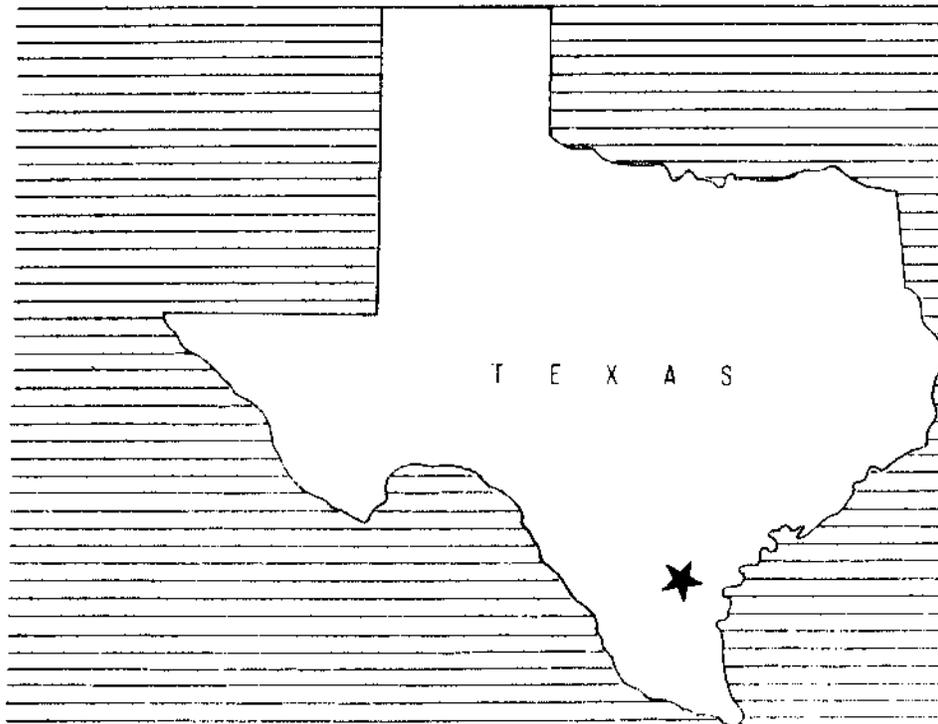


SUPPLEMENTAL  
WORK PLAN NUMBER II

FOR WATERSHED PROTECTION AND FLOOD PREVENTION  
**SAN DIEGO - ROSITA CREEKS  
WATERSHED**

DUVAL - JIM WELLS, COUNTIES, TEXAS



October 1968

TABLE OF CONTENTS

	Page
SUPPLEMENTAL WATERSHED WORK PLAN AGREEMENT . . . . .	1
PURPOSE OF THE SUPPLEMENTAL WORK PLAN . . . . .	1
SUMMARY OF PLAN . . . . .	1
General Summary . . . . .	1
Structural Measures . . . . .	2
Damages and Benefits . . . . .	2
Operation and Maintenance . . . . .	2
WATERSHED PROBLEMS . . . . .	3
Floodwater Damages . . . . .	3
Sediment Damage . . . . .	3
Erosion Damage . . . . .	3
Problems Relating to Water Management . . . . .	3
EXISTING OR PROPOSED WORKS OF IMPROVEMENT . . . . .	3
WORKS OF IMPROVEMENT TO BE INSTALLED . . . . .	4
Structural Measures . . . . .	4
BENEFITS FROM WORKS OF IMPROVEMENT . . . . .	4
COMPARISON OF BENEFITS AND COSTS . . . . .	5
ACCOMPLISHING THE PLAN . . . . .	6
Structural Measures for Flood Prevention . . . . .	6
PROVISIONS FOR OPERATION AND MAINTENANCE . . . . .	6
Structural Measures for Flood Prevention . . . . .	6
COST-SHARING . . . . .	6
<b>TABLES</b>	
Revised Table 1 - Estimated Project Installation Cost . . . . .	7
Revised Table 2 - Estimated Structural Cost Distribution . . . . .	8
Revised Table 3 - Structure Data-Floodwater Retarding Structures . . . . .	9-10
Revised Table 4 - Annual Cost . . . . .	11
Revised Table 5 - Estimated Average Annual Flood Damage Reduction Benefits . . . . .	12
Revised Table 6 - Comparison of Benefits and Costs for Structural Measures . . . . .	13
INVESTIGATION AND ANALYSES . . . . .	14
Program Determination . . . . .	14
Hydraulic and Hydrologic Investigations . . . . .	15
Sedimentation Investigations . . . . .	15
Effect of Watershed Treatment on Sediment Yields . . . . .	15
Economic Investigation . . . . .	16
Determination of Annual Benefits from Reduction in Damage . . . . .	16

