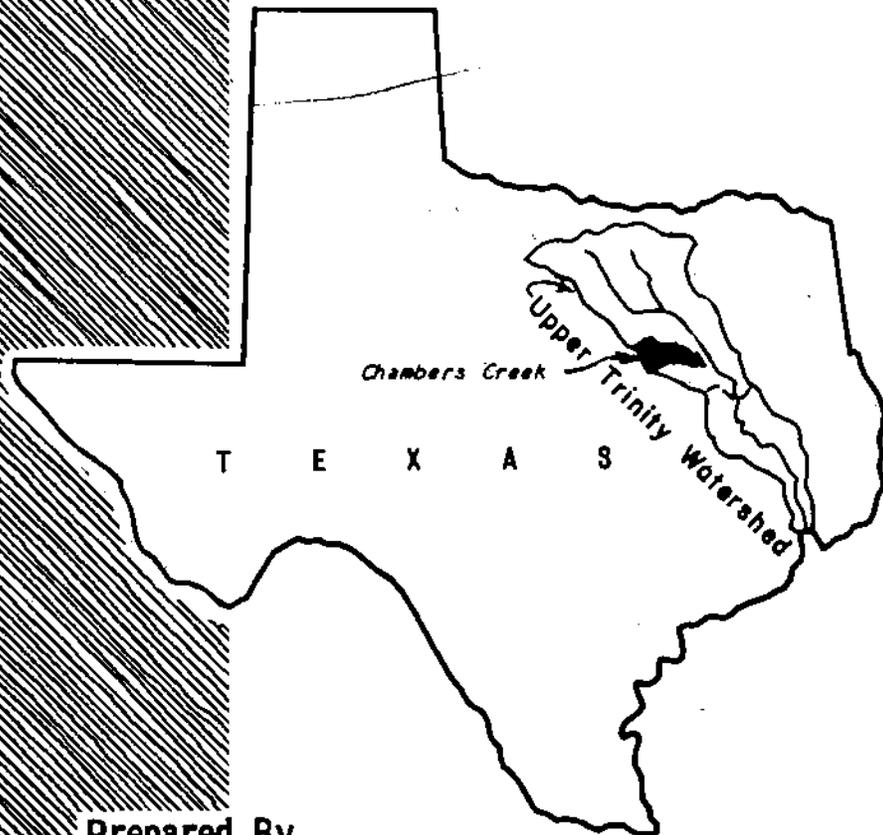


**SUPPLEMENTAL
WORK PLAN**

**CHAMBERS CREEK
WATERSHED**

OF THE TRINITY RIVER WATERSHED
JOHNSON COUNTY, TEXAS



Prepared By
SOIL CONSERVATION SERVICE
U. S. DEPARTMENT OF AGRICULTURE
Temple, Texas
September 1961

SUPPLEMENTAL WATERSHED WORK PLAN AGREEMENT

between the

Nolan-Aquilla Soil Conservation District
Local Organization

(Hereinafter referred to as the District)

Johnson County Commissioners Court
Local Organization

(Hereinafter referred to as the County)

City of Alvarado
Local Organization

(Hereinafter referred to as the City)

In the State of Texas

and the

United States Department of Agriculture
Soil Conservation Service
(Hereinafter referred to as the Service)

Whereas, the District has heretofore entered into a Flood Control Supplemental Memorandum of Understanding with the Soil Conservation Service and the District and County have entered into a Watershed Work Plan Agreement for Johnson County for assistance in constructing works of improvement for the prevention of floods in the Chambers Creek Watershed, State of Texas, under the authority of the Flood Control Act of 1944 (58 Stat. 887).

Whereas, the responsibility for carrying out all or portion of the work of the Department on the watershed has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the District, the City and the Service a mutually satisfactory revised plan for Construction Unit 3 for works of improvement within the Chambers Creek Watershed, State of Texas, hereinafter referred to as the Watershed Work Plan. The Sponsoring Local Organization and the Service further agree to all other terms, conditions, and stipulations of said Watershed Work Plan Agreement not modified herein.

