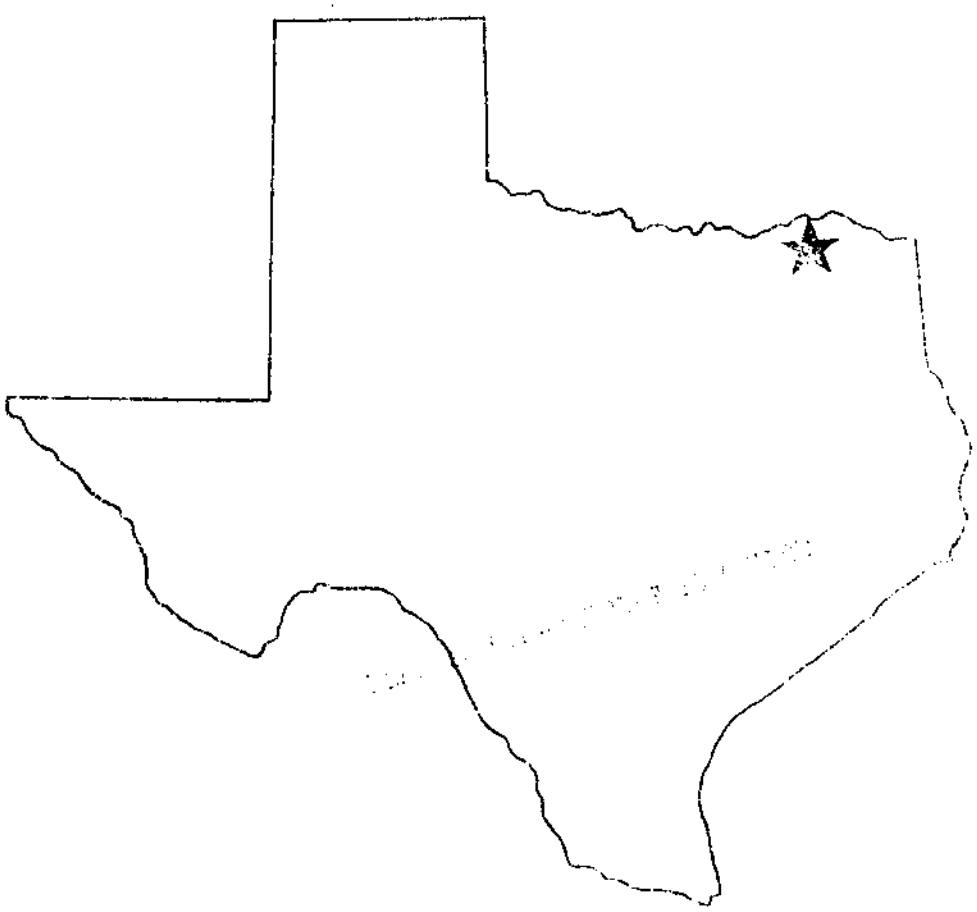
SUPPLEMENTAL PLAN NO. III

FOR WATERSHED PROTECTION AND FLOOD CONTROL

PINE CREEK WATERSHED

LAMAR COUNTY, TEXAS



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TEMPLE, TEXAS

SUPPLEMENTAL WATERSHED PLAN NO III

FOR

PINE CREEK WATERSHED
Lamar County, Texas

PRELIMINARY - SUBJECT TO CHANGE

October 1990

SUPPLEMENTAL WATERSHED PLAN AGREEMENT NO. III

Between the

Lamar Soil and Water Conservation District
Local Organization

Lamar County Water Control & Improvement District Number III
Local Organization

Lamar County Commissioners Court
Local Organization

City of Paris
Local Organization

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 Plan Agreement for Pine Creek Watershed, State of Texas, executed by the Sponsoring Local Organization Named therein and the Service became effective on the 6th day of March, 1964; and

Whereas, the Supplemental Watershed Plan Agreement No. I executed by the Sponsoring Local Organization named therein and the Service became effective on the 11th day of August 1971; and

