

USDA - SCS - FORT WORTH, TEXAS



FLOODWATER RETARDING DAM NO. 9

SANDERSON CANYON WATERSHED PROJECT

TERRELL COUNTY, TEXAS

DRAINAGE AREA	2,688 ACRES
TOTAL STORAGE	907 AC.FT.
HEIGHT OF DAM	52 FEET
VOLUME OF FILL	577,269 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
 1977

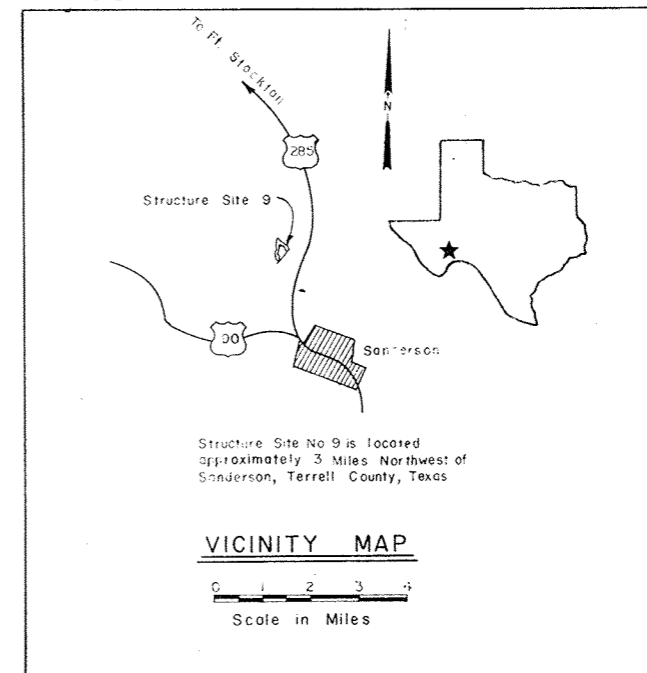
CONSTRUCTION DRAWINGS APPROVED

Gene C. Vittetoe (M.D.K.) 10-31-77
STATE CONSERVATION ENGINEER DATE

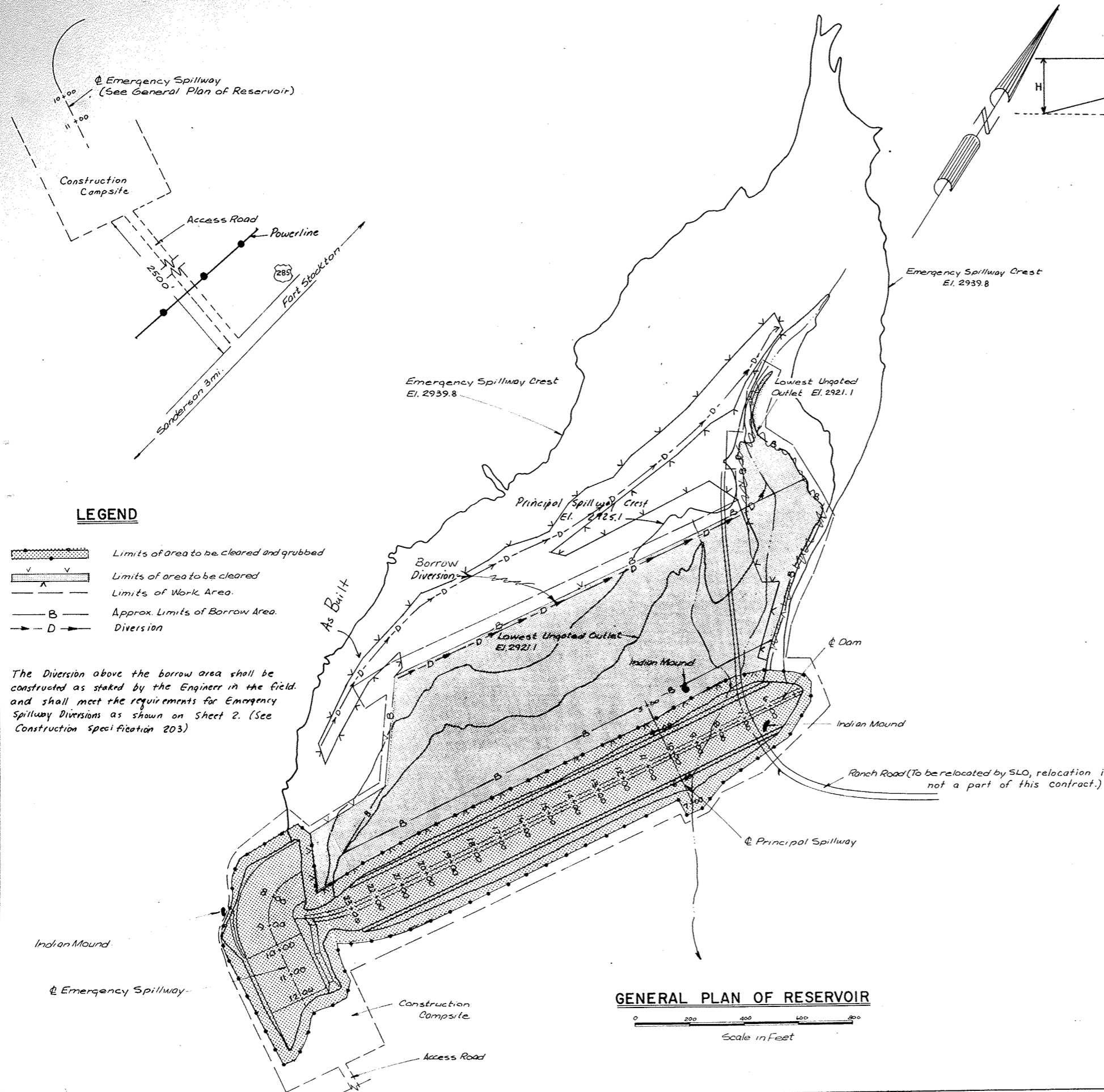
Donald Spasinger 12/13/77
HEAD, ENGINEERING STAFF DATE
FORT WORTH, TEXAS

As-Built Plans 2-19-79
778

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2	PLAN OF EMBANKMENT AND DRAINAGE
3	PROFILE OF EMBANKMENT
4	PROFILE OF LEVEE
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4-C	EMBANKMENT DETAIL (SEE APPENDIX)
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As Built



TYPICAL SECTION - BORROW DIVERSION

1+20 to 12+00 - H=4'; W=10'; S/S=4:1

12+00 to 13+00 - Transitional

13+00 to 17+00 - H=3'; W=10'; S/S=4:1

17+00 to 18+00 - Transitional

18+00 to 20+00 - H=2'; W=10'; S/S=4:1

20+00 to 23+00 - Emergency Spillway Diversion

ELEVATION	SURFACE ACRES	CAPACITY	
		ACRE FEET	INCHES
2908	1	1	0.1
2912	3	7	0.2
2916	9	29	0.3
2920	17	79	0.4
2921.1	19	96	0.4
2924	26	163	0.5
2925.1	20	193	0.5
2928	26	286	0.6
2932	47	452	0.7
2936	62	670	0.8
2939.8	73	907	0.9
2940	74	941	0.9
2944	86	1259	1.0
2948	96	1625	1.1
2951	110	2040	1.2
2953.0	113	2150	1.2

Drainage Area, Acres	2,600
Top of Dam (effective) El.	2953.0
Emergency Spillway Crest El.	2939.8
Principal Spillway Crest El.	2925.1
Lowest Ungated Outlet El.	2921.1
Sediment Capacity, Acre Feet	210
Floodwater Capacity, Acre Feet	694
Maximum Emergency Spillway Capacity, cubic feet/second	27,908
Principal Spillway Capacity, @ El. 2939.8, cubic feet/second	III

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

LEGEND

- Limits of area to be cleared and grubbed
- Limits of area to be cleared
- Limits of Work Area.
- Approx. Limits of Borrow Area.
- Diversion

The Diversion above the borrow area shall be constructed as stated by the Engineer in the field and shall meet the requirements for Emergency Spillway Diversion as shown on Sheet 2. (See Construction Specification 203)

As-Built Plans 2/19/79 JTB

GENERAL PLAN OF RESERVOIR FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS, AND TERRELL COUNTIES TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED A.V.T.	DATE 4-77	Approved by <i>bcj</i>	
DRAWN A.V.T.	DATE 4-77	STATE CONSERVATION ENGINEER S. C. S.	
TRACED T.C.E.	DATE 4-77	SHEET 1 of 21	
CHECKED L.T.	DATE 6-77	DRAWING NO. 4-E-35,744	

Emergency Spillway Diversions shall have 13 ft. minimum base width; 3:1 side slopes; and 18" effective height. Effective height may be secured by grading a channel across high points to reduce the height of fill required in low areas. Where a channel section is required, the minimum bottom width of channel shall be 12 ft. (See Construction Specification 203.)

Where durable rock is not exposed at grade, the finished grade of the emergency spillway shall be over excavated 1 foot and 1 foot of rock shall be placed in the Emergency Spillway.

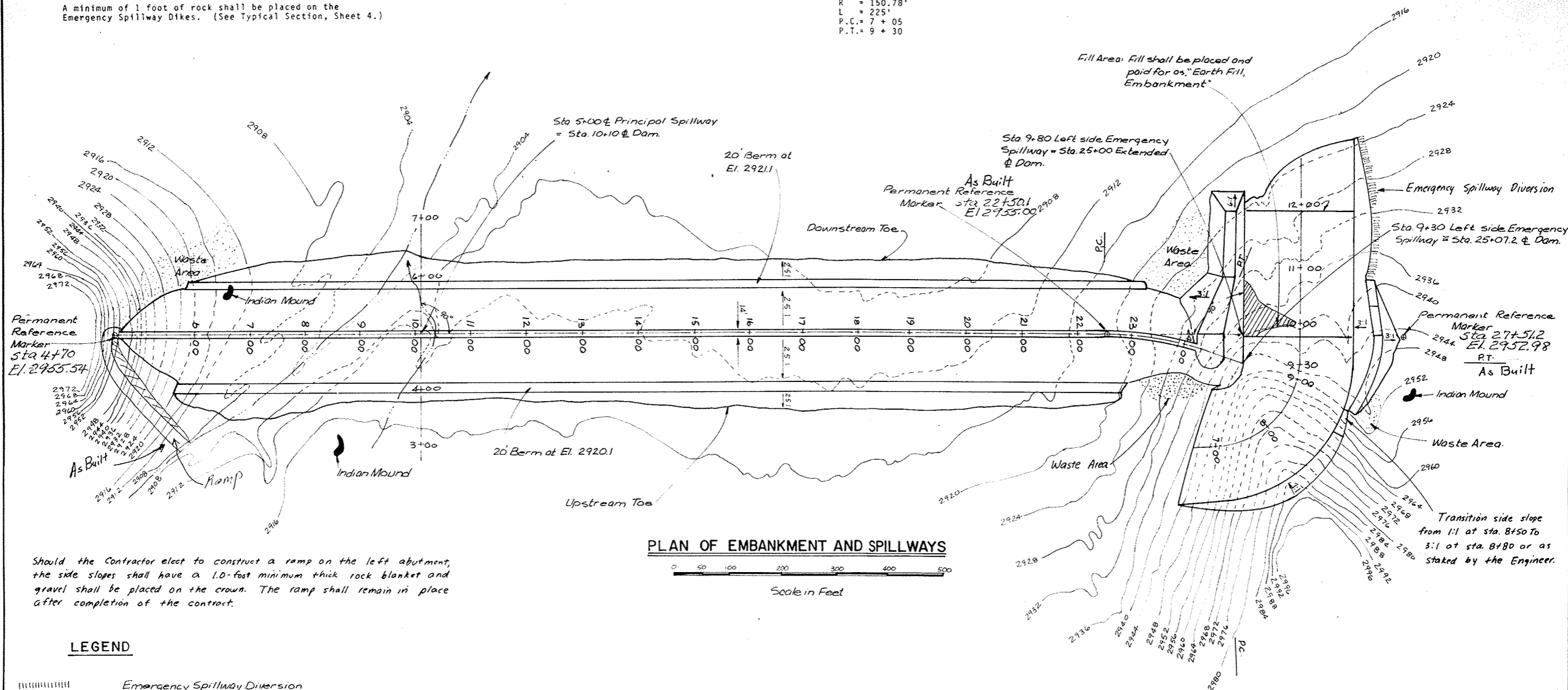
A minimum of 1 foot of rock shall be placed on the Emergency Spillway Dikes. (See Typical Section, Sheet 4.)

EMBANKMENT CURVE DATA

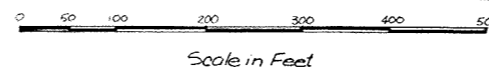
$\Delta = 18^\circ 26'$
D = 90' 13"
R = 621.7'
L = 200'
P.C. = 22 + 49.12
P.T. = 24 + 49.12

EMERGENCY SPILLWAY CURVE DATA

$\Delta = 85^\circ 30'$
D = 380'
R = 150.78'
L = 225'
P.C. = 7 + 05
P.T. = 9 + 30



PLAN OF EMBANKMENT AND SPILLWAYS



Should the Contractor elect to construct a ramp on the left 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.

LEGEND

Emergency Spillway Diversion

As-Built Plans 2-19-79 JTB

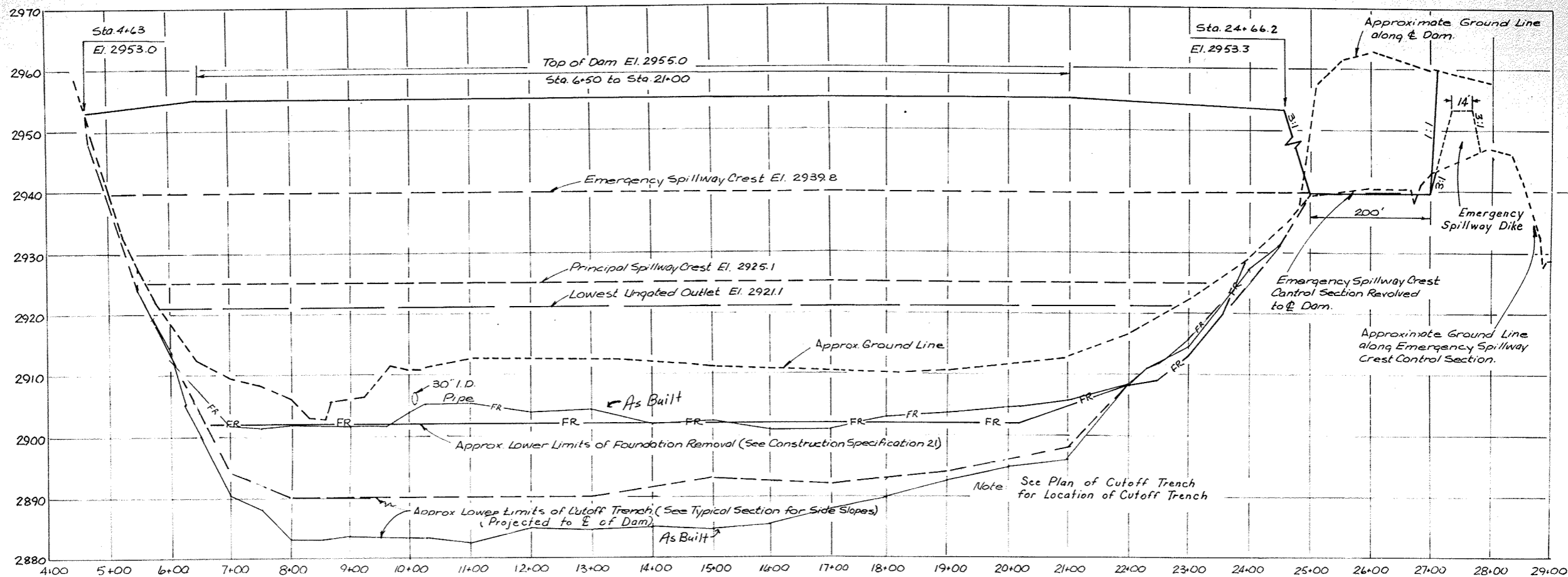
NOTE: If needed to complete the required rock fills, additional rock material shall be obtained from the cut slope of the Emergency Spillway as staked by the Engineer. (See Construction Specification 21.)