Whereas, the City will benefit from the carrying out the revised plan for works of improvement through the provision for a multiple-purpose structure (Alvarado Reservoir) to be designed to retard floodwaters and to provide municipal water and sediment storage;

It is mutually agreed that in installing and operating and maintaining the works of improvement described in the revised plan for Construction Unit 3:

1. The District, County, and/or the City will acquire without cost to the Federal Government such land, easements or rights-of-way as will be needed in connection with the works of improvement.
Estimated cost \$157,594).

2. The District will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to State laws as may be needed in the installation and operation of all works of improvement except the multiple-purpose structure (Alvarado Reservoir).

3. The City will acquire such water rights pursuant to State law as may be required or needed in the installation and operation of the multiple-purpose works of improvement (Alvarado Reservoir).

4. The percentages of construction costs of structural measures 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 Cost</u> (Dollars)
1 Multiple-Purpose Structure No. 42	30.30	69.70	76,735
Single-Purpose Structures	0	100	514,832

5. The percentages of the cost for installation services 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 Installation Service Cost</u> (Dollars)
Multiple-Purpose Structure No. 42	30.30	69.70	20,856
Single-Purpose Structures	0	100	167,723

6. The District will obtain agreements from owners of not less than 50 percent of the land above each structure that will carry out conservation farm or ranch plans on their land.

7. The District will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the Watershed Work Plan.

8. The District will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

9. The District and County will be responsible for the operation and maintenance of all structural works of improvement, except the multiple-purpose structure (Alvarado Reservoir), and the City of Alvarado will be responsible for the operation and maintenance of the multiple-purpose structure (Alvarado Reservoir), by actually performing the work or arranging for such work in accordance with an Operation and Maintenance Agreement to be entered into.

10. The Service will award and administer the contract covering the construction of the multiple-purpose structure and the three remaining floodwater retarding structures and bear all contract administration costs.

11. The costs for works of improvement reflected in the Work Plan represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

12. 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, as revised, is contingent on the appropriation of funds for this purpose.

The contribution of the City to the construction and installation costs of the multiple-purpose structure that is applicable to municipal water supply will be provided for in a separate Agreement to be entered into between the Service, the District, the County, and the City prior to the obligation of any such costs. Such Agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the multiple-purpose structure.

13. The Watershed Work Plan may be amended or revised, and this agreement may be modified or terminated, only by mutual agreement of the parties hereto.

14. No member of Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

Nolan-Aquilla Soil Conservation District

By: [Signature]
Title: Chairman
Date: 11-14-61

The signing of this agreement was authorized by resolution of Governing Body of the Nolan-Aquilla Soil Conservation District adopted at a meeting held _____, 1961.

[Signature]
Secretary

Date: 11-13-61

Johnson County Commissioners Court

By: [Signature]
Title: Cassidy Judge
Date: 11-13-61

The signing of this agreement was authorized by a resolution of the governing body of the Johnson County Commissioners Court, adopted at a meeting held on _____, 1961.

[Signature]
Clerk of Johnson County Court

Date: 11-13-61

City of Alvarado

By: [Signature]
Title: Mayor
Date: 11-7-61

The signing of this agreement was authorized by Alvarado City Council at a meeting held on 11-7-61, 1961.

[Signature]
Secretary

Date: _____

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service

By: _____
Title: _____
Date: _____

SUPPLEMENTAL WORK PLAN
CHAMBERS CREEK WATERSHED
(Construction Unit 3)
Of the Trinity River Watershed
Johnson County, Texas

Plan Prepared and Works of Improvement
to be Installed Under the Authority
of the Flood Control Act of 1936
as Amended and Supplemented

Participating Agencies

Johnson County Commissioners Court
City of Alvarado
Agricultural Conservation Program Service
Extension Service

Prepared by:

Soil Conservation Service
U. S. Department of Agriculture
September 1961

SUPPLEMENTAL WORK PLAN
CHAMBERS CREEK WATERSHED
(Construction Unit 3)
Of the Trinity River Watershed
Johnson County, Texas
September, 1961

INTRODUCTION

Authority

The Chambers Creek Watershed Flood Prevention Project will be carried out under the authority of the Soil Conservation Act of 1935 (Public Law No. 46, 74th Congress), The Flood Control Act of June 22, 1936 (Public Law No. 738, 74th Congress), the Flood Control Act of December 22, 1944, (Public Law No. 534, 78th Congress, 2nd Session), and the Act of May 13, 1960 (Public Law No. 86 - 468).