**FIGURE**

Figure 4 - Planned Structural Measures Map

SUPPLEMENTAL WATERSHED WORK PLAN AGREEMENT NUMBER II

between the

Agua Poquita Soil and Water Conservation District  
Local Organization

Nueces-Jim Wells-Kleberg Soil and Water Conservation District  
Local Organization

Duval County Commissioners Court  
Local Organization

Jim Wells County Commissioners Court  
Local Organization

Nueces County Commissioners Court  
Local Organization

In the State of Texas

(hereinafter referred to as the Sponsoring Local Organization)

and the

Soil Conservation Service  
United States Department of Agriculture

(hereinafter referred to as the Service)

Whereas, the Watershed Work Plan Agreement for the San Diego-Rosita Creeks Watershed, State of Texas, executed by the sponsoring local organizations named herein and the Service, became effective on the eighth day of April 1959; and

Whereas, the Supplemental Watershed Work Plan Agreement for San Diego Rosita Creeks Watershed, State of Texas, executed by the sponsoring local organization named therein and the Service, became effective on the seven day of April 1965; and

Whereas, in order to carry out the watershed work plan for said watershed, it has become necessary to modify said Watershed Work Plan Agreement and

Whereas, a Supplemental Watershed Work Plan Number II, which modifies the watershed work plan dated May 1958 and the Supplemental Watershed Work Plan dated October 1964, for said watershed has been developed through cooperative efforts of the Sponsoring Local Organization and the Service, which plan is annexed and made a part of this agreement; and

Now, therefore, the Sponsoring Local Organization and the Service hereby agree upon the following modifications of the terms, conditions, and stipulations of said Watershed Work Plan Agreement:

1. Paragraph numbered 1 is modified to read as follows:

Except as hereinafter provided, the Sponsoring Local Organization will acquire without cost to the Federal Government such land rights as will be needed in connection with the works of improvement. (Estimated cost \$248,120.) The percentages of this cost to be borne by the Sponsoring Local Organization and the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (percent)	<u>Service</u> (percent)	<u>Estimated Land Rights Co</u> (dollars)
11 Floodwater Retarding Structures	100	0	248,120

2. Paragraph numbered 3 is modified to read as follows:

The percentages of construction costs of the structural works of improvement to be paid by the Sponsoring Local Organization and by the Service are as follows:

<u>Works of Improvement</u>	<u>Sponsoring Local Organization</u> (percent)	<u>Service</u> (percent)	<u>Estimated Construction</u> (dollars)
11 Floodwater Retarding Structures	0	100	1,500,686

3. Paragraph numbered 4 is modified to read as follows:

The Service will bear the cost of all installation services applicable to works of improvement for flood prevention (Estimated cost \$494,359)

The Sponsoring Local Organization will bear the cost of all installation services applicable to works of improvement for purposes other than flood prevention. (None anticipated.)

4. The costs shown in this agreement represent preliminary estimate for structure No. 6A and actual costs for structure Nos. 1 through 5 and 7 through 11. In determining the final costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

- 5. This agreement does not constitute a financial document to serve as a basis for the obligation of Federal funds, and financial and other assistance to be furnished by the Service in carrying out the watershed work plan is contingent on the appropriation of funds for this purpose.

The program conducted will be in compliance with all requirements respecting non-discrimination as contained in the Civil Rights Act of 1964 and the regulations of the Secretary of Agriculture (7 C.F.R. 15.1 - 15.12), which provide that no person in the United States shall, on the ground of race, color, or national origins, be excluded from participation, be denied the benefits of, or be subjected to discrimination under a activity receiving Federal financial assistance.

The Sponsoring Local Organization and the Service further agree to other terms, conditions, and stipulations of said Watershed Work Plan Agreement not modified herein.

Agua Poquita Soil and Water Conserv  
District

Local Organization

By *Ramiro Carrillo*  
Ramiro Carrillo  
Title Chairman

Date March 13, 1969

The signing of this agreement was authorized by a resolution of the governing body of the Agua Poquita Soil and Water Conservation District  
Local Organization

adopted at a meeting held on March 13, 1969

*Pete Hunter*  
(Secretary, Local Organization  
Pete Hunter

Date March 13, 1969

Nueces-Jim Wells-Kleberg Soil and  
Water Conservation District

Local Organization

By C. M. Allen

C. M. Allen

Title Chairman

Date February 18, 1969

The signing of this agreement was authorized by a resolution of the governing body of the Nueces-Jim Wells-Kleberg Soil and Water Conservation District

Local Organization

adopted at a meeting held on February 18, 1969

F. C. Wolf  
(Secretary, Local Organization)

F. C. Wolf

Date February 18, 1969

Duval County Commissioners Court

Local Organization

By Aroher Parr

Aroher Parr

Title County Judge

Date March 10, 1969

The signing of this agreement was authorized by a resolution of the governing body of the Duval County Commissioners Court

