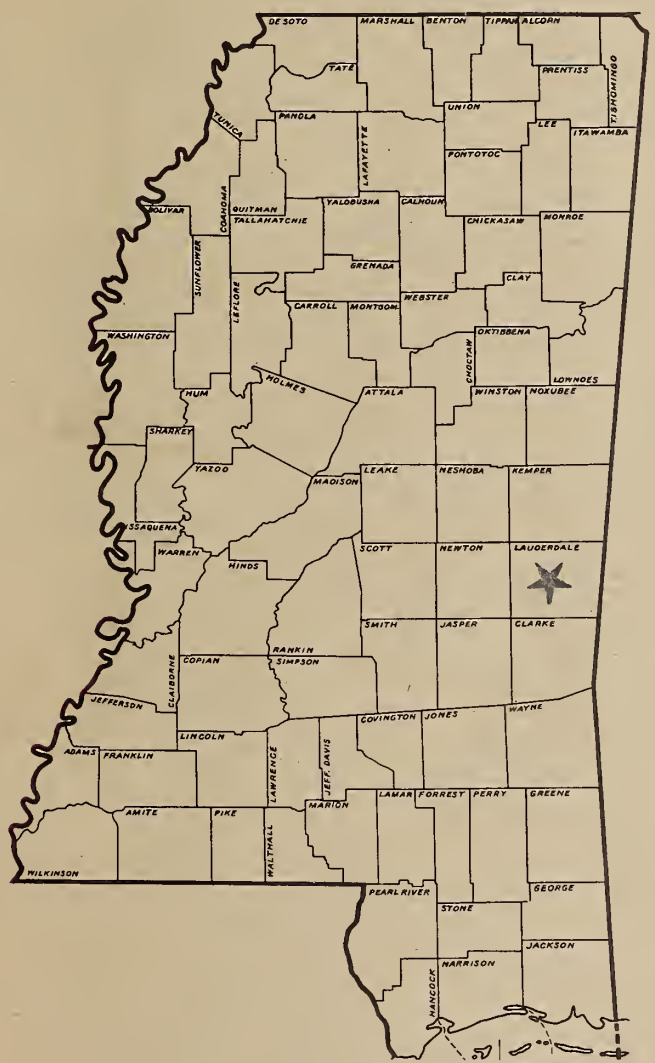
WATERSHED WORK PLAN

FOR

WATERSHED PROTECTION, FLOOD PREVENTION, AGRICULTURAL WATER MANAGEMENT AND OTHER BENEFICIAL PURPOSES

SOWASHEE CREEK WATERSHED

LAUDERDALE COUNTY, MISSISSIPPI



APRIL 1972

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A D D E N D U M

Sowashee Creek Watershed Work Plan, Mississippi

This addendum shows the results of using an interest rate of 5½ percent in the economic evaluation. Annual project costs, benefits and benefit-cost ratio are as follows:

1. Annual project costs are $525,181.
2. Annual project benefits are $761,148.
3. The project benefit-cost ratio is 1.4:1.0.

WATERSHED WORK PLAN
SOWASHEE CREEK WATERSHED

Lauderdale County, Mississippi

Prepared under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83rd Congress; 68 Stat. 666) as amended.

Prepared by:

Sowashee Drainage District
City of Meridian, Mississippi
Pat Harrison Waterway District
Lauderdale County Soil Conservation District

With assistance by:

U. S. Department of Agriculture, Soil Conservation Service
U. S. Department of Agriculture, Forest Service

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Lauderdale County, Mississippi

April 1972

SUMMARY OF PLAN

The Sowashee Creek Watershed is sponsored by the Sowashee Drainage District, the City of Meridian, Mississippi, the Pat Harrison Waterway District, and the Lauderdale County Soil Conservation District.

Sowashee Creek Watershed contains 52,910 acres or about 82.7 square miles and is located in the central part of Lauderdale County. Public lands within the watershed consist of approximately 242 acres owned by the State of Mississippi, 276 acres owned by the U. S. Government, and 3,338 acres owned by the City of Meridian. The lands owned by the State of Mississippi consists of Sixteenth Section lands (school lands) administered by the Board of Supervisors of Lauderdale County. The lands owned by the U. S. Government consists of 106 acres in the National Fish Hatchery, Bureau of Sport Fisheries and Wildlife, Department of Interior and 170 acres in the Southern Sugar Crops Experiment Station, Agricultural Research Service, and Department of Agriculture.

Existing problems are (1) floodwater damages to urban areas, pastures, and fixed improvements, (2) difficulty in establishing and maintaining open ditches to remove floodwater from the low flat areas of the flood plain, (3) moderate to severe erosion in the upland areas, (4) sediment damage and minor scour damage to the flood plain, (5) low farm income that affects the economy of the watershed and surrounding area, and (6) a shortage of recreation facilities.

These problems will be reduced to such an extent as is physically possible and economically feasible by establishing land treatment measures, constructing 13 floodwater retarding structures, 1 multiple purpose structure for flood prevention and recreation, approximately 55 miles of stream channel improvements, and other measures necessary to solve the watershed problems.

The application of the proposed works of improvement will accomplish the following: (1) provide flood protection for the urban area of Meridian subject to flood damage from Sowashee Creek and its tributaries, (2) increase income of low income farm families and small landowners, (3) reduce erosion damage to roadsides and upland soils, (4) maintain the use of agricultural land in the flood plain in a productive condition and be subject to less frequent floodwater and sediment damages, (5) reduce the acreage of steep land in cultivation, and (6) provide additional recreational facilities.

There are 31,502 acres of forest land located in this watershed. Forestry measures are proposed on 4,754 acres. These measures include critical area stabilization, hydrologic stand improvement, and multiple use forest land management. The forest land treatment measures will contribute to flood prevention and watershed protection by reducing runoff and stabilizing the soil to prevent erosion. Under continued protection and proper management, the forest stands will contribute considerably to the future overall economy of the watershed.

The length of the installation period for the works of improvement is 6 years, but the critical area stabilization measures should be completed during the first 2 or 3 years of the installation period.

Technical assistance for applying the forestry measures will be furnished by the U. S Forest Service, in cooperation with and through the Mississippi Forestry Commission. Forest land treatment measures will be maintained by the landowners or operators of the land on which the measures are installed.

Land treatment measures will be installed by farmers through conservation farm plans in cooperation with the Lauderdale County Soil Conservation District. The measures will be installed at an estimated total cost of $522,249 of which it is estimated only $142,651 will be financed from PL-566 funds.

Floodwater retarding structures, the multiple purpose structure and channel improvements will be installed by contract by the Soil Conservation Service. The floodwater retarding structures will be installed at an estimated total cost of $882,051, of which about $750,146 installation costs are to be financed by PL-566 funds and about $131,905, representing the value of land rights is to be financed from Other funds.

The multiple purpose structure and basic facilities will be installed at an estimated total cost of $565,550, of which about $278,282 will be financed from PL-566 funds and about $287,268 will be financed from Other funds.

The stream channel improvements (about 55 miles) will be installed at an estimated total cost of $5,383,815 of which about $5,068,508 will be financed from PL-566 funds and about $315,307 will be financed from Other funds, Table 2.

The planned works of improvement will be installed over a six-year period at an estimated total cost of $8,289,038, of which about $7,102,630 will be financed from PL-566 funds and about $1,186,408 will be financed from Other funds, Table 1.

The project will directly benefit approximately 124 farms or parts of farms in the agricultural lands of the flood plain in addition to the owners and occupants of 365 residential, business and industrial units. Of the 8,414 acres in the flood plain, 7,109 acres will receive flood reduction benefits.

Hunting, fishing and recreational activities will be provided throughout the watershed by utilizing the farm ponds, wildlife area plantings, odd corners of fields, and field borders along woods. Hardwoods will be utilized for game habitat through timber stand improvement to the extent compatible with good watershed management. Additional hunting, fishing and recreational activities will be provided in the floodwater retarding structures and the multiple purpose structure.

The average annual costs of structural measures are estimated to be $515,871. The average annual benefits are estimated to be $760,454. The benefit-cost ratio is estimated to be 1.5 to 1.0, Table 6.

The Sowashee Drainage District is a legal subdivision of the State of Mississippi and has legal authority as provided in Mississippi Senate Bill 1220, extraordinary session 1955. The City of Meridian, and the Pat Harrison Waterway District will assist the Sowashee Drainage District with financing and installation of the project.

Land treatment measures will be operated and maintained by individual farmers under cooperative agreements with the Lauderdale County Soil Conservation District.

The City of Meridian will operate and maintain Multiple Purpose Structure No. 14, including recreational aspects of this structure, and all channel improvements within and downstream from the City with financing from the regular operating budget of the City. The 13 floodwater retarding structures and all remaining channel improvements will be operated and maintained by the Sowashee Drainage District, The City of Meridian and the Pat Harrison Waterway District with the latter being financially responsible for this portion of the operation and maintenance funds with financing from the regular operating budget of the District. The estimated average annual cost for operation and maintenance of the project is $96,154.

DESCRIPTION OF THE WATERSHED

Physical Data

Location

Sowashee Creek Watershed lies in eastern Mississippi, in the central part of Lauderdale County. Most of the City of Meridian is

within the watershed. Other communities in or on the boundaries of the watershed are Marion, Topton, Russell and Bonita. The watershed is in the upper reaches of the Pascagoula River Basin.

Sowashee Creek rises about six miles northeast of Meridian and flows in a southwestern direction through the eastern and southern portions of Meridian to its confluence with Okatibbee Creek about three miles south of Meridian. Principal tributaries of Sowashee Creek are Nanabe and Gallagher Branch.

Land

Sowashee Creek Watershed lies entirely within the North Central Hills physiographic region. The North Central Hills is characterized as an area of rough, rugged relief, with large flood plains and is a region of sharply inclined surfaces that are subject to rapid sheet erosion and gullying.

The watershed is made up of several formations, starting from east of Russell, with the oldest formation to the western edge of Meridian; Holly Springs formation, from the Wilcox group, Eocene; the Bashi, Hatchitigbe, Meridian, upper members of the Wilcox group, Eocene; and finally in the southeastern portion of the watershed, Tallahatta formation of the Claiborne group Eocene.

The Holly Springs is made of irregularly bedded, fine to coarse sands with more or less lignitic clays, commonly fossiliferous.

The Bashi formation is comprised of sand and silt, very fine grained, light gray to greenish gray, thinly bedded and apparently cross bedded, interbedded with gray to black silt and clay.

The Hatchitigbe consists of silt and sand, light gray, irregularly streaked with iron stains along what appears to be laminated cross laminae and cross laminae.

The Meridian formation is comprised of sand, whitish, reddish brown, yellow brown, unconsolidated, fine grain, cross bedded with leopard-like mottlings of limonite stains.

The Tallahatta formation is a predominantly sandy facies containing clay lenses, and abundant clay stringers, locally glauconitic.

Soils are formed from Coastal Plain sands, clays and gravels. They are low in natural soil fertility, contain little organic matter and are usually strongly acid. Erosion is moderate with some areas being severely eroded. More than one-half of the land is forested. The remainder is used for cattle farming or is urban. Bottoms are relatively wide.

Principal upland soils are Ruston, Rumford, Shubuta, Cuthbert, Boswell and Eustis. Ruston and Rumford are deep, well drained, friable soils. Shubuta, Cuthbert and Boswell are moderately well drained with clayey subsoils. Eustis soils are deep, excessively drained sandy soils with rapid internal drainage. These soils respond to fertilization and, when managed within their capacilities, yields of locally grown crops are moderate to high.

Bottomland soils are Mantachie, Iuka and Bibb. Mantachie and Iuka are friable, somewhat poorly to moderately well drained soils. They produce well when given surface drainage and are protected from overflow. Bibb is a poorly drained soil best suited to pasture and adapted hardwoods.

The topography ranges from flat in the bottomland to gently rolling to steep along the rim of the watershed boundary. The main valleys average about 2,500 feet in width. The elevation above mean sea level ranges from about 260 feet at the outlet of the project to about 580 feet along the northern rim of the watershed.

The present land use of the watershed is about 6 percent cropland, 10 percent pasture and perennials, 59 percent woodland, 8 percent miscellaneous and idle land and 17 percent in urban areas.

Vegetative cover for the entire watershed is generally fair except for the urban areas which are very poor. Sheet erosion is moderate to severe throughout the upland areas. Erosion is active on 63 miles (one side) of road banks. Severe erosion is active on 400 acres. The hydrologic cover condition on the pastures is approximately 56 percent good, 37 percent fair and 7 percent poor. The hydrologic cover condition of the miscellaneous and idle land is approximately 56 percent good, 41 percent fair and 3 percent poor. The hydrologic cover condition of the cropland is 88 percent good and 12 percent poor.

Fifty-nine percent or 31,502 acres of the watershed are classified as forest land. The hydrologic condition, based on five hydrologic condition classes is 25 percent fair; 55 percent poor, and 20 percent very poor. Burning, overcutting and past cultivation of lands which are now forested have contributed to this poor hydrologic condition. Under improved management and protection, improvement of hydrologic condition and increased forest growth are expected.

Water

Generally, there has been sufficient moisture to produce crops. At present, there are no irrigation systems nor are there any planned as project measures in this watershed. Water sources for agricultural use are considered adequate for expected future needs.

Water for domestic use in the agricultural areas is supplied from drilled wells, dug wells, and springs. Livestock water is obtained from drilled wells and farm ponds. Municipal and industrial water supplies are from drilled wells and from reservoir storage both within and outside of this watershed. The future plans for municipal and industrial water supply will eliminate the reservoir storage within the watershed. There is no indication of a shortage in the ground water supply. There is a need for additional water for recreational purposes for present and future use.

Climate

Based on the 1967 Annual Summary at Meridian, Mississippi, the average precipitation is 53.13 inches. About 38.04 inches of precipitation occur during the crop growing season of March through November. The wettest month is March with an average of 6.32 inches and the driest month is October with an average of 2.22 inches.

The average annual temperature is 64.8 degree Fahrenheit. January is the coldest month with an average temperature of 48.1 degrees, and July is the hottest month with an average of 81.5 degrees.

The length of the growing season is about 220 days between the last killing frost in March and the first killing frost in November.

Fish and Wildlife

The stream fishery resource in Sowashee Creek Watershed is almost negligible. Headwater areas are too small to provide significant fishery habitat while downstream areas become congested with debris, both natural and man-caused. About 175 private ponds and small lakes are found within the watershed with 20 estimated to be 15 to 20 acres in size and the remaining averaging less than five acres.

The upland pine-hardwood type makes up most of the forest land and constitutes the most important segment of forest game habitat. Small blocks of hardwoods, several acres in size, are found along the major stream and are associated with improved pasture. Squirrels are important forest game species as the encroachment of urbanization reduces the potential of existing deer and turkey populations.

Quail and rabbit habitat is good to excellent in much of the watershed and is generally dispersed. It is estimated however, that half of the watershed is "too close in" or "built up" to provide safe harvest of any game species. There is, however, some waterfowl use of the stream, particularly in the lower reach.

Economic Data

The economy of the watershed, present and expected, will be influenced greatly by the industrial and commercial growth within and around the City of Meridian. In most areas of the watershed,

the urban influence upon the watershed can be expected to increase and the agricultural importance decline in the future.

The production of beef cattle is the major source of farm income. Some row cropping is still being done in scattered areas throughout the watershed. Forest products produced are of moderate importance. The present land use for the watershed consists of 3,049 acres of cropland; 5,031 acres of grassland; 31,502 acres of woodland; and 13,328 acres of other and miscellaneous land, of which it is estimated 9,024 acres are urban. In the water problem area, the present land use is estimated to be 2,881 acres of grassland, 3,579 acres of woodland, and 1,954 acres other and miscellaneous, of which is estimated 1,148 acres are urban. The urban area consists of industrial plants, commercial, residential, public and undeveloped property.

The forest types are 50 percent pine; 10 percent pine-hardwood; 15 percent hardwood-pine; and 25 percent hardwood. The principal species are loblolly pine, red oak, sweetgum, shortleaf pine and hickory. Minor species include blackjack oak, persimmon, southern red oak, silver maple, sourwood, mulberry, ironwood, ash, yellow poplar and hackberry. Ninety-two percent of the forest area is medium to well stocked with merchantable tree species. Sawtimber volumes average 420 board feet per acre for pine and 275 board feet per acre for hardwood. Pulpwood volumes average 2.0 cords per acre for pine, and 1.1 cords per acre for hardwood.

The City of Meridian owns 3,338 acres of forest land. This area is managed for the City's water supply and is in excellent condition silviculturally, as well as, hydrologically. The remaining 90 percent of the forest area is in small privately-owned tracts.

The Mississippi Forestry Commission, through the various Federal-State cooperative forestry programs, is providing forest management assistance, forest fire prevention and suppression, distribution of planting stock, and forest pest control assistance to private landowners in the watershed. Under continued protection and proper management, the forest stands will contribute considerably to the future overall economy of the watershed area.

Public lands within the watershed consist of approximately 242 acres of Sixteenth Section lands (school lands), 170 acres in the Southern Sugar Crops Experiment Station, 106 acres in the National Fish Hatchery and 3,338 acres owned by the City of Meridian.

There are approximately 305 farms or parts of farms within the watershed that will average about 130 acres in size with an average value of about $200 per acre. Estimated value per farm for land and buildings is about $26,000. The average size and value of farms within the watershed differ from county averages because of the closeness to the City of Meridian, where land values are higher than the county average. Due to the limited use of the productive flood plain from the

hazards of flooding and increased costs of operation and living, many of the farm operators have found it necessary to supplement their farm income by taking part time or full time jobs in nearby Meridian. In 1964, about 61 percent of the farm operators worked off-farm at least part time.

With protection from frequent flooding on the flood plain land so that a more intensive type of management could be practiced, the increase in annual incomes will have a significant effect on the economy of the watershed area.

The farms which employ as much as one and one-half man-years of hired labor are in a minority and their operations comprise a very small percent of the benefited area.

An estimated 95 percent of the City of Meridian, second largest city in Mississippi, lies within the watershed. This portion of the watershed is occupied largely by industrial, commercial, residential and public property. Expansion of the urban area has been rapid and can be expected to continue. As a result, the land values within the watershed are more dependent upon site locations than upon use for agricultural purposes.

Meridian has a diversified economy based on agriculture, industry, wholesaling and retailing. The Meridian Industrial and Commercial Foundation has long range plans for future industrial and commercial development within a 15-mile radius of Meridian. Several of these areas are located in part within the flood plain area and their future successful development will be contingent in part on the reduction of flooding on the Sowashee Creek and Nanabe Creek flood plains.

The 1967 population of the watershed is estimated to be about 56,915. This is an increase of about 8,000 over 1960. Approximately 54,500 of these live within the City of Meridian. The rural population is estimated to be 2,415 with 1,932 being non-farm and 483 farm people.

The opportunity of promoting the Comprehensive Overall Economic Development Program for Lauderdale County as prepared by the Lauderdale County Resource Development Committee will be greatly enhanced since the objectives of the watershed plan will incorporate many of the agricultural (cropland, pastureland, woodland, watershed and wildlife) objectives of the R.A.D. plan of works.

Numerous county and farm-to-market roads, city streets, State Highways 19 and 39; U. S. Highway 80, 45 and 11; Interstates 20 and 59; the Southern Railroad, Gulf, Mobile and Ohio, Illinois Central and the Meridian and Bigbee Railroads provide easy access to nearby markets and business areas. Other than the City of Meridian, the communities of Russell, Marion, Topton and Bonita are located within the watershed.

Land Treatment Data

The watershed is in the Lauderdale County Soil Conservation District. Of the 305 farms or parts of farms in the watershed, 80 have conservation farm plans. About 50 percent of the planned practices have been established (see Table 1-A).

The Soil Conservation District has assisted landowners and farmers in establishing land treatment measures such as pasture planting, pasture renovation, tree planting, farm ponds, terracing, grassed waterways, surface field ditches, small dragline ditches, fish pond stocking and management, wildlife habitat development and wildlife habitat preservation.

Gas, Oil and Natural Resources

There are no oil or gas fields or wells in the watershed. Five large pipe lines cross the watershed area but none will be affected by planned works of improvement to be installed.

WATERSHED PROBLEMS

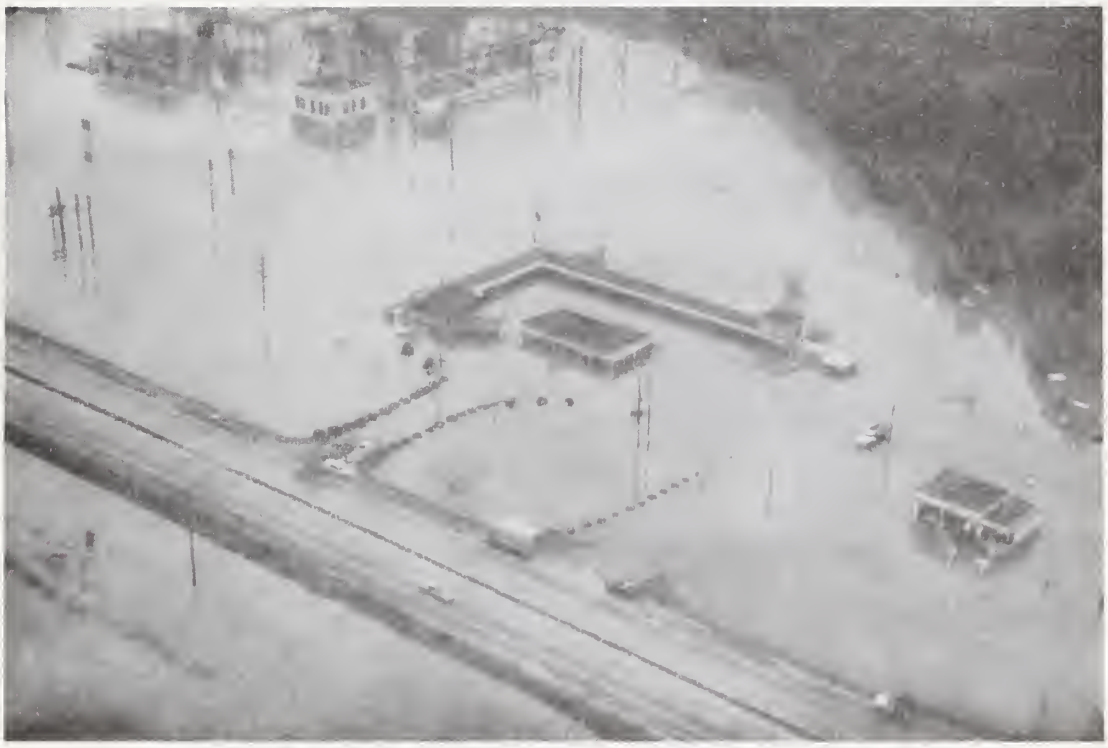
Erosion Damage

There are approximately 29,393 acres of Classes IIe, IIIe, IVe, VIe and VIIe lands in the watershed exclusive of the urban areas. Of this total, 1,732 acres are in cultivation, 1,301 acres are idle, 3,057 acres are in pasture and perennials, and 23,303 acres are in woods. Sheet erosion is moderate to severe in the upland areas. Gully erosion is active on 400 acres. Bare roadbanks along 63 miles (one side) of roads are eroding and has caused filling of channels, road ditches and culverts. The sheet, gully and roadbank erosion also contribute to sediment deposition on flood plain lands.

