

WORK PLAN

EAST FORK ABOVE LAVON WATERSHED

OF THE TRINITY RIVER WATERSHED
Collin and Grayson Counties, Texas
(Revised August, 1956)

Prepared By

SOIL CONSERVATION SERVICE
UNITED STATES
DEPARTMENT OF AGRICULTURE

Temple, Texas
August, 1956

WATERSHED WORK PLAN

AGREEMENT

between the

COLLIN COUNTY SOIL CONSERVATION DISTRICT

(name of local organization)

UPPER ELM-RED SOIL CONSERVATION DISTRICT

(name of local organization)

(name of local organization)

STATE OF TEXAS,

(hereinafter referred to as the local organization)

and the

SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE
(hereinafter referred to as the Service)

Whereas, the responsibility for administration of the Flood Prevention Program authorized by the Flood Control Act of 1936, as amended and supplemented, has been assigned by the Secretary of Agriculture to the Soil Conservation Service; and

Whereas, there has been developed through the cooperative efforts of the local organization and the Service a mutually satisfactory plan for works of improvement for said watershed, designated as the watershed work plan for East Fork Above Lavon Watershed, State of Texas, which watershed work plan is annexed to and made a part of this agreement; and

Whereas, the watershed work plan describes the watershed and its problems, and sets forth a plan for works of improvement including a schedule of operations, the kinds and quantities of measures to be installed, the estimated cost, cost-sharing arrangements, maintenance and other responsibilities of those participating in the project, and economic justification for installing, operating and maintaining the works of improvement; and

Now, therefore, in view of the foregoing considerations, the local organization and the Secretary of Agriculture, through the Service, hereby agree on the watershed work plan, and further agree that the works of improvement as set forth in said plan will be installed, operated, and maintained substantially in accordance with the terms, conditions, and stipulations provided for therein.

It is further understood that this agreement does not constitute a financial document to serve as a basis for the obligation of Federal funds, and that 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 and on the execution of supplemental agreements setting forth the cost-sharing arrangements and other conditions that are applicable to specific works of improvement.

It is further agreed that the watershed work plan may be amended or revised, and that this agreement may be modified or terminated, only by mutual agreement of the parties hereto.

No member of or Delegate to Congress 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.

COLLIN COUNTY SOIL CONSERVATION DISTRICT
(name of local organization)

By John D. Wells
Title Chairman, Board of Supervisors
Date Sept. 10, 1956

The signing of this agreement was authorized by a resolution of the governing body of the Collin County Soil Conservation District
(name of local organization)

adopted at a meeting held on Sept. 10, 1956.

Blair E. Wood
(Secretary, local organization)
Date Sept 10, 1956

UPPER ELM-RED SOIL CONSERVATION DISTRICT
(name of local organization)

By J. W. Doss

Title Chairman, Board of Supervisors

Date Sept 12, 1956

The signing of this agreement was authorized by a resolution of the governing body of the Upper Elm-Red Soil Conservation District
(name of local organization)

adopted at a meeting held on September 12, 1956.

Willard Kempton
(Secretary, local organization)

Date September 12, 1956

(name of local organization)

By _____

Title _____

Date _____, 195

The signing of this agreement was authorized by a resolution of the governing body of the _____
(name of local organization)

adopted at a meeting held on _____, 195 .

(Secretary, local organization)

Date _____, 195

Soil Conservation Service
United States Department of Agriculture

By _____
(State Conservationist)

Date _____, 195

WORK PLAN
EAST FORK ABOVE LAVON WATERSHED
Of the Trinity River Watershed
Collin and Grayson Counties, Texas
(Revised August, 1956)

Participating Agencies

Collin County Soil Conservation District
Upper Elm-Red Soil Conservation District
Agricultural Conservation Program Service
Extension Service
Soil Conservation Service

Prepared By

Soil Conservation Service
United States Department of Agriculture
August, 1956

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INTRODUCTION

Authority

The East Fork 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) and the Flood Control Act of December 22, 1944 (Public Law No. 534, 78th Congress, 2nd Session).

Purpose and Scope of Plan

The Collin County and Upper Elm-Red Soil Conservation Districts provide through their programs and work plans, for the application of a complete program of soil and water conservation and improved plant management within this watershed. Their objectives are to use each acre of agricultural land in accordance with its capabilities for sustained agricultural production and to treat each acre in accordance with its needs for protection and improvement. Such a program, when applied and maintained on all the land within the watershed, will be effective in reducing runoff from small rains and will effect some reduction in peak flows from excessive rains. Effective land treatment will have a major effect in the reduction of erosion rates of upland, which in turn will reduce sediment damages. Additional structural measures for flood prevention are needed for complete soil and water conservation and plant management in the watershed and to provide effective reductions in flood damage.

The purposes of this plan are (1) to state specifically the land treatment and structural practices and measures which are designed primarily for, or contribute directly to flood prevention, and (2) to specify how, when, and by whom they will be carried out to achieve the maximum practicable reduction of erosion, floodwater, and sediment damages. Measures and practices planned herein constitute an integral part of the complete soil and water conservation and plant management program in this watershed and have been incorporated in the work plan of each of the soil conservation districts concerned.

Application of this mutually developed plan will provide the maximum protection to and improvement of land and water resources which can be justified economically and undertaken at this time with the combined facilities of local interests and State and Federal agencies. Upon completion and continued maintenance of the measures set forth in this plan, a material contribution will be made toward increasing agricultural production to a level consistent with the capability of the land, thereby promoting the welfare of the landowners and operators, the community, the State and the Nation.

The area in the watershed includes parts of Collin and Grayson Counties, and contains 224,935 acres (approximately 351 square miles).

SUMMARY OF PLAN

This plan includes a combination of land treatment measures, which contribute directly to soil and water conservation, and structural measures primarily for flood prevention. The works of improvement listed in table 1 are planned to be installed at an estimated cost of \$7,697,270, of which \$4,073,416 is to be borne by State and local interests and \$3,623,854 by the Federal Government.

The Collin County and the Upper Elm-Red Soil Conservation Districts, under provisions of State enabling legislation, have agreed to assume responsibility for overall periodic inspection and maintenance of the floodwater retarding structures and stream channel improvement at an estimated annual cost of \$14,863. The landowners and operators will maintain the land treatment measures.

When the works of improvement are applied and operating at full effectiveness, the ratio of the estimated average annual benefit, \$300,062, to the estimated average annual equivalent cost, \$152,054, is 1.97 to 1, based on 1955 price levels for installation costs and long-term prices (BAE 1951 price projection) for operation and maintenance costs and benefits. Benefits were evaluated on the flood plains of Wilson Creek, Tickey Creek, and East Fork of the Trinity (and its tributaries) above Lavon Reservoir. Benefits have been included for the part of the flood plain which lies between the high-water elevation for Lavon Reservoir and the estimated water elevation in Lavon Reservoir that would result from a 10-year expectancy storm (elevation 480 m.s.l.) and for the expected reduction of sediment deposition in Lavon Reservoir.

DESCRIPTION OF THE WATERSHED

Physical Data

East Fork of the Trinity River rises near the town of Dorchester in Grayson County, Texas, and flows in a southerly direction for approximately 50 miles, emptying into Lavon Reservoir, in Collin County. This work plan covers that portion of the watershed above elevation 480 m.s.l. in Lavon Reservoir. The watershed ranges in width from 5 to 15 miles, averaging 9 miles. Wilson, Honey, Whites, Hurricane, Throckmorton, Clemons, White Rock and Tickey Creeks are the major tributaries.

The watershed has a total area of 224,935 acres (approximately 351 square miles) which includes 4,125 acres in the Lavon Reservoir area above elevation 480 m.s.l. Approximately 209,330 acres are in farms, with the remainder in urban areas, roads, highways, Lavon Reservoir, stream channels and other miscellaneous uses. An estimated 69 percent of the watershed is being used for crop production. Cotton, corn and small grain are the principal crops

grown. There are approximately 16,000 acres of bottom land in the watershed, of which 14,640 acres are flood plain and 1,360 acres are in stream channels.

Land use in the watershed is estimated to be:

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Cultivation	155,672	69.2
Pasture	47,915	21.3
Wooded Pasture	5,743	2.6
Stream Channels	1,360	0.6
Lake Surface <u>1/</u>	4,125	1.8
Miscellaneous <u>2/</u>	10,120	4.5
Total	224,935	100.0

1/ Lavon Reservoir (area that lies above elevation 480 in the flood pool).

2/ Includes roads, highways, railroads, towns, etc.

The East Fork watershed lies in the Blackland Prairie Land Resource Area and contains three principal groups of soils. These are (1) bottom lands or alluvial soils (fine textured, slowly and moderately permeable); (2) black, waxy soils (slowly permeable); and (3) light-colored, deep and shallow soils over chalk and marl (moderately permeable). Alluvial soils make up about 13 percent of the total watershed and are very productive. The black, waxy soils are fine textured soils developed from marls or calcareous clays. They are moderately productive except where erosion has been severe. The light-colored deep and shallow soils are formed from interbedded chalks and marls of the Austin formation.

About 50 percent of the cultivated land is in relatively poor physical condition as a result of prolonged, intensive cultivation. Much of its fertility and organic matter has been lost as a result of severe erosion on the more sloping lands. The shallow soils are used largely for the production of small grains, principally wheat.

The principal geologic formations found in the watershed are Austin chalk, Taylor marl and Eagle Ford shale. All of these formations are of Upper Cretaceous (Gulf) age. Austin chalk occupies 83 percent of watershed and consists of interbedded chalks and marls. Taylor marl occupies 10 percent of the watershed, in the extreme lower reaches and is composed of interbedded gray marls, blue and yellow shales and clays. Eagle Ford shale occupies 7 percent of the watershed, along the extreme west watershed divide, and is composed chiefly of light-colored, compressed and laminated shales with a few thin ledges of sandstone and sandy clay. Most of the planned floodwater retarding structures are located in the Austin chalk formation. Aside from some difficulty of spillway excavation, no serious construction problems are anticipated.

Physiographically, the watershed consists of a plain, dissected by numerous streams which have cut shallow valleys.

Topography ranges from nearly level to gently rolling with localized small areas of broken land. Elevation ranges from 480 feet above mean sea level in Lavon Reservoir to 800 feet along the north watershed divide.

The stream channels of East Fork and its tributaries are irregular in size, with wide and deep reaches alternating with shallow, sediment-filled reaches. In general the size of the channel increases with the size of the drainage area on most of the tributary streams, while on the main stem of the East Fork there is little relationship between channel size and location in the watershed.

Temperatures range from 7 degrees below zero to 118 degrees above zero, with a mean annual temperature of 65.7 degrees Fahrenheit. The average date of the last killing frost is March 29 and that of the first killing frost is November 13, a normal frost-free period of 229 days.

The mean annual precipitation of 39.24 inches, based on a 49-year record, at McKinney, is fairly evenly distributed, with the greatest amounts of rainfall occurring in April and May. Individual rains of excessive amounts cause severe erosion and flood damage. Although these storms may occur during any season, the majority have occurred in the spring months. The minimum recorded annual rainfall was 20.76 inches and the maximum was 54.79 inches.

Water for livestock and domestic uses on farms in the watershed is supplied largely by shallow wells and small farm ponds. These sources, however, do not provide a dependable supply. Deep wells extending into the Trinity or Woodbine sands supply McKinney and most of the small towns.

The East Fork watershed is served by Soil Conservation Service work units at McKinney and Van Alstyne, which are assisting the Collin County and the Upper Elm-Red Soil Conservation Districts. These work units have assisted landowners and operators in preparing 606 conservation plans on 87,765 acres within the watershed. Where land treatment measures have been applied and maintained for as long as 3 to 5 years, crop yields have increased 20 to 25 percent and erosion damages have been materially reduced.

Economic Data

The better or more productive uplands throughout the watershed are devoted largely to the production of crops. Approximately 70 percent of the cultivated land is used for cotton, corn and small grains. Other crops grown are grain sorghums, clovers, hay and truck crops.

The more broken lands are used for livestock production. Beef enterprises predominate, but several dairies within the watershed sell milk to processors and distributors located in Dallas.

There are approximately 1,620 farms in the watershed with an average size

of 130 acres. Scattered throughout the watershed are small villages and residential areas occupied principally by people who commute to and from their work in McKinney and Dallas. Also, some people live on small acreages which are inadequate for subsistence and supplement their income by employment on farms, in urban areas, or in small industries located in or near the watershed. These people contribute little to agricultural production. Land values are usually high, partly because of the proximity of Dallas.

McKinney, the largest city in the area is located in the lower portion of the watershed. The towns of Howe, Van Alstyne, Anna, Melissa and Princeton are located along the eastern border of the watershed.