PLAN OF EMBANKMENT AND SPILLWAYS FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED

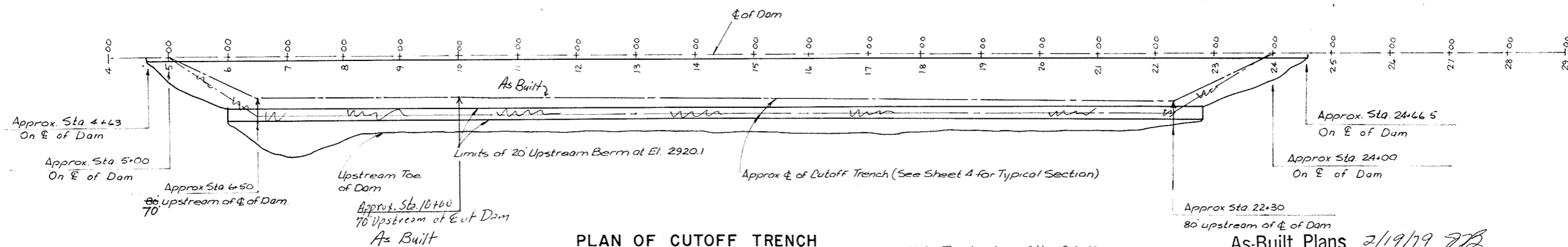
IN
BREWSTER, PECOS, AND TERRELL COUNTIES TEXAS

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

DESIGNED A.V.T. DATE 4-77
DRAWN J.A.G. & A.V.T. 4-77
TRACED T.C.E. 4-77
CHECKED L.T. 6-77
APPROVED BY J.C. 6-77
STATE CONSERVATION ENGINEER S.C.E.
JUDAL 1977
SHEET 2 DRAWING NO.
4-E-35,744
of 21



PROFILE ON \mathcal{C} OF DAM

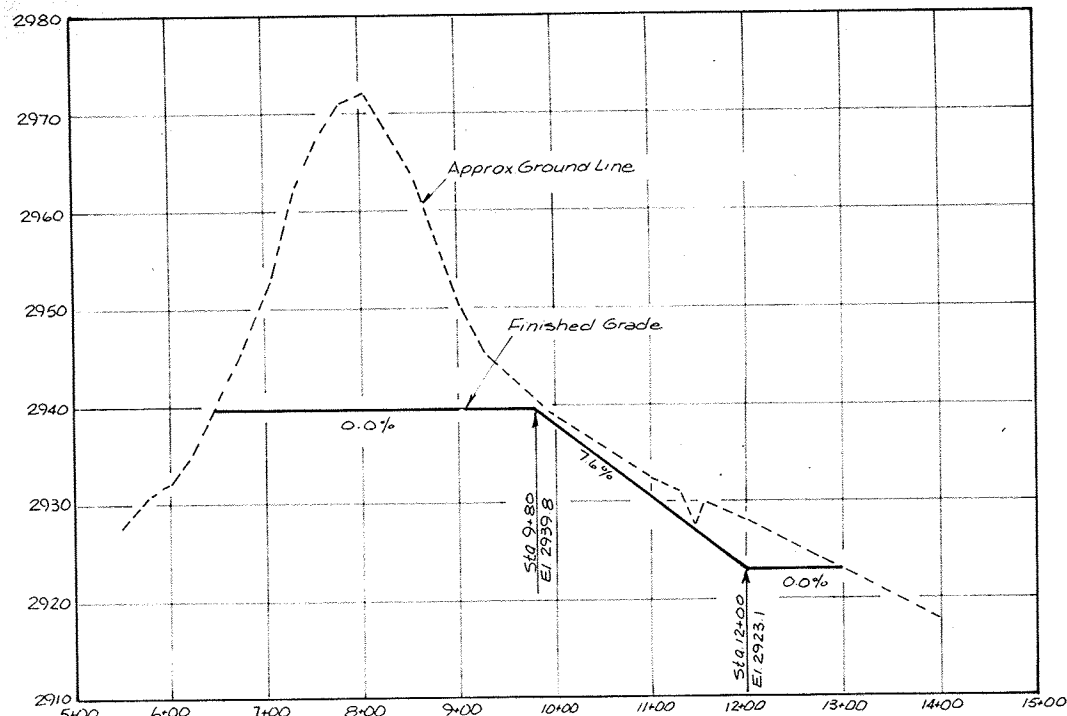


PLAN OF CUTOFF TRENCH

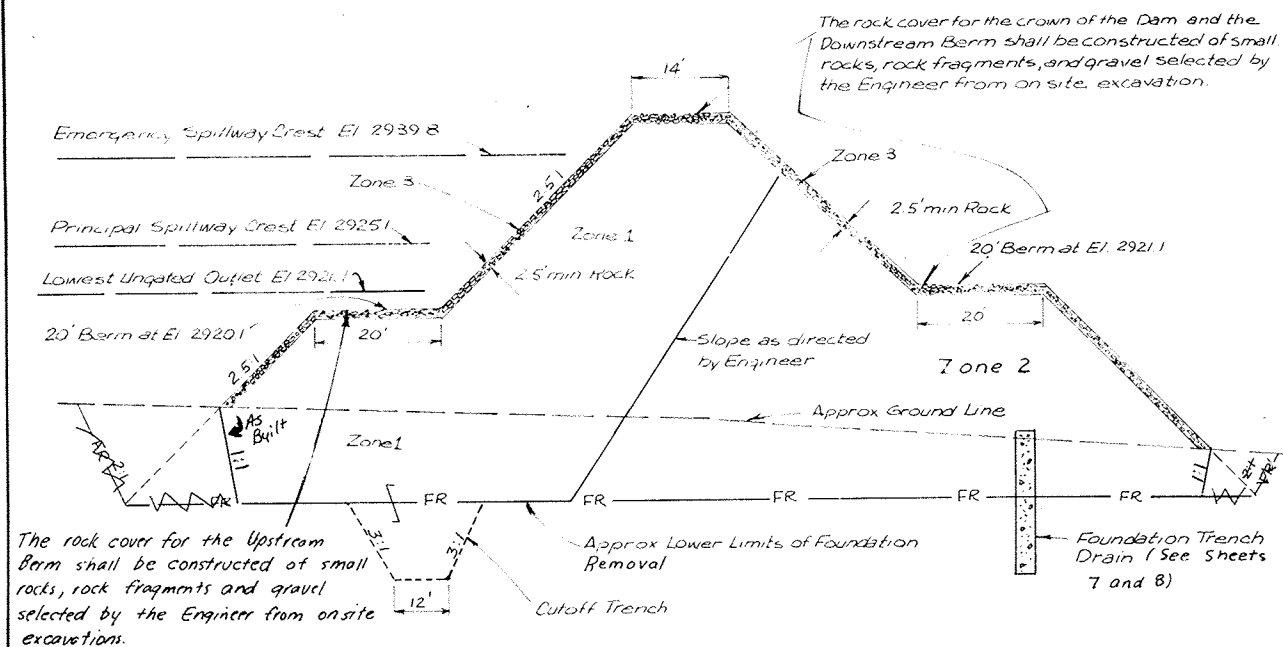
Note: The location of the Cutoff may be altered by the Engineer in the field.

As-Built Plans 2/19/79 JTB

PROFILE ON \mathcal{C} OF DAM FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS, AND TERRELL COUNTIES TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED	AVT.	DATE	4-77
DRAWN	AVT.	DATE	4-77
TRACED	T.C.E.	DATE	4-77
CHECKED	L.T.	DATE	6-77
APPROVED BY		STATE CONSERVATION ENGINEER'S SIGNATURE	
SHEET		DRAWING NO.	
No. 3		4-E-35,744	
of 21			

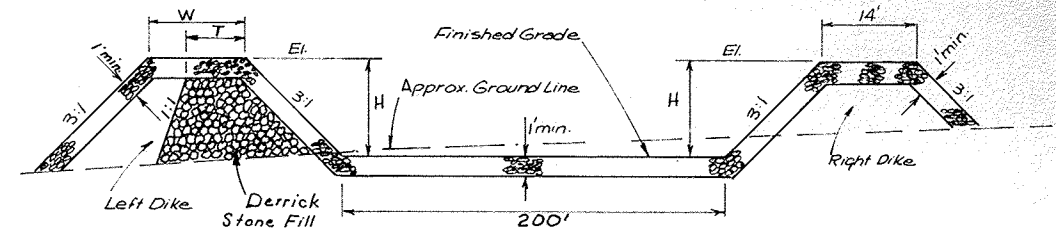


PROFILE ON C OF EMERGENCY SPILLWAY



Foundation Removal Change Approved
By M. D. Kay, State Design Engr.
3-24-78.

TYPICAL SECTION



LEFT DIKE: From Embankment to Approximate Station 9+80, El. = 2953.3, W=50', T=20'
From Approximate Station 9+80 to Approximate Station 10+80, Dike is transitional
From Approximate Station 10+80 to Approximate Station 12+00, H=5.5', W=20', T=8'

RIGHT DIKE: From Approximate Station 8+80 to Approximate Station 9+80, El. = 2953.3
From Approximate Station 9+80 to Approximate Station 10+30, Dike is transitional
From Approximate Station 10+30 to Approximate Station 10+80, H=5.5'
From Approximate Station 10+80 to Approximate Station 11+00, Dike transitions to diversion.
From Approximate Station 11+00 to Approximate Station 13+30 is a diversion

DIKE AND SPILLWAY MATERIALS:

Except where durable rock is exposed at grade, a rock blanket as shown shall be constructed from suitable rock and suitable rock fragments (maximum dimension 1') obtained from required excavations. (See Construction Specification 21.)

Material forming dikes, transitions, and spillway blanket shall be placed and paid for as "Earth Fill, Embankment." (See Construction Specification 23A.)

The rock used for the derrick stone fill in the left emergency spillway dike shall be harvested or produced stone that have individual stone weights ranging from 1500 to 4000 pounds. The derrick stone shall be placed so as to produce a reasonably dense fill with a minimum of voids. Insofar as practical, the voids between particles shall be filled with gravelly clay earth. Material placed as derrick stone fill shall be placed and paid for as "Earth Fill, Embankment." See Construction Specification 23A.)

The side slopes of the emergency spillway that are excavated into hard rock shall be 1:1 except as noted on Sheet 2.

TYPICAL SECTION- EMERGENCY SPILLWAY

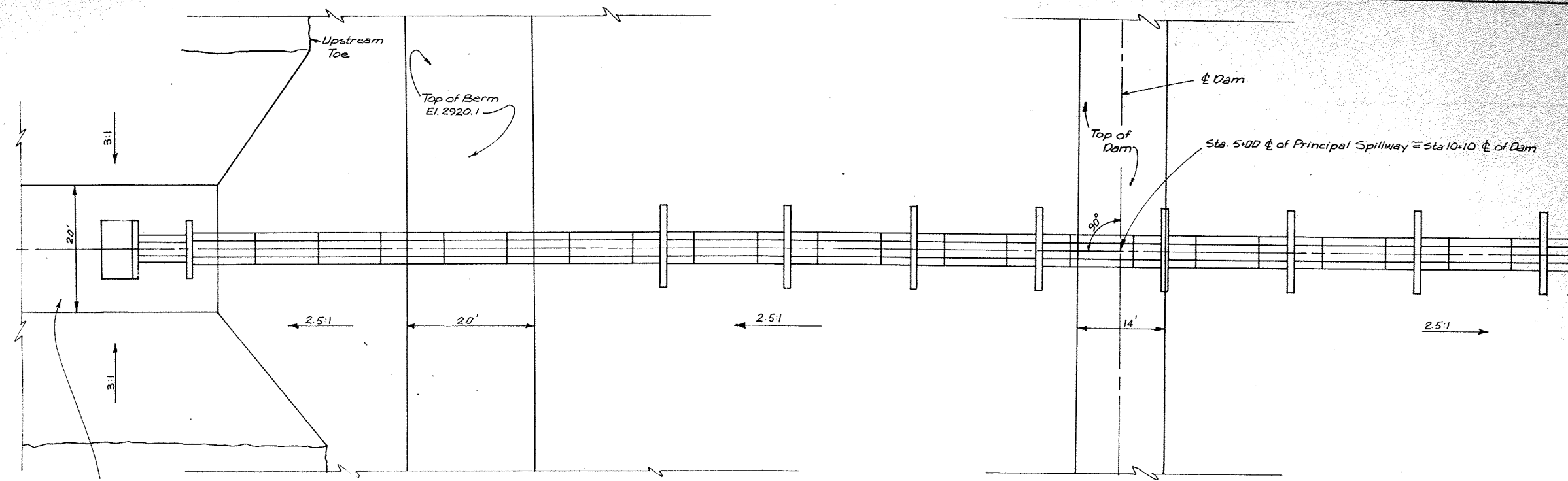
MATERIALS PLACEMENT DATA								
Embankment Zone No. 1/	Type or Unified Classification	Field Control Test	Placement and Compaction Requirements					
		ASTM Test	Max. Allowable Particle Size	Max. Uncompacted Layer Thickness	Specified Compaction Class	Min. Dry Density Percent of Field Test	Moisture Limits Relative to Field Test	
		Number Method				Max. Dry Density	From To	Optimum %
1	CL, slightly gravelly, silty clay, moderately plastic	D698 A or B	6"	9"	A	95	Opt	Up
2	CL, sandy, gravelly clay, moderately plastic	D698 A or B	6"	9"	A	95	Opt	Up
2	SC, gravelly, clayey sand, moderately plastic	D698 A or B	6"	9"	A	95	Opt	Up
3	Rock 2/ 3/ 4/	—	30"	36"	—	—	—	—
2	GC-clayey Gravel	moisture only	9"	C	C	opt.	up	As Built

- 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.
- Rock placed on the embankment shall be reasonably well graded from a maximum particle size of 30" down to spalls and cobbles with not less than 50% by weight larger than 6". The most durable rock shall be placed on the upstream slope of the embankment. The least dimension of an individual rock fragment shall not be less than one-third the greatest dimension of the fragment. Sizing of oversized rock material from the required site excavations to meet the specified gradation will be required.
- The rock shall be dumped and spread into place in approximately horizontal layers not more than 3 feet in thickness. It shall be placed in a manner to produce a reasonably homogeneous stable fill that contains no segregated pockets of large or small fragments or large unfilled spaces caused by bridging of the larger fragments. The source of this material shall be durable rock fragments produced as the result of performing required excavations of consolidated rock formations. No special compaction is required for materials placed in Zone 3. Zone 3 shall be placed and paid for as "Earth Fill, Embankment." (See Construction Specification 23A.)
- See Typical Section of Emergency Spillway for Derrick Stone Requirements.

ZONED EMBANKMENT DATA

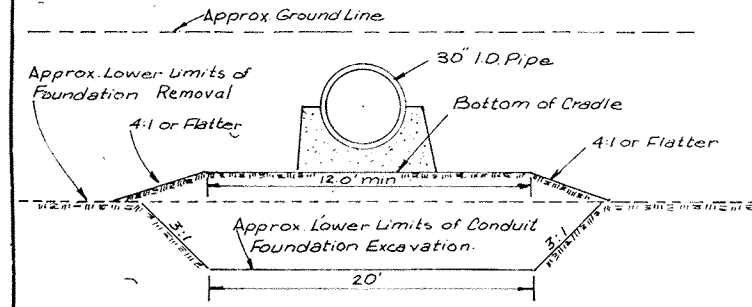
As-Built Plans 2/19/79 JTB

PROFILE AND SECTIONS FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS, AND TERRELL COUNTIES TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED A.V.T.	DATE 4-77	APPROVED BY JCB	
DRAWN A.V.T.	DATE 4-77		
TRACED T.C.E.	DATE 4-77	SHEET 4	DRAWING NO. 4-E-35,744
CHECKED L.T.	DATE 6-77	of 21	

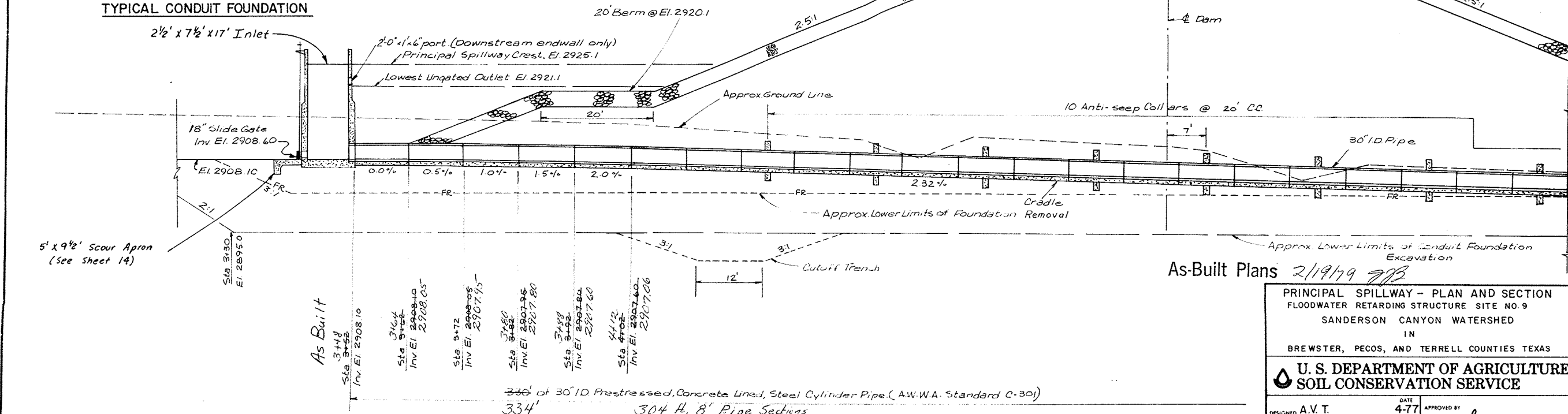


Excavate Principal Spillway Inlet Channel to Limits Shown at El. 2908.1 from Upstream Toe to borrow area. (See Construction Specification 21)

PLAN



NOTE: Prior to placing fill material around the completed conduit, the exposed earth surfaces shall be reworked as necessary and to the depth necessary to remove all cracks caused by weathering and to establish or restore the density and moisture requirements specified for that type of material.