Whereas, the Supplemental Watershed Plan Agreement No. II executed by the Sponsoring Local Organization named therein and the Service became effective on the 31th day of August 1984 and

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

Whereas, it has become necessary to modify the watershed plan, as supplemented, by adding the modification of Site 1A (Rev.) to create a multiple-purpose structure to include municipal and industrial water supply capacity; and

Whereas, a Supplemental Watershed Plan No. III, which modifies the Watershed Plan dated November 1962, as supplemented, for said watershed, has been developed through the cooperative efforts of the Sponsoring Local

Organization and the Service, which plan is annexed to and made a part of this agreement;

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

1. The Lamar County Water Supply District agrees to become one of the local organizations sponsoring said watershed project.

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

   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 $573,100.)

3. Paragraph numbered 3 in the Watershed Plan Agreement is modified to read as follows:

   The percentages of construction cost of structural measures to be paid by the Sponsoring local Organization and by the Service are as follows:

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Construction Cost (dollars)
Site 1 (Rev.)	27.9	72.1	1,065,617

4. Paragraph numbered 4 in the Watershed Plan Agreement is modified to read as follows:

   The percentages of the engineering costs to be borne by the Sponsoring Local Organization and the Service as follows:

Works of Improvement	Sponsoring Local Organization (percent)	Service (percent)	Estimated Construction Cost (dollars)
Site 1 (Rev.)	27.9	72.1	125,400

5. Paragraph numbered 5 in the Watershed Plan is modified to read as follows:

   The Sponsoring Local Organization and the Service will each bear the costs of Project Administration which it incurs, estimated to be $32,460 and $46,330 respectively, for Site 1(Rev.) installation.

6. The following recommendations are suggested to compensate for the increased loss of 201 acres of wooded and herbaceous habitat. These recommendations are in keeping with other habitat enhancement provisions already found in the watershed plan and final environmental impact statement.

A. Revegetate open areas within the easement area east of county road crossing north to south upstream from dam to hardseed producing, adaptable plants such as Verde Kleingrass, Alamo switchgrass, Illinois bundleflower, prairie senna, and Thurmbergii lespedeza. It is estimated that 207 acres of wildlife food and cover plants would be established. Also, trees and shrubs such as pecan, red oak, water oak, plum, and yaupon will be planted.

B. Land clearing within the detention pool is to be kept to a minimum. Pattern for land clearing had been developed. Fish travelways about 50 feet wide will be cleared, allowing for fish movement and increased edge-effect of submerged structure for various fish species. These patterns through wooded areas will provide terrestrial animal habitat prior to inundation.

C. Fish structure will be enhanced by the placement of trees, removed during land clearing process, in those areas denuded of any type of fish structure.

D. Waterfowl habitat will be enhanced by the inundation of flat shallow reaches upstream. Establishment of reseeding, water-tolerant food plants such as Japanese millet, sesbania, and wild buckwheat along the shoreline west of the inundated county road will improve waterfowl foods.

E. Dam and spillway fencing plans will be modified to leave backtoe of dam unencumbered with wire fencing.

F. Installation of structure Site 1 (Rev.) will develop an additional 197 surface acres of water for migrating waterfowl, other birds, and sport fish habitat.

G. It is recommended that the following sport and forage species of fish be stocked as numbers recommended by the Texas Parks and Wildlife Department, Fisheries Division: largemouth bass, bluegill and redear sunfish, threadfin shad, fathead minnows, black crappie, and channel catfish.

7. Grade stabilization structures Nos. 101 and 104 are to be deleted.

8. Grade stabilization structure No. 105 is added to the plan.

9. The Sponsoring Local Organization and the Service further agree to all other terms, conditions, and stipulations of said Watershed Plan, as supplemented, not modified herein.

Lamar Soil and Water
Conservation District
Local Organization

By _____

Title _____

_____
Address Zip Code

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Lamar Soil and Water Conservation District adopted at a meeting held on _____

_____ _____
Secretary, Local Organization Address Zip Code

Date _____

Lamar County Water Control and
Improvement District Number 3
Organization

By _____ Local

Title _____

_____
Address Zip Code

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Lamar County Water Control and Improvement District Number 3 adopted at a meeting held on _____.