The principal towns and their estimated populations are:

<u>City or Town</u>	<u>Population</u>
McKinney	10,560
Howe	546
Van Alstyne	1,650
Anna	509
Princeton	564

The principal industries in the watershed are associated with agriculture and include textile mills, cotton gins, garment factories, feedstuffs, candy, insulation materials, milk products, poultry dressing and machine shops.

The watershed is served by approximately 869 miles of roads of which 190 miles are paved. There are 200 bridges on these roads, 50 of which span the larger streams. Floods occasionally make some of the roads impassable. The detours thus occasioned cause delay and extra travel distance to and from places of employment and markets. The Texas and New Orleans Railroad provides adequate rail service.

WATERSHED PROBLEMS

Floodwater Damage

East Fork and its tributaries flood frequently and cause high annual damage. Flooding occurs several times a year on the watershed. The flood plain is wide and flat; consequently a small rise above bank-full stage will cause large areas to be flooded. During the 20-year period, 1923 to 1942 inclusive, there were 60 floods that covered more than one-half of the flood plain, and 45 smaller floods. Floods occurring during the growing season have caused considerable damage to growing crops. For the floods experienced during the 20-year period studied the total direct floodwater and sediment damages were estimated to average \$418,756 annually under present conditions, of which \$237,223 was crop and pasture damage. In addition, there were numerous indirect damages such as the interruption of travel, initial losses sustained by dealers and industries in the area, and similar items. The total annual value of these indirect damages was estimated to have been \$41,876. The

average annual monetary flood damages are summarized in table 4.

Sediment Damage

Most of the flood plain in the East Fork watershed has received substantial amounts of sediment deposits. Approximately 3,560 acres have been damaged 5 to 10 percent, in terms of reduced fertility. The estimated area damaged under present conditions is 2,085 acres damaged to the extent of 5 percent of its annual production, and 1,475 damaged to the extent of 10 percent of its annual production.

In general, these overbank deposits are of the same texture and color as the original material and have been deposited at the rate of not more than a few inches during each major flood. Much of the area damaged by sediment is affected by impaired internal drainage caused by previous deposition of silt and clay.

Channel filling has been severe in portions of all creek channels in the East Fork watershed. The gradient of the streams is fairly low, and vegetation is partially plugging the channels in places. Reduction of the original channel capacity averages at least 50 percent in the lower portion of the watershed and about 37 percent throughout. East Fork channel is filling from its confluence with Hurricane Creek down to Lavon Reservoir. Wilson Creek begins silting approximately a mile below State Highway 24. These reductions in channel capacity have caused greater frequency and increased depths of flooding at numerous points throughout the flood plain. Though this was recognized no consideration was given to it in estimating future damages or evaluating benefits.

Benefits, based on reduction of sediment damages resulting from installation of floodwater retarding structures, were confined to the flood plain located below proposed structures which will be inundated by the largest flood evaluated in the 20-year storm series. Damages resulting from deposition of less fertile sediment on flood plains will be reduced approximately 77 percent by the entire watershed program.

Lavon Reservoir, under present conditions of land use, will receive sediment at the approximate annual rate of 2.0 acre-feet per square mile of drainage area from the East Fork watershed. It is estimated that the application of land treatment measures will reduce the sediment yield to the reservoir an average of 36 percent. It is estimated that the installation of the proposed floodwater retarding structures will reduce the sediment yield an additional 17 percent, based on 43 percent of the total watershed being controlled by floodwater retarding structures. This reduction has been included in calculation of flood prevention benefits.

Erosion Damage

Erosion damages within the East Fork watershed range from moderate to high. Severe sheet erosion has occurred on the untreated gently rolling or smooth

upland and sheet and gully erosion are very active on the rough land. At the present time a decrease in these damages, due to the effectiveness of applied conservation practices, can be noticed. Some steep formerly cultivated areas have been established in grass. A considerable acreage of cultivated land has been terraced and put in close-growing crops. Still other areas have been removed from cultivation and allowed to lie idle. Natural revegetation is slow but the erosion damage is being reduced. When 80 percent of the land treatment needed on the watershed has been applied, a 60 percent reduction in erosion damages can be expected.

Sediment yields for the watershed are generally high, ranging from approximately 1.0 to 3.0 acre-feet per square mile annually. The estimates of sediment yields to the floodwater retarding structures were based on reservoir sedimentation surveys and sediment-yield studies involving watersheds of similar size and condition in the Blackland Prairie Land Resource Area.

Scour damage on flood plains is not extensive. About four percent (566 acres) of the total flood plain has been scoured by floodwater, resulting in damages ranging from 5 to 40 percent. Acreages affected by scour are estimated as follows:

189 acres damaged 5 percent
 148 acres damaged 10 percent
 137 acres damaged 20 percent
 and 92 acres damaged 40 percent

Of the total area affected, 51 percent is cropland.

Problems Relating to Methods now used in the Conservation, Development, Utilization and Disposal of Water

During the past 40 years unorganized attempts have been made by individual landowners to levee bottom lands along the main stem of East Fork, Wilson Creek, and Honey Creek. These efforts, generally, have not proven to be satisfactory and the levees are not being maintained.

Lavon Reservoir, into which East Fork drains, stores water for urban use. The planned works of improvement will prolong the life of the reservoir and preserve its storage capacity for beneficial uses by reducing the rate of sedimentation.

The works of improvement will produce no known detrimental effects on any other program which may be developed in the future.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures

An effective conservation program based upon the use of each acre of agricultural land within its capabilities and its treatment in accordance with its needs, such as is now being carried out by the Collin County and the Upper

Elm-Red Soil Conservation Districts, is essential to a sound and continuing program of flood prevention in the watershed. Basic to the attainment of this objective is the establishment and maintenance of all applicable soil and water conservation and plant management practices. Emphasis will be placed on accelerating the establishment of those land treatment practices which have a measurable effect on the reduction of floodwater and sediment damages.

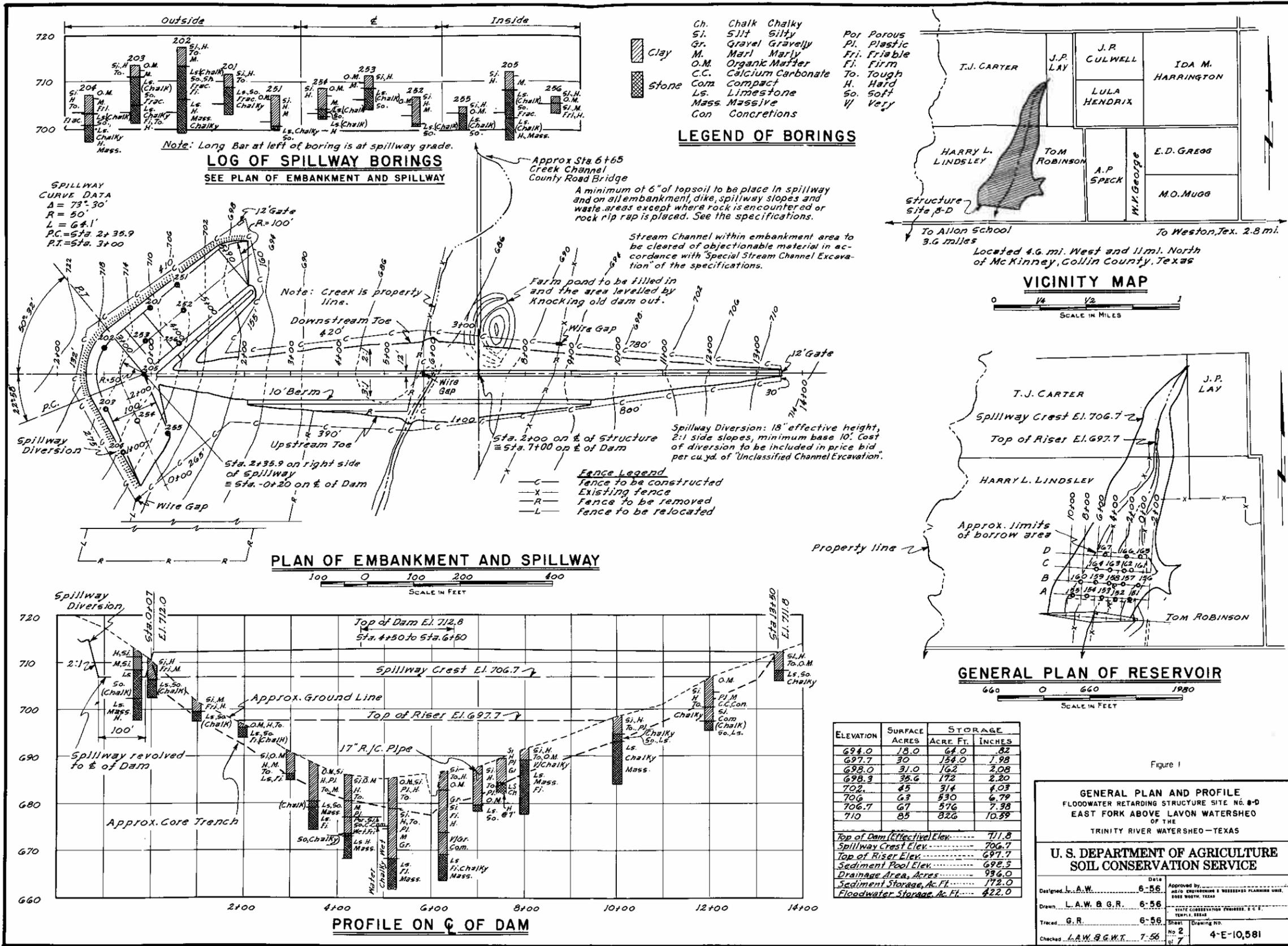
An important phase of the work is the establishing of 3,986 acres of vegetated waterways to facilitate the construction of 3,063 miles of terraces and 96 miles of diversions. Establishment of these waterways must precede construction of many terraces and diversions. An equally important measure is planting pasture on 51,720 acres of formerly cultivated land and overgrazed pasture where needed to establish effective stands and adequate cover to reduce erosion and sediment yield. Other land treatment measures which will have a direct effect on flood prevention and which will be applied include contour farming, cover cropping, rotation hay and pasture, crop residue utilization and proper use of pasture. A total of 1,416 farm ponds will be constructed for adequate distribution of grazing. Legumes in a conservation crop rotation and in pasture improvement will be planted on 93,377 acres to improve water-holding capacity of the soils, increase infiltration rate, improve soil fertility and reduce erosion. Rotation hay and pasture will be used on 14,366 acres. Proper use of pasture will be given to 69,809 acres. The estimated cost of planning and establishing these measures is \$3,862,140, as shown in table 1. These measures will be installed by the landowners and operators of the watershed.

Under the guidance and with the assistance of the Collin County and the Upper Elm-Red Soil Conservation Districts, landowners will apply other needed measures not included in table 1. These practices are a part of a complete soil, plant and water conservation program, but since they do not contribute directly to a program of flood prevention their cost has not been included in Table 1.

Structural Measures for Flood Prevention

The floodwater retarding structures needed to provide flood protection for the flood plains, roads, bridges, and rural improvements are listed, with their cost, in table 1. A plan of a typical floodwater retarding structure is shown as figures 1 and 1A. To comply with existing laws of Texas, no water will be stored in the sediment pool in excess of 200 acre-feet unless the landowner receives prior approval from the State Board of Water Engineers. The sediment pool and a portion of the detention pool will be designed to store the sediment yield expected from the drainage area of the structure during a 50-year period.

A system of 71 floodwater retarding structures and 6.4 miles of stream channel improvement are to be installed to protect the flood plain along East Fork and Wilson, Honey, Tickey, Whites, Hurricane, Throckmorton and Clemons Creeks. The structures will be constructed at or near the location



ELEVATION	SURFACE		STORAGE	
	ACRES	ACRE FT.	ACRE FT.	INCHES
694.0	18.0	64.0		.82
697.7	30	154.0		1.98
698.0	31.0	162		2.08
698.3	35.6	172		2.20
702.	45	314		4.03
706	63	530		6.79
706.7	67	576		7.38
710	85	826		10.39

Top of Dam (Effective) Elev. 711.8
 Spillway Crest Elev. 706.7
 Top of Riser Elev. 697.7
 Sediment Pool Elev. 692.5
 Drainage Area, Acres 936.0
 Sediment Storage, Ac. Ft. 172.0
 Floodwater Storage, Ac. Ft. 422.0

GENERAL PLAN AND PROFILE
 FLOODWATER RETARDING STRUCTURE SITE NO. B-D
 EAST FORK ABOVE LAVON WATERSHED
 OF THE
 TRINITY RIVER WATERSHED—TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date 6-56
 Approved by L.A.W. & G.R.
 Drawn by L.A.W. & G.R.
 Traced by G.R.
 Checked by L.A.W. & G.R.

Approved by L.A.W. & G.R.
 Drawn by L.A.W. & G.R.
 Traced by G.R.
 Checked by L.A.W. & G.R.

