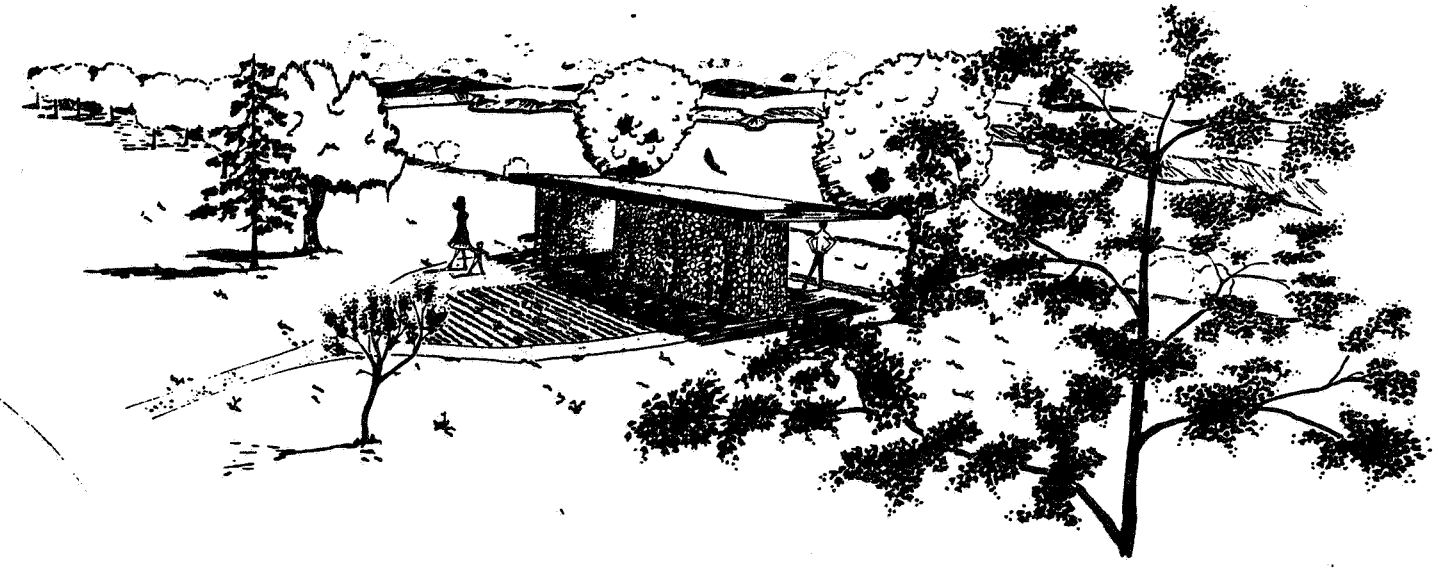
BRAZOS RIVER BASIN, TEXAS
SAN GABRIEL RIVER

GRANGER LAKE

MASTER PLAN

DESIGN MEMORANDUM NO. 18

AUGUST 1973
REVISED MARCH 1974



U S ARMY ENGINEER DISTRICT FORT WORTH
CORPS OF ENGINEERS FORT WORTH, TEXAS

SWDPL-R (SWFED-PR 31 Aug 73) 13th Ind
SUBJECT: Granger Lake, San Gabriel River, Texas - DM No. 18, Master Plan

23 NOV 1979

TO: District Engineer, Fort Worth

The request to relocate 48 proposed campsites from Wilson H. Fox and Friendship Parks to Taylor Park is approved. However, the proposed development as shown would appear to necessitate considerable cut and fill. Field verifications of roads and camp spurs should be made to minimize environmental disruptions.

FOR THE DIVISION ENGINEER:

Barry G. Rought

wd all incl

BARRY G. ROUGHT, P.E.
Chief, Planning Division

CF:
HQDA (DAEN-CWO-R) w/5 cys 12th Ind only

SWFED-DC/SWFED-PR (SWFED-PR 31 Aug 73) 12th Ind
SUBJECT: Granger Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

DA, Fort Worth District, Corps of Engineers, PO Box 17300, Fort Worth, Texas 76102 9 October 1979

TO: Division Engineer, Southwestern

1. During the preparation of this master plan Fort Worth District analyzed the need for and the number of camping units required to accommodate the expected recreational use. The recreation facilities analysis in Table VI-7, pages VI-4 and VI-5, was used to determine the basic recreation facilities needed to accommodate the expected optimum capacity of 680,000 recreation days annually for the first stage development. Based on this analysis 156 camping units are required to support the number of campers anticipated on an average summer weekend day.

2. The number of camping units, their cost, and the benefits to be derived from their construction was approved by the 2d Ind from OCE, dated 22 February 1974.

3. Because of difficult topography, it is impossible to provide the number of camping units as shown on the conceptual master plan layouts. During the preparation of the plans and specifications, additional field investigations were made and designs were refined resulting in the elimination of 48 camping units. Forty-two and six camping units, respectively, were eliminated from Wilson H. Fox and Friendship Parks.

4. To alleviate this shortage and to head off certain operational problems due to a lack of facilities we propose to construct 48 camping units in Taylor Park. The layout for the park is shown in the attached plate 1. There are no desirable areas large enough so that these facilities could be developed in Fox or Friendship Parks.

5. The cost for providing these camping units is depicted in the attached cost estimate.

6. Your expedited review and approval is requested.

FOR THE DISTRICT ENGINEER:

2 Incl
Added 2 incl (9 cy)
5. Cost Estimate
6. Plate 1

for ARTHUR D. DENYS
Chief, Engineering Division

Estimate for Additional Camping Facilities
at Taylor Park

Prices Reflect 1 Sep 79 Price Levels

	Unit	Quantity	Unit Price	Total
1. Sanitary facilities				
a. Camper service building	Ea	2	$100,000	$200,000
b. Alteration of evaporation pond and field (Fox Park)	Job	Sum	-	150,000
c. Trailer dump station	Ea	1	15,000	15,000
d. Sewer system	Job	Sum	-	99,000
				$464,000
2. Electrical Distribution System	Job	Sum	-	130,000
3. Camping units				
a. Picnic table & shelter	Ea	48	7,500	360,000
b. Fireplace cookers	Ea	48	125	6,000
c. Trash cans	Ea	48	115	5,500
				371,500
4. Courtesy dock	Ea	2	7,000	14,000
5. Roads and parking				
a. Two-way road	Mi	1.02	135,000	137,700
b. One-way road	Mi	.38	100,000	38,000
c. Miscellaneous (wheel stops, pullouts, signs, pavement marking, parking, etc.	Job	Sum	-	189,700
				365,400
6. Addition to water system				
a. 10,000 gallon water storage tank	Job	Sum	-	30,000
b. Booster pump and pressure tank	Job	Sum	-	15,000
c. Water lines	Job	Sum	-	99,500
				144,500
7. Ranger control station	Job	Sum	-	24,500
				1,513,900
15% Contingencies				226,100
Sub-total				1,740,000
E&D				73,000
S&A				109,000
Total				$1,887,000

INCL 5

COURTESY DOCK

TRAIL SILF MUSEUM

COURTESY DOCK

CAMPING SERVICE BUILDING

CAMPING SERVICE L.B.I. DING

TRAFFIC CONTROL GATE

VAULT TOILET

PARKING FOR HIKERS

HIKING TRAIL BY OTHERS

TRAFFIC CONTROL GATE

ROAD NO. 3

TRAFFIC CONTROL GATE

COURTESY DOCK

LIMIT WILSON HOBBS PARK

LIMIT TAYLOR PARK

W.B. TOILET

W.B. TOILET PICNIC AREA

ROAD NO. 3

MON. 309-2A

LIMITS OF PARK AREA

GOVERNMENT PROPERTY LINE

MATCH LINE SEE SHT.

MON. 336-1

MON. 336-3

MON. 336-2

MON. 336-4 339-1

MON. 330-3

GOVERNMENT PROPERTY LINE

CONTROL STATION

SANITARY DUMP STATION

TRAFFIC CONTROL GATE

ROAD NO. 1

MON. 330-

MON. 310-5

MON. 310-2

MON. 310-1A

MON. 309-4 310-1

MON. 309-3

GOVERNMENT PROPERTY LINE

WILSON FOX PARK

TAYLOR PARK

TRAFFIC CONTROL GATE

R.B.

MON. 310-5 330-1

MON. 310-6

SCALE 1 INCH = 200 FEET

200 100 0 200 400

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY

DRAWN BY

CHECKED BY

SUBMITTED BY

ENGINEER

GRANGER DAM AND LAKE
SAN GABRIEL RIVER, TEXAS
TAYLOR PARK

ADDITIONAL DEVELOPMENT PLAN

INV NO | DATED JUNE 19TH

CONTR NO

DRAWING NUMBER | SHEET NO 1 OF 1 | SEQUENCE NO

TO ACCOMPANY 12TH IND. TO D.M. NO 1

SWDPL-R (SWFED-PR 31 Aug 73) 11th Ind
SUBJECT: Laneport Lake - Submission of Supplement No. 1 to Design Memorandum No. 18, Master Plan

DA, Southwestern Division, Corps of Engineers, Main Tower Building, 1200 Main Street, Dallas, TX 75202 7 MAR 1974

TO: District Engineer, Fort Worth

1. Subject supplement is approved subject to the following comments:

a. A similar amount of hiking trail originally approved for Taylor Park should be deleted to absorb the cost of the proposed trail.

b. The vault toilets should be deleted since sanitary facilities are provided at each end of the trail and no roadway is proposed to facilitate pumping or cleanup of these facilities.

c. It is recommended that the trailside museum be replaced with a rustic interpretive type sign, perhaps with a small roof supported by the sign supports to protect the displays. This is considered adequate in view of the nature of the area to be interpreted and the maintenance which would be required for the museum-type facility proposed.

d. Para 4. Design criteria should include a discussion of elevations to be maintained in relation to the conservation pool.

2. Future actions, if any, anticipated in support of the proposal as submitted or to take exception to comments furnished should include the following additional information for justification as required:

a. The status of the historic site in relation to the National Register of Historic Places.

b. Evidence of coordination with the State Historic Preservation Officer and other qualified individuals.

c. Incremental justification of additional trail proposed, if required primarily for recreation.

SWDPL-R (SWFED-PR 31 Aug 73) 11th Ind
SUBJECT: Laneport Lake - Submission of Supplement No. 1 to Design Memorandum No. 18, Master Plan

d. Maintenance proposals for the trailside museum.

FOR THE DIVISION ENGINEER:

Barry G. Rought

wd incl

BARRY G. ROUGHT, P.E.
Chief, Planning Division

CF:
HQDA (DAEN-CWO-R) (5 cy)

SWFED-DC (SWFED-PR 31 Aug 73) 10th Ind
SUBJECT: Laneport Lake - Submission of Supplement No. 1 to Design Memorandum No. 18, Master Plan

DA, Fort Worth District, Corps of Engineers, PO Box 17300, Fort Worth, Texas 76102 27 January 1977

TO: Division Engineer, Southwestern, ATTN: SWDPL-R

1. Submitted for your review and approval are nine copies of the subject supplement. The supplement proposes additional recreational development in Taylor Park relating to the Hoxie house, the San Gabriel Ranch and the Hoxie and Willis Creek bridges. The proposed development was not considered during preparation of the master plan because landowner litigation on the project precluded access for site investigation.

2. The citizens of Williamson County, archeologists who have conducted cultural resources surveys of the area, and the State Historic Preservation Officer have shown a sincere interest in the recognition of the historically significant events of the San Gabriel Ranch and the preservation of the Hoxie and Willis Creek bridges.

3. Sketches of proposed new facilities, shown on plate No. 2 and described in paragraph 4 of the supplement, were prepared prior to the current studies relating to the architectural theme for Granger. When the theme has been finalized the proposed facilities will be redesigned as required.

FOR THE DISTRICT ENGINEER:

JJJohnson

1 Incl(9 cy)
Added 1 incl
4. as

ARTHUR D. DENYS
Chief, Engineering Division

BRAZOS RIVER BASIN, TEXAS

DESIGN MEMORANDUM NO. 18 (GRANGER)
ON
GRANGER, NORTH FORK, AND SOUTH FORK RESERVOIRS
SAN GABRIEL RIVER, TEXAS

MASTER PLAN

SUPPLEMENT NO. 1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

JANUARY 1977

BRAZOS RIVER BASIN, TEXAS
DESIGN MEMORANDUM NO. 18 (GRANGER)
ON
GRANGER, NORTH FORK AND SOUTH FORK RESERVOIRS
SAN GABRIEL RIVER, TEXAS
SUPPLEMENT NO. 1
MASTER PLAN

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LIST OF FIGURES

LIST OF PLATES

BRAZOS RIVER BASIN, TEXAS
SAN GABRIEL RIVER
TRIBUTARY TO
BRAZOS RIVER, TEXAS

STATUS OF DESIGN MEMORANDA

Design Memo No.	Title	Date Submitted: District Engineer	Date Submitted: Division Engineer	Date Approved OCE
1	Hydrology-Part A (General)	14 Jul 65	3 Nov 65	16 Dec 65
	Supplement No. 1 (General)	1 Aug 66	16 Aug 66	19 Sep 66
	Hydrology-Part B (Laneport)	30 Sep 66	28 Nov 66	25 Apr 67
	Hydrology-Part C (North Fork)	11 Aug 66	1 Nov 66	22 Dec 66
	Hydrology-Part D (South Fork)	5 Dec 66	6 Apr 67	
2	General (North Fork)	8 Dec 66	30 Mar 67	21 Dec 67
3	Availability of Materials (3 dams)(Revised)	25 Jan 68	20 Feb 68	26 Mar 68
4	General (Laneport)	31 Jan 67	5 May 67	21 Dec 67
	Supplement No. 1 (Laneport)	31 May 67		
	Supplement No. 2	19 Jan 68	15 Feb 68	17 Apr 68
	Supplement No. 3	23 Jul 69	7 Oct 69	12 Feb 70
	Supplement No. 4	28 Jan 71	26 Mar 71	16 Jun 71
5	General (South Fork)	17 Mar 67	6 Jul 67	6 Oct 67
6	Reservoir-Mgt-Prelim Master Plan (North Fork)	17 Feb 67	10 May 67	28 Jun 67
7	Reservoir-Mgt-Prelim Master Plan (Laneport)	22 Mar 67	9 May 67	17 Jul 67
8	Real Estate-Land for Const and Reservoir Areas (North Fork)	25 Apr 67	25 May 67	8 Aug 67
8A	Real Estate-Land for Const and Reservoir Areas (Laneport)	2 Jun 67	30 Jun 67	4 Dec 67
9	Project Buildings and Access Road (North Fork)(Revised)	30 Nov 67	9 Feb 68	26 Mar 68
	Supplement No. 1	**24 Mar 72**	**4 May 72**	**App by SWD**
10	Project Buildings and Access Road (Laneport)(Revised)	**31 Jan 72**	**10 Mar 72**	**App by SWD**
11	Relocations-Dam Construction Area (Laneport)	7 Aug 67	30 Aug 67	App by SWD
12	Sedimentation and Degradation Ranges (Laneport)	20 Dec 67	19 Jan 68	26 Feb 68
13	Sedimentation and Degradation Ranges (North Fork)	20 Oct 67	1 Nov 67	12 Dec 67
14	County Road Relocation Pt 2 (North Fork)	**10 Feb 72**	**17 May 72**	**17 Jul 72**
15	**Electric Transmission Lines Relocation (Laneport)**	**2 Mar 73**	**4 Apr 73**	**App by SWD**
16	**Master Plan (North Fork)**	**31 Oct 73**	**24 Jan 74**	**5 Apr 74**
17	**Outlet Works (North Fork)**	**31 Dec 68**	**4 Apr 69**	**22 Aug 69**

Design Memo No.	Title	Date Submitted: District Engineer	Date Submitted: Division Engineer	Date Approved: OCE
18	Master Plan (Laneport) Supplement No. 1	31 Aug 73	24 Oct 73	22 Feb 74
		This Report		
19	FM 971 Relocation (Laneport)	19 Apr 72	17 Aug 72	28 Sep 72
20	County Road Relocation (Laneport)	26 Nov 71	16 Dec 73	29 Feb 72
21	Spillway, Embankment and Outlet Works (Laneport)	Included in DM No. 4		
22	Reservoir Clearing (North Fork)	12 Dec 72	10 Jan 73	App by SWD
22	Reservoir Clearing (North Fork) (Revised)	8 Dec 76		
23	Spillway, Embankment and Access Road (North Fork)	24 Jul 72	21 Sep 72	29 Dec 72
24	Pedernales Electric Co-op Relocation (North Fork)	13 Aug 74	30 Aug 74	App by SWD
25	Reservoir Clearing (Laneport)	29 Jun 73	7 Aug 73	App by SWD
26	Rural Telephone Lines Relocation (Laneport)	21 Mar 73	11 Apr 73	App by SWD

BRAZOS RIVER BASIN, TEXAS

SUPPLEMENT NO. 1
DESIGN MEMORANDUM NO. 18
MASTER PLAN
FOR
GRANGER LAKE
SAN GABRIEL RIVER, TEXAS

1. Purpose. The purpose of this supplement is to recommend that the planned recreational development for Taylor Park be modified to provide additional development which will portray the history of the Hoxie house (Sunnyside) and the San Gabriel Ranch. Although Sunnyside disappeared from the scene almost 40 years ago, the lives of the people who built Sunnyside and developed the ranch are important to the development of the State of Texas and the United States and should be recognized in the development of Taylor Park.

2. Summary of the History of the San Gabriel Ranch. The story of the ranch begins in May 1830 when Pedro Zarza, a citizen of Villa Aldama, Nuevo Leon, Mexico, applied for and received a grant of six leagues of Texas land which was located on the south bank of the San Gabriel River at the mouth of Williamson Creek. This six leagues (26,570 acres) was to become known as the Hoxie San Gabriel Ranch.

In 1838, Dr. Asa Hoxey (or Hoxie) purchased the six leagues of land. Of all the individuals who were ever associated with the land on the San Gabriel, Dr. Asa Hoxey was one of the most outstanding. A native of Georgia, Hoxey was at the height of his financial and professional powers when he made the decision to move to Texas. A member of an old New England family, he soon established a reputation in his new home for his political, as well as medical, abilities. Dr. Hoxey was involved deeply in the movement for Texas' independence, having been chosen to be a delegate to the General Consultation at San Felipe, and having participated in the siege of Bexar.

On 20 May 1863, Asa Hoxey died, leaving a wife, Elizabeth, who was named executrix of his will, and two children. When Elizabeth Hoxey died 2½ years after her husband, the estate was a tangled confusion of money, property, and relatives. By 1876, the estate was settled, and the heirs began to dispose of their shares almost immediately.

The 30 years between 1876, when Asa Hoxey's heirs began to sell the Zarza grant, and the new owners sold their shares in 1910, were the most eventful in the history of the Hoxey San Gabriel Ranch. Their importance stems from three factors: (1) for the first time the land was developed and used for the raising of sheep, cattle, horses, and crops; (2) the Hoxey's home was constructed; and (3) the ownership and management of the ranch passed to three members of the Hoxey family--Herbert M., John R., and Mortimer R.--all of whom were important figures on the State and National scene.

Herbert M. (Hub) Hoxie was the first member of the family to buy into the ranch in 1876. Prior to that, in the years preceding and during the Civil War, Hoxie acquired the political connections and business interests that eventually made him one of the most renowned managers in the annals of American railroading. In 1860 he became Secretary of the Republican State Control Committee, and was appointed U.S. Marshal in 1861. Hoxie was a strong abolitionist and during his tenure as marshal he not only ran an underground railroad, but also headed a movement to break up the activities of the Knights of the Golden Circle, a pro-slavery organization sympathetic to the Southern cause.

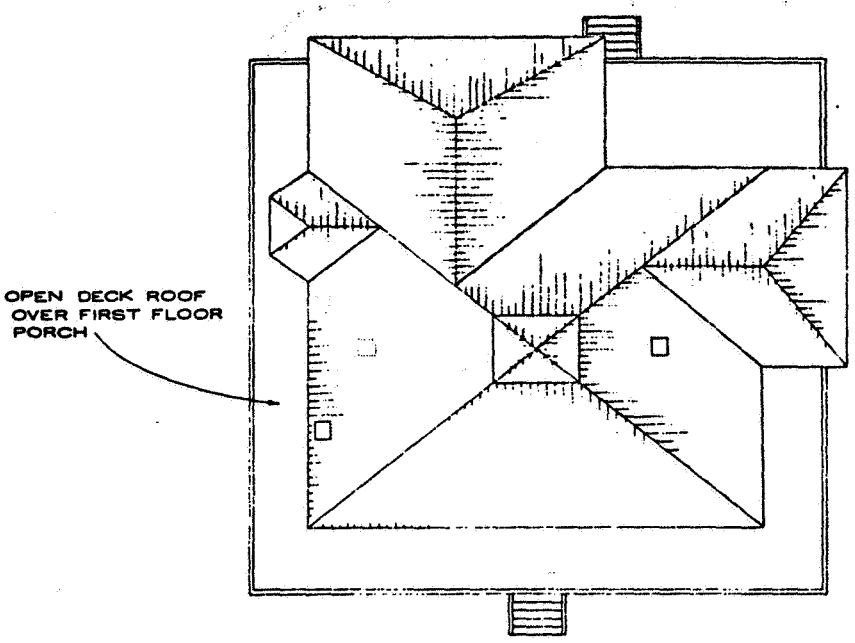
H. M. Hoxie's attempts at cattle raising were far outshone by those of his cousin, John R. Hoxie. John Hoxie spent more time than any of his relatives in acquiring the Zarza land from Asa Hoxey's heirs, putting it to use for cultivation and grazing, and finally building a house there which never served as a home for his own family but did become a symbol to the nearby Taylor community of the Hoxie's wealth and prestige.

John Hoxie showed early interest in stock raising, railroading, and banking, and by 1878 had made a fortune in securities and had begun to look at Texas as a place for further investments. He formed a loose partnership with W. W. Mumford and F. Allison, registering sets of marks and brands with both men, undoubtedly relying on them to manage his properties north and east of Taylor while he lived in Chicago. In late 1883 Hoxie made a contract with his nephew, Mortimer Hoxey, to take charge of the large San Gabriel Ranch.

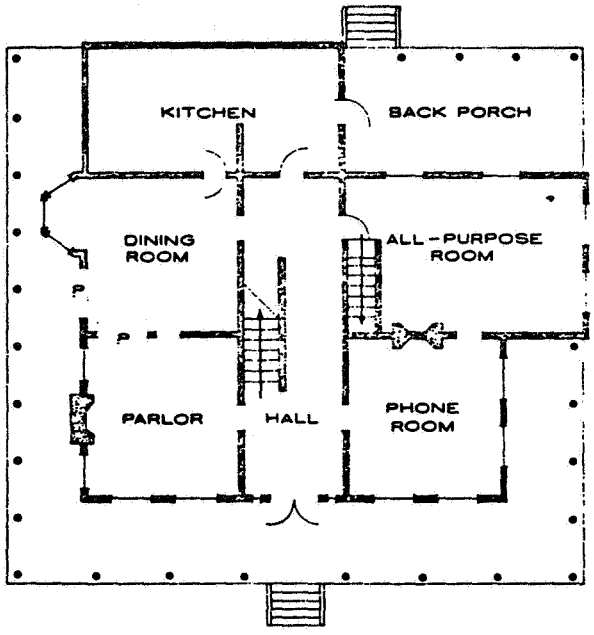
John Hoxie and his family visited the Taylor area in February 1886, and it is likely that he returned that spring to oversee construction of his new house on the San Gabriel. Although the starting date is unknown, the house was reported as "just completed" on 24 January 1887. At the time of its completion, the Hoxie mansion was a two-story frame Italianate structure with a stone basement, attic, and cupola. It was situated on a high bluff overlooking the San Gabriel River and was reported as easily seen from locations 10 miles distant. With the exception of the McFadin residence upriver toward Circleville, Sunnyside was the most impressive domestic structure between Hoxie community and Granger. Figures 1 and 2 show a plan and south elevation of the house.

Despite the charms of his house, John R. Hoxey's stay was very brief. His wife and children never cared for the building and its surroundings, and by 1887 Hoxie was involved in new business dealings in Fort Worth, leaving his newphew, Mortimer Hoxie, to manage his Williamson County properties. A foreman, R. O. Lankford, lived in Sunnyside.

Mary Hoxey, John's wife, managed the estate from the time of her husband's death on 21 November 1896 until 1910, when the distance between Taylor and her Chicago home may have become overwhelming. On 28 March 1910, she sold the property to a partnership between Francis A. Allison, Fred Welch (both of Taylor), and her son, Gilbert H. Hoxie of Chicago.



ROOF PLAN



FIRST FLOOR PLAN

Figure 1

SUNNYSIDE

NOT TO SCALE

Figure 2

On 3 December 1930 they filed a subdivision plat and proceeded to sell off parcels of land. The tract of land on which the Hoxie house stood was retained by Mrs. F. A. Allison and Mrs. S. C. Gerhert (a member of the Welch family) and managed by Charles F. Allison. The land was rented to tenant farmers who also occupied the house.

The burning of Sunnyside on 31 March 1938 attracted much local attention, but with the destruction of the structure all evidence of the house and its past disappeared. The Hoxies were gone. The further subdivision of the property, the filling in of the cavernous basement in 1932, and the acquisition of the property by the Corps of Engineers in 1973 finally erased all obvious traces of a site that once had been a Williamson County landmark.

In conclusion, just how important were the Hoxies and their San Gabriel Ranch? The house itself, at the time of its construction, was not architecturally significant, and its cost, $15,000 to $20,000, was not an unusual amount for a wealthy family to spend on a home. In considering its age, there are other homes in the area which were old structures by the time Sunnyside was built. Also, the length of time the Hoxies resided in the house was negligible. Finally, any architectural significance of the structure was considerably lessened with its burning.

On the other hand, if the house were merely typically Victorian in its excess of size, complexity, and at times lack of comforts, the families who owned it and developed the ranch were anything but ordinary. In every way--personal ability, wealth, and social and business acumen--the Hoxie family members were out of the ordinary They were, like the house they built, a little larger than life. Asa Hoxey, for example, not only participated in many of the military events leading up to the formation of the Republic of Texas, but filled leadership positions after Texas gained statehood. John R. Hoxie, hailed as one of the significant forces in the development of Fort Worth, was at one time the wealthiest individual in Williamson County, and was representative of the large numbers of eastern and midwestern capitalists who made the economic development of Texas possible in the 1870's and 1880's. Herbert M. Hoxie, though connected only with the ranch property itself, was hailed at his death as the virtual head of the Gould system of railroads in the Southwest, and was one of the foremost railway managers in the United States. Simultaneously, as founder of the Taylor townsite, he was an important local figure.

What is significant about the Hoxie San Gabriel Ranch, then, is not so much Sunnyside itself, which disappeared from the scene almost 40 years ago, but the lives of the people who built it and developed the ranch. For this reason, it is important that the merits of the Hoxie family members as significant local, State, and National figures be recognized, and the relative value of the cultural site to the history of the family be kept in mind in any development of the property.

3. Plan of Development. This supplement envisions providing the recreational facilities as shown on plates IX-6 and IX-7 of Design Memorandum No. 18, plus the development of a trail system and trailside museum designed to portray the history of the Hoxie house and the San Gabriel Ranch and the individuals associated with them.

a. Trails (plate 1). The trail system will be designed to accommodate strictly nonvehicular circulation. The 1-mile system will interconnect the intensely developed eastern portion of the park to the western portion which is being developed for low-density recreational use. As indicated on plate 1, two drainages are traversed by the trail system and will require bridges. In keeping with the historical theme, the Hoxie and Willis Creek bridges will be relocated and utilized in the trail development. The bridges are iron with plank floors and are good examples of bridges constructed during the 1890's. Although iron bridges are numerous in the area, they are disappearing, and these are worthy of being preserved. There is a possibility that the district can get an engineering group at Fort Hood to relocate the bridges and if this can be arranged, then the cost to relocate the bridges can be saved. Coordination will continue as project planning continues. Figures 3, 4, 5, and 6 are pictures of the bridges.

b. Trailside Museum. To publicize the history and the individuals involved with the Hoxie house and the San Gabriel Ranch, a trailside museum will be built next to the trail and at the site of the Hoxie house. In addition to concentrating on the history, this museum will also provide information about the recreation activities of the lake.

4. Design Criteria.

a. Trail System. In general, primary hiking trails will be 4 feet wide on stabilized soil. In heavy use areas around the trailside museum, trails will be surfaced with permanent materials such as bituminous surfacing to control erosion and lessen the impact upon the site. The layout of the trail shown in this supplement is conceptual. Exact locations will be sited in the field to take advantage of topography, vegetation, and other environmental features. Only a minimum of grading and clearing will be done in preparation for construction of the facilities. Since the cover is very limited, all woody vegetation will be preserved.

b. Trailside Museum. The design for this facility was developed to harmonize with the surrounding environment while providing a design that is simple, functional, and economical to maintain. The structure will be of concrete construction with the roof support columns and the floor slab covered with local stone. The underside of the concrete slab roof will be textured to resemble wood planks. Displays will be mounted on wood with a sheet of plexiglass covering them. An artist rendering of the facility is shown on plate 2.

