SWDPL-R (SWLED-PV 31 Oct 74) 3d Ind
SUBJECT: Bull Shoals Lake, White River, Arkansas and Missouri, Design Memorandum No. 1-G, Updated Master Plan for Development and Management of Bull Shoals Lake

DA, Southwestern Division, Corps of Engineers, Main Tower Building, 1200 Main Street, Dallas, Texas 75202 16 APR 1975

TO: District Engineer, Little Rock

Subject updated Master Plan is approved subject to comments in the previous indorsements.

FOR THE DIVISION ENGINEER:

FOR Robert J. Wilson
HARRY G. ROUGHT
Chief, Planning Division

CF:
DAEN-CWP-V (dupe)

DAEN-CWP-V (31 Oct 74) 2nd Ind
SUBJECT: Bull Shoals Lake, White River, Arkansas and Missouri, Design Memorandum No. 1-G, Updated Master Plan for Development and Management of Bull Shoals Lake

DA, Office of the Chief of Engineers, Washington, DC 20314 3 Apr 75

TO: Division Engineer, Southwestern
ATTN: Chief, Planning Division

1. The updated Master Plan for Bull Shoals Lake is approved subject to comments of the Division Engineer and the following:

a. SWDPL-R, 1st Ind., para 1. We concur that further study should be made in the allocation of lands for operation: recreation, low-density use; and for operation: natural areas. From our map review of Land Use Maps it appears that there could be a substantial reduction of natural areas.

b. Section VII. Practically all areas where camping sites are provided and proposed have too few units to defray O&M costs from user fee revenues. Operational studies of camping show that generally a minimum of 150 sites are needed to offset O&M costs. Accordingly further study is indicated of the camping areas.

c. Group Use Park, page 7-7. Consideration should be given to a second area for group use in the western portion of the lake. It probably should be located in Missouri, if land area is suitable for such purposes.

d. Table 23, page 15-5. Swimming beach item shows 12 existing units and 13 proposed at $6,000 each. Based on this cost, the facility requirements for swimming beaches appear grossly inadequate if the projected needs are going to be met. (Tables 11, 12, 13, 14, pages 5-14, -15, -16.) Further study is indicated.

e. Other

(1) Page 7-11, Yocum Creek Park is Plate 19 instead of Plate 12 as shown.

(2) Plate 7. The Group Use Park and the Mariner's Island Park should be shown as Future Parks.

2. The land use maps in this DM will be particularly useful to Real Estate as they identify the location of present and future outgrants.

FOR THE CHIEF OF ENGINEERS:

wd incl

ALEX SHWAIKO
Acting Chief, Planning Division
Directorate of Civil Works

12 DEC 1974

WDPL-R (SWLED-PV 31 Oct 74) 1st Ind
UBJECT: Bull Shoals Lake, White River, Arkansas and Missouri, Design Memorandum No. 1-G, Updated Master Plan for Development and Management of Bull Shoals Lake

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street, Dallas, Texas 75202

TO: HQDA (DAEN-CWP-V) WASH DC 20314

1. Forwarded recommending approval of the land use portion of the subject master plan subject to the following comment:

Para. 7-01 d, Operations: natural area, page 7-12. Based on the "primary function" of lands allocated as natural areas, as stated in this paragraph, it appears that the lands should more appropriately be allocated Operations: recreation, low-density use.

2. Those portions of the plan pertaining to development and management of the project resources are approved subject to the following comment:

It is noted that the costs in this report are 10 months older than the submittal date. In accordance with ER 1110-2-1150, current prices should be used in future updating of this DM and subsequent submittal of feature DMs.

Barry G. Rought

BARRY G. ROUGHT
Chief, Planning Division

1 Incl
wd 4 cys

CF:
SWLED-PV w/o incl
SWDPL-R
SWDRE
SWDCO
Eng. Rec.
SWDPD w/o incl

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF:

SWLED-PV

31 October 1974

SUBJECT: Bull Shoals Lake, White River, Arkansas and Missouri, Design Memorandum No. 1-G, Updated Master Plan for Development and Management of Bull Shoals Lake

Division Engineer, Southwestern

Design Memorandum No. 1-G, which was prepared by an architectural-engineering firm under Contract DACW03-73-C-0097, is submitted for your approval.

1 Incl (7 cys)
as

DONALD G. WEINERT
Colonel, Corps of Engineers
District Engineer

WHITE RIVER WATERSHED

BULL SHOALS LAKE

WHITE RIVER
ARKANSAS AND MISSOURI

DESIGN MEMORANDUM NO. 1-G

UPDATED MASTER PLAN
FOR
DEVELOPMENT AND MANAGEMENT OF
BULL SHOALS LAKE

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
LITTLE ROCK, ARKANSAS
OCTOBER 1974

100

PREPARED BY
R. W. BOOKER & ASSOCIATES
ENGINEERS-ARCHITECTS-PLANNERS
ST. LOUIS, MISSOURI

PREFACE

In the past decade, the public demand for recreation on federal lands has shown unprecedented growth. More than ever before, administering agencies are faced with the need to plan recreation facilities and to manage recreation use. It is important that planning and management efforts be directed toward the goal of optimum utilization of public lands and that these efforts be based on sound environmental principles and a thorough knowledge of the capabilities of the resources involved. It is equally important that all plans be frequently reviewed and updated in order to provide for the orderly progression of recreation development and to discard any planning assumptions which are no longer relevant. With these goals and objectives providing the major direction, this updated master plan for lake development and management was prepared as set forth in the following pages of this document.

SUMMARY

This updated master plan represents a continuing effort to periodically re-evaluate the processes of planning and management which have formed the basis for the development and use of the Bull Shoals Lake project.

The compilation of data on recreation and environmental resources of the project area was examined and supplemented with new information. These and other factors were evaluated with regard to influences or constraints which they might exert on resource development and management. Statements and recommendations for the updated master plan were obtained from concerned local, state, and federal agencies.

Utilizing data obtained through the above processes, a physical plan of development was formulated. In this plan, all project lands were allocated based on their potential optimum utilization.

Existing parks were evaluated in terms of adequacy in providing water-related outdoor public recreational opportunities, and efficiency of design. Park plans were revised where required. Where necessary, design criteria were derived for proposed facilities. Finally, consideration was given to special problems, both existing and potential, as they affected the Bull Shoals project.

WHITE RIVER WATERSHED
ARKANSAS AND MISSOURI

WHITE RIVER
BULL SHOALS LAKE

DESIGN MEMORANDUM NO. 1-G

UPDATED MASTER PLAN FOR
DEVELOPMENT AND MANAGEMENT OF
BULL SHOALS LAKE

PREVIOUSLY ISSUED AND CURRENTLY SCHEDULED DESIGN MEMORANDUMS

Memo. No.	Subject	Date Submitted or Scheduled	Date Approved
-	Master Plan for Recreational Development and Reservoir Utilization, Bull Shoals, White River, Arkansas and Missouri	29 Jun 51	30 Jul 51
-	Bull Shoals Reservoir, Arkansas and Missouri; Construction Design Memorandum, Basic Recreational Facilities at Completed Projects, FY 61	17 Jan 61	25 Jan 61
1-D	Bull Shoals Dam and Reservoir, White River, Arkansas and Missouri; Design Memorandum 1-D - Master Plan for Bull Shoals (Updated)	3 Mar 61	(1)
1-E	Bull Shoals Dam and Reservoir, Updated Master Plan for Reservoir Development and Management	9 Jul 65	12 Aug 66
1-F	Bull Shoals Reservoir, Master Plan for Ozark Isle	24 Sept 63	3 Jun 65
-	Supplement No. 1 to updated Master Plan for Reservoir Development and Management	5 Jul 67	29 Jan 68
-	Supplement No. 2 to Updated Master Plan for Reservoir Development and Management	10 Jan 69	15 Apr 69

(1) Submitted in draft form. Returned from SWD by 1st Ind dated 10 Jul 61, for further study and revision

PREVIOUSLY ISSUED AND CURRENTLY SCHEDULED DESIGN MEMORNADUMS (CONT.)

Memo. No.	Subject	Date Submitted or Scheduled	Date Approved
-	Supplement No. 3 to Updated Master Plan for Reservoir Development and Management	28 Jan 70	1 May 70
-	Supplement No. 4 to Updated Master Plan for Reservoir Development and Management	24 Jul 70	8 Oct 70
-	Supplement No. 5 to Updated Master Plan for Reservoir Development and Management	27 Aug 71	17 Nov 71
-	Supplement No. 6 to Updated Master Plan for Reservoir Development and Management	18 Nov 71	21 Dec 71
-	Supplement No. 7 to Updated Master Plan for Reservoir Development and Management	9 Jun 72	(1)
-	Supplement No. 8 to Updated Master Plan for Reservoir Development and Management	27 Sept 72	(1)
-	Supplement No. 9 to Updated Master Plan for Reservoir Development and Management	26 Jan 73	12 Mar 73
1-G	Bull Shoals Lake, Arkansas and Missouri, Updated Master Plan for Lake Development and Management	Oct 74	
(1)	Not favorably considered for approval		

APPENDICES

A	Project Resource Management Plan	Aug 72	
B	Forest Management Plan	Feb 73	Feb 74
C	Fire Protection Plan	Jan 75	
D	Fish and Wildlife Management Plan	Nov 72	Jun 73
E	Project Safety Plan	Apr 73	Jun 73

WHITE RIVER WATERSHED
ARKANSAS AND MISSOURI

WHITE RIVER
BULL SHOALS LAKE

DESIGN MEMORANDUM NO. 1-G

UPDATED MASTER PLAN FOR
DEVELOPMENT AND MANAGEMENT OF
BULL SHOALS LAKE

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BULL SHOALS LAKE
WHITE RIVER
ARKANSAS AND MISSOURI

UPDATED MASTER PLAN FOR
DEVELOPMENT AND MANAGEMENT OF
BULL SHOALS LAKE

SECTION I

INTRODUCTION

1-01. Project authorization and related legislation. The project was authorized by the Flood Control Act approved 28 June 1938, (Public Law No. 761, 75th Congress, 3d Session) which was later modified by the Flood Control Act approved 18 August 1941, (Public Law No. 228, 77th Congress, 1st Session) to include authorization of the project for flood control and generation of hydroelectric power. Section 4 of the Flood Control Act approved 22 December 1944, as amended by Section 4 of the Flood Control Act approved 24 July 1946, as amended by Section 209 of the Flood Control Act approved 3 September 1954 (Public Law No. 780, 83rd Congress), as amended by Section 207 of the Flood Control Act of 1962, as amended by Section 2 of the Land and Water Conservation Fund Act of 1965, and as further amended by Section 210 of the Rivers and Harbors Flood Control Act of 1968, authorized the Department of the Army to provide for recreational use of the lakes under its control.

1-02. Project purposes. Bull Shoals is a multiple-purpose power generation and flood control project and is a major unit in a comprehensive plan for development of the water resources of the White River Basin in Missouri and Arkansas.

1-03. Purpose of master plan. This master plan updates design memoranda Nos. 1-E and 1-F for Bull Shoals Lake approved 12 August 1966 and 3 June 1965. This updated plan is part of a continuing process to guide the development and use of the Bull Shoals project throughout the project life and to ensure that changes in policy, land use philosophy, and public need are reflected in its development and management.

1-04. Prior pertinent design memorandums. The initial master plan for the Bull Shoals Lake was approved 30 July 1951. It was later updated in 1961 and 1965 and approved in 1966. The initial master plan for Ozark Isle was approved in 1965. Nine supplements, representing alterations in the updated master plan for the Bull Shoals Lake, were later added. A project resource management plan and a fish and wildlife management plan were prepared in 1972; a forest management plan and a project safety plan were prepared in 1973. A fire protection plan is currently being prepared and is scheduled for submission in January 1975.

1-05. Application of public laws.

a. Flood Control Act of 1944 (Public Law 78-534). The Department of the Army is authorized to provide for recreational use of the projects under its control by Section 4 of the Flood Control Act approved 22 December 1944, as amended by Section 4 of the Flood Control Act approved 24 July 1946, as amended by Section 209 of the Flood Control Act approved 3 September 1954, and as amended by Section 207 of the Flood Control Act of 1962 approved 23 October 1962, as amended by Section 2 of the Land and Water Conservation Fund Act of 1965, and as further amended by Section 210 of the Rivers and Harbors Flood Control Act of 1968.

b. Fish and Wildlife Coordination Act of 1958 as amended (Public Law 85-624). Fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resources development programs.

c. Federal Water Project Recreation Act of 1965 (Public Law 89-72). In accordance with current cost sharing policy established by the Secretary of the Army in coordination with the Office of Management and Budget, development of all future parks will require participation by a non-Federal body furnishing at least 50 percent of the cost of recreational development and providing operation and maintenance upon completion of the development. Also, all recreational development will be subject to the cost sharing policy after FY 1974 unless a system of user fees is established to recover all operation and maintenance costs.

d. Water Resources Planning Act of 1965 (Public Law 89-80). This act was designed to provide for the optimum development of the nation's natural resources through coordinated planning of water and related land resources. It provides authority for the establishment of a water resources council and river basin commissions.

A comprehensive study of the White River Basin was initiated prior to the passage of the act by the Ad Hoc Water Resources Council. This study was completed in 1968. Volume V of the study focused on outdoor recreation resources of the White River Basin. A study was authorized to determine if the Beaver, Table Rock, Bull Shoals, and Norfork lakes should be designated as a National Recreation Area (NRA). That study is now being conducted. (If Bull Shoals Lake is included in the NRA, the development of recreational resources and acquisition of additional lands would not be subject to the cost-sharing provision of the Federal Water Project Recreation Act, referenced under c. above).

1-06. Scope of report. This updated design memorandum for the Bull Shoals Lake evaluates the land and water resources of the project and presents plans for their proper utilization in light of available data on resource capabilities and anticipated public demand for recreation. Special attention is focused on land allocation, as defined

in ER 1120-2-400, and park site planning. This master plan is intended to assure the wise and orderly development of the Bull Shoals project in providing recreational opportunities for public enjoyment of the resource.

SECTION II

PROJECT DESCRIPTION

2-01. General. The total area contained in the Bull Shoals project, including both land and water surface, consists of 101,196 acres. Of this total, 100,090 acres are fee-owned and 1,106 acres are in flowage easement. When the lake is at conservation pool (elevation 654 feet above mean sea level), the total exposed land area comprises 55,750 acres. The outer boundary of this land holding follows section or subsection lines, and was acquired according to a controlling contour of 700 feet above mean sea level elevation. Fee lands extend to the center of the streambed of the White River.

2-02. Location. Bull Shoals Lake is one of a series of five lakes in the Upper White River Basin in northern Arkansas and southern Missouri. The other lakes in the series are Beaver, Table Rock, and Taneycomo on the White River, and Norfork on the North Fork River.

Bull Shoals Dam is located in Marion and Baxter Counties, Arkansas, about seven miles north of Cotter and ten miles west of Mountain Home. The dam is situated at mile 418.6 of the White River and impounds a lake extending from the dam northwest along the White River and its tributaries to the Empire District Electric Company Dam located at mile 506.1, in Taney County, Missouri. The lake and surrounding project lands are contained in Ozark and Taney Counties in Missouri, and Boone, Baxter, and Marion Counties in Arkansas.

2-03. Project data.

a. Basin hydrologic and climatic summary. The White River Basin drains an area of 27,765 square miles. Of this drainage area 10,622 square miles are located in Missouri and 17,143 square miles in Arkansas. The drainage area above Bull Shoals Lake is approximately 22 percent of the White River Basin or 6,036 square miles.

The White River rises in the Boston "Mountains" in the western part of the basin and flows in a generally northerly direction to the Missouri-Arkansas state line (mile 591.9), thence in a generally easterly direction for about 115 miles in southern Missouri and for about 30 miles along either side of the state line until it finally crosses into Arkansas at about mile 447.5. Downstream from that point, it flows in a generally southeasterly direction to the mouth of the Black River (mile 264.8) near Newport, Arkansas, and then in a southerly direction to join the Mississippi River at mile 599 above Head of Passes, Louisiana, and about 14 miles above the mouth of the Arkansas River. The principal tributaries flowing into the White River are the Buffalo, James, North Fork, Black, Little Red, and

Cache Rivers, and Big Creek. The Beaver, Table Rock, Empire District Electric Company, and Bull Shoals Dams form a series of lakes beginning near Fayetteville, Arkansas, and extending 235 miles through northwest and north-central Arkansas and southwest Missouri.

The fall of the White River varies from 1.7 feet per mile in its middle reaches to 0.4 feet per mile near its mouth. Major Mississippi floods cause backwater effects which have reached approximately 165 miles upstream from the confluence of the White River with the Mississippi.

The average annual discharge of the White River of more than 20,900 cubic feet per second ranks this river high in streamflow compared to other rivers in the United States. Contributing to this streamflow is an average annual rainfall of approximately 45 inches and the flow issuing from numerous large springs in the Ozark Plateaus. Of the 69 springs in the United States with average flows of 100 c.f.s. or more, seven are located in this region. These springs contribute to the flow of the White River even during periods of drought.

The White River drainage system contains about 22 miles of seriously polluted streams. The most serious problem was the excessive nutrient and high BOD load discharged to the James River as sewage effluent by the city of Springfield, Missouri (pop. 118,950), and other communities in the area. A total of 12 miles of stream were seriously polluted this way. The excessive nutrients carried by the James River probably contributed to the annual severe oxygen depletions in the hypolimnion of Table Rock Lake. Discharges of this hypolimnial water through Table Rock Dam resulted in dissolved oxygen levels as low as 2.0 mg/l in Lake Taneycomo. The Corps of Engineers is attempting to improve this situation by aeration.

The river carries only a small amount of sediment and is considered a clear water stream. The chemical quality of surface water is generally satisfactory except in certain areas where it is excessively hard, or contains high levels of nitrate, disolved solids, iron or salt.

The White River Basin is located in the climatic zone classified as humid subtropic which includes most of the southeastern United States.[1] In this climatic region weather changes are frequent, particularly in early summer when monsoon wind systems carry warm, moist, unstable, maritime tropical air into the area.

[1]Koppen - Geiger System of Climate Classification. After R. Geiger and W. Pohl (1953).

In general, the climate in the basin is moderate with an average annual temperature of about 59°. Late summer is the time of maximum heat and least rainfall. Temperatures ranging from 90° to 100° are common during this time of the year. During the winter months, midday temperatures in the basin are relatively warm, around 55° to 60°. Some short periods of cold weather occur with temperatures ranging from 0° to 10°. On winter nights, temperatures from 40° to below freezing are common.

Average annual precipitation ranges from 42 inches in the north of the basin to 54 inches in the south, with a mean of about 45 inches occurring in the Bull Shoals area. The average annual snowfall for the Bull Shoals area is about 12 inches.

b. Lake shoreline, length, and general character. The shoreline of the lake is irregular, and varies topographically from steep bluffs to gently sloping points. Much of the shoreline in the upper reaches of the lake, because of its gentle slope, is subject to rapid dewatering when the pool elevation is reduced. When the lake is at conservation pool, the shoreline is 740 miles long.

c. Project structures (operational). The Bull Shoals project includes a concrete gravity-type dam and a hydro-electric generating plant. The dam is 2,256 feet long and rises 258 feet above the streambed. A spillway section, 808 feet long, is located above the river channel and is controlled by 17 radial crest gates 28 feet high and 40 feet long. In the base of the dam are 16 4-foot by 9-foot control conduits. There are four 40,000 kilowatt and four 45,000 kilowatt generating units. The following table summarizes the pertinent engineering data on the project.

TABLE 1
ENGINEERING FEATURES OF BULL SHOALS LAKE

Dam		
Crest length (feet)		2,256
Height of dam (roadway) above foundation (feet)		283
Width of base of dam (feet)		230
Volume of concrete in dam (cubic yards)		2,100,000
Spillway		
Length of spillway (feet)		808
Elevation of spillway crest (feet above m.s.l.)		667
Control works		
Number of rectangular conduits through base of dam		16
Size of conduits (feet)		4 x 9
Number of slide gates per conduit		2
Power provision		
Main generating units		8
Rated capacity of each unit (kilowatts)	4@	40,000
	4@	45,000
Lake		
Top of flood-control pool elevation (feet above m.s.l.)		695
Surface area (acres)		71,240
Storage capacity of project (acre feet)		5,408,000
Length of shoreline (miles)		1,050
Top of conservation pool elevation (feet above m.s.l.)		654
Surface area (acres)		45,440
Storage capacity of project (acre feet)		3,048,000
Length of shoreline (miles)		740
Bottom of power drawdown elevation (feet above m.s.l.)		628.5
Surface area (acres)		33,800
Storage capacity of project (acre feet)		2,045,000
Spillway design, flood (feet above m.s.l.)		703

2-04. Project operation. The operation of the project consists of the impoundment of water in the lake during periods of high runoff and its release through the hydroelectric power plant to produce electricity which is marketed by the Southwestern Power Administration, U. S. Department of the Interior. The dam was designed for maximum pool elevation 703, and is operated for a nominal flood control pool at an elevation of 695 feet m.s.l. Under normal conditions, the lake elevation fluctuates between 654 feet m.s.l., which is the top of the conservation pool, and 628.5 feet m.s.l., the bottom of the power drawdown. This fluctuation results from the impoundment of runoff, the release of water for hydropower generation, and floodwaters evacuated into the lake from Table Rock Lake during periods of high runoff.

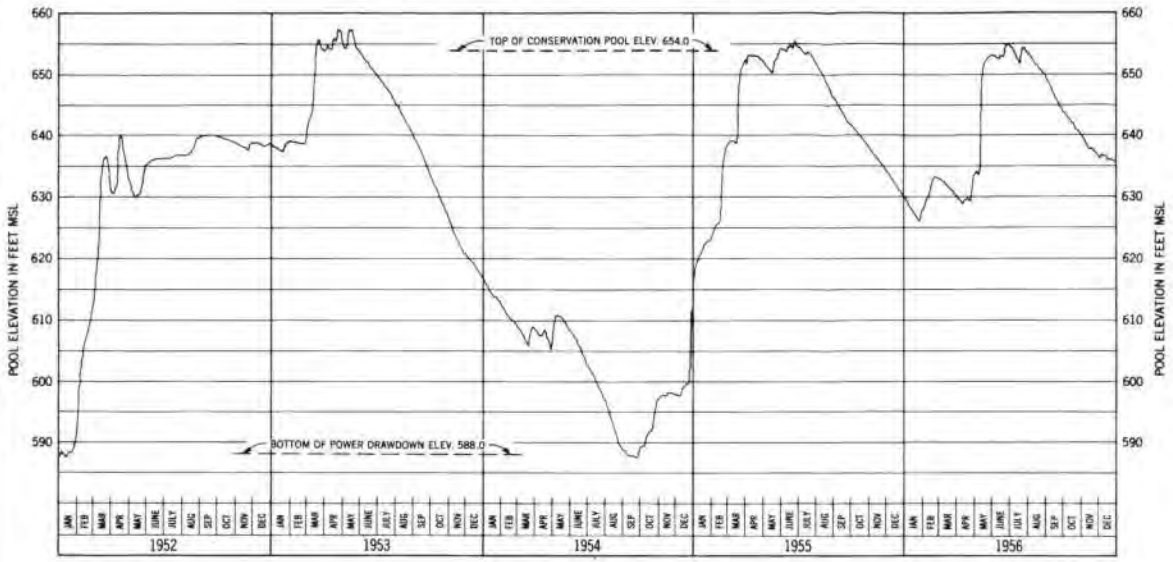
During flood conditions, the lake level may rise into the flood control pool, and under extreme flooding may exceed the top of the flood control pool by as much as eight feet during the surcharge operation. During extended droughts, the lake level will fall from evaporation, but may also be drawn down to elevation 588 feet m.s.l., if necessary, to meet long-range hydroelectric power commitments. Plate 1 shows experienced lake levels from 1952 through 1973. A summary of the natural flows at the damsite for the 38-year period from October, 1921, to September, 1959, is shown below.

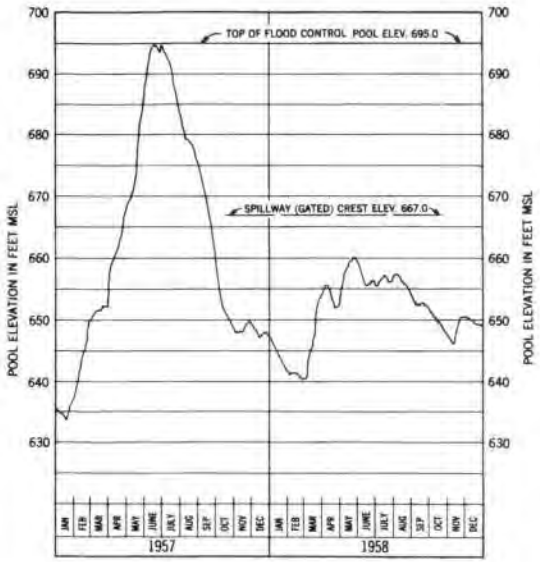
TABLE 2
FLOWS INTO LAKE
(October, 1921, through September, 1959)

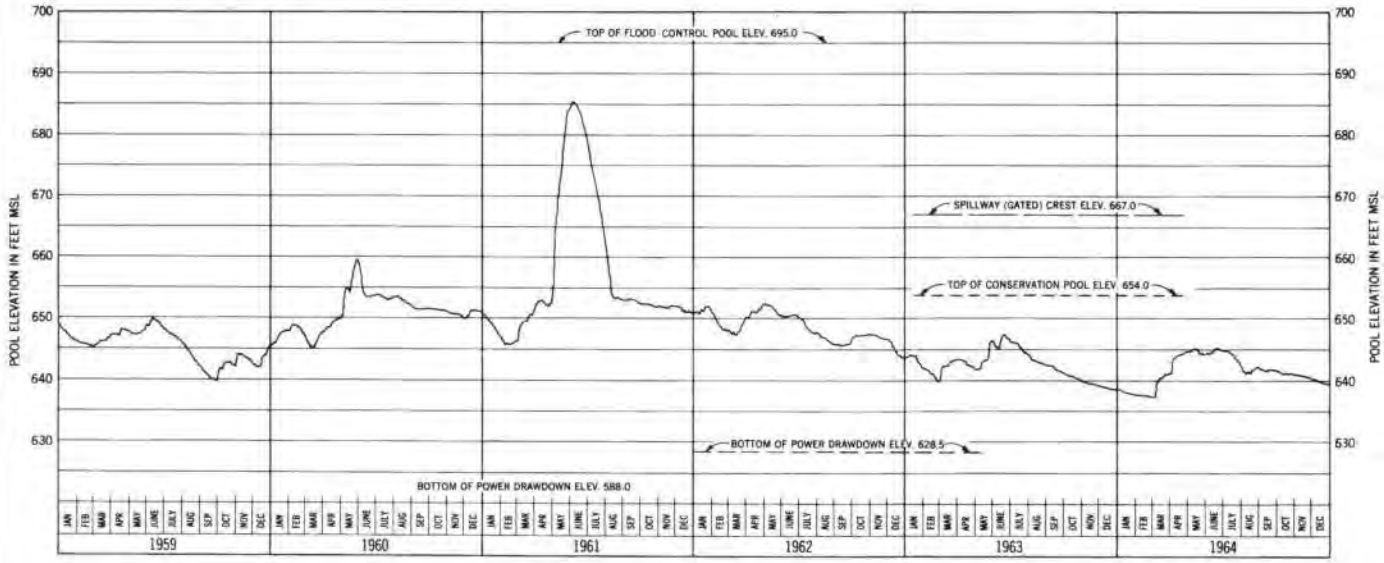
	Period	Acre Feet	Avg. rate (c.f.s.)
Average annual	38 years	4,693,900	6,490
Maximum year	1927	10,454,800	14,470
Minimum year	1954	879,800	1,220
Maximum month	April, 1927	3,397,000	57,190
Minimum month	October, 1951	9,260	150

2-05. Visitation - existing and projected.

a. Experienced visitation. The collection of visitation data for the Bull Shoals project was begun in 1952. In that year, 421,800 persons visited the project. This figure, contrasted with the 1972 visitation figure of 3, 940,000, illustrates the remarkable increase in visitation which the Bull Shoals project has experienced in a period of twenty years (See Plate 2, Graph No. 1 - Annual Visitation to Bull Shoals).







NOTES:

1. CONSTRUCTION OF THE PROJECT BEGAN IN APRIL 1946.
2. FILLING OF THE POWER POOL BEGAN JULY 1951.
3. POWER GENERATION BEGAN SEPTEMBER 1952.
4. FINAL TWO TURBINES (TOTAL OF EIGHT) WERE PLACED IN OPERATION AUGUST AND SEPTEMBER 1963.
5. DURATION FROM MIDNIGHT POOL ELEVATIONS FOR PERIOD APRIL 1953 THRU DECEMBER 1972.
6. BOTTOM OF POWER DRAWDOWN RAISED FROM ELEV. 588 TO 628.5 JANUARY 1962.

WHITE RIVER WATERSHED — WHITE RIVER, ARKANSAS

EXPERIENCED LAKE LEVELS

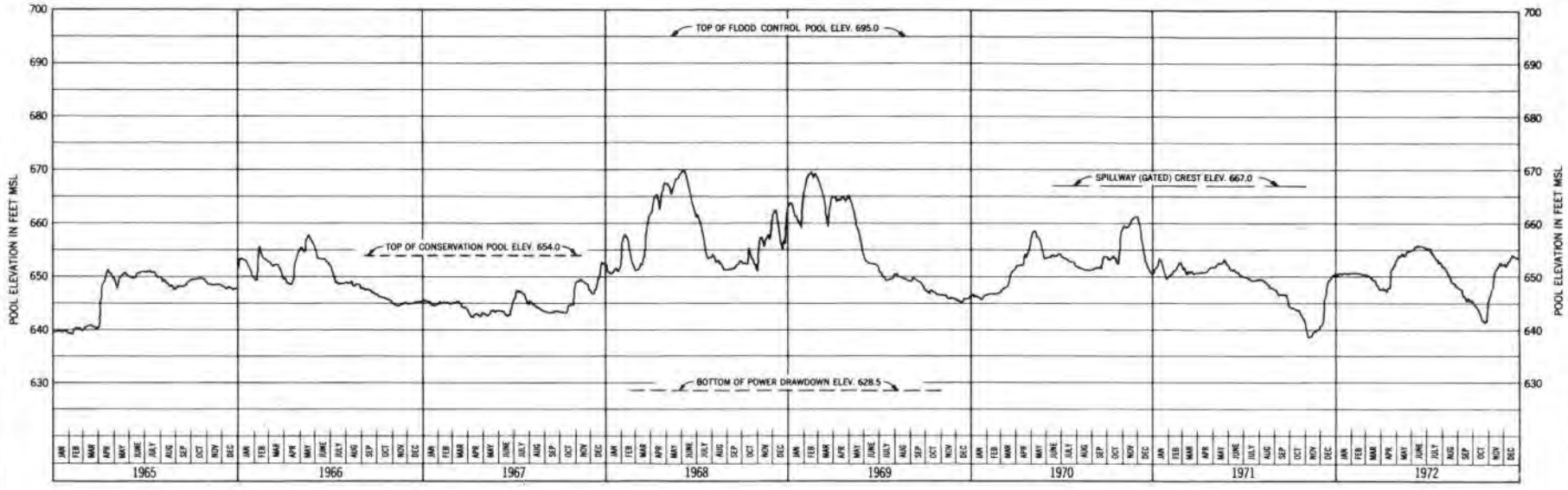
BULL SHOALS LAKE

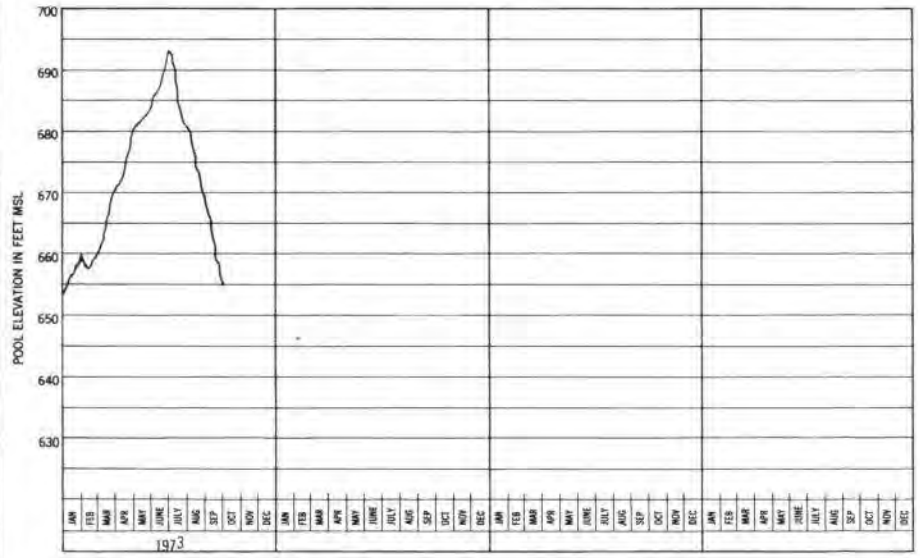
SCALE: AS SHOWN

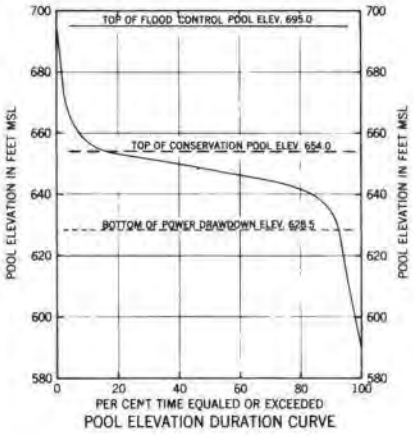
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS APRIL, 1974

CORPS OF ENGINEERS

U. S. ARMY







POOL ELEVATION DURATION CURVE

NOTES:

1. CONSTRUCTION OF THE PROJECT BEGAN IN APRIL 1946.
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WHITE RIVER WATERSHED — WHITE RIVER, ARKANSAS

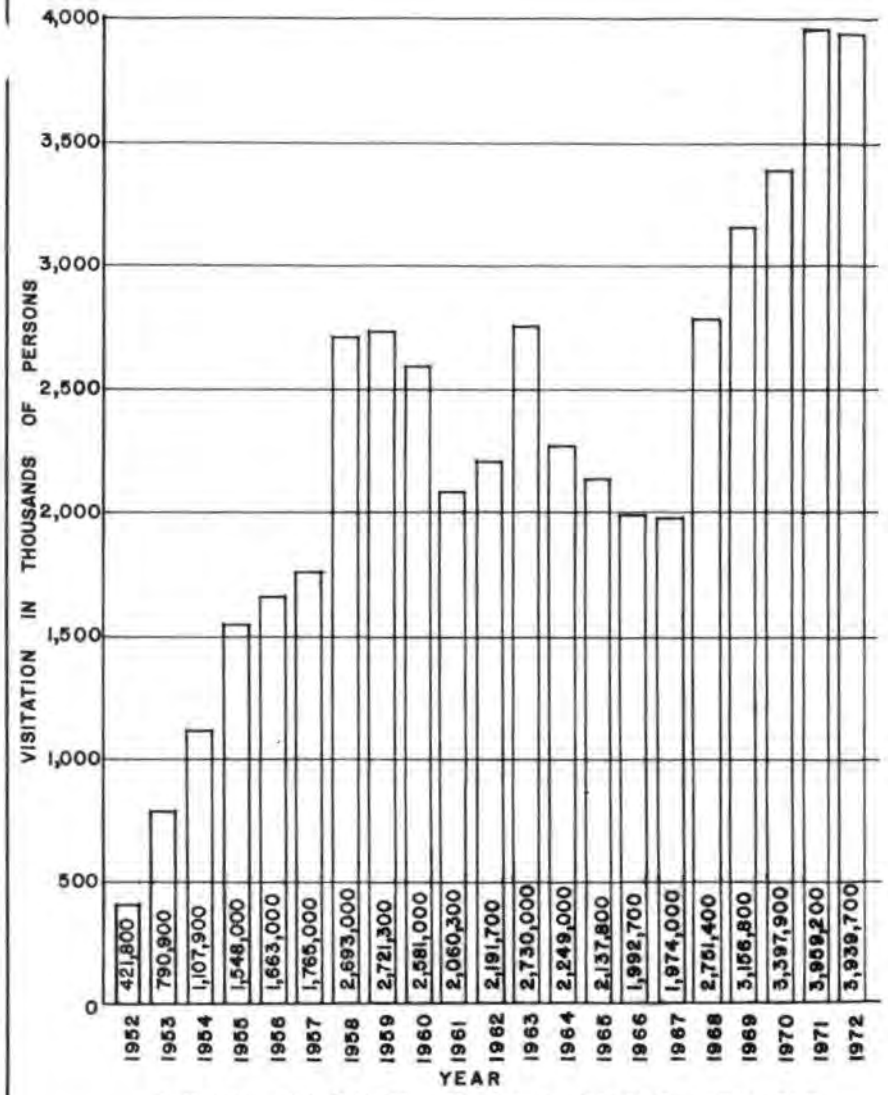
EXPERIENCED LAKE LEVELS

BULL SHOALS LAKE

SCALE: AS SHOWN

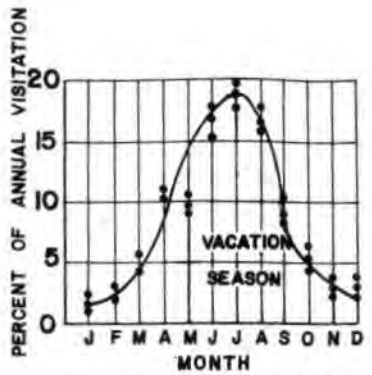
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS APRIL, 1974

SHEET 2 OF 2



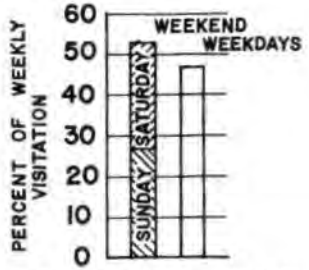
ANNUAL VISITATION TO BULL SHOALS 1952-1972

GRAPH NO. 1



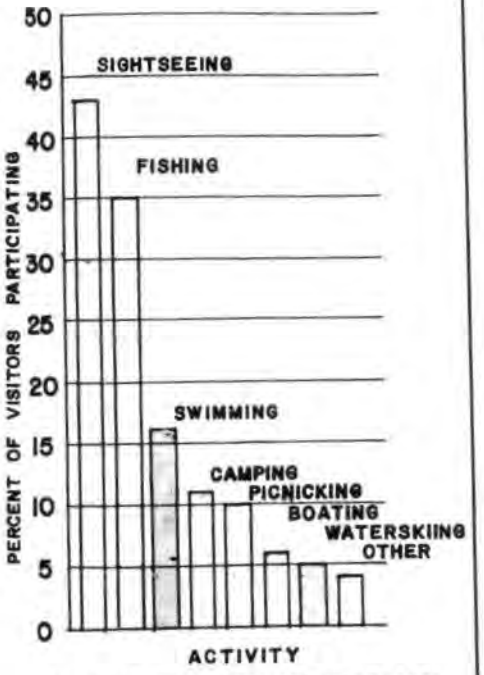
SCATTER OF MONTHLY VISITATION (1970-1972)

GRAPH NO. 2



WEEKLY DISTRIBUTION OF VISITATION (1966-1968)

GRAPH NO. 3



DISTRIBUTION OF RECREATION ACTIVITY

GRAPH NO. 4

SUMMARY OF BULL SHOALS PROJECT VISITATION DATA 1952 TO 1972

Drops in visitation occurred in 1961 and the period from 1964 to 1967. The visitation during 1961 was about 500,000 less than the previous year due to unseasonably cool weather during the spring, and an extremely high lake elevation of 685± feet m.s.l. During 1963 climatic conditions were more favorable and visitation increased. A new park (Shadow Rock) was opened near Forsyth, Missouri, and the access road to Ozark Isle Park was completed. These factors also contributed to an increase in visitation in 1963.

During the period of 1964-1967, attendance at the project decreased by about 760,000. The decrease was partially caused by inclement weather during many of the weekends when attendance is normally high. Also during this period, some new lakes became available in adjoining areas of Arkansas, Missouri, and Kansas. These new facilities attracted visitation which otherwise would have been experienced at Bull Shoals Lake.

Graph No. 2 (Plate 2) shows the scatter of monthly visitation recorded between 1970 and 1972. The summer months of June, July, and August, which fall during the vacation season, contribute the highest percentages of annual visitation.

Graph No. 3 (Plate 2) shows weekly distribution of visitation. This information, derived from visitor surveys conducted between the years of 1966 and 1968, indicates that weekend visitation (53 percent) comprises a greater proportion of total annual use than weekday visitation (47 percent).

Graph No. 4 (Plate 2), derived from data assembled from a survey of recreation participation conducted in 1968, shows the distribution of recreation activity by percent of visitors participating in each activity. It can be seen from the graph that a higher percentage of visitors participate in sightseeing and fishing than in other activities.

b. Future visitation.

(1) Method of projection. The method used to project visitation to the Bull Shoals project is based on the relationship between personal income and recreation participation. Past observations have revealed that total personal income for the zone of influence of a recreation facility, although not a complete causal explanation of user demand, serves as a relatively reliable index of recreation usage. As total personal income rises, visitation increases proportionately. In contrast to the linear regression method used previously to estimate future visitation to the Bull Shoals project, this improved method attempts to correlate an indicative causal factor, total personal income, with visitation to produce a better estimate of future project usage.

(2) Assumptions. The following assumptions were utilized in projecting future visitation for the Bull Shoals project:

(a) Per capita demand for outdoor recreation will continue to show a directly proportional relationship to per capita personal income (PCPI).

(b) Project visitation is proportional to the population residing within the zone of influence.

(c) The major percentage of visitors to the Bull Shoals project will continue to issue from an area around the project defined as the zone of influence, as determined from information collected in surveys of project users.

(3) Procedure.

(a) The zone of influence for Bull Shoals Lake was determined. The zone defined consists of the area falling within 100 highway miles of the project (See Plate 3). From past surveys it is known that this area contributes approximately 90 percent of all day use visitors.

(b) Population and PCPI data were derived for the zone of influence. Data sources utilized were the 1970 Census of Population (for Arkansas and Missouri) and OBERS Projections, Economic Activity in the United States[1,2,3] (The zone of influence includes Water Resources Subarea 1101 - White River, and parts of Subareas 1029 - Osage-Gasconade, 1107 - Verdigris-Neosho, and 1111 - Lower Arkansas, as delineated by the U.S. Water Resources Council in the OBERS Projections.). Data derived from census tabulations were used to form a statistical base and a statistical relationship developed in order to utilize OBERS Projections for population and per capita income.

(c) Population was multiplied by PCPI for the years 1972, 1980, 1990, and 2000 to obtain total personal income for the zone of influence. (See Table 3.)

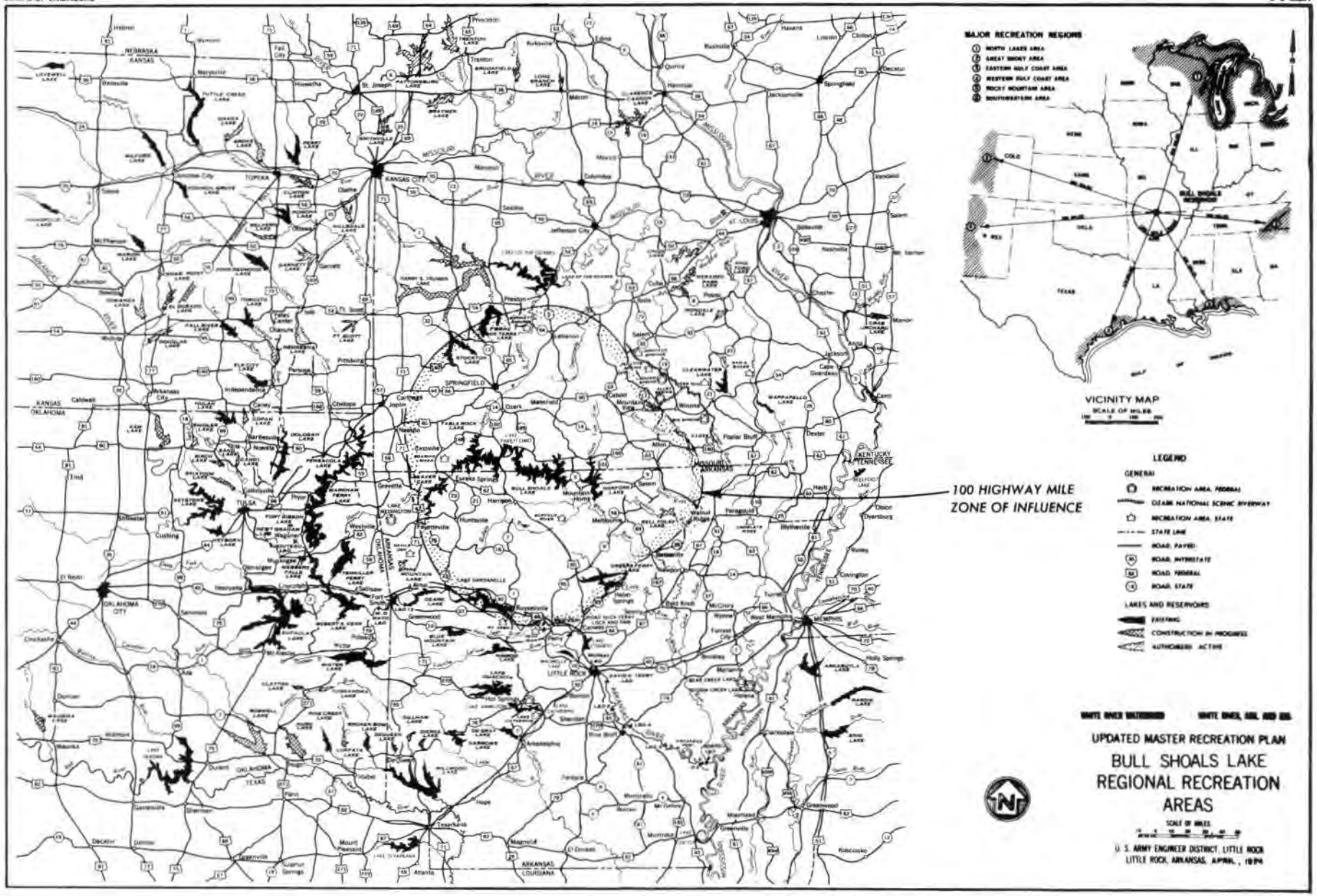
[1]Bureau of the Census. 1972. General Social and Economic Characteristics - Arkansas, 1970 Census of Population. Social and Economic Statistics Administration, United States Department of Commerce.

[2]Bureau of the Census. 1972. General Social and Economic Characteristics - Missouri, 1970 Census of Population. Social and Economic Statistics Administration. United States Department of Commerce.

[3]U.S. Water Resources Council. 1972. OBERS Projections, Regional Economic Activity in the U.S. U.S. Government Printing Office.

CORPS OF ENGINEERS

U S ARMY



(d) Multipliers representing the increases in total personal income from base year 1972 to 1980, 1990, and 2000 were calculated. (See Table 3.)

TABLE 3
POPULATION-INCOME PROJECTIONS
FOR THE 90 PERCENT ZONE OF INFLUENCE
BULL SHOALS LAKE

(1) Year	(2) Estimated Population	(3) PCPI*	(4) Total Personal Income (Thousands (Col. 2 x Col. 3)	(5) MULTIPLIER
1972 base yr	872,500	$2,180	$1,902,050	---
1980	927,000	2,680	2,484,360	1.31
1990	1,013,700	3,540	3,588,498	1.89
2000	1,100,300	4,930	5,424,479	2.85

*1967 dollars

(e) The appropriate multipliers were applied to the known visitation figure for base year 1972 to project visitation for 1980, 1990, and 2000. (See Table 4 below.)

TABLE 4
VISITATION PROJECTIONS
BULL SHOALS LAKE

Year	Visitation	Percent Increases from 1972
1972 (base year)	3,940,000	--
1980	5,160,000	31
1990	7,450,000	89
2000	11,230,000	185

(4) Evaluation of results. The projections based on the assumption that total personal income and visitation in the zone of influence would exhibit proportionate increases produced results which appeared realistic in relation to trends in usage of Corps recreational facilities.

Because the relationships between causal factors and recreation use may change significantly with time, however, any visitation projection unavoidably decreases in reliability the greater the time span considered. It is virtually impossible to predict how future events may affect recreation participation. For that reason, all projections must of necessity be based on factors known to have influenced both past and present visitation.

Two principal factors which were considered in relation to their possible effect on visitation projections are competition from new recreation facilities and the carrying capacity of the resource for human use.

(a) Competition. The major sources of competition for any recreation facility are the alternative recreation areas which are similar in nature and provide comparable recreation opportunities. The principal source of competition for Bull Shoals would originate from other large water-based facilities. At present, although there are several major lakes in and adjacent to the Bull Shoals zone of influence, these competing facilities have had no identifiable lasting effect on Bull Shoals visitation. (See Plate 2, Graph 1.) This may be explained by the growing popularity of water-oriented outdoor recreation activities, which has created a demand in excess of the supply.

Although no significant additional competition is expected from existing lakes, future development of new lakes may exert some influence on Bull Shoals visitation, particularly in the first few years following their availability to the public for recreation use. Five new Corps lakes are now authorized in the Bull Shoals zone of influence. These are Richland and Arlington in Missouri, and Lone Rock, Water Valley, and Bell Foley in Arkansas. At this time Bell Foley Lake is in the advanced engineering and design stage. Planning is incomplete for the other four projects and no determination has been made of construction dates; consequently, it is not possible to predict when competition from these sources would have an effect, if any, on Bull Shoals visitation.

Just outside the zone of influence, construction has begun on the Harry S. Truman Lake which is in Missouri, west of Lake of the Ozarks. The zone of influence of the Harry S. Truman Lake will overlap that of the Bull Shoals Lake and it is probable that some persons, particularly those living closer to Truman Lake than to Bull Shoals, will prefer to visit Truman. However, it is possible that these persons are those who are already visiting Lake of the Ozarks, Stockton, and Pomme de Terre Lakes, all of which would be more readily accessible. If this assumption is true, the presence of the Truman Lake may have no great effect on Bull Shoals visitation.

The projected visitation figure of 11,230,000 for the year 2000 appears realistic in terms of past trends which have proved to be fairly constant despite competition from newly developed projects near Bull Shoals Lake. Therefore, no adjustment for competition should be made in the year 2000 visitation projection figure.

(b) The carrying capacity of the resource for human use. This design memorandum shows development of the Bull Shoals project for optimum use rather than maximum use in order to preserve the qualities which make the resource enjoyable to visitors, and thus to provide a sustained high quality recreation experience. A recreation facility such as Bull Shoals, which is natural resource based, is limited by the environmental tolerance of the resource in its capacity to accommodate human use without deterioration.

To make a determination of the amount of visitor pressure which the Bull Shoals resource can withstand and still provide a quality recreation experience, a study was made of present usage in terms of visitor pressure and its effect on the existing use areas in the project. From this information, categories of use were derived. Assumptions were then made regarding the adequacy of present facilities and the ability of the project to accomodate future anticipated usage as expressed by the visitation projections discussed in this section.

Table 5 shows visitation, developed acreage, and visits/acre/year for Corps parks in 1972.

TABLE 5
VISITATION, DEVELOPED ACREAGE, AND VISITS PER ACRE
INTENSIVE USE PARKS
BULL SHOALS LAKE
1972

Park	Visitation	Developed Acreage	Visits/Acre
Beaver Creek	68,800	20	3,440
Buck Creek	66,700	48	1,390
Bull Shoals	136,600	9	15,180
Highway K	39,100	13	3,010
Highway 125	43,600	25	1,740
Kissee Mills	56,800	15	3,790
Lakeview	315,300	54	5,840
Lead Hill	343,500	55	6,250
Lowry	4,100	3	1,370
Oakland	43,600	76	570
Ozark Isle	14,700	190	80
Point Return	53,900	38	1,420
Pontiac	76,100	26	2,930
River Run	80,600	36	2,240
Spring Creek	42,600	15	2,840
Theodosia	149,200	41	3,640
Tucker Hollow	46,000	16	2,880
Woodard	16,100	35	460
TOTAL	1,521,200	715	------

In 1972, approximately 1,521,200 persons, comprising about 40 percent of the total project visitation of 3,940,000, utilized parks operated by the Corps of Engineers on Bull Shoals Lake. These parks contained a total of 715 developed acres and experienced an average of 2,130 annual visits per acre of developed land.

At present, the distribution of visitation is uneven, ranging from 80 visits per acre to 15,180 per acre at the various parks. This disparity in usage per acre, is in part, due to the fact that there are variations in intensity of facility development from park to park, and also because some parks are innately more attractive to visitors than others.

Several parks are typical in respect to usage patterns. Beaver Creek, River Run, and Kissee Mills parks, because of heavy visitation in the months of February and March during the white bass run, cannot be said to be representative of a project-wide visitor use pattern. Other parks which are atypical are Bull Shoals and Highway K, which experience intensive usage of the marina facilities located there, and Ozark Isle, which is closed to traffic in winter. Because the parks mentioned above are not representative of typical use patterns for the project, they were excluded in the assignation of use ratings. In Table 6, data on use densities for the parks representative of visitor usage in the Bull Shoals project were organized in order of ascending rank, and use ratings assigned.

TABLE 6
VISITS PER ACRE AND USE RATINGS
FOR DEVELOPED PARKS REPRESENTATIVE OF PROJECTWIDE USE
BULL SHOALS LAKE
1972

Site	Visits/Developed Acre/Year	Use Ratings
Woodard	460	Low
Oakland	570	(0-999 visits/acre/year)
Lowry	1,370	
Buck Creek	1,390	
Point Return	1,420	Moderate
Highway 125	1,740	(1,000 - 2,999
Spring Creek	2,840	visits/acre/year)
Tucker Hollow	2,880	
Pontiac	2,930	
Theodosia	3,640	High
Lakeview	5,840	(3,000 - 6,500
Lead Hill	6,250	visits/acre/year)

In Table 6, use ratings or categories were assigned to groups of parks on the basis of judgment, and were verified by the Bull Shoals Lake Manager. Low use was defined as 0 to 999 visits per acre per year; moderate use was defined as 1,000 to 2,999 visits per acre per year; and, high use was defined as 3,000 to 6,500 visits per acre per year. None of the parks on the project were overused, i.e., no parks were used to the extent that management problems such as site deterioration or traffic congestion were severe.

It should be noted that some parks which were given moderate use ratings could be considered to be intermediate between low and moderate use, or moderate and high use on the basis of observations during the peak visitor season; however, these parks were assigned to one of the three categories as defined for purposes of simplicity.

The information contained in Table 6 shows that a developed park on the Bull Shoals project can support, with proper management, high usage within the range of 3,000 to 6,500 visits per acre per year without significant deterioration of the natural resource.

Only about 2.86 percent of the total land area above the conservation pool (55,750 acres, see para. 2-01) is now developed for public use. Approximately 1.28 percent, or 715 acres, is now developed in Corps parks; 1.58 percent, or 880 acres, is contained in parks administered by agencies other than the Corps. Within the presently existing parks administered by the Corps, approximately 2,516 acres are undeveloped. In this design memorandum, 4,360 additional acres of land were allocated for intensive use parks. If all of this land were developed by year 2000, the total acreage would be 8,471 acres. Excluding the 880 acres now administered by other agencies, Corps-administered parks would comprise a total of 7,591 acres.

Assuming that future visitation to Corps parks in the Bull Shoals project will continue to be in the neighborhood of 40 percent of total visitation, in the year 2000, out of the total 11,230,000 visitors anticipated, 4,492,000 will visit developed Corps parks. The average visitation (utilizing 7,591 acres) would then be 591 visits per acre per year. If the upper limit for use is defined as being 6,500 visits per acre per year, the limit of carrying capacity of the Bull Shoals project will not be reached by the year 2000.

The projected visitation of 11,230,000 for the year 2000 needs no adjustment to account for limits of the resource in terms of human use. The land use allocations as proposed in this design memorandum will be adequate to that date, based on the assumption that management controls will be effective in spreading the visitor load reasonably evenly throughout the project.

SECTION III

PROJECT STATUS

3-01. Project development and operation chronology.

a. Dam and appurtenant works. The project was authorized in 1941 and construction of the dam was begun in April 1946. In February 1951 the project was ready for beneficial use for flood control, and in July 1951 filling of the conservation pool was begun. Provisions were made for the installation of eight hydorelectric generating units, four of which were installed to begin power generation in September 1952. Final construction of the dam and switchyard was accomplished in July 1953. The final hydroelectric generating units were installed in December 1963, providing the project with a generating capacity of 340,000 kilowatts.

b. Recreational lake development. (See Section 4-07 for description of recreational lake development outlined below.)

(1) By Corps of Engineers. The development of the lake for recreational use was authorized by Section 4 of the Flood Control Act approved 22 December 1944, and subsequent amendments. Authority to prepare a master plan for the recreational development and land utilization of the Bull Shoals project is contained in the second indorsement from the Office, Chief of Engineers, dated 20 October 1949, to basic letter from the Little Rock District, dated 29 September 1949, subject; "Preliminary Report on Need for Recreational Development, Bull Shoals Reservoir, White River, Arkansas and Missouri." There were 18 general areas selected for initial development and seven additional areas selected for future development.

(2) By state agencies. The Arkansas Forestry and Parks Commission developed a park at the dam site containing about 725 acres.

(3) By cities. Parks were developed by three cities - Forsyth, Missouri, and Lead Hill and Bull Shoals, Arkansas.

(4) By quasi-public groups. Recreational facilities have been provided at three areas by the Ozark Empire Area Council of Boy Scouts, Christian Camp Site Association, and the First Methodist Church of Harrison, Arkansas.

3-02. Chronology of expenditures.

a. Project approval. Section 4 of the Flood Control Act approved 22 December 1944, as amended by Section 4 of the Flood Control Act approved 24 July 1946, and as further amended by Section 209 of the Flood Control Act approved 3 September 1954 (Public Law No. 780, 83rd Congress), authorized the Department of the Army to provide for recreational use of the lakes under its control.

b. General funds. A total of $488,000 of construction general funds was allocated to the Bull Shoals project for the initial development of recreational parks. The initial development was completed in FY 1958 and the first additional recreational funds (code 711) were allocated in FY 1959.

c. Code 712 funds (Ozark Isle). In FY 1969 and FY 1970 $1,131,000 was allocated for the development of Ozark Isle Park, under the Code 712 program, which was a special program for the rapid development of sites which local interests have agreed to operate and maintain upon completion. In FY 1973 $14,945 was transferred from the Beaver Lake Code 712 funds to the Bull Shoals Lake Code 712 funds to complete land acquisition at Ozark Isle Park.

d. Total funds. Through FY 1974 a total of $1,652,645 in Code 711 funds, and $1,145,945 in Code 712 funds have been allocated for the further development of the parks on Bull Shoals Lake. All previously allocated funds have been obligated for construction contracts, and the expenditures will be completed in FY 1974.

e. Cost sharing.

(1) Administration policy as set forth in EC 1130-2-138, dated 31 May 1974 , requires that further development of existing or future recreational parks will require a non-federal body to agree to furnish at least 50 percent of the cost of this construction after FY 1974, unless adequate facilities are provided which will allow a system of user fees to be established to recover all costs of operation, maintenance, and replacement.

(2) A cost sharing contract with the Arkansas Department of Parks and Tourism for the further development of the Bull Shoals State Park is scheduled to be initiated in FY 1975. Total cost of the proposed development is $362,000 and will consist of construction of 1,200 linear feet of paved road, 60 parking spaces, 85 campsites with parking spur for each, 1 entrance building, 1 trailer dump station, 1 bathhouse, electrical distribution system, water distribution system, and treatment plant with sewage collection system. The State will administer the contract with the Government to reimburse its share based on actual work accomplished.

f. Summary. A summary of allocations by fiscal year for Code 711 and Code 712 funds is shown in Table No. 7.

TABLE 7
RECREATION FUNDS BY FISCAL YEAR (FY)
BULL SHOALS LAKE

FY	CODE 711	OZARK ISLE CODE 712
1959	$ 10,500.00	
1960	21,125.46	0
1961	17,279.00	0
1962	51,500.00	0
1963	278,727.00	0
1964	42,343.61	0
1965	21,350.00	0
1966	94,000.00	0
1967	135,820.76	0
1968	387,100.00	0
1969	0	681,000.00
1970	95,000.00	450,000.00
1971	71,000.00	0
1972	136,900.00	0
1973	290,000.00	14,945.00*
1974	0	0
TOTAL FUNDS	$1,652,645.83	$1,145,945.00

* Funds transfered from Beaver Code 712 project for completion of land acquisition at Ozark Isle.

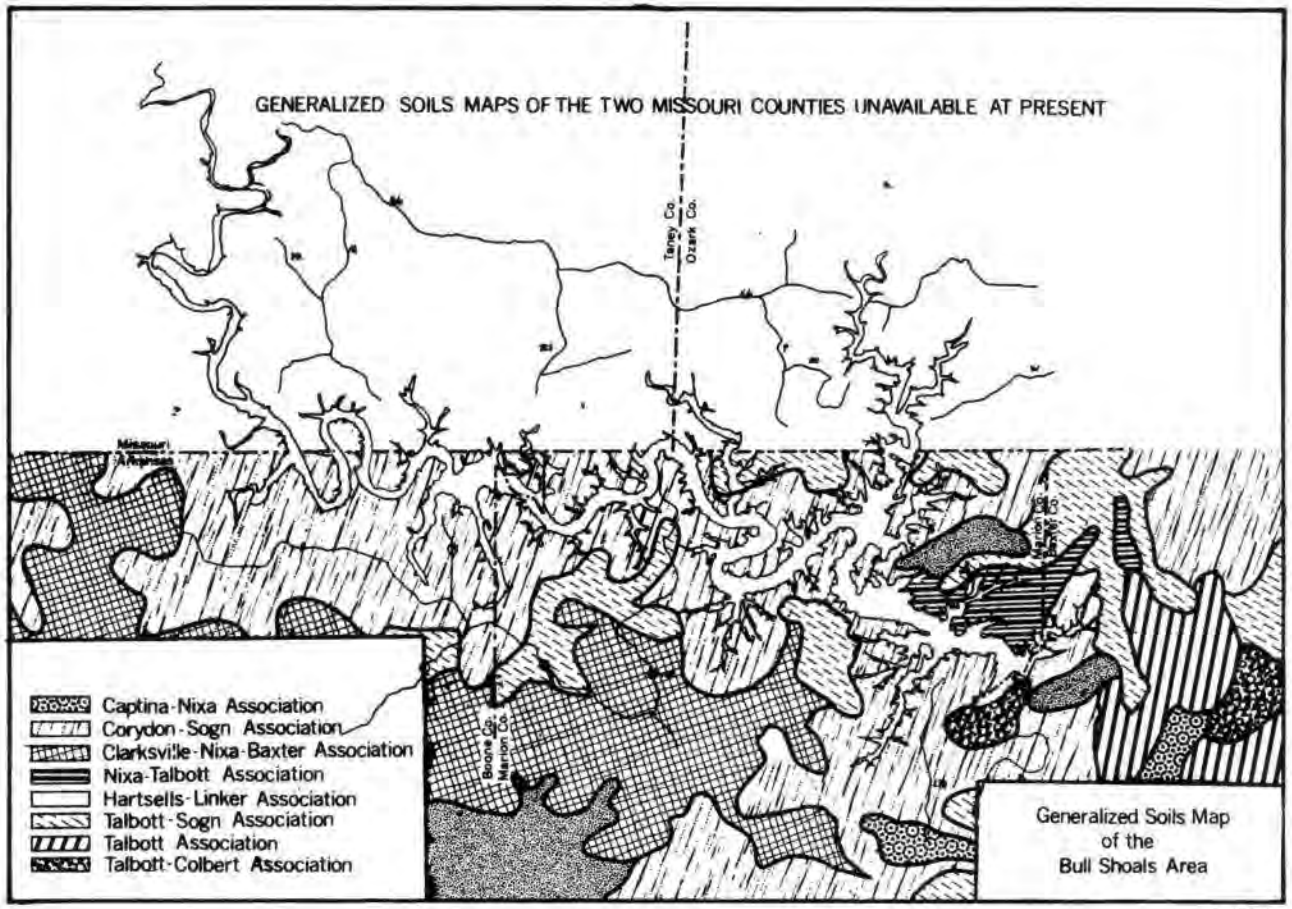

GENERALIZED SOILS MAPS OF THE TWO MISSOURI COUNTIES UNAVAILABLE AT PRESENT
Taney Co.
Ozark Co.
Missouri
Arkansas
Boone Co.
Marion Co.
Captina-Nixa Association
Corydon-Sogn Association
Clarksville-Nixa-Baxter Association
Nixa-Talbott Association
Hartsells-Linker Association
Talbott-Sogn Association
Talbott Association
Talbott-Colbert Association
Generalized Soils Map
of the
Bull Shoals Area

PLATE 4

SECTION IV

RECREATIONAL AND ENVIRONMENTAL RESOURCES OF THE PROJECT AREA

4-01. Geologic. Bull Shoals Lake is located within the physiographic province known as the Ozark Plateau, which includes the St. Francois and Boston Mountains and the Salem and Springfield Plateaus. This province occupies the northern portion of Arkansas and the greater part of southern Missouri. This unglaciated region is the most extensive relief feature between the Rocky Mountains on the west and the Appalachian Mountains on the east. Geologically, it is one of the oldest areas on the continent and can be described in general terms as a moderately dissected plateau surrounded by lowland areas. It is an asymmetrical dome which is steeper on the eastern edge than the western.

From Cambrian to Pennsylvanian time, sedimentary beds of sandstones, limestones, dolomites, and shales were deposited. In the late Cretaceous Period, the Ozark Region was uplifted. Following this uplift, the region was worn down to a relatively flat plain containing sluggish streams and swampy areas. During the late Tertiary Period, the Ozark Region was uplifted a second time. This resulted in the rejuvenation of the streams, which cut new valleys and produced the rough topography now found in the Ozark Region.

Bull Shoals Lake is located within the Salem Plateau area of the Ozark Plateau Province. The Salem Plateau, excluding the St. Francois Mountains, includes those portions of the Ozarks carved from Ordovician age rocks or older, and isolated portions of younger sediments.

Apart from the broad rolling plain located away from large streams, the Salem Plateau has been roughly dissected with incised streams. The White River in its middle course runs in a valley approximately 500 feet deep. Valley development has exposed rocks composed of cherts, limestones, and dolomites of Ordovician Age. These rocks have very old faults, are quite cavernous, and contain some catastrophic sinks.

The soils around Bull Shoals Lake were derived principally from cherty limestone, cherty very siliceous dolomite, and cherty siliceous dolomite. These geologic materials were laid down in continuous layers with cherty limestone forming the recent deposit. With the Tertiary uplift, the tributaries of the White River cut through these layers leaving the cherty limestone on the upper ridges and exposing the other layers in their respective positions. Because cherty limestone decomposes rather quickly (geologically), cherty light brown soils were formed on the upper ridges. In areas where the cherty very siliceous dolomite is exposed, pale brown silty loams were produced. Along low slopes, terraces, and bottomlands, alluvial limestone and dolomite soils were deposited.

The following eight soils associations are found in and around the Bull Shoals project area: Corydon-Sogn, Nixa-Talbott, Talbott-Sogn, Clarksville-Nixa-Baxter, Captina-Nixa, Hartsells-Linker, Talbott, and Talbott-Colbert.

Corydon-Sogn soils are developed from limestone and cherty limestone on moderately sloping to steep hillsides. Corydon soils are cherty dark brown silt loams lying over plastic clay subsoils and are 20 to 40 inches deep. They are slowly permeable, well-drained, and neutral in pH. Sogn soils are black stony silt loams usually less than 20 inches deep. These soils exhibit slow permeability, are somewhat excessively drained, and are acidic.

The Nixa-Talbott soils association is found on gently sloping ridge tops. Depth to limestone bedrock ranges from three to five feet. Nixa soils are slowly permeable, moderately well-drained, and consist of grayish-brown cherty silt loam overlying a subsoil of mottled cherty silt loam, or cherty silty clay loam which is a fragipan. Talbott soils are very slowly permeable and well-drained with grayish-brown cherty silt loam surface soil over clay subsoil. Both soils are acidic.

The Talbott-Sogn soil association occurs on rolling to steep mountainsides. Depth to bedrock is three to five feet. The soils are acid to neutral in pH. Individual characteristics for Talbott and Sogn soils are contained in the foregoing soil descriptions.

Clarksville-Nixa-Baxter soils are derived from cherty limestone and found on gently sloping narrow ridge tops and steep side slopes. These soils are moderately deep to deep, rapidly to very slowly permeable, and acidic. Clarksville soils are grayish-brown very cherty silt loams and are generally deep. In some places, however, they are shallow and overlie massive chert. Baxter soils are brown cherty silt loams, are well-drained and are composed of cherty silt loam surface soil over cherty silty clay or clay subsoil. (Nixa soils were previously described.)

Captina-Nixa soils are developed over cherty limestone on broad gently sloping to level uplands. They are moderately deep to deep, moderately well-drained, very slowly permeable, and acidic. Captina soils have brown cherty silt loam surfaces over gray mottled fragipans. (Nixa soils are discussed under the Clarksville-Nixa-Baxter association.)

The Hartsells-Linker association of deep, moderately permeable, loamy, acidic, well-drained soils are formed on moderately steep hillsides and gently sloping ridgetops. Hartsells soils are grayish-brown sandy loams over yellowish-brown sandy clay loams. Linker soils are brown sandy loams over yellowish-red to red sandy clay loams.

Soils of the Talbott association are developed on gently sloping ridgetops and moderately steep hillsides. They are moderately deep, well-drained, slowly permeable, acid, loamy soils with grayish-brown cherty silt loam surfaces over yellowish-red-to-olive clay subsoils. Limestone bedrock underlies these soils at a depth of three to five feet.

Talbott-Colbert soils are moderately deep and well to moderately well-drained, slowly permeable, acid, and loamy. They have been formed on gently sloping ridgetops and moderately steep hillsides. Colbert soils are grayish-brown cherty silt loams over yellowish-brown to olive plastic clay, and are two to five feet deep over limestone bedrock. (Talbott soils are described under the Talbott-Sogn association.)

Plate 4 is a generalized soils map showing the distribution of the soil associations described above.

4-02. Archaeologic. Archaeological investigations conducted by the University of Arkansas in cooperation with the Smithsonian Institute have produced evidence indicating that the general upper White River area was once inhabited by a primitive prehistoric people. The origin and fate of this civilization is unknown. However, on the basis of results of the university investigations, two separate cultures are believed to have existed between 500 B.C. and 500 A.D. The peoples comprising the earlier culture have been designated the Bluff Dwellers, and the later culture the Top-Layer People.

The artifacts found were preserved because they were protected by the rock shelters, and also because the nitrate from saltpeter found in the shelters acted as a preservative. As a result, bones, skins, feathers, and fish scales which were remnants of animals used for food by primitive cultures have been remarkably well-preserved. Additionally, complete mummified burial remains of many bodies have been found.

Prehistoric artifacts obtained through the research conducted by the University of Arkansas are now contained in the university museum, along with the records of the history which has been determined from these findings.

No national historic properties, as established by the National Record of Historic Places, are now contained in the Bull Shoals project; however, in case of new development within the project, the appropriate State Liaison Officer for Historic Preservation will be contacted.

4-03. Historic. The historic significance of the Bull Shoals project area has been reviewed with reference to Executive Order 11593, "Protection and Enhancement of the Cultural Environment". The project contains

no historic sites enrolled in the National Register of Historic Places; however, its general history provides an excellent potential source of material for visitor programs.

Among the many items of historic interest are the exploration of the Ozark region by De Soto's men in search of gold in the early 1500's, the passage of the Cherokee Indians through the area after the enactment of the Indian Removal Act of 1830, the existence of the northwest boundary of the Cherokee Nation near the town of Lead Hill, Arkansas, between 1819 and 1829, the Civil War animosities resulting in bitter partisan warfare in the region, and the folkways and traditions of the settlers which remained essentially intact for many years because of the geographic isolation of the Ozark area.

4-04. Ecologic. Man's past use of the land surrounding Bull Shoals Lake has greatly influenced the ecological character of the area. This use essentially began with the movement of settlers into the region. Much of the original mature forest cover was cut by the settlers for lumber and to provide clearings for agriculture. Forest management for the best use of the resource, as we know it today, was nonexistent and forests were divested of the most desirable trees. Forest lands were overgrazed by domestic stock, causing soil compaction, accelerated soil erosion, and destruction of seedlings. Uncontrolled wildfires and fires set by settlers to remove underbrush further damaged the land, thus inhibiting regeneration of trees and damaging existing forest stands. Soils in the area, which were initially low in fertility, were further depleted through years of continual cultivation and erosion accelerated by removal of the protective vegetative cover.

As the character of the vegetation was altered in the Bull Shoals area, the species composition and populations of wildlife dependent on particular types of vegetation were also altered. As forests were cut, species typically found in mature forest cover were reduced in number. Species requiring ecotone habitats or edge increased in number as more edge between fields and forest was created. Secondary succession occurring on cut-over land and abandoned fields produced brushy areas which supported greater numbers of animals requiring these types of vegetation for survival.

When Bull Shoals Lake was filled, the environment was again altered by the elimination of habitat contained in the area inundated, and by the creation of new habitat for aquatic organisms. Migration of wildlife to adjacent areas occurred, and some species, both vertebrate and invertebrate, which were adapted to rivers or associated terrestrial environments, were reduced in number or distribution. New habitat and resting areas suitable for migratory waterfowl following the Mississippi Flyway were created.

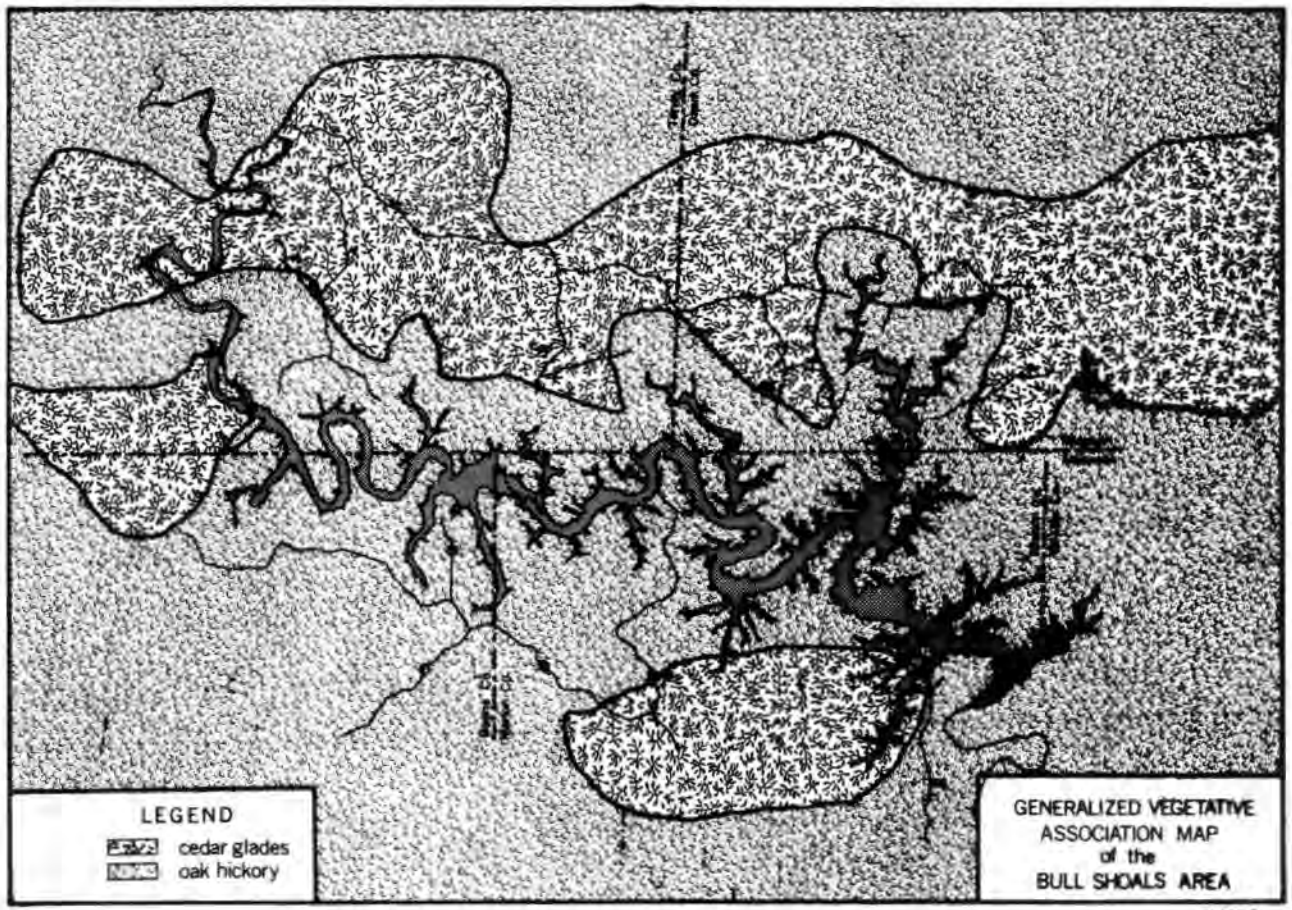

LEGEND
cedar glades
oak hickory
GENERALIZED VEGETATIVE ASSOCIATION MAP of the BULL SHOALS AREA

PLATE 8

Under Corps management, practices to restore the land and to encourage wildlife have been implemented. Forest stands are now being managed to provide an aesthetically desirable, ecologically diverse environment, and no harvests of merchantable timber are being conducted. Management practices for wildlife are being carried out by both the Arkansas Game and Fish Commission and the Missouri Conservation Commission to provide suitable conditions for the establishment and propagation of wildlife species.

In addition to the general management programs as described above, other programs have been established to control disease and pest organisms. Programs exist for the control of larval and adult mosquitoes, flies and wasps, forest disease organisms and injurious insects, and two mammalian pests - the beaver and the rat.

Mosquito larvae are partially controlled by the lake fluctuation during normal operation. The problem of mosquito larva control is relatively minor because the general steepness and rockiness of the reservoir shoreline provides few places favorable for mosquito propagation. Adult mosquitoes are controlled by mowing weeds to eliminate mosquito resting areas in parks.

Ceilings and walls of toilets and picnic shelters are sprayed with approved insecticides to control flies. Wasps are controlled by spraying approved insecticides under roofs of toilets, picnic shelters, and camp shelters.

Damaging insects and disease organisms are commonly present in forest stands. To guard against serious damage which may be caused by epidemics, all forest lands administered by the Corps are kept under observation. In addition, the Corps of Engineers is obligated to take necessary action to prevent infestation of forest areas on adjoining properties. If serious problems with insects or diseases should occur, experts will be consulted for advice on proper control measures.

Rats and beavers are two mammals which are subject to control through Corps management programs. Rats have been effectively controlled through the utilization of state-approved guidelines for solid waste disposal. Beavers, which were introduced into the general area of Bull Shoals Lake several years ago by the Arkansas Game and Fish Commission, have now become pests in some areas. This has occurred because of the relative absence of predators, which, if present, would remove a certain amount of the weaker animals, and thus provide a natural check on the beaver population. Because of the rapid increase in numbers of beavers in the State of Arkansas since introduction, they have been removed from the protected list and can be hunted or trapped throughout the year during daylight hours. Control measures for beaver, should they become a serious problem in the Bull Shoals project, would consist principally of trapping.

4-05. Environmental.

a. Topography. The terrain is generally rugged with narrow ridges, V-shaped valleys, rocky slopes, and bluffs. Broad alluvial valleys lie beyond the farthest reaches of the lake. Elevations range from 450 feet m.s.l. in the valleys to 1,100 feet m.s.l. on the highest peaks, with many of the hills and ridges reaching elevations of 775 to 825 feet m.s.l. The lake itself is the dominant feature of the area with a serpentine configuration formed by the meanders of the White River and its tributaries.

b. Vegetation.[1] Forest cover in the area is essentially a "mixture" of oak-hickory forest and cedar glades in two senses of the term. Related largely to edaphic variation within the area, two types of "mixtures" exist; these may be termed "transitions" and "mosaics". In the "transition" areas, the two general vegetation types or associations are intermixed and share their habitats to some extent. The species of one association gradually disappear and those of the remaining association become dominant. Transitions generally occur in "hybridized" habitats in which conditions are not so extreme that they preclude the development of either association. Conversely, vegetation types in a "mosaic" form patterns in which the two (or more) types do not occupy the same habitat. In these patterns, "hybridization of the habitat" (in this case, chiefly admixtures of soil types) has not occurred, and the effect created is a pattern of "islands" of one association set in a "matrix" of the other.

In the Bull Shoals region, limestone and dolomite outcroppings generally support cedar glades associations, forming a mosaic pattern set in the oak-hickory forest matrix. These glades appear as relatively open grassy areas with scattered junipers (red cedar) and groves of deciduous trees. Their chief components are juniper, post oak, hackberry, poverty grass, and big and little bluestem, and they often support a number of prairie forbs in unique associes. In areas having sandstone substrates, or where formation of the forest soils characteristic of most of the Ozarks has occurred only to a limited degree, "transitional" areas have developed, with a mixture of cedar glades and oak-hickory forest occupying the same habitats. The dominant species of the oak-hickory forest are red oak, white oak, black oak, shagbark and pignut hickory, elm, and ash. A third type of substrate, the more fully developed forest soils characteristic of most of the Ozark area, supports comparatively pure oak-hickory associations.

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[1] Terminology and ecological description used in the following discussion are based on that of Kuchler, A.W., Potential Natural Vegetation of the Conterminous United States, (1964).

The generalized vegetation map included in this report (Plate 5) indicates only broad areas in which one of the two major associations (oak-hickory and cedar glades) clearly predominates.

c. Fish and Wildlife.

(1) Fish. The impoundment of the White River to form Bull Shoals Lake has resulted in changes in the composition of the fish population, concommittant with the change in aquatic habitat from river to lake. In the White River, smallmouth bass was the principal game fish; largemouth bass, spotted bass, channel catfish, longear sunfish, green sunfish, and several other sunfish species were also present in appreciable numbers. All of these species were able to survive in the new lake habitat; however, after impoundment, largemouth bass, white bass, and crappie became the most important species in sport fisherman harvest.

The impoundment of Bull Shoals Lake caused environmental changes in the tailwater portion of the White River downstream from the dam. Cold water releases from the lake produced habitat suitable for rainbow and brown trout which were introduced to these tailwaters. However, because of various unfavorable environmental factors such as lack of suitable substrate, fluctuation of water temperatures, and pulsation of current and water level, trout reproduction has been unsatisfactory.

During periods when there is little or no power generation, the water flow in the tailwater area is reduced, resulting in shallower depths over existing White River shoals than is generally desired by float fishermen. When these periods of low flow coincide with high air temperatures and solar radiation, water temperatures several miles downstream from the dam may rise above that which trout can tolerate. Studies are authorized but not funded to develop a plan of lake operation which will minimize these periods of excessively high temperatures in the tailwaters, and provide adequate water for navigation over the shoals areas. Operational minimums have been established to minimize trout mortality in the tailwaters.

Experimental stocking of trout in the lake since 1963 has been successful because the trout thrive in the deep portions of the lake where there are favorable water temperatures and oxygen concentrations. An important trout fishery has been developed in the lake, and limit catches are frequently made by those fishing 30 to 50 feet below the surface, particularly in the vicinity of the dam. In addition to the stocking of rainbow and brown trout in 1963, introductions of northern pike, walleye, striped bass, blue catfish, and threadfin shad have been made in recent years by the Arkansas Game and Fish Commission to fill lake habitats not fully utilized by native fish species.

In addition to fish stocking programs as described above, both the Arkansas Game and Fish Commission and the Missouri Department of Natural Resources are currently conducting programs for the propagation and study of fish species in Bull Shoals Lake. The Arkansas Game and Fish Commission, on 1 January 1963, licensed for 25 years 33 acres for construction of a fish nursery pond. The pond is located in Boone County, on the west shore of the Sugarloaf Creek arm of the lake, near the town of Lead Hill. Activities conducted there in 1973 included fathead minnow stocking, pond fertilization, and placement of concrete spawning blocks. Other activities conducted in the project by the Arkansas Game and Fish Commission were fish population sampling, angler use and harvest surveys, shoreline seining, and collection of smallmouth bass for use at hatcheries. Similar management activities will continue to be conducted in the future.

In 1972, a study was conducted by the Arkansas Game and Fish Commission to investigate methods of increasing the harvestable standing crop of largemouth bass, smallmouth bass, and spotted bass. It was found that raising and holding the water level one to two feet above the conservation pool elevation during bass spawning season produced a higher spawn of bass. The water level inundated terrestrial vegetation along the edge of the lake providing protection for the bass fry until they reached a size large enough to discourage predation. In addition, the decomposition of the inundated vegetation promoted the growth of plankton, the main source of food for bass fry in early stages of growth. Plankton is also a food source for threadfin shad which comprise a major part of the diet of young bass when they become predaceous.

The results of the study showed that the 1972 year class of bass was the largest since 1968 when excessive runoff raised the lake level approximately 15 feet above the top of the conservation pool. The study recommended that the water level in Bull Shoals Lake be raised to a minimum elevation of 660 feet m.s.l. at least once every three years during May and June and be maintained at or above this level until July 1. It was additionally suggested that the water level be raised to 664 feet m.s.l. once every six years and be maintained during fish spawning season.

(2) Wildlife. The principal small game species found in the Bull Shoals area are bobwhite quail, cottontail rabbit, mourning dove, gray and fox squirrel. Quail, rabbit, and squirrel populations vary with habitat quality and mourning dove numbers increase during the fall migration, but generally there is a low population of doves throughout the area.

White-tailed deer and Eastern wild turkey are common big game animals in the Bull Shoals area. Ozark and Taney Counties, Missouri, have been a nucleus in the state for deer and turkey, even when populations of these species were at their lowest levels.

Mallards are the predominant migratory waterfowl species visiting the Bull Shoals project. Migratory geese common to the area are blue and snow geese with lesser numbers of Canada geese. Giant Canada geese were introduced into the Bull Shoals project by the Missouri Department of Conservation in 1971 and 1972 creating a resident flock.

Principal furbearing animals found in the project are mink, muskrat, beaver, and raccoon.

Two animals which are on the list of rare and endangered species occur in the general area of the White River Basin - the red wolf and the southern bald eagle. Sightings of bald eagles have been reported in the Bull Shoals area frequently.

Wildlife management programs in the project are currently being carried out by the Arkansas Game and Fish Commission, the Missouri Conservation Commission and the Corps of Engineers. The Arkansas Game and Fish Commission holds license to 1,527 acres of land known as the Jones Point Wildlife Management Area. (The initial license was issued on 1 June 1952 for 20 years, and renewed on 1 June 1972 for 10 years.) The site is a peninsula located in northern Marion County on the north shore of the lake, and south of the town of Dugginsville, Missouri.

Facilities presently existing at Jones Point include a headquarters cabin and water system. The FY 1973 report submitted by the Arkansas Game and Fish Commission indicated that no development or maintenance work was accomplished for that year. Proposed work items for FY 1974 include bulldozing a firelane across the peninsula, burning a firelane around the headquarters cabin, clearing approximately 10 acres for food plots, reblading three miles of roads, and installing fencing and a cattle guard to exclude cattle and hogs. All legal hunting will continue to be permitted in the area.

On 1 January 1963 a license was granted to the Arkansas Game and Fish Commission for a period of 25 years for the purpose of constructing, operating, and maintaining a fish nursery pond. The area encompasses about 33 acres, and is located in Boone County, on the west shore of the Sugarloaf Creek arm of the lake, near the town of Lead Hill. The pond, dam, and spillway cover about 20 acres.

Approximately 21,191 acres of land and water are now licensed by the Missouri Department of Conservation. Included in this license are all lands in the lake below the conservation pool elevation 654 m.s.l. Of this total, 2,132 acres are being utilized as part of the Drury Refuge and Wildlife Management Area. This license was granted on 26 February 1952, and renewed on 1 January 1971 for a period of 10 years.

The primary objective of the refuge portion of the Drury Area is the production of wild turkeys for restocking in other parts of Missouri. A secondary objective is to provide food for migratory waterfowl, and a resident flock of giant Canada geese. Public use of the refuge is generally prohibited with the exception of shoreline fishing. Maintenance of roads, fences, posters, and buildings is routinely conducted. In the next fiscal year, 16 acres of food plots on the licensed area will be fertilized and planted to a small grain-legume combination for wild turkeys, and approximately 48 acres of land along the lakeshore will be planted to wheat and ladino clover to provide food for waterfowl.

The primary objective of the wildlife management portion of the Drury Area is public recreation. A secondary objective is production of wild turkeys for release in other parts of the state. Existing facilities such as roads and fences are being maintained. Approximately 15 acres in Bee Creek Valley will be cultivated, fertilized, and planted to grass-legume and small grain-legume food plots, primarily for the benefit of deer and turkeys.

The remainder of the land licensed by the Missouri Department of Conservation consists of 19,059 acres. This land is open to public hunting and fishing with the exception of waterfowl refuges located on the Theodosia and Turkey Creek arms of the lake, which are closed to hunting during waterfowl season, and to fishing from boats from November 1 to January 15 each year.

Current management practices are grazing and cropping. Various areas are recommended by the Missouri Department of Conservation biologist, and then leased to local farmers for this purpose by the Corps of Engineers. The purposes of grazing as it applies to wildlife management are to maintain fields in suitable vegetative cover to protect soil and enhance wildlife habitat, and to keep pastures relatively open to maintain huntable populations of quail and rabbit. Lessees may be requested by the Department of Natural Resources biologist to improve vegetative cover on some fields by seeding and fertilizing, and to mow portions of fields periodically to control the invasion of woody plants.

On fields which are suitable for cropping, the Department of Conservation has entered into sharecrop agreements with lessees to plant cereal grains and legumes, providing high quality food for wildlife. The cereal grain crops remaining in the fields at spring plowing time each year are harvested and sold. The proceeds are used to purchase and/or plant additional wildlife foods. Legumes are cut, bailed, and removed periodically to stimulate a succulent regrowth palatable to wildlife.

As of 1 January 1974, there were 17,820 acres of land included in a total of 158 leases for the purposes of agriculture or cattle grazing. These leases are subject to periodic review and renewal or cancellation.

The forest management plan now being implemented by the Corps of Engineers will benefit wildlife by ultimately producing a forest with a diversity of tree species of all ages, thus providing a wide range of food and cover types for wildlife. Openings will be created for wildlife, mast and den trees will be saved, and downed tree tops will be left to serve as nesting sites and cover.

4-06. Scenic. The land surrounding Bull Shoals Lake typifies the rugged scenic terrain of the Ozarks. In the project, bluffs cut by meanders of the White River complement the forested hills, ridges, and ravines.

In some areas adjacent to the lakeshore property owned by the Corps of Engineers; however, the integrity of the natural landscape is altered by commercial resorts, residences, and other developments. As viewed from recreation parks and from the lake, these developments may lessen public enjoyment of the scenic beauty of Bull Shoals Lake. Through proper management of Corps land and silvicultural practice to improve its scenic value, these areas will be screened from view as much as possible.

4-07. Recreational. There are 24 parks presently in operation on Bull Shoals Lake. Nineteen of these parks are operated by the Corps of Engineers, with the remainder operated by other agencies. All of the parks provide facilities for water-related recreational activities, along with other facilities for activities such as camping and picnicking. In addition to these parks, three group use areas now are being utilized by private groups on a recreational outgrant basis. A dam overlook has been provided near the right abutment of Bull Shoals Dam.

Following are brief descriptions of the parks and recreational outgrants on the Bull Shoals project, grouped according to administering agency.

a. Corps parks.

(1) Beaver Creek Park. (See Plates 35, 35A, 35B, and 35C.) Located in the upper reaches of the lake, this park is approximately two and a half miles south of Kissee Mills, Missouri. It contains 65 acres above the top of the conservation pool. Recreation facilities include a commercial boat dock, a public launching ramp, picnic and camping grounds, beach, and enclosed fishing dock. Access to the site is by Missouri Highway 0 south from U.S. Highway 160. The site is relatively flat with little topographic relief. Tree cover is sparse.

Additional facilities proposed in this design memorandum consist of an entrance complex, and camping and picnic units. On the eastern portion of the park, multi-family and single-family camping units will be developed. Several picnic units will be added near the existing beach and marina area. On the western portion of the park, camping loops for multi- and single-family groups are proposed.

(2) Buck Creek Park. (See Plates 31 and 31A.) This park is situated on the Little Buck Creek arm of the lake, approximately six miles southeast of Protem, Missouri. It contains approximately 68 acres above the top of the conservation pool. Existing recreational facilities include a commercial boat dock area, two public launching ramps, picnic and camp units, and a swimming beach. Access is available by Missouri Highway 125 from the town of Protem. A free ferry operates between Buck Creek and the Highway 125 Park. The site is rolling to flat with no steep slopes. Tree cover is limited to the upper portions of the site above approximate elevation 690.

Proposals for further development of the Buck Creek Park include an entrance complex, the addition of several camping units, and the removal of some road segments to provide better internal traffic circulation.

(3) Bull Shoals Park. (See Plates 26 and 26A.) Bull Shoals Park is west of the City of Bull Shoals, Arkansas, and contains about 37 acres. Recreation facilities provided in the park are picnic and camp units, a boat launching ramp, and a commercial boat dock. A one-quarter mile bituminous surface access road from Arkansas State Highway 178 provides access to the park. The site slopes gently to the south and west and is moderately well-vegetated.

Facility development proposed for this site consists of a new camping loop on the western portion of the site with multi- and single-family camping units, and an orientation area for incoming visitors. The water system will be tied to the existing water line of the City of Bull Shoals.

(4) Dam Site Park. (See Plates 23 and 23A.) The Dam Site Park is located directly north of the right abutment of Bull Shoals Dam and contains approximately 230 acres. At present, the site is minimally developed, containing only a few picnic sites and an overlook shelter. The area is transected by Arkansas State Highway 178 which crosses over the dam. Topographically, the site varies from flat areas on the tops of hills to fairly steep slopes near the lake. Tree cover is extensive.