Sheet No. 2
 Drawing No. 4-E-10,581

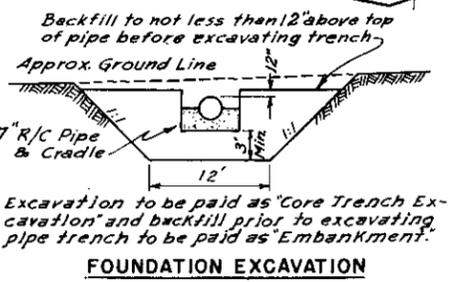
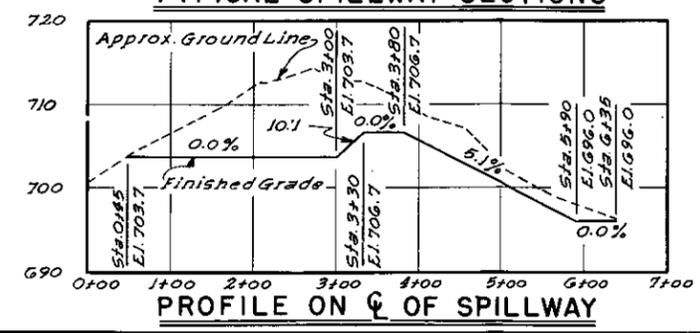
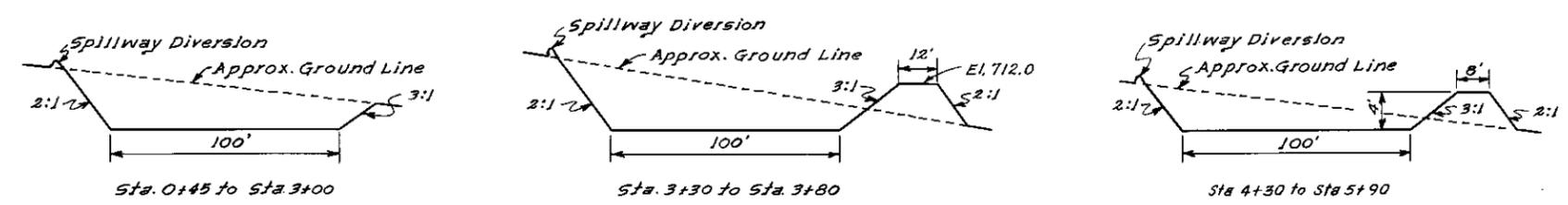
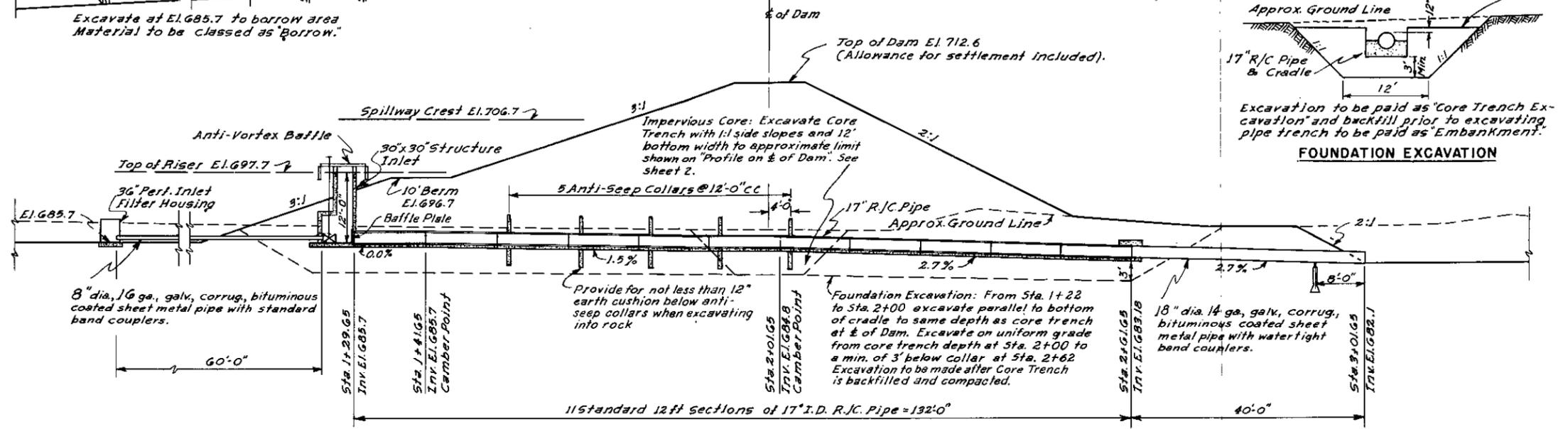
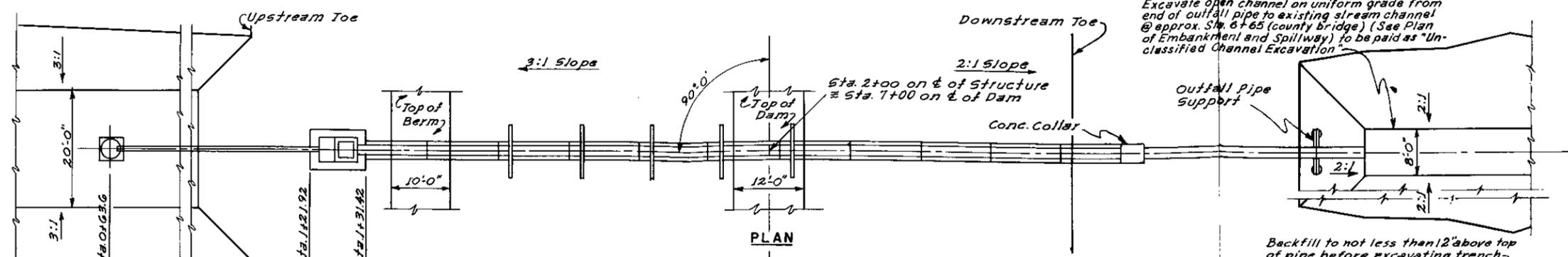


Figure 1-a

STRUCTURE — PLAN AND SECTION FLOODWATER RETARDING STRUCTURE SITE No. B-0 EAST FORK ABOVE LAVON WATERSHED OF THE TRINITY RIVER WATERSHED — TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed by	L.A.W.	Date	6-56
Drawn by	L.A.W. & G.R.	Approved by	H. M. [Signature]
Traced by	G.R.	Checked by	L.A.W. & G.W.T.
Checked by	L.A.W. & G.W.T.	Sheet No.	3 of 7
		Drawing No.	4-E-10,581

shown on the Structure Location Map, figure 2. Data concerning the floodwater retarding structures and stream channel improvement are summarized in tables 6 and 6A. The structures will inundate 79 acres of the flood plain.

The system of structures will temporarily detain runoff from 49 percent of the watershed above Valley Section No. 2, located on the main stem of East Fork immediately above Lavon Reservoir. Sufficient detention storage can be developed at all structure sites to make possible the use of vegetative spillways, which are substantially less costly than concrete or similar type spillways.

The total estimated cost for installing the floodwater retarding structures and channel improvement is \$3,786,830. The annual equivalent cost, including operation and maintenance, is \$152,054.

Thirteen of the proposed floodwater retarding structures have been constructed since the original watershed plan was developed. The cost of these structures is summarized in table 1.

Effect of Works of Improvements on Damages and Benefits

The combined program of land treatment and structural measures for flood prevention would eliminate damages from 57 of the floods that occurred in the 20-year period of study. Of the remaining 48 floods, 46 would be reduced to minor floods. Average annual flooding throughout the watershed would be reduced from 35,457 acres to approximately 11,260 acres.

The estimated average annual direct and indirect flood damage, based on floods experienced in the 20-year period of study, would be reduced from \$460,632 to \$130,728, a reduction of 72 percent. Approximately 57 percent of the expected reduction in average annual damages caused by the storms in the 20-year period studied would result from the system of floodwater retarding structures and channel improvement. The annual value of this reduction is estimated to be \$187,037 of the total of \$329,904 from all measures, as shown in table 4.

Owners and operators of flood plain lands say that if adequate flood protection is provided they will restore much of the land now in pasture to production of high value crops such as cotton, corn, alfalfa and truck. Much present pastureland was removed from cultivation because of the flood hazard. It is estimated that increased net income from all changes in land use will amount to \$103,748 annually at long-term price levels. The proposed structural program will reduce the sediment damage to Lavon Reservoir to the extent of an estimated \$9,277 annually.

The proposed program of flood prevention on the East Fork watershed will have no known detrimental effect on any existing or proposed downstream projects that might be constructed in the future.

COMPARISON OF BENEFITS AND COSTS

When the structural measures for flood prevention are installed and operating at full effectiveness, the ratio of the average annual benefit, \$300,062, to the average annual costs of the measures, \$152,054 is \$1.97:1, based on 1955 price levels for installation costs and long-term price levels (BAE 1951 price projection) for operation and maintenance costs and benefits. In addition to the monetary benefits, there are other substantial values which will accrue from the program such as increased opportunities for recreation, better living conditions, and a sense of security, which have not been evaluated.

ACCOMPLISHING THE PLAN

Land Treatment Measures

Land treatment measures itemized in table 1 will be established on the land by farmers in cooperation with the Collin County and the Upper Elm-Red Soil Conservation Districts. The cost of applying these measures will be borne by the owners and operators of the land. It is expected that the owners and operators will be reimbursed, based on the current program, for a portion of this cost through the existing Agricultural Conservation Program. The farmer cost, less the estimated ACP payment, is shown for each land treatment measure in table 1. The soil conservation districts are giving assistance in the planning and application of these measures under their going programs, accelerated by the assistance of the Soil Conservation Service work units, to get needed measures installed as rapidly as possible.

The governing bodies of the Collin County and the Upper Elm-Red Soil Conservation Districts will arrange for meetings according to a definite schedule, and by individual contacts will encourage the landowners and operators within the East Fork watershed to adopt and carry out soil and water conservation plans on their farms. District-owned equipment will be made available to the landowners in accordance with the existing arrangements for equipment usage in the districts. Each district-governing body will make periodic inspections of the completed conservation measures within its district and take necessary action to attain adequate maintenance.

The Soil Conservation Service work units at McKinney and Van Alstyne will assist landowners and operators cooperating with the districts in accelerating the preparation and application of soil and water conservation plans.

The Agricultural Extension Service will carry out the educational phase of the program by conducting general information and local farm meetings, preparing radio and press releases, and using other methods of disseminating information to landowners and operators in the East Fork watershed to help achieve understanding and stimulate participation in carrying out the entire plan.

The soil and water conservation loan program of the Farmers Home Administration is available to all eligible individual farmers and ranchers in the area. Educational meetings will be held in cooperation with other agencies outlining the services available and eligibility requirements. Present FHA

clients will be encouraged to cooperate in the program.

The County ASC Committees will cooperate with the governing bodies of the soil conservation districts by selecting and providing financial assistance for those ACPS practices which will accomplish the conservation objectives in the shortest possible time.

Structural Measures for Flood Prevention

The Soil Conservation Service will contract for the construction of the 58 floodwater retarding structures (13 others have been constructed prior to revision of this plan) and 6.4 miles of stream channel improvement. Technicians will be provided to plan, design, prepare specifications, supervise construction, prepare contract payment estimates, make final inspection, certify completion, and perform related duties for the installation of these structural measures.

The Collin County and the Upper Elm-Red Soil Conservation Districts will furnish the land easements and rights-of-way for all the structural measures at no cost to the Federal Government.

The following is a grouping of structures for construction purposes, each of which has a favorable benefit-cost ratio, based on those benefits that will accrue to each group:

Subwatershed Construction Units	No. of Sites	Annual Benefits (dollars)	Annual Cost (dollars)	Benefit- Cost Ratio (dollars)
1. Wilson Creek 1A, 1B, 1C, 1D, 1E, 2A, 2B, 3A, 3B, 3C, 3D, 4, 5A, 6A & 6B	15	61,021	36,145	1.69:1
2. Honey Creek 8A, 8B, 8C, 8D, 8E, 8F, 8G, 8H, & 9 through 17	17	55,912	36,085	1.55:1
3. Upper East Fork 18 through 23, 25 through 31 & 35 through 37	16	49,254	21,631	2.28:1
4. Whites Creek 38 through 41	4	18,989	8,178	2.32:1
5. Hurricane Creek 42 through 45	4	16,984	6,819	2.49:1
6. Throckmorton Creek 46 and 47	2	11,449	4,589	2.49:1
7. Clemons Creek 49 through 52	4	14,048	6,388	2.20:1
8. Tickey Creek 55 and 56	2	11,256	4,340	2.59:1
Total	64	238,913	124,175	1.92:1

Construction can be started on any one of these units as soon as local interests have obtained the necessary easements and rights-of-way for all structures in the groups and Federal funds are available. The channel improvement on Wilson Creek will not be constructed until all the floodwater retarding structures in Wilson Creek watershed are completed. Construction at sites 24, 32, 33, 34, 48, 53, and 54, not listed above, should be deferred until an appreciable degree of control has been attained from other program installations.