_____ _____
Secretary, Local Organization Address Zip Code

Date _____

Lamar County Commissioners Court
Local Organization

By _____

_____
Address Zip Code

Title _____

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Lamar County Commissioners Court adopted at a meeting held on _____.

_____
Secretary, Local Organization

_____
Address Zip Code

Date _____

City of Paris
Local Organization

By _____

Title _____

_____.
Address Zip Code

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the City of Paris adopted at a meeting held on _____

_____
Secretary, Local Organization

_____
Address Zip Code

Date _____

Lamar County Water
Supply District
Local Organization

By _____

Title _____

_____
Address Zip Code

Date _____

The signing of this agreement was authorized by a resolution of the governing body of the Lamar County Water Supply District adopted at a meeting held on _____.

_____
Secretary, Local Organization

Date _____

Soil Conservation Service
United States Department of Agriculture

Approved by:

_____
State Conservationist

_____
Date

PRELIMINARY - SUBJECT TO CHANGE

SUPPLEMENTAL

WATERSHED PLAN NO. III

FOR

WATERSHED PROTECTION AND FLOOD PREVENTION

PINE CREEK WATERSHED
Lamar County, Texas

Prepared Under the Authority of the Watershed Protection and Flood Prevention Act, (Public Law 566, 83rd Congress, 68 Stat. 666), As Amended.

Prepared By:

Lamar Soil and Water Conservation District

Lamar County Water Control and Improvement District Number 5

Lamar County Commissioners Court

City of Paris, Texas

Lamar County Water Supply District

With Assistance By:

U.S. Department of Agriculture
Soil Conservation Service
October 1990

PRELIMINARY - SUBJECT TO CHANGE

PREFACE

The supplemental watershed plan has been briefed to avoid excessive duplication with similar information presented in the Environmental Impact Statement. The Environmental Impact Statement should be reviewed for pertinent information regarding the planned project, environmental setting, water and related land resource problems, environmental impacts, project alternative, and the irreversible and irretrievable commitment of resources.

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SUPPLEMENTAL
WATERSHED PLAN NO. III

PINE CREEK WATERSHED
Lamar County, Texas

October 1990

PURPOSE OF THE SUPPLEMENTAL WATERSHED PLAN

It has become necessary to modify the watershed plan, as supplemented, for Pine Creek Watershed in order to modify Site 1(Rev.) to create a multiple-purpose structure to include municipal and industrial water supply capacity; delete two grade stabilization structures; add one grade stabilization structure; and add the suggested recommendations to compensate for the environmental impacts.

The following are changes and modifications made in appropriate parts of the watershed plan.

WORKS OF IMPROVEMENT TO BE INSTALLED

The supplemental watershed plan provides for modifying Site 1(Rev.) for municipal and industrial water storage. Site 1(Rev.) is located on Pine Creek approximately three miles below the intersection of SH 82 and SH 79. The total drainage area of the structure is 10.94 square miles.

Site 1(Rev.) has the capacity to store 660 acre-feet of sediment [illegible] acre-feet of water supply. The floodwater capacity is 3,990 acre-feet [illegible] providing a total of 6,450 acre-feet of storage to the emergency spillway crest.

A 48-inch diameter conduit principle spillway at mean sea level elevation of 525.0 will drawdown the detention storage in ten days or less with a maximum discharge of 248 c.f.s. The vegetated emergency spillway will consist of a 200-foot flat bottom width with 3:1 side slopes with the emergency spillway crest at 533.0 mean sea level elevation.

Grade stabilization structure No. 105 is being added. The rock riprap structure will stabilize the inlet by eliminating the excessive grade and conveying design discharges at non-erosive velocities.

EXPLANATION OF INSTALLATION COSTS

The total estimated installation cost of the structural measures, as supplemented, is $1,068,617, of which Public Law 566 costs will be $[illegible] and the local share will be $533,417.