It is proposed in this design memorandum that the east and northwest portions of the site be developed for trailer camping. Proposed development for the southwest portion of the site, near the dam overlook, consists of walk-in camping for groups. Day use facilities consisting of a boat launching ramp and picnic sites are planned for the portion of the park east of Highway 178. Entrance control would be provided at this park.

(5) Highway K Park. (See Plates 34 and 34A.) Highway K Park contains 47 acres, and is located approximately 5 miles southeast of Kirbyville, Missouri, at the termination of Missouri State Highway K. Facilities contained in the park include a boat dock, a public boat launching ramp, and picnic and camp grounds. A cafe, snack bar, and overnight accommodations are available nearby. Tree cover is extensive.
Slopes are moderately steep along the edge of the lake. Development is confined to the more gentle slopes along the ridge tops.

Proposed development of Highway K Park includes addition of an entrance control complex, picnic units, camping units in the northern portion of the park, and a camping loop and an additional public launching ramp in the eastern portion.

(6) Highway 125 Park. (See Plates 30, 30A, 30B, and 30C.) Highway 125 Park is located at the northern tip of a large peninsula about four miles north of Peel, Arkansas. It contains approximately 303 acres above the top of the conservation pool. Recreation facilities include a commercial boat dock, public boat launching facilities, picnic and camp grounds, cafe, overnight accommodations, and a swimming beach. Access to the site is via Highway 125. The Arkansas Highway Department operates a free ferry between Highway 125 Park and Buck Creek Park. Topography is gentle to rolling with the exception of the west end of the site, which slopes steeply to the lake. Tree cover is scattered.

Proposed development of Highway 125 Park will include an entrance complex, walk-in and trailer camping facilities, two public boat launching ramps, a beach, a turnaround loop road at the ferry landing, and an amphitheatre.

(7) Kissee Mills Park. (See Plates 36 and 36A.) This park is located one and a half miles southeast of Kissee Mills, Missouri, and contains approximately 205 acres. Recreation facilities provided include a public boat launching ramp, picnic and camp grounds, and a gravel beach. The site is on U.S. Highway 160. The topography of the park is relatively flat. This has led to frequent flooding which has eliminated a large portion of the tree cover.

Additional camping and picnic units are proposed for this park.

(8) Lakeview Park. (See Plates 24 and 24A.) Lakeview Park is located approximately two miles northeast of the left abutment of the Bull Shoals Dam. It contains approximately 186 acres. Recreation facilities available include a commercial boat dock, a public boat launching ramp, a beach with a change shelter, group picnic facilities, and picnic and camp areas. Access is available off Arkansas Highway 178. The site slopes gently to the north and west, becoming steeper along the shoreline. Tree cover is significant.

Further development for Lakeview will include additional single-family camping units, a boat launching ramp, and an entrance complex. The eastern portion of the site, which is a long narrow peninsula, will be provided with walk-in campsites. The campsites will be accessible by an existing trail ending in an observation point at the end of the peninsula. The existing road network in the park will be altered to provide more efficient control of traffic.

(9) Lead Hill Park. (See Plates 32 and 32A.) This park is located on a large peninsula between the east and west arms of Sugar Loaf Creek, about three and a half miles north of Lead Hill, Arkansas. It contains approximately 77 acres. Existing recreational facilities include a commercial boat dock, public launching ramp, picnic and camp grounds,

floating cafe and fishing dock, beach with change house, group picnic facilities, and enclosed fishing dock. Access to the park is via Arkansas State Highway 7. The topography of the park is predominantly flat. Tree cover is sparse.

Facilities proposed for further development include the addition of camping units on existing camping loops, an orientation area at the entrance to the park, picnic units and a beach in the northern portion of the park, and a public launching area in the southern portion, with access from the entrance road.

(10) Lowry Park. (See Plates 41 and 41A.) This park is located on the Bear Creek Arm of the lake adjacent to the community of Crumpler, Arkansas. It contains approximately 183 acres above the top of the conservation pool. Recreation facilities consist of picnic and camp units. Access is by way of a county road off Arkansas State Highway 14. The site is separated into three areas by Bear Creek on the west and a cliff on the east. Slopes on the west and east portions of the site are gentle. Vegetative cover on the site is significant, with numerous overstory trees providing shade in the camping area.

Included in proposed development plans for Lowry Park are the following facilities: an entrance control complex, additional camping units, a launching ramp,and beach at the northern tip of the park; additional camp and picnic units in the southwestern portion;and a beach, boat launching ramp,and picnic units in the central portion.

(11) Oakland-Ozark Isle Park. (See Plates 25 and 25A.) Located on the eastern end of the lake, approximately four miles west of Oakland, Arkansas, Oakland Park contains approximately 76 acres above the top of the conservation pool. Recreation facilities are a commercial boat dock floating cafe, beach, a boat launching ramp, picnic and camp grounds, and a group picnic area. The park is located at the termination of Arkansas Highway 202. Site topography is characterized by rolling hills with relatively level crests. Vegetative cover is sparse.

The Ozark Isle Park consists of a large island west of Oakland Park and a portion of the mainland south of Oakland Park. The island is connected to the mainland by a causeway. The park is five miles south of the Arkansas-Missouri state line and ten miles upstream from the Bull Shoals Dam. The total land area contained in the park is 830 acres. Recreation facilities are picnic and camp units, a swimming beach with bath change shelter, and a boat launching ramp. Ozark Isle is accessible via Arkansas Highways Nos. 5 and 202 from U.S. Highways 160 on the north and 62 on the south. The island, for the most part, is relatively level and slopes gently to the shoreline on the south and east. Tree cover is fairly heavy on the south and west portions of the site; the northern portion supports only sparse vegetation. The mainland portion of the park is moderately wooded. Surface drainage has created medium washes, dividing the area into two distinct peninsulas, and a gently rounded north-south ridge about 3,000 feet long.

Facilities proposed on the island include additional picnicking and camping units, and an entrance control complex.

At the mainland end of the causeway, proposed facilities include a visitor information center and a trailer sanitary dumping station. The administration facilities will be in this immediate vicinity. About 1,200 feet eastward, an existing structure is ideal for use as a caretaker's home. A nature study center and a series of appropriate trails are proposed along the ridge and the two peninsulas.

Planning for the continued development of this park is in accordance with comments received in letter, dated 10 September 1974, from Arkansas Department of Parks and Tourism. A copy of this letter is included in Section VI.

(12) Point Return Park. (See Plates 39 and 39A.) This park is located approximately one mile east of Bull Shoals, Arkansas. It is approximately 38 acres in size. Existing recreation facilities include a launching ramp, picnic and camp grounds, and a beach. A secondary road from the City of Bull Shoals provides access. Topography of the site is gently sloping. Tree cover is extensive except for an open band 100-200 feet wide along the lake.

Facility development for this site as proposed in this design memorandum consists of an entrance control complex, additional picnic and camp units, and a boat launching ramp.

(13) Pontiac Park. (See Plates 27 and 27A.) This park is located on the eastern shore of the lake, approximately one mile southwest of Pontiac, Missouri. It contains approximately 85 acres. Recreation facilities include a commercial boat dock, a beach, a public boat launching ramp, cafe, and picnic and camp units. Missouri State Highway W provides access. Slopes on the site range from gentle to moderate. Tree cover is substantial.

Proposed development of Pontiac Park will include the construction of multi-family and single-family camping units, additional picnic units, an entrance control complex, an amphitheatre, a beach, and a boat launching ramp.

(14) River Run Park. (See Plates 38, 38A, and 38B.) Located on the extreme northwestern end of the lake, River Run Park is directly opposite Forsyth, Missouri. The park contains approximately 164 acres above the top of the conservation pool. Facilities include a public launching ramp and camp grounds. Access to the park is from Missouri State Highway 76. The developable area along the lake is flat with no tree cover.

Facilities proposed for development of this park consist of an orientation area at the entrance to the site; alteration of some existing roads to form camping loops and improve traffic circulation in the area; and the addition of picnic units, camping units, and a boat launching ramp.

(15) Spring Creek Park. (See Plates 28 and 28A.) Located on the northeastern section of the lake, the park is approximately four and a half miles south of Isabella, Missouri. It contains approximately 372 acres. A portion of the park is leased to the Ozark Empire Area Council of the Boy Scouts of America. The eastern half of the park contains a public boat launching ramp, picnic grounds, and a small boat dock area. Access is available via State Highway HH. Slopes are fairly steep along the waterfront except in the boat launching and beach areas. This has essentially confined development to the ridges. Vegetative cover is substantial throughout the park.

Development proposed consists of the following: camping units, a public launching ramp, and beach to be constructed on a peninsula on the west side of the park; and additional picnic units and a beach on the eastern portion of the site. An entrance control complex is proposed for development in the western portion of the park.

(16) Theodosia Park. (See Plates 29, 29A, 29B, and 29C.) This site is approximately one mile east of Theodosia, Missouri, adjacent to the point where U.S. Highway 160 crosses the Little North Fork arm of the lake. It is 170 acres in size. Recreation development in the area includes a commercial boat dock, boat launching ramp, group picnic area, picnic and camp grounds, beach, overnight accommodations, and a cafe. The developable slopes along the northern portion of the site are void of tree cover. Slopes along the east side are steep.

Development proposed for Theodosia Park includes the addition of camp units, picnic units with shelters, boat launching ramp, and a beach. Alteration of the internal road network is proposed to facilitate more efficient use of the park. An entrance control complex will also be provided.

(17) Tucker Hollow Park. (See Plates 33, 33A, 33B, and 33C.) This park is located approximately nine miles northwest of Lead Hill, Arkansas. It contains approximately 80 acres above the top of the conservation pool. Recreation facilities on the site include a commercial boat dock area, a boat launching ramp, picnic and camp grounds, overnight accommodations, and a beach. Access is off Arkansas State Highway 281. The site slopes gently to the lake on the east and contains substantial tree cover.

Further development proposed for complete utilization of Tucker Hollow Park comprises an entrance control complex, camping loops with single- and multi-family units north of the access road, single- and multi-family camping units, and 10 walk-in camp units in the northeastern portion of the park.

(18) Woodard Park. (See Plates 40 and 40A.) This park is located at the tip of a long peninsula approximately seven miles west of Cedar Creek, Missouri. It contains approximately 50 acres above the top of the conservation pool. Existing recreation facilities consist of a public boat launching ramp and camp grounds. A secondary road off Missouri

State Highway KK provides access to the site. The northeastern segment of the park contains a relatively steep embankment near the lake. The remainder of the park slopes gently towards the north and west shores. Tree cover is substantial throughout the site.

Additional development for Woodard Park will be limited because of its small size. The addition of three camping loops, a new beach, a launching ramp with supporting picnic units for day use, and an entrance complex are proposed.

b. Parks administered by other agencies.

(1) By state agencies.

State of Arkansas - Bull Shoals State Park. (See Plates 22 and 22A.) On 17 May 1955 the Arkansas Forestry and Parks Commission leased for a period of 25 years, approximately 994 acres situated on the right and left banks of the lake at the dam site. The area was developed as the Bull Shoals State Park. On 22 October 1970 the State of Arkansas relinquished 269 acres lying on the northwest bank of Bull Shoals Lake and the White River, leaving about 725 acres in the State Park on the left bank of the lake and on the left bank of the river downstream from the dam.

Facilities which are provided at the State Park include a commercial boat dock, camping and picnicking units, a boat launching ramp, and a lodge. Access is by way of Arkansas State Highway 178, which passes through the site. The topography of the park varies from relatively flat hilltops to steep slopes near the lake. Topography is relatively flat near the White River. Tree cover is extensive.

(2) By cities.

(a) Bull Shoals, Arkansas - Bull Shoals City Park. (See Plate 8.) On 1 November 1970, the city of Bull Shoals secured a 25-year lease on an area of about 241 acres of land for the purpose of developing a public park. Facilities provided included picnic and camp areas, restrooms, and drinking water. A trout dock was provided by a sublease. A concession agreement was executed on 8 February 1971 with the Bull Shoals Golf Association for the construction of a golf course. On 22 February 1972, the city's lease was revised to delete about 174 acres, and the city retained about 67 acres.

The presently existing park is located on the southeastern end of the lake, just south of Bull Shoals, Arkansas, on the right bank of the White River immediately downstream from Bull Shoals Dam. Recreation facilities available include a commercial boat dock and public launching ramp. A nine-hole golf course is under construction. Access to the park is off State Highway 178. The topography of the park ranges from moderately steep to flat, with significant vegetative cover confined to the higher portions.

(b) Forsyth, Missouri - Shadow Rock Park. (See Plates 37 and 37A.) On 9 September 1959 the city of Forsyth, Missouri, secured a 10-year license to develop a public park and recreation area known as Shadow Rock Park. The area was originally developed by the Corps of Engineers, using the old Forsyth City Park as a nucleus. The license was renewed on 1 May 1969 and extended to 30 April 1979, for the use of approximately 54 acres of land.

Recreation facilities in the park include a commercial boat dock, a boat launching ramp, picnic units, camp grounds, playground, shuffleboard and tennis courts, a baseball field with flood lights, and a rodeo area. Missouri Highway 76 from the north and U.S. Highway 160 from the east and west provide access. The park is level and vegetation is sparse.

(c) Lead Hill, Arkansas - Lead Hill City Park. (See Plate 15.) On 1 January 1968 a 10-year lease was secured by the city of Lead Hill on approximately 15.2 acres for a public park. The area lies about one-half mile east of the city. On 1 May 1972 the city secured a 25-year lease on the site to satisfy a requirement of the Department of Interior, Bureau of Outdoor Recreation (BOR), to obtain funds to improve the city's park facilities. The total cost of improvements was $5,000 with BOR contributing 50% of the necessary funds. The improvements included a ballfield, picnic sites, a croquet court and restroom.

The park is accessible via a secondary road from the city of Lead Hill. The land contained in the park is very level and vegetation is sparse.

(3) By counties.

Taney County Soil and Water Conservation District Commission - Shoal Creek Park. (See Plate 16.) A license was granted to the Taney County Soil and Water Conservation District Commission on 1 April 1969 for a period of five years. The license expires 31 March 1974, at which time it is subject to renewal. Shoal Creek Park is located directly southeast of the town of Protem, Missouri, and contains 18 acres. Missouri State Highway 125 provides direct access to the park. The topography of the site is rolling with gentle slopes to the west. Vegetation is sparse. Recreational facilities developed in the area are a horse show arena and a picnicking area. An existing spring on the site has been cleaned and prepared for use; the water is not potable.

c. Recreational outgrants.

(1) Christian Camp Site Association. (See Plate 16.) On 21 July 1958 this group secured a 25-year lease on approximately 60 acres of land on the south shore of the lake at the confluence of Trimble Creek, in Marion County, Arkansas. The purpose of the lease was for the development of a camp for retreats, meetings, convocations, or group gatherings.

The facilities provided include mobile homes for supervisory personnel, basketball and tennis courts, a picnic pavilion, a meeting house, and swimming float.

The camp is accessible from a gravel road off Arkansas State Highway 125. A hill which slopes gently from a relatively level crest is the principal topographic feature of the site. Tree cover is extensive.

(2) First Methodist Church of Harrison, Arkansas. (See Plate 15.) On 1 January 1969, this group secured a 10-year lease on about 50 acres of land for use as a picnic and recreation facility. The site is located on the west shore of the Sugarloaf Creek arm of the lake northeast of the city of Lead Hill, Arkansas. A masonry restroom and drilled water well are the only facilities which have been constructed. Access is provided by a gravel road off Arkansas State Highway 14. The site slopes moderately to the south and east, and is well-vegetated.

(3) Ozark Empire Area Council Boy Scouts. (See Plate 10.) On 10 November 1952 the Ozark Empire Area Council of the Boy Scouts of America secured a lease on 38.80 acres of land on the Spring Creek arm of the lake for the purpose of establishing a wilderness explorer base camp to be used for non-commercial recreational purposes. The site of the camp is located within the Spring Creek Park. Missouri State Highway HH provides access. The site slopes gently to the south and west, and is heavily forested. There is no permanent development on the site; however, during 1970 the Boy Scouts carried out site improvement activities consisting of the planting of more than 200 pine and walnut trees. This lease will be subject to renewal on 9 November 1977.

SECTION V

FACTORS INFLUENCING AND CONSTRAINING RESOURCE DEVELOPMENT AND MANAGEMENT

5-01. General. In terms of resource characteristics, the Bull Shoals project is well suited for the types of recreational development for which it is being utilized. Further development of the project, as proposed, will not adversely affect the integrity of these resources, nor will any unduly severe restraints be encountered. Periodic re-evaluation of development plans and management practices will serve to assure that any assumptions made are valid.

In addition to considerations of environmental and recreational resources as they relate to project operation, numerous other factors of a diverse nature were studied in the preparation of this master plan. The following discussion outlines factors which have relevance for consideration in planning and management of the Bull Shoals project.

5-02. Demographic.

a. Population. As indicated by population projections set forth in Table 3, the population in the Bull Shoals zone of influence will increase from 872,500 to 1,100,300 between 1972 and the year 2000. For decades many of the counties surrounding the lake have experienced declines in population, but this trend has reversed and populations have been increasing since the 1960 census.

Within the Bull Shoals zone of influence, there are only two relatively large urban population concentrations--the city of Springfield, Missouri, with a 1970 population of approximately 120,000, and the Fayetteville-Springdale-Rogers, Arkansas, urban area with a 1970 population of 61,800. Both of these urban centers are located on the outermost portion of the zone of influence between 75 and 100 miles from Bull Shoals Lake. All other communities in the zone of influence are less than 15,000 in population.

Cities such as Little Rock, North Little Rock, Fort Smith, and Joplin, which are approximately 25 miles outside the zone of influence, undoubtedly contribute to some of the visitation at Bull Shoals Lake, particularly to overnight use. However, these population centers, as well as Springfield and Fayetteville-Springdale-Rogers, and the cities of St. Louis, Kansas City, Tulsa, and Memphis are served by other lakes which are more immediately available. Past visitor surveys conducted at Bull Shoals Lake indicate that the smaller cities nearer the lake contribute a major portion of the day use visitors, whereas the more distant cities contribute significantly to the overnight use of project facilities.

A relatively recent trend in growth of minor population concentrations is in evidence in the development of second home and retirement communities near Bull Shoals Lake. No studies have been conducted to determine the extent to which persons inhabiting these communities contribute to the use of recreation facilities on the lake; however, because a principal reason for development of the communities is lake access, it can be assumed that their presence contributes to project visitation, particularly in the form of persons participating in fishing, boating, and other water-related activities.

b. Land use. Forestry is the predominant land use in the Bull Shoals zone of influence. This is evident from a survey of aerial photos, USGS quadrangles, and maps showing forest cover. Although Mark Twain National Forest accounts for thousands of acres of land within the Bull Shoals zone of influence, most forested areas are under private ownership. Agricultural acreage accounts for a relatively large amount of land, with urban areas, water bodies, and thoroughfares being the other major land uses.

Although forestry and agriculture are principal land uses, they account for only about 10 percent of the labor force. Approximately one third of the workers in the area are employed in manufacturing. The predominant manufacturing activity is the production of textiles, with wood products secondary. Food processing is also important in the region and in most cases this activity is located close to major urban centers. Analyzed from a regional standpoint, manufacturing activity occurs in three broad bands across the zone of influence. Furniture production and other wood processing is located primarily in the eastern portions of the zone, with textiles in the central portion, and food processing to the west. Mining is still an important industrial land use in southwestern Missouri, although it employs relatively few persons.

Second home and retirement home developments are becoming a significant land use throughout the Ozarks. Several housing developments have been built adjacent to Bull Shoals Lake and others will follow.

5-03. Topography, geology, and soils. Topography is a significant limiting factor in the development of project land. The typical ruggedness of this Ozark area prohibits intensive development in many locations, and, therefore, there are a limited number of sites containing appropriate slopes and adequately-sized areas of land desirable for the location of water access recreation facilities. The extensive alteration of landforms is not acceptable under Corps of Engineers guidelines. The exhaustion of suitable areas for development of water-related use areas is not presently a crucial problem; however, the situation will become more critical in the future as the demand for recreational facilities increases.

The geology of the area imposes no unusual restraints on construction; however, a potentially severe problem could arise in relation to groundwater ecology. Because of the porosity of the rock, a free interchange of water occurs between formations, especially from the Burlington or Jefferson City Formations into the Eminence Formation. Leaky aquifers are common in the region. Additionally, because of the erosion of the uppermost impermeable strata of these rock formations and the consequent exposure of more porous rock, percolation of surface water into the water table occurs.

Because of these factors, the potential exists for groundwater contamination. If contamination did enter the groundwater, it could spread from its original source into widespread areas of waterbearing rock formations and ultimately into bodies of water such as Bull Shoals Lake. It is important, therefore, that all possible controls be exercised on effluent disposal and sewage treatment, both within and outside of the project area.

In general, the soils found in the Bull Shoals project do not exhibit characteristics severely constraining facility development. An important factor which should be investigated before construction, however, is the ability of soils on selected use sites to withstand intensive use. Trampling, which generally occurs on these sites, may cause soil compaction, resulting in increased surface runoff and accelerated erosion. Vegetative cover may also be affected because of the reduction of air and water holding capacity of the soil. Soil compaction on use sites is not now a major problem in the project because the majority of soils are stoney and, therefore, resist compaction.

A second factor to be considered in development is shoreline erosion resulting from wave action. In some areas, this erosion may cause serious problems in maintenance and might thus prohibit development of water-related facilities.

The fertility level of soils as it affects vegetative growth in the project area may influence the plan of development in terms of a construction schedule. In general, the soils of the Ozark Region, with the exception of alluvial soils, are low in fertility. Plant growth is comparatively slow and, therefore, areas for future use must be selected well in advance so that plant cover will be adequate when development is begun.

5-04. Accessibility. Bull Shoals Lake is adequately served by the Federal and State highway networks within the lake's Missouri and Arkansas environs. Interstate 44 traverses Missouri on a northeast/southwest alignment providing access to Bull Shoals from St. Louis, Rolla, Joplin, and Springfield. This major highway is located about 45 miles north of the lake and is directly linked to the area by U.S. Route 65 which intersects with I-44 at Springfield. North of Sedalia, Missouri, I-70 intersects U.S. Route 65 and provides access to Bull Shoals from Kansas City.

U.S. Route 65 along its north/south alignment also provides Bull Shoals with an access link to Little Rock, Arkansas, about 130 miles south of the lake. U.S. Route 65, along with Arkansas State Route 7, further links the Bull Shoals area with Interstate 40, which traverses Arkansas on an east/west alignment, through the cities of Memphis, Tennessee, Little Rock and Fort Smith, Arkansas. Interstates 44 and 40 are high speed, limited-access, dual-lane highways and connecting routes provide access to the lake from all major urban areas in the region.

Other U.S. highways in the immediate vicinity providing access to the Bull Shoals project are U.S. Route 160 and U.S. Route 62. U.S. Route 160 crosses southern Missouri on an east/west alignment and provides the primary access to the northern shoreline of the lake. U.S. Route 62 crossing northern Arkansas in an east/west alignment provides the primary access to the southern shoreline of Bull Shoals Lake. U.S. Routes 65, 160, and 62 are all two-lane, asphalt and/or concrete paved highways of adequate pavement width and in reasonably good condition. U.S. Route 65 is the better of the three, being wider, straighter, and with better shoulder and surface conditions.

Secondary access to the southern shoreline is provided by Arkansas State Routes 7, 14, 125, 178, and 281. They are, for the most part, two-lane, low-type, bituminous paved roads in good to fair condition, without wide shoulders, and are narrow and curving. State Route 125 continues into Missouri and connects to U.S. Route 160. At the eastern end of the lake, about 10 miles from the shoreline, Arkansas and Missouri State Route 5 running north and south through Mountain Home in Arkansas, and Gainesville in Missouri, connects U.S. Routes 160 and 62. In this eastern area of the lake, the shoreline is linked to Arkansas-Missouri State Route 5 by Arkansas Route 202. Further access to most areas and state and city parks is provided through a network of gravel-surfaced or unimproved roads. Some of these are in fair condition while most would be considered poor. However, these roads are primarily intended for country farm-to-market purposes and not for heavy or regular use by visitors to the lake.

Other types of access to the Bull Shoals area can be gained through scheduled bus service to the larger communities near the lake. In addition, airport facilities are available at Mountain Home, Arkansas, 10 miles to the east of the dam; at Harrison, Arkansas, 30 miles southwest of the lake; and Flippin, Arkansas, 10 miles south of the damsite. The airport facilities at Mountain Home and Flippin are adequate for most general aviation aircraft. Each airport has one runway with hard surfacing, 3500 feet in length. Both facilities have runway lighting, all weather landing capabilities, and unicom radios. No scheduled commercial air carrier service is available. The Harrison (Boone County, Arkansas) Airport facilities include a hard-surfaced runway 5600 feet in length, runway lighting, a rotating beacon, all-weather landing

capabilities, and unicom radio. Scheduled commercial air carrier service is available at Boone County Airport from Frontier Airlines. An airport is located at the School of the Ozarks, about three miles west of Hollister, Missouri, near the headwaters of Bull Shoals Lake. The hard-surfaced landing strip is 100 feet wide and 3600 feet long, is lighted, and has a parallel taxiway. Also available are an airport office, pilot's lounge, hangar facilities, rotating beacon, and non-directional radio beacon.

No railroad passenger service is available to the Bull Shoals area.

5-05. Area of influence. The area of primary influence around Bull Shoals Lake, from which 90 percent of day use visitors are drawn, consists of all surrounding land within 100 miles of the project. Bull Shoals Lake also receives many visitors from beyond this immediate area of influence. Many of these visitors are campers who are on major vacations, and for whom Bull Shoals Lake is a primary destination or an interim stopping point. Surveys conducted in the 1960's showed that approximately 33 percent of all visitors originated outside the day use zone of influence, or beyond 100 miles from Bull Shoals.

a. Population and growth trends. Bull Shoals Lake is located in a region which experienced a loss of population between the years 1950 and 1960. This trend reversed between 1960 and 1970 and the population for the day use area of influence as defined above increased from approximately 760,000 to over 852,000 persons, a total increase of approximately 92,000. Population projections predict a further increase, if present trends continue, of approximately 75,000 persons between 1970 and 1980, 97,000 between 1980 and 1990, and 87,000 between 1990 and the year 2000.

b. Income. In the zone of influence, per capita personal income (PCPI) is low compared to PCPI for the nation as a whole. In 1970, the average PCPI for the United States was $2,940 whereas in the zone of influence it was $2,090. Arkansas as a whole ranks forty-ninth among the fifty states in PCPI.

Projections published by the U.S. Water Resources Council[1] predict a 28 percent increase in average PCPI in the zone of influence between 1970 and 1980, 29 percent between 1980 and 1990, and 43 percent between 1990 and the year 2000. Projections of PCPI and total personal income for the Bull Shoals area are shown in Table 3, page 2-8.

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[1]U.S. Water Resources Council. 1972. OBERS Projections Regional Economic Activity in the U.S. U.S. Government Printing Office.

c. Economy. The Ozark Region, in which the Bull Shoals project is contained, as compared to the rest of the nation, historically has been an economically depressed area. It is characterized by an inadequate job market, high unemployment rate, and low per capita incomes resulting from the lack of industrialization and reliance on a generally unviable economic base. The failure of this area to advance with the industrial revolution in the United States in the early part of the century, was largely due to its geographic isolation. This isolation essentially removed the region from major channels of transportation and communication. As a consequence, the traditional extractive industries of agriculture, mining, and timber exploitation continued to function as the principal economic bases for the Ozark Region for a much longer period of time than in other parts of the nation. These industries have now declined considerably in importance.

The economic conditions of the Ozark Region have been to a great degree, self-perpetuating. In the absence of industry requiring skilled labor, there was little opportunity for workers to acquire skills through on-the-job training. Conversely, because of the lack of skilled labor, industries requiring specialized skills found the area undesirable for establishment. As a result, the industries which have entered the area are principally those requiring minimal skills, and, consequently, paying lower wages. Because of the low tax base in the region, public service facilities such as hospitals and schools are generally inadequate, thus contributing to the failure of communities to attract industries and workers from other areas.

The lack of jobs and the general undesirability of those jobs available resulted in the out-migration of many of the most ambitious and highly educated workers, who might have stayed had the region had more to offer them. This out-migration was felt most strongly in the 1950's when many parts of the Ozark Region experienced declines in population.

In the 1960's, however, the region experienced an upward trend in population, with the greatest increases occurring in small cities of the 5,000-10,000-25,000 size classes.

This growth has been the result of the rapidly increasing industrialization of the area by firms attracted by cheap labor and the absence of unionization in rural areas. Increased mechanization in production has enabled these firms to utilize unskilled workers. Also, the movement of industry into the rural areas has stimulated the establishment of retail and wholesale businesses in small cities.

These phenomena have acted to retain that portion of the population which previously had been migrating to other areas for employment and also to draw new workers into the area.

In addition to manufacturing and retail and wholesale businesses, the impact of the leisure industry has been felt in the area. In particular, the market for retirement and vacation homes is becoming increasingly important. This industry may be an important factor in boosting the economy of the Ozark Region in the future, particularly in the smaller and more isolated communities.

5-06. Related recreational-historic-scientific areas. Within the Bull Shoals Lake zone of influence, as defined in the preceding section, there are several lakes which, along with Bull Shoals Lake are the major sources of water-related recreation opportunities in the area. (See Plate 3.) All but one of these facilities are operated by the Corps of Engineers. They are Pomme de Terre, Stockton, Table Rock, and Taneycomo (owned by the Empire District Electric Company) in Missouri; and Greers Ferry, Beaver, and Norfork Lakes located in Arkansas (some extend into Missouri). One additional Corps of Engineers lake, Bell Foley in Arkansas, is within the zone of influence, and is now in the detailed planning stage.

Water-oriented recreational opportunities, except those in the body-contact category, are provided by Ozark Lake, Lake Dardanelle, and Pools Nos. 8 and 9, all of which are a portion of the McClellan-Kerr Arkansas River Navigation System Recreation parks are being developed along this waterway to provide camping and day use facilities. These areas are located in the southern limits of the zone of influence of Bull Shoals Lake.

Various other water-related facilities are scattered throughout the zone of influence. Most of these are state-administered; however, two units which are significant in terms of national interest are the Ozark National Scenic Riverways and the Buffalo National River, which are administered by the National Park Service, U.S. Department of the Interior.

Numerous facilities in the area offer recreational activities which are principally forest-related. A lesser number of facilities are based on historical or scientific features. Table 8 is a listing of facilities available for public use in the Bull Shoals zone of influence.

TABLE 8
PUBLIC RECREATION FACILITIES IN THE BULL SHOALS ZONE OF INFLUENCE
(EXCLUDING MAJOR LAKES)

OWNERSHIP	MISSOURI	ARKANSAS
Federal:	Clark National Forest Mark Twain National Forest Wilson's Creek National Battlefield Ozark National Scenic Riverways	Buffalo National River Holla Bend National Wildlife Refuge Ozark National Forest Pea Ridge National Military Park *Buffalo Point Recreation Area Blanchard Springs Caverns McClellan-Kerr Arkansas River Navigation System Parks *Lost Valley Park
State:	Bennett Springs State Park Huckleberry Ridge State Forest Missouri State Forest Montauk State Park Roaring River State Park Stockton State Park Table Rock State Park	Bull Shoals State Park Lake Charles State Recreation Area Lake Dardanelle State Park Mammoth Spring State Park Mount Nebo State Park Petit Jean State Park Russellville State Park Winthrow Spring State Park Devil's Den State Park Old Carrollton State Historic Monument Old Davidson State Historic Monument Ozark Folk Center Prairie Grove State Historic Monument

* This park is included in the land administered by the National Park Service for the Buffalo National River.

VISITATION PROJECTIONS FOR BULL SHOALS LAKE

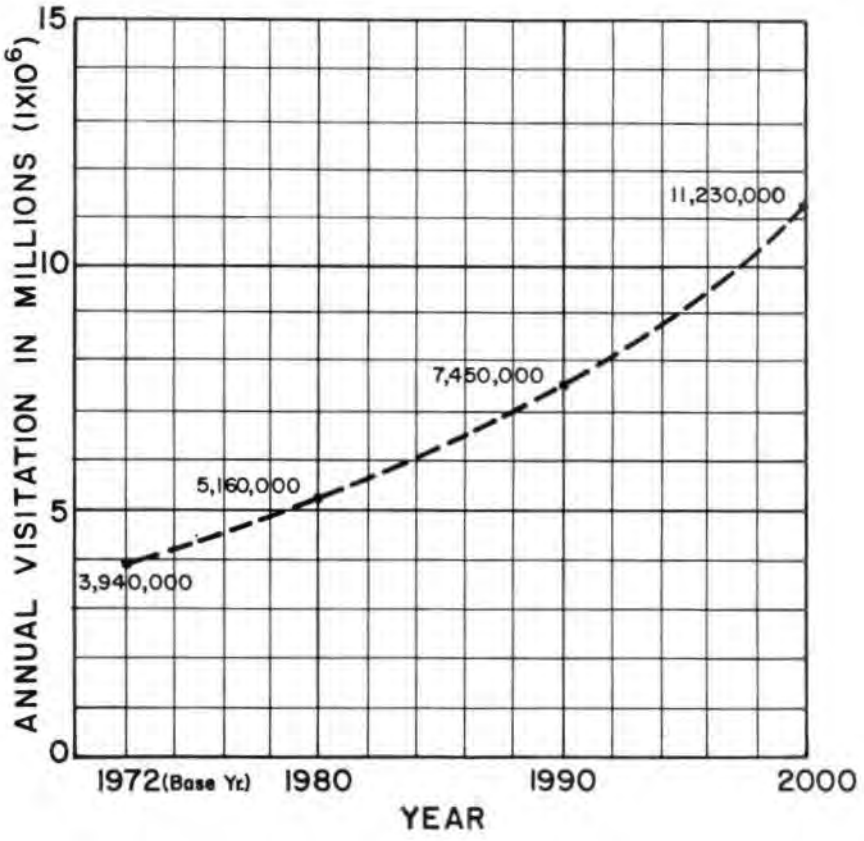

PLATE 6

5-07. Project plan of operation and effects on public use. The Bull Shoals Lake impounds water which is released through the hydroelectric power plant to produce electricity which is marketed by the Southwestern Power Administration, U.S. Department of the Interior. In periods of severe flooding, water is spilled over the dam when the lake reaches elevation 703.

The basic operation of impoundment and release results in a fluctuation of the lake by as much as 20 to 30 feet annually. This fluctuation affects water-related recreational facilities in the parks around the lake. During periods of high water, some facilities are inundated, causing them to be unusable. High water also causes extensive erosion and debris accumulation, creating problems in shoreline maintenance.

During periods of low water, boat launching ramps and dock facilities may be unusable because of their distance from the water's edge, and floating facilities have to be relocated as the water level fluctuates.

5-08. Type, location, and extent of earth borrow, spoil areas, and polluted sites. The Bull Shoals drainage basin is, for the most part, relatively free of earth borrow, spoil, or polluted areas near or adjacent to project lands. Since most of the mining in the Bull Shoals area was conducted underground, open pit or stripped areas are small and do not influence or constrain future planning or development. Abandoned shaft mining operations are significant only in that they represent a possible source of pollution of the lake due to ground water filtering through old shafts. It would appear, based on recent water quality evaluations as discussed in Section 5-09, that this has probably not occurred. However, where abandoned mines are located near the lake or its primary tributaries, periodic water sampling at these locations should be carried out to ensure that such pollution is not present. The mines or quarries listed below are those which are near Bull Shoals or its tributary streams as located and mapped by the U.S. Geological Survey, 1972. All of the sites are located in Arkansas. No mine sites located in Missouri are considered close enough to the lake to have an effect.

Area and Tributary	Location	Name
2 miles west of South Lead Hill, Arkansas-East side of West Sugarloaf Creek	Boone County S6, T20N, R18W	Quarry
4 miles southwest of Dam Mitchell Creek	Marion County S2, T19N, R16W	Monkey Island Mine Erie Ozark Mine
4 miles southwest of Dam Brushy Fork Creek	Marion County S34, T20N, R16W	Lost Bell Mine

Area and Tributary	Location	Name
4 miles southwest of Dam Wildcat Creek	Marion County S26, 27 & 35, T20N, R16W	Mines
2 miles southwest of Highway 125 & 14 Junction East Sugarloaf Creek	Marion County S32, T20N, R17W	Copperhead Mine Pilot Rock Mine Pigeon Roost Mine

5-09. Water quality of lake and tailwater. Information obtained in April, 1973, from the Arkansas Department of Pollution Control and Ecology indicated that recent surveys of the White River Basin (including Bull Shoals Lake and tailwater) showed the water quality of this area to be unusually high by all standards. This high water quality is due to several factors.

A principal factor contributing to the high overall water quality is the excellent chemical quality of the surface waters of the streams and tributaries in the White River Basin. United States Public Health Service tests of these streams and tributaries rate them good to excellent for a majority of uses and well within the Public Health Service drinking water standards.

The Bull Shoals drainage basin comprises an area of about 6,036 square miles, fed by Beaver, Table Rock, and Taneycomo Lakes, and tributaries which are clear, swift, and cold. The low silt levels in these streams are primarily due to heavy vegetative cover prevalent within the lake's drainage basin, which acts to stabilize the soil and thus prevent its erosion. Turbidity of stream and lake waters is experienced only for brief periods after heavy rains.

Streams and tributaries carry very little industrial and municipal water effluents into the lake. The low levels of industrial and municipal waste effluents are primarily due to absence of major industrial activity within the immediate Bull Shoals area and the low densities of urban development around the lakeshore.

A buffer zone of federally owned lands completely surrounding the lake coupled with the careful management of these lands are other factors contributing to the overall water quality of Bull Shoals Lake. Some small communities near the lake, however, are without public sanitary sewers and are, therefore, potential contributors to lake pollution. These communities are Diamond City, Lead Hill, Oakland, Bull Shoals, Lakeview, Isabella, and Theodosia.

The Corps of Engineers recognized the potential for degradation of the water quality of Bull Shoals Lake which could result in increased eutrophication rates caused by municipal and industrial effluents.

These effluents may contain quality-damaging nitrogen and phosphorus compounds as well as other detrimental wastes. The Mountain Home (Arkansas) Resident Office controls waste discharges from project lands into the lake waters and cooperates with Missouri and Arkansas state agencies in controlling pollution and waste discharges outside the project lands which could affect the waters of the lake or its bordering land area. In addition, all mobile houseboat and floating cabin facilities are inspected annually for compliance with Arkansas and Missouri health standards. Lake utilization permits are issued only if these facilities meet compliance standards.

Groundwater within the White River and Bull Shoals Drainage Basins has been determined by the U.S. Geological Survey to be of good chemical quality and usable for most purposes. This is applicable to groundwater at depths varying from 500-1000 feet below the surface. At parks where water is provided for human consumption, samples are taken periodically from the wells and sent to the Arkansas State Board of Health and Missouri Division of Health laboratories for analysis.

5-10. Pre-project exploitation of mineral and timber resources and its effect on public use and enjoyment. Immediately before and after the turn of the century, shaft mining occurred in both the Missouri and Arkansas areas around Bull Shoals. This mining was primarily for zinc and lead. Most of the mining activity in the area ceased after World War I. During World War II, some of the mines were revived due to shortages of zinc and lead, but have ceased to be active since that time. Over the years, some limestone quarrying has taken place in the area, but never to any great extent.

The majority of the mineral exploitation in the area did not take place on project land. Old mine sites or other prior mineral exploitations have no foreseeable effect on the future development of facilities for public use.

The history of timber exploitation in the project area begins with the first white settlers and ends with the purchase of the land by the Corps of Engineers. As a result of the long period of timber exploitation, both by commercial organizations and by private landowners, the forest which now covers the project area consists largely of non-marketable trees. The area has been under Corps management for roughly two decades and, consequently, enough natural recovery of the forest has occurred to provide a pleasant scenic area for public enjoyment. The continued improvement of the forest resource is assured through the management program designed for implementation on project lands. The chief goal of this plan is to provide and sustain a desirable forest environment for recreation use.

5-11. Anticipated attendance and facility needs. Using the projection method described in Section 2-05, estimates were made of anticipated project attendance for Bull Shoals Lake. These estimates are shown below. A graphic representation of the estimates are shown in Plate 6.

TABLE 9
ANTICIPATED ATTENDANCE
BULL SHOALS LAKE

Year	Anticipated Attendance
1980	5,160,000
1990	7,450,000
2000	11,230,000

a. Predictions of over or underuse. As discussed in Section 2-05, the amount of land allocated to Recreation: Intensive Use in the land use plan for the Bull Shoals project, if developed, will be adequate to support recreation use through the year 2000.

At present, there is a wide range of densities of visitor use on existing sites. In the site plans contained in this design memorandum, visitor control entrance stations are proposed for the more highly developed existing sites. When these facilities are constructed, it will be possible for project personnel to effectively control visitor usage and thus prevent overuse in the future.

b. Demand for specific types of uses. In surveys conducted in 1968 at the Bull Shoals Lake project, visitors were interviewed concerning the types of recreation activities in which they desired to participate during their visits. The total number of responses for each activity was tabulated and converted to percentages of the total number of visitors surveyed. These percentages were defined as participation rates and indicated what proportion of visitors intended to participate in the various recreation activities.

Table 10 shows the normal summer weekend day, summer season, and annual participation rates for each activity for 1968. These participation rates were derived from the 1968 survey at Bull Shoals Lake.

TABLE 10
1968 PARTICIPATION RATES
BULL SHOALS LAKE

Activity	Normal Summer Weekend Day	Summer Season	Annual
Picnicking	.09	.10	.10
Camping	.14	.19	.11
Swimming	.23	.30	.16
Boating	.11	.08	.06
Waterskiing	.13	.09	.05
Fishing	.23	.29	.35
Sightseeing	.41	.35	.43
TOTAL*	1.34 (134%)	1.40 (140%)	1.26 (126%)

* Because visitors may take part in more than one activity per visit, totals for participation rates may exceed 100% as shown.

The activity participation rates shown in Table 10 were applied to the 1972 calculated normal summer weekend day, summer season, and annual visitation to the project to yield an estimate of the number of activity days[1] that the Bull Shoals Lake project supported in 1972. Normal summer weekend day, summer season, and annual visitation figures were obtained in the following manner.

(1) Annual visitation was obtained from 1972 records for Bull Shoals Lake.

[1]An activity day is defined as participation by one person in one activity in one day. A person participating in three different activities in one day would be counted as three activity days. A person participating in one activity three times in one day would be counted as one activity day.

(2) Summer season visitation for 1972 was determined by combining visitation data for the three summer months of June, July, and August.

(3) Normal summer weekend day visitation for 1972 was derived by dividing the total summer season visitation by 13 (13 week summer base) to arrive at a normal summer weekly visitation. The normal summer weekly visitation was then multiplied by the percentage of visitors using the project on summer weekends (46 percent as determined by the 1968 Bull Shoals survey) to arrive at the normal summer weekend visitation. It was assumed that the visitation was equally divided between Saturday and Sunday. Therefore, one-half of the normal summer weekend visitation would equal the visitation for a normal summer weekend day.

(4) The appropriate participation rates were then multiplied by the normal summer weekend day, summer, and annual visitation figures for 1972 to estimate the total number of activity days for each activity. This information is shown in Table 11 below.

TABLE 11
1972 ACTIVITY DAYS
BULL SHOALS LAKE

Activity	Normal summer weekend day	Summer season	Annual
Picnicking	3,200	200,400	394,000
Camping	5,000	380,800	433,400
Swimming	8,100	601,200	630,400
Boating	3,900	160,300	236,400
Waterskiing	4,600	180,400	197,000
Fishing	8,100	581,200	1,379,000
Sightseeing	14,500	701,400	1,694,200
TOTAL ACTIVITY DAYS	47,400	2,805,700	4,964,400
TOTAL VISITATION	35,400	2,004,000	3,940,000

c. Projected recreational use. Anticipated demand was calculated in terms of normal summer weekend day, summer season, and annual activity days for each activity, using the projection method employed in determining future visitation to the project. See Tables 12, 13, and 14.

TABLE 12
PROJECTED NORMAL SUMMER WEEKEND DAY USE
IN ACTIVITY DAYS
BULL SHOALS LAKE

Activity	1972 (base year)	1980	1990	2000
Picnicking	3,200	4,200	6,000	9,100
Camping	5,000	6,600	9,500	14,300
Swimming	8,100	10,600	15,300	23,100
Boating	3,900	5,100	7,400	11,100
Water Skiing	4,600	6,000	8,700	13,100
Fishing	8,100	10,600	15,300	23,100
Sightseeing	14,500	19,000	27,400	41,300
TOTAL	47,400	62,100	89,600	135,100

TABLE 13
PROJECTED SUMMER SEASON USE
IN ACTIVITY DAYS
BULL SHOALS LAKE

Activity	1972 (base year)	1980	1990	2000
Picnicking	200,400	262,500	378,800	571,100
Camping	380,800	498,800	719,700	1,085,300
Swimming	601,200	787,600	1,136,300	1,713,400
Boating	160,300	210,000	303,000	456,900
Water Skiing	180,400	236,300	341,000	514,100
Fishing	581,200	761,400	1,098,500	1,656,400
Sightseeing	701,400	918,800	1,325,600	1,999,000
TOTAL	2,805,700	3,675,400	5,302,900	7,996,200

TABLE 14
PROJECTED ANNUAL USE
IN ACTIVITY DAYS
BULL SHOALS LAKE

Activity	1972 (base year)	1980	1990	2000
Picnicking	394,000	516,100	744,700	1,122,900
Camping	433,400	567,800	819,100	1,235,200
Swimming	630,400	825,800	1,191,500	1,796,700
Boating	236,400	309,700	446,800	673,700
Waterskiing	197,000	258,100	372,300	561,500
Fishing	1,379,000	1,806,500	2,606,300	3,930,200
Sightseeing	1,694,200	2,219,400	3,202,000	4,828,500
TOTAL	4,964,400	6,503,400	9,382,700	14,148,700

d. Anticipated demand for specific types of facilities. To determine anticipated demand for specific types of facilities, appropriate recreation planning and design criteria as set forth in EM 1110-2-400, dated 1 September 1971, were applied to the visitation projections contained in Sections 2-05 and 5-11 of this design memorandum. The recreation planning and design criteria utilized are shown in Table 15. These criteria are based on visitor usage capacities of facilities. Primary facilities are essentially assigned on a projectwide basis, whereas supporting facilities such as toilets, washhouses, etc., are generally based on the needs of individual sites.

Table 16 shows 1972 facility requirements for the Bull Shoals project according to the design criteria listed in Table 15. The deficiency in facilities was calculated by subtracting existing facilities shown in a September 1973 inventory from the 1972 requirements. The resulting data shows that present facilities are in most instances inadequate according to 1972 standards.

TABLE 15
RECREATION PLANNING AND DESIGN CRITERIA
(DERIVED FROM EM 1110-2-400)

Facility	Design Criteria	
	Project Basis	Site Basis
PRIMARY:		
Picnic Tables	1/each 10-15 normal summer weekend day picnickers	----------
Group Picnic Shelters	1/each 225 normal summer weekend day picnickers	----------
Camp Units	1/each 5 normal summer weekend day campers	----------
Swimming Beaches	25 linear ft. shoreline/each 150 normal summer weekend day swimmers	----------
Launching Ramps	1/each 40,000 annual visitors	----------
SUPPORTING:		
Camp Area Washhouses	1/each 50-100 developed camp units	----------
Change Houses	----------	1/each area with less than 600 normal summer weekend day swimmers

TABLE 15 (Con't)

Facility	Design Criteria: Project Basis	Design Criteria: Site Basis
Toilets		
Picnic Areas	----------	Areas with over 50,000 annual visitors: 1 waterborne* facility/each 2500 normal summer weekend day visitors Areas with less than 50,000 annual visitors: 1 double-unit vault toilet each 2500 normal summer weekend day visitors
Camping Areas	1 waterborne** facility/each 50 camp units	----------
Swimming Areas	----------	1 waterborne*** facility/each area with over 600 swimmers peak visitor daily use, or 1 waterborne facility/each area with 75,000 annual visitors (vault toilet/ each area with daily use of less than 600 visitors, and separated from bathchange shelters)
Dump Stations	1/each 50-200 camp units	----------

* Waterborne facility for picnic area consists of four water closets and two lavatories for women; two water closets, two urinals and two lavatories for men.

** Waterborne facility for camping areas consists of four water closets, and four lavatories for women; three water closets, one urinal, and four lavatories for men.

*** Waterborne facility for swimming area not defined.

TABLE 16
FACILITY REQUIREMENTS
BULL SHOALS LAKE
1972

Facility*	Requirements 1972	Inventory September 1973	Deficiency September 1973
PRIMARY:			
Picnic Tables	213	165	48
Group Picnic Shelters	14	5	9
Camp Units	1000	354	646
Swimming Beaches (Linear ft. shoreline)	1350	650	700
Launching Lanes**	99	36	63
SUPPORTING:***			
Camp Area Washhouses	10	0	10
Change Houses	14	10	4
Toilets	31 waterborne toilets 22 vault toilets	3 waterborne toilets 4 vault toilets, convertible to waterborne 30 vault toilets non-convertible	28 waterborne toilets, or: If convertible vault toilets changed to waterborne: 24 waterborne toilets
Dump Stations	7	9	0

* Calculations based on facilities in Corps-administered sites only.
** One launching lane equals approximately 12-14 feet in width.
*** Calculations for deficiencies in support facilities were based on existing primary facilities, rather than primary facility requirements.

NOTE: Facilities under construction or contract at the time of the inventory were counted as existing.

Projections of future requirements for primary facilities (Table 17) were calculated, using the projection method employed in predicting visitation and activity participation for the project.

TABLE 17
PROJECTED REQUIREMENTS
PRIMARY FACILITIES
BULL SHOALS LAKE

Facility	1972 (Base Year)	1980	1990	2000
Picnic Units	213	279	403	607
Group Picnic Shelters	14	18	26	40
Camp Units	1000	1310	1890	2850
Swimming Beach (Linear feet)	1350	1770	2550	3850
Launching Ramps	99	130	187	282

For the years 1980, 1990, and 2000, only primary facility need projections were calculated. The design criteria for supporting facilities as stated in EM 1110-2-400 are based on individual park visitation; therefore, projections of supporting facility needs for future years were not applicable. Any such projections would assume that the numbers of parks would remain essentially the same. However, as new parks are added in the next three decades, visitation patterns will be altered, with a greater percentage of the total visitation expanding to these new sites. It will be necessary to construct additional supporting facilities in the parks where usage indicates and as new primary facilities are added.

5-12. Application of Public Law 89-72. The Federal Water Project Recreation Act of 1965 (Public Law 89-72) requires that cost sharing of financial responsibilities in joint Federal-non-Federal development, enhancement, and management of recreation and fish and wildlife resources of Federal water projects be on a 50-50 basis. This law had immediate effect on those lakes established after its enactment. For those lakes previously established, such as Bull Shoals Lake, the law comes into effect depending on the year of their establishment. As applicable to the Bull Shoals Lake, implementation of the 50-50 cost sharing agreement will apply after fiscal year 1974, unless a system of user fees is established at parks to recover all costs of operation, and maintenance.

5-13. Environmental and ecological features. It is the general intent in development and management of the Bull Shoals project to protect and enhance environmental features which are the basic attractions of the area and typify the character of the Ozark Region.

To date, no studies have been conducted to compile a comprehensive list of flora and fauna in the Bull Shoals project. A study on the Norfork project, however, was conducted for the Corps by Arkansas State University in 1972 and 1973.[1] Because of the proximity of the two projects, and their environmental similarities, the information compiled in the Norfork report is applicable to Bull Shoals.

Of particular interest in the Norfork report are data pertaining to plant species which are endemic to the White River Basin and occur principally on bluffs. Although no evidence has been collected that these endemic species are significant in the project area, bluff areas, wherever possible, have been allocated as natural areas, and therefore, will be preserved.

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[1] Arkansas State University. 1973. Preliminary Environmental Inventory of the Lake Norfork Area, Vols. I and II (Unpublished). Prepared for the Little Rock District, Corps of Engineers.

SECTION VI

COORDINATION WITH OTHER AGENCIES

6-01. Initial coordination. Coordination for the first master plan for recreational development and reservoir utilization for the Bull Shoals project, (ultimately approved 30 July 1951) as required by the Flood Control Act of 1944, was completed in 1950. A public hearing was held in Harrison, Arkansas, on 22 August 1950 to coordinate the plan with local, state, and federal interests. Additional reports and recommendations were requested and received from appropriate state and federal agenices.

6-02. Recent coordination. During preparation of this master plan, concerned local, state, and federal agencies were contacted requesting comments and recommendations concerning the updating of the master plan. Below is a listing of agencies contacted.

a. Federal agencies.

(1) Agricultural Stabilization and Conservation Service.

Harrison, Arkansas. No reply received.
Mountain Home, Arkansas. No reply received.
Yellville, Arkansas. No reply received.
Kirbyville, Missouri. No reply received.
Thornfield, Missouri. No reply received.

(2) Bureau of Sport Fisheries. Major comments incorporated into Sections 4-05, 9-01, and 9-02.

b. State agencies.

(1) Arkansas Archaeological Survey. Major comments incorporated into Section 4-02.

(2) Arkansas Department of Parks and Tourism. Major comments incorporated into Section 7-02(b).

(3) Arkansas Department of Planning. Suggestions incorporated into Section 7-02.

(4) Arkansas Department of Pollution Control and Ecology. Major comments incorporated into Section 5-09.

(5) Arkansas Game and Fish Commission. Major comments and results of a research report incorporated into Section 4-05.

(6) Arkansas State Department of Health. Suggested areas of concern discussed in Sections 4-05, 5-09, Appendix A - Project Resources Management Plan, and Appendix E - Project Safety Plan.

(7) Arkansas State Geologist. No reply received.

(8) Missouri Department of Community Affairs. No reply received.

(9) Missouri Historical Survey and Planning Office. No historical sites listed were within project boundary.

(10) Missouri Water Resources Board. No new information.

c. Local agencies.

(1) Mayor of Bull Shoals, Arkansas. No reply received.

(2) Mayor of Diamond City, Arkansas. No reply received.

(3) Mayor of Lead Hill, Arkansas. No reply received.

(4) Mayor of Mountain Home, Arkansas. No reply received.

(5) Mayor of Forsyth, Missouri. No reply received.

(6) Mayor of Gainesville, Missouri. No reply received.

(7) Mayor of Kirbyville, Missouri. No reply received.

Correspondence with the above agencies follows:

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

2 April 1973

Mr. Waldo Fowler, Director
Agricultural Stabilization
and Conservation Service
Post Office Box 130
Harrison, Arkansas 72601

Dear Mr. Fowler:

We are updating the Master Plan for Development and Management of Bull Shoals Lake. The purpose of this plan will be to serve as a guide for the administration and operation of the lake: to assure preservation of the scenic, biological, historical, and recreational resources of the lake area; and to assure coordination with interested Federal, State, and local agencies. A Bull Shoals information folder is inclosed for your information and use.

It would be helpful if you would furnish any information you consider pertinent to a discussion of soil characteristics in the general area of the lake. This information will be used in planning for the further development and use of the Bull Shoals project. Receipt of this information by 20 April 1973 will aid in the timely completion of the master plan.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

1 Incl
As stated

Same letter to: Mr. Lee Brown, Kirbyville, Missouri 65679
Mr. Archie M. Wallace, Thornfield, Missouri 65762
Mr. Owen F. Cooper, P.O. Box 430, Mt. Home, Ark. 72653
Mr. Wm. J. Manney, P.O. Box 226, Yellville, Ark. 72687

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

4 April 1973

Mr. C. Edward Carlson, Regional Director
Bureau of Sport Fisheries and Wildlife
U.S. Fish and Wildlife Service
Peachtree-Seventh Building
Atlanta, Georgia 30323

Dear Mr. Carlson:

We are updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. The purpose of these plans is to serve as guides for the administration and operation of the lakes; to assure preservation of the scenic, biological, historical, and recreational resources of the lake areas; and to assure coordination with interested Federal, State, and local agencies. Information folder maps of the lakes are inclosed for your information and use.

We would appreciate your furnishing any information concerning the fish and wildlife resources of these lakes that you feel should be considered in planning for the further development and management of these lakes. This information is needed by 20 April 1973 for our use in coordinating with the architect-engineer firms which are updating the master plans.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

3 Incl
As stated

United States Department of the Interior
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
17 EXECUTIVE PARK DRIVE, N. E.
ATLANTA, GEORGIA 30329

AIRMAIL

July 5, 1973

District Engineer
U.S. Army Corps of Engineers
P.O. Box 867
Little Rock, Arkansas 72203

Dear Sir:

Reference is made to your letter dated April 4, 1973, SWLED-PV, which requested information relative to updating Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. Reference is also made to excerpts from a draft of the master plans which were transmitted to Mr. Paul Smith of our Vicksburg, Mississippi, field office by letter of April 20 from your office.

The excerpt for Bull Shoals Lake mentions that raccoon, mink, deer, and turkey have benefited as a result of the lake. Our comments on this matter are that inundation of habitat for these species has had net adverse effects upon them. Also, bays, coves, and inlets afford little if any protection to game animals from predation by dogs and wolves.

The statement that the economy of the area has greatly benefited by the overall enhancement of fish and wildlife potentialities which have resulted from construction of Bull Shoals is also questionable. Reservoir and tail-water fishing and waterfowl benefits generally do occur as a result of impoundments. However, on the negative side there are generally losses of stream fishing, big game, small game, fur animal, and wildlife-oriented potential because of inundation. Although man-day utilization could increase by virtue of public ownership and access, the potential capability of the area to produce many species and provide wildlife-oriented recreation enjoyment is impaired. An abundance of reservoir waters is present in the Ozark Plateau region, and more are being planned. We view Bull Shoals as a highly popular recreational area, but one in which there has been an overall net loss of fish and wildlife habitat needs for the region.

Following is a list of general items that we believe are worthy of your consideration in updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes.

1. Manage all resources and activities consistent with soil and space capabilities and to improve the quality of air, water, and natural beauty;

2. Cooperate with other Federal, state, and local government agencies and national, state, and local associations, organizations, foundations, and institutions of higher learning in identifying, protecting, interpreting, and developing significant wildlife-oriented recreation opportunities;

3. Involve state game and fish departments in all activities which may have an impact upon fish and wildlife resources;

4. Cooperate with state agencies in establishing areas needed to provide special hunting, fishing, general recreation and management needs (i.e.; zoning for primitive weapons hunting, floating fishing piers, water skiing, swimming, waterfowl hunting, etc.);

5. Identify areas where limited access must be maintained to provide high quality hunting for bear, deer, or wild turkey or which are needed to protect wildlife that require an undisturbed environment;

6. Post all lands available for public use and areas that have zoning restrictions;

7. Operate recreational facilities only where adequate operational and maintenance services can be provided. Close facilities where these services cannot be provided;

8. Administer lands and waters to prohibit use beyond carrying capacity;

9. Stabilize eroding areas;

10. Monitor water quality in areas where activities could alter the environment;

11. Limit camping to areas designated and developed for that purpose;

12. Restrict motorized vehicle use to roads, parking areas, and designated camping areas;

13. Apply suitable surfacing on the roads, trails, and parking areas to accomplish a quality job for protecting air, water, soil, and natural beauty; and,

14. Exclude livestock from areas where irreconcilable and unmanageable conflicts exist with other resources or proper forage resource use.

We appreciate this opportunity to provide comments for updating the master plans for these three Ozark reservoirs. Please continue to call upon us whenever we can be of assistance in planning for fish and wildlife conservation for these reservoirs and their associated areas of influence.

Sincerely yours,

C. Edward Carlson

Regional Director

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

3 April 1973

Mr. Charles R. McGimsey III, Director
Arkansas Archeological Survey
University of Arkansas Museum
Fayetteville, Arkansas 72701

Dear Mr. McGimsey:

We are updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. The purpose of these plans is to serve as a guide for the administration and operation of the lakes; to assure preservation of the scenic, biological, historical, and recreational resources of the lake areas, and to assure coordination with interested Federal, State and local agencies. Information folder maps are inclosed for your information and use.

It would be appreciated if you would furnish information concerning archeological significance in the vicinity of the lakes which should be considered in planning for the further development and use of these projects. Archeological data were not included in the original master plans. Also, information concerning archeological resources which could be brought to the attention of the visiting public by information centers, signs, and fireside talks by park personnel would be of value. This information is needed by 20 April 1973 for our use in coordinating with the architect-engineer firms who are updating the master plans.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

3 Incl
As stated

PRESERVING THE PAST FOR THE FUTURE

ARKANSAS ARCHEOLOGICAL SURVEY

DIRECTOR • CHARLES R. MCGIMSEY III
STATE ARCHEOLOGIST • HESTER A. DAVIS

Coordinating Office
University of Arkansas Museum
Fayetteville, Arkansas 72701

April 16, 1973

Mr. Calvin W. Shelton
Acting Chief, Engineering Division
Little Rock District, Corps of Engineers
P.O. Box 867
Little Rock, Arkansas 72203

Dear Mr. Shelton:

This letter is in response to your letter of 3 April 1973, reference code SWLED-PV, requesting information on the archeological resources of the areas of Nimrod, Blue Mountain and Bull Shoals Lakes.

We cannot provide you with the archeological data you need simply because we have not yet had the opportunity to collect this kind of information. We would need to undertake a research project around the three lakes in order to find out where sites are located and to determine their significance.

A brief study, limited to site location survey and minor test excavation, was conducted before construction and flooding of the Bull Shoals reservoir. Twenty-five sites were located in the Arkansas portion of the reservoir, primarily on the narrow bottomlands of the White River or at the juncture of tributaries with the White River. All of these were within the reservoir conservation pool. Over the past 15 years, a few site locations have been reported to the University Museum which are being eroded by the lake between the conservation and flood pool elevations. No archeological research has been conducted above the flood pool.

No archeological research has been undertaken in the Ouachita Mountains region where Nimrod and Blue Mountain reservoirs are located, and no site surveys were conducted before the reservoir construction. We have only very limited knowledge from scattered prehistoric sites reported in the area.

The fact that we do not have adequate information on the archeological resources of either the Nimrod and Blue Mountain or the Bull Shoals areas reflects the limited professional personnel and funding available rather than lact of siginificant archeological resources in these areas. The Petit Jean and Fourche la Fave river valleys apparently were important areas of contact between the prehistoric peoples of the Arkansas River valley and of the Ouachita River basin and the Red River valley. The White River was an important route of contact between the peoples living on the Mississippi alluvial plain and those in the interior of the Ozarks.

In order to recover and preserve information on the archeological resources before these resources are destroyed, it will be necessary to undertake a research project in those areas where lake developments are planned before those developments are initiated. This is important because of the increasing destruction of prehistoric sites. While no individual project development may appear to be doing a great amount of damage, the accumulation of many projects

is creating a major threat to the preservation and recovery of archeological resources.

We think that interpretive programs about the prehistoric utilization of an area should be developed whenever possible. The research for this type of program can be done at the same time as recovery research discussed above. There can be little doubt but what the potential for an interpretive program--in the form of interesting and significant sites--is in the areas of these three lakes. Pointing out the locations of sites to the public, however, does not provide an understanding of what the way of life was like for the occupants of that site or how it fits within the broader utilization of the region.

A good interpretive program could be developed in two stages. First, it would be necessary to undertake an intensive site location survey. During this survey the archeologist would locate sites, study them in relation to the local topography and collect an adequate sample of artifacts to establish the period, or periods, of occupation and evaluate the significance and potential of the sites. This would require minor test excavations to determine the extent, depth and content of the sites located. As a result of the intensive survey, it would be possible to establish the cultural relationship and periods of occupations within the area and the importance of the various sites. A simple interpretive presentation could be developed from this information alone. The most significant sites should then be excavated in order to provide details about the prehistoric lifeway. Exhibits and booklets for the information centers and fireside talks could be developed and sites themselves could be "stablized" as exhibits.

The field work, analysis and report writing for the intensive surveys would probably take at least one year for each reservoir area, while the more extensive site excavations would have to extend over several years. The Arkansas Archeological Survey is not funded to undertake such a research project on its own for federal and state agencies, but arrangements could be worked out so that we could do the work for you.

What I am trying to say, relative to your Master Plan, is that at this time we do not have adequate archeological information which would be of use to you in planning future development. On the other hand, before any development takes place--in fact as a part of the planning process--archeological research should be provided for through which interpretive information would become available. I look forward to further correspondence with you as your plans develop for the projects. If it would help, I could come to Little Rock to discuss these problems with you. If we can be of further service in any way, please let me know.

Sincerely,

/s/ Hester Davis

Hester A. Davis
State Archeologist

HAD/jg
cc: National Park Service
Arizona Archeological Center
Box 49008
Tucson, AZ 85717

Regional Director, Southwest Region
National Park Service, Box 728
(Attn: Calvin Cummings, Archeologist)
Santa Fe, NM 87501

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

3 April 1973

Mr. William E. Henderson, Director
Department of Parks and Tourism
149 State Capitol Building
Little Rock, Arkansas 72201

Dear Mr. Henderson:

We are updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. The purpose of these plans will be to serve as guides for the administration and operation of the lakes; to assure preservation of the scenic, biological, historical, and recreational resources of the projects; and to assure coordination with interested Federal, State, and local agencies. Information folder maps are inclosed for your information and use.

It would be helpful if you would furnish any information of historical or recreational significance which could be used in planning the future development and use of the projects. Also, we would appreciate related historical and recreation data that could be brought to the attention of the visiting public by fireside talks, signs, or information centers. This information is needed by 20 April 1973 for our use in coordinating with the architect-engineer firms who are updating the master plans.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

3 Incl
As stated

ARKANSAS DEPARTMENT OF PARKS & TOURISM
149 State Capitol Little Rock, Arkansas 72201 Telephone (501) 371-1511

Dale Bumpers
Governor

William E. Henderson
Director

L. V. Sutles
Director of State Parks

Lou Oberste
Travel Director

April 16, 1973

Mr. Calvin Shelton
Acting Chief, Engineering Division
U. S. Corps of Engineers
Federal Building
Little Rock, Arkansas 72201

Dear Mr. Shelton:

In response to your letter of April 3, 1973 concerning updating of Masterplans for Nimrod, Blue Mountain and Bull Shoals Lakes the following information is supplied to you for your use.

The enclosed map has radii of 50 and 100 miles from the Nimrod and Blue Mountain Lakes and radii of 50, 100, and 200 miles from Bull Shoals Lake.

The information is on recreational developments administered by the State Parks that are similar in nature to those areas administered by the Corps.

A. Nimrod and Blue Mountain Lakes

Recreation:
The Arkansas State Parks has no plans for development of recreational facilities on these lakes.

State Park developments in other areas are as follows:

1. 50 mile radius		
a. Lake Dardanelle	renovation	1975
b. Lake Ouachita	renovation & expansion	1974
c. Lake Catherine	renovation & expansion	complete
2. 100 mile radius		
a. Daisey	renovation	1973
b. DeGray	new development	1974-75
c. Millwood	new development	1975

Interpretation:
The State Parks does not have specific information on scenic, biological or historical aspects of these two lakes. Due to limited manpower within the interpretive division we are not able to offer much assistance in obtaining this information, however we would strongly suggest

such activities by the Corps in these areas. Well managed and presented naturalist activities enhance the visitors stay and provide the visitor with a high regard for the park and the agency.

B. Bull Shoals Lake

Recreation:

The Bull Shoals State Park located adjacent to the dam on the south side will undergo basic renovation in 1973.

Other state park developments within a 200 mile radius are as follows:

1. 50 mile radius		
a. Ozark Folk Center	Non-water oriented	1973
2. 100 mile radius		
a. Lake Charles	SCS Lake renovation	1975
b. Lake Dardanelle	renovation	1975
3. 200 mile radius		
a. DeGray	new development	1974-75
b. Milwood	new development	1975
c. Lake Ouachita	renovation & expansion	1974
d. Daisey	renovation	1973
e. Lake Catherine	renovation & expansion	complete

Interpretation:

Beginning July 11, 1973 there will be an interpretive program at Bull Shoals State Park. Enclosed is a draft copy of the chapter on interpretation from the Bull Shoals Masterplan of the Arkansas State Parks. Our plan is not yet complete but should be available soon.

All other State Parks have been located for your convience. I hope this information has been of some value to you. If we can be of any further assistance please notify us, we will be happy to cooperate any way we can.

Sincerely,

Bill Thompson, Chief
Planning & Design

BT:lj

Enc:

DRAFT

INTERPRETIVE PROGRAM

BULL SHOALS STATE PARK

MASTER PLAN

Taking all in consideration, Bull Shoals is a terrific opportunity to establish a good park-interpretive program. It has a sizeable population of people living within five miles of the park which should add to the attendance of the activities. The park has a large amount of land suitable for trail construction (these areas offer good nature interpretation with some historical interpretation.) Also, the park certainly has plenty of visitation by campers.

Bull Shoals has a natural area of approximately 250 to 300 acres for which a trail system will be developed this year and in future years. Several trails of varying lengths containing such things as geology, the unique plants that are found on the White River bluff system, and scenic overlooks that overlook the White River below the dam will be the high points on these trails. A short self-guiding nature trail will be developed along the top of the bluff system, perhaps incorporating portions of the major long trail of about 2½ hours.

A permanent amphitheater site should be picked and would probably be best put across the dam road from the camp area, near the nature trail in the "natural area". The amphitheater should be constructed of natural materials such as rock and logs with a design that will be discussed later....a permanent design which will fit all amphitheater sites.

A major complex area of a visitor center and interpretive center and offices for park personnel should be planned for the overlook area where the superintendent's quarters and the group facility or lodge are located now. This will depend upon whether the Corps of Engineers' maintenance area will be cleaned up so as not to be detrimental to the looks of the area. We are going to interprete different things within the interpretive center such as the history of the building of the dam and diagrams of how the dam operates. We will try to get in contact with the Corps of Engineers' office to see that we are not duplicating any of the interpretations that they might have so as to complement each other instead of being detrimental to each other's programs.

We have come into contact with a local photographer that has offered pictures of the building of the dam and the history of the dam, which we will try to use. Other displays will include such things as the river and life along it. We will try not

to use live displays, except for perhaps fish. These fish would be displayed in the discarded Buffalo River aquarium if the National Park Service agrees to let us have the aquarium. Plans in the future should include an entrance sign, such as the type carved by Hal Lane and which has been used in selected other state parks. This should be located at the intersection of 178 and the powerhouse road or river road. The sign will be wasted unless the dump behind the intersection is removed.

A very good interpretive feature within the park is the Big Spring area. In this area there should be a wayside exhibit, perhaps incorporating a rock structure with plexaglass panels to show the dynamics of the spring, the way the stream plays into the ecology of the White River contrasted to what the White River would be without streams such as Big Spring, and the gurgling sound of the rocks and their polished effect. The area would be a limited day use area without any picnicking, but benches scattered around the spring would allow people to sit and listen to the gurgling of the rocks. The whole idea behind it is the preservation of the area because of the uniqueness of the spring in the park.

In order to reach a larger number of people in our interpretive programs, we would have small interpretive exhibits along the river shore, the lake shore, and in the camp areas. These small exhibits should pertain to the whole interpretive theme of the park which will be interpreted within the park visitor center. The interpretive theme of the nature center in the park will be the interrelation of these three interpretive ecologies.

Due to the fact that this park is as popular as it is as far as camping and the rest of the uses of the year round facilities, we do need a full-time naturalist here. And, in order to accommodate a full-time naturalist here, you need permanent living quarters. Plans will be made for the development of living quarters and that area that needs to be set aside to accommodate a full-time naturalist.

The lobby area of the group facility could be used, in the near future, as a nature center, this year or possibly next year. Very little should be put into this area. It should be an area of little cost and yet tasteful. Probably some of the best exhibits available would be rock exhibits, exhibits on just the damsite area, and some of the other exhibits that have been used in other parks which are not being used. One of these could possibly be the snake exhibit at Petit Jean, that has been discarded.

ARKANSAS DEPARTMENT OF PARKS & TOURISM
PARKS DIVISION

Dale Bumpers
Governor

William E. Henderson
Director

1510 Broadway Little Rock, Arkansas 72202 Telephone (501) 371-1633

Jack E. Miller
Director of State Parks

September 10, 1974

Colonel Donald Weinert
District Engineer
P.O. Box 867
Little Rock, Arkansas 72203

Re: Ozark Isle and Oakland Park

Dear Colonel Weinert:

In 1971, Arkansas State Parks agreed to assume eventual responsibility for the public recreation area at Bull Shoals Lake known as Ozark Isle. This agreement was based on the stipulation that the Corps of Engineers would finish development of the area by FY 76. We now understand that due to a lack of funds, this development cannot be completed by that time.

In view of this, we at State Parks re-examined the master plan for Ozark Isle to determine whether we could accept less than full development. After several conferences with members of your staff, we have defined minimum Corps development in order for us to incorporate the area into the Arkansas State Park System. A complete summary of these requirements is attached as Appendix "A". All of these items are already included in the Corps' updated master plan (March 1974) with the exception of the entrance road/complex and sewer service for the Oakland Park area.

In regard to Oakland Park and the existing leased marina complex, we feel that state control of the entire area, including marina, is necessary to manage the park for the best advantage of both park personnel and the visiting public. A meeting should be arranged between the Corps of Engineers, the marina concessionaire and Arkansas State Parks to discuss the lease agreement and arrive at an arrangement that will satisfy all parties concerned. We feel that the existing lease could be assigned to State Parks without major changes except we would want to further investigate the method of rent computation before making a commitment.

We are currently in the process of developing our final budget for FY 76-77. It would probably be January of 1976 before federal construction could begin, and at best, May or June of 1977 before it would be completed. Therefore, we are not requesting any operation and maintenance money to be provided until July 1, 1977. If the construction is completed, we would be prepared to assume control of the park at that time. However, we feel that it would be wise for us to provide some liaison personnel several months before we actually take the area in order to become familiar with the mechanics of the park.

If the requested new development is not complete or nearing completion by July 1, 1977, we feel it will be best to remove Ozark Isle from our list of proposed parks.

Thank you for the help and consideration that you and your staff have provided on the project. I hope that funds are available and that we will be able to continue working together on the development of this park.

If you have questions regarding this letter or attachments, please do not hesitate to call.

Sincerely,

Jack E. Miller
Director

JEM:mb

Enc: Attachments: 4
Appendix A, B, C, Project Map

NOTE: Appendix "C", Plans and/or specifications for project facilities, is not attached at this time but will be sent at a later date.

APPENDIX A

Items which are considered essential for operation of the Ozark Isle and Oakland as a state park are as follows:*

1. A complete sewage treatment system to include collection lines from all toilets inside the project boundaries including Oakland Park Area. A trailer dump and sewage treatment plant of adequate capacity shall be included as part of the complete operating system.

2. Two bathhouses with water-borne toilets. These should be heated, winterized, and with hot water showers. One each to be located in area "D" and "M" as indicated on attached project map. Suggested floor plan attached. Add hot water to all existing bathhouses.

3. Construction of a maintenance compound to include service building with office and bath, underground fuel tanks and electric pumps, air and water to service island, chain link fence with locking gate around entire compound. Suggested plans attached, all to be located as indicated on Master Plan Map.

4. Electrical connections in 80 campsites. Fifty located in area "D" and 30 located in area "M" as indicated on attached project map. All new electrical wiring for entire park to be placed underground. Specifications attached. No electrical in areas "F" and "G".

5. Freeze proof water hydrants in 108 campsites. Fifty located in area "D", 30 located in area "M", 14 in area "F" and 14 in area "G". Specifications attached.

6. New entrance road with security gates and entrance building to be located approximately as shown on attached map. Building plan attached. Close existing entrance into Oakland Park area. This will provide a single park entrance with better traffic flow and security.

7. All areas to have landscaping and erosion control as they are developed. General maintenance of area should be brought to level of other existing Corps areas on Bull Shoals Lake.

8. Oakland Park area will be included in overall project scope.

9. Complete development of 51 new campsites and necessary road net as shown on master plan map attached: 25 in area "C", 18 in area "M", 4 in area "F" and 4 in area "G". Water and electric covered in items 4 and 5.

10. Road between areas "B" and "C" should be elevated to at least an elevation of 685' and rip-rapped on the lakeside. There is a severe erosion problem there due to high water and wave damage.

* For convenience, letter designation has been assigned each facility area and is keyed to the attached project map.

11. Completely remove the change shelter in area "C". This shelter is regularly destroyed by high water wave action and is a hazard to public safety. The shelter is presently damaged by recent high water.

APPENDIX B

Items considered necessary for park operation but not absolutely essential. These items should be included if at all possible.

1. Two (2) restrooms (water borne) above high water line at beach areas "J" and "C". Walkway down to beach. Sepcifications attached.

2. Pavilion style picnic shelters with patios and grills located in area "B" as indicated on map. Specifications attached.

3. Water borne restroom in area "B" picnic area as indicated on map.

4. Tent pads (18' X 18') in 25% of campsites as designated by State Park personnel. Specifications attached.

5. Launch ramp and ski beach in area "B". Parking lot for 40 vehicles with walk to launch ramp as shown on attached map.

6. Path with steps as needed to launch ramp in area "E" from area "F".

7. Develop beach in areas "C" and "J".

8. Steps from two parking areas into area "H". Control erosion at parking lots.

9. Paint watertower and building with Coco Brown (or equivalent) paint and plant visual screen around chain link fence in area "G".

10. Construction Group Camp in area "H" to include parking lot, tent pads, tables, fire ring, and water borne toilet.

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

3 April 1973

Mr. Charles T. Crow, Director
Arkansas State Planning Department
Capitol Hill Building, 4th Floor
Little Rock, Arkansas 72201

Dear Mr. Crow:

We are updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. The purpose of these plans will be to serve as guides for the administration and operation of the lakes; to assure preservation of the scenic, biological, historical, and recreational resources of the projects; and to assure coordination with interested Federal, State, and local agencies. Information folders are inclosed.

It would be helpful if you would furnish any information you consider pertinent to the development of recreational and other project resources. This information will be used in planning for the further development and use of these lakes. Receipt of your information by 20 April 1973 will aid us in coordinating with the architect-engineer firms which are updating the master plans.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

2 Incl
As stated

DALE BUMPERS
GOVERNOR

ARKANSAS
DEPARTMENT OF PLANNING
CAPITOL HILL BUILDING
LITTLE ROCK, ARKANSAS 72201
AREA CODE 501 371-1211 / 371-1301

CHARLES T. CROW
DIRECTOR

April 6, 1973

Mr. Calvin W. Shelton
Acting Chief, Engineering Division
Department of The Army
Little Rock District, Corps of Engineers
P. O. Box 867
Little Rock, Arkansas 72203

Dear Mr. Shelton:

Thank you for the opportunity to comment on your revision of the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes.

Bull Shoals Lake, Blue Mountain Lake, and Nimrod Lake are three very fine multi-purpose recreational areas. They all offer great fishing, camping, boating and swimming to increasing numbers of visitors. I am sure that during the updating the increased visitation will be a major factor considered.

Development of more basic camping areas, nature trails, and regulation or restriction of off-road vehicles are three recreational uses to be evaluated.

If we can be of further assistance, please let us know.

Sincerely,

Doug Blair

Doug Blair
Assistant Program Manager
Environmental Planning Division

DB/ab

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF:

SWLED-PV

4 April 1973

Mr. S. Ladd Davies, Director
Pollution Control and Ecology
8001 National Drive
Little Rock, Arkansas 72209

Dear Mr. Davies:

We are updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. The purpose of these plans is to serve as guides for the administration and operation of the lakes; to assure preservation of the scenic, biological, historical, and recreational resources of the lake areas; and to assure coordination with interested Federal, State, and local agencies. Information folders are inclosed for your information and use.

We would appreciate any information you can furnish concerning existing sources or potential sources of water pollution and possible remedial measures that should be considered in planning for the further development and use of these projects. This information is needed by 20 April 1973 for our use in coordinating with the architect-engineer firms that are preparing the updated master plans.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

3 Incl
As stated

STATE OF ARKANSAS
DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
8001 NATIONAL DRIVE
LITTLE ROCK, ARKANSAS 72209

501 371-1701 GEN. OFF
501 371-1136 AIR DIV.

April 18, 1973

Mr. Calvin W. Shelton
Acting Chief, Engineering Division
Little Rock District, Corps of Engineers
P.O. Box 867
Little Rock, Arkansas 72203

Re: Lakes Nimrod, Blue Mountain and Bull Shoals

Dear Mr. Shelton:

Receipt is acknowledged of your letter dated April 4, 1973 requesting information on above referenced lakes.

Based on the results of recent surveys conducted by this organization in the White River and Arkansas River Basins no serious sources of water pollution were found existing as to warrant compliance actions nor affecting presently the water quality of these three lakes. However, potential sources of water pollution do exist within the respective watersheds. These consist primarily of point sources such as municipal sewage treatment plants, unsewered municipalities or built-up areas and recreational-use areas. There are also non-point sources such as drainage or run-off from agricultural areas, stock farms, and feed lots which may account for residual toxic herbicides or high-nutrient fertilizers and other by-products of the land-uses around the lakes. In particular, the potential point sources are as listed hereunder:

Blue Mountain Lake:

1. City of Booneville - Has a secondary wastewater treatment plant consisting of clarifier, sludge digester and stabilization ponds. Effluent is finally discharged to Petit Jean River.

2. Booneville State Sanitorium facilities - has a mechanical sewage treatment plant consisting of clarifiers, trickling filter, sludge digester and drying beds. Effluent also discharges to Petit Jean River.

3. Magazine - A community with a population of 588 but without public sanitary sewer facilities.

4. Blue Mountain - A built-up area with some 94 population count but no public sanitary sewer facilities.

5. Sugar Grove - A built-up area without public sanitary sewer facilities.

Nimrod Lake:

1. Plainview - A community with a population of 548 but without public sanitary sewer facilities.

2. Built-up areas which have no public sanitary sewers are Kingston, Gilkey, Y-City, Boles, Cedar Creek, Nola, Gravelly, Bluffton, Briggsville, Wing, Rover and Fourche Junction.

Bull Shoals Lake: (Sources located within Arkansas Stateline only)

Small communities without public sanitary sewers are Lowry, Sugar Loaf, Diamond City, Lead Hill, Monarch, Peel, Lakeway, Oakland and Fairview.

In general accelerated eutrophication has come to be recognized as a very important aspect of the overall problem of water quality degradation in the lakes of this country. As more man-made lakes are created it becomes increasingly important to take steps while the lakes are still young to assure that the eutrophication processes are kept as nearly as possible at natural levels. The possible remedial measures that should be considered, therefore, in planning for the further development and use of the reference projects are:

1. Controlling wastewater effluents and runoff from communities and developments around the periphery of the lakes and tributary streams;

2. Incorporating or annexing by purchase, condemnation or other means the entire watersheds into the lake reservation areas in order to prevent further encroachment.

3. Controlling to some extent the use of the lands around the lakes; and

4. Monitoring the progress of the enrichment processes to detect accelerated eutrophication at the earliest possible time.

To implement the last safeguard, pollution control repeat stations may be established in the lakes and downstream of potential pollution sources and problem areas and regular periodic surveys undertaken to determine the extent, if any, of water quality degradation, both chemical, biological or bacteriological.

Bull Shoals Lake was found to contain water of exceptionally good quality in all respects. There are various reasons for this. Primarily, the relatively low degree of development around this lake along with the fact that the Corps of Engineers maintains a sufficiently broad buffer zone around the periphery of the lake protects against widespread encroachment or development near the water's edge.

Nimrod Lake is exposed to sanitary wastewater runoff from the City of Plainview which is located on the north lake shores and has no public sanitary sewers. Water samples obtained at Porter Creek which receives the drainage from this community showed some levels of total coliform bacteria. So did samples obtained at Highway 27 located on the western end of the lake and near the confluence with Fourche La Fave River.

Sampling stations located in Blue Mountain Lake showed similar levels of total coliform bacteria. Like Lake Nimrod this lake is exposed to runoff from unsewered communities located upstream.

Both Blue Mountain and Nimrod Lakes are within the Arkansas River Basin the lower portion of which is still being currently surveyed by this Commission for existing and possible sources of water pollution. The results of this survey upon completion will be available in a report form.

Should additional information which we can furnish be required, please let me know.

Very truly yours,

A. DeGuzman
Engineer

AD:msd

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF:

SWLED-PV

4 April 1973

Mr. Andrew Hulsey, Director
Arkansas Game and Fish Commission
Game and Fish Commission Building
Little Rock, Arkansas 72201

Dear Mr. Hulsey:

We are updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. The purpose of these plans is to serve as guides for the administration and operation of the lakes; to assure preservation of the scenic, biological, historical, and recreational resources of the lake areas; and to assure coordination with interested Federal, State, and local agencies. Information folder maps of Nimrod, Blue Mountain, and Bull Shoals are inclosed for your information and use.

We would appreciate it if you would furnish any information you consider pertinent for a discussion of the game and fish resources of these lakes, and any information you consider beneficial for planning of further development and use of these projects. Also, specific information that should be brought to the attention of the visiting public by use of information centers, signs, or fireside talks would be helpful. This information is needed by 20 April 1973 for our use in coordinating with the architect-engineer firms which are updating the master plans.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

3 Incl
As stated

Arkansas
Game and Fish Commission

LITTLE ROCK, ARKANSAS 72201

April 20, 1973

Mr. Calvin W. Shelton, Acting Chief
Engineering Division
U. S. Army Corps of Engineers
P.O. Box 867
Little Rock, Arkansas 72203

Dear Mr. Shelton:

Receipt is acknowledged of your correspondence of April 4, 1973 as concerns Master Plans for Development and Management of Nimrod, Blue Mountain and Bull Shoals Lakes. You have requested that we furnish information pertinent to management and utilization of game and fisheries resources on these projects as well as suggestions for future use and development.

As you know, coordination between the Corps of Engineers and this Commission has greatly enhanced the fisheries resource potential and related recreational opportunities afforded the public on Blue Mountain Lake. In this respect, we are enclosing for your information and reference, two publications which were prepared by our fisheries biologists in connection with these cooperative management efforts. Also, conducive to optimum production potentials of fisheries resources is the recent manipulation of the water level of Bull Shoals Lake and an ensuing administrative report to the Commission on this activity is also enclosed.

At the present time, our most pressing need, insofar as the fisheries resources of Bull Shoals Lake is concerned, centers around our proposal to rear caged cultures of trout and

catfish in Bull Shoals Lake. Our ability to fulfill management objectives in this respect, of course, is contingent upon the resolution of discordancies between our agency and the Corps of Engineers. Without belaboring the finer points of our position on this matter, I think it will suffice to say that caged culture of trout and catfish, once initiated on Corps of Engineers' reservoirs in Arkansas, will make a terrific contribution to the overall sport fishing potential of the state.

We appreciate the opportunity to comment on your Master Plans for these projects.

Yours very truly,

Andrew H. Hulsey,
Director

AHH:RWB:ac

Enc.

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

4 April 1973

Dr. John A. Harrel
State Health Officer
Arkansas State Department of Health
4815 West Markham Street
Little Rock, Arkansas 72205

Dear Dr. Harrel:

We are updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. The purpose of these plans is to serve as guides for the administration and operation of the lakes; to assure preservation of the scenic, biological, historical, and recreational resources of the lake areas; and to assure coordination with interested Federal, State, and local agencies. Information folders are inclosed for your information and use.

We would appreciate it if you would furnish information that you feel should be considered in planning for the further development and use of these projects. This information will be used in the preparation of a portion of the updated master plan. This information is needed by 30 April 1973 for our use in coordinating with the architect-engineer firms which are preparing the updated master plans.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

3 Incl
As stated

ARKANSAS STATE DEPARTMENT OF HEALTH
LITTLE ROCK

BUREAU
ENVIRONMENTAL ENGINEERING

April 10, 1973

In Reply Refer To

Mr. Calvin W. Shelton
Acting Chief, Engineering Division
Little Rock District, Corps of Engineers
Box 867
Little Rock, Arkansas 72203

Re: Master Plans for Development and Management
Nimrod, Blue Mountain, Bull Shoals Lakes

Dear Mr. Shelton:

Reference is made to your letter dated April 4, 1973, requesting information to be considered in the planning for development and management of the referenced Lakes.

Certain areas of concern to this department which we feel should be included in the plan will be public and semi-public water supplies, sewage and solid waste disposal, vector control, recreational sanitation, and eating establishment sanitation.

This department will be available at any time to coordinate our requirements with the development and management planners.

If we can be of service, please contact us.

Yours truly,

BUREAU OF CONSUMER PROTECTION SERVICES

G. T. Kellogg, P.E.
Director and Chief Engineer

GTK:TAS:cvh

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

2 April 1973

Mr. Norman F. Williams
State Geologist
State Capitol Building
Little Rock, Arkansas 72201

Dear Mr. Williams:

We are updating the Master Plans for Development and Management of Nimrod, Blue Mountain, and Bull Shoals Lakes. The purpose of these plans is to serve as a guide for the administration and operation of the lakes; to assure preservation of the scenic, biological, historical, and recreational resources of the lake area; and to assure coordination with interested Federal, State, and local agencies. Information folders are inclosed for your information and use.

We would appreciate it if you would furnish information concerning any unusual geological history of formations which should be considered in planning for the further development and management of these projects. Also, any information which should be brought to the attention of visitors to the lakes through the use of informative signs or fireside talks would be helpful. This information is needed by 20 April 1973 for our use in coordinating with the architect-engineer firms that are preparing the updated master plans.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

3 Incl
As stated

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

3 May 1973

Mr. Eugene Horton, Project Planner
Department of Community Affairs
500 Jefferson Building
Jefferson City, Missouri 65101

Dear Mr. Horton:

In a letter dated 3 April 1973, Mr. Clifford L. Summers of the Missouri Water Resources Board was requested to furnish information for our use in updating the Master Plan for Development and Management of Bull Shoals Lake. Mr. Summers in a letter dated 16 April 1973 advised us that you had information available which identifies environmentally sensitive or critical areas, which should be considered in planning for the further development of Bull Shoals Lake.

It would be most helpful if you would furnish this information for our use in updating the master plan. Receipt of this information by 25 May 1973 will aid in the timely completion of the master plan.

Sincerely yours,

/S/
D. R. RIPPEY
Chief, Engineering Division

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

3 May 1973

Mrs. William Holmes
State Historical Survey & Planning Office
Columbia Professional Building
909 University Avenue
Columbia, Missouri 65201

Dear Mrs. Holmes:

In a letter dated 3 April 1973, Mr. Clifford L. Summers of the Missouri Water Resources Board was requested to furnish information for our use in updating the Master Plan for Development and Management of Bull Shoals Lake. Mr. Summers in a letter dated 16 April 1973, advised us tnat you had inventories of identified historical and archaeological sites in the area which should be considered in planning for the further development of Bull Shoals Lake.

It would be most helpful if you would furnish this information for our use in updating the master plan. Receipt of this information by 25 May 1973 will aid in the timely completion of the master plan.

Sincerely yours,

/S/

D. R. RIPPEY
Chief, Engineering Division

MISSOURI STATE PARK BOARD
State Historical Survey and Planning Office • 909 University Avenue
Suite 215 • Columbia Professional Bldg. • Columbia, Mo. 65201 • 314 449 0725

May 29, 1973

Mr. D. R. Rippey
Chief, Engineering Division
Department of the Army
Little Rock District
Corps of Engineers
P. O. Box 867
Little Rock, Arkansas 72203

Dear Mr. Rippey:

RE: SWLED-PV, your letter of May 3, 1973, Bull Shoals Lake

There are no historic or archaeological sites enrolled on the National Register of Historic Places in the Bull Shoals Lake area. Some archaeological research has been conducted in this area and the following sources should be consulted for specific information:

1. Howard, Lynn E.
   1951 Archaeological Survey in the Bull Shoals Region of Arkansas. Missouri Archaeologist, Vol. 13, No. 1.

2. Anonymous
   1948 Report on the survey of the Bull Shoals Reservoir in Ozark County. The Missouri Archaeological Society Newsletter, #19, pp. 1-2.

3. 1949 Bull Shoals salvage operation, March 24-27, 1947. The Missouri Archaeological Society Newsletter, #28, pp. 3-4.

4. The Archaeological Survey of Missouri. Contact the Director at Room 22, Switzler Hall, University of Missouri, Columbia, Missouri 65201.

We understand the site of Theodosia Mill is now under water at Theodosia in Ozark County. Another mill in the vicinity of the lake is the Hammond Mill on Little North Fork River. For your information we are enclosing the list of inventoried historic sites in Taney and Ozark counties. Our information is incomplete because a thorough historic survey of the area has not been made.