Table 1 indicates the planned schedule of operation for each phase of the project. The cooperating parties have agreed that this schedule should be followed to achieve the most efficient prosecution of the work. This schedule will be adjusted year-by-year on the basis of any significant changes in the plan found to be mutually desired and in light of current appropriations and accomplishments. The various features of cooperation between the cooperating parties have been covered in appropriate memoranda of understanding and working agreements.

PROVISIONS FOR OPERATION AND MAINTENANCE

Land Treatment Measures

Land treatment measures will be installed and maintained by the landowners or operators of the farms on which the measures are installed under agreements with the Collin County and the Upper Elm-Red Soil Conservation Districts. Representatives of the soil conservation districts will make periodic inspections of these measures to determine needs and encourage landowners and operators to perform maintenance. They will make district-owned equipment available for this purpose.

Structural Measures for Flood Prevention

The 71 floodwater retarding structures and 6.4 miles of improved channel will be maintained by the Collin County and the Upper Elm-Red Soil Conservation Districts and the East Fork Watershed Association.

All floodwater retarding structures will be inspected at least annually and after each heavy rain or streamflow. Items of inspection will include but not be limited to the conditions of the principal spillway and its appurtenances, the emergency spillway, the earth fill, the vegetative cover of the earth fill, and fences and gates installed as a part of the floodwater retarding structures. The sponsoring local organization will maintain a record of all maintenance inspections and work done.

Provisions will be made by the soil conservation districts for free access of the district and Federal representatives to inspect the works of improvement.

The estimated annual operation and maintenance cost is \$14,863, based on present construction costs. The necessary maintenance work will be accomplished through the use of resources of the Collin County and the Upper Elm-Red Soil Conservation Districts and the East Fork Watershed Association.

TABLE 1 - ESTIMATED INSTALLATION COST
(Based on 1955 Price Levels)
East Fork Above Lavon Watershed, Texas
(Trinity River Watershed)

For: Period 7/1/50 to 6/30/56

Items	Unit	No. Applied 7/1/50 to 6/30/56	Estimated Cost		Total (dollars)
			Federal (dollars)	Non- Federal (dollars)	
LAND TREATMENT					
Soil Conservation Service					
Land Treatment Measures					
Contour Farming	Acre	14,554	-	14,554	14,554
Cover Cropping	Acre	50,980	-	489,408	489,408
Rotation Hay and Pasture	Acre	8,590	-	77,310	77,310
Crop Residue Utilization	Acre	46,078	-	46,078	46,078
Proper Use Pasture	Acre	17,923	-	35,846	35,846
Rotation Grazing	Acre	26,938	-	-	-
Pasture Planting	Acre	16,982	-	297,185	297,185
Brush Control	Acre	1,516	-	90,960	90,960
Wild Life Area Improvement	Acre	2,107	-	-	-
Terracing	Mile	1,159	-	144,875	144,875
Diversion Construction	Mile	7.7	-	1,925	1,925
Waterway Development	Acre	784	-	44,751	44,751
Pond Construction	No.	239	-	46,005	46,005
Drop Inlets and Drop Structures	No.	18	-	17,280	17,280
Sod Flumes	No.	55	-	4,538	4,538
Technical Assistance (Accl.)			41,000	-	41,000
SCS Subtotal			41,000	1,310,715	1,351,715
TOTAL LAND TREATMENT			41,000	1,310,715	1,351,715
STRUCTURAL MEASURES					
Soil Conservation Service					
Waterflow Control		8C,8F,8G,8H,			
Floodwater Retarding Structures	Nos.	9,10,11,12,13, 14,15,16,& 24	570,414	-	570,414
Channel Improvement	Mi.	-	-	-	-
TOTAL FLOOD PREVENTION			570,414	-	570,414
TOTAL CONSTRUCTION COSTS			570,414	-	570,414
TOTAL INSTALLATION SERVICES			171,126	-	171,126
TOTAL OTHER COST			-	43,715	43,715
TOTAL STRUCTURAL MEASURES			741,540	43,715	785,255
Work Plan Preparation Cost			48,300	-	48,300
GRAND TOTAL			830,840	1,354,430	2,185,270
SUMMARY					
Total SCS			830,840	1,354,430	2,185,270
TOTAL			830,840	1,354,430	2,185,270

Date: August, 1956

TABLE 1 - ESTIMATED INSTALLATION COST
 (Based on 1955 Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

For: Fiscal Year 1957

Items	Unit	Number to be Applied	Estimated Cost		Total (dollars)
			Federal (dollars)	Non- Federal (dollars)	
LAND TREATMENT					
Soil Conservation Service					
Land Treatment Measures					
Contour Farming	Acre	2,100	-	2,100	2,100
Cover Cropping	Acre	10,000	-	108,000	108,000
Rotation Hay and Pasture	Acre	800	-	6,688	6,688
Crop Residue Utilization	Acre	5,000	-	5,000	5,000
Proper Use Pasture	Acre	2,500	-	5,000	5,000
Rotation Grazing	Acre	3,500	-	-	-
Pasture Planting	Acre	2,200	-	41,250	41,250
Brush Control	Acre	140	-	8,400	8,400
Wild Life Area Improvement	Acre	200	-	-	-
Terracing	Mile	105	-	11,550	11,550
Diversion Construction	Mile	4	-	880	880
Waterway Development	Acre	220	-	12,100	12,100
Pond Construction	No.	40	-	7,700	7,700
Drop Inlets and Drop Structures	No.	8	-	7,680	7,680
Sod Flumes	No.	25	-	2,062	2,062
Technical Assistance (Accl).			9,000	-	9,000
SCS Subtotal			9,000	218,410	227,410
TOTAL LAND TREATMENT			9,000	218,410	227,410
STRUCTURAL MEASURES					
Soil Conservation Service					
Waterflow Control					
Floodwater Retarding Structures	Nos.	1A,1B,2A,3A, 8A,8B,8D,& 8E	287,898	-	287,898
Channel Improvement	Mile		-	-	-
TOTAL FLOOD PREVENTION			287,898	-	287,898
TOTAL CONSTRUCTION COSTS			287,898	-	287,898
TOTAL INSTALLATION SERVICES			86,370	-	86,370
TOTAL OTHER COST			-	30,456	30,456
TOTAL STRUCTURAL MEASURES			374,268	30,456	404,724
Work Plan Preparation Cost			-	-	-
GRAND TOTAL			383,268	248,866	632,134
SUMMARY					
Total SCS			383,268	248,866	632,134
TOTAL			383,268	248,866	632,134

Date: August, 1956

TABLE 1 - ESTIMATED INSTALLATION COSTS
 (Based on 1955 Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

For: Fiscal Year 1958

Items	Unit	Number to be Applied	Estimated Cost		Total (dollars)
			Federal (dollars)	Non- Federal (dollars)	
LAND TREATMENT					
Soil Conservation Service					
Land Treatment Measures					
Contour Farming	Acre	2,600	-	2,600	2,600
Cover Cropping	Acre	12,500	-	135,000	135,000
Rotation Hay and Pasture	Acre	900	-	7,524	7,524
Crop Residue Utilization	Acre	6,000	-	6,000	6,000
Proper Use Pasture	Acre	2,800	-	5,600	5,600
Rotation Grazing	Acre	3,800	-	-	-
Pasture Planting	Acre	2,450	-	45,938	45,938
Brush Control	Acre	200	-	12,000	12,000
Wild Life Area Improvement	Acre	200	-	-	-
Terracing	Mile	130	-	14,300	14,300
Diversion Construction	Mile	6.5	-	1,430	1,430
Waterway Development	Acre	240	-	13,200	13,200
Pond Construction	No.	45	-	8,662	8,662
Drop Inlets and Drop Structures	No.	11	-	10,560	10,560
Sod Flumes	No.	30	-	2,475	2,475
Technical Assistance (Accl.)			9,000	-	9,000
SCS Subtotal			9,000	265,289	274,289
TOTAL LAND TREATMENT			9,000	265,289	274,289
STRUCTURAL MEASURES					
Soil Conservation Service					
Waterflow Control		2B, 3B, 3C, 3D,			
Floodwater Retarding Structures	Nos.	4, 42, 43, 44, & 45	332,951	-	332,951
Channel Improvement	Mile		-	-	-
TOTAL FLOOD PREVENTION			332,951	-	332,951
TOTAL CONSTRUCTION COSTS			332,951	-	332,951
TOTAL INSTALLATION SERVICES			99,886	-	99,886
TOTAL OTHER COST				38,753	38,753
TOTAL STRUCTURAL MEASURES			432,837	38,753	471,590
Work Plan Preparation Cost					
GRAND TOTAL			441,837	304,042	745,879
SUMMARY					
Total SCS			441,837	304,042	745,879
TOTAL			441,837	304,042	745,879

Date: August, 1956

TABLE 1 - ESTIMATED INSTALLATION COSTS
 (Based on 1955 Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

For: Fiscal Year 1959

Items	Unit	Number to be Applied	Estimated Cost		Total
			Federal (dollars)	Non- Federal (dollars)	
LAND TREATMENT					
Soil Conservation Service					
Land Treatment Measures					
Contour Farming	Acre	3,000	-	3,000	3,000
Cover Cropping	Acre	12,000	-	129,600	129,600
Rotation Hay and Pasture	Acre	1,000	-	8,360	8,360
Crop Residue Utilization	Acre	6,500	-	6,500	6,500
Proper Use Pasture	Acre	3,500	-	7,000	7,000
Rotation Grazing	Acre	4,500	-	-	-
Pasture Planting	Acre	2,700	-	50,625	50,625
Brush Control	Acre	230	-	13,800	13,800
Wild Life Area Improvement	Acre	300	-	-	-
Terracing	Mile	150	-	16,500	16,500
Diversion Construction	Mile	7	-	1,540	1,540
Waterway Development	Acre	260	-	14,300	14,300
Pond Construction	No.	50	-	9,625	9,625
Drop Inlets and Drop Structures	No.	14	-	13,440	13,440
Sod Flumes	No.	40	-	3,300	3,300
Technical Assistance (Accl).	No.		9,000	-	9,000
SCS Subtotal			9,000	277,590	286,590
TOTAL LAND TREATMENT			9,000	277,590	286,590
STRUCTURAL MEASURES					
Soil Conservation Service					
Waterflow Control		5A, 6A, 6B, 25,			
Floodwater Retarding Structures	Nos.	26, 27, 38, 39, 40, & 41	388,175	-	388,175
Channel Improvement	Mile		-	-	-
TOTAL FLOOD PREVENTION			388,175	-	388,175
TOTAL CONSTRUCTION COSTS			388,175	-	388,175
TOTAL INSTALLATION SERVICES			116,452	-	116,452
TOTAL OTHER COST			-	53,866	53,866
TOTAL STRUCTURAL MEASURES			504,627	53,866	558,493
Work Plan Preparation Cost			-	-	-
GRAND TOTAL			513,627	331,456	845,083
SUMMARY					
Total SCS			513,627	331,456	845,083
TOTAL			513,627	331,456	845,083

Date: August, 1956

TABLE 1 - ESTIMATED INSTALLATION COSTS
 (Based on 1955 Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

For: Remaining to be Done

Items	Unit	Number to be Applied	Estimated Cost		Total
			Federal (dollars)	Non- Federal (dollars)	
LAND TREATMENT					
Soil Conservation Service					
Land Treatment Measures					
Contour Farming	Acre	50,930	-	50,930	50,930
Cover Cropping	Acre	7,897	-	85,288	85,288
Rotation Hay and Pasture	Acre	3,076	-	25,715	25,715
Crop Residue Utilization	Acre	4,805	-	4,805	4,805
Proper Use Pasture	Acre	43,086	-	86,172	86,172
Rotation Grazing	Acre	29,346	-	-	-
Pasture Planting	Acre	27,388	-	513,528	513,525
Brush Control	Acre	1,580	-	94,800	94,800
Wild Life Area Improvement	Acre	4,003	-	-	-
Terracing	Mile	1,519	-	167,090	167,090
Diversion Construction	Mile	70.8	-	15,576	15,576
Waterway Development	Acre	2,482	-	136,510	136,510
Pond Construction	No.	1,042	-	200,585	200,585
Drop Inlets and Drop Structures	No.	261	-	250,560	250,560
Sod Flumes	No.	546	-	45,045	45,045
Technical Assistance (Accl).			45,535	-	45,535
SCS Subtotal			45,535	1,676,601	1,722,136
TOTAL LAND TREATMENT			45,535	1,676,601	1,722,136
STRUCTURAL MEASURES					
Soil Conservation Service					
Waterflow Control		1E, 1D, 1C, 17			
Floodwater Retarding Structures	Nos.	thru 23, 28 thru 37, 46 thru 56	892,354	-	892,354
Channel Improvement	Mi.	6.4	191,299	-	191,299
TOTAL FLOOD PREVENTION			1,083,653	-	1,083,653
TOTAL CONSTRUCTION COSTS			1,083,653	-	1,083,653
TOTAL INSTALLATION SERVICES			325,094	-	325,094
TOTAL OTHER COST				158,021	158,021
TOTAL STRUCTURAL MEASURES			1,408,747	158,021	1,566,768
Work Plan Preparation Cost			-	-	-
GRAND TOTAL			1,454,282	1,834,622	3,288,904
SUMMARY					
Total SCS			1,454,282	1,834,622	3,288,904
TOTAL			1,454,282	1,834,622	3,288,904