Public Law 566 costs include $535,200 for construction, $69,000 for engineering services; and $46,325 for project administration.

The local costs consist of $593,417 for construction, $56,990 for engineering services, $573,100 for land rights, and $4,180 for project administration. The local costs for project administration include sponsors' costs relative to contract administration, overhead, and organization costs and whatever construction inspection they desire to make at their own expense.

EFFECTS OF WORKS OF IMPROVEMENT

The modification of Site 1A to Site 1(Rev.) will provide an additional 1800 acre-feet of water for municipal and industrial use. An additional four acres will be required for the dam and spillway.

The sediment pool elevation will change from Elev. 517.0 to Elev. 525.0. This will increase the sediment pool area by 197 acres.

The detention pool elevation will change from Elev. 530.0 to Elev. 533.0. This will increase the surface area by 129 acres.

The construction cost of $700,000 for Site 1A will increase to a little over $1,000,000 for Site 1 (Rev.).

Two grade stabilization structures are being deleted (GSS-101, 104). These two have been determined to no longer be needed. One additional grade stabilization structure (GSS-105) is being added. It will consist of a rock gabion structure to stabilize the grade in the channel.

PROJECT BENEFITS

Estimated average annual floodwater damage for reaches 3, 3A, and 4 will be reduced from $384,850 to $145,990, or 62 percent (Revised Table 5). Floodwater damage was calculated for reaches 3, 3A, and 4 because this was the portion of the floodplain impacted by Site 1 (Rev.). Floodwater damage reduction benefits for Site 1 (Rev.) was based upon the percentage of drainage area controlled by Site 1 (Rev.) when compared to the total project (14.87 percent). Based upon these assumptions, the floodwater damage reduction benefits for Site 1 (Rev.) were calculated to be $35,500.

The average annual municipal and industrial water supply benefits were estimated to be $61,460.

COMPARISON OF BENEFITS AND COSTS

The total average annual cost of Site 1 (Rev.) (amortized total installation cost plus average annual operation and maintenance cost) is $67,720. The site will produce average annual benefits of $96,960. The benefit to cost ratio is 1.4:1.0 (Revised Table 6).

PROJECT INSTALLATION

The installation period for the structural measures to be installed will be two years. The general sequence of installation is shown under the estimated schedule of obligations, "Explanation of Installation Costs."

The sponsoring local organization has requested the Soil Conservation Service to advertise, award, and administer the contracts.

FINANCING PROJECT INSTALLATION

Funds for the local share of the cost of installation of the Site 1(Rev.) modification will be provided by the Lamar County Water Supply. The District has the required funds for this undertaking; these funds were obtained through the districts existing revenues.

PROVISIONS FOR OPERATION AND MAINTENANCE

The estimated annual operation and maintenance cost is $500 for the floodwater retarding structure.

Reservoir Data	Site 1 [illegible]	Site 18 [illegible]
Sediment Capacity	660 Ac. Ft.	660 Ac. Ft.
Water supply capacity	1800 Ac. Ft.	0 Ac. Ft.
Floodwater capacity	3990 Ac. Ft.	4010 Ac. Ft.
Total	6450 Ac. Ft.	4670 Ac. Ft.