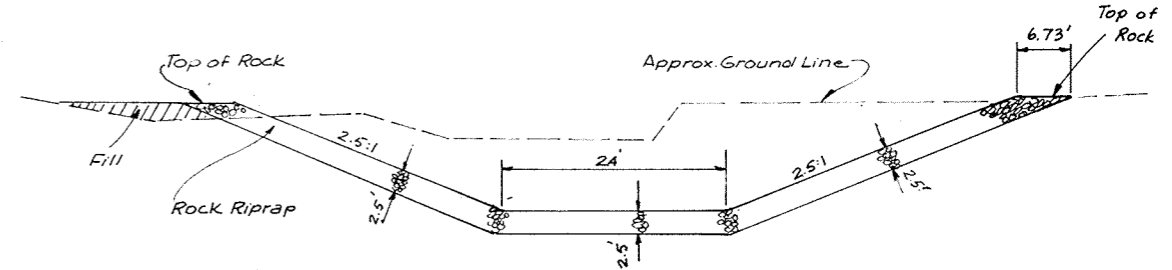
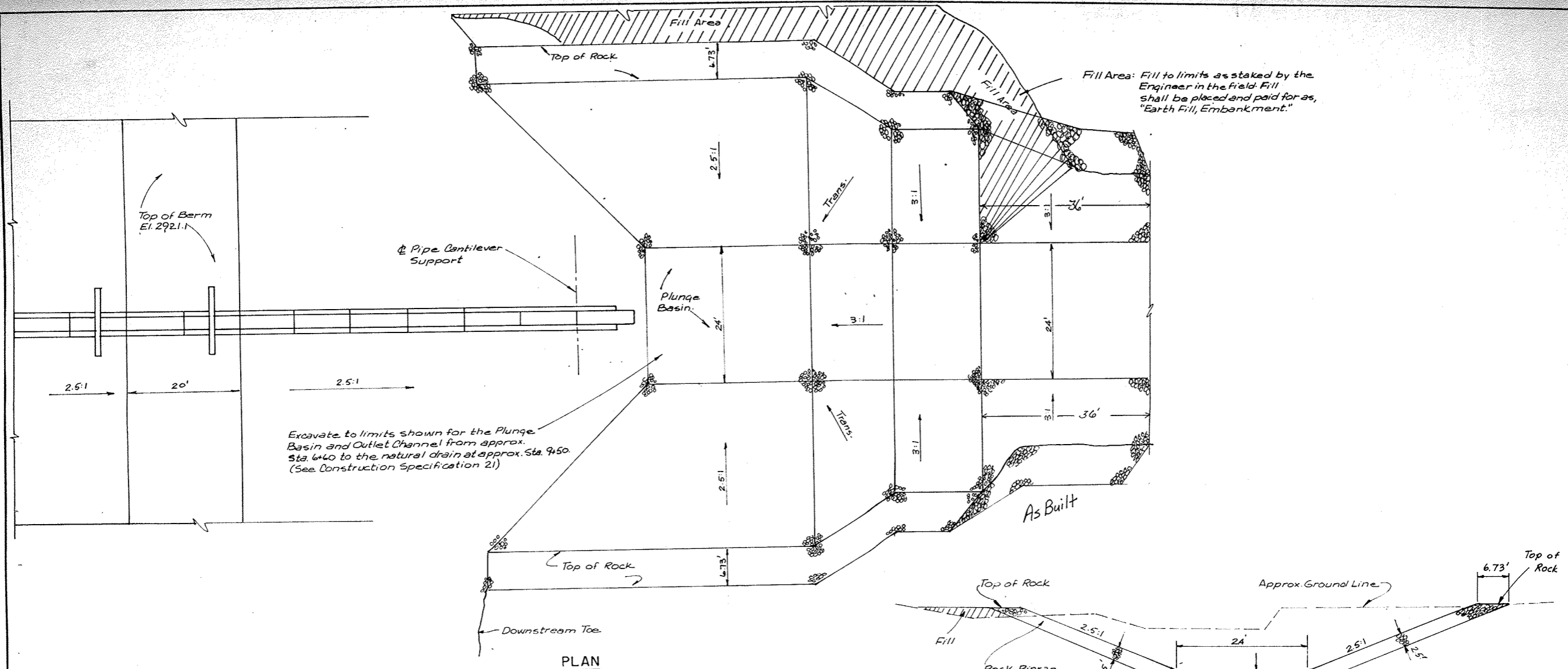


SECTION
PRINCIPAL SPILLWAY

As-Built Plans 2/19/79

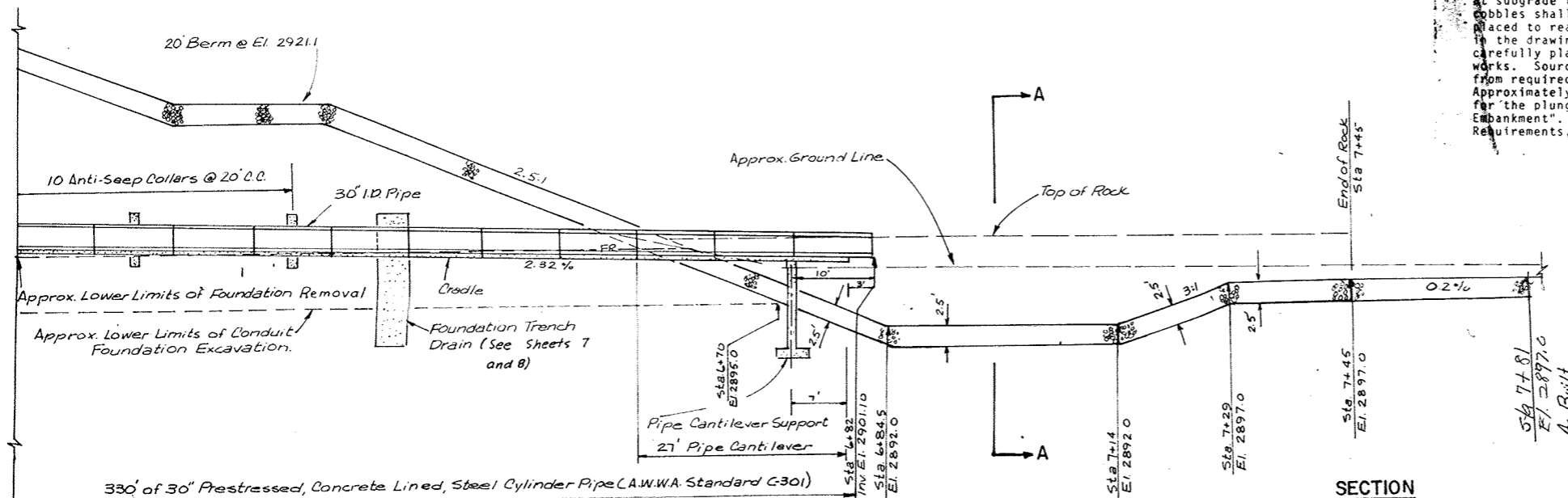
PRINCIPAL SPILLWAY - PLAN AND SECTION
FLOODWATER RETARDING STRUCTURE SITE NO. 9
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS, AND TERRELL COUNTIES TEXAS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	A.V.T.	DATE	4-77	APPROVED BY	hcv
DRAWN	A.V.T. & G.P.	DATE	4-77	STATE ENGINEER	STATE ENGINEER
TRACED	T.C.E.	DATE	4-77	SHEET	5
CHECKED	L.T.	DATE	6-77	DRAWING NO.	4-E-35,744



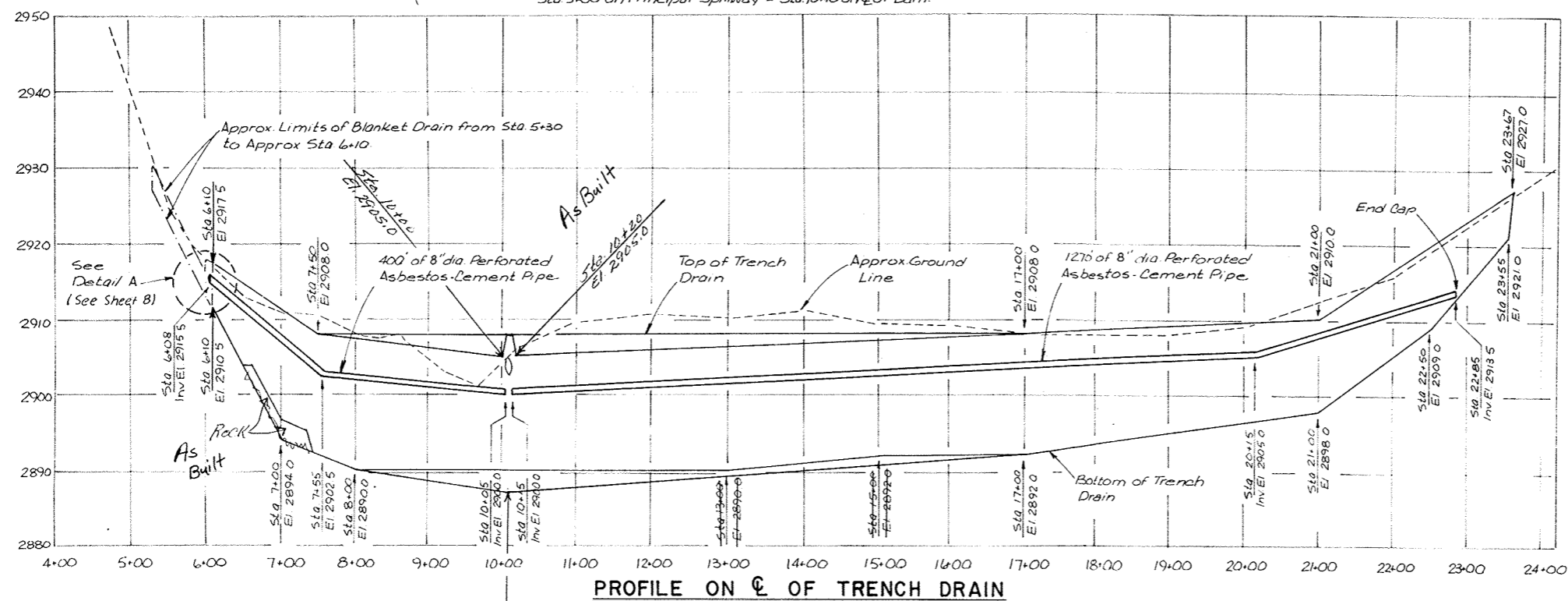
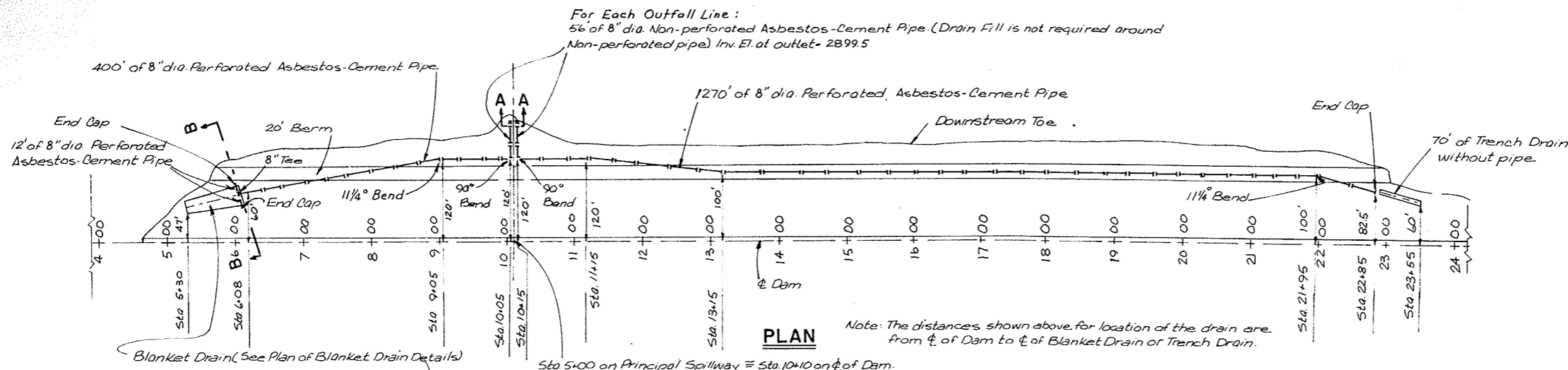
Note: The top of rock in the plunge basin shall extend to the ground line or elevation 2903.6, whichever is higher.

Place a minimum 2.5 feet thickness of dumped rock on the slopes of the plunge basin as shown with rock sizes grading from small at subgrade to large at finished grade. Placement of spalls and cobbles shall precede dumping of boulders. Boulders shall be placed to reasonably neat lines of the finished grades as shown in the drawings. Rock against the Principal Spillway shall be carefully placed to avoid damaging pipe and other structural works. Sources of rock materials shall be durable rock separated from required site excavations and stockpiled for use in plunge basin. Approximately 780 cu. yds. of rock will be required. Rock fill for the plunge basin shall be measured and paid for as "Earth Fill, Embankment". (See Construction Specification 23A.) For Rock Gradation Requirements, See Sheet 4.)

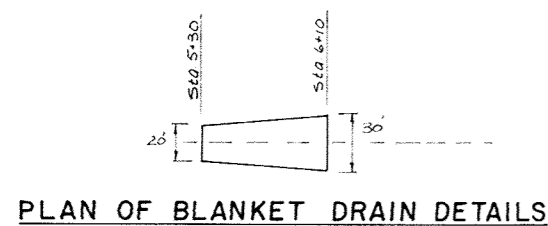


As-Built Plans 2/19/79 272

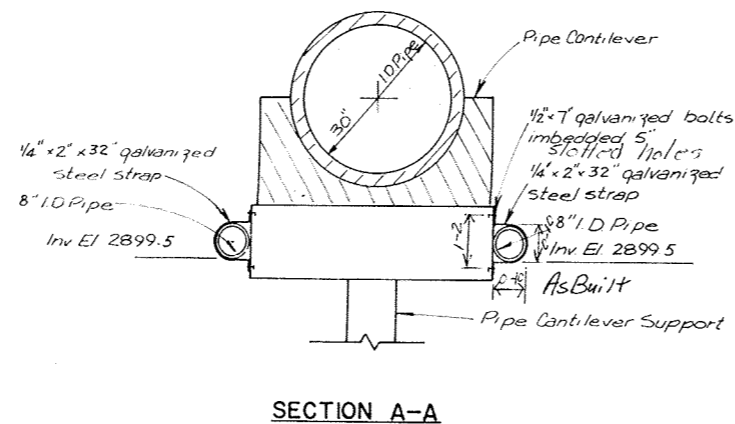
PRINCIPAL SPILLWAY - PLAN AND SECTION FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS, AND TERRELL COUNTIES TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED	A.V.T.	DATE	4-77
DRAWN	A.V.T. & G.P.	APPROVED BY	4-77
TRACED	T.C.E.	STATE CONSERVATION ENGINEER'S OFFICE	4-77
CHECKED	L.T.	SHEET	6
		DRAWING NO.	4-E-35,744



See Sheet 8 for Section B-B and Detail A and other Embankment Foundation Drain Details.