Purpose and Scope of Supplemental Plan

The purpose of this Supplemental Work Plan is to augment the supply of municipal water for the city of Alvarado, Texas and to increase the level of protection afforded by the works of improvement for flood prevention planned for Construction Unit 3 of the Chambers Creek Watershed Work Plan of July 1955. Construction Unit 3 includes the drainage area of the North Fork of Chambers Creek above its confluence with Cottonwood Creek near Maypearl, Texas.

This supplement to the Chambers Creek Work Plan includes the addition of Structure 42, a multiple-purpose reservoir (City of Alvarado Water Supply Reservoir), and the deletion of floodwater retarding structures 30A, 39, 40, 41, 42B, 42C, and 42D.

The city of Alvarado, Texas made a request to the Soil Conservation Service early in 1960 to explore the possibilities of including storage for municipal water supply in proposed floodwater retarding structures in Turkey Creek, a tributary of Chambers Creek.

The consulting engineers engaged to represent the city of Alvarado have completed their studies and report, and recommend "that the city of Alvarado participate with the Soil Conservation Service in the construction of a multiple-purpose reservoir to insure the city of an adequate water supply in the future".

The consulting engineers' report shows that the proposed multiple-purpose reservoir (Structure 42) would yield sufficient water, through an extreme drouth period, such as the one experienced in 1950-1957, to serve a population of 5,300 which is expected by the year 2000 A.D. The total cost of the multiple-purpose structure will be less than that of two structures, one for flood prevention and one for municipal water supply.

SUMMARY OF PLAN

The Chambers Creek Work Plan of July 1955 includes a combination of land treatment measures for watershed protection and structural works of improvement for flood prevention for the portion of the watershed included in Construction Unit 3. The planning and application of the land treatment measures will be carried out in accordance with the provisions of the original plan. This supplement provides for the addition of a multiple-purpose structure for municipal water supply for the city of Alvarado, and for flood prevention, and for the deletion of floodwater retarding structures 30A, 39, 40, 41, 42B, 42C, and 42D.

The structural measures now planned for Construction Unit 3 are multiple-purpose Structure 42 and floodwater retarding structures 30 through 38, 33A, 42, 43, 43A, 44, 44A, and 44B. All of the structures have been constructed except multiple-purpose Structure 42 and floodwater retarding structures 43, 43A, and 44B.

The total cost of the structural measures that have been installed together with the estimated cost of structures 42, 43, 43A, and 43B is \$904,726, of which \$157,594 is to be borne by State, City, and local interests and \$747,132 by the Federal Government.

The proposed revisions set forth in this supplemental work plan will result in a net Federal saving of \$166,922, with an increase of \$1,940 in annual benefits due to the higher degree of protection afforded by substituting the multiple-purpose structure for the deleted floodwater retarding structures.

The total Federal cost of floodwater retarding structures in Construction Unit 3 would be reduced from \$914,054 without the changes to \$747,132 with the changes.

The total cost of structural measures without the changes is \$1,007,348 and \$904,726 with the changes.

The degree of control for Construction Unit 3 is 39.13 square miles or 41.45 percent without the changes, and 45.07 square miles or 47.74 percent with the proposed changes.