Local Organization

adopted at a meeting held on March 10, 1969

Alberto Garcia  
(Secretary, Local Organization)

Alberto Garcia

Date 3/10-69

*County Clerk  
Dunn*

Jim Wells County Commissioners Court  
Local Organization

By T. L. Harville  
T. L. Harville  
Title County Judge

Date March 11, 1969

The signing of this agreement was authorized by a resolution of the governing body of the Jim Wells County Commissioners Court Local Organization

adopted at a meeting held on March 11, 1969

Araldo Gonzalez  
(Secretary, Local Organization)  
Araldo Gonzalez

Date March 11, 1969

Nueces County Commissioners Court  
Local Organization

By Noah H. Kennedy, Jr.  
Noah H. Kennedy, Jr.  
Title County Judge

Date February 28, 1969

The signing of this agreement was authorized by a resolution of the governing body of the Nueces County Commissioners Court Local Organization

adopted at a meeting held on February 28th, 1969

Mrs. Henry E. Ganger  
County Secretary, Local Organization  
By Marianne Ganger Deputy  
Soil Conservation Service  
United States Department of Agriculture

By \_\_\_\_\_  
State Conservationist

Date \_\_\_\_\_

SUPPLEMENTAL  
WORK PLAN NUMBER II  
FOR  
WATERSHED PROTECTION AND FLOOD PREVENTION  
SAN DIEGO-ROSITA CREEKS WATERSHED  
Duval and Jim Wells Counties, Texas

Prepared Under the Authority of the Watershed Protection and Flood Prevention Act. (Public Law 566, 83rd Congress; 68 Stat. 666 as Amended by Public Law 1018, 84th Congress; 70 Stat. 1088).

Prepared By:

Agua Poquita Soil and Water Conservation District  
(Sponsor)

Nueces-Jim Wells-Kleberg Soil and Water Conservation District  
(Sponsor)

Duval County Commissioners Court  
(Sponsor)

Jim Wells County Commissioners Court  
(Sponsor)

Nueces County Commissioners Court  
(Sponsor)

With Assistance By

U. S. Department of Agriculture  
Soil Conservation Service  
October 1968

SUPPLEMENTAL  
WATERSHED WORK PLAN NUMBER II  
SAN DIEGO-ROSITA CREEKS WATERSHED  
Duval and Jim Wells Counties, Texas  
October 1968

PURPOSE OF THE SUPPLEMENTAL WORK PLAN

Since the original San Diego-Rosita Creeks Watershed work plan was prepared, extensive oil field developments have occupied, to a large extent the proposed site for floodwater retarding structure No. 6. Therefore, has become necessary to delete this structure and add floodwater retarding structure No. 6A, which is the only feasible alternate available, in order to have a plan that can be applied fully and one that is feasible economically. Floodwater retarding structure No. 6A will increase the drainage area controlled in the watershed by 23.21 square miles. This will increase the level of flood protection provided, not only to San Diego-Rosita Creeks Watershed, but also to Chiltipin-San Fernando Creeks Watershed, Agua Dulce Creek Watershed, and Agua Dulce Laterals Watershed.

Changes or modifications referring to limiting design criteria apply only to floodwater retarding structure No. 6A. Structure Nos. 1 through 5 and 7 through 11 are constructed.

The San Diego-Agua Dulce Soil Conservation District, as referred to in this work plan, shall hereinafter be known as the Nueces-Jim Wells-Kleberg Soil and Water Conservation District as the result of change in name only.

SUMMARY OF PLAN

General Summary

The fourth paragraph is modified to read:

"The work plan proposes installing in a 12-year period, a project for the protection and development of the project area at a total estimated installation cost of \$3,452,340. The share to be borne by Public Law 566 funds is \$2,020,045. The share to be borne by other than Public Law 566 funds is \$1,432,295. In addition, the local interests will bear the entire cost of operation and maintenance."

### Structural Measures

The paragraph is modified to read:

"The structural measures included in the plan consist of 11 floodwater retarding structures having a total sediment storage and floodwater detention capacity of 46,130 acre-feet. The total cost of structural measures is \$2,248,665, of which the Public Law 566 share is \$1,995,045. The local share is \$235,620 of which 97.8 percent is for land, easements, and rights-of-way and 2.2 percent for administering contracts."

