM-BLAIR & AFFILIATES, INC. DATE 9/12/79
SAN ANTONIO, TEXAS



INDEX OF DRAWINGS	
Sheet No.	Title
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2	Plan of Embankment and Spillways
3	Material Placement
4-5	Principal Spillway - Plan and Section
6	Emergency Spillway - Plan and Profile
7	Embankment Foundation Drain
8	Pipe Details
9	Principal Spillway Inlet
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13	Trash Rack, Slide Gate & Pipe Cantilever Support Details
14	Port Trash Rack
15	Principal Spillway Inlet scour Apron
16-20	Plan and Profile for Geologic Investigations



BENHAM - BLAIR & AFFILIATES, INC.
ARCHITECTS ENGINEERS PLANNERS CONSULTANTS
SUITE 470 SOUTH TOWER C.P.M. LIFE BUILDING SAN ANTONIO, TEXAS

Drawing No. 4-E-36,852

STORAGE-CAPACITY TABLE

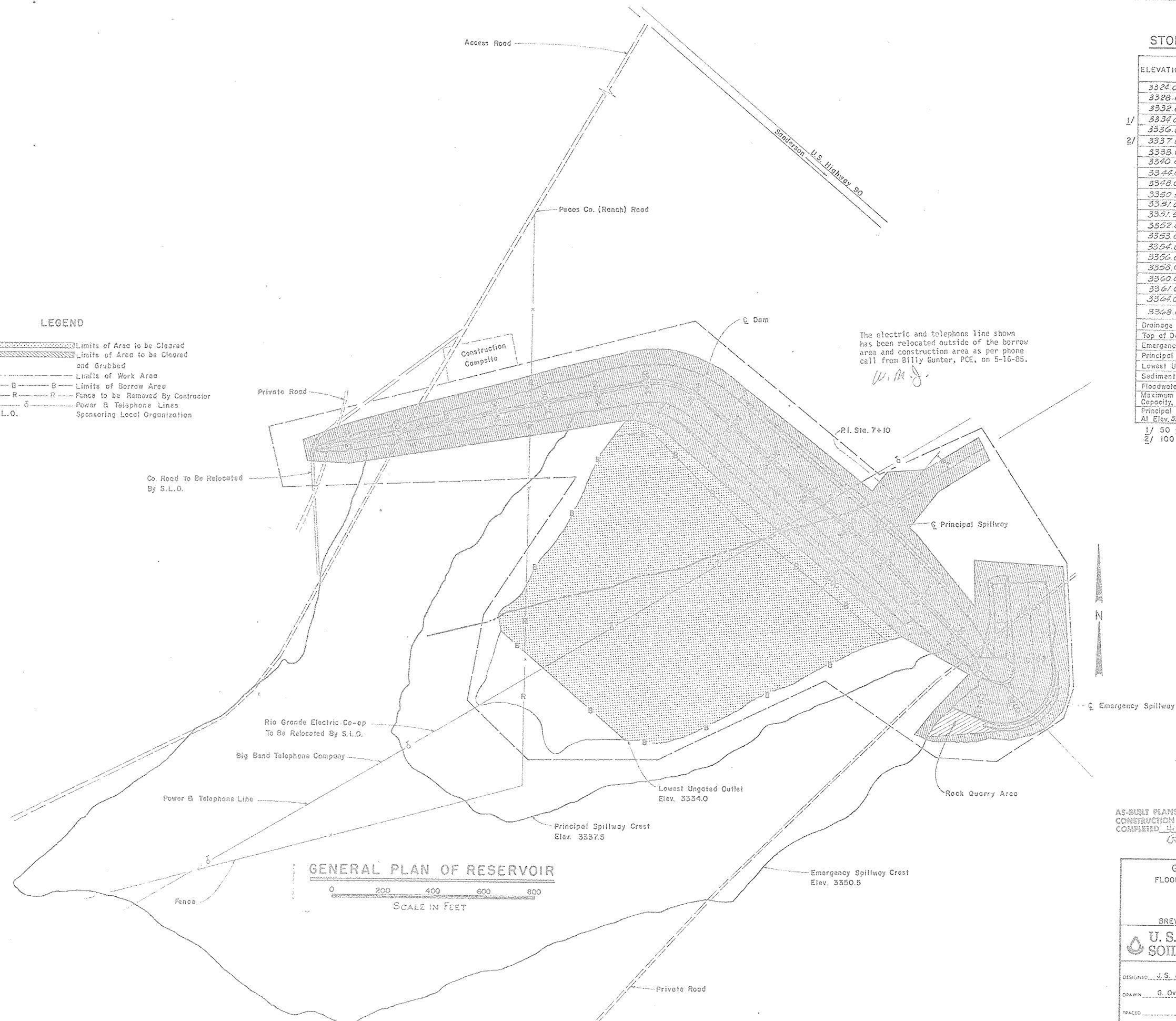
ELEVATION	SURFACE ACRES	CAPACITY	
		ACRE FEET	INCHES
3324.0	2.0	4	0.009
3328.0	10.0	26	0.07
3332.0	23.5	95	0.22
3334.0	32.0	148	0.35
3336.0	43.0	226	0.54
3337.5	53.0	326	0.70
3338.0	55.0	326	0.77
3340.0	65.0	444	1.06
3344.0	87.0	748	1.76
3348.0	111.0	1144	2.70
3350.5	128.0	1429	3.37
3351.0	130.0	1500	3.54
3351.5	133.0	1555	3.70
3352.0	138.0	1645	3.87
3353.0	145.0	1770	4.23
3354.0	153.0	1920	4.60
3356.0	171.0	2260	5.33
3358.0	185.0	2640	6.20
3360.0	201.5	3005	7.09
3361.0	207.0	3222	7.60
3364.0	231.5	3871	8.13
3368.0	261.1	4856	11.45

Drainage Area, Acres		5086.0
Top of Dam (effective) Elev.		3361.0
Emergency Spillway Crest Elev.		3350.5
Principal Spillway Crest Elev.		3337.5
Lowest Ungated Outlet Elev.		3334.0
Sediment Capacity, Acre Feet		326.0
Floodwater Capacity, Acre Feet		1103.0
Maximum Emergency Spillway Capacity, cubic feet/second		10,320.0
Principal Spillway Capacity, At Elev. 3350.5, cubic feet/second		102

1/ 50 yr. Submerged Sediment
2/ 100 yr. Submerged Sediment

LEGEND

--- Limits of Area to be Cleared
--- Limits of Area to be Cleared and Grubbed
--- Limits of Work Area
--- Limits of Borrow Area
--- Fence to be Removed By Contractor
--- Power & Telephone Lines
--- S.L.O. Sponsoring Local Organization



GENERAL PLAN OF RESERVOIR

0 200 400 600 800
SCALE IN FEET

AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/1/85

NO CHANGE IN PLANS



GENERAL PLAN OF RESERVOIR
FLOODWATER RETARDING STRUCTURE SITE NO. 3
SANDERSON CANYON WATERSHED

IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

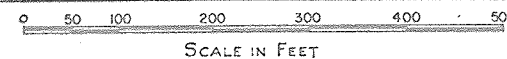
DESIGNED	J. S. Almon	DATE	5/79	APPROVED BY	J. S. Almon	TITLE	STATE CONSERVATION ENGINEER'S O.E.P.
DRAWN	G. Ovalle	DATE	5/79	APPROVED BY	J. S. Almon	TITLE	Benham-Stair & Associates, Inc.
TRACED		SHEET	1	DRAWING NO.			
CHECKED	J. S. Almon	DATE	5/79	NO. 1			
				OF 20			

4-E-36,852

Embankment Curve Data

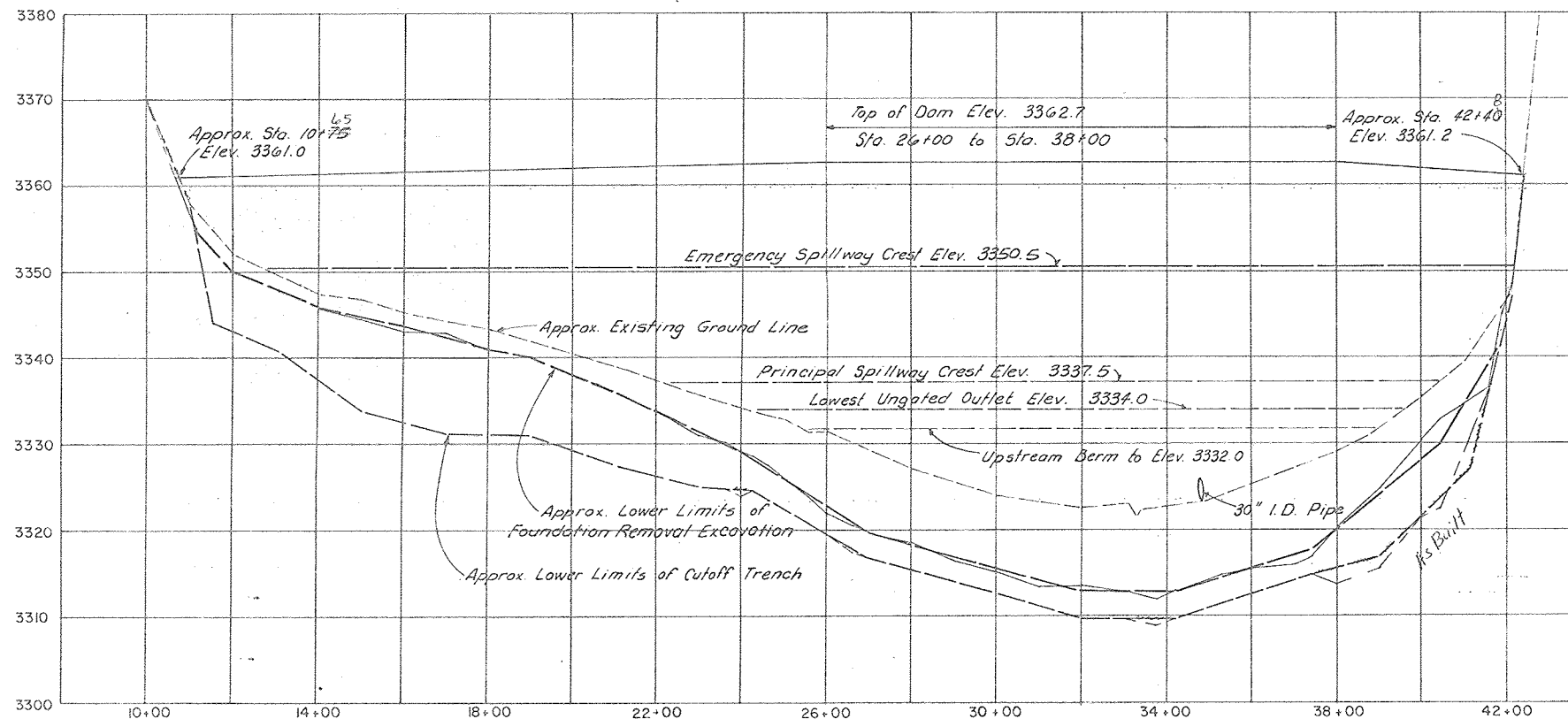
$\Delta = 52^\circ$
 $D = 17^\circ 20'$
 $R = 330.55'$
 $L = 300'$
 $T = 116.22'$
 $P.C. = 23+61.22$
 $P.T. = 26+61.22$

PLAN OF EMBANKMENT AND SPILLWAYS



Emergency Spillway Curve Data

$\Delta = 115^\circ$
 $D = 44^\circ$
 $R = 130.22'$
 $L = 261.37'$
 $P.C. = 7+04.58$
 $P.T. = 9+65.92$



PROFILE ON C OF DAM

Should The Contractor Elect To Construct A Ramp On The Left & Right Abutment, The Side Slopes Shall Have A 1.0 Foot Minimum Thick Rock Blanket And Gravel Shall Be Placed On The Crown. The Ramp Shall Remain In Place After Completion Of The Contract.

AS-BUILT PLANS
 CONSTRUCTION
 COMPLETED 4/9/85

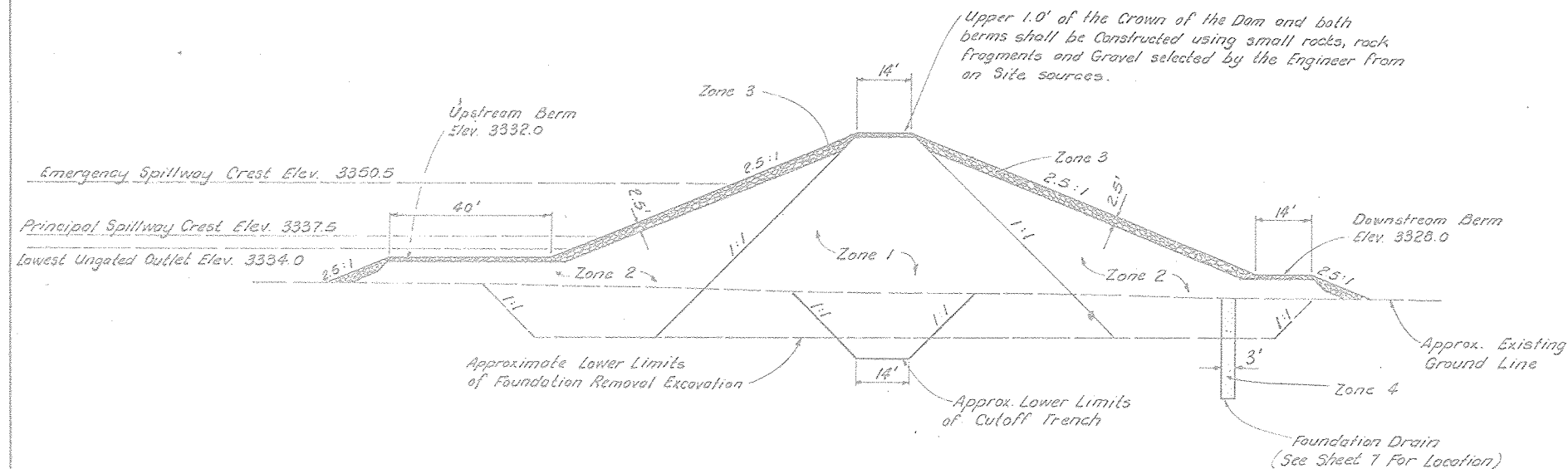


PLAN OF EMBANKMENT AND SPILLWAYS
 FLOODWATER RETARDING STRUCTURE SITE NO. 3
 SANDERSON CANYON WATERSHED
 IN

BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

DESIGNED	J. S. Almon	DATE	5/79
DRAWN	G. Ovalle	DATE	5/79
CHECKED	J. S. Almon	DATE	5/79
APPROVED BY	 John S. Almon, P.E. Benham-Blair & Associates, Inc.		
TRACED		SHEET	No. 2 of 20
		DRAWING NO.	4-E-36,852