Blanket Drain shall have a thickness of 3' normal and shall consist of coarse drain fill. (See Sheet 8 for Details of Drain Pipe in lower end of Blanket Drain)



The last section of each outfall line shall be fastened to the pipe cantilever with a strap and two bolts as shown in Section A-A. The terminal section of pipe in each outfall line shall be a minimum of 15 feet in length and extend approximately 4 feet beyond the pipe cantilever support. Two steel straps and four bolts are required. The straps and bolts shall be galvanized. (See Construction Specification 44.)

A rodent guard shall be installed on the outfall end of each non-perforated pipe (2 rodent guards required)

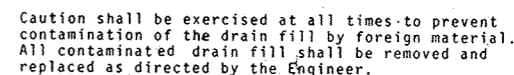
As-Built Plans 2/19/79 JJB

EMBANKMENT FOUNDATION DRAIN
FLOODWATER RETARDING STRUCTURE SITE NO. 9
SANDERSON CANYON WATERSHED

IN
BREWSTER, PECOS, AND TERRELL COUNTIES, TEXAS

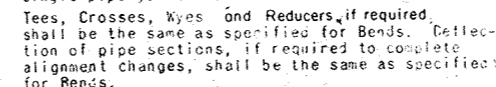
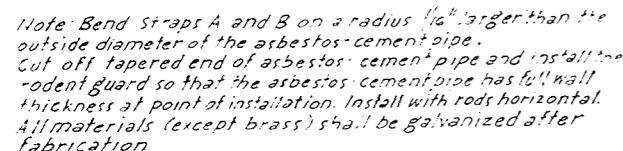
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	A.V.T.	DATE	4-77	APPROVED BY	JCB
DRAWN	A.V.T.	DATE	4-77	SHEET	7
TRACED	J.C.E.	DATE	4-77	DRAWING NO.	4-E-35,744
CHECKED	L.T.	DATE	6-77	of 21	



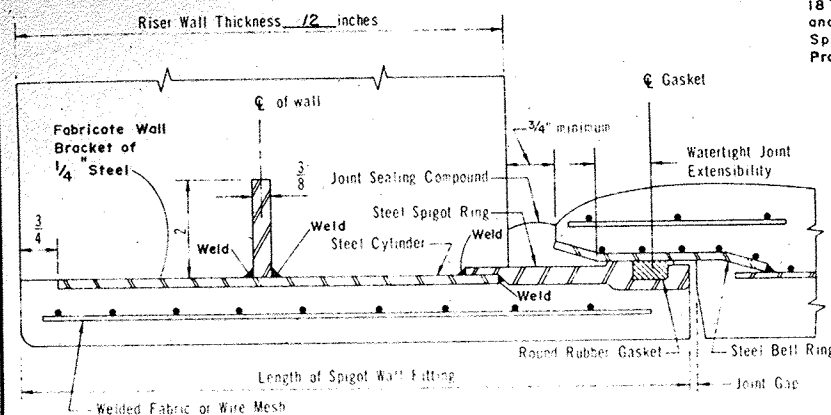
The drain fill shall consist of a mixture of 3 parts ASTM, C-33 Coarse Aggregate, Size NO. 467, and 1 part ASTM, C-33, Fine Concrete Aggregate; or a mixture of 1 part ASTM, C-33, Coarse Aggregate, Size No. 467 and 1 part ASTM, D-448, Coarse Aggregate, Size No. 89; or any other aggregate that will grade within the following limits:

STIEVE 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 - 13
No. 200	0 - 5



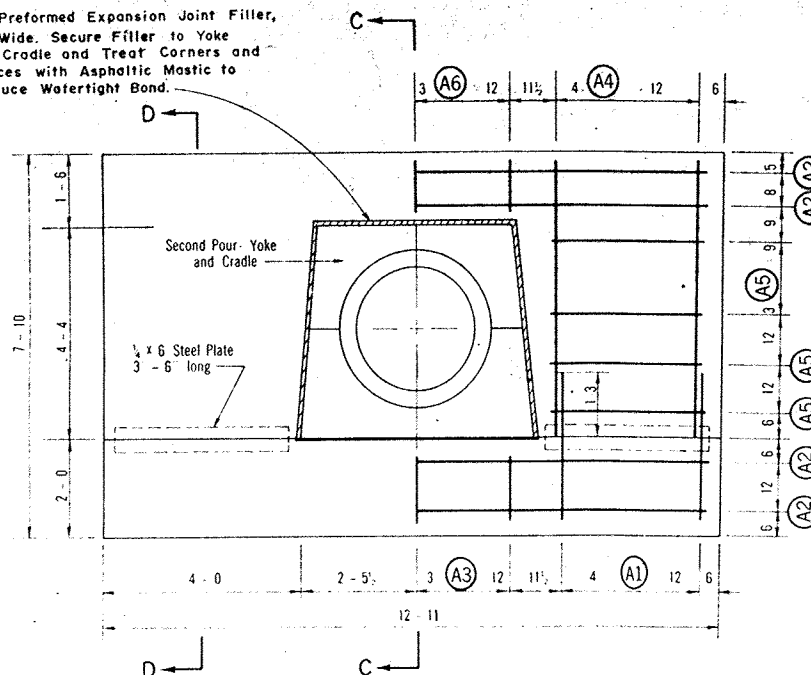
The installation of the non-perforated pipe shall be with original bedding that provides uniform and continuous bedding contact throughout the entire line. Joining shall be in accordance with the manufacturer's recommendations. Backfill and compaction shall be as specified in Construction Specification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

<p align="center">EMBANKMENT FOUNDATION DRAIN FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED</p> <p align="center">IN</p> <p align="center">BREWSTER, PECOS, AND TERRELL COUNTIES, TEXAS</p>																					
<p align="center">U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</p>																					
Designed A.V.T. Drawn A.V.T. Traced T.C.F. Checked L.T.	<table border="1"> <tr> <td>Date</td> <td>4-77</td> <td>Approved by</td> <td><i>GCV</i></td> </tr> <tr> <td></td> <td>4-77</td> <td></td> <td>STATE RESERVATION NO. 28-57-1-1</td> </tr> <tr> <td></td> <td>4-77</td> <td>Sheet</td> <td>TEMPLE TEXAS</td> </tr> <tr> <td></td> <td>6-77</td> <td>Drawing No.</td> <td>No. 8</td> </tr> <tr> <td></td> <td></td> <td></td> <td>4-E-35,744</td> </tr> </table>	Date	4-77	Approved by	<i>GCV</i>		4-77		STATE RESERVATION NO. 28-57-1-1		4-77	Sheet	TEMPLE TEXAS		6-77	Drawing No.	No. 8				4-E-35,744
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	4-77	Sheet	TEMPLE TEXAS																		
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			4-E-35,744																		



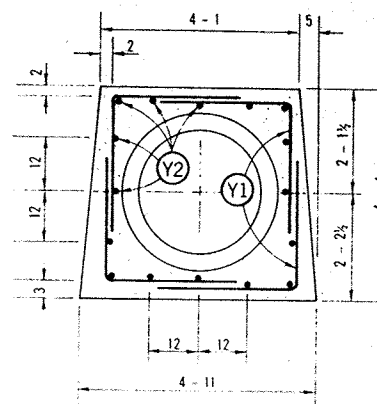
DETAIL A

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

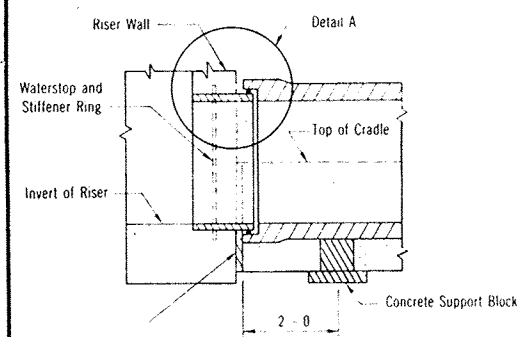


DETAIL OF ANTI-SEEP COLLAR

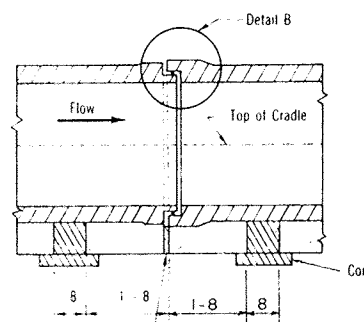
Yoke steel not shown.



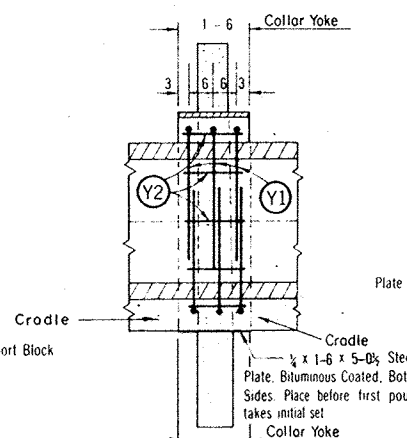
DETAIL OF ANTI-SEEP COLLAR YOKE



DETAIL OF SPIGOT WALL FITTING

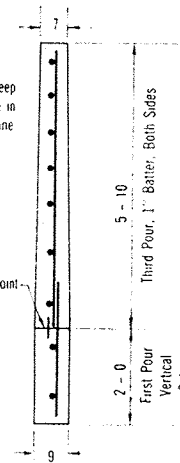


DETAIL OF PIPE JOINT

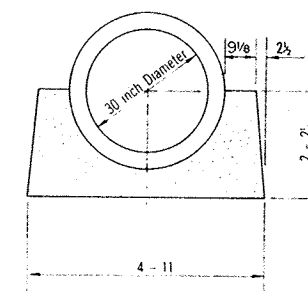


SECTION C-C

Anti-seep collar steel not shown.



SECTION D-D



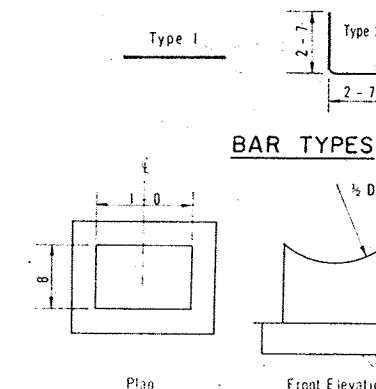
DETAIL OF CRADLE

STEEL SCHEDULE						
Anti-seep Collar and Yoke, 10 Required.						
Mark	Size	Quantity per Collar	Length	Type	Total Quantity	Total Length
A1	4	8	3-0	1	80	240-0
A2	4	4	12-5	1	40	496-8
A3	4	5	1-6	1	50	75-0
A4	4	8	5-7	1	80	446-8
A5	4	10	3-6	1	100	360-0
A6	4	5	1-0	1	50	50-0
Y1	4	12	5-2	21	120	620-0
Y2	4	16	1-2	1	160	186-8
Total						2465-0

QUANTITIES	
Concrete	Cu. Yds.
Anti-seep Collar including Yoke	
• Each	2.777
Total 10 Collars	27.77
Cradle	
** Per Lineal Foot of Cradle	0.2560
Total (302 lin. ft. less 5.0 lin. ft. in yokes)	72.96
Steel	Pounds
Anti-seep Collar including yoke, 1 collar	164.662
Total, 10 Collars	1646.62

Concrete quantities are based on an outside diameter of pipe of 35 3/4 inches. Steel quantities do not change with outside diameter of pipe.

This quantity is given by
 $3.164 - 0.000303 (D_f)^2$ cu yds
 This quantity is given by
 $0.3851 - 0.000101 (D_f)^2$ cu yds.
 D_f = outside diameter of pipe furnished, inches.

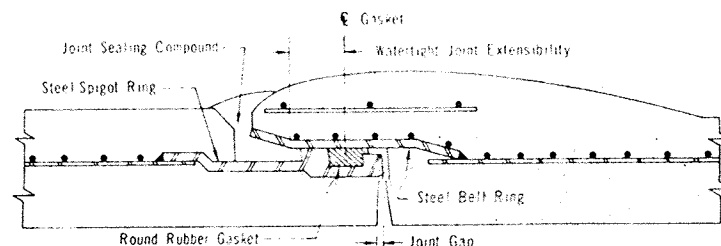


BAR TYPES

SUGGESTED SUPPORT BLOCKS

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.

As-Built Plans NO CHANGES IN CONSTRUCTION 2/19/79 JTB



DETAIL B

Joint length equals watertight joint extensibility plus joint gap.

The pipe shall be drawn together so that the maximum joint gap does not exceed 3/8 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 3/8 inch.

JOINT REQUIREMENTS				
Length of Pipe Section	Minimum Joint Length	Minimum Joint Limiting Angle		
feet	inches	radians	degrees	
* 10	3.375	0.022	1.26	
* 16	4.375	0.022	1.26	
* 20	5.0	0.022	1.26	
* 8	3.00	0.022	1.26	

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.

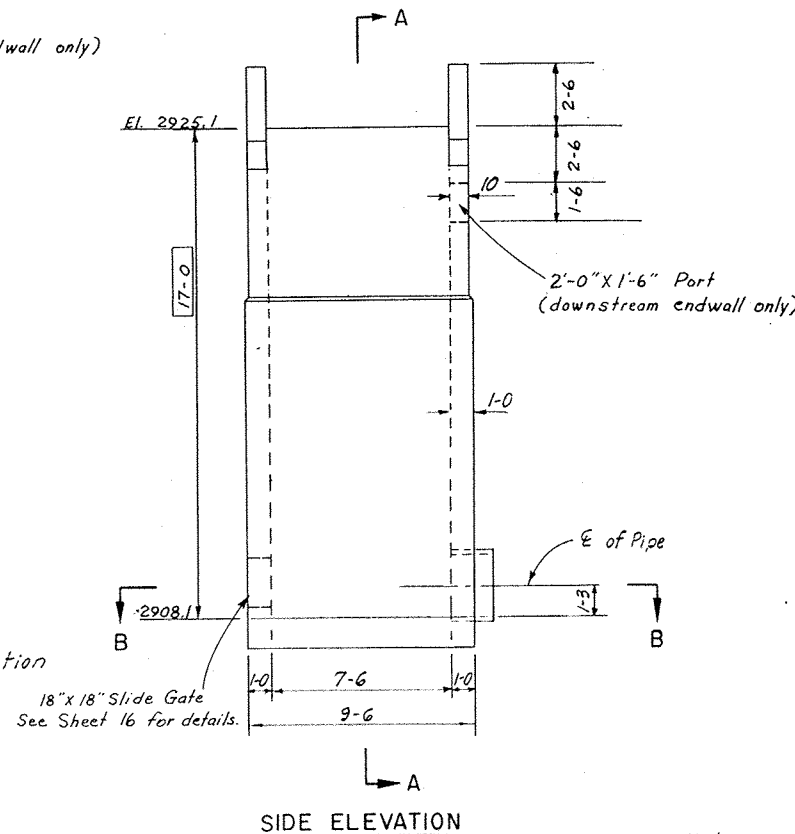
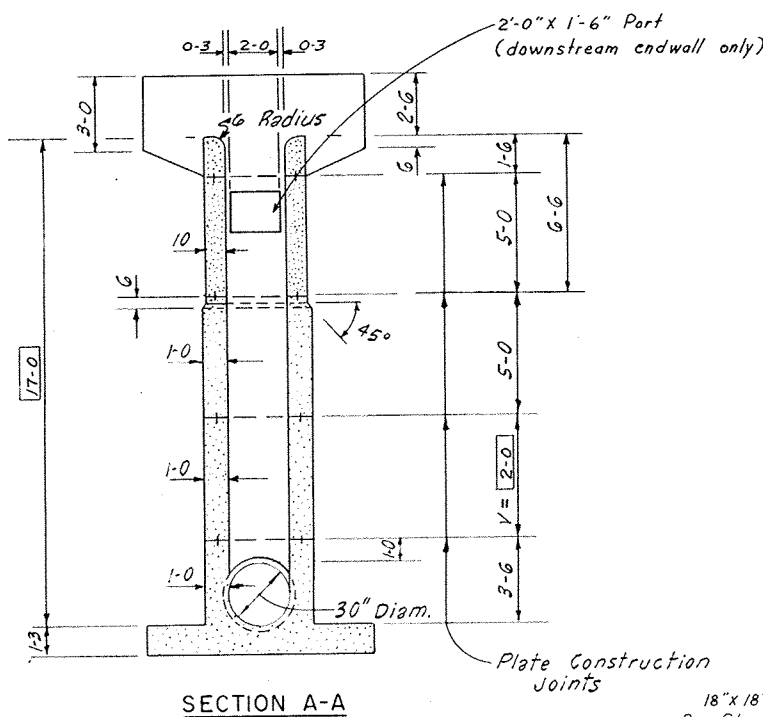
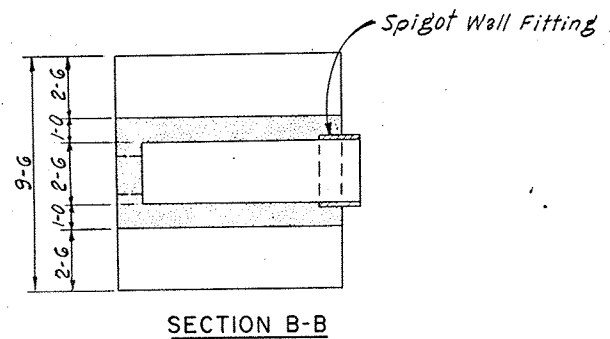
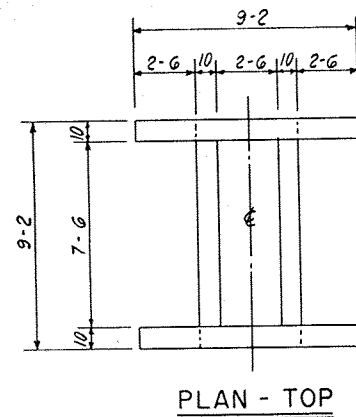
*Used 38' length pipes
 *Used 3' 10' length pipes

STRENGTH REQUIREMENTS		
Inside Diameter of Pipe	Internal Load	External Load
	Hydrostatic Pressure	Minimum 3-Edge Bearing Strength in Pounds per Lineal Foot of Pipe
		Applicable Standard Specification
		AWWA C-301
	Head of Water	Load to produce 0.001 inch crack one foot long.
inches	feet	
30	50	7500

The outside diameter of pipe assumed in design is 35 3/4 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.