### Damages and Benefits

The first and second paragraphs are modified to read:

"The estimated average annual floodwater, sediment, erosion, and indirect damage within the watershed is \$15,032 under present conditions. The estimated average annual damage with the project, including land treatment and structural measures is \$4,281. The average annual benefit accruing to structural measures is \$101,812, of which \$92,897 accrue outside the watershed. These benefits are distributed as follows:

Benefits inside project area:	
Damage reduction benefits	\$10,019
Benefits outside project area:	
From Chiltipin-San Fernando Creeks Watershed	42,496
From Agua Dulce Creek Watershed	21,419
From Agua Dulce Laterals Watershed	16,062
Incidental Water Management Benefits	3,465
Secondary Benefits	<u>8,367</u>
Total Benefits	\$101,828

"The ratio of the average annual benefits (\$101,828) to the average annual cost of structural measures (\$84,393) is 1.2 to 1."

### Operation and Maintenance

The paragraph is modified to read:

"Land treatment measures will be installed, operated, and maintained by the landowners or operators of the farms under agreements with the Agua Poquita and the Nueces-Jim Wells-Kleberg Soil and Water Conservation Districts. The 11 floodwater retarding structures will be operated and maintained jointly by the County Commissioners Courts of Duval, Jim Wells, and Nueces Counties, which have legal authority to raise and expend funds for this purpose. The estimated

average annual cost of operation and maintenance of the structures is \$2,000."

#### WATERSHED PROBLEMS

##### Floodwater Damages

The fourth paragraph is modified to read:

"It is estimated that the average annual direct floodwater damage under existing conditions is \$7,431, of which \$2,037 is crop and pasture damage, \$1,755 is other agricultural damage, and \$3,639 is nonagricultural damage, primarily to roads and bridges. In addition, there are numerous indirect damages, such as interruption of travel and initial losses sustained by dealers and industries in the area, which are estimated to average \$1,389 per year."

##### Sediment Damage

The last two sentences of the paragraph are modified to read:

"This amounts to an average annual monetary damage of \$295. Within the improved channel of San Diego Creek near Alice, the present average annual loss of capacity is estimated to be 11,164 cubic yards, which represents a damage of \$3,382, the annual cost for channel maintenance by sediment removal."

##### Erosion Damage

"The estimated average annual damage by scour is \$2,535."

##### Problems Relating to Water Management

The last sentence of the paragraph is modified to read:

"City officials studied engineering and hydrologic data and determined that additional storage for municipal water supply in the San Diego-Rosita Creeks watershed was not feasible because of the distance from Alice or inadequate storage possibilities."

#### EXISTING OR PROPOSED WORKS OF IMPROVEMENT

The first paragraph, first sentence, and the second paragraph, last sentence, are modified to read:

"The San Diego-Rosita Creeks watershed is served by Soil Conservation Service work units at Alice and Benavides assisting the Nueces-Jim Wells-Kleberg Soil and Water Conservation District and the Agua Poquita Soil and Water Conservation District."

"The combined land treatment measures and floodwater retarding structures are expected to reduce this amount by 68 percent."

#### WORKS OF IMPROVEMENT TO BE INSTALLED

##### Structural Measures

The second and fifth paragraphs are modified to read:

"The 11 floodwater retarding structures will have a total floodwater detention capacity of 43,151 acre feet, and will temporarily detain runoff from 61 percent of the total watershed. An average of 3.83 inches of runoff will be detained from the watershed area above the planned structures. This is the equivalent of 2.33 inches of runoff from the entire 222,450 acre watershed."

"The total estimated cost of establishing these works of improvement is \$2,248,665, of which \$253,620 will be borne by local interest and \$1,995,045 by Public Law 566 funds (revised table 1). The average annual cost is estimated to be \$82,393 for installation and \$2,000 for operation and maintenance, a total annual cost of \$84,393.

#### BENEFITS FROM WORKS OF IMPROVEMENT

The first paragraph, last sentence is modified to read:

"Average annual flooding throughout the watershed would be reduced from 1,392 acres to 397 acres."

The third paragraph is modified to read:

"The area on which flood plain scour damage will occur can be expected to be reduced from 819 acres to 232 acres, a reduction of 72 percent."

The fifth paragraph, first three sentences are modified to read:

"The estimated average annual flood, erosion, sediment, and indirect damage within the watershed would be reduced from \$15,032 to \$4,281, a 71 percent reduction. No benefits from restoration of flood plain lands to former production levels are included in the above values. About 93 percent of the expected reduction in the average annual damage would result from the system of floodwater retarding structures."

Paragraph added after fifth paragraph.

"Incidental water management benefits will result from the installation of the 11 floodwater retarding structures. It is estimated that the sediment pools of these structures will have an average combined capacity of 990 acre-feet during the

project evaluation period. This incidental storage of surface water will be a valuable resource to this area of relatively low rainfall. The annual monetary value of the incidental benefit from water management is estimated to be \$3,465."