The reduction in average annual damages expected as a result of the planned programs are:

Without changes	72 percent
With changes	79 percent

COMPARISON OF BENEFIT AND COST

The over-all benefit-cost analysis for structural measures, without and with the changes is as follows:

	: Annual : Benefits (dollars)	: Annual : Costs (dollars)	: Benefit-Cost : Ratio (dollars)
Without Changes	38,599	38,386 <u>1/</u>	1.01:1
With Changes	40,539	34,136 <u>1/</u>	1.19:1

1/ Includes actual construction costs for 12 completed structures.

Benefits accruing to structural measures in Construction Unit 3 include its pro-rata share of downstream benefits along the Trinity River flood plain which were allocated in the 1955 Chambers Creek Watershed Work Plan. Additional pro-rata benefits on Chambers Creek downstream from Construction Unit 3 accruing to the structural measures were not claimed in the evaluation of this unit. Had these benefits on Chambers Creek been included, the benefit-cost ratios, both without and with the changes, would have been substantially more favorable.

COST ALLOCATION AND COST SHARING

Costs for the multiple-purpose structure were allocated between purposes using the Separable Cost Remaining Benefit Method. The alternate cost estimates for a single-purpose flood prevention structure were developed by the Soil Conservation Service. The costs for the multiple-purpose structure were developed jointly by the Soil Conservation Service and the consulting engineers, representing the city of Alvarado, Texas.

Cost estimates are summarized in the following table:

Item	: Flood : Prevention (dollars)	: Municipal : Water Supply (dollars)	: Multiple- : Purpose (dollars)
Water Storage Costs:			
Construction	47,362	84,145	76,735
Installation Services	12,873	8,415	20,856
Subtotal	60,235	92,560	97,591
Land and Easements	83,720	100,000	100,000
Legal Fees	4,200	- <u>1/</u>	5,000
Road Relocation & ROW	0	0	10,000
Subtotal	87,920	100,000	115,000
Total	148,155	192,560	212,591
Water Utilization Costs:			
Raw Water Pumping Plant	0	32,400	32,400
Raw Water Pipeline	0	42,280	42,280
Treatment Plant	0	108,000	108,000
Total	0	182,680	182,680

1/ Legal fees have been included in the cost of land and easements.

Costs of obtaining an adequate municipal supply from different sources are as follows:

Water Sources	Installation Cost (dollars)	Annual O & M Cost (dollars)
Single-Purpose Reservoir	375,240	14,194
Multiple-Purpose	247,116	14,194

In considering alternatives, the consulting engineers ascertained that ground water supplies would not furnish an adequate supply from either a quality or quantity standpoint. They estimated that the benefit to the city of Alvarado from a fully adequate municipal water supply would be sufficient to justify only a contribution to the multiple-purpose structure for this purpose by the city of \$64,436 after deducting costs for water utilization and operation and maintenance. The Soil Conservation Service concurs in this estimate.

Using the above estimates of costs and benefits, the cost allocation between purposes under the Separable Cost Remaining Benefits Method is as follows:

	Flood Prevention Only (dollars)	Municipal Water Supply (dollars)	Total (dollars)
1. Benefits	-	64,436	-
2. Alternate Cost	148,155	192,560	-
3. Justifiable Expense	148,155	64,436	212,591
4. Separable Cost	20,031	64,436	84,467
5. Remainder	128,124	0	128,124
6. Joint Costs Allocation	128,124	0	128,124
7. Allocated Costs	148,155	64,436	212,591
Percent Allocation	69.70	30.30	100.00

Based on the cost allocation shown above, the following table shows the cost sharing required for the multiple-purpose reservoir:

Item	Flood Prevention			Municipal Water Supply		Total		Total
	Federal	Other	Total	Other	Federal	Other	Total	
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Construction	47,362	0	47,362	29,373	47,362	29,373	<u>1/</u> 76,735	
Installation Services	12,873	0	12,873	7,983	12,873	7,983	<u>1/</u> 20,856	
Land, Easements, Rights-of-way and Legal Fees	0	87,920	87,920	27,080	0	115,000		115,000
Total	60,235	87,920	148,155	64,436	60,235	152,356		212,591
Percent of Total			69.70	30.30				100.00

1/ Other outlay in addition to land, easements, and rights-of-way
\$29,373 + \$7,983 = \$37,356.