TYPICAL SECTION

MATERIALS PLACEMENT DATA									
Embankment Zone No. 1/	Type or Unified Classification	Field Control Test		Placement and Compaction Requirements					
		ASTM Test		Max. Allowable Particle Size	Max. Uncompacted Layer Thickness	Specified Compaction Class	Min. Dry Density, Percent of Field Test Max. Dry Density	Moisture Limits, Relative to Field Test Optimum %	
		Number	Method					From	To
1	CL; Silty Clay	D-698	A or B	5"	9"	A	95	Opt.	Up
2	SC/EC; Clayey Gravelly Sand to Sandy Gravel	Moisture Only D-698	A or B	6"	9"	C 2/	-	Opt.	Up
3	Rockfill	-	-	24"	36"	-	-	-	-
4	Drain - Sand and Gravel	-	-	-	-	III	-	-	-

ZONED EMBANKMENT DATA

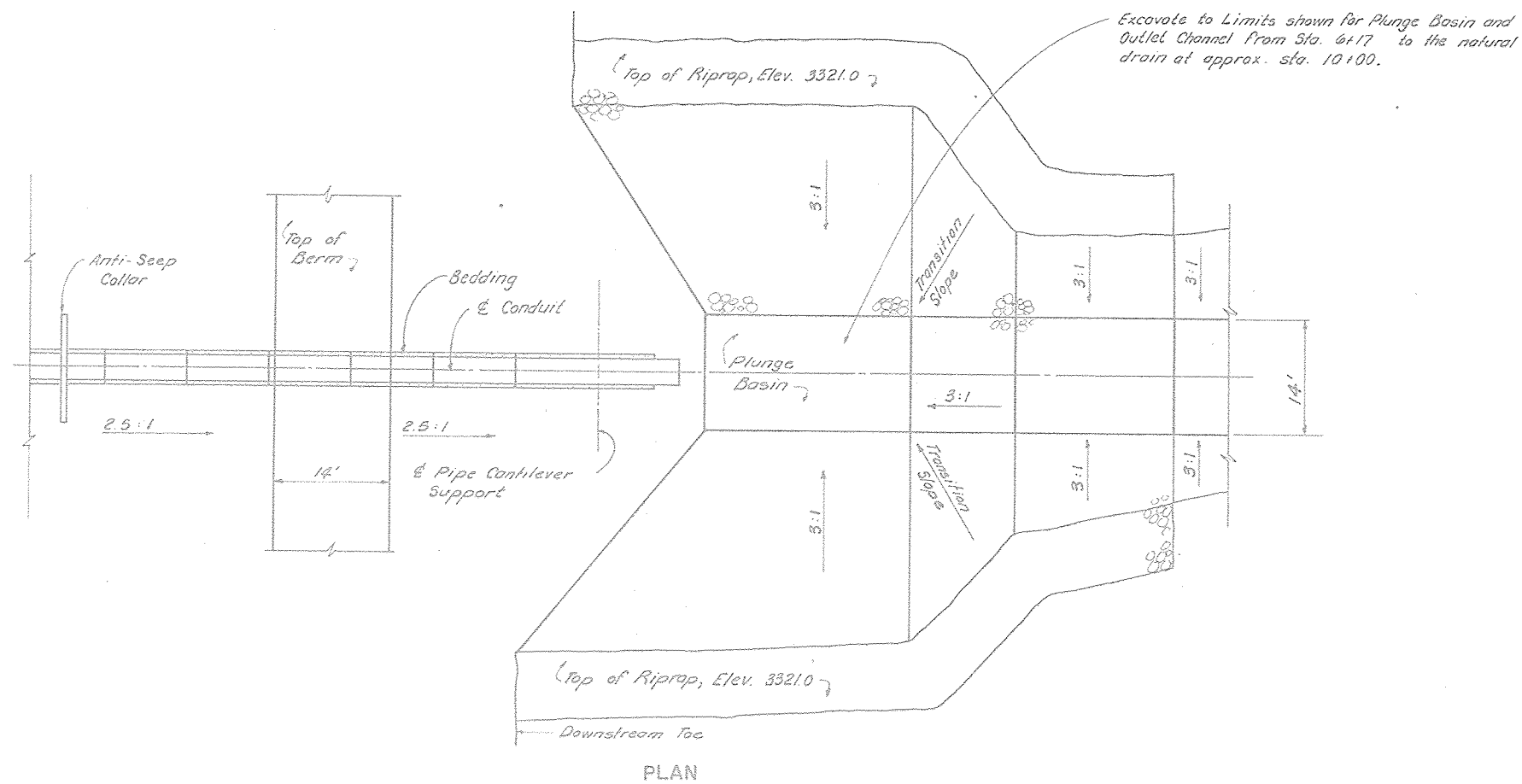
- 1/ The zone boundaries shown in the typical section are approximate. They may be varied as permitted by the Engineer, to allow the use of all suitable and needed materials from the required excavations.
- 2/ Class C compaction shall be accomplished by a minimum of 4 complete passes per layer of tamping roller weighing not less than 1200 pounds per foot of roller width at a towing or traveling speed of 2 mph or greater.
- 3/ Rock shall be reasonably well graded from a maximum particle size of 24" down to the 3" size with not less than 50% by weight larger than 12". Sizing of oversized rock materials from the required excavations or quarry area to meet the specified gradations will be required. No special compaction or moisture control will be required. (See Construction Specification 25)
- 4/ Gradation Requirements shown on sheet 7.

NO CHANGE IN PLANS

AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/9/85

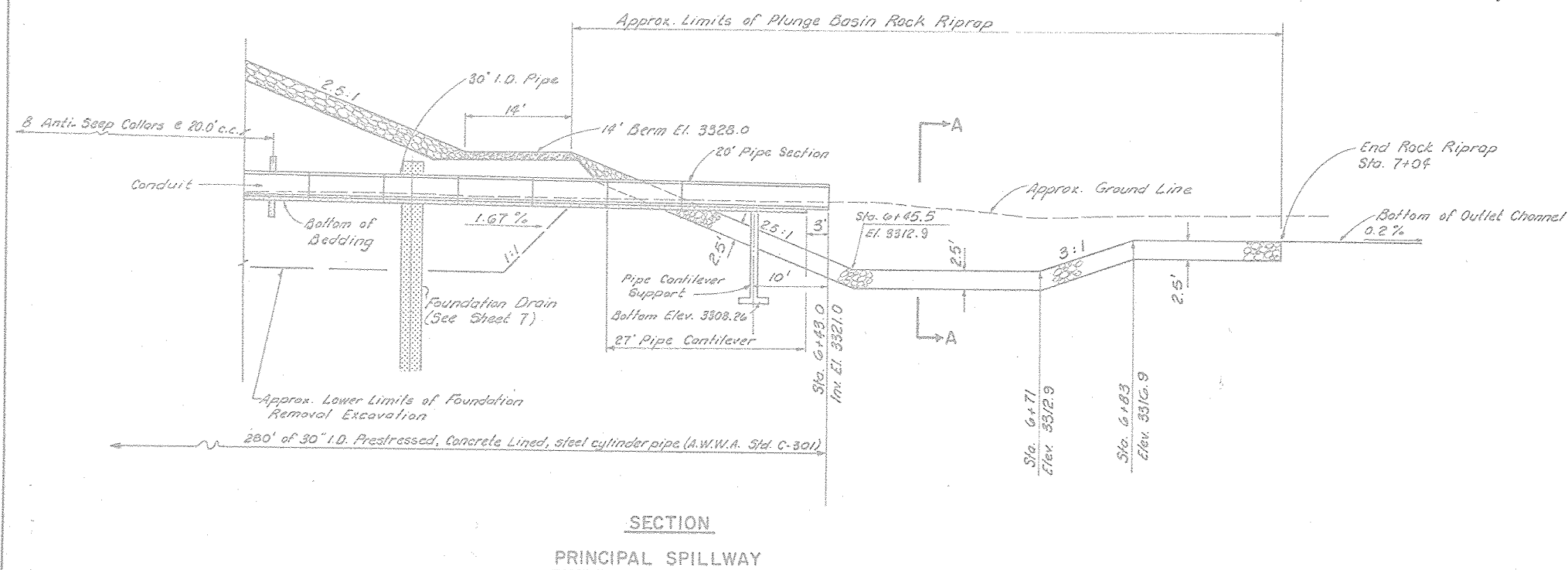
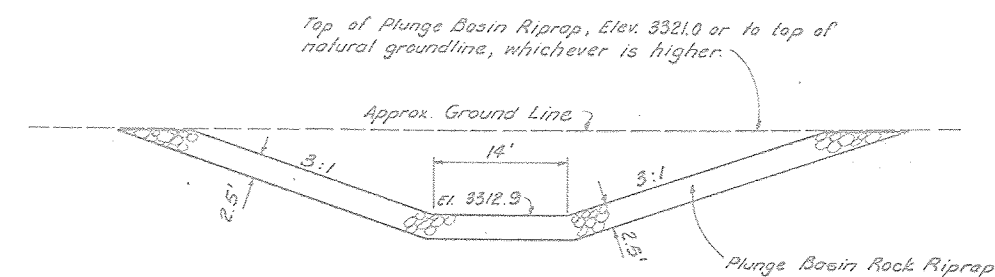


MATERIAL PLACEMENT FLOODWATER RETARDING STRUCTURE SITE NO. 3 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED: J. S. Almon	DATE: 5/79	APPROVED BY: [Signature]	TITLE: J. S. ALMON
DRAWN: G. Oville	DATE: 5/79	APPROVED BY: [Signature]	TITLE: Benham-Blair & Associates, Inc.
TRACED:		SHEET: 3	DRAWING NO: 4-E-36,852
CHECKED: J. S. Almon	DATE: 5/79	OF: 20	



Size of Rock Lbs.	% Smaller by Weight
1350	100
100	35 - 65
10	5 - 10

The least dimension of an individual rock fragment shall not be less than one-third of the greatest dimension of the fragment. (See Construction Specification Vol.)
Approximately 360 cu. yds. Plunge Basin Rock Riprap required.



NO CHANGE IN PLANS

AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/9/85



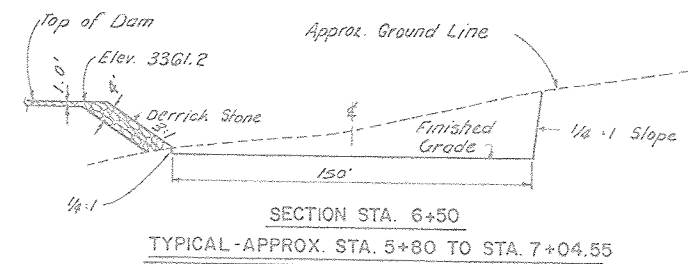
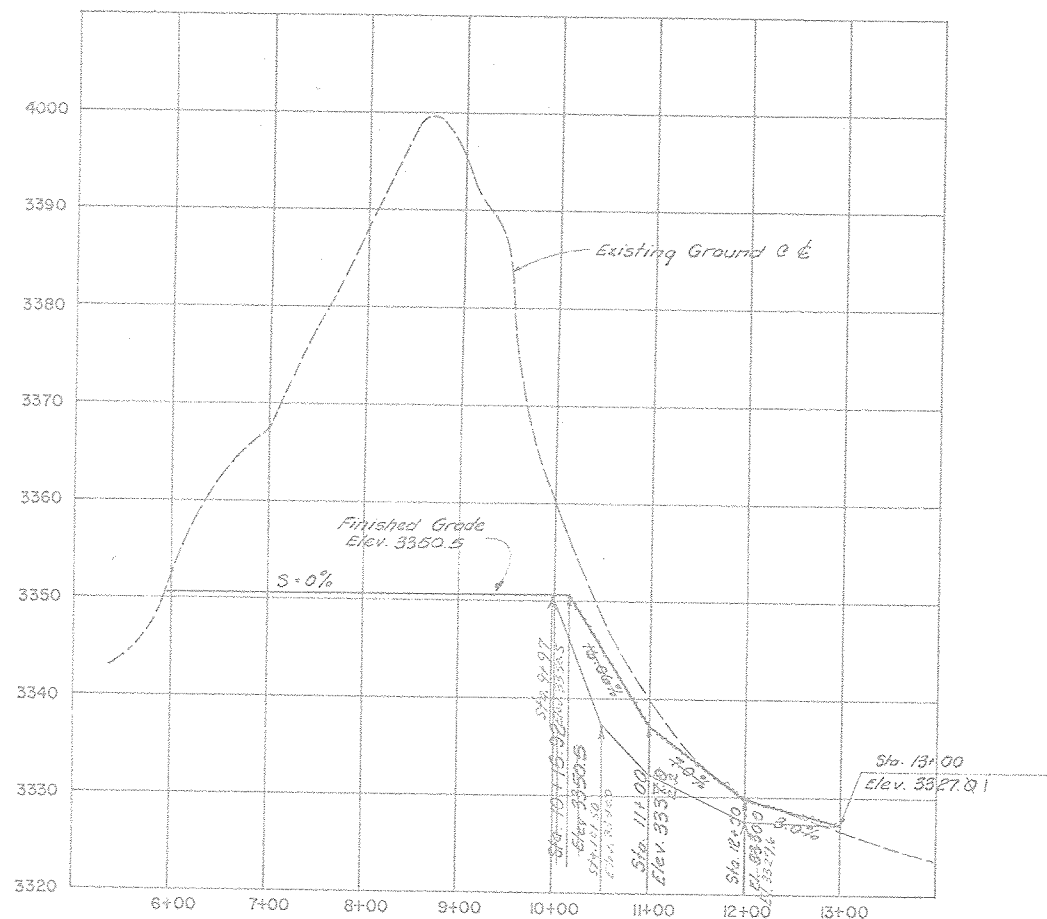
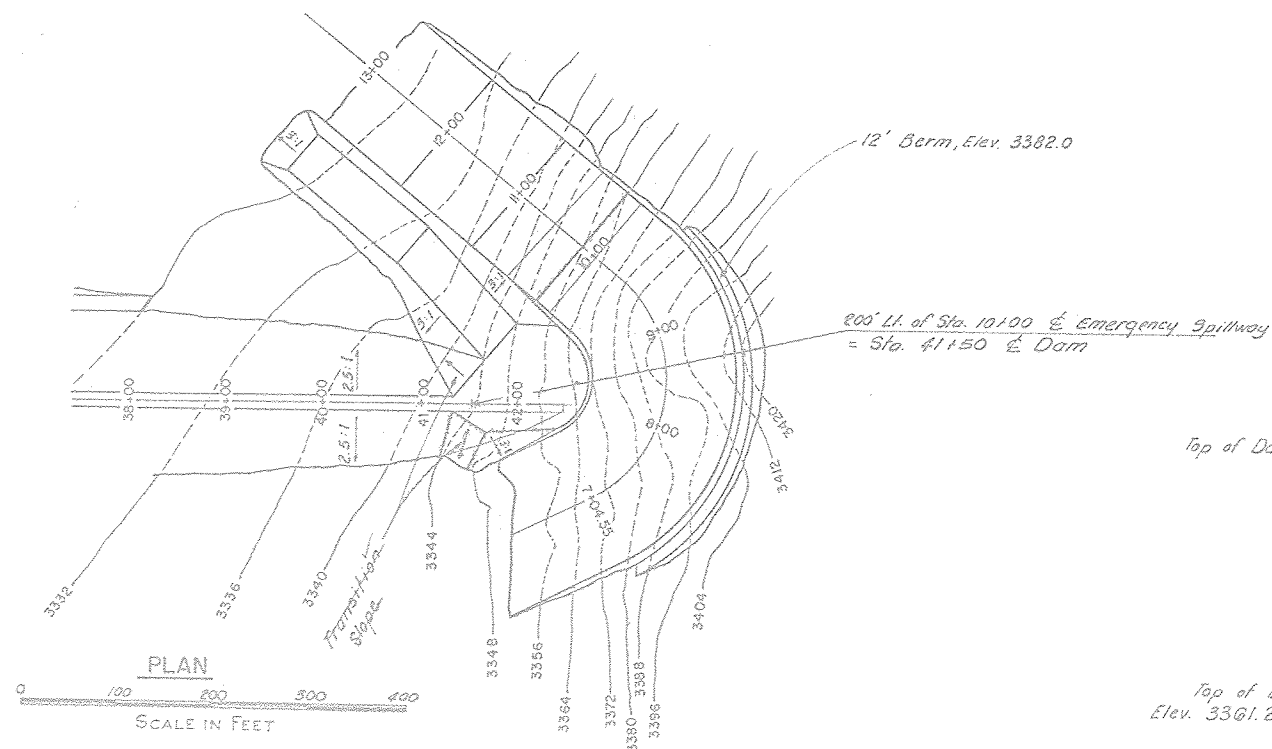
PRINCIPAL SPILLWAY- PLAN AND SECTION
FLOODWATER RETARDING STRUCTURE SITE NO. 3
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