Figure 3. Willis Creek Bridge

Figure 4. Hoxie Bridge

Figure 5. Approach Hoxie Bridge

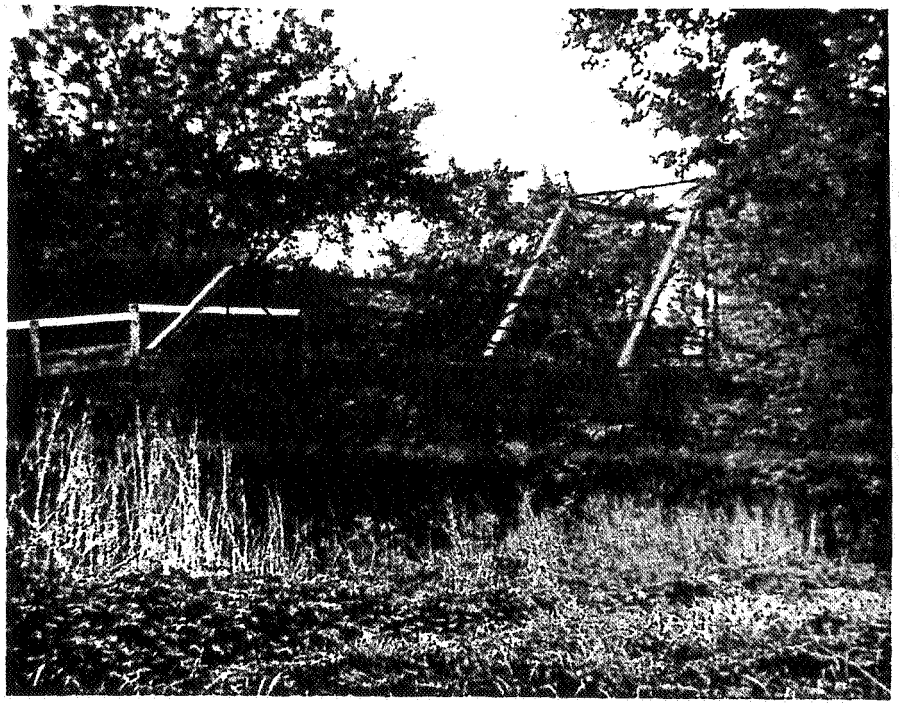


Figure 6. Pony Truss - Hoxie Bridge

5. Cost. Cost to the 14 account for the features proposed in this supplement is as follows:

Item	Unit	Unit Cost	Quantity	Cost
1. Park roads (BIT)(2-way)	Mile	$105,000	.10	$ 10,500
2. Parking area, paved (BIT)	SY	6.50	600	3,900
3. Frame toilets (conc vault)	Each	5,850	2	11,700
4. Hiking trail (soil cement)	Mile	10,000	1	10,000
5. Trailside museum	Each	50,000	1	50,000
6. Relocate bridges*				
Hoxie bridge	LS	17,100		17,100
Willis Creek bridge	LS	10,300		10,300
7. Signs	Each	115	10	1,150
8. Site improvement				
a. Underbrushing	LS			2,000
b. Turfing and landscaping	LS			5,000
9. Fence	LF	2.00	200	400
10. Traffic control gate	Each	650	1	650
Subtotal				$122,700
Contingencies, 20%+				24,300
Subtotal				$147,000
Engineering and design				13,500
Supervision and administration				10,500
Total				$171,000

*This cost will not be incurred if an engineering group at Fort Hood relocates the bridges.

6. Analysis of Change in Cost. The features proposed in this supplement represent an increase in the project cost of either $171,000 or $133,000 depending on the bridge relocations. This increase in cost is partially offset by a decrease of $14,500 which represents the cost to remove and scrap the bridges. Funds for the work proposed in this supplement were not included in the PB-3 because the need for this improvement was determined subsequent to submission of the master plan.

7. Recommendations. Recommend this supplement be approved as the basis for design and specifications for the construction of the items presented.

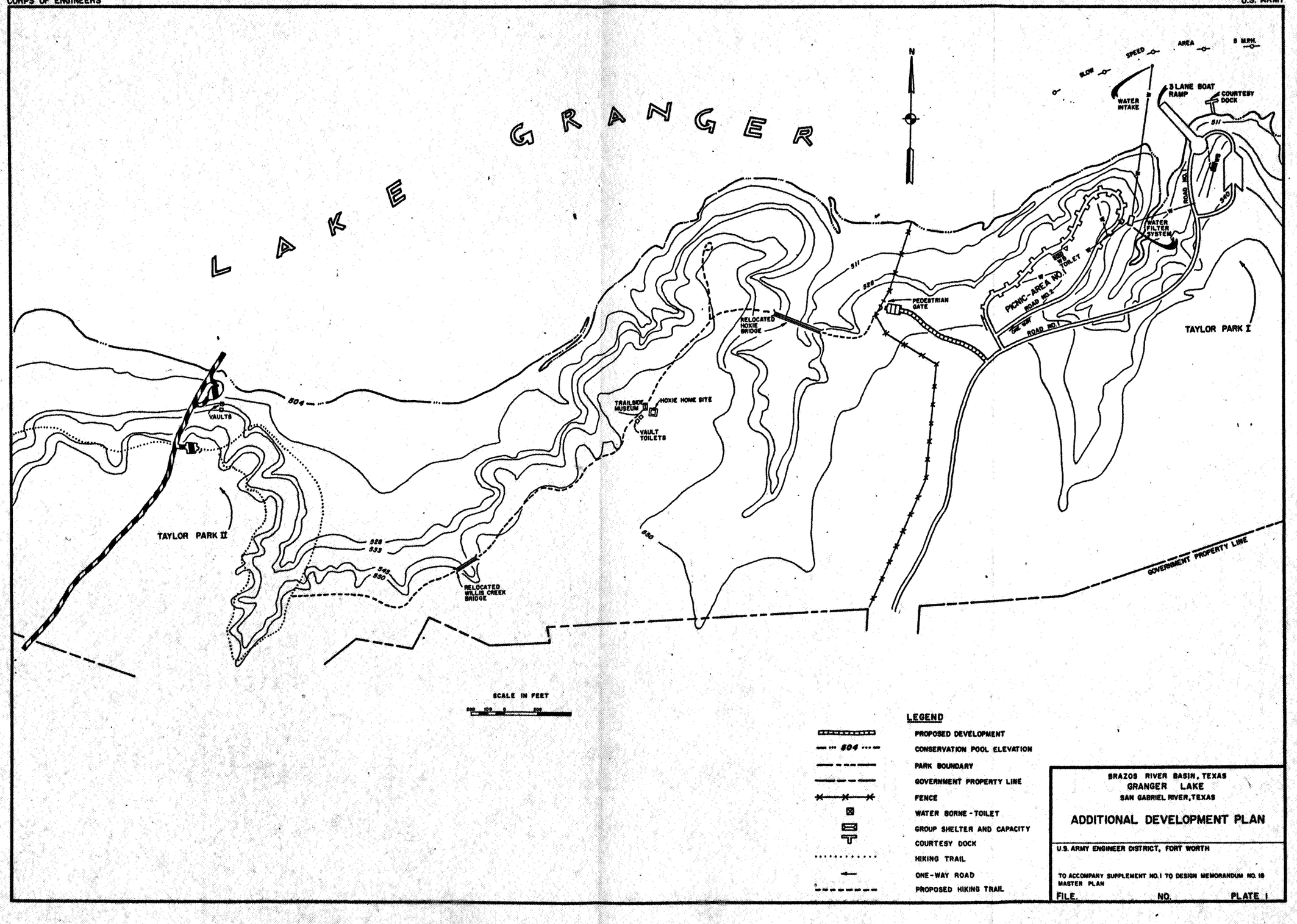
BIBLIOGRAPHY

Freeman, Martha Doty, A History of the Hoxie San Gabriel Ranch: Williamson County, Texas. Research Report No. 63, Texas Archeological Survey, The University of Texas at Austin, Austin, Texas. July 1976.

PLATES

CORPS OF ENGINEERS

U.S. ARMY



LEGEND

- PROPOSED DEVELOPMENT
- 504 CONSERVATION POOL ELEVATION
- PARK BOUNDARY
- GOVERNMENT PROPERTY LINE
- FENCE
- WATER BORNE - TOILET
- GROUP SHELTER AND CAPACITY
- COURTESY DOCK
- HIKING TRAIL
- ONE-WAY ROAD
- PROPOSED HIKING TRAIL

BRAZOS RIVER BASIN, TEXAS
GRANGER LAKE
SAN GABRIEL RIVER, TEXAS

ADDITIONAL DEVELOPMENT PLAN

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY SUPPLEMENT NO.1 TO DESIGN MEMORANDUM NO. 18 MASTER PLAN

FILE. NO. PLATE 1

SWDPL-R (SWFED-PR 31 Aug 73) 9th Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street, Dallas, Texas 75202 7 JAN 1975

TO: District Engineer, Fort Worth

The explanations and revisions furnished in the preceeding indorsement are approved.

FOR THE DIVISION ENGINEER:

Barry G. Rought

BARRY G. ROUGHT
Chief, Planning Division

1 Incl
wd 6 cys

CF:
DAEN-CWP-V (dupe)

SWFED-DC (SWFED-PR 31 Aug 73) 8th Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

DA, Fort Worth District, Corps of Engineers, PO Box 17300, Fort Worth Texas 76102 26 November 1974

TO: Division Engineer, Southwestern, ATTN: SWDPL-R

Purpose of this indorsement is to present the revisions or explanations in accordance with the comments contained in the fifth indorsement SWDPL-R, 24 Oct 73, subject, Laneport Lake, San Gabriel River, Texas, DM #18, Master Plan. The replies to the paragraphs and revised pages and sections follow.

a. Paragraph 3a. A site layout plan for the area below the dam has been devised and added plate IX-15 is inclosed.

b. Paragraph 3b. A statement has been added to paragraph 13-14b to provide for the inclusion of a lakeshore management plan appendix as soon as guidelines are available and revised pages XIII-5 and XIII-6 are inclosed.

c. Paragraph 3c. Provision for registration booths shall be withheld until operational policies determine need.

d. Paragraph 3d. Multiple lane access to camping area entrances shall be accomplished during the formulation of plans and specifications.

e. Paragraph 3e. It is agreed that the group shelter should be relocated in the parking area vicinity and this will be accomplished during the formulation of plans and specifications.

f. Paragraph 3f. We concur.

g. A revised outline of concession facilities has been included in para. 9-07d and revised page IX-9 is inclosed.

h. Paragraph h. It is agreed that within park areas wire mesh fences should be used in preference to barbed wire.

i. We concur that there are now more pleasing shelter designs and one will be selected for inclusion in construction drawings.

FOR THE DISTRICT ENGINEER:

Gordon A. Walhood

1 Incl
3. as

GORDON A. WALHOOD
Chief, Engineering Division

Undated but issued on or about 20 Oct 74

SWDPL-R (SWFED-PR 31 Aug 73) 7th Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

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

TO: District Engineer, Fort Worth

The subject master plan is approved subject to comments in the preceding indorsements and to the following:

Comment 2, 6th Indorsement. In consideration of this comment, it should be noted that all day-use development is on one-way circulation roads with none provided on "access" roads as defined in Appendix B to EM 1110-2-400.

FOR THE DIVISION ENGINEER:

for BARRY C. ROUGHT
Chief, Planning Division

CF:
DAEN-CWP-V (dupe)

FLR

DAEN-CWP-V (31 Aug 73) 6th Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

DA, Office of the Chief of Engineers, Washington, D. C. 20314 2 Oct 74

TO: Division Engineer, Southwestern, ATTN: SWFED-PR

1. The Master Plan for Laneport Lake is approved subject to comments in the preceding indorsement.

2. During preparation of construction plans, consideration should be given to eliminating back-out parking along access roads in day-use areas. Parallel (pull through) parking or large, concentrated parking ~~late~~ lots should be investigated by the District.

FOR THE CHIEF OF ENGINEERS:

wd all incl

for Robert L Fulton
IRWIN REISLER
Chief, Planning Division
Directorate of Civil Works

SWDPL-R (SWFED-PR 31 Aug 73) 5th Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street, Dallas, Texas 75202 14 JUN 1974

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

1. Forwarded recommending approval of the change in the concept of development.

2. As indicated in paragraph 2 of the preceding 4th Indorsement and paragraph 7-03, the plan has been revised in the interest of providing a mutually acceptable plan for development. The development concepts presented in the first submission of this master plan primarily concentrated initial development on the south side of the lake for most efficient management of same. However, at subsequent public meetings, local citizens within the vicinity expressed some dissatisfaction with the plan. The principal basis for their concern was that the majority of the land acquired for the project was removed from the Granger School District tax roll, with no provision for initial facility development within their district. This resulted in a change in concept to initially develop the Willis Creek and Friendship Parks by transferring some facilities from the other areas. This concept has received the approval of the citizens of Granger as well as support from other municipalities in the vicinity and the Williamson County judge. We concur in the change.

3. Those revised portions of the plan pertaining to site development and management are approved subject to the following:

a. Para 9-08. A site layout plan should be provided for the area to be developed below the embankment.

b. Para 13-14b. A statement should be added that a lakeshore management plan will be prepared in accordance with current policies pertaining to private floating facilities and made a part of the master plan as Appendix F.

c. Plate IX-2. It is recommended that provision of registration booths be withheld until such time that the project becomes operational. At that time a more accurate determination of need and location could be made based on current management policies.

d. Plates IX-2 and IX-12. Consideration should be given to providing additional parking space or multiple lane access roads at the entrance to the camping areas to facilitate fee collection.

SWDPL-R (SWFED-PE 31 Aug 73) 5th Ind 14 JUN 1974
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

e. Plate IX-10. Provision of a group shelter at the end of the hiking trail is not concurred in. It is considered that use of the facility would be limited and a maintenance problem would be created if the shelter is sited at the location proposed. The facility should be relocated within the vicinity of the parking area provided for trail users.

f. Plates IX-10 and IX-12. According to criteria stated in EM 1110-2-400, the lower limit of the boat launching ramps should be at approximate elevation 489. This elevation should be used or justification furnished for deviation from same.

g. Plate IX-12. A discussion should be included in para 9-07d concerning the facilities and services proposed in the concession area.

h. Table X-3. In the interest of safety, barbed wire fencing should not be used in the immediate vicinity of developed public use areas. However, we would have no objection to the use of a single strand of barbed wire at the top of a wire mesh fence if considered necessary for stock control.

i. Plate XI-3. While this picnic shelter design was originally provided in the OCE "Standard Plans" (now superseded), it is considered that from an aesthetic and maintenance standpoint, other designs are superior. In view of the above, it is recommended that consideration be given to an alternate design from the Park Practice Design Program, another district or agency, or an original design using heavy wood rigid frames (also glue laminated frames) with minimum 2" wood decking. In this regard, reference is made to the manufactured wood picnic shelters included in literature furnished with letter SWDED-E dated 13 March 1973, subject: "Prefab Park Pavilions."

FOR THE DIVISION ENGINEER:

Barry G. Rought

1 Incl
wd 4 cys

BARRY G. ROUGHT
Chief, Planning Division

CF:
SWFED-PR (wo incl)

SWFED-DC (SWFED-PR 31 Aug 73) 4th Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

DA, Fort Worth District, Corps of Engineers, PO Box 17300, Fort Worth, Texas 76102 26 April 1974 .

TO: Division Engineer, Southwestern, ATTN: SWDPL-R

1. Resubmitted herewith are nine copies of Design Memorandum No. 18, Laneport Lake Master Plan, for review and approval.

2. This master plan has been revised to satisfy the desires of the citizens of Williamson County. The comments received from Federal, State and local governmental agencies have also been incorporated in this plan.

3. Elm Grove Park has been renamed "Wilson H. Fox Park." This name change was made to satisfy the requests from the local citizens.

4. It is recommended that this revised master plan be approved as a guide for development and management of Laneport Lake project.

FOR THE DISTRICT ENGINEER:

J. L. JOHNSON
Acting Chief, Engineering Division

1 Incl (9 cys)
Added 1 Incl
2. DM No. 18 (Rev)

SWDPL-R (SWFED-PR 31 Aug 73) 3d Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street, Dallas, Texas 75202 13 MAR 1974

TO: District Engineer, Fort Worth

J. F. W.

CF:
DAEN-CWP-V

DAEN-CWP-V (31 Aug 73) 2nd Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

DA, Office of the Chief of Engineers, Washington, DC 20314 22 Feb 74

TO: Division Engineer, Southwestern
ATTN: SWDPL-R

The Master Plan for Laneport Lake is approved subject to comments of the Division Engineer and the following:

a. In the preparation of future master plans it would be desirable to include in the beginning of the report a Preface, Summary, and list of previously issued Design Memoranda. (See Appendix C, ER 1120-2-400.)

b. Page VIII-1, paragraph 8-02. The plans for initial development for Elm Grove Park and Taylor Park show 100 and 56 camp units, respectively. Recognized camp area operation experience shows that for realization of an economically feasible system for fee collection which off-sets O&M costs, a minimum of 150 units are needed per area. The final plans and specifications should consider locating all units in one area or provide justification prior to award for retaining these small-scale developments.

c. Page VIII-3, Table VIII-2 and page X-2, paragraph d. The breakwater shown on Plate VIII-3 should be considered an item for Federal construction.

d. Page VIII-6, paragraph b, last sentence and Table VIII-3. An item for providing walks and other special facilities for the handicapped should be considered in the development costs, if not already built-in with other items of Table VIII-3.

e. Page VIII-13, paragraph 8.07. The statement implies or indicates that as soon as the project is placed in operation that there will be an outlet area bank fishing opportunity created. If this is true the recommended facilities should be built under the initial construction general program.

f. Page X-2, paragraph f. Whether or not off-road vehicles will be permitted on the project should be considered in the next supplement or updating of the plan. Guidance on this matter will soon be issued.

g. Page XV-1. ER 1120-2-401 is superseded by ER 1105-2-129.

FOR THE CHIEF OF ENGINEERS:

wd all incl

IRWIN REISLER
Chief, Planning Division
Directorate of Civil Works

SWDPL-R (SWFED-PR 31 Aug 73) 1st Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

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

OCT 24 1973

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

Forwarded recommending approval subject to the following comments:

a. Tables II-1, II-2, and Plates VIII-2, VIII-3, VIII-4, and VIII-5. The location of proposed facilities appears to have been based on placing them above the initial 5-year flood pool elevation of 511.0'. Since the ultimate 5-year pool is only 4' higher at elevation 515.0', consideration should be given (in preparation of plans and specifications) to locating facilities above elevation 515.0' insofar as practicable without jeopardizing the use intended for the facility so that they will not have to be relocated in the future.

b. Para 3-06. The discussion on soils, including Tables III-1 and 2, describes soil properties as they relate to construction activities. The various soil types should also be discussed in terms of their fertility and productivity which are important considerations in development of wildlife food plantings and vegetative cover.

c. Para 6-08. Coordination of sewage disposal facilities with the Environmental Protection Agency should be accomplished in accordance with SWDED-E letter dated 2 October 1972, subject: "Coordination with Environmental Protection Agency."

d. Para 7-08g and Section XV. It is the intent, in the preparation of Master Plans, that the wildlife management plans be presented in sufficient depth to provide a concept plan for the development and management of these resources. In this regard, the discussion presented gives little more than a stated objective of what should be carried out on lands allocated for wildlife management. The discussion should be expanded to indicate species to be managed, habitat types and acreages involved, management measures and developments to be applied (with full justification thereof) and the means of accomplishment. Also, a vegetative cover and wildlife habitat map should be included.

e. Para 8-06a, Table VIII-2.

(1) The quantity of picnic units listed in this Table does not agree with those listed in the Picnic Facilities Table on Plate VIII-3. They should be reconciled.

(2) Item 3b. Six 14' ramp lanes with a 4' separation between lanes would be 104' wide instead of 100'. This should be corrected.

f. Paras 8-06c and 8-06d. It should be stated here and made clearer throughout the Master Plan that Willis Creek and Friendship Parks are future development areas, to be developed in the event the pool is raised to ultimate conditions with revegetation and landscaping to be performed initially under Cost Account No. 14.

g. Table IX-4.

(1) Items 6b, c, d, and e, 11c and d, 12a, 13, and 15a and b. The unit cost times the quantity does not give the total cost for these items. Discussion with District personnel indicates that the unit costs are actually lump sum figures and the total Acct. 14 costs are correct. This will be corrected in future updating of the Master Plan.

(2) Item 15b includes only fencing of the two parks to be developed initially. This will also be corrected in future updating actions.

h. Table IX-4 and para 10-04d. The cost estimate does not indicate the cost of sewage disposal facilities and according to para 10-04d, these facilities are to be designed in the future. In accordance with SWDR 1110-2-9 dated 30 Nov 70, sewage disposal design costs and locations for initial development will be prepared in the same detail as other features, such as roads and water supply. The correspondence referenced in comment c above indicates that submissions to EPA should be at the report and design memorandum stages. The information on sewage disposal presented here is not adequate for submission to EPA. In view of the above, it is recommended that the required information be provided by supplement.

i. Para 11-03.

(1) Practices prescribed in this para should be in accordance with the concept plan developed in Section XIII.

(2) Only those practices which require immediate or special attention should be presented in this para. In this regard, those practices described in para 11-03e should be removed.

j. Para 11-03b(1). The use of Johnson Grass for revegetation is questioned, particularly since it is not shown in para 3-07a(1) to be common to the area. In view of the above and since it is a noxious plant, consideration should be given to deleting it from the recommended list.

OCT 24 1973

SWDPL-R (SWFED-PR 31 Aug 73) 1st Ind
SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

k. Plates XI-2, 3 and 4. These plates show only the areas "allocated" for wildlife habitat improvement and for afforestation and that they are not "revegetation plans showing various treatments" as indicated in para 11-03. It appears, from the information presented, that revegetation with native and introduced grasses, as listed in para 11-03, is the principal feature of the wildlife management program other than planting of trees and other silvicultural measures in the forested areas. A wildlife management plan cannot be considered complete without including such measures as wildlife food plantings (food plots or strips), enhancement of natural weed growth for wildlife food and cover, provision of brush piles, preservation of den trees, etc.

1. Vegetative Management Plan. The paragraph, as presently written, states the general objective for development of the vegetative resources. The discussion should be expanded to present a concept plan for development of the vegetative resources, taking into account soil types, topography, and climate; requirements of the land itself; existing vegetation, and those vegetative manipulative practices needed to enhance the development of other resources. The discussion should lay out generally the objectives for vegetative development for each land use allocation and the major steps to be taken to reach the objectives.

FOR THE DIVISION ENGINEER:

for Robert F. Wilson
HOWARD R. BARE
Chief, Planning Division

1 Incl
wd 4 cys

CF: wo incl
SWFED-PR

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102

SWFED-PR

31 August 1973

SUBJECT: Laneport Lake, San Gabriel River, Texas, Design Memorandum No. 18, Master Plan

THRU: Division Engineer, Southwestern

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

1. Design Memorandum No. 18, Master Plan, for the development and management of the Laneport project is submitted for your review and approval.

2. The plan is being submitted for coordination to Federal, State, and local governmental agencies known to have an interest in the plan of development for Laneport Lake.

Floyd H. Henk

1 Incl (9 cys)
as

FLOYD H. HENK
Colonel, CE
District Engineer

BRAZOS RIVER BASIN, TEXAS

DESIGN MEMORANDUM NO. 18

MASTER PLAN
FOR
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

This report, prepared in the Planning Branch of the Engineering Division, Fort Worth District, has been coordinated with the Real Estate Division and the Operations Division and is recommended for approval.

Michael B. Cottell
Chief, Real Estate Division

Terry E. Robinson for
Chief, Operations Division

BRAZOS RIVER BASIN, TEXAS
DESIGN MEMORANDUM NO. 18
MASTER PLAN
FOR
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

SUMMARY

1. This master plan is intended as a comprehensive guide for the orderly and coordinated development and management of the land and water areas of the project. It has been revised to satisfy the desires and demands of the citizens of Williamson County as well as to incorporate the comments received from Federal, State, and local governmental agencies. This plan also reflects the comments received from the office of the Chief of Engineers and from the Southwestern Division.

2. Laneport Lake, in conjunction with North Fork and South Fork Lakes, is an important unit in the comprehensive plan for the conservation, development, and utilization of the water resources of the Brazos River Basin. The three lake project is scheduled for construction in stages with Laneport and North Fork Lakes as the first stage units. The construction of South Fork Lake will be deferred until additional water supply is needed. The project's authorized purposes are flood control, water conservation, recreation, and fish and wildlife enhancement.

3. The project is located in Williamson County 10 miles northeast of Taylor, Texas, at river mile 31.9 on the main stem of the San Gabriel River. It is a temperate region of long, warm summers and short, mild winters. The lake will be situated in the Blackland Prairie, an area characterized by flat, mature valleys. The project area is intensively cultivated and native vegetation exists only in areas not suited for agriculture use. The lake will inundate 4,400 acres at the top of the interim conservation pool, elevation 504 feet msl. The ultimate pool will increase the pool height to 512 feet msl.

4. The project is currently under construction and is scheduled for completion during January 1979. This plan only proposes the construction of recreation facilities required for the first-stage development at interim pool elevation of 504 feet msl. This development will be provided by the Federal Government on a noncost-sharing basis. Under present policy, cost-sharing by local interests is required for future recreation development.

5. In order to maintain the quality of the recreational experience, the capacity of the land and the water to sustain such use has been analyzed, and limitations have been imposed. The optimum capacity was estimated to be 680,000 annual recreation days at the interim pool stage of development.

6. Wilson H. Fox, Taylor, Willis Creek and Friendship Parks have been designated for intensive recreation use. The parks have 1,385 acres available for public use at the top of the conservation pool. The initial recreation development will include, but not be limited to, roads, parking area, boat launching ramps, sanitary facilities, and public camping and picnic areas.

7. At this time, there are no agencies that are willing to assume the responsibility for the operation and maintenance of the parks. Therefore, the Corps of Engineers will be responsible for the operation and maintenance of the project.

BRAZOS RIVER BASIN, TEXAS
SAN GABRIEL RIVER
TRIBUTARY TO
BRAZOS RIVER, TEXAS

STATUS OF DESIGN MEMORANDA

Design Memo No.	Title	Date Submitted: District Engineer	Date Submitted: Division Engineer	Date Approved OCE
1	Hydrology-Part A (General)	14 Jul 65	3 Nov 65	16 Dec 65
	Supplement No. 1 (General)	1 Aug 66	16 Aug 66	19 Sep 66
	Hydrology-Part B (Laneport)	30 Sep 66	28 Nov 66	25 Apr 67
	Supplement No. 1 (Laneport)	26 Sep 68	23 Oct 68	6 Dec 68
	Supplement No. 2 (Laneport)	29 Aug 73	11 Oct 73	App by SW
	Hydrology-Part C (North Fork)	11 Aug 66	1 Nov 66	22 Dec 66
	Supplement No. 1 (North Fork)	27 Jul 73	23 Aug 73	App by SWI
	Hydrology-Part D (South Fork)	5 Dec 66	6 Apr 67	
2	General (North Fork)	8 Dec 66	30 Mar 67	21 Dec 67
3	Availability of Materials (3 dams)(Revised)	25 Jan 68	20 Feb 68	26 Mar 68
4	General (Laneport)	31 Jan 67	5 May 67	21 Dec 67
	Supplement No. 1 (Laneport)	31 May 67		
	Supplement No. 2	19 Jan 68	15 Feb 68	17 Apr 68
	Supplement No. 3	23 Jul 69	7 Oct 69	12 Feb 70
	Supplement No. 4	28 Jan 71	26 Mar 71	16 Jun 71
5	General (South Fork)	17 Mar 67	6 Jul 67	6 Oct 67
6	Reservoir-Mgt-Prelim Master Plan (North Fork)	17 Feb 67	10 May 67	28 Jun 67
7	Reservoir-Mgt-Prelim Master Plan (Laneport)	22 Mar 67	9 May 67	17 Jul 67
8	Real Estate-Land for Const and Reservoir Areas (North Fork)	25 Apr 67	25 May 67	8 Aug 67
8A	Real Estate-Land for Const and Reservoir Areas (Laneport)	2 Jun 67	30 Jun 67	4 Dec 67
9	Project Buildings and Access Road (North Fork)(Revised)	30 Nov 67	9 Feb 68	26 Mar 68
	Supplement No. 1	24 Mar 72	4 May 72	App by SWI
10	Project Buildings and Access Road (Laneport)(Revised)	31 Jan 72	10 Mar 72	App by SWD
11	Relocations-Dam Construction Area (Laneport)	7 Aug 67	30 Aug 67	App by SWD
12	Sedimentation and Degradation Ranges (Laneport)	20 Dec 67	19 Jan 68	26 Feb 68
13	Sedimentation and Degradation Ranges (North Fork)	20 Oct 67	1 Nov 67	12 Dec 67
14	County Road Relocation Pt 2 (North Fork)	10 Feb 72	17 May 72	11 Jul 72

Design Memo No.	Title	Date Submitted: District Engineer	Date Submitted: Division Engineer	Date Approved OCE
15	Electric Transmission Lines - Relocation (Laneport)	2 Mar 73	4 Apr 73	App by SWD
16	Reservoir Mgt-Master Plan (North Fork)	31 Oct 73	24 Jan 74	
17	Outlet Works (North Fork)	31 Dec 68	4 Apr 69	22 Aug 69
18	Reservoir Mgt-Master Plan (Laneport)	This Report		
19	FM 971 Relocation (Laneport)	19 Apr 72	17 Aug 72	28 Sep 72
20	County Road Relocation (Laneport)	26 Nov 71	16 Dec 71	29 Sep 72
21	Spillway, Embankment, and Outlet Works (Laneport)	Included in DM No. 4		
22	Reservoir Clearing (North Fork)	12 Dec 72	10 Jan 73	App by SWD
23	Spillway, Embankment, and Access Road (North Fork)	24 Jul 72	21 Sep 72	29 Dec 72
24	Pedernales Electric Co-op Relocation (North Fork)	Sep 74*		
25	Reservoir Clearing (Laneport)	29 Jun 73	7 Aug 73	
26	SW Bell & General Telephone Co. Telephone Lines (Laneport)	21 Mar 73	11 Apr 73	App by SWD

*Scheduled Submission Date

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

PERTINENT DATA

General

Location:

The Laneport Dam is located at river mile 31.9 on the San Gabriel River, about 10 miles northeast of Taylor, Texas. The reservoir is located in Williamson County.