All costs of water utilization facilities are excluded both from the single-purpose and multiple-purpose cost allocation. Such costs will be the same in each case and must be borne by the city.

Farmers Home Administration Loan

The city of Alvarado is interested in securing a Farmers Home Administration loan. Initial steps have been taken, but definite arrangements have not been completed.

SUPPLEMENTAL TABLE 2
ESTIMATED STRUCTURE COST DISTRIBUTION 1/
 Chambers Creek Watershed, Texas
 (Trinity River Watershed)
 Work Plan Revision - Construction Unit 3
WITHOUT CHANGES

Structure Site Number	Federal Installation Cost				Installation Services				Total	
	Construction	Engineer's Estimates	Contingencies	Other	Engineering	Other	Federal	Non-Federal	Installation	Estimated Total Cost
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Floodwater Retarding Structures										
30 3/	32,963	-	-	7,557	4,516	-	45,036	3,710	-	48,746
30A	30,897	3,090	-	6,797	3,549	-	44,333	2,970	-	47,303
31 3/	53,140	-	-	10,372	6,496	-	70,008	7,160	-	77,168
32 3/	23,307	-	-	5,972	2,624	-	31,903	3,730	-	35,633
33 3/	41,463	-	-	12,951	6,193	-	60,607	7,970	-	68,577
33A 3/	37,491	-	-	7,663	2,333	-	47,487	5,920	-	53,407
34 3/	34,116	-	-	8,174	3,063	-	45,353	2,660	-	48,013
35 3/	27,007	-	-	8,215	1,839	-	37,061	2,390	-	39,451
36 3/	26,017	-	-	6,332	2,588	-	34,937	2,590	-	37,527
37 3/	28,843	-	-	6,780	2,182	-	37,805	4,300	-	42,105
38 3/	52,299	-	-	9,063	3,105	-	64,467	7,150	-	71,617
39	9,030	903	-	1,987	1,037	-	12,957	4,280	-	17,237
40	20,240	2,024	-	4,453	2,325	-	29,042	2,770	-	31,812
41	36,627	3,663	-	8,058	4,207	-	52,555	5,170	-	57,725
42B	18,362	1,836	-	4,040	2,109	-	26,347	1,270	-	27,617
42C	19,256	1,926	-	4,236	2,212	-	27,630	4,930	-	32,560
42D	23,900	2,390	-	5,258	2,745	-	34,293	2,230	-	36,523
43	32,239	3,224	-	7,093	3,703	-	46,259	7,680	-	53,939
43A	28,413	2,841	-	6,251	3,264	-	40,769	5,634	-	46,403
44 3/	52,498	-	-	11,594	4,800	-	68,892	4,780	-	73,672
44A 3/	34,826	-	-	8,654	1,809	-	45,289	2,570	-	47,859
44B	7,683	768	-	1,690	883	-	11,024	1,430	-	12,454
TOTAL	670,617	22,665	153,190	67,582	914,054	93,294	1,007,348			

1/ Does not include work plan preparation cost.

2/ Includes easements, rights-of-way, legal fees, and removing obstacles.

3/ Constructed - actual cost.

SUPPLEMENTAL TABLE 2
ESTIMATED STRUCTURE COST DISTRIBUTION 1/
 Chambers Creek Watershed, Texas
 (Trinity River Watershed)
 Work Plan Revision - Construction Unit 3