Top of Conservation Pool - Elev. 525.0
2450 Ac. Ft. Storage Capacity

Estimates of Costs

1. Construction						
Clearing of Timber	68 ac @	$520	$35,360	60 ac @	$520	$31,200
Excavation Cutoff	38800 cy @	$1.00	$38,800	38800 cy @	$1.00	$38,800
Foundation Preparation	10726 cy @	$1.00	$10,726	10726 cy @	$1.00	$10,726
Chimney Drain	4990 cy @	$16.50	$82,335	4000 cy @	$16.50	$66,000
Excavation Emerg. Spwy.	89600 cy @	$1.00	$89,600	53945 cy @	$1.00	$53,945
Earth Fill	244080 cy @	$1.00	$244,080	197628 cy @	$1.00	$197,628
Principal Spillway & Appurtenances			$92,690			$82,895
Rock Rip Rap	5836 Tons @	$30.00	$175,080	2963 Tons @	$30	$88,890
Plastic Filter Cloth	8314 Sq. Yd. @	$3.00	$24,942	3244 Sq. Yd. @	$3.00	$9,732
Fence Installation	7000 Lin. Ft. @	$2.00	$14,000	6950 Lin. Ft.	$2.00	$13,900
Topsoil	26600 Sq. Yd. @	$0.70	$18,620	26600 Sq. Yd. @	$0.70	$18,620
Landscaping & Vegetation	15.4 Ac. @	970	$14,938	$15 Ac. @	$970	$14,550
Mobilization			$12,780			$13,802
Mitigation Measures			$15,000			$5,000
Raw Water Intake Struc. & Appurt.			$60,600			$0
Subtotal			$929,600			$645,700
Contingency			$92,960			$64,570
Total Construction Cost			$1,022,600			$710,300
2. Engineering Services			$120,000			$91,600
3. Project Administration			$75,400			$47,800
4. Land Rights						
Land Purchase	789 Ac. @ 600		$473,400			$0
Flood Easements			0			$190,500
Legal Fees			$22,000			$0
Appraisal Fee			$30,000			$0
Land Surveys			$23,000			$0
Subtotal - Land Rights			$548,400			$329,900
5. Water Rights			$5,000			$0
Total			$1,771,400			$1,040,200

REVISED TABLE 1 - PRELIMINARY BUDGET ESTIMATION COST
COST ALLOCATION - COST SHARING SUMMARY
(DOLLARS)
PINE CREEK WATERSHED, TEXAS
MULTIPLE PURPOSE STRUCTURE SITE 1 REVISED

ITEM	COST ALLOCATION: Flood Prevention	M&I Water 1,800 Ac.Ft.	M&I Water 2,940 Ac.Ft.	M&I Water 4,540 Ac.Ft.	COST SHARING: 1,800 Ac.Ft. PL-566 Funds	1,800 Ac.Ft. Other Funds	2,940 Ac.Ft. PL-566 Funds	2,940 Ac.Ft. Other Funds	4,540 Ac.Ft. PL-566 Funds	4,540 Ac.Ft. Other Funds
Construction	593,030	270,000	373,430	531,320	593,030	270,000	593,030	373,430	593,030	531,320
Engineering	68,190	31,060	42,950	61,110	68,190	31,060	68,190	42,950	68,190	61,110
Project Administration	37,510	5,640	8,880	13,090	42,050	1,100	45,290	1,100	49,500	1,100
Land Rights										
Land	159,760	359,870	423,940	524,730	0	526,330	0	590,390	0	691,190
Appraisal Fees	6,700	10,280	11,120	12,450	0	10,280	0	11,120	0	12,450
Legal Fees	0	8,560	9,270	10,390	0	8,560	0	9,270	0	10,390
Water Rights	0	5,400	7,900	11,400	0	5,400	0	7,900	0	11,400
Municipal Outlet Structure	0	72,500	72,500	72,500	0	72,500	0	72,500	0	72,500
Total	865,190	763,310	949,990	1,236,980	703,270	925,230	706,510	1,108,660	710,720	1,391,450

Price Base 1989

Firm Yield: Ac.Ft./Yr.	N/A	1,580	2,166	2,967
(Paris Gaget Million Gallons/Day		1.41	1.93	2.65

July 1990

[illegible] T.E.W. 04/07/83

TABLE 1A

[illegible]