Date: August, 1956

TABLE 1 - ESTIMATED INSTALLATION COST
(Based on 1955 Price Levels)
East Fork Above Lavon Watershed, Texas
(Trinity River Watershed)

For: Total Project

Items	Unit	Number to be Applied	Estimated Cost		Total
			Federal (dollars)	Non- Federal (dollars)	
LAND TREATMENT					
Soil Conservation Service					
Land Treatment Measures					
Contour Farming	Acre	73,184	-	73,184	73,184
Cover Cropping	Acre	93,377	-	947,296	947,296
Rotation Hay and Pasture	Acre	14,366	-	125,597	125,597
Crop Residue Utilization	Acre	68,383	-	68,383	68,383
Proper Use Pasture	Acre	69,809	-	139,618	139,618
Rotation Grazing	Acre	69,084	-	-	-
Pasture Planting	Acre	51,720	-	948,523	948,523
Brush Control	Acre	3,666	-	219,960	219,960
Wild Life Area Improvement	Acre	6,810	-	-	-
Terracing	Mile	3,063	-	354,315	354,315
Diversion Construction	Mile	96	-	21,351	21,351
Waterway Development	Acre	3,986	-	220,861	220,861
Pond Construction	No.	1,416	-	272,577	272,577
Drop Inlets and Drop Structures	No.	312	-	299,520	299,520
Sod Flumes	No.	696	-	57,420	57,420
Technical Assistance (Accl.)			113,535	-	113,535
SCS Subtotal			113,535	3,748,605	3,862,140
TOTAL LAND TREATMENT			113,535	3,748,605	3,862,140
STRUCTURAL MEASURES					
Soil Conservation Service					
Waterflow Control					
Floodwater Retarding Structures	Each	71	2,471,792	-	2,471,792
Channel Improvement	Mile	6.4	191,299	-	191,299
TOTAL FLOOD PREVENTION			2,663,091	-	2,663,091
TOTAL CONSTRUCTION COSTS			2,663,091	-	2,663,091
TOTAL INSTALLATION SERVICES			798,928	-	798,928
TOTAL OTHER COST			-	324,811	324,811
TOTAL STRUCTURAL MEASURES			3,462,019	324,811	3,786,830
Work Plan Preparation Cost		2/	48,300	-	48,300
GRAND TOTAL			3,623,854	4,073,416	7,697,270
SUMMARY					
Total SCS			3,623,854	4,073,416	7,697,270
TOTAL			3,623,854	4,073,416	7,697,270

1/ Estimated \$1,427,324 reimbursement to local interests by ACPS not included.

2/ Includes \$29,000 cost of preparation of original plan.

Date: August, 1956

TABLE 2
 STATUS OF FLOOD PREVENTION JOB PRIOR TO FIRST YEAR OF WORK PLAN
 (Based on 1955 Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Measure	: Unit :	: Number :	: Federal : : Cost :	: Non-Federal : : Construc- : : tion <u>2/</u> :	: Total : : Cost :
			: <u>1/</u> :	: (dollars) :	: (dollars) :
LAND TREATMENT MEASURES					
Contour Farming	Acre	4,546			
Cover Cropping	Acre	16,928			
Rotation Hay and Pasture	Acre	400			
Crop Residue Utilization	Acre	23,890			
Proper Use Pasture	Acre	553			
Rotation Grazing	Acre	0			
Pasture Planting	Acre	4,039			
Brush Control	Acre	563			
Wild Life Area Improvement	Acre	2,000			
Terracing	Mile	711			
Diversion Construction	Mile	12			
Waterway Development	Acre	332			
Pond Construction	No.	133			
Drop Inlet and Drop Structures	No.	0			
Sod Flumes	No.	0			
Technical Assistance (Accl.)	-	-			
Subtotal			11,200	436,541	447,741
STRUCTURAL MEASURES					
Floodwater Retarding Structures	Each	-	-	-	-
Subtotal			-	-	-
Total			11,200	436,541	447,741

1/ Flood Prevention Funds, including acceleration funds.

2/ Excluding an estimated \$161,642 from other Federal funds (ACPS) by which private interests were reimbursed.

Date: August, 1956

TABLE 3 - ANNUAL COSTS
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	AMORTIZATION OF INSTALLATION :		OPERATION AND MAINTENANCE :		Total
	COSTS 1/ (dollars)	Non- Federal :	COSTS 2/ (dollars)	Non- Federal :	
	Federal :	Total :	Federal :	Total :	
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
STRUCTURAL MEASURES FOR FLOOD PREVENTION					
Waterflow Control					
Floodwater Retarding Structures					
IE and ID					
1C	5,825	753	6,578	232	6,810
1B	1,692	153	1,845	77	1,922
1A	2,427	141	2,568	116	2,684
2A	563	75	638	77	715
2B	3,145	308	3,453	116	3,569
3A	1,216	102	1,318	77	1,395
3B	928	72	1,000	77	1,077
4	2,855	189	3,044	116	3,160
3C	2,862	217	3,079	116	3,195
3D	1,662	102	1,764	77	1,841
5A	1,300	87	1,387	77	1,464
6B	1,695	107	1,802	77	1,879
6A	3,850	226	4,076	154	4,230
8A	1,926	161	2,087	116	2,203
8B	1,668	299	1,967	77	2,044
8C	1,645	180	1,825	77	1,902
8D	1,226	202	1,428	77	1,505
8E	1,150	177	1,327	77	1,404
8F	1,671	165	1,836	77	1,913
8G	1,592	112	1,704	77	1,781
8H	3,686	354	4,040	116	4,156
9	1,514	176	1,690	77	1,767
10	1,892	109	2,001	77	2,078
11	1,975	98	2,073	77	2,150
	3,115	207	3,322	116	3,438

TABLE 3 - ANNUAL COSTS - Continued
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	AMORTIZATION OF INSTALLATION :		OPERATION AND MAINTENANCE :		Total
	Federal :	Non- Federal :	Federal :	Non- Federal :	
	COSTS 1/ (dollars)		COSTS 2/ (dollars)		(dollars)
STRUCTURAL MEASURES FOR FLOOD PREVENTION					
Waterflow Control					
Floodwater Retarding Structures					
12	2,272	122	2,394	77	2,471
13	2,219	91	2,310	77	2,387
14	1,396	88	1,484	77	1,561
15	1,999	149	2,148	116	2,264
16	1,822	168	1,990	77	2,067
17	989	131	1,120	77	1,197
18, 19, 20, 21, 22 and 23	6,677	1,697	8,374	501	8,875
24	1,439	160	1,599	77	1,676
25 and 26	2,583	633	3,216	154	3,370
27	1,133	154	1,287	77	1,364
28	781	133	914	77	991
29	1,084	167	1,251	77	1,328
30	958	147	1,105	77	1,182
31	1,296	107	1,403	77	1,480
32	1,844	146	1,990	116	2,106
33	933	224	1,157	77	1,234
34	1,622	124	1,746	77	1,823
35	958	159	1,117	77	1,194
36	550	73	623	77	700
37	951	119	1,070	77	1,147
38	825	118	943	77	1,020
39, 40 and 41	5,780	1,108	6,888	270	7,158
42 and 43	3,272	904	4,176	193	4,369
44	746	80	826	77	903
45	1,348	122	1,470	77	1,547

TABLE 3 - ANNUAL COSTS - Continued
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	AMORTIZATION OF INSTALLATION:		OPERATION AND MAINTENANCE:		Total
	COST 1/ (dollars)	Non- Federal	COSTS 2/ (dollars)	Non- Federal	
	Federal	Total	Federal	Total	(dollars)
STRUCTURAL MEASURES FOR FLOOD PREVENTION					
Waterflow Control					
Floodwater Retarding Structures					
46	2,231	376	2,607	116	2,723
47	1,504	285	1,789	77	1,866
48	932	106	1,038	77	1,115
49 and 50	2,696	671	3,367	193	3,560
51	1,011	137	1,148	77	1,225
52	1,380	146	1,526	77	1,603
53	1,311	139	1,450	77	1,527
54	590	91	681	77	758
55	1,703	777	2,480	77	2,557
56	1,386	320	1,706	77	1,783
Stream Channel Improvement	8,769	177	8,946	8,695	17,641
Subtotal	122,071	15,120	137,191	14,863	152,054
TOTAL STRUCTURAL MEASURES FOR FLOOD PREVENTION					
GRAND TOTAL	122,071	15,120	137,191	14,863	152,054

1/ Based on 1955 price levels

2/ Based on long-term price levels (BAE 1951 price projection)

Date: August, 1956

TABLE 4 - SUMMARY OF BENEFITS
 (Based on Long-Term Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Item	Estimated Average :		Estimated Average :		Benefits From Structural Measures (dollars)
	Estimated Average Annual Damage Without Project (dollars)	Without Structural Measures (dollars)	Estimated Average Annual Damage With Project (dollars)	Annual Damage With Project (dollars)	
Floodwater	403,453	280,875	116,161	164,714	
Sediment	11,320	5,214	1,556	3,658	
Erosion	3,983	2,789	1,127	1,662	
Indirect	41,876	28,887	11,884	17,003	
Subtotal	460,632	317,765	130,728	187,037	
Benefit from Changed Use of Land	xxxx	xxxx	xxxx	103,748	
Benefit from Reduction of Sediment Deposition in Lavon Reservoir	xxxx	xxxx	xxxx	9,277	
TOTAL FLOOD PREVENTION BENEFITS	xxxx	xxxx	xxxx	300,062	

Date: August, 1956

TABLE 5 - BENEFIT-COST ANALYSIS
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	AVERAGE ANNUAL BENEFITS 1/										Average:Benefit-			
	Flood- water :	Sediment :	Erosion :	Indirect :	Change of Land :	Use :	Project :	Outside Area :	Total :	Cost :	Ratio	Annual :	Cost :	Ratio
	(dollars)										(dollars) (dollars) (dollars)			
1E and 1D	6,725	272	75	707	6,330	416	14,525	416	6,810	2.13:1	6,810	2.13:1	6,810	2.13:1
1C	1,728	70	20	182	1,627	107	3,734	107	1,922	1.94:1	1,922	1.94:1	1,922	1.94:1
1B	1,482	60	17	156	1,395	92	3,202	92	2,684	1.19:1	2,684	1.19:1	2,684	1.19:1
1A	861	35	10	90	810	53	1,859	53	715	2.60:1	715	2.60:1	715	2.60:1
2A	4,585	184	52	482	4,316	282	9,901	282	3,569	2.77:1	3,569	2.77:1	3,569	2.77:1
2B	738	30	8	78	694	46	1,594	46	1,395	1.14:1	1,395	1.14:1	1,395	1.14:1
3A	579	23	7	61	545	36	1,251	36	1,078	1.16:1	1,078	1.16:1	1,078	1.16:1
3B	1,902	77	21	200	1,790	117	4,107	117	3,160	1.30:1	3,160	1.30:1	3,160	1.30:1
4	2,683	108	30	282	2,525	166	5,794	166	3,195	1.81:1	3,195	1.81:1	3,195	1.81:1
3C	962	39	11	101	905	59	2,077	59	1,841	1.13:1	1,841	1.13:1	1,841	1.13:1
3D	730	29	8	77	687	45	1,576	45	1,464	1.08:1	1,464	1.08:1	1,464	1.08:1
5A	1,381	56	16	145	1,300	85	2,983	85	1,879	1.59:1	1,879	1.59:1	1,879	1.59:1
6B	2,480	100	28	261	2,335	153	5,357	153	4,230	1.27:1	4,230	1.27:1	4,230	1.27:1
6A	1,417	57	16	149	1,334	88	3,061	88	2,203	1.39:1	2,203	1.39:1	2,203	1.39:1
8A	3,756	71	32	386	1,802	254	6,301	254	2,044	3.08:1	2,044	3.08:1	2,044	3.08:1
8B	3,320	63	28	341	1,593	225	5,570	225	1,902	2.93:1	1,902	2.93:1	1,902	2.93:1
8C	2,126	40	18	218	1,020	144	3,566	144	1,505	2.37:1	1,505	2.37:1	1,505	2.37:1
8D	1,610	30	14	165	772	109	2,700	109	1,404	1.92:1	1,404	1.92:1	1,404	1.92:1
8E	1,954	37	16	201	938	132	3,278	132	1,913	1.71:1	1,913	1.71:1	1,913	1.71:1
8F	1,508	29	13	155	724	102	2,531	102	1,781	1.42:1	1,781	1.42:1	1,781	1.42:1
8G	4,009	76	34	412	1,924	271	6,726	271	4,156	1.62:1	4,156	1.62:1	4,156	1.62:1
8H	2,085	40	18	214	1,001	141	3,499	141	1,767	1.98:1	1,767	1.98:1	1,767	1.98:1
9	1,356	26	11	139	651	92	2,275	92	2,078	1.09:1	2,078	1.09:1	2,078	1.09:1
10	1,397	26	12	144	670	95	2,344	95	2,150	1.09:1	2,150	1.09:1	2,150	1.09:1
11	2,298	44	19	236	1,103	156	3,856	156	3,438	1.12:1	3,438	1.12:1	3,438	1.12:1