Structure Site Number	Federal Installation Cost				Total	
	Construction	Installation	Engineer-	Other	Federal	Non-Federal
	Estimates	Engineer-	ing	Installation Services	Installation:	Estimated
	(dollars)	(dollars)	(dollars)	(dollars)	Cost 2/	Cost
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Floodwater Retarding Structures						
30 3/	32,963	-	7,557	4,516	45,036	3,710
31 3/	53,140	-	10,372	6,496	70,008	7,160
32 3/	23,307	-	5,972	2,624	31,903	3,730
33 3/	41,463	-	12,951	6,193	60,607	7,970
33A 3/	37,491	-	7,663	2,333	47,487	5,920
34 3/	34,116	-	8,174	3,063	45,353	2,660
35 3/	27,007	-	8,215	1,839	37,061	2,390
36 3/	26,017	-	6,332	2,588	34,937	2,590
37 3/	28,843	-	6,780	2,182	37,805	4,300
38 3/	52,299	-	9,063	3,105	64,467	7,150
42 4/	43,056	4,306	8,612	4,261	60,235	87,920
43	32,239	3,224	7,093	3,703	46,259	7,680
43A	28,413	2,841	6,251	3,264	40,769	5,634
44 3/	52,498	-	11,594	4,800	68,892	4,780
44A 3/	34,826	-	8,654	1,809	45,289	2,570
44B	7,683	768	1,690	883	11,024	1,430
TOTAL	555,361	11,139	126,973	53,659	747,132	157,594
						904,726

1/ Does not include work plan preparation cost.
 2/ Includes easements, rights-of-way, legal fees, and removing obstacles.
 3/ Constructed - actual cost.
 4/ Does not include \$29,373 contract cost, \$7,983 installation services, and \$27,080 land easements and rights-of-way allocated to municipal water storage to be paid for by city of Alvarado.

SUPPLEMENTAL TABLE 3
STRUCTURE DATA - MULTIPLE-PURPOSE STRUCTURE

Chambers Creek Watershed, Texas
(Trinity River Watershed)

Item	Unit	STRUCTURE NUMBER 42 <u>1/</u>
Drainage Area <u>2/</u>	Sq. Mi.	15.3
Storage Capacity		
Sediment Pool	Ac. Ft.	424
Sediment in Municipal Pool	Ac. Ft.	171
Sediment in Detention Pool	Ac. Ft.	82
Floodwater Detention	Ac. Ft.	4,471
Municipal Water Supply	Ac. Ft.	4,186
Total	Ac. Ft.	9,334
Surface Area		
Sediment Pool <u>3/</u>	Acre	100
Floodwater Detention Pool	Acre	774
Municipal Water Supply	Acre	505
Volume of Fill	Cu. Yd.	201,330
Elevation Top of Dam	Foot	704.1
Maximum Height of Dam <u>4/</u>	Foot	46
Emergency Spillway		
Crest Elevation	Foot	699.0
Bottom Width	Foot	270
Type	-	Veg.
Percent Chance of Use <u>5/</u>	-	1.8
Average Curve No. - Condition II	-	73
Emergency Spillway Hydrograph		
Storm Rainfall (6-hour) <u>6/</u>	Inch	8.31
Storm Runoff	Inch	5.07
Velocity of Flow (Vc) <u>7/</u>	Ft./Sec.	0
Discharge Rate <u>7/</u>	C.F.S.	0
Maximum Water Surface Elevation <u>7/</u>	Foot	-
Freeboard Hydrograph		
Storm Rainfall (6-hour) <u>8/</u>	Inch	13.85
Storm Runoff	Inch	10.24
Velocity of Flow (Vc) <u>7/</u>	Ft./Sec.	9.8
Discharge Rate <u>7/</u>	C.F.S.	7,907
Maximum Water Surface Elevation <u>7/</u>	Foot	704.1
Principal Spillway Capacity (Maximum)	C.F.S.	293
Capacity Equivalents		
Sediment Pool	Inch	0.52
Sediment in Municipal Pool	Inch	0.21
Sediment in Detention Pool	Inch	0.10
Floodwater Detention	Inch	5.48
Municipal Water Supply	Inch	5.13
Spillway Storage <u>9/</u>	Inch	3.11
Class of Structure	-	A <u>10/</u>

(See footnotes on next page)

September 1961

SUPPLEMENTAL TABLE 3 - Continued
STRUCTURE DATA - MULTIPLE-PURPOSE STRUCTURE

Chambers Creek Watershed, Texas
(Trinity River Watershed)