The sixth paragraph is modified to read:

"Average annual benefits of \$42,496 will accrue to the planned structural measures in the San Diego-Rosita Creeks Watershed from reduction of damages on the mainstem of the San Fernando Creek below its confluence with San Diego Creek. Average annual benefits to the project in the amount of \$21,419 will accrue from the flood plains of Pintas Creek and Agua Dulce Creek below the confluence of Agua Dulce Creek and Pintas."

The seventh paragraph, first and last sentences are modified to read:

"Additional average annual benefits of \$16,062 will be derived from the flood plain of the Agua Dulce Laterals Watersheds. The total flood prevention benefits accruing to works of improvements in the San Diego-Rosita Creeks Watershed from reduction in flood damages are estimated to be \$89,996 annually."

Paragraph added after seventh paragraph.

"Secondary benefits, including increased business activity and improved economic conditions in the watershed area, will result from the installation of the project. The operation and maintenance of the project measures will provide some employment opportunities for local residents. It is estimated that the project will produce local secondary benefits, which excludes indirect benefits in any form, averaging \$8,367 annually. Secondary benefits from a national viewpoint were not considered pertinent to the economic evaluation."

#### COMPARISON OF BENEFITS AND COSTS

The paragraph is modified to read:

"The total average annual cost of the structural measures (amortized total installation cost, plus operation and maintenance) is estimated to be \$84,393. These measures are expected to produce average annual benefits excluding secondary benefits, of \$93,461, resulting in a benefit-cost ratio of 1.1:1.0. The ratio of total average annual project benefits accruing to structural measures (\$101,828) to the average annual cost of structural measures (\$84,393) is 1.2:1:0 (revised table 6). In addition to the direct monetary benefits, there are other substantial values which will accrue from the project, such as improved wildlife conditions, better living conditions, a sense of security, and an indeterminable benefit from ground water recharge, none of which have been used for project justification."

## ACCOMPLISHING THE PLAN

### Structural Measures for Flood Prevention

The fourth paragraph is modified to read:

"Floodwater retarding structure Nos. 1 through 5 and 7 through 11 have been constructed. The installation of structure No. 6A will be completed within two years."

## PROVISIONS FOR OPERATION AND MAINTENANCE

### Structural Measures for Flood Prevention

The eighth paragraph is modified to read:

"The estimated annual operation and maintenance cost of all structural measures is \$2,000, based on adjusted normalized prices. The necessary maintenance work will be accomplished either by contract or force account."

## COST-SHARING

The first paragraph, last sentence is modified to read:

"The required local costs for structural measures, consisting of the value of land, easements, and rights-of-way, (\$248,120), and the cost of administering contracts (\$5,500), are estimated at \$253,620."

The second and third paragraphs are modified to read:

"The entire cost of constructing structural measures, amounting to \$1,500,686 will be borne by Public Law 566 funds. In addition, the installation services cost of \$494,359 will be a Public Law 566 expense. This is a total Public Law 566 cost of \$1,949,005 for the installation of structural measures.

The total project cost of \$3,452,340 will be shared 59.0 percent (\$2,020,045) by Public Law 566 funds and 41.0 percent (\$1,432,295) by other than Public Law 566 funds."

REVISED TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

San Diego-Rosita Creeks Watershed, Texas

Installation Cost Item	Unit	No. to be Applied	Estimated Cost (Dollars) <sup>1/</sup>		
			Public Law Funds	Other Funds	Total
			(dollars)	(dollars)	(dollars)
<u>LAND TREATMENT FOR</u>					
Watershed Protection					
Soil Conservation Service					
Contour Farming	Acre	1,910	-	955	955
Cover Cropping	Acre	3,749	-	29,992	29,992
Crop Residue Utilization	Acre	11,524	-	23,048	23,048
Rotation Hay and Pasture	Acre	2,142	-	12,852	12,852
Brush Control	Acre	60,000	-	600,000	600,000
Proper Use	Acre	88,232	-	220,580	220,580
Range Seeding	Acre	50,000	-	220,000	220,000
Pasture Planting	Acre	571	-	3,426	3,426
Diversion Construction	Mile	5	-	3,422	3,422
Pond Construction	Each	16	-	12,800	12,800
Terraces	Mile	60	-	12,000	12,000
Waterway Development	Acre	50	-	1,000	1,000
Technical Assistance			25,000	38,600	63,600
SCS Subtotal			25,000	1,178,675	1,203,675
<b>TOTAL LAND TREATMENT</b>			<b>25,000</b>	<b>1,178,675</b>	<b>1,203,675</b>
<u>STRUCTURAL MEASURES</u>					
Soil Conservation Service					
Floodwater Retarding Structures	No.	11	1,500,686	-	1,500,686
SCS Subtotal			1,500,686	-	1,500,686
Subtotal - Construction			1,500,686	-	1,500,686
<u>Installation Services</u>					
Soil Conservation Service					
Engineering Service			284,492	-	284,492
Other			209,867	-	209,867
SCS Subtotal			494,359	-	494,359
Subtotal - Installation Services			494,359	-	494,359
<u>Other Costs</u>					
Land, Easements, and R/W			-	248,120	248,120
Administration of Contracts			-	5,500	5,500
Subtotal - Other			-	253,620	253,620
<b>TOTAL STRUCTURAL MEASURES</b>			<b>1,995,045</b>	<b>253,620</b>	<b>2,248,665</b>
<b>TOTAL PROJECT</b>			<b>2,020,045</b>	<b>1,432,295</b>	<b>3,452,340</b>