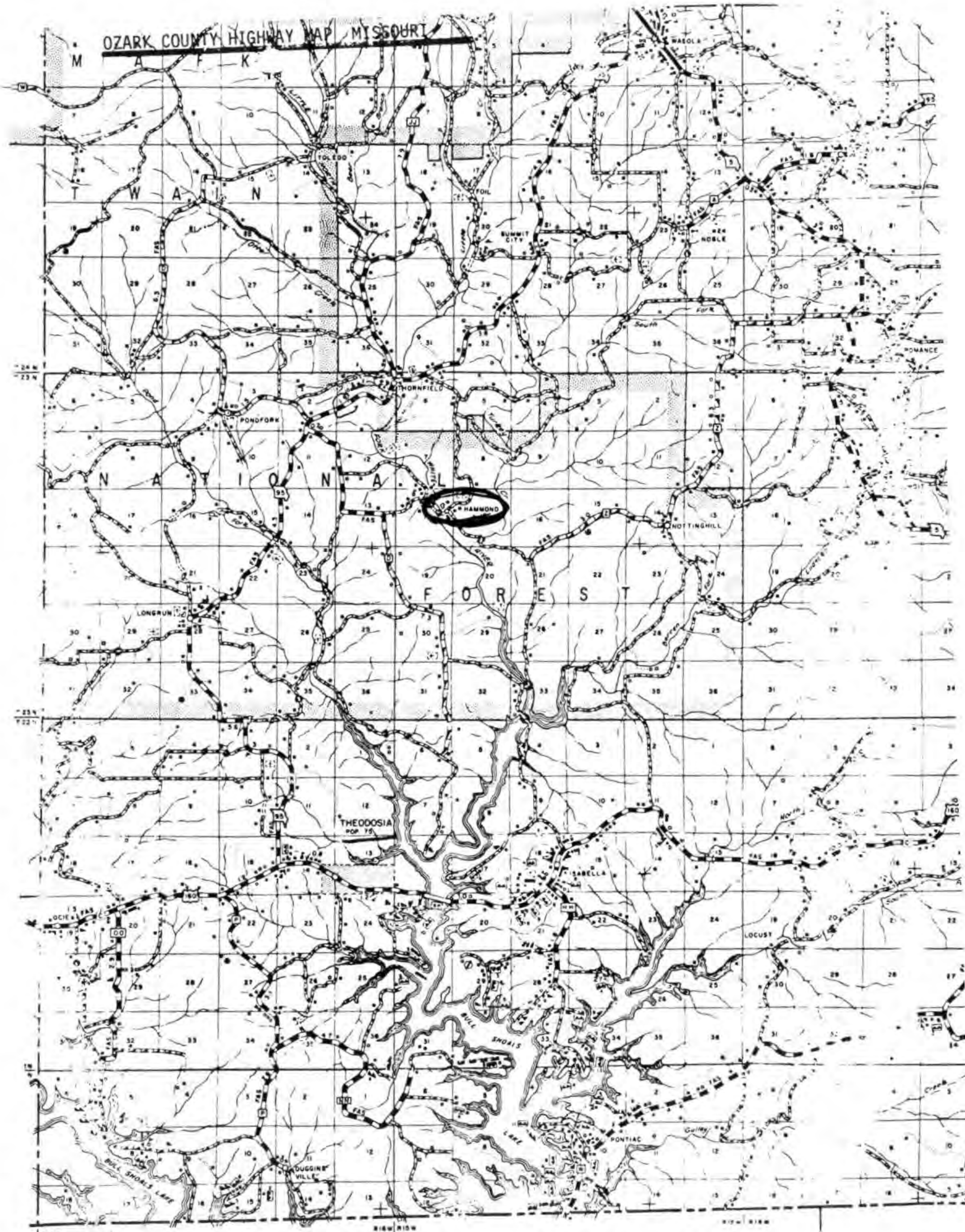
Sincerely,

STATE HISTORICAL SURVEY AND PLANNING OFFICE

M. Patricia Holmes

(Mrs.) M. Patricia Holmes
Chief Architectural Historian

MPH/djm


OZARK COUNTY HIGHWAY MAP MISSOURI
M A R K
T W A I N
N A T I O N A L
F O R E S T
WASOLA
TOLEDO
FOIL
SUMMIT CITY
NOBLE
ROMANCE
HORNFIELD
PONDFORK
HAMMOND
NOTTINGHILL
LONGRUN
THEODOSIA
POP. 75
ISABELLA
LOCUST
BULL SHOALS LAKE
PONTIAC
DUGGINSVILLE

COUNTY

OZARK: PUBLIC BUILDINGS AND SITES

MARKERS, MONUMENTS, AND MEMORIALS

NAME	DATE	LOCATION
* HAMMOND MILL	1900	THORNFIELD AREA
ZANONI MILL	1905	GAINESVILLE AREA
DAWT MILL	1900	TECUMSEH AREA
HODGSON MILL	1897	SYCAMORE
ROCKBRIDGE MILL		ROCKBRIDGE

* According to our inventory, this is the only historic site that may be located within or near the described project area.

COUNTY

TANEY: PUBLIC BUILDINGS AND SITES

HOUSES

NAME	DATE	LOCATION
WILDERNESS CHURCH OF THE OZARKS	1880's	REEDS SPRING AREA
WASH GIBBS FREE MUSEUM		
OLD MATT'S CABIN (J.K. ROSS)	1884	BRANSON AREA
SHEPHERD OF THE HILLS MUSEUM		
SCHOOL OF THE OZARKS		

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

3 April 1973

Mr. Clifford L. Summers, Executive Director
Water Resources Board
Post Office Box 271
Jefferson City, Missouri 65101

Dear Mr. Summers:

We are updating the Master Plan for Development and Management of Bull Shoals Lake. The purpose of this plan will be to serve as a guide for the administration and operation of the lake; to assure preservation of the scenic, biological, historical, and recreational resources of the lake area; and to assure coordination with interested Federal, State, and local agencies. A Bull Shoals information folder is inclosed for your information and use.

It would be helpful if you would furnish any information of historical, archeological, recreational, or other environmental significance, which should be considered in planning the further development and use of the Bull Shoals project. Also, additional information you consider pertinent to a discussion of project resources would be helpful. This information is needed by 20 April 1973 for our use in coordinating with the architect-engineer firm which is updating the master plan.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

1 Incl
As stated

THE STATE OF MISSOURI

Water Resources Board

Department of Business and Administration
JEFFERSON CITY, MISSOURI 65101

CLIFFORD L. SUMMERS
Acting Executive Director

P. O. Box 271
Area Code 314
Telephone ~~635-9254~~
751-4252

April 16, 1973

Mr. Calvin W. Shelton
Acting Chief, Engineering Division
Little Rock District, Corps of Engineers
Post Office Box 867
Little Rock, Arkansas 72203

Dear Mr. Shelton:

This is in reply to your letter of April 3 requesting assistance in obtaining information useful in the preparation of the Master Plan for Development and Management of Bull Shoals Lake.

Much of the information available in the State of Missouri has been provided through comments on the Forestry Management Plan and the recent environmental impact statement for the operation of the facility.

In addition, inventories of identified historic and archaeological sites in the area may be obtained from the State Historical Survey & Planning Office, Columbia Professional Building, 909 University Avenue, Columbia, Missouri 65201. Mr. Eugene Horton, Project Planner, Department of Community Affairs is identifying and locating environmentally sensitive/critical areas as an initial step in the preparation of a state land use plan. It is our understanding that he had fairly complete information on the Table Rock-Bull Shoals area in Missouri. It is suggested that your consultants contact the above agencies for any recent information that has been assembled.

Sincerely,

Clifford L. Summers

Clifford L. Summers
Acting Executive Director

CC: Mr. Eugene Horton
Mrs. William Holmes

DEPARTMENT OF THE ARMY
LITTLE ROCK DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 867
LITTLE ROCK, ARKANSAS 72203

REPLY TO
ATTENTION OF

SWLED-PV

4 April 1973

Honorable Bill Dickerson
Mayor of Mountain Home
Mountain Home, Arkansas 72653

Dear Mayor Dickerson:

We are updating the Master Plan for Development and Management of Bull Shoals Lake. The purpose of this plan will be to serve as a guide for the administration and operation of the lake; to assure preservation of the scenic, biological, historical, and recreational resources of the lake area, and to assure coordination with interested Federal, State, and local agencies. A Bull Shoals information folder is inclosed for your use.

It would be helpful if you would furnish any information you consider pertinent to planning for the further development and use of Bull Shoals Lake. This information is needed by 20 April 1973 for our use in coordinating with the architect-engineer firm which is updating the master plan.

Sincerely yours,

/S/

CALVIN W. SHELTON
Acting Chief, Engineering Division

1 Incl
As stated

Same letter to: Mayor Charles Hogle, Bull Shoals, Arkansas 72619
Mayor Lloyd Pumphrey, Lead Hill, Arkansas 72644
Mayor William M. Westfall, Diamond City, Arkansas 72644
Mayor John Luna, Gainsville, Missouri 65655

SECTION VII

PHYSICAL PLAN OF DEVELOPMENT

7-01. Allocation of project lands and waters. A plan for allocation of project land was formulated in accordance with categories as set forth in ER 1120-2-400 dated 1 November 1971. (See Plates 8-21.) These categories are defined and their application discussed below:

a. Project operations. As of 30 June 1974 there were a total of 101,195.76 acres of land in fee and easement in the Bull Shoals project. Of these lands there were 45,440 acres below the top of conservation pool elevation 654 m.s.l. Above elevation 654 there are ~~9,505~~ 8,505 acres of land allocated for recreation-intensive use in existing and proposed parks. Also, a total of 22,718 acres are licensed to the states of Arkansas and Missouri for the purpose of fish and wildlife management. An area of 75 acres is used for administrative purposes adjacent to the dam and appurtenant works. The remaining lands have been allocated for recreation low density and natural areas.

b. Operations: recreation-intensive use. Recreation-intensive use areas are those which are allocated for development of parks for intensive recreational activities. Development may include concession and quasi-public facilities. Agricultural uses are permitted on an interim basis only.

Because high intensity use sites are those which will experience the greatest use throughout the project, and which will be the most highly developed, particular attention was given to formulating criteria to assure that these areas would be appropriate for their defined uses. The following criteria were utilized:

(1) Acreage should be adequate for development and future expansion.

(2) Areas should be dispersed throughout the project to spread the visitor load and avoid overuse and congestion on some parts of the lake.

(3) Vegetation and soils should be capable of supporting intensive use with the proper management.

(4) Topography should be appropriate for development of water-related recreation facilities.

(5) Development should be possible without extensive site modification.

(6) Areas should not be subject to rapid dewatering.

Twenty-four partially developed parks comprise the existing areas allocated to recreation-intensive use. Table 18 lists these parks with their locations, acreages (including undeveloped land), and administering agencies. (For further description, see Section 4-07.)

TABLE 18
EXISTING INTENSIVE USE PARKS
BULL SHOALS LAKE
SEPTEMBER 1973

SITE	ADMINISTERING AGENCY	LOCATION				SIZE (ACRES)
		SECTIONS	TOWNSHIP	RANGE	COUNTY AND STATE	
Beaver Creek	Corps	33 & 34	23N	19W	Taney Co., Missouri	65
		13 & 24	23N	20W		
Buck Creek	Corps	21 & 22	21N	17W	Marion Co., Arkansas	68
Bull Shoals	Corps	17 & 18	20N	15W	Marion Co., Arkansas	37
Dam Site	Corps	16,17,20 & 21	20N	15W	Marion Co., Arkansas	230
Highway K	Corps	27,28, & 34	23N	20W	Taney Co., Missouri	47
Highway 125	Corps	3,4,9, & 10	21N	17W	Marion Co., Arkansas	303
Kissee Mills	Corps	14,15, & 22	23N	19W	Taney Co., Missouri	205
Lakeview	Corps	25,26,35, & 36	20N	15W	Baxter Co., Arkansas	186
Lead Hill	Corps	17 & 18	21N	18W	Boone Co., Arkansas	77
Lowry	Corps	13	21N	20W	Boone Co., Arkansas	183
		7 & 18	21N	19W		
Oakland	Corps	6	20N	15W	Marion Co., Arkansas	76
Ozark Isle	Corps	6 & 7	20N	15W	Marion Co., Arkansas	830
		1 & 12	20N	16W		
		36	21N	16W		
Point Return	Corps	9 & 10	20N	15W	Marion Co., Arkansas	38

TABLE 18 (Con't)

SITE	ADMINISTERING AGENCY	LOCATION				SIZE (ACRES)
		SECTIONS	TOWNSHIP	RANGE	COUNTY AND STATE	
Pontiac	Corps	9,10,15, & 16	21N	15W	Ozark Co., Missouri	85
River Run	Corps	4,5, & 8	23N	20W	Taney Co., Missouri	164
		33	24N	20W		
Spring Creek	Corps	3,4, & 9	21N	15W	Ozark Co., Missouri	372
		33 & 34	22N	15W		
Theodosia	Corps	24	22N	16W	Ozark Co., Missouri	170
		18,19, & 30	22N	15W		
Tucker Hollow	Corps	9,16, & 17	21N	19W	Boone Co., Arkansas	80
Woodard	Corps	33 & 34	23N	20W	Taney Co., Arkansas	50
Bull Shoals City Park	City of Bull Shoals, Ark.	20 & 21	20N	15W	Marion Co., Arkansas	67
City of Lead Hill Park	City of Lead Hill, Ark.	4 & 5	20N	18W	Boone Co., Arkansas	15
Shadow Rock	City of Forsyth, Missouri	33 & 34	24N	20W	Taney Co., Missouri	54
Shoal Creek	Taney Co.,Mo. Soil & Water Conservation Distr. Comm.	5 & 8	21N	17W	Taney Co., Missouri	18
Bull Shoals State Park	State of Ark.	33,34, & 35	20N	15W	Baxter Co., Arkansas	725
		3 & 4	19N	15W		
		20 & 21	20N	15W	Marion Co., Arkansas	
					TOTAL	4145

In addition to parks now existing, twenty-one sites containing approximately 4,360 acres were allocated to recreation-intensive use for future park development. The names, locations, and acreages of these sites are listed in Table 19. The sites are further described in the following paragraphs.

Big Bend Park (See Plate 9.) Big Bend is located on the south shore of the lake, on the tip of a large peninsula, at the confluence of the lake and Little North Fork River, about 15 miles northeast of Lakeway, Arkansas. The area is approximately 200 acres in size when the lake is at conservation pool elevation. It is accessible from a graded road which connects to a gravel road north of Midway, Arkansas. Gentle, sparsely vegetated slopes on the lakeshore surround a nearly level, forested central area. In terms of future development, this site is suitable for camping, picnicking, boat launching, beach, and marina development. At present there is no residential development on the project boundaries; minimal residential development has taken place in areas visible from the shoreline of this site. The scenic qualities of the site are thus enhanced by the lack of visible encroachment from any vantage point within the area. Because the site lies on a portion of Bull Shoals Lake which is relatively large, congestion of boats on this part of the lake would not be a problem.

Boone Point Park (See Plate 17.) This future park lies at the end of a large peninsula about eight miles south of Cedar Creek, Missouri. It contains approximately 195 acres above the top of the conservation pool. Access can be gained from Missouri Highway M. The site slopes gently south and southeast to the lake, and is well-forested. Boone Point is suitable for camping, picnicking, and water access facility development. No encroachment of residential development is now present. Some development across the lake is visible; however, for the most part the visual impact of this development would not constitute a serious problem in terms of scenic quality. Scenic hiking trails now proposed for development along the shoreline leading from the park site would provide additional opportunities for recreation for the visitor.

Cedar Creek Park (See Plate 21.) This site lies on the Cedar Creek arm of Bull Shoals Lake, about four miles southwest of Hilda, Missouri. It consists of approximately 170 acres above conservation pool elevation. Access is via Missouri Highwayy OO from Missouri Highway M. The park slopes gently to Cedar Creek on the south and steeply to Bull Shoals Lake on the west. The site is well-forested. The Beaver Creek Park, which is relatively close, is heavily used in February and March during the white bass run; therefore, it can be assumed that the Cedar Creek Park would experience a similar use pattern. Facilities should be provided for camping, picnicking, and water access.

TABLE 19
PROPOSED INTENSIVE USE PARKS
BULL SHOALS LAKE

SITE	LOCATION				APPROXIMATE SIZE (ACRES)
	SECTION	TOWNSHIP	RANGE	COUNTY AND STATE	
Big Bend	21 & 22	21N	16W	Marion Co., Arkansas	200
Boone Point	23,26, & 27	21N	19W	Boone Co., Arkansas	195
Cedar Creek	2 & 3	22N	19W	Taney Co., Missouri	170
	34 & 35	23N	19W		
Eagle's Nest	24	20N	16W	Marion Co., Arkansas	50
Elbow	15,16,21, & 22	21N	18W	Boone Co., Arkansas	155
	10,11,14, & 15	21N	18W	Taney Co., Missouri	
Fairview	25	20N	16W	Marion Co., Arkansas	70
Group Use	9, 16 & 17	20N	15W	Marion Co., Arkansas	165
Gulley Spring	32	21N	15W	Marion Co., Arkansas	35
Horseshoe Bend	7,17, & 18	21N	18W	Taney Co., Missouri	615
	12	21N	19W	Taney Co., Missouri	
	2,3, & 11	21N	19W	Boone Co., Arkansas	
Indian Point	29,30, & 31	21N	15W	Marion Co., Arkansas	400
Jimmie Creek Island	7 & 18	20N	15W	Marion Co., Arkansas	270
	12 & 13	20N	16W		
Little Fool Creek	23 & 24	21N	17W	Marion Co., Arkansas	675
	24	21N	16W		

TABLE 19 (Con't)

SITE	LOCATION				APPROXIMATE SIZE (ACRES)
	SECTION(S)	TOWNSHIP	RANGE	COUNTY AND STATE	
Mariner's Island	7	20N	15W	Marion Co., Arkansas	25
	12 & 13	20N	16W		
McVey	8 & 9	21N	16W	Ozark Co., Missouri	200
Music Creek	1 & 12	20N	17W	Marion Co., Arkansas	325
Noe Creek	14,15,22, & 23	20N	15W	Marion Co., Arkansas	80
Red Wolf	1	21N	16W	Ozark Co., Missouri	50
	6	21N	17W	Taney Co., Missouri	
Risley Hollow	17 & 18	21N	17W	Taney Co., Missouri	60
	13	21N	17W	Boone Co., Arkansas	
Sister Creek	2,3,10, & 11	20N	15W	Marion Co., Arkansas	480
Sugarloaf	7 & 8	21N	18W	Boone Co., Arkansas	50
Yocum Creek	4	21N	19W	Taney Co., Missouri	90
	25	22N	20W		
				TOTAL	4360

Eagle's Nest Park (See Plate 8.) Eagle's Nest is located approximately two miles southwest of Bull Shoals, Arkansas, and is accessible by a light-duty road off Arkansas State Highway 178. It contains 50 acres when the lake is at elevation 654. The area is relatively level in the central portion and slopes fairly steeply to the lake on the north, west, and east. Forest cover is extensive. Camping, water access, and day use facilities at the site will serve to spread the visitor load more evenly among the parks located in the general vicinity of the dam.

Elbow Park (See Plates 16 & 17) The Elbow site is situated on the Elbow Creek arm of the lake, southwest of Protem, Missouri. It contains about 155 acres above the conservation pool. Access to the area is provided by about four miles of gravel road leading from Protem. The site contains a large level area with bluffs on the west side and is well-forested. The Elbow site offers an excellent opportunity for the development of a major park. The area contains a large amount of developable land and has excellent scenic qualities. Additionally, the site has a good water relationship and would be appropriate for extensive development of marina and boat launch facilities.

Fairview Park (See Plate 8.) The Fairview site is situated northwest of Fairview, Arkansas, and contains 70 acres. Access is provided by a light-duty road, approximately one and one-half miles long, leading from the town of Fairview, Arkansas. The site is a peninsula characterized by level to gently rolling topography and moderate forest cover. Fairview, as Eagle's Nest, should be developed as a park to provide additional camping and day use facilities to serve the demand concentrated in the dam area.

Group Use Park (See Plate 9.) The site is located in Sections 9, 16, and 17, Township 20N, Range 15W, in Marion County, Arkansas. It is situated on the north shore of the lake at the mouth of Sister Creek, about four miles southwest of Oakland, Arkansas. Access is provided by a secondary road south off Arkansas State Highway 202. Rolling forested hills with ample flat areas on the crests make this site an excellent location for facility development. There are about 165 acres above conservation pool.

Gulley Spring Park (See Plate 9.) This site is located on the east side of the lake, approximately two miles west of Oakland, Arkansas. It is approximately 35 acres in size when the lake is at conservation pool elevation. Access is gained from a secondary road from Oakland, Arkansas. The site is well-vegetated and contains a flat central area with rolling slopes on the west, southwest, and northwest sides. When all proposed future parks are developed, this site, because it is directly east of the Indian Point Park, would not have a particularly scenic view. Its principal function would be to provide additional water access for the eastern portion of Bull Shoals Lake. In view of the development

which will take place on the Indian Point Park, and which is taking place at Ozark Isle and Oakland, which are also relatively close, Gulley Spring would be developed to provide supplementary camping and water access facilities for those visitors who did not desire to utilize the more intensively developed parks.

Horseshoe Bend Park (See Plate 17.) This site is located approximately eight miles northwest of Lead Hill, Arkansas. It contains 615 acres above conservation pool. Access is by way of a secondary road from Arkansas State Highway 14. Steep slopes characterize the peninsula, and gentle slopes the remainder of the site. The site has a northern aspect and is extensively forested. Horseshoe Bend is a very large site offering excellent opportunities for the development of intensive water-related facilities such as beaches, boat launching ramps, and marinas.

Indian Point Park (See Plate 9.) This future park site is located on a long peninsula near the mouth of the Little North Fork River, three miles south of Pontiac, Missouri. The land area contained in the site consists of 500 acres when the lake is at conservation pool elevation. A road south from Pontiac provides access. The site contains a large level area in its center with moderate slopes to the lakeshore. Vegetation is moderate to heavy over most of the site with the exception of the sparsely vegetated northern portion. The Indian Point site is a very desirable site in terms of development of a major park. The area could accommodate a large number of camping units, beaches, and water access facilities; and control would be efficient because of its peninsular configuration.

Jimmie Creek Island Park (See Plate 8.) Jimmie Creek Island is located about one and one-half miles west of the city of Bull Shoals, Arkansas, and is 270 acres in size when the lake is at elevation 654. It is accessible via a ten-mile gravel road north off Arkansas State Highway 14, four miles north of Summit, Arkansas. The southern portion of the area is characterized by gently rolling to level terrain, whereas the northern portion slopes steeply to the lakeshore. The site is extensively forested. Because of its attractive scenic qualities, this site has the potential for development of a very desirable park, providing a high quality recreation experience. It is proposed that this park be planned so that camping units and other facilities be placed to utilize the aesthetic qualities to their best advantage, with a minimum of environmental alteration. A possibility which may be considered, in view of the island configuration of the northern portion of the site, is the utilization of this land for walk-in camping, or a system of self-guiding interpretive trails. A trail system would provide an additional recreation activity for visitors utilizing camping or other facilities in the main part of the site, and the island would lend itself very well to this type of development.

Little Fool Creek Park (See Plate 14.) This site is located on the west side of the lake, approximately three miles north of Pool, Arkansas. It is approximately 675 acres in size when the lake is at conservation pool elevation. Access to the site is by way of a secondary road from Arkansas State Highway 125. Slopes on the site are moderately steep, with bluffs on the northern edge. Tree cover is extensive. The Little Fool Creek Site will be a major site for recreation development. An attribute of this park is that the principal view is of Jones Point Management Area to the east and south. Because no intensive development will occur in this area as long as it is licensed for wildlife management purposes, the possibility that the view will be despoiled is negligible. Two large coves on the Little Fool Creek site which offer protection from wind and wave action will be considered for concessionnaire marina facilities.

Mariner's Island Park (See Plate 9.) Mariner's Island is located south of Ozark Isle Park, and west of the southern tip of the peninsula where the Dry Run Homesites are located. Its size is 25 acres and it has no automobile access. The elevation at the highest point of the island is 724 m.s.l. Slopes are relatively gentle, and forest cover is sparse. Because this site is close to Ozark Isle Park in terms of boating distance, future uses which may be considered are boat-in camping and picnicking.

McVey Park (See Plate 13.) This future park site lies on the south side of the McVey Hollow arm of the lake, about nine miles southwest of Theodosia, Missouri. It contains about 200 acres above conservation pool. A 2.5 mile gravel road from Missouri Highway P provides access. The site is relatively level with moderate slopes to the north and south. The northern portion of the site has moderate tree cover, whereas the tree cover on the south and central portions of the site is sparse. The McVey site will provide water access to this arm of the lake, along with the Red Wolf future park site. The site provides a great deal of lake frontage, and therefore lends itself well to provision of beach, boat launching, and marina facilities. Ample space is available to provide camping and picnicking units, most of which will have an excellent water relationship.

Music Creek Park (See Plate 14.) This future park site is located approximately 11 miles north of Summit, Arkansas, and comprises 127~~325~~ acres. A four-mile long gravel road west from Midway, Arkansas, provides access. The topography of the site is gently rolling in the center with fairly steep slopes to the lake on the west and southwest. Forest cover is extensive.

This site is located on an arm of the lake rather than on a major part of the lake. At present, there is no development in the surrounding area. Because of its relative isolation and excellent forest cover, the site lends itself well to the development of camping units for visitors preferring to be somewhat removed from sight or sound of other activity. Water access would be provided, but major emphasis would be on providing camping opportunities in a relatively secluded atmosphere.

Noe Creek Park (See Plate 9.) The Noe Creek site is a peninsula situated two miles northwest of Lakeview, Arkansas. It is 80 acres in size. Access is available from a gravel road off Arkansas State Highway 202, about five miles south of Oakland, Arkansas. The terrain is gently rolling, and the site is moderately well-forested. Noe Creek is the only future park serving the northern portion of the lakeshore in the general vicinity of the dam. It will be developed accordingly, with camping, picnicking, and water access facilities, to balance the public facilities in the area.

Red Wolf Park (See Plate 13.) This site is located on the Big Creek arm of the lake approximately five miles due east of Protem, Missouri. It contains approximately 50 acres when the lake is at conservation pool elevation. Gravel roads from U.S. Highway 160 and Missouri Highway U provide access. Slopes are moderate and vegetative cover is sparse. Red Wolf Park will provide access to the shallow water fishing areas of Big Creek and Miller Creek. This will be a convenience for the people in the vicinity of Protem. A limited number of camp sites are proposed.

Risley Hollow Park (See Plate 16.) The Risley Hollow site is located about three miles from the town of Protem, Missouri. It contains 60 acres above the conservation pool. Access is provided by two miles of unimproved and gravel roads from Missouri Highway 125. Slopes are moderate and the area is well-forested. When developed, this park will be the only one for several miles of shoreline which contains camp sites. Proposed development includes camping, picnic, and water-related facilities to serve this part of the lake.

Sister Creek Park (See Plate 9.) The Sister Creek site is located roughly four miles northwest of Lakeview, Arkansas, on the north shore of the Sister Creek arm of the lake. It is served by a light-duty road diverging from Arkansas State Highway 202, two miles south of Oakland, Arkansas. The site contains 480 acres; it slopes steeply to the lake from the centers of three peninsular land segments created by the arms of Sister Creek. The amount of forest cover varies from sparse to moderate. The long shoreline of this site provides opportunities to situate many of the camp sites and picnic sites within view of the water. The large size of the park will provide the opportunity for development of a major public use park.

Sugarloaf Park (See Plate 17.) This site is located approximately seven miles northwest of Lead Hill, Arkansas, and contains approximately 50 acres. Access is provided by a secondary road off Arkansas State Highway 14. The site slopes steeply to the southeast and gently to the east, and is well forested. The site will provide additional water access facilities and camping units to supplement those at the Elbow site and Lead Hill Park. These areas provide access to a large area of Bull Shoals Lake.

Yocum Creek Park (See Plate ~~12.~~ 19) This 90-acre site is located on the north shore at the western end of the lake at the confluence of Yocum Creek. It is in Section 4, Township 22N, Range 19W, and Section 25, Township 22N, Range 20W, Taney County, Missouri. The vegetative cover is moderate. The terrain slopes gently to the shoreline. The configuration of the shoreline is divided into four peninsulas, which will provide a natural separation of overnight and day use facilities. Access is by way of a secondary road off Missouri Highway KK. The site is about 5.5 miles southwest of the town of Cedar Creek, Missouri.

c. Operations: recreation-low density use. Lands allocated in this category function as sites for low-density recreation activities and buffer zones. Buffer zones consist of: open space between intensive recreation developments, and, open space between these developments and public or private land which, by virtue of its use, is incompatible with the recreation development and would detract from the quality of public use. Some examples of low density use are: ecological workshops, trails, primitive camping, etc. No agricultural uses are permitted except on an interim basis.

Six criteria were used for allocating lands for low density use:

(1) Areas of sufficient size and character should be provided for activities which, by their nature, are incompatible with intensive use. Examples are primitive camping and nature-related activities.

(2) These areas need not be chosen on the basis of adaptability for development of water-related recreation facilities such as boat docks or ramps.

(3) All areas presently in limited motel/resort leases or licenses[1] should be allocated as low density use areas, with the exception of those

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[1]Leases refer to use agreements between private parties and the Federal Government. Licenses refer to use agreements between public agencies and the Federal Government.

which occur in areas proposed for future parks; these will be shown as recreation-intensive use. The leases or licenses are granted to resort operators for the purpose of furnishing private floating facilities, such as docks, and other services to their clientele.

(4) All areas presently in county road outgrants should be allocated as low density use areas, with the exception of those located at the Theodosia and Highway 125 Parks. When these parks are further developed, the county road outgrants will no longer be needed. These road outgrants were shown as part of the parks, and therefore allocated to recreation-intensive use.

(5) All areas presently leased or licensed for agriculture or grazing purposes should be allocated as low density use areas.

(6) Any areas in the project leased for homesites should be allocated as low density use areas. Only one such area is now in existence. This area is known as Dry Run Homesites and is located on a peninsula south of Ozark Isle Park. Dry Run Homesites contains approximately 73 acres, subdivided into 41 lots to be leased on a long-term basis of 25 years. Ten homes have been completed and three are under construction.

d. Operations: natural area. Natural areas include lands allocated for preservation of scientific, ecological, historical, archaeological, and visual values; lands managed to protect rare and endangered species of flora and fauna; and narrow bands of project land between the conservation pool and the project boundary. Natural areas may be entirely undeveloped or may contain limited development such as trails. No trails terminals may be located on lands allocated as natural areas. The primary function of natural area zoning in the Bull Shoals project area is to serve as a buffer to protect visual values. No agricultural uses are permitted.

e. Operations: wildlife management. Wildlife management lands include those allocated as habitat for fish and wildlife, or for propagation of such species. These lands are continuously available for low density recreation activities. Presently, 21,191 acres of Corps land are licensed to the Missouri Conservation Commission, and 1,527 acres to the Arkansas Game and Fish Commission for the purposes of fish and wildlife management.

f. Other.

(1) Historical sites. At the present time, there are no identified historical sites located in the Bull Shoals project area. As stated in Section 3-02, the possibility exists that archaeological sites may be present in the project area; however, until further investigation is possible, the location and significance of these sites are indeterminate.

(2) Interim use. As of 1 January 1974, there were 17,320 acres of land included in 158 leases for the purposes of agriculture and grazing. These leases are subject to periodic review and renewal or cancellation.

7-02. Trails and parks.

a. Trails. Five types of trails are planned for development in the Bull Shoals project area. These are: 1) interpretive trails, 2) connecting trails, 3) hiking trails, 4) equestrian trails, and 5) motorcycle trails. (See Plates 8-21.) These trails total approximately 435 miles. Guidelines for trails are outlined in Section VIII, Facility Load and Other Design Criteria.

(1) Interpretive trails. Interpretive trails are designed to provide an educational experience for visitors through trail programs which may be either self-guiding or conducted by trained personnel. A wide variety of topics and emphases are suitable for interpretive trail programs, ranging from general items of interest to theme programs dealing with special topics such as ecology, geology, or wildlife management.

In planning interpretive trails for the Bull Shoals projects, trail routes, whenever feasible, were located near parks. In some cases, the provision of trails near these areas was not possible because of insufficient space, or the development of incompatible facilities adjacent to the sites. Two trails were provided in wildlife management areas for use by visitors who will travel to the sites by boat.

Eight interpretive trails were included in the project trail plan. Most of these trails are 1.5 to 2 miles in length, and follow a figure-eight pattern, so that visitors are not forced to walk the entire length of the trail if they do not wish. One trail, eight miles in length, is provided in the Jones Point Wildlife Management Area in Arkansas. This trail is intended to offer a different kind of experience to accomodate the visitor who seeks a greater degree of isolation and who is interested in wildlife management practices.

In addition to providing interpretive trails for the average visitor, hard-surfaced and easily negotiable trails located in parks will be provided, which would be suitable for use by the physically limited and the elderly. Because such trails must be chosen only on the basis of a critical field inspection, none were indicated on Land Use Maps. (See Plates 8-21.)

(2) Connecting trails. These trails connect existing intensive use parks to each other and range from one to sixteen miles in length. (Other trails located between use areas and longer than sixteen miles were placed in the hiking trail category described in (3) below.) Rain shelters will be provided at intervals on connecting trails.

(3) Hiking trails. These trails range from 16-80 miles in length, and were located, insofar as possible, on portions of the shoreline which were relatively undeveloped in terms of private floating facilities and adjacent residences. Trail terminals or points of entrance to the trails were indicated where existing roads provided access. Rain shelters will be provided at intervals along hiking trails.

(4) Equestrian trails. One 15-mile equestrian trail system is proposed. (See Plates 11 and 12.) Separate access was provided to prevent conflict between trail riders and park visitors and to prevent congestion of parks with parked vehicles and horse trailers. The equestrian trail system is located on the North Fork of the lake. This site was chosen because private property adjacent to this part of the shoreline is minimally developed in homesites and resort facilities. Equestrian trails along major portions of the lakeshore would be undesirable, because lakeshore property owned by the Corps of Engineers is frequently adjacent to highly developed and populated areas. A more secluded trail would provide a more satisfactory experience for the trail rider and would also avoid conflict between trail riders, homeowners, and resort visitors. In addition, the proposed location for the trail system contains sufficient space for the development of trails which follow a loop pattern rather than a linear pattern.

(5) Motorcycle trails. Approximately 40 miles of motorcycle trails are shown for future ad hoc consideration. Access points to these trails will be located near high-intensity use areas so that trail use can be monitored and controlled by project personnel. No separate access to motorcycle trails will be provided.

The motorcycle trails will be located in arms of the lake, rather than on the shoreline of the main body of the lake, to remove them from residential development and to reduce the problem of noise nuisance. The trails will be routed through wooded areas as much as possible to further muffle sound and to provide variety and interest for the motorcycle rider. One-quarter mile access trails from adjacent parks will route users to the point where the trails begin. (This distance is recommended by the Motorcycle Industry Council as a minimum distance for a buffer zone.)

Each trail will consist of a loop containing crossovers at various points so that users will not have to travel the entire length of the trail, but can traverse a distance satisfactory to them.

The trails will serve minibikes and trail bikes. Regulations will be necessary to assure that all motorcycles using the trails have appropriate equipment, such as mufflers and spark arresters.

Possible trail locations are shown in recreation low density areas and will be planned for development only subsequent to public hearings, and when a public need has been expressed. The final establishment of motorcycle trails will be in accordance with ER 1130-2-405 dated 17 January 1974, subject "Use of Off-Road Vehicles on Civil Works Projects."

b. Park plans. This design memorandum contains revised site plans for 19 existing parks: Beaver Creek, Buck Creek, Bull Shoals, Dam Site, Highway K, Highway 125, Kissee Mills, Lakeview, Lead Hill, Lowry, Oakland-Ozark Isle, Point Return, Pontiac, River Run, Shadow Rock, Spring Creek, Theodosia, Tucker Hollow, and Woodard. A site plan is proposed for one new park which will be provided for group use.

The park plans include proposals for development of new facilities, conversion of certain existing facilities (i.e., picnic units to camp units and convertible vault toilets to waterborne toilets), and the removal of some existing facilities, such as roads and picnic units. The summary presented in Table 20 represents the end product of park development, taking into consideration the above factors. Because the facilities planned for the new Group Use Park are different in nature from the other parks, the proposed development of this park is discussed in greater detail in this section.

Plates 22 through 42A in this design memorandum contain park designs and aerial photomaps of all of the Corps parks as well as Shadow Rock Park and Bull Shoals State Park. Cost estimates for all Corps park site development are contained in Tables 22 through 45.

The overall development concept for the park design in the Bull Shoals project was based on four principal objectives: improved visitor control, separation of uses, efficient internal circulation, and the provision of additional or improved facilities to meet user demand and the federal requirements under Public Law 93-81.

(1) Improved visitor control. Entrance complexes were included in park designs based on the extent of proposed development of the park and its anticipated visitor usage. The entrance complexes provide the following facilities: a shelter for project personnel manning the entrance, a gate to be closed at specified hours to discourage unauthorized persons from entering parks, a small orientation parking area, a holding area outside the gate to provide temporary parking for campers arriving after hours or waiting for an available space, an information board, and restrooms. In addition to providing overall control for the parks, entrance complexes would function as information dissemination centers for incoming visitors and as fee collection points.

TABLE 20
SUMMARY OF COMPLETE DEVELOPMENT BY SITE*
BULL SHOALS LAKE

Site	Picnic Units	Group Picnic Shelters	Camp Units**	Swimming Beach (Lin. Ft. Shoreline)	Boat Launching Lanes	Camp Wash Houses	Change Houses	Toilets*** (Type) V	WB	WB/S	Trailer Dump Stations
Beaver Creek	27	1	232	50	3	3	1	5	1	3	1
Buck Creek	15	-	99	50	5	1	1	3	1	2	1
Bull Shoals	-	-	31	-	3	-	-	2	-	-	1
Bull Shoals State Park	30	1	100	300	1	-	-	-	-	2	1
Dam Site	16	1	131	-	2	2	-	4	2	2	2
Group Use	-	2	-	100	-	2	-	1	1	-	-
Highway K	9	1	53	-	3	1	-	3	2	1	1
Highway 125	6	-	188	150	4	3	2	4	6	2	1
Kissee Mills	27	-	15	100	1	-	1	2	-	-	-
Lakeview	5	2	115	100	4	2	1	6	2	-	2
Lead Hill	23	2	66	100	4	-	2	4	-	-	1

* This total includes walk-in primitive camp units. The numbers of walk-in units at each of these parks are as follows: Bull Shoals Dam-7; Highway 125-12; Lakeview-19; Tucker Hollow-11, and Lowry-3.
** This does not include administrative facilities and dorms at Group Use Park.
*** Vault Toilet (V), Waterborne Toilet (WB), Waterborne Toilet with Showers (WB/S).

TABLE 20 (Con't)

Site	Picnic Units	Group Picnic Shelters	Camp Units**	Swimming Beach (Lin. Ft. Shoreline)	Boat Launching Lanes	Camp Wash Houses	Change Houses	Toilets*** (Type) V	WB	WB/S	Trailer Dump Stations
Lowry	27	-	66	100	2	1	2	1	1	1	1
Oakland	8	1	14	50	2	-	-	1	-	1	-
Ozark Isle	26	1	84	50	2	-	2	1	2	-	1
Point Return	14	1	37	50	3	1	1	2	-	-	1
Pontiac	14	-	47	100	3	1	1	1	1	2	1
River Run	10	1	88	-	3	-	-	1	-	-	1
Shadow Rock	24	-	39	-	1	1+	-	3	-	-	-
Spring Creek	24	1	118	100	4	2	2	2	4	2	1
Theodosia	5	2	67	100	5	1	2	2	2	1	1
Tucker Hollow	2	-	136	50	2	2	1	2	4	1	2
Woodard	8	-	42	50	1	1	1	1	2	-	1
TOTAL	320	17	1768	1600	56	24	22	51	31	20	21

+ Shower Building

(2) Separation of uses. Whenever possible, day use and camping areas were physically separated to prevent conflict between the different types of users, and to facilitate the control function discussed above.

Presently many of the units designated for picnicking are being used by campers. The revised site plans contained in this design memorandum, when implemented, will effect a distinct separation of picnic and camping use.

(3) Efficient internal circulation. Circulation patterns within parks were designed to reduce safety hazards and to facilitate the objective of separation of uses by routing visitors to the proper activity areas as efficiently as possible. Existing circulation patterns for parks in operation were studied and when necessary, changes in current roadways proposed.

(4) Additional and/or improved facilities. A study of design standards based on the visitor use capacities of recreation facilities (EM 1110-2-400) as related to current visitation records showed that additional facilities were needed to more effectively accommodate present user demand, and also to provide adequate facilities for anticipated future demand. Further, under Public Law 93-81 (See Section 8-01), to justify fee systems for public use of recreation facilities, a generally higher degree of development is required than now exists in project parks. Although the provision of these required facilities was not feasible in a few parks because of topographic characteristics, or other limiting factors, the majority of the park designs follow Public Law 93-81.

Other factors were also considered in park design. Through past studies on other Corps projects, it has been determined that approximately 25 percent of campers visiting Bull Shoals and other similar projects are multi-family groups with two or more vehicles. To accommodate this special demand, multi-family camping units were provided, containing two to four spurs each. To accommodate campers traveling in caravans or large groups, some camping loops consisting of a series of clustered camping spurs were also provided.

Development of a plan for the new Group Use Park required a design approach different from that utilized in planning for family-oriented parks. Proposed development was directed primarily at providing a number of semi-autonomous areas within the park so that a number of groups could be accommodated simultaneously while still remaining relatively isolated from each other. In addition, each of these group areas was designed for a different level of facility development, from primitive to fully developed. Thus a visiting group's choice of any of the alternative facilities provided would be determined by the level of outdoor experience which they desired. The alternative facilities included in the park design are discussed below.

Alternative 1. In the northwest portion of the area, a dormitory will be provided for group use. Groups using this dormitory would have the convenience of modern housing and sanitary facilities, and could thus dispense with the necessity for pitching tents and conducting other primarily housekeeping activities which accompany primitive camping. Their time could be utilized in participating in special programs or in the various activities available in the park.

Alternative 2. Two clusters of five cabins each were provided. These cabins could house counselors and youths independently, or could be adapted to accommodate a student group with one counselor per cabin. It is anticipated that the cabins would contain housekeeping facilities, located either in individual cabins, or in one cabin to serve each cabin cluster.

Another possible variation for cabin utilization might be to equip or reserve one cabin in each cluster for a meeting area where such activities as studying biological specimens, making art and craft items, etc. could be conducted.

Alternative 3. Two relatively large areas are provided for primitive tent camping. Camp sites are walk-in sites accessible by hiking trails, and would contain no facilities other than toilets.

Additional facilities are an amphitheatre, two administrative areas, an archery range, two courtesy piers for boat docking, two swimming beaches, hiking and interpretive trails, and two group picnic shelters.

SECTION VIII

FACILITY LOAD AND OTHER DESIGN CRITERIA

8-01. Facility design criteria.

a. General. Criteria applicable to overall facility development planned for Corps parks are contained in the following references:

(1) EM 1110-2-400 dated 1 September 1971, Recreation Planning and Design Criteria.

(2) ER 1110-2-400 dated 1 February 1971, Design of Recreation Sites, Areas and Facilities.

(3) ER 1120-2-400 dated 1 November 1971, Recreation Resources Planning.

(4) ER 1130-2-400 dated 28 May 1971, Recreation Resource Management of Civil Works Water Resource Projects.

(5) ER 1165-2-400 dated 3 August 1970, Recreational Planning, Development, and Management Policies.

(6) Park Practice Design Manual of the National Park Service.

(7) Public Law 93-303, enacted 7 June 1974, which provides for collection of fees at Corps of Engineers parks. (See para. 9-03.)

b. Special considerations. In addition to the general design criteria contained in the references listed above, a number of more specific criteria are applicable to development in the Bull Shoals project.

(1) Construction of masonry waterborne toilets with showers, vehicle sanitary stations, duplex family picnic shelters, and camper washhouses, and conversion of vault type toilets to waterborne, will follow approved plans as shown in Design Memorandum No. 1-D, Updated Master Plan for Development and Management of Norfork Lake dated July 1973.

(2) The precise arrangement of the various elements comprising entrance complexes will be determined according to terrain and the particular requirements of the individual parks. General locations of park entrance complexes are shown on individual park plans. Concept drawings for typical park entrance complexes are included in this updated master plan. (See Plates 44 and 45.)

(3) The types and locations of water supply and sanitation facilities will be determined through coordination with the appropriate agencies of the states of Arkansas and Missouri. Design and operation of these facilities will meet applicable standards established by Federal and State laws.

(4) Designs for dormitory and group camp cabins at the proposed Group Use Park will be developed with the intent of providing facilities to blend esthetically with the site. Approval of new designs will be obtained prior to advertisement for bids.

8-02. Trails criteria.

a. General. Guidelines for the construction and location of equestrian, hiking (including connecting trails), interpretive, and motorcycle trails, and trails for the physically limited are listed in Table 21.[1,2,3,4,5,6,7,8,9]

b. Special considerations.

(1) Trails for the physically limited. Trails designed for use by physically limited persons should be interpretive in function. They

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[1]Alpern, Morris, Clayton, Charles, and Mead P. Miller. 1973. Motorcycle Park Planning and Management. Motorcycle Industry Council.

[2]American Motorcycle Association. 1972. AMA News, Environmental Forum Supplement. American Motorcycle Association.

[3]Ashbaugh, Byron L. and Raymond J. Kordish. 1971. Trail Planning and Layout. National Audubon Society.

[4]Bureau of Land Management, U.S. Department of the Interior. 1965. BLM Roads Handbook. Section 9115, Release 9-39. U.S. Government Printing Office.

[5]Bureau ofOutdoor Recreation, U.S. Department of the Interior. 1971. Off-Road Recreation Vehicles. U.S. Government Printing Office.

[6]_____ 1971. Proceedings: National Symposium on Trails. U.S. Government Printing Office.

[7]National Park Service, U.S. Department of the Interior. 1963. The Park Practice Program. Index B-3101. National Conference on State Parks and National Park and Recreation Association.

[8]State Council of Parks and Outdoor Recreation, State of New York. 1967. Outdoor Recreation for the Physically Handicapped. Department of Conservation, State of New York.

[9]Corps of Engineers. 1974. Use of Off-Road Vehicles on Civil Works Projects, ER 1130-2-405 Dated 17 January 1974. Office of the Chief of Engineers, Department of the Army.

TABLE 21

TRAIL GUIDELINES

Criteria	Type of Trail				
	Hiking	Interpretive	Equestrian	Physically Limited	Motorcycle
Tread Width	3'	4' - 6'	4'	4'	3' - 4'
Clearing Width	6' - 8'	8' - 10'	8' - 10'	6' - 8'	4' - 6'
Clearing Height	8' - 10'	8' - 10'	10' - 12'	8' - 10'	6' - 8'
Grade	10-15% maximum (20% for no more than 150 feet)	10% maximum	10-15% maximum	1-3% maximum	100% maximum (Depending on soils and experience of users)
Soils	Few limitations	Few limitations	Well-drained, stable; sandy or wet areas should be avoided	Few limitations	Well-drained, stable; easily eroded soils should be avoided
Surfacing	None	None or wood chips, gravel, native stone (Depending on amount of use)	None	Sealed asphalt, asphaltic concrete	None
Cross-Section	Whatever is required for good drainage	Level	Whatever is required for good drainage	Level	Whatever is required for good drainage
Direction	Two-way	One-way	One-way	One-way	One-way
Configuration	Linear or loop	Figure-8 or loop	Figure-8 or loop	Loop	Figure-8 or loop
Length	Any	1/8 - 1/4 mi.	Any	1/8 - 1/4 mi.	2.5 mi. minimum, 250 mi. maximum, (Depending on user)
Location	Scenic or remote	Scenic and varied (Depends on program)	Scenic, convenient to good access roads	Scenic and varied if possible, nearly level terrain	Scenic, rugged terrain, 1/4 mi. from nearest dwelling
Alignment	Curving with frequent changes in direction and grade	Gently curving, more gradual grade changes	Curving with grade changes as required by terrain	Minimal curving, avoid grade changes, avoid steps for elevation changes	Curves, switchbacks, grade changes, straight stretches
Elevation Changes	By natural grade	By natural grade	By natural grade	By smooth, non-slip ramp of no more than 8% grade	By natural grade
Marking	Durable, easily read, permanent	Durable, easily read, permanent	Durable, easily read, removable	Durable, easily read, (Braille incl.) permanent	Durable, easily read, removable hazards should be noted
Other Use	None	None	None	May be used by non-handicapped (Suitable for elderly)	None
Hours of Use	Any	Any	Any	Any	Daylight only (Specific times posted)
Rotation of Use	None necessary	None necessary	Should be rotated, if possible	None necessary	Should be rotated, if possible
Rest Areas and Campgrounds	None	Rest areas should be provided	None	Rest areas should be provided	None
Interpretive Stations	If desired	As appropriate, more in first half of trail	None	As appropriate, more in first half of trail	None
Safety Measures	As developed through alignment and clearing	As developed through alignment and clearing	As developed through alignment and clearing	Curbing, handrails, smooth surface transitions, guardrails, surface markings	As developed through alignment and clearing
Hazards	None, if possible	None	None	None	Mudholes, stream fords - 18" deep max., logs - 12" dia. max., rocky and sandy areas, jumps
Degree of Difficulty	Variable	Low	Appropriate for average rider-moderate	Low	Dependent on user, moderate difficulty for average rider

should have a minimum surface width of 48 inches paved with a smooth, hard, non-skid surface, and should be reasonably level in cross-section. Rest areas should be on the same elevation as the trail, and constructed of the same surface material. Rest areas should be provided with park benches. These benches should have backs, and arm rests spaced 24 inches apart along their length. Guardrails or curbs should be placed at hazardous locations. Painted lines, as well as a variation in surface material, which could be sensed by blind persons, should be located at the edges of the trail.

(2) Motorcycle trails. ER 1130-2-405 dated 17 January 1974 requires that "the public be fully involved in the planning process of designating areas of use and special operating conditions for the provision of off-road vehicle use on project lands." Motorcycle trail areas proposed in this design memorandum are intended to be tentative only. At such time as motorcycle trail areas and special operating conditions are established through meetings with the general public, user groups and conservation organizations, a supplement to the master plan will be prepared and submitted for approval.

(3) Hiking and connecting trails. Trailside rain shelters are proposed for location at eight to ten mile intervals along hiking and connecting trails. These structures will be similar to the design shown in the National Park Service "Grist" Manual, Volume 10, No.3, Page 21. There will be no facilities for overnight camping on hiking and connecting trails.

SECTION IX

SPECIAL PROBLEMS

9-01. Natural resource preservation and interpretation. The development and management of the project is based on the principle of conservation to "preserve" the resources of the area so that they are not exhausted by public use, but are sustained to provide recreation enjoyment for future generations. The land use allocation plan, described in Section 7-01 of this report, is a principal device for assuring that the natural resources of the project are designated on the basis of their highest and best use. The forest and wildlife management plans for the project function as corollary programs for implementation of proper management practices in conjunction with these land use allocations.

The implementation of interpretive programs in the future will enhance the overall conservation program for the project by promoting greater public understanding of natural resources and greater respect for the benefits which they provide.

A definitive interpretive program will be the subject of a future supplement to this master plan.

9-02. Fish and wildlife resources. Within the Bull Shoals project, a large amount of acreage is licensed to the Missouri Conservation Commission and Arkansas Game and Fish Commission for the management of fish and wildlife resources. In these areas, as well as on other lands of the project, the state agencies are principally responsible for the management of the resources and also for the enforcement of applicable state regulations such as bag limits and seasons. The Corps of Engineers cooperates with the state conservation agencies in the administration of licensed land. Other land in the project, not licensed specifically for fish and wildlife management purposes, is managed principally by the Corps with cooperation from the states. The Bureau of Sport Fisheries and Wildlife offers assistance to the states and the Corps in the management of fisheries and wildlife resources.

Problem areas in the management of fish and wildlife resources now being studied are the possible implementation of a program to increase bass propagation in the lake, and the effect of low water discharges on tailwater fisheries. In 1972, the Arkansas Game and Fish Commission with the cooperation of the Corps of Engineers, conducted a study to determine the effect of a raised lake level on bass spawn survival. (See Section 4-05.) The Commission found that a raised lake level increased bass spawn survival, and recommended that the lake be raised to at least 660 feet m.s.l. once every three years and to 664 feet m.s.l. once every six years, during the summer months. If this program were implemented, the recreational value of the lake in terms of sport fishing potential would be enhanced; however, recreation activities in parks could be affected by the partial inundation of park facilities located

near the water's edge. Additionally, to maintain the suggested lake elevation during the summer months, which are periods of reduced runoff, would require a major reduction in the generation of hydroelectric power, which is one of the authorized purposes of the project.

Operational minimum discharges of water have been established to minimize trout mortality in the tailwaters during the periods of high temperatures.

9-03. Archaeological and historical resources. As stated previously, it is known that there are archaeological sites located in the project area; however, only minor surveys have been conducted and no extensive excavation of archaeological sites has been possible. No historical sites have been identified within the project area.

Assuming that in-depth archaeological and historical investigations may be conducted sometime in the future, a problem may be encountered if the locations of excavated sites were made known to the public. Public knowledge of the specific locations of these sites could lead to their desecration by souvenir hunters. Interpretation of the pre-history and history of the Bull Shoals project area should be conducted through the use of displays and public information programs rather than through visits to the sites.

9-04. Fee systems and collection. ~~It is the policy of the Corps of Engineers that~~ P.L. 90-483 PROVIDES THAT no access or entrance fees can be charged at any of the Corps recreation facilities. User fees, however, may be used as a means to defray management costs in park use areas and are authorized by Public Laws 90-483, 92-347, 93-81, and 93-303. Public Law 93-303, enacted 7 June 1974, provides for the collection of fees at family camping and group camping areas having the following facilities: tent or trailer spaces, drinking water, access roads, refuse containers, toilet facilities, personal collection of the fee by an employee of the Federal agency operating the facility, reasonable visitor protection, and a simple device for containing a campfire. A system of fee collection has been implemented in accordance with this Public Law. Two parks, Lowry and Woodard, have been selected as free parks.

9-05. Special land and water uses.

a. Land Uses.

(1) Motorcycle trail areas. To fulfill the role of the Federal Government in providing motorcycle facilities to meet the growing demand of the public for this type of recreation, a number of motorcycle trail areas have been tentatively proposed for the Bull Shoals project. The provision of these areas on public lands was authorized in Executive Order 11644, Use of Off-Road Vehicles on the Public Land, dated 8 February 1972. The development of off-road recreation vehicle use areas on Corps projects is subject to the requirements of ER 1130-2-405 dated 17 January 1974.

These documents recognize the fact that improper or uncontrolled use of off-road recreation vehicles such as motorcycles, can cause adverse social and environmental impacts. In response to the need for proper control of this use, the motorcycle trail areas proposed in this design memorandum were designated for location in areas where the necessary control by Corps personnel could be effected.

(2) Waste collection and treatment systems. All waterborne facilities were provided with underground collection systems composed of four-inch or six-inch lines which are routed into a centrally located treatment plant. Mechanical tertiary treatment plants were selected as the principal method of treatment. The use of stabilization lagoons was investigated and considered unacceptable due to the sloping nature of the terrain and the presence of rock close to the surface. Additionally, the large amount of surface area required with the necessary clearing was considered as a negative factor in the investigation of stabilization lagoons as an alternate treatment method.

In parks which were below flood pool level or which had only vault toilets, hauling was assumed to be directed to the nearest treatment facilities and additional capacity was provided to accommodate the total combined load. In parks with distinctly separate watersheds, separate treatment facilities were provided based on the economic alternates of pumping with lift stations vs. separate treatment plant cost.

All treatment plants were sized on the basis of 20 gallons/person/day and 0.06 pounds five day BOD/person/day for all parks with waterborne facilities, and five gallons/person/day and 0.02 pounds 50 day BOD/person/day for all parks with vault toilets. Population projections were based on assuming five persons/camp site.

Consideration of operational and construction factors limited the size of mechanical treatment plants to 20,000 gpd. On sites where the demand exceeded 20,000 gpd, an additional unit was proposed. This arrangement would afford the opportunity for staged construction and operation.

The present design envisions discharging the treated effluent into the lake below elevation 630. If, in the future, a policy of zero discharge would be required, the holding tank which has been provided at each treatment plant could be utilized in conjunction with some form of spray irrigation or disposal system.

b. Water uses. It is not anticipated that any serious problems will arise due to water uses proposed in this design memorandum.

SECTION X

PROJECT RESOURCE MANAGEMENT

10-01. General. Management of the resources to provide recreation, wildlife and fish propagation, timber, and scenic and esthetic values is the primary consideration given to the resource base. The coordinated uses of these resources will be consistent with project purposes. A dynamic human population and an ever changing resource base requires a flexible resource management plan with an allowance for numerous revisions. The proposed future development areas will be protected and their values preserved with all interim uses consistent with intended land use. A Project Resource Management plan has been prepared as Appendix A to this master plan.

10-02. Staffing and Organization. The Resident Engineer and his staff, including the ranger force, will be aware of the multiple-use aspects of resource management and will make daily decisions regarding resource use. Preservation and use will be finely balanced with an awareness of all use factors.

10-03. Administrative and Maintenance. The administrative and maintenance functions will be performed by personnel under the supervision of the Resident Engineer. Maintenance of existing resources will be accomplished on a programed systematic basis with flexibility to provide interim maintenance as required. The multiple uses of the project will be recognized and maintenance procedures will be compatible, and if possible, complimentary to other project uses. All standard safety precautions will be adhered to assuring the safety of the staff and the public.

10-04. Law enforcement. Rangers have authority to issue citations for designated offenses; however, they do not have the authority to make arrests. A low-key law enforcement policy is in use with the visitor being controlled through facility design and non-offensive, suggestion-type signs. Where arrests are required, local, State, or Federal law enforcement agencies assist. The enforcement personnel will perform their duties with little or no disruption to the surrounding visitors.

10-05. Safety. Safety of personnel and visitors alike is of primary importance in the project area. Devices and procedures which have been implemented to promote safety in the project include signs, ranger talks for visitors, information folders and news media releases, regular inspection of concession and recreation facilities, periodically scheduled employee safety meetings, and safety and first-aid demonstrations. In addition, various written manuals and directives on safety are kept in the project office for reference.

10-06. Concession Activities. Concessions are provided for the public for access and convenience to enhance the recreation experience and accommodate the user. Additional commercial leases will be granted only after a market analysis has been made which indicates a need for additional concession facilities and that an additional concession will be economically feasible. Twelve concession boat dock facilities are now being operated at Bull Shoals Lake, providing a total of 487 rental boats, 97 storage docks, and 1141 boat rental stalls. Other facilities operated by concessionaires are three resorts, three cafes, and a heated fishing dock. A complete evaluation of adequacy of location and safety features of these facilities are contained in the project resource management plan.

10-07. Visitor interpretation and education. The goals of the educational and interpretive facilities and programs at Bull Shoals Lake are to inform the public of purposes and operational aspects of the project, to interpret the historical and natural features of the area, and to provide opportunities for visitor enjoyment. The methods used to accomplish these goals are: visitor information signs, marker buoys, and visitor programs. Examples of visitor programs which are available are: ranger fireside talks, ranger films and slide programs, self-guiding nature trails, and tours of the dam and powerhouse.

SECTION XI

FOREST MANAGEMENT

11-01. General. The forest management plan for Bull Shoals Lake has been prepared in accordance with ER 1130-2-400 dated 28 May 1971 and was approved in February 1974. The objective of the forest management plan is to establish guidelines for the orderly management of the various forest resources. The forest management plan will be supplemented by detailed compartment prescriptions developed annually on an area approximately equal to one tenth of the total land management area. See Appendix B to this master plan.

11-02. Objective and policy. The objective of forest management is to protect water quality through the control of soil erosion, restore the forest to a healthy state, provide forest cover required for recreational use and development, improve wildlife and fisheries habitat, and preserve and improve scenic values. Forest lands are managed for their multiple resources. The removal of vegetation, living or dead, will be done only with sound justification, such as silvicultural needs, urgent disease and insect control, fire hazard reduction, and removal for construction of recreational facilities or specific essential uses.

11-03. Physical and ecological resources and characteristics. Forest cover types in the Bull Shoals project have been classified according to the tree species forming the plurality of stocking. The forest cover types present are: white oak, white-black-northern red oak, black oak-hickory, post oak-blackjack oak, redcedar, hardwood-redcedar, and ash-cottonwood-sycamore. The distribution of these species is related to the occurrence of microhabitats created by variations in soils, slope, insolation, moisture, and other ecological factors. Past land uses have had a significant influence on the types and quality of tree species presently found in the project area.

11-04. Treatments and programs. The forest management program contained in the forest management plan for the Bull Shoals project will be applied to a woodland area of 33,500 acres. This area has been divided into ten compartments of approximately 3,350 acres each which will be treated on a 10-year rotation cycle. Each year, one compartment will be inventoried and management decisions made on the treatment required. Silvicultural practices such as thinning, selective cutting, patch cutting, prescribed burning, site preparation, application of herbicides, reforestation, and other forest management practices will be performed as appropriate. Species located in the flood control pool that have been killed by enundation will be replaced by water tolerant species. Guidelines for vegetation management in park areas will be provided through vegetation management plans which are not a part of the forest management plan. Vegetation management plans for park areas will be developed in cooperation with the State forestry agencies. Recommendations for wood products to be removed will be a function of the operations element with disposal and sales administration being performed by the real estate element.

11-05. Personnel and fiscal requirements. Proper implementation of the forest management plan would require the addition of the following personnel to the project staff: a landscape architect, a biologist, a forester, and two laborers. These personnel, with the exception of the laborers, would be utilized for forest management at both the Bull Shoals and Norfork projects. The management plan would be carried out under the supervision of the respective lake managers and the district forester.

The total annual cost for implementation of the forest management plan at the Bull Shoals project, including salary requirements calculated on the basis of man-day estimates, forest fire fighting, construction of fire lanes, maintenance of fire trails, forest stand improvement, reforestation, and landscape repair in parks, is estimated at $42,000. The total annual benefit from the forest management program is estimated at $108,000; therefore, the net annual benefit would be approximately $65,000.

11-06. Work plans. The lake manager will annually prepare a work program of what is to be done to implement the forest management plan and will maintain records reflecting work which has been performed, as well as timber products harvested, and the value of these products.

SECTION XII

FIRE PROTECTION

12-01. General. The purpose of the fire protection plan is to establish policies, equipment, specific actions, and manning guides and to train personnel in the protection of woodlands from fires. The fire protection plan for Bull Shoals Lake is being prepared in accordance with ER-1130-2-400 dated 28 May 1971 and will be submitted as Appendix C to this master plan.

12-02. Cooperative Agreements. To provide adequate fire protection for the project area, cooperative agreements have been developed to provide for mutual assistance efforts to be conducted by the cooperating parties whenever necessary. The Arkansas Forestry Commission and the Missouri Department of Conservation are working with the Corps of Engineers and assistance is offered by all parties to lands under the other's jurisdiction.

12-03. Training. Appropriate personnel on the project staff are trained in fire prevention and suppression methods. This training program assures that qualified personnel will be available to detect potential fire hazards in the project, and also to assist in fire suppression in emergency situations. Proper training in fire fighting techniques and safety factors is a joint responsibility of the park manager and the district office. Ouachita National Forest has agreed to include Corps personnel in their annual fire simulator training. The Arkansas Forestry Commission is also cooperating to provide training.

12-04. Equipment. All tools and equipment for use in fire prevention and suppression activities will be described in the fire protection plan with respect to quantity, type, location, condition, and adequacy.

12-05. Prevention, presuppression and suppression activities. Activities of fire prevention, presuppression and suppression will be a part of the fire protection plan. Procedures will be established for the assignment of duties in each phase to various personnel.

SECTION XIII

FISH AND WILDLIFE MANAGEMENT

13-01. General. The purpose of the plan is to provide for the systematic management of the land and water areas of Bull Shoals Lake in striving for the improvement of fish and wildlife potentials. The fish and wildlife management plan has been prepared and submitted in accordance with ER 1130-2-400 dated 28 May 1971. It was approved in March 1974 and is submitted as Appendix D of this master plan. The fish and wildlife management plan implements Section 3 of the Fish and Wildlife Coordination Act of 1958 (PL 85-624) which provides for the use of Civil Works projects for the conservation, maintenance, and management of fish and wildlife resources and habitat. Wildlife observation, study, and photography will be considered on an equal basis with hunting and fishing activities. Fish and wildlife resources are considered a valuable asset to the recreationist and will be developed and managed to insure the continuation of these resources.

13-02. Aquatic.

a. Management programs for aquatic fauna of the Bull Shoals project are aimed primarily at providing game fish which are desirable for recreational fishing. These game fish include northern pike, walleye, striped bass, blue catfish, largemouth bass, smallmouth bass, spotted bass, white bass, and trout. The fish and wildlife management plan contains detailed descriptions of the fish propagation, stocking, and research programs which have been conducted in the Bull Shoals project, as well as plans for future programs.

b. The principal agencies responsible for conducting fish management programs at Bull Shoals Lake are the Missouri Department of Conservation, the Arkansas Game and Fish Commission, and the U.S. Bureau of Sport Fisheries and Wildlife. The programs of these agencies are coordinated with the Corps of Engineers which cooperates in management efforts as required.

13-03. Terrestrial. Terrestrial improvement provides many recreational areas for hikers, naturalists, and other outdoor sportsmen. The areas will also provide outdoor classroom situations and research areas in addition to areas for the photographer. Open areas will be kept open to provide nesting for quail and turkey. Management programs for terrestrial fauna are presently being conducted by the Missouri Department of Conservation, the Arkansas Game and Fish Commission, and the Corps of Engineers. In general terms, the programs of the two state agencies consist essentially of habitat improvement, provision of wildlife foods, and stocking of a few species. The principal focus of the Corps program is in forest management for wildlife and administration of the Agricultural and Grazing program for wildlife enhancement. These programs are described briefly in Section 4-05 of this design memorandum.

SECTION XIV

PROJECT SAFETY

14-01. General. The project safety plan identifies the common recurring hazards in each major area of project operations. The plan describes precautionary actions to be taken to prevent or control hazardous situations. Areas considered in the plan include construction, maintenance, park facilities, visitor protection, equipment operation, and office operations. A project safety plan, prepared in accordance with ER 1130-2-400 dated 28 May 1971, has been completed and was approved June 1973. It is Appendix E of this master plan. Briefly summarized below are the general elements of the plan.

14-02. General program guidelines. Program guidelines have been established for the major phases and areas of project operation at Bull Shoals Lake. These include guidelines pertaining to administration facilities, structures, sanitation, access, park facilities, and public information procedures.

14-03. General public. Common recurrent hazards and unsafe conditions have been identified and procedures implemented to protect the public and to take measures which will minimize or eliminate the possibility of personal injury. These procedures include not only the provision of equipment such as handrails for steps and ramps, adequate lighting for sanitary facilities, and warning signs, but also frequent inspection and maintenance of public facilities and the implementation of a continuing program of pollution and disease vector control. Numerous methods are employed to educate the public concerning possible safety hazards, and rules and regulations have been established for visitor protection.

14-04. Employee. It is the policy of the Corps of Engineers that no employee shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety. Accordingly, appropriate sanitation procedures and safety precautions have been implemented and an equipment monitoring system instituted in compliance with Corps safety regulations.

SECTION XV

COST ESTIMATES

15-01. Summary of estimated cost. The estimated total cost of construction for park development proposed in this design memorandum is $17,272,000. A summary of estimated cost for additional recreational facilities by parks is shown in Table 22. Table 23 summarizes estimated cost for development by facilities. Detailed cost estimates for each park are contained in Tables 24 through 45.

15-02. Cost-sharing policy.

a. Public Law 89-72. In accordance with current cost-sharing policy established by the Secretary of the Army, in coordination with the Office of Management and Budget, further development of all parks will require participation by a non-Federal public body furnishing at least 50 percent of the cost of recreational development and providing for operation and maintenance upon completion of development, unless a system of user fees is established to recover all operation, maintenance and replacement costs. All recreational development will be subject to this policy after FY 1974.

b. Ozark National Recreation Area. A study is being conducted to determine if Bull Shoals, Norfork, Beaver, Table Rock, Greers Ferry, and Bell Foley Lakes should be made the Ozark Unit of the National Recreation System. If the Ozark National Recreation Area is created, future recreation development and operation will be carried out by the Federal Government. Cost sharing under PL 89-72 will not be applicable.

15-03. Facility costs. All cost estimates are based on January 1974 price levels, as applied to experienced cost of similar facilities in the Little Rock District. Costs for facilities not previously constructed were based on other data sources.

TABLE 22

SUMMARY OF ESTIMATED COST FOR ADDITIONAL

RECREATIONAL FACILITIES BY PARKS

BULL SHOALS LAKE

Account No.	Area	Cost
	Recreational Facilities	
	Dam Site Park	1,115,400
	Lakeview Park	536,100
	Ozark Isle Park	1,806,600
	Oakland Park	134,900
	Bull Shoals Park	174,800
	Pontiac Park	548,700
	Spring Creek Park	1,212,300
	Theodosia Park	762,500
	Highway 125 Park	1,592,700
	Buck Creek Park	550,500
	Lead Hill Park	274,400
	Tucker Hollow	750,700
	Highway K Park	417,900
	Beaver Creek Park	1,196,400
	Kissee Mills Park	136,800
	River Run Park	458,400
	Point Return Park	228,800
	Woodard Park	459,300
	Lowry Park	704,800
	Group Use Park	595,900
	Project Trails and rain shelters	1,231,800
	Total direct cost	14,889,700
	Engineering and design	1,488,900
	Supervision and administration	893,400
	Total	17,272,000

TABLE 23

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

SUMMARY

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	53,277	-	-
(2) Flexible pavement	do	-	197,353	-	-
(a) New construction	do	$17.00	-	78,462	1,333,850
(b) Existing gravel	do	3.50	-	31,564	110,500
b. 12 feet wide					
(1) Gravel	do	8.50	14,195	-	-
(2) Flexible pavement	do	-	8,072	-	-
(a) New construction	do	11.00	-	77,932	857,250
(b) Existing gravel	do	2.50	-	2,320	5,800
c. 10 feet wide					
(1) Gravel	do	7.50	-	2,780	20,850
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	12,933	15,350	76,750
b. Flexible pavement	do	-	79,616	-	-
(1) New construction	do	8.00	-	90,600	724,800
(2) Existing gravel	do	2.25	-	4,180	9,400
Launching lanes, concrete	Ea	30,000	33	24	720,000
Camping spurs					
a. Single	do	500	330	877	438,500
b. Double	do	700	17	76	53,200
c. Triple	do	900	1	76	68,400
d. Pull through	do	650	-	17	11,050
e. Existing to be paved	do	400	-	108	43,200

Note: The proposed development at Bull Shoals State Park is not included in the summary sheet. This development is subject to cost sharing and funds are scheduled for allocation in FY 75.

TABLE 23 (Con.)

SUMMARY

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	35	28	392,000
(2) Waterborne	do	30,000	-	25	750,000
(3) Waterborne with showers	do	32,000	2	19	608,000
(4) Convert to waterborn	do	12,000	-	10	120,000
b. Wooden, vault	do	-	4	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	48,000	360,000
b. Sewer lines, 6" PVC, gravity	do	8.00	-	14,006	112,050
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	22,550	225,500
d. Outfall lines, 4" steel in lake	do	8.50	-	853	7,250
e. Outfall lines, 6" steel in lake	do	12.00	-	2,284	27,400
f. Manholes	Ea	400	-	133	53,200
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	1	26,500
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	4	138,000
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	2	81,000
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	7	318,500
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	2	160,000
l. Lift station	do	16,500	-	19	313,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	17	178,500
n. Electrical, outside	Sum Job	-	-	-	81,500
Contingencies, 15%	-	-	-	-	314,800

TABLE 23 (Con.)

SUMMARY

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	2,350	31,912	55,850
b. Water line, 2" PVC	do	3.90	27,000	89,274	348,150
c. Gate valves & boxes	Sum Job	-	-	-	55,550
d. Water wells	Ea	12,000	32	12	144,000
e. Wellhouse & equipment	do	13,100	13	14	183,400
f. Electrical	Sum Job	-	-	-	25,000
Contingencies, 15%	-	-	-	-	120,000
Picnic units	Ea	400	95	286	114,400
Camp units					
a. Basic (including walk-in)	do	650	495	1,251	813,150
b. Add shelter	do	250	-	306	76,500
c. Add electrical	do	200	-	680	136,000
Group camp	do	400	-	18	7,200
Table canopies	do	250	76	179	44,750
Add electrical (existing camp unit)	do	200	-	129	25,800
Picnic shelters	do	10,500	5	14	147,000
Amphitheaters	do	750	1	9	6,750
Drinking fountains	do	1,000	66	366	366,000
Changehouses	do	8,500	10	11	93,500
Sanitary stations					
a. Marine	do	10,000	-	4	40,000
b. Travel trailer	do	4,000	11	10	40,000
Washhouses	do	35,000	2	23	805,000
Swimming beaches	do	6,000	12	13	78,000
Mercury vapor lights	do	350	36	46	16,100
Courtesy docks	do	6,000	1	4	24,000
Towers	do	2,500	-	2	5,000
Trails					
a. Connecting	Mile	2,500	-	65.00	162,500
b. Hiking	do	2,500	-	290.00	725,000
c. Interpretive	do	10,000	-	25.00	250,000
d. Equestrian	do	2,500	-	15.00	37,500
e. Motorcycle	do	1,200	-	40.00	48,000
f. Park circulation	do	2,500	1.40	10.70	26,750
g. Shelters (rain)	Ea	200	-	44	8,800

TABLE 23 (Con.)

SUMMARY

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	–	1	184,000 (1)
Visitor center	do	30,000	–	1	30,000
Nature center	do	80,000	–	1	80,000
Administration building	do	75,000	–	2	150,000
Group cabin	do	10,000	–	10	100,000
Playground equipment	Sum Job	–	–	–	61,700
Dormitories	Ea	19,000	–	1	19,000
Causeway	do	25,000	1	1	25,000
Archery area	do	350	–	1	350
Reforestation	Acre	250	–	47	11,800
Landscaping & beautification	Sum Job	–	–	–	59,450
Site preparation	do	–	–	–	64,650
Entrance complex	Ea	15,000	–	15	225,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	–	4,450	8,900
(2) Flexible pavement	do	4.80	–	11,012	52,850
b. 12 feet wide					
(1) Gravel	do	1.90	–	13,764	26,150
(2) Flexible pavement	do	4.05	–	1,272	5,150
Parking area removals					
a. Gravel	SY	1.25	–	3,320	4,150
b. Flexible pavement	do	2.00	–	515	1,050
Camping unit removals	Ea	150	–	53	7,950
Picnic unit removals	do	150	–	11	1,650
Total					14,889,700

(1) Additional $84,000 added for appurtenant works required at Ozark Isle Park.

Visitation

1967 - 1,974,000
1968 - 2,781,300
1969 - 3,156,800
1970 - 3,397,900
1971 - 3,959,200
1972 - 3,939,700
1973 - 3,066,300

TABLE 24

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

BULL SHOALS STATE PARK

Acres 725 — See Plate 22

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	-	-	-
(2) Flexible pavement	do	-	29,568	-	-
(a) New construction	do	$17.00	-	1,200	20,400
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	-	-
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	-	-
b. Flexible pavement	do	-	-	-	-
(1) New construction	do	8.00	-	1,340	10,700
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	-	-	-
Camping spurs					
a. Single	do	500	-	85	(1)24,600
b. Double	do	700	-	-	-
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

See footnote at end of table.

TABLE 24 (Con.)

BULL SHOALS STATE PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	-	-	-
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	1	(1)20,000
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	2	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	200	(1)10,000
b. Sewer lines, 6" PVC, gravity	do	8.00	-	1,400	(1)10,500
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	2,000	(1)15,000
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	7	2,800
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 30,000 GPD	do	65,000	-	1	65,000
l. Lift station	do	16,500	-	2	(1)17,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	-	-
n. Electrical, outside	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-

See footnote at end of table.

TABLE 24 (Con.)

BULL SHOALS STATE PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	3,750	6,550
b. Water line, 2" PVC	do	3.90	-	3,150	12,250
c. Gate valves & boxes	Sum Job	-	-	-	-
d. Water wells	Ea	12,000	-	-	-
e. Wellhouse & equipment	do	13,100	-	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-
Picnic units	Ea	400	11	-	-
Camp units					
a. Basic (including walk-in)	do	650	-	85	(1) 49,000
b. Add shelter	do	250	-	-	-
c. Add electrical	do	200	-	85	17,000
Group camp	do	400	-	-	-
Table canopies	do	250	-	-	-
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	1	-	-
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	1	-	-
Changehouses	do	8,500	-	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	1	(1) 3,500
Washhouses	do	35,000	2	-	-
Swimming beaches	do	6,000	-	-	-
Mercury vapor lights	do	350	-	-	-
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

See footnote at end of table.

TABLE 24 (Con.)

BULL SHOALS STATE PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	-
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	-
Site preparation	do	-	-	-	-
Entrance complex	Ea	15,000	-	1	(1) 10,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	-	-
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
E&A, S&A					67,200
Total					(2) 362,000

Notes: (1) Where the proposed facility cost does not agree with the unit cost, the facility cost was based on estimates received from the Arkansas Department of Parks and Tourism.

(2) The total cost of $362,000 will be cost-shared with the Arkansas Department of Parks and Tourism. This work is scheduled to be constructed during FY 1975 and will not be reflected in our Summary Sheet (Table 23).

Visitation

1967 - NA
1968 - 471,400
1969 - 506,200
1970 - 560,200
1971 - 712,700
1972 - 600,000
1973 - 463,000

TABLE 25

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

DAM SITE PARK

Acres 230 — See Plate 23

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	6,200	-	-
(2) Flexible pavement	do	-	8,800	-	-
(a) New construction	do	$17.00	-	7,300	124,100
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	11,500	126,500
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	140	1,050
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	2,190	10,950
b. Flexible pavement	do	-	2,850	-	-
(1) New construction	do	8.00	-	6,600	52,800
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	-	2	60,000
Camping spurs					
a. Single	do	500	31	65	32,500
b. Double	do	700	-	5	3,500
c. Triple	do	900	-	13	11,700
d. Pull through	do	650	-	17	11,050
e. Existing to be paved	do	400	-	-	-

TABLE 25 (Con.)

DAM SITE PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	4	56,000
(2) Waterborne	do	30,000	-	2	60,000
(3) Waterborne with showers	do	32,000	-	2	64,000
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	2,000	15,000
b. Sewer lines, 6" PVC, gravity	do	8.00	-	2,000	16,000
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	1,530	15,300
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	100	1,200
f. Manholes	Ea	400	-	8	3,200
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	1	45,500
k. Treatment plant, tertiary, 40,000 GPD	do	80,000			
l. Lift station	do	16,500	-	1	16,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	7,500
Contingencies, 15%	-	-	-	-	19,600

TABLE 25 (Con.)

DAM SITE PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	2,285	4,000
b. Water line, 2" PVC	do	3.90	-	11,500	44,850
c. Gate valves & boxes	Sum Job	-	-	-	4,250
d. Water wells	Ea	12,000	-	-	-
e. Wellhouse & equipment	do	13,100	-	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	8,000
Picnic units	Ea	400	-	16	6,400
Camp units					
a. Basic (including walk-in)	do	650	31	131	85,150
b. Add shelter	do	250	-	-	-
c. Add electrical	do	200	-	104	20,800
Group camp	do	400	-	7	2,800
Table canopies	do	250	-	-	-
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	-	1	10,500
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	-	26	26,000
Changehouses	do	8,500	-	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	2	8,000
Washhouses	do	35,000	-	2	70,000
Swimming beaches	do	6,000	-	-	-
Mercury vapor lights	do	350	-	2	700
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 25 (Con.)

DAM SITE PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	8,700
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	5,100
Site preparation	do	-	-	-	5,550
Entrance complex	Ea	15,000	-	2	30,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	-	-
b. 12 feet wide					
(1) Gravel	do	1.90	-	2,500	4,750
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	31	4,650
Picnic unit removals	do	150	-	-	-
Total					1,115,400

(1) Playground equipment proposed:

1. Horizontal monkey ladder (2) @ 150	$ 300
2. See-saw, 4 units (4) @ $340	1,360
3. Slide 12' (2) @ $385	770
4. Slide 20'	550
5. Swings 8' - 4 seat (4) @ $315	1,260
6. Swings 12' - 4 seat	550
7. Whirlers 6'	375
8. Whirlers 10'	660
9. 3-riding toys (3) @ $360	1,080
10. 5-riding toys	600
11. Wood climbing structure with slide	1,200
Total	$8,705

Visitation	
1967	-
1968	-
1969	-
1970	-
1971	-
1972	- 10,000
1973	- 29,400

TABLE 26

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

LAKEVIEW PARK

Acres 186 — See Plate 24

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	2,700	-	-
(2) Flexible pavement	do	-	14,420	-	-
(a) New construction	do	$17.00	-	1,800	30,600
(b) Existing gravel	do	3.50	-	2,300	8,050
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	1,605	-	-
(a) New construction	do	11.00	-	1,700	18,700
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	80	600
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	1,180	5,900
b. Flexible pavement	do	-	9,330	-	-
(1) New construction	do	8.00	-	1,350	10,800
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	3	1	30,000
Camping spurs					
a. Single	do	500	51	28	14,000
b. Double	do	700	3	2	1,400
c. Triple	do	900	-	1	900
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	6	2,400

TABLE 26 (Con.)

LAKEVIEW PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	4	2	28,000
(2) Waterborne	do	30,000	-	1	30,000
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	1	12,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	2,400	18,000
b. Sewer lines, 6" PVC, gravity	do	8.00	-	1,675	13,400
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	480	4,800
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	100	1,200
f. Manholes	Ea	400	-	9	3,600
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	1	45,500
k. Treatment plant, tertiary, 40,000 GPD	do	80,000			
l. Lift station	do	16,500	-	1	16,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	5,000
Contingencies, 15%	-	-	-	-	17,800

TABLE 26 (Con.)

LAKEVIEW PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	600	2,171	3,800
b. Water line, 2" PVC	do	3.90	4,000	5,385	21,000
c. Gate valves & boxes	Sum Job	-	-	-	3,850
d. Water wells	Ea	12,000	4	-	-
e. Wellhouse & equipment	do	13,100	2	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	4,300
Picnic units	Ea	400	4	1	400
Camp units					
a. Basic (including walk-in)	do	650	73	46	29,900
b. Add shelter	do	250	-	-	-
c. Add electrical	do	200	-	27	5,400
Group camp	do	400	-	-	-
Table canopies	do	250	3	1	250
Add electrical (existing camp unit)	do	200	-	11	2,200
Picnic shelters	do	10,500	1	1	10,500
Amphitheaters	do	750	1	-	-
Drinking fountains	do	1,000	19	17	17,000
Changehouses	do	8,500	1	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	1	1	4,000
Washhouses	do	35,000	-	2	70,000
Swimming beaches	do	6,000	1	-	-
Mercury vapor lights	do	350	10	2	700
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	1.4	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 26 (Con.)

LAKEVIEW PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	1,400
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	3,750
Site preparation	do	-	-	-	1,800
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	700	1,400
(2) Flexible pavement	do	4.80	-	1,406	6,750
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	605	2,450
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	4	600
Picnic unit removals	do	150	-	-	-
Total					536,100

(1) Playground equipment proposed:

1. See-saw, 4 units	$ 340
2. Slide 12'	385
3. Swings 8' - 4 seat	315
4. 3-riding toys	360
Total	$1,400

Visitation	
1967	143,000
1968	172,600
1969	180,500
1970	251,500
1971	302,400
1972	315,300
1973	275,100

TABLE 27

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

OZARK ISLE PARK

Acres 830 — See Plate 25

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	2,286	-	-
(2) Flexible pavement	do	-	39,600	-	-
(a) New construction	do	$17.00	-	5,300	90,100
(b) Existing gravel	do	3.50	-	2,286	8,000
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	1,800	-	-
(a) New construction	do	11.00	-	1,400	15,400
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	-	-
b. Flexible pavement	do	-	8,100	-	-
(1) New construction	do	8.00	-	14,700	117,600
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	-	2	60,000
Camping spurs					
a. Single	do	500	79	34	17,000
b. Double	do	700	4	-	-
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

TABLE 27 (Con.)

OZARK ISLE PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	-	-
(2) Waterborne	do	30,000	-	5	150,000
(3) Waterborne with showers	do	32,000	2	2	64,000
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	12,400	93,000
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	12,800	128,000
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	100	1,200
f. Manholes	Ea	400	-	22	8,800
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	1	80,000
l. Lift station	do	16,500	-	7	115,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	7,500
Contingencies, 15%	-	-	-	-	66,700

TABLE 27 (Con.)

OZARK ISLE PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	4,800	8,400
b. Water line, 2" PVC	do	3.90	12,400	3,800	14,800
c. Gate valves & boxes	Sum Job	-	-	-	2,100
d. Water wells	Ea	12,000	1	1	12,000
e. Wellhouse & equipment	do	13,100	1	1	13,100
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	7,550
Picnic units	Ea	400	-	93	37,200
Camp units					
a. Basic (including walk-in)	do	650	71	51	33,150
b. Add shelter	do	250	-	-	-
c. Add electrical	do	200	-	43	8,600
Group camp	do	400	-	4	1,600
Table canopies	do	250	-	52	13,000
Add electrical (existing camp unit)	do	200	-	37	7,400
Picnic shelters	do	10,500	-	2	21,000
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	-	121	121,000
Changehouses	do	8,500	2	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	1	4,000
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	1	1	6,000
Mercury vapor lights	do	350	-	7	2,450
Courtesy docks	do	6,000	-	2	12,000
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	7.6	19,000
g. Shelters (rain)	Ea	200	-	-	-

TABLE 27 (Con.)

OZARK ISLE PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	1	(1) 184,000
Visitor center	do	30,000	-	1	30,000
Nature center	do	80,000	-	1	80,000
Administration building	do	75,000	-	1	75,000
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	-
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	1	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	3,800
Site preparation	do	-	-	-	5,400
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	-	-
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
Total					1,806,600

(1) Additional $84,000 added for appurtenant works required by the State of Arkansas before they will assume operation and maintenance.

Visitation

1970 - 16,300
1971 - 5,600
1972 - 14,700
1973 - 31,200

TABLE 28

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

OAKLAND PARK

Acres 76 — See Plate 25

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	2,300	-	-
(2) Flexible pavement	do	-	3,600	-	-
(a) New construction	do	$17.00	-	-	-
(b) Existing gravel	do	3.50	-	2,000	7,000
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	1,200	-	-
(a) New construction	do	11.00	-	-	-
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	480	-	-
b. Flexible pavement	do	-	3,300	-	-
(1) New construction	do	8.00	-	600	4,800
(2) Existing gravel	do	2.25	-	480	1,100
Launching lanes, concrete	Ea	30,000	1	1	30,000
Camping spurs					
a. Single	do	500	10	7	3,500
b. Double	do	700	2	-	-
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	18	7,200

TABLE 28 (Con.)

OAKLAND PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	2	-	-
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	1	12,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	295	2,200
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	1,400	14,000
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	-	-
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	1	16,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	-	-
n. Electrical, outside	Sum Job	-	-	-	4,000
Contingencies, 15%	-	-	-	-	5,500

TABLE 28 (Con.)

OAKLAND PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	-	-
b. Water line, 2" PVC	do	3.90	-	-	-
c. Gate valves & boxes	Sum Job	-	-	-	-
d. Water wells	Ea	12,000	2	-	-
e. Wellhouse & equipment	do	13,100	-	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-
Picnic units	Ea	400	8	5	2,000
Camp units					
a. Basic (including walk-in)	do	650	26	5	3,250
b. Add shelter	do	250	-	5	1,250
c. Add electrical	do	200	-	-	-
Group camp	do	400	-	-	-
Table canopies	do	250	8	-	-
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	1	1	10,500
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	-	-
Changehouses	do	8,500	-	1	8,500
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	-	-
Swimming beaches	do	6,000	1	-	-
Mercury vapor lights	do	350	2	1	350
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 28 (Con.)

OAKLAND PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	-
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-		450
Site preparation	do	-	-		800
Entrance complex	Ea	15,000	-	-	-
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	-	-
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
Total					134,900

Visitation	
1967	40,100
1968	60,700
1969	78,900
1970	87,900
1971	90,800
1972	43,600
1973	39,700

TABLE 29

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

BULL SHOALS PARK

Acres 37 — See Plate 26

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	2,757	-	-
(2) Flexible pavement	do	-	2,160	-	-
(a) New construction	do	$17.00	-	1,400	23,800
(b) Existing gravel	do	3.50	-	2,757	9,650
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	1,400	15,400
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	3,700	-	-
b. Flexible pavement	do	-	3,600	-	-
(1) New construction	do	8.00	-	100	800
(2) Existing gravel	do	2.25	-	3,700	8,300
Launching lanes, concrete	Ea	30,000	2	1	30,000
Camping spurs					
a. Single	do	500	-	21	10,500
b. Double	do	700	-	-	-
c. Triple	do	900	-	2	1,800
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	4	1,600

TABLE 29 (Con.)

BULL SHOALS PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	1	14,000
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	-	-
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	-	-
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	-	-
n. Electrical, outside	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-

TABLE 29 (Con.)

BULL SHOALS PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	400	700
b. Water line, 2" PVC	do	3.90	-	2,615	10,200
c. Gate valves & boxes	Sum Job	-	-	-	1,150
d. Water wells	Ea	12,000	1	-	-
e. Wellhouse & equipment	do	13,100	1	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	1,800
Picnic units	Ea	400	-	-	-
Camp units					
a. Basic (including walk-in)	do	650	11	20	13,000
b. Add shelter	do	250	-	2	500
c. Add electrical	do	200	-	15	3,000
Group camp	do	400	-	-	-
Table canopies	do	250	-	-	-
Add electrical (existing camp unit)	do	200	-	7	1,400
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	4	4,000
Changehouses	do	8,500	-	-	-
Sanitary stations					
a. Marine	do	10,000	-	1	10,000
b. Travel trailer	do	4,000	-	1	4,000
Washhouses	do	35,000	-	-	-
Swimming beaches	do	6,000	-	-	-
Mercury vapor lights	do	350	7	-	-
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 29 (Con.)

BULL SHOALS PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	-
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	600
Site preparation	do	-	-	-	7,150
Entrance complex	Ea	15,000	-	-	-
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	302	1,450
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
Total					174,800

Visitation

1967 - 75,800
1968 -102,500
1969 -107,200
1970 -122,400
1971 -122,500
1972 -136,600
1973 -141,600

TABLE 30

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

PONTIAC PARK

Acres 85 — See Plate

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	900	-	-
(2) Flexible pavement	do	-	5,833	-	-
(a) New construction	do	$17.00	-	5,500	93,500
(b) Existing gravel	do	3.50	-	450	1,600
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	309	-	-
(a) New construction	do	11.00	-	1,300	14,300
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	1,060	5,300
b. Flexible pavement	do	-	2,600	-	-
(1) New construction	do	8.00	-	4,000	32,000
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	1	30,000
Camping spurs					
a. Single	do	500	8	31	15,500
b. Double	do	700	1	3	2,100
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	5	2,000

TABLE ___ (Con.)

PONTIAC PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	2	28,000
(2) Waterborne	do	30,000	-	1	30,000
(3) Waterborne with showers	do	32,000	-	2	64,000
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	1,960	14,700
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	270	2,700
d. Outfall lines, 4" steel in lake	do	8.50	-	76	650
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	5	2,000
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	1	34,500
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	1	16,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-			5,000
Contingencies, 15%	-	-			13,000

TABLE 30 (Con.)

PONTIAC PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	314	550
b. Water line, 2" PVC	do	3.90	2,500	987	3,850
c. Gate valves & boxes	Sum Job	-	-	-	1,300
d. Water wells	Ea	12,000	2	1	12,000
e. Wellhouse & equipment	do	13,100	1	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	2,650
Picnic units	Ea	400	4	9	3,600
Camp units					
a. Basic (including walk-in)	do	650	26	26	16,900
b. Add shelter	do	250	-	4	1,000
c. Add electrical	do	200	-	19	3,800
Group camp	do	400	-	-	-
Table canopies	do	250	-	6	1,500
Add electrical (existing camp unit)	do	200	-	17	3,400
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	10	3	3,000
Changehouses	do	8,500	-	1	8,500
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	1	1	6,000
Mercury vapor lights	do	350	2	3	1,050
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 30 (Con.)

PONTIAC PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	–	–	–
Visitor center	do	30,000	–	–	–
Nature center	do	80,000	–	–	–
Administration building	do	75,000	–	–	–
Group cabin	do	10,000	–	–	–
Playground equipment	Sum Job	–	–	–	2,100
Dormitories	Ea	19,000	–	–	–
Causeway	do	25,000	–	–	–
Archery area	do	350	–	–	–
Reforestation	Acre	250	–	–	–
Landscaping & beautification	Sum Job	–	–	–	2,500
Site preparation	do	–	–	–	1,350
Entrance complex	Ea	15,000	–	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	–	–	–
(2) Flexible pavement	do	4.80	–	552	2,650
b. 12 feet wide					
(1) Gravel	do	1.90	–	448	850
(2) Flexible pavement	do	4.05	–	309	1,250
Parking area removals					
a. Gravel	SY	1.25	–	–	–
b. Flexible pavement	do	2.00	–	–	–
Camping unit removals	Ea	150	–	–	–
Picnic unit removals	do	150	–	2	300
Total					548,700

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units	340
3. Slide 20'	550
4. Swings 8' - 4 seat	315
5. Whirlers 6'	375
6. 3-riding toys	360
Total	$2,090
Use	$2,100

Visitation

1967 - 33,800
1968 - 42,100
1969 - 68,400
1970 - 90,500
1971 - 85,400
1972 - 76,100
1973 - 73,800

TABLE 31

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

SPRING CREEK PARK

Acres 372 — See Plate

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	10,400	-	-
(2) Flexible pavement	do	-	4,070	-	-
(a) New construction	do	$17.00	-	6,000	102,000
(b) Existing gravel	do	3.50	-	9,600	33,600
b. 12 feet wide					
(1) Gravel	do	8.50	1,132	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	8,400	92,400
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	2,230	11,150
b. Flexible pavement	do	-	-	-	-
(1) New construction	do	8.00	-	7,600	60,800
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	2	60,000
Camping spurs					
a. Single	do	500	-	63	31,500
b. Double	do	700	-	13	9,100
c. Triple	do	900	-	10	9,000
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

TABLE 31 (Con.)

SPRING CREEK PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	2	1	14,000
(2) Waterborne	do	30,000	-	3	90,000
(3) Waterborne with showers	do	32,000	-	2	64,000
(4) Convert to waterborn	do	12,000	-	1	12,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	7,253	54,400
b. Sewer lines, 6" PVC, gravity	do	8.00	-	250	2,000
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	1,950	19,500
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	250	3,000
f. Manholes	Ea	400	-	21	8,400
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	1	45,500
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	2	33,000
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	7,500
Contingencies, 15%	-	-	-	-	27,550

TABLE 31 (Con.)

SPRING CREEK PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	3,400	5,950
b. Water line, 2" PVC	do	3.90	-	11,308	44,100
c. Gate valves & boxes	Sum Job	-	-	-	4,750
d. Water wells	Ea	12,000	1	2	24,000
e. Wellhouse & equipment	do	13,100	-	3	39,300
f. Electrical	Sum Job	-	-	-	5,000
Contingencies, 15%	-	-	-	-	18,500
Picnic units	Ea	400	7	17	6,800
Camp units					
a. Basic (including walk-in)	do	650	6	112	72,800
b. Add shelter	do	250	-	-	-
c. Add electrical	do	200	-	78	15,600
Group camp	do	400	-	-	-
Table canopies	do	250	-	11	2,750
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	-	1	10,500
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	22	22,000
Changehouses	do	8,500	-	2	17,000
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	1	4,000
Washhouses	do	35,000	-	2	70,000
Swimming beaches	do	6,000	-	2	12,000
Mercury vapor lights	do	350	-	5	1,750
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 31 (Con.)