Land use adjustments are needed in this area. The steeper lands in cultivation should be retired to permanent vegetation and the cultivated crops could be moved to the flood plain. This would permit more efficient use of both the upland and benefited flood plain lands. These adjustments would permit more efficient use of land, labor and capital for both the upland and benefited flood plain lands. Financing the needed adjustments will be a problem due to the low farm income.

Floodwater Damage

There are 8,414 acres of flood plain land in the watershed. The agricultural land has a current average value ranging from $150 to $225 per acre with average values of the urban area ranging up to $5,000 or more per acre. Floodwater damages include damages to the urban areas, pastures and fixed improvements such as fences, field ditches, and county and state roads and bridges.



Floodwater of Sowashee Creek inundates areas south of Tom Bailey Drive.

Sowashee Creek near end of main urban area.

4-27356

Sowashee Creek as it enters main urban area at US Highway 45 crossing.

Sowashee Creek just west of Bonito Interchange.

4-27356

Damaging floods on the agricultural flood plains occur on an average of 2 to 5 times per year with the floods during the growing season occuring from 2 to 4 times per year. This flooding has caused considerable acreage of the flood plain to be abandoned from cultivation.

Due to the large size of the present channel in the main urban areas, the damaging floods occur less frequently than on the agricultural flood plain. Low areas of the urban flood plain flood from 1 to 2 times per year. The most damaging flood in recent years occured on April 5 and 6, 1964 and caused an estimated damage to the urban area of $275,200 under 1964 development and prices and had a recurrence interval of approximately 33 years.

The soils of the flooded areas are in land Capability Classes IIw, 40 percent; IIIw, 13 percent; and IVw, 47 percent. The flood plain areas would be used to a greater degree for residential and industrial development and pastures if it were not for the existing flood hazard. Significant areas of the urban flood plain cannot be utilized for development because of flooding. The rapid rate of growth of the Meridian metropolitan area requires additional land for development. There has been no recent loss of life as a direct result of flooding.

Without the project, expected development in the watershed will sustain the following estimated average annual damage: crops and pastures, $7,811; other agricultural, $2,771; residential, industrial and commercial, $427,914; roads, streets and bridges, $36,957; sediment, $4,052; erosion, $4,800 and indirect, $91,222, Table No. 5.

Sediment Damage

Roadside erosion and erosion in the upland areas have resulted in moderate to severe siltation in most of the stream channels. Sediment has caused channel fill with increased frequency of flooding in the affected areas. Overbank deposition on flood plain land has resulted in reduced yields of pasture land. Approximately 3,225 acres of flood plain land have been damaged from 10 to 80 percent.

Some scour damage occurs on the flood plain as a result of the frequency of overflows - however, it is limited in scope, does not hinder cultivation, and was not evaluated.

The present sediment yield in Sowashee Creek at the lower boundary of the watershed is estimated to be approximately 86,000 tons per year or approximately 1.63 tons/acre/year.

Problems Relating to Water Management

Some channel improvement work has been completed and provides sufficient capacity to meet the drainage needs for the areas they serve. There are no high water tables or seepage problems. The efforts of the local people, through individual on-farm land treat-

ment and individual and group conservation engineering practices, have not been sufficient to solve the floodwater and sediment problems.

There is a need for additional farm ponds to facilitate better management of pastures. Adequate moisture for the production of crops commonly grown in the area is available from normal rainfall. No project action is needed at this time to provide additional sources of water for irrigation.

The Bonita Reservoir, located within the watershed, and the Long Creek Reservoir, adjacent to the watershed, are owned and operated by the City of Meridian. These reservoirs provide limited recreation use, mostly fishing. The Okatibbee Reservoir, located about seven miles northwest of Meridian, has recently been constructed by the U. S. Army Corps of Engineers This is approximately a 3,200-acre reservoir with associated recreational development now being planned. There is a need, however, to provide additional facilities for the general public. This additional need is outlined in a report of the Bureau of Outdoor Recreation, U. S. Department of Interior - Appendix H of the Pascagoula River Comprehensive Basin Study, dated December 1966, and is titled "A Report of the Recreation Aspects of the Pascagoula River Basin, Mississippi and Alabama".

The present estimated population is 218,600 people within a 50-mile radius of the watershed. The watershed sponsors are very interested in developing recreational facilities in connection with the Multiple purpose structure. Stream water quality at the site of the proposed multiple purpose structure is generally adequate for the intended uses.

PROJECTS OF OTHER AGENCIES

There has never been an organized drainage district in this watershed, but the Sowashee Drainage District is now being organized.

A comprehensive river basin survey has been completed for the Pascagoula River Basin of which this watershed is a part. The U. S Army, Corps of Engineers studies include reservoir sites in the basin. One of these reservoirs has been completed and is located on Okatibbee Creek approximately seven miles northwest of Meridian.

In 1955, The Corps of Engineers completed channel improvement on main Sowashee Creek from channel profile Station 0+00 to 548+90. This improvement was completed under the authority of Section 205 of the Flood Control Act of 1948. Additional improvement is now needed due to increased development and the need for a higher degree of protection for the urban area.

PROJECT FORMULATION

Significant areas of flood plain lands of the watershed are located in urban areas of the City of Meridian on Sowashee Creek and Gallagher

Branch. Severe flooding causes heavy damage to residential, commercial and industrial properties. This damage will increase in the future without this project because of the rapid development of the area. A primary objective of the sponsors is to provide a high degree of protection for these urban areas.

It was agreed that the level of protection to be provided these urban areas would eliminate the damage from a flood that could be expected to occur on the average of once in 100 years except for small insignificant damages. Because of the anticipated high cost of easements, limited work area and extremely high cost of modifications and replacements of existing bridges, culverts and gas, water and sewer mains, it was agreed that channel improvement of Gallagher Branch would terminate at channel profile Station 98+00.

The remaining objectives of the local people are (1) increase the income of low income families and small landowners, (2) retire steep eroded lands to grasses and trees, (3) reduce the frequency and duration of flooding to the extent that about 75 percent of the agricultural flood plain land benefited by structural measures can be used intensively for agricultural production, (4) establish more adequate vegetative cover through better use of conservation cropping systems, and to vegetate and control critical sediment producing areas in the uplands, (5) provide additional water storage in one floodwater retarding structure with basic facilities for recreational purposes, and (6) install water level control devices in 13 floodwater retarding structures and multiple purpose structure to partially mitigate damages to waterfowl habitat and/or fishery resources caused by stream channel improvements.

The land treatment measures included in this plan are those measures that will contribute measureably to meeting the objectives and desires of the local sponsors by reducing sediment, retarding runoff and increasing infiltration rates. The amounts of these measures which can be accomplished during the installation period only are included in this work plan.

The future land treatment program was developed from a field survey of the watershed and is based on needs over that supplied by the going program. The program is limited by expected landowner participation and the length of the installation period.

The Mississippi fire loss index goal and the watershed protection goal is 0.25 percent. The average percent burn on the woodland of the watershed for the years 1962 through 1966 was 0.39 percent. Extreme fire conditions in 1963 caused the fire loss index to be above the watershed goal. The State advises there is no need for additional fire equipment in the watershed area, however, they plan to increase their fire prevention activities in the watershed.

There will be a slight increase in fire hazard with 484 acres being planted to tree seedlings. The continued increase in efficiency and effectiveness of fire control activities by the Mississippi Forestry Commission will keep pace with the increase in hazard and risk.

In order to meet the desires and objectives of the local people and with emphasis on floodwater storage, sites were investigated for 16 floodwater retarding structures and one multiple purpose structure. Due to the topography, small drainage area of structures and anticipated cost of easements, 3 floodwater retarding structures were eliminated, one of those was on Gallagher Branch. This site was eliminated due to the very small drainage area and extremely high land values. The 13 floodwater retarding structures and one multiple purpose structure, together with the selected channels, provide an acceptable degree of protection. This permits a lesser degree of channel improvement to be used and still meet project objectives.

The floodwater retarding and multiple purpose structures are supplemented by approximately 55 miles of channel improvements. The degree of flood protection, which these structures and channels will provide, is the highest feasible and meets the objectives of the local people at this time.

There are many alternatives that were discussed and considered in the formulation of this work plan. Some alternatives were eliminated with little consideration because of their incompatability or ineffectiveness with project objectives.

One alternative considered was no project at all, which would leave the watershed unchanged. No favorable or adverse environmental effects would be created as a result of project actions. None of the problems that led the sponsors to request project action would be eliminated or reduced.

Another alternative considered was to apply conservation land treatment and critical area land treatment to the land of the watershed. This alternative would provide a minor amount of flood reduction by providing better hydrologic cover condition. The rates of erosion and sedimentation would be reduced. The scenic qualities and wildlife habitat of the watershed would be increased through planting and management of trees, grasses and legumes and wildlife plantings.

Another alternative was to apply the land treatment measures and all floodwater retarding structures that could within reason be installed. This alternative would provide a larger amount of flood reduction, especially in the upper agricultural areas. The flood reduction in the urban area would be significant and would provide some relief for the watershed problems. The rates of erosion and sedimentation will be reduced to their maximum amount. The good qualities of the alternative listed in the previous paragraph will be retained. The fish and wildlife

habitat and the scenic qualities would be enhanced by water in the permanent pool areas above the floodwater retarding structures. The wildlife habitat and agricultural use of the lands in the pool areas above the floodwater retarding structures would be altered or lost.

Another alternative was the adding of recreation water to the permanent pool of one floodwater retarding structure and the inclusion of basic recreation facilities for fishing, swimming, boating, picnicking, camping and nature study adjacent to the recreation pool. This alternative will retain all of the good and bad features of the previous alternative but would increase the area of land covered by water. This would improve the fish habitat and decrease the wildlife habitat and would decrease the agricultural use of land. The inclusion of the recreation features will improve the quality of living for the community and the general public.

Still another alternative was the addition of channel improvement measures to the previous alternative. This alternative will eliminate or reduce the problems that led the sponsors to request project action. The addition of channel improvement will result in wildlife habitat losses at least temporarily. All of the other good and bad features of the above alternative would exist with this alternative.

Channels alone were considered early in the project formulation. This consideration was eliminated because of the large number of bridges (highway, railroad and streets) that would have to be modified. Channels alone would increase flooding downstream from the watershed. This is not in keeping with Soil Conservation Service policy of retaining excess water as close to where it falls as possible. This is to prevent projects from adding to downstream damages.

A concrete lined channel was considered in the area of Sowashee Creek through and downstream from the City of Meridian. This was eliminated because of excessive cost.

Floodways and zoning of the flood plain land at least through the city of Meridian was considered. This was eliminated because of the present development and location of development in the flood plain areas.

There will be no relocations of property, or displacements of persons, businesses or farm operations made necessary by the construction of structural measures included in this plan - therefore, there will be no relocation payments or need for relocation advisory assistance.

This watershed is being planned prior to the authorization of the Department of Agriculture portion of the Comprehensive Study for the Pascagoula River Basin because of the severe flooding problem and urgent need for immediate relief. Works of improvement planned are in harmony with the plans developed for the Pascagoula River Basin.

WORKS OF IMPROVEMENT TO BE INSTALLED

Land Treatment Measures

An effective conservation program, based upon the use of each acre of land within its capabilities and treatment in accordance with its needs, is necessary for a sound flood prevention and agricultural water management program. Land treatment measures were considered as a basic element in formulating the watershed project and are essential if it is to function successfully.

The Lauderdale County Soil and Water Conservation District has primary responsibility through the Conservation Farm Plan with individual farm operators, for the overall planning of land treatment measures. The land treatment measures will be applied by individual farmers with assistance from the Conservation District, the Mississippi Forestry Commission in cooperation with the U. S. Forest Service through the Cooperative Forest Management Program and any other agency interested in the application of land treatment measures.

The land treatment measures for watershed protection and critical area treatment under the concept of multiple use can be selected and applied so that wildlife habitat can be developed, maintained and enhanced. Land treatment measures for watershed protection with emphasis on their wildlife habitat effect are considered in each of the major land use categories.

The measures planned for the cropland consist of terraces, grassed waterways or outlets, contour farming, row arrangement, crop residue use, conservation cropping systems, diversions, wildlife habitat development and preservation.

The measures planned for the grassland (pastures) consist of pasture planting, pasture management, pasture renovation, brush control, farm ponds, surface field ditches, mains and laterals, fish pond stocking, fish pond management, and wildlife habitat preservation. The measures planned for the woodland consist of tree planting and forest stand improvement. Technical assistance will be provided for improved forest management. The measures for critical area treatment consist of planting trees, grasses and legumes and vegetation for roadside erosion control.

Conservation cropping systems and crop residue utilization will increase the protection of cultivated lands by using high residue producing crops and soil conditioning crops periodically. Wildlife habitat development and preservation will provide cover and protection for the soil. These measures will increase the infiltration rates of the soil, increase available moisture holding capacities, and reduce runoff and sheet erosion.

Terraces contour farming, row arrangement, grassed waterways or outlets, and diversions will provide a means for controlled disposal of excess surface water from the upland areas. This will reduce both sheet and gully erosion.

Surface field ditches, and mains and laterals will provide a means of adequate disposal of excess surface water from the flood plain. These measures are necessary to assure the full realization of benefits made possible by the reduction in the frequency of flooding and used in the justification of the structural measures proposed for installation under the PL-566 Act.

Pasture planting, pasture renovation, brush control and pasture management will be followed, where appropriate, on idle acres, established pastures, and other land which should be in a perrennial cover for sustained agricultural production. Farm ponds will be located to facilitate more uniform distribution of grazing and thus permit management which will provide the most effective grass cover for runoff and sediment control. Farm ponds will be stocked with fish and some of them managed in the concept of multiple use.

The land treatment measures on forest land will reduce runoff and prevent erosion by stabilizing the soil and by continuous care of the stands. Forest litter produced under proper forest management and protection is the source of a good humus layer needed to increase infiltration rates and water storage capacity. Favoring desirable species for humus buildup during cutting operations will assure the development of well aggregated soils and maintain a good humus layer.

A forest management program aimed at fulfilling watershed needs and objectives will be followed. The forest lands will be managed to fulfill timber, wildlife, and recreation needs to the extent that such management is compatible with sound watershed management.

The land treatment measures planned for the private lands are:

(1) Tree Planting - Flood Prevention (240 acres)

Two hundred and forty acres of critically eroding land will be established by planting to trees. Loblolly pine or other soil stabilizing species will be used. This treatment will increase the rate of water intake and detention storage capacity. This will result in retarding runoff and reducing soil loss and sediment to a minimum. Site preparation and fencing are included in measures when required to assure success of tree planting.

(2) Tree Planting - Watershed Protection (914 acres)

Reforestation of 914 acres of appropriate understocked and low quality stands is necessary to adjust land use capability and

reduce runoff and erosion by developing a protective canopy over the forest floor and a spongy humus layer under a protective layer of litter.

(3) Forest Improvement Measures (3,600 acres)

These silvicultural operations are aimed at improving hydrologic conditions by the manipulation of stand composition to create conditions favorable for the maximum production and protection of litter, humus and forest cover. These measures are also directed towards the achievement of the multiple-use objectives of forest landowners. Specific treatment measures include thinnings, weedings, improvement, salvage and harvest cuttings, wildlife habitat improvement practices and multiple use forest land management.

Food and cover development for wildlife in forest, pasture, and cropland will be a part of the land use and land treatment program of the watershed. The Soil Conservation District will assist the landowners and operators in developing individual conservation farm plans. Technical assistance will be provided to proper sources in planning and carrying out measures and practices on forest land and open land that will improve and protect wildlife habitat on 3,100 acres. Approximately 50 acres will be planted to wildlife food plants in small areas and strips as an added source of food and cover. The remaining 3,050 will be preservation of present habitat by such practices as disking, clipping and protection from fire, insects, disease, and grazing, creating small openings in the forest canopy, and favoring existing and potential den and food bearing trees. The planting of grass mixtures on an additional 349 acres of critical area and the planting of 240 acres of trees on critical areas will provide additional wildlife cover.

As the City of Meridian expands, a land treatment problem, that of reducing soil erosion from exposed bare soil during construction operations, may develop. Some measures that may become necessary to offset these problems are: temporary desilting basins, seeding and mulching bare soil, temporary diversion of runoff, forested buffer zones, infiltration zones and sediment trapping areas. The Soil and Water Conservation District and municipal officials will work closely together to achieve application of needed measures.

The estimated total cost of installing the land treatment measures is $522,249, Table 1.

Structural Measures

Floodwater Retarding Structures

A floodwater retarding structure is a compacted homogeneous earth fill dam having a fixed drawdown tube and an emergency spillway. Its primary purpose is to detain runoff, dewatering its detention or flood pool at a predetermined rate through the drawdown tube (principal spillway), thereby reducing the peak flood flows through the flood plain area downstream. Suitable vegetation is established on the embankment, emergency spillway, and exposed borrow areas to protect them from erosion.

Thirteen floodwater retarding structures are planned for the control of damaging floodwater and sediment as shown on the Project Map, Figure 5. The estimated cost for installing these structures is $882,051, Table 2. They will provide 7,684 acre feet of floodwater detention capacity. This is equivalent to 6.30 inches of runoff from the controlled drainage area of 22.85 sq. mi. or 1.74 inches of runoff from the entire watershed. They will impound in detention storage from 4.75 to 7.33 inches of runoff from their respective drainage areas which is 27.64 percent of the watershed, Table 3.

Space for storage of 100-year sediment accumulation was provided in reservoirs of the 13 floodwater retarding structures. Space was made available on the basis of 80 percent of sediment having submerged density and 20 percent aerated.

Eleven structures were planned with two-stage principal spillways and two structures were planned with single stage. Use of the two-stage principal spillways permits more efficient structure design, utilizing full conduit capacity for discharge of the runoff from the larger, less frequent storms.

The lowest ungated riser inlets were set at a 50-year submerged sediment elevation on Structure Nos. 1,3,5,7 and 8. Space for sediment was made available in sediment pool reserved for the second 50-year period for submerging 80 percent of the second 50-year period and aerating 10 percent of the first 50-year period. Space was made available in flood detention pools for aerating 10 percent of the first 50-year period and 20 percent of the second 50-year period of sediment accumulation. The 50-year submerged sediment elevation for lowest ungated riser inlets created unsatisfactory impoundments for Structure Nos. 2,4,6,9,10,11,12 and 13. To mitigate this condition, the lowest ungated riser inlets were set as follows: Structure Nos. 4,6,9,10,12 and 13 at the 100-year sediment elevation; Structure No. 2 at the 73-year submerged sediment elevation and Structure No. 11 at the 59-year submerged sediment elevation. Storage space for sediment in Structure Nos. 2 and 11 was made available in the sediment pool reserved for the second 50-year period for submerging 80 percent of the second 50-year period and aerating 10 percent of the first 50-year period. Storage space was made available in the flood detention pool for aerating 10 percent of the first and 20 percent of the second 50-year periods of sediment accumulation.

There are no unusual foundation or soil conditions that will create problems in the construction of the floodwater retarding structures or emergency spillways. The emergency spillways will be vegetated. Foundation drains will be provided for the structures as determined by the detailed soils investigation. The preliminary soils investigation indicates foundation drains are needed, therefore, the structural cost estimates include this cost.

There are no gravel pits, pipe lines, oil or gas wells that will be affected by the construction of the planned works of improvement.

The road affected by the flood pool of Floodwater Retarding Structure No. 3 will be abandoned.

A water level control device, a vertical sliding gate, will be installed in all floodwater retarding structures. These gates will be incorporated into the structure designs. This will allow the permanent pool levels to be drawn down 2 to 3 feet. A three-foot drawdown will expose approximately 181 acres within these structures for planting of millet for waterfowl. Aquatic vegetation can also be controlled by fluctuating the water level. These devices will partially mitigate the damages to the waterfowl habitat and stream fishery resources caused by the channel improvement. During periods of critical low stream flow, at least as much water as enters the reservoir will be released to provide for downstream uses and to maintain a beneficial equilibrium of biological organisms. This water can be released through the water level control device.

A typical section of a floodwater retarding structure is shown in Figure 4. Design Data for the 13 floodwater retarding structures is shown in Table 3.

Multiple Purpose Structure

A multiple purpose structure in this instance is similar to the floodwater retarding structure except that it contains added permanent water storage for recreational purposes.

Multiple Purpose Structure No. 14 is planned for the control of damaging floodwater and sediment and added water storage for recreational purposes. Basic facilities are to be installed for this structure. The estimated cost for installing this structure, including basic facilities and the water level control device is $565,550. It will provide 1,587 acre feet of floodwater and sediment detention capacity and 2,895 acre feet of storage for recreational purposes.

The floodwater detention capacity of 1,361 acre-feet for the multiple purpose structure is the equivalent of 6.90 inches of

runoff from the drainage area of 3.70 square miles or 0.31 inches of runoff from the entire watershed. The drainage area of this structure is 4.48 percent of the watershed.

The 100-year submerged sediment was placed below the ungated riser inlet or permanent pool elevation. Space was made available in the detention pool for the 100-year aerated sediment.