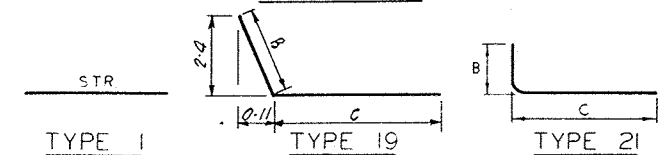
PIPE DETAILS
 FLOODWATER RETARDING STRUCTURE SITE NO.9
 SANDERSON CANYON WATERSHED
 IN
 BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed	AVT	Date	4/77	Approved by	
Drawn	AVT	Date	4/77		
Traced	GP	Date	4/77		
Checked	LT	Date	6-77		



STEEL SCHEDULE															
Mark	Size	Quantity	Length	Type	B	C	Total Length	Mark	Size	Quantity	Length	Type	B	C	Total Length
B 1	# 6	10	9-0	1			90-0	T1	# 5	14	6-2	1			86-4
B 2	# 6	10	9-0	1			90-0	T2	# 5	14	6-4	1			88-8
B 3	# 7	34	9-3	21	3-3	6-0	314-6	T3	# 5	8	3-3	1			26-0
B 4	# 6	10	9-0	1			90-0	T4	# 5	12	8-9	1			105-0
B 5	# 6	10	9-0	1			90-0	T5	# 5	36	8-0	21	2-9	5-3	288-0
B 6	# 6	2	3-9	1			7-6	T6	# 5	14	8-3	1			115-6
B 7	# 5	6	7-0	21	1-0	6-0	42-0	T7	# 5	4	6-8	1			26-8
B 8	# 6	3	7-0	21	1-0	6-0	21-0	T8	# 5	12	8-10	1			106-0
B 9	# 5	16	7-0	21	1-0	6-0	112-0	T9	# 5	8	5-3	19	2-6	2-9	42-0
B 10	# 6	10	8-6	1			85-0	T10	# 5	8	3-2	1			25-4
B 11	# 5	5	3-6	1			17-6	T11	# 5	8	3-7	1			28-8
B 12	# 6	3	2-3	1			6-9								
B 13	# 5	2	2-3	1			4-6								
B 14	# 6	10	6-3	21	0-8	5-7	62-6								
B 15	# 6	18	8-9	21	3-1	5-8	157-6								

BAR TYPES



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

As-Built Plans NO CHANGES IN CONSTRUCTION

2/19/79 *[Signature]*
Scale in Feet 0 2 4 6

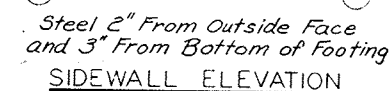
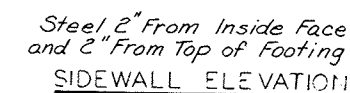
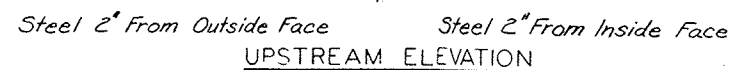
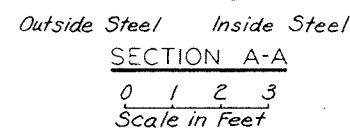
- Notes:
- For Spigot Wall Fitting, See Detail Sheet 9
 - For Trash Rack, Grating, Sleeves and Bolts, See Detail Sheet 16
 - For Construction Joints, See Detail Sheet 16
 - For Port Trash Rack, See Sheet 15
 - For Principal Spillway Inlet Scour Apron, See Sheet 14

PRINCIPAL SPILLWAY INLET FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED			
IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed by	AVT	Date	4/77
Drawn by	AVT	Date	4/77
Traced by	GP	Date	4/77
Checked by	LT	Date	6-77
Approved by		<i>[Signature]</i>	
Sheet		No 10	
Drawing No		4-E-35,744	

STANDARD OPEN RISER	
STANDARD DWG. NO.	ES-3130-2020R
DATE	3-67
SHEET	1 OF 4
ADAPTED FROM	
STANDARD COVERED RISER	
DESIGN CONSTANTS	$f_c = 4000 \text{ psi}$ $f_s = 1600 \text{ psi}$
	$n = 8$ $f_s = 20,000 \text{ psi}$
STANDARD DWG. NO.	ES-3030-2520R
DATE	5-65
SHEET	1 OF 4

QUANTITIES

Steel:			
# 4 Bars	319-0	Lin. Ft.	213.1 Lbs.
# 5 Bars	1841-10	Lin. Ft.	1921.0 Lbs.
# 6 Bars	751-3	Lin. Ft.	1128.4 Lbs.
# 7 Bars	314-6	Lin. Ft.	642.8 Lbs.
Total			3905.3 Lbs.
Length of #5 Bars = (1338-0) + (Length of Bars R1, R3, R4, and R5).			
Length of #6 Bars = (700-3) + (Length of Bars R2).			
Total Concrete = (18.03) + (0.89V) = 19.81 Cu. Yds.			



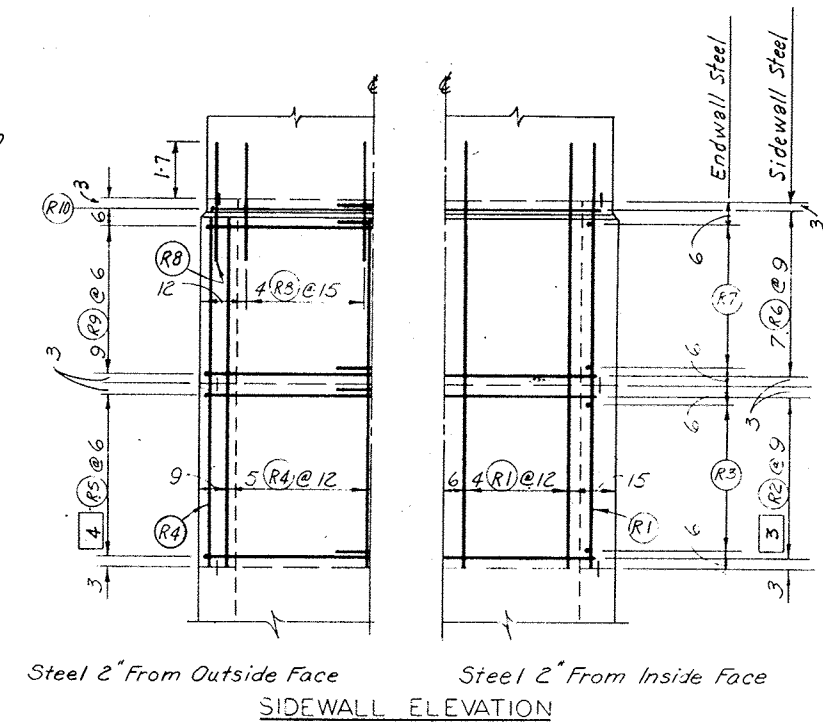
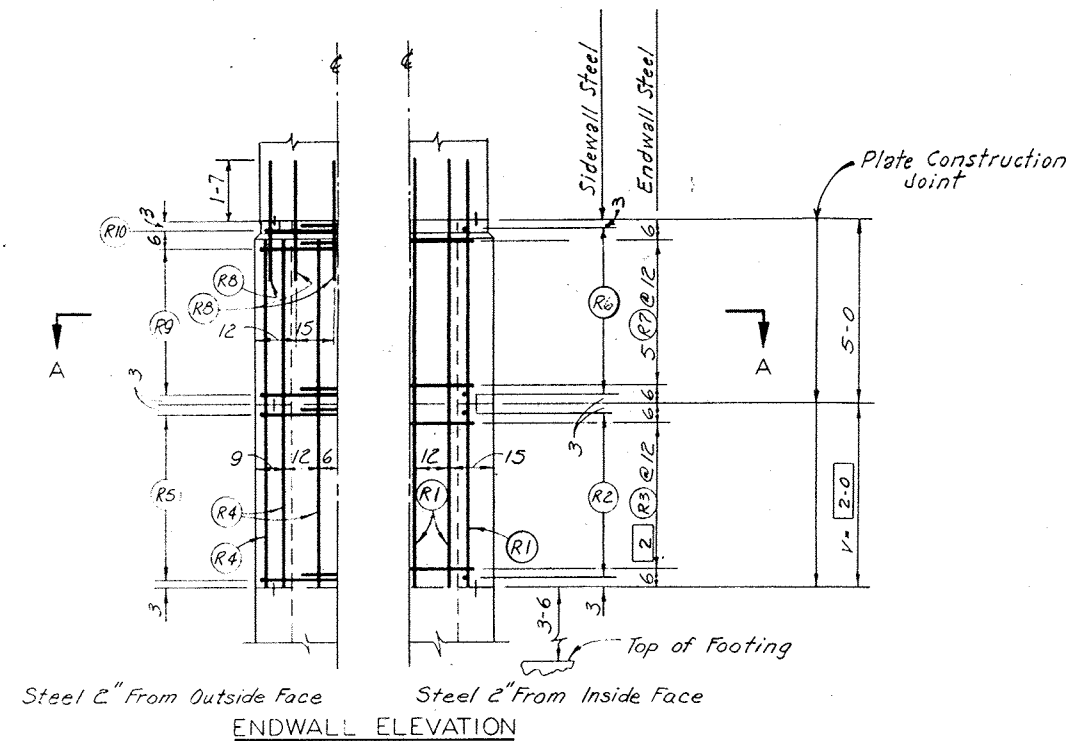
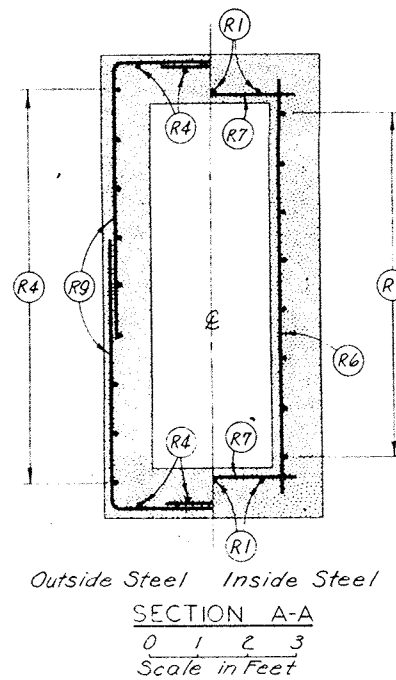
As-Built Plans NO CHANGES IN CONSTRUCTION

2/19/79 JJK

0 2 4
Scale in Feet
Unless Otherwise Shown

STANDARD OPEN RISER	
STANDARD DWG. NO. ES-3130-2020 R	
DATE 3-67	SHEET 2 OF 4
ADAPTED FROM	
STANDARD COVERED RISER	
DESIGN CONSTANTS	
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STANDARD DWG. NO. ES-3030-2520 R	
DATE 5-65	SHEET 2 OF 4

STEEL PLACEMENT - PRINCIPAL - PAVEMENT WAY INLET			
FLOODWATER RETARDING STRUCTURE SITE NO. 9			
SANDERSON CANYON WATERSHED			
IN			
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	AVT	Date	4/77
Drawn	AVT		4/77
Traced	GP		4/77
Checked	LT		6-77
		Approved by	<i>LCV</i>
		Sheet	No 11
		Drawing No	4-E-35,744
		STATE CONSERVATION ENGINEER, S. C. S.	EX-16, FEB 67
		pl 21	



As-Built Plans NO CHANGES IN CONSTRUCTION

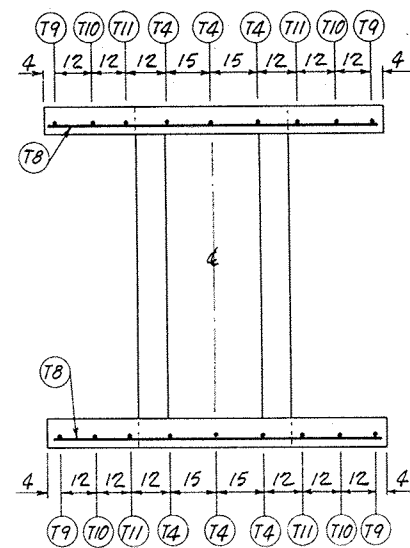
2/19/79 778

0 2 4
Scale in Feet

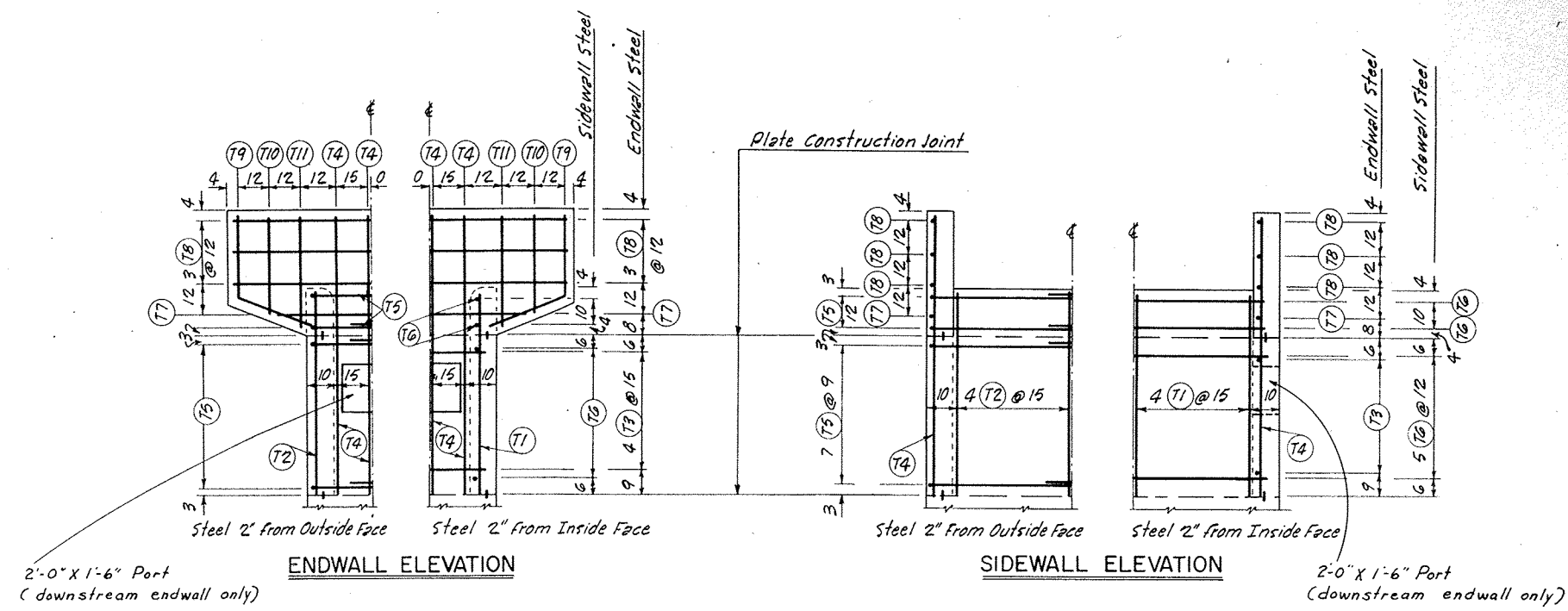
Unless Otherwise Shown

STANDARD OPEN RISER	
STANDARD DWG NO	ES-3130-2020 R
DATE 3-67	SHEET 3 OF 4
ADAPTED FROM	
STANDARD COVERED RISER	
DESIGN CONSTANTS $f'_c = 4000$ psi $f_c = 1600$ psi $n = 8$ $f_s = 20,000$ psi	
STANDARD DWG. NO.	ES-3030-2520 R
DATE 5-65	SHEET 3 OF 4