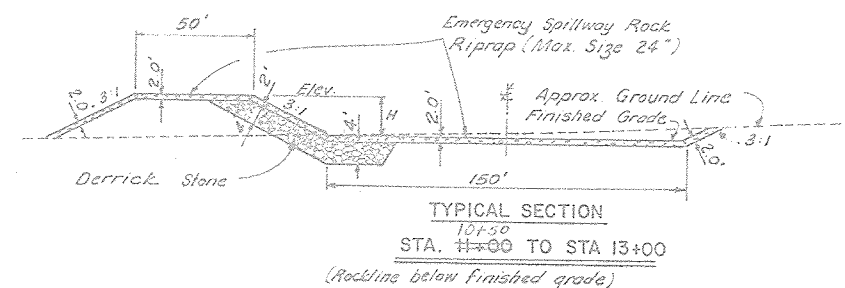
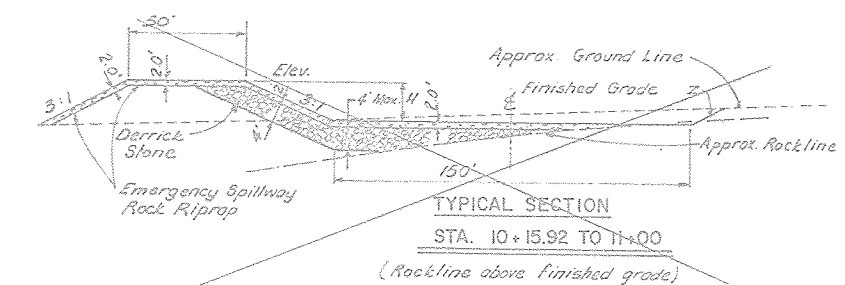
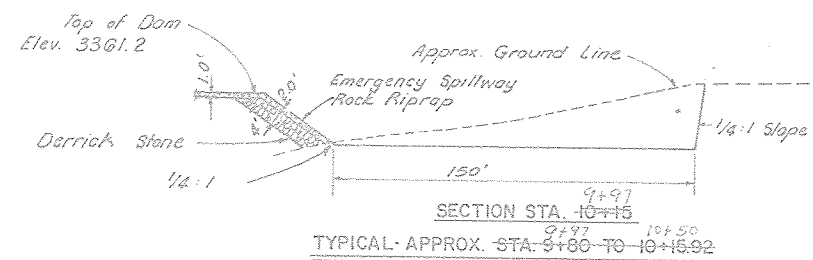
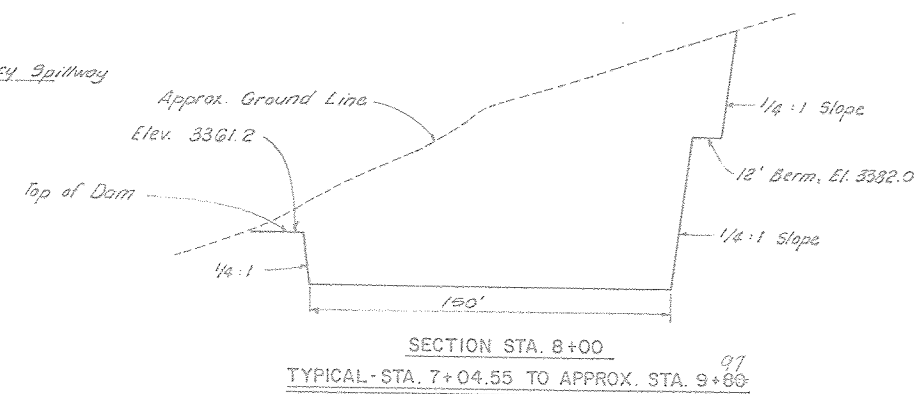
DESIGNED	J. S. Aimon	DATE	5/79	APPROVED BY	STATE COMMISSIONER OF LAND
				TITLE	WIRELESS TEXAS
DRAWN	G. Ovale	5/79		TITLE	John S. Aimon, Jr.
				TITLE	Bonham-Baker & Associates, Inc.
TRACKED				SHEET	DRAWING NO
CHECKED	J. S. Aimon	5/79	No	5	4-E-36,852
			20	20	

CHECKED J.S. Almon 5/79 No. 5 4-E-36,852 of 20

SCS-ENG-314 (Rev. 7-72)



Note:
Presplitting of Emergency Spillway cut slopes in rock will be required for cuts greater than 10'.



Left Dike:
From Embankment to Sta. 11+50, dike shall transition from Elev. 3361.2 to H=5.0 ft.
From Sta. 11+50 to approx. Sta. 13+00, H=5.0 ft.

Right Slope:
From Sta. 10+50 to Sta. 11+00, transition 2 from 1/4:1 to 3:1
From Sta. 11+00 to approx. Sta. 13+00, 3:1

TYPICAL SECTIONS - EMERGENCY SPILLWAY

NOTES:

DERRICK STONE

1) The rock used for the derrick stone shall be harvested or produced stone that shall have individual or stone weights ranging from 1000 to 4000 pounds. The derrick stone shall be placed so as to produce a reasonably dense fill with a minimum of voids. (See Construction Specification 61.)

EMERGENCY SPILLWAY ROCK RIPRAP

2) Areas of Emergency Spillway floor where durable rock is not exposed at grade shall be over-excavated a minimum of 2.0' and brought back to grade with rock riprap material. Emergency Spillway rock riprap shall be reasonably well graded from a max. rock size of 24 inches down to the 3 inch size with not more than 50% by weight smaller than 12 inches.

Sizing of oversized rock materials from the required excavations or quarry area to meet the specified gradation will be required. No special compaction or moisture control will be required. (See Construction Specification 25. Approximately 5,948 cu. yds. Emergency Spillway rock riprap required.

AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/19/85

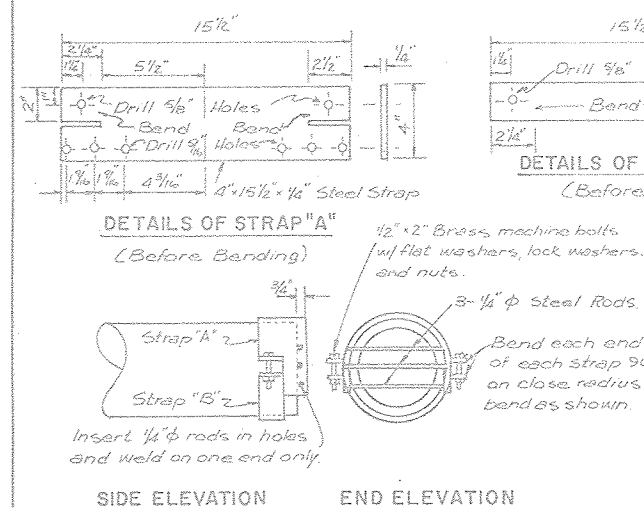
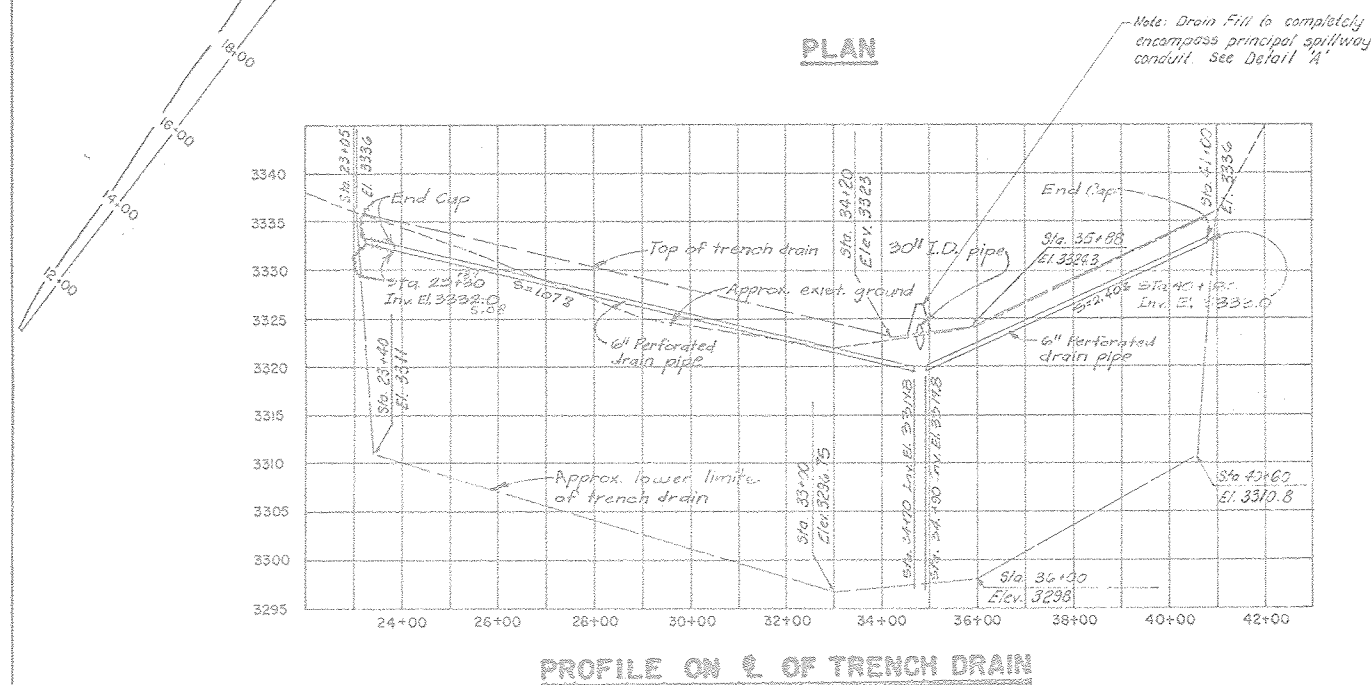
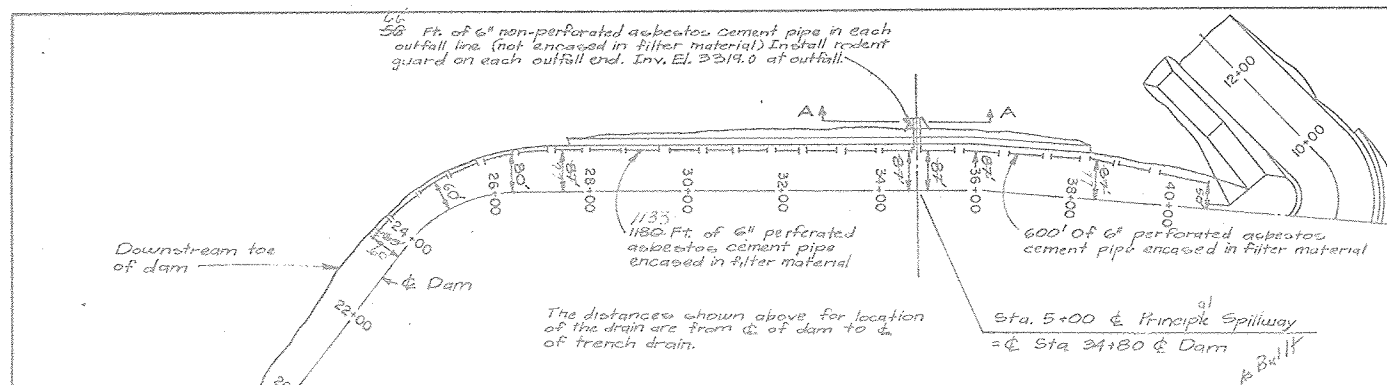