- 1/ Municipal water supply for the city of Alvarado, Texas
- 2/ Excludes area from which runoff is controlled by other structures.
- 3/ Surface area at top of design sediment storage.
- 4/ Measured from centerline of stream channel to effective top of dam.
- 5/ Based on regional stream gage analysis and soil-cover complex characteristics of the watershed of the individual structure.
- 6/ 0.75P adjusted to drainage area. Value of P from Figure 3.21-1, Supplement A, Section 4, National Engineering Handbook.
- 7/ Maximum during passage of hydrograph. The emergency spillway capacity meets the minimum requirements for Class B structure as contained in Washington Engineering Memo. SCS-27.
- 8/ 1.25P adjusted to drainage area. Value of P from Figure 3.21-1, Supplement A, Section 4, National Engineering Handbook.
- 9/ Storage from emergency spillway crest to top of dam.
- 10/ Net detention storage exceeds the minimum requirements for Class B structures as contained in Washington Engineering Memo SCS-27.

September 1961

SUPPLEMENTAL TABLE 4 -
ANNUAL COSTS 1/
 Chambers Creek Watershed, Texas
 (Trinity River Watershed)

Work Plan Revision - Construction Unit 3

Without Changes

Measures	Amortization of Installation Costs 2/		Operation & Maintenance Costs 3/		Total
	Federal	Non-Federal	Total	Non-Federal	
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)

Floodwater Retarding
Structures

Nos. 30, 30A, 31, 32, 33, 33A, 34 through 41, 42B, 42C, 42D, 43, 43A, 44, 44A, and 44B	33,034	3,372	36,406	1,980	38,386
TOTAL	33,034	3,372	36,406	1,980	38,386

1/ Does not include work plan preparation cost.

2/ Installation costs based on actual contract price for installed structural measures, and 1960 price levels for proposed structural measures amortized for 50 years at 2.625 percent interest rate.

3/ Based on long-term prices as projected by ARS, September 1957.

September 1961

SUPPLEMENTAL TABLE 4
ANNUAL COSTS 1/
 Chambers Creek Watershed, Texas
 (Trinity River Watershed)
 Work Plan Revision - Construction Unit 3

With Changes

Measures	Amortization of Installation Costs <u>2/</u>		Operation & Maintenance Costs <u>3/</u>		Total
	Federal	Non-Federal	Federal	Non-Federal	
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)

Floodwater Retarding Structures

Nos. 30, 31, 32, 33, 33A, 34 through 38, <u>4/</u> 42, 43, 43A, 44, 44A, and 44B	27,001	5,695	32,696	1,440	34,136
TOTAL	27,001	5,695	32,696	1,440	34,136