Purpose:

Flood control, water conservation, fish and wildlife, and general recreation.

Authorization:

Congressional authority for the construction of Laneport Lake was originally contained in the Flood Control Act approved 3 September 1954 (Public Law 780, 83d Congress, 2d Session) in accordance with the plan of improvement as outlined in House Document No. 535 (81st Congress, 2d Session). Congressional resolution adopted 29 July 1955 requested that House Document No. 535 be reviewed to determine if a change in the site of Laneport Reservoir were advisable. The Flood Control Act approved 23 October 1962 (Public Law 874, 87th Congress, 2d Session) authorized the construction and operation of North Fork and South Fork Lakes in conjunction with the authorized Laneport Lake as outlined in House Document No. 591 (87th Congress, 2d Session). Authority to initiate advance planning is contained in the Public Works Appropriation Act of 1965, approved 30 August 1964 (Public Law 88-511) and in Advice of Allotment C-124 dated 9 September 1964.

Drainage areas:*

San Gabriel River	Square Miles
Above mouth San Gabriel River	1,355
Above Laneport Damsite (total)	709
Above USGS gage at Circleville (discontinued)	598
Above USGS gage at Georgetown (active)	399
Above USGS gage at Georgetown (discontinued)	398
Below confluence North and South Fork San Gabriel River	398

North Fork San Gabriel River

	Square Miles
Above mouth North Fork San Gabriel River	270
Above North Fork Damsite	246

South Fork San Gabriel River

Above mouth South Fork San Gabriel River	128
Above South Fork Damsite	123

*Drainage areas in this report were either furnished by the U. S. Geological Survey, Austin, Texas, in November 1963, or adjusted to agree with such areas as were furnished at that time. Inasmuch as the drainage area revisions are minor, data in the present report pertaining to unit hydrographs, runoffs, etc., are based on the drainage areas previously used in "Review of Report on Brazos River and Tributaries, Texas - Covering San Gabriel River Watershed."

Estimated annual runoff at Laneport Dam for period 1 February 1924 - 30 September 1963:

	Acre-feet	Inches(1)
Maximum	455,532	12.01
Minimum	8,888	0.23
Average	163,717	4.32

(1) Based on a total drainage area of 711 square miles.

Floods at Georgetown gage	Peak discharge (cfs)
April 1957	155,000
October 1959	71,500
June 1944	37,500
June-July 1940	34,500
September 1936	32,400
November 1940	30,000

Embankment (Laneport):

Type	Rolled earth fill
Total length	16,320 feet
Top width	30 feet

Spillway (Laneport):

Length at crest	950 feet
Type	Ogee
Control	None

Outlet works (Laneport):

Flood control conduit:

Type	1 gated conduit
Dimension	18-foot diameter
Control	Two 8' x 18' hydraulically operated gates
Invert elevation	457.0

Low-flow outlets (emptying into flood control conduit)

Intake dimensions	3' x 4'
Number	3
Control	One 3' x 4' manually operated slide gate at each intake to wet well and one 3' x 4' manually operated gate in wet well with intake invert elevation 486.0

Intake invert elevations

Upper level	502.0
Middle level	494.0
Lower level	486.0

Spillway design flood (North Fork and Laneport system):

For incremental area of 236 square miles above North Fork Damsite:

Duration	48 hours
Total volume of rainfall	26.76 inches
Average infiltration rate	0.10 in/hr
Total volume of runoff	21.71 inches
Total volume of runoff	273,300 acre-feet
Peak inflow to full reservoir	297,900 cfs
Maximum outflow	215,830 cfs

For local area of 475 square miles between North Fork and Laneport Damsites:

Duration	48 hours
Total volume of rainfall	29.86 inches
Average infiltration rate	0.10 in/hr
Total volume of runoff	24.89 inches
Total volume of runoff	630,500 acre-feet
Peak inflow to full reservoir (local area)	408,800 cfs
Peak inflow to full reservoir (including outflow from North Fork Lake)	535,500 cfs

Maximum outflow (reservoir level 550.3)

Spillway	342 330 cfs
Outlet works	0
Total	342,330 cfs

Laneport Lake:

Feature	Elevation (ft. msl)	Area (acres)	Capacity (1) Acre-feet	Capacity (1) Equivalent runoff (inches)(2)
Top of dam	555.0	21,000	-	-
Maximum design water surface	550.3	19,220	579,900	22.89
Spillway crest	528.0	11,040	244,200	9.64
Top of conservation pool	504.0	4,400	65,500	2.59
Maximum tailwater	481.5			
Streambed	440.0			

(1) Includes 44,100 acre-feet of storage for estimated 100-year sedimentation in proposed reservoir with 27,600 acre-feet below elevation 504.0 and 16,500 acre-feet between elevation 504.0 and 528.0.

(2) Based on drainage area of 475 square miles between Laneport and North Fork Damsites.
(3) After 100-year sediment deposition.
(4) Based on upstream slope of 1:3.

Spillway design flood (North Fork, South Fork, and Laneport system):

For incremental area of 120 square miles above South Fork Damsite:

Duration	48 hours
Total volume of rainfall	23.85 inches
Average infiltration rate	0.10 in/hr
Total volume of runoff	18.83 inches
Total volume of runoff	120,500 acre-feet
Peak inflow to full reservoir	152,600 cfs
Maximum outflow	88,000 cfs

For incremental area of 236 square miles above North Fork Reservoir:

Duration	48 hours
Total volume of rainfall	25.20 inches
Average infiltration rate	0.10 in/hr
Total volume of runoff	19.84 inches
Total volume of runoff	249,700 acre-feet
Peak inflow to full reservoir	269,100 cfs
Maximum outflow	187,000 cfs

For local area of 355 square miles between North Fork, South Fork, and Laneport Damsites:

Duration	48 hours
Total volume of rainfall	30.82 inches
Average infiltration rate	0.10 in/hr
Total volume of runoff	25.88 inches
Total volume of runoff	489,900 acre-feet
Peak inflow to full reservoir (local area)	363,800 cfs
Peak inflow to full reservoir (including outflow from North Fork and South Fork Reservoirs)	462,300 cfs

Maximum outflow (reservoir level 548.9)

Spillway	311,200 cfs
Outlet works	13,800 cfs
Total	325,000 cfs

Laneport Lake:

Feature	Elevation (ft msl)	Area (acres)	Capacity (1) Acre-feet	Capacity (1) Equivalent runoff (inches)(2)
Top of dam	555.0	21,000	-	-
Maximum design water surface	548.9	18,670	553,500	29.23
Spillway crest	528.0	11,040	244,200	12.90
Top of conservation pool	512.0	6,230	107,400	5.68
Maximum tailwater	**481.5**			
Streambed	**440.0**			

(1) Includes 44,100 acre-feet or 2.33 inches of storage for estimated 100-year sedimentation in proposed reservoir with 33,700 acre-feet below elevation 512.0 and 10,400 acre-feet between elevation 512.0 and 528.0.

(2) Based on drainage area of 355 square miles between Laneport and North and South Fork Damsites.

BRAZOS RIVER BASIN, TEXAS

DESIGN MEMORANDUM NO. 18

MASTER PLAN
FOR
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

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TABLES

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TABLES (continued)

LIST OF PLATES

TABLE OF CONTENTS (continued)

LIST OF PLATES (continued)

LIST OF APPENDIXES

Appendixes A through E to this master plan will be prepared and submitted in accordance with ER 1130-2-400 dated 23 May 1971.

1
INTRODUCTION

BRAZOS RIVER BASIN, TEXAS
DESIGN MEMORANDUM NO. 18
MASTER PLAN
FOR
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

I - INTRODUCTION

1-01. Authority for the project.-

a. Congressional authority for the construction of Laneport Lake, a unit in the comprehensive plan for the development of the Brazos River Basin, on the San Gabriel River, Texas, is contained in Public Law 780 (83rd Congress, 2d session), approved 3 September 1954. This is in accordance with the recommendations of the Chief of Engineers contained in House Document No. 535 (81st Congress, 2d session).

b. A congressional resolution adopted 29 July 1955 requested that House Document No. 535 be reviewed to determine if a change in Laneport Lake, as authorized, was advisable. The review resulted in the recommendation to construct and operate North Fork and South Fork Lakes in conjunction with the authorized Laneport Lake. Public Law 874 (87th Congress, 2d session), approved 23 October 1962, authorized construction of the North Fork and South Fork Lakes in conjunction with a modified Laneport Lake substantially in accordance with the recommendations of the Chief of Engineers in House Document No. 591 (87th Congress, 2d session). Authority to initiate advanced planning is contained in the Public Works Appropriation Act of 1965 (Public Law 88-511) approved 30 August 1964, and in Advice of Allotment C-124 dated 9 September 1964.

1-02. Authority for recreational program.- The authorizing document, Public Law 874, designated recreation as an authorized project purpose.

1-03. Authority for fish and wildlife program.- Congressional authority for the fish and wildlife program at reservoir projects under the control of the Department of the Army is contained in the Fish and Wildlife Coordination Act of 1958, as amended, Public Law 85-624 (72 Stat 563), and Public Law 89-669 (80 Stat 926), approved 15 October 1966.

1-04. Authority for resources development program.- Authority for the development of the resources of the Laneport Lake project is contained in Public Law 86-717 (74 Stat 817) approved 6 September 1960, and Public Law 89-298 (Sect. 302) approved 27 October 1965.

1-05. Project purposes.- The authorized purposes of this project are flood control, water conservation, recreation, and fish and wildlife enhancement.

1-06. Purpose of the master plan.-

a. The master plan is intended as a guide for the orderly and coordinated development and management of the land and water resources of the project. It will classify and zone project lands and waters for their highest and best use.

b. During the construction phase, the master plan will serve as a basis for design and preparation of plans and specifications for construction of the proposed recreation facilities. After completion of project construction, a 5-year continuing schedule of reevaluation and updating will provide an opportunity to accommodate changing conditions or future variations in public demands.

1-07. Previous design memoranda.- All previous and future design memoranda are tabulated under "Status of Design Memoranda" in the introductory pages of this design memorandum.

1-08. Environmental impact statement.- In accordance with Section 102 of the National Environmental Policy Act of 1969, the final environmental statement for Laneport, North Fork, and South Fork Lakes was completed and filed on 27 March 1972 with the Council on Environmental Quality.

1-09. Scope of this report.- This design memorandum presents a description of the project. Described herein are the environmental and recreational resources of the project, the factors influencing and restricting resource management and development, and the methods and techniques for the development, improvement, and management of these resources. The plan of development integrates appropriate uses and allocations into a well balanced and flexible guide for the administration, development, and coordinated management of land and water resources and recreation facilities in the best interest of the public. The general concepts of optimum utilization of project resources for public use, provision of recreational facilities, and the proper stewardship of the overall project are also presented in this text.

II
PROJECT DESCRIPTION

II - PROJECT DESCRIPTION

2-01. General.-

a. The authorized Laneport, North Fork, and South Fork Lakes are important units in a presently authorized system of 12 reservoirs in the Brazos River Basin for the multiple purposes of flood control, water supply, hydroelectric power, recreation, and fish and wildlife enhancement. Six of the reservoirs have been constructed and are now in operation. The six existing units are Whitney Lake on the Brazos River, Waco Lake on the Bosque River, Proctor and Belton Lakes on the Leon River, Stillhouse Hollow Lake on the Lampasas River, and Somerville Lake on Yegua Creek. The three authorized reservoir units not mentioned above are Millican and Navasota Lakes on the Navasota River and Aquilla Lake on Aquilla Creek. The locations of the 12 reservoir units are shown on plate II-1.

b. Laneport, North Fork, and South Fork Lakes are all located within the San Gabriel watershed. The three-lake San Gabriel project is scheduled for construction in stages, with Laneport and North Fork Lakes as the first-stage units, and South Fork Lake as the unit to be constructed when additional water supply is needed. Upon completion of the second stage, the water conservation storage of Laneport will be increased by transferring its flood control storage to South Fork Lake.

2-02. Location.- The project is located in Williamson County, Texas. The damsite is located at river mile 31.9 on the main stem of the San Gabriel River about 10 miles northeast of Taylor, Texas. The authorized project is served by State Highways 95 and 29, and Farm to Market Roads 971 and 1331. Several all-weather county roads lead from the above-mentioned roads and will provide additional access to the lake area.

2-03. Climate.- The San Gabriel watershed is located in a region where seasons of moderate winters and comparatively long hot summers prevail. Periods of excessive precipitation are occasionally experienced with the passage of frontal storms, local thunderstorms, and cyclonic storms originating in the Gulf of Mexico. The mean annual precipitation in the watershed is about 32 inches. July, the driest month, usually has an average precipitation of less than 2 inches. The mean annual temperature over the watershed is 68 degrees F. January, the coldest month, has an average daily temperature of 36 degrees F, and August, the warmest month, has an average daily temperature of 97 degrees F. Temperatures at stations in and near the watershed have ranged from a maximum of 114 degrees F to a minimum of -12 degrees F.

2-04. Lake area and general character.- The project is located east of the Balcones Escarpment in the Blackland Prairie, an area prized for its agriculture productivity. This is a region of low to moderate relief characterized by gently rolling hills and youthful to mature valleys. About 90 percent of the area is cleared and is intensively farmed. Tree cover and native grasses are mostly restricted to the banks of the narrow streams and to the major tributaries. A full conservation pool (elevation 504.0 feet msl), under initial conditions (Stage 1), will cover an area of 4,400 acres and will create a shoreline 34 miles long. Under ultimate conditions, the conservation storage level will be raised to elevation 512.0 feet msl. At that time the conservation pool will inundate 6,230 acres and will have a shoreline of 60 miles. About 13.5 miles of the San Gabriel River channel and about 7.0 miles of Willis Creek will be under water at elevation 512.0 feet msl. At the conservation pool elevation, the lake will be characterized by a shoreline that has gentle slopes and shallow water. For the most part, native tree cover will be restricted to the headwater area of the lake. Pertinent data on Laneport Lake is presented in tables II-1 and II-2.

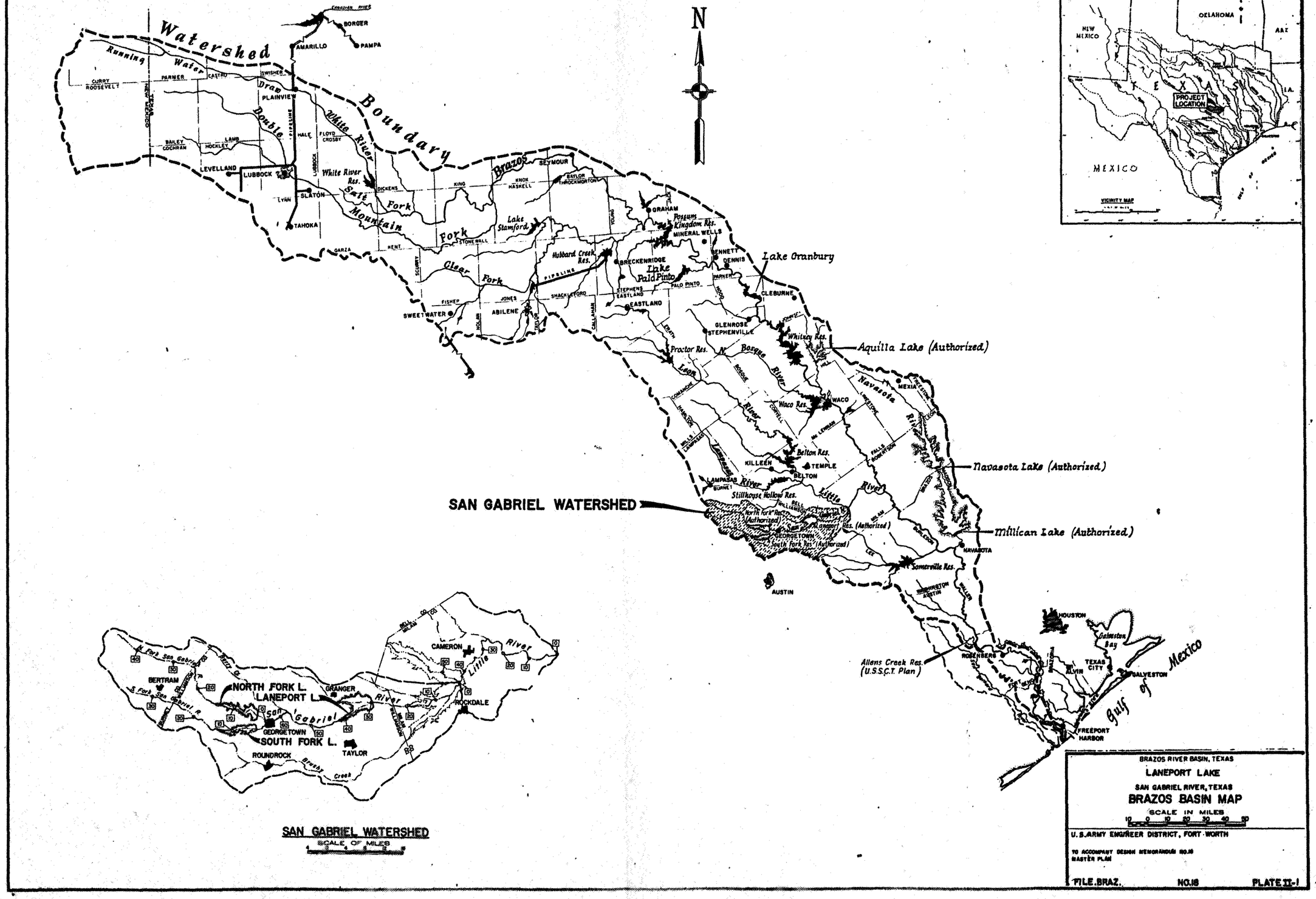
2-05. Description of the dam.- The dam will be rolled earthfill, with a length of 16,320 feet, a top width of 30 feet, and an elevation of 115 feet above the streambed. The spillway will be an uncontrolled ogee type, 950 feet in length at the crest. The flood control outlet works will consist of an 18-foot diameter conduit with two 8-foot hydraulically operated gates at elevation 457.0 feet msl. The low-flow outlets will empty into the flood control conduit and will consist of three gates at elevations 502.0, 494.0 and 486.0 feet msl. The general plan of embankment is shown on plate II-2.

2-06. Initial area and capacity data.- A tabulation of the initial area and capacity data for the lake at river mile 31.9 is shown in table II-3. The initial area and capacity curves and the capacity curve after 100 years of sedimentation are shown on plate II-3.

2-07. Fluctuation of pool.- According to the pool elevation probability and duration curves, as shown in plate II-4, pool elevation can be expected to vary about 14.0 feet in an average 5-year period. As indicated by the duration curve, the top of conservation pool (elevation 504.0 feet msl) will be equaled or exceeded approximately 40 percent of the time. The average pool (elevation 502.5 feet msl) during the period June through August (prime recreation season) is only 1.5 feet below the top of conservation pool. It will be equaled or exceeded 72 percent of the time. The 5-year drawdown level (elevation 497.0 feet msl) will be equaled or exceeded 92 percent of the time. The pool level should equal or exceed the 5-year flood frequency (elevation 511.0 feet msl) only 2 percent of the time.

CORPS OF ENGINEERS

U.S. ARMY



SAN GABRIEL WATERSHED

SCALE OF MILES

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

BRAZOS BASIN MAP

SCALE IN MILES

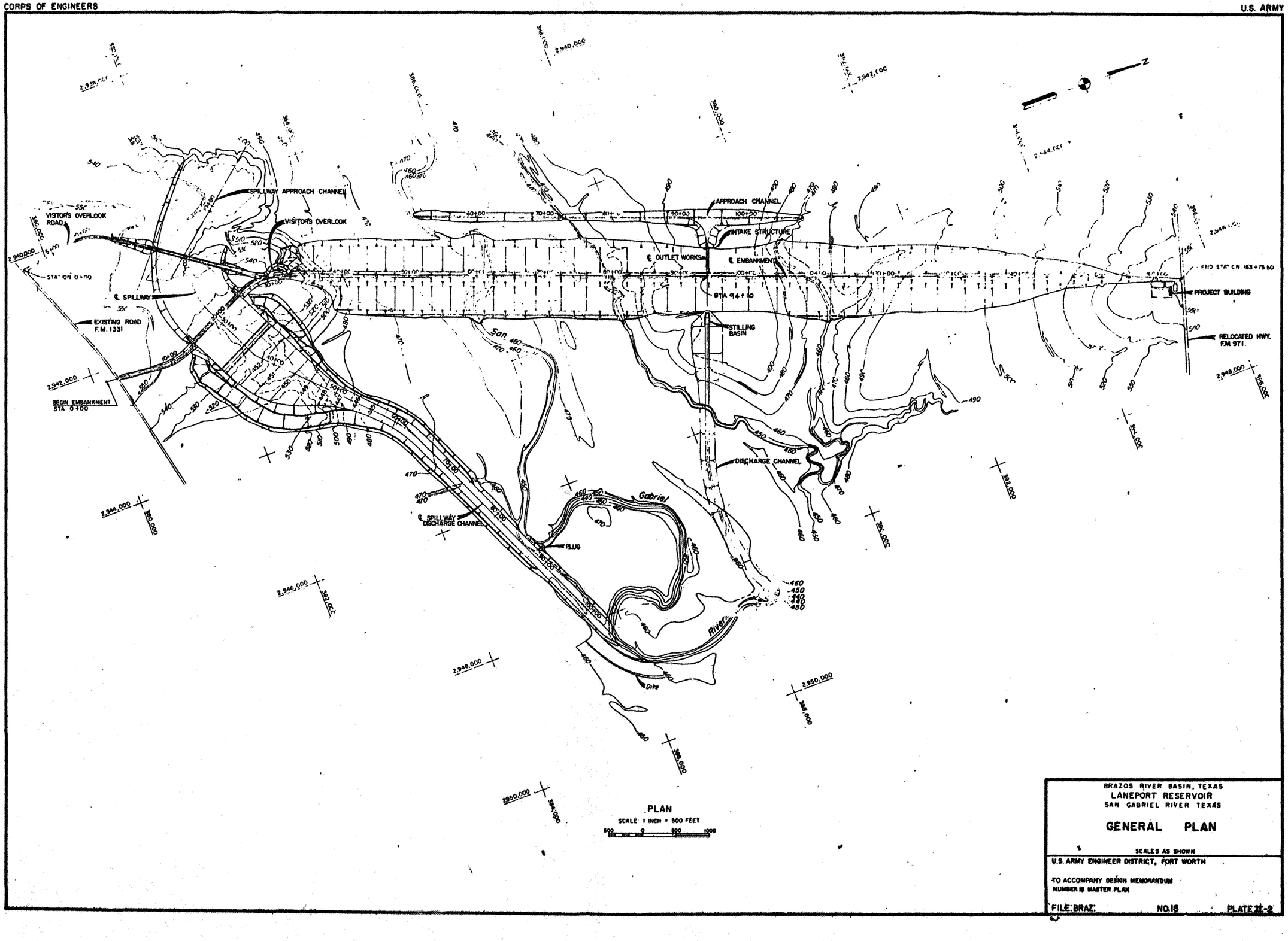
U.S. ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY DESIGN MEMORANDUM NO.18 MASTER PLAN

FILE BRAZ. NO.18 PLATE II-1

CORPS OF ENGINEERS

U.S. ARMY



PLAN

SCALE 1 INCH = 500 FEET

500 0 500 1000

BRAZOS RIVER BASIN, TEXAS

LANEPORT RESERVOIR

SAN GABRIEL RIVER TEXAS

GENERAL PLAN

SCALES AS SHOWN

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

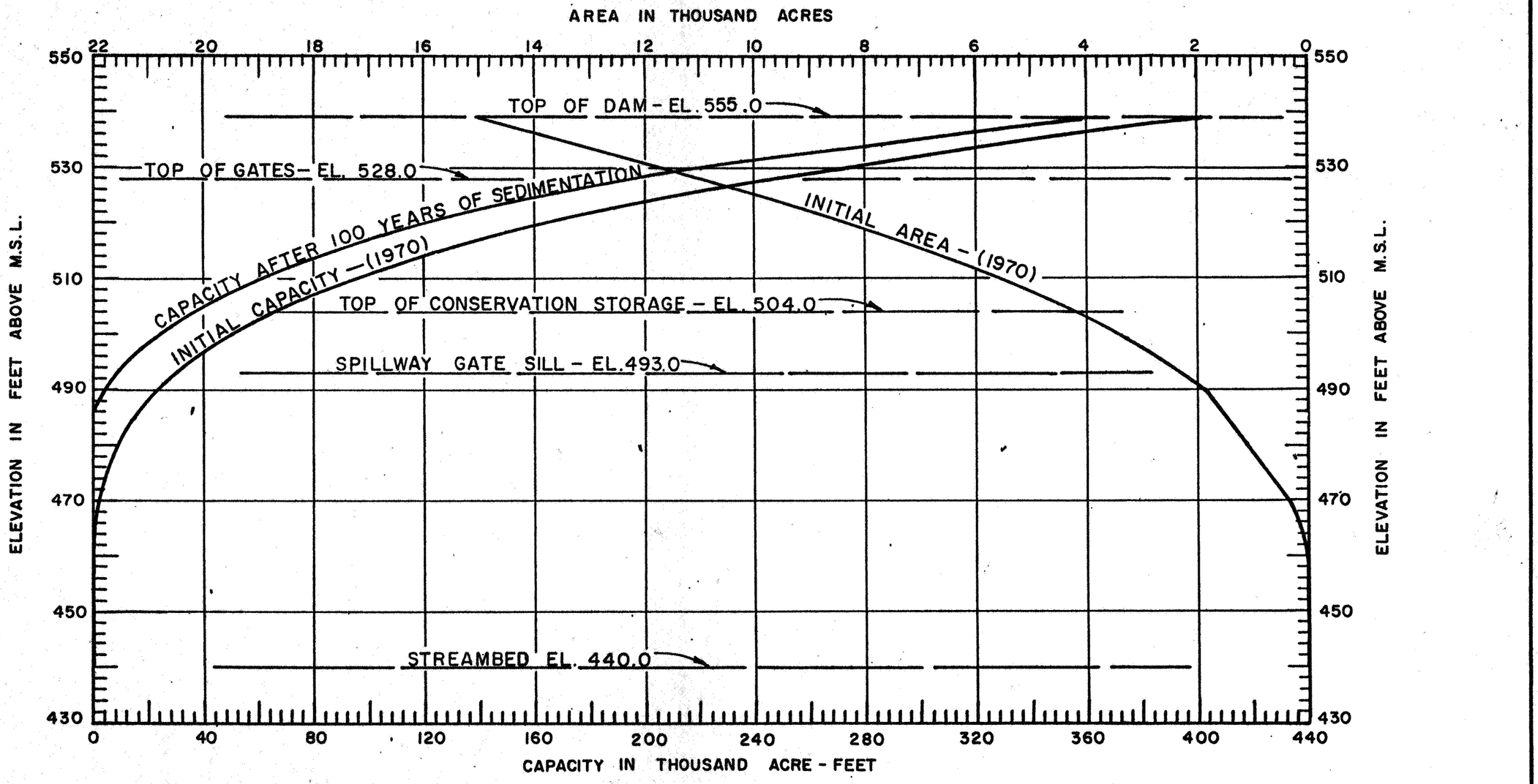
TO ACCOMPANY DESIGN MEMORANDUM NUMBER 18 MASTER PLAN

FILE: BRAZ: NO. 18 PLATE II-2

G.L.P

CORPS OF ENGINEERS

U.S. ARMY



NOTES:

Drainage area = 709 Square Miles; 463 Square Miles (incremental) [1]
One inch of runoff = 37,813 acre - feet
One inch of runoff = 24,693 acre - feet (incremental) [1]
[1] Inches of runoff shown based on incremental area below North Fork Damsite