STEEL PLACEMENT- PRINCIPAL SPILLWAY INLET			
FLOODWATER RETARDING STRUCTURE SITE NO. 9			
SANDERSON CANYON WATERSHED			
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	AVT	Date	4/77
Drawn	AVT	Approved by	[Signature]
Traced	GP	STATE CONSERVATION ENGINEER, S. C. E.	
Checked	ET	TERRELL, TEXAS	
		Sheet	12
		Drawing No.	4-F-35,744



PLAN-TOP



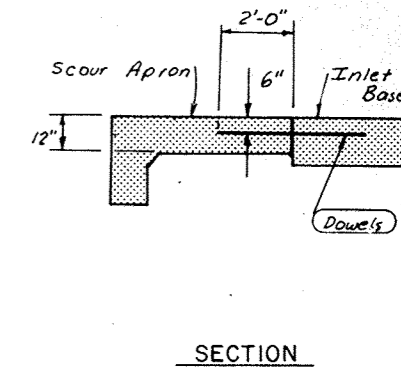
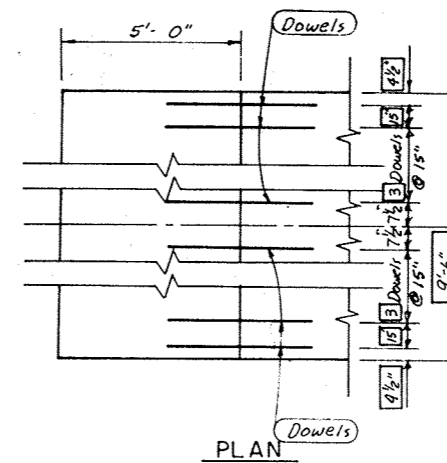
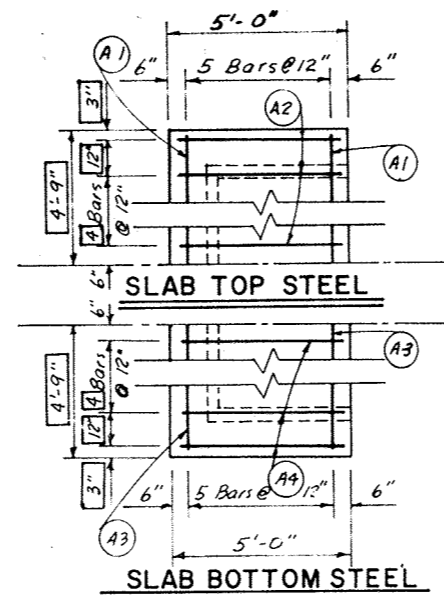
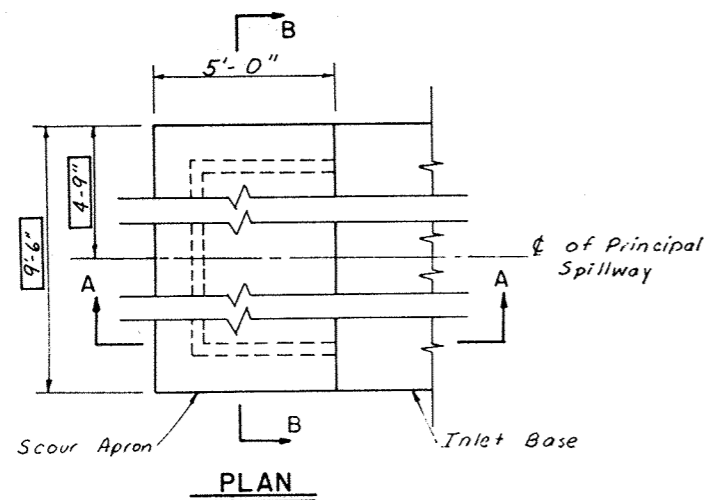
Note: Cut or deflect steel to clear port opening.
See Sheet 10 for location of port opening.

0 1 2 3 4 5
Scale in Feet

As-Built Plans NO CHANGES IN CONSTRUCTION 2/19/79 JLB

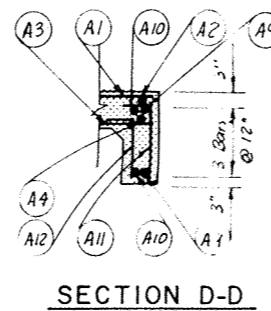
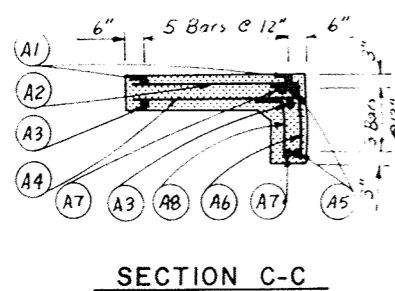
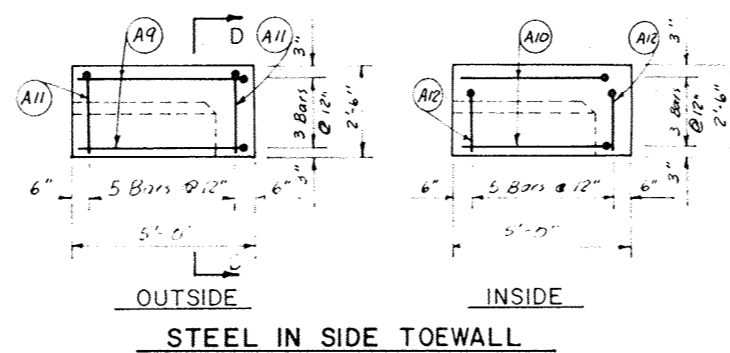
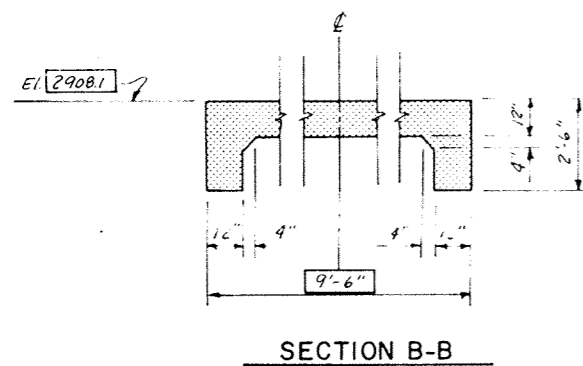
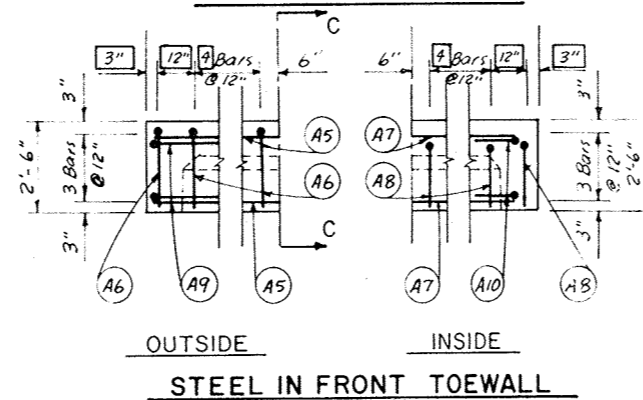
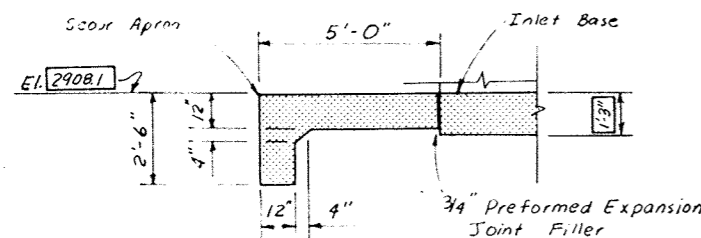
STANDARD OPEN RISER	
DESIGN CONSTANTS	$f'_c = 4000 \text{ psi}$ $f_c = 1600 \text{ psi}$ $n = 8$ $f_s = 20,000 \text{ psi}$
STANDARD DWG. NO.	ES-3130-2020R
DATE	SHEET 4 OF 4

STEEL PLACEMENT - PRINCIPAL SPILLWAY INLET FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed <u>AVT</u>	Date <u>4/77</u>
Drawn <u>AVT</u>	Approved by <u>JLB</u>
Traced <u>GP</u>	Sheet <u>4/77</u>
Checked <u>L.T.</u>	No. <u>3</u> Drawing No. <u>4-E-35,744</u>



DOWEL BAR DETAILS

Note: The scour apron shall be fastened to the inlet base with dowels of No. 6 deformed steel bars, 4 feet long.
8 dowels required.



STR

BAR TYPES

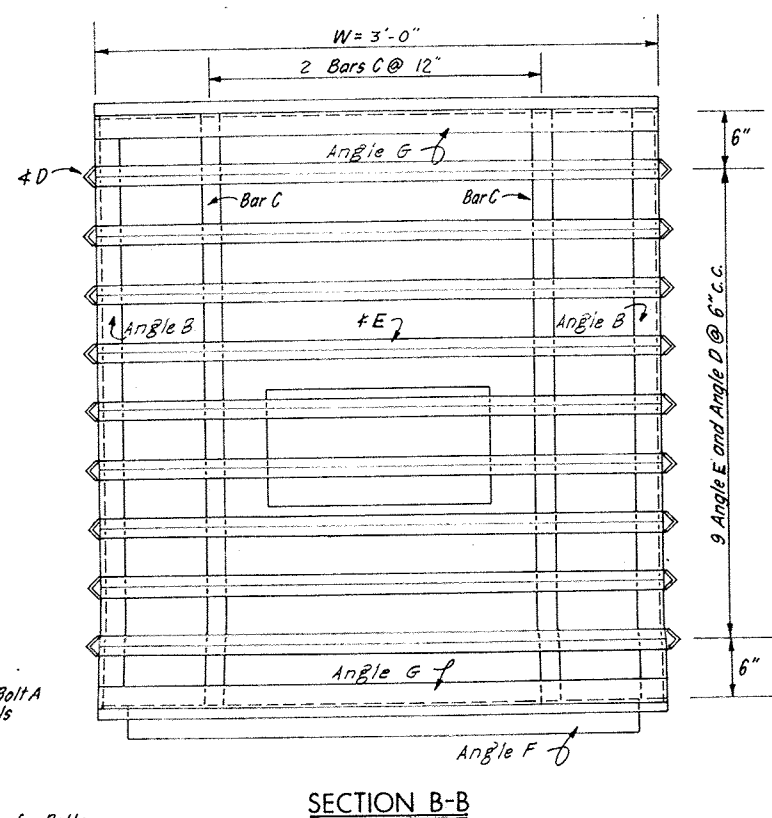
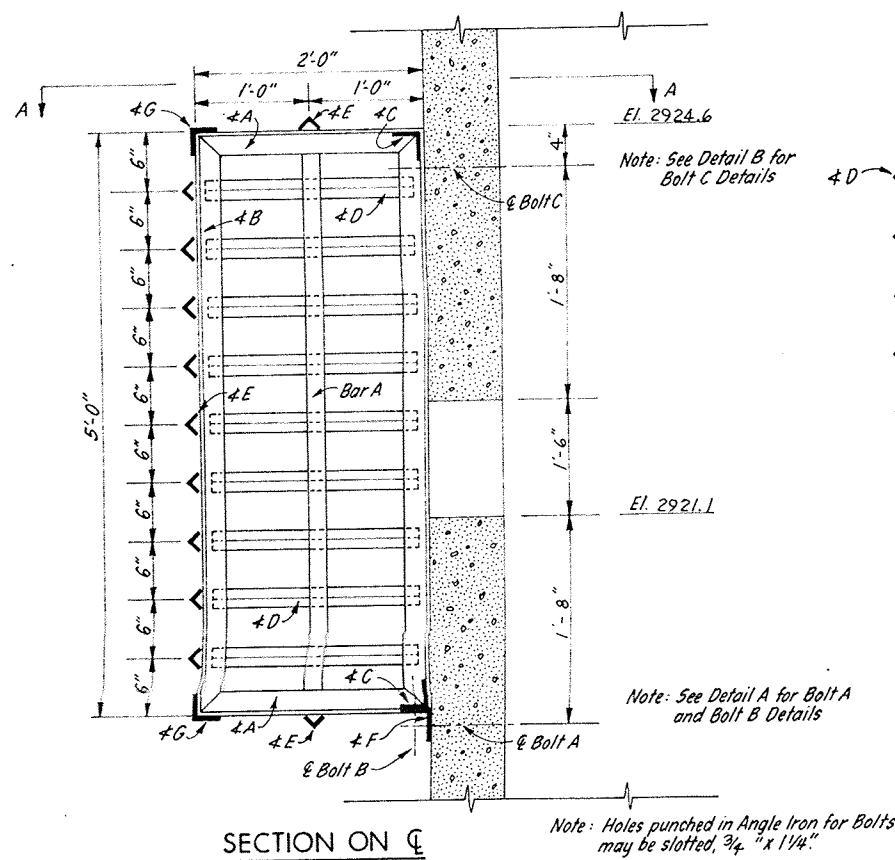
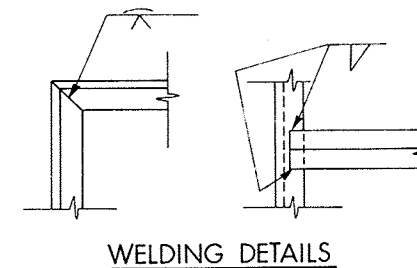
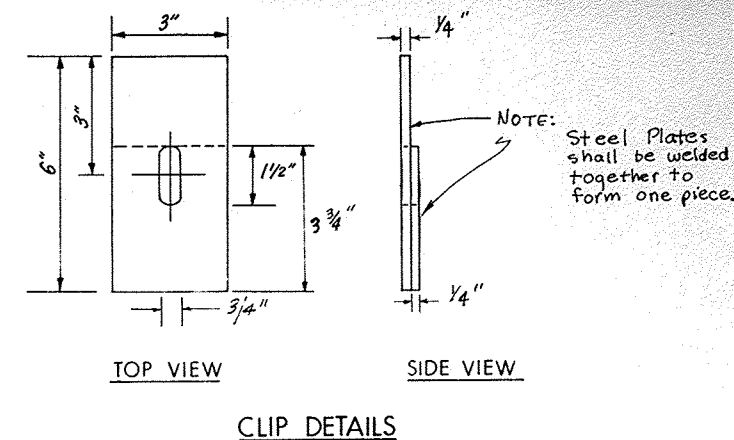
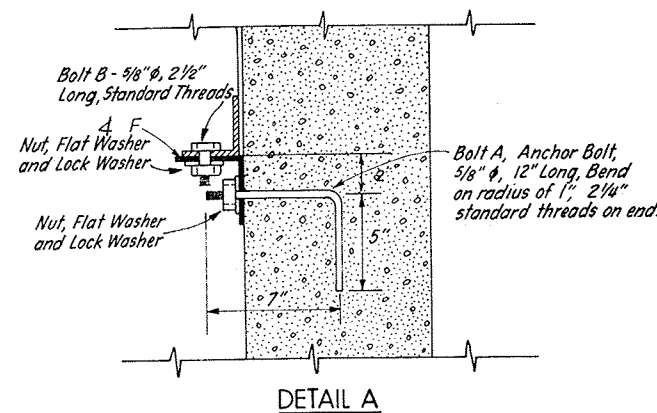
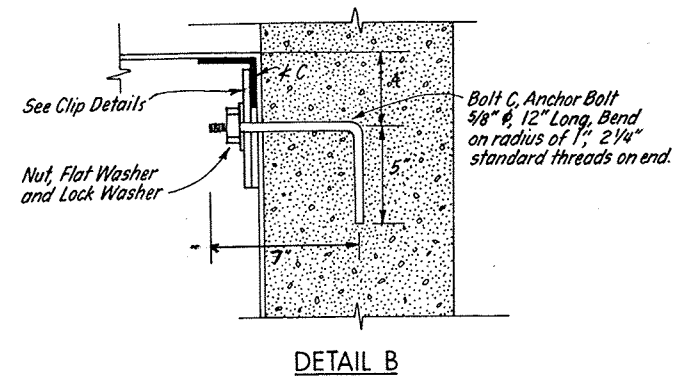
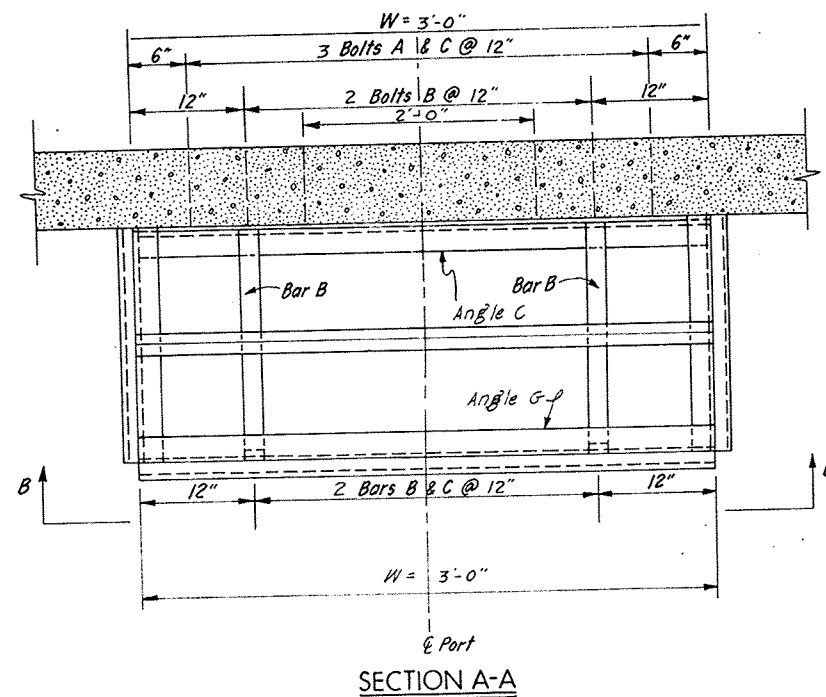
STEEL SCHEDULE							
Mark	Size	Quantity	Length	Type	B	C	Total Length
A1	5	5	9-0	str.			45-0
A2	5	10	9-7	str.			45-10
A3	4	5	9-0	str.			45-0
A4	4	10	9-7	str.			45-10
A5	5	3	9-0	str.			27-0
A6	5	10	2-10	17	2-0	0-10	28-4
A7	4	3	9-0	str.			27-0
A8	4	10	2-2	17	1-6	0-8	21-8
A9	5	6	6-3	17	1-8	4-7	37-6
A10	4	6	5-4	17	1-3	4-1	32-0
A11	5	10	2-10	17	2-0	0-10	28-4
A12	4	10	2-2	17	1-6	0-8	21-8
Total Steel in Scour Apron (Size No. 5) = 212'-0"							
= 221.1 lbs.							
Total Steel in Scour Apron (Size No. 4) = 193'-2"							
= 129.0 lbs.							
Total Steel = 350.1 lbs.							
Total Reinforced Concrete in Scour Apron = 2.77 Cu Yds.							