STRUCTURAL MEASURES FOR FLOOD PREVENTION

Waterflow Control

Floodwater Retarding Structures

TABLE 5 - BENEFIT-COST ANALYSIS - Continued
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	AVERAGE ANNUAL BENEFITS										Average: Benefit-		
	Flood- water	Sediment	Erosion	Indirect	Use	Change of Land	Outside Project	Total	Annual Cost	Cost Ratio	Annual Cost	Cost Ratio	
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	
12	1,458	28	12	150	700	99	2,447	2,471	0.99:1				
13	850	16	7	87	408	58	1,426	2,387	0.60:1				
14	1,103	21	9	113	530	75	1,851	1,561	1.19:1				
15	1,316	25	11	135	632	89	2,208	2,264	0.98:1				
16	1,397	26	12	144	670	95	2,344	2,067	1.13:1				
17	1,782	34	15	183	855	121	2,990	1,197	2.50:1				
18, 19, 20, 21, 22, and 23	16,359	312	138	1,680	7,851	1,108	27,448	8,875	3.09:1				
24	1,407	27	12	145	675	95	2,361	1,676	1.41:1				
25 and 26	5,304	101	45	544	2,545	359	8,898	3,370	2.64:1				
27	1,174	22	10	121	564	79	1,970	1,364	1.44:1				
28	911	17	8	94	437	62	1,529	991	1.54:1				
29	1,316	25	11	135	632	89	2,208	1,328	1.66:1				
30	941	18	8	97	452	64	1,580	1,182	1.34:1				
31	982	19	8	101	471	66	1,647	1,480	1.11:1				
32	1,296	25	11	133	622	88	2,175	2,106	1.03:1				
33	1,296	25	11	133	622	88	2,175	1,234	1.76:1				
34	1,114	21	9	114	534	75	1,867	1,823	1.02:1				
35	1,114	21	9	114	534	75	1,867	1,194	1.56:1				
36	435	8	4	45	209	29	730	700	1.04:1				
37	820	16	7	84	394	56	1,377	1,147	1.20:1				
38	668	13	6	69	321	45	1,122	1,020	1.10:1				
39, 40, and 41	10,649	202	90	1,094	5,111	721	17,867	7,158	2.50:1				
42 and 43	8,533	163	72	877	4,095	578	14,318	4,369	3.28:1				
44	628	12	5	64	301	42	1,052	903	1.16:1				
45	962	18	8	99	462	65	1,614	1,547	1.04:1				

STRUCTURAL MEASURES FOR FLOOD PREVENTION

Waterflow Control

Floodwater Retarding Structures

TABLE 5 - BENEFIT-COST ANALYSIS - Continued
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	AVERAGE ANNUAL BENEFITS						AVERAGE ANNUAL BENEFITS			Average:Benefit-		
	Flood- water	Sediment	Erosion	Indirect	Change of Land	Outside Project	Total	Area	Use	Cost	Cost	Ratio
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
STRUCTURAL MEASURES FOR FLOOD PREVENTION												
Waterflow Control												
Floodwater Retarding Structures												
46	3,422	65	29	352	1,642	232	5,742	2,723	2.11:1			
47	3,401	65	29	350	1,632	230	5,707	1,866	3.06:1			
48	931	18	8	96	447	63	1,563	1,115	1.40:1			
49 and 50	5,942	113	50	611	2,851	402	9,969	3,560	2.80:1			
51	1,033	20	9	106	496	70	1,734	1,225	1.42:1			
52	1,397	27	12	144	670	95	2,345	1,603	1.46:1			
53	1,245	24	10	128	598	84	2,089	1,527	1.37:1			
54	678	13	6	70	326	46	1,139	758	1.50:1			
55	3,308	90	65	347	3,716	184	7,710	2,557	3.02:1			
56	1,522	41	30	159	1,710	84	3,546	1,783	1.99:1			
Stream Channel Improvement												
(Wilson Creek)												
Subtotal	24,348	345	342	2,503	20,242	-	47,780	17,641	2.71:1			
TOTAL STRUCTURAL MEASURES FOR FLOOD PREVENTION												
Subtotal	164,714	3,658	1,662	17,003	103,748	9,277	300,062	152,054	1.97:1			
GRAND TOTAL												
Subtotal	164,714	3,658	1,662	17,003	103,748	9,277	300,062	152,054	1.97:1			

1/ Based on long-term price levels (BAE 1951 price projections)

2/ 1955 level installation costs, amortized for 50-year period; long-term price levels.

(BAE 1951 price projections) for annual operation and maintenance costs.

3/ Structures 8C, 8F, 8G, 8H, 9, 10, 11, 12, 13, 14, 15, 16, and 24 are already constructed and were justified with benefit-cost ratios calculated on the basis of price levels, project-life periods and other criteria different than those used herein.

TABLE 6 - STRUCTURE DATA
 Preliminary Estimates for Floodwater Retarding Structures
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Site No.	Drain- age Area : sq. ml.	STORAGE								SURFACE AREA			FLOOD PLAIN AREA				PRINCIPAL SPILLWAY	
		Sediment			Bear- erve: Riser	Reserve: Above Riser	Det. Fool	Total Stor.	Total Det.	Total Stor.	Top of Riser	Top of Pool	Ht. of Oam	Below Top of Riser	Under of Pool	Total Det.	Volume of Fill	Max. Disch. Cap.
		Sed.	Below	Above														
18	5.68	200	258	57	1,574	2,089	1.70	5.20	6.90	38	196	33	0	0	0	192,992	28	
1D	1/ 3.62	200	177	47	1,003	1,427	2.20	5.20	7.40	48	154	21	0	0	0	137,088	47	
1C	2.39	170	0	21	662	853	1.50	5.20	6.70	24	74	31	0	0	0	95,865	12	
1B	2.05	156	0	19	568	743	1.60	5.20	6.80	24	67	32	0	0	0	137,521	10	
1A	1.19	79	0	10	331	420	1.40	5.20	6.60	15	38	19	1	0	1	31,880	6	
2A	6.34	200	288	60	1,816	2,364	1.60	5.30	6.90	22	160	38	0	0	0	178,238	32	
2B	1.02	92	0	11	282	385	1.90	5.20	7.10	14	34	33	0	0	0	68,900	9	
3A	0.80	87	0	11	222	320	2.30	5.20	7.50	15	36	34	0	0	0	52,614	9	
3B	2.63	200	112	39	730	1,081	2.50	5.20	7.70	29	93	40	0	0	0	161,785	13	
4	3.71	200	47	31	1,028	1,306	1.40	5.20	6.60	35	110	34	4	2	6	162,175	19	
3C	1.33	120	0	15	368	503	1.90	5.20	7.10	21	50	32	5	3	8	94,179	9	
3D	1.01	91	0	11	279	381	1.90	5.20	7.10	17	40	28	3	4	10	96,072	10	
5A	1.91	154	0	19	529	702	1.70	5.20	6.90	23	52	37	6	4	10	218,137	17	
6B	3.43	200	61	32	951	1,244	1.60	5.20	6.80	25	96	37	0	0	0	109,128	10	
6A	1.96	120	0	15	651	786	1.30	6.10	7.40	17	63	38	0	0	0	94,508	19	
8A	3.71	200	14	24	1,040	1,278	1.20	5.25	6.45	49	119	31	0	0	0	93,185	16	
8B	3.28	200	20	25	917	1,162	1.40	5.25	6.65	42	64	32	0	0	0	69,457	10	
2/ 8C	2.10	171	0	19	588	778	1.70	5.25	6.95	36	69	29	0	0	0	65,163	9	
8D	1.59	168	0	19	445	632	2.20	5.25	7.45	32	68	33	0	0	0	94,676	10	
8E	1.93	176	0	20	541	737	1.90	5.25	7.15	28	75	32	0	0	0	82,623	10	
2/ 8P	1.49	108	0	0	403	511	1.40	5.30	6.70	19	52	31	0	0	0	111,361	23	
2/ 8G	3.96	200	20	0	1,108	1,328	1.04	5.25	6.29	40	125	30	0	0	0	85,814	10	
2/ 8H	2.06	200	8	0	546	754	1.90	5.25	7.15	30	77	33	0	0	0	84,654	12	
2/ 9	1.34	150	0	0	412	562	2.10	5.79	7.89	17	46	38	0	0	0	89,490	13	
2/ 10	1.38	158	0	0	392	550	2.16	5.34	7.50	15	44	34	0	0	0	138,327	12	
2/ 11	2.27	200	17	0	703	920	1.79	5.80	7.59	36	72	38	5	0	5	93,565	14	
2/ 12	1.44	185	0	0	397	582	2.40	5.17	7.57	19	50	33	0	0	0	95,375	11	
2/ 13	0.84	123	0	0	258	381	2.75	5.78	8.53	15	33	30	0	0	0	59,479	19	
2/ 14	1.09	109	0	0	294	403	1.87	5.04	6.91	14	36	32	0	0	0	101,755	16	
2/ 15	1.30	200	9	0	429	638	3.01	6.19	9.20	23	49	35	0	0	0	78,763	13	
2/ 16	1.38	200	26	0	465	691	3.08	6.35	9.43	29	56	33	0	0	0	56,064	9	
17	1.76	193	0	22	629	844	1.90	5.30	7.20	21	57	32	0	0	0	70,879	13	
18	2.59	200	6	23	415	644	1.66	3.00	4.66	33	74	29	0	0	0	43,426	21	
19	1/1.53	120	0	13	425	558	1.63	5.20	6.83	26	64	30	4	2	6	62,705	10	
20	1.23	186	0	21	340	547	3.18	5.20	8.38	23	53	37	0	0	0	39,457	9	
21	0.50	52	0	6	139	197	2.18	5.20	7.38	8	22	30	0	0	0	51,341	8	
22	0.46	47	0	5	124	176	2.20	5.20	7.40	8	21	28	0	0	0	110,526	81	
23	1/9.85	200	391	66	2,732	3,389	1.25	5.20	6.45	44	277	35	0	0	0	81,538	7	
2/ 24	1.39	141	0	0	424	565	1.90	5.73	7.63	14	53	32	5	3	8	70,852	12	
25	2.37	200	61	29	658	948	2.30	5.20	7.50	32	97	32	0	0	0	75,556	26	
26	1/2.87	200	25	25	796	1,046	1.63	5.20	6.83	23	97	30	0	0	0	64,201	9	
27	1.16	111	0	12	321	444	2.00	5.20	7.20	20	44	29	0	0	0	44,243	9	
28	0.90	86	0	10	250	346	2.00	5.20	7.20	15	40	31	0	0	0	61,429	9	
29	1.30	112	0	13	361	486	1.80	5.20	7.00	19	52	32	0	0	0	54,258	8	
30	0.93	98	0	11	256	365	2.20	5.20	7.40	18	41	28	0	0	0	73,427	9	
31	0.97	93	0	10	268	371	2.00	5.20	7.20	13	32	33	0	0	0	104,518	9	
32	1.28	148	0	17	354	519	2.43	5.20	7.63	19	42	34	0	0	0	52,858	9	
33	1.28	182	0	20	355	557	2.95	5.20	8.15	27	54	31	0	0	0	91,918	10	
34	1.10	127	0	14	306	447	2.40	5.20	7.60	16	36	38	0	0	0	54,300	8	
35	1.10	98	0	11	306	415	1.86	5.20	7.06	20	47	28	3	1	4	31,192	8	
36	0.43	45	0	5	120	170	2.18	5.20	7.38	10	21	28	0	0	0	53,904	9	
37	0.81	93	0	10	224	327	2.40	5.20	7.60	16	34	30	0	0	0	46,749	8	
38	0.66	76	0	9	182	267	2.43	5.20	7.63	15	35	28	0	0	0	202,439	31	
39	6.28	200	403	67	1,741	2,411	2.00	5.20	7.20	33	165	44	0	0	0	61,742	9	
40	1.05	90	0	10	291	391	1.78	5.20	6.98	11	36	34	0	0	0	63,371	53	
41	1/3.19	200	129	37	885	1,251	2.15	5.20	7.35	37	121	34	10	5	15	129,579	30	
42	6.05	200	319	58	1,677	2,254	1.79	5.20	6.99	29	165	38	0	0	0	55,813	42	
43	1/2.38	200	11	23	660	894	1.84	5.20	7.04	34	97	34	4	2	6	42,286	9	
44	0.62	80	0	8	172	260	2.68	5.20	7.88	10	23	30	0	0	0	76,402	9	
45	0.95	106	0	12	263	381	2.33	5.20	7.53	15	37	32	0	0	0	126,430	17	
46	3.38	200	44	27	938	1,209	1.50	5.20	6.70	33	100	38	0	0	0	85,205	17	
47	3.36	200	42	27	933	1,202	1.50	5.20	6.70	26	89	38	0	0	0	52,081	8	
48	0.92	88	0	10	255	353	2.00	5.20	7.20	13	31	27	0	0	0	100,617	17	
49	3.43	200	7	23	952	1,182	1.26	5.20	6.46	34	120	33	0	0	0	52,121	29	
50	1/2.44	178	0	20	677	875	1.52	5.20	6.72	33	94	27	0	0	0	57,307	8	
51	1.02	86	0	10	282	378	1.78	5.20	6.98	16	40	26	4	2	6	78,194	9	
52	1.38	119	0	13	381	513	1.80	5.20	7.00	17	44	33	0	0	0	74,301	9	
53	1.23	130	0	15	342	487	2.20	5.20	7.40	15	43	31	0	0	0	33,439	9	
54	0.67	64	0	7	185	256	2.00	5.20	7.20	10	27	30	0	0	0	96,481	25	
55	4.96	200	228	48	1,376	1,852	1.80	5.20	7.00	40	235	30	0	0	0	78,522	11	
56	2.28	200	8	23	633	864	1.90	5.20	7.10	33	99	30	0	0	0			
Total	152.29	10,566	2,731	1,295	42,560	57,152				1,690	5,157	54	25	79	6,110,129			