ITEM	INSTALLATION COST: MP STRUCTURE	INSTALLATION COST: MP STRUCTURE W/O FP	INSTALLATION COST: MP STRUCTURE W/O WS	SEPARABLE COST: WATER SUPPLY	SEPARABLE COST: FLOOD PREV.	SEPARABLE COST: TOTAL	JOINT COST	ALLOCATED JOINT COST: WATER SUPPLY 27.9%	ALLOCATED JOINT COST: FLOOD PREVENTION 72.1%	ALLOCATED TOTAL COST: WATER SUPPLY	ALLOCATED TOTAL COST: FLOOD PREVENTION	ALLOCATED TOTAL COST: TOTAL
Construction	1,022,600	1,022,600	710,300	312,300	0	312,300	710,300	198,174	512,126	510,474	512,126	1,022,600
Engineering Services	120,000	120,000	91,600	28,400	0	28,400	91,600	25,556	66,044	53,956	66,044	120,000
Project Administration	75,400	40,000	47,800	27,600	35,400	63,000	12,400	3,460	8,940	31,060	44,340	75,400
Land Rights	548,400	548,400	210,500	337,900	0	337,900	210,500	58,720	151,771	396,630	151,771	548,400
Water Rights	5,000	5,000	0	5,000	0	5,000	0	0	0	5,000	0	5,000
												0
Total	1,771,400	1,736,000	1,060,200	711,200	35,400	746,600	1,024,800	285,919	738,881	997,119	774,281	1,771,400

STORAGE ALLOCATION	AC. FT.	PERCENT
Flood Prevention	4,647	72.1
Water Supply	1,800	27.9
Total	6,447	100.0

SITE 1 COST ALLOCATION

SITE 1 (Rev.1 COST ALLOCATION
(Dollars) 1/

ITEM	COST ALLOCATION: PURPOSE: FLOOD PREVENTION	COST ALLOCATION: PURPOSE: M&I WATER SUPPLY	COST ALLOCATION: PURPOSE: TOTAL	COST SHARING: PL 566: FLOOD PREVENTION	COST SHARING: PL 566: M&I WATER SUPPLY	COST SHARING: PL 566: TOTAL	COST SHARING: OTHER: FLOOD PREVENTION	COST SHARING: OTHER: M&I WATER SUPPLY	COST SHARING: OTHER: TOTAL
Construction	512,126	510,474	1,022,600	512,130	0	512,130	0	510,470	510,470
Engineering Services	66,044	53,956	120,000	66,040	0	66,040	0	53,960	53,960
Project Administration	44,340	31,060	75,400	41,460	29,940	71,400	2,880	1,120	4,000
Land Rights	151,770	396,630	548,400	0	0	0	151,770	396,630	548,400
Water Rights	0	5,000	5,000	0	0	0	0	5,000	5,000
Total	774,280	997,120	1,771,400	619,630	29,940	649,570	154,650	967,180	1,121,830

REVISED TABLE 3 - STRUCTURAL DATA

DAMS WITH PLANNED STORAGE CAPACITY

Pine Creek Watershed, Texas

Item	Unit	Structure Name Site 1(Rev.)
Class of Structure		B
Seismic Zone		1
Uncontrolled Drainage Area	Sq. Mi.	10.94
Controlled Drainage Area	Sq. Mi.	0
Total Drainage Area	Sq. Mi.	10.94
Runoff Curve No. (1-day)(AMC II)		80
Time of Concentration (T)	Hr.	3.2
Elevation Top of Dam	Ft.	538.2
Elevation Crest of Emergency Spillway	Ft.	533.1
Elevation Crest High Stage Inlet	Ft.	525.0
Emergency Spillway Type		Vegetated
Emergency Spillway Bottom Width	Ft.	200
Emergency Spillway Exit Slope	Ft./Ft.	-
Maximum Height of Dam	Ft.	30.2
	Cu. Yd.	282,345
Total Capacity 2/	Ac. Ft.	6,450
Sediment Submerged	Ac. Ft.	660
Sediment Aerated	Ac. Ft.	1,800
Floodwater Retarding	Ac. Ft.	3,990
Surface Area		
Sediment Pool	Ac.	137
Water Supply Pool	Ac.	342
Floodwater Retarding Pool 1/	Ac.	648
Principal Spillway Design		
Rainfall Volume (2-Day)	In.	8.68
Rainfall Volume (10-Day)	In.	14.88
Runoff Volume (10-Day)	In.	10.23
Capacity of High Stage (Maximum)	C.F.S.	242
Dimensions of Conduit	In.	42