Note: All Concrete shall equal or exceed Class 4000.

Cubic Yards of Concrete in Scour Apron =
 $0.460' \times (width in feet) + (0.058)(width in feet)$

As-Built Plans NO CHANGES IN CONSTRUCTION 2/19/79

PRINCIPAL SPILLWAY INLET SCOUR APRON			
FLOODWATER RETARDING STRUCTURE SITE NO. 9			
SANDERSON CANYON WATERSHED			
IN			
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED	AVT	DATE	5/77
DRAWN	AVT	DATE	5/77
TRACED	AVT	DATE	5/77
CHECKED	L.T.	DATE	6-77
APPROVED BY			4-E-35,744
SHEET			14
DRAWING NO			4-E-35,744



SCHEDULE OF MATERIALS REQUIRED FOR ONE RACK		
QUANTITY	ITEM	DESCRIPTION
4	Angle A	2 1/2" x 2 1/2" x 1/4" x 2'0" Cut and weld
4	Angle B	2 1/2" x 2 1/2" x 1/4" x 5'0" Cut and weld
2	Angle C*	3" x 3" x 1/4" x 2'-11 1/2" Weld
18	Angle D	1 1/2" x 1 1/2" x 1/4" x 1'11" Weld
11	Angle E	1 1/2" x 1 1/2" x 1/4" x 3'-0" Weld
1	Angle F*	3 1/2" x 3 1/2" x 1/4" x 2'-6"
2	Angle G	2 1/2" x 2 1/2" x 1/4" x 3'-0" Weld
2	Bar A	1/4" x 2" x 4'7" Weld
4	Bar B	1/4" x 2" x 2'0" Weld
2	Bar C	1/4" x 2" x 4'11 1/4" Weld
3	Bolt A	5/8" Anchor Bolt, See Detail A
2	Bolt B	5/8" , See Detail A
3	Bolt C	5/8" Anchor Bolt, See Detail B
3	Clip	See Clip Details
8	Nuts Flat & Lock Washers	See Detail A and Detail B

*Angle C and Angle F shall have slots punched to allow Bolts A, B and C to pass through.

Trash Rack shall be galvanized after fabrication.

Number of Racks Required: One

All bolts, nuts, washers and other parts of the trash rack shall be galvanized.

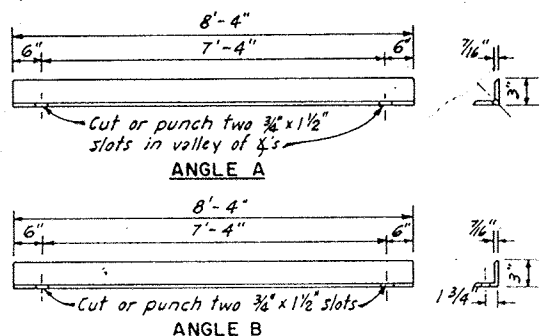
As-Built Plans NO CHANGES IN CONSTRUCTION 2/19/79 JJB

VARIABLE BAR DATA	
Length of Angle C =	W - 1/2"
Length of Angle E =	W
Length of Angle F =	W - 6"
Length of Angle G =	W

PORT TRASH RACK FLOODWATER RETARDING STRUCTURE SITE NO. 9 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES TEXAS	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
DESIGNED: AVT 4/77	APPROVED BY: JCB
DRAWN: AVT 4/77	STATE CONSERVATION ENGINEER, S.C.E.
TRACED: GP 4/77	TEMPLE, TEXAS
CHECKED: LT 6-77	SHEET 15 OF 21
DRAWING NO. 4-E-35,744	

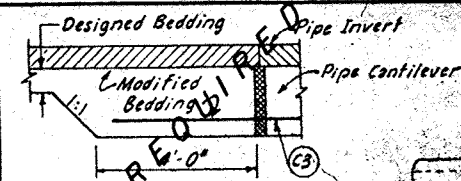
SCHEDULE OF MATERIALS FOR TRASH RACK			
Item	Quan.	Length	Total Feet
3"x3"x1/4" Angles A	14	8'-4"	116'-8"
5/8" Angle Bolts A, washers & nuts	28	21"	
3/4" I.D. Pipe Sleeve	32	0'-10"	26'-8"
5/8" Angle Bolts B, washers & nuts	4	20"	
3"x3"x1/4" Angles B	2	8'-4"	16'-8"
Grating Panels	3		

All parts of the trash rack shall be galvanized. See Construction Specification B1 and Material Specification 582.



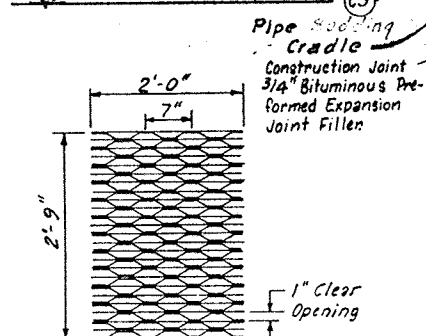
DETAIL OF ANGLES FOR TRASH RACK

Galvanized steel grating of a different pattern, meeting the requirements specified, will be acceptable if approved by the Engineer.



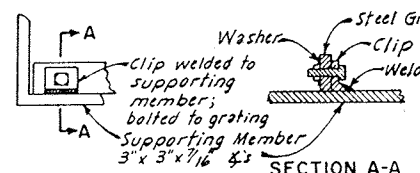
When used, bedding shall be modified as shown to accommodate C3 bars.

SECTION-MODIFIED BEDDING



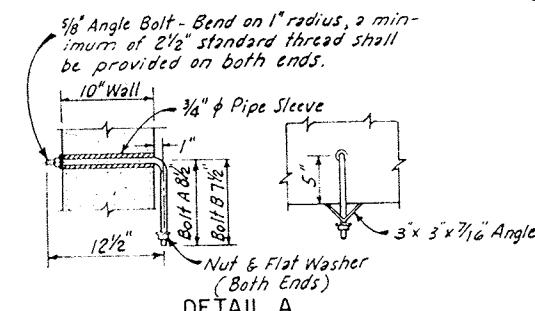
Grating: Galvanized steel; pattern as shown; bearing bars 1" x 3/16", min. weight 9.0 lbs. per sq. ft. Fasten to supporting angles with clips as shown. Not less than 3 clips on each side of each panel. 3 panels required.

GRATING

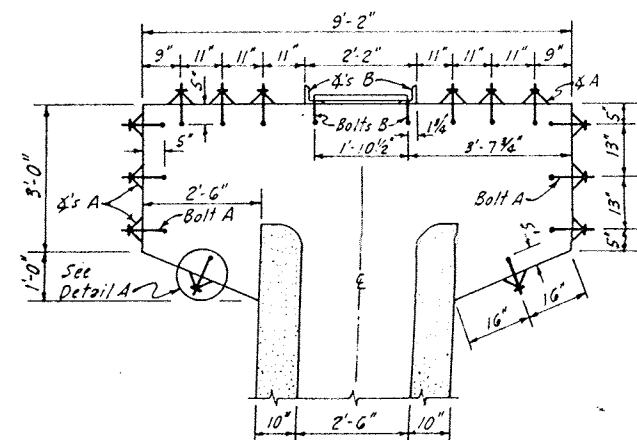


CLIP DETAILS

(Acceptable alternate to above clip detail is saddle clip with 1/8" x 1 1/4" galvanized bolts.)

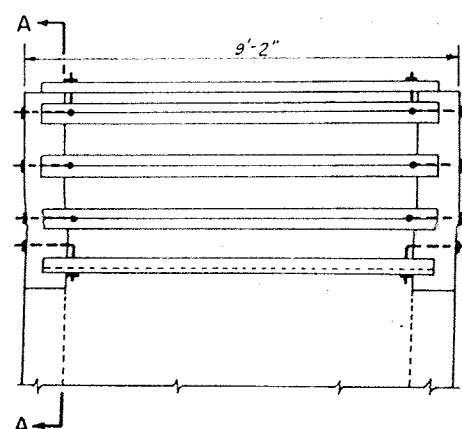


DETAIL A



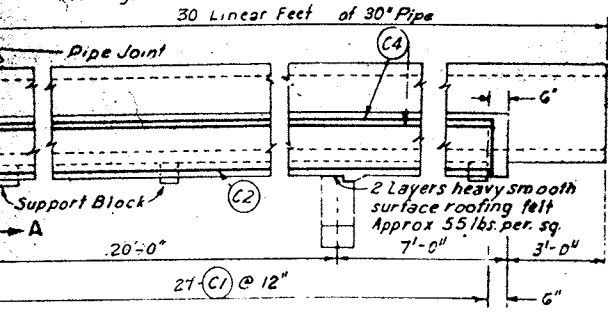
SECTION A-A

TRASH RACK

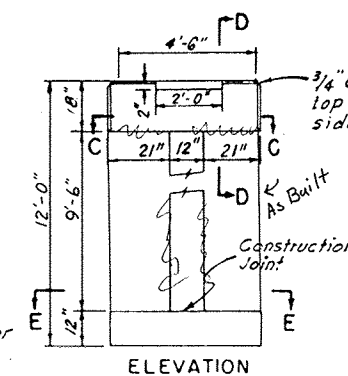


SIDE ELEVATION

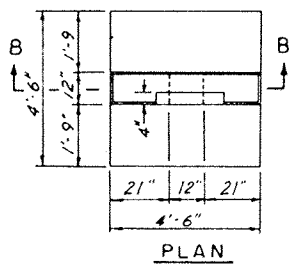
Note: The conduit from Sta. 6+52 to Sta. 6+82 may be made up of 3-10 foot sections of pipe or 1-10 foot section and 1-20 foot section unless otherwise approved by the Engineer.



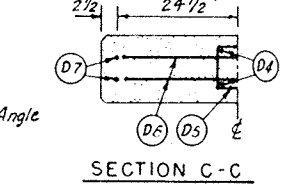
PIPE CANTILEVER



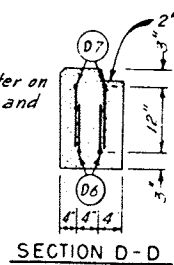
ELEVATION



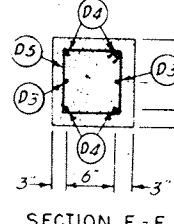
PLAN



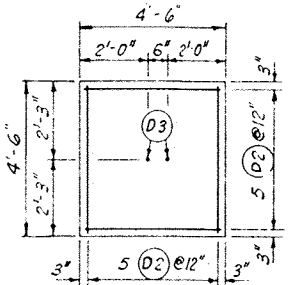
SECTION C-C



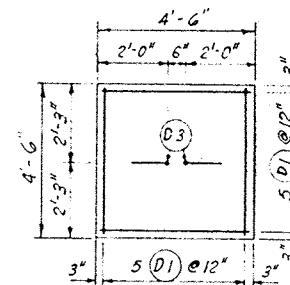
SECTION D-D



SECTION E-E



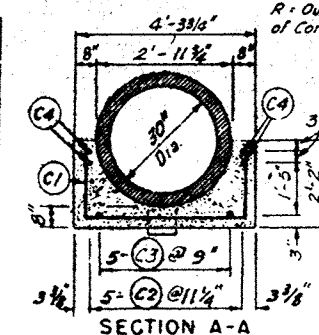
BASE TOP STEEL



BASE BOTTOM STEEL

PIPE CANTILEVER SUPPORT

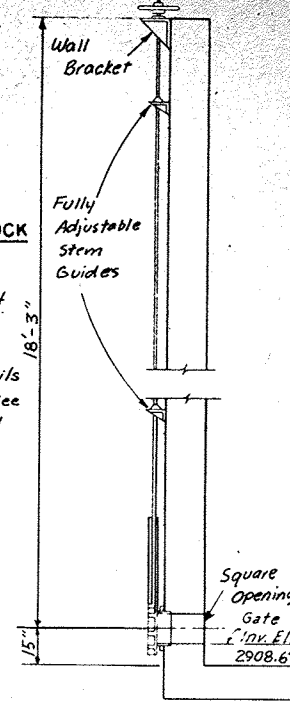
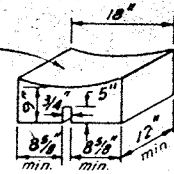
Note: Sides of Pipe Cantilever to be formed with lumber or metal.



SECTION A-A

CANTILEVER SUPPORT BLOCK

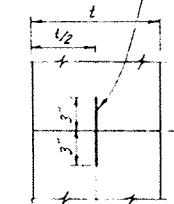
Note: Wall bracket and stem guides shall have sufficient adjustment to insure a vertical mounting for the gate stem. Slide gate details at right are not to scale. See Sheet 10 for location of wall thickness changes.



18" X 18" SLIDE GATE

The slide gate shall be centered in the upstream wall of the riser. See manufacturer's data for details of gate frame, stem splices and anchor bolt detail.

Note: Shear Plate shall be free from dirt, oil, grease, paint, mill scale, loose or thick rust or other coating which might destroy or reduce its bond with concrete.