The maximum depth of the sediment pool (100-year submerged) for Structure No. 14 will be 13.0 feet, the depth of the recreation pool above the sediment pool will be 26.0 feet, and the maximum depth of the combined pools will be 39.0 feet. The surface area of the recreation pool will be 200 acres with an additional 121 acres to be utilized for the basic facilities area.

There are no unusual foundation or soil conditions that will create problems in construction. The emergency spillway will be vegetated.

The water level control device in this structure will further mitigate the damages to the stream fishery resources and will also serve as a management tool for making replacements or repairs to some of the water-based facilities. Since this device will serve both flood prevention (mitigation measure) and recreation (management tool), the cost was allocated to purposes using the "use of facilities" method.

The approximate kinds and amounts of basic facilities to be included for this structure are listed in Table 2-B were based on a design capacity of 2,127 persons per day. The location of the structure is shown on the Project Map, Figure 7.

Adequate city water supply and sewage mains are located nearby. Costs are limited to water distribution and sewage collection lines within the recreation area. The city water supply will be used as the source of water for the recreation area and the city sewage system and garbage disposal system will be used for disposal of wastes from the recreation area.

The City of Meridian owns all land involved in this multiple purpose structure as well as the entire drainage area. The City of Meridian is now getting a portion of its water supply from this area but plan that in the future this will not be a part of their water supply.

State and local public health agency requirements will be met in the installation of this structure and related facilities. If it is found at the time of construction that the water quality is not suitable for primary contact recreation, the source of pollution will be eliminated or the construction will not proceed. The City of Meridian,

a co-sponsor of the project, will monitor the quality of water in the recreation lake as a part of the operation and maintenance of the facility.

Design data for the multiple purpose structure is shown in Table No. 3.

The 13 floodwater retarding structures and one multiple purpose structure will provide 9,045 acre feet of floodwater detention capacity. This is the equivalent of 6.46 inches of runoff from their combined drainage areas of 26.55 square miles or 2.05 inches of runoff from the entire watershed. They will impound in detention storage from 4.75 to 7.33 inches of runoff from their respective drainage areas which total 32.11 percent of the watershed.

Flood Prevention Channels

There are approximately 55 miles of channel improvement planned in this watershed. This channel improvement for flood prevention varies from simple clearing and snagging to a portland cement concrete lined channel.

Gallagher Branch will be enlarged from its new confluence with Sowashee Creek (Sowashee Sta 316+50 = Gallagher Sta 16+50) to a portland cement concrete drop structure located at Sta 45+50. A portland cement concrete lined channel (see Figure 2) is planned from Sta 45+50 to Sta 98+00 which will be the end of the improvement on this tributary. The weir in this drop structure is designed to pass the 100-year frequency flow. This structure is a Type C (see Engineering Handbook, Section 11, U. S. Department of Agriculture, Soil Conservation Service) drop spillway (see Figure 3). The earthen channel below the stilling basin is protected by riprap in an enlarged section until complete excess energy dissipation is accomplished. A lined channel was chosen because of the excessive grade, limited right-of-way and the requirement for 100-year protection in an urban area.

The main Sowashee Creek joins Okatibbee Creek at the lower end of this project. Since the Okatibbee is controlled approximately 12 miles upstream from this junction by a U. S. Army Corps of Engineers dam, there will be no significant backwater encountered. There is no outlet available which will keep the 100 year design flow from this project in bank, however, the outlet is considered adequate, due to the control on Okatibbee Creek.

The main Sowashee Channel is designed to provide 100-year protection from its confluence with Okatibbee Creek, Sta 0+00 to Sta 525+00. Three Type C drop structures are planned between the Okatibbee Creek and the end of the urban protection (see Figure 3). These weirs

are designed to pass the 100-year flow with no significant tail water effect at design capacity. Provisions are incorporated to allow dissipation of excess energy on portland cement concrete and enlarged ripraped sections.

A transition section is designed between Sta 525+00 and Sta 585+00 to bring the channel from 100-year capacity down to the size required for agricultural protection.

The majority of the channel improvement above Sta 585+00 on the main creek and its tributaries in the agricultural portion of the watershed is clearing and snagging. Enlargement was required on the main Sowashee Channel from Sta 810+00 to Sta 860+00. Some enlargement was required on Lateral No. 6 from approximately Sta 70+00 to Sta 200+00. The lateral from Dam No. 11 and Dam No. 14 required enlargement to carry the release from the structures.

The materials through which these channels are to be constructed are SM, SC-SM with plasticity indices ranging from non-plastic to 19, with most sections having a plastic index of 6 or less.

Using USDA Soil Conservation Service Technical Release No. 25 to establish criteria, the allowable velocities were 3 to 4 feet per second. These velocities were unrealistic when associated with a channel of the size required to carry the 100-year peak discharge from a 50 square mile drainage area. Therefore, research was initiated to determine the velocities which had existed in the Sowashee Channel after improvement by the U. S. Corps of Engineers in 1955. Using this data, it was determined that a velocity of 5 feet per second would be allowable for the 10-year storm under "as built" conditions. The data and procedures used to make this decision are presented in the engineering section of Investigations and Analysis, Page 75.

The purpose of the channel improvements is to provide additional capacity for disposing of controlled flow from the floodwater retarding and multiple purpose structures and the runoff from the uncontrolled portion of the watershed. The channels will supplement these structures and will further reduce flood stages, frequency of flooding and flood plain area inundated.

The pipe overfall structures are to be installed as appurtenances to the channel improvement and their installation, with adapted vegetation on channel banks, is needed to eliminate or reduce the degrading and upstream channel erosion. The approximate number and location of pipe overfall structures needed was determined by a study of the areas draining directly into the proposed channel improvements. The exact number and location of these structures will be determined at the time of final design of the channel improvements.

The reinforcements, alterations and modifications to be made on main Sowashee Creek Channel and on fixed improvements are as follows:

a. Lengthen 3 bridges
b. Build one new bridge
c. Underpin 8 bridges
d. Riprap under 12 bridges
e. Support and riprap 9 sewer lines
f. Anchor 1 gas line
g. Relocate 10 power poles
h. Salvage abandoned building
i. Shift church building

Erosion of the channel through the I-59 and I-20 Interchange (4 new bridges) will be prevented by riprap. This riprap will be placed as part of the entrance section for Drop Structure No. 1 which will be located immediately downstream from the most downstream interchange bridge.

The modifications, alterations and reinforcements to be made on Gallagher Creek are as follows:

a. Lengthen 1 bridge
b. Build 1 new bridge and 1 box culvert
c. Underpin 4 bridges
d. Support 1 sewer line
e. Relocate 2 waterslines

In addition, concrete lining is planned on Gallagher Branch between channel profile Stations 46+20 and 98+00. Design velocities are too high for earth channels due to slope and restricted right-of-way. This also necessitated a planned concrete grade control and energy dissipator structure at the lower end of the concrete lining.

Design data, channel capacity and other pertinent data for channel improvements are shown in Table 3-A.

Illustrations of typical channel sections are shown in Figures 1 and 2. The Project Map, Figure 6, shows the location of the measures with respect to the watershed.

A model study will be made of the concrete lined channel improvement on Gallagher Branch prior to final design. The cost of this study is estimated to be about $50,000 and is included in the engineering portion of the cost estimate.

EXPLANATION OF INSTALLATION COSTS

Land Treatment Measures

Land treatment measures will be installed at an estimated total cost of $522,249, of which about $142,651 will be financed from PL-566 funds, and about $379,598 will be financed by Other funds, Table 1.

The PL-566 funds are for additional technical assistance to accelerate the land treatment program, for cost-sharing on installation of critical area plantings, and for cost-sharing on roadside erosion control. The Other funds costs are for installing the land treatment measures, technical assistance, and for cost-sharing on the installation of the critical area plantings and roadside erosion control.

The PL-566 technical assistance costs will be used to prepare and revise conservation farm plans and for preparing forest management plans; for planning, establishing, and maintaining conservation cropping systems, contour farming, crop residue use, row arrangement, pasture planting, pasture management, pasture renovation, brush control, farm ponds, tree planting, timber stand improvement, grassed waterways or outlets, diversions, terracing, surface field ditches, mains and laterals, wildlife food planting, habitat development and preservation, and stocking and management of fish ponds. The above items are a combination of practices on which the cost has been estimated but adequate treatment will be achieved through various combinations of these practices.

The costs of installing the forestry phases of the program were developed by the Mississippi Forestry Commission and the U. S. Forest Service. The technical assistance costs were based on the present costs of the going Cooperative Forest Management Program. The costs of installing measures were based on present prices paid by landowners or operators to establish individual measures in the locality. The amount of forest land treatment measures needed to meet treatment goals was based on a field survey of the watershed, adjusted for expected landowner participation during the installation period.

The estimated cost of the forest land treatment program is $73,700. Of this amount, $15,500 will be provided under authority of PL-566 and $58,200 will be contributed by other sources. The PL-566 funds are for accelerated technical assistance and for cost-sharing for critical area tree planting and site preparation.

The Mississippi Forestry Commission will provide $1,100 for accelerated technical assistance, and the going Cooperative Forest Management Program will provide additional technical assistance valued at $400.

The landowners and operators will finance $56,700 of the other $58,200 for installation of measures on their lands. The remaining $1,500 of Other funds is the $1,100 and $400 stated in the above paragraph as coming from the Mississippi Forestry Commission and the going Cooperative Forest Management Program.

The unit cost for establishing land treatment measures are based on current values in this area (1969 prices). The basis for the cost-sharing on critical area land treatment measures was based on the current cost-sharing rate for establishing similar measures under the Rural Environmental Assistance Program in Lauderdale County.

Structural Measures

Floodwater Retarding Structures

The 13 floodwater retarding structures, including water level control devices, will be installed at a total installation cost of $882,051 of which about $750,146 will be financed from PL-566 funds and about $131,905 will be financed from Other funds, Table 2.

The PL-566 funds include costs for construction $656,921 (which includes 12 percent for contingencies) and engineering, $93,225.

The Other funds cost for land rights amounts to approximately $131,905.

Water level control devices will be installed in 13 floodwater retarding structures. These devices will be installed as mitigating measures for waterfowl and fish habitat losses which will result from channel improvements. These losses will occur from disturbance of beaver ponds and the clearing and overhanging trees from channel banks which provide habitat and waterfowl food in the streams. The cost for installing these devices is included in the construction cost of the floodwater retarding structures and amounts to $6,500.

Multiple Purpose Structure

Multiple Purpose Structure No. 14, including the water level control device, is to be installed at a total installation cost of $250,663, of which about $132,939 will be financed by PL-566 funds and about $117,724 will be financed by Other funds.

The specific costs for Multiple Purpose Structure No. 14 are $63,000, all allocated to recreation. This $63,000 is estimated land value costs. The joint costs are $187,663. Using the "use of facilities" method to allocate these joint costs to purposes, $66,488 was allocated to flood prevention and $121,175 was allocated to recreation. On cost-sharing for the costs allocated to flood

prevention ($66,488), PL-566 funds will bear the cost of construction ($60,054) and engineering ($6,434). On cost-sharing for the costs allocated to recreation ($184,175), PL-566 funds will bear 50 percent of the construction costs ($54,724) and 100 percent of the engineering costs ($11,727). Other funds will bear 50 percent of the construction costs ($54,724) and 100 percent of the land rights costs ($63,000) since all of the land is owned by the City of Meridian, a co-sponsor.

No cost-sharing will be provided for the engineering, legal or administrative costs incurred by the local organizations for acquiring land rights for the multiple purpose structure.

Recreational Facilities

The basic facilities with Multiple Purpose Structure No. 14 are to be installed at a total installation cost of $314,887, of which $145,343 or about 46 percent will be financed from PL-566 funds and $169,544 or about 54 percent will be financed from Other funds.

Cost-sharing on the basic facilities with Structure No. 14 was allocated equally between PL-566 funds and Other funds for construction ($131,278) and engineering ($14,065). Land rights cost of $24,200 was allocated 100 percent to Other funds since the City of Meridian, one of the co-sponsors of this project, owns all land involved in this structure as well as the entire drainage area.

Flood Prevention Channels

Flood prevention channels are to be installed at an estimated total cost of $5,383,815 of which about $5,068,508 will be financed from PL-566 funds and about $315,307 will be financed from Other funds.

PL-566 funds include cost for construction ($4,650,221), which includes 12 percent for contingencies, and engineering ($418,287). The construction cost will be used for constructing the channels, installing the pipe overfall structures as appurtenant measures, and planting adapted vegetation along channel banks. Engineering services cost will be used to make the detailed surveys and prepare plans and specifications.

The Other funds include costs of obtaining land rights ($315,307). Land rights costs will be used for purchasing easements and rights-of-way and for local costs associated with installation of the channel improvements.

The estimated costs of planned alterations, modifications, strengthening, etc., of fixed improvements on Sowashee Creek are as follows:

SOWASHEE CREEK

Station	Funding		Type of Work
	PL-566 Dollars	Other Dollars	
234+00	0	5,100	Sewer - riprap; new supports; strengthening sewer overflow structure.
269+40	0	4,800	Sewer - riprap; new supports.
270+60	29,200	0	Bridge (49th Ave.) - underpin; riprap; drift deflectors.
272+20	14,300	0	Railroad bridge - underpin, riprap; drift deflectors.
305+60	39,000	0	Tom Bailey Bridge - strengthen concrete piers; underpin, riprap.
312+30	0	11,800	Sewers - new supports; riprap, rebuild 2 manholes.
364+50	16,500	0	Railroad bridge - Underpin; riprap; drift deflectors.
273+50	12,200	21,000	31st Ave. - add 4 ea. 20-ft. spans with bulkheads; underpin; riprap; drift deflectors; relocate 2 power poles; relocate 2 telephone poles; salvage abandoned building; shift church building; build retaining wall.
387+60	0	6,400	Sewer - new supports; riprap.
403+10	0	11,100	Grand Ave., add one 24-ft. span and bulkhead; relocate 4 ea. power poles; anchor 4 manholes; new supports for 200 ft. 30" sewer.
438+50	21,600	10,800	22nd Ave. - strengthen concrete piers; underpin; riprap; new supports for sewer.
439+40	0	500	Gas line anchor.
440+30	11,100	0	Frontage road - underpin; riprap.
452+15	0	300	Sewer - anchor sewer.
453+40	7,200	51,700	18th Ave., add six 20-ft. spans and 2 bulkheads; relocate 6 power poles; and riprap 400 ft. retaining wall.

Station	Funding PL-566	Funding Other	Type of Work
459+20	8,200	0	Railroad - underpin - riprap.
527+20	0	37,500	New bridge.
531+90	8,000	0	Highway 45 - riprap.
548+90	18,000	0	Old Highway 80 - riprap.

The estimated costs of planned alterations, modifications, strengthening, etc., of fixed improvements on Gallagher Creek are as follows:

Station	Funding PL-566	Funding Other	Type of Work
22+20	0	20,982	Build new bridge; new sewer supports; riprap, deflectors.
35+00	30,100	0	Underpin and reinforce railroad bridge.
45+80	8,700	8,500	Add 10 ft. span; relocate water line, reinforce bridge.
52+50	9,800	500	Reinforce bridge, relocate water line.
59+40	0	8,600	Build concrete box culvert.
71+50	19,800	0	Underpin and reinforce bridge.

Project Administration

The total cost for administering this project is estimated to be $935,373, of which about $863,043 will be financed from PL-566 funds and about $72,330 will be financed from Other funds.

The PL-566 funds costs include $498,618 for construction inspection of structural measures on which PL-566 construction funds are spent; $1,407 for reviewing, servicing and construction inspection on architectural and engineering contracts to protect the Government's interest in basic recreational facilities in connection with Multiple Purpose Structure No. 14; and $363,018, other costs for Soil Conservation Service administrative cost in project installation which includes $13,000 for administration of contracts and $350,018 overhead costs.

The Other funds costs include $10,997 for construction inspection; $1,407 for reviewing, servicing and construction inspection on architectural and engineering contracts to protect the local interest in

basic recreational facilities in connection with Multiple Purpose Structure No. 14; and $59,926 other costs for administrative costs in project installation which includes an estimated $51,243 legal costs and $8,683 overhead costs.

Costs

The unit costs used in this project are based on actual construction costs in the State of Mississippi and on the actual value of land and services in the watershed.

Estimated Schedule of Funds by Project Years

Project Year	PL-566	Other Funds	Total
First			
Land Treatment	$23,776	$63,267	$87,043
Subtotal	23,776	63,267	87,043
Second			
Land Treatment	23,775	63,266	87,041
Structures	392,847	177,064	569,911
Subtotal	416,622	240,330	656,952
Third			
Land Treatment	23,775	63,266	87,041
Structures	392,941	207,149	600,090
Subtotal	416,716	270,415	687,131
Fourth			
Land Treatment	23,775	63,266	87,041
Structures	3,661,687	265,085	3,926,772
Subtotal	3,685,462	328,351	4,013,813
Fifth			
Land Treatment	23,775	63,266	87,041
Structures	1,312,757	52,182	1,364,939
Subtotal	1,336,532	115,448	1,451,980
Sixth			
Land Treatment	23,775	63,267	87,042
Structures	336,704	33,000	369,704
Subtotal	360,479	96,267	456,746
SUBTOTAL	6,239,587	1,114,078	7,353,665
Project Administration	863,043	72,330	935,373
TOTAL PROJECT	7,102,630	1,186,408	8,289,038

EFFECTS OF WORKS OF IMPROVEMENT

There is a total of 8,414 acres of flood plain within the watershed. After installation of the proposed project measures, the total area benefited by structural measures will be 7,109 acres. There will be 6,358 acres directly benefited and 751 acres indirectly benefited. The indirectly benefited area is located along tributary streams on which no structural measures are planned. These benefits occur as a result of adequate outlets being provided by the planned channel improvements. No monetary benefits were claimed on this indirectly benefited area.

The installation of the project measures will effect a reduction in acres flooded for the agricultural area of the watershed of approximately 58 percent for the 100-year frequency, 60 percent for the 50-year frequency, 67 percent for the 25-year frequency, 76 percent for the 10-year, 84 percent for the 5-year, 92 percent for the 2-year and 100 percent for the 1-year frequency storm.

The objective of the project for the urban areas is to reduce the damage from a flood that could be expected to occur on the average of once in 100 years to a level where the damages would be relatively minor.

The installation of the project measures will effect a reduction in acres flooded for the main Sowashee Creek urban area of 100 percent for the 100 year frequency storm.

This reduction in acres flooded on main Sowashee Creek urban areas would eliminate any monetary damage from a storm the size of the April 5-6, 1964 storm of approximately 33-year frequency. In addition, no monetary damage would be expected to occur on main Sowashee Creek urban area from a 100-year frequency storm.

After project installation, the opportunity for development of much of the urban flood plain for commercial and industrial sites will be greatly enhanced. Easy access to nearby major highways and railroads will make the development of this area more desirable.

The Gallagher Branch tributary urban area would not be expected to flood up to channel profile Station 98+00 from a storm the size of the April 5-6, 1964 storm or from a 100-year frequency storm. No channel improvements are planned above Station 98+00 at the request of one of the sponsors, the City of Meridian, due to anticipated high cost of easements, the limited work area and the extremely high cost of bridge and culvert modifications and replacements.

It is expected that monetary damages will continue to occur on Gallagher Branch above channel profile Station 98+00. Annual damages remaining above channel profile Station 98+00 and to channel profile Station 220+50 (40th Street) are estimated to be $20,828, while $162,700 damage would be expected from a 100-year frequency storm. No damages were evaluated above 40th Street.

The City officials of the City of Meridian and the local residents of the upper Gallagher Creek area understand that there will be flooding on Gallagher Creek upstream from Station 98+00 after the installation of the proposed Sowashee Watershed project measures. Station 98+00 is in the upper limits of the proposed channel improvment. The City of Meridian will advertise this flood danger to the concerned people at least once each year until such time as the danger is removed or reduced so that its chance of occurrence is one in a hundred years. They will use their official position to encourage the future non-development of the flood prone area until such time as the flood danger is reduced to the point that only insignificant flood damage would result from a storm with recurrence interval of once in 100 years.

No further urban development is recommended on the Gallagher Branch flood plain above channel profile Station 98+00.

The map of the urban area, included in this work plan, shows the area expected to be flooded by a 100-year frequency storm with and without the installation of this project. There are approximately 53 commercial establishments, 302 residences and 10 industrial sites in the area to be benefited by proposed works of improvement. No estimate as to number and types of property owners was made on Gallaghers Branch above channel profile Station 98+00.

The installation of the project measures will greatly reduce the indirect damages caused from flooding by reducing the need for evacuation, savings of relief expenditures, reduced costs of inoculations against diseases, and reduced time and cost of travel to work because of flooded streets.

Secondary benefits of a local nature only were claimed. These benefits will accrue because of increased economic activity directly attributed to the watershed area.

After installation of the proposed project measures, the damages to fixed improvements such as fences, field ditches, and county and farm roads and bridges will be reduced approximately 94 percent.

Flood plain area benefited by structural measures amounts to 7,109 acres and is owned by approximately 124 agricultural landowners and 365 urban landowners. The benefited acreage per ownership in the agricul-

tural area ranges from a few acres to about 200 acres. High yields of crops and pastures can be expected on this land. The proposed project will reduce the frequency of flooding sufficiently so that farmers can install and maintain needed field ditches on flood plain land.

The reduction in the frequency of flooding events and area flooded during the cropping season will make possible the intensification of flood plain land.

There will be no increase in surplus or allotted crops in the watershed. Cropland acreage on class "e" land will be reduced from 1,732 to 1,004 acres. The major portion of this change will occur on Classes IIIe, IVe, and VIe lands and will be established to perennial vegetation such as trees and grass. The land use adjustment and the reduction in the frequency of flooding events and area flooded will permit a more intensive type of management of the flood plain lands. This will result in more efficient operations, reduced costs, and increased net returns to all farmers in the watershed, especially the low income farmers. About 85 percent of the farms have gross farm income of less than $2,500 annually from the sale of farm products.

Cotton and soybeans are the only crops produced primarily for market. Grain crops (crops and oats) are grown primarily for on-farm use as grain or silage for beef cattle herds.