EMERGENCY SPILLWAY PLAN AND PROFILE
FLOODWATER RETARDING STRUCTURE SITE NO. 3
SANDERSON CANYON WATERSHED

IN
BREWSTER, PECOS AND TERRELL COUNTIES,

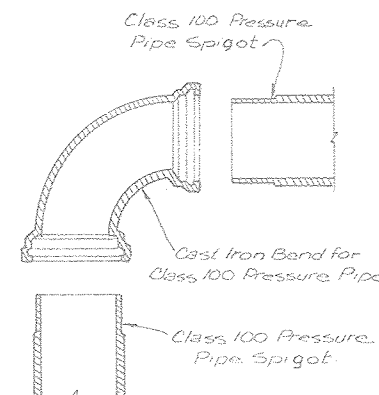
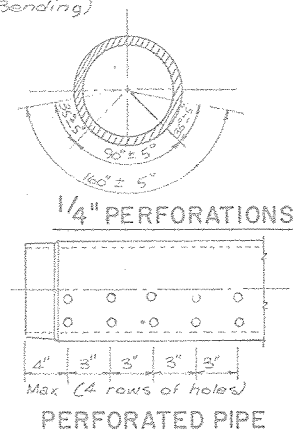
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	J.S. Almon	DATE	5/79	APPROVED BY	J.S. Almon	DATE	5/79
DRAWN	G. Oville	DATE	5/79	TITLE	EMERGENCY SPILLWAY		
TRACED				BY	J.S. Almon		
CHECKED	J.S. Almon	DATE	5/79	SHEET	6	DRAWING NO.	4-E-36,852



Note: Bend Straps A and B on a radius '1/4" larger than the outside diameter of the asbestos-cement pipe. Cut off tapered end of the asbestos-cement pipe and install the rodent guard so that the asbestos-cement pipe has full wall thickness at point of installation. Install with rods horizontal. All materials (except brass) shall be galvanized after fabrication.

RODENT GUARD DETAILS



DETAILS-PIPE FITTINGS (Other than Straight Couplings)

Excavations for the Trench Drain shall have vertical sides and be 3.0' wide as shown in the Typical Section. (See Construction Specification 24.)

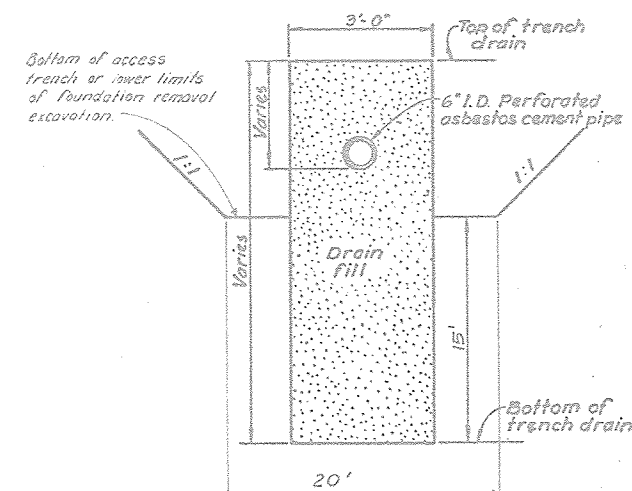
Place a min. 2.0 ft. thickness of fill immediately above and adjacent to the top of the trench drain and as backfill for the access trench using relatively pervious site materials selected by the Engineer. This fill to be placed and paid for as "Earth Fill, Embankment."

DRAIN FILL REQUIREMENTS

Installation and materials quality shall comply with the requirements of Construction Specification 24 and Material Specification 52.

The drain fill shall consist of a mixture of 3 parts of ASTM-C-33 Coarse Aggregate, Size No. 467 and 1 part of ASTM-C-33 Fine Concrete Aggregate or any other aggregate that will grade within the following limits:

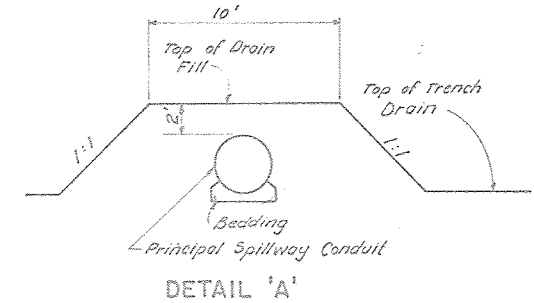
SIEVE SIZE	% PASSING BY WEIGHT
3"	100
1 1/2"	82 - 100
3/4"	60 - 100
3/8"	35 - 85
No. 4	10 - 70
No. 10	0 - 40
No. 20	0 - 20
No. 40	0 - 15
No. 200	0 - 5



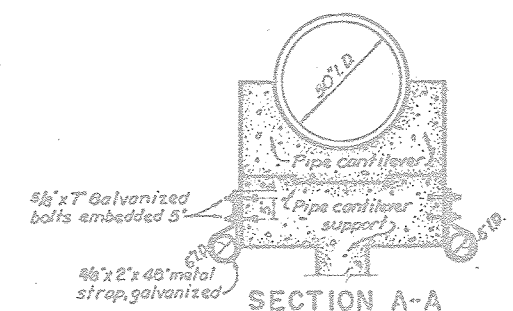
Note: Bends shall be 90°, 45°, 22 1/2°, or 11 1/4° as designated on the Plan and shall comply with the requirements of Material Specification 545.

For changes in horizontal or vertical alignment which are less than 10° or which differ from the standard bends mentioned above, the alignment change not taken up by the standard bend, shall be made by deflection of an equal number of pipe sections on either side of the point of intersection of the alignment shown. No angle of deflection for a single pipe joint shall exceed 4° or 7°.

Tees, Crosses, Wyes, and Reducers, if required, shall be the same as specified for Bends. Deflection of pipe sections, if required to complete alignment changes, shall be the same as specified for Bends.



Note: Drain fill shall not be dropped more than 5 feet vertically unless a tremie or other equivalent means is used to prevent segregation.



The last section of each outfall pipe shall be fastened to the pipe cantilever support with a strap and 2 bolts as shown. Each of the last two sections in each outfall line shall be a minimum 10 ft. in length. 1 strap and 2 bolts are required for each outfall line. The straps and bolts shall be galvanized. The end of the drain pipe will extend approx. 4 ft. beyond the $\frac{1}{2}$ of the pipe cantilever support.

Note: All Asbestos-Cement Pipe and Couplings shall be Class 100, Pressure Pipe, and shall conform to the requirements of Materials Specification 545.

The bedding of perforated pipe, installed in filter material shall be ordinary bedding providing uniform and continuous bedding contact throughout the entire line. Joining shall be in accordance with the manufacturer's recommendations. Tamping of the filter material under and on the sides and top of the pipe will be required only to the extent necessary to eliminate voids or empty pockets.

The installation of the non-perforated pipe shall be with ordinary bedding that provides uniform and continuous bedding contact throughout the entire line. Joining shall be in accordance with the manufacturer's recommendations. Backfill and compaction shall be as specified in Construction Specification 23.

AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/9/85

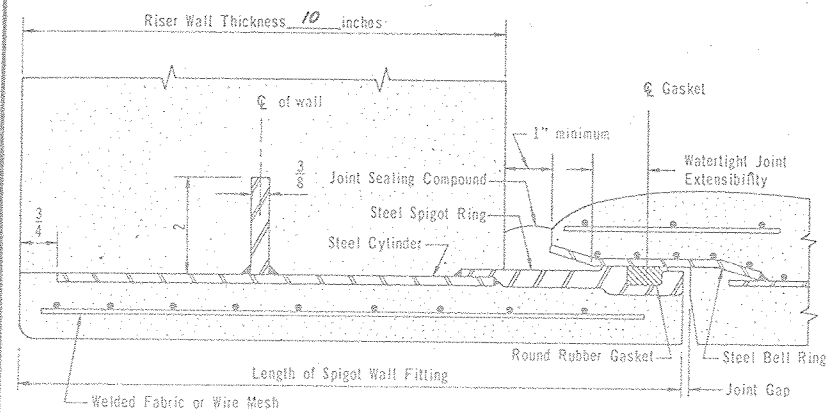
NO CHANGE IN PLANS

EMBANKMENT FOUNDATION DRAIN
FLOODWATER RETARDING STRUCTURE SITE NO. 3
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS, AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

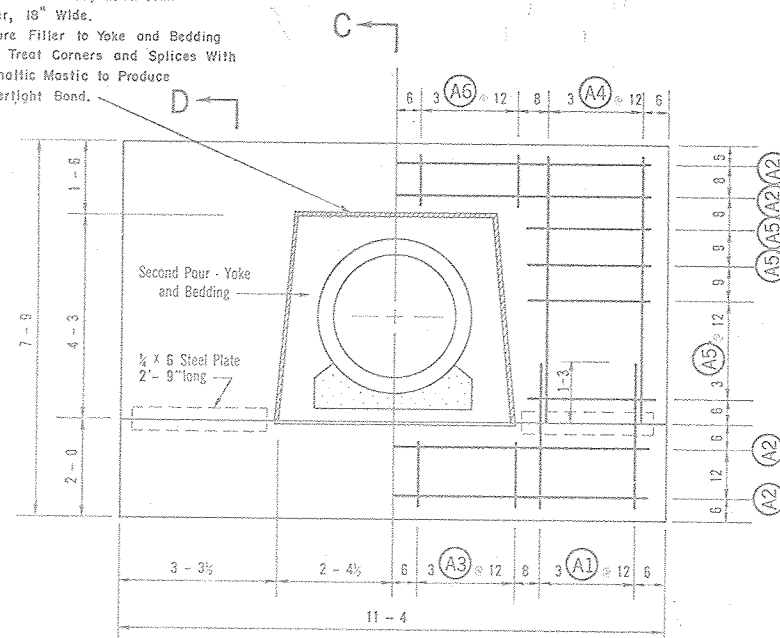
DESIGNED: J.S. Almon DATE: 5/79
DRAWN: G. Ovalle DATE: 5/79
CHECKED: J.S. Almon DATE: 5/79
APPROVED BY: [Signature] DATE: 5/79
Benham-Blair & Associates, Inc.
SHEET NO. 7 OF 20
DRAWING NO. 4-E-36,852





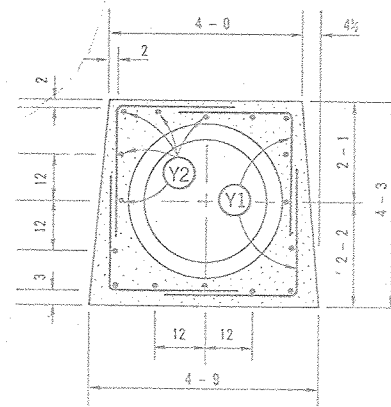
DETAIL A

3/4" Preformed Expansion Joint Filler, 18" Wide. Secure Filler to Yoke and Bedding and Treat Corners and Splices With Asphaltic Mastic to Produce Watertight Bond.



DETAIL OF ANTI-SEEP COLLAR

Yoke steel not shown.



DETAIL OF ANTI-SEEP COLLAR YOKE

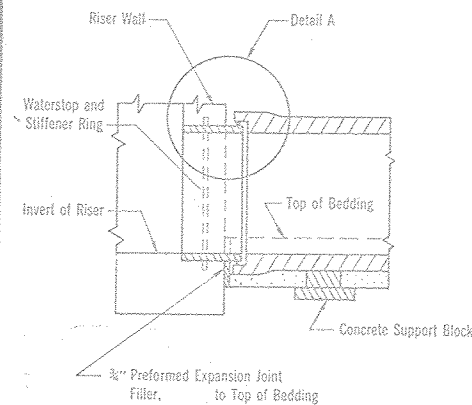
STEEL SCHEDULE						
Anti-seep Collar and Yoke, ϕ Required.						
Mark	Size	Quantity per Collar	Length	Type	Total Quantity	Total Length
A1	4	6	3 - 0	1	48	144'-0"
A2	4	4	10 - 10	1	32	346'-0"
A3	4	6	1 - 6	1	48	72'-0"
A4	4	6	5 - 6	1	48	264'-0"
A5	4	10	2 - 9	1	80	220'-0"
A6	4	6	1 - 0	1	48	48'-0"
Y1	4	12	5 - 2	21	96	496'-0"
Y2	4	16	1 - 2	1	128	143'-4"

Total: 1740'-0"

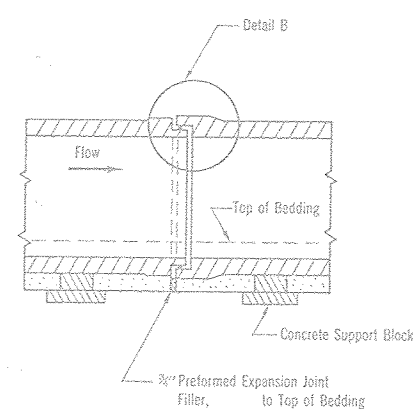
QUANTITIES		
Concrete		Cu. Yds.
Anti-seep Collar including Yoke		2.4103
* Each		2.3999
Total	6 Collars	14.3994
Bedding		
** Per Linear Foot of Bedding		X = 0.0745
Total	289-20-6 (1.61) (41) (1.72)	17.30
Steel		Pounds
Anti-seep Collar including Yoke		1162.3

Concrete quantities are based on an outside diameter of pipe of 35.3 inches. Steel quantities do not change with outside diameter of pipe.