SPRING CREEK PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	3,500
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	6,550
Site preparation	do	-	-	-	4,850
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	800	1,600
(2) Flexible pavement	do	4.80	-	198	950
b. 12 feet wide					
(1) Gravel	do	1.90	-	1,132	2,150
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
Total					1,212,300

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units (2) @ $340	680
3. Slide 12'	385
4. Slide 20'	550
5. Swings 8' - 4 seat (2) @ $315	630
6. Whirlers 6'	375
7. 3-riding toys (2) @ $360	720
Total	$3,490
Use	$3,500

Visitation

1967 - 19,000
1968 - 39,800
1969 - 28,100
1970 - 25,100
1971 - 33,400
1972 - 42,600
1973 - 41,800

TABLE 32

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

THEODOSIA PARK

Acres 170 — See Plate 29 & 29A

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	4,750	-	-
(2) Flexible pavement	do	-	8,900	-	-
(a) New construction	do	$17.00	-	9,391	159,650
(b) Existing gravel	do	3.50	-	200	700
b. 12 feet wide					
(1) Gravel	do	8.50	700	-	-
(2) Flexible pavement	do	-	358	-	-
(a) New construction	do	11.00	-	3,200	35,200
(b) Existing gravel	do	2.50	-	700	1,750
c. 10 feet wide					
(1) Gravel	do	7.50	-	200	1,500
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	1,250	6,250
b. Flexible pavement	do	-	11,960	-	-
(1) New construction	do	8.00	-	7,900	63,200
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	3	90,000
Camping spurs					
a. Single	do	500	11	36	18,000
b. Double	do	700	-	4	2,800
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	5	2,000

TABLE 32 (Con.)

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	2	1	14,000
(2) Waterborne	do	30,000	-	2	60,000
(3) Waterborne with showers	do	32,000	-	1	32,000
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	2,753	20,650
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	153	1,300
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	6	2,400
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	1	34,500
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	10,800

TABLE 32 (Con.)

THEODOSIA PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	700	771	1,350
b. Water line, 2" PVC	do	3.90	2,600	2,756	10,750
c. Gate valves & boxes	Sum Job	-	-	-	1,800
d. Water wells	Ea	12,000	2	1	12,000
e. Wellhouse & equipment	do	13,100	1	1	13,100
f. Electrical	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	6,250
Picnic units	Ea	400	2	4	1,600
Camp units					
a. Basic (including walk-in)	do	650	29	41	26,650
b. Add shelter	do	250	-	5	1,250
c. Add electrical	do	200	-	29	5,800
Group camp	do	400	-	-	-
Table canopies	do	250	129	4	1,000
Add electrical (existing camp unit)	do	200	-	2	400
Picnic shelters	do	10,500	1	1	10,500
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	9	5	5,000
Changehouses	do	8,500	1	1	8,500
Sanitary stations					
a. Marine	do	10,000	-	1	10,000
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	1	1	6,000
Mercury vapor lights	do	350	4	4	1,400
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 32 (Con.)

THEODOSIA PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	3,500
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	3	800
Landscaping & beautification	Sum Job	-	-	-	3,350
Site preparation	do	-	-	-	1,700
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	100	200
(2) Flexible pavement	do	4.80	-	948	4,550
b. 12 feet wide					
(1) Gravel	do	1.90	-	421	800
(2) Flexible pavement	do	4.05	-	358	1,450
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	3	450
Picnic unit removals	do	150	-	1	150
Total					762,500

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units (2) @ $340	680
3. Slide 12'	385
4. Slide 20'	550
5. Swings 8' - 4 seat (2) @ $315	630
6. Whirlers 6'	375
7. 3-riding toys (2) @ $360	720
Total	$3,490
Use	$3,500

Visitation

1967 - 101,700
1968 - 112,200
1969 - 200,100
1970 - 146,900
1971 - 152,400
1972 - 149,200
1973 - 120,100

TABLE 33

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

HIGHWAY 125 PARK

Acres 303 — See Plate 30 & 30A

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	-	-	-
(2) Flexible pavement	do	-	12,400	-	-
(a) New construction	do	$17.00	-	18,700	317,900
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	9,700	106,700
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	180	1,350
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	2,133	-	-
b. Flexible pavement	do	-	6,000	-	-
(1) New construction	do	8.00	-	4,713	37,700
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	2	60,000
Camping spurs					
a. Single	do	500	21	106	53,000
b. Double	do	700	1	11	7,700
c. Triple	do	900	-	7	6,300
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	17	6,800

TABLE 33 (Con.)

HIGHWAY 125 PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	3	1	14,000
(2) Waterborne	do	30,000	-	5	150,000
(3) Waterborne with showers	do	32,000	-	2	64,000
(4) Convert to waterborn	do	12,000	-	1	12,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	3,880	29,100
b. Sewer lines, 6" PVC, gravity	do	8.00	-	5,044	40,350
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	1,780	17,800
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	450	5,400
f. Manholes	Ea	400	-	22	8,800
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	1	40,500
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	1	45,500
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	2	33,000
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	2	21,000
n. Electrical, outside	Sum Job	-	-	-	10,000
Contingencies, 15%	-	-	-	-	37,750

TABLE 33 (Con.)

HIGHWAY 125 PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	3,743	6,550
b. Water line, 2" PVC	do	3.90	-	8,795	34,300
c. Gate valves & boxes	Sum Job	-	-	-	6,550
d. Water wells	Ea	12,000	2	2	24,000
e. Wellhouse & equipment	do	13,100	1	2	26,200
f. Electrical	Sum Job	-	-	-	5,000
Contingencies, 15%	-	-	-	-	15,400
Picnic units	Ea	400	4	4	1,600
Camp units					
a. Basic (including walk-in)	do	650	27	161	104,650
b. Add shelter	do	250	-	18	4,500
c. Add electrical	do	200	-	113	22,600
Group camp	do	400	-	-	-
Table canopies	do	250	12	3	750
Add electrical (existing camp unit)	do	200	-	4	800
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	-	26	26,000
Changehouses	do	8,500	1	1	8,500
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	3	105,000
Swimming beaches	do	6,000	1	1	6,000
Mercury vapor lights	do	350	2	4	1,400
Courtesy docks	do	6,000	1	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	0.2	500
g. Shelters (rain)	Ea	200	-	-	-

TABLE 33 (Con.)

HIGHWAY 125 PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	9,400
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	1	25,000
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	6,650
Site preparation	do	-	-	-	6,150
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	521	2,500
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	2	300
Total					1,592,700

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units (5) @ $340	1,700
3. Slide 12' (4) @ $385	1,540
4. Swings 8' - 4 seat (5) @ $315	1,575
5. Swings 12' - 4 seat	550
6. Whirler 10'	660
7. 3-riding toys (4) @ $360	1,440
8. 5-riding toys	600
9. Wood climbing structure with slide	1,200
Total	$9,415
Use	$9,400

Visitation	
1967	23,300
1968	25,300
1969	29,600
1970	37,200
1971	46,100
1972	43,600
1973	54,300

TABLE 34

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

BUCK CREEK PARK

Acres 68 — See Plate 31

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	4,350	-	-
(2) Flexible pavement	do	-	6,450	-	-
(a) New construction	do	$17.00	-	1,550	26,350
(b) Existing gravel	do	3.50	-	3,880	13,300
b. 12 feet wide					
(1) Gravel	do	8.50	779	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	1,632	17,950
(b) Existing gravel	do	2.50	-	700	1,750
c. 10 feet wide					
(1) Gravel	do	7.50	-	40	300
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	1,100	5,500
b. Flexible pavement	do	-	4,111	-	-
(1) New construction	do	8.00	-	3,169	25,350
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	4	1	30,000
Camping spurs					
a. Single	do	500	26	57	28,500
b. Double	do	700	-	1	700
c. Triple	do	900	-	5	4,500
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	18	7,200

TABLE 34 (Con.)

BUCK CREEK PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	2	2	28,000
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	2	64,000
(4) Convert to waterborn	do	12,000	-	1	12,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	1,520	11,400
b. Sewer lines, 6" PVC, gravity	do	8.00	-	344	2,750
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	470	4,700
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	142	1,700
f. Manholes	Ea	400	-	3	1,200
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	1	45,500
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	1	16,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	5,000
Contingencies, 15%	-	-	-	-	14,950

TABLE 34 (Con.)

BUCK CREEK PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	1,400	2,450
b. Water line, 2" PVC	do	3.90	-	3,295	12,850
c. Gate valves & boxes	Sum Job	-	-	-	3,200
d. Water wells	Ea	12,000	2	-	-
e. Wellhouse & equipment	do	13,100	1	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	2,800
Picnic units	Ea	400	2	13	5,200
Camp units					
a. Basic (including walk-in)	do	650	31	69	44,850
b. Add shelter	do	250	-	18	4,500
c. Add electrical	do	200	-	34	6,800
Group camp	do	400	-	-	-
Table canopies	do	250	2	13	3,250
Add electrical (existing camp unit)	do	200	-	11	2,200
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	-	15	15,000
Changehouses	do	8,500	1	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	1	-	-
Mercury vapor lights	do	350	-	3	1,050
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 34 (Con.)

BUCK CREEK PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	2,100
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	2	500
Landscaping & beautification	Sum Job	-	-	-	2,300
Site preparation	do	-	-	-	3,100
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	850	1,700
(2) Flexible pavement	do	4.80	-	1,250	6,000
b. 12 feet wide					
(1) Gravel	do	1.90	-	79	150
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	1	150
Picnic unit removals	do	150	-	-	-
Total					550,500

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units	340
3. Slide 20'	550
4. Swings 8' - 4 seat	315
5. Whirlers 6'	375
6. 3-riding toys	360
Total	$2,090
Use	$2,100

Visitation

1967 - 36,600
1968 - 56,800
1969 - 63,000
1970 - 54,400
1971 - 58,100
1972 - 66,700
1973 - 61,900

TABLE 35

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

LEAD HILL PARK

Acres 77 — See Plate 32

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	157	-	-
(2) Flexible pavement	do	-	11,140	-	-
(a) New construction	do	$17.00	-	1,400	23,800
(b) Existing gravel	do	3.50	-	157	550
b. 12 feet wide					
(1) Gravel	do	8.50	4,840	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	500	5,500
(b) Existing gravel	do	2.50	-	920	2,300
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	-	-
b. Flexible pavement	do	-	2,350	-	-
(1) New construction	do	8.00	-	6,400	51,200
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	2	60,000
Camping spurs					
a. Single	do	500	23	28	14,000
b. Double	do	700	-	6	4,200
c. Triple	do	900	1	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	3	1,200

TABLE 35 (Con.)

LEAD HILL PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	3	1	14,000
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	-	-
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	-	-
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	-	-
n. Electrical, outside	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-

TABLE 35 (Con.)

LEAD HILL PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	700	829	1,450
b. Water line, 2" PVC	do	3.90	3,500	923	3,600
c. Gate valves & boxes	Sum Job	-	-	-	1,050
d. Water wells	Ea	12,000	2	-	-
e. Wellhouse & equipment	do	13,100	1	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	950
Picnic units	Ea	400	12	11	4,400
Camp units					
a. Basic (including walk-in)	do	650	45	25	16,250
b. Add shelter	do	250	-	21	5,250
c. Add electrical	do	200	-	-	-
Group camp	do	400	-	-	-
Table canopies	do	250	10	12	3,000
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	1	1	10,500
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	17	5	5,000
Changehouses	do	8,500	1	1	8,500
Sanitary stations					
a. Marine	do	10,000	-	1	10,000
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	-	-
Swimming beaches	do	6,000	1	1	6,000
Mercury vapor lights	do	350	3	2	700
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 35 (Con.)

LEAD HILL PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	3,800
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	6	1,500
Landscaping & beautification	Sum Job	-	-	-	1,200
Site preparation	do	-	-	-	1,350
Entrance complex	Ea	15,000	-	-	-
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	906	4,350
b. 12 feet wide					
(1) Gravel	do	1.90	-	3,921	7,450
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	4	600
Picnic unit removals	do	150	-	-	-
Total					274,400

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units	340
3. Swings 8' - 4 seat	315
4. Swings 12' - 4 seat	550
5. Whirler 10'	660
6. 5-riding toys	600
7. Wood climbing structure with slide	1,200
Total	$3,815
Use	$3,800

Visitation

1967 - 167,300
1968 - 229,200
1969 - 228,300
1970 - 248,300
1971 - 242,600
1972 - 343,500
1973 - 273,700

TABLE 36

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

TUCKER HOLLOW PARK

Acres 80 — See Plate 33 & 33A

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	700	-	-
(2) Flexible pavement	do	-	9,000	-	-
(a) New construction	do	$17.00	-	2,600	44,200
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	6,300	69,300
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	700	5,250
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	1,200	6,000
b. Flexible pavement	do	-	2,225	-	-
(1) New construction	do	8.00	-	1,600	12,800
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	-	-
Camping spurs					
a. Single	do	500	14	65	32,500
b. Double	do	700	-	8	5,600
c. Triple	do	900	-	10	9,000
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	14	5,600

TABLE 36 (Con.)

TUCKER HOLLOW PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	2	1	14,000
(2) Waterborne	do	30,000	-	2	60,000
(3) Waterborne with showers	do	32,000	-	1	32,000
(4) Convert to waterborn	do	12,000	-	2	24,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	2,413	18,100
b. Sewer lines, 6" PVC, gravity	do	8.00	-	1,662	13,300
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	430	4,300
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	150	1,800
f. Manholes	Ea	400	-	9	3,600
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	1	45,500
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	1	16,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	5,000
Contingencies, 15%	-	-	-	-	17,850

TABLE 36 (Con.)

TUCKER HOLLOW PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	1,514	2,650
b. Water line, 2" PVC	do	3.90	-	4,000	15,600
c. Gate valves & boxes	Sum Job	-	-	-	4,500
d. Water wells	Ea	12,000	2	1	12,000
e. Wellhouse & equipment	do	13,100	1	2	26,200
f. Electrical	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	7,550
Picnic units	Ea	400	4	-	-
Camp units					
a. Basic (including walk-in)	do	650	28	108	70,200
b. Add shelter	do	250	-	33	8,250
c. Add electrical	do	200	-	76	15,200
Group camp	do	400	-	-	-
Table canopies	do	250	-	-	-
Add electrical (existing camp unit)	do	200	-	8	1,600
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	20	20,000
Changehouses	do	8,500	1	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	1	1	4,000
Washhouses	do	35,000	-	2	70,000
Swimming beaches	do	6,000	1	-	-
Mercury vapor lights	do	350	6	1	350
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 36 (Con.)

TUCKER HOLLOW PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	6,600
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	5	1,250
Landscaping & beautification	Sum Job	-	-	-	2,400
Site preparation	do	-	-	-	4,050
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	700	1,400
(2) Flexible pavement	do	4.80	-	500	2,400
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	2	300
Total					750,700

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units (3) @ $340	1,020
3. Slide 12' (2) @ $385	770
4. Swings 8' - 4 seat (3) @ $315	945
5. Swings 12' - 4 seat	550
6. Whirler 10'	660
7. 3-riding toys (2) @ $360	720
8. 5-riding toys	600
9. Wood climbing structure with slide	1,200
Total	$6,615
Use	$6,600

Visitation

1967 - 34,400
1968 - 27,200
1969 - 41,200
1970 - 60,300
1971 - 45,500
1972 - 46,000
1973 - 59,500

TABLE 37

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

HIGHWAY K PARK

Acres 47 — See Plate 34

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	100	-	-
(2) Flexible pavement	do	-	6,240	-	-
(a) New construction	do	$17.00	-	100	1,700
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	474	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	2,350	25,850
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	80	600
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	1,100	5,500
b. Flexible pavement	do	-	2,730	-	-
(1) New construction	do	8.00	-	3,000	24,000
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	1	30,000
Camping spurs					
a. Single	do	500	-	35	17,500
b. Double	do	700	-	3	2,100
c. Triple	do	900	-	4	3,600
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

TABLE 37 (Con.)

HIGHWAY K PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	2	1	14,000
(2) Waterborne	do	30,000	-	1	30,000
(3) Waterborne with showers	do	32,000	-	1	32,000
(4) Convert to waterborn	do	12,000	-	1	12,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	1,620	12,150
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	300	2,550
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	4	1,600
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	1	34,500
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	10,000

TABLE 37 (Con.)

HIGHWAY K PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	829	1,450
b. Water line, 2" PVC	do	3.90	-	2,692	10,500
c. Gate valves & boxes	Sum Job	-	-	-	3,200
d. Water wells	Ea	12,000	2	-	-
e. Wellhouse & equipment	do	13,100	-	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	2,250
Picnic units	Ea	400	2	7	2,800
Camp units					
a. Basic (including walk-in)	do	650	19	39	25,350
b. Add shelter	do	250	-	2	500
c. Add electrical	do	200	-	37	7,400
Group camp	do	400	-	-	-
Table canopies	do	250	-	4	1,000
Add electrical (existing camp unit)	do	200	-	5	1,000
Picnic shelters	do	10,500	-	1	10,500
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	16	16,000
Changehouses	do	8,500	-	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	1	4,000
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	-	-	-
Mercury vapor lights	do	350	-	2	700
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 37 (Con.)

HIGHWAY K PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	2,100
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	1,900
Site preparation	do	-	-	-	1,750
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	100	200
(2) Flexible pavement	do	4.80	-	208	1,000
b. 12 feet wide					
(1) Gravel	do	1.90	-	474	900
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	5	750
Picnic unit removals	do	150	-	-	-
Total					417,900

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units	340
3. Slide 20'	550
4. Swings 8' - 4 seat	315
5. Whirlers 6'	375
6. 3-riding toys	360
Total	$2,090
Use	$2,100

Visitation	
1967	35,100
1968	45,000
1969	59,500
1970	49,000
1971	37,700
1972	39,100
1973	49,000

TABLE 38

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

BEAVER CREEK PARK

Acres 65 — See Plate 35 & 35A

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	2,257	-	-
(2) Flexible pavement	do	-	4,550	-	-
(a) New construction	do	$17.00	-	5,450	92,650
(b) Existing gravel	do	3.50	-	1,057	3,700
b. 12 feet wide					
(1) Gravel	do	8.50	600	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	15,050	165,550
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	560	4,200
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	3,320	940	4,700
b. Flexible pavement	do	-	11,720	-	-
(1) New construction	do	8.00	-	3,562	28,500
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	3	-	-
Camping spurs					
a. Single	do	500	9	146	73,000
b. Double	do	700	-	16	11,200
c. Triple	do	900	-	15	13,500
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	9	3,600

TABLE 38 (Con.)

BEAVER CREEK PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	2	3	42,000
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	3	96,000
(4) Convert to waterborn	do	12,000	-	1	12,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	4,253	31,900
b. Sewer lines, 6" PVC, gravity	do	8.00	-	981	7,850
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	590	5,900
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	621	7,450
f. Manholes	Ea	400	-	11	4,400
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	1	80,000
l. Lift station	do	16,500	-	1	16,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	2	21,000
n. Electrical, outside	Sum Job	-	-	-	7,500
Contingencies, 15%	-	-	-	-	29,050

TABLE 38 (Con.)

BEAVER CREEK PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	350	3,314	5,800
b. Water line, 2" PVC	do	3.90	2,000	7,603	29,650
c. Gate valves & boxes	Sum Job	-	-	-	5,250
d. Water wells	Ea	12,000	2	-	-
e. Wellhouse & equipment	do	13,100	1	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	6,100
Picnic units	Ea	400	1	27	10,800
Camp units					
a. Basic (including walk-in)	do	650	18	215	139,750
b. Add shelter	do	250	-	51	12,750
c. Add electrical	do	200	-	43	8,600
Group camp	do	400	-	-	-
Table canopies	do	250	-	27	6,750
Add electrical (existing camp unit)	do	200	-	6	1,200
Picnic shelters	do	10,500	-	1	10,500
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	8	27	27,000
Changehouses	do	8,500	1	-	-
Sanitary stations					
a. Marine	do	10,000	-	1	10,000
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	3	105,000
Swimming beaches	do	6,000	1	-	-
Mercury vapor lights	do	350	-	3	1,050
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 38 (Con.)

BEAVER CREEK PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	6,300
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	12	3,000
Landscaping & beautification	Sum Job	-	-	-	2,500
Site preparation	do	-	-	-	9,100
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	1,200	2,400
(2) Flexible pavement	do	4.80	-	2,115	10,150
b. 12 feet wide					
(1) Gravel	do	1.90	-	605	1,150
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	3,320	4,150
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	1	150
Picnic unit removals	do	150	-	1	150
Total					1,196,400

(1) Playground equipment proposed:

1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units (4) @ $340	1,360
3. Slide 12' (3) @ $385	1,155
4. Slide 20'	500
5. Swings 8' - 4 seat (4) @ $315	1,260
6. Whirlers 6'	375
7. 3-riding toys (4) @ (360	1,440
Total	$6,290
Use	6,300

Visitation

1967 - 49,500
1968 - 46,300
1969 - 57,300
1970 - 78,500
1971 - 84,200
1972 - 68,800
1973 - 80,600

TABLE 39

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

KISSEE MILLS PARK

Acres 205 — See Plate 36

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	-	-	-
(2) Flexible pavement	do	-	5,100	-	-
(a) New construction	do	$17.00	-	500	8,500
(b) Existing gravel	do	3.50	-	157	550
b. 12 feet wide					
(1) Gravel	do	8.50	870	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	1,150	12,650
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	-	-
b. Flexible pavement	do	-	240	-	-
(1) New construction	do	8.00	-	3,500	28,000
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	1	-	-
Camping spurs			-	13	6,500
a. Single	do	500	-	1	700
b. Double	do	700	-	-	-
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400			

TABLE 39 (Con.)

KISSEE MILLS PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	1	14,000
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	-	-
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	-	-
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	-	-
n. Electrical, outside	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-

TABLE 39 (Con.)

KISSEE MILLS PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	657	1,150
b. Water line, 2" PVC	do	3.90	-	2,218	8,650
c. Gate valves & boxes	Sum Job	-	-	-	1,300
d. Water wells	Ea	12,000	1	-	-
e. Wellhouse & equipment	do	13,100	1	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	1,650
Picnic units	Ea	400	4	24	9,600
Camp units					
a. Basic (including walk-in)	do	650	4	13	8,450
b. Add shelter	do	250	-	11	2,750
c. Add electrical	do	200	-	-	-
Group camp	do	400	-	-	-
Table canopies	do	250	6	12	3,000
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	6	6,000
Changehouses	do	8,500	-	1	8,500
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	-	-
Washhouses	do	35,000	-	-	-
Swimming beaches	do	6,000	1	1	6,000
Mercury vapor lights	do	350	-	-	-
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200			

TABLE 39 (Con.)

KISSEE MILLS PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	1,400
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	4	1,000
Landscaping & beautification	Sum Job	-	-	-	2,450
Site preparation	do	-	-	-	1,400
Entrance complex	Ea	15,000	-	-	-
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	-	-
b. 12 feet wide					
(1) Gravel	do	1.90	-	868	1,650
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	240	500
Camping unit removals	Ea	150	-	2	300
Picnic unit removals	do	150	-	1	150
Total					136,800

(1) Playground equipment proposed:

1. See-saw, 4 units	$ 340
2. Slide 12'	385
3. Swings 8' - 4 seat	315
4. 3-riding toys	360
Total	$1,400

Visitation

1967 - 37,400
1968 - 65,700
1969 - 71,600
1970 - 55,500
1971 - 56,300
1972 - 56,800
1973 - 28,100

TABLE 40

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

SHADOW ROCK PARK

Acres 54 — See Plate 37

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	5,600	-	-
(2) Flexible pavement	do	-	7,650	-	-
(a) New construction	do	$17.00	-	-	-
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	-	-
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00			
Parking areas					
a. Gravel	SY	5.00	300	-	-
b. Flexible pavement	do	-			
(1) New construction	do	8.00	-	-	-
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	1	-	-
Camping spurs					
a. Single	do	500	-	-	-
b. Double	do	700	-	-	-
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

TABLE 40 (Con.)

SHADOW ROCK PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	-	-
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	2	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	-	-
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	-	-
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	-	-
n. Electrical, outside	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-

TABLE 40 (Con.)

SHADOW ROCK PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	-	-
b. Water line, 2" PVC	do	3.90	-	-	-
c. Gate valves & boxes	Sum Job	-	-	-	-
d. Water wells	Ea	12,000	2	-	-
e. Wellhouse & equipment	do	13,100	-	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-
Picnic units	Ea	400	24	-	-
Camp units					
a. Basic (including walk-in)	do	650	-	-	-
b. Add shelter	do	250	-	-	-
c. Add electrical	do	200	-	-	-
Group camp	do	400	-	-	-
Table canopies	do	250	-	-	-
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	-	-
Changehouses	do	8,500	-	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	-	-
Washhouses	do	35,000	-	-	-
Swimming beaches	do	6,000	-	-	-
Mercury vapor lights	do	350	-	-	-
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 40 (Con.)

SHADOW ROCK PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	-
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	-
Site preparation	do	-	-	-	-
Entrance complex	Ea	15,000	-	-	-
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	-	-
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
Total					

Visitation

1967 - 145,000
1968 - 233,300
1969 - 342,200
1970 - 269,500
1971 - 410,300
1972 - 312,600
1973 - 93,200

TABLE 41

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

RIVER RUN PARK

Acres 164 — See Plate 38

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	-	-	-
(2) Flexible pavement	do	-	11,892	-	-
(a) New construction	do	$17.00	-	3,900	66,300
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	2,800	-	-
(a) New construction	do	11.00	-	3,400	37,400
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	-	-
b. Flexible pavement	do	-	5,500	-	-
(1) New construction	do	8.00	-	4,525	36,200
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	1	30,000
Camping spurs					
a. Single	do	500	18	49	24,500
b. Double	do	700	5	2	1,400
c. Triple	do	900	-	3	2,700
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

TABLE 41 (Con.)

RIVER RUN PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	5	70,000
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	-	-
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	-	-
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	-	-
n. Electrical, outside	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	-

TABLE 41 (Con.)

RIVER RUN PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	229	400
b. Water line, 2" PVC	do	3.90	-	6,282	24,500
c. Gate valves & boxes	Sum Job	-	-	-	2,200
d. Water wells	Ea	12,000	1	1	12,000
e. Wellhouse & equipment	do	13,100	-	2	26,200
f. Electrical	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	10,200
Picnic units	Ea	400	-	10	4,000
Camp units					
a. Basic (including walk-in)	do	650	20	70	45,500
b. Add shelter	do	250	-	70	17,500
c. Add electrical	do	200	-	-	-
Group camp	do	400	-	-	-
Table canopies	do	250	-	10	2,500
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	-	1	10,500
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	-	11	11,000
Changehouses	do	8,500	-	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	-	-
Swimming beaches	do	6,000	-	-	-
Mercury vapor lights	do	350	-	-	-
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 41 (Con.)

RIVER RUN PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	4,200
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	10	2,500
Landscaping & beautification	Sum Job	-	-	-	2,850
Site preparation	do	-	-	-	3,000
Entrance complex	Ea	15,000	-	-	-
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	1,406	6,750
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	275	550
Camping unit removals	Ea	150	-	2	300
Picnic unit removals	do	150	-	-	-
Total					458,400

(1) Playground equipment proposed:

1. See-saw, 4 units (3) @ $340	$1,020
2. Slide 12' (3) @ $385	1,155
3. Swings 8' - 4 seat (3) @ $315	945
4. 3-riding toys (3) @ $360	1,080
Total	$4,200

Visitation

1967 - 37,800
1968 - 42,800
1969 - 52,900
1970 - 69,700
1971 - 78,400
1972 - 80,600
1973 - 18,300

TABLE 42

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

POINT RETURN PARK

Acres 38 — See Plate 39

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	$17.00	5,700	-	-
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	-	-
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	850	4,250
b. Flexible pavement	do	-	3,000	-	-
(1) New construction	do	8.00	-	3,600	28,800
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	2	1	30,000
Camping spurs					
a. Single	do	500	22	15	7,500
b. Double	do	700	-	-	-
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

TABLE 42 (Con.)

POINT RETURN PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	2	-	-
(2) Waterborne	do	30,000	-	-	-
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	720	5,400
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	253	2,150
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	1	400
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	1	26,500
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	7,000

TABLE 42 (Con.)

POINT RETURN PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	1,485	2,600
b. Water line, 2" PVC	do	3.90	-	949	3,700
c. Gate valves & boxes	Sum Job	-	-	-	1,700
d. Water wells	Ea	12,000	2	-	-
e. Wellhouse & equipment	do	13,100	-	-	-
f. Electrical	Sum Job	-	-	-	-
Contingencies, 15%	-	-	-	-	1,200
Picnic units	Ea	400	6	10	4,000
Camp units					
a. Basic (including walk-in)	do	650	22	15	9,750
b. Add shelter	do	250	-	-	-
c. Add electrical	do	200	-	11	2,200
Group camp	do	400	-	-	-
Table canopies	do	250	2	3	750
Add electrical (existing camp unit)	do	200	-	17	3,400
Picnic shelters	do	10,500	-	1	10,500
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	2	8	8,000
Changehouses	do	8,500	1	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	1	-	-
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	1	-	-
Mercury vapor lights	do	350	-	2	700
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 42 (Con.)

POINT RETURN PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	-
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	800
Site preparation	do	-	-	-	950
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	500	2,400
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	2	300
Total					228,800

Visitation

1967 - 47,600
1968 - 69,500
1969 - 47,200
1970 - 65,800
1971 - 53,400
1972 - 53,900
1973 - 55,200

TABLE 43

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

WOODARD PARK

Acres 50 — See Plate 40

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	1,400	-	-
(2) Flexible pavement	do	-	200	-	-
(a) New construction	do	$17.00	-	1,671	28,400
(b) Existing gravel	do	3.50	-	1,400	4,900
b. 12 feet wide					
(1) Gravel	do	8.50	2,500	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	2,750	30,250
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	200	1,500
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	1,100	5,500
b. Flexible pavement	do	-	-	-	-
(1) New construction	do	8.00	-	3,681	29,450
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	-	1	30,000
Camping spurs					
a. Single	do	500	-	34	17,000
b. Double	do	700	-	1	700
c. Triple	do	900	-	2	1,800
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

TABLE 43 (Con.)

WOODARD PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	-	-
(2) Waterborne	do	30,000	-	1	30,000
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	1	12,000
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	1,280	9,600
b. Sewer lines, 6" PVC, gravity	do	8.00	-	-	-
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	850	8,500
d. Outfall lines, 4" steel in lake	do	8.50	-	71	600
e. Outfall lines, 6" steel in lake	do	12.00	-	-	-
f. Manholes	Ea	400	-	1	400
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	1	34,500
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	1	16,500
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	5,000
Contingencies, 15%	-	-	-	-	12,900

TABLE 43 (Con.)

WOODARD PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	971	1,700
b. Water line, 2" PVC	do	3.90	-	2,064	8,050
c. Gate valves & boxes	Sum Job	-	-	-	1,550
d. Water wells	Ea	12,000	-	1	12,000
e. Wellhouse & equipment	do	13,100	-	1	13,100
f. Electrical	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	5,850
Picnic units	Ea	400	-	8	3,200
Camp units					
a. Basic (including walk-in)	do	650	4	38	24,700
b. Add shelter	do	250	-	17	4,250
c. Add electrical	do	200	-	20	4,000
Group camp	do	400	-	-	-
Table canopies	do	250	4	8	2,000
Add electrical (existing camp unit)	do	200	-	4	800
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	7	7,000
Changehouses	do	8,500	-	1	8,500
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	1	4,000
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	-	1	6,000
Mercury vapor lights	do	350	-	2	700
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 43 (Con.)

WOODARD PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	1,400
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	1,450
Site preparation	do	-	-	-	1,800
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	200	950
b. 12 feet wide					
(1) Gravel	do	1.90	-	2,000	3,800
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
Total					459,300

(1) Playground equipment proposed:

1. See-saw, 4 units	$ 340
2. Slide 12'	385
3. Swings 8' - 4 seat	315
4. 3-riding toys	360
Total	$1,400

Visitation	
1967	-
1968	-17,000
1969	-15,600
1970	-16,800
1971	-15,100
1972	-16,100
1973	-16,700

TABLE 44

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

LOWRY PARK

Acres 183 — See Plate 41

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	6,600	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	$17.00	-	3,200	54,400
(b) Existing gravel	do	3.50	-	5,400	18,900
b. 12 feet wide					
(1) Gravel	do	8.50	2,300	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	5,400	59,400
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	1,150	5,750
b. Flexible pavement	do	-	-	-	-
(1) New construction	do	8.00	-	7,800	62,400
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	-	2	60,000
Camping spurs					
a. Single	do	500	7	44	22,000
b. Double	do	700	1	-	-
c. Triple	do	900	-	4	3,600
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	9	3,600

TABLE 44 (Con.)

LOWRY PARK

Item	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	1	1	14,000
(2) Waterborne	do	30,000	-	1	30,000
(3) Waterborne with showers	do	32,000	-	1	32,000
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	1,400	10,500
b. Sewer lines, 6" PVC, gravity	do	8.00	-	800	6,400
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	221	2,650
f. Manholes	Ea	400	-	5	2,000
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	1	40,500
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	-	-
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	11,250

TABLE 44 (Con.)

LOWRY PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	1,914	3,350
b. Water line, 2" PVC	do	3.90	-	5,910	23,050
c. Gate valves & boxes	Sum Job	-	-	-	3,300
d. Water wells	Ea	12,000	1	1	12,000
e. Wellhouse & equipment	do	13,100	1	1	13,100
f. Electrical	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	8,600
Picnic units	Ea	400	-	27	10,800
Camp units					
a. Basic (including walk-in)	do	650	4	66	42,900
b. Add shelter	do	250	-	49	12,250
c. Add electrical	do	200	-	31	6,200
Group camp	do	400	-	-	-
Table canopies	do	250	-	13	3,250
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	-	-	-
Amphitheaters	do	750	-	-	-
Drinking fountains	do	1,000	-	16	16,000
Changehouses	do	8,500	-	2	17,000
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	1	4,000
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	-	2	12,000
Mercury vapor lights	do	350	-	2	700
Courtesy docks	do	6,000	-	-	-
Towers	do	2,500	-	-	-
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	-	-
g. Shelters (rain)	Ea	200	-	-	-

TABLE 44 (Con.)

LOWRY PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	-	-
Group cabin	do	10,000	-	-	-
Playground equipment	Sum Job	-	-	-	1,400
Dormitories	Ea	19,000	-	-	-
Causeway	do	25,000	-	-	-
Archery area	do	350	-	-	-
Reforestation	Acre	250	-	5	1,250
Landscaping & beautification	Sum Job	-	-	-	3,200
Site preparation	do	-	-	-	3,100
Entrance complex	Ea	15,000	-	1	15,000
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	-	-
b. 12 feet wide					
(1) Gravel	do	1.90	-	1,316	2,500
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
Total					704,800

(1) Playground equipment proposed:

1. See-saw, 4 units	$ 340
2. Slide, 12'	385
3. Swings 8' - 4 seat	315
4. 3-riding toys	360
Total	$1,400

Visitation	
1967	2,800
1968	1,700
1969	2,000
1970	4,200
1971	3,900
1972	4,100
1973	1,700

TABLE 45

DETAILED ESTIMATE OF COST FOR ADDITIONAL RECREATIONAL FACILITIES

BULL SHOALS LAKE

GROUP USE PARK

Acres 165 — See Plate 42

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Roads					
a. 18 feet wide					
(1) Gravel	LF	-	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	$17.00	-	2,700	45,900
(b) Existing gravel	do	3.50	-	-	-
b. 12 feet wide					
(1) Gravel	do	8.50	-	-	-
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	11.00	-	800	8,800
(b) Existing gravel	do	2.50	-	-	-
c. 10 feet wide					
(1) Gravel	do	7.50	-	600	4,500
(2) Flexible pavement	do	-	-	-	-
(a) New construction	do	10.00	-	-	-
(b) Existing gravel	do	2.00	-	-	-
Parking areas					
a. Gravel	SY	5.00	-	-	-
b. Flexible pavement	do	-	-	-	-
(1) New construction	do	8.00	-	2,200	17,600
(2) Existing gravel	do	2.25	-	-	-
Launching lanes, concrete	Ea	30,000	-	-	-
Camping spurs					
a. Single	do	500	-	-	-
b. Double	do	700	-	-	-
c. Triple	do	900	-	-	-
d. Pull through	do	650	-	-	-
e. Existing to be paved	do	400	-	-	-

TABLE 45 (Con.)

GROUP USE PARK

Item	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Toilets					
a. Masonry					
(1) Vault	Ea	$14,000	-	1	14,000
(2) Waterborne	do	30,000	-	1	30,000
(3) Waterborne with showers	do	32,000	-	-	-
(4) Convert to waterborn	do	12,000	-	-	-
b. Wooden, vault	do	-	-	-	-
Sewage system					
a. Sewer lines, 4" PVC, gravity	LF	7.50	-	1,853	13,900
b. Sewer lines, 6" PVC, gravity	do	8.00	-	1,250	10,000
c. Sewer lines, 4" C.I. or steel force main	do	10.00	-	-	-
d. Outfall lines, 4" steel in lake	do	8.50	-	-	-
e. Outfall lines, 6" steel in lake	do	12.00	-	150	1,800
f. Manholes	Ea	400	-	6	2,400
g. Treatment plant, tertiary, 5,000 GPD	do	26,500	-	-	-
h. Treatment plant, tertiary, 10,000 GPD	do	34,500	-	-	-
i. Treatment plant, tertiary, 15,000 GPD	do	40,500	-	-	-
j. Treatment plant, tertiary, 20,000 GPD	do	45,500	-	1	45,500
k. Treatment plant, tertiary, 40,000 GPD	do	80,000	-	-	-
l. Lift station	do	16,500	-	-	-
m. Holding tank, dosing siphon, chlorinator, analyzer, & house	do	10,500	-	1	10,500
n. Electrical, outside	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	13,000

TABLE 45 (Con.)

GROUP USE PARK

	Unit	Unit Cost	Existing Facilities: FY 73 Quantity	Proposed Facilities: Quantity	Proposed Facilities: Cost
Water system					
a. Water line, 3/4" PVC	LF	$1.75	-	886	1,550
b. Water line, 2" PVC	do	3.90	-	6,192	24,150
c. Gate valves & boxes	Sum Job	-	-	-	2,550
d. Water wells	Ea	12,000	-	1	12,000
e. Wellhouse & equipment	do	13,100	-	1	13,100
f. Electrical	Sum Job	-	-	-	2,500
Contingencies, 15%	-	-	-	-	8,400
Picnic units	Ea	400	-	-	-
Camp units					
a. Basic (including walk-in)	do	650	-	-	-
b. Add shelter	do	250	-	-	-
c. Add electrical	do	200	-	-	-
Group camp	do	400	-	7	2,800
Table canopies	do	250	-	-	-
Add electrical (existing camp unit)	do	200	-	-	-
Picnic shelters	do	10,500	-	2	21,000
Amphitheaters	do	750	-	1	750
Drinking fountains	do	1,000	-	11	11,000
Changehouses	do	8,500	-	-	-
Sanitary stations					
a. Marine	do	10,000	-	-	-
b. Travel trailer	do	4,000	-	-	-
Washhouses	do	35,000	-	1	35,000
Swimming beaches	do	6,000	-	2	12,000
Mercury vapor lights	do	350	-	1	350
Courtesy docks	do	6,000	-	2	12,000
Towers	do	2,500	-	2	5,000
Trails					
a. Connecting	Mile	2,500	-	-	-
b. Hiking	do	2,500	-	-	-
c. Interpretive	do	10,000	-	-	-
d. Equestrian	do	2,500	-	-	-
e. Motorcycle	do	1,200	-	-	-
f. Park circulation	do	2,500	-	2.9	7,250
g. Shelters (rain)	Ea	200	-	-	-

TABLE 45 (Con.)

GROUP USE PARK

	Unit	Unit Cost	Existing Facilities FY 73 Quantity	Proposed Facilities Quantity	Proposed Facilities Cost
Maintenance Building	Ea	100,000	-	-	-
Visitor center	do	30,000	-	-	-
Nature center	do	80,000	-	-	-
Administration building	do	75,000	-	1	75,000
Group cabin	do	10,000	-	10	100,000
Playground equipment	Sum Job	-	-	-	3,800
Dormitories	Ea	19,000	-	1	19,000
Causeway	do	25,000	-	-	-
Archery area	do	350	-	1	350
Reforestation	Acre	250	-	-	-
Landscaping & beautification	Sum Job	-	-	-	5,650
Site preparation	do	-	-	-	300
Entrance complex	Ea	15,000	-	-	-
Road removals					
a. 18 feet wide					
(1) Gravel	LF	2.00	-	-	-
(2) Flexible pavement	do	4.80	-	-	-
b. 12 feet wide					
(1) Gravel	do	1.90	-	-	-
(2) Flexible pavement	do	4.05	-	-	-
Parking area removals					
a. Gravel	SY	1.25	-	-	-
b. Flexible pavement	do	2.00	-	-	-
Camping unit removals	Ea	150	-	-	-
Picnic unit removals	do	150	-	-	-
Total					595,900

(1) Playground equipment proposed	
1. Horizontal monkey ladder	$ 150
2. See-saw, 4 units	340
3. Swings 8' - 4 seat	315
4. Swings 12' - 4 seat	550
5. Whirler 10'	660
6. 5-riding toys	600
7. Wood climbing structure with slide	1,200
Total	$3,815
Use	$3,800

Visitation	
1967	-
1968	-
1969	-
1970	-
1971	-
1972	-
1973	-

SECTION XVI

CONCLUSIONS AND RECOMMENDATIONS

16-01. Conclusions.

a. The Bull Shoals Lake Project should be developed in accordance with this master plan. Its utilization will assure that all project lands and water are developed according to the best and highest use, and conserved and wisely managed to provide recreational opportunities for present and future generations.

b. This master plan is considered to be a flexible plan of action, establishing the basic direction for development and management of the Bull Shoals project consonant with the capabilities of the resource and the public demand. The master plan will be periodically reviewed on a five year basis to facilitate the evaluation and utilization of new information as it becomes available.

16-02. Recommendations. It is recommended that this master plan be approved as the basis for future development and management of the Bull Shoals land and water resources.

SECTION XVII

LAND USE MAPS, SITE PLANS, PHOTOMAPS, AND TYPICAL DETAILS

Plate No.	Title
7	Project Recreation Parks and Land Use Map Index
8-21	Land Use Maps
22	Dam Area and Bull Shoals State Park
22A	Dam Area and Bull Shoals State Park Photomap
23	Dam Site Park
23A	Dam Site Park Photomap
24	Lakeview Park
24A	Lakeview Park Photomap
25	Bull Shoals Park
25A	Bull Shoals Park Photomap
26	Oakland Park
26A	Oakland Park Photomap
27	Pontiac Park
27A	Pontiac Park Photomap
28	Spring Creek Park
28A	Spring Creek Park Photomap
29 & 29A	Theodosia Park
29B & 29C	Theodosia Park Photomap
30 & 30A	Highway 125 Park
30B & 30C	Highway 125 Park Photomap
31	Buck Creek Park
31A	Buck Creek Park Photomap
32	Lead Hill Park
32A	Lead Hill Park Photomap
33 & 33A	Tucker Hollow Park
33B & 33C	Tucker Hollow Park Photomap
34	Highway K Park
34A	Highway K Park Photomap
35 & 35A	Beaver Creek Park
35B & 35C	Beaver Creek Park Photomap
36	Kissee Mills Park
36A	Kissee Mills Park Photomap
37	Shadow Rock Park
37A	Shadow Rock Park Photomap
38	River Run Park
38A & 38B	River Run Park Photomap
39	Point Return Park
39A	Point Return Park Photomap
40	Ozark Isle Park
40A	Ozark Isle Park Photomap

Plate No.	Title
41	Woodard Park
41A	Woodard Park Photomap
42	Lowry Park
42A & 42B	Lowry Park Photomap
43	Group Use Park
43A	Group Use Park Photomap
44 & 44A	Typical Entrance Complexes
45	Typical Structures
46	Recreation Road Details

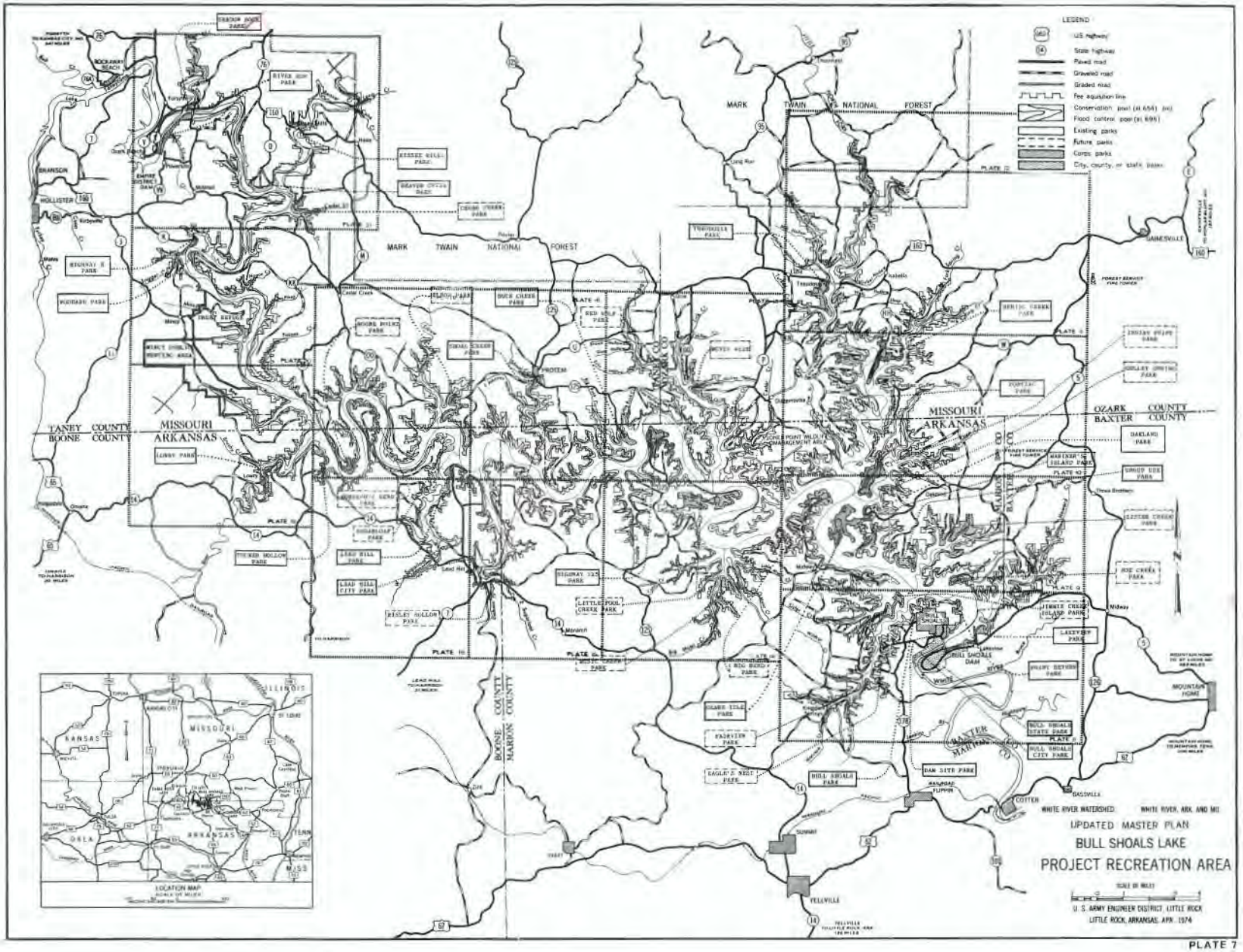
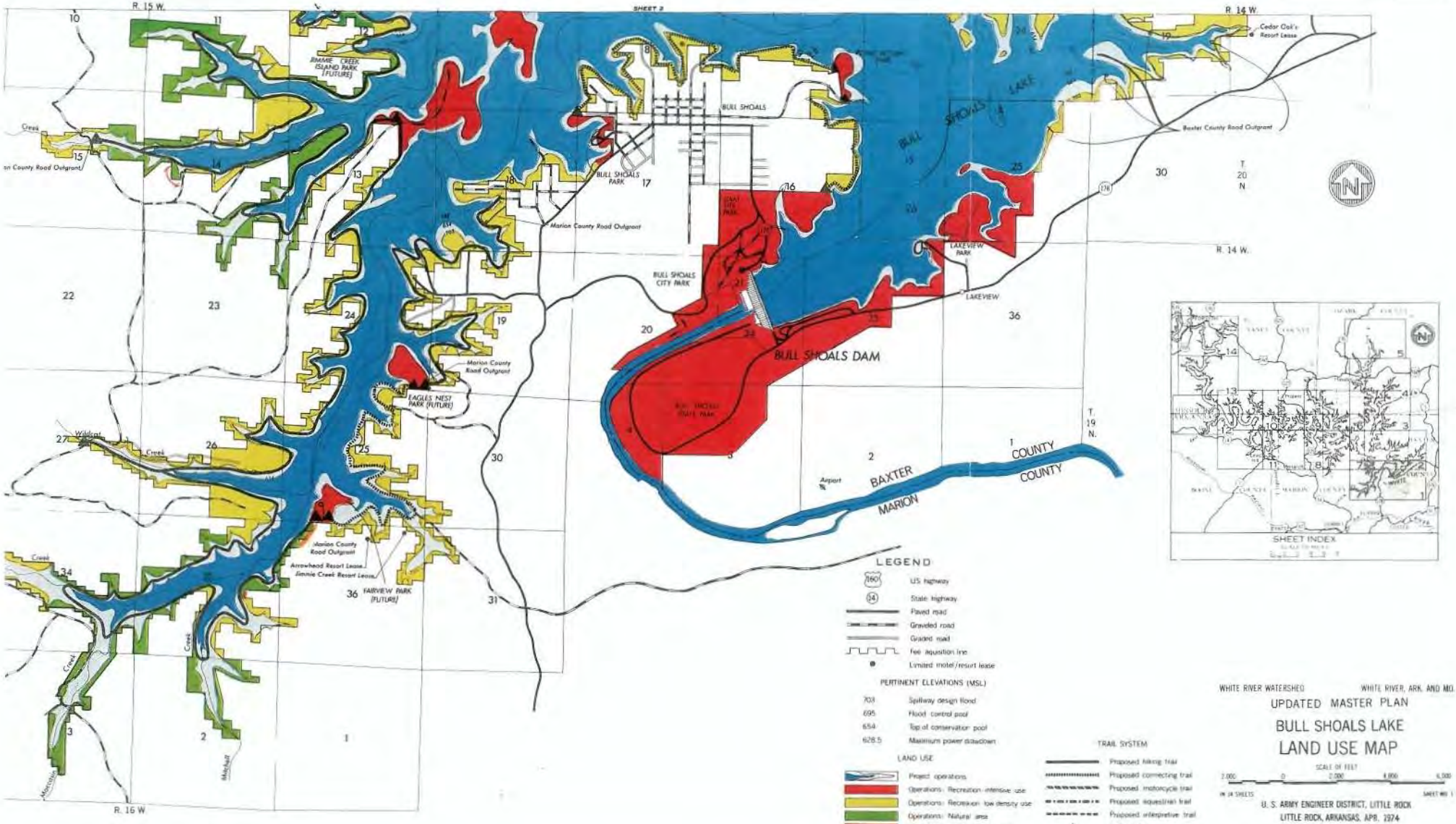

LEGEND
US highway
State highway
Paved road
Gravelled road
Graded road
Fee aquisition line
Conservation pool (el 654) (ac)
Flood control pool (el 695)
Existing parks
Future parks
Corps parks
City, county, or state parks
MARK TWAIN NATIONAL FOREST
TANEY COUNTY
BOONE COUNTY
MISSOURI
ARKANSAS
OZARK COUNTY
BAXTER COUNTY
BOONE COUNTY
MARION COUNTY
BRANSON
HOLLISTER
BULL SHOALS DAM
BULL SHOALS LAKE
MOUNTAIN HOME
YELLVILLE
GASSVILLE
LOCATION MAP
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
PROJECT RECREATION AREA
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 7



WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

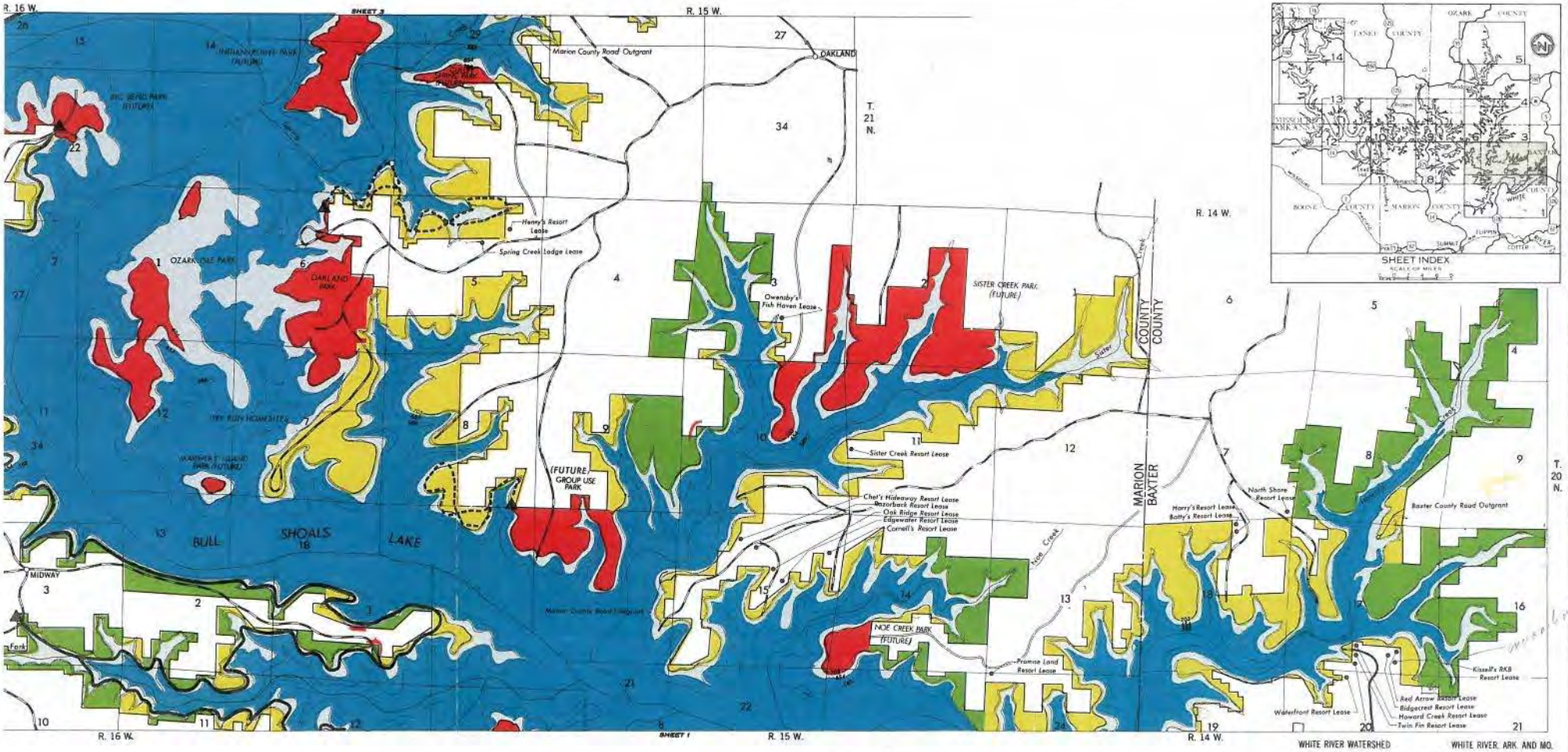
BULL SHOALS LAKE
LAND USE MAP

SCALE OF FEET

2,000 0 2,000 4,000 6,000

IN 14 SHEETS — SHEET NO. 1

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974



WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

LEGEND

- US. highway
- State highway
- Paved road
- Graveled road
- Graded road
- Fee aquisition line
- Limited motel/resort lease

PERTINENT ELEVATIONS (MSL)

703	Spillway design flood
695	Flood control pool
654	Top of conservation pool
628.5	Maximum power drawdown

LAND USE

- Project operations
- Operations: Recreation - intensive use
- Operations: Recreation - low density use
- Operations: Natural area
- Operations: Wildlife Management

TRAIL SYSTEM

- Proposed hiking trail
- Proposed connecting trail
- Proposed motorcycle trail
- Proposed equestrian trail
- Proposed interpretive trail
- Trail terminal

UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP

SCALE OF FEET
2,000 0 2,000 4,000 6,000

IN 14 SHEETS — SHEET NO. 2

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 9

CORPS OF ENGINEERS

U. S. ARMY

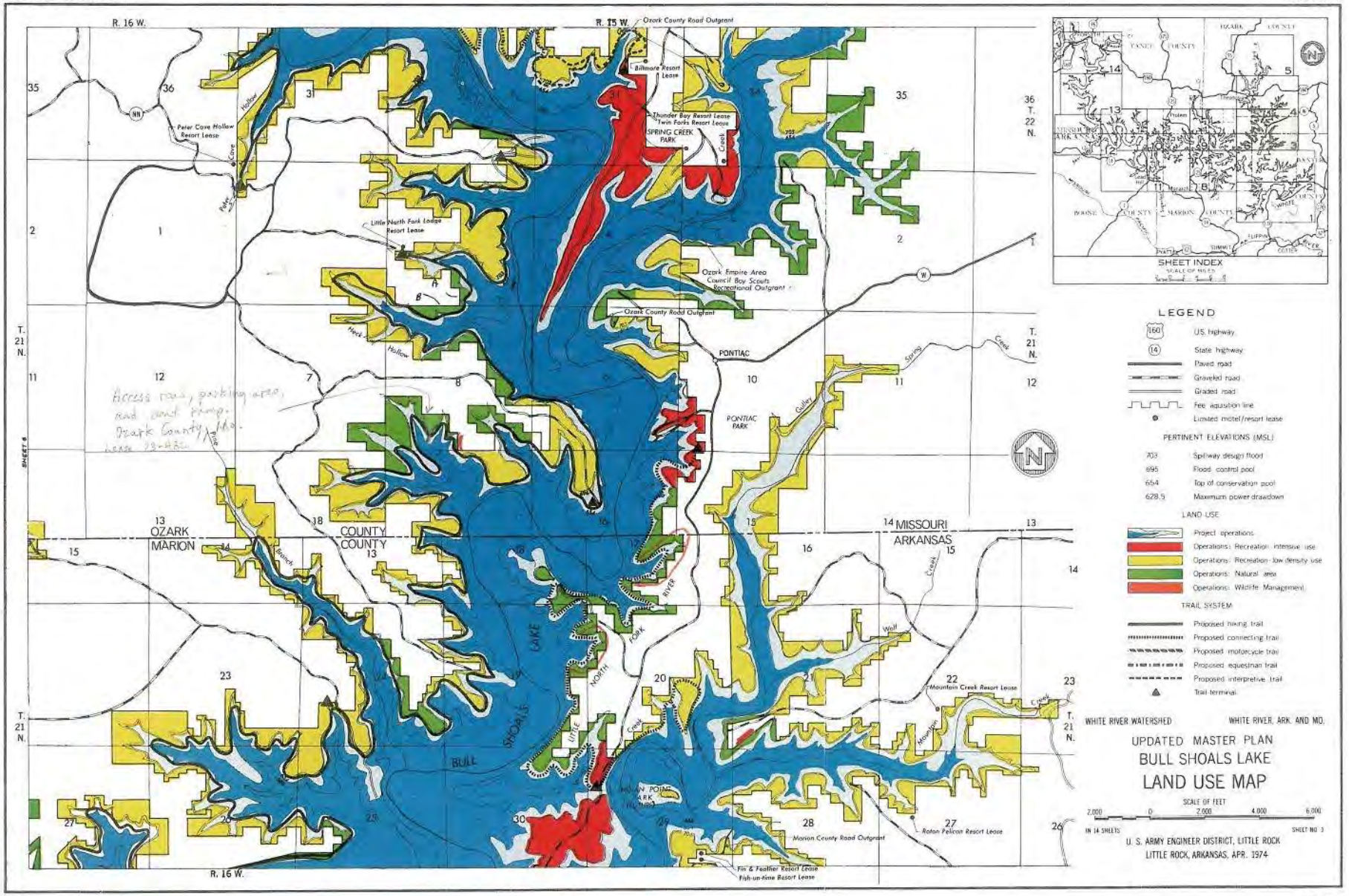
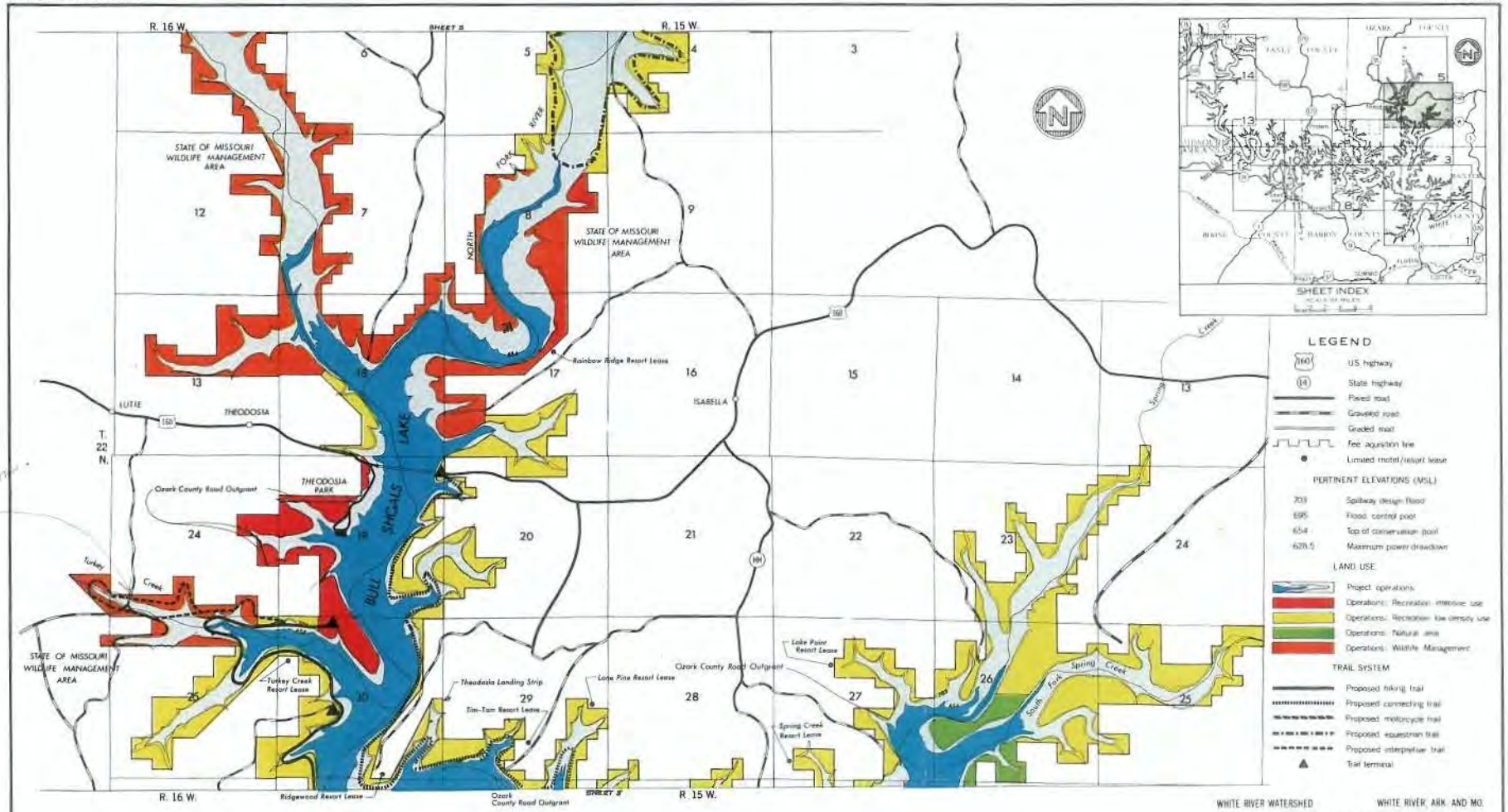


PLATE 10

CORPS OF ENGINEERS

U.S. ARMY



WHITE RIVER WATERSHED

WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP

SCALE OF FEET

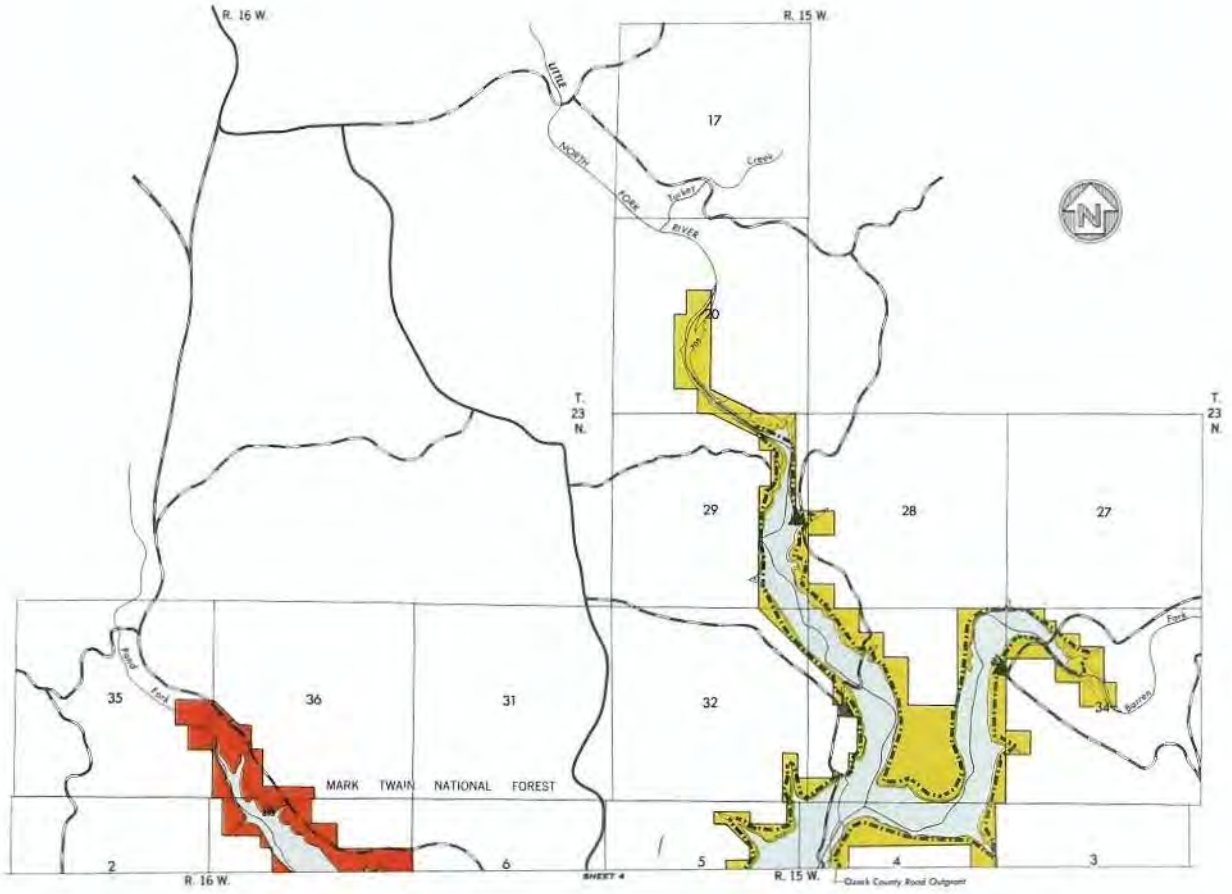
2,000 0 2,000 4,000 6,000

IN 14 SHEETS

SHEET NO. 6

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 11



LEGEND

- US highway
- State highway
- Paved road
- Graveled road
- Graded road
- Fee acquisition line
- Limited motel/resort lease

PERTINENT ELEVATIONS (MSL)

703	Spillway design flood
695	Flood control pool
654	Top of conservation pool
628.5	Maximum power drawdown

LAND USE

- Project operations
- Operations - Recreation - intensive use
- Operations - Recreation - low density use
- Operations - Natural area
- Operations - Wildlife Management

TRAIL SYSTEM

- Proposed hiking trail
- Proposed connecting trail
- Proposed motorcycle trail
- Proposed equestrian trail
- Proposed interpretive trail
- Trail terminal

WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP

SCALE OF FEET
2,000 0 2,000 4,000 6,000

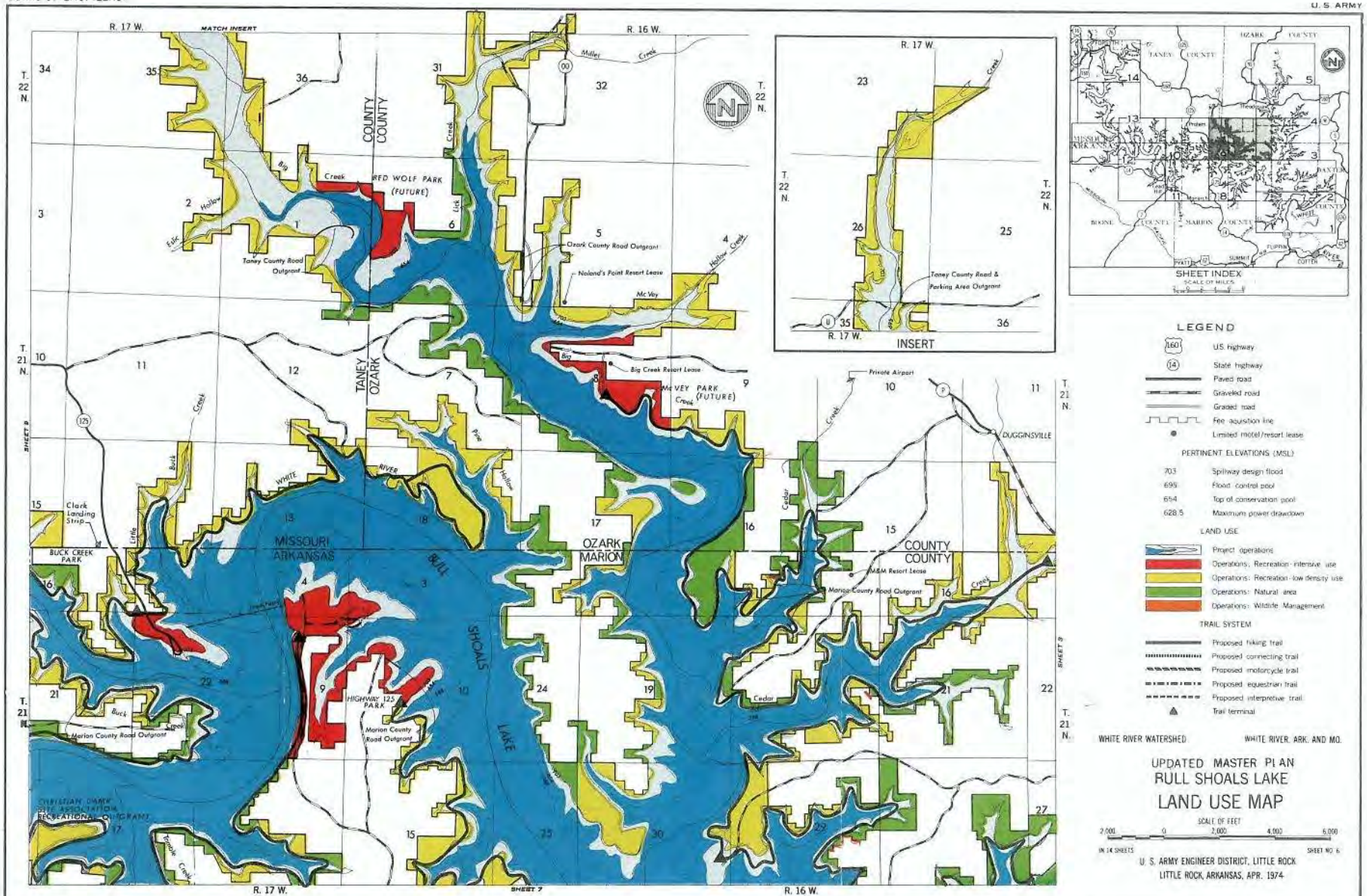
IN 14 SHEETS — SHEET No. 5

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 12

CORPS OF ENGINEERS

U. S. ARMY



LEGEND

- US highway
- State highway
- Paved road
- Graveled road
- Graded road
- Fee aquisition line
- Limited motel/resort lease

PERTINENT ELEVATIONS (MSL)

703	Spillway design flood
695	Flood control pool
654	Top of conservation pool
628.5	Maximum power drawdown

LAND USE

- Project operations
- Operations: Recreation-intensive use
- Operations: Recreation-low density use
- Operations: Natural area
- Operations: Wildlife Management

TRAIL SYSTEM

- Proposed hiking trail
- Proposed connecting trail
- Proposed motorcycle trail
- Proposed equestrian trail
- Proposed interpretive trail
- Trail terminal

WHITE RIVER WATERSHED

WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
RULL SHOALS LAKE
LAND USE MAP

SCALE OF FEET
2,000 0 2,000 4,000 6,000

IN 14 SHEETS

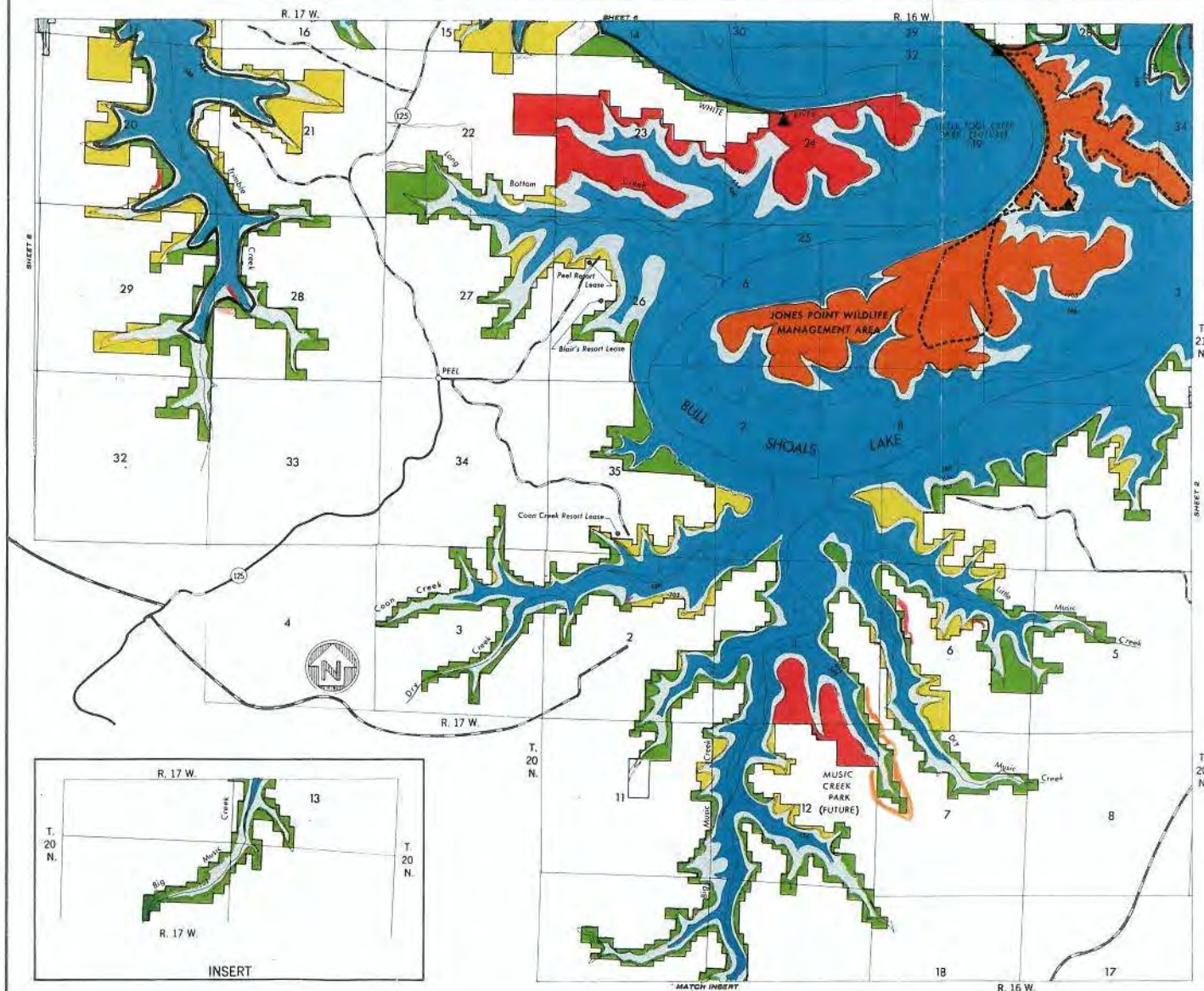
SHEET NO. 6

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 13

CORPS OF ENGINEERS

U. S. ARMY



LEGEND

- US highway
- State highway
- Paved road
- Gravelled road
- Graded road
- Fee aquisition line
- Limited motel/resort lease

PERTINENT ELEVATIONS (MSL)

703	Spillway design flood
695	Flood control pool
654	Top of conservation pool
628.5	Maximum power drawdown

LAND USE

- Project operations
- Operations: Recreation-intensive use
- Operations: Recreation-low density use
- Operations: Natural area
- Operations: Wildlife Management

TRAIL SYSTEM

- Proposed hiking trail
- Proposed connecting trail
- Proposed motorcycle trail
- Proposed equestrian trail
- Proposed interpretive trail
- Trail terminal

WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

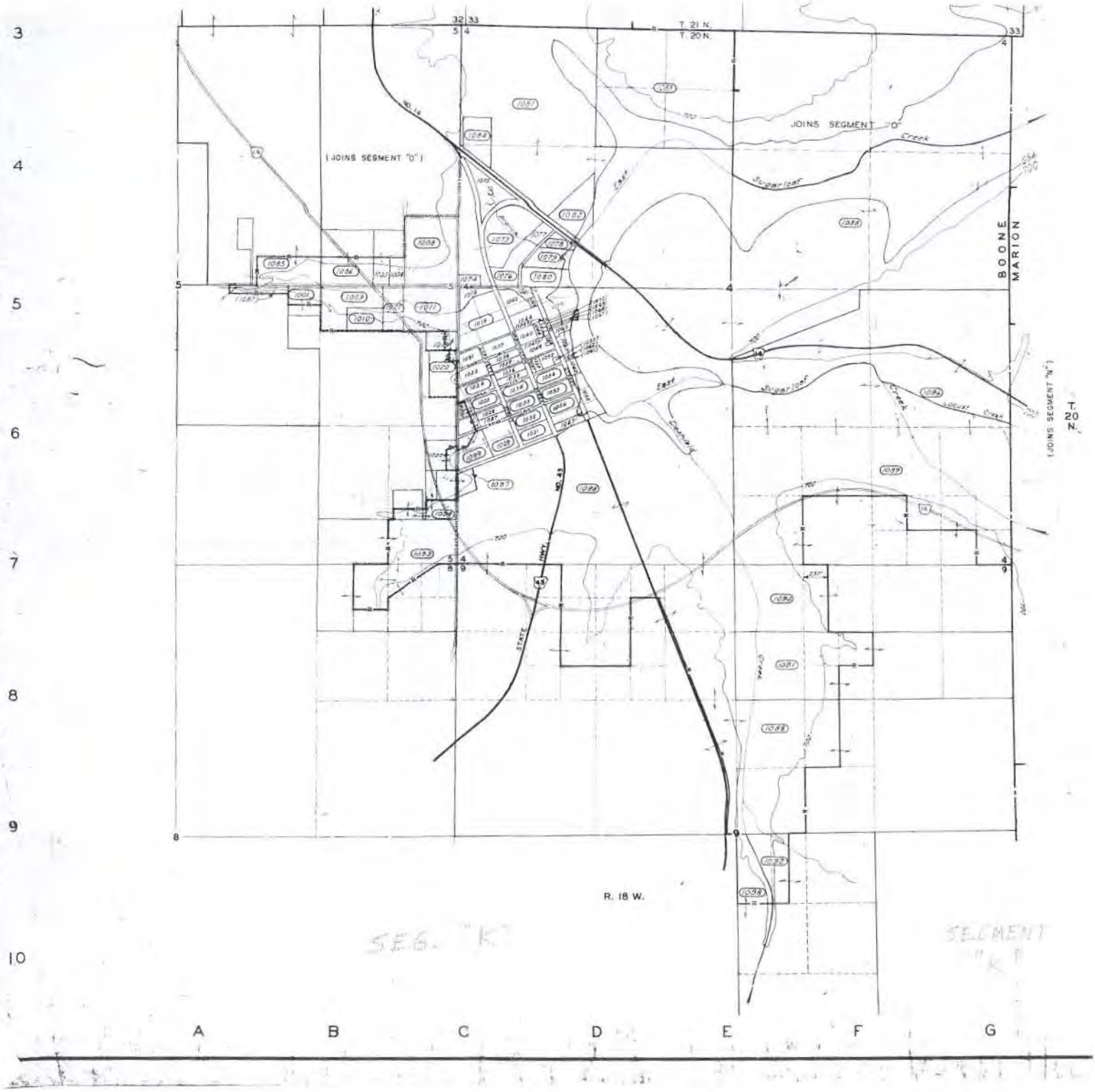
UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP

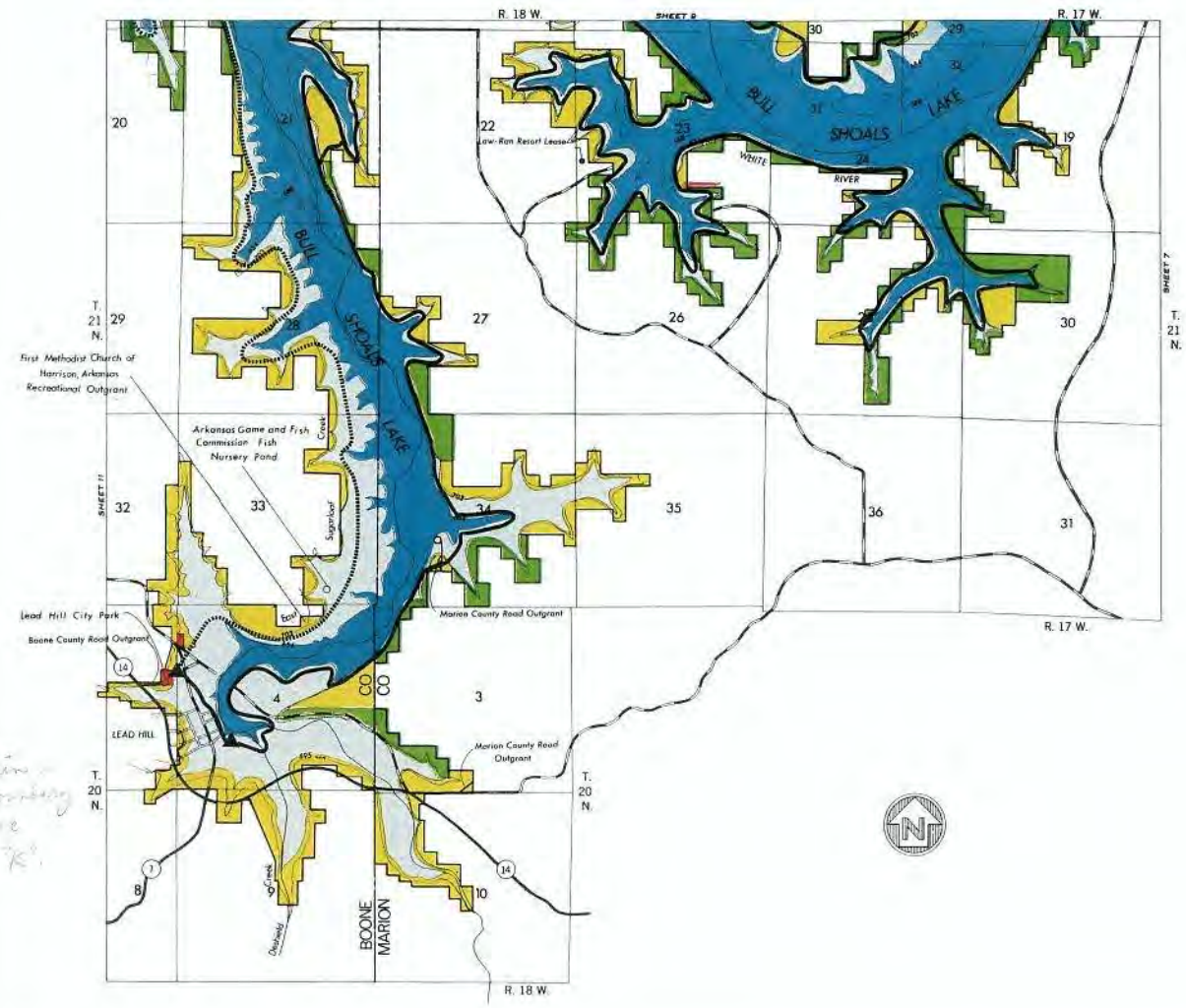
SCALE OF FEET
2,000 0 2,000 4,000 6,000

IN 14 SHEETS — SHEET NO. 7

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 14


T. 21 N.
T. 20 N.
R. 18 W.
(JOINS SEGMENT "D")
JOINS SEGMENT "D"
BOONE
MARION
(JOINS SEGMENT "K")
SEG. "K"
SEGMENT "K"
A
B
C
D
E
F
G



LEGEND

- US highway
- State highway
- Paved road
- Gravelled road
- Graded road
- Fee aquisition line
- Limited motel/resort lease

PERTINENT ELEVATIONS (MSL)

703	Spillway design flood
695	Flood control pool
654	Top of conservation pool
628.5	Maximum power drawdown

LAND USE

- Project operations
- Operations: Recreation intensive use
- Operations: Recreation low density use
- Operations: Natural area
- Operations: Wildlife Management

TRAIL SYSTEM

- Proposed hiking trail
- Proposed connecting trail
- Proposed motorcycle trail
- Proposed equestrian trail
- Proposed interpretive trail
- Trail terminal

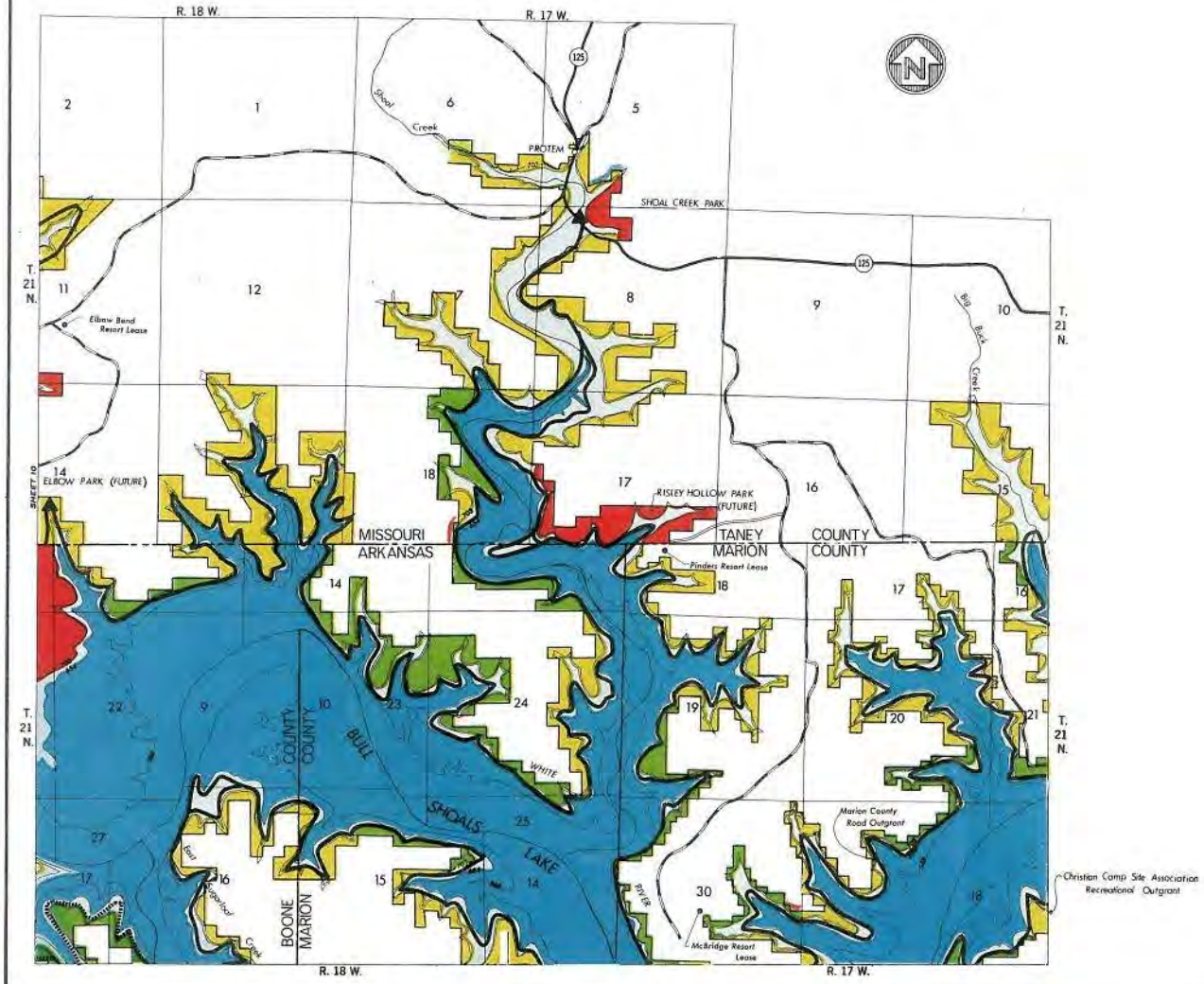
WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP

SCALE OF FEET
2,000 0 2,000 4,000 6,000

IN 34 SHEETS — SHEET NO. 8

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974



LEGEND

- US. highway
- State highway
- Paved road
- Graveled road
- Graded road
- Fee aquisition line
- Limited motel/resort lease

PERTINENT ELEVATIONS (MSL)

703	Spillway design flood
695	Flood control pool
654	Top of conservation pool
628.5	Maximum power drawdown

LAND USE

- Project operations
- Operations: Recreation-intensive use
- Operations: Recreation-low density use
- Operations: Natural area
- Operations: Wildlife Management

TRAIL SYSTEM

- Proposed hiking trail
- Proposed connecting trail
- Proposed motorcycle trail
- Proposed equestrian trail
- Proposed interpretive trail
- Trail terminal

WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP

SCALE OF FEET
2,000 0 2,000 4,000 6,000

IN 24 SHEETS — SHEET NO. 9

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

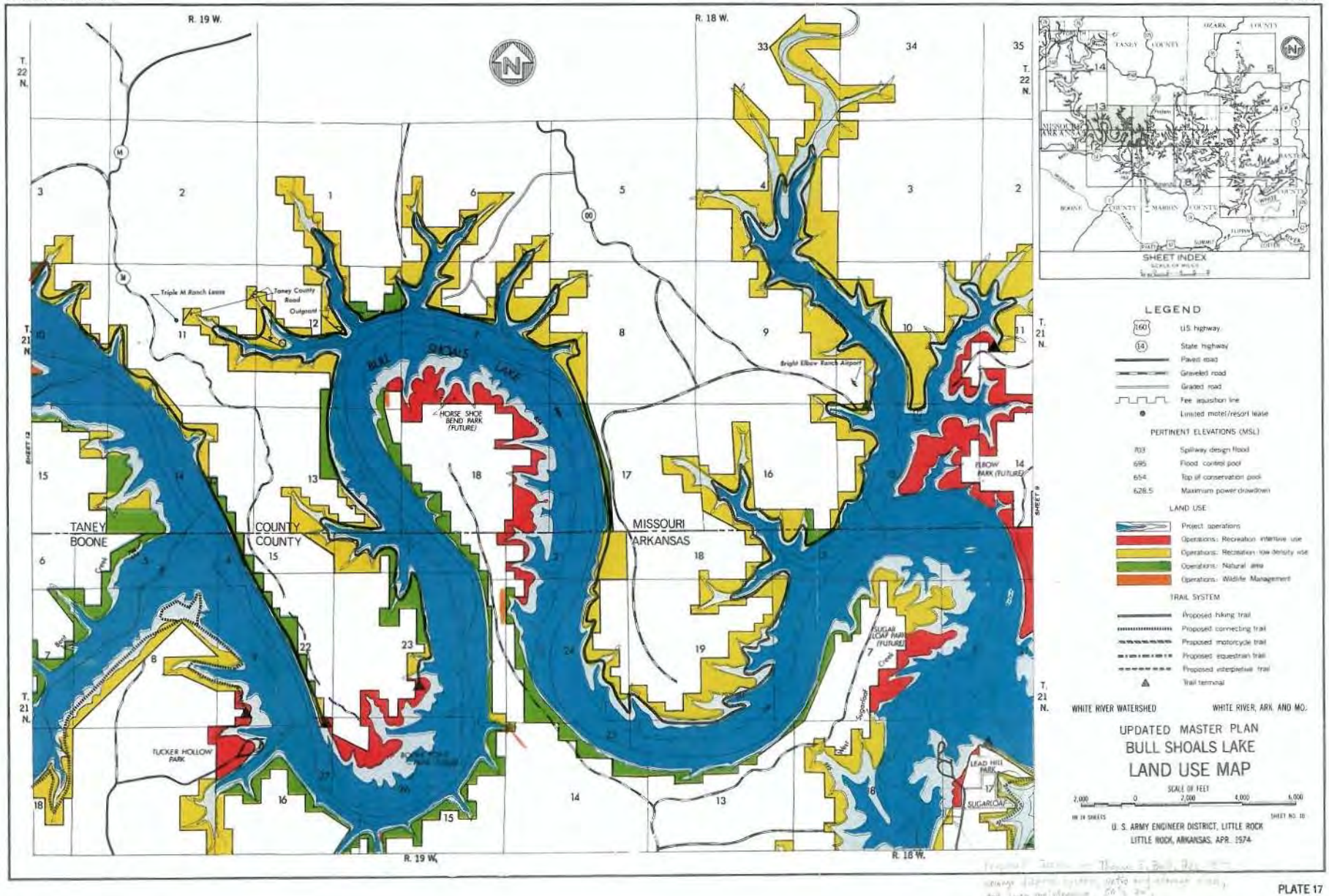
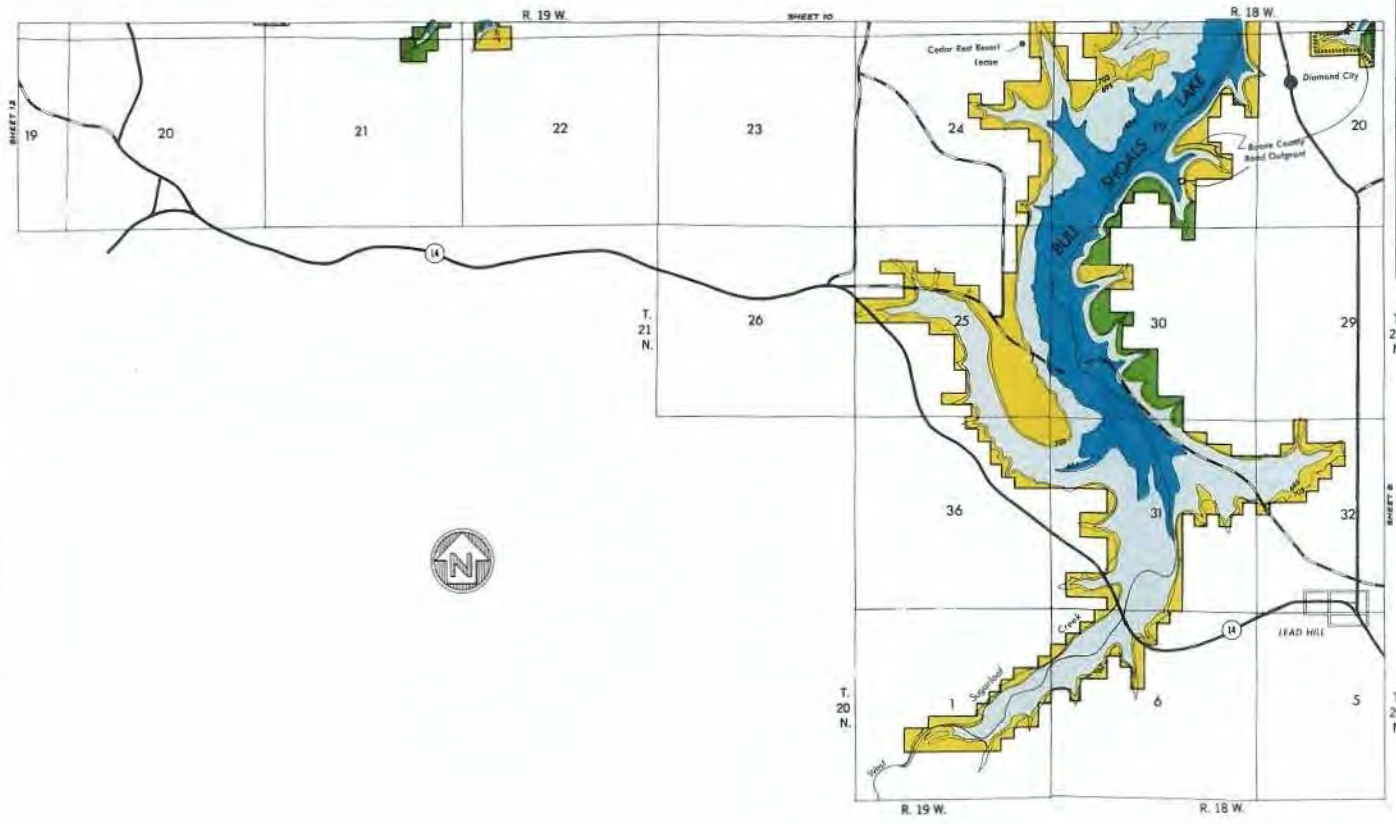

R. 19 W.
R. 18 W.
T. 22 N.
T. 21 N.
TANEY COUNTY
BOONE COUNTY
MISSOURI
ARKANSAS
BULL SHOALS LAKE
Triple M Ranch Lanes
Taney County Road Outgrant
HORSE SHOE BEND PARK (FUTURE)
Bright Elbow Ranch Airport
ELBOW PARK (FUTURE)
SUGAR LOAF PARK (FUTURE)
TUCKER HOLLOW PARK
LEAD HILL PARK
SUGARLOAF
SHEET 12
SHEET 9
SHEET INDEX
OZARK COUNTY
TANEY COUNTY
BOONE COUNTY
MARION COUNTY
LEGEND
160 U.S. highway
14 State highway
Paved road
Graveled road
Graded road
Fee aquisition line
Limited motel/resort lease
PERTINENT ELEVATIONS (MSL)
703 Spillway design flood
695 Flood control pool
654 Top of conservation pool
628.5 Maximum power drawdown
LAND USE
Project operations
Operations: Recreation intensive use
Operations: Recreation low density use
Operations: Natural area
Operations: Wildlife Management
TRAIL SYSTEM
Proposed hiking trail
Proposed connecting trail
Proposed motorcycle trail
Proposed equestrian trail
Proposed interpretive trail
Trail terminal
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP
SCALE OF FEET
2,000 0 2,000 4,000 6,000
IN 14 SHEETS
SHEET NO. 10
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 17

CORPS OF ENGINEERS

U.S. ARMY



LEGEND

- US highway
- State highway
- Paved road
- Graveled road
- Graded road
- Fee aquisition line
- Leased motel/resort lease

PERTINENT ELEVATIONS (MSL)

- 703 Spillway design flood
- 695 Flood control pool
- 654 Top of conservation pool
- 628.5 Maximum power drawdown

LAND USE

- Project operations
- Operations: Recreation-intensive use
- Operations: Recreation-low density use
- Operations: Natural area
- Operations: Wildlife Management

TRAIL SYSTEM

- Proposed hiking trail
- Proposed connecting trail
- Proposed motorcycle trail
- Proposed equestrian trail
- Proposed interpretive trail
- Trail terminus

WHITE RIVER WATERSHED

WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

BULL SHOALS LAKE

LAND USE MAP

SCALE OF FEET

2,000 0 2,000 4,000 6,000

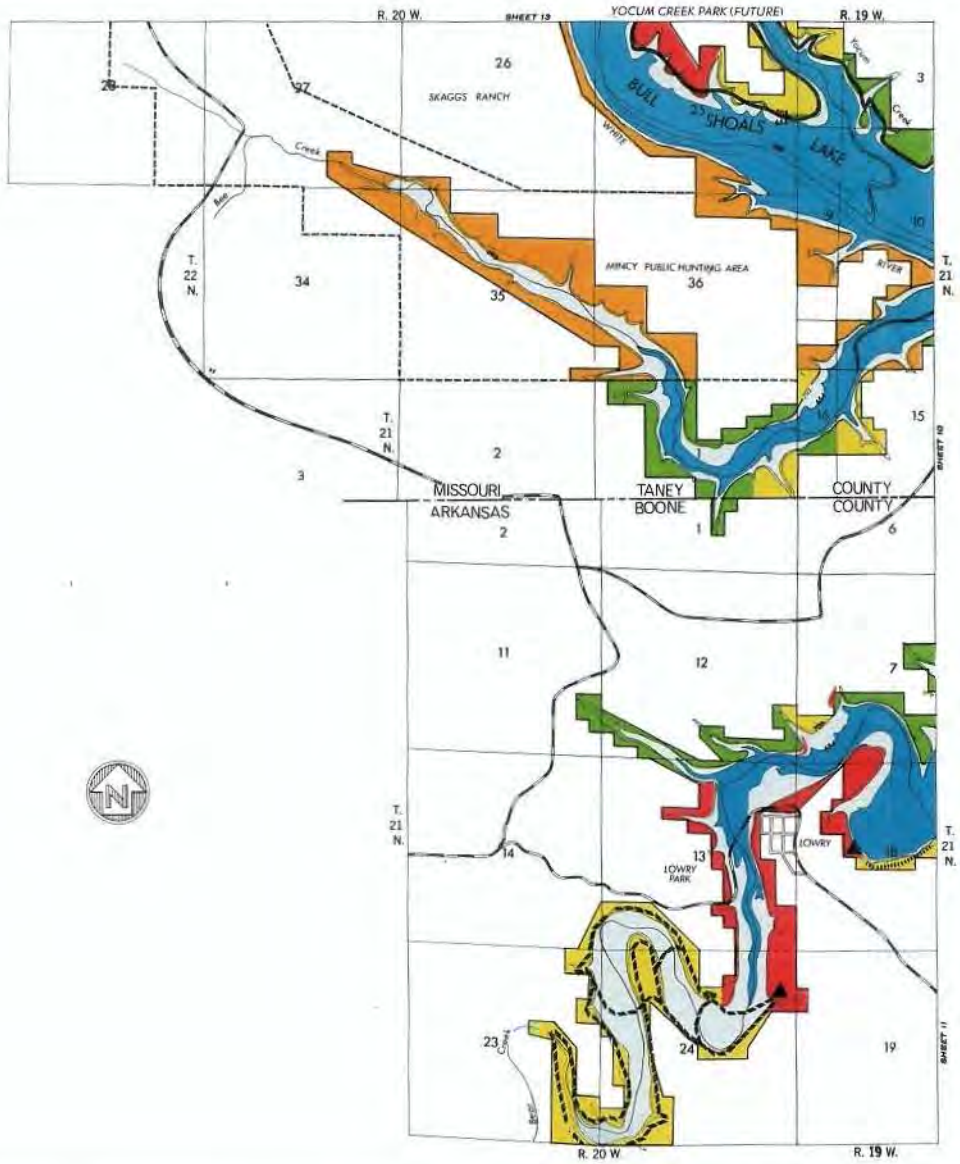
IN 14 SHEETS

SHEET NO. 11

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK

LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 18



LEGEND

- US highway
- State highway
- Paved road
- Graveled road
- Graded road
- Fee agusition line
- Leased motel/resort lease

PERTINENT ELEVATIONS (MSL)

703	Spillway design flood
695	Flood control pool
654	Top of conservation pool
628.5	Maximum power drawdown

LAND USE

- Project operations
- Operations: Recreation intensive use
- Operations: Recreation low density use
- Operations: Natural area
- Operations: Wildlife Management

TRAIL SYSTEM

- Proposed hiking trail
- Proposed connecting trail
- Proposed motorcycle trail
- Proposed equestrian trail
- Proposed interpretive trail
- Trail terminal

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP

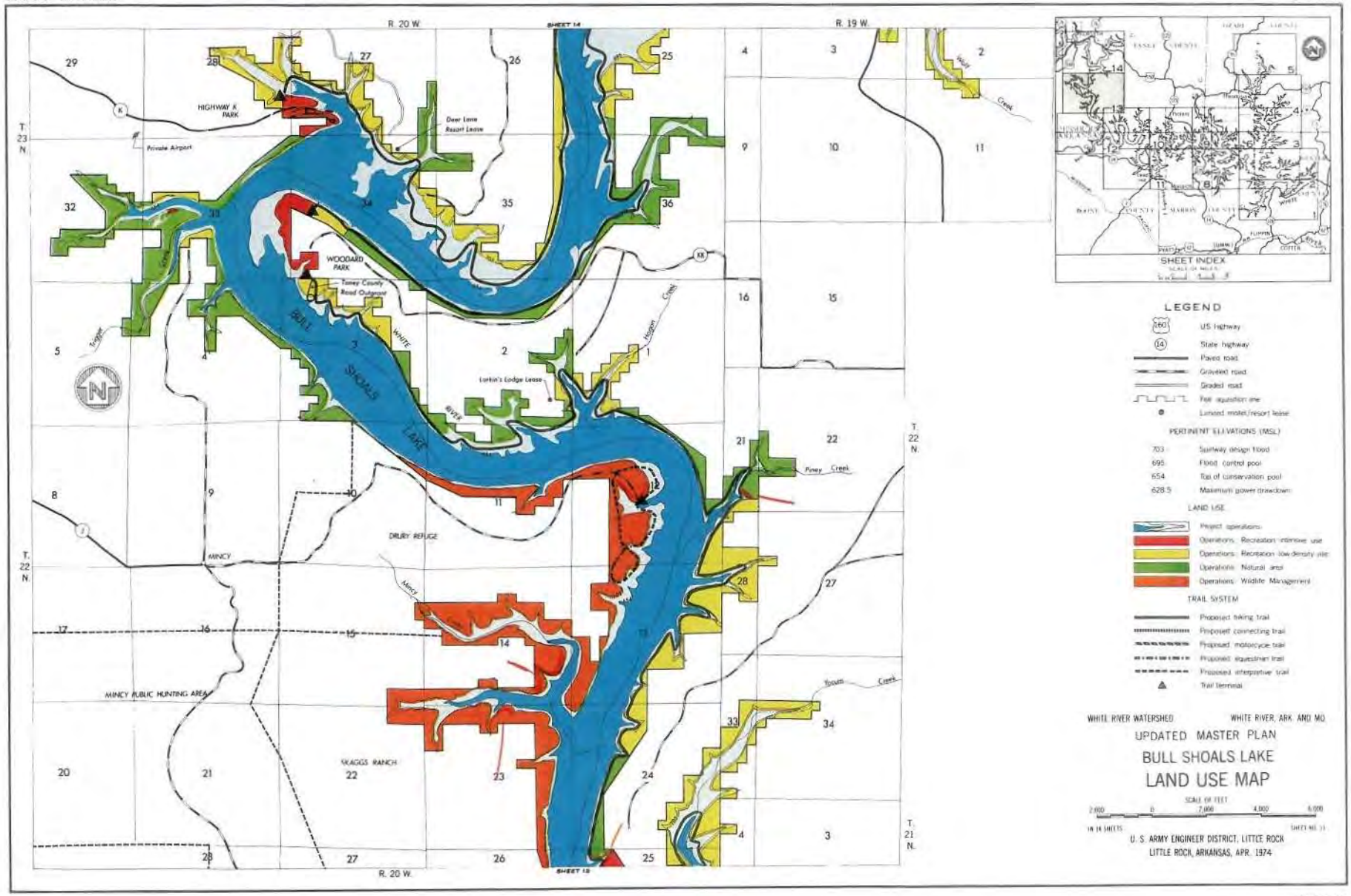
SCALE OF FEET
2,000 0 2,000 4,000 6,000

IN 24 SHEETS SHEET NO. 19

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

CORPS OF ENGINEERS

U S ARMY



WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP

SCALE OF FEET

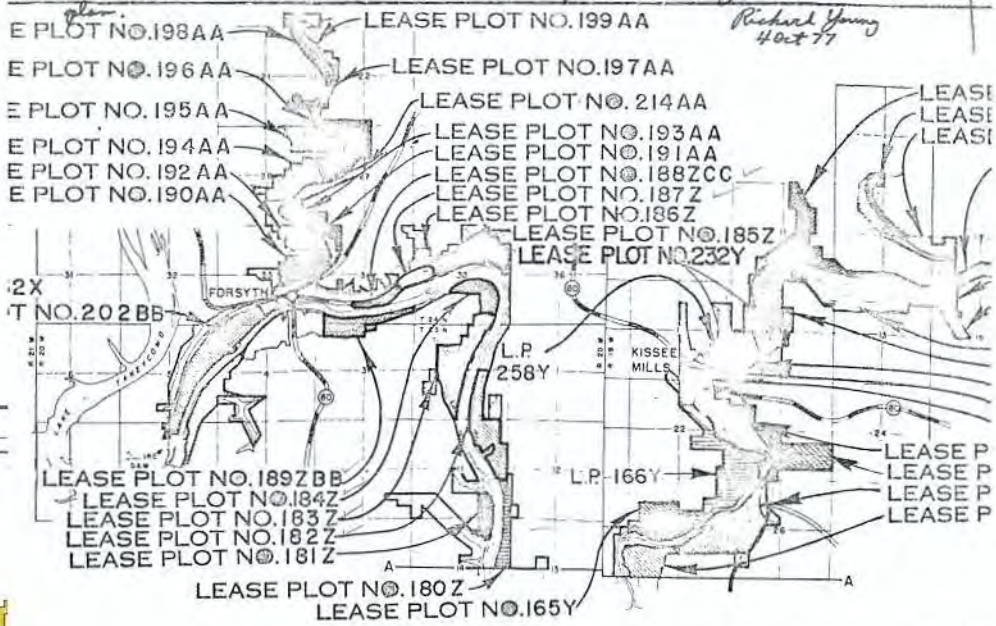
2,000 0 2,000 4,000 6,000

IN 14 SHEETS — SHEET NO. 13

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 20

Lease plots to be added to licence to Missouri Dept. of Conservation for wildlife management purposes; 182-Z, 183-Z, 184-Z, 187-Z, 188ZCC, and 189ZBB total 575 acres. All allocated for low density recreation in master plan.
Richard Young
4 Oct 77



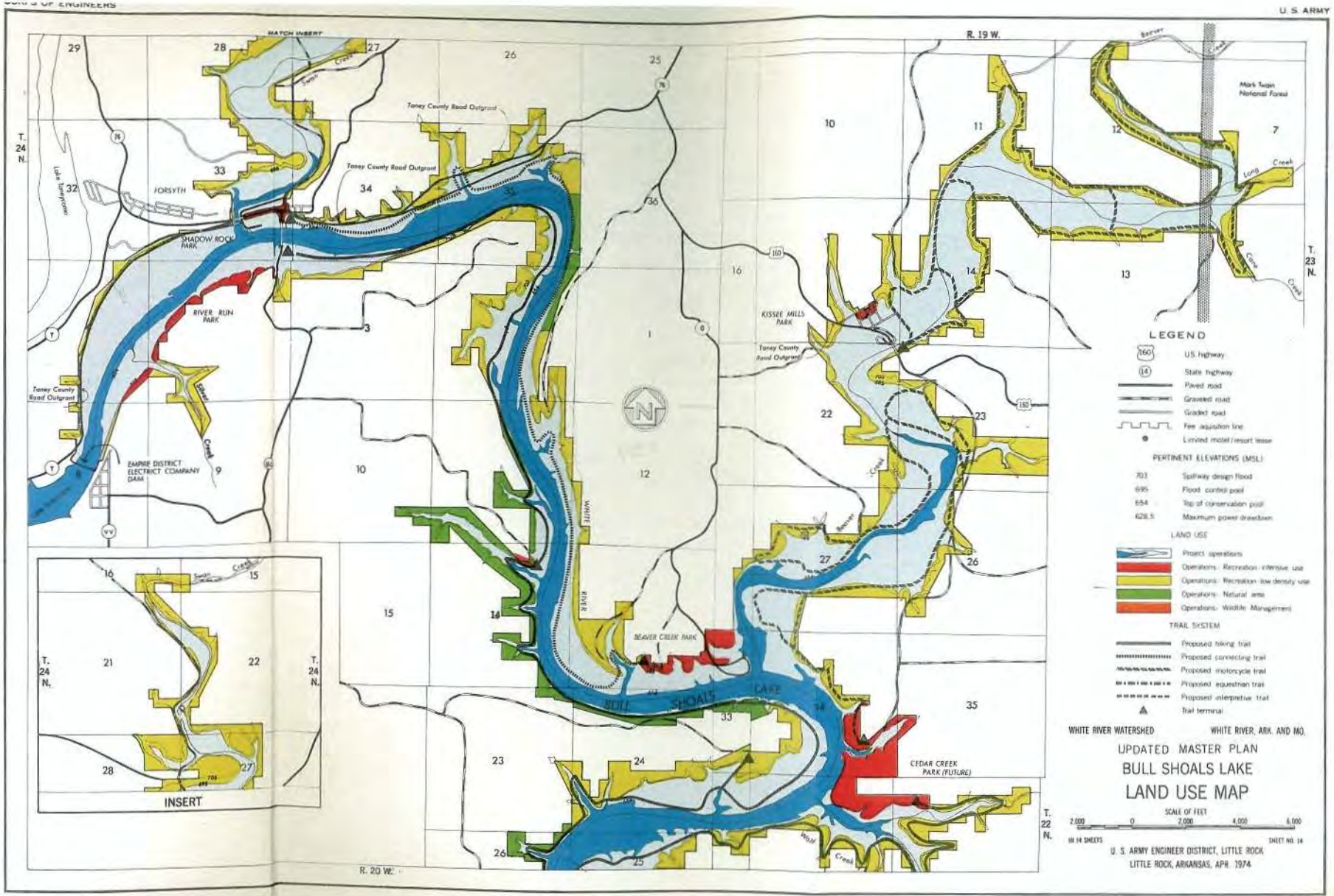
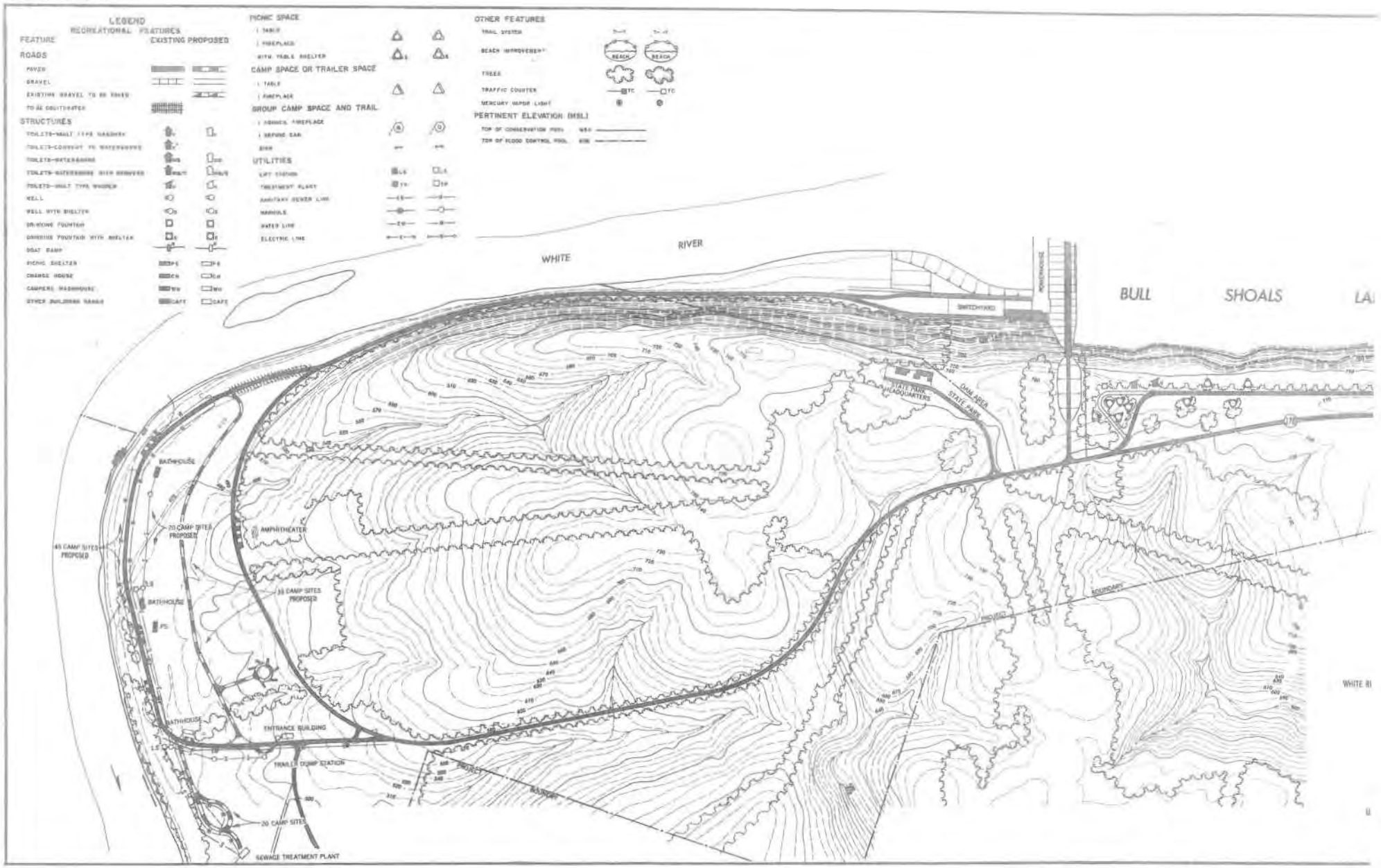
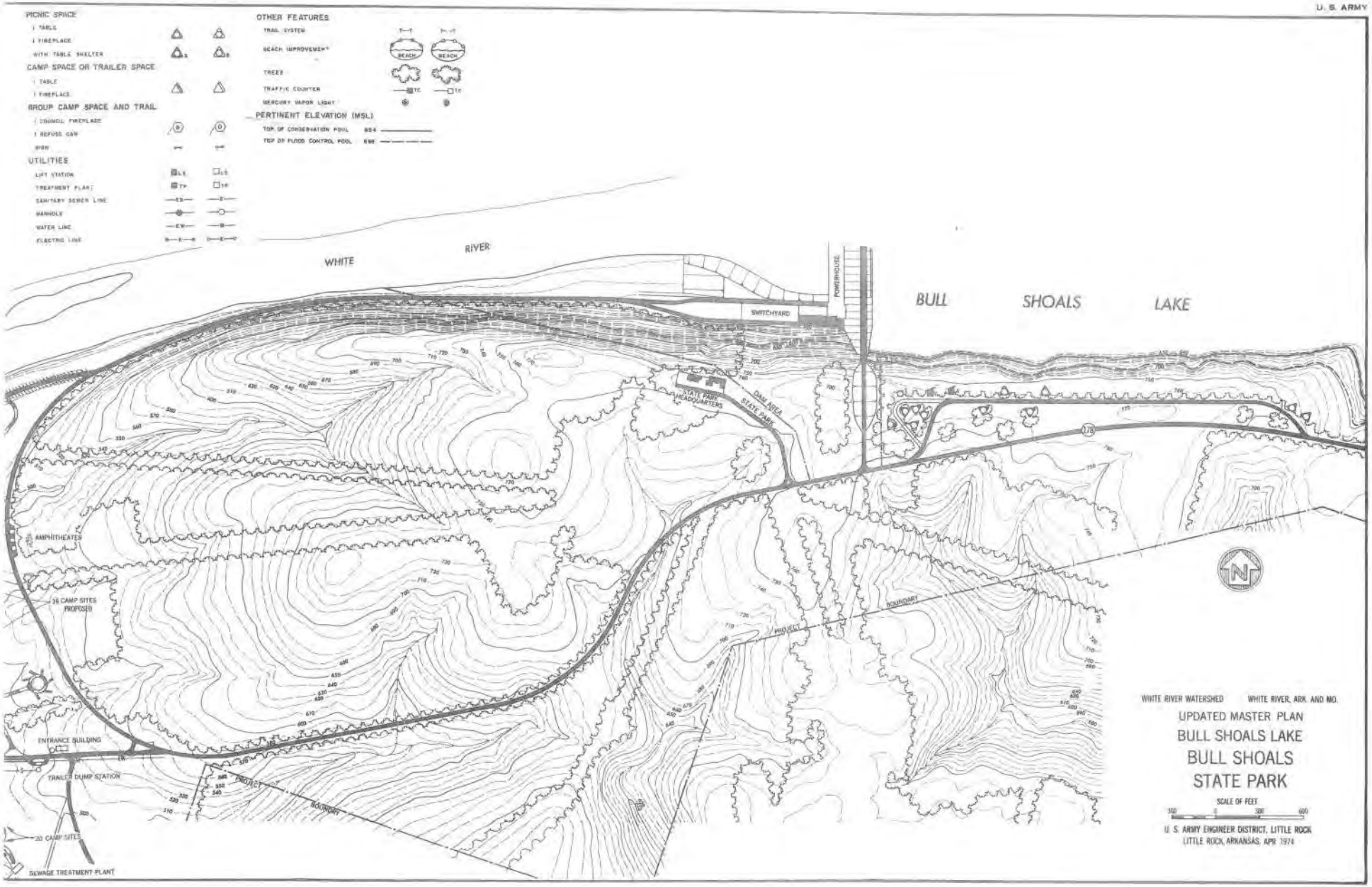
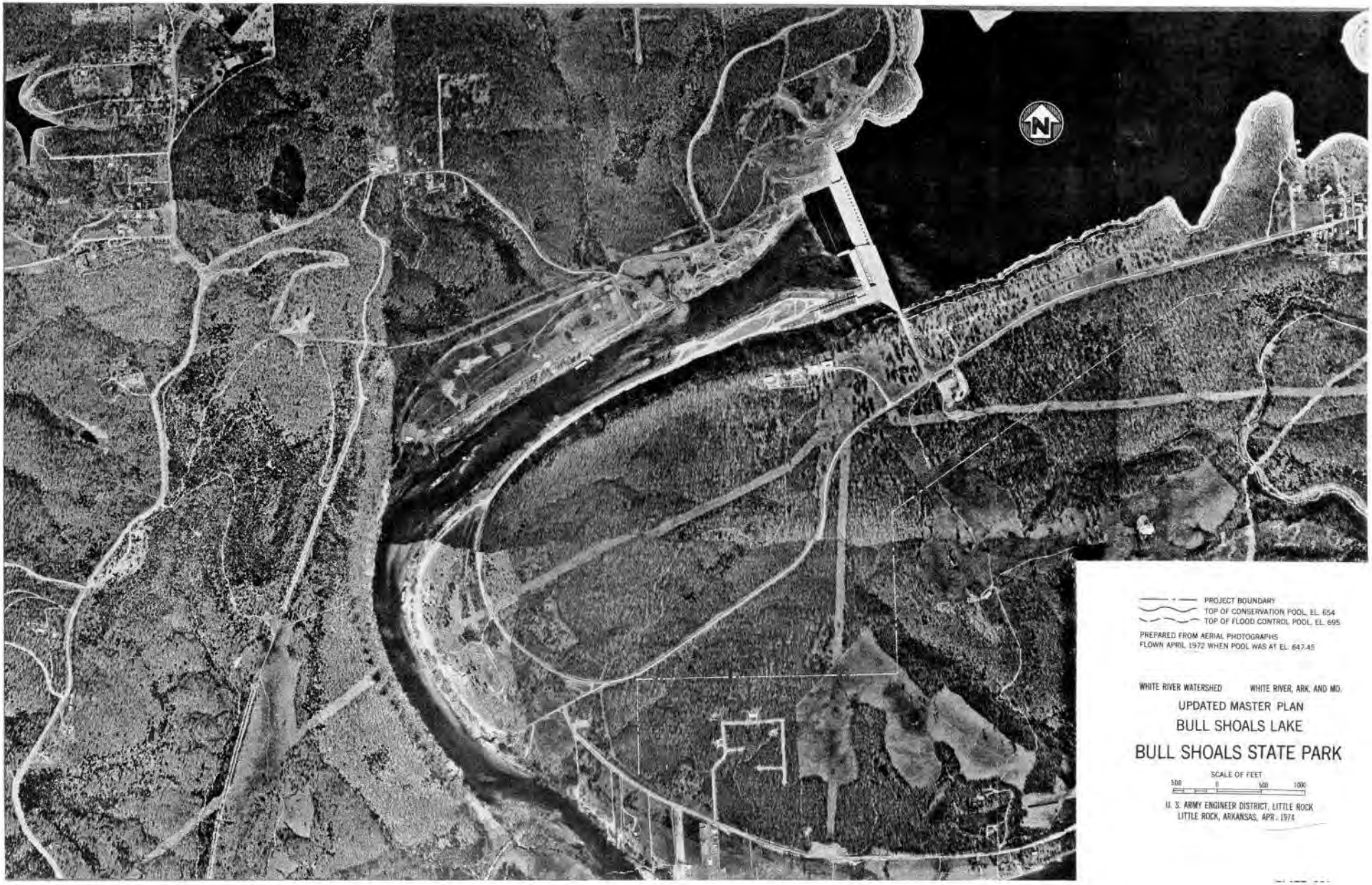

R. 19 W.
R. 20 W.
T. 24 N.
T. 23 N.
T. 22 N.
MATCH INSERT
FORSYTH
Lake Taneycomo
SHADOW ROCK PARK
RIVER RUN PARK
EMPIRE DISTRICT ELECTRIC COMPANY DAM
Taney County Road Outgrant
Mark Twain National Forest
KISSEE MILLS PARK
BEAVER CREEK PARK
CEDAR CREEK PARK (FUTURE)
BULL SHOALS LAKE
WHITE RIVER
INSERT
LEGEND
US highway
State highway
Paved road
Graveled road
Graded road
Fee aquisition line
Limited motel/resort lease
PERTINENT ELEVATIONS (MSL):
703 Spillway design flood
695 Flood control pool
654 Top of conservation pool
628.5 Maximum power drawdown
LAND USE
Project operations
Operations- Recreation- intensive use
Operations- Recreation- low density use
Operations- Natural area
Operations- Wildlife Management
TRAIL SYSTEM
Proposed hiking trail
Proposed connecting trail
Proposed motorcycle trail
Proposed equestrian trail
Proposed interpretive trail
Trail terminal
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
LAND USE MAP
SCALE OF FEET
2,000 0 2,000 4,000 6,000
SHEET NO. 14
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

PLATE 21

CORPS OF ENGINEERS




PICNIC SPACE
1 TABLE
1 FIREPLACE
WITH TABLE SHELTER
CAMP SPACE OR TRAILER SPACE
1 TABLE
1 FIREPLACE
GROUP CAMP SPACE AND TRAIL
1 COUNCIL FIREPLACE
1 REFUSE CAN
SIGN
UTILITIES
LIFT STATION
TREATMENT PLANT
SANITARY SEWER LINE
MANHOLE
WATER LINE
ELECTRIC LINE
OTHER FEATURES
TRAIL SYSTEM
BEACH IMPROVEMENT
BEACH
TREES
TRAFFIC COUNTER
MERCURY VAPOR LIGHT
PERTINENT ELEVATION (MSL)
TOP OF CONSERVATION POOL 654
TOP OF FLOOD CONTROL POOL 695
WHITE RIVER
BULL SHOALS LAKE
POWERHOUSE
SWITCHYARD
STATE PARK HEADQUARTERS
DAM AREA STATE PARK
278
AMPHITHEATER
36 CAMP SITES PROPOSED
ENTRANCE BUILDING
TRAILER DUMP STATION
PROJECT BOUNDARY
20 CAMP SITES
SEWAGE TREATMENT PLANT
N
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
BULL SHOALS
STATE PARK
SCALE OF FEET
350 0 300 600
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR 1974



PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695

PREPARED FROM AERIAL PHOTOGRAPHS
FLOWN APRIL 1972 WHEN POOL WAS AT EL. 647.45

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

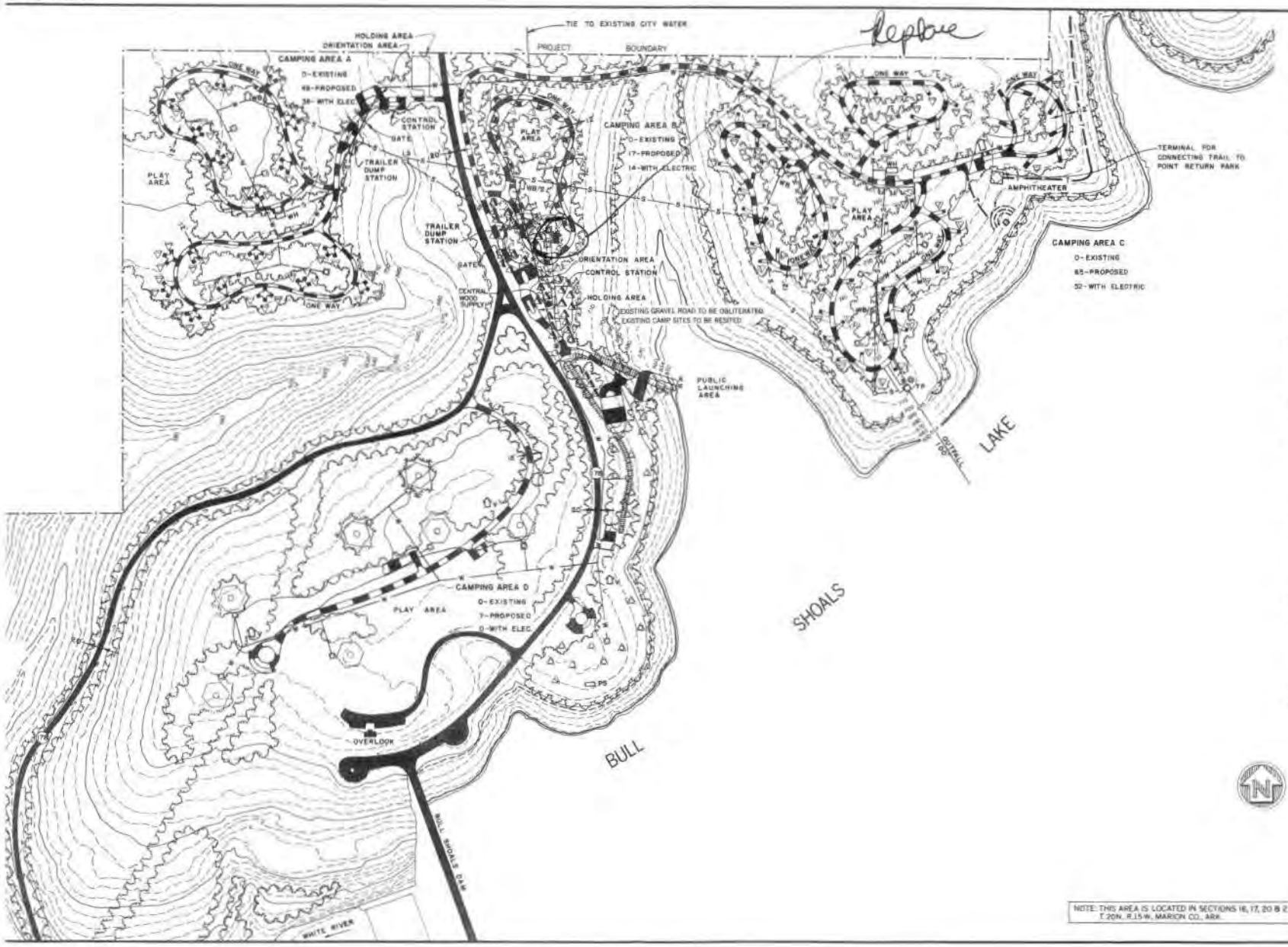
UPDATED MASTER PLAN

BULL SHOALS LAKE

BULL SHOALS STATE PARK

SCALE OF FEET
500 0 500 1000

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974



LEGEND
RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
CHANGE HOUSE		
CAMPERS WASHHOUSE		
OTHER BUILDINGS NAMED		
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COOKING FIREPLACE		
1 EATING DAIS		
SIGN		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654

TOP OF FLOOD CONTROL POOL 695

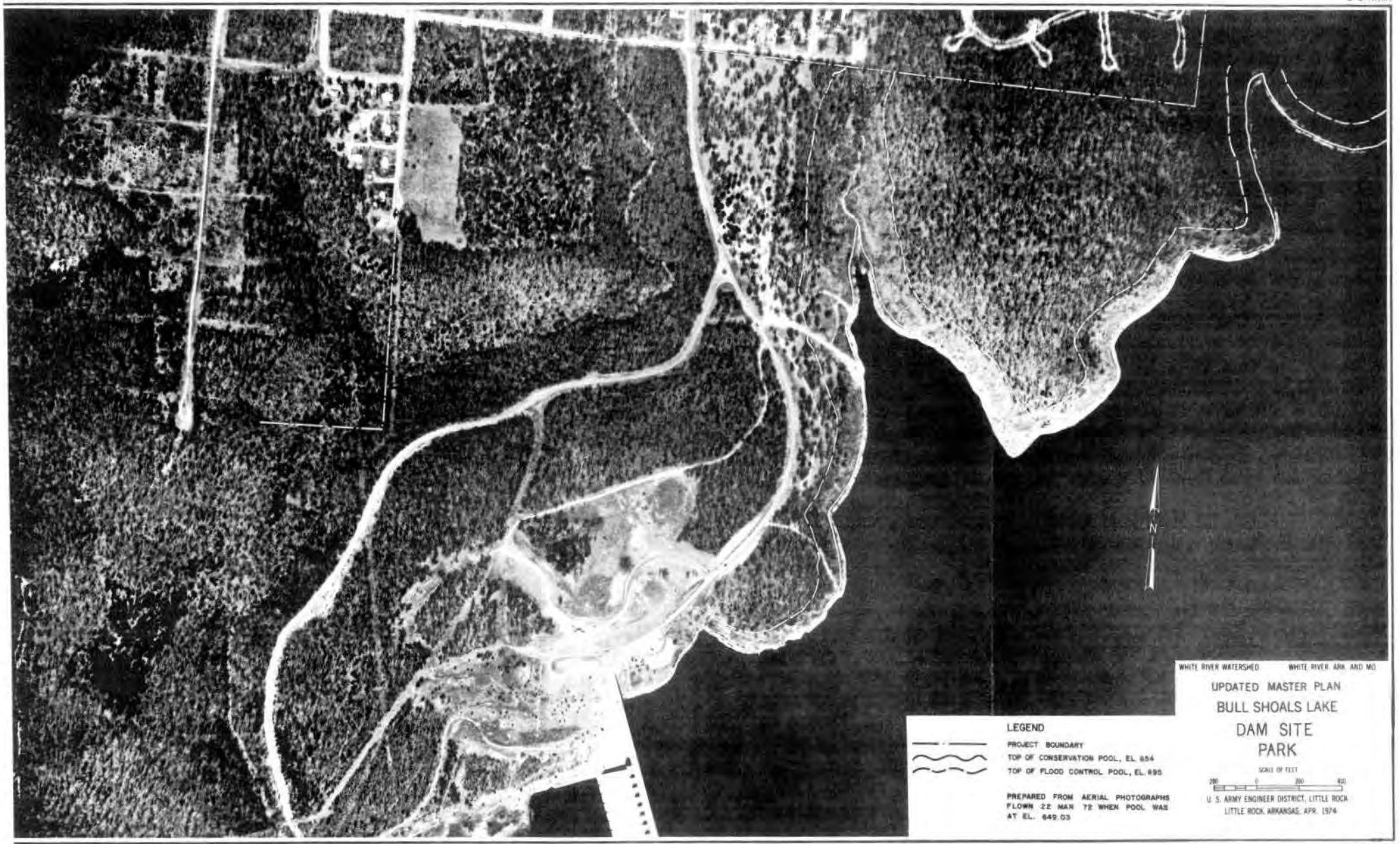
WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

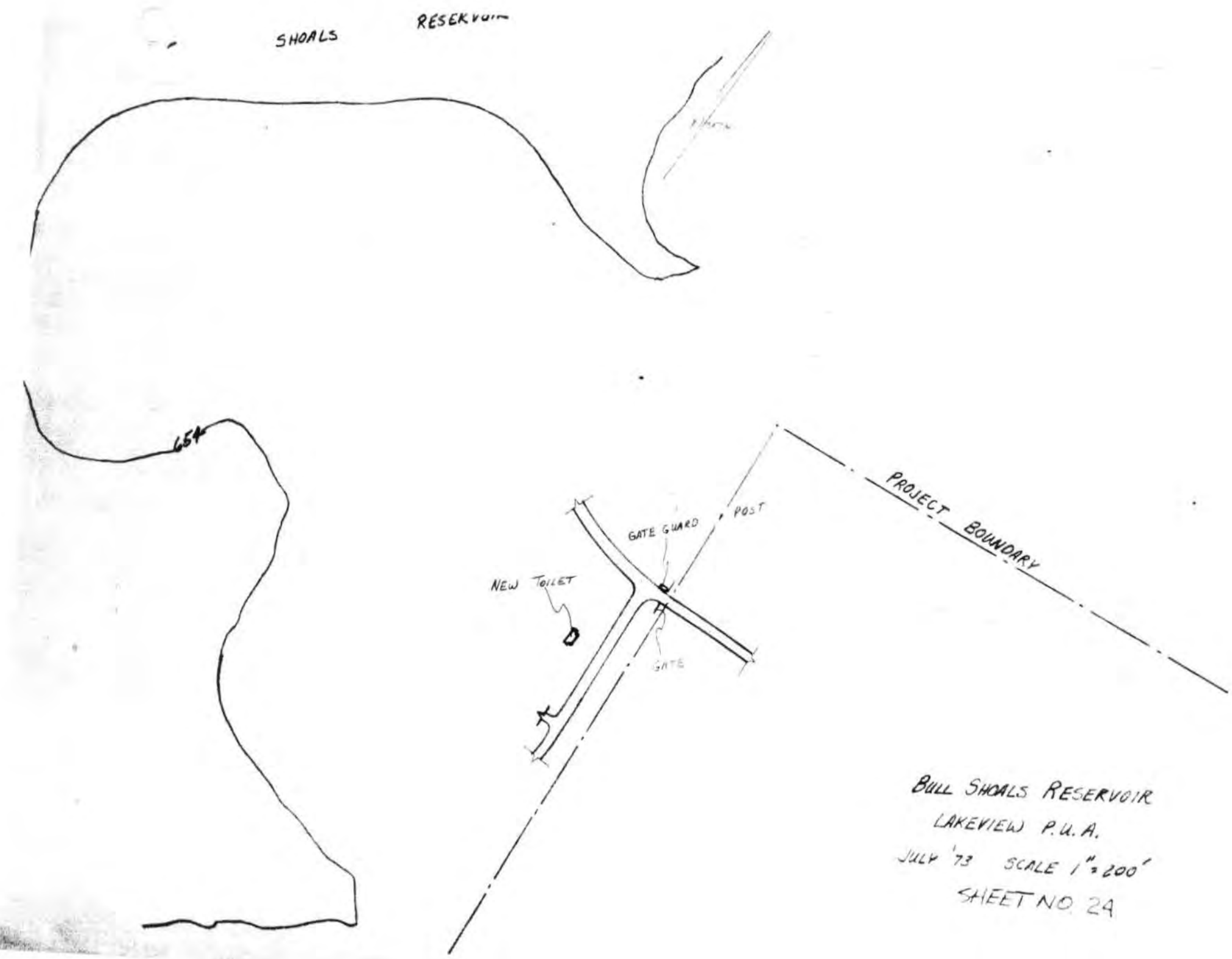
NOTE: THIS AREA IS LOCATED IN SECTIONS 16, 17, 20 & 21 T. 20N., R. 15 W., MARION CO., ARK.

UPDATED MASTER PLAN
BULL SHOALS LAKE
DAM SITE
PARK

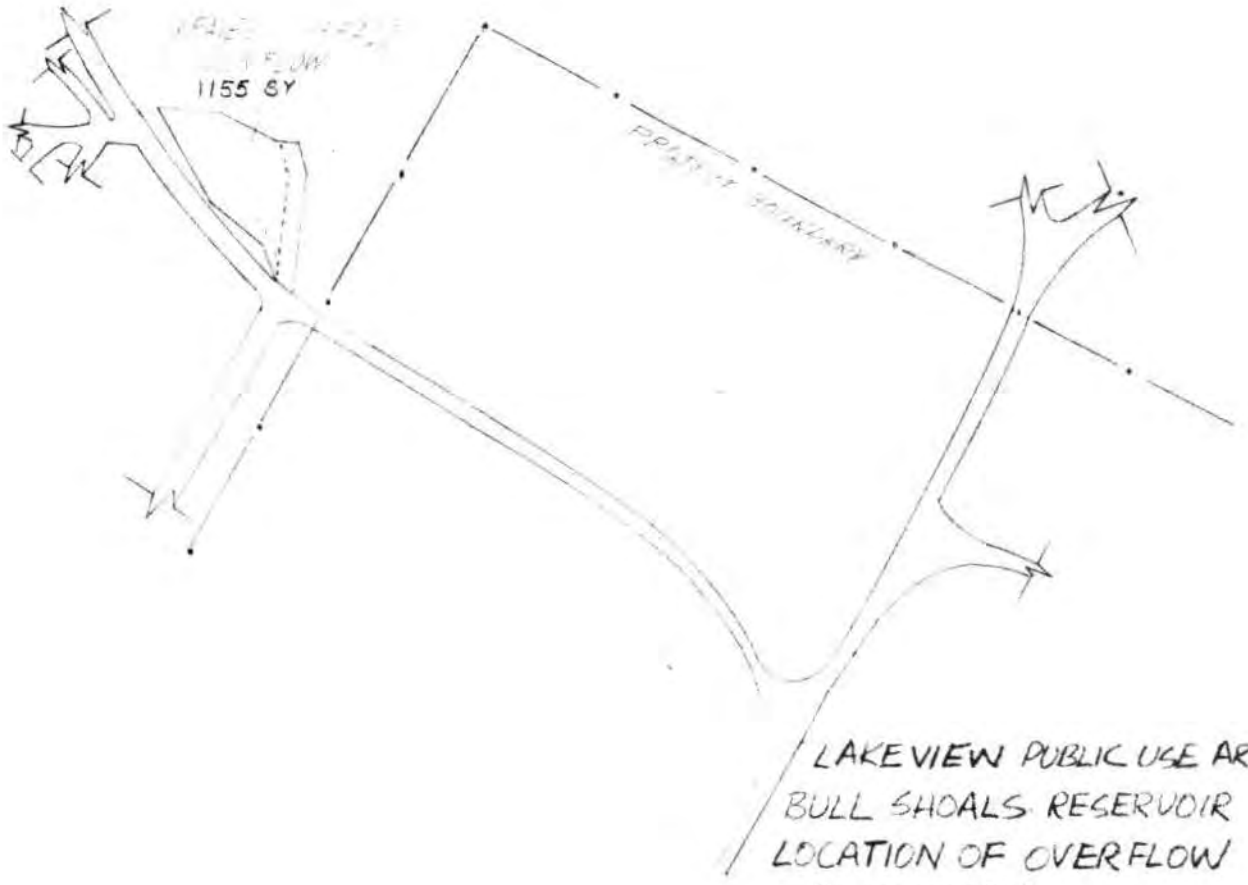
SCALE OF FEET

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK ARKANSAS APR. 1974


N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 22 MAR 72 WHEN POOL WAS AT EL. 649.03
WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
DAM SITE
PARK
SCALE OF FEET
200 0 200 400
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974



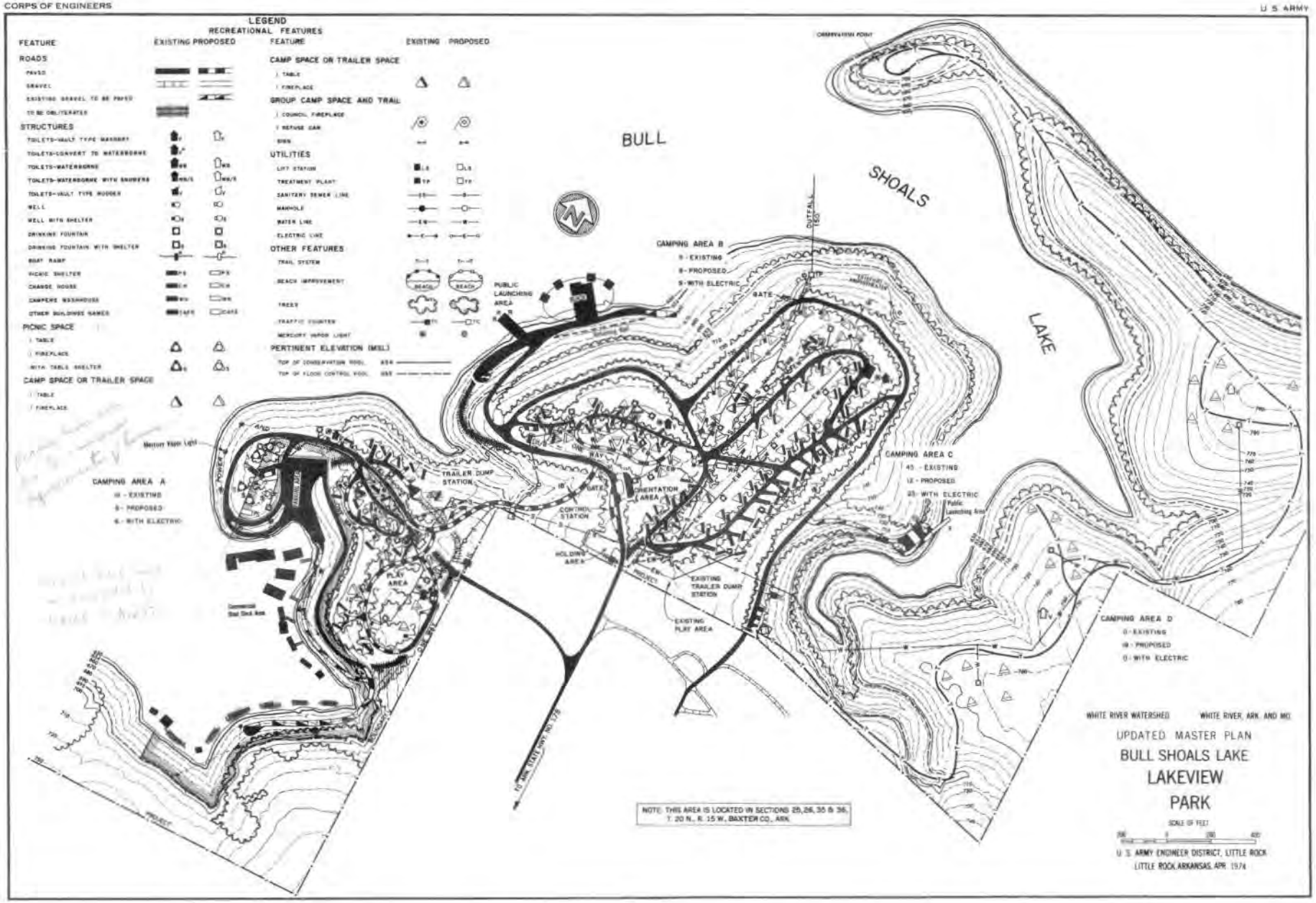
BULL SHOALS RESERVOIR
LAKEVIEW P.U.A.
JULY '73 SCALE 1" = 200'
SHEET NO. 24

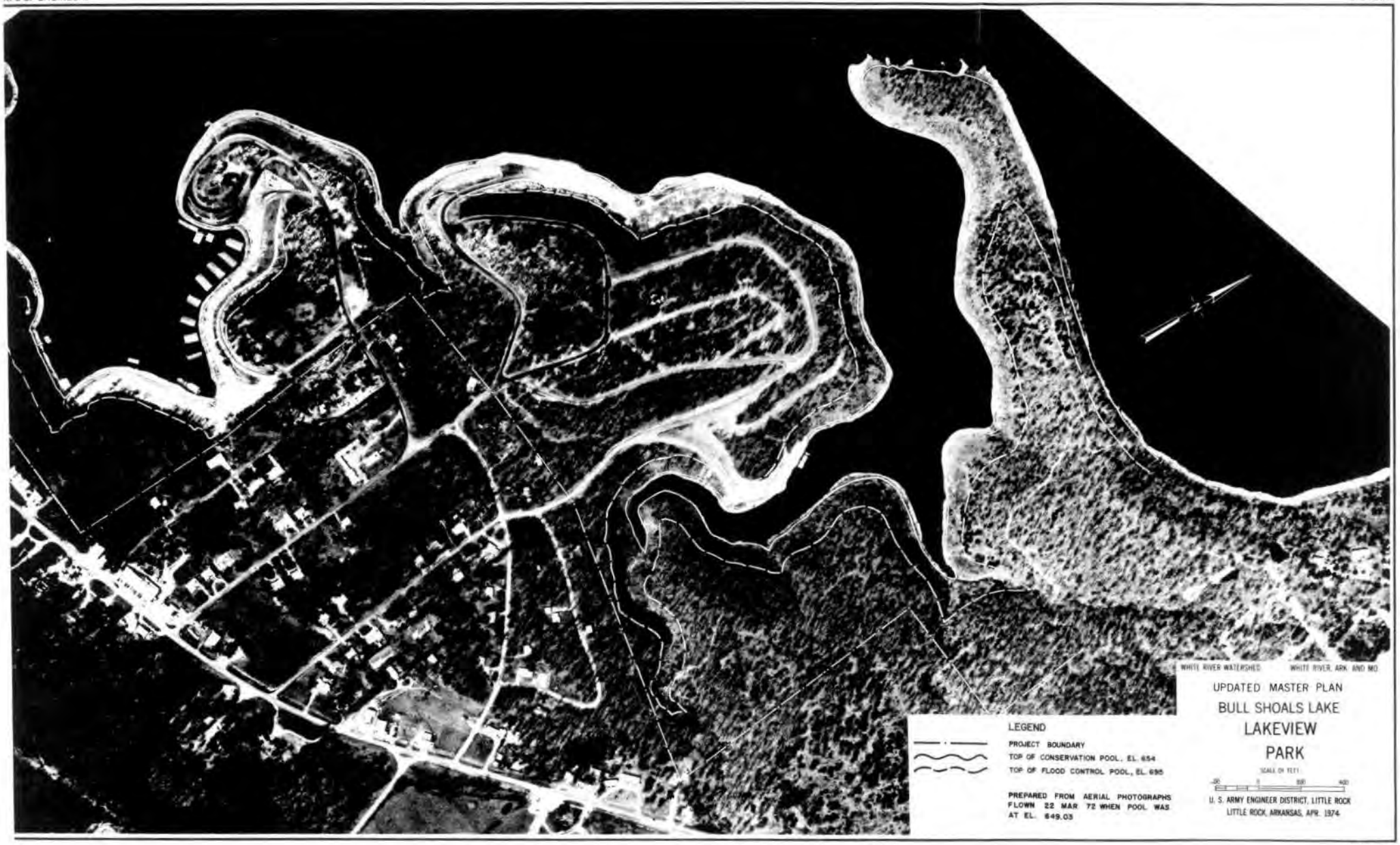


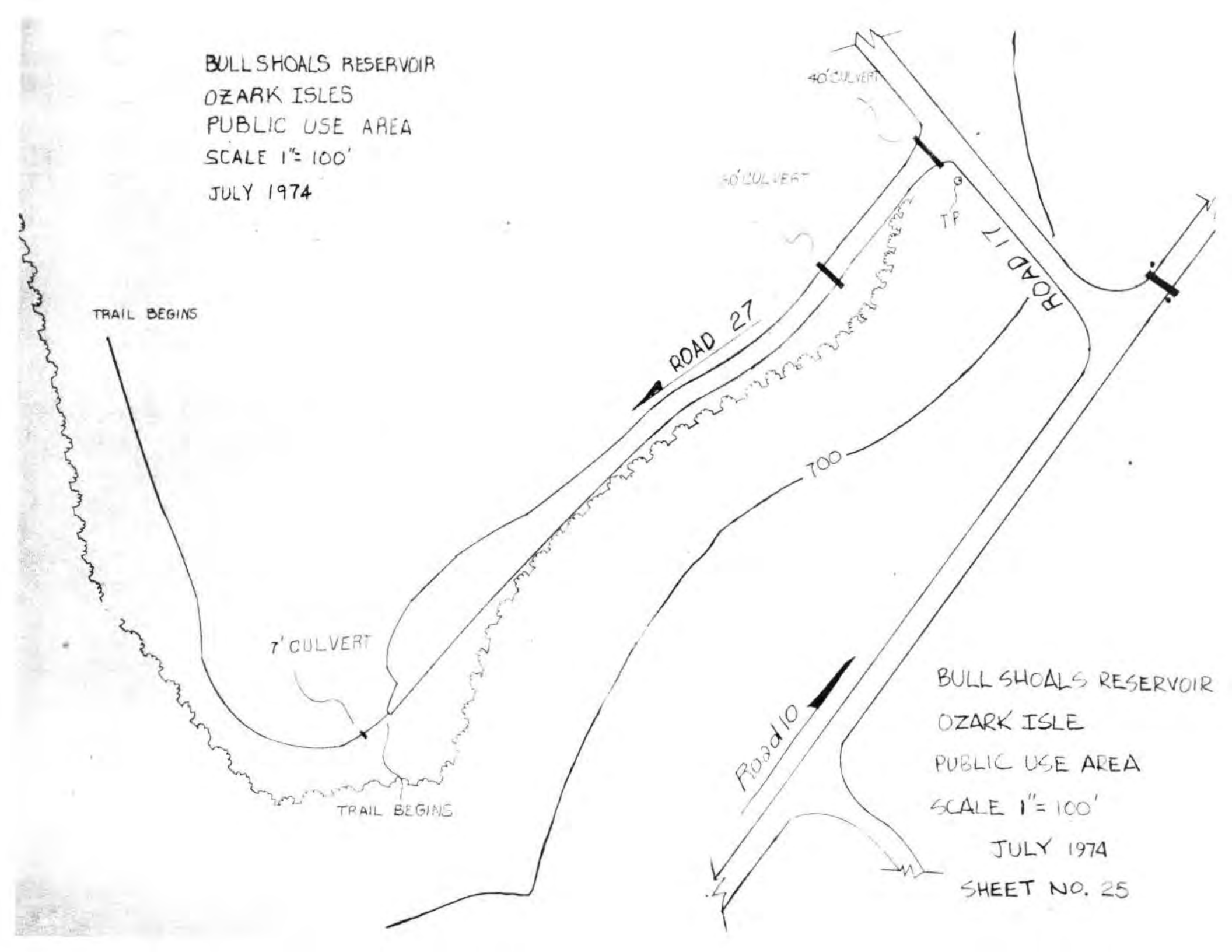
LAKEVIEW PUBLIC USE AREA
BULL SHOALS RESERVOIR
LOCATION OF OVERFLOW
AUGUST 1973
SHEET NO. 24
SCALE: 1"=200'

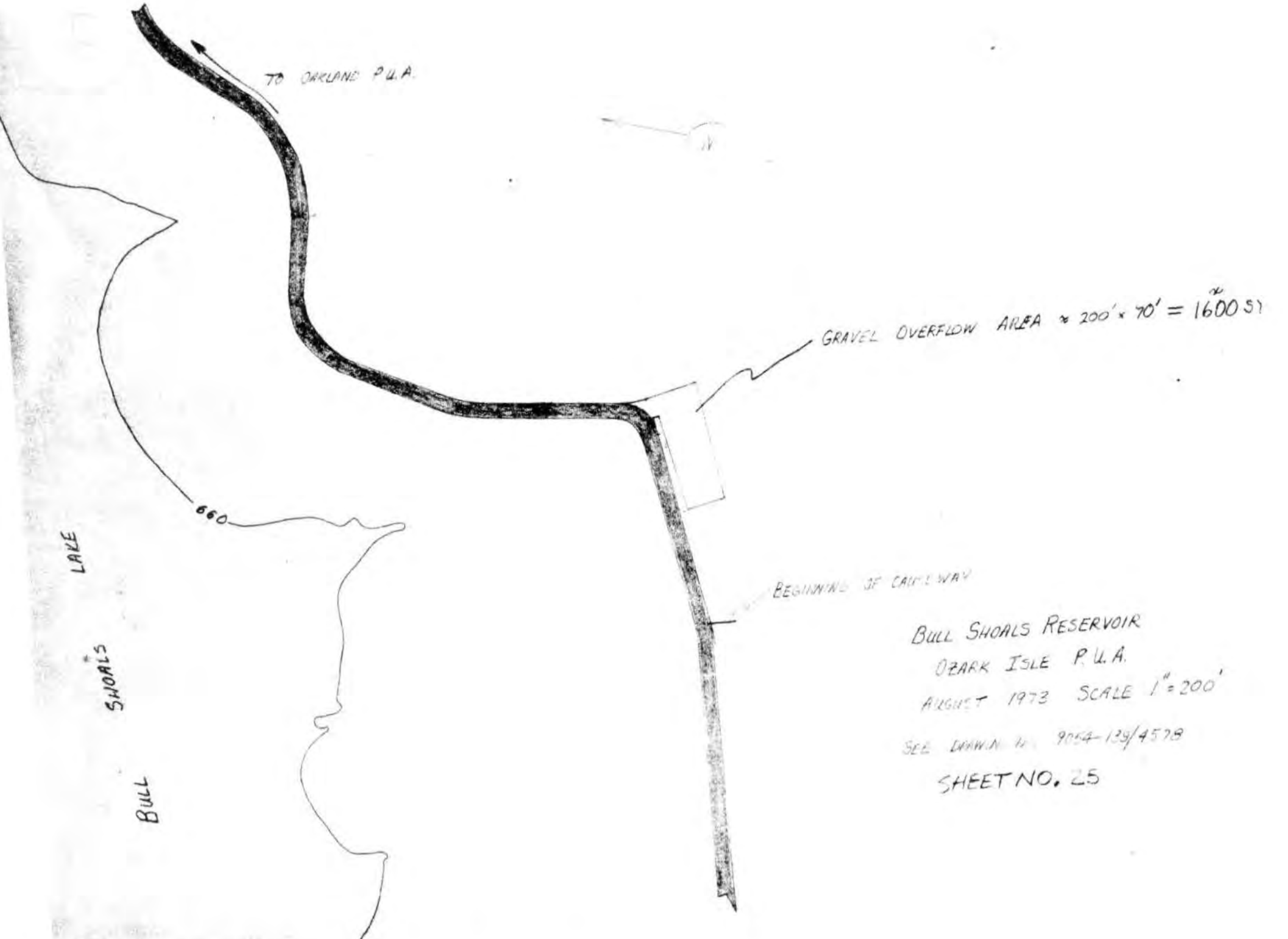
CORPS OF ENGINEERS

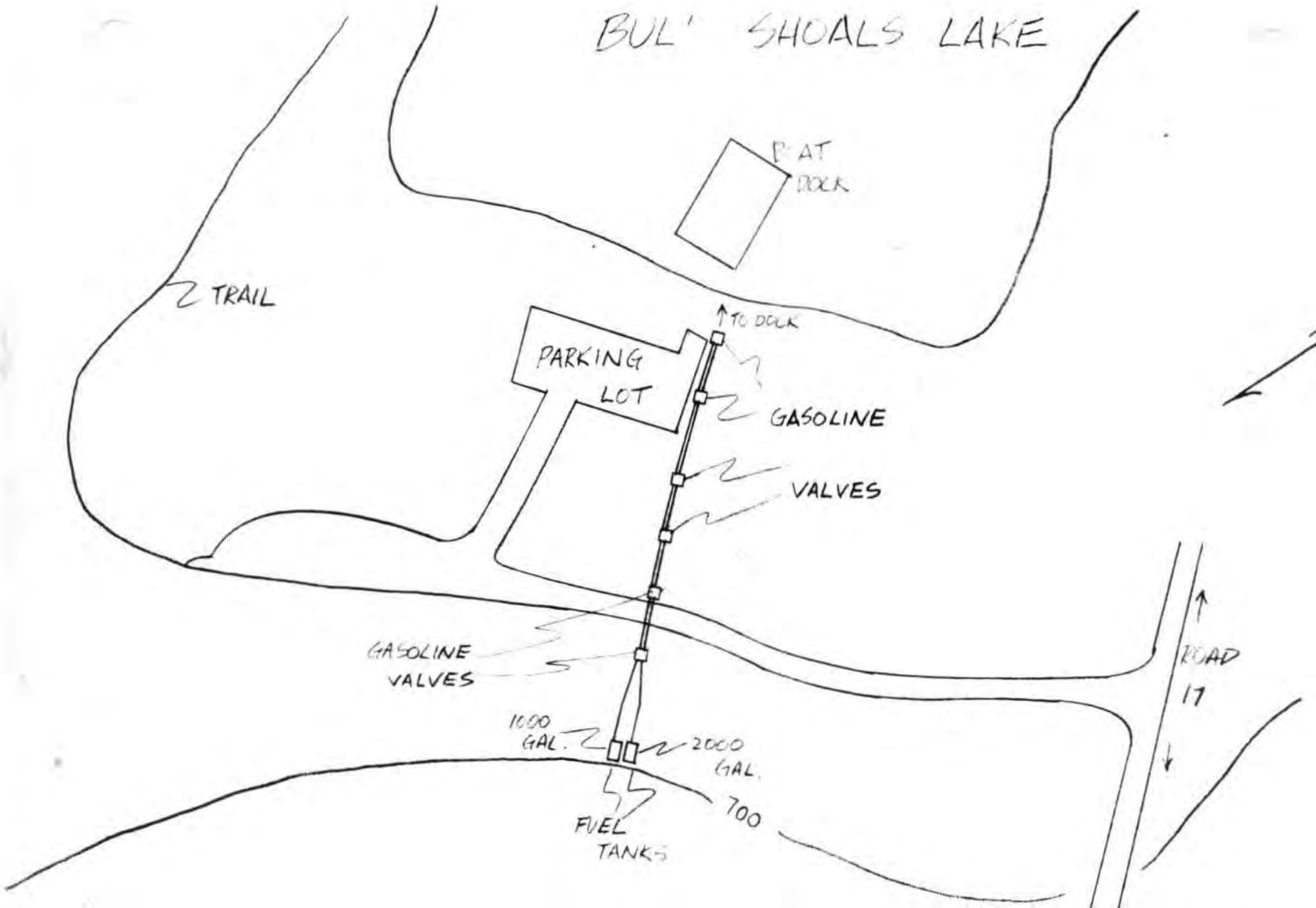
U S ARMY




WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
LAKEVIEW
PARK
SCALE IN FEET
-200 0 200 400
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 22 MAR 72 WHEN POOL WAS AT EL. 649.03

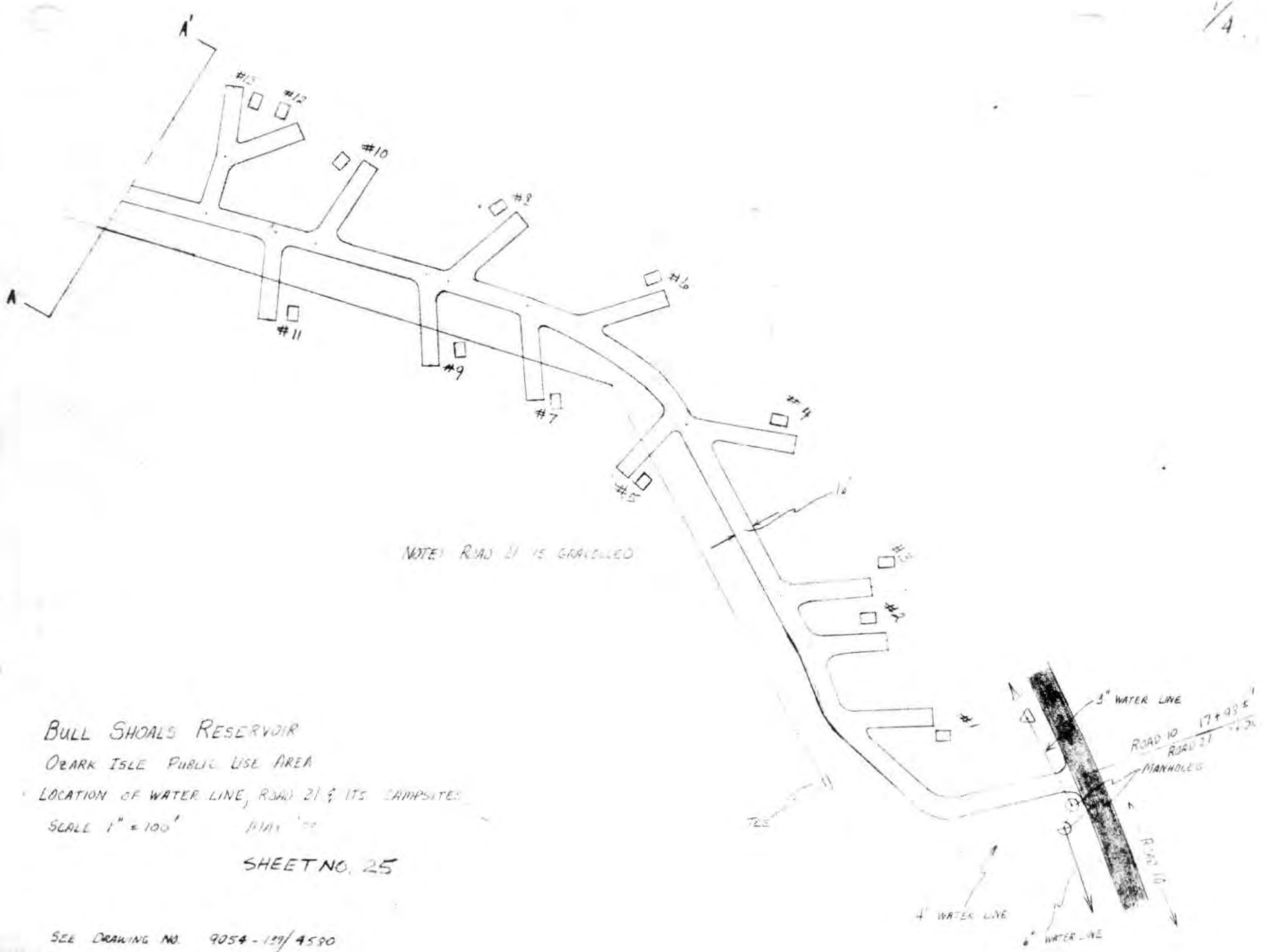

BULL SHOALS RESERVOIR
OZARK ISLES
PUBLIC USE AREA
SCALE 1"= 100'
JULY 1974
40' CULVERT
60' CULVERT
TP
ROAD 17
TRAIL BEGINS
ROAD 27
700
7' CULVERT
TRAIL BEGINS
Road 10
BULL SHOALS RESERVOIR
OZARK ISLE
PUBLIC USE AREA
SCALE 1"= 100'
JULY 1974
SHEET NO. 25


TO OARLAND P.U.A.
N
GRAVEL OVERFLOW AREA ≈ 200' × 70' = 16000 SF
660
LAKE
BULL SHOALS
BEGINNING OF CAUSEWAY
BULL SHOALS RESERVOIR
OZARK ISLE P.U.A.
AUGUST 1973 SCALE 1" = 200'
SEE DRAWING NO. 9054-139/4578
SHEET NO. 25



←ROAD 10→

BULL SHOALS RESERVOIR
OZARK ISLE P.U.A.
LOCATION OF PARKING
TO NEW DOCK 6/9/76



BULL SHOALS RESERVOIR

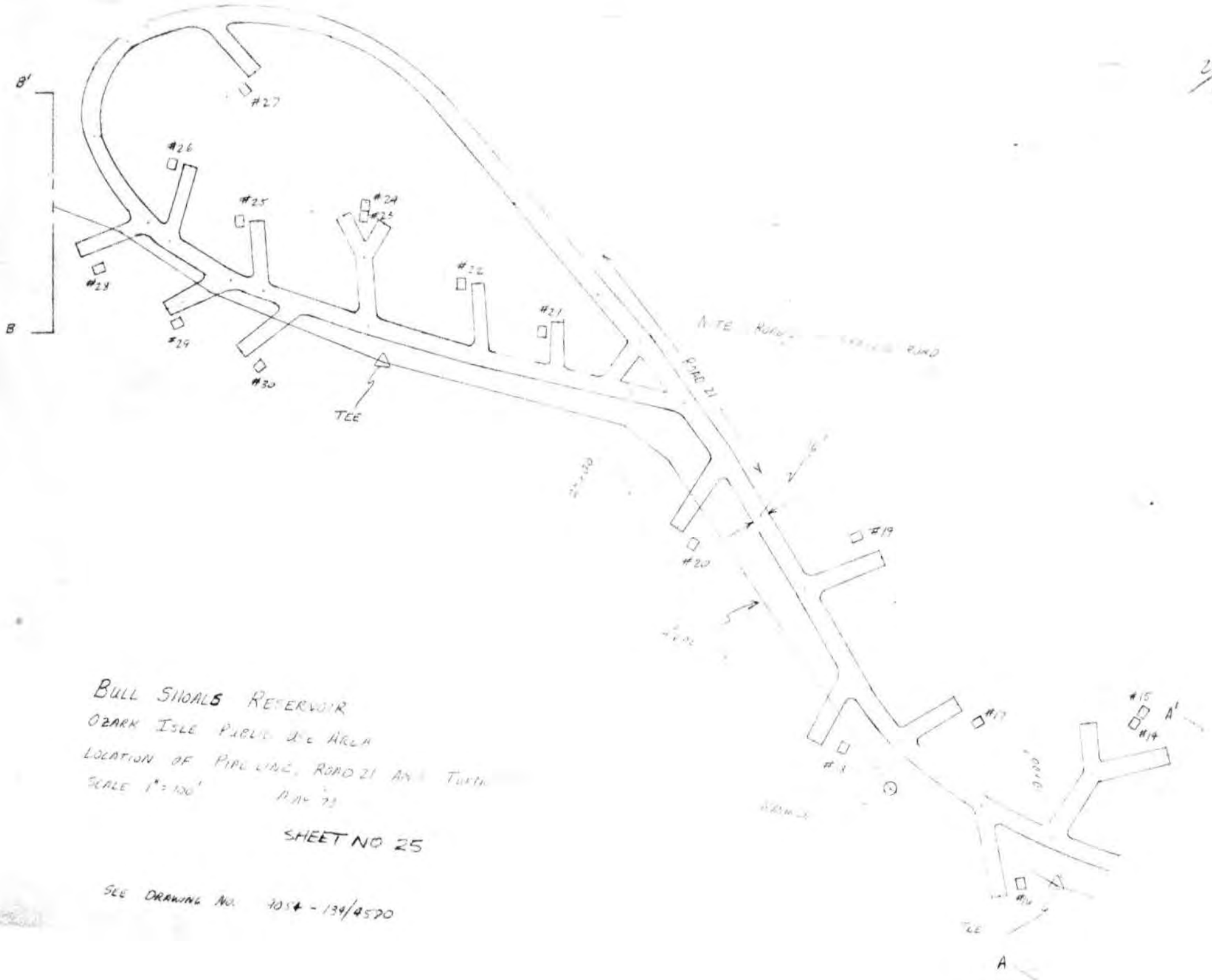
OZARK ISLE PUBLIC USE AREA

LOCATION OF WATER LINE, ROAD 21 & ITS CAMPSITES

SCALE 1" = 100'

SHEET NO. 25

SEE DRAWING NO. 9054-129/4580



BULL SHOALS RESERVOIR
OZARK ISLE PUBLIC USE AREA
LOCATION OF PIPELINE, ROAD 21 AND TURN
SCALE 1" = 100'
MAY 73

SHEET NO 25

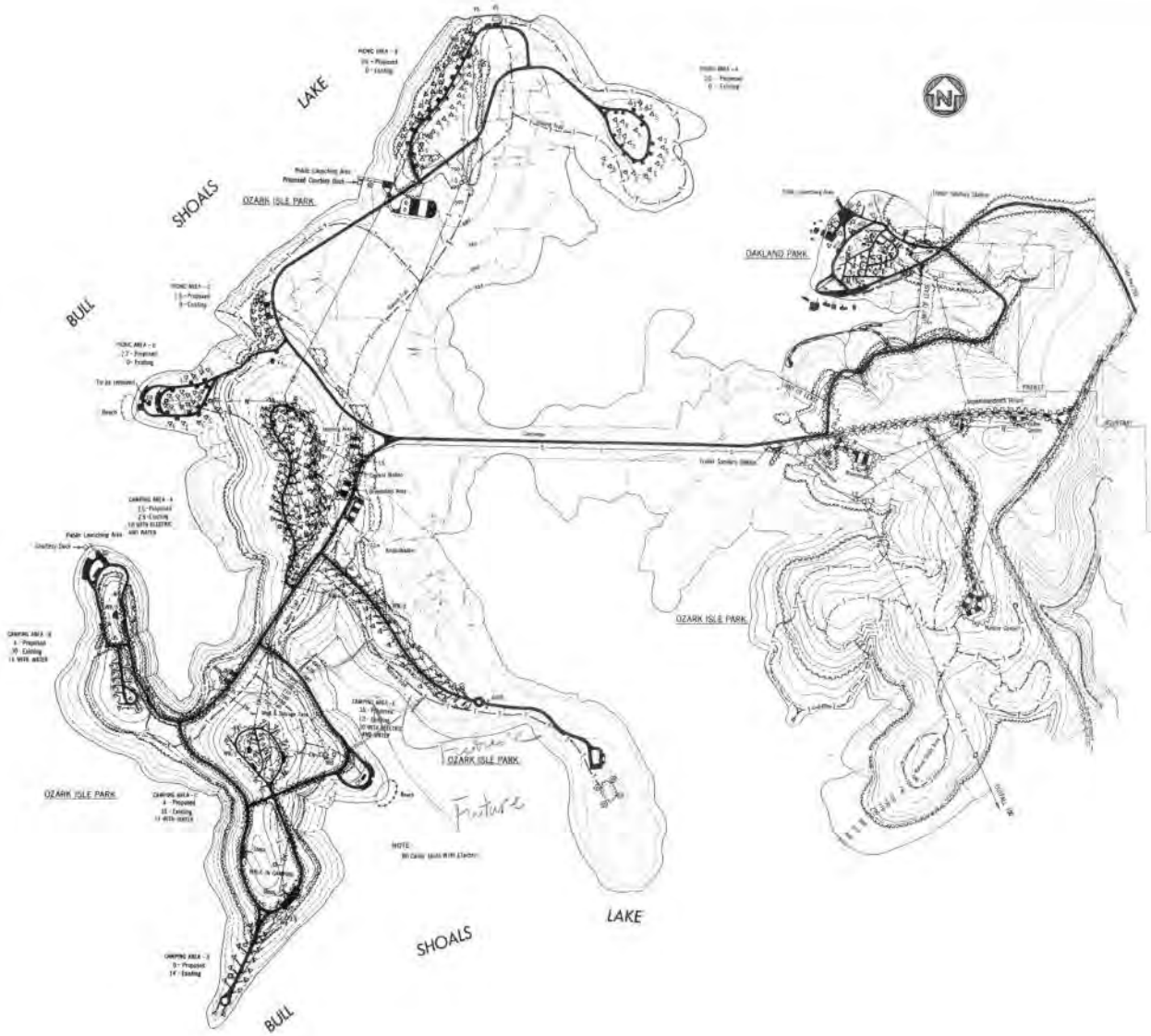
SEE DRAWING NO. 1054 - 134/4520

SHEET NO. 25

SEE DRAWING NO. 8861-139/4456

CORPS OF ENGINEERS

U.S. ARMY



LEGEND
RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
STRUCTURES		
PICNIC SPACE:		
CAMP SPACE OR TRAILER SPACE		
GROUP CAMP SPACE AND TRAIL		
UTILITIES		
OTHER FEATURES		
PERTINENT ELEVATION (MSL)		

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

BULL SHOALS LAKE

OAKLAND-OZARK ISLE PARK

SCALE OF FEET

0 400 800

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, MARCH 1974

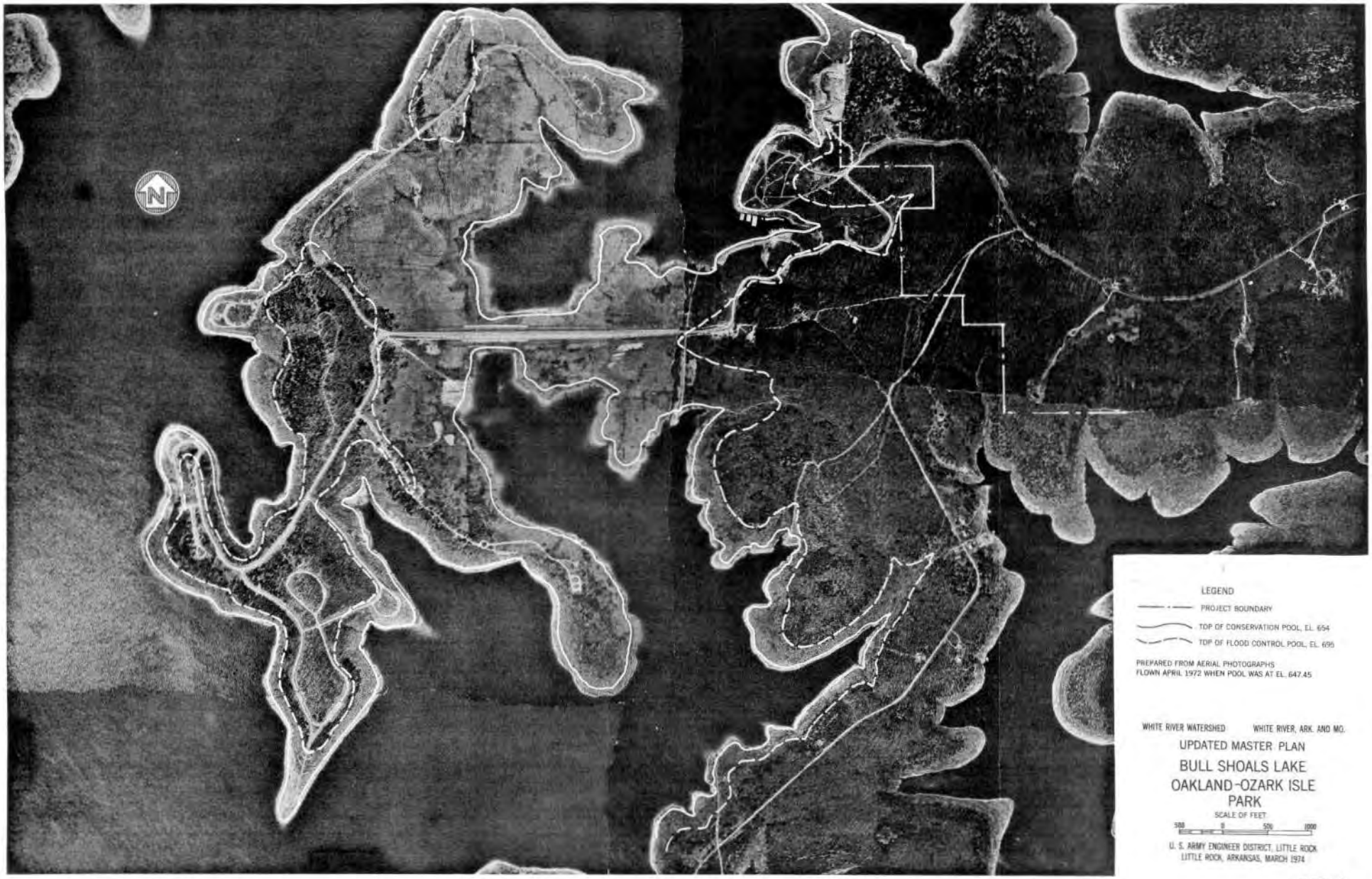
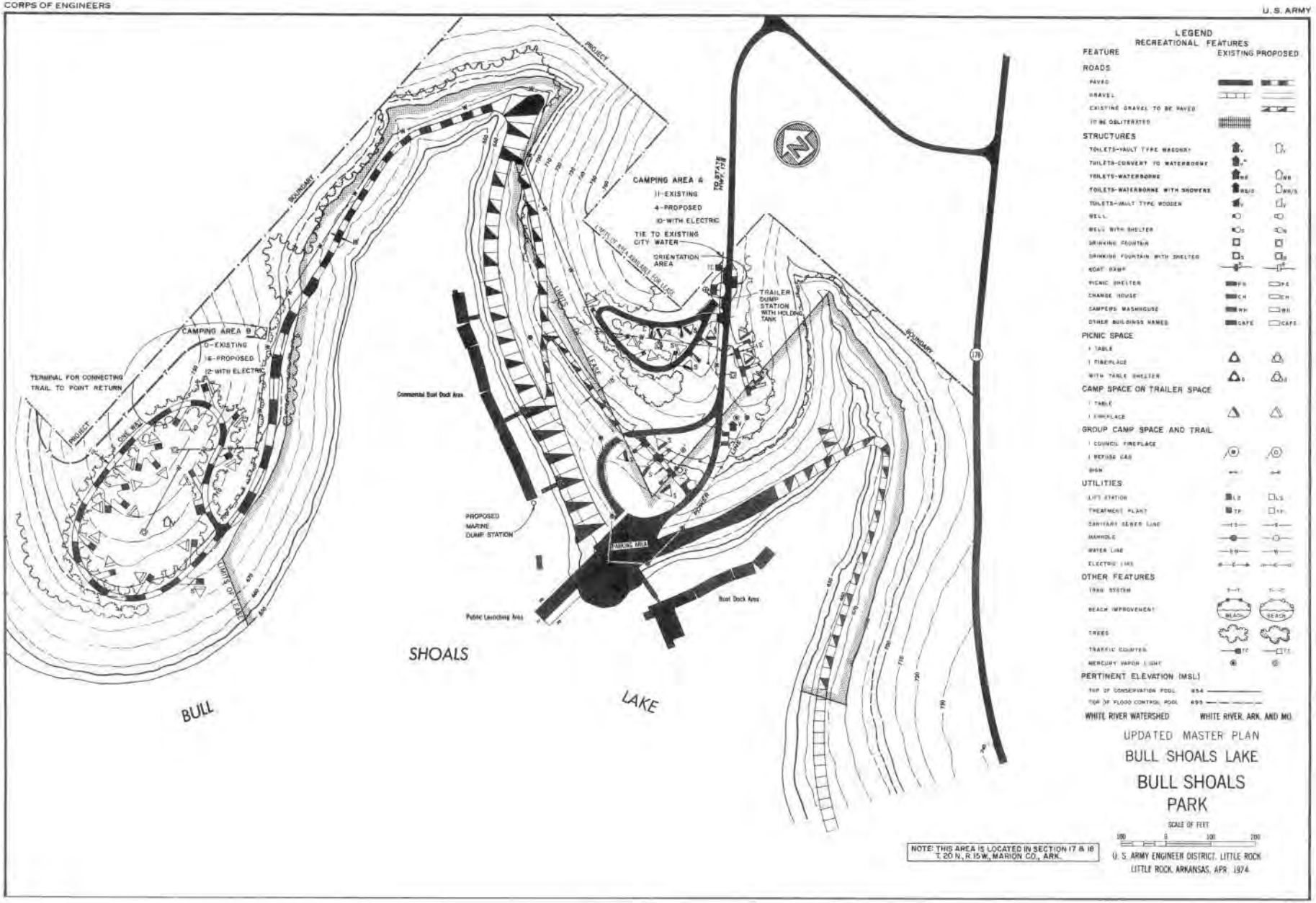

N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS
FLOWN APRIL 1972 WHEN POOL WAS AT EL. 647.45
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
OAKLAND-OZARK ISLE
PARK
SCALE OF FEET
500 0 500 1000
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, MARCH 1974

PLATE 25A

CORPS OF ENGINEERS

U. S. ARMY



LEGEND

RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
CHANGE HOUSE		
CAMPERS WASHHOUSE		
OTHER BUILDINGS NAMED		
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654

TOP OF FLOOD CONTROL POOL 695

WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

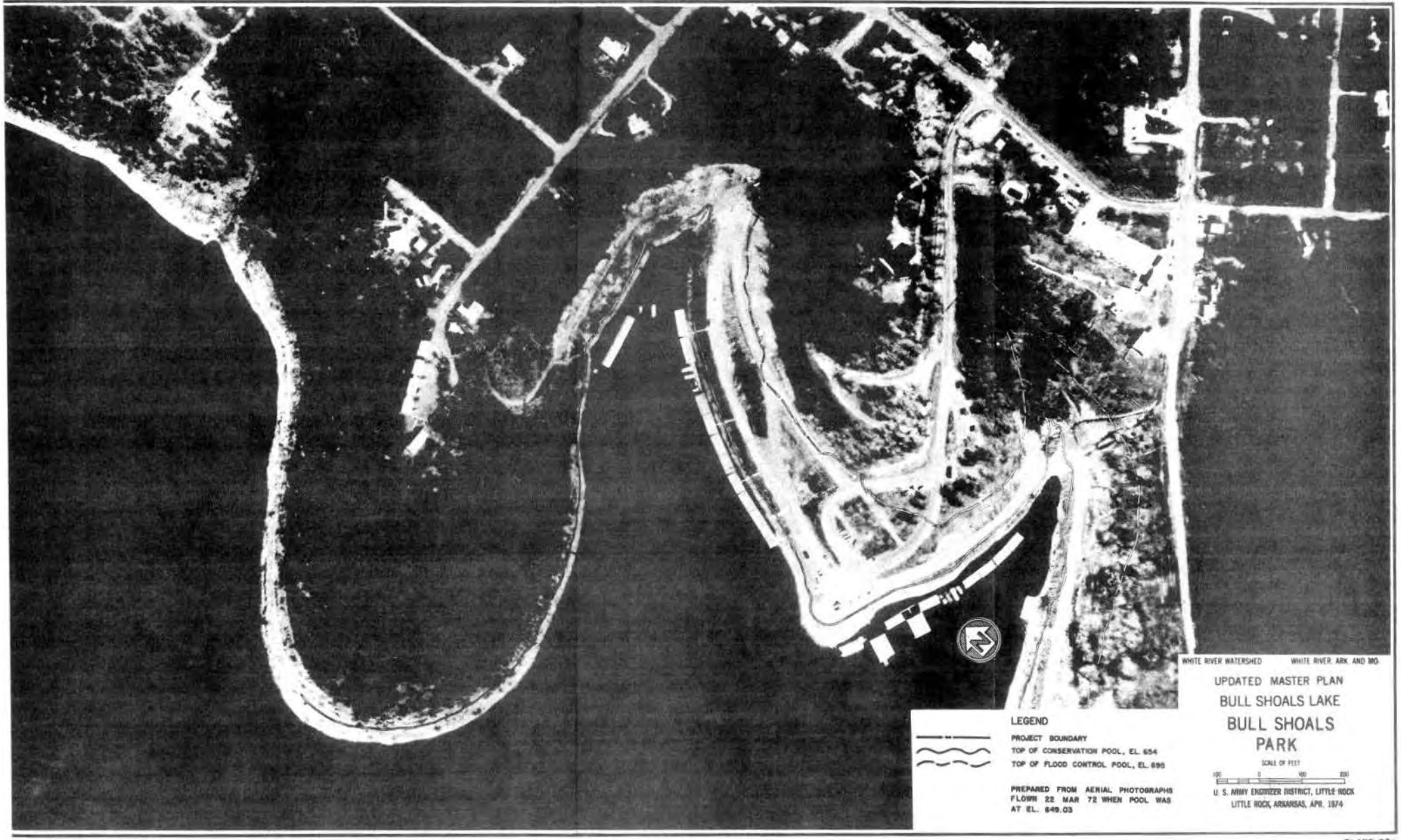
UPDATED MASTER PLAN
BULL SHOALS LAKE
BULL SHOALS PARK

SCALE OF FEET

100 0 100 200

NOTE: THIS AREA IS LOCATED IN SECTION 17 & 18 T. 20 N., R. 15 W., MARION CO., ARK.