BRAZOS RIVER BASIN, TEXAS
LANEPORT RESERVOIR
SAN GABRIEL RIVER, TEXAS

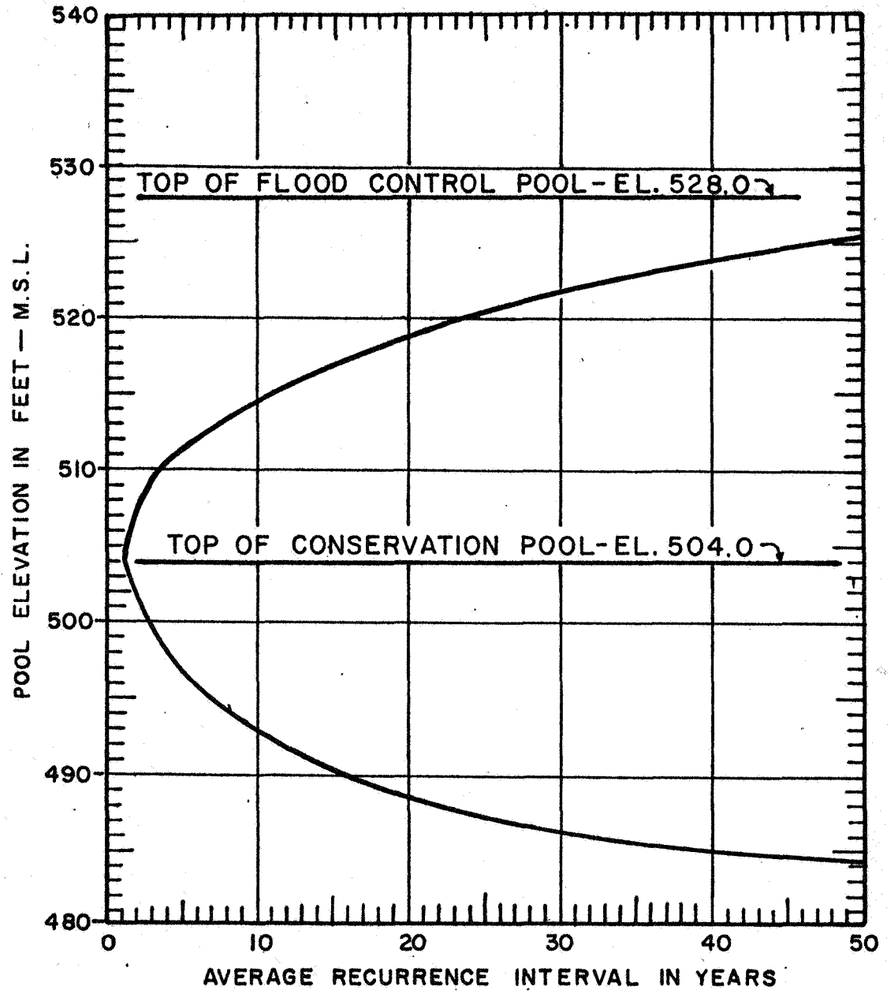
AREA AND CAPACITY CURVES

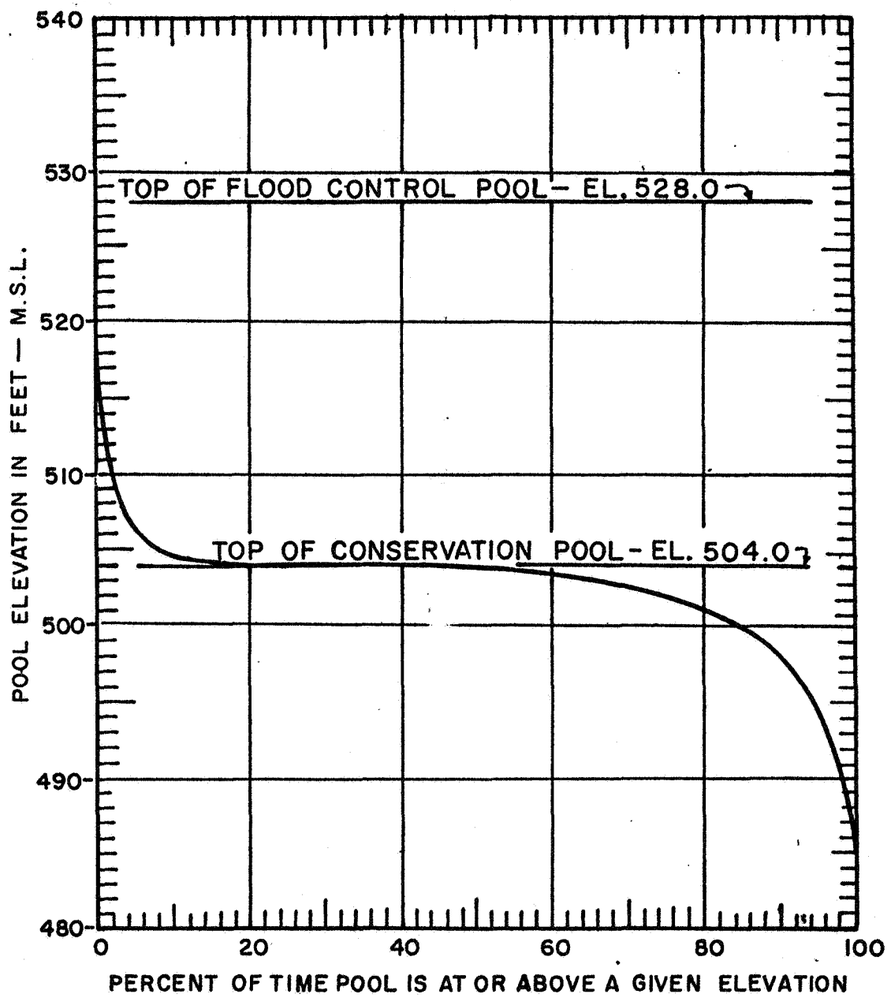
SCALE AS SHOWN

U.S. ARMY ENGINEER DIST., FT. WORTH, March 1974

TO ACCOMPANY DESIGN MEMORANDUM NUMBER 18 MASTER PLAN

FILE BRAZ. NO.18 PLATE II-3





BRAZOS RIVER BASIN, TEXAS
LANEPORT RESERVOIR
SAN GABRIEL RIVER, TEXAS
POOL ELEVATION PROBABILITY AND DURATION CURVES
SCALE AS SHOWN

U.S.ARMY ENGINEER DIST., FT. WORTH

TO ACCOMPANY DESIGN MEMORANDUM NUMBER 18 MASTER PLAN

FILE BRAZ. NO.18 PLATE II-4

Table II-1

LANEPORT LAKE
PERTINENT DATA
STAGE I
INITIAL CONDITIONS WITH NORTH FORK LAKE

Feature	Elevation (feet msl)	Area (acres)	Capacity (acre-feet)
Drainage area (709 square miles)		453,760 1/	
Top of dam	555.0 2/	21,000	
Maximum design water surface	549.3	18,820	561,100
Top of flood control pool (spillway crest)	528.0	11,040	244,200
5-year flood pool	511.0	5,980	101,500
Top of conservation pool 3/	504.0	4,400	65,500
Recreation pool 4/	502.5	3,985	
Sediment reserve			44,100 5/
5-year frequency drawdown	497.0	2,920	40,400
10-year frequency drawdown	492.6	2,200	29,200
Total fee area		13,200	
Flowage easement		1,650	

1/Includes the area upstream of North Fork and South Fork dams.
2/Based on an upstream slope of 1:3.
3/Elevation and area will vary between the top and bottom of the conservation pool depending upon hydrological factors and consumers' needs.
4/Average elevation during prime season, June through August.
5/27,600 acre-feet below elevation 504.0 msl; 16,500 acre-feet between elevations 504.0 and 528.0 feet msl.

Table II-2

LANEPORT LAKE
PERTINENT DATA
STAGE II
ULTIMATE CONDITIONS WITH
NORTH AND SOUTH FORK LAKES IN SYSTEM

Feature	Elevation (feet msl)	Area (acres)	Capacity (acre-feet)
Drainage area (709 square miles)		453,760 1/	
Top of dam	555.0	21,000	
Maximum design water surface	548.9	18,670	555,300
Top of flood control pool (spillway crest)	528.0	11,040	244,200
5-year flood line	515.0	7,020	127,200
Top of conservation pool	512.0	6,230	107,600
Sediment reserve			44,100 2/
5-year frequency drawdown	508.5	5,380	87,630
10-year frequency drawdown	505.0	4,520	69,960

1/Includes the area upstream of North Fork and South Fork dams.
2/33,700 acre-feet below elevation 512.0; 10,400 acre-feet between elevations 512.0 and 528.0 feet msl.

Table II - 3
AREA AND CAPACITY DATA - INITIAL
LANEPORT LAKE
River mile 31.9
Drainage area = 709 square miles

Elev.	0	1	2	3	4	5	6	7	8	9
					Area in acres:					
440	0	1	2	3	4	5	6	7	8	9
450	10	12	16	20	26	32	38	46	52	58
460	65	80	102	120	150	180	200	220	270	290
470	344	390	440	500	580	650	750	850	980	1,050
480	1,133	1,230	1,300	1,370	1,420	1,460	1,520	1,610	1,680	1,750
490	1,828	1,970	2,120	2,250	2,420	2,580	2,740	2,920	3,100	3,280
500	3,420	3,670	3,880	4,090	4,400	4,520	4,770	5,020	5,260	5,500
510	5,789	5,980	6,230	6,490	6,760	7,020	7,300	7,600	7,900	8,200
520	8,473	8,800	9,100	9,400	9,720	10,050	10,360	10,700	11,040	11,390
530	11,709	12,020	12,400	12,730	13,100	13,480	13,860	14,220	14,630	15,000
540	15,386									
					Capacity in acre-feet:					
440		1	2	4	8	12	19	25	33	41
450	50	62	76	94	117	146	181	223	272	327
460	389	461	552	663	798	960	1,150	1,360	1,610	1,890
470	2,200	2,570	2,990	3,460	4,000	4,610	5,310	6,110	7,030	8,040
480	9,130	10,310	11,580	12,910	14,310	15,740	17,230	18,800	20,440	22,160
490	23,950	25,850	27,890	30,080	32,410	34,910	37,570	40,400	43,410	46,600
500	49,950	53,500	57,270	61,260	65,500	69,960	74,610	79,500	84,640	90,020
510	95,670	101,500	107,600	114,000	120,600	127,500	134,700	142,100	149,900	157,900
520	166,300	174,900	183,900	193,100	202,700	212,600	222,800	233,300	244,200	255,400
530	266,900	278,800	291,000	303,600	316,500	329,800	343,400	357,500	371,900	386,700
540	401,900									

2-08. Cost-sharing features.-

a. Recreation.- In accordance with instructions presented in ER 1120-2-404 for the implementation of the Federal Water Project Recreation Act (Public Law 89-72) of 1965, this project is classified as a category "C" project, with the initial recreation development provided on a noncost-sharing basis. After the project becomes operational, future recreation development will be subject to cost-sharing provisions.

b. Water conservation storage.- The Brazos River Authority, a State agency, indicated by letter dated 16 October 1967, that they would pay project costs allocated to the requested water storage.

III
PROJECT STATUS

III - PROJECT STATUS

3-01. Project development.- Construction of the project was initiated during November 1972 and is presently scheduled for completion in January 1979. Deliberate impoundment is programmed for June 1978. Construction of the embankment and partial excavation of the spillway was initiated in November 1972. The project building has been recently completed. The anticipated schedule of construction is shown in table III-1.

3-02. Land acquisition.- The land requirements necessary for construction and operation of the project are estimated to be 14,850 acres. Land acquisition was started in July 1969 and should be substantially complete by June 1975. The acquisition program is approximately 75 percent complete to date.

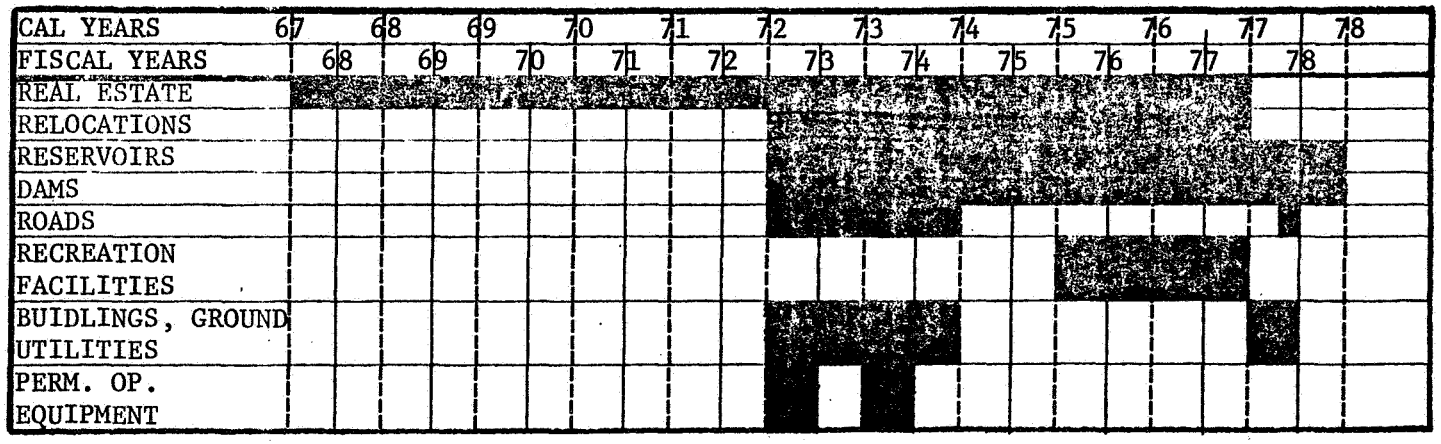
3-03. Recreation facility development.-

a. This master plan only proposes the construction of recreation facilities required for the first-stage development, interim pool elevation 504.0 feet msl. These facilities are scheduled for completion by July 1977. A detailed discussion of the proposed recreation facility development appears in chapter IX.

b. All future development is dependent upon recreation trends and demands experienced at the project as well as the realization of the ultimate pool.

Table III-1

CONSTRUCTION SCHEDULE
LANEPORT LAKE



IV
RECREATIONAL AND ENVIRONMENTAL RESOURCES OF THE PROJECT

IV - RECREATIONAL AND ENVIRONMENTAL RESOURCES OF THE PROJECT

4-01. General.- The authorized project is located in an agricultural region which is situated between the two highly industrialized and commercial urban communities of Austin and Temple, Texas. The principal economy of the immediate lake area is farming. The proposed project should materially enhance the recreational value of the area by providing a water-based recreational attraction. Laneport will offer a large expanse of inland water, with an irregular shoreline as the major attracting feature. The other project resources and the improvements planned should greatly improve the overall attractiveness of the project. An understanding of the project resources is helpful in identifying potential problems and needs, and in formulating the solutions.

4-02. Archeological and paleontological resources.-

a. In late 1963, the Texas Archeological Survey (then the Texas Archeological Salvage Project) conducted a preliminary archeological investigation of the San Gabriel River watershed in the vicinity of the authorized lake site. The survey was conducted under a memorandum of agreement between the National Park Service and the University of Texas, Austin, as part of the Interagency Archeological Salvage Program. This investigation dealt primarily with the Paleo-Indian, Archaic, and Neo-American periods. Although the investigation was limited to work directed toward locating, recording, and surface collecting archeological materials, 22 archeological sites were discovered within the boundary of the proposed project. The results of these investigations are found in the following publication: (1) Harry Shafer and James E. Corbin. An Appraisal of the Archeological Resources of North Fork, South Fork and Laneport Reservoirs, Williamson County, Texas. Austin: Texas Archeological Salvage Project, 1965.

b. After the 1963 survey, Texas Archeological Survey (TAS) completed the initial testing program at the archeological sites found in the planned Laneport Lake basin. This program, carried out in the fall of 1968, included excavations at three sites. These sites provided a prehistoric record of aboriginal habitation in the area ranging in time from 5000 B.C. to possibly as late as A.D. 1750. Additionally, a surface reconnaissance in the Laneport area was carried out during and subsequent to the 1968 testing program and resulted in the location and recording of 17 additional sites. The results of this testing-reconnaissance have been prepared in manuscript form and will be submitted as a contract-satisfying report to the National Park Service by early 1974. The report will be subsequently published by the Texas Memorial Museum.

c. A program for additional excavation at the Loeve-Fox site (41WM230) was carried out in 1973. This site contains remains dating from possibly as early as 3000 B.C. to about A.D. 1200. Included in the investigated complex was a prehistoric cemetery comprised of over 25 individuals. A report detailing the results of this work is now being prepared by Elton R. Prewitt and will be available for circulation late in 1974. This summarizes the extent of professional archeological work to date in the Laneport Lake area. The results of this work indicate that additional surface collecting, testing, and excavation are necessary before the archeological significance of these discoveries can be effectively evaluated. Additional site investigations and excavation will be conducted under the direction of the National Park Service prior to impoundment.

4-03. Historical resources.-

a. Although there are no historical sites designated as having National, State, or regional significance within the project boundary, numerous historical sites, buildings, cemeteries, and other related places of local historical interest can be found in proximity to the project. An investigation was conducted to insure identification of notable historical sites and other places having local historical interest. This investigation revealed that permanent Anglo-American settlements in Williamson County, as it is known today, began in the early 1800's with immigrants coming from a variety of nations. These settlers were farmers and ranchers with their heritage carrying over to today. Two early cattle drive trails, the Chisholm and the Shawnee, crossed the watershed in the vicinity of Georgetown. Both trails came from the south through Austin, passing west of Granger on the way to Waco and north Texas.

b. Three Spanish missions and a presidio were built on the banks of the San Gabriel (then called San Xavier) in 1746. The missions were located between the present town of San Gabriel and the confluence of the San Gabriel River and Brushy Creek.

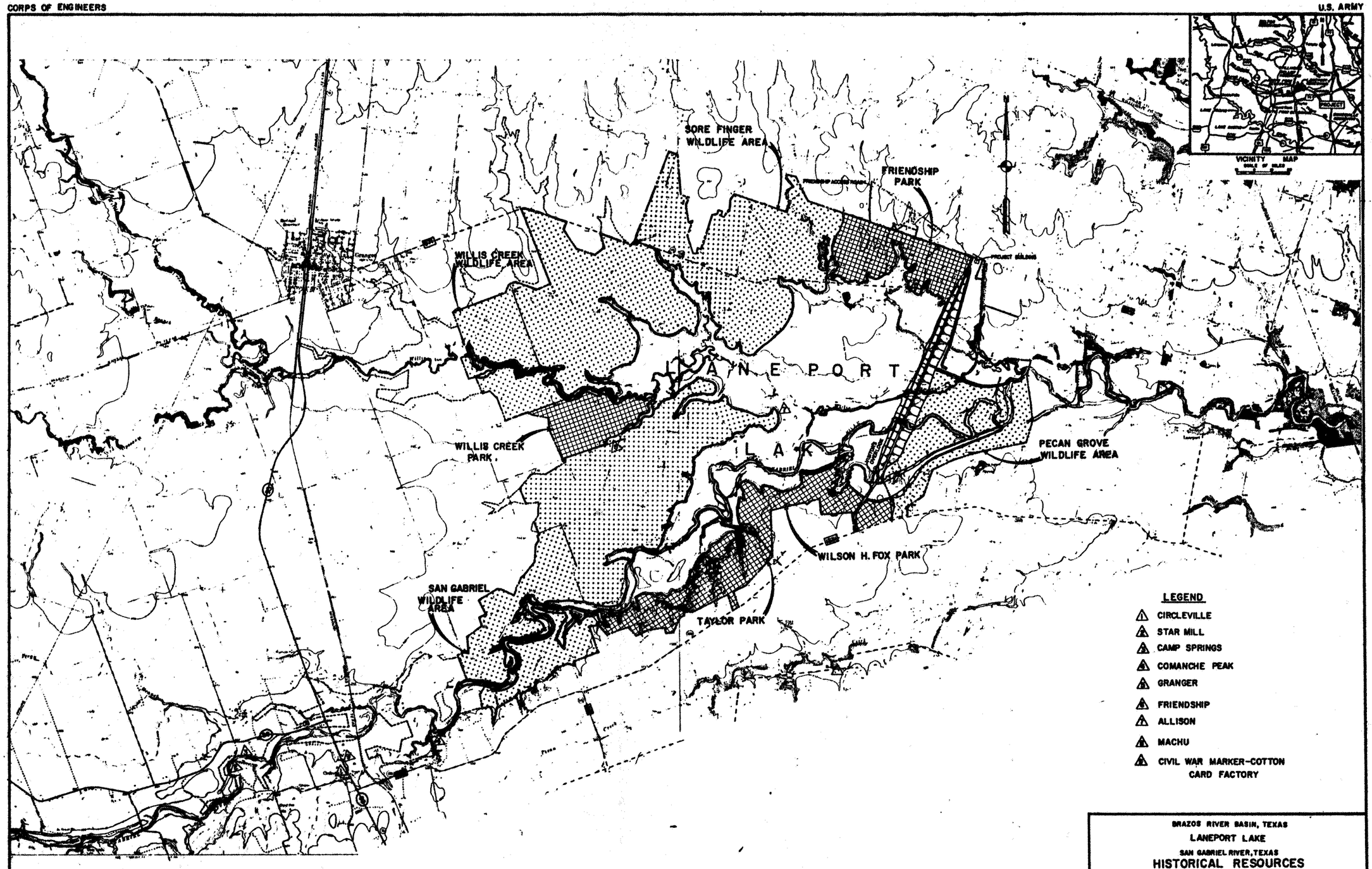
c. Clara Stearns Scarbrough describes many of the notable historical events that occurred in the vicinity of the project in her book, Land of Good Water, Takachue Pouetsu: A Williamson County, Texas, History, published by Williamson County Sun Publishing Company, 1973.

d. Several sites having local historical significance are shown on plate II-1. The more notable historical sites are as follows:

(1) Circleville.- This site, the oldest of the settlements, was established in 1853 on the south bank of the San Gabriel River near the city of Granger. Several old buildings are all that remain today.

CORPS OF ENGINEERS

U.S. ARMY



LEGEND

- CIRCLEVILLE
- STAR MILL
- CAMP SPRINGS
- COMANCHE PEAK
- GRANGER
- FRIENDSHIP
- ALLISON
- MACHU
- CIVIL WAR MARKER-COTTON CARD FACTORY

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

HISTORICAL RESOURCES

SCALE OF FEET

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.18
MASTER PLAN

FILE: BRAZ. NO.18 PLATE IX-1

It was here that Joseph Eubank established a cotton and wool card factory used during the Civil War. A State Civil War marker is located 6 miles north of Taylor near the San Gabriel River bridge.

(2) Star Mill.- In 1857 David H. McFadin and Christopher Columbus built the Star Mill one-half mile west of Circleville on the south bank of the San Gabriel River. This mill served the people from the east and central part of the county for many years.

(3) Camp Springs.- Camp Springs, also called Campground Springs, was an old Indian campsite. It was so named because of the springs which fed the river. The Star Mill was built a short distance above these springs. After the Civil War, this was a popular picnic ground for people of the area.

(4) Comanche Peak.- Comanche Peak is a bluff located on the San Gabriel River where Indians were said to run buffalo over the bank. This site is occupied by the Comanche or McFadin Cemetery located approximately 1-mile east of Circleville.

(5) Granger.- The city of Granger was established in 1882 by the construction of the railroad. It enjoyed several decades of very rapid growth and development. Granger is of historical interest because of its old brick buildings, including a handsome opera house which was built in 1905.

(6) Friendship.- The small farming community of Friendship was settled in the latter part of the nineteenth century. Because of the land requirements for Laneport Lake, the residents of this community have been resettled. Friendship Park has been named for this small town.

(7) Allison.- Eliha Crosswell Allison settled this small community near the confluence of the San Gabriel River and Willis Creek in 1847. Allison's school, church and gin were destroyed by a flood in the early nineteen-hundreds. The Allison cemetery is the only remnant of the old community.

(8) Machu.- Machu was a small farming community named for Paul Machu. It was located near the Machu cemetery which is all that remains today. This cemetery will be relocated in the near future.

4-04. Geologic resources.- Several distinct geological formations are found throughout the San Gabriel Basin. Lower Cretaceous, Upper Cretaceous, and Eocene formations have been identified by geologists.

In the western part of the San Gabriel Basin, Lower Cretaceous formations are exposed. However, downward faulting near the central portion of the San Gabriel Basin, in the vicinity of Georgetown, reduced these formations to an underground position. From this point east through the watershed, underground Upper Cretaceous formations dominate. The Upper Cretaceous formations include (in order from west to east) Eagle Ford, Austin, Taylor, and Navarro. The general strike for these units is northeast-southwest, and all dip to the southeast. Because all geologic formations in the project area are underground, there are no exposed geologic places of interest. The environmental and engineering geological properties of the geologic formations found in the project area are listed in table IV-1.

4-05. Scenic resources.- The major scenic resources of the project area will be the water provided by the proposed lake. Scenic resources upstream from the proposed damsite consist of a cultivated flood plain sparsely covered with native trees or grasses. The tailwater region will be characterized by a narrow corridor of native grasses and large trees along the stream banks. Large deciduous trees such as cottonwood, willow, and native pecan are found in the downstream area. All scenic resources in the project area, although of comparatively moderate value, will be preserved where possible. In addition, enhancement of the scenic resources will be accomplished through beautification measures planned for the project.

4-06. Soils.-

a. Project area.- The soils within the project area have formed from native prairie grass conditions. Most of the area is now in cultivation except along the larger streams. The predominant soils are clayey varieties, with the Houston Black soil series predominating. The proposed lake will inundate two basic soil series: the Frio and the Houston Black. The major soil series associated with the surrounding project lands include the Houston Black, Heiden, Altoga, Ferris-Heiden, and in smaller amounts, the Lewisville and Patrick. The project soils survey maps are shown in plates IV-2 and IV-3. Because of the general site characteristics and topography, the project can be divided into lowlands and uplands.

(1) Lowland.- The principal soil series within this zone is the Frio series, which is a well drained, moderately permeable, calcareous silty clay. It is dark brown to gray in color, and is associated with slopes of mainly less than 1 percent. It is restricted to the San Gabriel River, its main tributary Willis Creek, and its smaller tributaries. For all practical purposes, the land that will be inundated by the proposed lake will consist of the Frio soil series.

(2) Upland.- The principal soil series associated with the uplands is the Houston Black. This series is a member of the fine, montmorillonitic, thermic family of Udic Pellusterts. The Houston Black soils are 3.5 to 5 feet deep, moderately well drained calcareous

clays. Surface runoff is slow to rapid. Water enters the soil rapidly when the soil is dry and cracked and very slowly when it is moist. The color varies from gray to mottled olive brown and gray. Approximately 90 percent of the soils to be inundated are in the Houston Black soil series.

b. Parks.-

(1) Friendship Park.- The shoreline at the top of the conservation pool will be composed primarily of the soils of the Houston Black series. The upland areas of the park have a 3 to 8 percent slope and consist of soils of the Heiden series. This soil is a deep calcareous clayey soil with a high erosion potential. Both the Houston Black and the Heiden soils possess soil characteristics that impose several severe use limitations.

(2) Wilson H. Fox.- This park is characterized by several heterogeneous soil series. The upland soils consist of Patrick, Lewisville, and Altoga silty clays, and Heiden and Houston Black clays. These soils range from moderately high to low fertility, with soil depths varying from shallow to deep. The shoreline areas, with slopes ranging in grade from 3 to 20 percent, consist of eroded Altoga and Ferris-Heiden soils. Altoga soils are well drained, light-colored silty clays. The Ferris-Heiden soils have a dark grayish-brown, calcareous clayey texture. The soils in this park have moderate to severe use limitations that will require careful land use planning.

(3) Taylor Park.- Altoga, Ferris-Heiden, and Houston Black soil series are found along the shoreline at the top of the conservation pool. The soils in the upland area of the park consist primarily of silty clay soils such as Altoga, Lewisville, and Patrick. Houston Black clays and Karnes clay loams are also found in the upland areas. Taylor Park, like Wilson H. Fox Park has a variety of soils with use limitations that will require prudent planning, coordinating, and management.

(4) Willis Park.- Willis Park is located on upland soils immediately adjacent to Willis Creek. The principal soil found in the park boundary belongs to the Houston Black series. Silty clays belonging to the Altoga series are found along the shoreline. Because of the limitations imposed by this soil series, wise land-use planning and good management techniques must be applied to properly develop the park.

c. Soil limitations and use.- Certain soil characteristics impose slight to severe limitations on recreational development, engineering, and land management. The ability of the various soil series to endure certain uses was determined from soil survey information provided by the Soil Conservation Service. Soil characteristics, use, and limitation information by soil series is presented in table IV-2. The information provided in table IV-2 was used as the basis for determination of land-use planning and land carrying capacity.