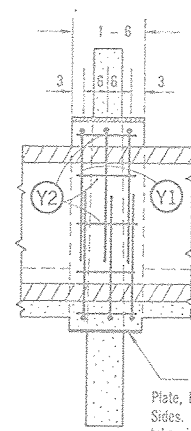
* This quantity is given by $2.399 - 0.0003030 (D_f + 38) (D_f - 38)$ cu. yds.
 ** This quantity is given by $0.0734 - 0.0005 (D_f - 38)$ cu. yds.
 D_f = outside diameter of pipe furnished, inches.



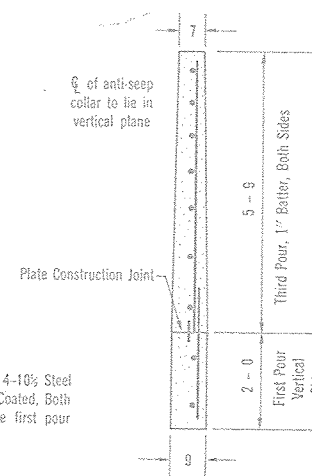
DETAIL OF SPIGOT WALL FITTING



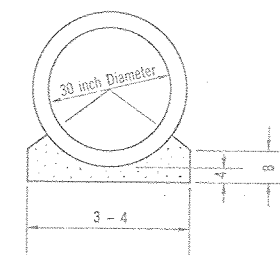
DETAIL OF PIPE JOINT



SECTION C-C



SECTION D-D



DETAIL OF BEDDING



BAR TYPES

SUGGESTED SUPPORT BLOCKS

AS-BUILT PLANS CONSTRUCTION COMPLETED 4/9/85

Sufficient blocks shall be provided to support the pipe to the required line and grade. The Contractor shall determine the number and size of blocks required. Wedges may be used as an alternate.

JOINT REQUIREMENTS			
Length of Pipe Section	Minimum Joint Length	Minimum Joint Limiting Angle	
feet	inches	radians	degrees
10	3 1/2	0.0175	1°
20	3 1/2	0.0175	1°

Outfall Section Only

For pipe length other than shown, joint requirements will be determined by the Engineer.

Where pipes of different length are connected, adjoining pipes shall meet the requirements of the longer pipe.

Prior to delivery of pipe, the pipe joint detail proposed for use shall be submitted to the Engineer for approval.

STRENGTH REQUIREMENTS			
Inside Diameter of Pipe	Internal Load	External Load	
		Minimum 3-Edge Bearing Strength in Pounds per Linear Foot of Pipe	
		Applicable Standard Specification	
		AWWA C-301	AWWA C-300
	Hydrostatic Pressure	Load to produce 0.001 inch crack one foot long	Load to produce 0.01 inch crack one foot long
	Head of Water		
inches	feet		
30	50	8500	

The outside diameter of pipe assumed in design is 35.3 inches. Where the pipe furnished has an outside diameter greater than assumed in design, the three-edge bearing strength of the pipe furnished must not be less than the specified three-edge bearing strength multiplied by the ratio of the outside diameter of the pipe furnished to the outside diameter assumed in design.



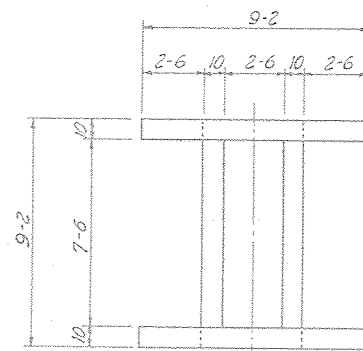
Rev 7-6-72
Rev 6-19-71

STANDARD CONDUIT DETAILS			
FOR REINFORCED CONCRETE PRESSURE PIPE PRINCIPAL SPILLWAY			
STANDARD DWG. NO. ES-5030-BE			
DATE	2-70	SHEET	1 OF 1

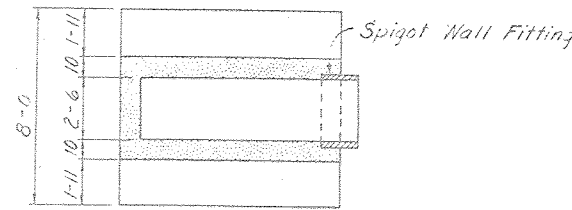
Joint length equals watertight joint extensibility plus joint gap.

The pipe shall be drawn together so that the maximum joint gap does not exceed 7/8 inch for pipe laid on a straight line. For cambered pipe or pipe laid on a curved line, the joint gap at the closest point shall not exceed 1/2 inch.

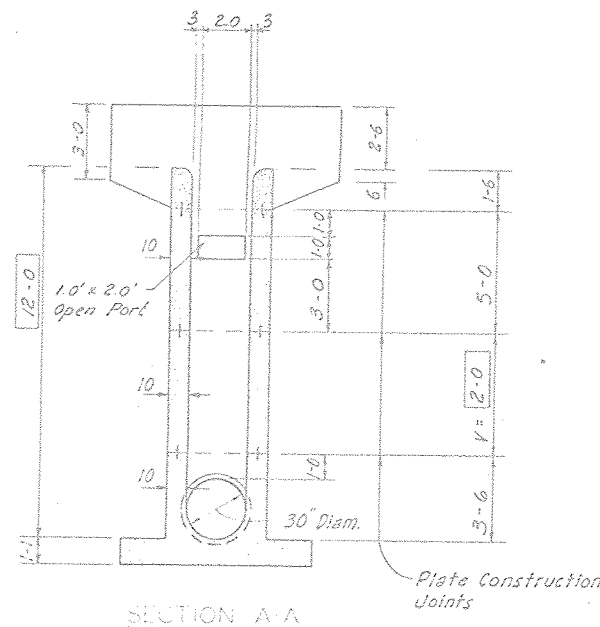
PIPE DETAILS			
FLOODWATER RETARDING STRUCTURE SITE NO. 3 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed	J. S. Almon	Date	5/79
Drawn	G. Ovelie	Date	5/79
Traced		Date	
Checked	J. S. Almon	Date	5/79
Sheet	No. 8 of 20	Drawing No.	4-E-36,852



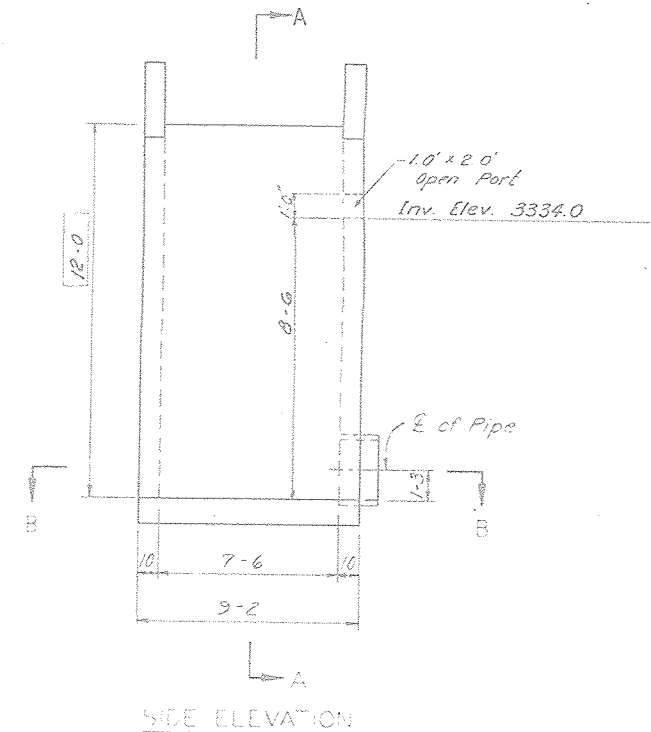
PLAN - TOP



SECTION B-B



SECTION A-A



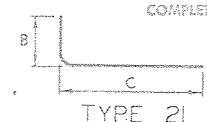
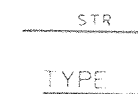
SIDE ELEVATION

STEEL SCHEDULE

Mark	Size	Quantity	Length	Type	B	C	Total Length	Mark	Size	Quantity	Length	Type	B	C	Total Length
B1	#6	10	7'-6"	1			75'-0"	T1	5	8	8'-0"	21	2'-9"	5'-3"	64'-0"
B2	#5	9	8'-9"	1			78'-9"	T2	5	4	8'-3"	1			33'-0"
B3	#7	34	9'-0"	21	3'-1"	5'-11"	306'-0"	T3	5	12	3'-10"	1			46'-0"
B4	#5	8	8'-9"	1			70'-0"	T4	5	8	3'-7"	1			28'-8"
B5	#5	9	7'-6"	1			67'-6"	T5	5	8	3'-2"	1			25'-4"
B6	#5	2	3'-0"	1			6'-0"	T6	5	8	5'-3"	19'	2'-6"	2'-9"	42'-0"
B7	#5	5	6'-9"	21	1'-0"	5'-9"	53'-9"	T7	5	12	8'-10"	1			106'-0"
B8	#6	3	6'-9"	21	1'-0"	5'-9"	20'-3"	T8	5	4	6'-8"	1			26'-8"
B9	#5	14	6'-9"	21	1'-0"	5'-9"	94'-6"								
B10	#6	10	8'-3"	1			82'-6"								
B11	#5	4	3'-3"	1			13'-0"								
B12	#6	3	2'-3"	1			6'-9"								
B13	#5	3	2'-3"	1			6'-9"								
B14	#5	10	5'-9"	21	0'-6"	5'-3"	57'-6"								
B15	#5	18	8'-0"	21	2'-9"	5'-3"	144'-6"								
R1	#5	6	8'-7"	1			51'-6"								
R2	#6	6	8'-3"	1			49'-6"								
R3	#5	4	3'-3"	1			13'-0"								
R4	#5	6	8'-7"	1			51'-6"								
R5	#5	16	8'-0"	21	2'-9"	5'-3"	128'-0"								
R6	#5	10	8'-3"	1			82'-6"								
R7	#5	8	3'-3"	1			26'-0"								
R8	#5	25	8'-6"	21	2'-9"	5'-3"	224'-0"								
R9	#5	14	8'-2"	1			114'-4"								
R10	#5	14	8'-4"	1			116'-8"								

NO CHANGE IN PLANS

BAR TYPES



AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/19/65

- Notes:
1. Bar dimensions are out to out of bar.
 2. Radius of bends equals 3 bar diameters for sizes equal to or less than #7.
 3. The 2" and 3" dimensions from face of concrete to steel are clear distances.

0 2 4 6
Scale in Feet

STANDARD OPEN RISER	
STANDARD DWG. NO.	ES-3130-1515 R
DATE	4-67
SHEET	1 OF 4
ADAPTED FROM	
STANDARD COVERED RISER	
DESIGN CONSTANTS	f'c = 4000psi f'c = 16000psi
	n = 8 fs = 20,000psi
STANDARD DWG. NO.	ES-3030-2015 R
DATE	3-65
SHEET	1 OF 4

QUANTITIES

Steel:

#5 Bars	1750-11	Lin. Ft.	1826-2	Lbs.
#6 Bars	238-0	Lin. Ft.	351-5	Lbs.
#7 Bars	306-0	Lin. Ft.	626	Lbs.
Total			2,803-7	Lbs.

Length of #5 Bars = (1275-11) + (Length of Bars R1, R3, R4, R5, R9, and R10)

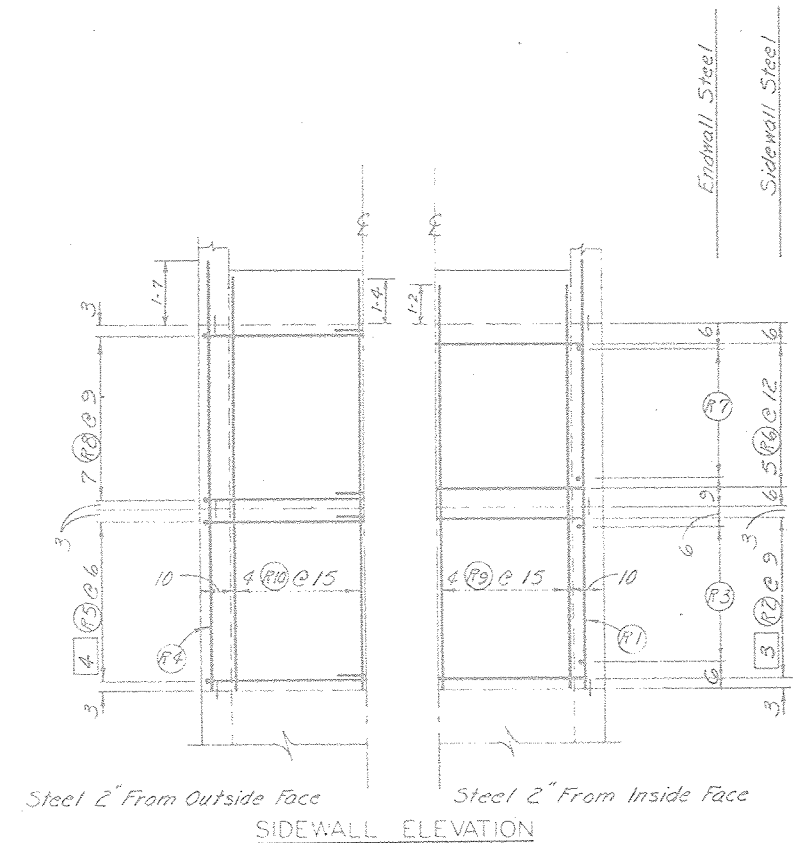
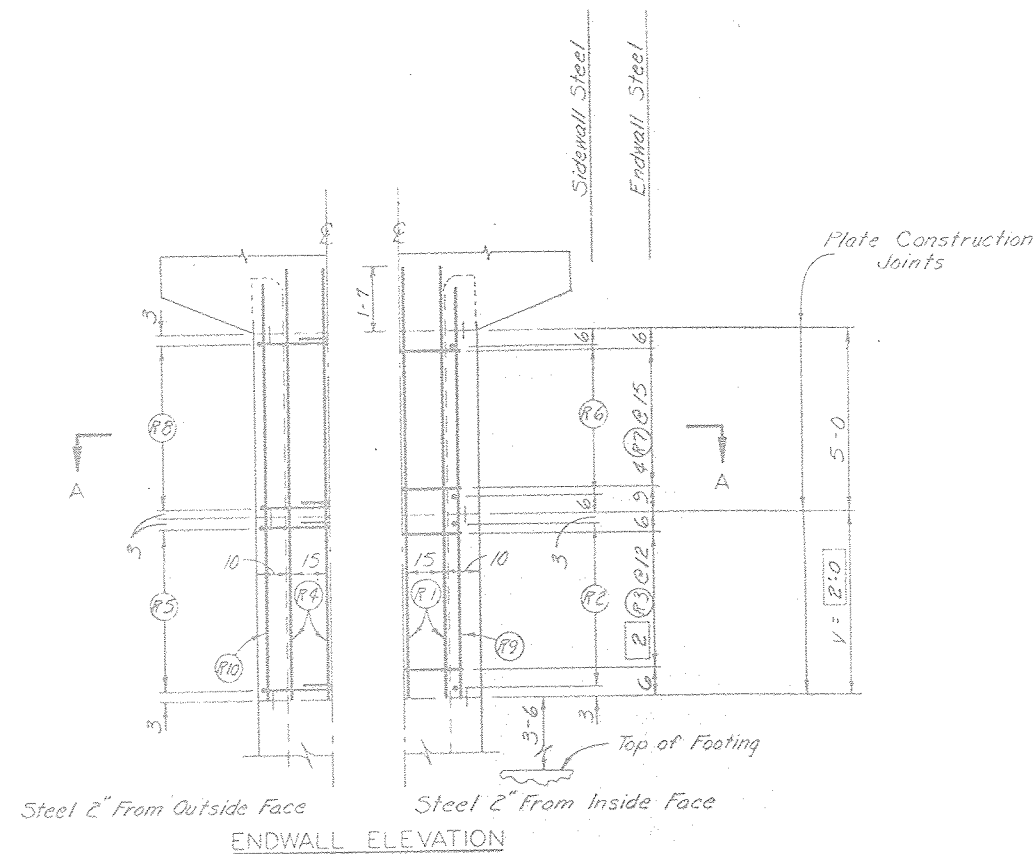
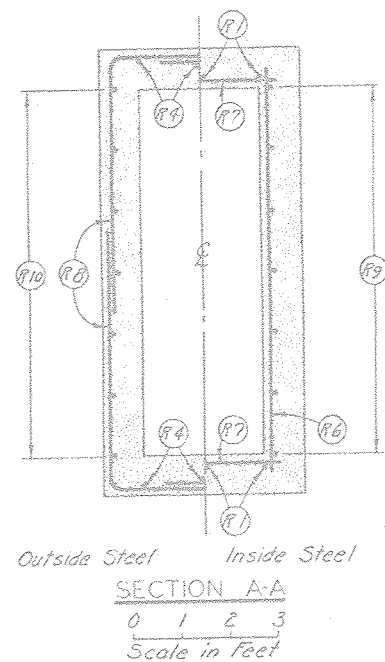
Length of #6 Bars = (184-6) + (Length of Bars R2).