After installation of the PL-566 measures, the annual rate of sediment yield in Sowashee Creek at the lower boundary of the watershed will be reduced from approximately 86,000 tons per year to approximately 41,000 tons per year.

The installation of the project measures will effect a 67 percent in the sediment overbank deposition. The erosion damage (roadside erosion) will be reduced by 68 percent. The reduction of sediment deposition and erosion of roadbanks and hillsides will enhance the scenic qualities of the watershed.

No adverse effects are expected downstream as a result of the installation of the PL-566 structural measures.

A management program which favors wildlife species will be followed by the individual farmers through conservation farm plans with the Soil Conservation District. There will be 349 acres of critical area treatment throughout the watershed that will be planted to various grass mixtures and will provide some wildlife cover. Desirable edge effect will be created by the establishment of 50 acres of wildlife food and cover plants. Management techniques will consist of creating small openings in woods, leaving fence rows, ditch banks and breaking large idle fields into smaller, intensively managed areas. Management practices will consist of disking, fencing, clipping and other methods of wildlife habitat improvement, as required.

Farm game habitat will not be altered significantly by the planned works of improvement. Installation of wildlife practices in conservation farm plans will enhance these species. Waterfowl habitat will be lost by clearing of beaver dams and overhanging mast trees along streams.

Some loss of squirrel habitat will occur from right-of-way clearing for channels. Pioneer vegetation along these channels will furnish cover for small game. Stream fishery resources in the watershed are almost negligible and therefore will not be significantly affected by the channel improvements.

Fourteen floodwater retarding and multiple purpose structures will enhance waterfowl habitat and lake fishery resources. There will be approximately 517 acres of available water created by these structures. Better management of fish populations and vegetation control will be possible by installation of the drawdown gates in the structures. Waterfowl food can be grown in the lake margins of the floodwater retarding structures by the use of these gates. This will partially mitigate damage to waterfowl habitat caused by stream channel improvements. It is expected that waterfowl will be attracted to this watershed by the Okatibbee Reservoir recently constructed by the U. S. Army Corps of Engineers.

The water that will collect in each of the permanent pools of the floodwater and multiple purpose structures appears to be of high quality and suitable for the uses planned. There is no indication of any unusual characteristics in the watershed areas above the structures to significantly change the quality of water from its natural state.

The general public will greatly benefit by the installation of the planned recreation in conjunction with Structure No. 14. It is planned that fishing, boating, swimming, camping, picnicking, and nature study will be the types of recreational enjoyment realized from the construction of this structure. The recreation facilities will be open to the public year round and it is estimated that this site will result in 84,015 visitor day use annually. The value of each visitor day is estimated to be $1.50. The primary season of use for this structure is the thirteen-week summer with a design capacity of 2,127 persons. The estimated present population within a 50-mile radius of these facilities is 218,600.

PROJECT BENEFITS

The estimated total average annual benefits, evaluated and used in project justification accruing to the works of improvement amount to $760,454 (Table 6). In addition, it is estimated that land treatment measures will provide damage reduction benefits of $11,139.

The damage reduction benefits are estimated as follows: crops and pastures, $7,019; other agricultural, $2,464; residential, commercial and industrial, $407,086; roads, street and bridges, $34,712; sediment, $2,718; erosion, $3,247, and indirect, $86,433.

The application of the planned project works of improvement will reduce the average annual damages presently occuring to crops and pastures from $7,811 to $792; other agricultural from $2,771 to $307; residential, commercial and industrial from $427,914 to $20,828; roads, streets and bridges from $36,957 to $2,245; sediment from $4,052 to $1,334; erosion from $4,800 to $1,553 and indirect from $91,222 to $4,789.

Other benefits accruing to the project are more intensive use to agricultural areas, $16,958 and to urban areas, $22,967; planned recreation, $126,022 and secondary, $61,967.

The recreation benefits evaluated are limited to those which are expected to accrue from use by the general public or organized groups.

Secondary benefits claimed accrue from the production, transportation, processing and marketing of project goods and services accruing within the zone of influence of the project. Secondary benefits from a national viewpoint were not considered pertinent to the economic evaluation.

The expected reduction of flood hazards will permit a higher level of fertilizer, cultivation, and insect control, and will increase the stability of family farms through more efficient operation, reduced costs, and increased net returns to the low income farm units.

The reduction in flooding in the urban area will permit this area to be used more intensively and will fulfill the need for additional land areas for future development except on Gallagher Branch above channel profile Station 98+00 where no change is anticipated.

Increased fishing water in the watershed will be provided by the construction of 14 floodwater retarding and multiple purpose structures. These reservoirs will be properly stocked with fingerling fish from Federal hatcheries. Technical assistance will be given landowners on stocking and managing these reservoirs for fish production.

Water level control devices will be installed in 13 floodwater retarding structures and on multiple purpose structure. These are vertical sliding gates and will allow the permanent pool levels

to be drawn down 2 to 3 feet when necessary. A much better fish and waterfowl management program is possible with facilities for fluctuating the water level. This will also aid in the control of aquatic vegetation.

The local sponsors will be encouraged to permit public use of the lakes above the floodwater retarding structures for fishing and recreational purposes. Facilities for public health safeguards, under existing regulations, will be the responsibility of landowners and operators of land on which the structures are located.

The local sponsors and landowners will be encouraged to seek professional assistance for operating the reservoirs for maximum fish and wildlife utilization.

The proposed forest land treatment measures will improve the hydrologic condition of the forest land. This will reduce sediment and retard storm runoff. Multiple use management and continued fire protection will increase productivity of the forest resource.

COMPARISON OF BENEFITS AND COSTS

The floodwater retarding structures and multiple purpose structure with facilities, in conjunction and channel improvements, are to be installed, operated and maintained at an estimated annual cost of $515,871 and will have annual benefits (exclusive of secondary) of $698,487 with a benefit-cost ratio of 1.4:1.0. Total benefits due to the project will be $760,454 with a benefit-cost ratio of 1.5:1.0.

PROJECT INSTALLATION

The works of improvement are to be installed over a six-year installation period.

All land treatment measures will be installed during the six-year installation period.

All land treatment measures will be installed during the six-year installation period by the farmers through conservation farm plans in cooperation with the Lauderdale County Soil Conservation District.

Land treatment measures above structural measures will be installed during the first four years of the installation period. The remaining two years will be used to install those land treatment measures in the flood plain which are contingent upon the installation of the planned structural measures.

These measures will be planned and applied farm by farm within the watershed consistent with the objectives of the Lauderdale County

Soil Conservation District and this plan. Additional technical assistance to accelerate the installation of these measures will be provided by the Soil Conservation Service.

Critical area treatment measures will be installed by the Sowashee Drainage District by contract during the first three years of the installation period with financial assistance of the Pat Harrison Waterway District. The technical assistance required for establishing the critical area measures including roadside erosion control will be provided by the Soil Conservation Service.

The local sponsoring organizations will enter into a three-eay agreement with the Mississippi Forestry Commission and the U. S. Forest Service to install the critical area tree planting measures on private land. This agreement will designate responsibility for accomplishing the critical area tree planting.

Landowners having forest land will be encouraged to apply and maintain the best forestry measures on their woodlands. The U. S. Forest Service, in cooperation with and through the Mississippi Forestry Commission, provides technical assistance in the planning and application of forest land treatment measures under the going Cooperative Forest Management Program. They will provide additional technical assistance for accelerating the installation of the forestry measures. A forester will be assigned to this project to assist and guide the landowners in the installation of the planned forestry measures.

All structural measures will be installed by contract during the six-year installation period by the Soil Conservation Service at the request of local sponsors. The Soil Conservation Service will provide engineering and other installation services for all structural measures except for basic facilities. The engineering services for basic facilities will be cost-shared on a 50-50 basis (50 percent Soil Conservation Service and 50 percent City of Meridian), of which the detailed engineering surveys and design will be provided through a negotiated architectural and engineering contract with the costs for Project Administration being provided by the Soil Conservation Service and the local sponsors in equal amounts for needed services such as supervision, inspection of plans and other administrative services, Table 2.

The Sowashee Drainage District will work with the Soil Conservation Service during construction to specifically install the 13 floodwater retarding structures and all channel improvements above the limits of the City of Meridian. The City of Meridian will work with the Soil Conservation Service during construction to specifically install Multiple Purpose Structure No. 14 including basic facilities, channel improvement on Gallagher Branch and main Sowashee Creek from the north city limits downstream to its confluence with Okatibbee Creek. The Pat Harrison Waterway District will assist the Sowashee Drainage District and the City of Meridian with financing.

This project was evaluated as one construction unit.

All land rights will be secured by the Sowashee Drainage District, the City of Meridian and the Pat Harrison Waterway District. These districts and the City have sufficient legal authority (including the power of eminent domain) to acquire all necessary land rights. These districts and the City will, if necessary, use their legal authorities and resources including the power of eminent domain to secure all needed land rights.

The construction procedures for the installation of structural measures will be in accord with all regulations in effect at the time of construction relating to disposal of solid waste, disposition of existing solid waste disposal sites in the area to be water-inundated and/or on adjacent public use lands, and in the placement and management of excavation spoil for mosquito control.

Sequence of Doing Work

(1) The Lauderdale County Soil Conservation District will obtain agreements to carry out recommended soil conservation measures and basic farm conservation plans from owners of not less than 50 percent of the land situated in the drainage area above each floodwater retarding structure. This will be done prior to PL-566 funds being provided for construction of that structure.

(2) Not less than 75 percent of the effective land treatment measures will be installed, or their installation commenced, on those sediment source areas which constitute a serious hazard to the satisfactory design, operation and maintenance of structural measures before their installation is started.

(3) Construct the floodwater retarding structures, the multiple purpose structure and basic facilities, and channels in the sequence as follows:

Second Project Year	-	Multiple Purpose Structure No. 14 and Floodwater Retarding Structure Nos. 2, 7 and 8.
Third Project Year	-	Floodwater Retarding Structure Nos. 1, 4, 5 and 6 and basic facilities for Multiple Purpose Structure No. 14.
Fourth Project Year	-	Floodwater Retarding Structures Nos. 3, 9, 10, 11, 12 and 13 and channel on main Sowashee Creek up to the channel profile Sta. 585+00

Fifth Project Year - Channel on Gallagher Branch.

Sixth Project Year - Channels on main Sowashee Creek from channel profile Sta. 585+00 to 1154+00, Nanabe Creek, Channel Nos. 1-8 and Nos. 10-14

FINANCING PROJECT INSTALLATION

Federal assistance for carrying out the works of improvement on non-Federal land as described in this plan will be provided under the authority of the Watershed Protection and Flood Prevention Act (public Law 566, 83rd Congress; 68 Stat.666) as amended.

The Sowashee Drainage District, the City of Meridian and the Pat Harrison Waterway District fully recognize the expense of organization, costs of legal services and miscellaneous expenses they must bear.

The Pat Harrison Waterway District will finance all land rights costs for 12 of the floodwater retarding structures. The Sowashee Drainage District will assist the Pat Harrison Waterway District in securing land rights for these 12 structures. The Sowashee Drainage District has sufficient legal authority (including the power of eminent domain) to acquire necessary land rights and will exercise this authority as needed.

The City of Meridian will provide land rights for Multiple Purpose Structure No. 14 and Floodwater Retarding Structure No. 11. The City owns all land involved in both of these structures.

It is expected that all land for channels will be donated. In the event the lands for channels are not donated, the Sowashee Drainage District will finance all land rights costs for channel improvements upstream from the Hawkins Road crossing and the City of Meridian will finance all land rights costs for channel improvements downstream from the Hawkins Road crossing. The City of Meridian, with financial assistance from the Pat Harrison Waterway District, will bear the local share of cost of all alterations, modifications and replacements of bridges, culverts and gas, water and sewer mains on channels within and downstream from the city limits.

The City of Meridian plans to apply for a Farmers Home Administration loan to pay for any costs that may be incurred by the City in the installation of the planned works of improvement. A letter of intention has been filed with the Lauderdale County Farmers Home Administration office.

The Pat Harrison Waterway District will pay for all of their costs incurred for the installation of this project from general operating funds.

The total cost for establishing the land treatment measures is estimated to be $522,249.

Land treatment measures to be installed on non-critical areas will be established entirely by individual landowners and operators. They will utilize the Rural Environmental Assistance Program to the extent possible; however, additional REAP cost-sharing will be needed to assist the low income farm families in establishing these measures.

The Sowashee Drainage District is responsible for establishing land treatment on the critical areas. The establishing of grasses and legumes and the roadside erosion control measures will be cost-shared by the Soil Conservation Service under PL-566 and the Sowashee Drainage District with financial assistance of the Pat Harrison Waterway District. Tree planting on non-Federal land will be cost-shared by the U. S. Forest Service in cooperation with and through the Mississippi Forestry Commission under PL-566 and the Sowashee Drainage District. The District will contribute its share of installing these measures in the form of labor, equipment for site preparation, transportation of supplies, and/or similar contributions from landowners and operators.

The other than PL-566 costs involved in the application of forest land treatment measures will be provided by the landowners and operators. The Rural Environmental Assistance Program (administered by the ASCS) is expected to cost-share with qualified landowners in the installation of these measures.

At the time of installation, the allowable value of these contributions will be based on the average prevailing current prices as determined by contractural installation of similar measures or other reliable cost studies.

The Board of Supervisors of Lauderdale County will be responsible for installing the land treatment measures on Sixteenth Section lands with Other funds.

Structural measures will be installed at an estimated total cost of $7,766,789, of which about $6,959,979 will be financed from PL-566 funds and about $806,810 will be financed by Other funds. The Sowashee Drainage District, the City of Meridian and the Pat Harrison Waterway District have requested the Soil Conservation Service to negotiate all contracts.

Financial and other assistance to be furnished by the U. S. Forest Service and the Soil Conservation Service in carrying out this project under PL-566 is contingent on the appropriation of funds for this project.

PROVISIONS FOR OPERATIONS AND MAINTENANCE

Land treatment measures on private land will be operated and maintained by landowners and operators under cooperative agreements with the Soil Conservation District. The operation and maintenance of these measures will be the financial responsibility of the individual operators and landowners. Operation and Maintenance of critical area plantings will be performed by the Sowashee Drainage District and financed by the Pat Harrison Waterway District from its regular operating funds.

The forest land treatment measures will be maintained by the landowners and operators under agreement with the Lauderdale County Soil Conservation District. The Mississippi Forestry Commission, in cooperation with the U. S. Forest Service, will furnish the technical assistance necessary for operating and maintaining the forest land treatment measures under the going Cooperative Forest Management Program. They will also continue to furnish protection under the going Cooperative Forest Control Program.

The Board of Supervisors of Lauderdale County will be responsible for maintaining the land treatment measures on Sixteenth Section lands.

The Sowashee Drainage District, the City of Meridian and the Pat Harrison Waterway District will assume the responsibility to operate and maintain the floodwater retarding structures including the water level control devices and flood prevention channels. The Pat Harrison Waterway District will assume the financial responsibility for this annual operation and maintenance estimated to be $47,912. This cost includes replacement costs for overfall pipes and water level control devices for the flood retarding structures, both with life expectancy of 30 years.

The City of Meridian will operate and maintain Multiple Purpose Structure No. 14 at an estimated annual cost of $48,242 from regular operating funds of the City. This includes the flood prevention and recreation aspects of this structure and replacement costs for basic facilities and the water level control device. Operation and maintenance of this structure will provide for use fees to be charged users of the facilities but will be limited to the amount needed to amortize the initial investment and to provide adequate operation, maintenance and replacement. In addition, the operation and maintenance will also provide for the custodial, policing, sanitation, safety and other operational services for the recreation development. Specific operation and maintenance agreements for this structure and related facilities will be executed prior to signing the project agreement.

The Pat Harrison Waterway District and the City of Meridian will be financially responsible for providing sufficient funds each year to defray the cash obligation of said project for operation and maintenance of structural measures and for replacement costs for parts of structures having a shorter life than 100 years. The balance of the annual operation and maintenance costs will be contributed as services in kind such as labor, equipment hire, and materials by the benefited landowners and operators in the watershed. These services will be arranged for by the Sowashee Drainage District and the City of Meridian.

Travelways for maintenance will be constructed as a part of the construction contract. These travelways will be adequate for movement and operation of maintenance equipment required for maintenance of the channel. They will be maintained as a part of the channel maintenance.

The structural measures will be inspected jointly by representatives of the Sowashee Drainage District, City of Meridian, Pat Harrison Waterway District and the Soil Conservation District. A Soil Conservation Service representative will participate in these inspections annually for a period of three years following construction. Items of inspection for the floodwater retarding and multiple purpose structures will include, but not be limited to, the condition of the principal spillway, the earthfill, the emergency spillway, the vegetative cover and other appurtenances installed as a part of the structures. Items of inspection for the channels will include, but not be limited to the degree of scour, sediment, deposition, bank erosion, obstructions to the flow caused by debris accumulation, and excessive brush and tree growth within the channel. The items of inspection listed are those most likely to require maintenance. The Soil Conservation Service will participate in operation and maintenance only to the extent of furnishing technical assistance to aid in inspection and technical guidance necessary.

The maintenance of the flood prevention channels will be accomplished by the use of sprays and/or labor and equipment to control noxious vegetative growth. Care will be taken in applying sprays to prevent drift in adjoining timberland. This is expected to assist in the promotion and growth of desirable vegetation for streambank erosion control and wildlife habitat. Additional maintenance will include the removal of drifts, debris, and/or silt bars as necessary.

The Sowashee Drainage District, the City of Meridian and the Pat Harrison Waterway District fully understand the requirements for adequate operation and arrangements will be made to satisfy these requirements.

Provisions will be made for free access of representatives of the sponsoring local organizations and the Soil Conservation Service to inspect and provide maintenance for all structural measures at any time.

Inspections after the third year will be made annually by the sponsors. They will prepare a report and send a copy to the Soil Conservation Service employee responsible for operation and maintenance inspections and followup. Where needed, the Soil Conservation Service employee may continue to provide assistance after the third year as determined by the State Conservationist.

Detailed plans for operation and maintenance will be contained in the Watershed Protection Operation and Maintenance Agreement, and this agreement will be executed prior to issuing the invitations to bid. The State Operations and Maintenance Handbook will be used as a guide in preparing and carrying out the Watershed Protection Operation and Maintenance Agreement.

TABLE I - ESTIMATED PROJECT INSTALLATION COSTS

Sowashee Creek Watershed, Mississippi

Installation Cost Item	Unit	Number: Non-Fed. Land	Estimated Cost 1/ (Dollars): P. L. 566 Funds: Non-Fed. Land	Other Funds: Non-Fed. Land	Total
LAND TREATMENT					
Soil Conservation Service					
Cropland	Ac.	2,425	0	40,818	40,818
Grassland	Ac.	4,940	0	246,555	246,555
Critical Area Planting					
Grasses and Legumes	Ac.	349	33,103	17,825	50,928
Technical Assistance			94,048	16,200	110,248
SCS Subtotal			127,151	321,398	448,549
Forest Service					
Flood Prevention					
Critical Area Tree Planting	Ac.	240	8,400	2,000	10,400
Technical Assistance			1,100	0	1,100
Watershed Protection					
Forest Land	Ac.	4,514	0	54,700	54,700
Technical Assistance			6,000	1,500 2/	7,500
FS Subtotal			15,500	58,200	73,700
TOTAL LAND TREATMENT 3/			142,651	379,598	522,249
STRUCTURAL MEASURES					
Construction					
Soil Conservation Service					
Floodwater Retard. Str.	No.	13	656,921	0	656,921
MP Structures	No.	1	114,778	54,724	169,502
Basic Facilities	No.	1	131,278	131,278	262,556
Stream Channel Imp.	Mi.	55	4,650,221	0	4,650,221
SCS Subtotal			5,553,198	186,002	5,739,200
Engineering Services					
Soil Conservation Service			543,738	14,066	557,804
Subtotal - Engineering			543,738	14,066	557,804

TABLE I - ESTIMATED PROJECT INSTALLATION COSTS (Cont'd)

Sowashee Creek Watershed, Mississippi

Installation Cost Item	Unit	Number Non-Fed. Land	Estimated Cost 1/ (Dollars) PL-566 Funds Non-Fed. Land	Other Funds Non-Fed. Land	Total
(Structural Measures Cont'd.)					
Relocation Payments					
Soil Conservation Service			0	0	0
Subtotal-Relocation			0	0	0
Project Administration					
Soil Conservation Service					
Relocation Assistance					
Advisory Services			0	0	0
Construction Inspection			498,618	10,997	509,615
Reviewing and Servicing A & E Contract 4/			1,407	1,407	2,814
Other			363,018	59,926	422,944
Subtotal - Project Adm.			863,043	72,330	935,373
Other Costs					
Land Rights			0	534,412	534,412
Subtotal - Other Costs			0	534,412	534,412
TOTAL STRUCTURAL MEASURES			6,959,979	806,810	7,766,789
TOTAL PROJECT			7,102,630	1,186,408	8,289,038
SUMMARY					
Subtotal - SCS			7,087,130	1,128,208	8,215,338
Subtotal - FS			15,500	58,200	73,700
TOTAL PROJECT			7,102,630	1,186,408	8,289,038

1/ Price base 1969.
2/ Includes $400 from the going Cooperative Forest Management Program.
3/ Includes estimated value of materials, equipment usage and labor contributed by landowners and operators, land treatment measures not cost-shared with PL-566 funds may or may not be cost-shared with Rural Environmental Assistance Program.
4/ The Service will perform such inspections with Federal Funds as is deemed necessary to protect the Government's interest ($14,065) in contract relative to basic recreational facilities for Site No. 14.