Table IV-1

ENVIRONMENTAL AND ENGINEERING GEOLOGICAL PROPERTIES OF INDIVIDUAL STRATIGRAPHIC UNITS UNDERLYING THE SAN GABRIEL RIVER WATERSHED

System	Formation	Description	Slope stability	Foundation properties	Infiltration properties	Water bearing properties	Excavation difficulty
Cretaceous	Navarro	Clays, clay sands, and clay marls	Fair to poor: shoring required	Fair	Good: variable because of heterogenous nature of material	Yields some potable water	Can be removed by conventional equipment
	Eagle Ford	Shale, limestone flags	Very poor in upper non-calcareous section (shoring needed) to good in lower flaggy section	Fair to good	Poor	Yields no potable water	Upper section easily removed with conventional equipment; flaggy section may require some blasting
	Austin	Chalky limestone with bentonite seams	Good	Good	Fair: along fissures and joints	Yields no water	May require some blasting
	Taylor	Shale and calcareous marl	Fair to poor: shoring required		Poor: is adequate for small septic tank systems except when saturation occurs	Yields small amounts of water from sandy phases	Can be removed by conventional equipment

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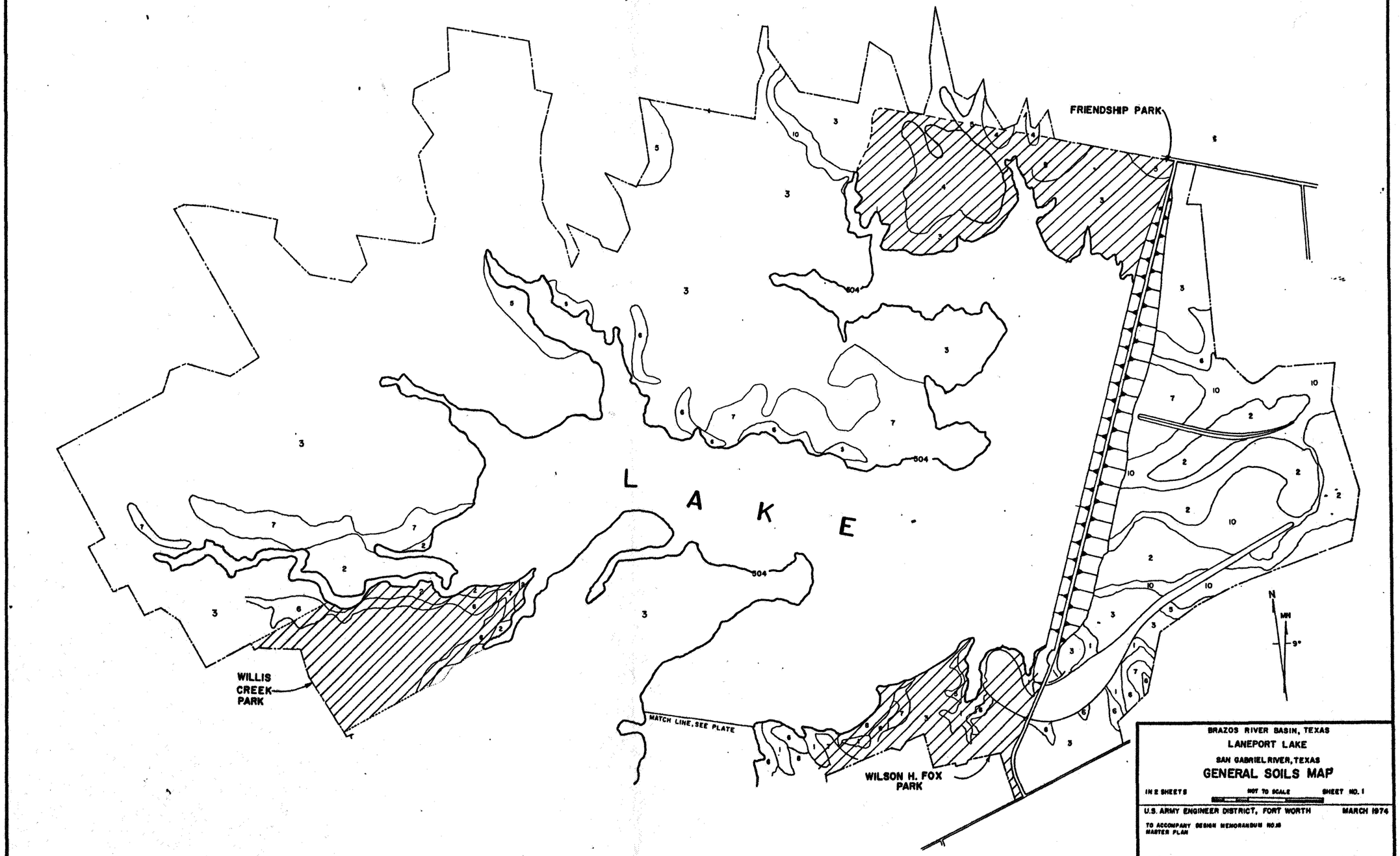


BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

GENERAL SOILS MAP

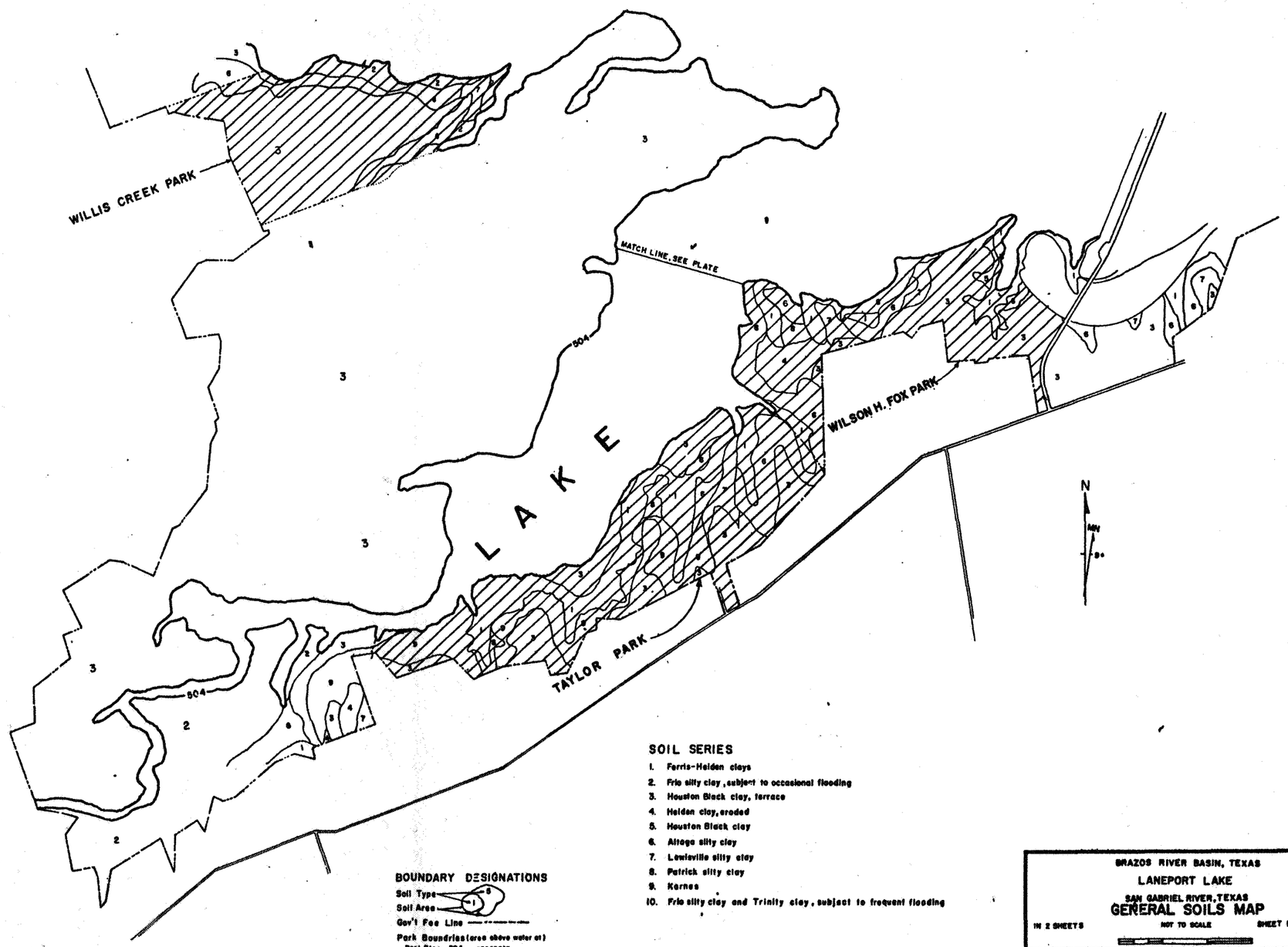
IN 2 SHEETS — NOT TO SCALE — SHEET NO. 1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.18 MASTER PLAN

FILE, BRAZ, NO.18 PLATE IV-2

CORPS OF ENGINEERS U.S. ARMY



SOIL SERIES

1. Ferris-Heiden clays
2. Frio silty clay, subject to occasional flooding
3. Houston Black clay, terrace
4. Heiden clay, eroded
5. Houston Black clay
6. Altoga silty clay
7. Lewisville silty clay
8. Patrick silty clay
9. Karnes
10. Frio silty clay and Trinity clay, subject to frequent flooding

BOUNDARY DESIGNATIONS

Soil Type 9
Soil Area 1
Gov't Fee Line
Park Boundries (area above water at)
Post Elev- 504
Post Elev- 512

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

GENERAL SOILS MAP

IN 2 SHEETS NOT TO SCALE SHEET NO. 2

U.S. ARMY ENGINEER DISTRICT, FORT WORTH MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.18 MASTER PLAN

FILE BRAZ. NO.18 PLATE IX-3

Table IV-2

LIMITATIONS* OF SOILS FOR RECREATIONAL DEVELOPMENT - WILLIAMSON COUNTY, TEXAS

Soil series	Recreation: Soil ratings and adverse features affecting: Sewage disposal: Filter fields	Sewage disposal: Lagoons	Construction	Traffic-ways	Camp areas	Picnic areas	Playground	Paths and trails	Wildlife suitability	Range sites, production, and plants
Altoga silty clay (6)	Moderate: permeability	Moderate: percolation rate	Moderate: shrink-swell potential; low corrosivity (concrete)	Severe: poor traffic supporting capacity	Severe: soil texture	Severe: poor traffic supporting capacity	Severe: soil texture, slopes greater than 6 percent	Severe: muddy when wet; soil texture	Openland: well suited Woodland: suited	Rolling blackland: 3,800 to 6,500 lbs**; Excellent condition: Indiangrass, little and big bluestem, switchgrass, Florida paspalum; Pasture group: (0-5 percent slopes) high potential for Kleingrass, improved Bermudagrass, Indiangrass, and weeping lovegrass.
Ferris-Heiden clays (1)	Severe: very slow permeability	Slight: 1-2 percent slopes; Moderate: 7-20 percent slopes	Severe: high corrosivity; high shrink-swell potential	Severe: high swell potential; poor traffic supporting capacity	Severe: poor trafficability; slow permeability	Severe: poor trafficability	Severe: poor trafficability	Severe: poor trafficability	Openland: suited Woodland poorly suited	Rolling blackland site: 4 to 7,000 lbs**; Excellent condition: Big and little bluestem, Indiangrass, switchgrass, sideoats grama, and perennial forbs; Pasture group: (1 to 5 percent slopes) high potential for improved Bermudagrass and Kleingrass.
Frio silty clay or silty clay loam (2,10)	Severe: permeability; flood hazard	Slight	Moderate: shrink-swell; low-corrosivity (concrete)	Moderate: traffic supporting capacity, shrink-swell	Moderate: permeability texture	Moderate: trafficability; texture	Moderate: trafficability; texture	Moderate: trafficability; texture	Openland: suited Woodland: well suited	Bottomland site: 3,500 to 6,500 lbs**; Excellent condition: Big and little bluestem, switchgrass, Indiangrass, and Texas wintergrass; Pasture group: medium potential for improved Bermudagrass, Johnsongrass and Kleingrass.
Heiden clay (4)	Severe: permeability 15-20 percent slopes	Slight: 0-2 percent slopes; Moderate: 2-7 percent slopes; Severe: 7-20 percent slopes	Severe: shrink-swell potential; low-corrosivity (concrete)	Severe: shrink-swell potential traffic supporting capacity	Severe: clay texture; very slow permeability	Severe: trafficability; muddy when wet	Severe: trafficability; soil compaction	Severe: trafficability; muddy when wet	Openland: suited Woodland: well suited	Rolling blackland: 4 to 8,000 lbs.** Excellent condition: Indiangrass, big and little bluestem, switchgrass, sideoats grama, and forbs; Pasture group: potential high for improved Bermudagrass or Kleingrass; medium production King Ranch bluestem and Kleberg bluestem.
Houston Black clay (3,5)	Severe: very slow permeability	Slight: 0-2 percent slopes; Moderate: more than 2 percent slopes	Severe: very high shrink-swell; high corrosivity	Severe: very poor traffic supporting capacity	Severe: clay texture; very slow permeability	Severe: poor trafficability; clay texture	Severe: poor trafficability; clay texture	Severe: poor trafficability	Openland: slight Woodland: severe, no woodland	Rolling blackland: 6 to 10,000 lbs.** Excellent condition: Big and little bluestem, Indiangrass, and switchgrass; Pasture group: adapted species are improved Bermudagrass and Kleingrass

Table IV-2 (continued)

Soil series	Recreation: Soil ratings and adverse features affecting: Sewage disposal: Filter fields	Sewage disposal: Lagoons	Construction	Traffic-ways	Camp areas	Picnic areas	Playground	Paths and trails	Wildlife suitability	Range sites, production, and plants
Karnes clay loam (9)	Moderate: permeability	Moderate: permeability 2-7 percent slopes; Severe: over 7 percent slopes	Moderate: shrink-swell potential 4-8 percent slopes; Severe: more than 8 percent slopes	Moderate: traffic supporting capacity from 6-15 percent slopes	Moderate: trafficability	Moderate: trafficability	Moderate: trafficability	Moderate: clay loam surface texture; trafficability	Openland: suited Woodland: well suited	Bottomland site: 3,500 to 6,500 lbs** Excellent condition: Big and little bluestem, switchgrass, Indiangrass, and Texas wintergrass; Pasture group: medium potential for improved Bermudagrass, Johnsongrass, and Kleingrass
Lewisville silty clay (7)	Slight: permeability	Slight to Moderate: permeability	Severe to Moderate: shrink-swell potential corrosivity; bearing strength	Severe: traffic supporting capacity; permeability	Severe: trafficability soil texture	Severe: soil texture	Severe: soil texture slope	Severe: trafficability; soil textire	Openland: suited Woodland: suited	Rolling blackland: 3 to 5,000 lbs** Excellent condition: Indiangrass, big and little bluestem, switchgrass, Florida paspalum and Virginia wildrye; Pasture group: adapted species include improved Bermudagrass, Johnsongrass King Ranch bluestem, and lovegrass
Patrick silty clay (8)	Slight: permeability	Slight to Moderate: permeability	Severe to Moderate: shrink-swell potential corrosivity; bearing strength	Severe: traffic supporting capacity; permeability	Severe: trafficability soil texture	Severe: soil texture	Severe: soil texture slope	Severe: trafficability; soil texture	Openland:: fair Woodland: good	Chalky ridge: 2 to 5,000 lbs** Excellent condition: little bluestem, Indiangrass, sideoats grama, Texas wintergrass, mesquite and liveoak; Pasture group: medium to high potential for improved Bermudagrass and Kleingrass

*Slight: The soil limitations are not serious; they are easy to overcome.
Moderate: It is generally feasible to overcome or correct soil limitations by means that are in general practice.
Severe: Use of the soil is questionable because the limitation is difficult to overcome.

**Pounds of estimated production of air dry herbage per acre.

4-07. Vegetation.-

a. Project area. The authorized project lands are presently under intensive cultivation. As a result of long periods of cultivation, the vegetative landscape is conspicuously absent of native trees and grasses. The exception is found along the river bottoms of the San Gabriel River and Willis Creek. The vegetative resources can be better analyzed by subdividing them into grass-forb and tree-shrub categories.

(1) Grasses and forbs.- The principal grasses native to this region called Blackland Prairies are big, little, and silver bluestem; Indian grass; dropseeds; buffalograss; Texas wintergrass; and several gramas. Little bluestem is the climax dominant. Several forbs are also common to this region; some of the more common forbs include milkweeds, common sunflower, and Texas paintbrush. Where the climax grasses have been overgrazed, annual weeds, less desirable grasses, forbs, and woody plants increase or invade. Because of the great erosion potential created by the exposure of large acreages, a revegetation program should be implemented as soon as possible. Some suggested species which are appropriate for replanting of the areas above the pool elevation are native grasses such as little and big bluestem, buffalograss, and gramas. Several varieties of Bermudagrass and weeping lovegrass are also recommended. Bermudagrass and buffalograss are recommended for planting at the lower elevations due to their ability to tolerate longer periods of inundation.

(2) Trees and shrubs.- Native trees within the proposed project area are found along the larger streams where topography or frequent flooding has prevented cultivation. Sore Finger Creek, Willis Creek, and the main San Gabriel River provide the primary sanctuary for the native trees and shrubs. The overflow areas support stands of eastern cottonwood, willow, American and winged elm, pecan, and bois d'arc. In areas that are frequently flooded, fair stands of young cottonwood and willow have become established. Shrubs such as white brush, buckeye, and flameleaf sumac are found in less frequently flooded areas. Tree distribution in the upland areas is confined to road rights-of-way, old fence rows, and area homesites. Some of the species around homesites, which originated from early plantings, consist of pecan, walnut, catalpa, and redbud. Other important upland trees are elm, hackberry, honey locust, and mesquite. A tree planting program will be necessary to improve the quality of the public-use areas.

4-08. Fisheries resources.- The Bureau of Sport Fisheries and Wildlife reports that the existing fishery resources on the San Gabriel River are composed of warmwater species such as largemouth and spotted bass, warmouth, channel and flathead catfish, bluegill, white crappie, green sunfish, and several species of minnows. Some of the less important fish found in the San Gabriel River are carp,

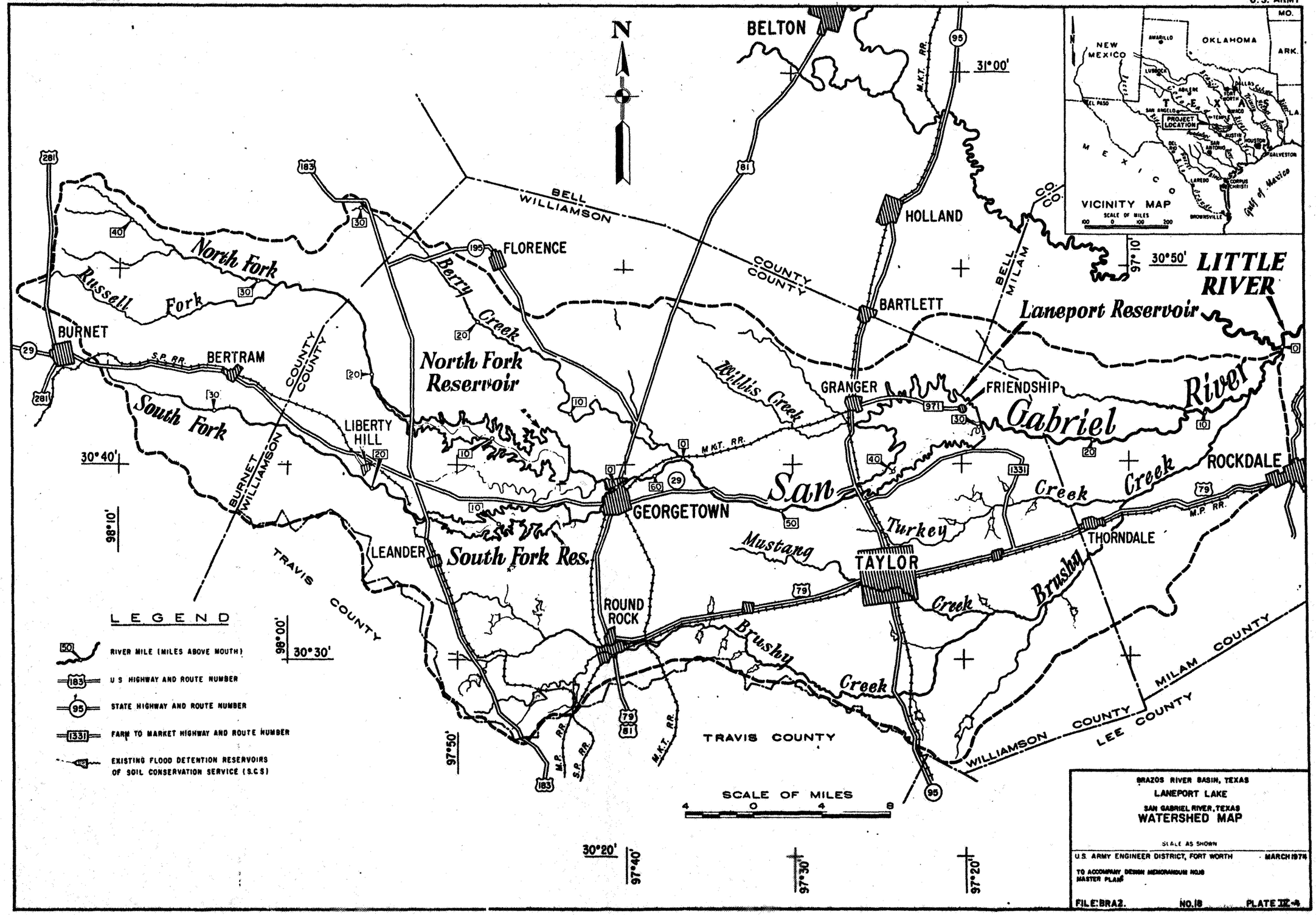
bullheads, suckers, gar, and shad. The latter group of fish is usually classified as rough fish. In the early years of impoundment, fish production can be expected to increase rapidly as the rising water creates good spawning areas. Largemouth bass, white crappie, and channel catfish will provide the best fishing in the early years of the lake. In later years, less desirable fish such as gar, drum, and gizzard shad will predominate unless good operational procedures and prudent fish management are practiced.

4-09. Wildlife resources.- Man's influences through his developments and residual wastes have caused significant reductions in wildlife habitat and food supplies; consequently, a reduction in resident populations of all categories of wildlife has occurred. Those wild animals which remain in the project area are primarily restricted to the native habitats found along the river bottomlands. A report by the Bureau of Sport Fisheries and Wildlife, dated 28 April 1967, revealed that the principal species of wildlife indigenous to the project area included bobwhite quail, mourning dove, fox squirrel, cottontail rabbit, raccoon, opossum, and ring-tailed cat. Big game species (white-tailed deer) are virtually nonexistent in the project area. During periods of waterfowl migration, the project is expected to receive considerable use. Some mallard and pintails are expected to winter on the lake and feed in nearby grain fields.

4-10. Water resources.- The San Gabriel River watershed, as shown on plate IV-4 has a total drainage area of 1,355 square miles, of which 709 square miles are tributary to the Laneport project. Practically all flows from the drainage area are from surface runoff. There is little contribution from seepage or springs. Because of the generally hilly topography, character of the soils, and nature of the rainfall in the upper reaches of the San Gabriel Basin, the drainage area is conducive to rapid runoff and flooding. Periods of rapid runoff occur frequently and at almost any time of year. The U.S. Geological Survey at Georgetown gage on the San Gabriel River reports an average annual runoff for the 36 year period (1934-1970) of 4.73 inches.

CORPS OF ENGINEERS

U.S. ARMY



LEGEND

- 50 — RIVER MILE (MILES ABOVE MOUTH)
- 183 — U S HIGHWAY AND ROUTE NUMBER
- 95 — STATE HIGHWAY AND ROUTE NUMBER
- 1331 — FARM TO MARKET HIGHWAY AND ROUTE NUMBER
- EXISTING FLOOD DETENTION RESERVOIRS OF SOIL CONSERVATION SERVICE (S.C.S)

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

WATERSHED MAP

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT, FORT WORTH · MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.8 MASTER PLAN

FILE: BRA2. NO.18 PLATE IX-4

V
FACTORS INFLUENCING AND RESTRICTING RESOURCE DEVELOPMENT AND MANAGEMENT

V - FACTORS INFLUENCING AND RESTRICTING RESOURCE DEVELOPMENT AND MANAGEMENT

5-01. General.- The aim of the master plan is to balance the development of recreation facilities and the available project resources to ensure the wise use of the project's resources in the best interest of the public. The formulation of this plan requires the determination, as far as possible, of project resources and the factors influencing and restricting their development and management. The interrelationship between the factors discussed in this chapter and the project resources discussed in chapter IV is vital in determining the recreational-use potential, the extent of project resource development necessary, the ability of the project to sustain intensive use, and the plans for resource development. Although various factors may be operative in particular situations, the factors presented in this chapter seem to be operative in general and to signify the greatest impact upon the development and management of project resources.

5-02. Day-use zone of origin.- Experience at completed lake projects in the Fort Worth District and at similar projects elsewhere suggests that the primary recreational use of these projects falls within the day-use category. The term "day-use zone of origin" refers to a 2-hour or 100-mile driving range which will allow driving to the project, participating in recreational activities, and returning home the same day. Therefore, an irregular area with a boundary approximately 100 road miles from the project was evaluated. It was determined from the evaluation that the "day-use market area" (the geographical area from which over 80 percent of the day-users originate) would be within 40 road miles of the project (plate V-1). Consequently, the examination of the factors influencing and restricting resource development and management was centered primarily around the project and the surrounding day-use market area.

5-03. Effect of socioeconomic factors.-

a. Existing population characteristics.- The existing population of the day-use market area is a mixture of urban and rural populations. The present large urban populations are distributed on an outer fringe of the day-use market in Austin, Temple, and Killeen. The immediate vicinity of the proposed lake is rural with a few small scattered towns. Eighty percent or more of the day-use visitation will be from Bastrop, Bell, Lee, Milam, Travis, and Williamson Counties. The estimated 1970 population from these counties totals 494,629. Approximately 84 percent of the total population is found in urban areas. The large urban areas of Austin, Temple, and Killeen, and

the smaller nearby urban centers such as Georgetown, Granger, Rockdale, Taylor, and Cameron, will be the primary sources of day-use visitation. Population data for the market area are shown by county in table V-1 and by city in table V-2.

b. Projected population characteristics.- The estimated population of the six counties composing the day-use market area has increased from 383,414 in 1960 to 494,629 in 1970. During this 10-year period, the population of the day-use market area has increased over 27 percent. The greatest increase in population has occurred in Bell and Travis Counties (table V-1).