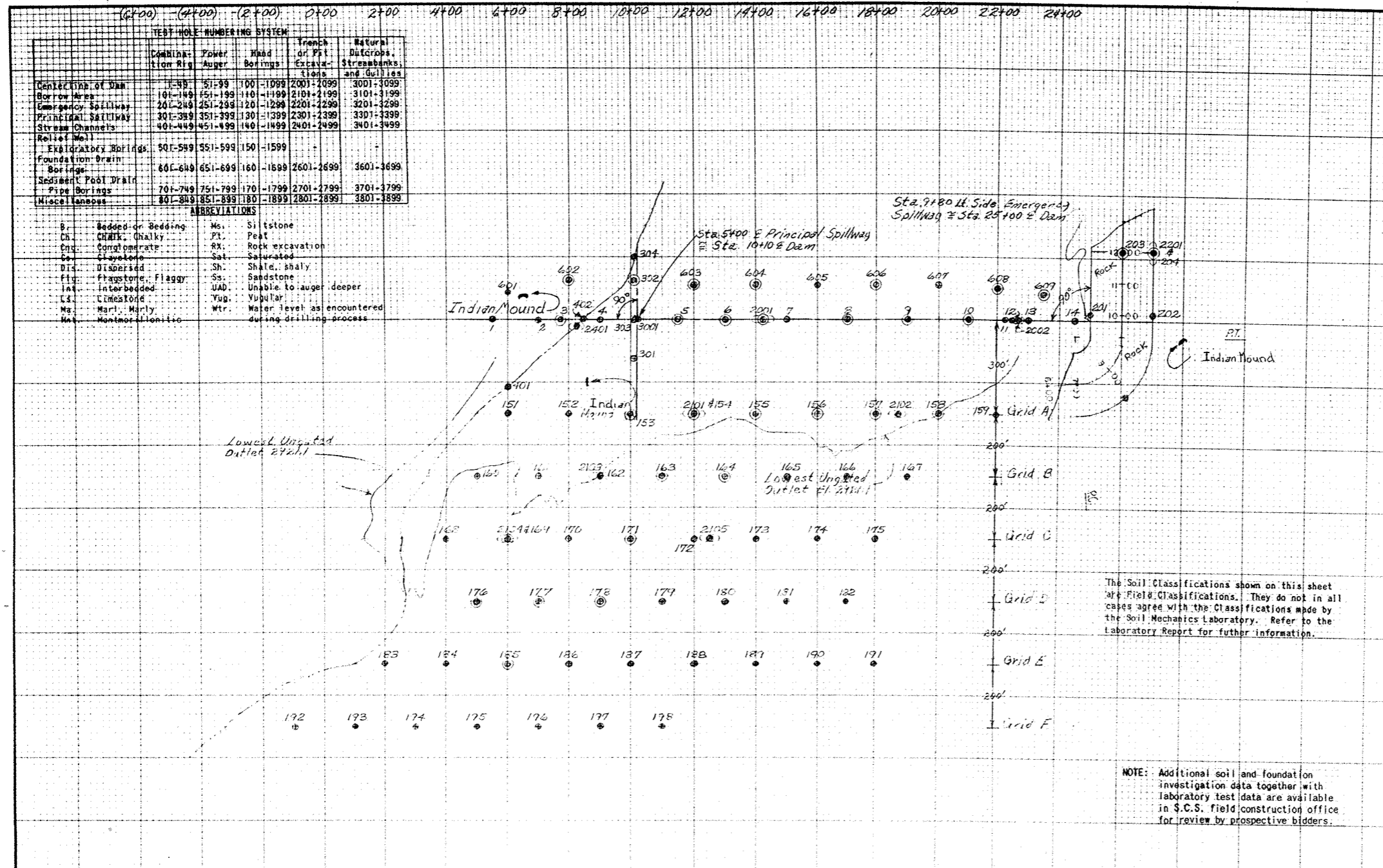
DETAIL OF SHEAR PLATE CONSTRUCTION JOINT

FOR TYPICAL BAR TYPES REFER TO A.C.I. STANDARD 315													
Bar No.	Location	Qty	Lgth	Total Length	Size	Type	A	B	C	D	E	F	G
C-1	Pipe Cantilever	27	7'-4"	198'-0"	4	S10		1-9	3-10	1-9			
C-2	"	5	2'-6"	132'-6"	6	S10							
C-3	"	5	3'-0"	150'-0"	5	S10							
C-4	"	4	2'-6"	106'-0"	7	S10							
Total Steel in Pipe Cantilever (Size # 4) = 132.26 lbs.													
Total Steel in Pipe Cantilever (Size # 5) = 157'-6" = 164.27 lbs.													
Total Steel in Pipe Cantilever (Size # 7) = 106'-0" = 216.66 lbs.													
Total Steel = 513.19 lbs.													
Total Reinforced Concrete in Pipe Cantilever = 5.86 Cu. Yds.													
D-1	Cantilever Support	10	4'-1"	40'-10"	5	S10							
D-2	"	10	4'-1"	40'-10"	4	S10							
D-3	"	2	3'-9"	7'-6"	6	S10		2-6	1-3				
D-4	"	4	10'-9"	43'-0"	6	S10							
D-5	"	15	3'-2"	47'-6"	3	F1	0-4	0-7 1/2	0-7 1/2	0-7 1/2	0-4		
D-6	"	2	5'-6"	11'-0"	4	2	0-9	4-0				0-9	
D-7	"	2	6'-2"	12'-4"	7	2	1-0	4-2				1-0	
Total Steel in Pipe Cantilever Support (Size # 3) = 47'-6" = 17.86 lbs.													
Total Steel in Pipe Cantilever Support (Size # 4) = 51'-10" = 34.62 lbs.													
Total Steel in Pipe Cantilever Support (Size # 5) = 40'-10" = 42.59 lbs.													
Total Steel in Pipe Cantilever Support (Size # 6) = 50'-6" = 75.85 lbs.													
Total Steel in Pipe Cantilever Support (Size # 7) = 12'-4" = 25.21 lbs.													
Total Steel = 196.13 lbs.													
Total Reinforced Concrete in Pipe Cantilever Support = 1.35 Cu. Yds.													

As-Built Plans

2/19/79 JRB

TRASH RACK, SLIDE GATE, AND PIPE CANTILEVER SUPPORT DETAILS			
FLOODWATER RETARDING STRUCTURE SITE NO. 9			
SANDERSON CANYON WATERSHED			
IN			
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	AVT	Date	4/77
Drawn	AVT	Date	4/77
Traced	GP	Date	4/77
Checked	LT	Date	6-77
Approved by		JCB	
Sheet		No. 6	
Drawing No.		4-E-35,744	



LEGEND

SYMBOLS

UNCONSOLIDATED MATERIAL

gravel	sand	silt	clay	cobbles, boulders
gravel, sandy	sand, gravelly	silt, gravelly	clay, gravelly	peat or muck
gravel, silty	sand, silty	silt, sandy	clay, sandy	
gravel, clayey	sand, clayey	silt, clayey	clay, silty	

CONSOLIDATED MATERIAL

Sedimentary Rocks

Conglomerate Cng.	shale sh.	limestone ls.	coal
breccia brc.	siltstone ss.	dolomite dol.	gypsum gyp.
sandstone ss.	marl	chalk ch.	chert cht.

Metamorphic Rocks

gneiss	schist
quartzite	slate
marble	soapstone talc serpentine

Igneous Rocks

intrusive	extrusive
pyroclastic	

Undifferentiated

--

Other Symbols

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

ABBREVIATIONS

ang.	angular	lam.	laminated	G	gravel, gravelly
bld.	boulders (> 12")	lse.	loose	S	sand, sandy
calc.	calcareous	mas.	massive	M	silt, silty
cali.	caliche	med.	medium	C	clay, clayey
cav.	cavities	mic.	micaceous	O	organic
cmt.	cemented	mod.	moderately	W	well graded
cse.	coarse	n. r.	no recovery	P	poorly graded
cbl.	cobbles (3"-12")	per.	permeable		
cpt.	compact	po.	poorly		
con.	concretions	rd.	rounded		
xln.	crystalline	sl.	slightly		
ds.	dense	sft.	soft		
dip.	dipping	s/.	some		
d.s.	downstream	slo.	slowly		
fn.	fine	stf.	stiff		
frm.	firm	t.b.	thin-bedded		
frac.	fractured	tuff.	tuffaceous		
frg.	fragments	u.s.	upstream		
fri.	friable	var.	variable		
grn.	grain	v/.	very		
gyp.	gypseous	w/.	with		
hd.	hard	wea.	weathered		
h.	highly	w.l.	water level		

TEST HOLE NUMBERING SYSTEM

Centerline of dam	1 - 99	Stream channel	401 - 499
Borrow area	101 - 199	Remedial wells	501 - 599
Emergency spillway	201 - 299		601 - 699
Centerline of outlet structure	301 - 399		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 with liquid limit of 50 or less
MH	Silts with liquid limit above 50
CL	Clays with liquid limit of 50 or less
CH	Clays with liquid limit above 50
OL	Organic silts and clays with liquid limit of 50 or less
OH	Organic silts and clays with liquid limit above 50

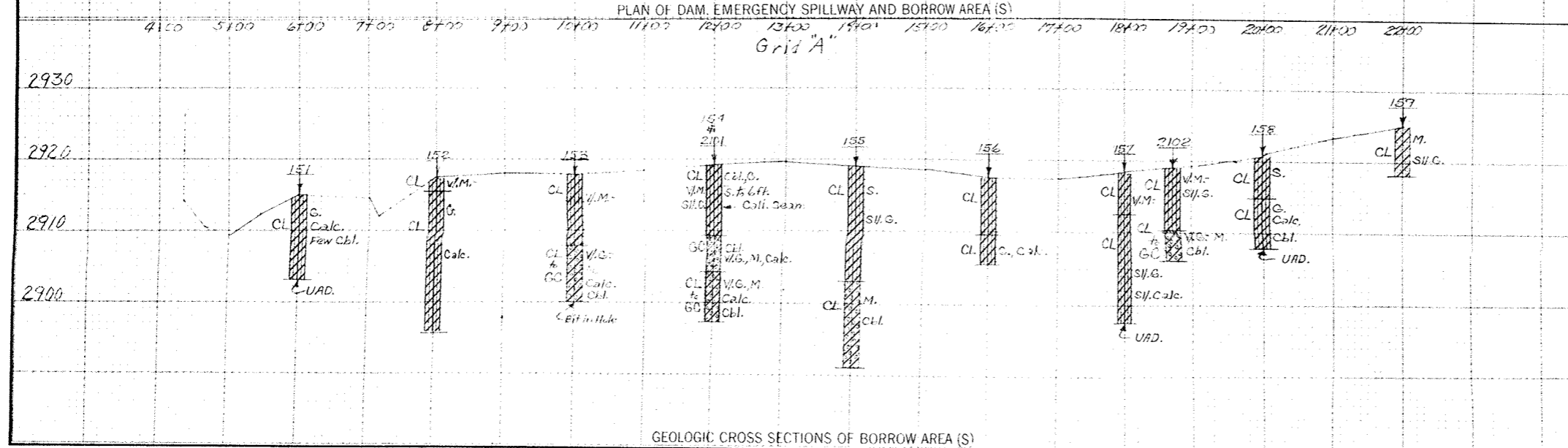
Revised February 1963

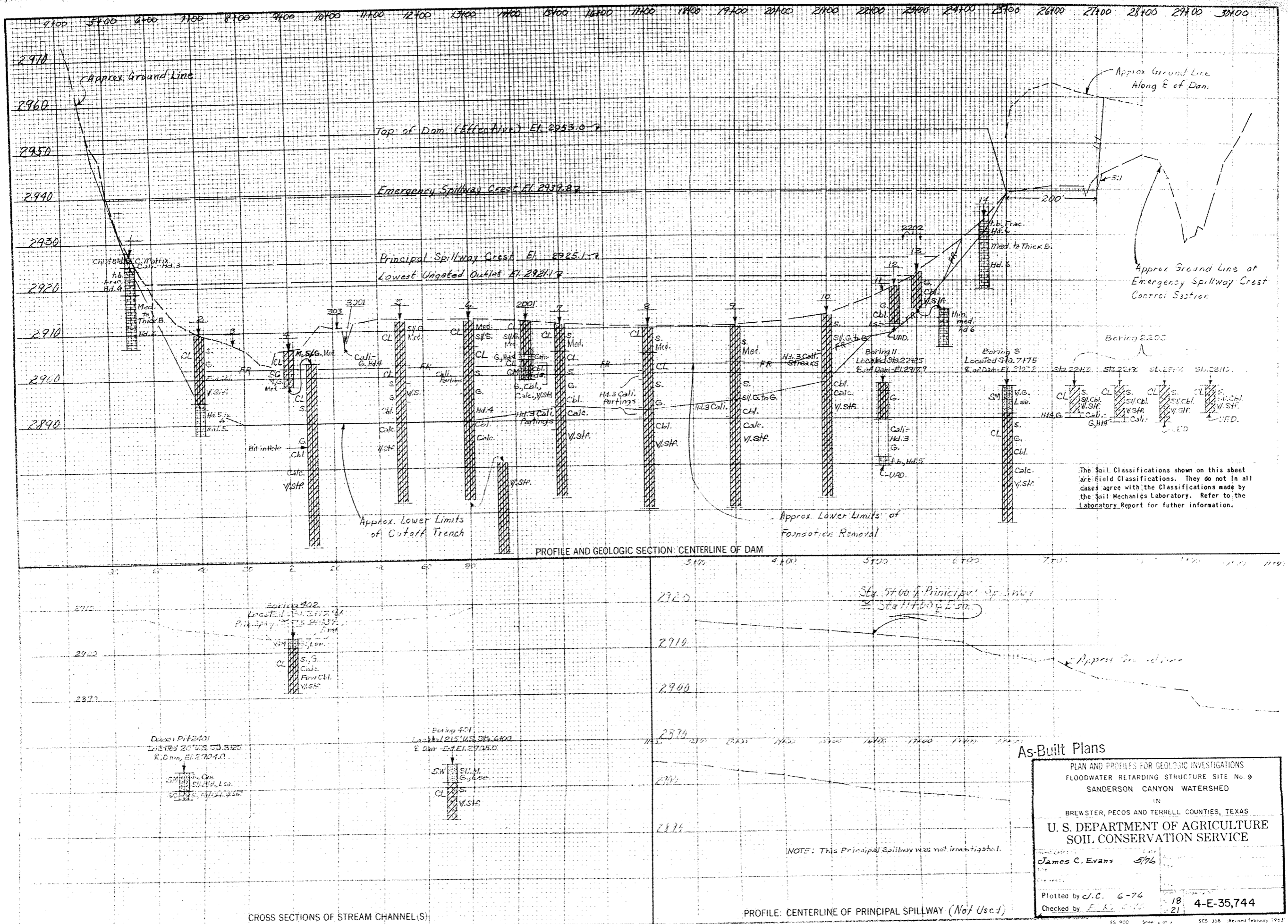
As-Built Plans

PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
FLOODWATER RETARDING STRUCTURE SITE No. 9
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Investigated by James C. Evans	Date 5/76	Approved by _____
Plotted by J.C. 6-76	Checked by E.K. 6-76	Sheet 17
Drawing No. 4-E-35,744		Sheet 21

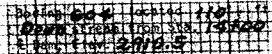
SCS-35A (April 1958)







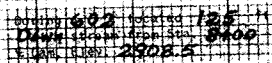
CL \leftarrow C.M. = G, Cbl., V.S.A.
UAD



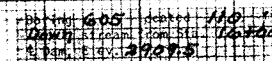
CL	S/G.
	Med.
CL	S.
	G, Cbl.
	Calc.
	V. Stf.



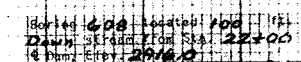
CL 1/2 G., 1/2 S/P
CL 1/2 S.
S/P G.
S/P, Cbl.
Cbl. C.
1/2 S/P.



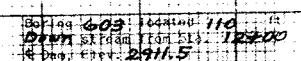
CL S.
G.
chl.
Calc.
V. St-2



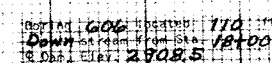
CL S/L G.
Med.
CL S.G.
Calc.
V.S/H



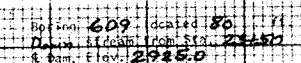
CL G., y/stp
CL S/G
S. y/stp
Cate.



CL S.
S.H.C.
Ca.c.
Med.
GM. S.H.C.
Cbl., ds.
U.A.D.



CL Med.
CL S.
CL G.
CL S. & C.
CL Calc.
CL 1/2 Sh.



CL

G.
Sil. Cbl.
Calc.
V. Stf.

HAR

FOUNDATION DRAIN BORINGS