Frequency Operation -		
Emergency Spillway	% Chance	2.0
Emergency Spillway Hydrograph		
Rainfall Volume	In.	9.64
Runoff Volume	In.	7.43
Storm Duration	Hr.	6
Velocity of Flow (V)	Ft./Sec.	3.2
Maximum Reservoir Water Surface Elevation	Ft.	533.9
Freeboard Hydrograph		
Rainfall Volume	In.	16.07
Runoff Volume	In.	13.71
Storm Duration	Hr.	6
Maximum Reservoir Water Surface Elevation	Ft.	537.4
Capacity Equivalents		
Sediment Volume	In.	1.13
Floodwater Retarding Volume	In.	6.70

1/ No additional fill to existing dam. Addition of principal spillway only.
2/ Crest of emergency spillway.

October 1990

SELECTED TABLE 9. STRUCTURAL DATA

GRADE STABILIZATION STRUCTURES
Pine Creek Watershed, Texas

Structure No.	Total Drainage Area (Ac.)	Design Discharge (cfs)	Design Frequency % Chance	Type Structure	Bottom Width (Ft.)	Fall (Ft.)	Estimated Volumes: Rock Riprap Cu. Yds.	Estimated Volumes: Concrete Cu. Yds.
102	1/ 307	1550	100	Rock Riprap Chute	12	11.0	4,270	-
103	550	656	4	Conctete Chute	6	10.0	-	50
105	960	447	100	Rock Riprap Chute	30	6.0	120	-

1/ Out-of-bank flow from Pine Creek is included in the design discharge and frequency.

December 1990

REVISED TABLE 4 - ANNUAL COST

Pine Creek Watershed, Texas

(Dollars) 1/

Evaluation Unit	Amortization of Installation Cost 2/	Operation, Maintenance, and Replacement Cost	Total
Site 1 (Rev.)			
	62,720	5,000	67,720
GRAND TOTAL	62,720	5,000	67,720

1/ Price Base: 1990

2/ Site 1 (Rev.)

October 1990

REVISED TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Pine Creek Watershed, Texas
(Reaches 3, 3A, & 4)
(Dollars) 1/

Item	Estimated Average Annual Damage: Without Project	With Project	Damage Reduction Benefits 2/ Project	Site 1 (Rev.) 3/
Floodwater				
Crop and Pasture	277,210	92,110	185,100	27,520
Other Agricultural	40,700	17,770	22,930	[illegible]
Nonagricultural	11,280	7,980	3,300	490
Subtotal	329,190	117,860	211,330	31,430
Sediment				
Swamping	15,770	12,110	3,660	540
Reservoirs	4,540	2,720	1,820	270
Subtotal	20,310	14,830	5,480	21[illegible]
Erosion				
Flood Plain Scour	350	30	320	[illegible]
Indirect	35,000	13,270	21,730	[illegible]
TOTAL	384,850	145,990	238,860	[illegible]

1/ Price base: Current normalized prices (October 1990) for agricultural damages and current prices (1990) for non-agricultural damages.

2/ Excludes effects of accelerated land treatment measures.

3/ Damage reduction benefits attributable to Site 1(Rev.)

REVISED TABLE 6 - COMPARISON OF BENEFITS AND COSTS

Pine Creek Watershed, Texas

(Dollars)