<sup>1/</sup> Price Base: 1967 except for structure Nos. 1 through 5 and 7 through 11 which are actual costs.

Supplement No. II

October 1968

REVISED TABLE 2 - ESTIMATED STRUCTURE COST DISTRIBUTION

San Diego-Rosita Creeks Watershed, Texas  
(Dollars) 1/

Structure Site No.	Installation Cost - Public Law 566 Funds			Installation Cost - Other Funds			Total Installation Cost
	Construction	Engineering	Other	566	Public Law	Adm. of and R/W	
Floodwater Retarding Structure Nos. 1 through 5, and 7 through 11	1,076,568	242,080	174,295	1,492,943	5,000	182,920	1,680,863
Floodwater Retarding Structure No. 6A	424,118	42,412	35,572	502,102	500	65,200	567,802
GRAND TOTAL	1,500,686	284,492	209,867	1,995,045	5,500	248,120	2,248,665

1/ Price Base: 1967 except for structure Nos. 1 through 5 and 7 through 11 which are actual costs.

Supplement No. II

October 1968

REVISED TABLE 3 - STRUCTURE DATA - FLOODWATER RETARDING STRUCTURES  
San Diego-Rosita Creeks Watershed, Texas

Item	Unit	STRUCTURE NUMBER					
		1	2	3	4	5	6A
Drainage Area	sq.mi.	23.19	19.66 1/2	19.03	19.04 1/2	7.43	41.51 1/2
Storage Capacity							
Sediment pool	ac.ft.	200	200	173	200	87	199
Sediment reserve below riser	ac.ft.	-	-	-	-	-	244
Sediment in detention pool	ac.ft.	62	52	41	51	-	177
Floodwater detention	ac.ft.	4,996	4,225	3,704	4,095	1,506	7,550
Total	ac.ft.	5,258	4,477	3,918	4,346	1,593	8,170
Surface Area							
Sediment pool (lowest ungated outlet)	acre	80	68	72	83	22	57
Floodwater detention pool	acre	578	574	415	515	220	1,004
Maximum Height of Dam	foot	26	24	29	27	29	48
Volume of Fill	cu.yd.	183,340	213,670	253,220	188,350	120,630	546,206
Emergency Spillway							
Type	-						
Frequency of use	year	29	29	25	29	25	100
Design storm rainfall							
Duration	hour	6	6	6	6	6	17.4
Total	inch	10.4	9.7	10.5	10.5	11.5	29.4
Bottom width	foot	350	350	418	400	300	1,000
Design depth	foot	3.1	3.1	3.9	4.3	4.4	14.0
Design capacity	c.f.s.	5,130	5,000	9,000	9,800	-	-
Freeboard	foot	1.0	1.0	1.0	1.0	-	-
Total capacity	c.f.s.	8,160	8,150	13,200	13,900	7,223	120,960
Principal Spillway							
Capacity	c.f.s.	162	300	95	190	36	1,003
Capacity Equivalents							
Sediment volume	inch	0.21	0.24	0.21	0.25	0.22	0.28
Detention volume	inch	4.04	4.03	3.64	4.03	3.80	3.41
Spillway storage	inch	2.25	2.65	2.55	3.12	2.83	8.86
Class of Structure	-	A	A	A	A	A	C

(Footnote on last page of Revised Table 3)

REVISED TABLE 3 - STRUCTURE DATA - FLOODWATER RETARDING STRUCTURES - Continued  
 San Diego-Rosita Creeks Watershed, Texas