Total Concrete = (11.85) + (0.72V) = 13.29 Cu.Yds.

- Notes:
1. For Spigot Wall Fitting, See Detail Sheet 8.
 2. For Trash Rack, Grating, Sleeves and Bolts, See Detail Sheet 13.
 3. For Construction Joints, See Detail Sheet 13.
 4. For Scour Apron Details, See Sheet 15.



PRINCIPAL SPILLWAY INLET FLOODWATER RETARDING STRUCTURE SITE NO. 3 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed J. S. Almon	Date 5/79
Drawn G. Ovalle	Date 5/79
Traced	Date
Checked J. S. Almon	Date 5/79
Approved by Construction Engineer	Date
John S. Almon, P.E.	Date
Benham-Blair & Associates, Inc.	Date
Sheet No. 9	4-E-36,852
of 20	



Note: Cut or shift steel as necessary to clear opening for port 2.

STANDARD OPEN RISER	
STANDARD DWG. NO. ES-3130-1515 R	
DATE 4-67	SHEET 3 OF 4
ADAPTED FROM	
STANDARD COVERED RISER	
DESIGN CONSTANTS	
$f'_c = 4000 \text{ psi}$ $f_c = 1600 \text{ psi}$	
$n = 8$ $f_s = 20,000 \text{ psi}$	
STANDARD DWG. NO. ES-3030-2015 R	
DATE 3-65	SHEET 3 OF 4

AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/9/85
138

NO CHANGE IN PLANS

0 2 4
Scale in Feet

Unless Otherwise Shown

STEEL PLACEMENT- PRINCIPAL SPILLWAY INLET
FLOODWATER RETARDING STRUCTURE SITE NO. 3
SANDERSON CANYON WATERSHED

IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

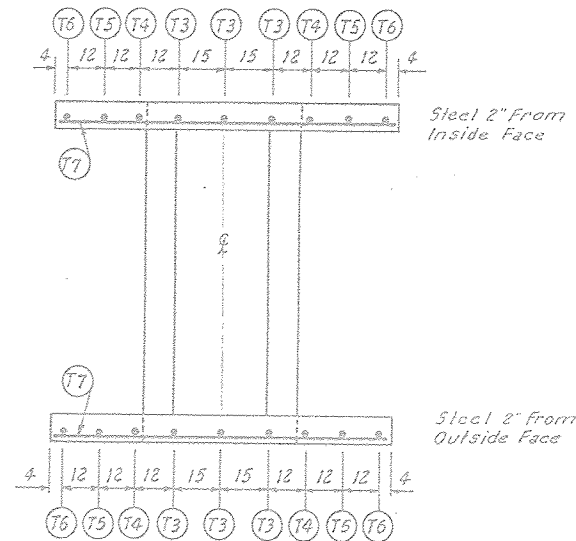
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



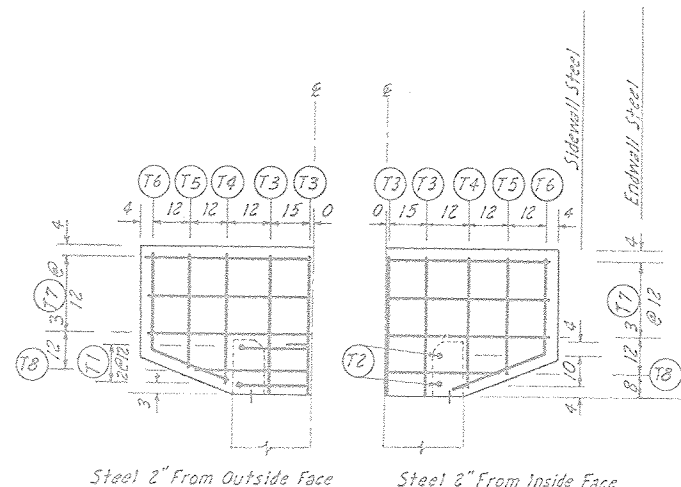
Designated by J. S. Almon	5/79	Approved by John S. Almon, P.E.
Drawn by G. Ovalle	5/79	Benham-Blair & Associates, Inc.
Checked by J. S. Almon	5/79	
	20	

4-E-36,852

FORM NO. 3-13 APRIL 1963

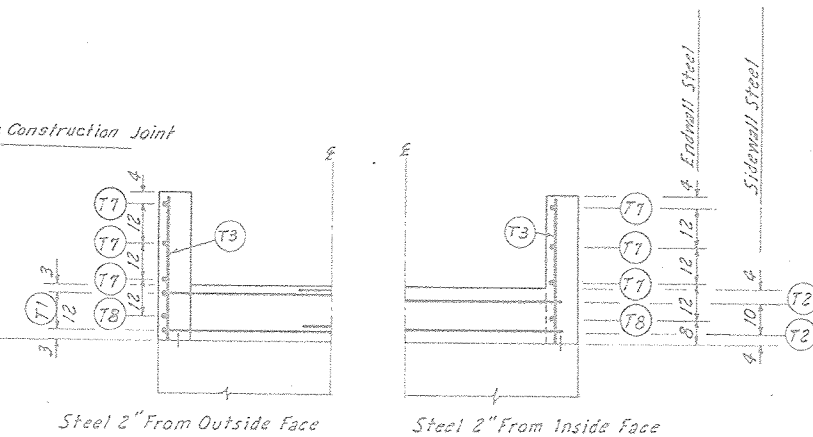


PLAN-TOP

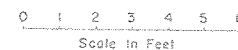


ENDWALL ELEVATION

Plate Construction Joint



SIDEWALL ELEVATION



STANDARD OPEN RISER	
DESIGN CONSTANTS	
$f'_c = 4000 \text{ psi}$	$f_c = 1600 \text{ psi}$
$n = 8$	$f_s = 20,000 \text{ psi}$
STANDARD DWG. NO.	
ES-3130-1510 R	
DATE 4-67	SHEET 4 OF 4

AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/17/85

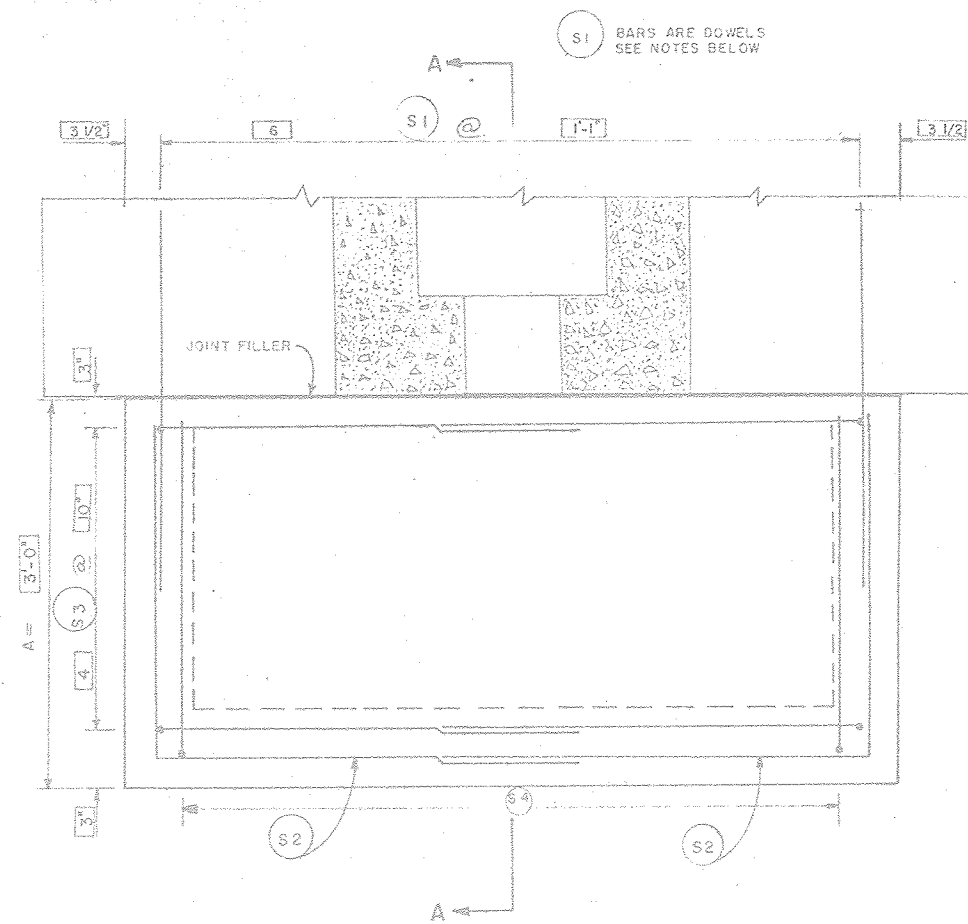
NO CHANGE IN PLANS

STEEL PLACEMENT - PRINCIPAL SPILLWAY INLET
FLOODWATER RETARDING STRUCTURE SITE NO. 3
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

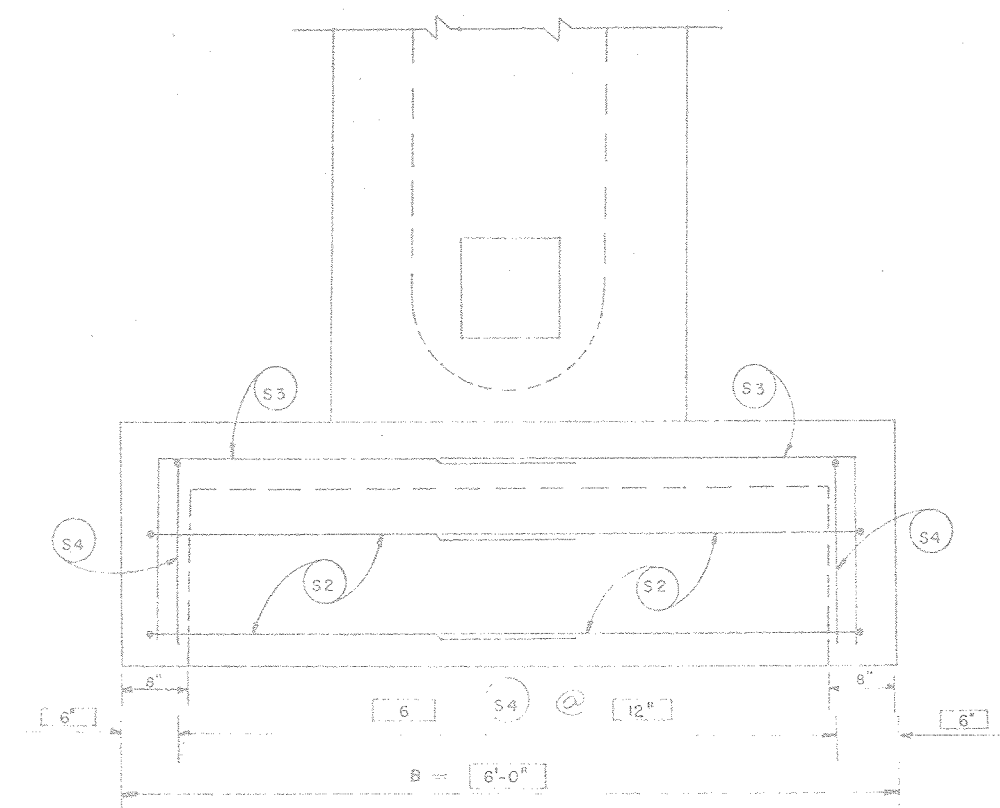
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J. S. Almon	Date 5/79	Approved By	Date
Drawn G. Oville	Date 5/79	John S. Almon, P.E.	Date
Traced		Benham-Blair & Associates, Inc.	
Checked J. S. Almon	Date 5/79	Sheet No. 12 of 20	Drawing No. 4-E-36,852