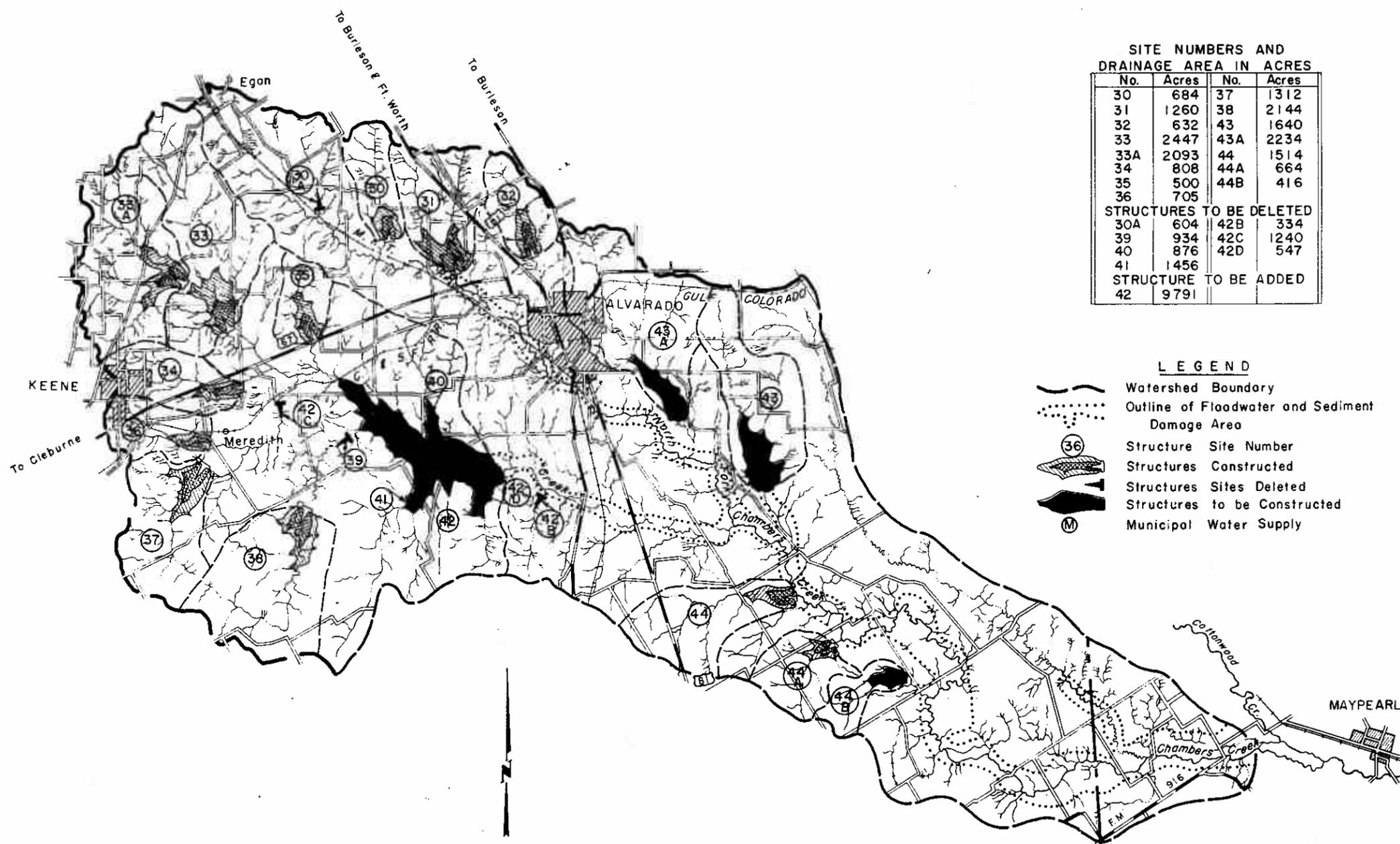
1/ Does not include work plan preparation cost.

2/ Installation costs based on actual contract price for installed structural measures, and 1960 price levels for proposed structural measures amortized for 50 years at 2.625 percent interest rate.

3/ Based on long-term prices as projected by ARS, September 1957.

4/ No. 42 is a multiple-purpose structure and does not include the cost allocated to municipal water storage.

September 1961



SITE NUMBERS AND DRAINAGE AREA IN ACRES

No.	Acres	No.	Acres
30	684	37	1312
31	1260	38	2144
32	632	43	1640
33	2447	43A	2234
33A	2093	44	1514
34	808	44A	664
35	500	44B	416
36	705		
STRUCTURES TO BE DELETED			
30A	604	42B	334
39	934	42C	1240
40	876	42D	547
41	1456		
STRUCTURE TO BE ADDED			
42	9791		

- LEGEND**
- Watershed Boundary
 - Outline of Floodwater and Sediment Damage Area
 - Structure Site Number
 - Structures Constructed
 - Structures Sites Deleted
 - Structures to be Constructed
 - Municipal Water Supply

PROJECT MAP
CONSTRUCTION UNIT 3
CHAMBERS CREEK WATERSHED
 OF THE
TRINITY RIVER WATERSHED—TEXAS
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 TEMPLE, TEXAS