Item	Unit	STRUCTURE NUMBER						Total
		7	8	9	10	11		
Drainage Area	sq.mi.	21.96	9.78 1/	15.20	24.00 1/	10.23	211.03	
Storage Capacity								
Sediment pool	ac.ft.	200	156	200	200	164	1,979	
Sediment reserve below riser	ac.ft.	69	-	-	69	-	382	
Sediment in detention pool	ac.ft.	82	-	76	77	-	618	
Floodwater detention	ac.ft.	4,919	2,087	2,967	4,787	2,182	43,151	
Total	ac.ft.	5,270	2,243	3,243	5,133	2,346	46,130	
Surface Area								
Sediment pool (lowest ungated outlet)	acre	52	45	38	86	55	658	
Floodwater detention pool	acre	530	319	322	540	305	5,293	
Maximum Height of Dam	foot	36	24	33	26	24	XXX	
Volume of Fill	cu.yd.	288,920	90,360	236,500	204,820	157,690	2,483,706	
Emergency Spillway								
Type								
Frequency of use	year	50	25	25	25	26	XXX	
Design storm rainfall								
Duration	hour	6	6	6	6	6	XXX	
Total	inch	10.4	11.2	10.8	9.7	11.1	XXX	
Bottom width	foot	300	400	450	600	400	XXX	
Design depth	foot	3.9	2.9	3.8	3.7	3.5	XXX	
Design capacity	c.f.s.	6,400	5,100	9,300	11,700	7,000	XXX	
Freeboard	foot	2.0	1.0	1.0	1.0	1.0	XXX	
Total capacity	c.f.s.	9,100	8,500	13,350	15,300	10,800	XXX	
Principal Spillway								
Capacity	c.f.s.	220	317	76	196	51	XXX	
Capacity Equivalents								
Sediment volume	inch	0.30	0.30	0.34	0.27	0.30	XXX	
Detention volume	inch	4.20	4.00	3.66	3.74	4.00	XXX	
Spillway storage	inch	3.20	2.84	2.17	2.37	4.54	XXX	
Class of Structure		B	A	A	A	A	XXX	

1/ Exclusive of area controlled by other floodwater retarding structures.

REVISED TABLE 4 - ANNUAL COST

San Diego-Rosita Creeks Watershed, Texas

(Dollars)

Evaluation Unit	: Amortization : of : Installation : Cost <u>1/</u>	: Operation : and : Maintenance : Cost <u>2/</u>	: Total
Floodwater Retarding Structure Nos. 1 through 11	82,393	2,000	84,393
<b>TOTAL</b>	<b>82,393</b>	<b>2,000</b>	<b>84,393</b>

1/ Price Base: Actual costs for structure Nos. 1 through 5 and 7 through 11 amortized for 50 years at 2-1/2 percent and structure No. 6A amortized for 50 years at 3-1/4 percent.

2/ Price Base: Adjusted normalized prices, April 1966.

Supplement No. II

October 1968

REVISED TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD  
DAMAGE REDUCTION BENEFITS

San Diego-Rosita Creeks Watershed, Texas

(Dollars) 1/

Item	Estimated Average Annual Damage Without Project	With Project	Damage Reduction Benefit
Floodwater Damage			
Crop and Pasture	2,037	548	1,489
Other Agricultural	1,755	280	1,475
Nonagricultural			
Road and Bridge	3,330	1,086	2,244
Other	309	1	308
Subtotal	7,431	1,915	5,516
Sediment			
Overbank deposition	295	37	258
Channel filling (improved channel-Alice, Texas)	3,382	1,065	2,317
Subtotal	3,677	1,102	2,575
Erosion			
Flood Plain Scour	2,535	873	1,662
Indirect	1,389	391	998
<b>TOTAL</b>	<b>15,032</b>	<b>4,281</b>	<b>10,751</b>

1/ Price Base: Adjusted normalized prices, April 1966.

Supplement No. II

October 1968

REVISED TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

San Diego-Rosita Creeks Watershed, Texas

(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS <sup>1/</sup>				Total	Average Annual Cost <sup>3/</sup>	Benefit : Cost Ratio
	Damage Reduction	Incidental	Other <sup>2/</sup>	Flood Prevention			
Floodwater Retarding Structure Nos. 1 through 11 <sup>4/</sup>	10,019	3,465	79,977	8,367	101,828	84,393	1.2:1
TOTAL	10,019	3,465	79,977	8,367	101,828	84,393	1.2:1

<sup>1/</sup> Price Base: Adjusted normalized prices, April 1966.

<sup>2/</sup> Includes \$42,496 damage reduction on the San Fernando Creek flood plain; \$21,419 damage reduction on Agua Dulce Creek flood plain; and \$16,062 damage reduction on the Agua Dulce Laterals flood plain.

<sup>3/</sup> From Revised Table 4.

<sup>4/</sup> In addition, it is estimated that land treatment measures applied outside drainage areas of floodwater retarding structures will provide damage reduction benefits of \$732 annually.