Table V - 1

MARKET AREA POPULATION DATA BY COUNTIES
Texas Almanac (1972-1973)

County	Total Population 1960	Total Population 1970	Percent Change from 1960 to 1970	Total Urban Population	Percent of Total
Bastrop	16,925	17,297	+ 2.2	11,449	66.2
Bell	94,097	124,483	+32.3	105,555	84.8
Lee	8,949	8,048	-10.0	4,409	54.8
Milam	22,263	20,028	-10.0	10,201	50.9
Travis	212,136	295,516	+39.3	264,499	89.5
Williamson	35,044	37,305	+ 6.5	18,822	50.5
	389,414	494,629		414, 935	

Table V - 2

POPULATION DATA FOR CITIES IN THE MARKET AREA

City	County	Total Population 1960	Total Population 1970	Percent Change from 1960 to 1970
Austin	Travis	186,545	251,808	+35.0
Belton	Bell	8,163	8,696	+ 6.5
Cameron	Milam	5,640	5,546	- 1.7
Elgin	Bastrop	3,511	3,895	+10.9
Georgetown	Williamson	5,218	6,395	+22.6
Gidding	Lee	2,821	2,783	- 1.3
Killeen	Bell	23,377	35,507	+51.9
Rockdale	Milam	4,481	4,655	+ 3.9
Taylor	Williamson	9,434	9,616	+ 1.9
Temple	Bell	30,419	33,431	+ 9.9

CORPS OF ENGINEERS

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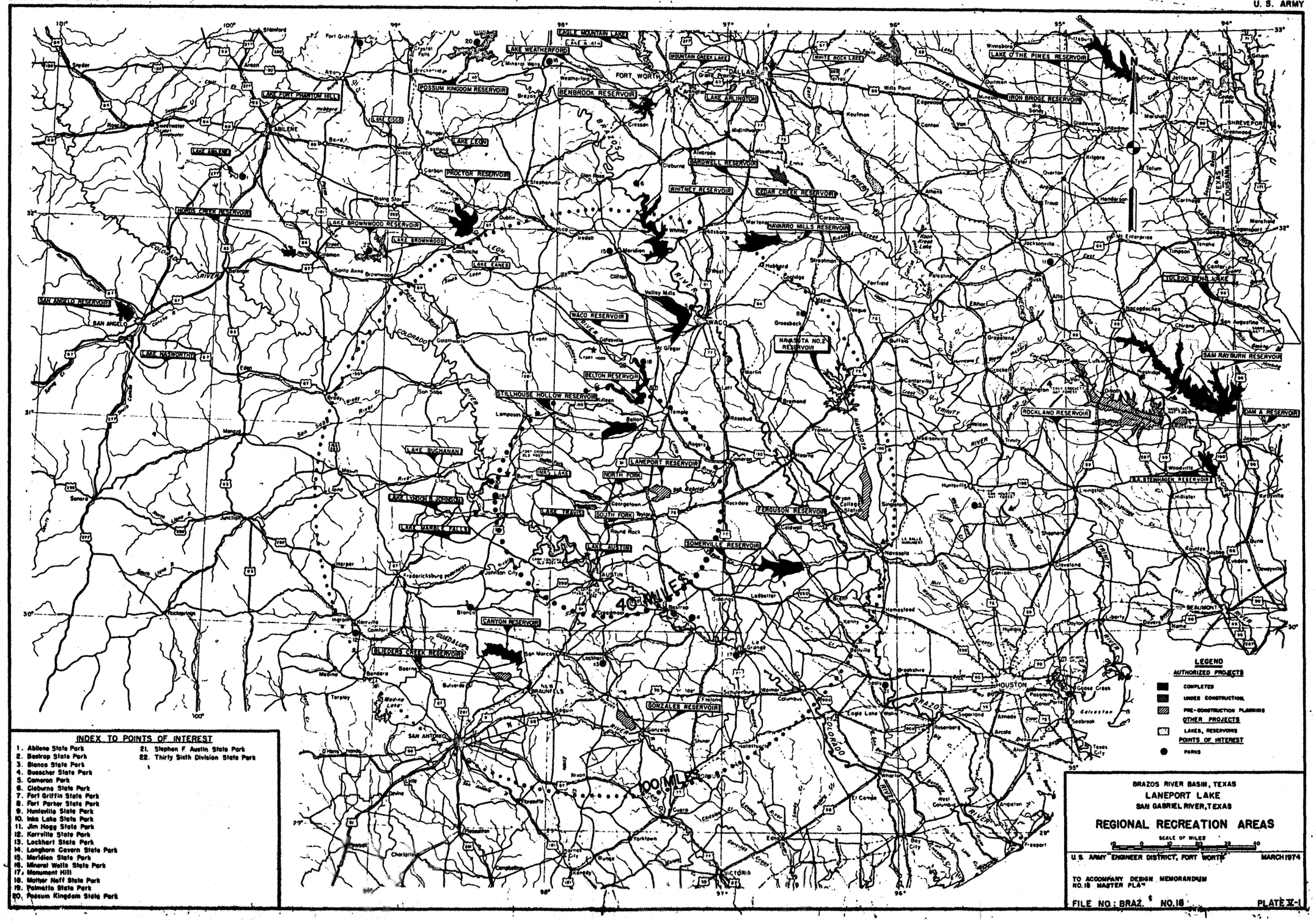

INDEX TO POINTS OF INTEREST

1. Abilene State Park
2. Bastrop State Park
3. Blanco State Park
4. Buescher State Park
5. Cameron Park
6. Cleburne State Park
7. Fort Griffin State Park
8. Fort Parker State Park
9. Huntsville State Park
10. Inks Lake State Park
11. Jim Hogg State Park
12. Kerrville State Park
13. Lockhart State Park
14. Longhorn Cavern State Park
15. Meridien State Park
16. Mineral Wells State Park
17. Monument Hill
18. Mother Neff State Park
19. Palmetto State Park
20. Possum Kingdom State Park
21. Stephen F Austin State Park
22. Thirty Sixth Division State Park

LEGEND

AUTHORIZED PROJECTS

- COMPLETED
- UNDER CONSTRUCTION
- PRE-CONSTRUCTION PLANNING

OTHER PROJECTS

- LAKES, RESERVOIRS

POINTS OF INTEREST

- PARKS

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

REGIONAL RECREATION AREAS

SCALE OF MILES 0 5 10 20 30 40

U.S. ARMY ENGINEER DISTRICT, FORT WORTH MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.18 MASTER PLAN

FILE NO: BRAZ. NO.18 PLATE X-1

This rapid increase in population has been due primarily to the rapid growth of the large urban centers of Austin, Temple, and Killeen. Population growth in the day-use market area is expected to make notable gains in the future. The greatest increases are expected to occur in the large metropolitan areas, and the slowest growth is expected in the rural portion of the day-use market area. The significance of the present and predicted population growth is the associated increase in public demand for outdoor recreation.

c. Growth patterns.- Since the 1940's the general trend has been movement away from the rural areas to the metropolitan areas. This trend has been evident in the day-use market area. It is expected to continue, but at a slower rate. Major changes have also taken place within the urban centers in the day-use market area. Because of increased income, racial problems, and other sociological elements, the general population of the large urban centers has migrated from the centers of cities to suburban areas. The net result of this trend has been a large radial expansion and encroachment upon adjacent rural areas.

d. General economy.- The economy in the immediate vicinity of the proposed lake is based primarily on farming. The upstream portion of the watershed above Georgetown is basically dependent upon ranching, supplemented by farming and diversified industries. In the downstream portion of the watershed, farming and livestock are better balanced with industry. The general economy in the outer fringe of the day-use market area is based on education, State and Federal employment, tourism, conventions, research, and industry associated with large metropolitan areas.

e. Real income per capita.- The 1972 effective per capita income for the day-use market area varied from a low of $2,364 in Milam County to a high of $3,593 in Travis County. The per capita income has steadily increased over the years and is expected to increase at a much more rapid rate in the future. An average projected per capita income for the counties composing the day-use market area is shown in table V-3.

Table V - 3

PROJECTED PER CAPITA INCOME*
Economic Area 129

1980	1990	2000	2010	2020
$3,765	$5,057	$7,014	$9,457	$12,655

*Source: Economic Activity in the United States by BEA Economic Areas, Historical and Projected 1929-2020, Volume 2, United States Water Resources Council, Washington, D.C.

Along with changes in average incomes, there are shifts in the distribution of income which make it economically possible for more people to engage in different kinds of outdoor activities. Table V-4 shows the 1971 distribution of income by counties in the day-use market area. It should be noted that Travis and Bell Counties have a high percentage of households with higher incomes. This is primarily the result of the large metropolitan centers located in these counties.

Table V - 4

PERCENTAGE OF HOUSEHOLDS BY CASH INCOME GROUPS*

Income Group	Bastrop	Bell	Lee	Milam	Travis	Williamson
0-$3,000	31.4	19.8	38.2	38.3	17.3	31.9
$3,000-$5,000	18.4	15.4	19.0	17.8	13.9	19.0
$5,000-$8,000	20.8	29.7	19.0	16.8	21.9	21.9
$8,000-$10,000	9.0	12.2	8.8	8.7	12.9	10.1
$10,000-$15,000	13.0	14.4	10.8	12.8	19.5	11.1
$15,000-up	7.4	8.5	4.2	5.6	14.5	6.0

*Source: 1972 Survey of Buying Power, "Sales Management and Marketing Magazine," 10 July 1972.

Bastrop, Lee, Milam, and Williamson Counties reflect the traditional agrarian economy, with a high percentage of the households having low incomes. As the day-use area becomes more urbanized, the household incomes should increase. As a result, a greater proportion of this higher income will be discretionary, with a larger proportion being available for outdoor recreation than is true today.

f. Leisure time.- The average workweek of the day-use market area has declined considerably in the past 70 years. In 1900, the average workweek was about 60 hours. Today the workweek has declined to about 40 hours. The net result has been increased leisure time. Although it is anticipated that there will be continued gradual decline in the average workweek, leisure time will be most significantly changed by the recent trend to shift to a 4-day workweek. This trend is expected to occur during the life of the project. With a larger amount of leisure time available each week, it is expected that an increased amount of participation in outdoor recreation will occur at the project.

5-04. Need for project recreation.- Determination of recreation needs is based on the demand and supply characteristics of the six counties that comprise the day-use market area. Need arises when the demand for recreational opportunities exceeds the supply of recreational opportunities. The "State Comprehensive Outdoor Recreation Plan" (SCORP) recognized that in the region in which Laneport Lake is located there are deficiencies in outdoor recreation facilities. Deficiencies mentioned in SCORP include hiking trails, boat ramps, equestrian trails, and camping and picnicking facilities. The need for these recreation opportunities has been shown, but the needs will not be met completely by this project.

5-05. Interstate demand.- Visitation from other States is expected to be minimal due to the project's location. With Interstate Highway 35 passing relatively near Laneport Lake, there will be the potential for visitation by transient campers. The lake will be a possible stopover point for visitiors traveling to Austin from the north or to Temple from the south.

5-06. Accessibility.-

a. Roads.- Interstate Highway 35 west of the lake is the major regional route and connecting link between the Dallas-Fort Worth-Waco, Temple-Austin, and San Antonio areas. U.S. Highway 79 and Farm to Market Road 1331 parallel the lake to the south. Access to the northern portion of the lake will be provided by Farm to Market Road 971. State Highway 95 crosses the upper reaches of the lake to the west. Access to the lake is exceptionally good because of the abundance of existing improved and unimproved county roads.

b. Railroads.- The lake area is served by the Southern Pacific, Texas and Pacific, Missouri Pacific, Missouri-Kansas-Texas, and Georgetown Railroads. The nearest railhead is located at Granger, Texas.

c. Air.- There are no commercial air transportation companies serving the lake area. The nearest airport facilities are at Georgetown and Taylor, Texas. The closest airports capable of handling commercial air transportation are located in Austin and Temple, Texas.

5-07. Existing and prospective alternative water-oriented recreation resources.- Because of the difficulty in determining the amount of all types of recreation alternatives and the degree to which each type constitutes a different recreation commodity, alternative recreation opportunities considered were primarily restricted to water-oriented outdoor recreation opportunities. Fortunately, the per capita use rate curve determination reflects the existing and prospective alternative water-oriented recreation opportunities available to the market area. A list of the major lakes in the market area is presented in table V-5.

5-08. Water quality of pool.- Available data suggests that the lake will have acceptable water quality. The exception will occur during periods of excessive flooding. There are several major sources of impurities that will influence the pool water quality:

(1) Inflows of natural calcium bicarbonates,
(2) Siltation from surface runoff,
(3) Inflows of agricultural pollution,
(4) Pollution from livestock confined in the stockyard at Georgetown, and
(5) Contamination of water by domestic waste.

Table V - 5

MAJOR LAKES IN THE MARKET AREA

Name	County	Administering Agency	Project Purpose	Surface Acres
Belton Lake	Bell, Coryell	USAE	M-FC-IN IR-R-MI	12,300
North Fork Lake (Under Construction)	Williamson	USAE	FC-C-R	1,310
South Fork Lake (Authorized)	Williamson	USAE	FC-C-R	1,160
Stillhouse Hollow Lake	Bell	USAE	M-IN-IR-FC R-MI	6,430
Somerville Lake	Lee, Burleson, Washington	USAE	M-IN-IR-FC R-MI	11,460
Tennessee Colony (Authorized)		USAE	FC-C-R	97,960
Lake Travis	Burnet, Travis	Lower Colorado River Authority	M-IN-IR-MI P-FC-R	18,930
Lake Austin	Travis	"	M-IN-P	1,830
Lake Bastrop	Bastrop	"	IN	906
Lake Marble Falls	Burnet	"	P	780
Lake Buchanan	Burnet, Llano, San Saba	"	M-IR-MI-P	23,060
Lake Lyndon B. Johnson	Burnet, Llano	"	P	6,375
Lake Waco	McLennan	USAE	M-FC-C-R MI	7,270
Tradinghouse Creek Lake	McLennan	Texas Power and Light	IN	2,010

Legend:
C - Conservation
FC - Flood Control
R - Recreation
P - Power
M - Municipal
IR - Irrigation
IN - Industrial
MI - Mining, including oil production

The greatest impact of these impurities will be an increase in the fertility level which should improve the fisheries resources by improving the fish habitat. In addition, the lake should be slightly turbid. These factors are not expected to render the water unsuitable for water-based recreation.

5-09. Water quality of tailwater region.- The water quality of the San Gabriel River below the damsite will be determined basically by the quality of the water in the pool and in the headwaters above the damsite. It is expected that the turbidity level of the tailwater region will increase significantly at times during the construction phase of the damsite. During periods of flooding, the water quality is predicted to be reduced considerably.

5-10. Water stratification.- The lake is expected to develop weak to moderate thermal stratification during late June, July, August, and early September, with the most pronounced stratification developing in August. A temperature variation of about 8^{o} C. can be expected between the upper and lower 20 feet below the surface. The thermal stratification is not expected to have a significant impact upon recreation.

5-11. Pool fluctuations.- The pool fluctuations are expected to vary in excess of 20 feet in any 10-year interval. This degree of fluctuation can have varying impacts on usage of the lake. The fluctuation can be expected to have an adverse impact upon the esthetic and recreation aspects of the project during extended periods of drawdown. However, the pool fluctuations should improve the fisheries habitat.

5-12. Drinking water standards.- The water of the San Gabriel River throughout the area studied meets the minimum chemical requirements for drinking water standards of the U.S. Public Health Service. Additionally, the waters of the San Gabriel River are classified as having medium salinity hazard and low sodium hazard according to standards set by the U.S. Salinity Laboratory staff. The water would, therefore, be satisfactory for irrigation.

VI
OUTDOOR RECREATION ATTENDANCE AND FACILITIES

VI - OUTDOOR RECREATION NEEDS AND FACILITIES

6-01. General.- The methodology used for predicting recreation needs follows the instructions presented in ER 1120-2-403, dated 26 March 1970. In essence, the recreation prediction procedure utilizes the "similar project" concept. This technique involves using recreation use information from similar existing projects to project recreation needs at a proposed project.

6-02. Day-use market area evaluation.-

a. Projected population of the day-use market area.- The population within the day-use market area (the geographic area within 40 road miles of the project) was projected from the base year 1980 through the year 2020. These projections were based on the current Series C population projections. A summary of the current projected populations by decade for the years 1980 through 2020 are shown in table VI-1.

Table VI-1

PROJECTED POPULATION IN THE MARKET AREA
(Series C projections)

Decade	Population
1980	580,333
1990	700,265
2000	829,524
2010	972,609
2020	1,128,369

b. Selection of initial per capita use rate.- In order to minimize the chance of an erroneous attendance based on a unique situation, recreation use data from similar projects were pooled to derive a per capita use curve. The selection of an initial per capita use rate curve for this project was made by adjusting and revising the per capita use curve to more nearly fit the prospective project. From the initial per capita use curve, a per capita use rate was found for each zone of influence (table VI-2).

Table VI - 2

PER CAPITA USE RATES FOR DAY-USE MARKET AREA

Zone	Per capita use rates
I (0-10 miles)	8.0
II (11-20 miles)	2.7
III (21-30 miles)	0.9
IV (31-40 miles)	0.3

c. Estimating total initial recreation needs.- After the per capita use rates were found for each zone of influence, the per capita use rates for each county in each zone were determined. The principal city of each county was used as a proxy for the population centroid of the county. The road-mile distance from the centroid to the project was then calculated. The per capita rate multiplied by the county population gives the expected recreation attendance from that county. This process is repeated for all counties within the market area, and the sum of these figures gives the initial recreation (day-use) for the base year 1980 from within the market area. It has been found that the initial recreation needs from within the market area will constitute about 95 percent of the total recreation attendance, with 5 percent originating from outside the market area. From the project survey data, overnight use is estimated to be 9 percent of the total use. The total projected recreational needs (base year 1980) has been estimated to be 767,000 annual recreation days.

d. Projection of potenital recreation needs.- An important part of the recreation analysis of the proposed project is the estimation of potential future recreation use. Although there are many factors that may affect future recreation attendance projections, there are essentially two basic items to be considered: (1) anticipated increase in future per capita use rates, and (2) population projections. Because present recreation participation rates on existing projects are increasing and are predicted to continue increasing, the initial per capita use rate must be adjusted to reflect the anticipated increase in per capita rates by decade. The initial per capita rates were adjusted by the factors presented in table VI-3.

Table VI - 3

ADJUSTMENT FACTORS FOR PER CAPITA USE RATES

1980 - 1.00
1990 - 1.17
2000 - 1.33
2010 - 1.48
2020 - 1.62

Then the adjusted per capita use rates were applied to the population projections to arrive at the projected recreation needs. The total projected recreation needs by decade is shown in table VI-4.

Table VI - 4

PROJECTED RECREATION NEEDS

1980	1990	2000	2010	2020
767,000	1,032,000	1,420,000	1,706,000	2,125,000

6-03. Attendance.- A combination of many related aspects which measure the maximum practical use of the project were studied to determine the optimum capacity. The optimum capacity for the first-stage development was estimated to be 680,000 annual recreation days. Table VI-5 presents the methodology used to determine this capacity. Initial recreation use has also been determined to be 680,000 annual recreation days. All future recreation development is essentially dependent upon the realization of the second-stage development. The optimum capacity for the second-stage development has been estimated to be 1,065,000 annual recreation days.

Table VI - 5

OPTIMUM CAPACITY - FIRST-STAGE DEVELOPMENT

Calculations:
3,985 water acres* ÷ 5.5 acres/boat = 724 boats on lake at one time
724 x 2 (½ boat active) = 1,448 boats (total boats)
1,448 x 3 persons/boat = 4,344 persons on lake at one time
4,344 x 2 (2:1 ratio of the number of land users compared to the number of water users) = 8,688 design day load
8,688 x 26 weekend days = 225,888 summer weekend users ÷ .65 summer weekend visitation rate = 347,520 summer visitation ÷ .51 summer visitation rate = 681,412 optimum capacity. Rounded to 680,000 optimum capacity.

*The water acres represent the average surface acreage during the prime recreation season.

6-04. Recreation facilities analysis.- The recreation facilities analysis in table VI-7 was used only to determine the basic recreation facilities for the first-stage development. The recreation analysis was partitioned into activities such as camping, picnicking, swimming, and boating. A summary of the recreation facilities is presented in table VI-6 .

TABLE VI - 6

FIRST-STAGE DEVELOPMENT
FACILITIES REQUIRED TO SUPPORT THE ANTICIPATED
AVERAGE SUMMER WEEKEND VISITATION

Facility	Initial and optimum development
Picnic units	162
Camping units	156
Boat ramps	14
Beach acreage	0.6

TABLE VI - 7

RECREATION FACILITIES ANALYSIS - FIRST-STAGE DEVELOPMENT

Design load computations: 8,670 design day load

Project: Laneport Lake

Total annual attendance: 680,000 initial and optimum visitation

Design day load:

Total annual attendance	680,000
Percentage of visits during summer months (51%)	x .51
	346,800
Percentage of visits on weekends (65%)	x .65
Total number of weekend users	225,420
Number of weekend days	÷ 26
Design day load	8,670

Picnicking:

Design day load	8,670
Percentage of visitors who are picnickers (28%)	x .28
Number of picnickers	2,428
Percentage of picnickers requiring facilities (40%)	x .40
Number of picnickers requiring facilities	971
Turnover rate (2)	÷ 2
	486
Number of persons per vehicle (3)	÷ 3
Picnic units required	162

Camping:

Design day load	8,670
Percentage of visitors who are campers (9%)	x .09
Number of campers	780
Number of persons per vehicle (5)	÷ 5
Camping units required	156

Boat ramps:

Design day load	8,670
Load factor (3)	÷ 3
Number of vehicles	2,890
Percentage of vehicles with boats (25%)	x .25
Number of boats	722
Number of launchings per day (50)	÷ 50
Boat launching ramps required	14

TABLE VI - 7 (continued)

Beaches:

Design day load	8,670
Percentage of visitors who are swimmers (15%)	x .15
Number of swimmers	1,301
Percentage of swimmers on beach (60%)	x .60
Number of beach users	781
Turnover rate (3)	÷ 3
Number of users on beach at any one time	260
Number of square feet of beach per person (50)	x 50
Square feet of land area required for sand beach	13,000 (.30 acre)

Number of swimmers	1,301
Percentage of swimmers in water (30%)	x .30
Number of swimmers in water	390
Turnover rate (3)	÷ 3
Number of swimmers in the water at any one time	130
Number of square feet of water surface per user (100)	x 100
Square feet of water surface required per swimmer	13,000 (.30 acre)

Number of swimmers	1,301
Percentage of swimmers needing no additional land (10%)	x .10
Number of swimmers needing no additional land	130

VII
COORDINATION WITH OTHER AGENCIES

VII - COORDINATION WITH OTHER AGENCIES

7-01. General.- During the development of a master plan, the Corps of Engineer's policy requires input and review from interested agencies at the Federal, State, and local levels. This section contains the history of the coordination effort and the comments of those who have reviewed the master plan.

7-02. History of project coordination prior to developing the master plan.-

a. Public hearing.- Public hearings were held during March 1968. The purposes of these hearings were to inform the public of the areas selected for public use and to provide an opportunity for all interested persons to express their views concerning the San Gabriel River project.

b. U.S. Public Health Service.- The U.S. Public Health Service presented a report entitled, "Municipal and Industrial Water Requirements, San Gabriel River, Lower Brazos River System, Texas," which is contained in appendix IV of the survey report for the San Gabriel River watershed dated 12 January 1962. In June 1965 the U.S. Public Health Service submitted an updated water supply and water quality study on the Navasota River watershed, lower Brazos River system, Texas. This study includes the entire lower Brazos River; therefore, it includes the San Gabriel River projects. A copy of this report was incorporated in appendix B, supplement number 1, Design Memorandum No. 4.

c. Bureau of Sport Fisheries and Wildlife.- The Bureau prepared a report on the fish and wildlife to be affected by the San Gabriel River and tributaries project, Texas, dated 28 April 1967. This report updates their survey report dated 12 September 1961. The updated report is presented in appendix A, supplement number 1, Design Memorandum No. 4.

d. National Park Service.-

(1) The Park Service participated in a field reconnaissance of the San Gabriel project during February 1960. Their report is presented in appendix IV of House Document 591; it is entitled, "Reconnaissance Report, Recreational Use and Development, San Gabriel River Watershed, Brazos River Basin."

(2) This agency initiated the archeological investigations of the project through the services of the University of Texas at Austin (Texas Archeological Survey). A summary of the professional work to date is presented in section IV, paragraph 4-02.

7-03. Summary of project coordination since the initiation of the master plan.-

a. Coordination meetings.-

(1) A coordination meeting was held at Granger, Texas on 5 November 1973 to permit local interests to express their views regarding the proposed recreation plan of development. The plan presented was not satisfactory to the citizens of Granger and other interested persons of the county. As a result, the Fort Worth District agreed to work with the citizens of Granger to insure that a mutually agreeable recreation plan was developed.

(2) On 20 December 1973 a second coordination meeting was held in Granger for the purpose of discussing the revised recreation plan. Representatives of the Fort Worth District and members of a group representing the citizens of Granger agreed that a mutually acceptable plan had been developed. The revised plan is presented in this design memorandum.

(3) On 12 February 1974 representatives of the Fort Worth District participated in an open forum meeting held at the Granger High School auditorium. The meeting was held at the request of Williamson County Judge C. L. Chance for the purpose of presenting the revised recreation plan.

b. Coordination of the master plan.- In accordance with ER 1165-2-400 this master plan has been submitted to Federal, State, and local governmental agencies for their review and comment. A list of the participating agencies and organizations is presented in table VII-1. Their comments and suggestions have been incorporated in this revised master plan. The replies from these agencies are included in this section of the master plan.

7-04. Sewage disposal facilities.- The type of sewage disposal facilities selected for use at Laneport Lake will be based upon the best available, practical, and economical treatment disposal system that meets Federal, State and local requirements. Close and continuing coordination will be maintained at all levels of government having special interest in health and sanitation. The design of sewage treatment facilities will be coordinated with the Environmental Protection Agency in accordance with SWDED-E letter dated 2 October 1972, subject: "Coordination with Environmental Protection Agency."

TABLE VII -I

COORDINATING AGENCIES

Agency	Reference letter number
U.S. Department of Agriculture	
Soil Conservation Service	VII-4
U.S. Department of Health Education and Welfare	VII-5
U.S. Department of the Interior	
Bureau of Outdoor Recreation	VII-6
Bureau of Sport Fisheries and Wildlife	VII-7
National Park Service	(No response)
Environmental Protection Agency	(No response)
State of Texas:	
Executive Department, Division of Planning Coordination	VII-8
Department of Agriculture	VII-9
Air Control Board	VII-10
State Soil and Water Conservation Board	VII-11
State Historical Survey Committee	VII-12
Water Development Board	VII-14
Water Quality Board	VII-16
Water Rights Commission	VII-17
Brazos River Authority	(No response)
Texas Parks and Wildlife	(No response)
Capital Area Planning Council	VII-32
The University of Texas at Austin	
Texas Archeological Survey	VII-33
Williamson County Historical Survey Committee	VII-35

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 648
Temple, Texas 76501

September 24, 1973

Colonel Floyd H. Henk, District Engineer
Fort Worth District,Corps of Engineers
Department of the Army
P. O. Box 17300
Fort Worth, Texas 76102

Dear Floyd:

We have reviewed a copy of Design Memorandum No. 18, Master Plan for the development and management of the Laneport Project, San Gabriel River, Texas.

We offer the following comments for your consideration:

1. Page III-2, a. Project area - Suggest first sentence to read: "The soils within the project area have formed under native grass vegetation."

2. Soil Series name Altoga is spelled incorrectly.

3. Last sentence - Suggest changing sentence to read: "Because of the general site characteristics and topography, the project can be divided into lowlands and uplands." The reason for this suggestion is that the Houston Black, Heiden and Ferris soils are not on the stream terrace, but they developed in Creataceous formations, such as the Taylor Marl. There are some low terraces in which the Houston Black clay, terrace, and Lewisville soils developed, but they are minor. The older, ancient terraces are actually higher in the landscape than the "Cretaceous" surfaces on the walls or slopes, and are outside the project area. If this suggestion is adopted, it will be necessary to change 3-60a(2) from Stream Terraces to Uplands throughout that paragraph.

We appreciate the opportunity to review and comment on this design memorandum.

Sincerely,

Edward E. Thomas
State Conservationist

cc:
Fred H. Tschirley, Office of the Secretary, USDA, Washington, D. C.
Kenneth E. Grant, SCS, Washington, D. C.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGIONAL OFFICE
1114 COMMERCE STREET
DALLAS, TEXAS 75202

OFFICE OF
THE REGIONAL DIRECTOR

September 19, 1973

Floyd H. Henk
Colonel, CE - District Engineer
Department of the Army
Ft. Worth District, Corps of Engineers
P. O. Box 17300
Ft. Worth, Texas 76102

Dear Sir:

The Department of Health, Education, and Welfare has received the copy of Design Memorandum No. 18, for the development and management of the Laneport project, San Gabriel River, Texas, forwarded with your letter of August 31, 1973.

In that you are requesting a design review of this project by the Water Hygiene Representative, we are forwarding this Memorandum to the Environmental Protection Agency in this Region where such program activities are now located.

The Bureau of Water Hygiene was a constituent of DHEW until December 1970, at which time it was organizationally relocated in the Environmental Protection Agency.

We still retain environmental health program responsibilities that apply where Section 102(2)(c) of Public Law 91-190 (the National Environmental Policy Act) is concerned in the development and review of Environmental Impact Statements.

Sincerely yours,

Wm F Crawford

William F. Crawford
Regional Environmental Officer

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
South Central Regional Office
Patio Plaza, 5000 Marble N.E., Room 211
Albuquerque, New Mexico 87110

FEB 8 1974

Colonel Floyd H. Henk
Fort Worth District
Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Colonel Henk:

We are responding by this letter on reviews of the Master Plans for both the Laneport and North Fork Lake projects, San Gabriel River, Texas. During an extended review time period granted by you, we met with Gordon Jones of the division office and representatives of all district offices in the Southwest Division. This day long discussion concerning recreation as a project purpose was very useful to us in clarifying certain procedures, aiding us in understanding methodology, and obtaining the State Recreation Planners' viewpoints concerning our mutual interests. We certainly didn't answer all the complex questions concerning such projects, but hopefully we are making progress.

In this postauthorization review our comments are normally focused on the recreation design aspects of the project. Since we didn't participate in preauthorization planning and haven't visited the site, we are addressing only certain appropriate sections of the Texas SCORP. We note in that document that although there is no need for more slack water for recreation in the entire market area of Laneport and North Fork, there is a deficit of picnicking facilities, camping facilities, and boat ramps. Your Master Plans for both projects seem to be designed to provide such facilities, and thus meet certain recreation needs.

Thank you for the opportunity to comment on these Master Plans and for the opportunity to meet with your staff during January. Such meetings are extremely helpful. Perhaps they should occur more frequently.

Sincerely yours,

for Rolland B. Handley
Regional Director

IN REPLY REFER TO: RB

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

September 24, 1973

District Engineer
Corps of Engineers, U. S. Army
P. O. Box 17300
Fort Worth, Texas 76102

Dear Sir:

As requested in your letter of August 31, 1973, we have reviewed the Design Memorandum No. 18, Master Plan for Laneport Lake, San Gabriel River, Texas, and have the following comments to make:

The Master Plan presents a well developed program to obtain maximum fish and wildlife benefits at the Laneport Lake. Those benefits can only be achieved by implementation of the plan. Among the beneficial aspects of the plan are zoning of the reservoir for fisherman and hunter use, development of four wildlife areas, planting of vegetation useful as food and cover for wildlife, restricting grazing on over-abused project lands, erosion control, fencing project lands, and providing fishing facilities for the handicapped.