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974



WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

BULL SHOALS LAKE

BULL SHOALS PARK

SCALE OF FEET

100 0 100 200

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

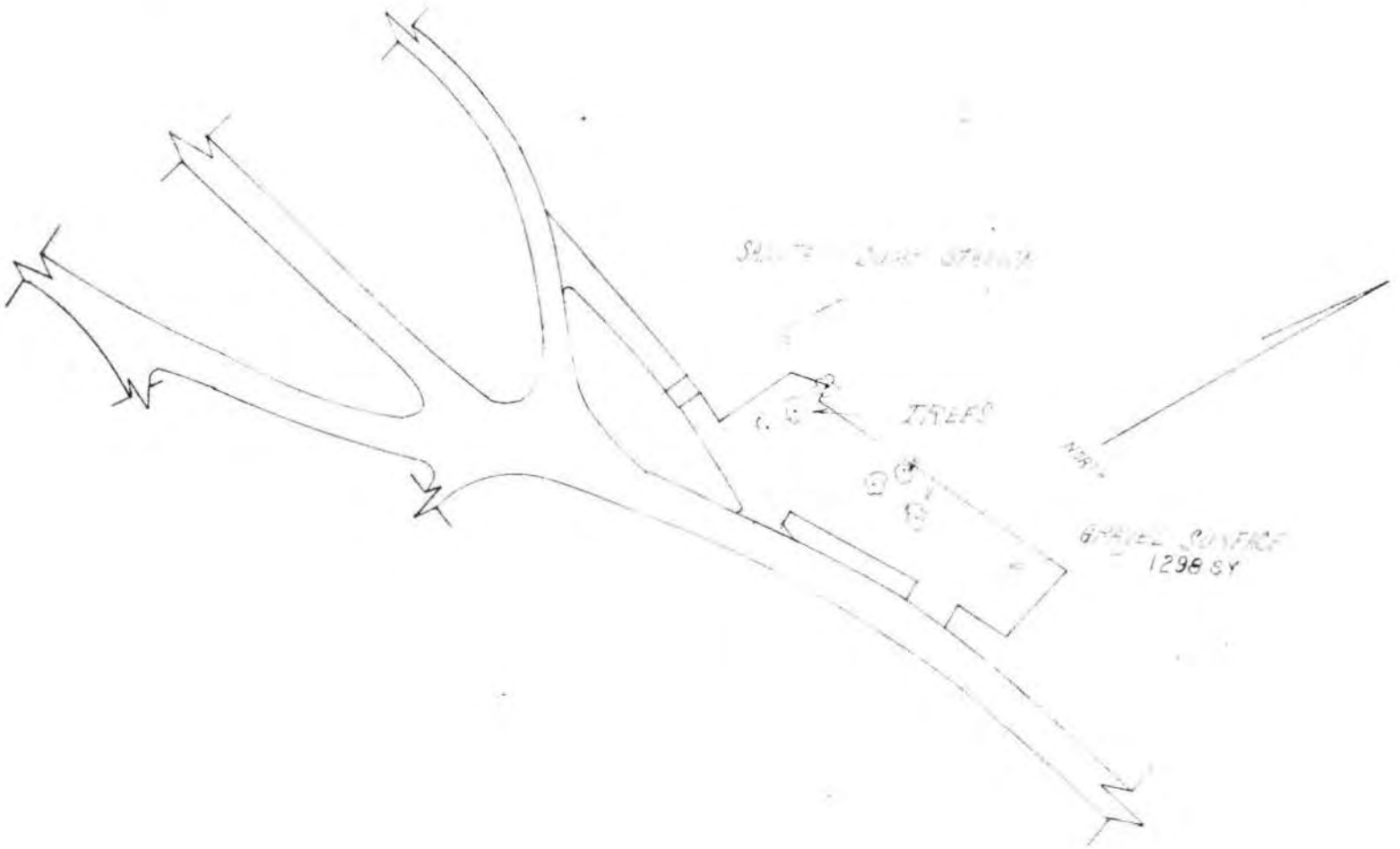
LEGEND

PROJECT BOUNDARY

TOP OF CONSERVATION POOL, EL. 654

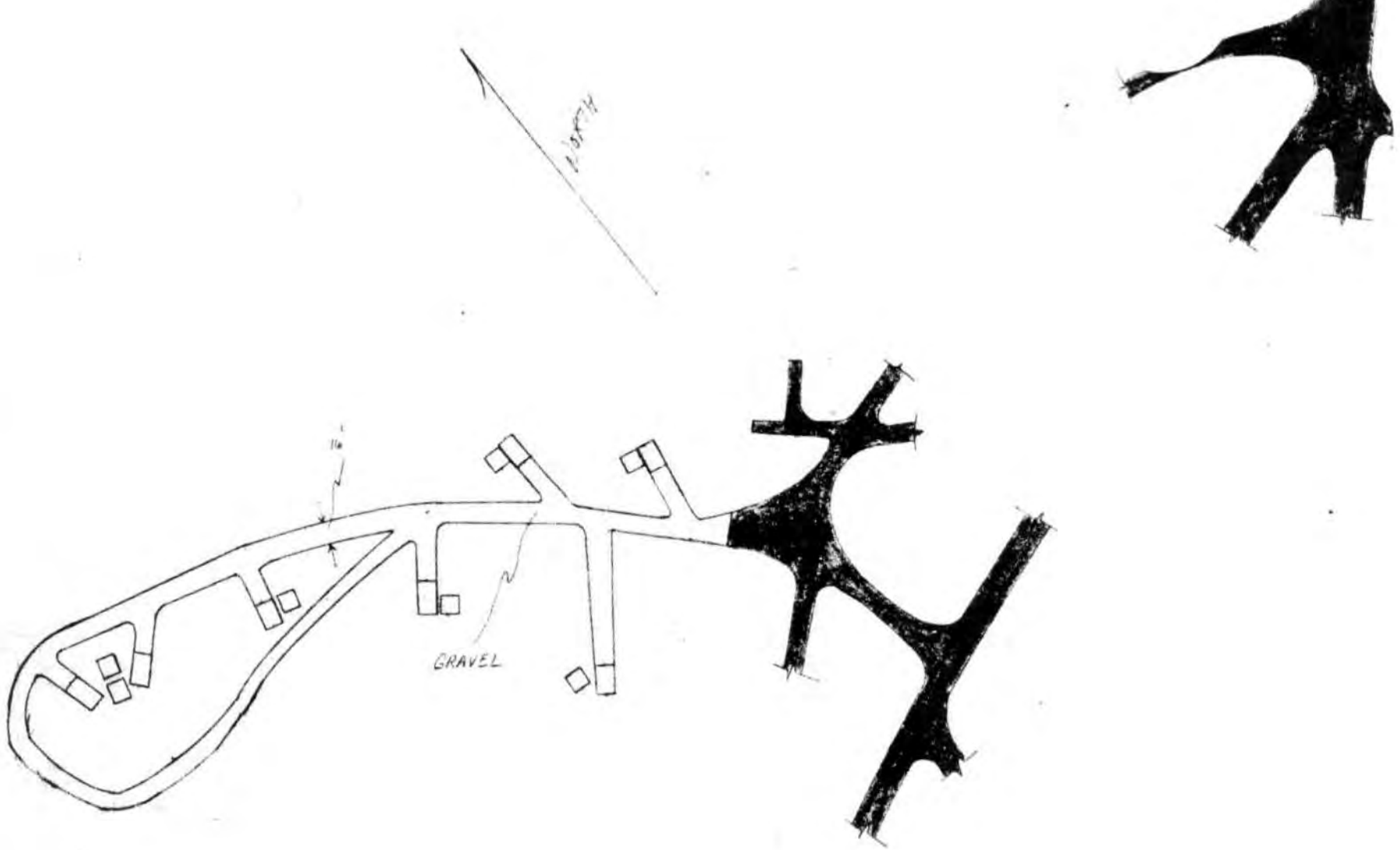
TOP OF FLOOD CONTROL POOL, EL. 695

PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 22 MAR 72 WHEN POOL WAS AT EL. 649.03



AUGUST 1973

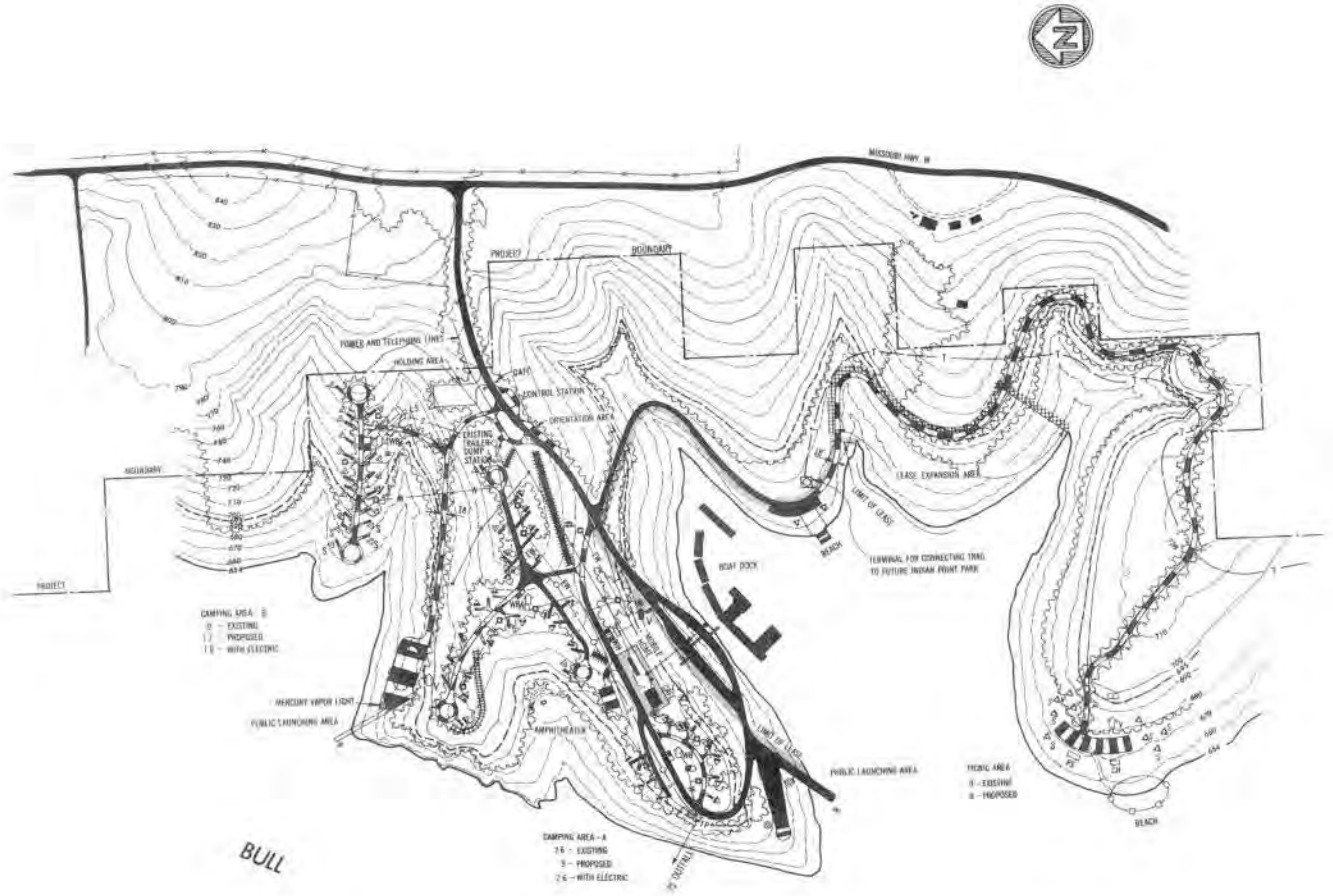
SHEET NO. 27



DRIVE PADS : 12' × 20'
TABLE PADS : 12' × 14'

BULL SIGNALS RESERVOIR
PINYON P.U.D.
LOCATION OF NEW ROAD AND
CAMPING AREA
SCALE 1" = 100'

SHEET NO. 27



LEGEND
RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE, MASONRY	V	V
TOILETS-CONVERT TO WATERBORNE	V*	
TOILETS-WATERBORNE	WB	WB
TOILETS-WATERBORNE WITH SHOWERS	WB/S	WB/S
TOILETS-VAULT TYPE WOODEN	V	V
WELL	W	W
WELL WITH SHELTER	W	W
DRINKING FOUNTAIN	D	D
DRINKING FOUNTAIN WITH SHELTER	D	D
BOAT RAMP		
PICNIC SHELTER	PS	PS
CHANGE HOUSE	CH	CH
CAMPERS WASHHOUSE	WH	WH
OTHER BUILDINGS NAMED	CAFE	CAFE
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER	S	S
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL RING		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION	LS	LS
TREATMENT PLANT	TP	TP
SANITARY SEWER LINE	SS	SS
MANHOLE		
WATER LINE	W	W
ELECTRIC LINE	E	E
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC DIVERTER	TC	TC
MERCURY VAPOR LIGHT		
PERTINENT ELEVATION (MSL)		
TOP OF CONSERVATION POOL — 654		
TOP OF FLOOD CONTROL POOL — 695		

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

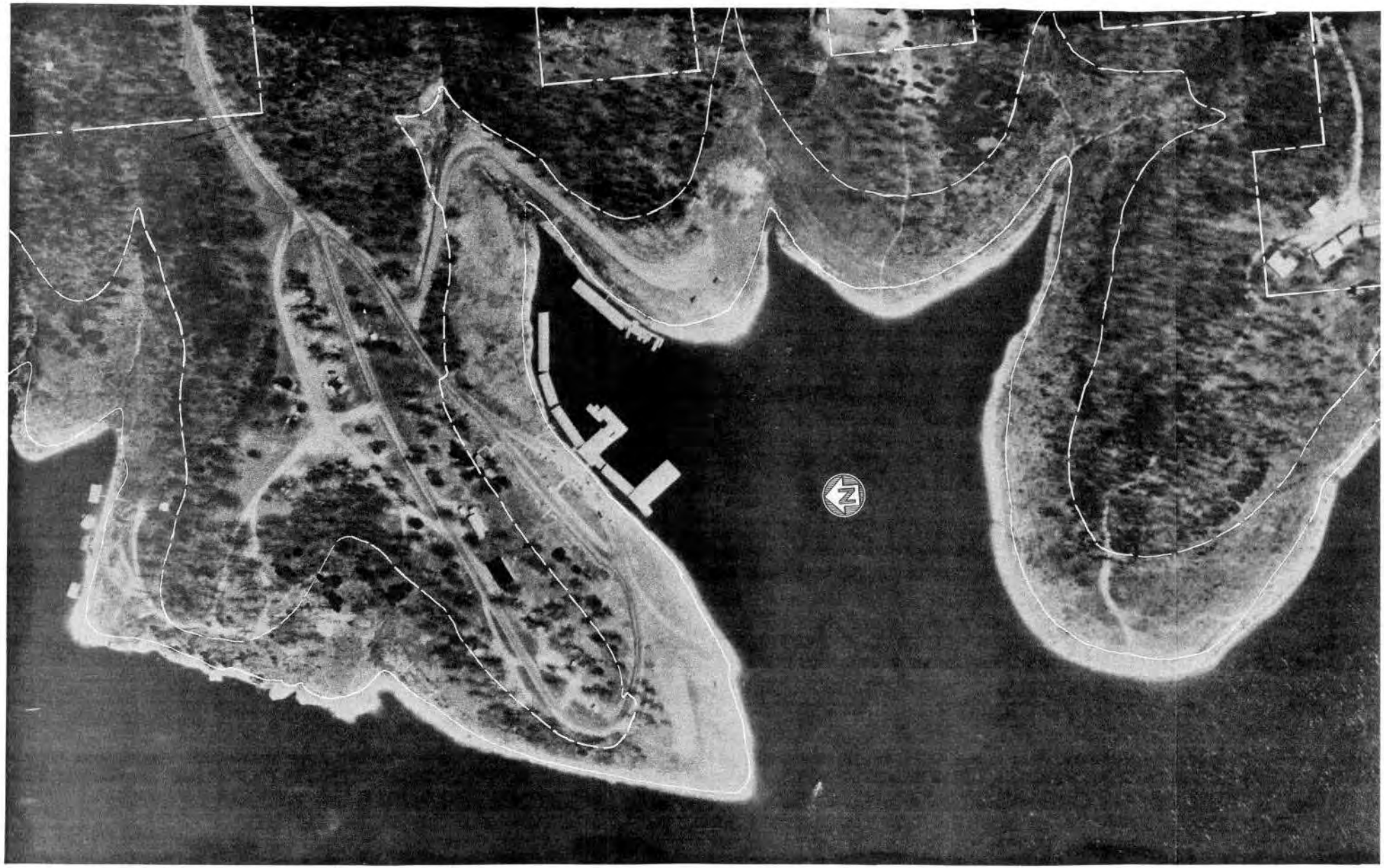
UPDATED MASTER PLAN
BULL SHOALS LAKE
PONTIAC PARK

SCALE OF FEET
200 0 200 400

NOTE: THIS AREA IS LOCATED IN SECTIONS 9, 10, 15 & 16, T 21 N., R 15 W. OZARK CO., MO.

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, MARCH 1974

PLATE 27



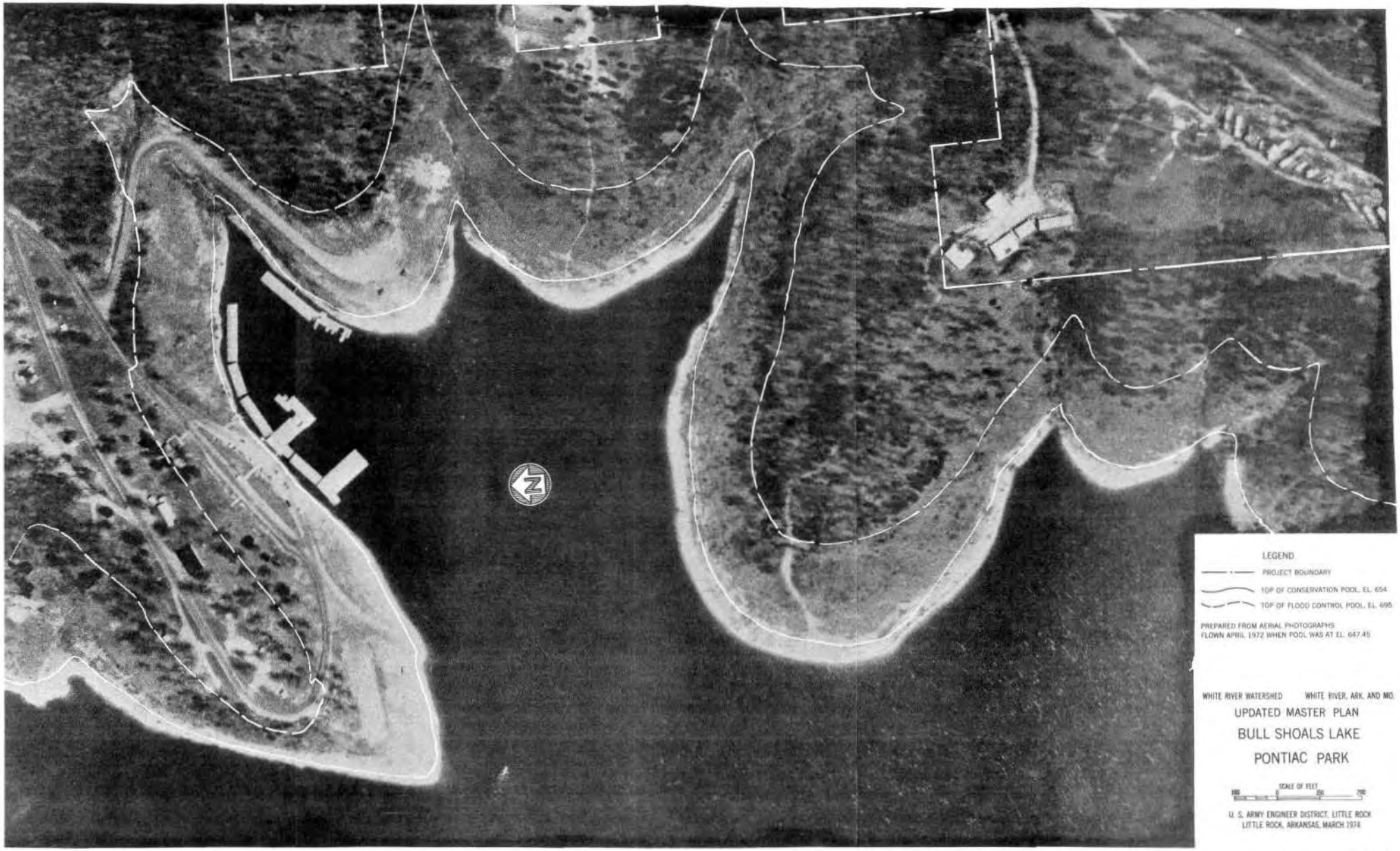
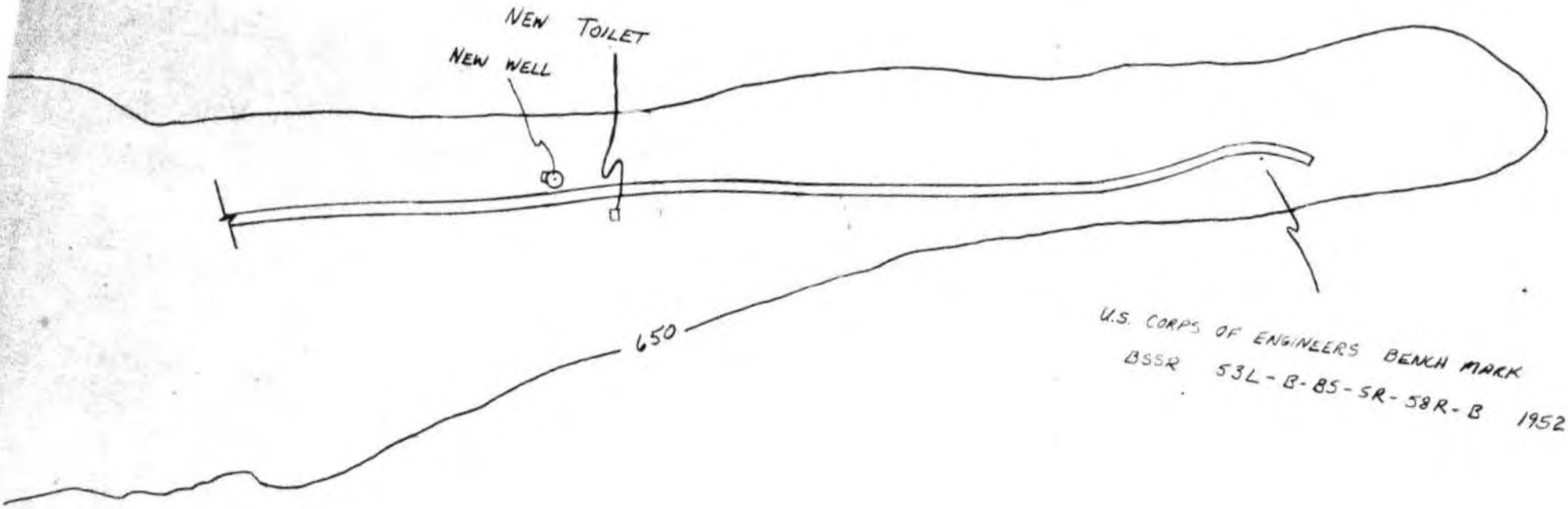

LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS
FLOWN APRIL 1972 WHEN POOL WAS AT EL. 647.45
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
PONTIAC PARK
SCALE OF FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, MARCH 1974

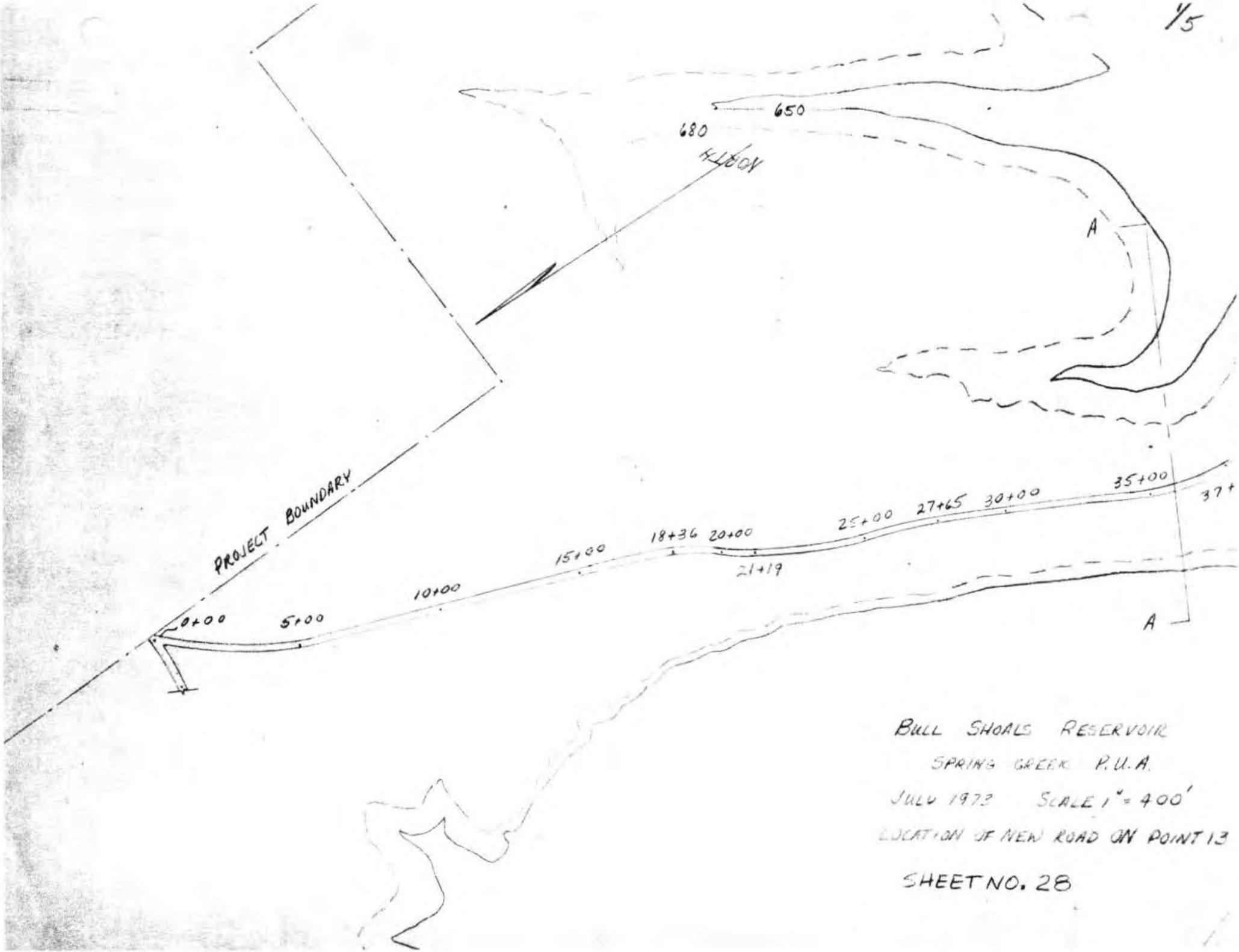
PLATE 27A

BULL SHOALS LAKE



U.S. CORPS OF ENGINEERS BENCH MARK
BSSR 53L-B-85-5R-58R-B 1952

BULL SHOALS RESERVOIR
SPRING CREEK P.U.A. (POINT 13)
MAY 1974 SCALE 1" = 400'
LOCATION OF NEW WELL AND TOILET
SHEET NO. 28



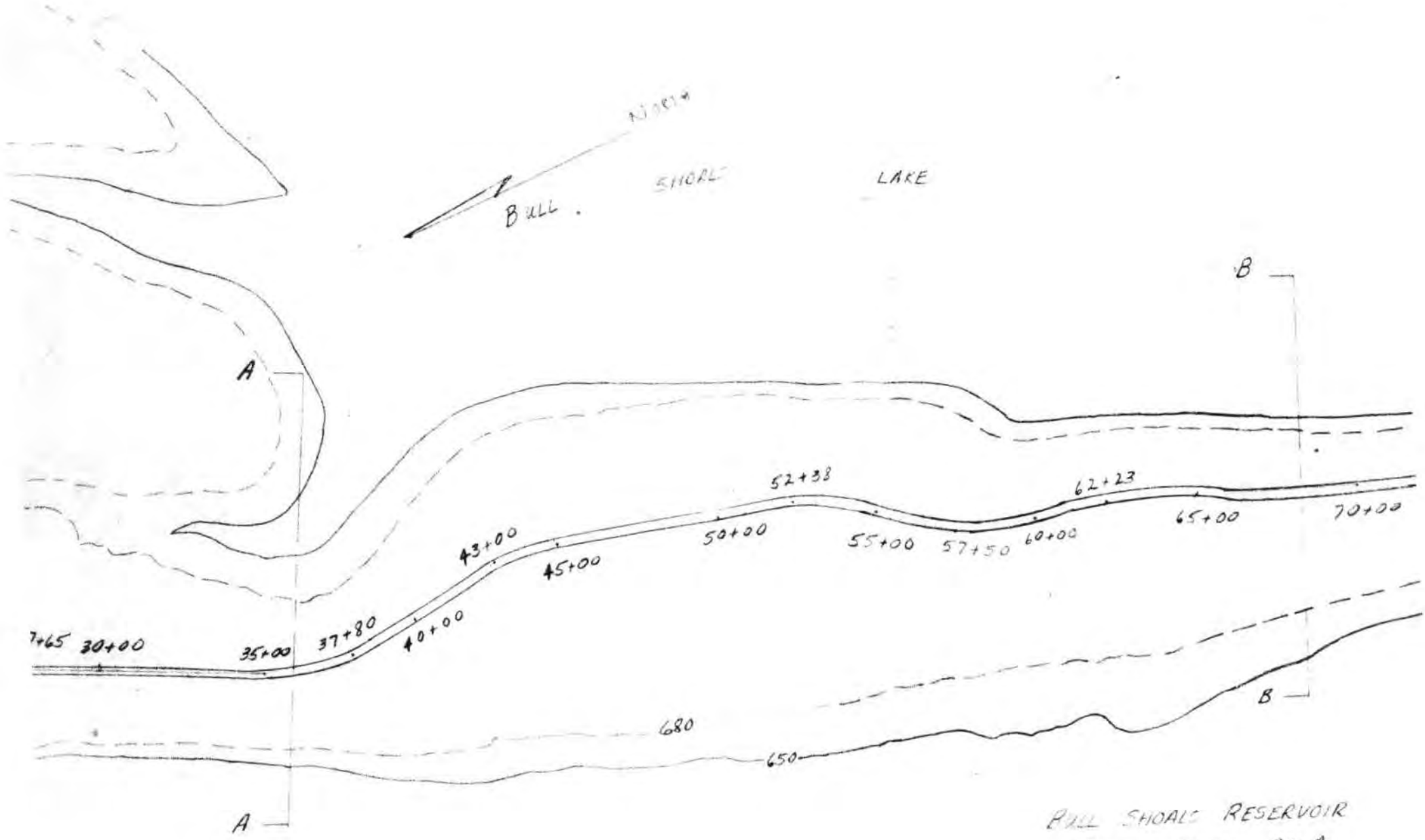
BULL SHOALS RESERVOIR

SPRING CREEK R.U.A.

JULY 1973 SCALE 1" = 400'

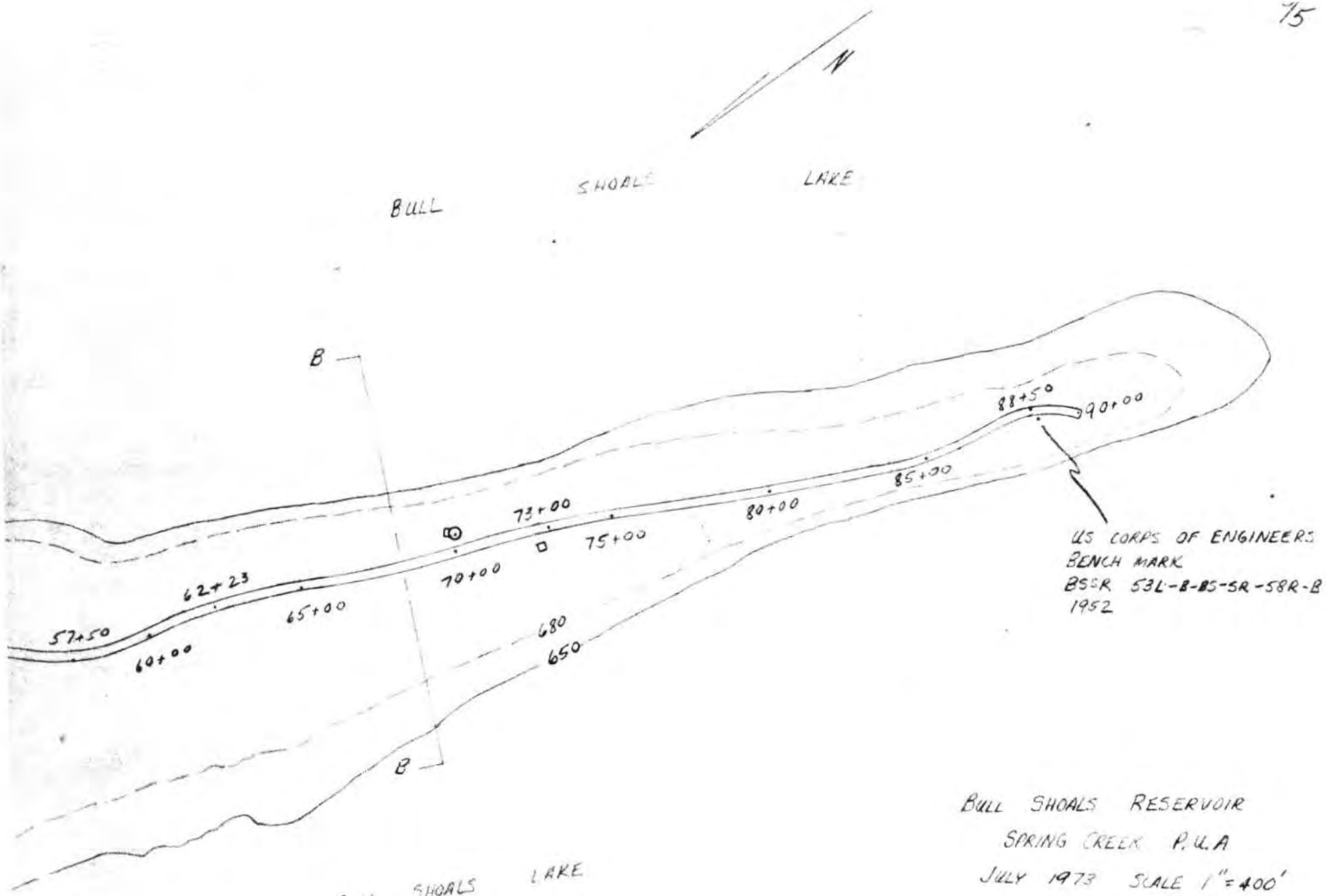
LOCATION OF NEW ROAD ON POINT 13

SHEET NO. 28



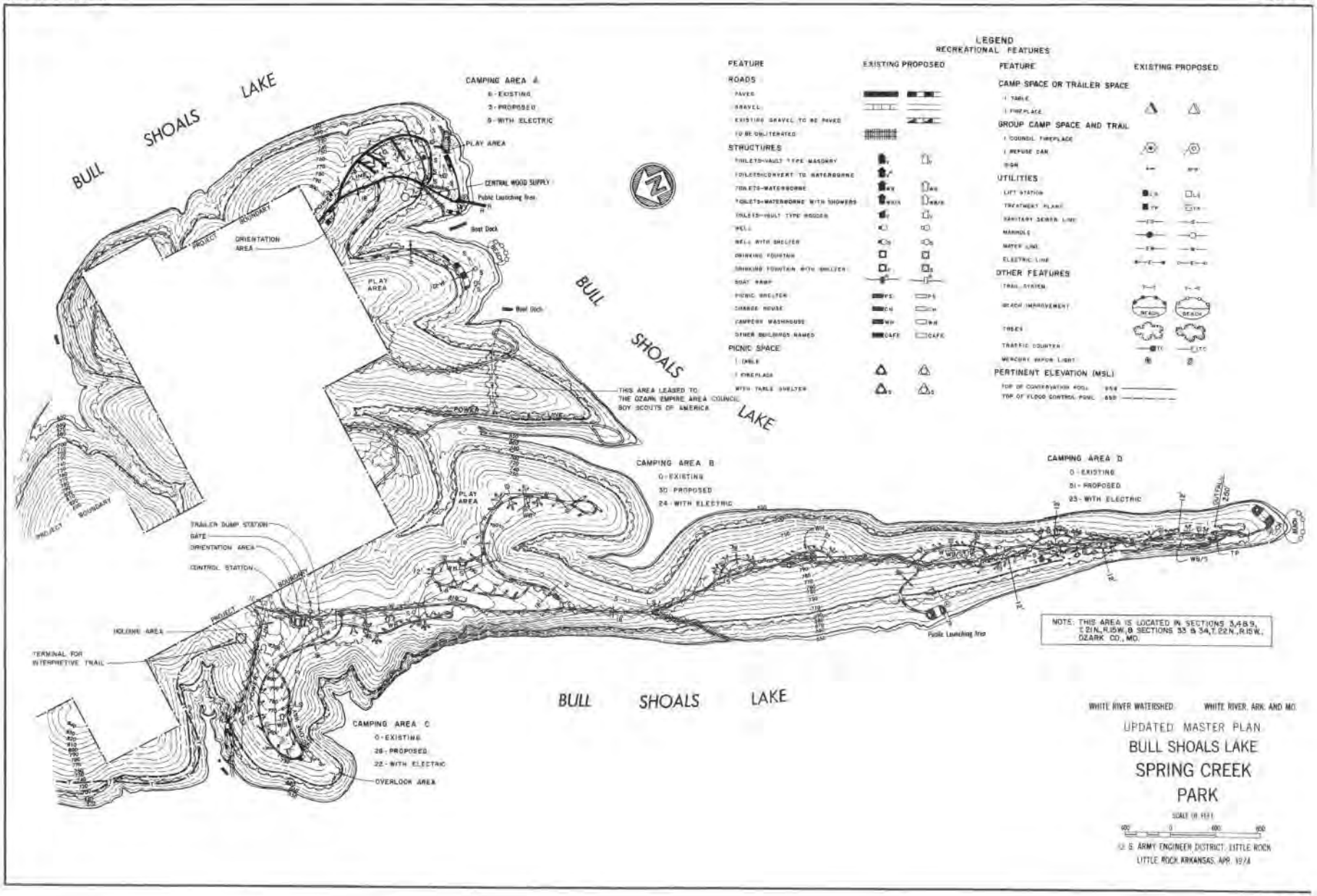
BULL SHOALS LAKE

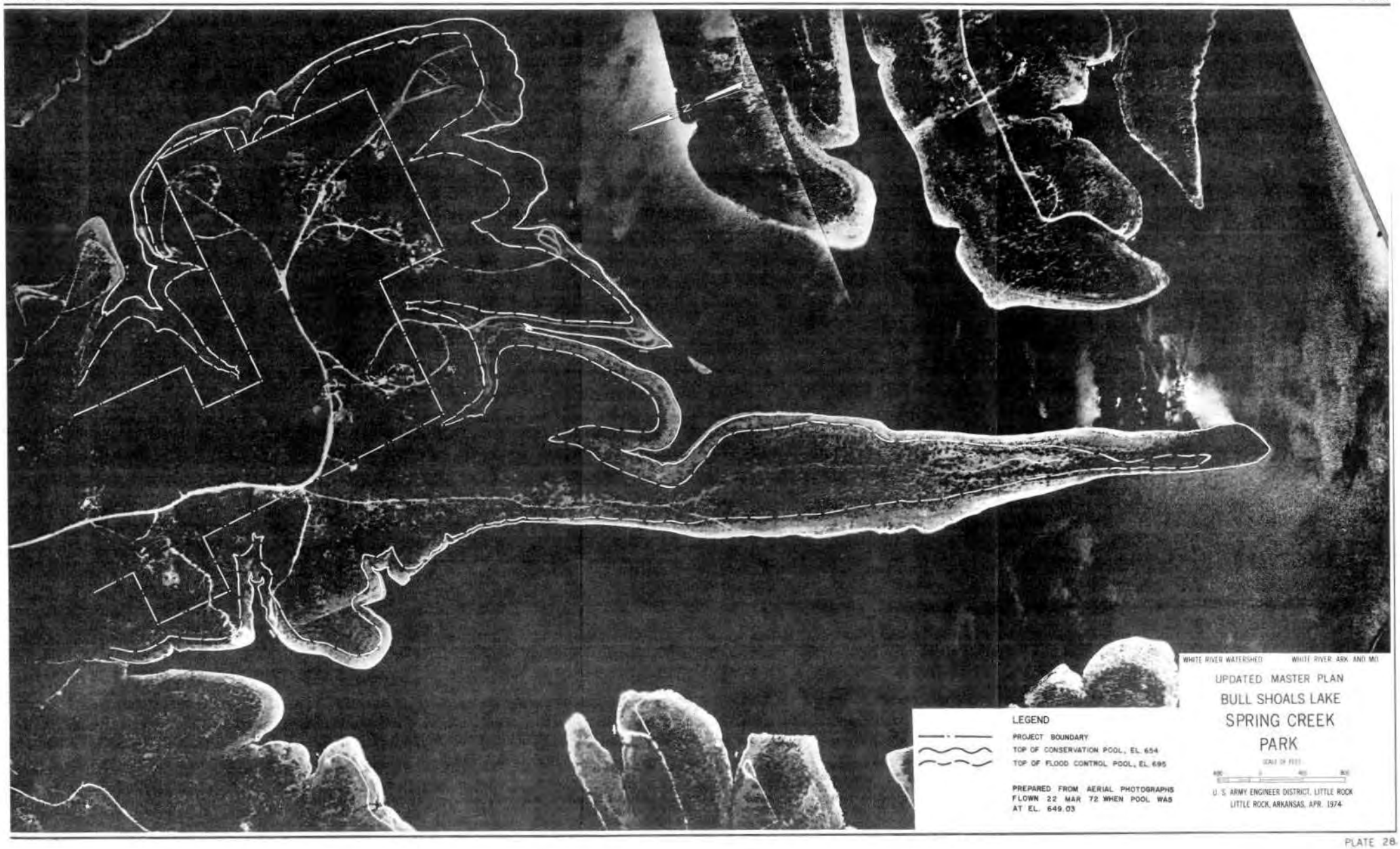
BULL SHOALS RESERVOIR
SPRING CREEK R.U.A.
JULY 1973 SCALE 1" = 400'
LOCATION OF NEW ROAD ON POINT 13
SHEET NO. 28



BULL SHOALS RESERVOIR
SPRING CREEK P.U.A
JULY 1973 SCALE 1"=400'
LOCATION OF NEW ROAD ON POINT 13

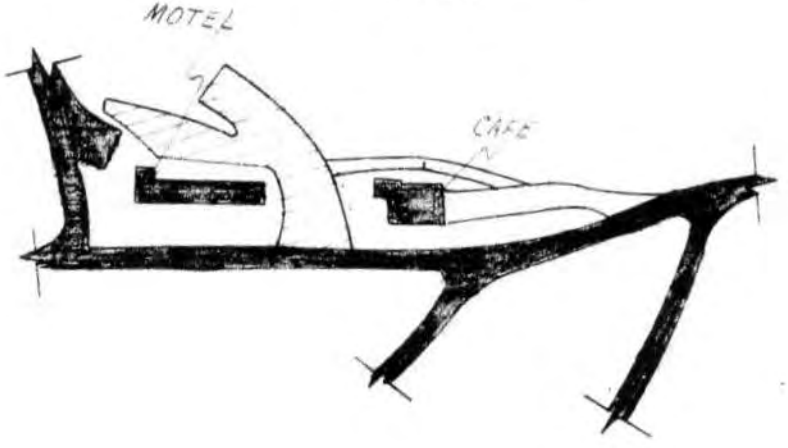
SHEET NO. 28


LEGEND
RECREATIONAL FEATURES
FEATURE
EXISTING PROPOSED
ROADS
PAVED
GRAVEL
EXISTING GRAVEL TO BE PAVED
TO BE OBLITERATED
STRUCTURES
TOILETS-VAULT TYPE MASONRY
TOILETS-CONVERT TO WATERBORNE
TOILETS-WATERBORNE
TOILETS-WATERBORNE WITH SHOWERS
TOILETS-VAULT TYPE WOODEN
WELL
WELL WITH SHELTER
DRINKING FOUNTAIN
DRINKING FOUNTAIN WITH SHELTER
BOAT RAMP
PICNIC SHELTER
CHARGE HOUSE
CAMPGROUND WASHHOUSE
OTHER BUILDINGS NAMED
CAFE
PICNIC SPACE
1 TABLE
1 FIREPLACE
WITH TABLE SHELTER
FEATURE
EXISTING PROPOSED
CAMP SPACE OR TRAILER SPACE
1 TABLE
1 FIREPLACE
GROUP CAMP SPACE AND TRAIL
1 COUNCIL FIREPLACE
1 REFUSE CAN
SIGN
UTILITIES
LIFT STATION
TREATMENT PLANT
SANITARY SEWER LINE
MANHOLE
WATER LINE
ELECTRIC LINE
OTHER FEATURES
TRAIL SYSTEM
BEACH IMPROVEMENT
BEACH
TOILETS
TRAFFIC COUNTER
MERCURY VAPOR LIGHT
PERTINENT ELEVATION (MSL)
TOP OF CONSERVATION POOL 654
TOP OF FLOOD CONTROL POOL 680
CAMPING AREA A
0 - EXISTING
3 - PROPOSED
0 - WITH ELECTRIC
CAMPING AREA B
0 - EXISTING
30 - PROPOSED
24 - WITH ELECTRIC
CAMPING AREA C
0 - EXISTING
28 - PROPOSED
22 - WITH ELECTRIC
CAMPING AREA D
0 - EXISTING
51 - PROPOSED
23 - WITH ELECTRIC
BULL SHOALS LAKE
PROJECT BOUNDARY
ORIENTATION AREA
PLAY AREA
CENTRAL WOOD SUPPLY
Public Launching Area
Boat Dock
THIS AREA LEASED TO THE OZARK EMPIRE AREA COUNCIL BOY SCOUTS OF AMERICA
POWER LINE
TRAILER DUMP STATION
GATE
CONTROL STATION
HOLDING AREA
TERMINAL FOR INTERPRETIVE TRAIL
OVERLOOK AREA
NOTE: THIS AREA IS LOCATED IN SECTIONS 3,4&9, T.21N.,R.15W.,& SECTIONS 33 & 34,T.22N.,R.15W., OZARK CO., MO.
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
SPRING CREEK
PARK
SCALE OF FEET
400 0 400 800
U.S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK ARKANSAS, APR. 1974


LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 22 MAR 72 WHEN POOL WAS AT EL. 649.03
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
SPRING CREEK
PARK
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

NORTH

NEW PARKING AREA
1600 SY



BULL SHOALS RESERVOIR

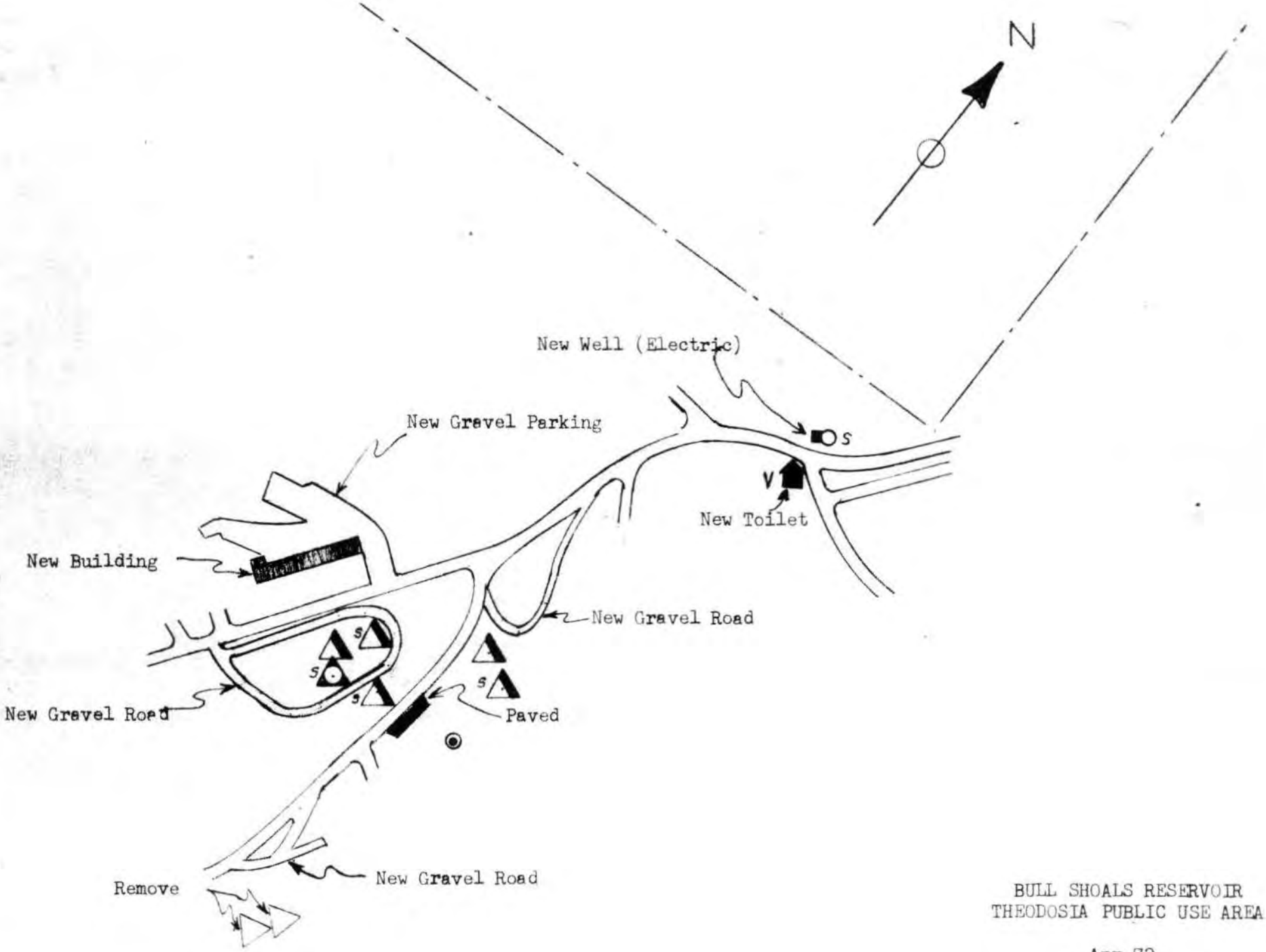
TABLE ROCK PUBLIC USE AREA

SCALE : 1" = 200'

LOCATION OF MOTEL PARKING AREA

JUNE 1973

SHEET NO.



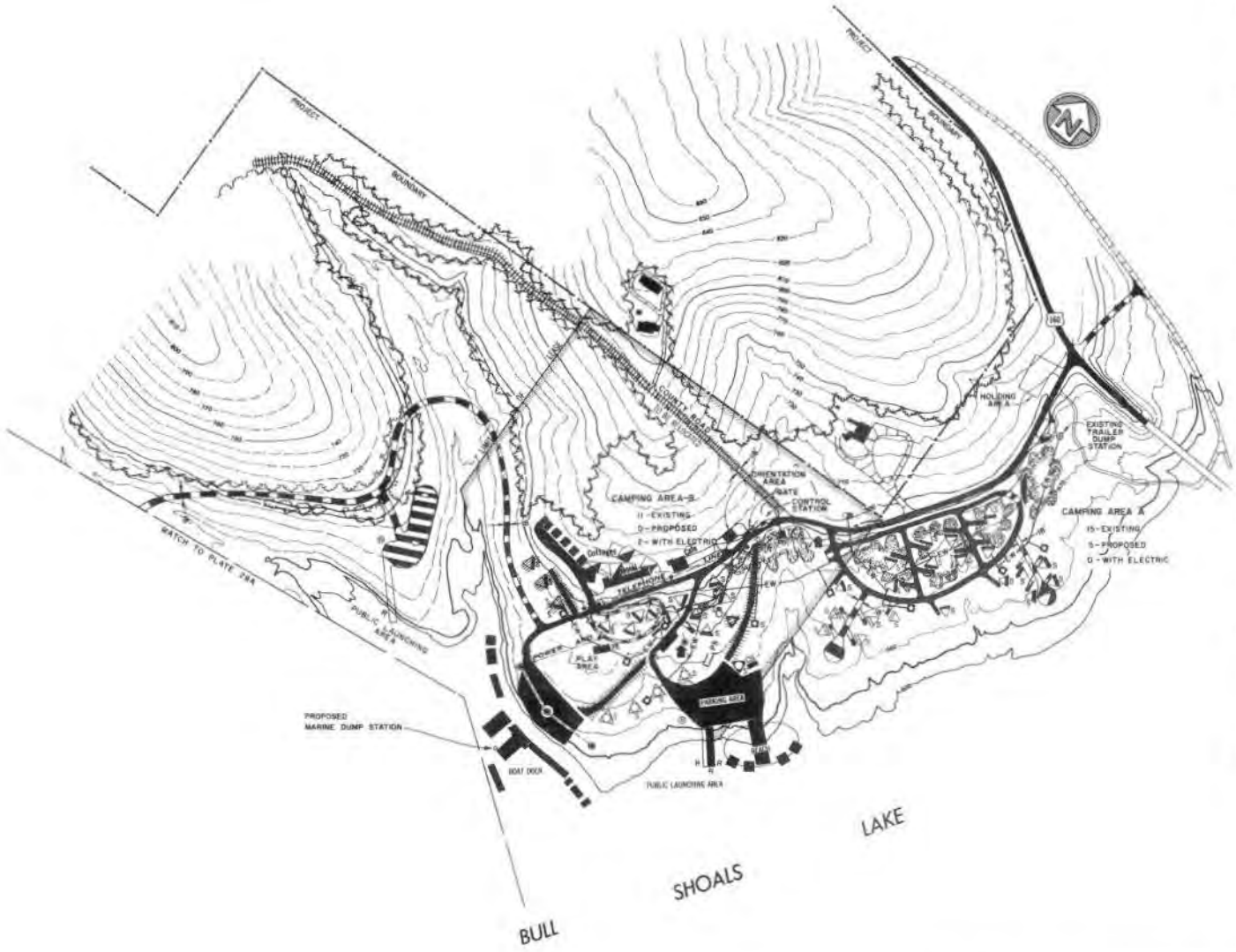
BULL SHOALS RESERVOIR
THEODOSIA PUBLIC USE AREA

Apr 72

SHEET NO. 29

CORPS OF ENGINEERS

U.S. ARMY



LEGEND

RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
CHANGE HOUSE		
CAMPERS WASHHOUSE		
OTHER BUILDINGS NAMED	CAFE	CAFE
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654

TOP OF FLOOD CONTROL POOL 695

WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

BULL SHOALS LAKE

THEODOSIA PARK

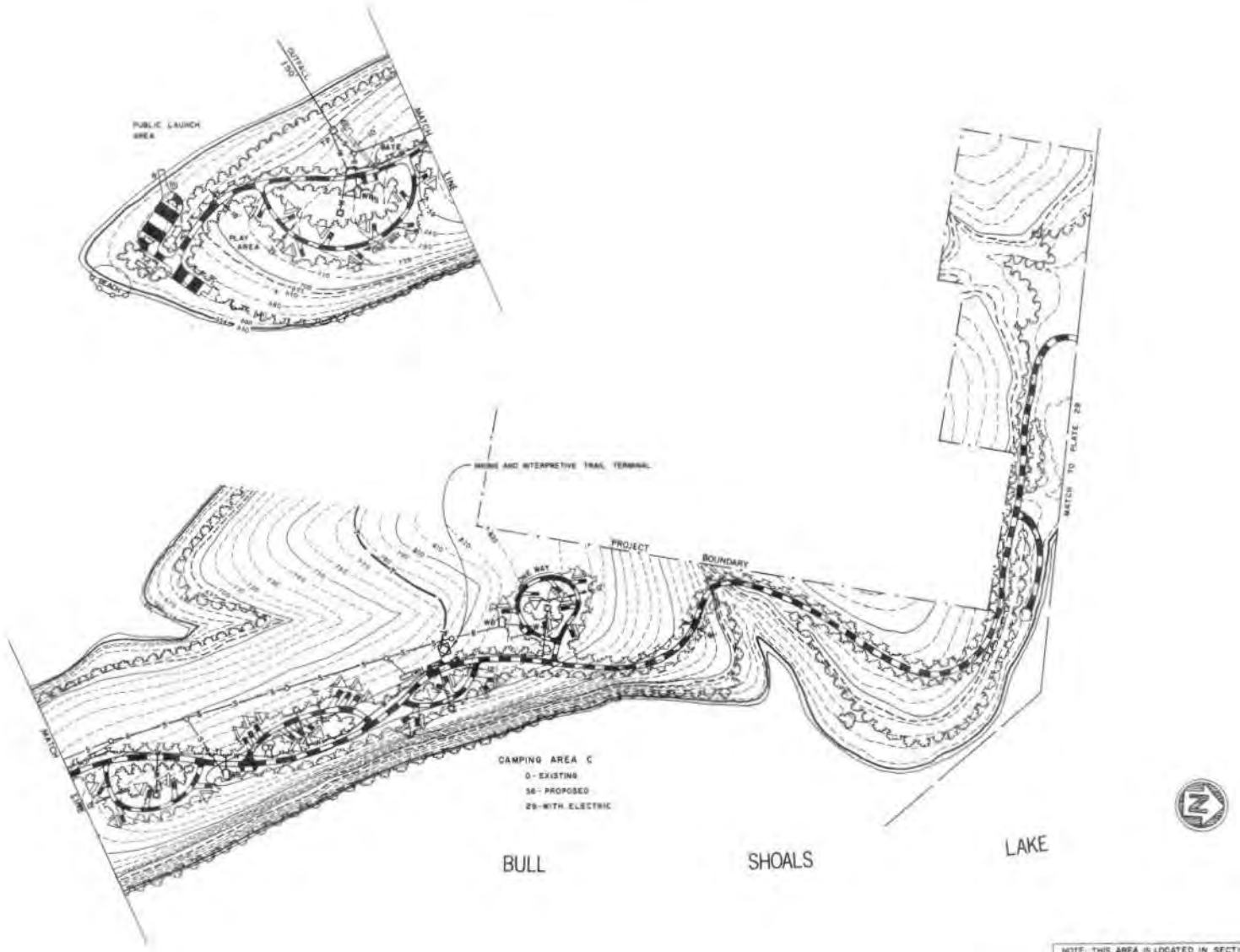
SCALE OF FEET

200 0 200 400

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK

LITTLE ROCK, ARKANSAS, APR 1974

NOTE: THIS AREA IS LOCATED IN SECTIONS 18, 19 & 30, T. 22 N., R. 15 W., & SECTION 24, T. 22 N., R. 16 W., OZARK CO., MO.



LEGEND
RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
STORAGE HOUSE		
CAMPERS WASHHOUSE		
OTHER BUILDINGS NAMED		
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
DOG		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654

TOP OF FLOOD CONTROL POOL 695

WHITE RIVER WATERSHED WHITE RIVER ARK. AND MO.

NOTE: THIS AREA IS LOCATED IN SECTIONS 18, 19 & 30, T 22 N., R 15 W., & SECTION 24, T 22 N., R 16 W., OZARK CO., MO.

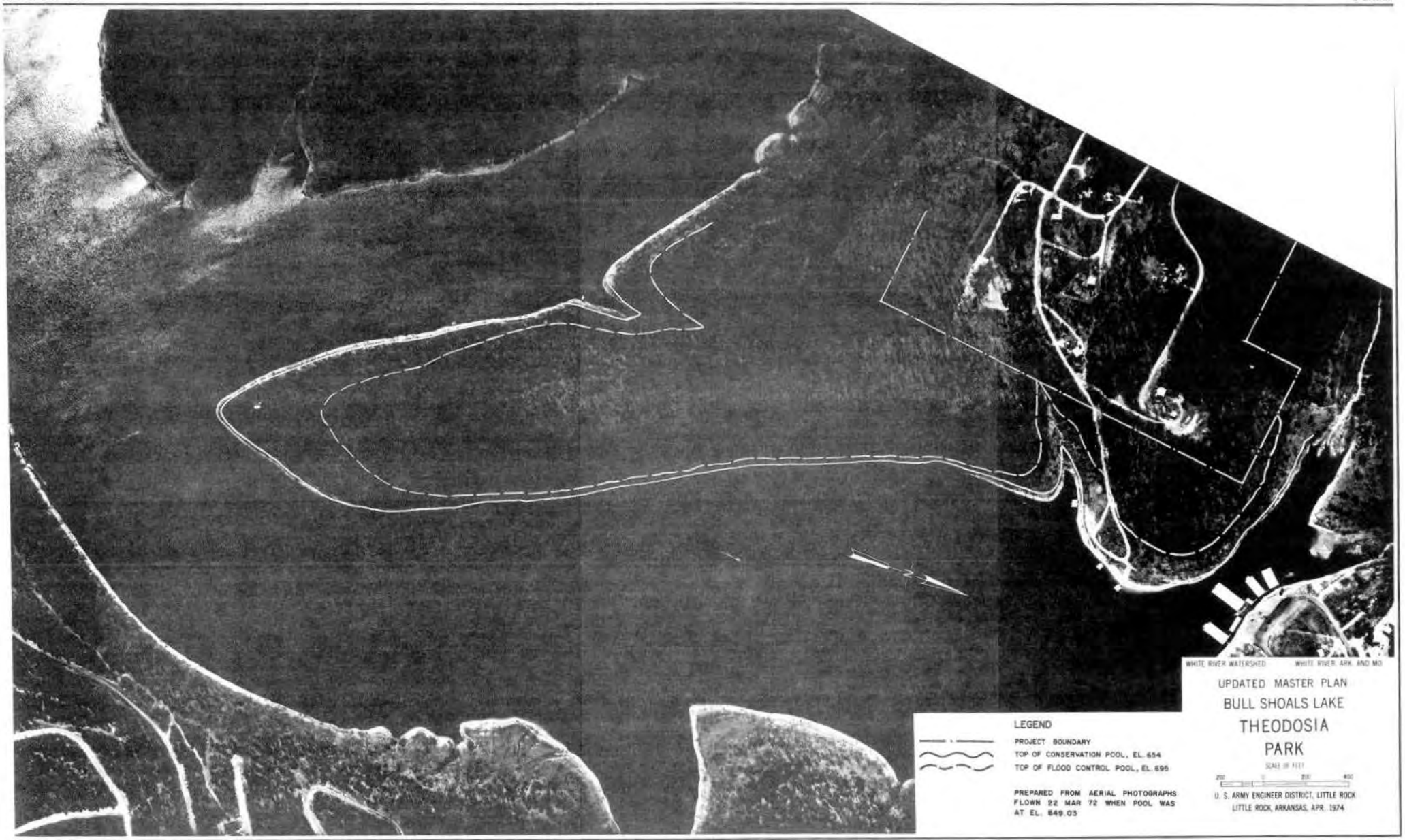
UPDATED MASTER PLAN
BULL SHOALS LAKE
THEODOSIA PARK

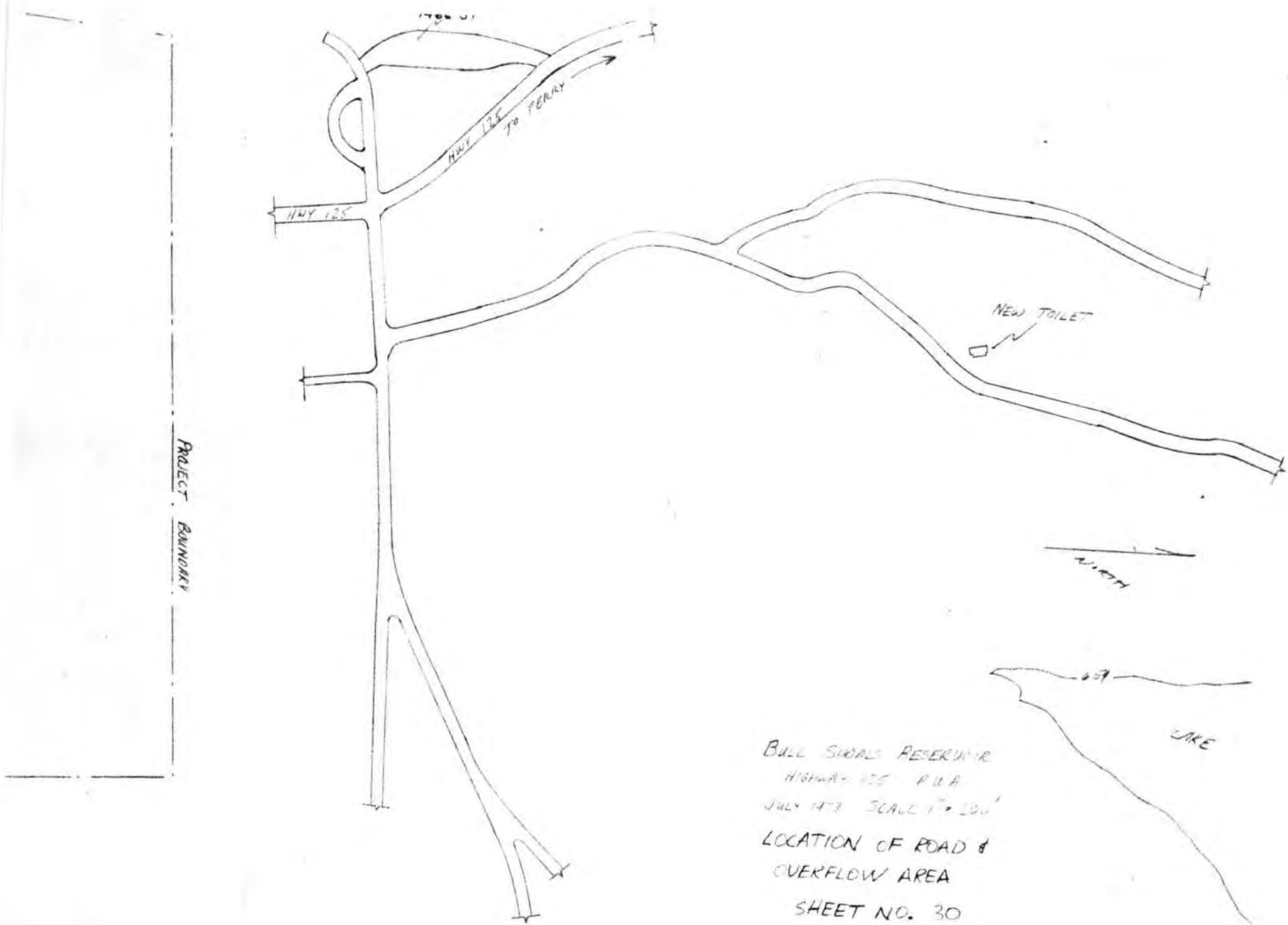
SCALE OF FEET

0 200 400 800

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974


WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
THEODOSIA
PARK
SCALE IN FEET
200 0 200 400
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 22 MAR 72 WHEN POOL WAS AT EL. 649.03


WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
THEODOSIA
PARK
SCALE OF FEET
200 0 200 400
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 22 MAR 72 WHEN POOL WAS AT EL. 649.03



PROJECT BOUNDARY

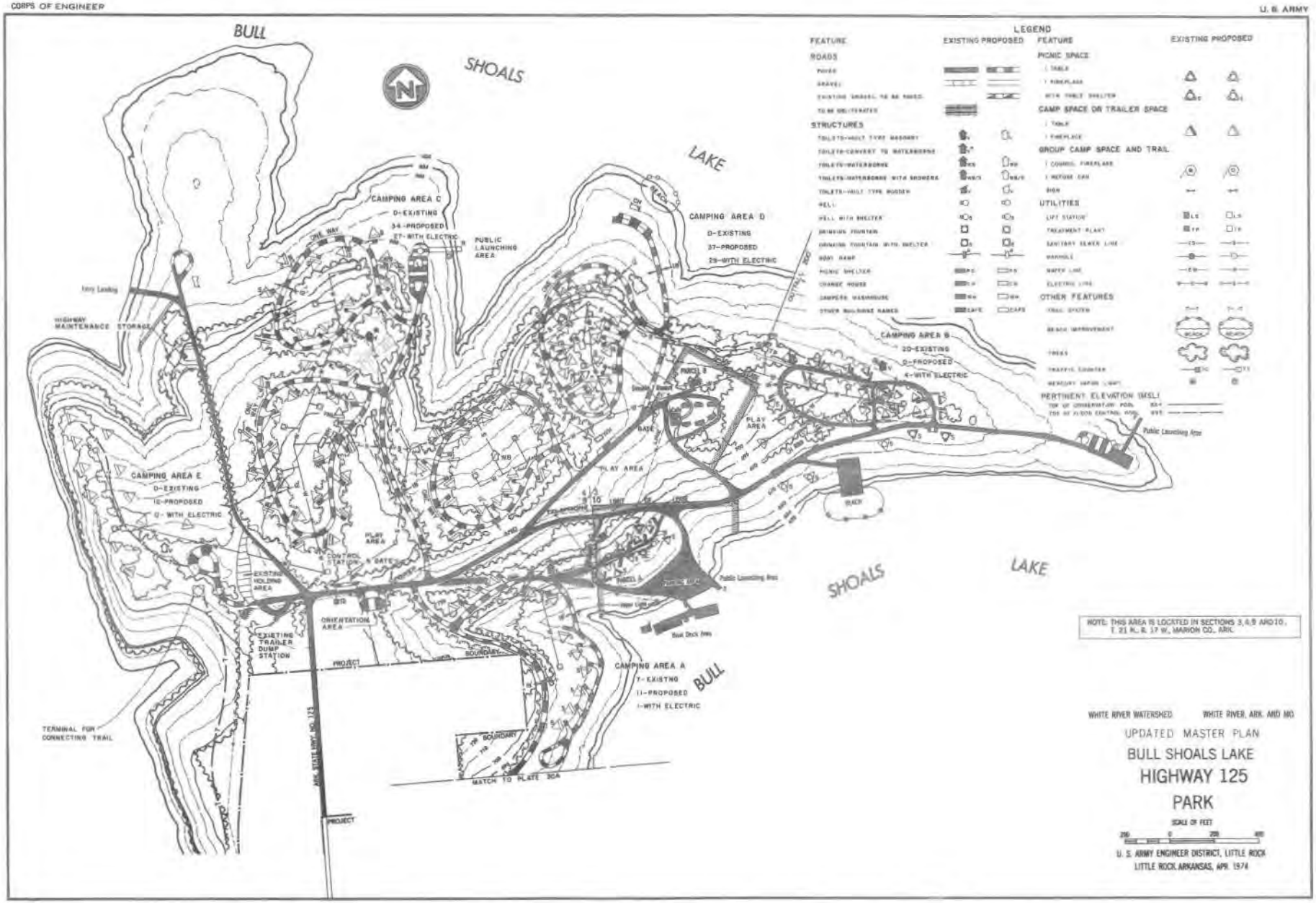
BULL SHOALS RESERVOIR
HIGHWAY 125 R.U.A.
JULY 1973 SCALE 1" = 200'

LOCATION OF ROAD & OVERFLOW AREA

SHEET NO. 30

CORPS OF ENGINEER

U. S. ARMY



NOTE: THIS AREA IS LOCATED IN SECTIONS 3,4,9 AND 10, T. 21 N., R. 17 W., MARION CO., ARK.

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

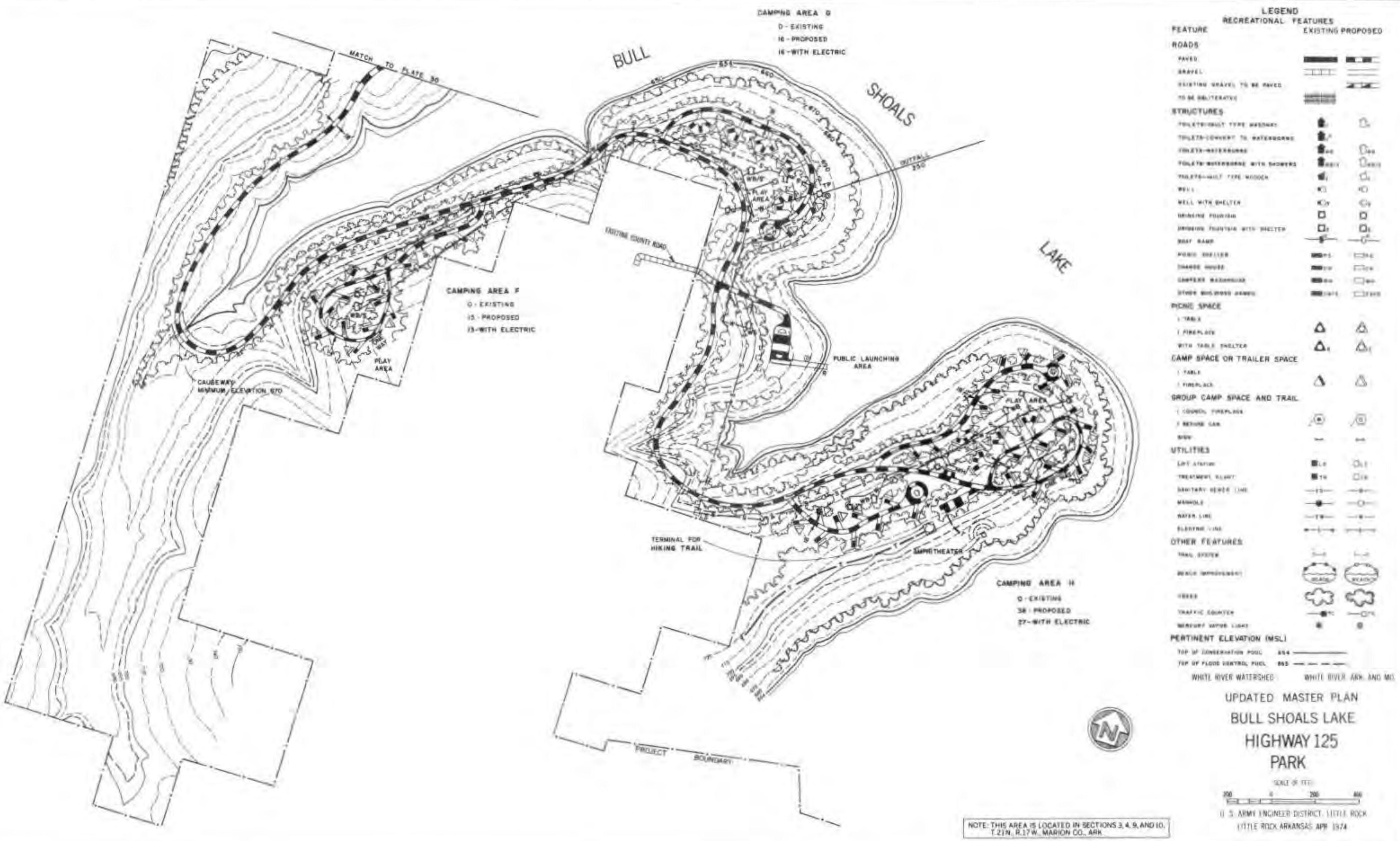
UPDATED MASTER PLAN

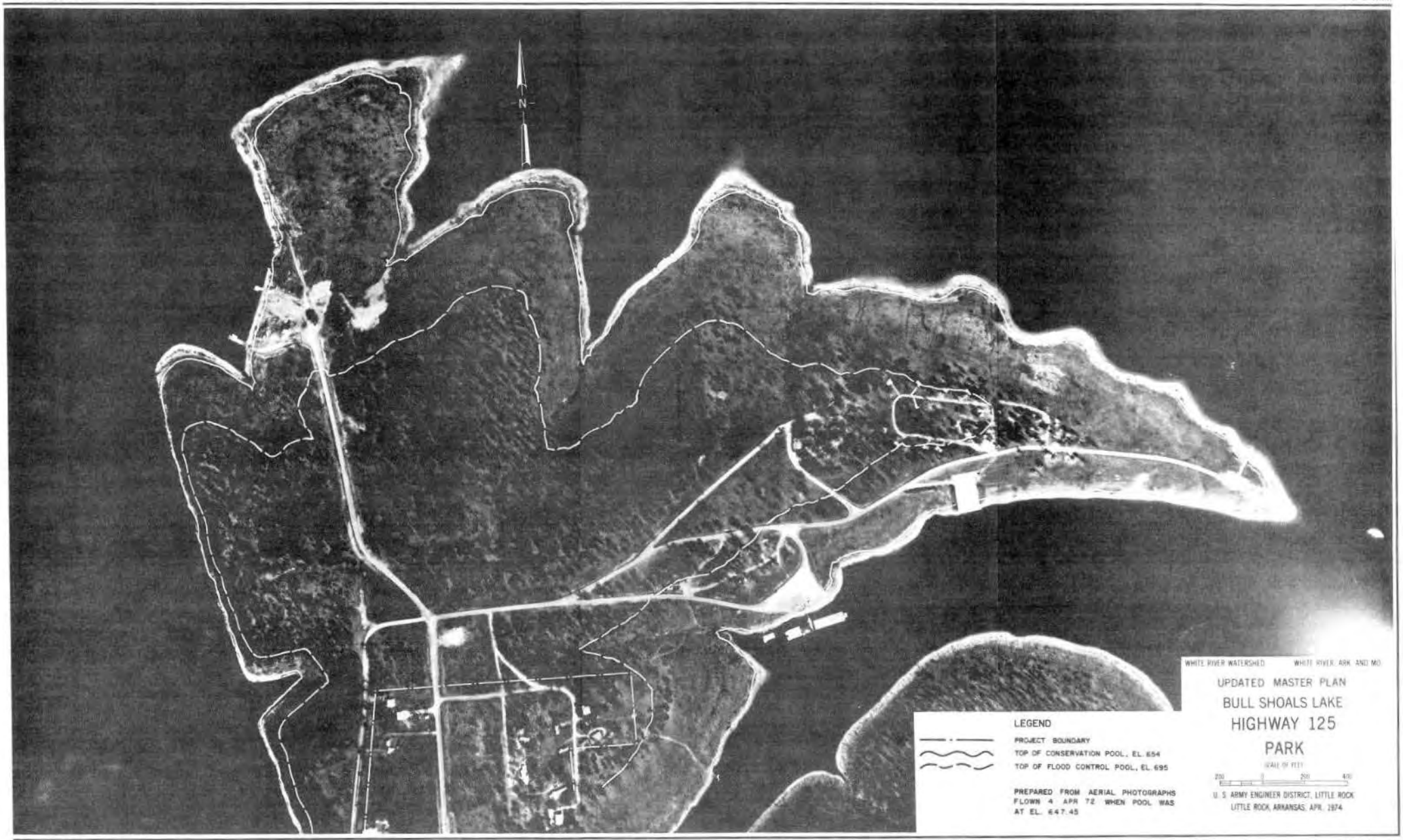
BULL SHOALS LAKE
HIGHWAY 125
PARK

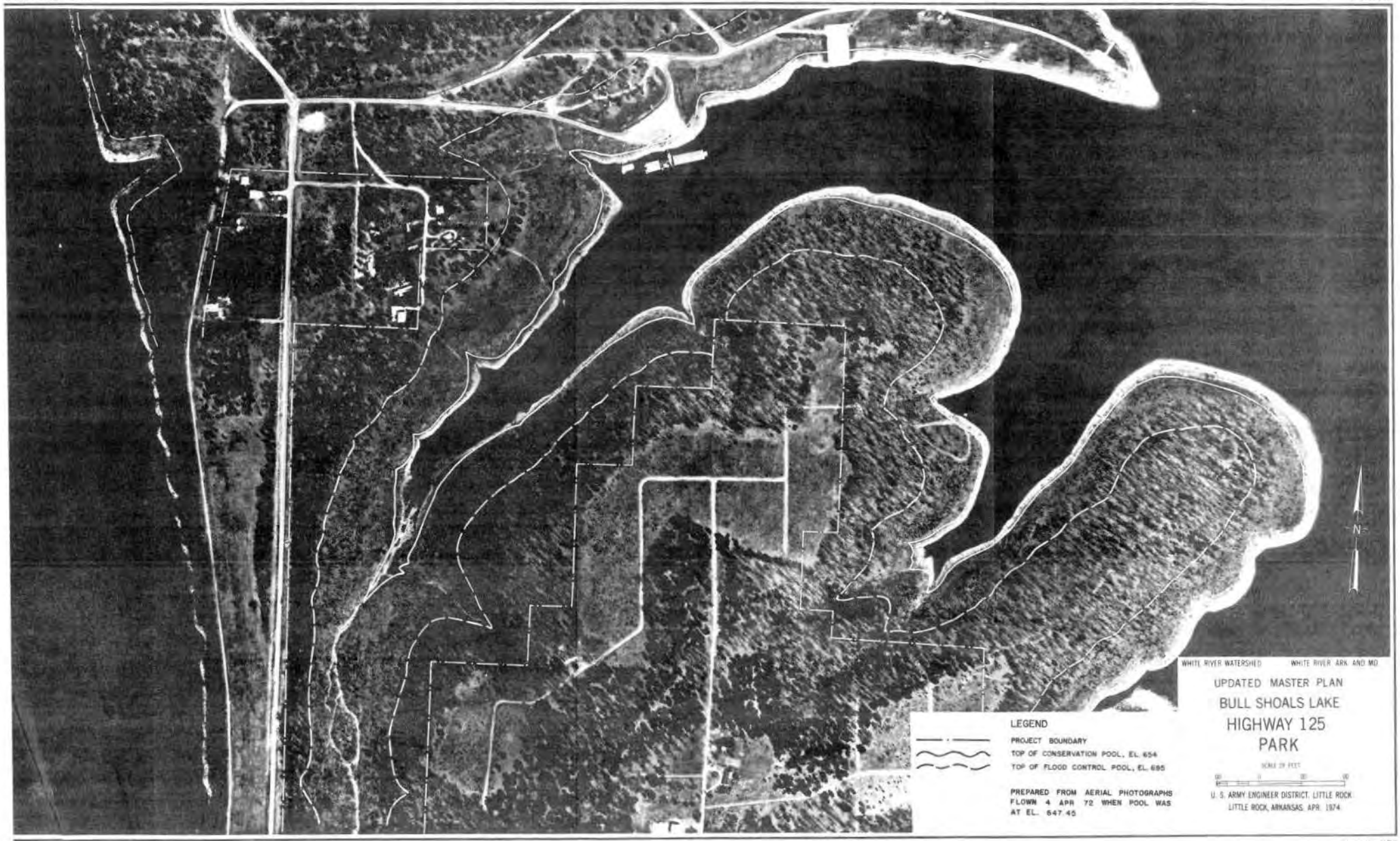
SCALE OF FEET

200 0 200 400

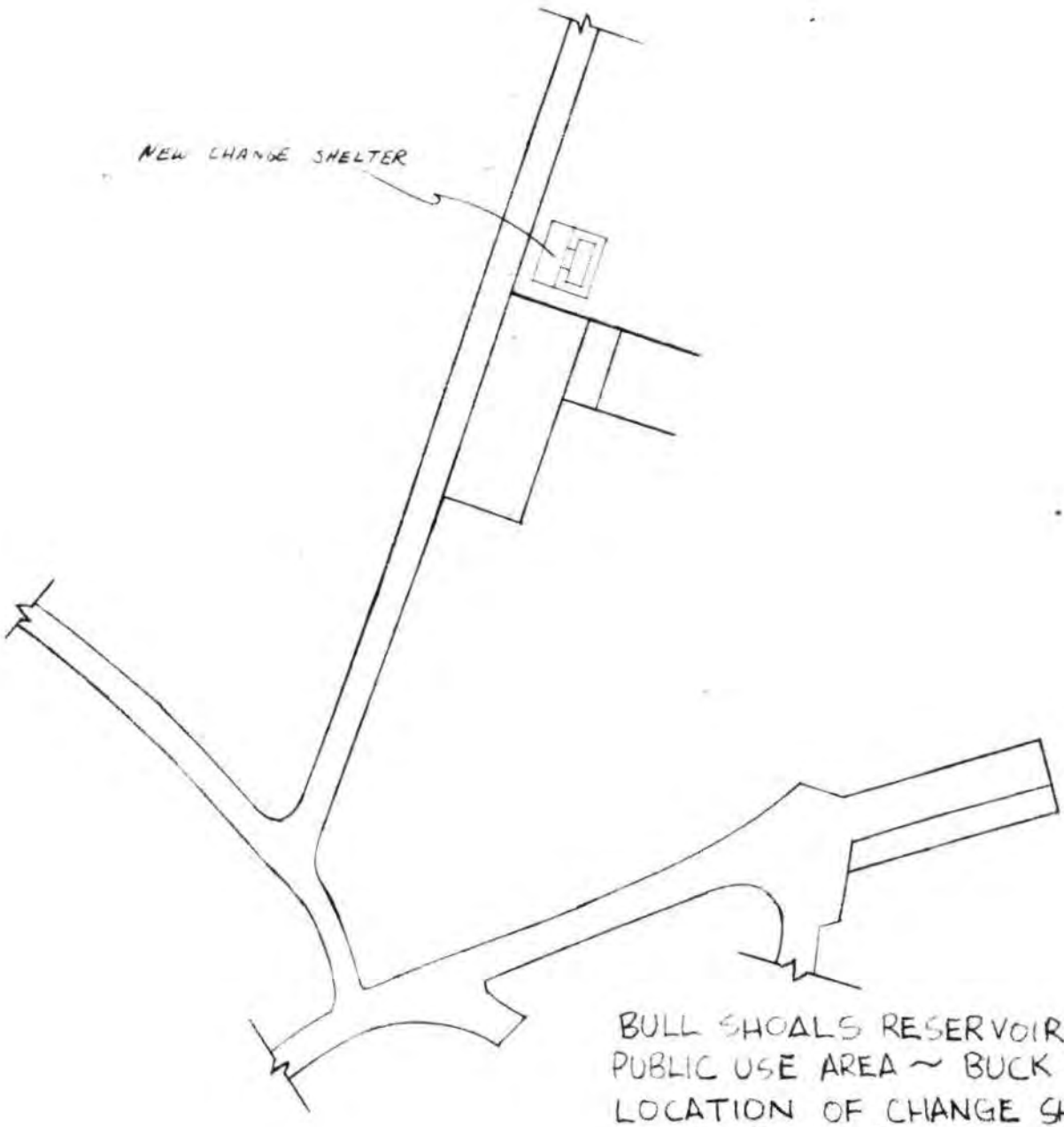
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974


CAMPING AREA G
D - EXISTING
16 - PROPOSED
16 - WITH ELECTRIC
BULL
SHOALS
LAKE
MATCH TO PLATE 30
CAMPING AREA F
0 - EXISTING
15 - PROPOSED
15 - WITH ELECTRIC
PLAY AREA
CAUSEWAY MINIMUM ELEVATION 870
EXISTING COUNTY ROAD
PUBLIC LAUNCHING AREA
TERMINAL FOR HIKING TRAIL
AMPHITHEATER
CAMPING AREA H
0 - EXISTING
38 - PROPOSED
27 - WITH ELECTRIC
PROJECT BOUNDARY
NOTE: THIS AREA IS LOCATED IN SECTIONS 3, 4, 9, AND 10, T.21N., R.17W., MARION CO., ARK.
LEGEND
RECREATIONAL FEATURES
FEATURE
EXISTING PROPOSED
ROADS
STRUCTURES
PICNIC SPACE
CAMP SPACE OR TRAILER SPACE
GROUP CAMP SPACE AND TRAIL
UTILITIES
OTHER FEATURES
PERTINENT ELEVATION (MSL)
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
HIGHWAY 125
PARK
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS APR 1974

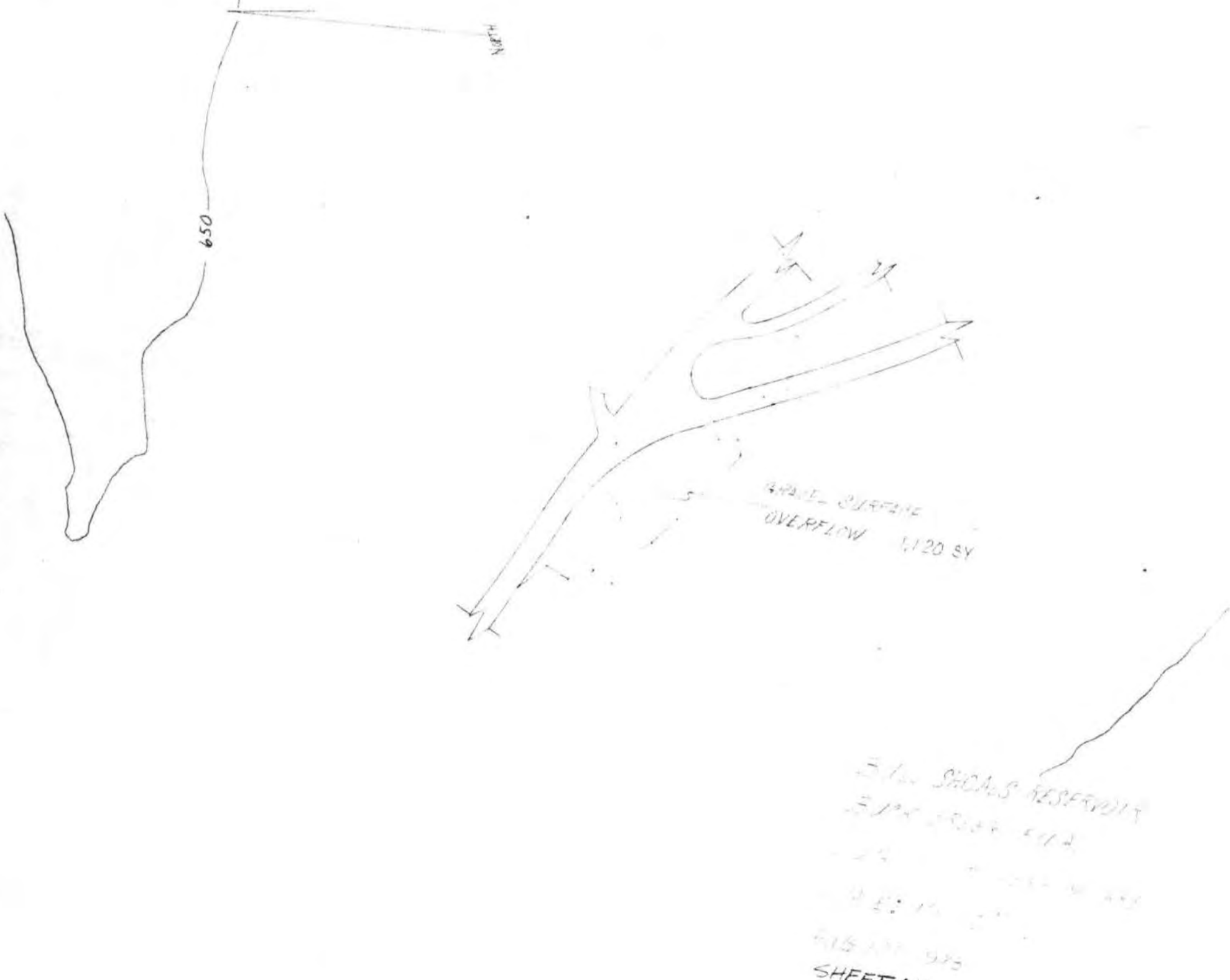

N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 4 APR 72 WHEN POOL WAS AT EL. 647.45
WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
HIGHWAY 125
PARK
SCALE OF FEET
200 0 200 400
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974


N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 4 APR 72 WHEN POOL WAS AT EL. 647.45
WHITE RIVER WATERSHED
WHITE RIVER ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
HIGHWAY 125
PARK
SCALE OF FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

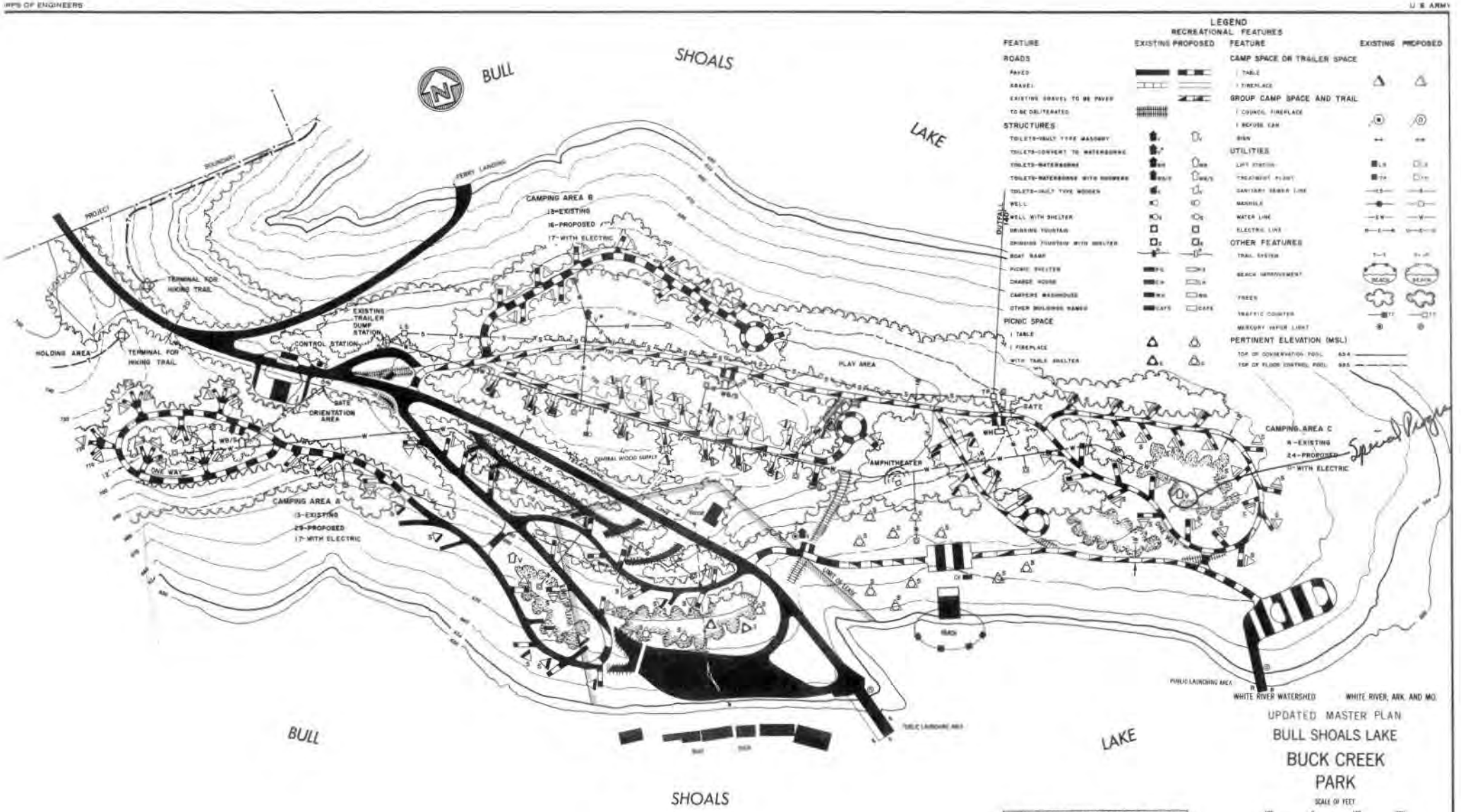
LOCATION OF CHANGE SHELTER
BULL SHOALS RESERVOIR
PUBLIC USE AREA BUCK CREEK
SCALE 1" = 100'
MAY 1974



BULL SHOALS RESERVOIR
PUBLIC USE AREA ~ BUCK CREEK
LOCATION OF CHANGE SHELTER
SCALE 1" = 100'
MAY 1974
SHEET NO. 31



SHEET NO. 31



LEGEND

RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
CHARGE HOUSE		
CAMPERS WASHHOUSE		
OTHER BUILDINGS NAMED		
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		

FEATURE	EXISTING	PROPOSED
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT		
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		
PERTINENT ELEVATION (MSL)		
TOP OF CONSERVATION POOL 654		
TOP OF FLOOD CONTROL POOL 695		

NOTE: THIS AREA IS LOCATED IN SECTION 21 & 22, T. 21 N., R. 17 W., MARION CO., ARK.