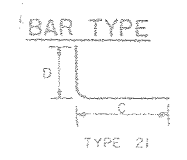




PLAN



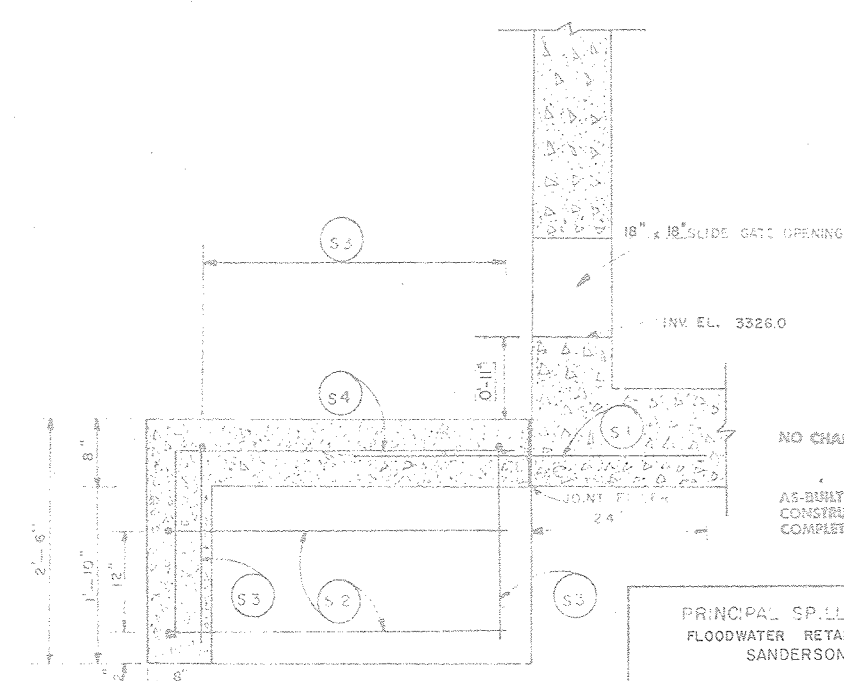
UPSTREAM ELEVATION



MARK	SIZE	QUANTITY	LENGTH	TYPE	D	C	TOTAL LENGTH	BAR NO.	C. LENGTH	D. LENGTH
S1	4	4	5'-11"	21	2'-6"	3'-5"	23'-8"	S1	B+5"	A-6"
S3		8	5'-3"	21	1'-8"	3'-4"	42'-0"	S3	A+4"	
S4	4	6	4'-5"	21	1'-11"	2'-6"	28'-6"	S4	A-6"	
TOTAL STEEL (SIZE 4)								92'-2" Lin Ft.		
TOTAL STEEL								61.57 Lbs.		
TOTAL REINFORCED CONCRETE								.927 Cu.Yds.		

CU YDS. CONCRETE = $5(A)(B) + 176(B) + 352(A) - 2916$
 A=INCHES 46856
 B=INCHES

NOTES: MAXIMUM CENTER SPACING OF NO.4 BARS SHALL NOT EXCEED 12"
 THE SCOUR APRON SHALL BE FASTENED TO THE INLET BASE WITH DOWELS OF NO.6 DEFORMED REINFORCING STEEL 4 FEET LONG; S ARE REQUIRED CENTER SPACING OF NO.6 BARS SHALL BE 15" OR LESS.
 ALL CONCRETE SHALL BE EQUAL OR EXCEED CLASS 4000.
 MINIMUM STEEL CLEARANCE AGAINST EARTH SHALL BE 3" EXCEPT S1 DOWELS AND S4 BARS SHALL BE CENTERED IN THE TOP SLAB.
 JOINT FILLER SHALL BE 3/4" PREFORMED EXPANSION JOINT FILLER.



SECTION A-A

NO CHANGE IN PLANS
 AS-BUILT PLANS
 CONSTRUCTION
 COMPLETED 4/19/85

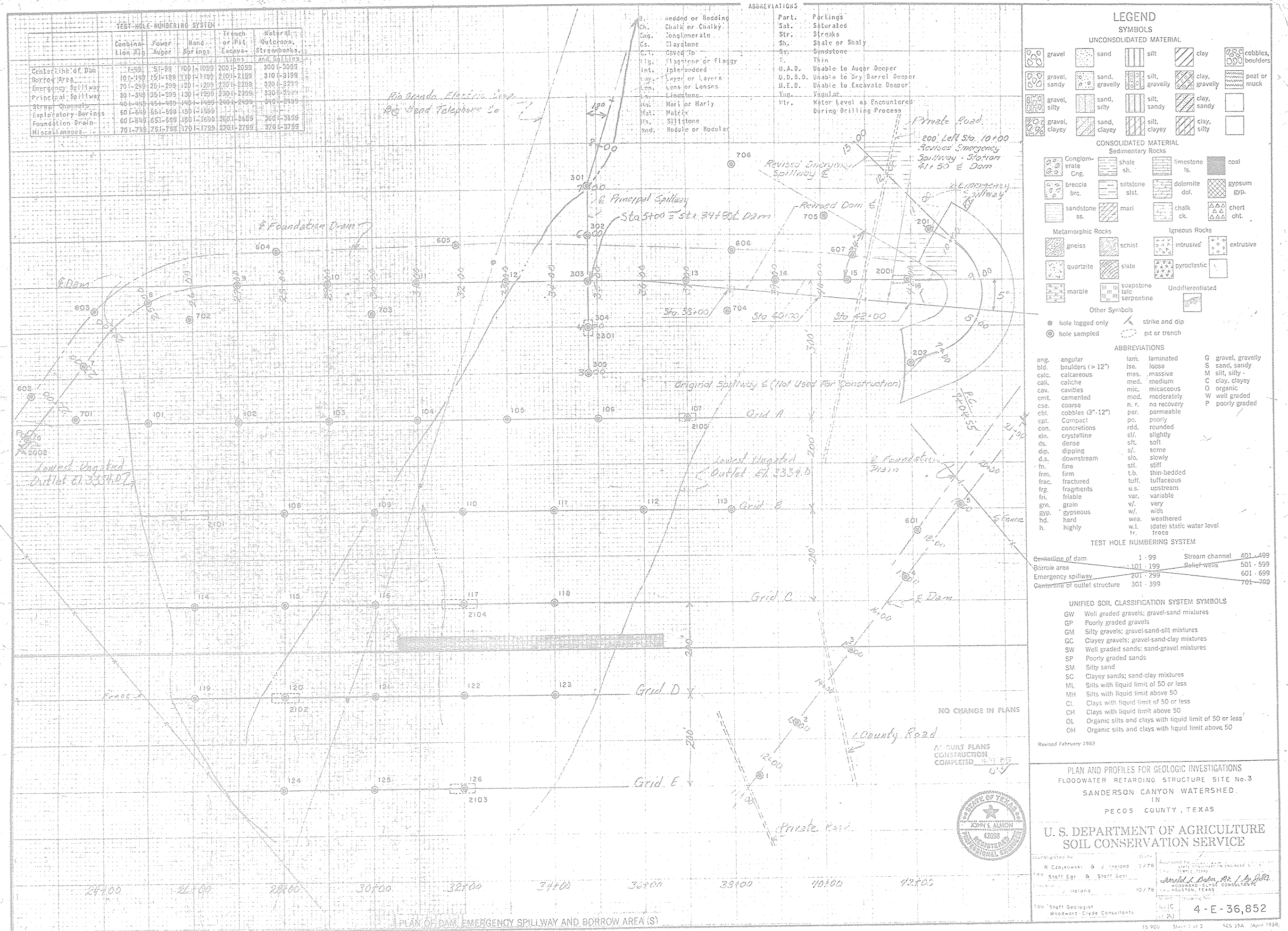


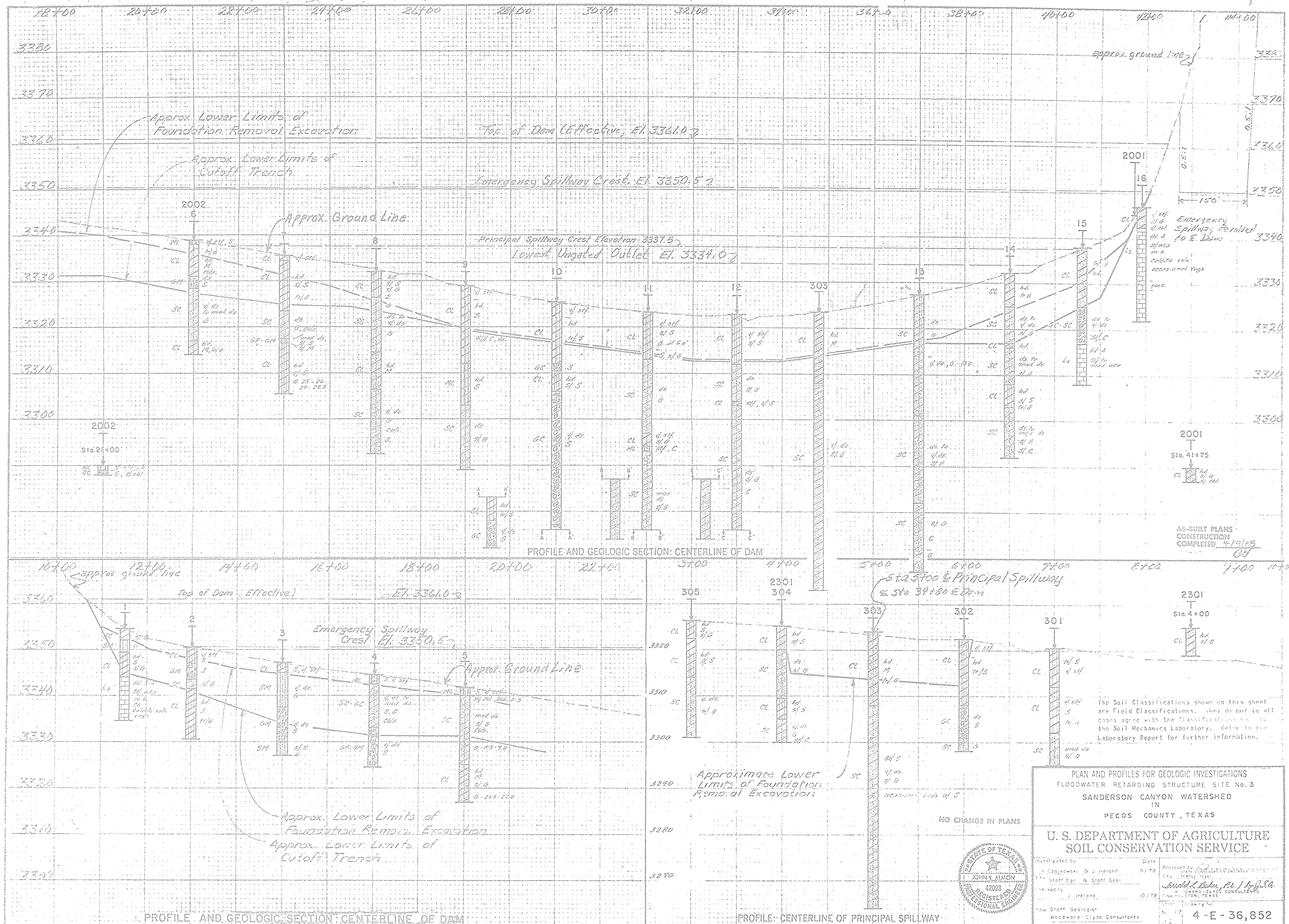
PRINCIPAL SPILLWAY INLET SCOUR APRON
 FLOODWATER RETARDING STRUCTURE SITE NO. 3
 SANDERSON CANYON WATERSHED
 IN
 BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

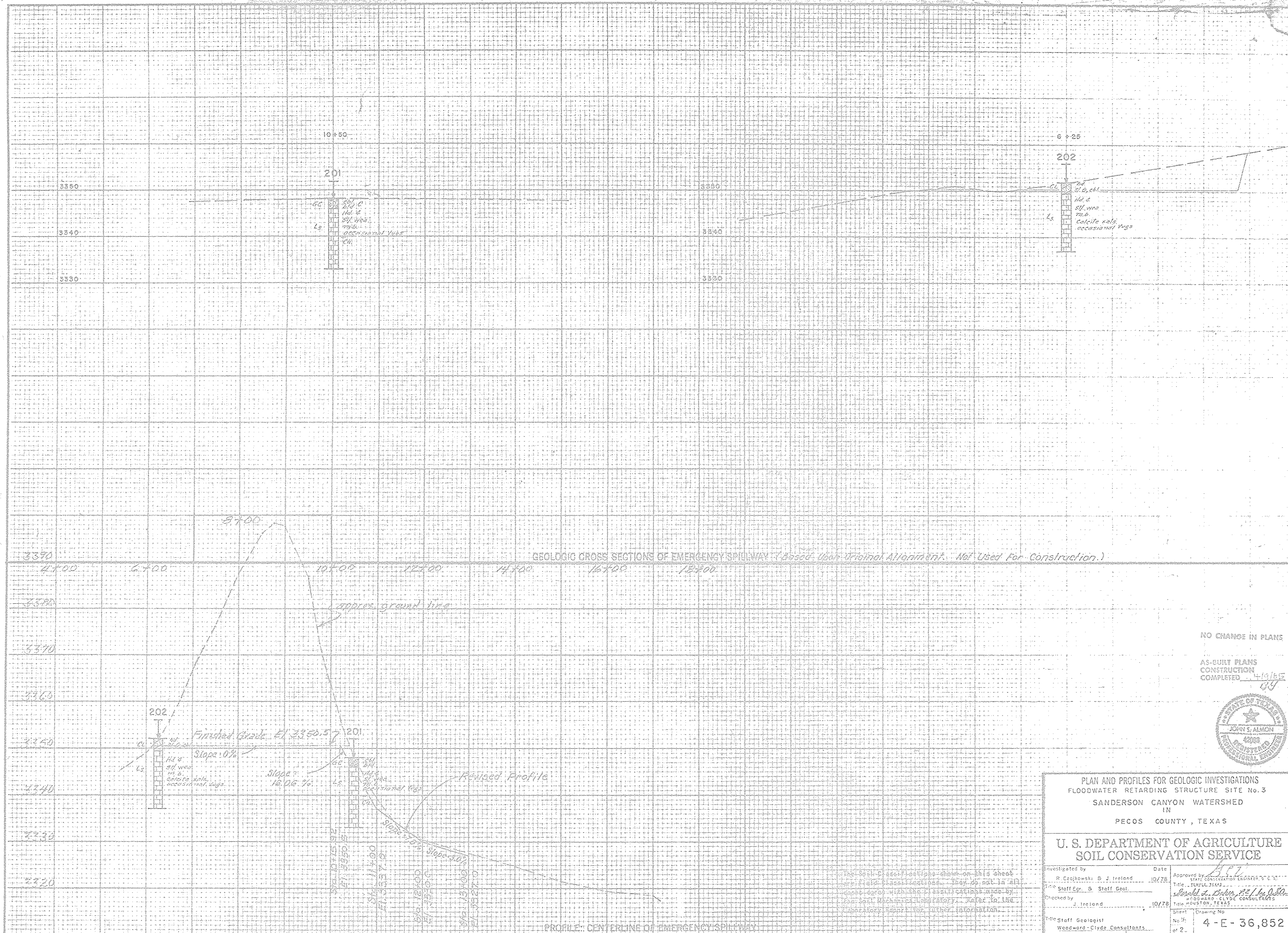
U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

DESIGNED BY J.S. Almon	DATE 5/79	APPROVED BY [Signature]	DATE 5/79
DRAWN BY G. Oville	DATE 5/79	CHECKED BY [Signature]	DATE 5/79
IN CHARGE J.S. Almon	DATE 5/79	REVISIONS	

4-E-36,852







GEOLOGIC CROSS SECTIONS OF EMERGENCY SPILLWAY (Based Upon Original Alignment. Not Used For Construction.)