TABLE I-A - STATUS OF WATERSHED WORKS OF IMPROVEMENT
(at time of work plan preparation)

Sowashee Creek Watershed, Mississippi

Measures	Unit	Applied to Date	Total Cost (Dollars) 1/
LAND TREATMENT			
Cropland			2/
Conservation Cropping System	Ac.	1,000	2,900
Terraces	Mi.	11	2,541
Grassed Waterway	Ac.	20	1,000
Contour Farming	Ac.	900	1,800
Cover Cropping	Ac.	1,300	19,500
Crop Residue	Ac.	1,300	5,200
Drainage Main and Laterals	Mi.	2	5,864
Drainage Field Ditch	Mi.	2	1,158
Diversions	Mi.	1	598
Row Arrangement	Ac.	700	1,400
Subtotal			41,961
Grassland			
Pasture Planting	Ac.	2,300	108,100
Pasture Renovation	Ac.	1,178	31,806
Pasture Management	Ac.	1,600	25,600
Farm Pond	No.	105	41,815 3/
Drainage Mains & Laterals	Mi.	3.5	10,262
Drainage Field Ditch	Mi.	1	579
Brush Control	Ac.	1,600	6,400
Fencing	Mi.	43	31,863
Land Clearing	Ac.	145	8,775
Subtotal			265,200
Woodland			
Tree Planting	Ac.	500	15,000
Critical Area Planting	Ac.	100	3,000
Stand Improvement	Ac.	690	2,400 4/
Cooperative Forest Fire Control	Ac.	31,500	6,250
Firebreak	Mi.	1	200
Subtotal			26,850
TOTAL			334,011

1/ Price base 1969
2/ Includes 50 acres and $1,000 for wildlife habitat development.
3/ Includes $760 for stocking of 100 ponds with fish and management of 28 ponds for fish.
4/ Includes $1,000 for 500 acres of wildlife habitat preservation.

TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Sowashee Creek Watershed, Mississippi

(Dollars) 1/

Item	Installation Costs - PL-566 Funds				Installation Cost -Other Funds				Total Installation Cost
	Construction	Engineering	Relocation Payments 2/	Total PL-566 Funds	Construction	Engineering	Land Rights	Relocation Payments 2/	Total Other	
Floodwater Retarding Structures:										
No. 1	102,908	12,863	0	115,771	-	-	16,790	0	16,790	132,561
No. 2	49,241	7,914	0	57,155	-	-	12,765	0	12,765	69.920
No. 3	38,934	6,257	0	45,191	-	-	6,900	0	6,900	52,091
No. 4	32,561	5,233	0	37,794	-	-	7,820	0	7,820	45,614
No. 5	42,745	6,870	0	49,615	-	-	7,245	0	7,245	56,860
No. 6	38,268	6,150	0	44,418	-	-	5,750	0	5,750	50,168
No. 7	121,556	13,024	0	134,580	-	-	33,005	0	33,005	167,585
No. 8	60,598	7,575	0	68,173	-	-	13,570	0	13,570	81,743
No. 9	33,256	5,345	0	38,601	-	-	5,865	0	5,865	44,466
No. 10	35,625	5,725	0	41,350	-	-	6,095	0	6,095	47,445
No. 11	43,289	6,957	0	50,246	-	-	2,990	0	2,990	53,236
No. 12	19,451	3,126	0	22,577	-	-	7,935	0	7,935	30,512
No. 13	38,489	6,186	0	44,675	-	-	5,175	0	5,175	49,850
Subtotal FWRS	656,921	93,225	0	750,146	-	-	131,905	0	131,905	882,051
Multiple Purpose Structure No.14	114,778 2/	18,161	0	132,939	54,724 3/	-	63,000	0	117,724	250,663
Basic Facilities Site No. 14	131,278	14,065 4/	0	145,343	131,278	14,066 4/	24,200	0	169,544	314,887
Subtotal MPS & Basic Facilities	246,056	32,226	0	278,282	186,002	14,066	87,200 5/	0	287,268	565,550
Channel Improvement: 6/							7/			
Sowashee Creek	3,214,546	237,013	0	3,451,559	-	-	241,825	0	241,825	3,693,384
Nanabe Creek	57,551	5,138	0	62,689	-	-	6,675	0	6,675	69,364
Lateral No. 1	4,917	527	0	5,444	-	-	525	0	525	5,969

TABLE 2 - Continued
Sowashee Creek Watershed, Mississippi

(Dollars) 1/

Item	Installation Costs - PL-566 Funds				Installation Costs - Other Funds				Total Installation Cost
	Construction	Engineering	Relocation Payments 2/	Total PL-566 Funds	Construction	Engineering	Land Rights	Relocation Payments 2/	Total Other	
Channel Improvements:(cont'd)										
Lateral No. 2	10,595	1,135	0	11,730	-	-	1,050	0	1,050	12,780
Lateral No. 3	13,373	1,433	0	14,806	-	-	900	0	900	15,706
Lateral No. 4	21,045	2,255	0	23,300	-	-	1,575	0	1,575	24,875
Lateral No. 5	9,296	996	0	10,292	-	-	750	0	750	11,042
Lateral No. 6	30,359	3,253	0	33,612	-	-	2,850	0	2,850	36,462
Lateral No. 7	15,109	1,619	0	16,728	-	-	1,650	0	1,650	18,378
Lateral No. 8	15,977	1,712	0	17,689	-	-	1,425	0	1,425	19,114
Lateral No. 10	5,906	633	0	6,539	-	-	600	0	600	7,139
Lateral No. 11	2,901	311	0	3,212	-	-	300	0	300	3,512
Lateral No. 12	18,558	1,988	0	20,546	-	-	1,575	0	1,575	22,121
Lateral No. 13	16,755	1,795	0	18,550	-	-	675	0	675	19,225
Lateral No. 14	8,179 8/	876	0	9,055	-	-	750	0	750	9,805
Gallaghers Creek	1,205,154 8/	157,603 9/	0	1,362,757	-	-	52,182 10/	0	52,182	1,414,939
Subtotal Channel Improvement	4,650,221	418,287	0	5,068,508	-	-	315,307	0	315,307	5,383,815
Subtotal	5,553,198 11/	543,738	0	6,096,936	186,002	14,066	534,412	0	734,480	6,831,416
Project Administration	////	////	0	863,043 12/	////	////	////	0	72,330 13/	935,373
GRAND TOTAL	5,553,198	543,738	0	6,959,979	186,002	14,066	534,412	0	806,810	7,766,789

1/ Price base - 1969
2/ Relocation payments for displacements prior to July 1, 1972 will be shared as provided in PL-91-646 and in paragraph numbered 2 of the agreement.
3/ Includes $500 for water level control structure (wildlife gate).
4/ A & E Contract estimated to be cost-shared 50-50.
5/ Land Rights not cost-shared, all of land owned by City of Meridian, a Co-Sponsor

(footnotes continued)

6/ Includes estimated costs of $1,579,000 for 3 grade stabilization structures; $152,100 for riprap, drift deflectors, reinforcing and underpinning 5 road bridges and 3 railroad bridges; $43,200 for riprap on 3 road bridges.

7/ Includes estimated costs of $37,500 for one new bridge; $44,000 for sewer line alterations; $79,000 for bridge alterations, salvage abandoned building, shift Church building and powerlines and constructing two retaining walls; and $500 to anchor one gas line.

8/ Includes estimated costs of $51,500 for reinforcing 4 existing road bridges; $83,600 for one grade control and energy dissipator structure; and $30,100 for reinforcing on railroad bridge.

9/ Includes estimated cost of $50,000 for a model study of the concrete lined channel.

10/ Includes estimated costs of $18,000 for one new bridge; $8,000 for constructing one concrete box culvert; $1,000 for relocating 2 gas lines; and $2,982 for sewer line supports, drift deflectors and riprap.

11/ Includes estimated costs of $120,750 for pipe overfall structures and $6,500 for 13 water level control structures (wildlife gates).

12/ Includes an estimated cost of $13,000 for administration of contracts on all structural measures.

13/ Includes estimated costs of $51,243 for other legal costs.

TABLE 2-A - COST ALLOCATION AND COST SHARING SUMMARY

Sowashee Creek Watershed, Mississippi

(Dollars) 1/

Item	COST ALLOCATION			COST SHARING					
	PURPOSE			PL-566			OTHER		
	Flood Prevention	Recreation	Total	Flood Prevention	Recreation	Total	Flood Prevention	Recreation	Total
Floodwater Retarding Structures	882,051	0	882,051	750,146	0	750,146	131,905	0	131,905
Multiple Purpose Structures	66,488	184,175	250,663	66,488	66,451	132,939	0	117,724	117,724
Basic Facilities Site No. 14	0	314,887	314,887	0	145,343	145,343	0	169,544	169,544
Stream Channel Improvement	5,383,815	0	5,383,815	5,068,508	0	5,068,508	315,307	0	315,307
GRAND TOTAL	6,332,354	499,062	6,831,416	5,885,142	211,794	6,096,936	447,212	287,268	734,480

1/ Price base 1969.

TABLE 2-B - RECREATIONAL FACILITIES
ESTIMATED CONSTRUCTION COSTS

Multiple Purpose Structure No. 14
Sowashee Creek Watershed, Mississippi

Item	Unit	Number or Amount	Estimated Unit Cost	Total Construction Cost 1/
Swimming - 1.5 acre beach				
Sandfill - 12"	Cu.Yd.	2,420	3	7,260
Retaining wall - 400' x 5' x 6"	Cu.Yd.	37	55	2,035
Lifeguard stand	No.	1	150	150
Boundary markers	No.	5	150	750
Bach house - 8-unit	No.	1	11,500	11,500
Parking-DBST-150 single spaces	Sq.Yd.	5,000	2.15	10,750
Camping - 80 units				
Raised tent mounds	No.	80	50	4,000
Picnic tables	No.	80	140	11,200
Underground garbage can installations	No.	80	40	3,200
Fireplaces	No.	80	40	3,200
Laundry - Comfort station-8-unit	No.	2	11,500	23,000
Parking - DBST-48 single spaces 32 double spaces	Sq.Yd.	3,378	2.15	7,263
Parking barriers	No.	80	45	3,600
Water faucets	No.	20	10	200
Fire rings	No.	2	30	60
Boating and Fishing				
Boat ramp-100' x 20'x 6" (2)	Cu.Yd.	74	40	2,960
Docks- 100' x 4'	No.	2	400	800
Piers - 100' x 8'	No.	2	900	1,800
Parking - DBST - 50 single spaces 50 double spaces	Sq.Yd.	4,444	2.15	9,556
Picnicking				
Picnic tables	No.	100	140	14,000
Fireplaces	No.	50	40	2,000
Fireplaces (at pavilion)	No.	2	150	300
Underground garbage can installations	No.	50	40	2,000
Parking-DBST-100 single spaces	Sq.Yd.	3,333	2.15	7,166
Group shelter - 20' x 20' (2)	Sq.Ft.	800	3	2,400
Pavilion - Comfort station - 8-unit	No.	1	9,200	9,200
Comfort station - 6-unit	No.	1	6,500	6,500
Water fountains	No.	20	50	1,000

TABLE 2-B - (continued)

Multiple Prupose Structure No. 14
Sowashee Creek Watershed, Mississippi

Item	Unit	Number or Amount	Estimated Unit Cost	Total Construction Cost 1/
Access Roads				
Double Lane - DBST	Mi.	1.1	25,000	27,500
Single Lane - DBST	Mi.	0.9	15,000	13,500
Miscellaneous				
Nature trails	Lin. Ft.	12,500	.15	1,875
Deepening edge of lake	Lin. Ft.	3,000	.15	450
Light Clearing 2/	Ac.	15	100	1,500
Fencing	Lin. Ft.	6,000	.75	4,500
Water distribution lines 3/	Lin. Ft.	5,900	2	11,800
Electrical distribution system	Mi.	1.5	2,500	3,750
Signs	No.	30	30	900
Cattle gap and gate	No.	1	600	600
Sewage discharge line	Lin. Ft.	6,900	2.50	17,250
Sewage dumping station	No.	1	2,500	2,500
Photo sensitive lights	No.	9	50	450
Subtotal				234,425
Contingencies				28,131
TOTAL CONSTRUCTION				262,556

1/ Price base 1969.
2/ No land treatment or vegetative practices will be needed.
3/ The water and sewage lines will connect to the City of Meridian's water and sewer lines.

TABLE 3 - STRUCTURAL DATA
STRUCTURES WITH PLANNED STORAGE CAPACITY
Sowashee Creek Watershed, Mississippi

Item	Unit	Structure Numbers 1	2	3
Class of Structure		"b"	"a"	"a"
Drainage area	Sq. Mi.	3.88	2.29	1.12
Controlled	Sq. Mi.	0.00	0.00	0.00
Curve No. (1 day) (AMC II)		71	76	74
Tc	Hr.	3.00	1.50	0.78
Elevation top of dam	Ft.	372.70	408.50	416.40
Elevation crest emergency spillway	Ft.	368.70	406.50	414.40
Elevation crest high stage inlet	Ft.	1/	402.30	411.80
Elevation crest low stage inlet	Ft.	352.40	394.00	404.00
Maximum height of dam	Ft.	38.70	26.50	27.40
Volume of fill	Cu. Yds.	134,549	43,988	33,398
Total capacity	Ac. Ft.	1542	1018 3/	410
Sediment submerged 1st 50 years	Ac. Ft.	138	110 3/	35
Sediment submerged 2nd 50 years	Ac. Ft.	122	27	33
Sediment aerated	Ac. Ft.	47	25	12
Beneficial use (recreation)	Ac. Ft.	0	0	0
Retarding	Ac. Ft.	1,235	856	330
Between high and low stage	Ac. Ft.	1/	438	178
Surface area				
Sediment pool	Acres	33	33	15
Beneficial use pool (recreation)	Acres	0	0	0
Retarding pool	Acres	146	111	60
Principal spillway				
Rain. vol (areal) (1 day)	In.	8.60	7.75	7.75
Rainfall vol. (areal) (10 day)	In.	15.16	13.66	13.66
Runoff vol. (10 day)	In.	8.05	8.00	7.48
Capacity of low stage (max.)	CFS	65	54	16
Capacity of high stage (max.)	CFS	1/	94	54
Frequency operation-Emer. Splwy.	% chance	1.50	2.70	2.80
Size of conduit	Dim.	24"	24"	24"
Emergency spillway				
Rainfall vol. (ESH) (areal)	In.	9.70	6.70	6.70
Runoff vol (ESH)	In.	6.08	3.99	3.79
Type		veg.	veg.	veg.
Bottom width	Ft.	144	46	49
Velocity of flow (V_e)	Ft/Sec	2/	2/	2/
Slope of exit channel	Ft/Ft	.0177	.0225	.0225
Maximum water surface elevation	Ft.	368.70	406.50	414.40
Freeboard				
Rainfall volume (FH) (areal)	In.	16.50	9.70	9.70
Runoff volume (FH)	In.	11.59	6.73	6.47
Max. water surface elevation	Ft.	372.70	408.50	416.40
Capacity equivalents				
Sediment volume	In.	1.48	1.17	1.34
Retarding volume	In.	5.97	6.17	5.53

TABLE 3 - STRUCTURAL DATA - Continued
Sowashee Creek Watershed, Mississippi

Item	Unit	Structure Numbers 4	5	6
Class of structure		"a"	"a"	"a"
Drainage area	Sq.Mi.	1.34	1.27	1.04
Controlled	Sq. Mi	0.00	0.00	0.00
Curve No. (1 day) (AMC II)		71	73	70
Tc	Hrs.	1.06	1.07	1.36
Elevation top of dam	Ft.	424.80	427.80	422.10
Elevation crest emergancy spillway	Ft.	422.80	425.80	420.10
Elevation crest high stage inlet	Ft.	420.00	422.80	417.70
Elevation crest low stage inlet	Ft.	415.20	412.50	413.70
Maximum height of dam	Ft.	20.80	22.80	17.10
Volume of fill	Cu. Yds.	22,456	42,051	31,572
Total capacity	Ac. Ft.	457 5/	465	346 5/
Sediment submerged 1st 50 years	Ac. Ft.	72 5/	47	57 5/
Sediment submerged 2nd 50 years	Ac. Ft.	-	43	-
Sediment aerated	Ac. Ft.	13	17	10
Beneficial use (recreation)	Ac. Ft.	0	0	0
Retarding	Ac. Ft.	372	358	279
Between high and low stage	Ac. Ft.	278	194	144
Surface				
Sediment pool	Acres	26	14	21
Beneficial use pool (recreation)	Acres	0	0	0
Retarding pool	Acres	68	63	50
Principal spillway				
Rainfall volume (areal) (1 day)	In.	7.75	7.75	7.75
Rainfall volume (areal) (10 day)	In.	13.66	13.66	13.66
Runoff volume (10 day)	In.	7.00	7.33	6.63
Capacity of low stage (max.)	CFS	20	19	14
Capacity of high stage (max.)	CFS	49	61	47
Frequency operation-Emer. Spil.	% chance	2.85	2.85	2.90
Size of conduit	Dim.	24"	24"	24"
Emergency spillway				
Rainfall volume (ESH) (areal)	In.	6.70	6.70	6.70
Runoff volume (ESH)	In.	3.47	3.68	3.37
Type		veg.	veg.	veg.
Bottom width	Ft.	49	42	41
Velocity of flow (V_e)	Ft/Sec	2/	2/	2/
Slope of channel	Ft/Ft	.0225	.0225	.0225
Maximum water surface elevation	Ft.	422.80	425.80	420.10
Freeboard				
Rainfall volume (FH) (areal)	In.	9.70	9.70	9.70
Runoff volume (FH)	In.	6.08	6.35	5.96
Maximum water surface elevation	Ft.	424.80	427.80	422.10
Capacity equivalents				
Sediment	In.	1.20	1.07	1.21
Retarding volume	In.	5.21	5.29	5.03

TABLE 3 - STRUCTURAL DATA - Continued
Sowashee Creek Watershed, Mississippi

Item	Unit	Structure Numbers 7	8	9
Class of structure		"b"	"b"	"a"
Drainage area	Sq. Mi.	5.04	2.42	0.87
Controlled	Sq. Mi.	0	0	0
Curve No. (1 day) (AMC II)		78	77	77
Tc	Hrs.	3.97	3.06	1.50
Elevation top of dam	Ft.	400.20	389.00	427.20
Elevation crest emergency spillway	Ft.	396.20	385.00	425.20
Elevation crest high stage inlet	Ft.	1/	380.00	422.60
Elevation crest low stage inlet	Ft.	382.50	369.70	418.00
Maximum height of dam	Ft.	32.70	33.00	23.20
Volume of fill	Cu.Yds.	160,216	70,721	21,968
Total capacity	Ac. Ft.	2,180	1.114	320
Sediment submerged 1st 50 years	Ac.Ft.	129	84	39 5/
Sediment submerged 2nd 50 years	Ac. Ft.	113	74	-
Sediment aerated	Ac. Ft.	46	28	7
Beneficial use (recreation)	Ac. Ft.	0	0	0
Retarding	Ac. Ft.	1,892	933	274
Between high and low stage	Ac. Ft.	1/	435	151
Surface area				
Sediment pool	Acres	40	24	25
Beneficial pool (recreation)	Acres	0	0	0
Retarding pool	Acres	287	160	51
Principal spillway				
Rainfall (areal) (1 day)	In.	8.60	8.60	7.75
Rainfall volume (areal) (10 day)	In.	15.16	15.16	13.66
Runoff volume (10 day)	In.	9.67	9.50	8.16
Capacity of low stage (max.)	CFS	98	45	15
Capacity of high stage (max.)	CFS	1/	61	48
Freq. operation - emer. spillway	% chance	1.45	1.45	2.75
Size of conduit	Dim.	30"	24"	24"
Emergency spillway				
Rainfall volume (ESH) (areal)	In.	9.70	9.70	6.70
Runoff volume (ESH)	In.	6.99	6.85	4.09
Type		veg.	veg.	veg.
Bottom width	Ft.	122	72	32
Velocity of flow (V_e)	Ft/Sec.	2/	2/	2/
Slope of exit channel	Ft/Ft	.01775	.01775	.0225
Maximum water surface elevation	Ft.	396.20	385.00	425.20
Freeboard				
Rainfall volume (FH) (areal)	In.	16.50	16.50	9.70
Runoff volume (FH)	In.	13.55	13.38	6.85
Maximum water surface elevation	Ft.	400.20	389.00	427.20
Capacity equivalents				
Sediment volume	In.	1.07	1.40	1.06
Retarding volume	In.	7.04	7.23	5.91

TABLE 3 - STRUCTURAL MEASURES - Continued
Sowashee Creek Watershed, Mississippi

Item	Unit	Structure Numbers 10	11	12
Class of Structure		"a"	"a"	"a"
Drainage area	Sq. Mi.	0.95	0.79	1.02
Controlled	Sq. Mi.	0	0	0
Curve No. (1 day) AMC II)		75	70	78
Tc	Hrs.	0.86	0.80	0.86
Elevation top of dam	Ft.	426.00	386.40	393.20
Elevation crest emergency splwy.	Ft.	424.00	384.40	391.20
Elevation crest high stage inlet	Ft.	420.80	380.40	388.90
Elevation crest low stage inlet	Ft.	416.00	371.00	385.00
Maximum height of dam	Ft.	22.50	27.40	17.20
Volume of fill	Cu. Yds.	28,627	40,360	10,345
Total capacity	Ac.Ft.	360	240	402
Sediment submerged 1st 50 years	Ac.Ft.	58 5/	20 3/	51 5/
Sediment submerged 2nd 50 years	Ac.Ft.	-	14	0
Sediment aerated	Ac. Ft.	11	6	9
Beneficial use (recreation)	Ac. Ft.	0	0	0
Retarding	Ac. Ft.	292	200	342
Between high and low stage	Ac. Ft.	156	110	183
Surface pool - Sediment pool	Acres	25	8	39
Beneficial use pool (recreation)	Acres	0	0	0
Retarding pool	Acres	53	26	69
Principal spillway				
Rainfall volume (areal) (1 day)	In.	7.75	7.75	7.75
Rainfall volume (areal) (10 day)	In.	13.66	13.66	13.66
Runoff volume (10 day)	In.	7.66	6.63	8.32
Capacity of low stage (max.)	CFS	15	11	22
Capacity of high stage (max.)	CFS	50	54	44
Freq. operation-emer. splwy.	% chance	2.75	3.00	2.70
Size of conduit	Dim.	24"	24"	24"
Emergency spillway				
Rainfall volume (ESH) (areal)	In.	6.70	6.70	6.70
Runoff volume (ESH)	In.	3.88	3.37	4.22
Type		veg.	veg.	veg.
Bottom width	Ft.	35	32	37
Velocity of flow (V_e)	Ft/Sec	2/	2/	2/
Slope of exit channel	Ft/ft	.0225	.0225	.0225
Maximum water surface elevation	Ft.	424.00	384.40	391.20
Freeboard				
Rainfall volume (FH) (areal)	In.	9.70	9.70	9.70
Runoff volume (FH)	In.	6.59	5.96	6.99
Maximum water surface elevation	Ft.	426.00	386.40	393.20
Capacity equivalents				
Sediment volume	In.	1.38	0.94	1.02
Retarding volume	In.	5.77	4.75	6.28

TABLE 3 - STRUCTURAL DATA - continued
Sowashee Creek Watershed, Mississippi

Item	Unit	Structural Numbers 13	14	Total
Class of Structure		"b"	"c"	
Drainage area	Sq. Mi.	0.82	3.70	26.55
Controlled	Sq. Mi.	0	0	
Curve no. (1 day) (AMC II)		79	71	
Tc	Hrs.	1.02	1.52	
Elevation top of dam	Ft.	397.30	389.20	
Elevation crest emergency spillway	Ft.	394.80	383.20	
Emergency crest high stage inlet	Ft.	390.50	1/	
Elevation crest low stage inlet	Ft.	384.00	377.00	
Maximum height of dam	Ft.	27.30	51.20	
Volume of fill	Cu. Yd.	34,857	221,388	896,496
Total capacity	Ac. Ft	366	4,482	13,702
Sediment submerged 1st 50 years	Ac. Ft	38 5/	192	1,070
Sediment submerged 2nd 50 years	Ac. Ft.	-	0	426
Sediment aerated	Ac. Ft.	7	34	272
Beneficial use (recreation)	Ac. Ft.	0	2,895 4/	2,895
Retarding	Ac. Ft	321	1,361	9,045
Between high and low stage	Ac. Ft.	151	1/	2,418
Surface area - Sediment pool	Acres	14	37 4/	354
Beneficial use pool (recreation)	Acres	0	200 4/	200
Retarding pool	Acres	45	249	1,438
Principal Spillway				
Rainfall volume (areal) (1 day)	In.	8.60	9.50	
Rainfall volume (areal) (10 day)	In.	15.16	16.30	
Runoff volume (10 day)	In.	10.00	9.02	
Capacity of low stage (max.)	CFS	12	126	
Capacity of high stage (max.)	CFS	52	1/	
Frequency operation - emer. splwy	% chance	1.45	0.80	
Size of conduit	Dim.	24"	30"	
Emergency Splwy-Rainfall Vol (ESH) (areal)	In.	9.70	13.35	
Runoff volume (ESH)	In.	7.11	9.46	
Type		veg.	veg.	
Bottom width	Ft.	143	260	
Velocity of flow (V_e)	Ft/Sec	2/	5.01	
Slope of exit channel	Ft/Ft	.0210	.0273	
Maximum water surface elevation	Ft.	394.80	384.50	
Freeboard				
Rainfall volume (FH) (areal)	In.	16.50	30.80	
Runoff volume (FH)	In.	13.69	26.39	
Maximum water surface elevation	Ft.	397.30	389.20	
Capacity equivalents- sed. vol.	In.	1.03	1.14	
Retarding vol.	In.	7.33	6.90	

1/ Single stage. 2/ No significant flow.
3/ Low stage riser set higher than 50 year submerged sediment elevation to attain satisfactory impoundment. 4/ Recreation storage.
5/ Lowest ungated riser set at 100 year sedimentation elevation to attain satisfactory impoundment.