1/ Excluding the area from which runoff is controlled by other floodwater retarding structures in series.

2/ Constructed prior to June 30, 1956.

NOTES: (1) Vegetative emergency spillways provided for all structures.
 (2) Moderate-hazard structures - 5A, 49, 50, 51, 52, 55 and 56; all others are low-hazard structures.

Date: August, 1956

TABLE 6A - STRUCTURE DATA
 Preliminary Estimate for Channel Improvement
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Location	Length (Miles)	Volume of Excavation (Cubic Yards)
Wilson Creek	6.4	695,631
Total	6.4	695,631

Date: August, 1956

TABLE 6B - STRUCTURE DATA
 Estimated Structure Cost Distribution
 (Based on 1955 Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	FEDERAL INSTALLATION COST				NON-FEDERAL INSTALLATION COST				Total Non- Federal Cost	Estimated Total Cost
	Contract (dollars)	Contin- gencies (dollars)	Installa- tion (dollars)	Adm. and Misc. (dollars)	Total Federal (dollars)	Easements: (Land Value) (dollars)	Legal Fees (dollars)	Removing Obstacles (dollars)		
1E	67,547	6,755	13,509	8,781	96,592	8,040	120	0	8,160	104,752
1D	47,981	4,798	9,596	6,238	68,613	7,893	120	0	8,013	76,626
1C	33,553	3,355	6,711	4,362	47,981	3,202	80	0	3,282	51,263
1B	48,132	4,813	9,626	6,257	68,828	2,971	60	0	3,031	71,859
1A	11,158	1,116	2,232	1,451	15,957	1,578	40	0	1,618	17,575
2A	62,383	6,238	12,477	8,110	89,208	6,480	140	0	6,620	95,828
2B	24,115	2,412	4,823	3,135	34,485	1,687	60	450	2,197	36,682
3A	18,415	1,842	3,683	2,394	26,334	1,521	40	0	1,561	27,895
3B	56,625	5,662	11,325	7,361	80,973	4,020	40	0	4,060	85,033
4	56,761	5,676	11,352	7,379	81,168	4,530	140	0	4,670	85,838
3C	32,963	3,296	6,593	4,285	47,137	2,136	60	0	2,196	49,333
3D	25,791	2,579	5,158	3,353	36,881	1,830	40	0	1,870	38,751
5A	33,625	3,362	6,725	4,371	48,083	2,250	60	0	2,310	50,393
6B	76,348	7,635	15,270	9,925	109,178	4,725	120	0	4,845	114,023
6A	38,195	3,819	7,639	4,965	54,618	2,981	120	350	3,451	58,069
8A	33,078	3,308	6,616	4,300	47,302	6,300	120	0	6,420	53,722
8B	32,615	3,261	6,523	4,240	46,639	3,710	160	0	3,870	50,509
8C	24,310	2,431	4,862	3,160	34,763	4,216	120	0	4,336	39,099
8D	22,807	2,281	4,561	2,965	32,614	3,732	60	0	3,792	36,406
8E	33,137	3,314	6,627	4,308	47,386	3,364	180	0	3,544	50,930
8F	31,573	3,157	6,315	4,104	45,149	2,308	100	0	2,408	47,557
8G	73,105	7,310	14,621	9,504	104,540	7,017	80	500	7,597	112,137
8H	30,035	3,003	6,007	3,905	42,950	3,673	100	0	3,773	46,723
9	37,515	3,752	7,503	4,877	53,647	2,219	120	0	2,339	55,986
10	39,173	3,917	7,835	5,092	56,017	2,025	80	0	2,105	58,122
11	61,770	6,177	12,354	8,030	88,331	4,340	100	0	4,440	92,771

FLOODWATER RETARDING
 STRUCTURES

TABLE 6B - STRUCTURE DATA
 Estimated Structure Cost Distribution
 (Based on 1955 Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	FEDERAL INSTALLATION COST					NON-FEDERAL INSTALLATION COST					Total Estimated Cost (dollars)	
	Contract	Installation	Administration	and	Total	Easements	Legal	Removing	Non-	Total		
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
12	4,506	9,013	5,858	64,440	2,565	60	0	2,625	67,065			
13	4,402	8,803	5,722	62,942	1,901	60	0	1,961	64,903			
14	2,769	5,538	3,600	39,597	1,853	40	0	1,893	41,490			
15	3,964	7,928	5,153	56,683	2,891	60	250	3,201	59,884			
16	3,613	7,227	4,697	51,671	3,587	20	0	3,607	55,278			
17	1,962	3,924	2,551	28,059	2,730	80	0	2,810	30,869			
18	2,481	4,962	3,225	35,476	5,500	60	325	5,885	41,361			
19	1,520	3,040	1,976	21,735	4,500	80	0	4,580	26,315			
20	2,195	4,389	2,853	31,384	3,850	60	0	3,910	35,294			
21	1,381	2,762	1,795	19,748	1,500	40	0	1,540	21,288			
22	1,797	3,594	2,336	25,696	1,450	40	0	1,490	27,186			
23	3,868	7,737	5,029	55,318	18,150	160	750	19,060	74,378			
24	2,854	5,708	3,710	40,810	3,350	80	0	3,430	44,240			
25	2,480	4,960	3,224	35,462	7,150	100	0	7,250	42,712			
26	2,645	5,289	3,438	37,817	6,200	160	0	6,360	44,177			
27	2,247	4,494	2,921	32,132	3,200	100	0	3,300	35,432			
28	1,549	3,097	2,013	22,144	2,750	100	0	2,850	24,994			
29	2,150	4,300	2,795	30,745	3,550	40	0	3,590	34,335			
30	1,899	3,798	2,469	27,156	2,950	60	150	3,160	30,316			
31	2,570	5,140	3,341	36,750	2,250	40	0	2,290	39,040			
32	3,658	7,316	4,756	52,311	3,050	80	0	3,130	55,441			
33	1,850	3,700	2,405	26,455	4,050	120	641	4,811	31,266			
34	3,217	6,434	4,182	46,004	2,600	60	0	2,660	48,664			
35	1,901	3,801	2,471	27,178	3,350	60	0	3,410	30,588			
36	1,092	2,183	1,419	15,611	1,550	20	0	1,570	17,181			
37	1,887	3,773	2,453	26,979	2,500	60	0	2,560	29,539			
38	1,636	3,272	2,127	23,397	2,500	40	0	2,540	25,937			

FLOODWATER RETARDING
 STRUCTURES

TABLE 6B - STRUCTURE DATA
 Estimated Structure Cost Distribution
 (Based on 1955 Price Levels)
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Structure Site Number or Name	FEDERAL INSTALLATION COST					NON-FEDERAL INSTALLATION COST					
	Contract (dollars)	Contingencies (dollars)	Installation (dollars)	Administration (dollars)	Easements (dollars)	Total (dollars)	Legal (dollars)	Removing (dollars)	Obstacles (dollars)	Federal (dollars)	Estimated Total Cost (dollars)
FLOODWATER RETARDING STRUCTURES											
39	70,854	7,085	14,171	9,211	101,321	12,150	180	0	0	12,330	113,651
40	21,610	2,161	4,322	2,809	30,902	2,350	100	0	0	2,450	33,352
41	22,180	2,218	4,436	2,883	31,717	8,750	280	0	0	9,030	40,747
42	45,353	4,535	9,071	5,896	64,855	11,700	120	750	0	12,570	77,425
43	19,535	1,953	3,907	2,540	27,935	6,700	160	0	0	6,860	34,795
44	14,800	1,480	2,960	1,924	21,164	1,650	60	0	0	1,710	22,874
45	26,741	2,674	5,348	3,476	38,239	2,600	20	0	0	2,620	40,859
46	44,250	4,425	8,850	5,753	63,278	7,000	320	750	0	8,070	71,348
47	29,822	2,982	5,964	3,877	42,645	6,000	120	0	0	6,120	48,765
48	18,480	1,848	3,696	2,402	26,426	2,200	80	0	0	2,280	28,706
49	35,216	3,522	7,043	4,578	50,359	7,750	140	0	0	7,890	58,249
50	18,242	1,824	3,648	2,371	26,085	6,350	180	0	0	6,530	32,615
51	20,057	2,006	4,011	2,607	28,681	2,800	140	0	0	2,940	31,621
52	27,368	2,737	5,474	3,558	39,137	3,050	80	0	0	3,130	42,267
53	26,005	2,601	5,201	3,381	37,188	2,900	80	0	0	2,980	40,168
54	11,704	1,170	2,341	1,522	16,737	1,850	100	0	0	1,950	18,687
55	33,768	3,377	6,753	4,390	48,288	15,600	100	1,000	0	16,700	64,988
56	27,483	2,748	5,496	3,573	39,300	6,750	120	0	0	6,870	46,170
Total	2,247,084	224,708	449,417	292,122	3,213,331	308,375	6,720	5,916	0	321,011	3,534,342
OTHER											
Channel Improvement (Wilson Creek)	173,908	17,391	34,781	22,608	248,688	3,200	600	0	0	3,800	252,488
Total	173,908	17,391	34,781	22,608	248,688	3,200	600	0	0	3,800	252,488
GRAND TOTAL	2,420,992	242,099	484,198	314,730	3,462,019	311,575	7,320	5,916	0	324,811	3,786,830

1/ Constructed - Actual Costs.