Supplement No. II

October 1968

## INVESTIGATIONS AND ANALYSES

### Program Determination

The fourth paragraph, items 2 and 3 are modified to read:

- "2. A field examination was made of all probable floodwater retarding structure sites previously located stereoscopically. Sites which did not have sufficient storage capacities were dropped from further consideration. From the remaining sites, a system of floodwater retarding structures was selected for further consideration and detail survey. Site Nos. 1 and 2, 3, and 4, 7 and 8, 9 and 10, and 1, 2, 3, 4, 5, and 6A were placed in series because no other sites were available to give the needed degree of control and because of the limited storage capacities of site Nos. 2, 4, 6A, 7, and 9. The release rates of the principal spillways of site Nos. 2, 4, 6A, 7, and 9 will be increased so that frequency of use of the emergency spillways will be reduced to once in 25-years for site Nos. 2, 4, 7, and 9, and to once in 100-years for site No. 6A which is classified as "c" because of the damage that could result from a sudden major breach of the embankment in the town of San Diego immediately downstream. Plans of a floodwater retarding structure, typical of those planned for the watershed, are illustrated by figures 5 and 5A.
3. A topographic map of each site was developed to cover the pools, dam, and emergency spillway areas. These maps and related surveys provided necessary information to determine if the required sediment and floodwater detention storage capacity could be obtained, the limit of the pool areas, estimated installation costs, and the most economical design for each structure. Structure data tables were developed to show for each structure the drainage area; the capacity needed for floodwater detention and sediment storage in acre feet and in inches of runoff from the drainage area; the release rate of the principal spillway; acres inundated by the sediment, sediment reserve, and detention pools; the volume of fill in the dam; the estimated costs of the structure; and other pertinent data (revised tables 2 and 3). The sediment and floodwater storage, structure classification, and principal and emergency spillway layout and design meet or exceed criteria outlined in Engineering Memorandum SCS-27 and Texas State Manual Supplement 2441. Multiple routings of freeboard hydrographs were made for site No. 6A to determine the spillway proportion and height of dam which would result in the most economical and feasible design of the structure."

### Hydraulic and Hydrologic Investigations

The first paragraph, items 9 and 10 are modified to read:

- "9. The appropriate emergency spillway and freeboard design storms were selected in accordance with criteria contained in Engineering Memorandum SCS-27 and Texas State Manual Supplement 2441. The total drainage area above structure No. 6A was used to develop the freeboard hydrograph.
10. Emergency spillway and freeboard design storm hydrographs were developed by procedures shown in Chapter 21, SCS National Engineering Handbook, Section 4, Hydrology."

The second paragraph, last sentence is modified to read:

"With land treatment measures and the planned system of structural measures in operation, 696 acres of flood plain would be inundated."

The third paragraph is modified to read:

"The detention volume in floodwater retarding astructure No. 6A was determined by methods contained in Chapter 21, SCS National Engineering Handbook, Section 4, Hydrology. The following table shows the minimum detention required and the actual detention planned for the structure."

---

Site No.	Structure Classification:	Minimum Floodwater Detention Required	Actual Floodwater Detention Planned
6A	C	3.47	3.47

---

The fourth paragraph is deleted.

### Sedimentation Investigations

#### Effect of Watershed Treatment on Sediment Yields

The first paragraph, last sentence is modified to read:

"With installation of both land treatment practices and flood-water retarding structures, total reduction in sediment yield at the mouth of the watershed will be 36 percent."

## Economic Investigation

### Determination of Annual Benefits from Reduction in Damage

New paragraph added after eighth paragraph:

"Water management benefits will occur incidental to the installation of the floodwater retarding structures proposed in this plan. Flood prevention was the only purpose considered in the location, capacity and design of these structures and no additional costs are involved in obtaining incidental benefits from the storage in the sediment pools of the structures. When all 11 structures are installed, it is estimated that the sediment pools will have an initial total capacity of 1,979 acre-feet. With the expected sediment deposition in the sediment pools, the capacity will decline to zero at the end of the 50-year project evaluation period. The sediment pools will have an average useable capacity of 990 acre-feet during the project period. The sediment pools of the planned structures will provide recreational opportunities for fishing and the hunting of water fow. Additional benefits will accrue from the use of the sediment pools as a source of livestock water. Based on studies made in Valley Creek watershed, incidental water management benefits were estimated to be \$3.50 per acre foot of average sediment pool capacity. Total annual benefits from this source are estimated to average \$3,465."

The ninth paragraph, sixth sentence is modified to read:

"The average annual net loss in production, based on adjusted normalized prices, within the sites was calculated and this value compared with the amortized cost of the structure sites."

New paragraph added after ninth paragraph.

"The value of local secondary benefits stemming from the project were estimated to be equal to 10 percent of direct primary benefits, including those from reduction of damages and incidental water management benefits. This excludes all indirect benefits from the computation of secondary benefits."