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

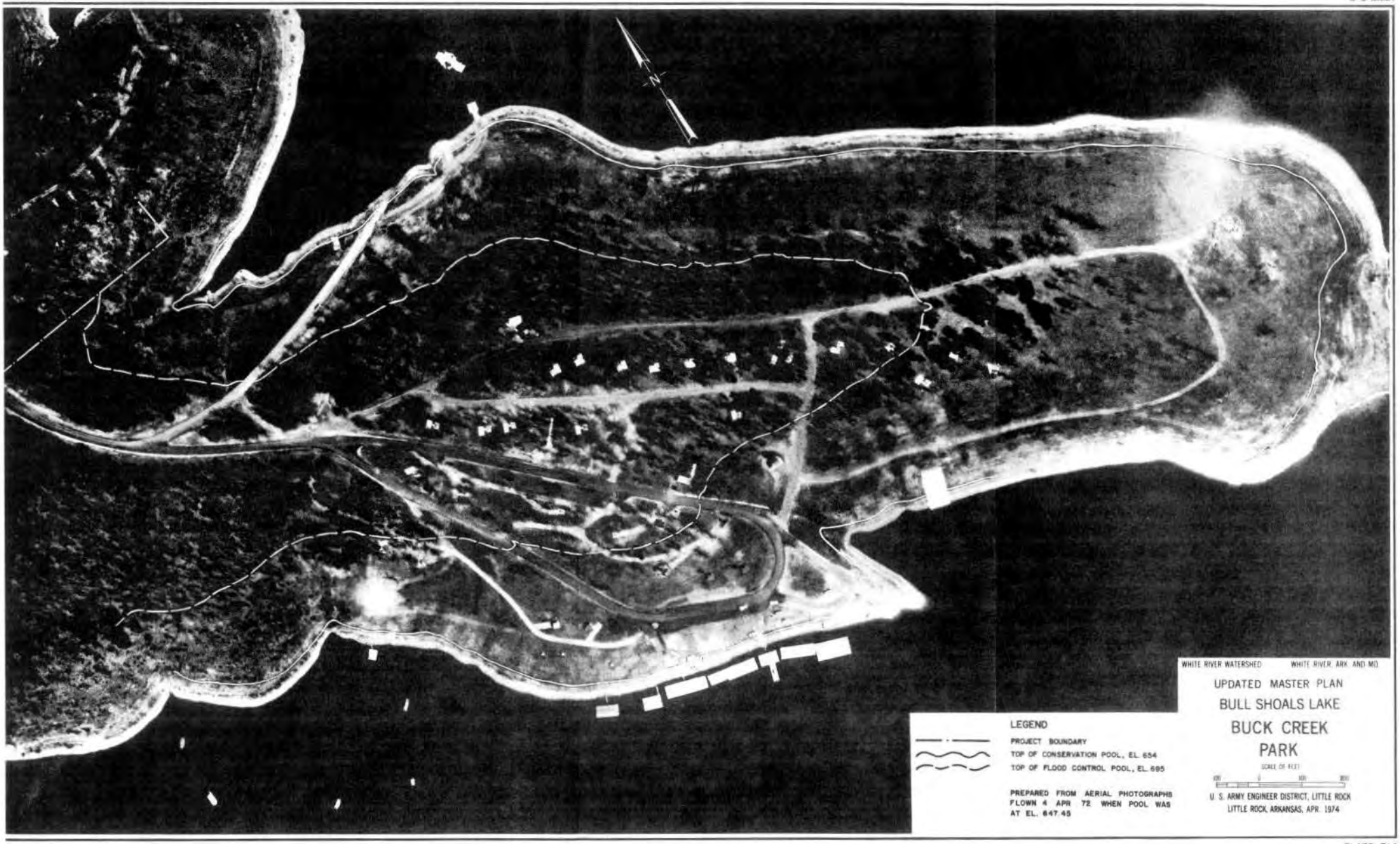
BULL SHOALS LAKE

BUCK CREEK PARK

SCALE OF FEET

100 0 100 200

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974


N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 4 APR 72 WHEN POOL WAS AT EL. 647.45
WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
BUCK CREEK
PARK
SCALE OF FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

BULL SHOALS RESERVOIR
LEAD HILL
PUBLIC USE AREA
1" = 200'

NORTH

PARKING AREA 60'X25'

655

PARKING AREA 55'X 40'

BULL SHOALS RESERVOIR
LEAD HILL
PUBLIC USE AREA
1" = 200'
SHEET NO. 32 1974

" SHOALS RESERVOIR

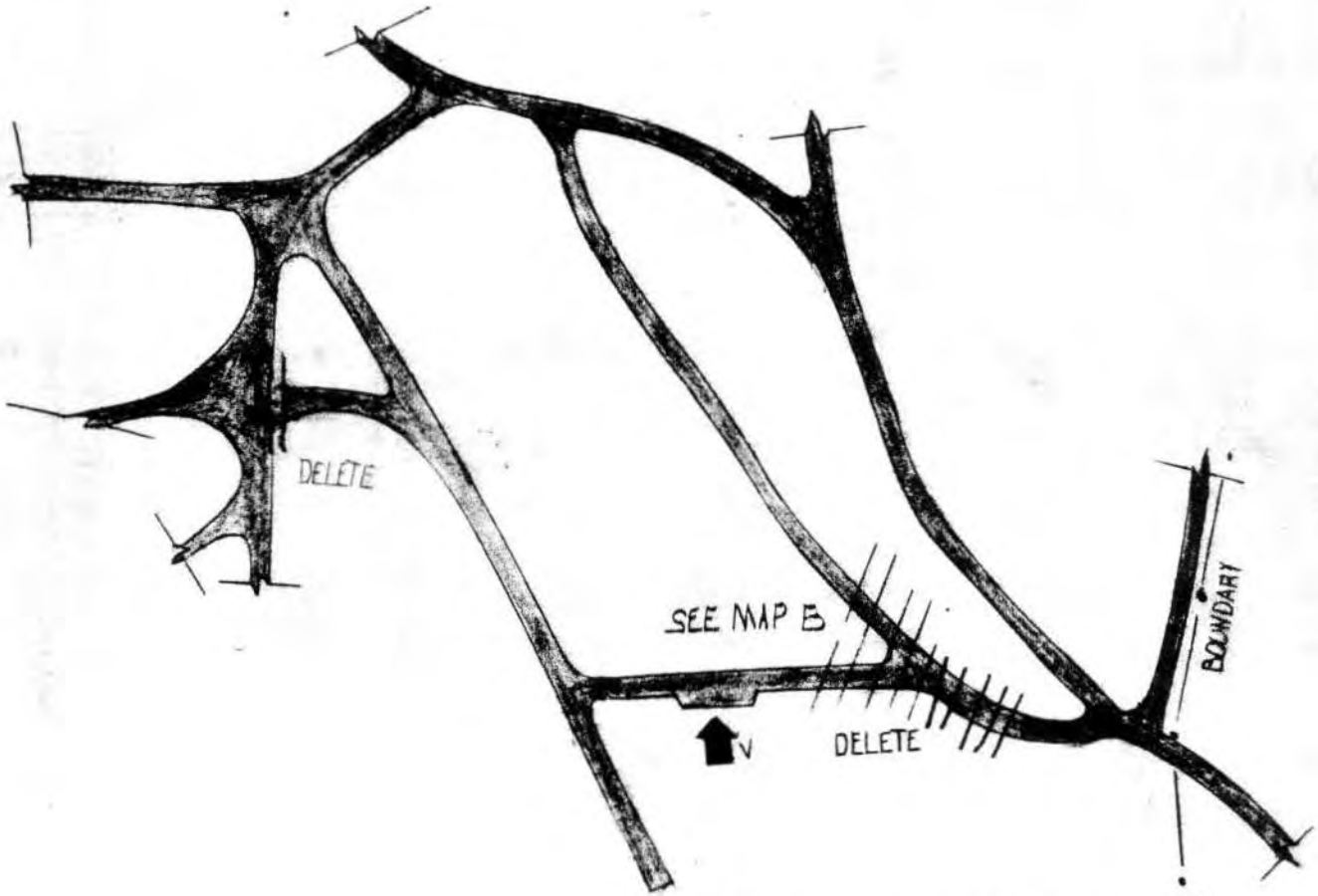
LEAD HILL P.U.A.

DELETED ROADS

JUNE 1974

SCALE 1"=200'

MAP A



LEAD HILL PUBLIC USE AREA
BULL SHOALS RESERVOIR
DELETED ROADS
JUNE 1974
SHEET NO. 32
SCALE: 1"=200' MAP A

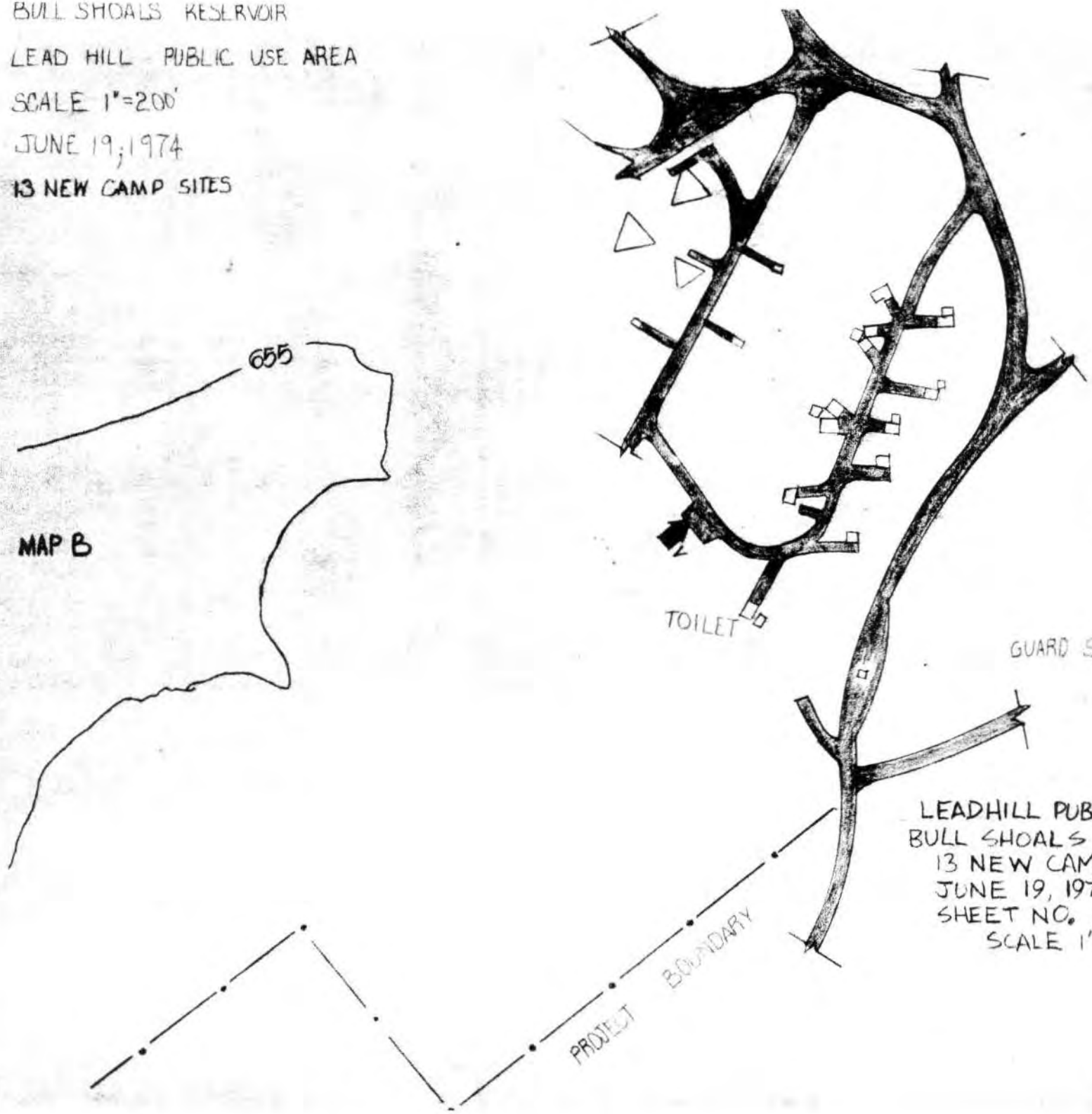
BULL SHOALS RESERVOIR

LEAD HILL - PUBLIC USE AREA

SCALE 1"=200'

JUNE 19, 1974

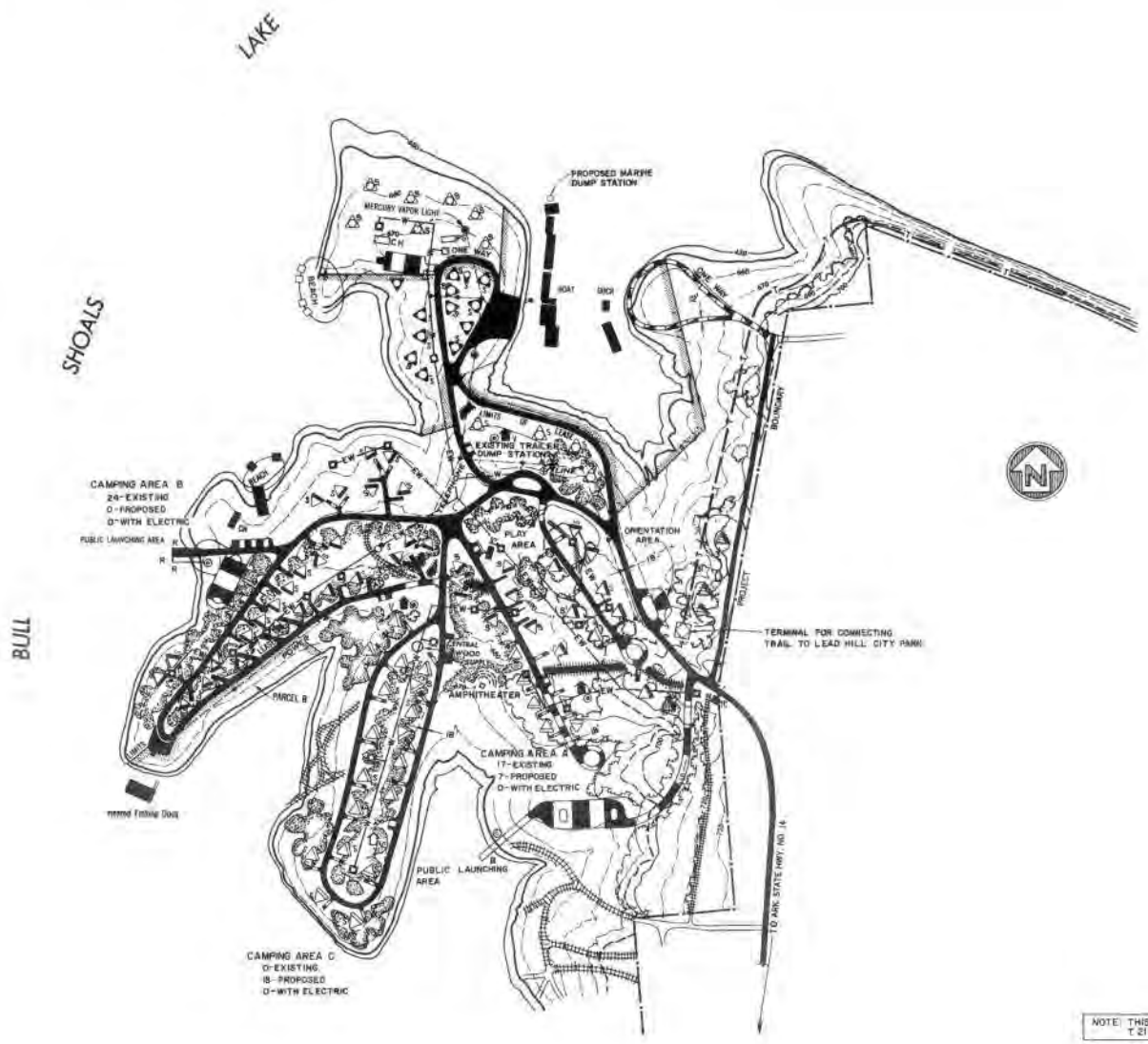
13 NEW CAMP SITES



LEADHILL PUBLIC USE AREA
BULL SHOALS RESERVOIR
13 NEW CAMPSITES
JUNE 19, 1974
SHEET NO. 32
SCALE 1"= 200' MAP B

CORPS OF ENGINEERS

U. S. ARMY



LEGEND

RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY	V	V
TOILETS-CONVERT TO WATERBORNE	V*	
TOILETS-WATERBORNE	WB	WB
TOILETS-WATERBORNE WITH SHOWERS	WB/S	WB/S
TOILETS-VAULT TYPE WOODEN	V	V
WELL	W	W
WELL WITH SHELTER	WS	WS
DRINKING FOUNTAIN	D	D
DRINKING FOUNTAIN WITH SHELTER	DS	DS
BOAT RAMP		
PICNIC SHELTERS	PS	PS
CHARGE HOUSE	CH	CH
CAMPERS WASHHOUSE	WH	WH
OTHER BUILDINGS NAMED	CAFE	CAFE
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER	TS	TS
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION	LS	LS
TREATMENT PLANT	TP	TP
SANITARY SEWER LINE	S	S
MANHOLE		
WATER LINE	W	W
ELECTRIC LINE	E	E
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER	TC	TC
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654

TOP OF FLOOD CONTROL POOL 695

WHITE RIVER WATERSHED — WHITE RIVER, ARK AND MO.

NOTE: THIS AREA IS LOCATED IN SECTIONS 17 & 18 T. 21 N., R. 18 W., BOONE CO., ARK.

SCALE OF FEET

200 0 200 400

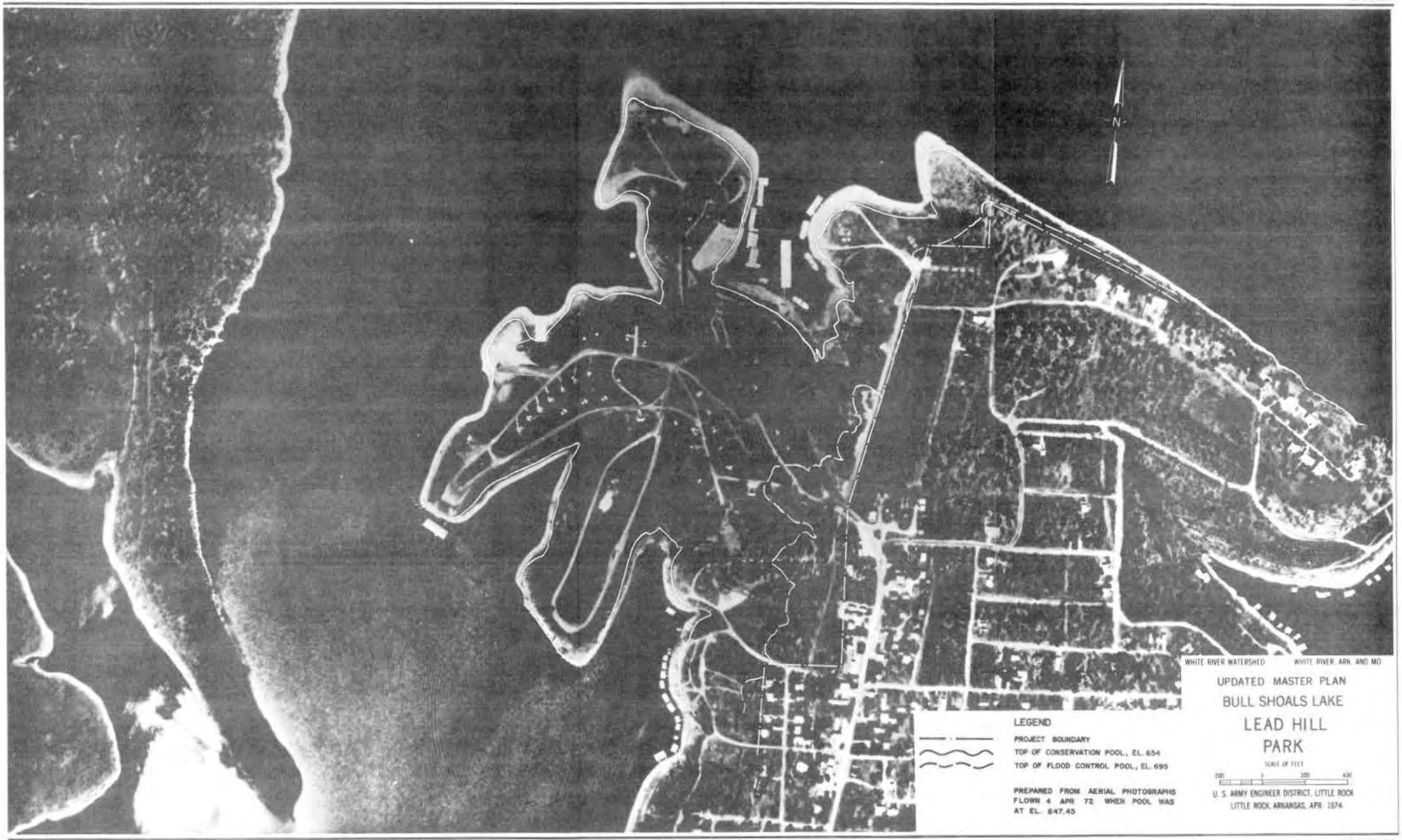
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK

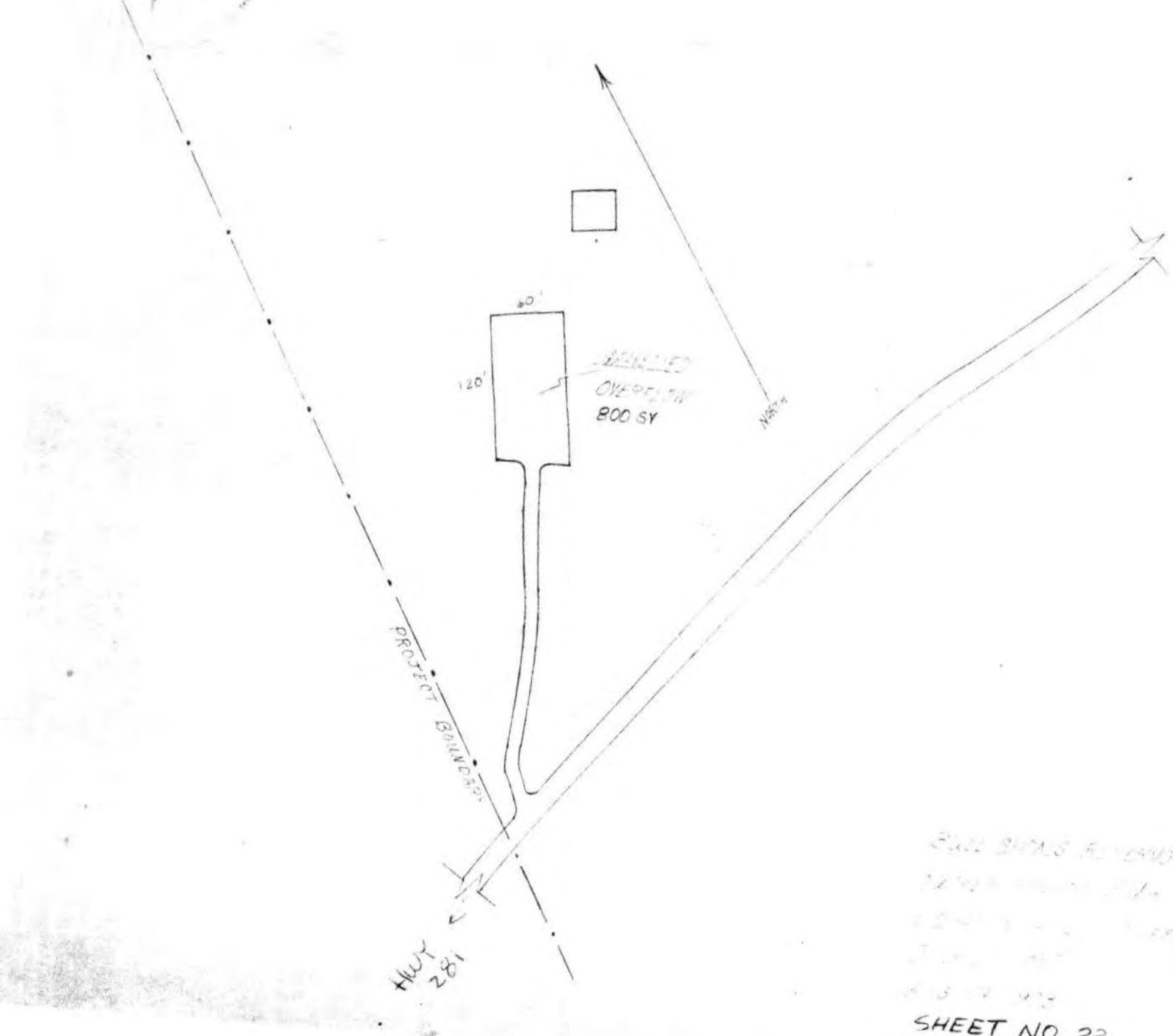
LITTLE ROCK, ARKANSAS, APR 1974

UPDATED MASTER PLAN

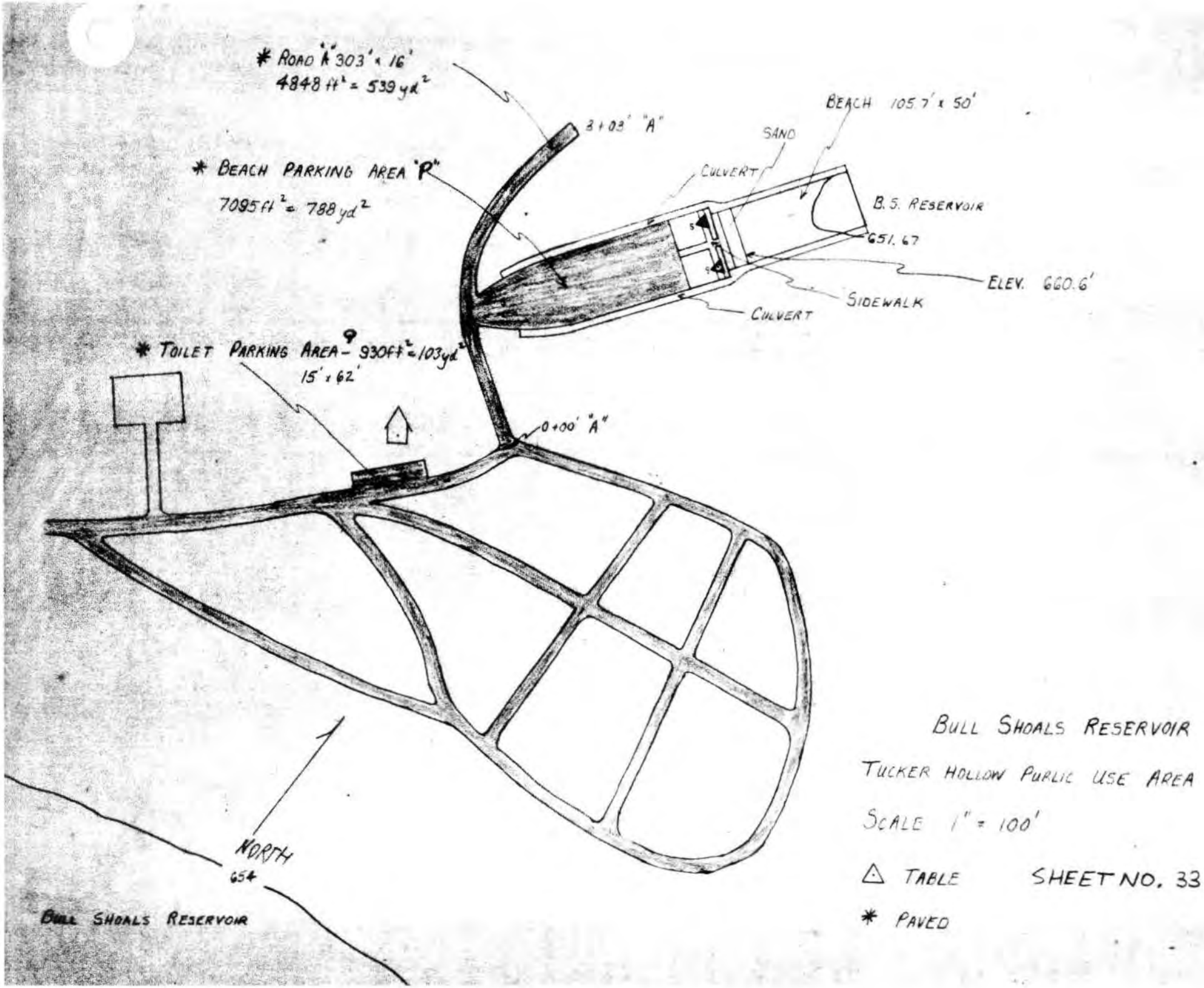
BULL SHOALS LAKE

LEAD HILL PARK


N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 4 APR 72 WHEN POOL WAS AT EL. 647.45
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
LEAD HILL
PARK
SCALE OF FEET
200 0 200 400
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR 1974



SHEET NO. 33



BULL SHOALS RESERVOIR

TUCKER HOLLOW PUBLIC USE AREA

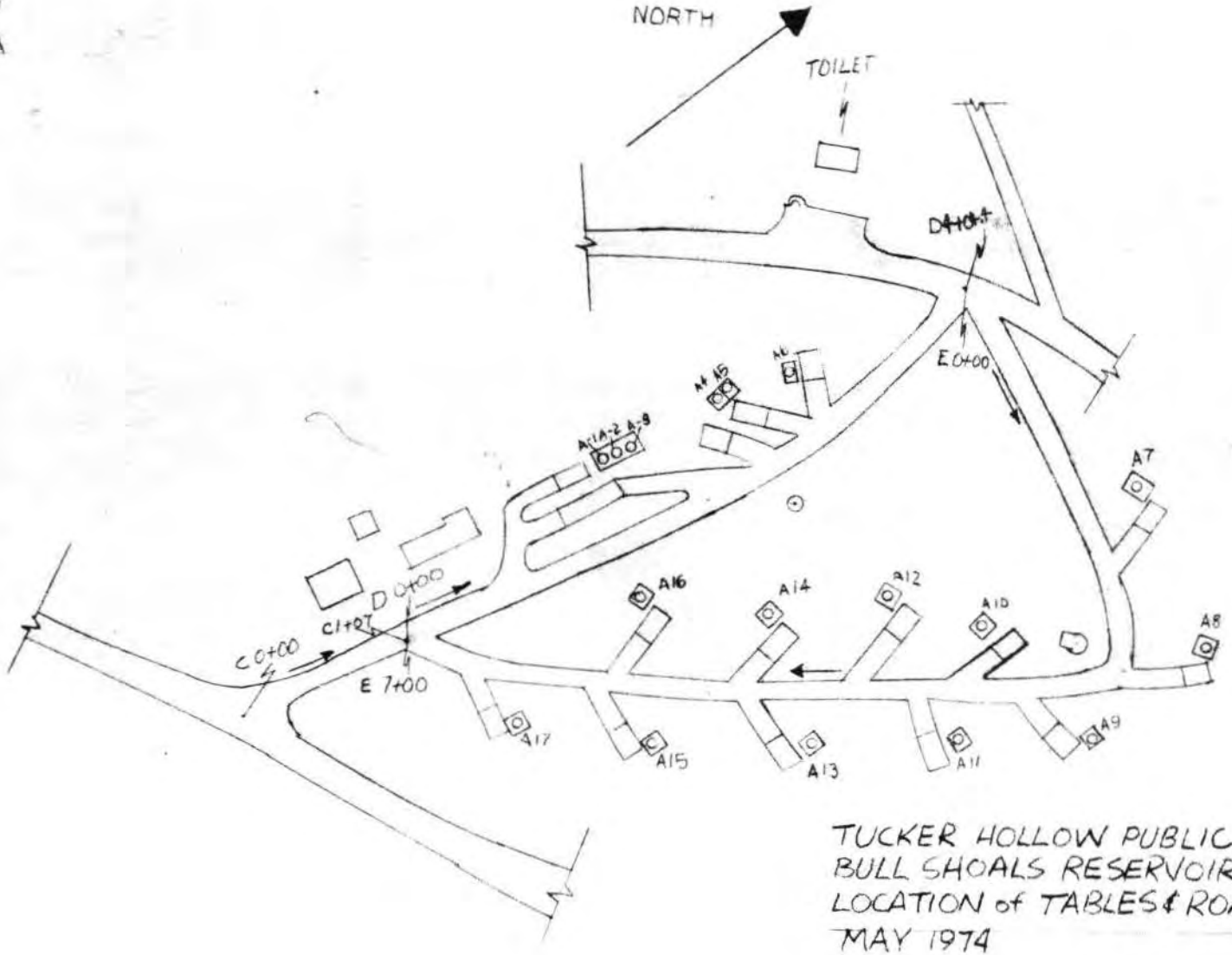
SCALE 1" = 100'

△ TABLE

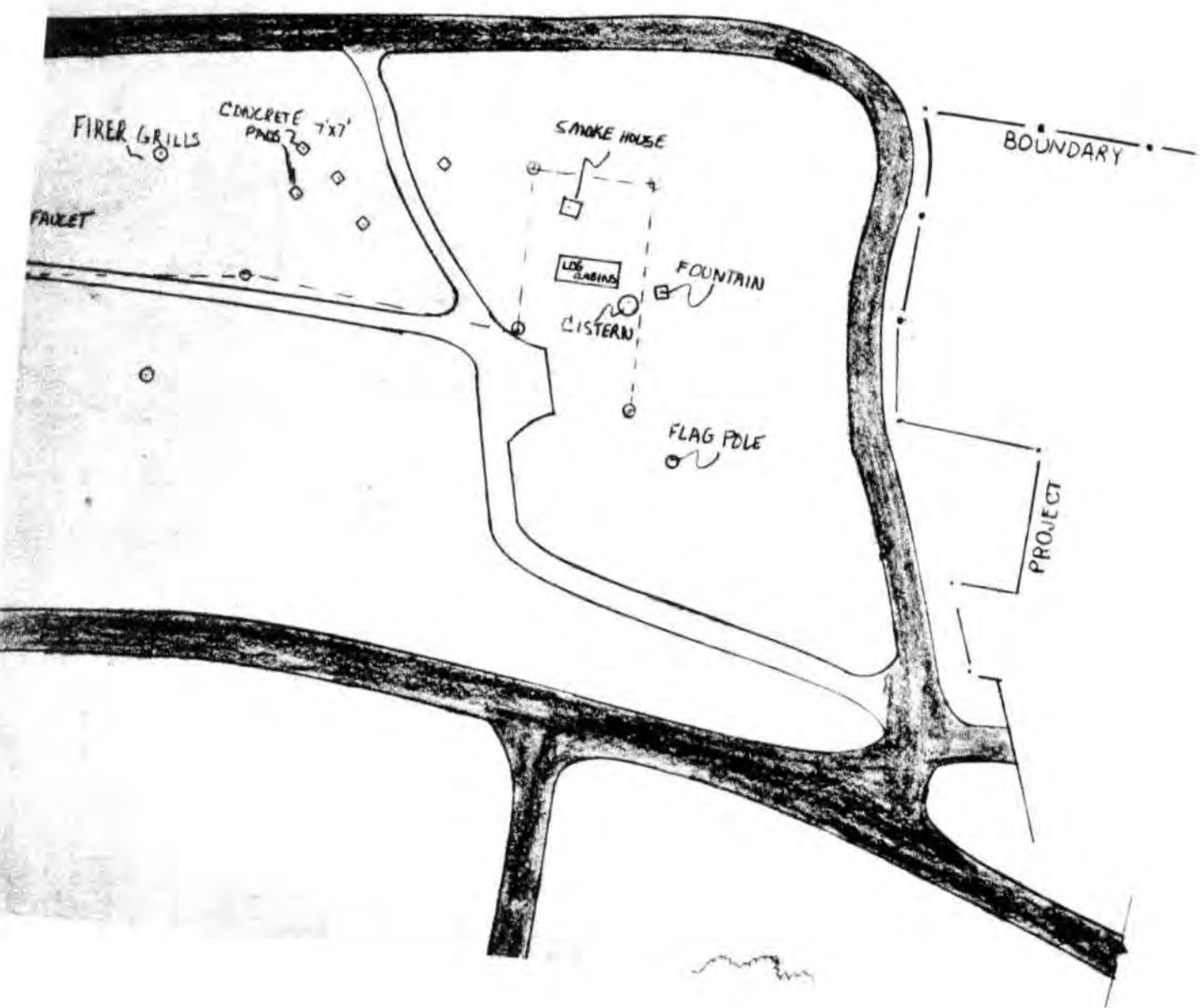
* PAVED

SHEET NO. 33

BULL SHOALS RESERVOIR
TUCKER HOLLOW
PUBLIC USE AREA
1" = 100'
MAY 1974



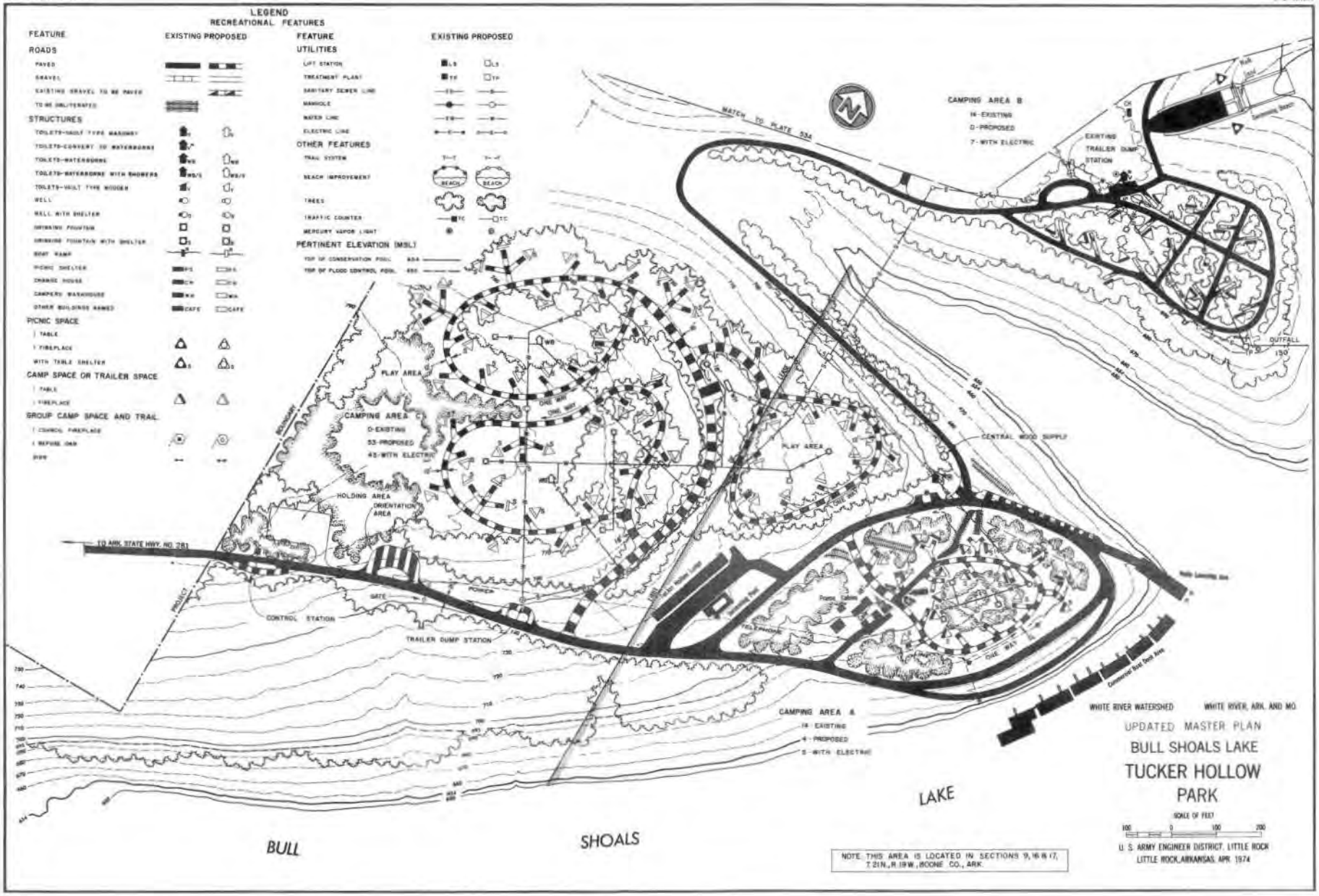
TUCKER HOLLOW PUBLIC AREA
BULL SHOALS RESERVOIR
LOCATION of TABLES & ROAD
MAY 1974
SHEET NO. 33
SCALE : 1" = 100'

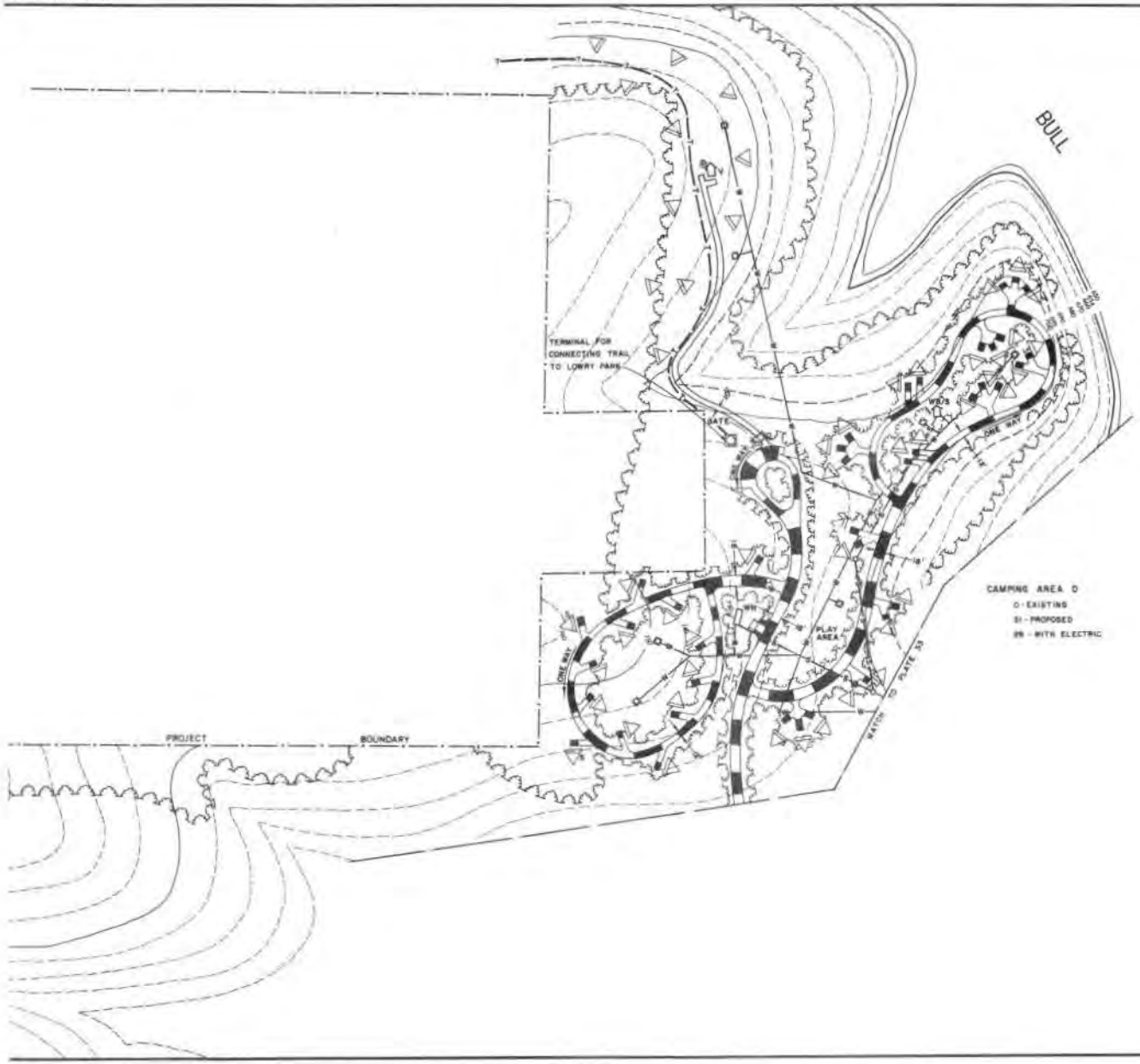


SHADOW ROCK
BULL SHOALS P.O.A.
LOCATION OF FACILITIES
JUNE 16-18, 1975
PLATE 33
1" = 100'

CORPS OF ENGINEERS

U.S. ARMY





LEGEND
RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
CHANGE HOUSE		
CAMPERS WASHHOUSE		
OTHER BUILDINGS NAMED	CAFE	CAFE
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654
TOP OF FLOOD CONTROL POOL 695

WHITE RIVER WATERSHED WHITE RIVER ARK AND MO

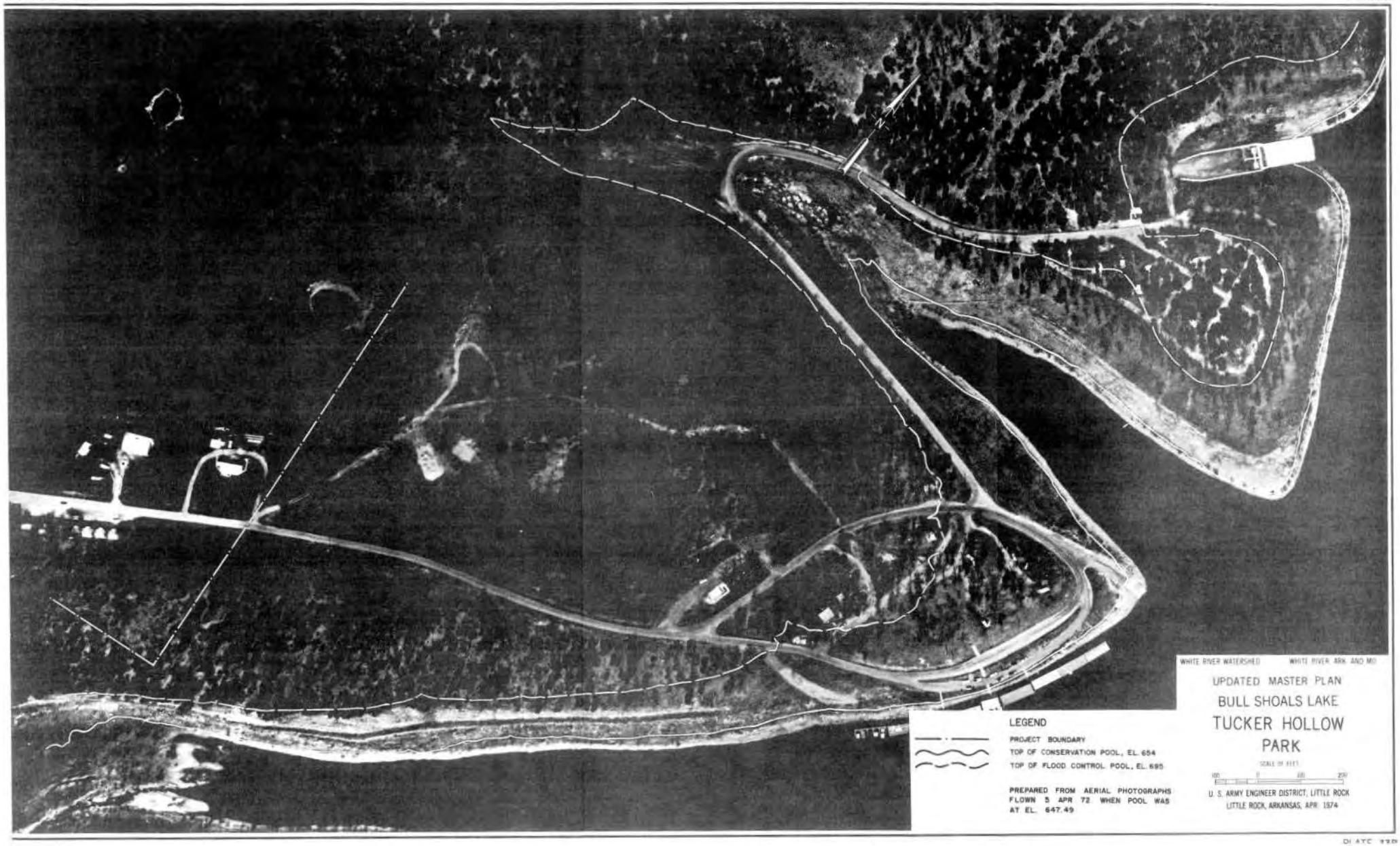
NOTE: THIS AREA IS LOCATED IN SECTIONS 9, 16, AND 17, T. 21 N., R. 19 W., BOONE CO., ARK.

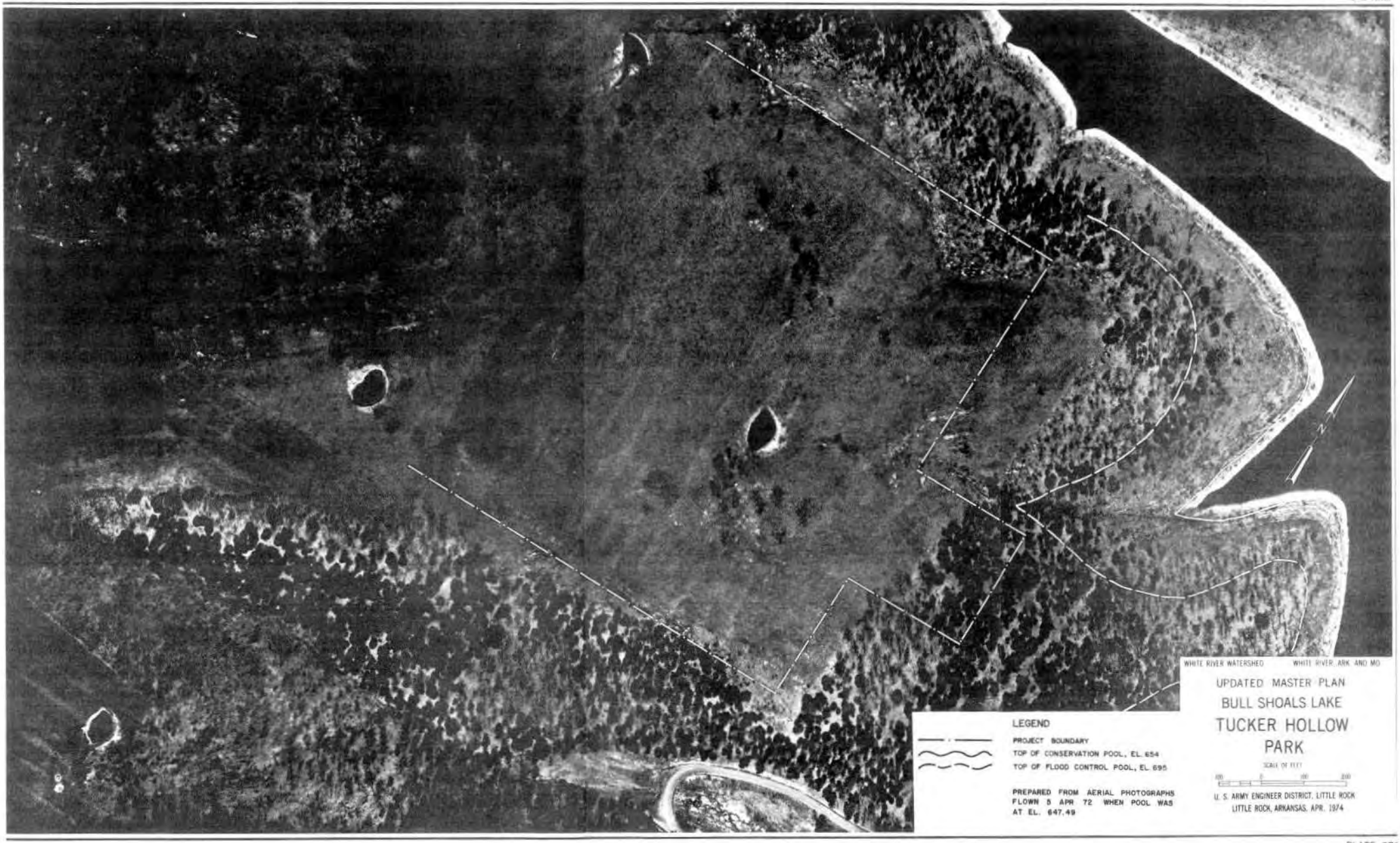
UPDATED MASTER PLAN
BULL SHOALS LAKE
TUCKER HOLLOW PARK

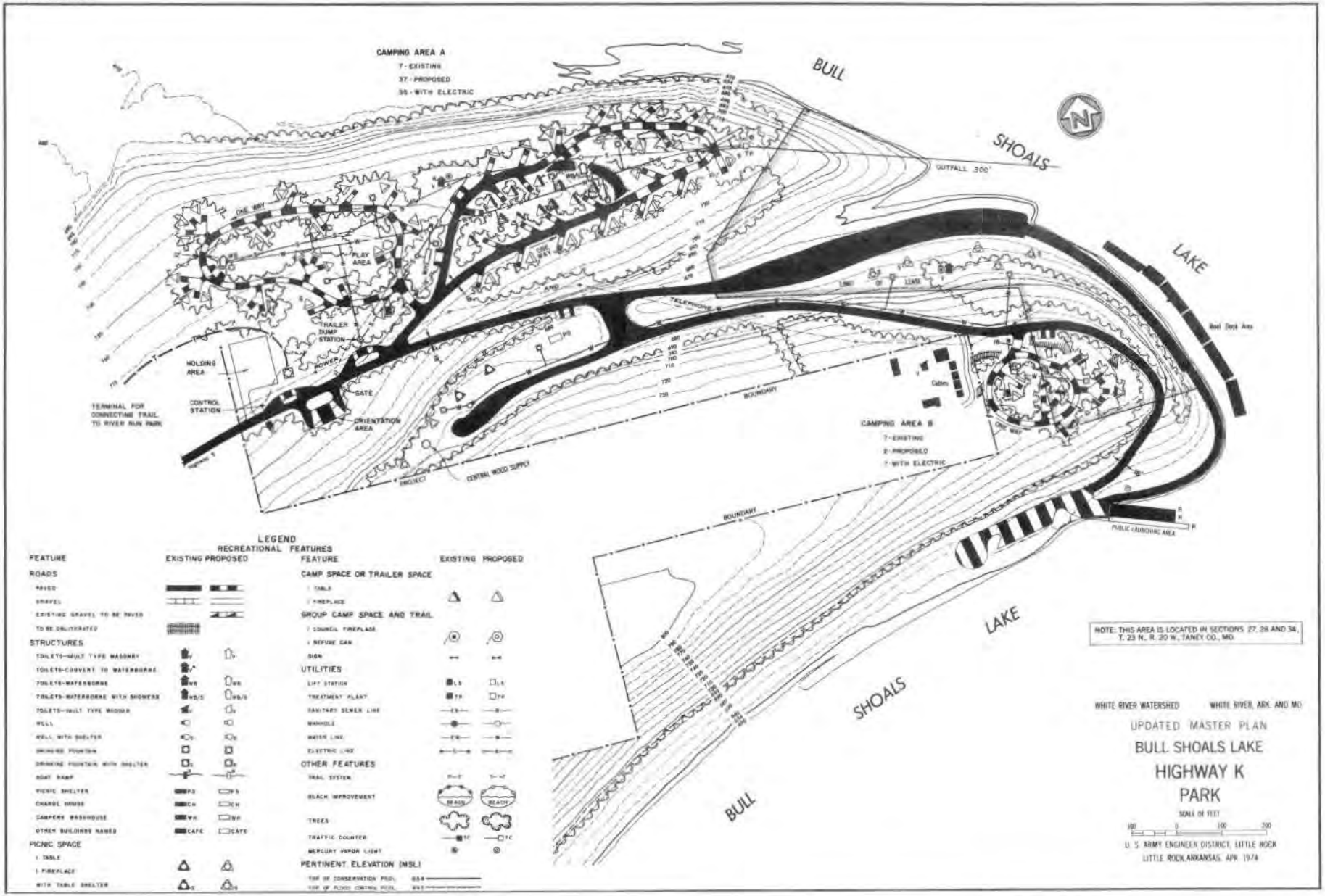
SCALE OF FEET
100 0 100 200

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK ARKANSAS, APR. 1974

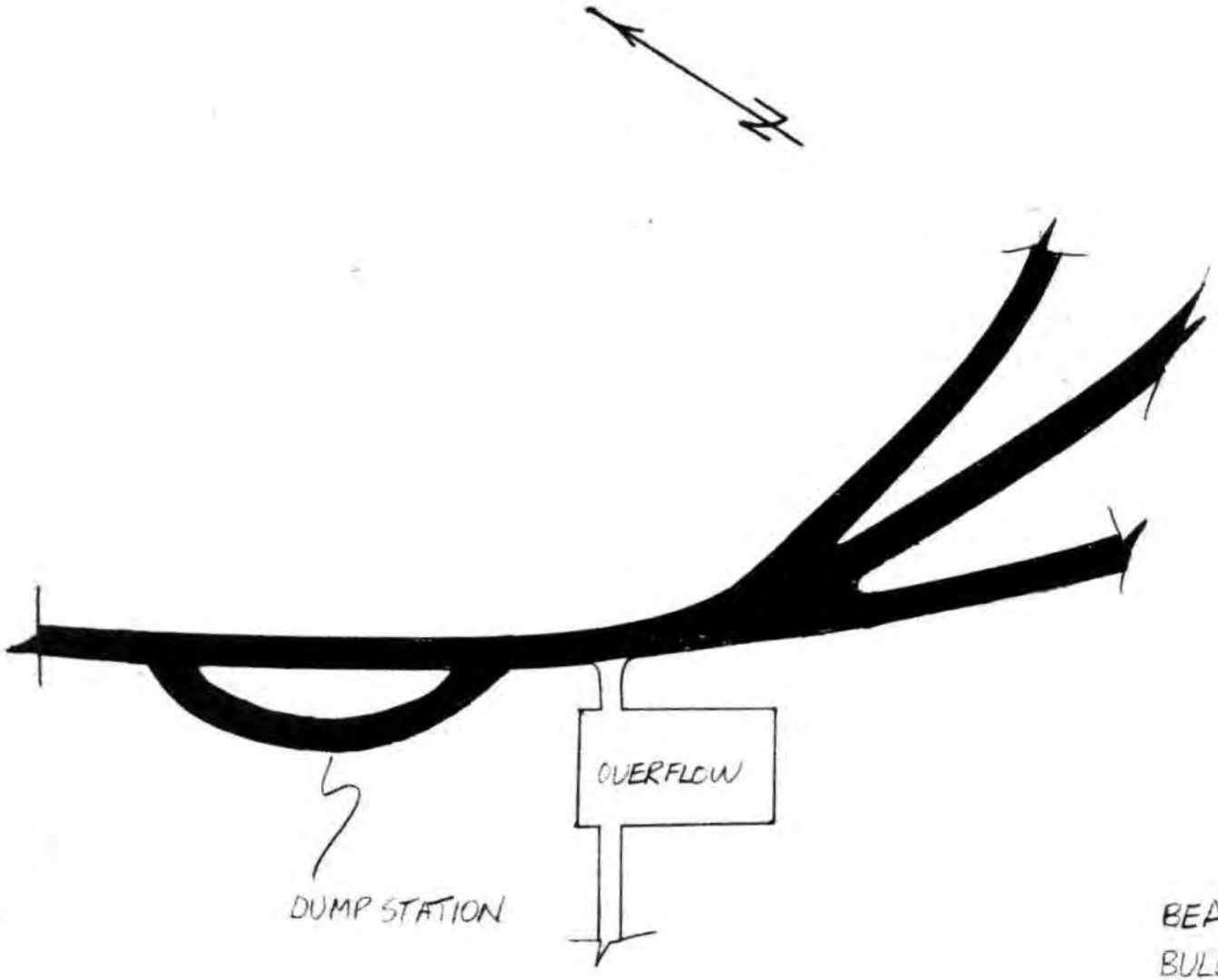
PLATE 33A


N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49
WHITE RIVER WATERSHED
WHITE RIVER ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
TUCKER HOLLOW PARK
SCALE IN FEET
100 0 100 200
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

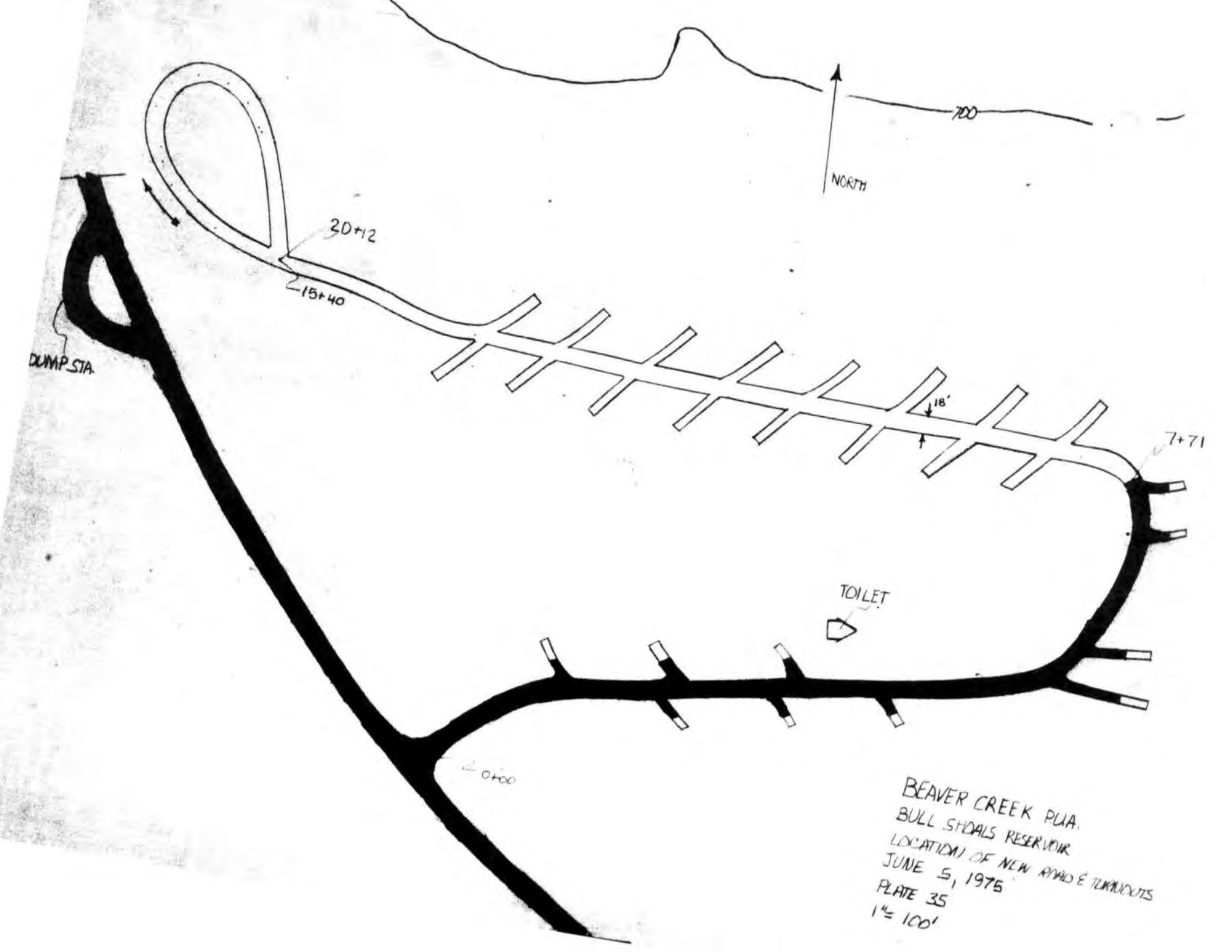

LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49
WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
TUCKER HOLLOW PARK
SCALE OF FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974


CAMPING AREA A
7 - EXISTING
37 - PROPOSED
35 - With ELECTRIC
BULL
SHOALS
LAKE
OUTFALL 300'
ONE WAY
PLAY AREA
TRAILER DUMP STATION
TELEPHONE
HOLDING AREA
CONTROL STATION
GATE
ORIENTATION AREA
TERMINAL FOR CONNECTING TRAIL TO RIVER RUN PARK
BOUNDARY
CENTRAL WOOD SUPPLY
PROJECT
Cabins
Boat Dock Area
CAMPING AREA B
7 - EXISTING
2 - PROPOSED
7 WITH ELECTRIC
PUBLIC LAUNCHING AREA
NOTE: THIS AREA IS LOCATED IN SECTIONS 27, 28 AND 34, T. 23 N., R. 20 W., TANEY CO., MO.
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
HIGHWAY K
PARK
SCALE OF FEET
100 0 100 200
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS. APR. 1974
LEGEND
RECREATIONAL FEATURES
FEATURE
EXISTING
PROPOSED
ROADS
PAVED
GRAVEL
EXISTING GRAVEL TO BE PAVED
TO BE OBLITERATED
STRUCTURES
TOILETS-VAULT TYPE MASONRY
TOILETS-CONVERT TO WATERBORNE
TOILETS-WATERBORNE
TOILETS-WATERBORNE WITH SHOWERS
TOILETS-VAULT TYPE WOODEN
WELL
WELL WITH SHELTER
DRINKING FOUNTAIN
DRINKING FOUNTAIN WITH SHELTER
BOAT RAMP
PICNIC SHELTER
CHARGE HOUSE
CAMPERS WASHHOUSE
OTHER BUILDINGS NAMED
CAFE
PICNIC SPACE
1 TABLE
1 FIREPLACE
WITH TABLE SHELTER
CAMP SPACE OR TRAILER SPACE
1 TABLE
1 FIREPLACE
GROUP CAMP SPACE AND TRAIL
1 COUNCIL FIREPLACE
1 REFUSE CAN
SIGN
UTILITIES
LIFT STATION
TREATMENT PLANT
SANITARY SEWER LINE
MANHOLE
WATER LINE
ELECTRIC LINE
OTHER FEATURES
TRAIL SYSTEM
BEACH IMPROVEMENT
BEACH
TREES
TRAFFIC COUNTER
MERCURY VAPOR LIGHT
PERTINENT ELEVATION (MSL)
TOP OF CONSERVATION POOL 654
TOP OF FLOOD CONTROL POOL 695


N
WHITE RIVER WATERSHED
WHITE RIVER ARK AND MO
UPDATED MASTER PLAN
BULL SHOALS LAKE
HIGHWAY K
PARK
(SCALE OF FEET)
200 0 100 200
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49



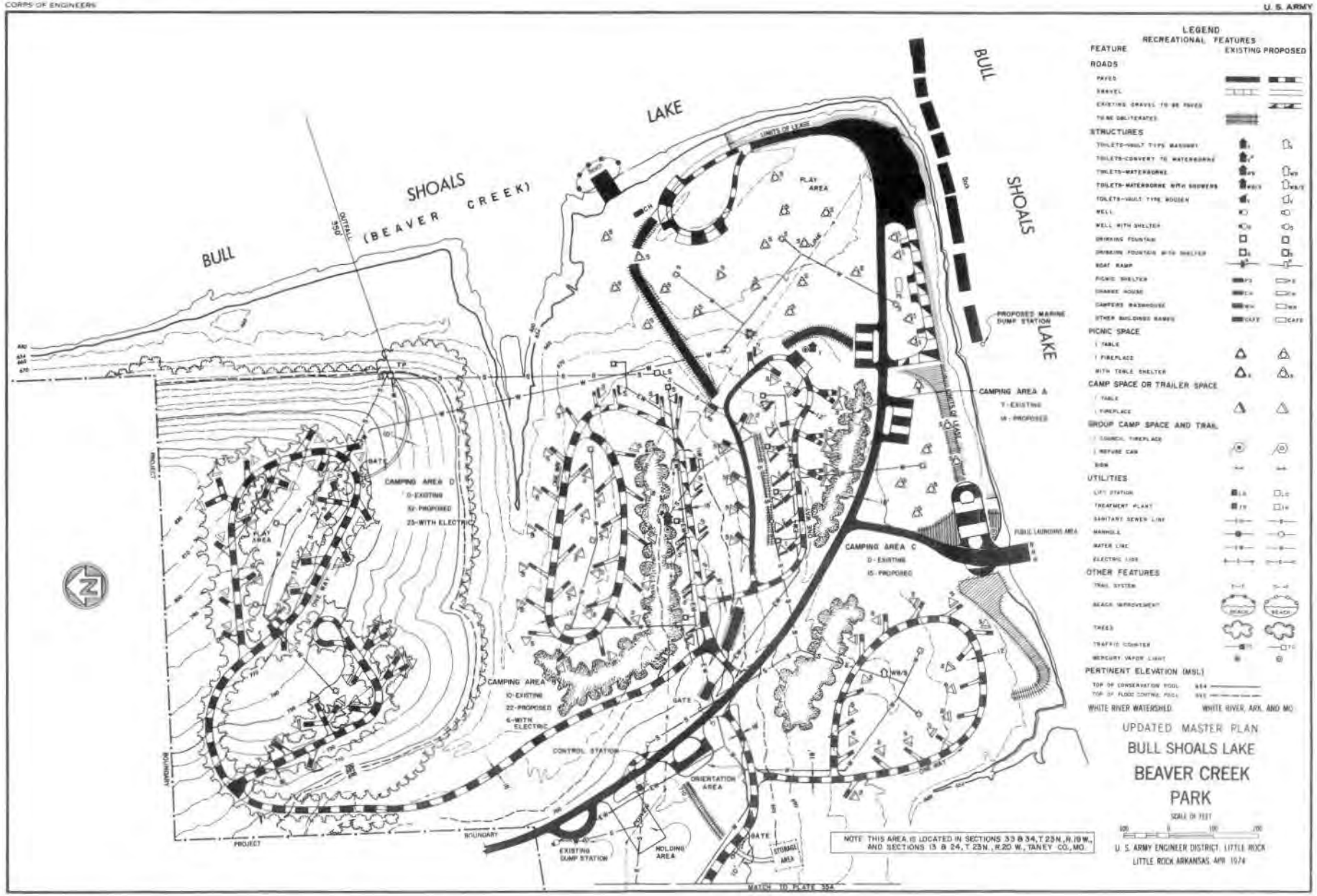
BEAVER CREEK PUBLIC USE AREA
BULL SHOALS RESERVOIR
LOCATION OF OVERFLOW AREA
JUNE 13, 1975
SCALE: 1" = 100'
PLATE NO: 35



BEAVER CREEK PUA.
BULL SHOALS RESERVOIR
LOCATION OF NEW ROAD & TURNOUTS
JUNE 5, 1975
PLATE 35
1" = 100'

CORPS OF ENGINEERS

U. S. ARMY



LEGEND
RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
CHANGE HOUSE		
CAMPERS WASHHOUSE		
OTHER BUILDINGS NAMED		
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT		
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654

TOP OF FLOOD CONTROL POOL 695

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

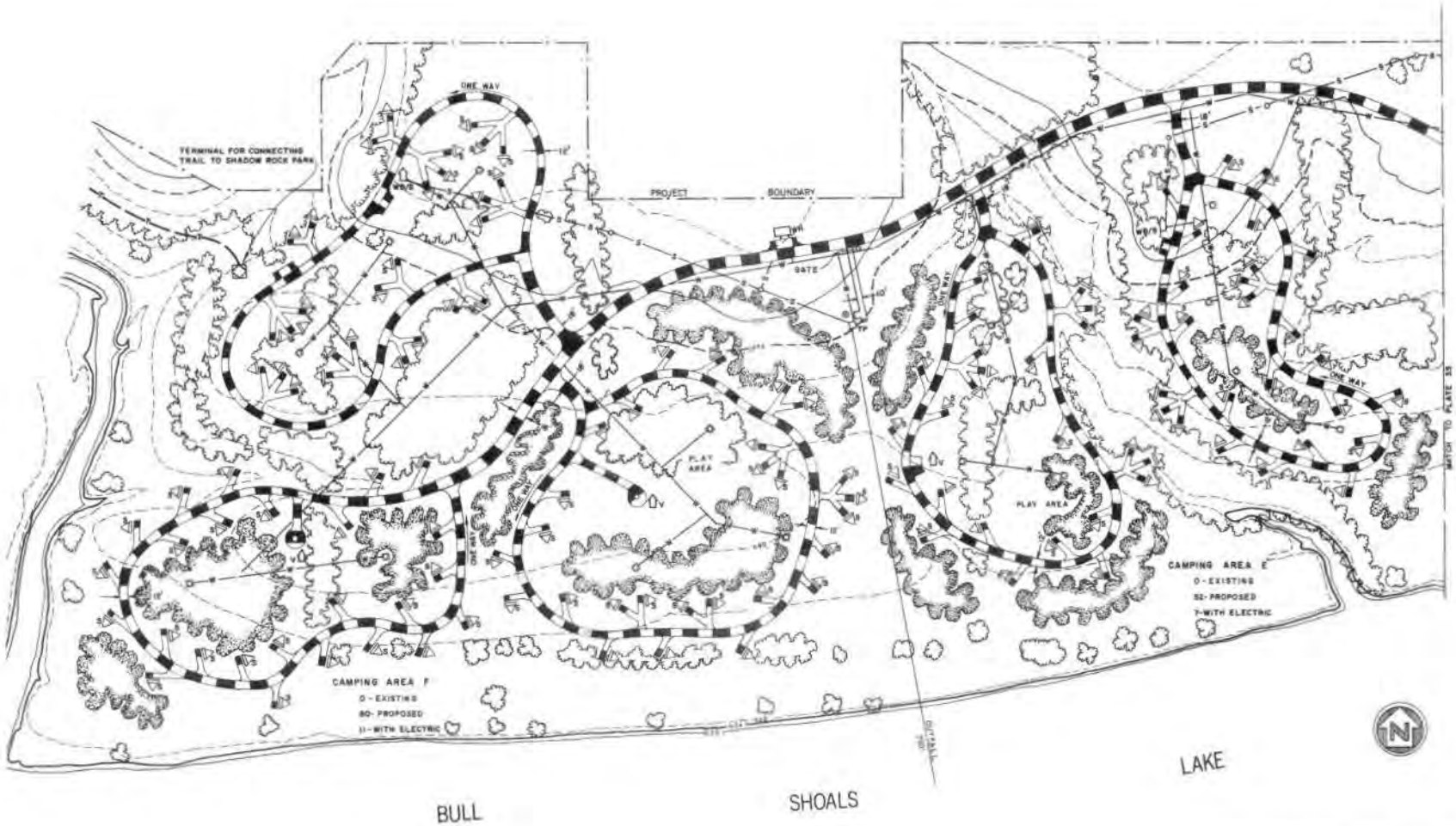
UPDATED MASTER PLAN

BULL SHOALS LAKE
BEAVER CREEK PARK

SCALE OF FEET

100 0 100 200

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK ARKANSAS, APR 1974



LEGEND
RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
CHANGE HOUSE		
CAMPERS' WASHHOUSE		
OTHER BUILDINGS NAMED	CAFE	
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		
PERTINENT ELEVATION (MSL)		
TOP OF CONSERVATION POOL 654		
TOP OF FLOOD CONTROL POOL 695		

WHITE RIVER WATERSHED WHITE RIVER ARK. AND MO.

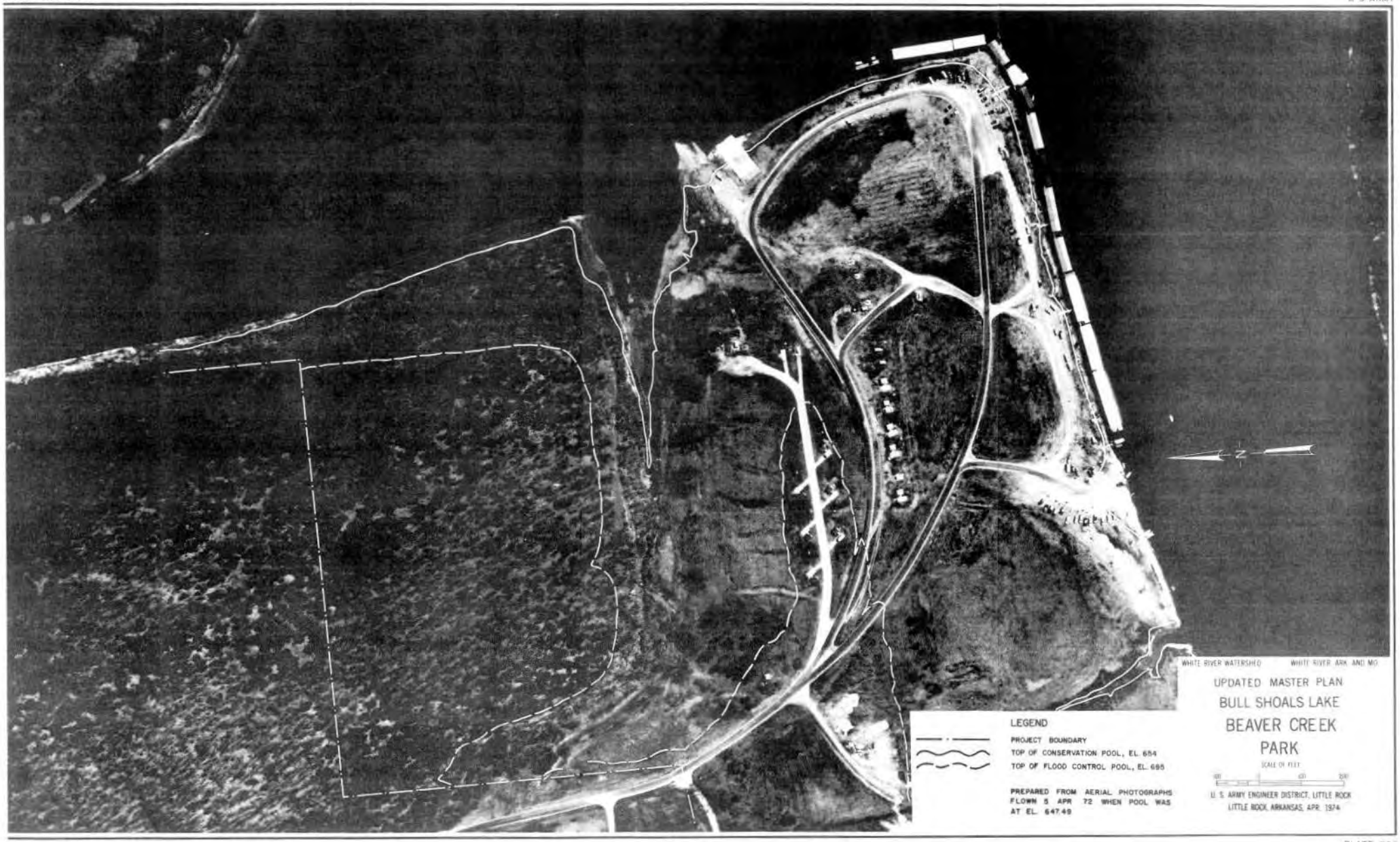
UPDATED MASTER PLAN

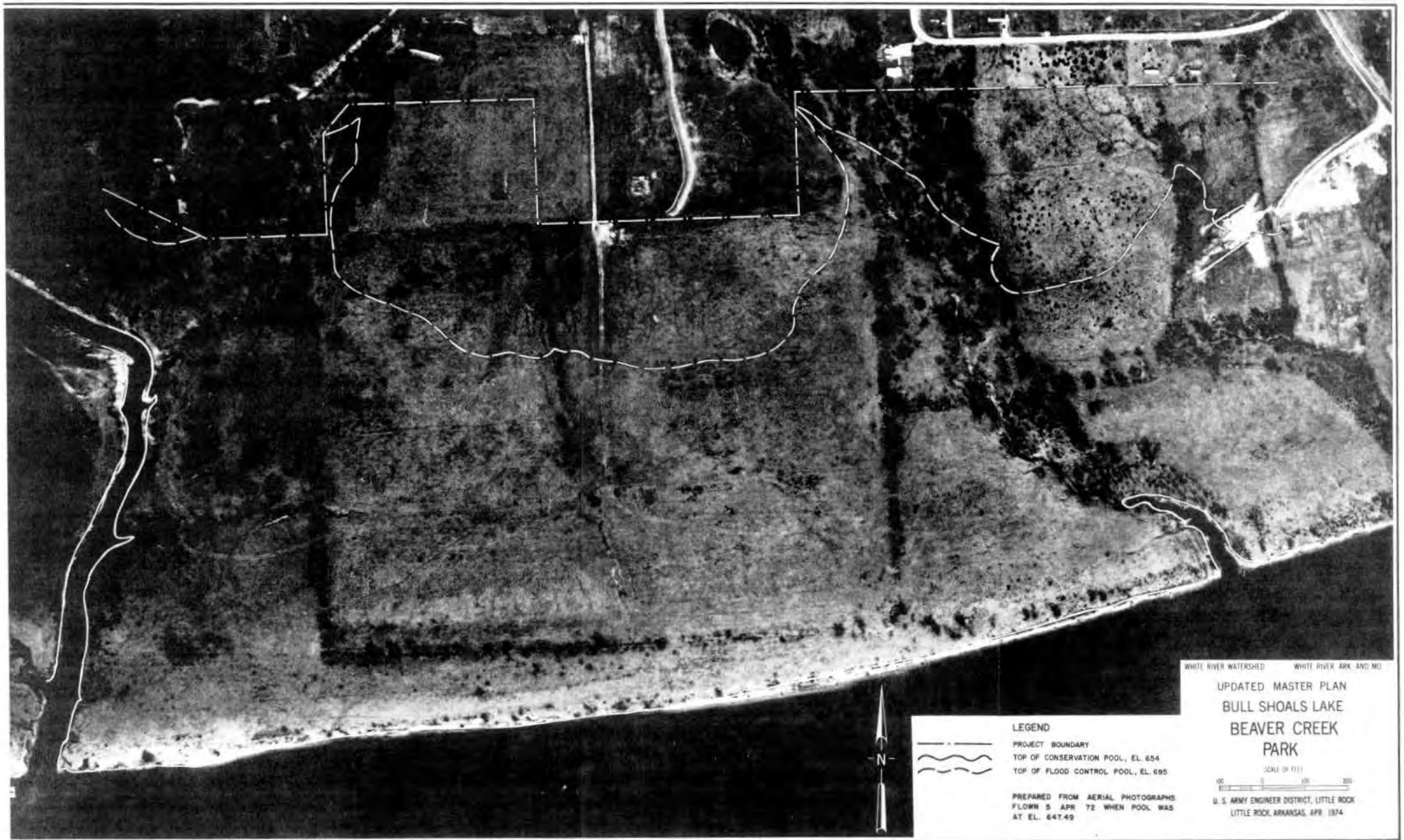
BULL SHOALS LAKE
BEAVER CREEK PARK

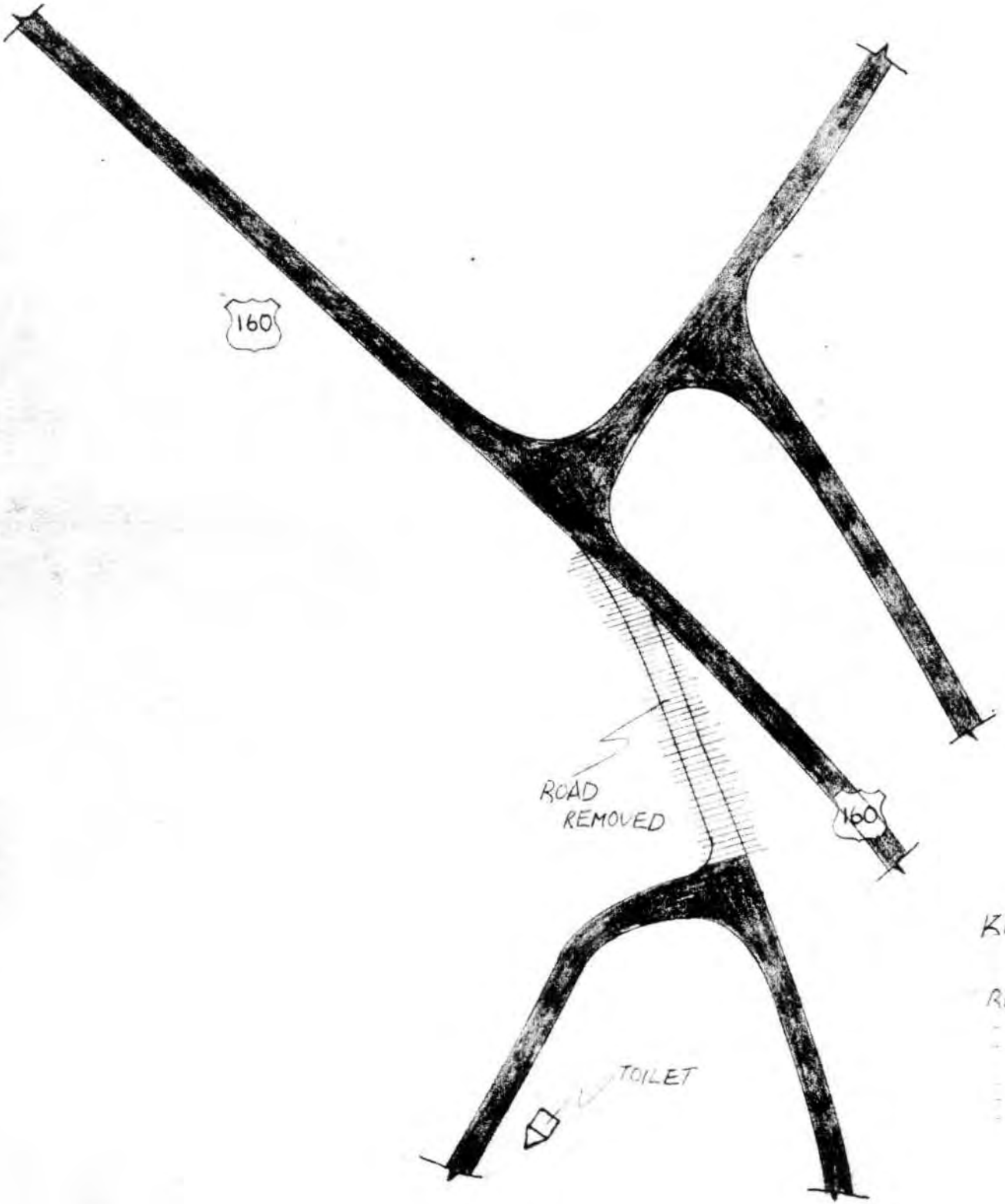
SCALE OF FEET
100 0 100 200

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

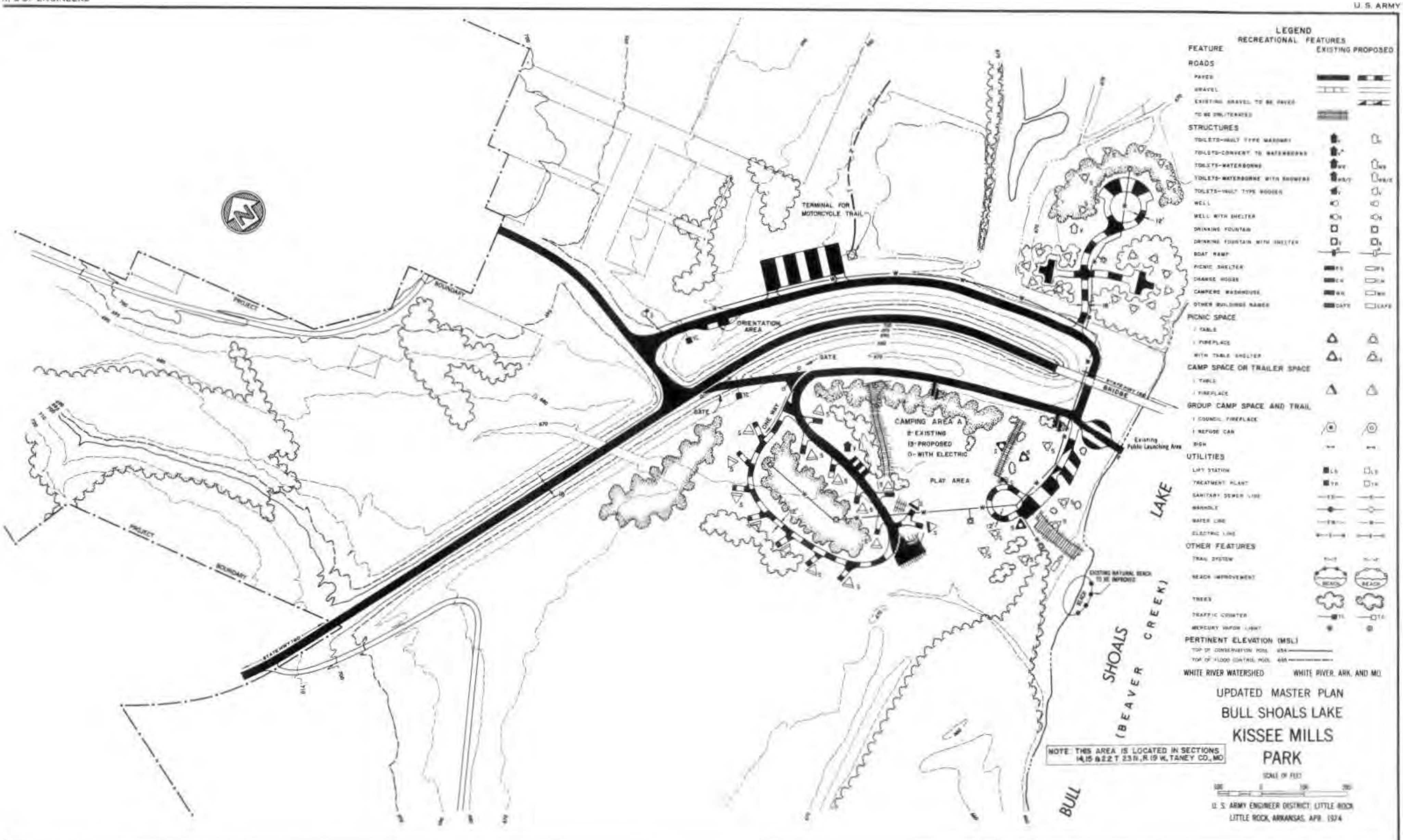
NOTE: THIS AREA IS LOCATED IN SECTIONS 33 & 34, T. 23N., R. 19 W., AND SECTIONS 13 & 24, T. 23 N., R. 20 W., TANEY CO., MO.