Date: August, 1956

TABLE 7 - SUMMARY OF PHYSICAL DATA
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Item	Unit	Quantity At Time of Revision	Quantity With Program
Watershed Area	Sq.Mi.	351	351
Watershed Area	Acre	224,935	224,935
Area of Cropland	Acre	155,672	126,256
Area of Pastureland	Acre	47,915	80,997
Area of Wooded Pastureland	Acre	5,743	2,077
Miscellaneous <u>1/</u>	Acre	15,605	15,605
Overflow Area Subject to Damage by Design Storm	Acre	15,999	11,992
Area Damaged Annually by:			
Sediment	Acre	3,560	1,191
Flood Plain Scour	Acre	566	195
Sheet Erosion	Acre	190,744	38,149
Average Annual Rainfall	Inch	39.24	39.24

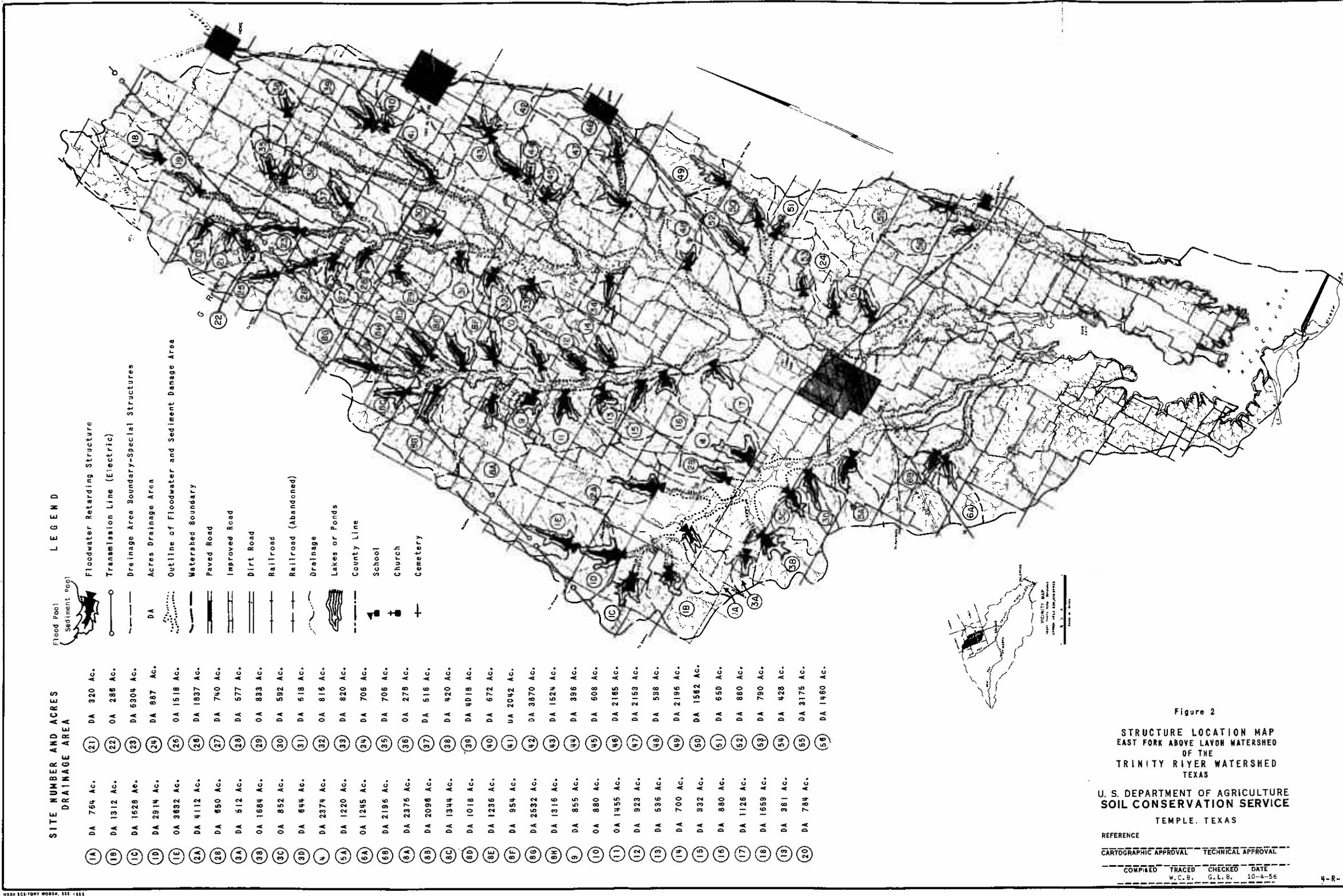
1/ Includes roads, highways, railroads, towns, stream channels and surface area of Lavon Reservoir above elevation 480 in the flood pool.

Date: August, 1956

TABLE 8 - SUMMARY OF PLAN DATA
 East Fork Above Lavon Watershed, Texas
 (Trinity River Watershed)

Item	Unit	Quantity
Years to Complete Program	Year	10
Total Installation Cost		
Federal	Dollar	3,462,019
Non-Federal	Dollar	324,811
Annual O and M Cost		
Federal	Dollar	-
Non-Federal	Dollar	14,863
Annual Benefits	Dollar	300,062
Structural Measures		
Floodwater Retarding Structures	Each	71
Channel Improvement	Mile	6.4
Area Inundated by Structures		
Flood Plain		
Detention Pool	Acre	25
Sediment Pool	Acre	54
Upland		
Detention Pool	Acre	5,132
Sediment Pool	Acre	1,636
Watershed Area above Structures	Acre	97,466
Reduction of Floodwater Damage		
Land Treatment Measures	Percent	30
Structural Measures	Percent	41
Reduction of Sediment Damage		
Land Treatment Measures	Percent	54
Structural Measures	Percent	32
Reduction of Erosion Damage (Flood Plain Scour)		
Land Treatment Measures	Percent	30
Structural Measures	Percent	42
Benefit from More Intensive Use of Land Resulting from Reduction of Flood Hazard	Dollar	103,748

Date: August, 1956



SITE NUMBER AND ACRES	
1A	DA 764 Ac.
1B	DA 1312 Ac.
1C	DA 1628 Ac.
1D	DA 2514 Ac.
1E	DA 3832 Ac.
2A	DA 4112 Ac.
2B	DA 650 Ac.
3A	DA 512 Ac.
3B	DA 1684 Ac.
3C	DA 852 Ac.
3D	DA 644 Ac.
4	DA 2374 Ac.
5A	DA 1220 Ac.
5B	DA 1245 Ac.
6B	DA 2196 Ac.
6A	DA 2376 Ac.
6B	DA 2098 Ac.
6C	DA 1344 Ac.
6D	DA 1018 Ac.
6E	DA 1236 Ac.
6F	DA 954 Ac.
6G	DA 2532 Ac.
6H	DA 1316 Ac.
7	DA 855 Ac.
8	DA 880 Ac.
9	DA 1455 Ac.
10	DA 923 Ac.
11	DA 536 Ac.
12	DA 700 Ac.
13	DA 332 Ac.
14	DA 880 Ac.
15	DA 1126 Ac.
16	DA 1659 Ac.
17	DA 361 Ac.
18	DA 784 Ac.
19	DA 764 Ac.
20	DA 1460 Ac.
21	DA 320 Ac.
22	DA 286 Ac.
23	DA 6904 Ac.
24	DA 887 Ac.
25	DA 1518 Ac.
26	DA 1837 Ac.
27	DA 740 Ac.
28	DA 577 Ac.
29	DA 833 Ac.
30	DA 592 Ac.
31	DA 618 Ac.
32	DA 816 Ac.
33	DA 820 Ac.
34	DA 706 Ac.
35	DA 706 Ac.
36	DA 278 Ac.
37	DA 516 Ac.
38	DA 420 Ac.
39	DA 4018 Ac.
40	DA 672 Ac.
41	DA 2042 Ac.
42	DA 3870 Ac.
43	DA 1524 Ac.
44	DA 396 Ac.
45	DA 608 Ac.
46	DA 2185 Ac.
47	DA 2153 Ac.
48	DA 598 Ac.
49	DA 2196 Ac.
50	DA 1582 Ac.
51	DA 650 Ac.
52	DA 880 Ac.
53	DA 790 Ac.
54	DA 428 Ac.
55	DA 3175 Ac.
56	DA 1460 Ac.

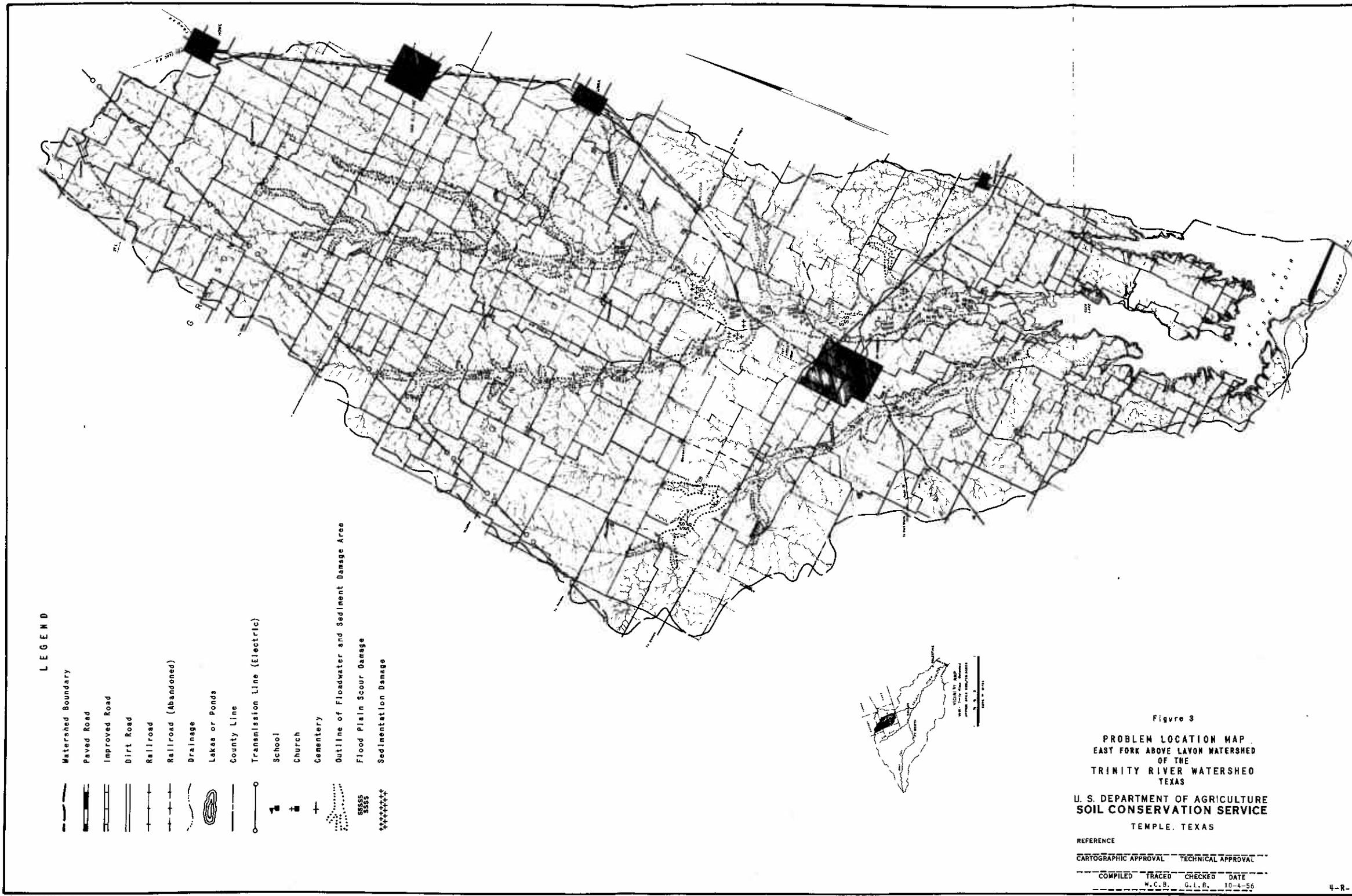
- LEGEND**
- Flood Pool
 - Sediment
 - Floodwater Retarding Structure
 - Transmission Line (Electric)
 - Drainage Area Boundary-Special Structures
 - Acres Drainage Area
 - Outline of Floodwater and Sediment Damage Area
 - Watershed Boundary
 - Paved Road
 - Improved Road
 - Dirt Road
 - Railroad
 - Railroad (Abandoned)
 - Drainage
 - Lakes or Ponds
 - County Line
 - School
 - Church
 - Cemetery

Figure 2
 STRUCTURE LOCATION MAP
 EAST FORK ABOVE LAYTON WATERSHED
 OF THE
 TRINITY RIVER WATERSHED
 TEXAS
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
 TEMPLE, TEXAS

REFERENCE

CARTOGRAPHIC APPROVAL _____ TECHNICAL APPROVAL _____

COMPILED _____ TRACED _____ CHECKED _____ DATE _____
 W. C. B. G. L. B. 10-4-56



LEGEND

- Watershed Boundary
- Paved Road
- Improved Road
- Dirt Road
- Railroad
- Railroad (Abandoned)
- Drainage
- Lakes or Ponds
- County Line
- Transmission Line (Electric)
- School
- Church
- Cemetery
- Outline of Floodwater and Sediment Damage Area
- Flood Plain Scour Damage
- Sedimentation Damage

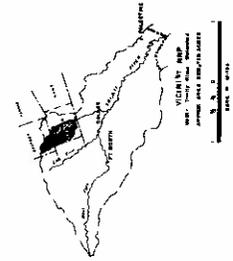


Figure 3
PROBLEM LOCATION MAP
 EAST FORK ABOVE LAYON WATERSHED
 OF THE
 TRINITY RIVER WATERSHED
 TEXAS

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

REFERENCE

CARTOGRAPHIC APPROVAL	TECHNICAL APPROVAL		
COMPILED	TRACED	CHECKED	DATE
M. C. B.	G. L. B.		10-4-56