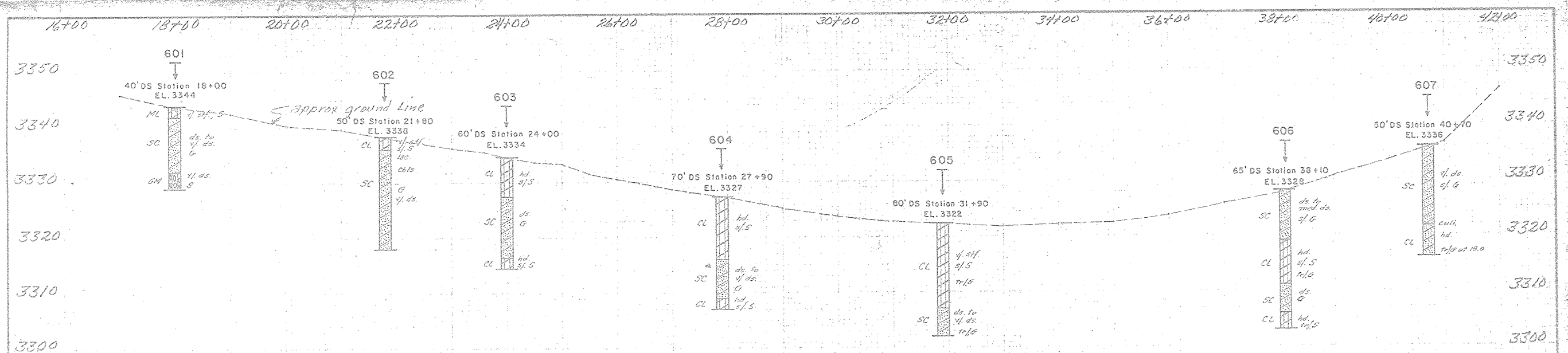
PROFILE: CENTERLINE OF EMERGENCY SPILLWAY

NO CHANGE IN PLANS

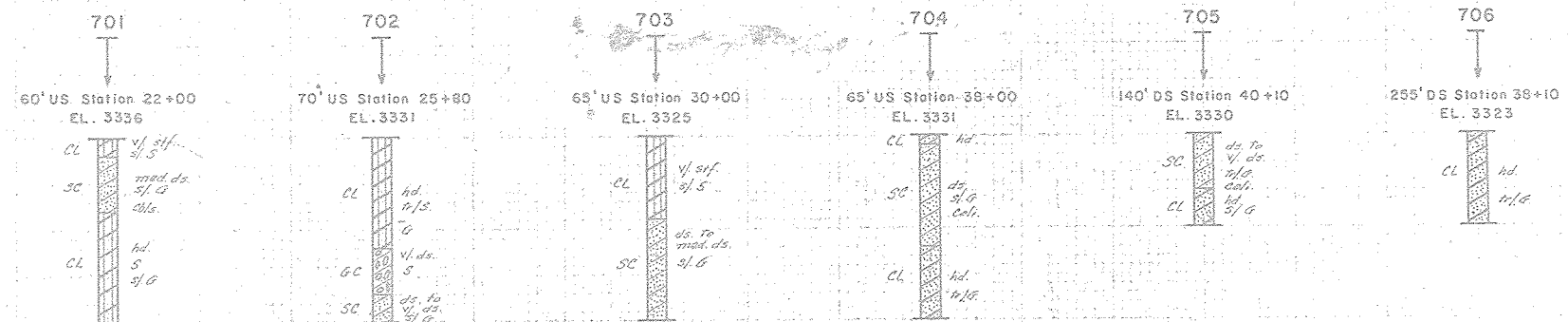
AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/19/85



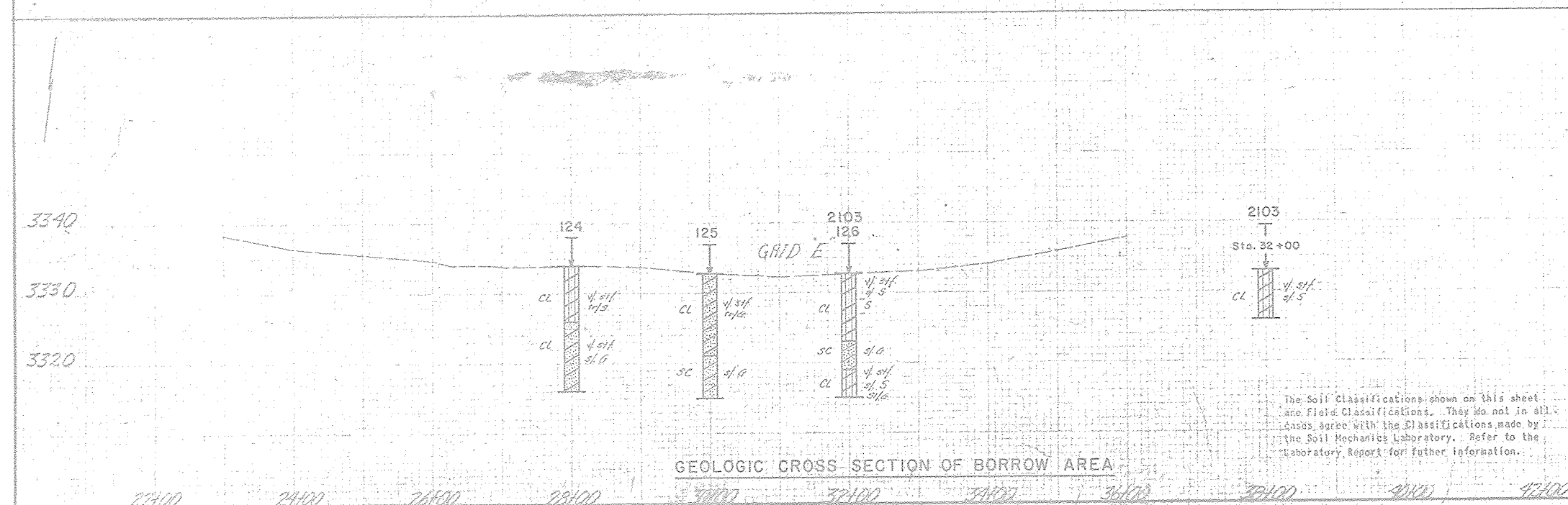
PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS FLOODWATER RETARDING STRUCTURE SITE No. 3 SANDERSON CANYON WATERSHED IN PECOS COUNTY, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Investigated by R. Crokowski, S. J. Ireland	Date 10/78	Approved by S. J. Ireland	Title STATE CONSERVATION ENGINEER'S 50
Checked by J. Ireland	Date 10/78	Checked by S. J. Ireland	Title WOODWARD-CLYDE CONSULTANTS
Sheet of 2		Drawing No. 4-E-36,852	



PROFILE OF FOUNDATION DRAIN



MISCELLANEOUS BORINGS



GEOLOGIC CROSS SECTION OF BORROW AREA

The Soil Classifications shown on this sheet are Field Classifications. They do not in all cases agree with the Classifications made by the Soil Mechanics Laboratory. Refer to the Laboratory Report for further information.

NO CHANGE IN PLANS

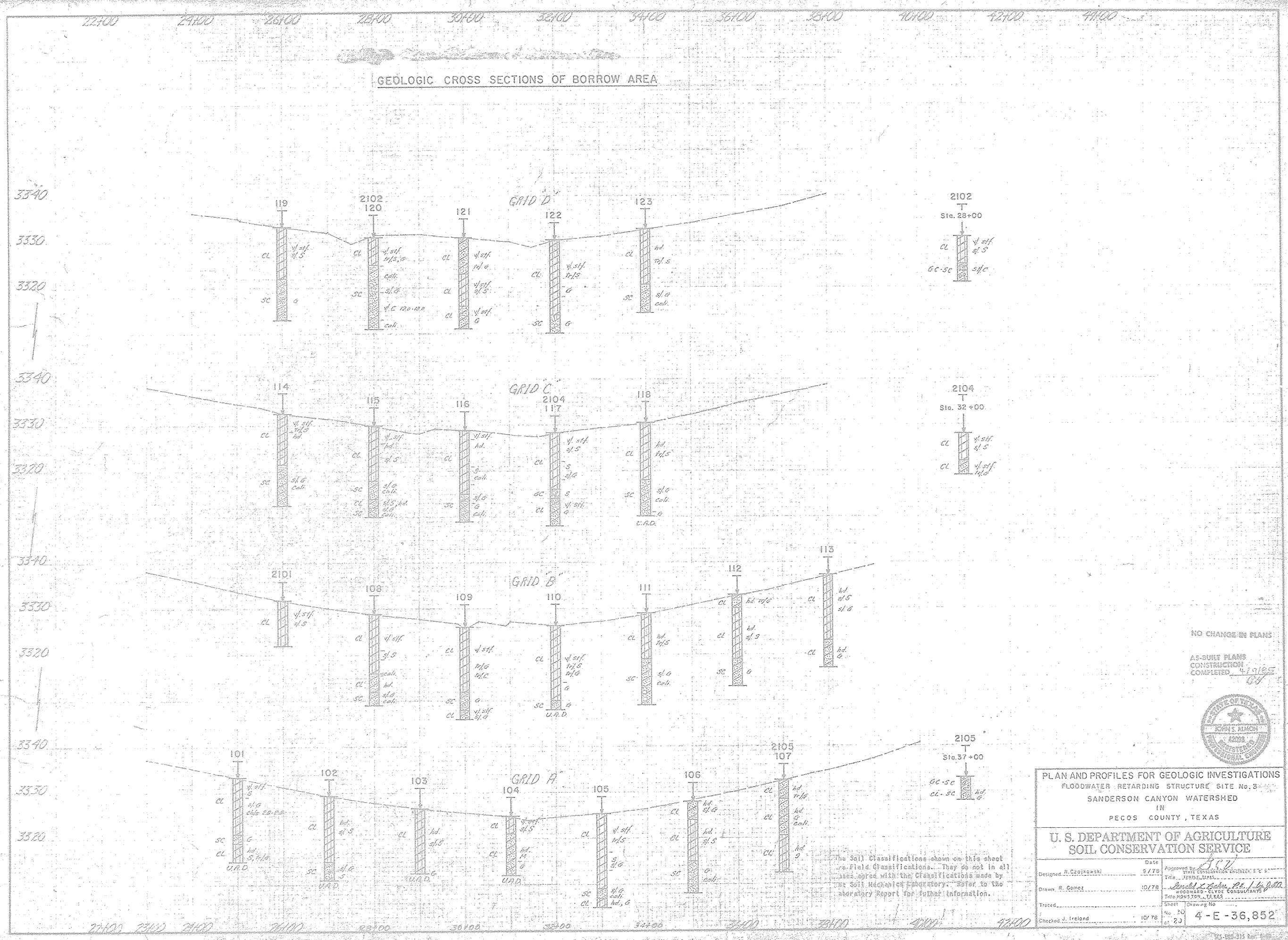
AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/9/85



PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
FLOODWATER RETARDING STRUCTURE, SITE No. 3
SANDERSON CANYON WATERSHED
IN
PECOS COUNTY, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed R. Czajkowski	Date 2/7/78	Approved by [Signature]
Drawn R. Gomez	10/1/78	Title [Signature]
Traced [Signature]	10/7/78	Sheet [Signature]
Checked J. Ireland	10/7/78	Drawing No. 4-E-36,852



NO CHANGE IN PLANS

AS-BUILT PLANS
CONSTRUCTION
COMPLETED 4/19/85



PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS FLOODWATER RETARDING STRUCTURE SITE No. 3 SANDERSON CANYON WATERSHED IN PECOS COUNTY, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed: R. Czajkowski	Date: 9/78	Approved by: [Signature]	Title: STATE CONSERVATION ENGINEER
Drawn: R. Gomez	Date: 10/78	Checked: [Signature]	Title: SENIOR CONSULTANT
Traced: [Signature]	Date: 10/78	Sheet: 20	Drawing No: 4-E-36,852
Checked: J. Ireland	Date: 10/78	Sheet: 21	

The Soil Classifications shown on this sheet are Field Classifications. They do not in all cases agree with the Classifications made by the Soil Mechanics Laboratory. Refer to the Laboratory Report for further information.