TABLE 3-A-STRUCTURE DATA - CHANNELS
Sowashee Creek Watershed, Mississippi

Channel Number or Name	Station	Drainage Area Sq. Mi. 1/	Capacity CFS Required	Capacity CFS Design	Water Surface Elevation	Hydraulic Gradient Ft/Ft	Channel Dimensions 2/ Bottom	Depth	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation 1000 CY	Type of Improvement 3/
Junction Okatibbee Creek	0+00	50.16	13900 4/	13985	278.9	.00040	170	14	1½:1	.03	.025	5.23	4.82 5/		CE
	303+00 6/	45.65	13000 4/	12530	300.8	.00030	200	13	1½:1	.03	.025	4.39	6.28 5/ 4.07	2761.82	CE
Sowashee Creek	403+00 7/	37.50	10700 4/	10360	311.0	.00040	190	11	1½:1	.03	.025	4.56	5.27 5/ 4.14	887.15	CE
	525+00 8/	29.50	8600 4/	8720	324.6	.00045	150	11	1½:1	.03	.025	4.76	5.47 5/ 4.27	739.86	CE
	585+00	25.97	2100 9/	1922	327.2	.00080	A=507	WP=62		.045	.045	3.41	5.71 3.41	124.85	C & S
	726+80	22.83	2000	1973	338.5	.00080	A=563	WP=68		.050	.050	3.50	3.50		C & S
	837+20	11.09	1000	998	347.3	.00080	18	8	1½:1	.03	.025	4.16	4.99		CE
	870+70	10.30	930	958	349.9	.00080	17	8	1½:1	.03	.025	4.13	4.96	6.11	CE
	901+20	10.27	920	1222	354.3	.00150	A=332	WP=58		.05	.05	3.68	3.68	2.30	C & S
	980+90	3.80	400	398	366.3	.00150	16	4.8	1½:1	.035	.025	3.57	5.00		CE
	1154+00	0.70	120	215	392.2	.00150	A=85	WP=26		.05	.05	2.53	2.53	15.86	C & S
Lateral No. 1 (Jct. Sowashee Cr.)	0+00	0.22	68	413	334.40	.0014	A=143	WP=34	-	.050	.050	2.89	2.89		C & S
Dam No. I	36+10	0.17	58	215	339.85	.0014	A=84	WP=25	-	.050	.050	2.56	2.56		C & S

TABLE 3-A - STRUCTURE DATA - Continued
Sowashee Creek Watershed, Mississippi

Channel Number or Name	Station	Drainage Area Sq. Mi.	Capacity CFS Required	Capacity CFS Design	Water Surface Elevation	Hydraulic Gradient Ft/Ft	Channel Dimensions 2/ Bottom Ft.	Depth Ft.	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation (1000 CY)	Type of Improvement 3/
Lateral No. 2															
(Jct. Nanabe Cr.)	0+00	0.60	150	617	377.00	.00226	A=180	WP=47	-	.050	.050	3.43	3.43	-	C & S
Dam No. 2	76+00	0.00	74	130	388.00	.00025	A=120	WP=34	-	.050	.050	1.08	1.08	-	C & S
Lateral No. 3															
(Jct. Nanabe Cr.)	0+00	0.29	87	358	371.90	.00290	A=96	WP=27	-	.050	.050	3.73	3.73	-	C & S
Dam No. 3	78+00	0.00	54	162	394.52	.00290	A=63	WP=31	-	.050	.050	2.57	2.57	-	C & S
Lateral No. 4															
(Jct. Sowashee)	0+00	5.77	820	814	365.60	.00310	A=200	WP=52	-	.050	.050	4.07	4.07	-	C & S
Dam No. 4	134+25	0.00	49	168	407.22	.00310	A=56	WP=23	-	.050	.050	4.07	4.07	-	C & S
Lateral No. 5															
(Jct. Sowashee Cr.)	0+00	0.70	170	288	379.50	.00285	A=68	WP=24	-	.050	.050	3.18	3.18	-	C & S
Dam No. 5	62+25	0.56	140	454	404.96	.00510	A=95	WP=28	-	.050	.050	4.78	4.78	-	C & S
Lateral No. 6															
(Jct. Lateral #7)	0+00	2.74	260	760	360.50	.00185	A=192	WP=36	-	.050	.050	3.96	3.96	-	C & S
	31+25	2.74	260	760	366.30	.00185	A=192	WP=36	-	.050	.050	3.96	3.96	-	C & S
	76+75	2.74	260	256	374.20	.00185	12	4.0	1.5:1	.035	.025	3.56	4.98	.843 8.500	CE

TABLE 3-A - STRUCTURE DATA - Continued
Sowashee Creek Watershed, Mississippi

Channel Number or Name	Station	Drainage Area Sq. Mi. 1/	Capacity CFS Required	Capacity CFS Design	Water Surface Elevation	Hydraulic Gradient Ft/Ft	Channel Dimensions 2/ Bottom Ft.	Depth Ft.	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation (1000 CY)	Type of Improvement 3/
Lateral No. 6 (continued)	137+75	2.36	240	256	385.70	.00185	12	4.0	1.5:1	.035	.025	3.56	4.98	11.444	CE
	188+25	2.00	204	95	396.00	.00185	9	4.0	1.5:1	.035	.025	3.40	4.76	1.278	CE
Dam No. 6	222+75	0.05	50	410	404.90	.00320	A=98	WP=25	-	.050	.050	4.18	4.18		C & S
Lateral No. 7 (Jct. Sowashee Cr.)	0+00	4.38	460	461	356.40	.00130	A=152	WP=32	-	.050	.050	3.03	3.03	-	C & S
Dam No. 7	119+50	0.00	147	706	374.45	.00210	A=200	WP=48	-	.050	.050	3.96	3.96	-	C & S
Lateral No. 8 (Jct. Sowashee Cr.)	0+00	0.82	190	191	340.40	.00100	A=88	WP=25	-	.050	.050	2.17	2.17	-	C & S
Dam No. 8	112+60	0.00	62	554	361.80	.00280	A=140	WP=35	-	.050	.050	3.96	3.96		C & S
Nanabe Creek (Jct. Sowashee Cr.)	0+00	8.02	810	848	338.80	.00117	A=270	WP=46	-	.050	.050	3.14	3.14	-	C & S
	129+50	7.48	755	1029	353.20	.00156	A=270	WP=46	-	.050	.050	3.81	3.81	-	C & S
	224+90	3.94	615	617	368.10	.00156	A=180	WP=36	-	.050	.050	3.43	3.43	-	C & S
	328+15	2.45	440	972	388.20	.00217	A=240	WP=48	-	.050	.050	4.05	4.05	-	C & S
Dam No. 9	407+15	0.00	48	173	409.32	.00330	A=53	WP=20	-	.050	.050	3.27	3.27	-	C & S

TABLE 3-A - STRUCTURE DATA - Continued
Sowashee Creek Watershed, Mississippi

Channel Number or Name	Station	Drainage Area Sq. Mi. 1/	Capacity CFS Required	Capacity CFS Design	Water Surface Elevation	Hydraulic Gradient Ft/Ft	Channel Dimensions 2/ Bottom Ft.	Depth Ft.	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation (1000 CY)	Type of Improvement 3/
Lateral No. 10 (Jct. Nanabe Cr.)	0+00	0.27	92	94	389.60	.00542	A=24	WP=14	-	.040	.040	3.91	3.91	-	C & S
Dam No. 10	46+75	0.00	50	310	410.00	.00350	A=78	WP=23	-	.050	.050	3.97	3.97	-	C & S
Lateral No. 11 (Jct. Sowashee Cr.)	0+00	0.00	54	66	350.70	.00250	3	3.0	1.5:1	.035	.025	2.94	4.11	7.363	CE
Dam No. 11	28+00	0.00	54	66	357.00	.00250	3	3.0	1.5:1	.035	.025	2.94	4.11		CE
Lateral No. 12 (Jct. Lateral #13)	0+00	1.05	230	326	345.00	.00280	A=86	WP=23	-	.050	.050	3.79	3.79	-	C & S
	83+50	0.54	140	130	368.40	.00280	A=44	WP=20	-	.045	.045	2.96	2.96	-	C & S
Dam No. 12	128+00	0.00	65	170	380.00	.00280	A=55	WP=20	-	.050	.050	3.09	3.09	-	C & S
Lateral No. 13 (Jct. Sowashee Cr.)	0+00	1.55	380	401	337.98	.00189	A=102	WP=29	-	.040	.040	3.76	3.76	-	C & S
Dam No. 13	115+00	0.00	52	432	376.61	.00530	A=87	WP=25	-	.050	.050	4.96	4.96		C & S
Lateral No. 14 (Jct. Sowashee Cr.)	0+00	1.62	201	655	316.60	.00360	A=150	WP=39	-	.050	.050	4.37	4.37	-	C & S
Dam No. 14	59+50	0.00	147	148	332.80	.00270	4	4.0	1.5:1	.035	.025	3.69	5.17	3.333	CE

TABLE 3-A - STRUCTURE DATA - Continued
Sowashee Creek Watershed, Mississippi

Channel Number or Name	Station	Drainage Area Sq.Mi. 1/	Capacity CFS Required	Capacity CFS Design	Water Surface Elevation	Hydraulic Gradient Ft/Ft	Channel Dimensions 2/ Bottom	Depth	Side Slopes	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation (1000 CY)	Type of Improvement 3/
Junction Sowashee Creek	16+65	5.18	7750 4/	7769	301.00	.00040	105	13	1.5:1	.03	.025	4.80	4.51 5/		CE
													5.76	143.726	
Gallagher Branch	44+75	5.11	7740 4/	7769	302.20	.00040	105	13	1.5:1	.03	.025	4.80	4.51 5/		CE
													5.76	7.416	
	45+50 10/	4.89	7550	7556 12/	306.66	-	60	12	Vert.	-	-	-	-		L
														5.153	
	52+10	4.89	7550 4/	7758	307.80	.0021	32	12.6	Vert.	.013	.013	19.25 11/	19.25		L
														3.936	
	59+00	4.62	7550 4/	7674	309.25	.0032	27	12.6	Vert.	.013	.013	22.57 11/	22.57		L
														5.467	
	71+00	4.62	7550 4/	7674	313.10	.0032	27	12.6	Vert.	.013	.013	22.57 11/	22.57		L
														8.200	
	98+00	4.62	7550 4/	7674	321.74	.0032	27	12.6	Vert.	.013	.013	22.57 11/			L
														0.000	

1/ Uncontrolled drainage area.
2/ Where excavation is not planned, show cross sectional area and wetted perimeter below hydraulic grade line.
3/ C & S - clearing and snagging; CE - Channel enlargement; L - lined channel.
4/ 100-year capacity for urban protection.
5/ 10-year frequency discharge n = .025.
6/ 13.0 foot drop structure and 11.0 ft. drop in grade.
7/ 9.5 foot drop structure and 9.5 drop in grade.
8/ 12.0 foot drop structure and 8.7 foot drop in grade.
9/ Transition section 525+00 to 585+00.
10/ 5.4 foot drop structure and energy dissipator.
11/ 100-year or bank full capacity velocity.
12/ Weir capacity.

TABLE 3-A - STRUCTURE DATA - CHANNELS
Sowashee Creek Watershed, Mississippi

Addendum Sheet

Channel Name or Number	Station	Type of Work 1/	Type of Channel Before Project 2/	Flow Condition Before Project 3/
Sowashee Creek	0+00	II	M(1955)	Pr
	303+00	II	M(1955)	Pr
	403+00	II	M(1955)	Pr
	525+00	II	M(1955)	Pr
	585+00	IV	N	Pr
	726+80	IV	N	Pr
	837+20	II	N	Pr
	870+70	II	N	Pr
	901+20	IV	N	Pr
	980+90	II	N	Pr
	1154+00	IV	N	Pr
Lateral No. 1	0+00	IV	N	E
	36+10	IV	N	E
Lateral No. 2	0+00	IV	N	E
	76+00	IV	N	E
Lateral No. 3	0+00	IV	N	E
	78+00	IV	N	E
Lateral No. 4	0+00	IV	N	E
	134+25	IV	N	E
Lateral No. 5	0+00	IV	N	E
	62+25	IV	N	E
Lateral No. 6	0+00	IV	N	I
	31+25	IV	N	I
	76+75	II	N	I
	137+75	II	N	E
	188+25	II	N	E
	222+75	IV	N	E
Lateral No. 7	0+00	IV	N	I
	119+50	IV	N	I
Lateral No. 8	0+00	IV	N	E
	112+60	IV	N	E

TABLE 3-A - STRUCTURE DATA - CHANNELS

Addendum Sheet- (continued)

Channel Name or Number	Station	Type of Work 1/	Type of Channel Before Project 2/	Flow Condition Before Project 3/
Nanabe Creek	0+00	IV	N	Pr
	129+50	IV	N	Pr
	224+90	IV	N	Pr
	328+15	IV	N	Pr
	407+15	IV	N	Pr
Lateral No. 10	0+00	IV	N	E
	46+75	IV	N	E
Lateral No. 11	0+00	IV	N	E
	28+00	IV	N	E
Lateral No. 12	0+00	IV	N	E
	83+50	IV	N	E
	128+00	IV	N	E
Lateral No. 13	0+00	IV	N	E
	115+00	IV	N	E
Lateral No. 14	0+00	IV	N	E
	59+50	IV	N	E
Gallagher Branch	16+65	II	M(1958)	E
	44+75	II	M(1958)	E
	45+50	II	M(1958)	E
	52+10	II	M(1958)	E
	59+00	II	M(1958)	E
	71+00	II	M(1958)	E
	98+00	II	M(1958)	E

1/ Type of Work -

II - Enlargement of existing channel or stream.

IV - Clearing and removal of debris within channel section.

(footnotes continued)

TABLE 3-A - STRUCTURE DATA - CHANNELS

Addendum Sheet (continued)

(footnotes continued)

2/ Type of Channel Before Project -

N - An unmodified, well defined natural channel or stream.

M( ) - Manmade ditch or previously modified channel or stream. Parentheses indicate approximate date of original major construction.

3/ Flow Condition Before Project -

Pr - Perennial - flows at all time except during extreme drought.

I - Intermittent - continuous flow through some seasons of the year, but little or no flow through other seasons.

E - Ephemeral - Flows only during periods of surface run-off.

TABLE 3-B - STRUCTURAL DATA

Grade Stabilization Structures
Sowashee Creek Watershed, Mississippi

Site Number	Drainage Area (sq. mile)	Drop (feet)	Concrete (cu. yds.)	Type of Structure 1/
Gallagher Branch Sta. 45+50	4.89	5.4	879	SD
Sowashee Creek Sta. 303+00	45.65	11.0	1230	SD
Sowashee Creek Sta. 403+00	37.50	9.5	1050	SD
Sowashee Creek Sta. 525+00	29.50	8.7	950	SD

1/ All these structures are Type C drop structures as shown in Engineering Hnadbook, Section 11, U. S. Department of Agriculture, Soil Conservation Service.

TABLE 4 - ANNUAL COST

Sowashee Creek Watershed, Mississippi

(dollars) 1/

Evaluation Unit	Amortization of Installation Cost 2/	Operation and Maintenance 3/	Total
13 floodwater retarding structures, 1 multiple purpose structure with basic facilities and about 55 miles of channel improvement	369,169	96,154	465,323
Subtotal	369,169	96,154	465,323
Project Administration	50,548	-	50,548
GRAND TOTAL	419,717	96,154	515,871

1/ Price Base: Installation cost 1969, Operation and Maintenance adjusted Normalized.

2/ Amortized for 100 years at 5 3/8 percent interest. (.05404)

3/ Includes $4,328 annual replacement cost for pipe overfall structures; $467 annual replacement cost for 13 water level control structures (wildlife gates); and $46,666 annual Operation and Maintenance cost for recreational facilities in connection with Multiple Purpose Structure No. 14 which includes an annual replacement cost of $7,243.

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Sowashee Creek Watershed, Mississippi
(Dollars) 1/

Item	Estimated Average Annual Damage		Damage Reduction Benefits
	Without Project	With Project	
Floodwater			
Crop and Pasture	7,811	792	7,019
Other agricultural	2,771	307	2,464
Non-agricultural			
Residential, commercial and industrial	427,914	20,828	407,086
Roads, bridges, etc.	36,957	2,245	34,712
Subtotal	475,453	24,172	451,281
Sediment			
Overbank deposition	4,052	1,334	2,718
Erosion			
Reduced roadside erosion	4,800	1,553	3,247
Indirect	91,222	4,789	86,433
TOTAL	575,527	31,848	543,679

1/ Price base: Adjusted normalized.

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Sowashee Creek Watershed, Mississippi

(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/					Total	Average Annual Cost 3/	Benefit Cost Ratio
	Damage Reduction	More Intensive Land Use: Agriculture	More Intensive Land Use: Urban	Planned Recreation	Secondary			
13 floodwater retarding structures; 1 multiple purpose structure with basic facilities; and about 55 miles of channel improvement	532,540	16,958	22,967	126,022	61,967	760,454	465,323	1.6:1.0
Project Administration	////	////	////	////	////	////	50,548	////
GRAND TOTAL	532,540 2/	16,958	22,967	126,022	61,967	760,454	515,871	1.5:1.0

1/ Price base: Adjusted normalized.
2/ In addition, land treatment benefits are estimated to be $11,139 annually.
3/ From Table No. 4.

INVESTIGATIONS AND ANALYSIS

Economics

Since the major floodwater damages in the watershed are to non-agricultural property, the synthetic frequency method of analysis was used. In the urban area, information on the April 1964 storm was collected on residential, commercial, industrial properties and to public utilities, as to depth of inside and outside flooding, estimated value of property flooding, and estimated damages incurred by this flood. Also, estimates of damages from storms producing stages of one foot higher and one foot lower were obtained at this same time. Information on estimated damages to streets, bridges, and other property were obtained on the 1961 and 1964 storms from the City Engineer. This information was summarized and evaluated. Using a 1964 1" = 500' photo, a building count was made to estimate the number of buildings that would flood from various frequency storms. Stage-damage relationships for 1964 conditions were developed by reaches using a combination of scheduled information and the Corps of Engineers, Omaha District, Residential Damage Tables with modifications. This information was projected for beginning of evaluation period 1980 and future without project 2010, using OBEs per worker earnings projections for Hattiesburg, Laurel and Meridian as a basis for making these projections. From this information, stage-damage curves were developed to cover a range of damage producing storms up to and including the 100-year storm. Average annual damages for future without project state of development were calculated for each evaluation reach.

In the agricultural area, landowners and operators farming approximately 20 percent of the flood plain were interviewed to determine land use without and with the project, flood-free yields, damages to fixed improvements, and anticipated use and yields with various degrees of protection. This scheduled information was summarized and evaluated. Damageable values by depth of flooding were derived from these summaries by evaluation reaches. Using these damageable values and frequency-area inundated by depths of flooding information, average annual damages for beginning of evaluation period 1980 and with project were calculated for each evaluation reach. These damages were projected to future without project 2015 by using a factor developed from projected 1980 and 2015 land use and production information from the River Basin Report of the Pascagoula River Basin.