Comments to specific sections of the report are as follows:

Page III-9, last line: Suggest using word "fish" instead of "sportfish" for nongame fishes (carp, bullheads, suckers, etc.).

Page V-1: An explanation or definition of the zones listed in Table V-2 would be helpful in determining the recreation attendance from the market area. (We presume the four zones listed comprise the market area.)

Pages V-4 through V-7: The information presented in these tables appear to be similar. Apparently, the recreation facilities for initial visitation and for optimum visitation will be alike.

We appreciate the opportunity to review and comment on the report.

Sincerely yours,

Regional Director

cc:
Field Supervisor, BSFW, Div. of River Basin Studies, Fort Worth, Texas

DOLPH BRISCOE
GOVERNOR

EXECUTIVE DEPARTMENT
DIVISION OF PLANNING COORDINATION
BOX 12428, CAPITOL STATION
AUSTIN, TEXAS 78711
PHONE 512 475-2427

October 23, 1973

Col Floyd Henk
District Engineer
U.S. Army Corps of Engineers
P.O. Box 17300
Ft. Worth, Texas 76102

Dear Col. Henk:

The attached comments on Design Memorandum No. 18, Master Plan for the Development and Management of the Laneport Lake Project, San Gabriel River, Texas, are submitted for your consideration.

Due to the extensive nature of some of the comments you may wish to meet with some of the review agencies. If so, please contact our office and we will arrange such a meeting.

Thank you for the opportunity to review this plan. If we can be of further assistance, please contact us.

Sincerely,

JAMES M. ROSE
Director

JMR:jfd

Attachments

cc: Hon. John C. White, Dept. of Agriculture
Mr. Charles R. Barden, Air Control Board
Mr. Harvey Davis, State Soil and Water Conservation Board
Mr. Truett Latimer, State Historical Commission
Mr. Harry Burleigh, Water Development Board
Mr. Hugh C. Yantis, Water Quality Board
Mr. A.E. Richardson, Water Rights Commission

EDMUND L. NICHOLS
Assistant Commissioner

October 15, 1973

Mr. James M. Rose, Director
Division of Planning Coordination
Office of the Governor
P.O. Box 12428, Capitol Station
Austin, Texas 78711

Dear Mr. Rose:

We have reviewed the Draft Environmental Impact Statement entitled Design Memorandum No. 18, Master Plan for Laneport Lake, San Gabriel River, Texas (Brazos River Basin, Texas) enclosed with your memorandum of September 19, 1973.

It is noted from an on-site inspection and from page II-6 2-09 of the memorandum that construction of Laneport Lake is already underway.

Full prior consideration has been given to the various aspects of the environmental impact, water control and conservation and land use. We do not have any specific negative comments concerning the project.

We appreciate the opportunity to review this statement.

Sincerely,

Edmund L. Nichols

ELN/cv

TEXAS AIR CONTROL BOARD

PHONE 512/451-5711
8520 SHOAL CREEK BOULEVARD
AUSTIN, TEXAS – 78758

CHARLES R. BARDEN, P.E.
EXECUTIVE DIRECTOR

HERBERT C. McKEE, PhD., P.E.
Chairman

HERBERT W. WHITNEY, P.E.
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JAMES D. ABRAMS, P.E.
FRED HARTMAN
WILLIE L. ULICH, Ph.D., P.E.

October 4, 1973

Mr. James M. Rose, Director
Division of Planning Coordination
Governor's Office
Sam Houston State Office Building
Austin, Texas 78711

ATTN: Mr. Walter Tibbitts

Dear Mr. Rose:

In regard to the Design Memorandum No. 18, Master Plan for Laneport Lake, we have reviewed this project and find no conflict between it and the attainment of our air quality goals in this area.

Thank you for your consideration in forwarding this document to us for our comments.

Sincerely,

Charles R. Barden, P.E.
Executive Director
Texas Air Control Board

TEXAS STATE SOIL AND WATER CONSERVATION BOARD
1018 First National Building
Temple, Texas 76501
AREA CODE 817, 773-2250

October 7, 1973

Brigadier General James M. Rose
Director, Executive Department
Division of Planning Coordination
Box 12428, Capitol Station
Austin, Texas 78711

Re: Master Plan for Lanceport Lake

Dear General Rose:

Thank you for forwarding the Master Plan for Lanceport Lake prepared by the Corps of Engineers.

We have reviewed the document in its entirety, but have not noted anything on which we wish to submit comments.

Sincerely yours,

Harvey Davis
Executive Director

HD/gek:ej

Texas State Historical Survey Committee
Box 12276, Capitol Station, Austin, Texas 78711
Truett Latimer
Executive Director

October 5, 1973

Mr. James M. Rose, Director
Division of Planning Coordination
Governor's Office
Box 12428, Capitol Station
Austin, Texas 78711

RE: Design Memorandum No. 18, Master Plan for Laneport Lake, San Gabriel River, Texas (Brazos River Basin, Texas)

Dear Mr. Rose:

In response to your request concerning the above-referenced project, we have examined the Design Memorandum and offer the following comments:

1. Sections 3-02 and 3-03 point out that archeological, paleontological, and historical resources are present within the confines of the proposed project area and that additional investigations are necessary to evaluate the archeological significance. These investigations might best be carried out in the form of an intensive archeological survey to locate, record, and appraise all cultural (prehistoric, historic, and architectural) resources. The investigation should provide, and result in, definition of research problems, cost and strategy for further study leading to the mitigation of adverse effects on the resource.

2. Section 7-08.b; notes that the objective of an archeological and historical management program is to salvage and preserve the archeological and historical resources associated with the project. All Corps properties that will not be subjected to controlled inundation should be examined from the standpoint of Executive Order 11593 (May 13, 1971), prior to any development in these areas. The data resulting from the 11593 investigation will prove invaluable in the formulation of development plans for facilities related to the lake. It must be pointed out that sites on federal lands are, by federal law, protected from damage, alteration or disturbance.

3. 12-03.a; Operation and maintenance may include the protection of cultural resources, especially prehistoric archeological sites, that are exposed as a result of the lake's action on the land form as a result of periodic inundation, wave action and accelerated erosion.

4. 12-05.a; should be amended to include protection of cultural resources from vandalism and disturbance, etc.

It is felt that these measures are necessary to protect and preserve the important cultural resources that would otherwise be irreversibly committed as a result of this project action. Their inclusion will satisfy the requirements of federal law and significantly enhance the merits of the project.

Thank you for the opportunity to comment on this design memorandum. If we can be of further assistance, please advise.

Sincerely,

Truett Latimer
Executive Director

By

Alton K. Briggs
Survey Archeologist

AKB:bjw

TEXAS WATER DEVELOPMENT BOARD

P.O. BOX 13087
CAPITOL STATION
AUSTIN, TEXAS 78711

HARRY P. BURLEIGH
EXECUTIVE DIRECTOR

AREA CODE 512
475-2201

301 WEST 2ND STREET

October 1, 1973

IN REPLY REFER TO.

TWDBP-O

General James M. Rose, Director
Division of Planning Coordination
Office of the Governor
P.O. Box 12428, Capitol Station
Austin, Texas 78711

Dear General Rose:

Please refer to your memorandum dated September 19, 1973 transmitting for review and comment the Corps of Engineers' Design Memorandum Number 18, Master Plan for Laneport Lake, San Gabriel River, Texas.

Staff level review of the Laneport Plan has resulted in the finding of a few apparent discrepancies which are discussed below.

In Table IV-1, we find that the 1970 market area population is larger than either the 1980 or 1990 population, as shown in Table V-1.

We believe that per capita income projections (Table IV-3) should be clarified. Volume 4 of OBERS contains per capita income data on the water resource sub-area in which Laneport is located. OBERS does not, however, reflect data contained in Table IV-3. If Table IV-3 was derived from another source, for instance from unpublished county income projections, it is suggested that such source be appropriately footnoted.

The procedures used in projecting recreation visitation may perhaps fail to measure recreation "demands," as opposed to

hypothetical attendance based on similar projects with comparable characteristics. Certain types of problems result from this projection method, such as the fact that projected attendance exceeds optimum recreation capacity between 1980 and completion of Stage II developments. We would certainly not suggest rewriting the report, but we believe that more advanced statistical analyses might have refined some of the projections.

Studies conducted by this agency tend to show that: the 100-mile market area limitation is perhaps too restrictive; that the estimated percentage of "day-users" living within 50 miles of the lake is possibly too high; and that the estimated per capita use rates by zone probably underestimate the relative importance of zones of influence furthest from the lake. More detailed recreation projection techniques, similar to those utilized by this agency, might be used in any further updates of the Laneport study report, but again we certainly would not suggest any major revisions in the report at this time.

The opportunity to furnish these comments is appreciated.

Sincerely,

Harry P. Burleigh

Harry P. Burleigh

TEXAS WATER QUALITY BOARD

314 WEST 11TH STREET 78701
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

September 20, 1973

RE: Laneport Lake

Colonel Floyd H. Henk
District Engineer
Department of the Army
Fort Worth District, Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102

Dear Colonel Henk:

The staff of the Texas Water Quality Board has reviewed the Master Plan for the development and management of the Laneport Lake project on the San Gabriel River and have the following comments and suggestions concerning the project.

It has been noted that the project plans contemplate the design of sewage treatment facilities meeting the requirements of the State. Also, that solid waste disposal will be coordinated with State Agencies, and also with local health officials. In this connection, proposed designs of facilities should be submitted for review and coordination well in advance of their construction or installation. It has also been noted that the water quality of the lake will be acceptable, with the exception occurring during periods of excessive flooding when flood flows will influence the pool quality.

We appreciate the opportunity to review and comment on this proposed plan. If we can be of further assistance, please let us know.

Very truly yours,

Emory G. Long, Director
Administrative Operations Division

GEJ:dh

ccs: Brazos River Authority
District #3
Mr. James M. Rose

TEXAS WATER RIGHTS COMMISSION

SAM HOUSTON STATE OFFICE BUILDING

October 3, 1973

Mr. James M. Rose, Director
Governor's Division of Planning
Coordination
Sam Houston State Office Building
Austin, Texas 78711

Re: U.S. Army Engineer District, Fort Worth, Master Plan for Laneport Lake, San Gabriel River, Texas, Brazos River Basin, Texas, Design Memorandum No. 18, August 1973.

Dear Mr. Rose:

In reply to your request by Memorandum of September 19, 1973, the Commission staff has reviewed the referenced Design Memorandum pertaining to the master plan for reservoir management and land use for the proposed Laneport Lake project, prepared by the U.S. Army Engineer District, Fort Worth, Texas. A copy of our staff Memorandum of Review is attached for your information and use.

In essence, the staff finds that the referenced document should be carefully reassessed by the Corps of Engineers adopting more rigorous and realistic views on the following items for the reasons as indicated:

1. The potentially wide range and greater frequency of recurrence in the fluctuations of lake levels. (The staff considers that these matters are important because lake levels can and will vary more widely than implied in the referenced document, not only because of basic hydrological

uncertainties, but also due to the constraints on the operations of any particular reservoir imposed by virtue of the State-authorized "system operation" of reservoirs in the Brazos River Basin.)

2. The extensive investment in lands acquired and dedicated to recreation, park, and wildlife management purposes. (The staff believes that this matter is important not only because of the obviously-substantial costs of land acquisition, but also because assurances that a master plan for reservoir land use will be designed as a "flexible" and "easily-modified" instrument, may be overly optimistic. Many constraints, ranging from statutory and legislative requirements to virtually irreversible land-use commitments, enter into the land-use plan over a period of time. Eventually, a rigidity permeates the land-use plan which, in turn, could compel major changes in the purposes and uses of the basic authorized water resources project. In short, the pressures of reservoir land use could result in changes in uses of reservoir waters, differing substantially from the uses indicated in the initial project justification. The impacts of these changes should be anticipated by both the Corps of Engineers and the local sponsor.)

The attached Memorandum of Review and the above summary comments are submitted as constructive suggestions to the planners concerned in order to assist them in their project development actions.

Sincerely yours,

A. E. Richardson

AER-AJD:ll

Attachment
As stated.

To: Executive Director
Texas Water Rights Commission

October 1, 1973

MEMORANDUM OF REVIEW
OF
U.S. ARMY ENGINEER DISTRICT
FORT WORTH
MASTER PLAN FOR LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS
BRAZOS RIVER BASIN, TEXAS
DESIGN MEMORANDUM NO. 18
AUGUST 1973.

By: Dr. Alfred J. D'Arezzo
Environmental Sciences Analyst

1. INTRODUCTION

1.1 Basis for Review.

a. By Letter of August 31, 1973, File Reference SWFED-PR, the District Engineer, U.S. Army Engineer District, Fort Worth, transmitted and requested review comments by October 1, 1973, on Design Memorandum No. 18 (DM No. 18), which is the reservoir management and land use master plan for Laneport Lake, prepared by the U.S. Army Engineer District, Fort Worth, Texas.

b. By Memorandum of September 19, 1973, the Director, Division of Planning Coordination (DPC), Office of the Governor of Texas, transmitted and requested review comments on the document cited in subparagraph 1.1 a, above, by October 10, 1973.

c. This review by the Texas Water Rights Commission (TWRC) staff is made in accordance with

the Commission's responsibilities as a member agency of the State's Interagency Council on Natural Resources and the Environment (ICNRE) -- assisting the Governor's DPC as the State of Texas' Clearinghouse for the review of Federal programs governed by the revised Office of Management and the Budget (OMB) Circular No. A-95, dated February 9, 1971.

1.2 Essential Background Data.

a. State of Texas Formal Actions and Concurrence in the Project.

(1) Initial Order: On June 25, 1962, the Texas Water Commission (TWC) adopted an Order finding that the project, as proposed in the report of the Chief of Engineers, U.S. Army, on the "San Gabriel River Watershed, Texas," was feasible and in the public interest. The TWC recommended that the reservoirs comprising the proposed project, consisting of Laneport, North Fork, and South Fork, be considered as an inseparable unit for authorization, design, and construction. Further, the TWC recommended that if simulatneous construction could not be prosecuted, the North Fork Reservoir be authorized and constructed first, the South Fork second, and Laneport last. The Commission also recommended that in the final design of Laneport Reservoir, consideration be given to possible storage for the purpose of water quality maintenance in the Brazos River, pursuant to the "Federal Water Pollution Control Act of 1961," which authorized the recognition of water quality maintenance as a desired Federal project purpose. Of special significance is the recommendation in the said Commission Order:

"That ownership by the State of Texas of the water involved

be fully recognized by all interested parties and that lawful rights to the use of such waters, vested pursuant to State law, be respected, protected and preserved."

(2) Revision of Conditions Stipulated in the Initial Order: By letter of April 5, 1966, the Texas Water Rights Commission (TWRC), successor to the TWC, informed the District Engineer, U.S. Army Engineer District, Fort Worth, in reply to the District Engineers' letter of March 31, 1966, that:

"The Texas Water Rights Commission concurs in the recommendations of the Fort Worth District, Army Corps of Engineers, for planning these projects sized generally as shown in the table dated 25 March 1966, which accompanied your letter. The Commission also concludes that the North Fork and Laneport Reservoirs should be simultaneously constructed, and that construction of South Fork Reservoir be deferred until the need justifies its development." 1/

1/ Similar concurrence in the revisions to the project was expressed by the Brazos River Authority in letter of April 16, 1966, and by the Texas Water Development Board in letter of April 22, 1966.

b. Relevant Water Rights Permits Issued by the Texas Water Rights Commission: On July 16, 1968, the TWRC granted permits to appropriate State water to the Brazos River Authority (BRA) authorizing the impoundment and priority of right of specific quantity of water in both the North Fork and Laneport Reservoir. The permits authorized the diversion and use for prescribed purposes, specific quantities of water for purposes of the system operation authorized by the Commission Order of July 23, 1964. The latter Order was amended by a Commission Order of July 23, 1968, which added the North Fork and Laneport Reservoirs to the reservoirs listed in the earlier Order of July 23, 1964. TABLE I, attached, contains a summary of the water quantities and purposes stipulated in the Permits of July 16, 1968, and the Commission Orders of July 23, 1964, and July 23, 1968. In short, the permits for the two reservoirs authorizes a total amount of (65,500 + 37,100) = 102,600 acre-feet of water per annum for the Brazos River system operation, including (25,000 + 14,200) = 39,200 acre-feet of water per annum of firm yield with priority of right useage. Further relevant discussion of the data contained in TABLE I will be made later in this review.

2. COMMENTS

2.1 Laneport Lake Level Fluctuations.

The staff believes that the master plan should reflect a more consistent and realistic view regarding the fluctuations of the Laneport Lake level, consistent with conservative hydrological expectancies and permitted water uses already formalized by the State of Texas.

Attention is invited to the following statements in paragraph 7-08 h, page VII-7, DM No. 18:

"h. Water.- The ultimate objective of managing the water resources will be to maintain the highest water quality possible....In addition, an appropriate water level regulation program will be necessary to optimize the multiple-use concept of this project. This program must be flexible enough to handle the assigned water storage and flood control responsibilities and still provide a water resource that will accentuate the other multiple-uses associated with the project." (Emphasis added.)

Earlier, in paragraph 2-07, page II-2, DM No. 18, emphasis appears to be given to expected limited range of water-level fluctuations by the following statements:

"According to the pool elevation probability and duration curves, as shown in plate II-4, pool elevation can be expected to vary about 14.0 feet in an average 5-year period.... the top of conservation pool (elevation 504.0 feet msl) will be equaled or exceeded approximately 40 percent of the time. The average pool (elevation 502.5 feet msl) during the period June through August (prime recreation season) is only 1.5 feet below the top of conservation pool. It will be equaled or exceeded 72 percent of the time."

In contrast to this emphasis on the relatively small range in reservoir fluctuation, attention is invited to the following significant statements in paragraph 1-05, page I-2, and paragraph 17-01, page XVII-1, DM No. 18:

"1-05. Project purposes.- The Laneport Lake project purposes are flood control, water conservation storage, recreation, and fish and wildlife enhancement. Flood control is the principle (sic) benefit of the project, constituting 59 percent of the current (as of 1 July 1972) total benefits. Recreation

and fish and wildlife benefits account for 26 percent of the total estimated benefits, and conservation storage is responsible for the remaining 15 percent." (Emphasis added; paragraph 1-05, page I-2.)

. . . .

"It is believed that by implementing this master plan, the natural and created resources of the project can be maintained and adequately developed to meet the project's optimum usage within the scope of the authorized purposes." (Emphasis added; paragraph 17-01, page XVII-1.)

A further realistic constraint arises from the required operation of the proposed Laneport Reservoir as part of a reservoir system. In this regard, attention is invited to paragraph 2-01, page II-1, DM No. 18:

"The authorized Laneport, North Fork, and South Fork Lakes are important units in a presently authorized system of 12 reservoirs in the Brazos River Basin for the multiple purposes of flood control, water supply, hydroelectric power, recreation, and fish and wildlife enhancement. Six of the reservoirs have been constructed and are now in operation."

Analysis of the above selected extracts conveys the net impression that project purposes, hydrological capabilities, and the constraints of water rights permits have not been fully reconciled. In addition, the staff believes that the authorized operation and concept of utilization of the San Gabriel reservoirs by the BRA is not known or fully understood by many project planners. In 1962, the TWC encouraged the BRA to begin studies of a system operation of all their existing and proposed reservoirs for the purpose of attaining maximum conservation, yield, and use of the surface-water resources of the BRA.

As indicated in subparagraph 1.2 b, above, permits granted BRA for construction of dams and reservoirs in the Brazos River Basin provided for a reservoir-system operation involving two different concepts of appropriation of State water. The staff believes that it is essential to explain carefully these concepts and their application insofar as the subject project under review is concerned. The data contained in TABLE I will now be analyzed as stated earlier.

The two concepts relate to a subordinating water right and a nonsubordinating water right. For the North Fork San Gabriel Reservoir this means that in any and all calendar years not more than 14,200 acre-feet (average, 19.6 cubic feet per second (cfs)) can be diverted and used as the firm yield of the project being senior in time to all subsequent water rights granted upstream and downstream. The authorized diversion and use of an additional 22,900 acre-feet as nonsubordinating to future upstream and downstream project during times of plenitude provide for the use of a total of not more than 37,100 acre-feet (51.2 cfs/annum) in a system operation.

Similarly, the Laneport permit authorizes a firm annual use of 25,000 acre-feet (34.5 cfs/annum) and up to 65,500 acre-feet (90.5 cfs/annum) during wet years in a system operation of which amount 40,500 acre-feet is nonsubordinating.

The conditions explained in the two preceding paragraphs provide for diversion and use of a firm annual quantity of 39,200 acre-feet at an average rate of 54.1 cfs, and up to 102,600 acre-feet (141.7 cfs) during years of plenitude of which 63,400 acre-feet (87.6 cfs) is nonsubordinating of future development.

The substance and purpose of the foregoing is that the BRA has authority granted by the State to divert and use water from different parts of the basin at higher than firm-yield rates in order to minimize flows of water into the Gulf of Mexico which have not provided some beneficial use inland. For example, if all Brazos River Basin flows were small and a

substantial flood occurred in the San Gabriel River Watershed which produced flows in excess of the requirements of all downstream users junior in time to BRA, then BRA could divert and use up to the maximum authorized quantity from the San Gabriel for supplying downstream water needs while conserving water stored in upstream reservoirs suffering drought and shortages of supply.

Therefore, the staff concludes that a careful description of the reservoir system concept should be an integral part of DM No. 18. A proper understanding of the system concept should permeate the project and reflect the necessity of giving first priority to the task of providing for future water needs of a growing region in a timely manner to prevent foreseeable water shortages and the attendant injuries to the State of Texas.

2.2 Clarification of the Scope of Land Acquisition and Costs.

In view of the statements made in the subject DM No. 18 that the Master Plan for Laneport Lake would have comprehensive coverage, the staff believes that consideration should be given by the Corps of Engineers to giving a more thorough discussion of the entire reservoir land-acquisition program and land-use program. Certain data pertaining to these programs appear to have been overlooked or are in need of clarification. The comprehensive objectives are stated as follows in the DM No. 18:

> "The objectives of this plan are to: (1) present a complete zoning and land use allocation plan which offers specific recommendations for the ultimate use and possible interim use to which all land and water should be dedicated; (2) to serve as a resource management guide for the comprehensive use of all project land and water areas through planned use of designated areas; and (3) to present the

concept and objectives for the development and management of all project resources." (See paragraph 7-01, page VII-1, DM No. 18; emphasis added.)

Analysis of the land-use acreage data pertaining to the Laneport Lake project, contained in TABLE VII-1, page VII-2, DM No. 18, indicates that of the total 13,200 acres to be acquired in fee, 4,400 acres are for water impoundment purposes, and 8,800 acres are to be used for recreation and wildlife management purposes. Of the 8,800 acres, 6,716 acres are for wildlife management areas, and 2,084 acres are for recreation and park areas. These figures show that about 67 percent (i.e., 8,800 acres of 13,200 acres) of all land to be acquired in fee is intended for recreation, parks, and wildlife management area purposes. About 76 percent (i.e., 6,716 acres of 8,800 acres) of the total nonimpoundment fee acreage is intended for wildlife management and development purposes.

The staff believes that in view of the extensive land investment involved in this project, the DM No. 18 should clarify the following specific questions:

a. What is the estimated cost of the land to be purchased for the recreational areas and for the wildlife management areas, respectively?

(Note: While the DM No. 18 furnished detailed data on the estimated costs of facilities construction for the recreational and park areas (see pages VIII-2 through VIII-4, Plates VIII-3 through VIII-8, and pages IX-1 through IX-6), the DM No. 18 contains only minimal data on the facilities for the wildlife management areas, and no land acquisitior

cost data for either the recreational and park areas or for wildlife management areas.) 1/

b. Is the purchase of the land for the recreational, park, and wildlife management areas to be made by the Federal government on a noncost-sharing basis insofar as the State and the local sponsor are concerned?

(Note: See paragraph 8-05, page VIII-2, DM No. 18, indicating that costs of "initial recreation development will be provided on a noncost-sharing basis." In addition, in the FY 1974 project justification data contained in the U.S. Congressional documents cited in the Note to preceding question, data is furnished indicating that $1,063,000 is included in the FY 1974 project request of $3,800,000 to "(C)ontinue acquisition of lands —— Laneport and North Fork." Also, $20,000 is included to "(C)ontinue boundary monumentation —— Laneport and North Fork." The cited project justification data also indicated that as of January 1, 1973, the status of completion of land acquisition programs for Laneport Lake and North Fork Lake were 32 percent and 35 percent, respectively.)

c. In view of the data contained in the above Note, was the past years' and current FY 1974 land acquisition programs based on a concurrent

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1/ In the FY 1974 project justification data furnished to the U.S. Congress, the Laneport Lake project is shown as requiring the acquisition of 14,850 acres of land (which conforms to the figure given on page VII-2, DM No. 18). See "Hearings Before a Subcommittee of the Committee on Appropriations, House of Representatives, 93rd Congress, 1st Session, Part 2," page 1764. Also, see "Senate Hearing Before the Committee on Appropriations, Senate, 93rd Congress, 1st Session, Part 2," page 1722.

14,850-acre (includes 1,650 acres for flowage easements) program for the Laneport Lake project and a 6,300-acre acquisition program for North Fork Lake project?

d. Which agency or agencies will develop and manage the 6,716 acres of proposed wildlife management areas around the Laneport Lake project? When will the detailed plan be submitted for field-level review and coordination?

(Note: Chapter XV, DM No. 18, states briefly that the Fish and Wildlife Management Plan is being developed.)

The staff believes that since land acquisition for recreation, parks, and wildlife management comprises such a large percentage of the land requirement, and since the cost of land, damages, and relocations already appears to be a potentially-substantial cost item not only insofar as the Laneport Lake project is concerned, but also of the related North Fork Lake and South Fork Lake projects which will comprise the 3-reservoir San Gabriel River Basin system, that special effort should be made to enhance the coverage of land program data in DM No. 18. This is important in order to facilitate the formulation of sound detailed project and land-use plans.

3. CONCLUSIONS

3.1 The staff believes that the DM No. 18 should be carefully reassessed by the Corps of Engineers adopting more rigorous and realistic views on the following items for the reasons as indicated:

a. The potentially-wide range and greater frequency of recurrence in fluctuations of lake levels. (These matters are important because lake levels can and will vary greatly not

only because of basic hydrological uncertanties, but also due to the constraints imposed on the operation of any particular reservoir -- impound by virtue of the State-authorized "system operation" of reservoirs in the Brazos River Basin.)

b. The extensive and preponderant investment in lands dedicated to recreation, park, and wildlife management. (This matter is important not only because of the substantial cost, but also because assurances that a master plan for reservoir land-use and management can be designed as a "flexible" and "easily-modified instrument, may be overly optimistic. Many constraints, ranging from statutory and legislative requirements to virtually irreversible land-use (zoning) commitments enter into the planning over a period of time. Eventually, a rigidity in land-use permeates the plan which, in turn, could compel major changes in the purposes and uses of the basic, authorized water resources project.)

4. SPECIAL REMARKS

The foregoing comments are presented with constructive intent to assist in the sound development of the Laneport Lake project and related projects.

Alfred J. D'Arezzo

AJD:ll

NOTED:

A. E. Richardson
Executive Director

TABLE I- A Summary of the Water Quantities and Purposes Granted in Permits of July 16, 1968, and the Commission Orders of July 23, 1964 and July 23, 1968.

Use	Permit Number and Reservoir	
	No. 2366, Laneport	No. 2367, North Fork
Impoundment in storage space provided by the Corps of Engineers	65,500 acre-feet	37,100 acre-feet
Priority of right use (firm yield)	25,000 acre-feet per annum	14,200 acre-feet per annum
Divert and use for purposes of system operations authorized by Commission Orders of July 23, 1964 and July 23, 1968:		
(1) Municipal purposes	30,000 acre-feet per annum	16,500 acre-feet per annum
(2) Industrial purposes	30,000 acre-feet per annum	16,500 acre-feet per annum
(3) Irrigation purposes	5,500 acre-feet per annum	4,100 acre-feet per annum
Subtotals	65,500 acre-feet per annum	37,100 acre-feet per annum

CAPCO

105 W. RIVERSIDE DR. • SUITE 246 • AUSTIN, TEXAS 78704 • (512) PH. 474-2376

SERVING LOCAL GOVERNMENTS IN

BASTROP • BLANCO • BURNET • CALDWELL • FAYETTE • HAYS • LEE • LLANO • TRAVIS • WILLIAMSON COUNTIES

October 17, 1973

Colonel Floyd D. Henk, C
District Engineer
Fort Worth District
Corps of Engineers
P. O. Box 17300
Fort Worth, Texas

RE: #3-09-13003 "Master Plan for Laneport Lake"

Dear Colonel Henk:

Mr. Jim Buxton from your office provided the Capital Area Planning Council's (CAPCO) Executive Committee with sufficient information to render a favorable review and comment. We appreciate your office's assistance in this matter.

The review process revealed a need for further involvement of Williamson County as well as the Cities of Taylor, Granger and Georgetown. At our meeting, Judge C. L. Chance, County Judge of Williamson County, requested that the Corps make a presentation before the Williamson County Commissioner's Court.

Thank you for your cooperation. Please call on us if you need further information.