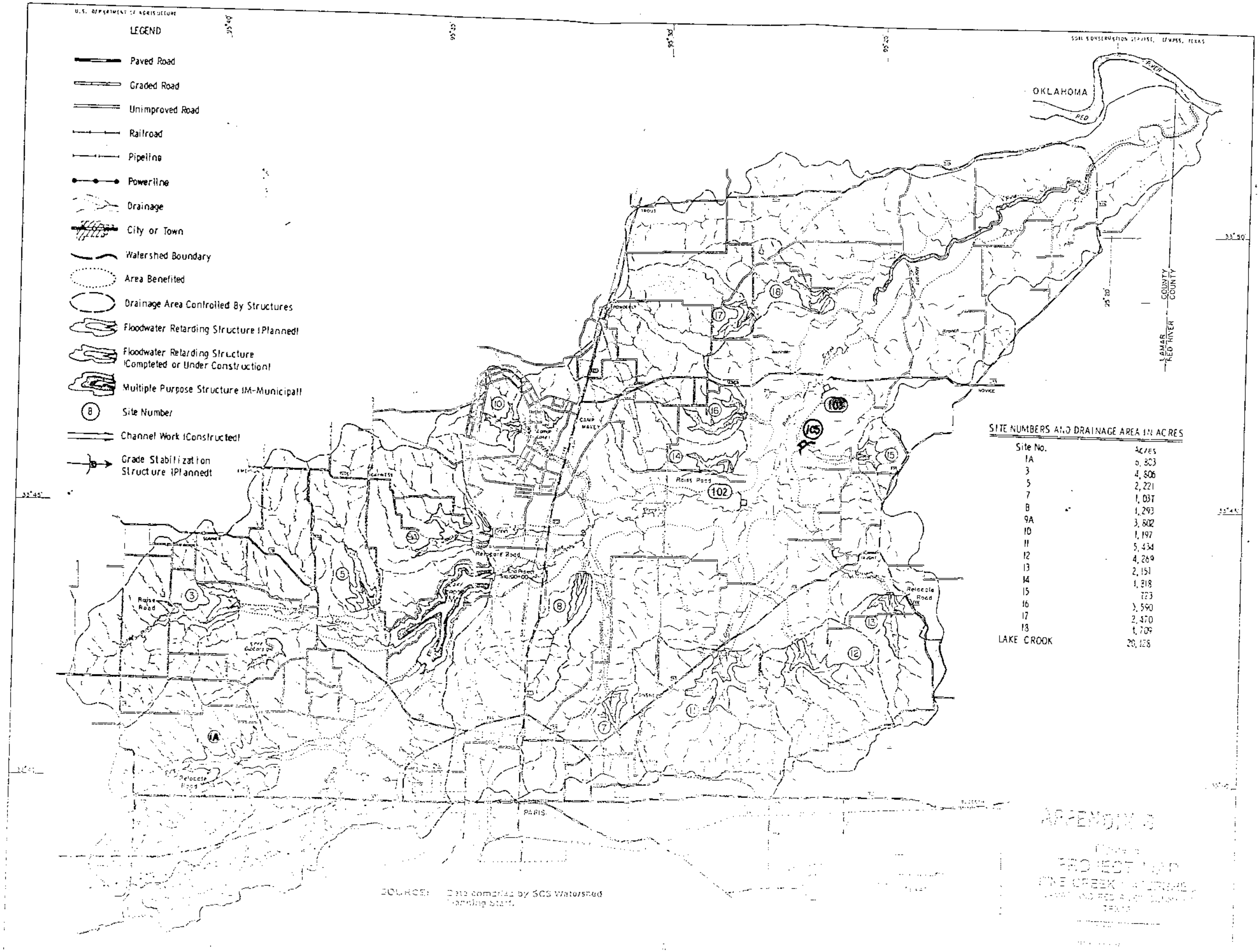
Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/			Average Annual Cost 3/	Benefit-Cost Ratio
	Damage Reduction 2/	M & I Water	Total		
Floodwater Retarding Structure No. 1 (Rev.)	35,500	61,460	96,960	67,720	1.4:1.0
GRAND TOTAL	35,500	61,460	96,960	67,720	1.4:1.0

1/ Price Base: Current normalized price levels (October 1990) for agricultural damages and current (1990) for non-agricultural damages

2/ From Table 5

3/ From Table 4

October 1990



SITE NUMBERS AND DRAINAGE AREA IN ACRES

Site No.	Acres
1A	6,303
3	4,806
5	2,221
7	1,037
8	1,293
9A	3,602
10	1,197
11	5,434
12	4,269
13	2,151
14	1,318
15	723
16	3,590
17	2,470
18	1,709
LAKE CROOK	20,128