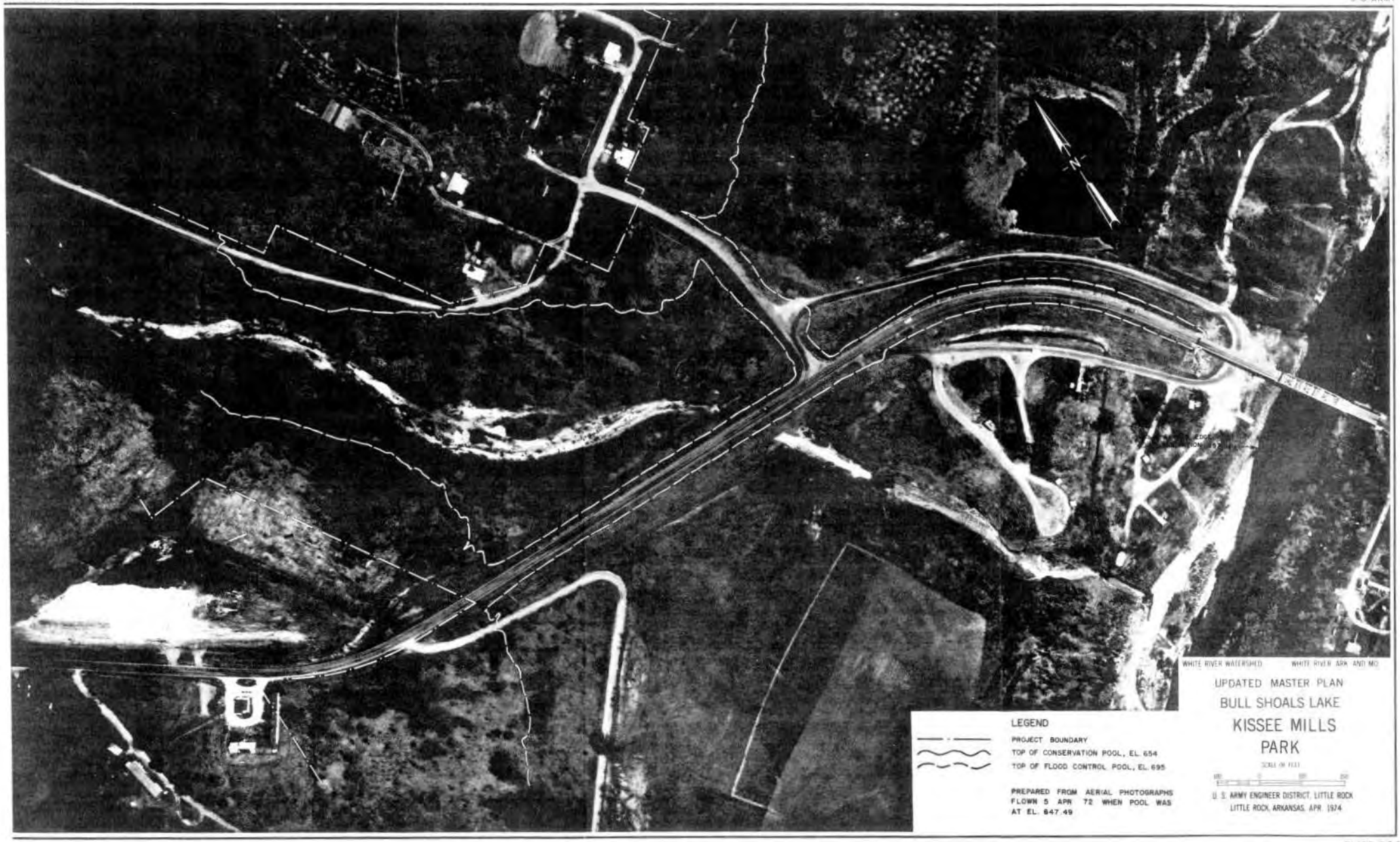

N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49
WHITE RIVER WATERSHED
WHITE RIVER ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
BEAVER CREEK
PARK
SCALE OF FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

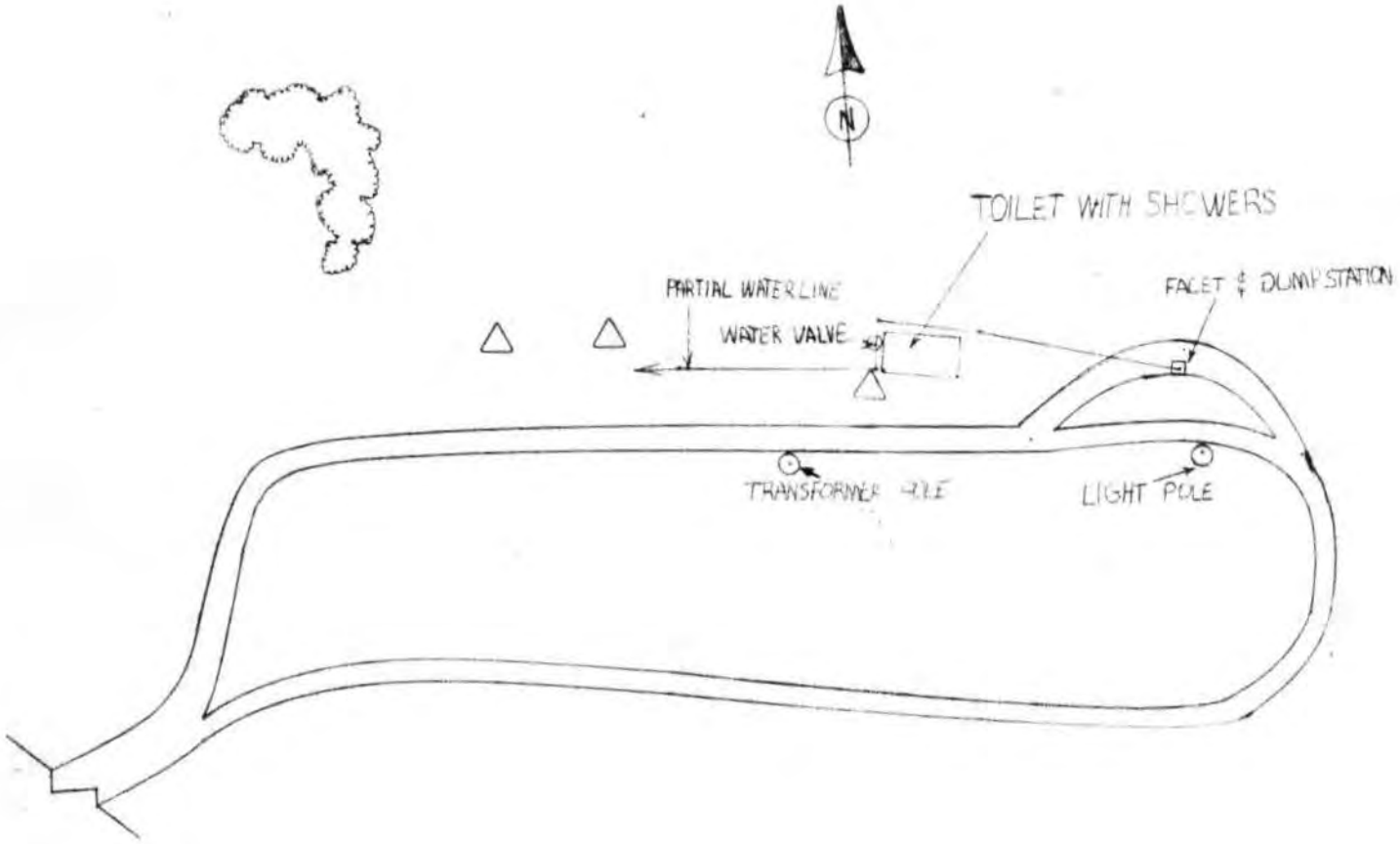

N
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49
WHITE RIVER WATERSHED WHITE RIVER ARK AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
BEAVER CREEK
PARK
SCALE OF FEET
100 0 100 200
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR 1974



KISSEE MILLS PUBLIC USE AREA
BULL SHOALS RESERVOIR
REMOVAL OF OLD ENTRANCE
JUNE 2, 1975
SCALE: 1" = 100'
PLATE NO: 36


LEGEND
RECREATIONAL FEATURES
FEATURE
EXISTING PROPOSED
ROADS
STRUCTURES
PICNIC SPACE
CAMP SPACE OR TRAILER SPACE
GROUP CAMP SPACE AND TRAIL
UTILITIES
OTHER FEATURES
PERTINENT ELEVATION (MSL)
TERMINAL FOR MOTORCYCLE TRAIL
ORIENTATION AREA
GATE
ONE WAY
CAMPING AREA A
8-EXISTING
13-PROPOSED
0-WITH ELECTRIC
PLAY AREA
Existing Public Launching Area
EXISTING NATURAL BEACH TO BE IMPROVED
LAKE
BULL SHOALS
(BEAVER CREEK)
PROJECT BOUNDARY
NOTE: THIS AREA IS LOCATED IN SECTIONS 14,15 & 22 T 23 N., R 19 W., TANEY CO., MO
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
KISSEE MILLS
PARK
SCALE OF FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974


N
WHITE RIVER WATERSHED
WHITE RIVER ARK. AND MO.
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49
UPDATED MASTER PLAN
BULL SHOALS LAKE
KISSEE MILLS
PARK
SCALE OF FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974



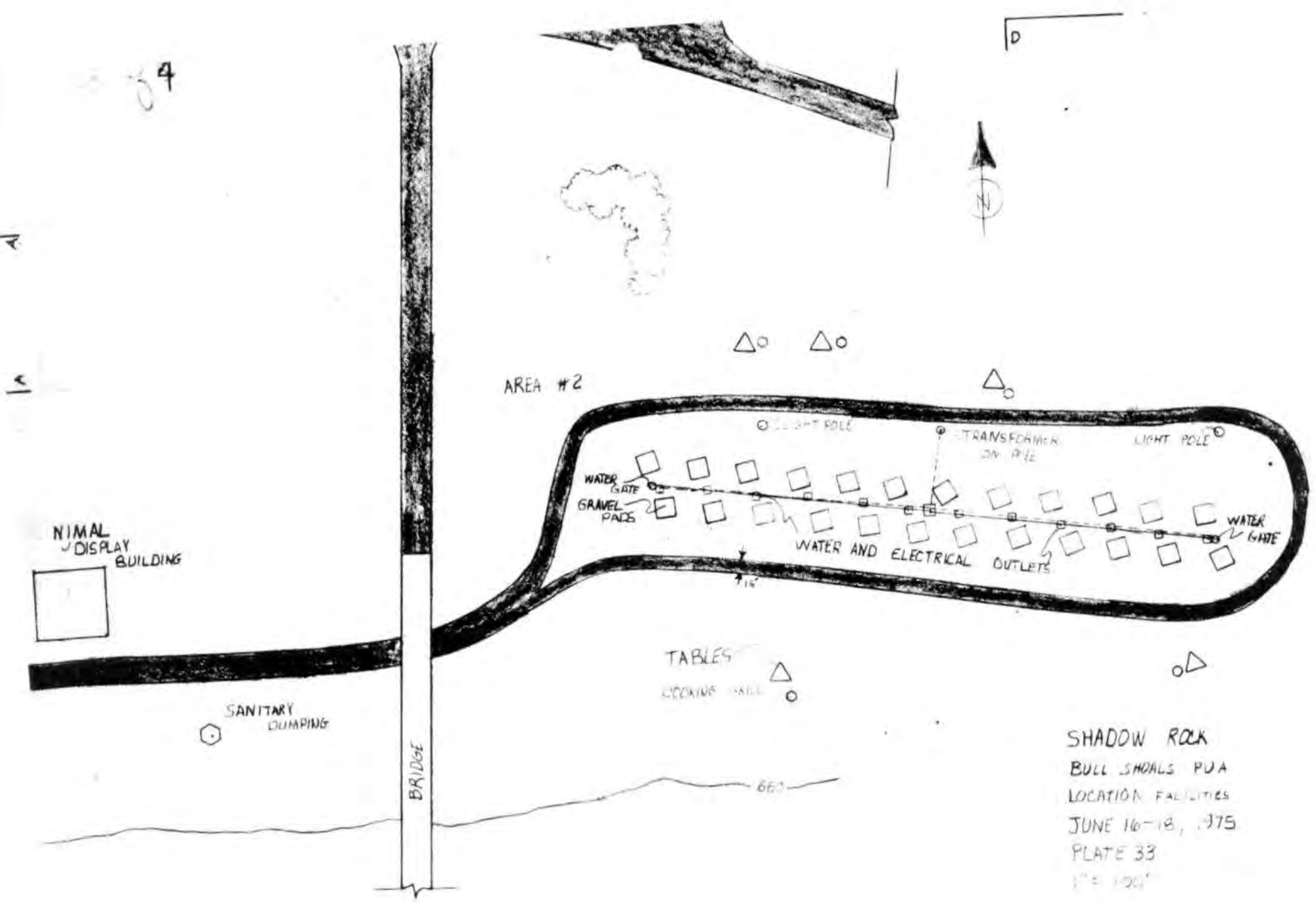
650

SHADOW ROCK

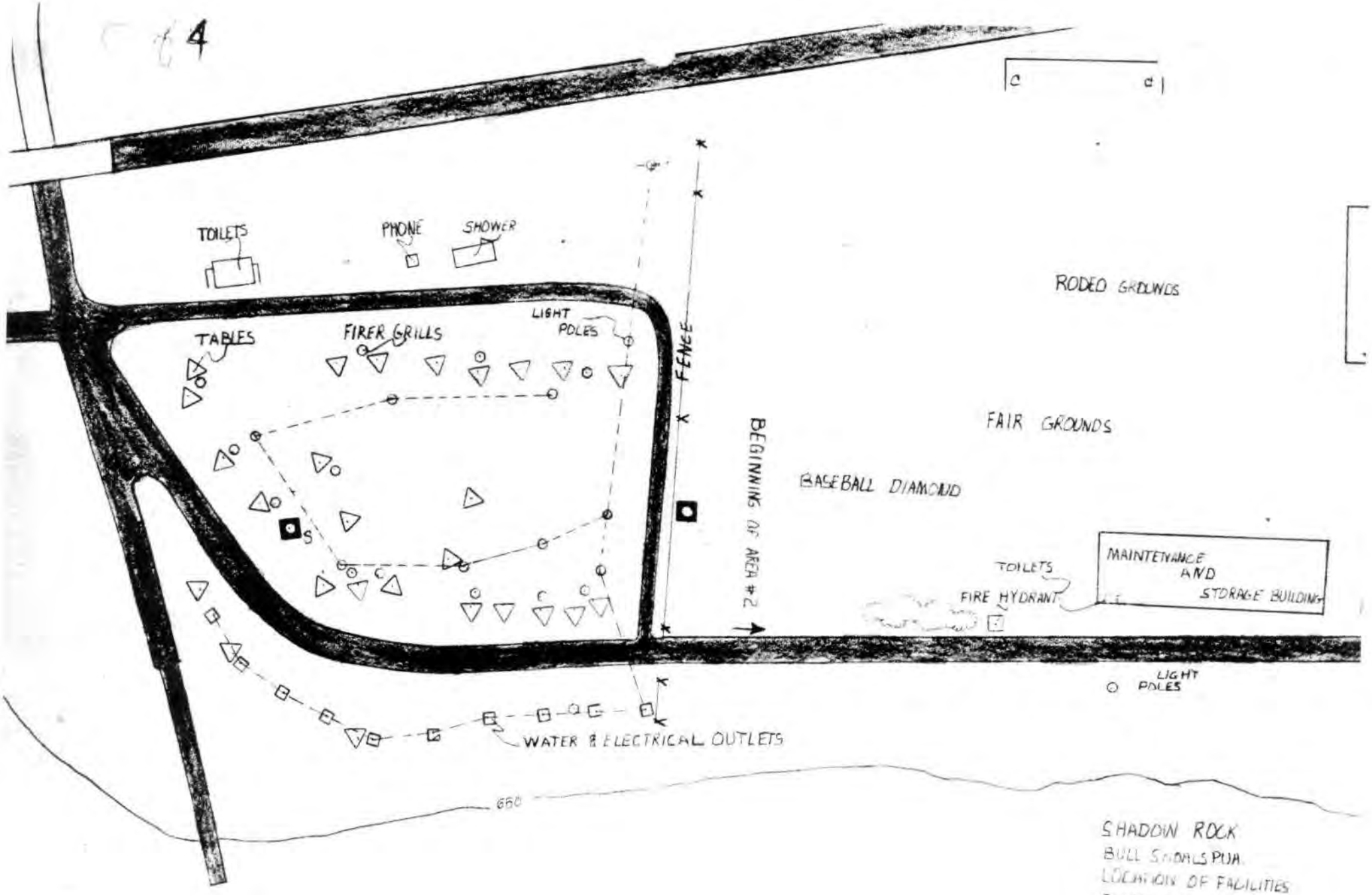
LOCATION OF TOILET, DUMP STATION AND PARTIAL WATER LINE

MAY 25, 1976

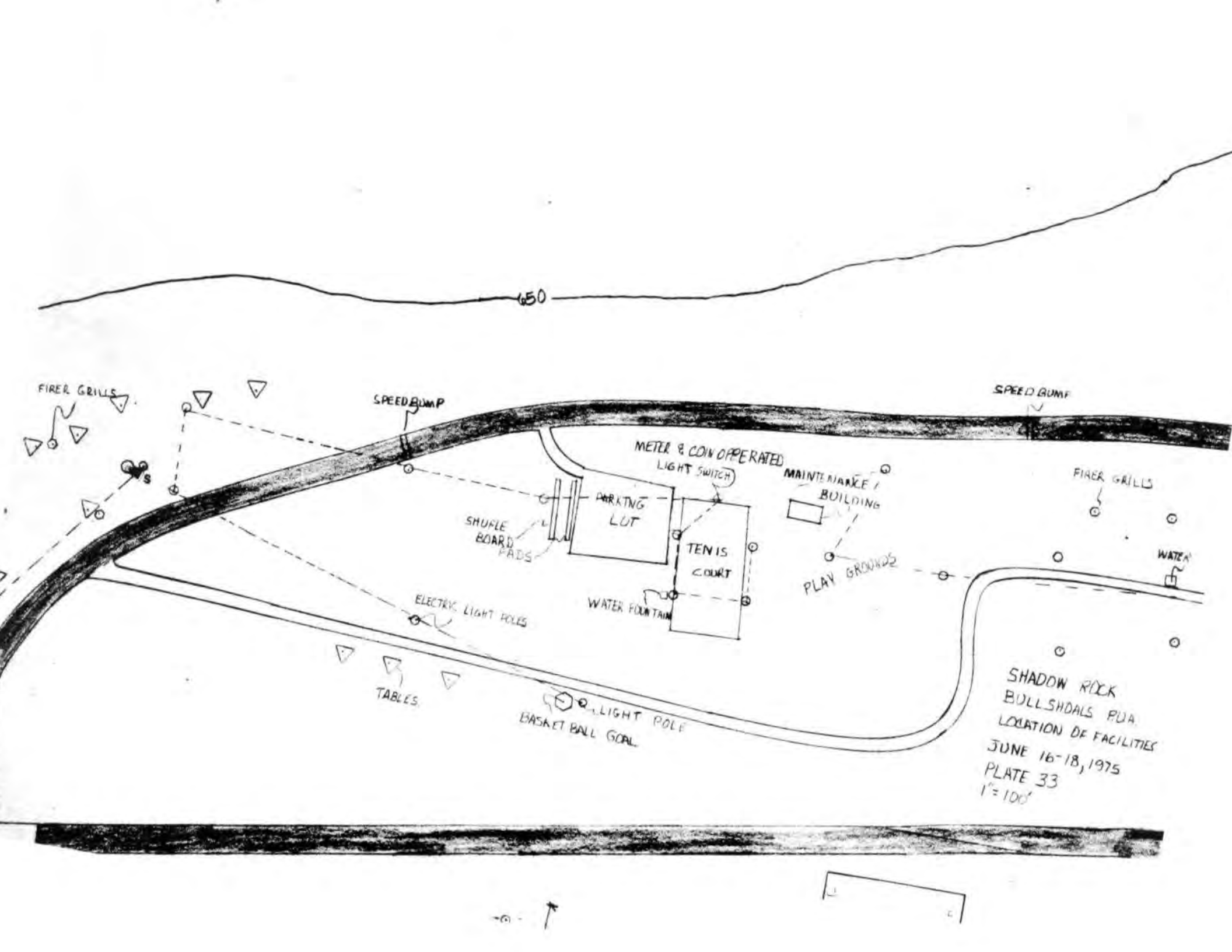
1" = 100'

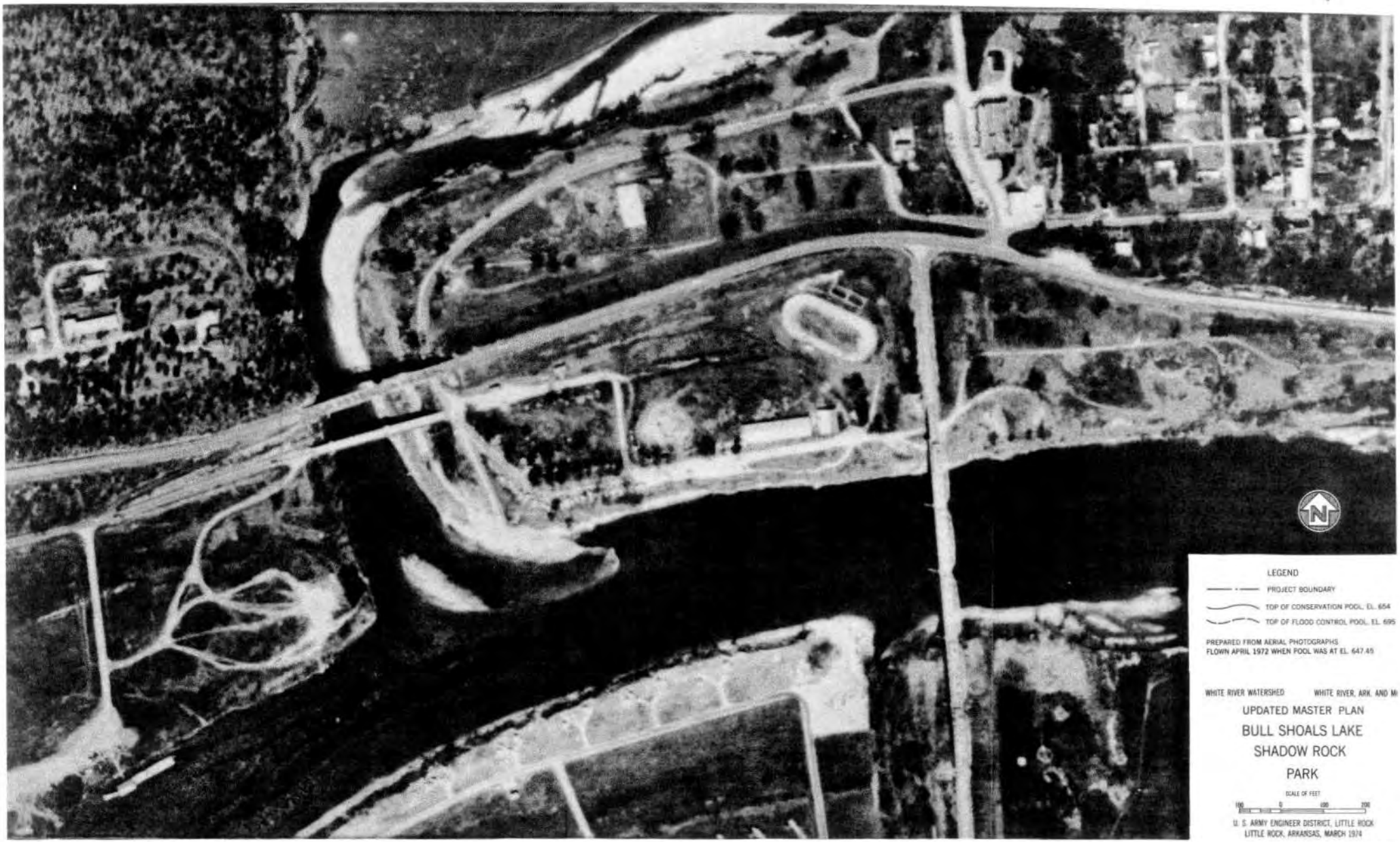


SHADOW ROCK
BULL SHOALS PUA
LOCATION FACILITIES
JUNE 16-18, 1975
PLATE 33
1" = 100'



SHADOW ROCK
BULL SHOALS PUA
LOCATION OF FACILITIES
JUNE 16-18, 1975
PLATE 33
1" = 100'


650
FIRER GRILLS
SPEED BUMP
SPEED BUMP
METER & COIN OPERATED
LIGHT SWITCH
MAINTENANCE / BUILDING
PARKING LOT
SHUFLE BOARD PADS
TENIS COURT
FIRER GRILLS
WATER
PLAY GROUNDS
WATER FOUNTAIN
ELECTRIC LIGHT POLES
TABLES
LIGHT POLE
BASKET BALL GOAL
SHADOW ROCK
BULLSHOALS RUA
LOCATION OF FACILITIES
JUNE 16-18, 1975
PLATE 33
1"=100'



LEGEND

PROJECT BOUNDARY

TOP OF CONSERVATION POOL, EL. 654

TOP OF FLOOD CONTROL POOL, EL. 695

PREPARED FROM AERIAL PHOTOGRAPHS
FLOWN APRIL 1972 WHEN POOL WAS AT EL. 647.45

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MI

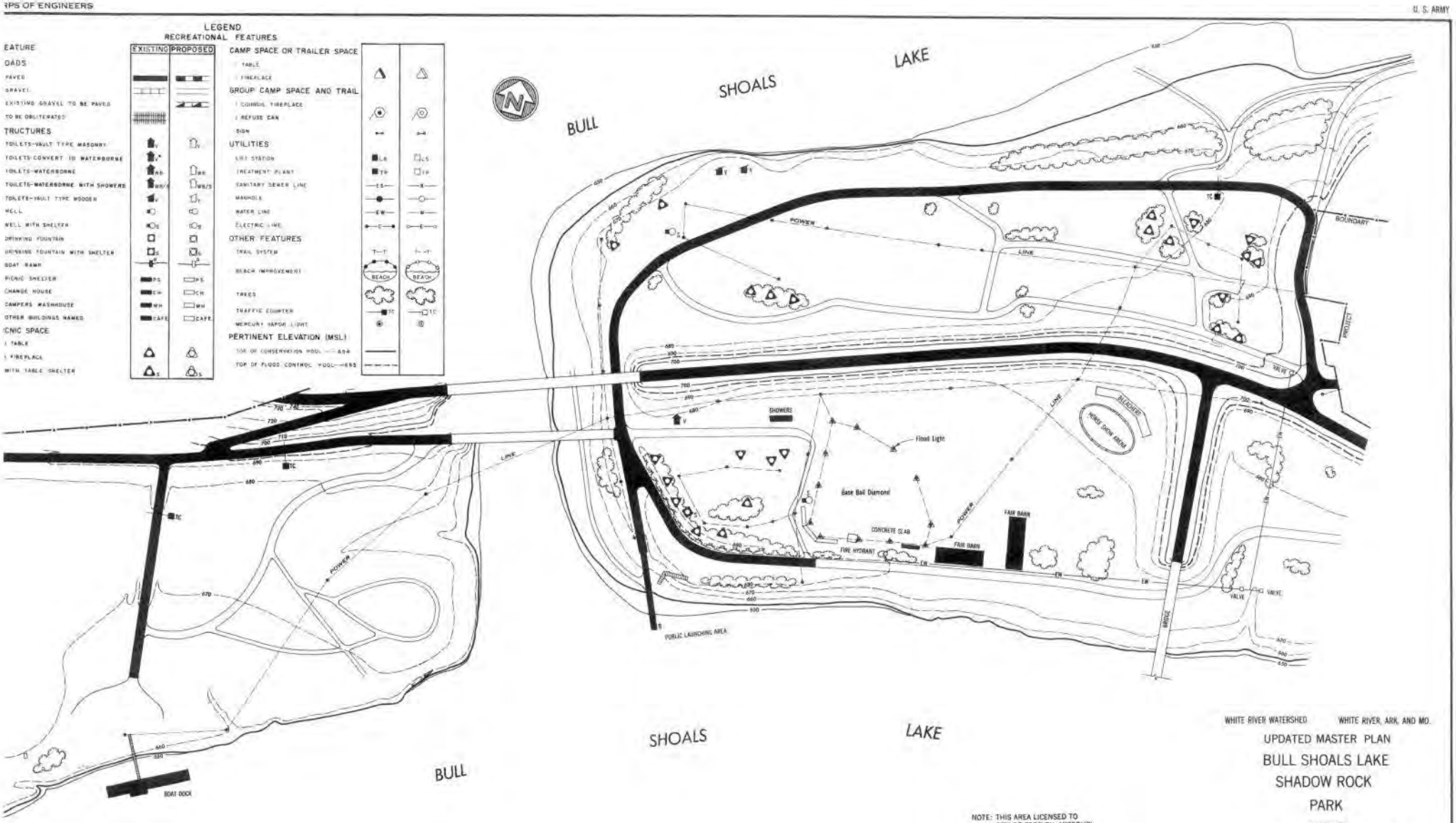
UPDATED MASTER PLAN
BULL SHOALS LAKE
SHADOW ROCK
PARK

SCALE OF FEET

100 0 100 200

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, MARCH 1974

PLATE 37



NOTE: THIS AREA LICENSED TO CITY OF FORSYTH, MISSOURI.

NOTE: THIS AREA IS LOCATED IN SECTION 33, T. 24 N., R. 20 W., TANEY CO., MO.

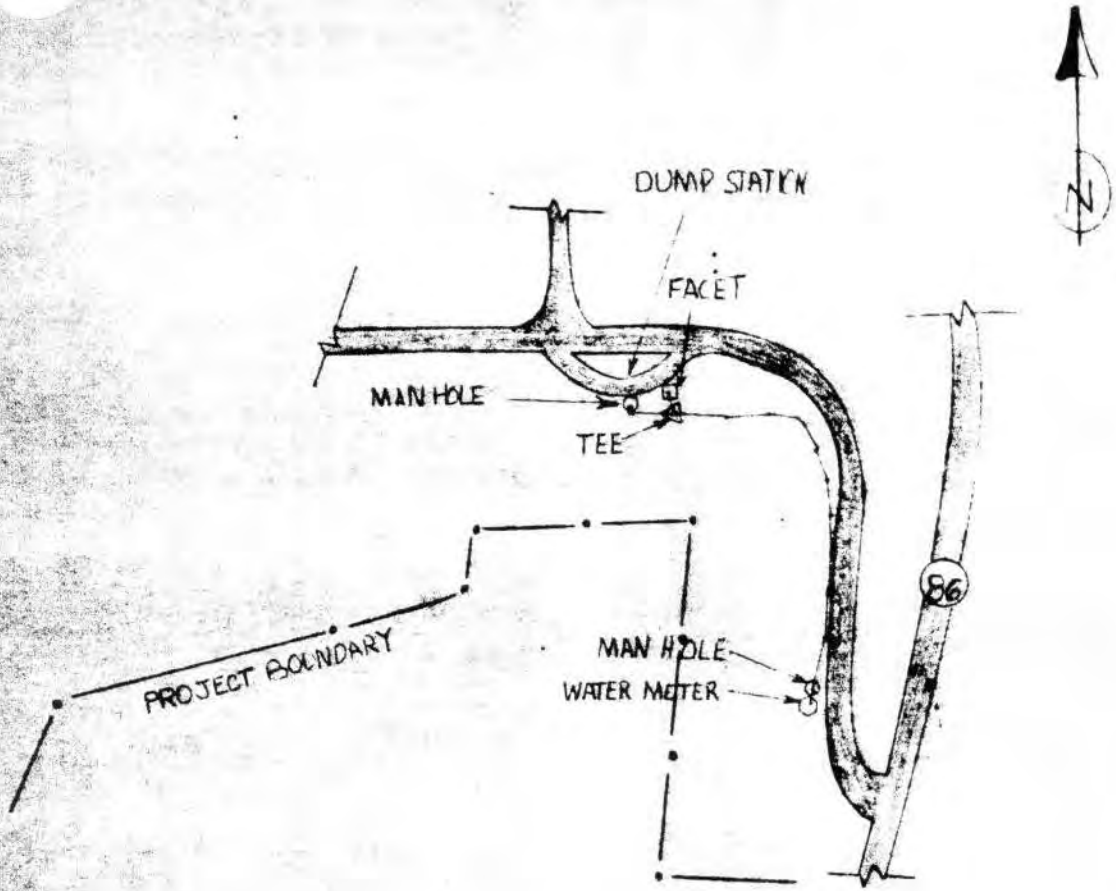
WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
SHADOW ROCK
PARK

SCALE OF FEET

100 0 100 200

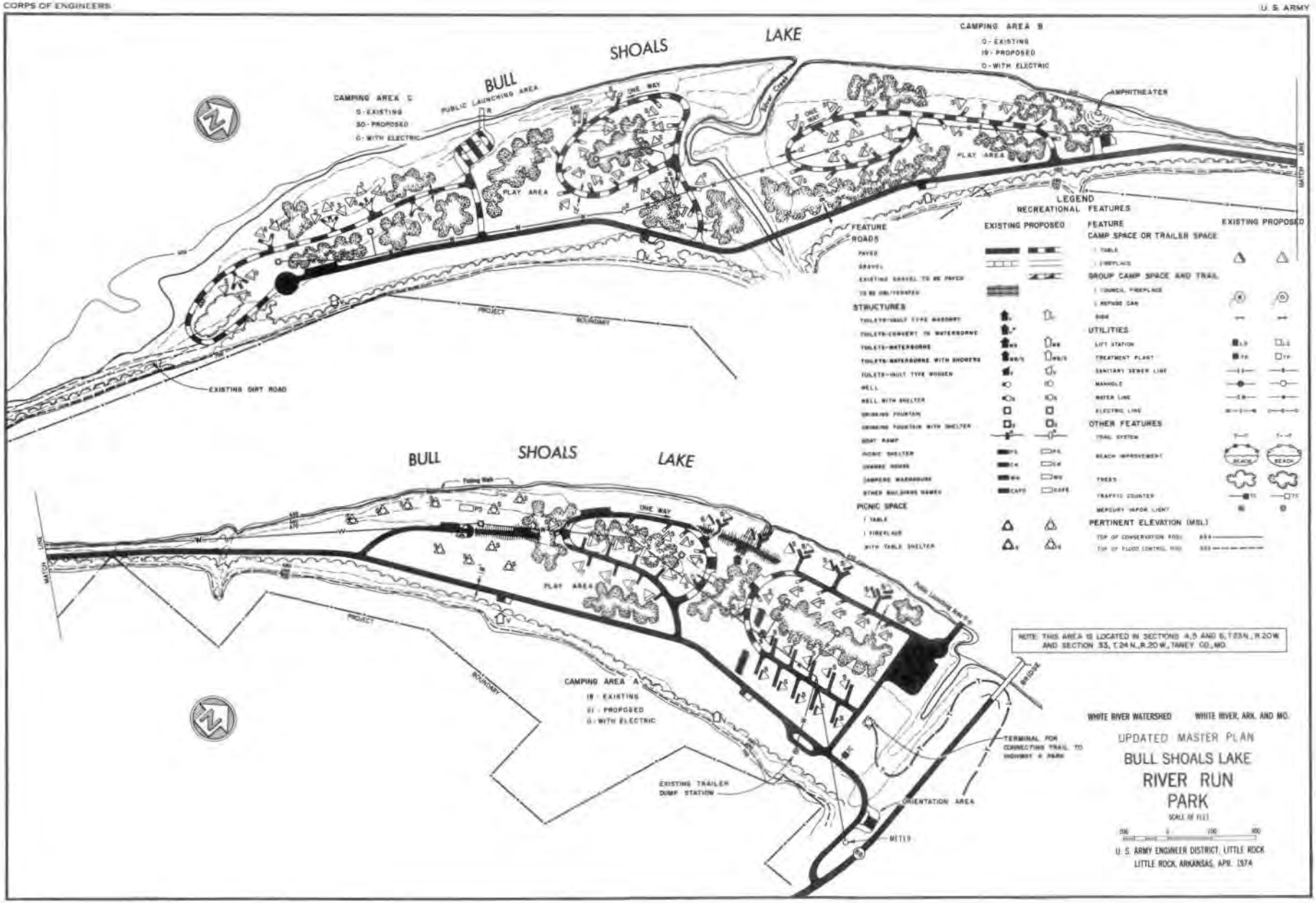
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, MARCH 1974

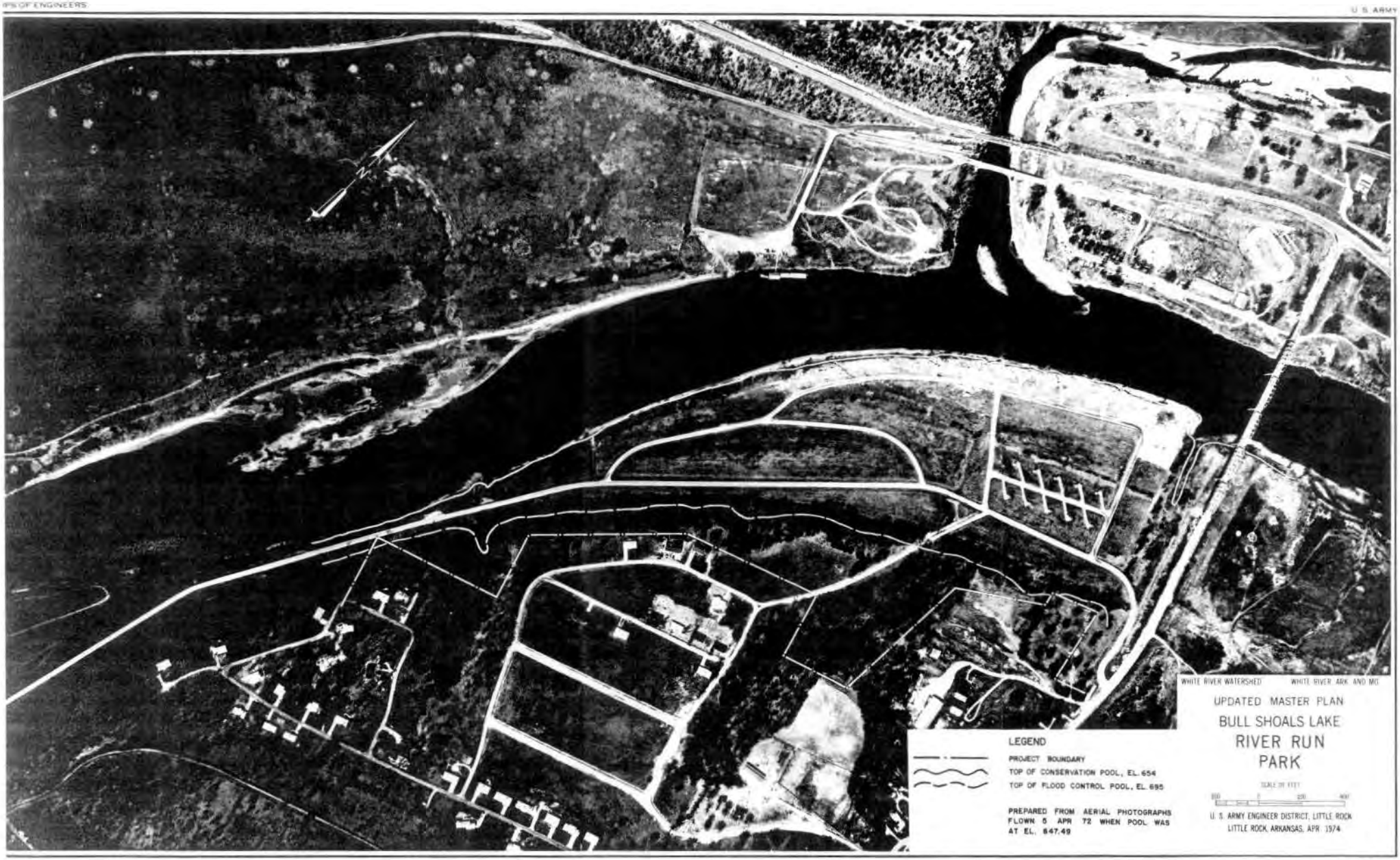


RIVER RUN
BULL SHOALS LAKE
LOCATION OF DUMP STATION AND
WATER LINE (INSTALLED MARCH 1976)
MAY 26, 1976
PLATE 38
SCALE 1" = 200'

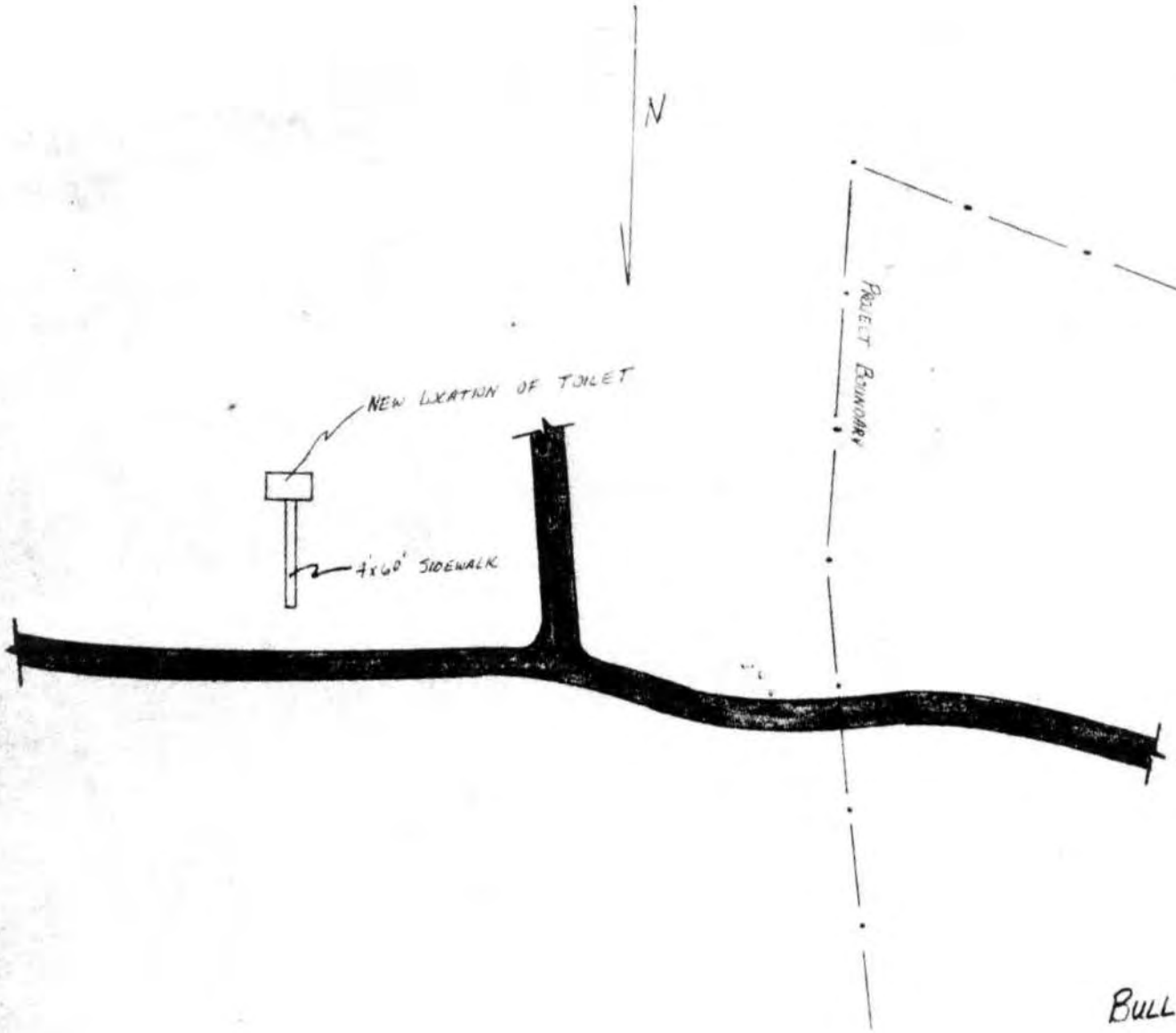
CORPS OF ENGINEERS

U. S. ARMY




WHITE RIVER WATERSHED
WHITE RIVER ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
RIVER RUN
PARK
SCALE IN FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR 1974
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS
FLOWN 5 APR 72 WHEN POOL WAS
AT EL. 647.49


WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49
UPDATED MASTER PLAN
BULL SHOALS LAKE
RIVER RUN
PARK
SCALE OF FEET
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

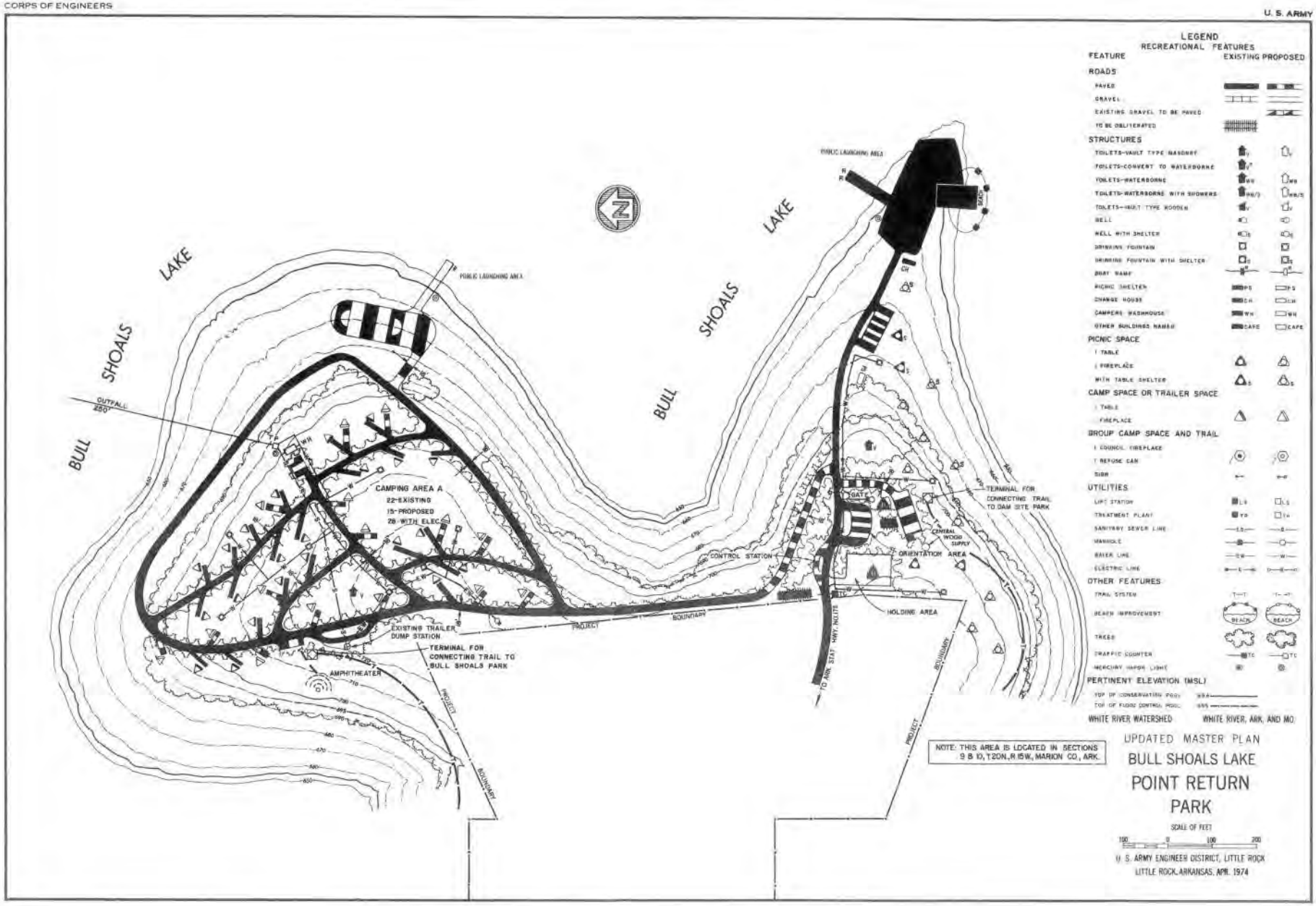


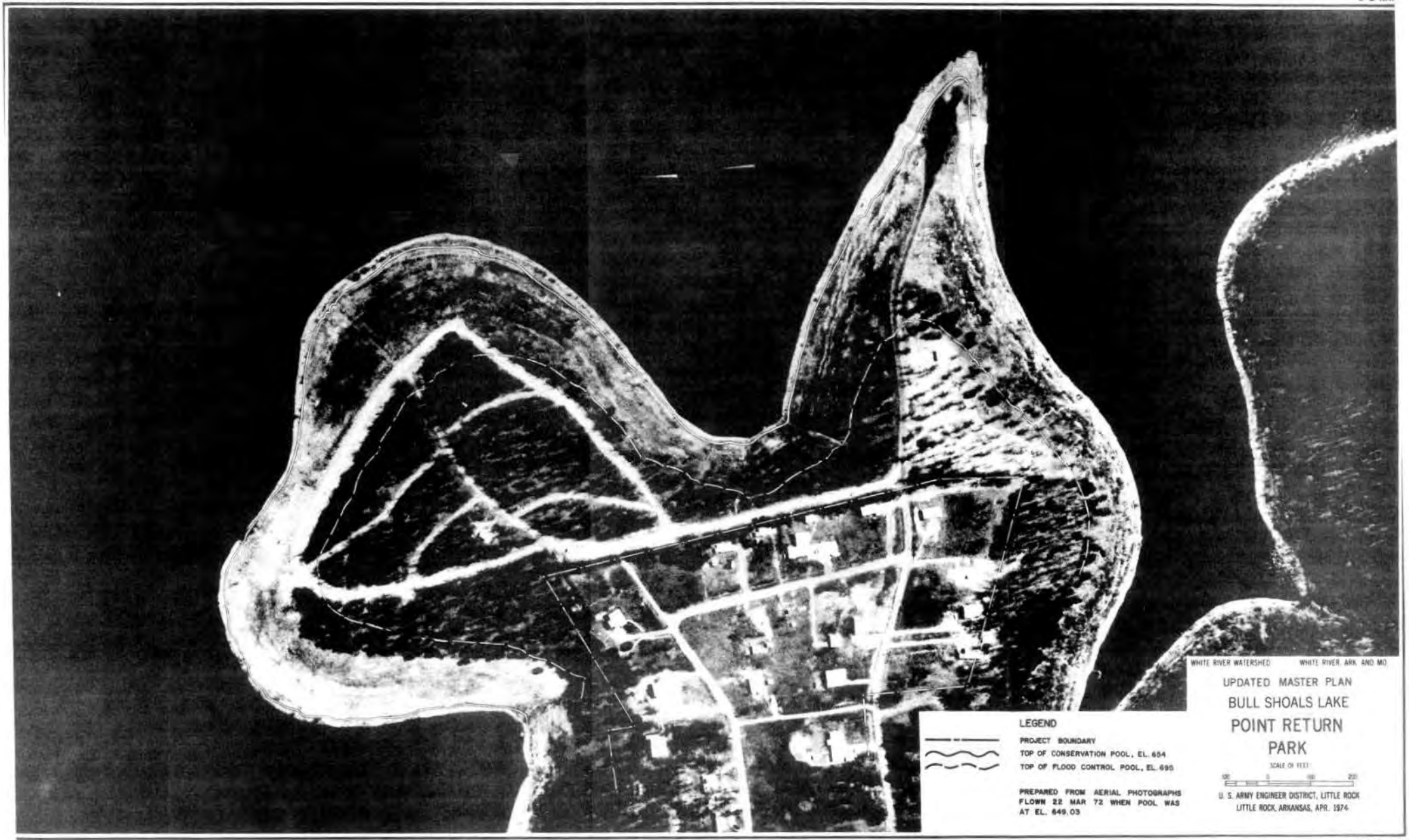
BULL SHOALS RESERVOIR
POINT RETURN P.U.A.
SCALE 1"=100' JUNE '73

LOCATION OF NEW TOILET
SHEET NO. 39

CORPS OF ENGINEERS

U. S. ARMY



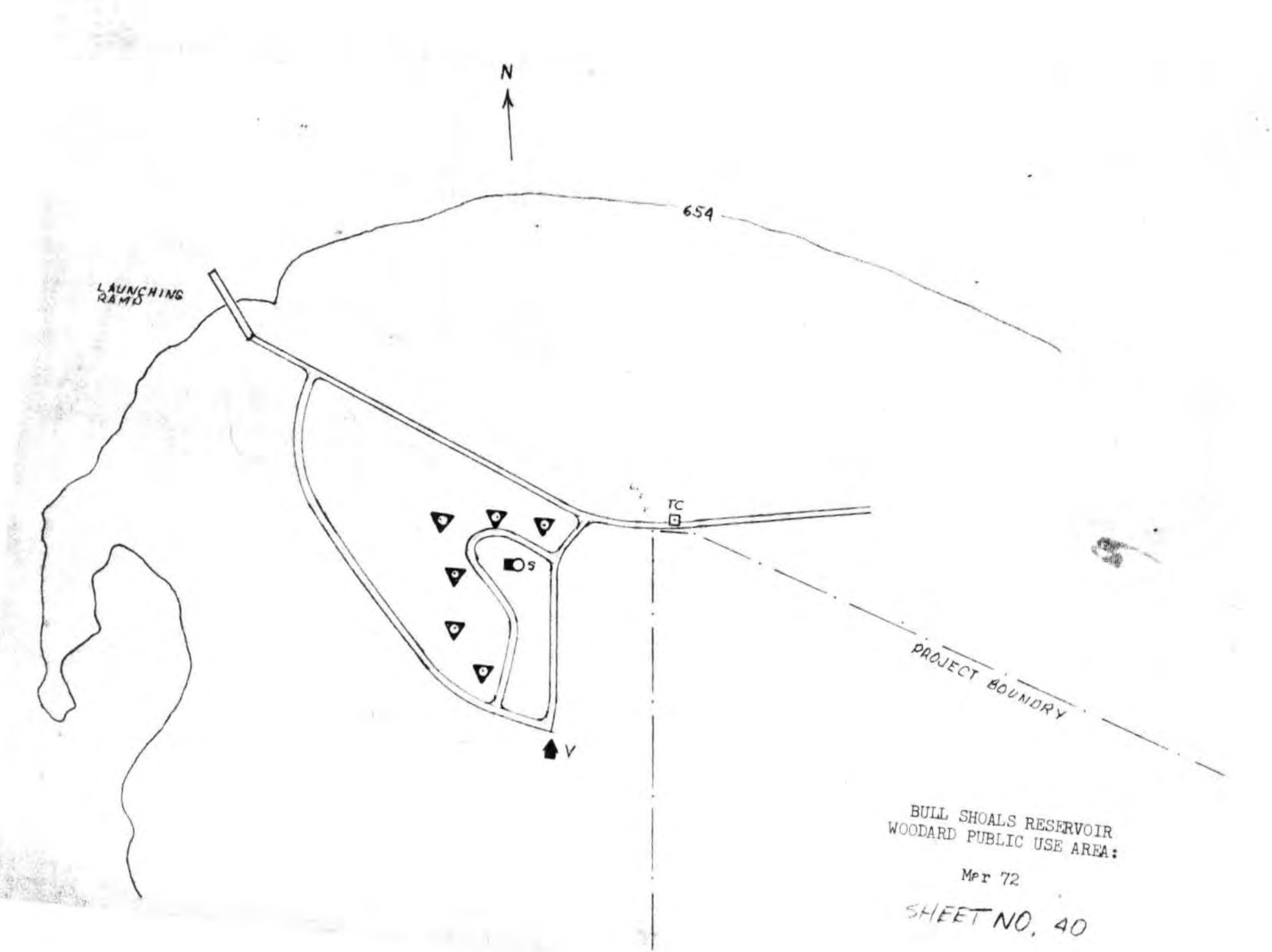


WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
POINT RETURN PARK

SCALE OF FEET

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974



BULL SHOALS RESERVOIR
WOODARD PUBLIC USE AREA:

Mar 72

SHEET NO. 40

CORPS OF ENGINEERS

U. S. ARMY

LEGEND

RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY		
TOILETS-CONVERT TO WATERBORNE		
TOILETS-WATERBORNE		
TOILETS-WATERBORNE WITH SHOWERS		
TOILETS-VAULT TYPE WOODEN		
WELL		
WELL WITH SHELTER		
DRINKING FOUNTAIN		
DRINKING FOUNTAIN WITH SHELTER		
BOAT RAMP		
PICNIC SHELTER		
CHANGE HOUSE		
CAMPERS WASHHOUSE		
OTHER BUILDING NAMED	CAFE	CAFE
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 CUNNEL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION		
TREATMENT PLANT		
SANITARY SEWER LINE		
MANHOLE		
WATER LINE		
ELECTRIC LINE		
OTHER FEATURES		
TRAIL SYSTEM		
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER		
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654

TOP OF FLOOD CONTROL POOL 695

WHITE RIVER WATERSHED

WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

BULL SHOALS LAKE

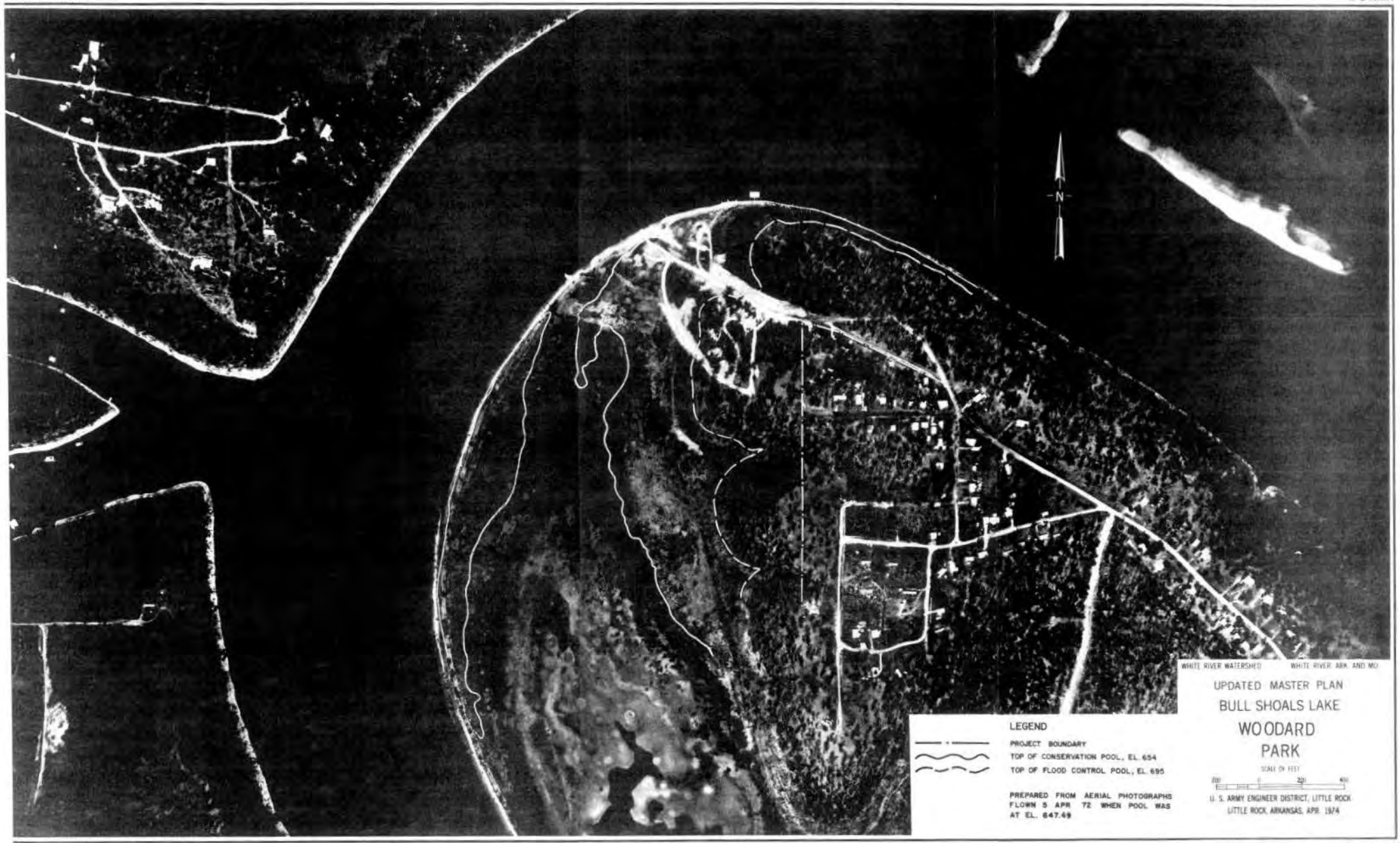
WOODARD PARK

SCALE OF FEET

200 0 200 400

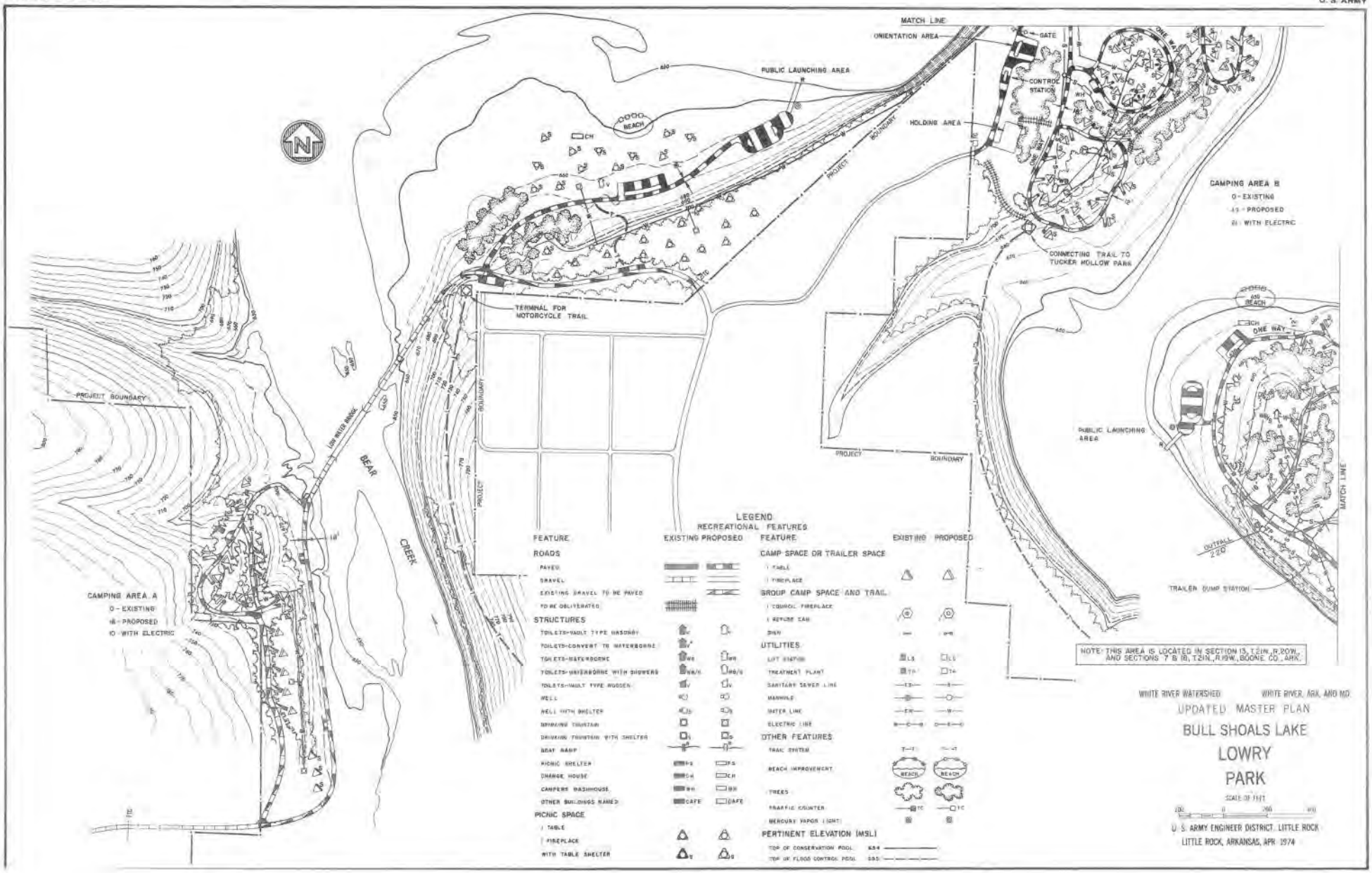
NOTE: THIS AREA IS LOCATED IN SECTIONS 33 AND 34, T. 23 N., R. 20 W., TANEY CO., MO.

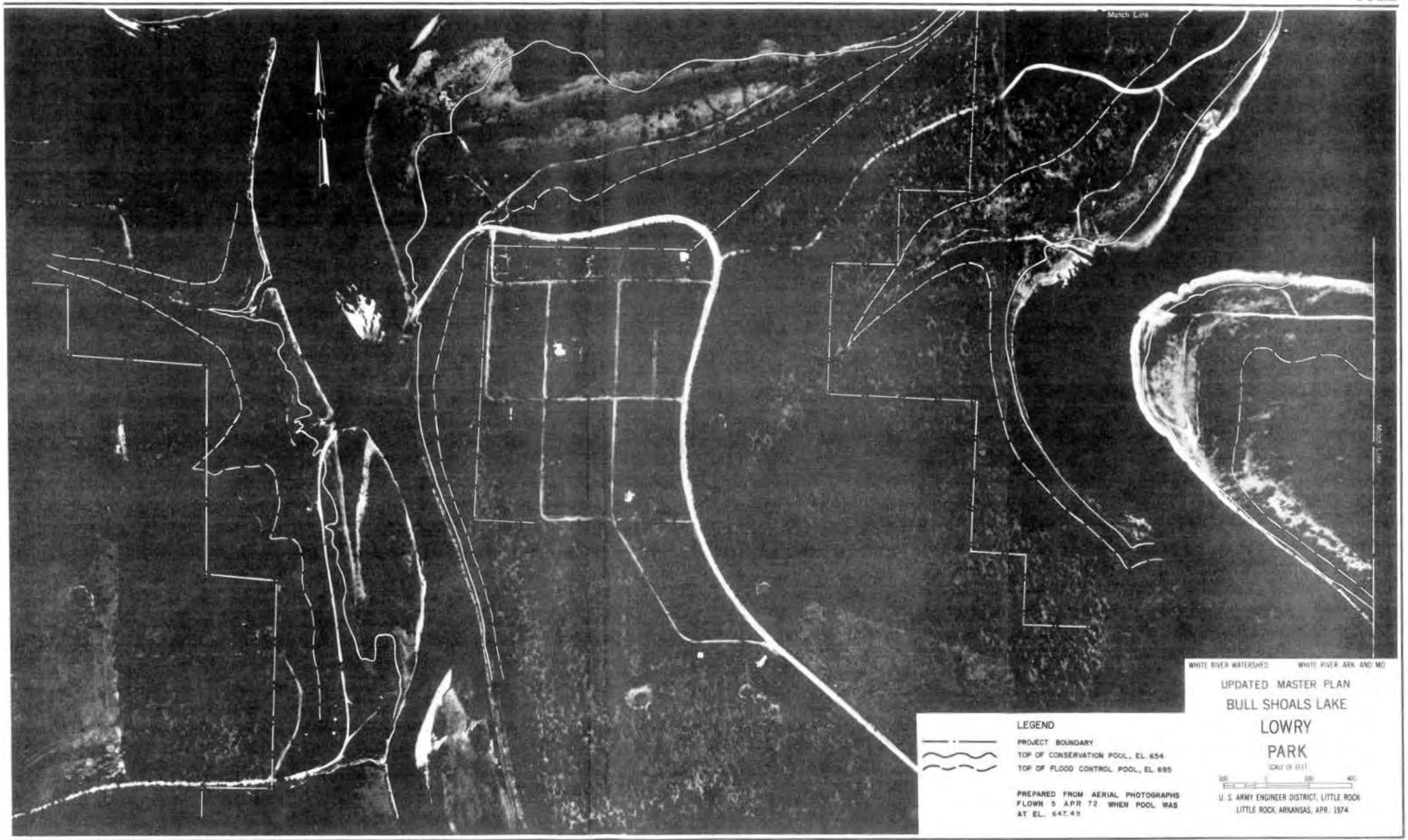
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR 1974


N
WHITE RIVER WATERSHED
WHITE RIVER, ARK. AND MO.
UPDATED MASTER PLAN
BULL SHOALS LAKE
WOODARD
PARK
SCALE IN FEET
400 0 200 400
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974
LEGEND
PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695
PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49

CORPS OF ENGINEERS

U. S. ARMY





WHITE RIVER WATERSHED WHITE RIVER ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
LOWRY
PARK

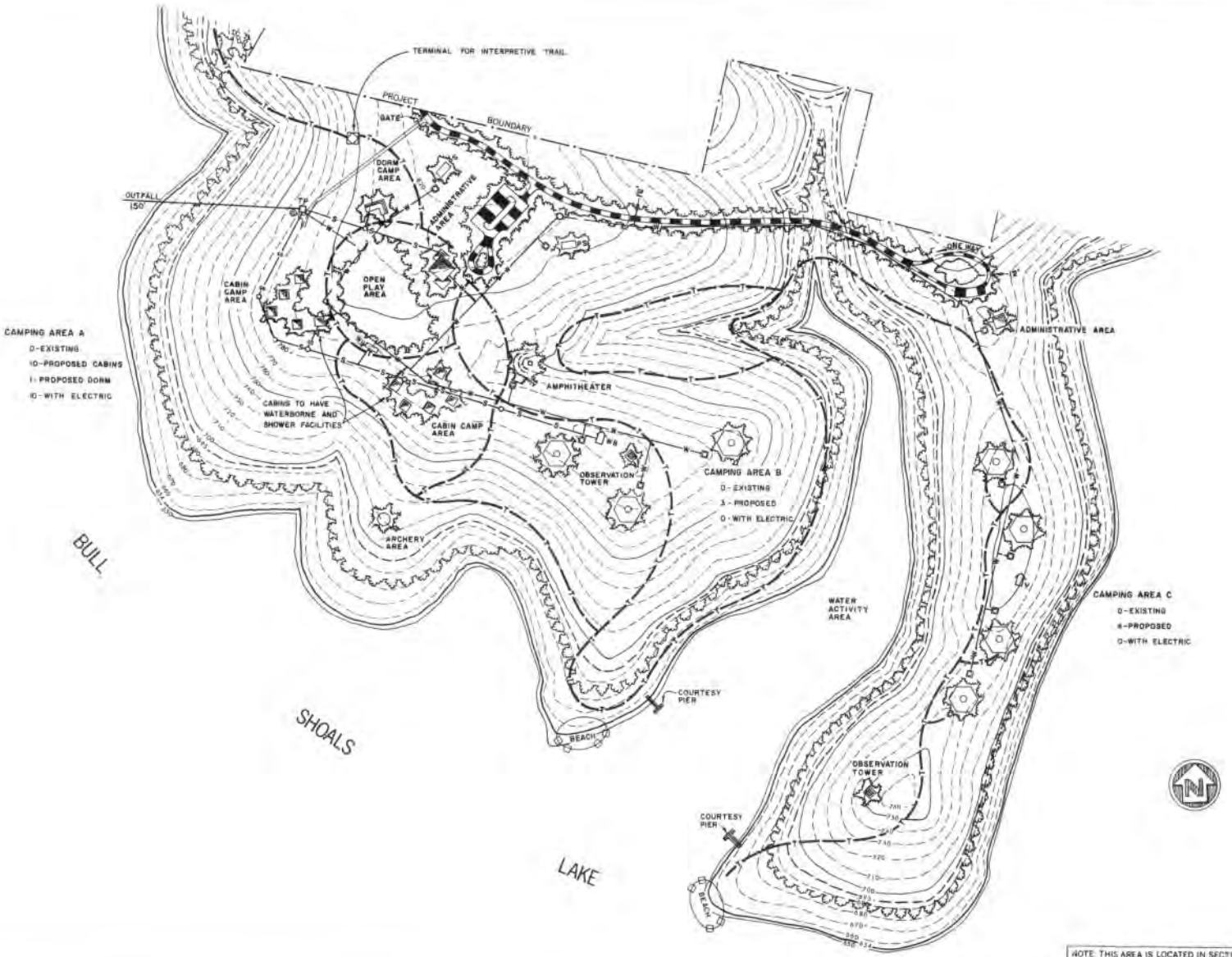
SCALE OF FEET

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

LEGEND

PROJECT BOUNDARY
TOP OF CONSERVATION POOL, EL. 654
TOP OF FLOOD CONTROL POOL, EL. 695

PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 5 APR 72 WHEN POOL WAS AT EL. 647.49



NOTE: THIS AREA IS LOCATED IN SECTIONS 9, 16, AND 17, T.20N., R.15W., MARION CO., ARK.

LEGEND

RECREATIONAL FEATURES

FEATURE	EXISTING	PROPOSED
ROADS		
PAVED		
GRAVEL		
EXISTING GRAVEL TO BE PAVED		
TO BE OBLITERATED		
STRUCTURES		
TOILETS-VAULT TYPE MASONRY	V	V
TOILETS-CONVERT TO WATERBORNE	V	
TOILETS-WATERBORNE	WB	WB
TOILETS-WATERBORNE WITH SHOWERS	WB/S	WB/S
TOILETS-VAULT TYPE WOODEN	V	V
WELL	W	W
WELL WITH SHELTER	W	W
DRINKING FOUNTAIN	D	D
DRINKING FOUNTAIN WITH SHELTER	D	D
BOAT RAMP		
PICNIC SHELTER	PS	PS
CHANGE HOUSE	CH	CH
CAMPERS WASHHOUSE	WH	WH
OTHER BUILDING NAMED	CAFE	CAFE
PICNIC SPACE		
1 TABLE		
1 FIREPLACE		
WITH TABLE SHELTER		
CAMP SPACE OR TRAILER SPACE		
1 TABLE		
1 FIREPLACE		
GROUP CAMP SPACE AND TRAIL		
1 COUNCIL FIREPLACE		
1 REFUSE CAN		
SIGN		
UTILITIES		
LIFT STATION	LS	LS
TREATMENT PLANT	TP	TP
SANITARY SEWER LINE	S	S
MANHOLE		
WATER LINE	W	W
ELECTRIC LINE	E	E
OTHER FEATURES		
TRAIL SYSTEM	T	T
BEACH IMPROVEMENT	BEACH	BEACH
TREES		
TRAFFIC COUNTER	TC	TC
MERCURY VAPOR LIGHT		

PERTINENT ELEVATION (MSL)

TOP OF CONSERVATION POOL 654

TOP OF FLOOD CONTROL POOL 695

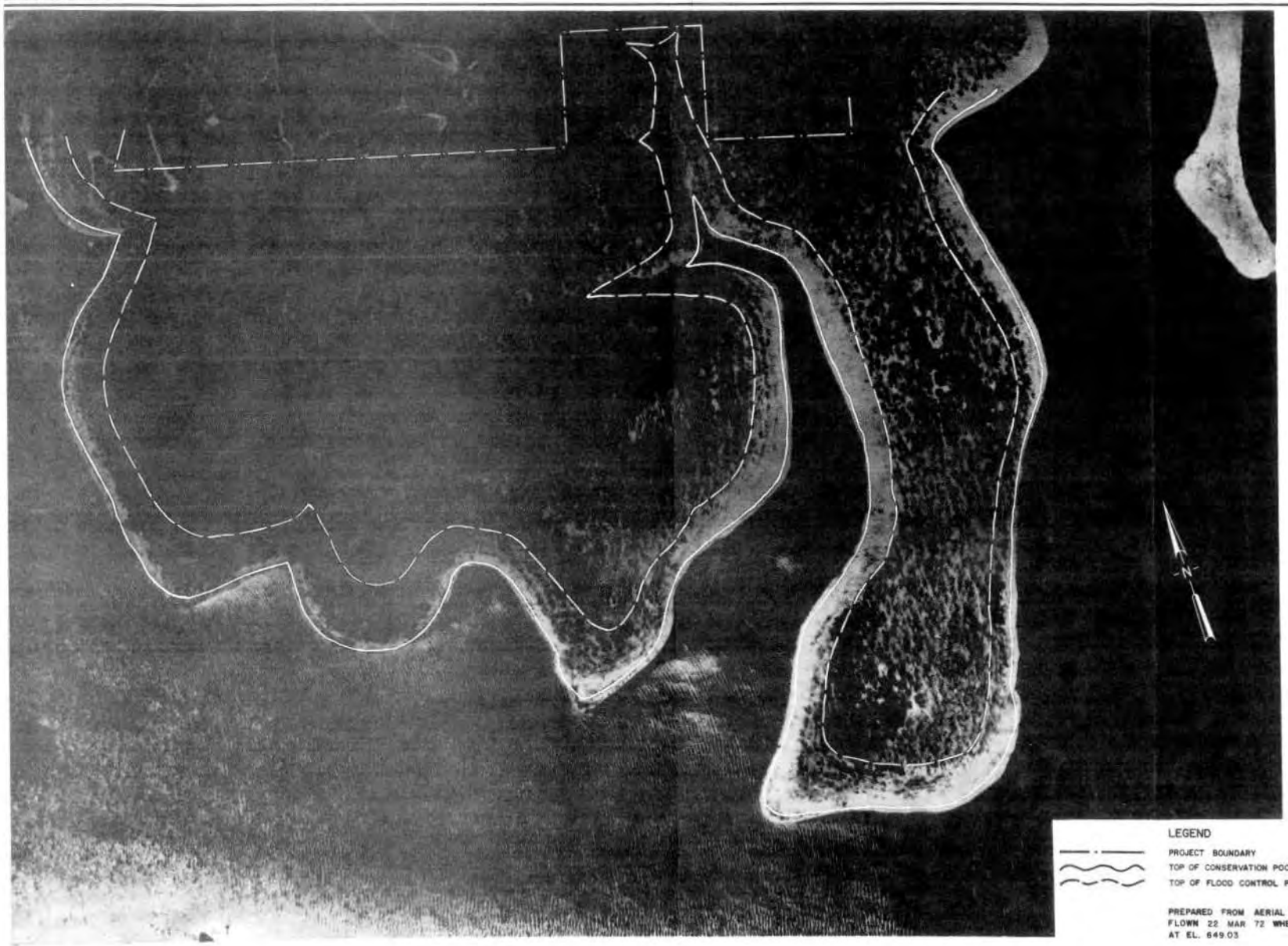
WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN
BULL SHOALS LAKE
GROUP USE PARK

SCALE OF FEET

200 0 200 400

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR 1974



LEGEND

PROJECT BOUNDARY

TOP OF CONSERVATION POOL, EL. 654

TOP OF FLOOD CONTROL POOL, EL. 695

PREPARED FROM AERIAL PHOTOGRAPHS FLOWN 22 MAR 72 WHEN POOL WAS AT EL. 649.03

WHITE RIVER WATERSHED WHITE RIVER ARK AND MO

UPDATED MASTER PLAN

BULL SHOALS LAKE

GROUP USE

PARK

SCALE OF FEET

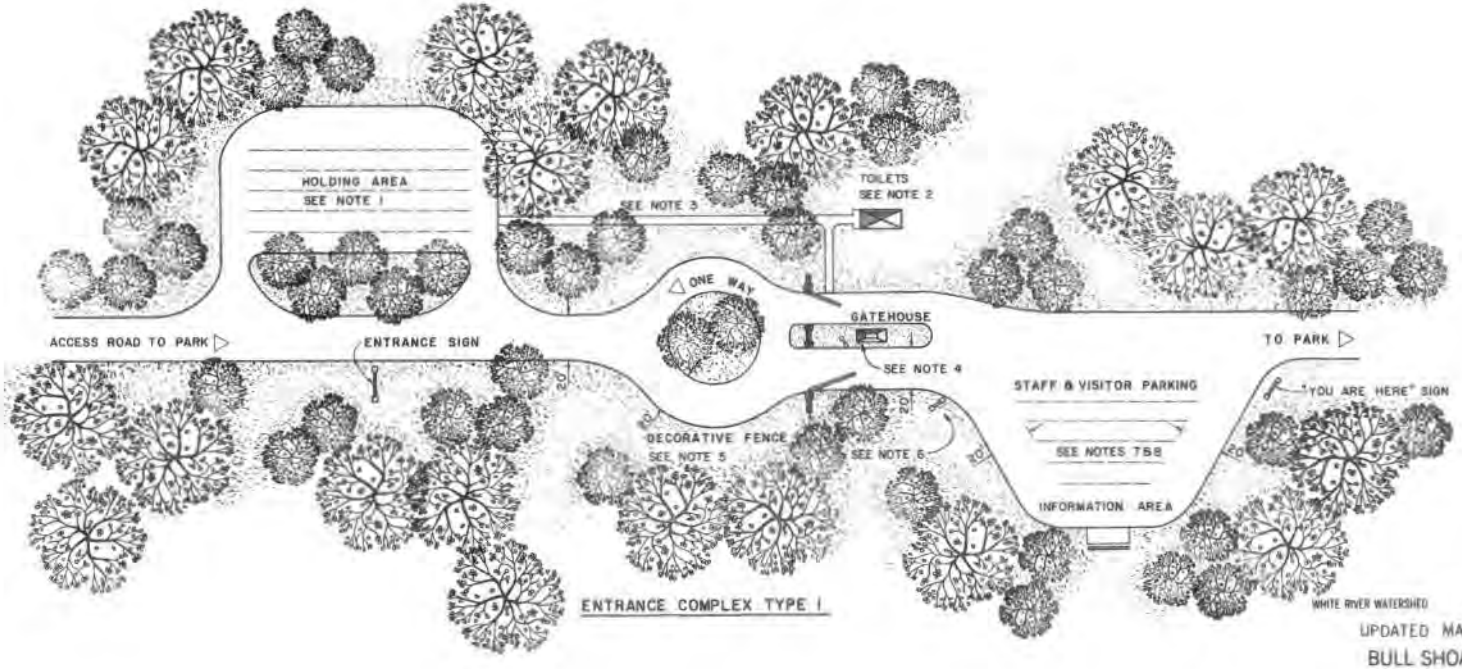
200 0 200 400

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK

LITTLE ROCK, ARKANSAS, APR. 1974

TYPICAL ENTRANCE COMPLEX NOTES

1. PARKING AREA FOR LATE ARRIVALS AND OVERFLOW (PARKING ARRANGEMENT WILL BE SITE ADAPTED TO PRECLUDE EXTENSIVE CUTTING OF TREES. GRAVEL PARKING.)
2. WHERE JUSTIFIED BY USE, RESTROOMS MAY BE PROVIDED AWAY FROM THE GATEHOUSE. THESE MAY BE SIMILAR TO CURRENT APPROVED DESIGNS OR THOSE SHOWN IN PARK PRACTICE DESIGN (PLATES 140A & G, 229H, AND 590H).
3. TRAILS AND RESTROOMS SHALL BE DESIGNED FOR USE BY THE PHYSICALLY LIMITED.
4. AT THE GATEHOUSE A MAP OF THE AREA SHALL BE PROVIDED WITH METAL OR PLASTIC NUMBERS TO BE USED BY RANGER TO DESIGNATE OCCUPIED CAMPSITES.
5. DECORATIVE FENCE AND GATES TO BLEND WITH LANDSCAPE.
6. COMPOSITE SIGN, USER FEE SIGN, AND FEE DEPOSITORY.
7. PARKING AREA WILL BE LOCATED AND SIZED TO MEET THE NEEDS OF EACH INDIVIDUAL RECREATION AREA.
8. PARKING ARRANGEMENT WILL BE SITE ADAPTED TO PRECLUDE EXTENSIVE CUTTING OF TREES. PAVED PARKING.



ENTRANCE COMPLEX TYPE I

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

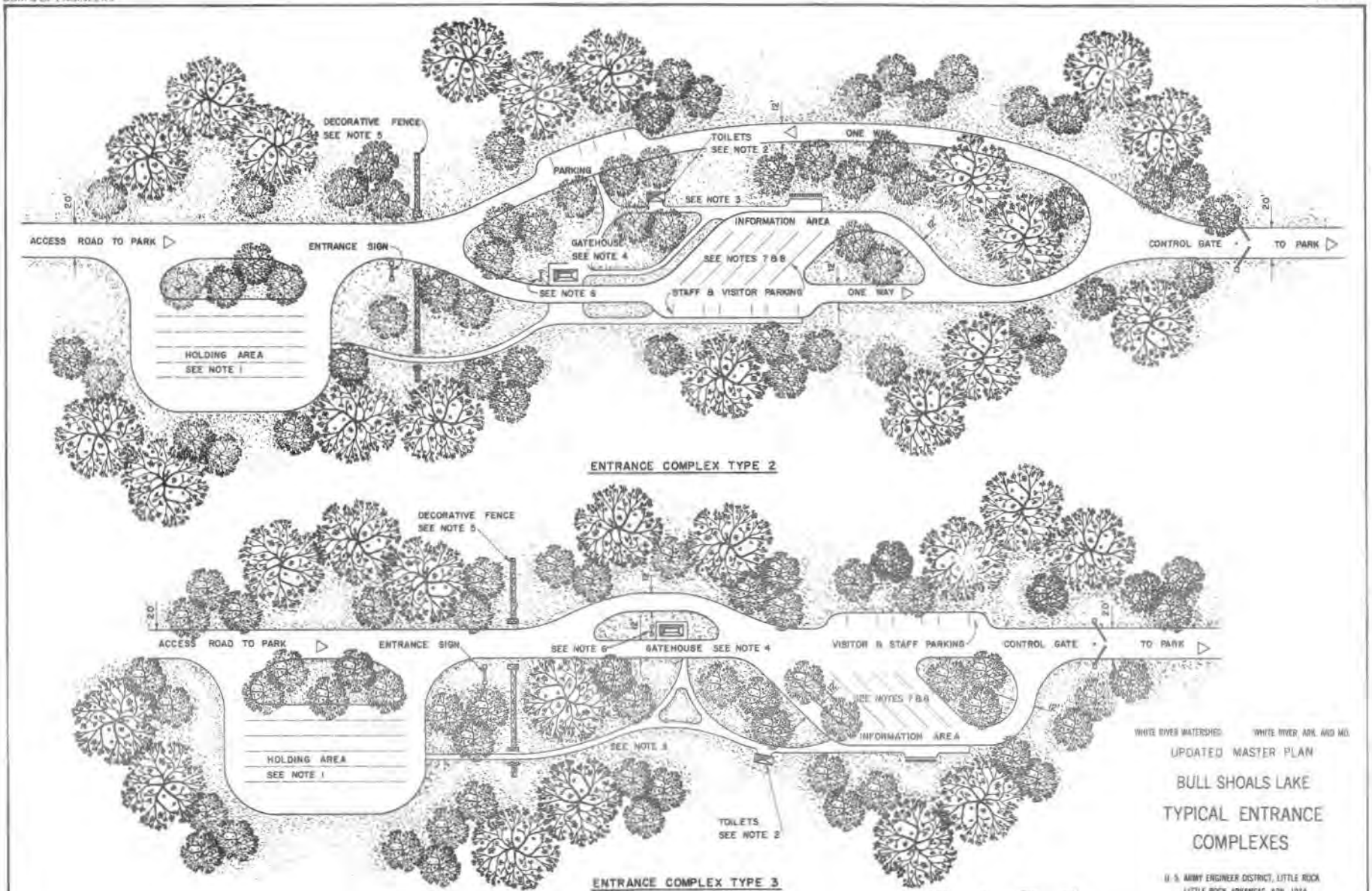
UPDATED MASTER PLAN

BULL SHOALS LAKE

TYPICAL ENTRANCE COMPLEX

GRAPHIC SCALE 30' 0 30' 60'

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974



WHITE RIVER WATERSHED WHITE RIVER ARK. AND MO.

UPDATED MASTER PLAN

BULL SHOALS LAKE

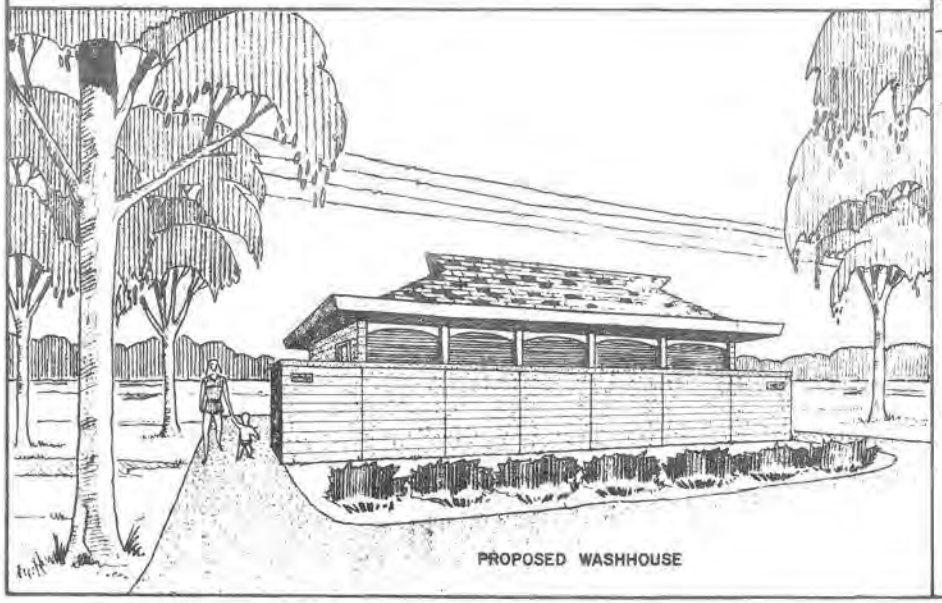
TYPICAL ENTRANCE COMPLEXES

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

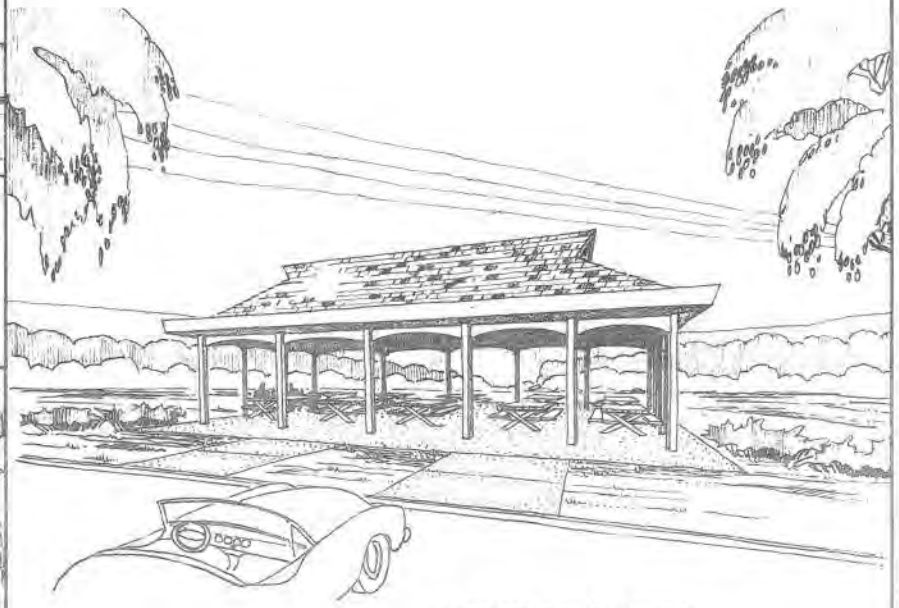
CORPS OF ENGINEERS

U. S. ARMY

RENOVATION OF EXISTING VAULT TOILET



PROPOSED WASHHOUSE



PROPOSED PICNIC SHELTER

WHITE RIVER WATERSHED WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

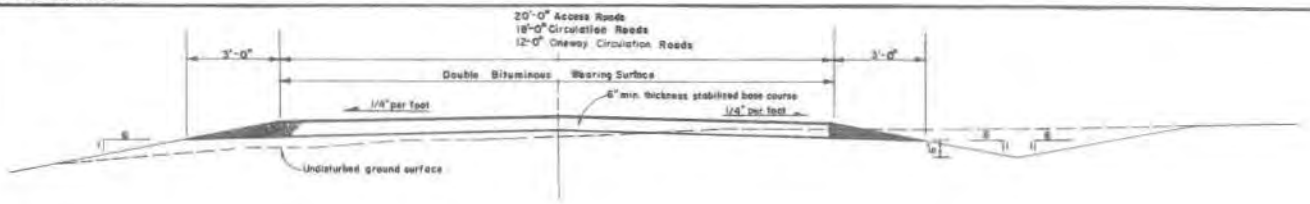
BULL SHOALS LAKE

TYPICAL STRUCTURES

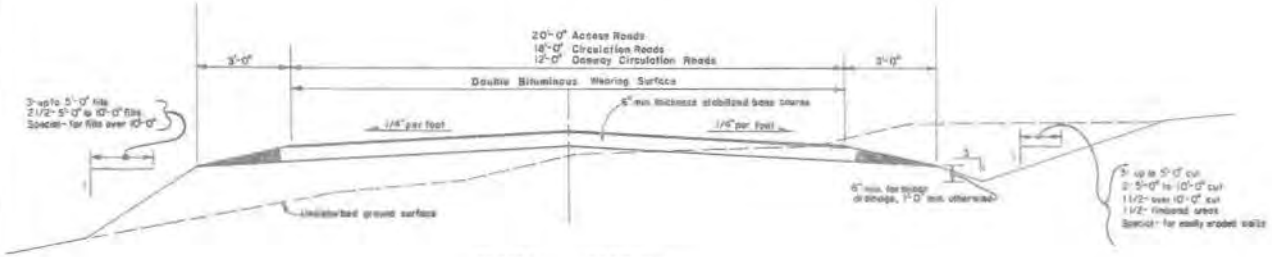
U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974

CORPS OF ENGINEERS

U.S. ARMY

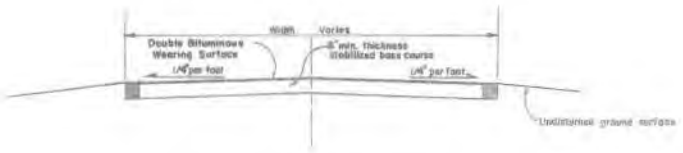


TYPICAL SECTION
(For roads in flat terrain with negligable vegetation)

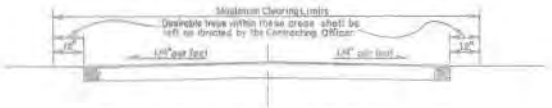


TYPICAL SECTION
(For roads in rolling to steep terrain)

WHERE GROUND SLOPES MORE THAN 5%

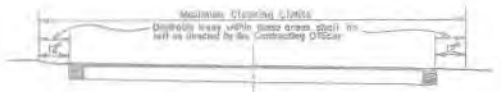


TYPICAL SECTION CAMP SPUR



WHERE GROUND IS FLAT OR SLOPES BOTH DIRECTIONS FROM CENTERLINE

TYPICAL SECTION
SERVICE ROAD



WHERE GROUND SLOPES 5% OR LESS
ROADS WITHIN PICNIC AND CAMPING AREAS

20' 0 20' 40'
GRAPHIC SCALE

WHITE RIVER WATERSHED — WHITE RIVER, ARK. AND MO.

UPDATED MASTER PLAN

BULL SHOALS LAKE
RECREATION ROAD DETAILS

U. S. ARMY ENGINEER DISTRICT, LITTLE ROCK
LITTLE ROCK, ARKANSAS, APR. 1974