Adjusted normalized prices were derived from data furnished by the Interdepartmental Staff Committee of the Water Resources Council, April 1966. Adjusted normalized prices, where applicable, were used in computing annual benefits. Future without project cost projections were used in computing annual operation and maintenance costs. Present (1969) prices were used for installation cost. The cost of all structural measures were amortized over a 100-year period with an interest rate of 5 3/8 percent (.05404).

Values for determining the cost of easements and rights-of-way were obtained with the help of the local sponsoring organizations. Due to the variation of land values in the urban and agricultural areas, different values were placed on the land depending on the location and degree of development. For the purposes of this evaluation, the following prices were considered fair and were used: $115 per acre for floodwater retarding structures, $200 per acre for multiple purpose structure with basic facilities, $75 per acre for channels in the agricultural area, $400 per acre on Sowashee Creek Channel within urban area, and $800 per acre on Gallaghers Creek Channel.

Damages and benefits from overbank sediment deposition were estimated on the basis of net income without and with the project due to the reduction of the sediment hazard. Associated costs and added floodwater damages, due to higher damageable values after project, were deducted from gross income. Sediment deposition benefits were discounted at 5 3/8 percent interest for the lag in accrual according to the recovery periods of ten to twenty years.

Agricultural benefits from more intensive use were estimated on the basis of increases in net income due to the reduction of flood hazards. Associated costs and added floodwater damages, due to higher damageable values after the project, were deducted from gross benefits. These benefits were claimed on approximately 1,294 acres and discounted for a five-year lag in accrual at 5 3/8 percent interest (.902).

More intensive use benefits were claimed on 425 acres of urban area. These benefits were estimated on the basis of the increase in value of land with project as compared to present value. All associated costs were deducted from gross increase and then amortized over the life of the project to convert to an annual equivalent. It is felt that other areas will be greatly enhanced, but due to time involved in evaluating and also since these additional benefits were not needed for project justification, they were not evaluated.

No downstream benefits on Okatibbee Creek were claimed in this evaluation.

Secondary benefits were developed in accordance with present procedures approved by the Soil Conservation Service. Secondary benefits were estimated to be ten percent of the direct primary benefits (less indirect) and added costs of production. These benefits were limited to those that are expected to accrue locally.

Planned recreation benefits were evaluated on Multiple Purpose Structure No. 14, complete with basic facilities. These benefits were based on visitor-day use of the structure and facilities, with the value

of a visitor-day being $1.50. The annual visitor-day estimate of 84,015 was based upon an estimate of the number of people within a 50-mile radius that will use these facilities. It is estimated that by 1980, over 226,100 people will live within a 50-mile radius of this site and will have access to the facilities.

The "use of facilities" method was used to allocate the joint costs of the multiple purpose structure between the purposes of flood prevention and recreation. The factors used to allocate these costs were obtained by dividing the acre-feet of storage for each purpose by the total storage capacity of the structure as follows:

Structure	Flood Prevention	Recreation
14	$\frac{1589}{4484} = 35.43\%$	$\frac{2895}{4484} = 64.57\%$

Joint construction costs allocated to recreation were divided equally between PL-566 funds and Other funds. Joint engineering costs will be borne by PL-566 funds. The cost for land was allocated to recreation and will not be cost-shared since all the land is presently owned by the City of Meridian, a co-sponsor.

The cost of basic facilities for recreation was divided equally between PL-566 funds and Other funds on construction and engineering costs. The cost for land will not be cost-shared since all of the land is presently owned by the City of Meridian, a co-sponsor.

Replacement costs for the initial basic facilities, less salvage value, were computed using an estimated average life of 20 years. The sinking fund method with an interest rate of 5 3/8 percent was used in computing these costs.

The annual costs for Operation and Maintenance of project channels varied according to location and bottom widths. The estimated costs were projected to reflect 2010 future without project prices. By using this method, operation and maintenance of channels in the urban area are estimated to be about $1,275 per mile. For channels in the remaining area, an estimated cost of about $400 per mile was used.

Replacement costs for the pipe overfall structures and 13 water level control structures (wildlife gates), were computed on the basis of an estimated life of 30 years. The sinking fund method with an interest rate of 5 3/8 percent was used in computing these costs.

Geologic

Geologic conditions in the watershed were determined by surface inspection and by making several hand auger borings at planned structure locations. Borings were made along the centerline of dam and in borrow

areas by drilling approximately six holes in Sites 1, 2, 5, 7 and 13. The remaining nine sites were checked by surface observation and appear similar to those where borings were made. No unusual conditions were found at any of the planned site locations that would adversely affect the stability of the structure.

All sites were located in the Bashie and Hatchitigbe formations of the Wilcox Group, Eocene Age. These are primarily coarse grained materials in SM, SC-SM, and some scattered lenses of sandy CL material. Seepage losses should be moderate to high in the foundation and sediment pool areas of these sites. The foundation soils appear to have adequate strength but shear testing of the lenticular clays in the foundation area will be required before final design and construction. Some of the present locations of the principal spillways in several sites, i.e. Nos. 1, 2 and 3 will require a considerable amount of foundation preparation as the centerlines of the dams parallel the stream channel across the center portion of the flood plain area and is filled up with loose sand and gravel. Generally, foundation drainage will be required on the sites where permeable material underlies the foundation area to considerable depth to relieve the deeper permeable sands and prevent piping. The foundation drains also will aid in embankment stability.

A detailed investigation with drilling rigs will be made prior to final design.

Channel conditions were determined by making several hand auger borings in the bottom of present channels, by observing the banks of present channels, and general field observations throughout the watershed. There are no unusual conditions observed that would affect construction of the flood prevention channels as planned. A geological investigation of the sediment transport was made and it indicates that channel fill could be a problem until sedimentation is reduced.

Sedimentation

A field examination of the flood plain area was made to determine the extent of sediment damages. Erosion rates were determined by the use of soil decline relationships according to present and proposed land use conditions above each floodwater retarding structure. Sediment storage requirements for each of the floodwater retarding structures were computed in accordance with Technical Release No. 12.

Soil Conditions

Soil surveys have been completed on about 70 percent of the watershed. The soil survey maps show the type of soil, slope, degree of erosion and major land use. A field examination was made to determine the soil cover complex conditions and provide other work plan needs.

Land Use and Treatment

Present land use was determined by use of a stratified random sampling procedure from the soil surveys and expanded to the entire watershed. Detailed information concerning the use of cultivated land was furnished by the District Conservationist. Future land use and treatment measures needed were planned for the entire watershed based on a realistic evaluation of expanded data obtained from conservation needs inventory and farm plans.

Forestry

A systematic field survey showed ground cover, forest and hydrologic conditions, and treatment needs. This survey, supporting data and information from other agencies and forestry officials determined the amount of remedial measures. The measures recommended contribute to flood reduction and soil stabilization.

Hydraulic and Hydrologic

The engineering field surveys and valley cross section surveys were used as data for the calculation of the rating curves for each valley cross section. The data was processed through a computer system using the water surface profile program to compute the water surface elevations for various discharges. This program included solutions of head-loss due to roads and bridges using the contracted opening method for open channel flow, the orifice equation for pressure flow, and the weir equation for over-topping the embankment. Also included was a plotting of the stage discharge curve and stage-acres inundated curve for each valley section. Printout sheets of this data plus the acres flooding by increments of depth of flooding for the 0 to 1, 1 to 3, and over 3 feet depths were obtained. In addition, stage-discharge data were punched on cards in the proper format for insertion in the TR-20 Project Formulation Hydrology Program.

Since urban protection is one of the primary program objectives, a frequency analysis of flooding was made using the frequency method of evaluation rather than the historical, or natural, series approach to flood damage evaluation.

The data of this watershed was set up to utilize the computer program which was developed for hydrologic processes as outlined in Technical Release No. 20, Project Formulation Program - Hydrology, dated May 1965. Accordingly, this data was forwarded to the Central Technical Unit, Hyattsville, Maryland, where ten storm events were routed through the watershed. In subsequent investigations of this watershed, additional routings were made, utilizing the computer facilities in the ADP Unit, Fort Worth, Texas.

Rainfall for the 24-hour duration period for the 100-, 50-, 25-, 10-, 5-, 2-, and 1-year frequencies were obtained from the U.S. Weather Bureau Technical Paper No. 40. The 24-hour duration rainfall for the one-fifth year frequency was determined in accordance with EWP Technical Guide No. 16, dated February 23, 1968, Re-Determining Rainfall Frequencies Greater Than 100 Events in 100 years. In addition to the eight above mentioned 24-hour rainfall frequencies, two actual storm events were included in the flood routing program. The storm of April 5-6, 1964 produced the greatest flooding on main Sowashee Creek in recent years. Hourly rainfall records for this storm were available from Weather Bureau records at Key Field Airport, Meridian, Mississippi, and was used for routing through the watershed.

Excessive channel velocities necessitated further investigations. The 100-, 10-, and 1-year storms were routed through the watershed for present, first and second future conditions, using an amended computer program. This routing was done at the ADP Unit, Fort Worth, Texas. Type 1 storm distribution pattern and the peak factor of 256.08 for the dimensionless hydrograph table were used in this set of routings. The first future condition included all FWRSs in plan; channel works of improvement in the agricultural portion of the watershed (above the Hawkins Crossing Road, Station 589+30); and present, or existing channel conditions through the urban portion (from the Hawkins Crossing Road, Station 589+30 to the outlet at the junction with Okatibbee Creek). The second future conditions were the same as the first future except that three grade control structures and channel enlargement were included in the urban portion of the watershed.

From concordant flow curves of the routed 100-, 10-, and 1-year frequency rainfalls, peak discharges for other frequency rainfalls were developed for flood analysis.

A stream gauge on main Sowashee Creek provided necessary data to develop a flood flow frequency analysis using the Log-Pearson Type III method. The annual flood magnitudes for 30 years were sent to ADP Unit at Fort Worth, Texas for processing on a computer system for the flood flow frequency analysis. Since this type of analysis is based upon the annual series, it was necessary to make adjustments to a partial duration series for comparison with the routed peak discharges. The routed peak discharges obtained from the 24-hour duration rainfall frequencies were adjusted to conform with the stream gage flood flow frequency analysis.

From field examinations of the areas behind the floodwater retarding structures and of the entire watershed, the hydrologic conditions were determined. With this and additional information from the U. S. Forest Service, District Conservationist, Soil Scientist, and Geologist, the hydrologic soil cover complexes were determined. The average runoff curve numbers were developed for each

floodwater retarding structure and the average runoff curve number for the watershed. Special consideration was given to urban areas where much of the surface area is of impervious materials such as concrete or asphalt paving, roof tops, compacted soils which would contribute greatly to higher potential runoff.

In order to determine the flood plain area, flood marks were set based upon information obtained from local residents. In addition, many pictures of the 1964 flood were available showing areas within the City of Meridian and were inundated. These pictures helped in outlining the flood plain area.

Stage-area inundated tables were developed for each evaluation reach by selected incremental depths of flooding under present conditions and for future conditions with floodwater retarding structures and various channel works of improvements in place.

To meet the requirements for level of protection for urban areas, as outlined in the Watershed Protection Handbook, the works of improvement will provide protection to the residential, commercial and industrial areas against major damages resulting from a recurrence of the largest storm on record or from one of the 100-year frequency, whichever is the greater. The runoff from the 100-year frequency storm was determined to be greater and the desired urban areas were afforded this degree of protection.

Fish and Wildlife

Field investigations were conducted by the Soil Conservation Service biologist and his findings have been discussed with representatives of the U. S. Fish and Wildlife Service and Mississippi State Game and Fish Commission.

Archeological and Historical

There are no recorded sites within the boundaries of the watershed.

Engineering

Photo mosaics were used as base map of watershed. Aerial photographs were used to locate valley cross sections and other physical data pertinent to developing engineering design.

Preliminary field investigations were made on seventeen sites. Three sites were eliminated due to poor storage potential, roads and other physical features. Thirteen floodwater retarding sites and one multiple purpose site were selected. These sites were considered more feasible and provide an adequate degree of protection.

Using mean sea level datum plane from published bench marks set by U.S. Coast and Geodetic surveys, temporary bench marks were set at strategic points and indicated on aerial photographs. This was done to facilitate vertical control while obtaining engineering survey data.

Valley and channel cross sections were taken at points representing different characteristics and conditions along streams. These sections provide basic data for estimating present capacities, flood routing and cost estimating. These surveys, supplemented by additional data, are considered adequate for final design.

Storage curves for four floodwater retarding structures and one multiple purpose structure were developed from topographic reservoir maps made by photogrammetric procedures and are considered accurate enough for final design. Storage curves for remaining structures were developed from topographic information taken from 15 minute quadrangle sheets and centerline profiles; and reservoir maps developed from data obtained by cross sectioning, picture tieing and stereoscopic contouring. These storage curves are not considered adequate for final design.

The multiple purpose structure was developed in accordance with criteria outlined in the Watershed Protection Handbook. Water and sediment storage, flood routing procedures and structure proportioning was based on requirements set forth in Engineering Memoranda MS-20, MS-22 and SCS-27.

Structures Nos. 1, 7, 8 and 13 were classified as "b" structures due to major highways, railroads and residences being located in flood plains immediately below proposed structure sites.

Structure No. 14, a multiple purpose structure, was classified as a "c" structure due to highly developed urban area immediately below.

The other nine structures were classified as "a" structures.

Channel slopes were determined by scaling distances between cross sections on aerial photographs. Manning's formula and criteria outlines in Engineering Memorandum MS-1 and Section 16, NEH, were used in channel design.

The urban protection design capacity is based on a 100-year frequency storm of 24-hour duration. Using present depths and slopes, the velocities developed by these capacities are not in accordance with Technical Release No. 25. The Technical Release No. 25 allowable velocities are in the 3 to 4 feet per second range. The design under these limiting criteria did not seem feasible due to limited right-of-way. Therefore, a study was made of the Sowashee Creek Channel which was

improved by the Corps of Engineers in 1955 to determine what magnitude of channel velocity would be safe in these soils. The channel was enlarged from the junction of Okatibbee Creek to Old Highway No. 80 (Sta. 548+90).

The U. S. Geological Survey operates a recording stream gage on Sowashee Creek. It is now located on U. S. Highway 45 within the Meridian City limits and about 8 miles upstream from the mouth of Sowashee Creek. Prior to November 13, 1959, the gage was located 0.4 miles upstream on U. S. Highway 80.

Between October 2, 1950 and June 16, 1970 a total of 228 discharge measurements were made in the field so that the stage-discharge curve for the gage could be kept current. All the discharge measurement summaries and stage-discharge relationship curves were obtained from the USGS for this study.

Twenty-six of the above mentioned discharge measurements were selected for further analysis. The actual discharge measurement notes were obtained. This data was plotted on profile paper where the cross-section area, velocity and discharge for each individual segment was determined. Combinations of segments representing the channel or portion of the channel were grouped together and the mean velocities determined. The summary of the 26 selected measurements and the calculated mean velocity for the channel section is shown on the table titled "Summary of USGS Data for Selected Storms at Sowashee Stream Gage". This table shows that the mean channel velocity exceeded 4 and 5 feet per second several times in the two years following the Corps of Engineers channel improvement. The velocity in some of the segments or combination of segments exceeded 8 feet per second.

Some of the larger storms, as taken from the USGS Water Supply Papers, were tabulated (water year, date, peak discharge, and gage heights) and a mean channel velocity determined. These mean channel velocities were determined from plottings of gage height vs. velocity of channel section. Five different plottings were made representing different channel conditions at the two different gage locations.

These five plottings are: 1. With the gage at the Highway 80 location prior to the Corps of Engineers improvement, 2. With the gage at the Highway 80 location after the Corps of Engineers improvement, 3. With the gage at the Highway 80 location but with measurements made at Highway 45, 4. With the gage moved to Highway 45 and for the years 1960-1964, and 5. With the gage at the Highway 45 location and for the years 1964-1969. An analysis of the mean channel velocities showed low velocities prior to the channel improvement work by the Corps of Engineers, several mean channel velocities

of 4.0 and 5.0 feet per second in the two years following channel improvement (velocities in some of the segments of the channel exceeded 8.0 feet per second), and decreasing mean channel velocities in the following years (probably due to poor maintenance). The storms occurring in the two years following the channel improvement were not large storms in the 10 to 100-year interval class, but were large enough to give some test of the measure of stability.

From these data it was concluded that a safe velocity for the 10-year storm in this soil would be 5 feet per second under as-built conditions.

The 100-year required capacity in combination with the allowable velocity made the design impossible without reducing the slope. This was accomplished by using three portland cement concrete drop structures.

The 100-year storm was routed under future conditions to be sure that the 100-year storm remains at or below the design hydraulic gradient.

The "n" values used in the design varied from .025 to .05 for the "as built" condition and ranged from .03 to .05 for the "aged" condition with the specific value being determined by the type of work planned. The velocities at the design capacity in the urban area range from 6.28 fps to 5.27 fps. The velocity of the 10-year frequency discharge in the urban area vary from 4.82 fps to 4.07 fps. All velocities in the channels where agricultural protection only is provided are 5.0 fps or less.

The 10-year storm was routed and the velocity at each section checked under as built conditions. The velocities for the 10-year capacities with "n" = .025 were under 5.0 fps in all locations except 3 valley sections located in the transition from urban protection to agricultural. These velocities were considered reasonable and acceptable due to the natural depth being greater than the design depth and the slope change being made in this area.

The high velocities encountered on Gallagher Branch necessitated the planning of a concrete lined channel with a grade control and energy dissipator structure at the lower end of the lining. Grade control structures, without channel lining were considered but were not planned because of restricted right-of-way at sites needed due to urban development. It was deemed more economical and practical to use concrete lining, with planned grade control and energy dissipator structure, to alleviate these high velocities and corresponding maintenance costs.

No specific foundation investigation was performed for the drop structures. However, an indurated clay formation is 0 to 20 feet below the surface in this area and excavation to 20 feet depth was used in the cost estimates for these drop structures. No unusual foundation problems are expected due to the close proximity of the indurated clay to the surface.

INFORMATION ON SOILS AND COMPARISON OF HYDRAULIC CHARACTERISTICS

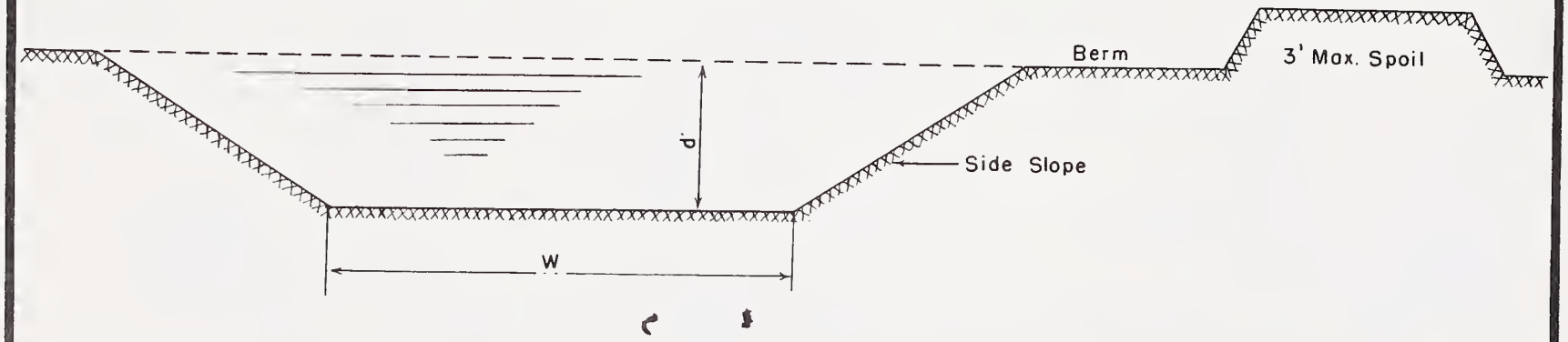
Main Sowashee Creek Channel

Sowashee Creek Watershed, Mississippi

Present Channel 1970

Station	Drainage Area Sq. Mi.	Soil Data Increment	Class	PI	Depth Feet	Bottom Width Feet	Top Width	Percent Vegetated
50+00	77	0-17'	SM 1/	NP	13	38	84	90
93+00	77	0-17'	SM 1/	NP	12	38	82	90
182+00	76	0-17'	SM 1/	NP	14	35	90	90
275+00	74	0-3' 3-7' 7-12'	SM 1/ SM 1/ SM 1/	NP-NP less than 5	12	34	95	85
328+50	68	0-11' 11-14' 14-18'	SM CL SM	NP 19 NP	12	33	64	90
459+20	60	0-6' 6-15' 15-19'	CL-ML SM CL-ML	6 NP 7	14	28	90	100

1/ Field Classification



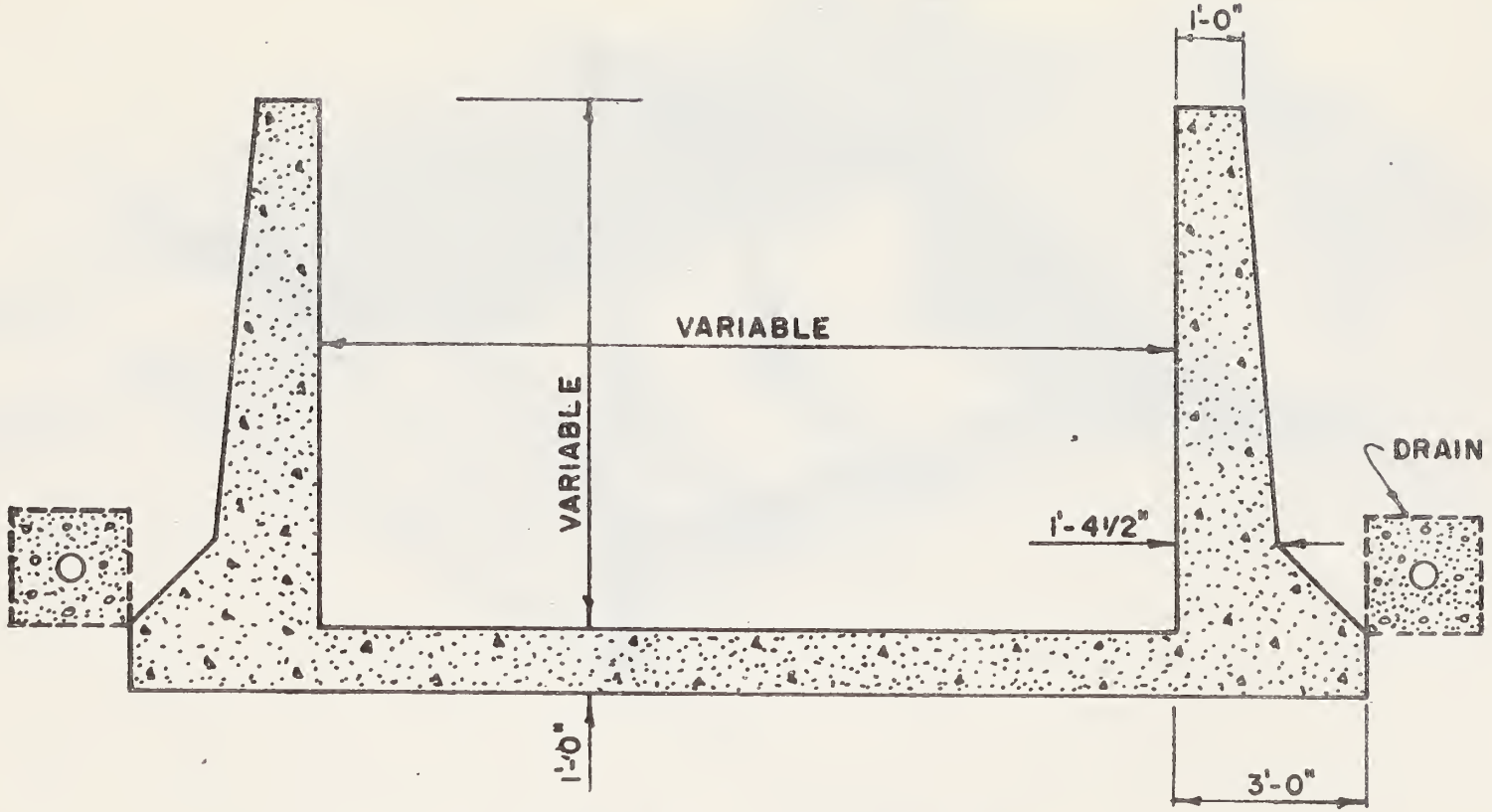
TYPICAL CROSS-SECTION TRAPEZOIDAL CHANNEL

FIGURE 1

9-66 4-L-22597

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
USDA-SCS-FORT WORTH, TEX. 1966

Formerly MR57-67, Spartanburg, S. C.



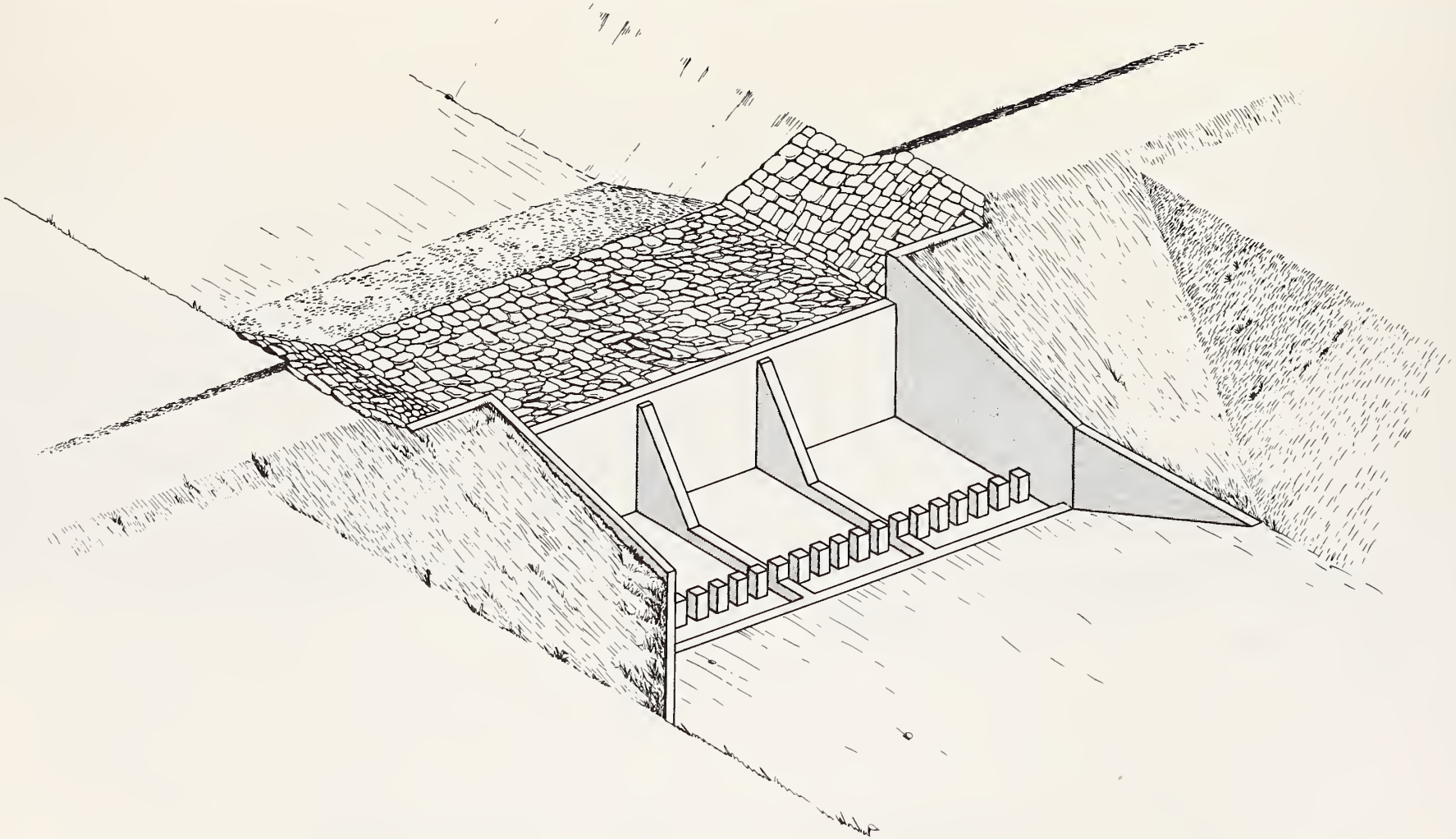
TYPICAL SECTION

CONCRETE LINED CHANNEL

SOWASHEE CREEK WATERSHED
GALLAGHER BRANCH
LAUDERDALE COUNTY, MISSISSIPPI

FIGURE 2

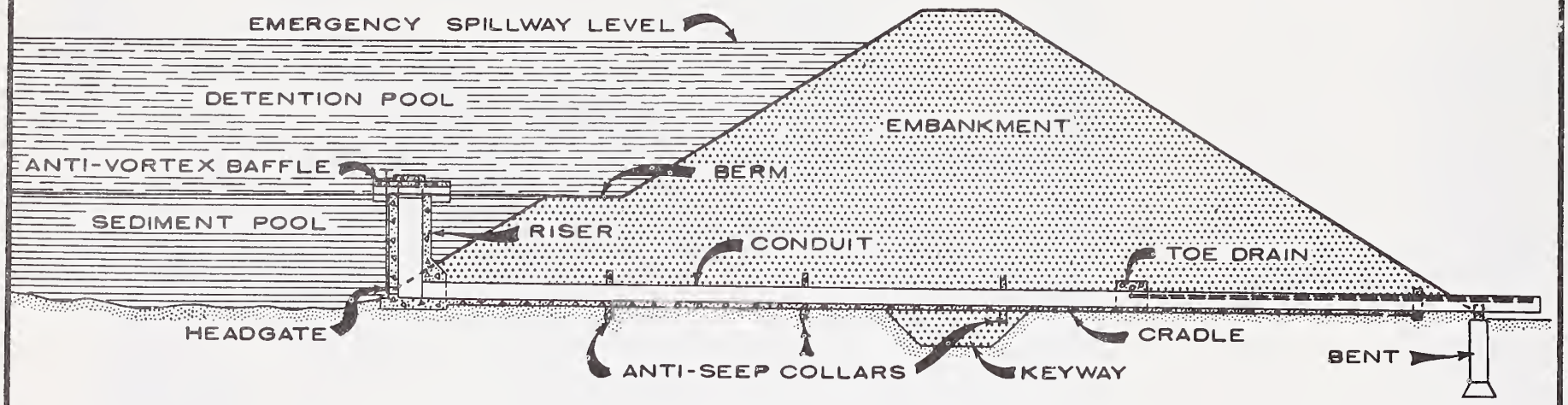
U.S.D.A. - S.C.S. - JACKSON, MISS. 1969



TYPICAL SECTION STRAIGHT DROP
SPILLWAY STRUCTURE TYPE "C"

FIGURE 3

USDA-SCS-FORT WORTH, TEX. 1971



SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

FIGURE 4

9-66 4-L-22596

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
USDA-SCS-FORT WORTH, TEX 1966

Formerly MR 56-209, Spartanburg, S. C.

URBAN AREA OF FLOOD PLAIN

CITY OF MERIDIAN
SOWASHEE CREEK WATERSHED
LAUDERDALE COUNTY, MISSISSIPPI
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
JACKSON, MISSISSIPPI

Rev. 6-71 4-R-27616

Present 100-Year Flood Plain without Project

Future 100-Year Flood Plain with Project

LEGEND
Present 100-Year Flood Plain without Project
Future 100-Year Flood Plain with Project

CITY OF MERIDIAN
LAUDERDALE COUNTY
MISSISSIPPI

0 1000 2000 3000 4000 5000 6000 FEET
APPROXIMATE SCALE
1:21600 or 1" = 1800 FEET

FIGURE 5

USDA SCS-FORT WORTH, TEX. 1971

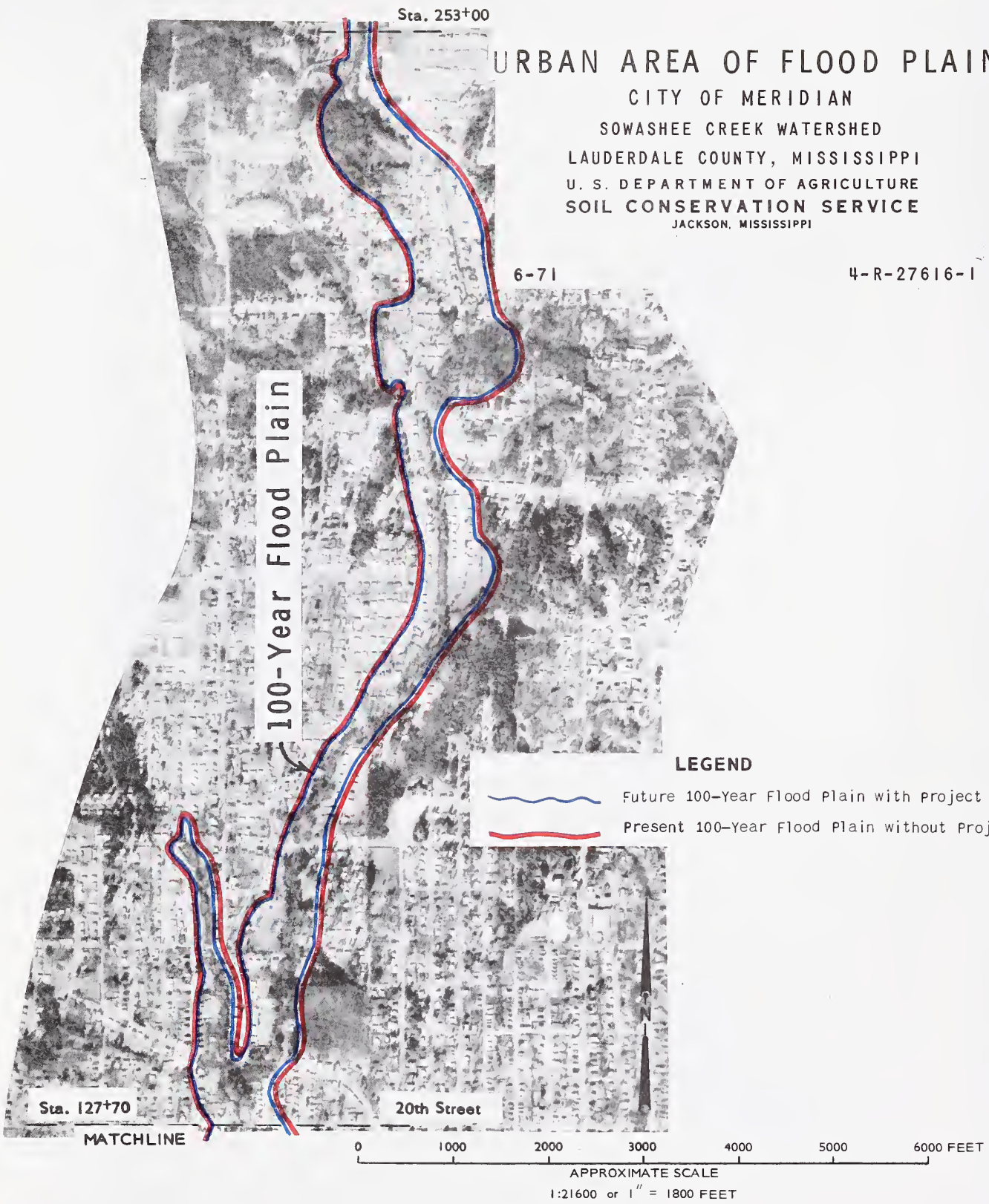
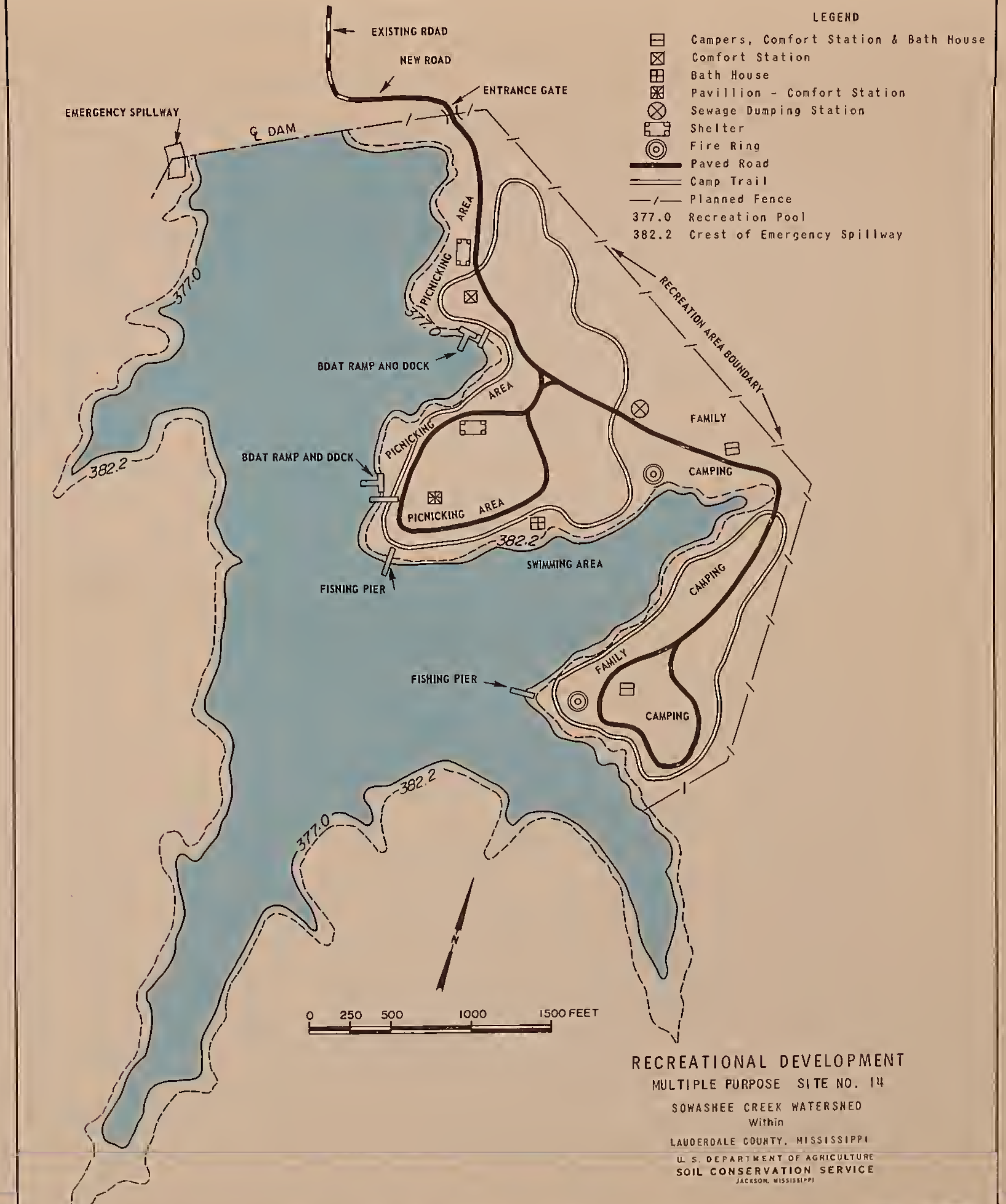


FIGURE 5

USDA-SCS-FORT WORTH, TEX. 1971



RECREATIONAL DEVELOPMENT

MULTIPLE PURPOSE SITE NO. 14

SOWASHEE CREEK WATERSHED

Within

LAUDERDALE COUNTY, MISSISSIPPI

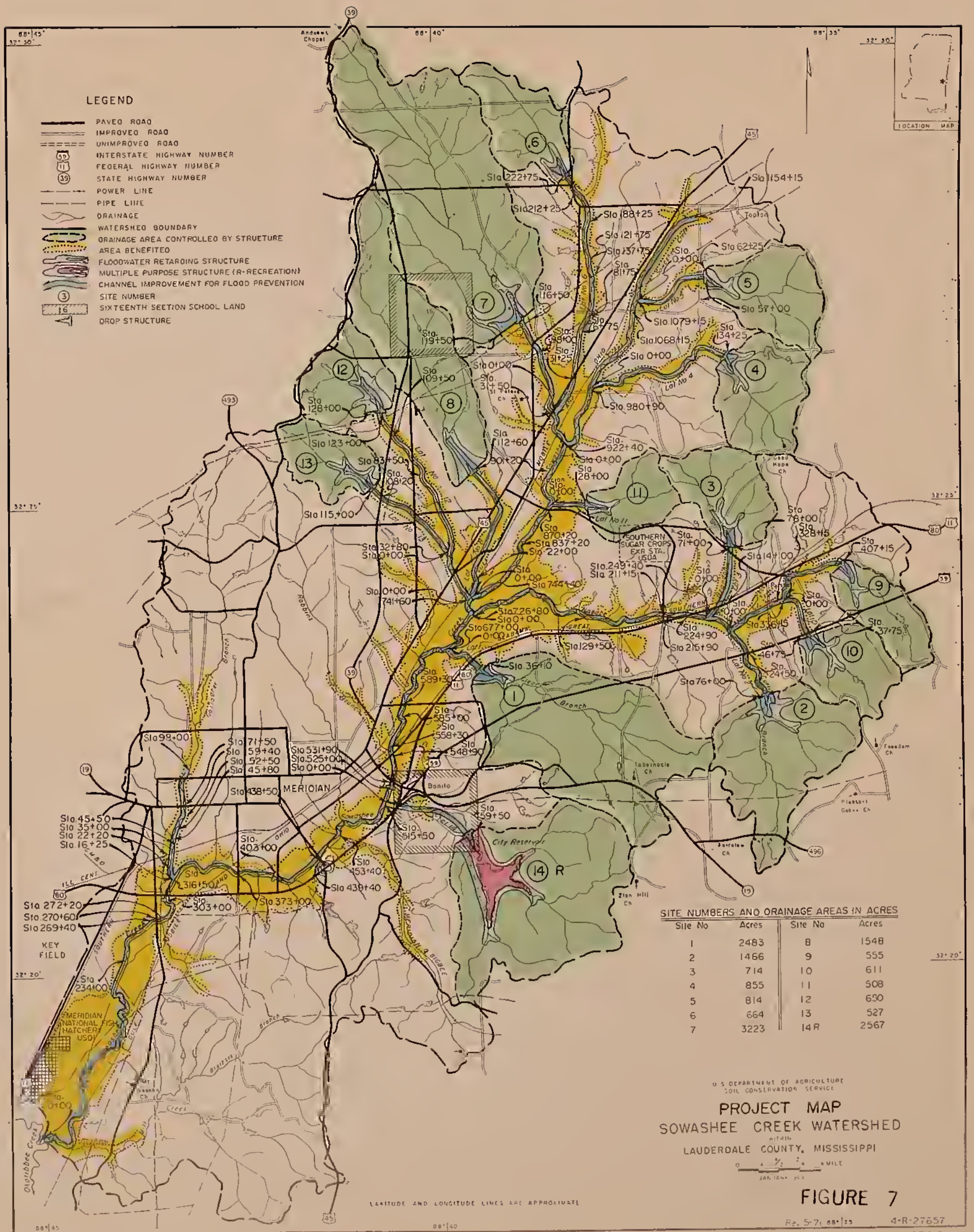
U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

JACKSON, MISSISSIPPI

2-69 4-R-27673

FIGURE 6



SITE NUMBERS AND DRAINAGE AREAS IN ACRES

Site No	Acres	Site No	Acres
1	2483	8	1548
2	1466	9	555
3	714	10	611
4	855	11	508
5	814	12	650
6	664	13	527
7	3223	14 R	2567

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

PROJECT MAP
SOWASHEE CREEK WATERSHED
LAUDERDALE COUNTY, MISSISSIPPI

LATITUDE AND LONGITUDE LINES ARE APPROXIMATE

FIGURE 7

Rev. 5-71 4-R-27657
Rev. 2-69 4-R-27,019