Sincerely,

Richard G. Bean
Executive Director

RGB:bc

Texas Archeological Survey
THE UNIVERSITY OF TEXAS AT AUSTIN

December 6, 1973

Mr. D. L. Orendorf, Chief
Engineering Division
U.S. Army Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Orendorf:

Thank you for your letter of 27 November requesting comments on your Design Memorandum No. 18, "Master Plan for Laneport Lake, San Gabriel River, Texas."

Section III 3-02:

As you are already aware, archeological investigations by the Texas Archeological Survey (then the Texas Archeological Salvage Project) have been more extensive than those mentioned in your text. Beyond the 1963 survey, well summarized in this section, our organization completed an initial testing program at archeological sites in the planned Laneport Lake basin. This program, carried out in the fall of 1968, included excavations at three sites: The Dobias-Vitek Site (41 WM 85); the Adamek Site (41 WM 135); and the Loeve Site (41 WM 133). These sites provided a prehistoric record of aboriginal habitation in the area ranging in time from 5000 B.C. to possibly as late as A.D. 1750. Additionally, a surface reconnaissance in the Laneport area was carried out during and subsequent to the 1968 testing program and resulted in the location and recording of 17 additional sites. The results of this testing-reconnaissance have been prepared in manuscript form and will be submitted as a contract-satisfying report to the National Park Service by January 1, 1974. The report will be subsequently published by the Texas Memorial Museum.

A program of additional excavation at the Loeve-Fox Site (41 WM 230) has been carried out in 1973--partly under contract with the National Park Service and partly by volunteer student labor working under supervision of Texas Archeological Survey staff archeologists. This site is situated with deep alluvial deposits of the San Gabriel River and contains well stratified archeological remains dating from possibly as early as 3000 B.C. to about A.D. 1200. Included in the investigated complex was a prehistoric cemetery comprised of over 25 individuals. A contract-satisfying report detailing the results of this work is now being prepared by Elton R. Prewitt of our staff and will be available for circulation late in 1974.

Mr. D. L. Orendorf

The above summarizes the extent of professional archeological work to date in the Laneport Lake area. I would, on this basis, concur wholeheartedly with your comment that additional field work is necessary in the area. The Laneport basin has demonstrated its very high potential for yielding information of historical and scientific importance; considerable work will have to be accomplished before effective mitigation can be achieved.

Section XII 12-08

As regard planning for "Visitor interpretation and education": I feel strongly that the results of archeological/historical resource investigations in the Laneport Lake area can provide an excellent body of information that, properly interpreted, would be usable for purposes of public education. It is my suggestion that on-site displays or possibly prepared brochures presenting the results of investigations in the immediate area be considered in your planning. The history and prehistory of the Laneport region is, by our standards of comparision, rich and revealing; I am thus of the opinion that knowledge and appreciation of these resources be shared with the public. I thank you for the opportunity to comment on this Design Memorandum. I shall see to it that your office receives copies of our forthcoming reports as these become available.

Sincerely,

David S. Dibble

David S. Dibble
Acting Director

DSD:mg

WILLIAMSON COUNTY HISTORICAL SURVEY COMMITTEE

CLARA SCARBROUGH 1318 UNIVERSITY AVENUE GEORGETOWN, TEXAS 78626

November 30, 1973

Mr. D. L. Crendorff, Chief Engineering Division
Department of the Army, Fort Worth Dist., Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Mr. Crendorff:

I have marked on the map you sent me November 27 places of historic interest since Anglo-American settlement of Williamson County, several sites of large Indian villages prior to that settlement, and also pointed out the proximity of three Spanish missions and a presidio which were built on the banks of the San Gabriel (then called San Xavier) from 1746 on through the next ten years. The missions were located between the present town of San Gabriel and the confluence of San Gabriel River and Brushy Creek.

I am sure you realize that temporary Indian villages and campsites were located all along the river in the area you show on the Laneport project. If you have not already done so, you might wish to refer to two reliable sources of material on this matter, which give much more detail:

(1) Harry Shafer and James E. Corbin. An Appraisal of the Archeological Resources of North Fork, South Fork and Laneport Reservoirs, Williamson County, Texas. Austin: Texas Archeological Salvage Project, 1965.

(2) Mardith K. Schuetz. "A Report of Williamson County Mound Material," Bulletin Texas Archeological Society, No. 28., 1957. (Note that this work locates a few artifacts which may date back to Paleo times, a significant fact, indeed.)

The mission complex of which I spoke is relatively unknown at the present time, but was one of the larger projects of its kind in Texas and there are literally reams of material about these missions. Their story is most dramatic--involving political schemes and intrigue, capitalistic ventures, graft; epidemics among the resident and nearby tribes;

illicit romances, assassinations and raids by unfriendly Indian tribes; and finally, the story of a persistent and devoted priest (who had founded the famous Alamo) who held the missions together for about ten years, planning, working and teaching the tribes who had petitioned him to build the missions. Those of us interested in preserving what we can of our heritage would certainly be in favor of any possible restoration of these simple missions. Details have been preserved in the Santa Cruz de Queretero records, of which there are transcripts by William E. Dunn in the University of Texas (Austin) Archives. Herbert E. Bolton also tells much of this dramatic story in his Texas in the Middle Eighteenth Century, republished by Russell & Russell, Inc., New York, 1962.

In addition to the Spanish names shown on map for two crossings over the San Gabriel, I might list for you the names of the three missions and presidio:

San Francisco Xavier de Horcasitas, also called Nuestra Señora de los Dolores del Rio de San Xavier
San Ildefonso
Nuestra Señora de la Candelaria
Presidio San Francisco Xavier de Gigedo

Of the Anglo-American settlements along the Laneport Reservoir area, I can give you the following notes:

Circleville, the oldest of the settlements, was established late in 1853 when three Dubark brothers, Joseph, Jr., William, and James, came there with their families. Between them the brothers knew the crafts of blacksmith, tinsmith, gunsmith, wheelwright, watchmaker, cabinetry, milling and spinning, and worked with silver, gold and pewter. Joseph Dubank and a partner set up a cotton and wool carding factory in the community during the Civil War. Thus this village became a small manufacturing center at a very early date. The community was assigned a post office in 1857 and continued to have one until 1918. Also in 1857, two local men, David H. McFadin (who had settled near Comanche Peak in 1846), and Christopher Columbus Gillett, built the Star Mill on the San Gabriel. This mill served people of the east and central part of the county. Some years later, after the mill was damaged by floods, but the mill wheel left intact, a gin was built north of the river, powered by the same mill wheel. The

early village had a blacksmith shop, general store, molasses mill, in addition to the other services already mentioned. In 1882, a railroad was built through Circleville, joining Fort Worth and points south, and creating the new towns of Bartlett, Granger, and terminating at Taylor, where the line intersected another one already established.

As mentioned, Granger was created in 1882 by the coming of the railroads. It enjoyed several decades of very rapid growth and development, and is still historically interesting because of some of its fine old brick buildings and its unusually wide street paved with brick. This town might well be restored as a model of the typical town created by the arrival of the railroad frontier of the 1880's. Note that the community has a handsome opera house, still intact, which was built in 1905.

The community of Allison had a post office in the name of "Conel" 1878-1880, and in the name of Allison 1892-1893, had a gin, store, school and church.

Hoxie community grew up after a railroad magnate named Hoxie bought huge acreage in 1878 and built a palatial residence north of the present village. Had post office 1900-1905.

Elm Grove was called Grove Ranch when it had a post office in 1887-1888, and was earlier a favorite Indian campsite of considerable size.

Camp Springs, also called Campground Springs, was another large Indian campsite, named because of the springs which feed the river at that place. The Star mill and gin were built a short distance above these springs. After the Civil War, this was a popular picnic ground for people of the area.

Waterloo had a post office in 1893, and a store, gin, and other businesses.

Somerset was an early rural school where church services were also held.

Laneport (well named for ~~the use of~~ a reservoir, I think!) was named for an early family there, Lane, and for the location of the town on the river. It had a number of

businesses, including several general stores, a furniture store which also sold coffins, a gin, grocery, and blacksmith. Laneport shared professional services of a doctor with Hare.

Hare had a post office from 1900 to 1904 and likewise had a number of small businesses.

Enterprise was a rural school established about 1900, and nicknamed Cocklebur because of the profusion of that weed in the vicinity.

Perhaps I have given you much more than you want. If you care to refer to further history of the area, you might see my book being released late in December, Land of Good Water, Wakachue Nouetsu: A Williamson County, Texas, History.

This is a fascinating area which I've known all my life, as you can guess. If I can assist you with any project which would preserve or otherwise enhance the history of these communities, I shall be happy to do so.

Yours truly,

Clara Scarbrough

Clara Scarbrough (Mrs. Don)

Note: My book mentioned above is copyrighted, and I have paraphrased material from it in my summary to you. If you give a bibliography in your supplement, I would appreciate your listing it. The full title is above. Author should be listed as Clara Stearns Scarbrough; publisher, Williamson County Sun Publishing Company, 1973.

VIII
LAND AND WATER USE PLAN OF DEVELOPMENT

VIII- LAND AND WATER USE PLAN OF DEVELOPMENT

8-01. General.- The basic concept behind the land and water use plan of development is the integration of authorized uses of the project land and water areas into a balanced development plan for the best use of all project resources in the best interest of the public throughout the life of the project. The intent is to present a plan of development which is flexible enough to meet the present and future needs of the project in consonance with the land capabilities and the esthetics of the project. The objectives of this plan are to: (1) present a complete zoning and land use allocation plan which offers specific recommendations for the ultimate use and possible interim use to which all land and water should be dedicated; (2) to serve as a resource management guide for the comprehensive use of all project land and water areas through planned use of designated areas; and (3) to present the concept and objectives for the development and management of all project resources.

8-02. Land acquisition.- The land acquisition necessary to accomplish the authorized purposes is in accordance with EM 405-2-150 and change number 1 dated 10 October 1966. Table VIII-1 presents the land requirements necessary for construction and operation of the project.

TABLE VIII - 1

PROJECT LAND ACQUISITION REQUIREMENTS-LANEPORT LAKE

Land Acquisition Requirements	Acres
Total acres	14,840
Flowage easements	(1,650)
Fee area	(13,200)
Project operations, damsite and downstream areas	1,329
Area above guide taking line for specific recreation	390
Area required for water conservation and flood control purposes and blocking out	11,481
Area occupied by interim conservation pool Elevation 504 msl	4,400
Additional area occupied by ultimate conservation pool - Elevation 512 msl	1,830
Area occupied by flood control pool Elevation 528 msl	4,810
Area required for protection against saturation and wave action and for blocking out	441

8-03. Land use allocation plan.- ER 1120-2-400 requires all lands at civil works water resource projects to be allocated to provide for sound development and management during the interim period when the pool is not at its ultimate elevation. The basic objective of the land use allocation plan is to insure proper stewardship of the project lands and its resources during these interim periods. Project lands were allocated for specific management purposes only after considerable research was conducted to determine their highest and best use. Land areas will be marked according to designated use as indicated on the land use allocation map with appropriate signs wherever necessary for proper land management and administration. Table VIII-2 presents a summary of the land use acreages.

TABLE VIII-2

LAND USE ALLOCATION PLAN*-LANEPORT LAKE

Land Usage	Acres
Project operations	431
Operations: Recreation intensive use	995
Operations: Recreation low-density use	268
Operations: Wildlife management	
Pecan Grove wildlife area	630
San Gabriel wildlife area	2,640
Willis Creek wildlife area	1,950
Sore Finger wildlife area	1,496
Specific recreation lands	390
Interim conservation pool, Elevation 504 msl	4,400
Total fee lands	13,200
Total flowage easement lands	1,650
Total Area	14,850

*The total acreage is in accordance with the project cost estimate PB3 effective 1 July 1973.

The land use allocation plan showing various designated land uses is presented in plate VIII-1. Descriptions of each of the allocated land areas follow:

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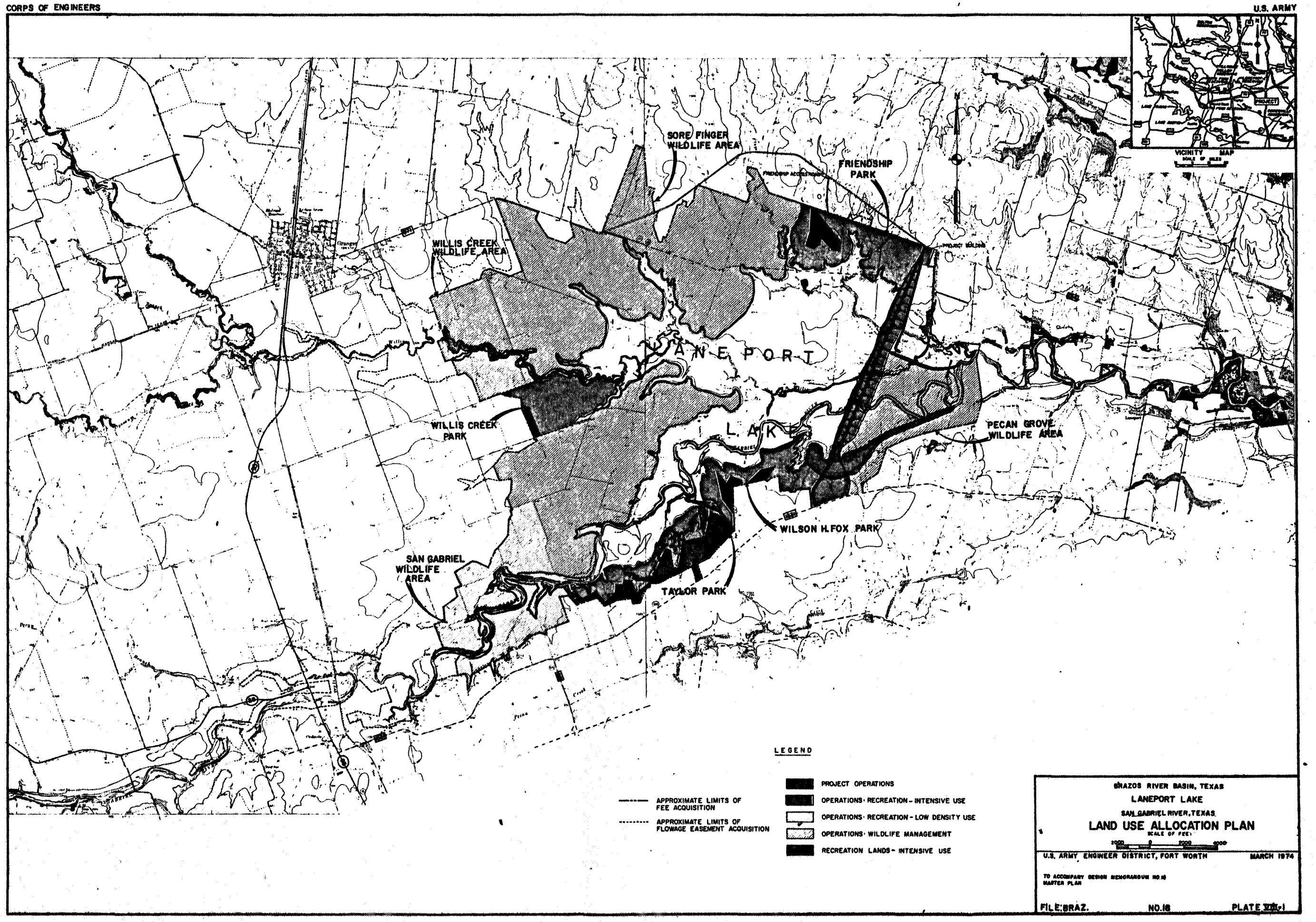


LEGEND

APPROXIMATE LIMITS OF FEE ACQUISITION

APPROXIMATE LIMITS OF FLOWAGE EASEMENT ACQUISITION

PROJECT OPERATIONS

OPERATIONS- RECREATION - INTENSIVE USE

OPERATIONS- RECREATION - LOW DENSITY USE

OPERATIONS- WILDLIFE MANAGEMENT

RECREATION LANDS - INTENSIVE USE

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

LAND USE ALLOCATION PLAN

SCALE OF FEET

2000 0 2000 4000

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.18
MASTER PLAN

FILE: BRAZ. NO.18 PLATE VIII-1

a. Project operations.- Project operation lands were acquired for the necessary construction and operation of the project for its authorized purposes. This category allocates a portion of this land to be managed for the safe, efficient operation and maintenance of the project office, embankment, pertinent works, and spillway. Agricultural use of these lands will be permitted only on an interim basis when not in conflict with the designated use.

b. Operations: recreation intensive use.- A portion of the land acquired for project operation needs was allocated for management as developed public use areas (park) for intensive recreational activities by the visiting public, including areas for concessions and quasi-public development. Fishing will be permitted except in restricted areas such as beach areas. No agricultural uses are permitted on these lands except on an interim basis for maintenance of open space and scenic values.

c. Operations: recreation low-density use.- This land was acquired for project operations purposes; it was allocated for management as a low-density type recreation area requiring limited supporting facilities. No agricultural uses are permitted on this land except on an interim basis for maintenance of open space, scenic values, or wildlife habitat improvement. Hunting and fishing will be permitted unless there is a conflict with the designated purpose.

d. Operations: wildlife management.- The wildlife areas on the land allocation map are project operation lands which have been set aside to provide, through proper management, suitable habitat for the propagation and preservation of native species of wildlife. This will result in a greater variety of recreation activities. Agricultural uses may be used as a management tool on an interim basis. Hunting and fishing will be permitted except when in conflict with the designated use.

e. Recreation land.- This land was acquired for recreation purposes and allocated to multiple purpose recreation use. No agricultural uses are permitted on this land except on an interim basis for maintenance of open space and scenic values.

8-04. Water use planning.- The intent of this section is to prepare a feasible water use plan which is flexible enough to allow modification by project personnel to meet the changing needs of the project. The objective is to plan water areas to minimize safety hazards while allowing maximum utilization of all water areas available. Water areas will be marked with buoys according to uses, restrictions, and rules as indicated in the water use planning plate. The water use map showing the various zoned areas is shown on plate VIII-2. A description of these areas is presented below:

a. Swimming areas.- Beaches and swimmming areas located in designated park areas will be so identified by buoys and proper signs. Only swimming and related activities are to be allowed in these areas. No boating or fishing will be permitted.

b. Low-speed boating areas.- Congested areas, such as boat ramp and marina mooring areas where high-speed boating and their associated wakes create an opportunity for accidents and property damage, are designated as low-speed boating areas. In addition, the low-speed boating areas will include areas in proximity to beaches and park areas. Skiing will be prohibited in these areas. Appropriately marked buoys will be placed limiting the speed of watercraft to 5 miles per hour.

c. Uncleared areas.- Uncleared (timbered) areas exist where surface and subsurface debris create a hazard to any type of boating activity. No effort will be made to restrict these areas from public use; however, they will be marked to alert the public.

d. Shallow areas.- Areas that are intermittent with shallow and deep water will be managed as shallow water areas in the interests of public safety. Floats advising the public of these areas will be maintained at the entrance or perimeter of the areas, as conditions warrant.

e. Low pool hazards.- Low pool hazards are subsurface structures such as old bridges and embankments, which become hazardous to boaters when the lake level is below the normal pool elevation. These areas will be identified by appropriate markers.

f. Restricted areas.- To insure visitor safety, the water area within 300 radial feet of the outlet and intake structures will be restricted from public use. Project personnel will classify any additional areas requiring extra safety restrictions. Buoys will be installed to indicate restricted areas.

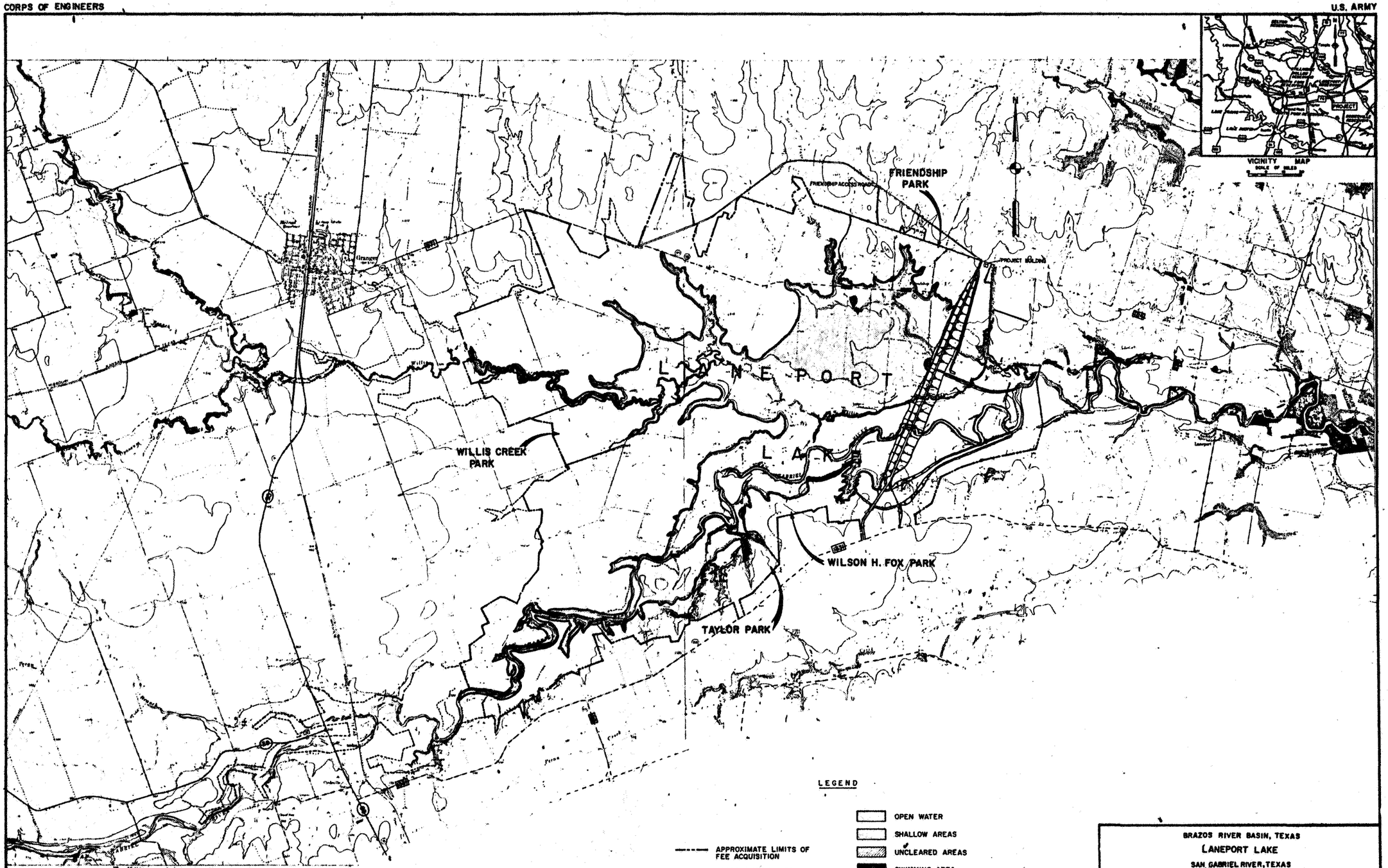
8-05. Off-road recreation vehicle areas.- In accordance with ER 1130-2-405 and Executive Order 11644, dated 9 February 1972, project lands were evaluated for the possibility of setting aside a specific area for off-road vehicle use. It has been determined that the use of off-road vehicles would be in conflict with the management goals established for this project. Therefore, this master plan does not propose an area for off-road vehicle use.

8-06. Collateral and interim use.-

a. Grazing leases other than in park areas.- This plan proposes to make designated project land areas available for grazing leases only on an interim basis as a management tool when such use does not conflict with the authorized purposes. All grazing leases will be primarily for the purpose of restoring and improving vegetation. The leased premises will be subject to free public use for hunting and fishing.

CORPS OF ENGINEERS

U.S. ARMY



BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

WATER USE PLAN

SCALE OF FEET

2000 0 2000 4000

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO. 18
MASTER PLAN

FILE: BRAZ. NO. 18 PLATE XIII-2

b. Nonprofit groups and private clubs.- The recreational needs of nonprofit groups and private clubs will be accommodated on a nonexclusive, first-come-first-serve, or short-term reservation basis. These groups will be assigned to a specific location within the recreation-intensive use areas. This will result in greater utilization of project lands. At the same time, it will reduce the cost of development, maintenance, and operation of areas for these organizations. There are no plans for long-term leases to nonprofit groups or private clubs.

c. Easements.- All outgrants including easements for roads and utility lines, will be processed on an individual basis. The policy of attempting to have private roads and utility lines located on non-Government land will be adhered to as much as possible. Lands will be acquired in flowage easement to allow for possible inundation, and no buildings for human habitation will be constructed on these lands. The written consent of the District Engineer or his authorized representative shall be obtained for the type and location of any structure and for appurtenances thereto now existing or to be erected or constructed on flowage easement lands.

8-07. Hunting restrictions.- Shotgun hunting in accordance with State laws and regulations will be permitted for all game species on all land and water areas except those in developed parks and in other posted areas. Waterfowl hunting will be permitted from registered water blinds, temporary land based blinds, or by jump-shooting. Duck hunting could be safely permitted in most areas between the November and January dates usually set for the Texas season. Due to the lack of public access on private lands, hunting for quail and other small game in season could be safely conducted in undeveloped parks and special use areas as noted on the land use map. All hunting must conform to Title 36 and the amendment to the Fort Worth District Regulation 1130-2-100, dated 3 November 1971.

8-08. Fishing.- Fishing in accordance with State laws and regulations will be permitted for all fish species on all water areas except in swimming areas and other restricted use areas shown on the water use map.

8-09. Management of environmental and recreational resources.-

a. General.- The concept underlying the management of project resources is to conserve, improve, and manage the resources for their best use and proper stewardship for the benefit of the general public. The intent of this section is to present the objectives for management of each project resource. It will serve as a guide until a more detailed resource plan can be developed. These objectives will be met by employing the most modern resource management techniques available. This will include but not be limited to controlling soil erosion, enhancing the vegetative cover for erosion control, providing wildlife habitat, increasing forage production, and providing for high quality public use. Specific

management plans for the various resources will be developed by the project office following an on-site survey; they will be submitted as an appendix to the master plan.

b. Archeological and historical.- The objective of an archeological and historical management program is to salvage and preserve the archeological and historical resources associated with the project. During the development of the program, the Corps of Engineers will seek cooperation from the National Park Service, State universities, and State and county historical societies and commissions. In addition, the Corps of Engineers will exert every effort to develop an archeological and historical program agreeable to all cooperating agencies so that the maximum benefits can be obtained.

c. Scenic.- In developing the scenic resources, the purpose is to provide sensory pleasure to the majority of the visitors. Since a water resource project of this type greatly modifies the environment the primary objective will be to minimize the impact of the the project on the environment by protecting existing resources. In addition, a landscaping and beautification program will be initiated to harmonize facility development with its environs; it will be designed to emulate as far as practical the esthetically pleasing "natural" environment presently existing within the project area.

d. Soils.- The primary objectives in developing a soil resources management program will be conservation, improvement, and enhancement. Improvement and development of the soil resources will be accomplished by controlling erosion on graded and disturbed areas, stabilizing gullies, and establishing and maintaining desirable vegetative cover.

e. Vegetation.- The basic objective of a vegetative management program is to provide stewardship of the land and resources through protection, improvement, and management of vegetative cover. This will be accomplished by planting, maintaining, and improving desirable trees and grasses. It is essential that desirable trees and grasses be established and maintained during the early development stages of the project. Cultivation of row crops will be phased out as rapidly as practicable. Areas where tree or grass cover is already established will not be disturbed unless a more desirable plant species can be planted to benefit the area. Plantings and simple drainage features will be used to control rapid runoff. Suitable tree species will be established along the shoreline, where desirable, and on public use areas where needed. Chapter XIV presents a concept plan for the development and management of the vegetative resources.

f. Fisheries.- A fisheries management program will be provided for the purpose of conservation of species and derivation

of maximum benefit from the fisheries resources. In managing the fisheries resources, the primary objective will be to increase the quality and quantity of the desirable game fish population. Such a program includes but is not limited to methods of controlling rough fish populations, stocking game fish, and buoying known areas of fish concentration points to facilitate their harvest by anglers. Although the responsibility of the fisheries resource is essentially that of the Texas Park and Wildlife Department, the Corps of Engineers will supply all possible aid and assistance to insure an adequate fisheries program.

g. Wildlife.- In order to obtain the greatest benefit from the wildlife resources, a scientifically based wildlife management program should be provided. The fundamental objective in managing this resource will be to attract the greatest variety of wildlife species and to produce huntable populations of game species. This objective can be accomplished by providing a cover restoration program using plants which will provide both food and cover and create an edge effect. Grazing will be controlled, and artificial aids such as nesting platforms will be used when necessary. Every effort will be employed to protect endangered wildlife species. The wildlife areas of this project meet the Texas Parks and Wildlife Department criteria for public use. A concept for a fish and wildlife management plan is presented in chapter XVI. A detailed vegetative management plan will be prepared and submitted in accordance with ER 1130-2-400 dated 28 May 1971.

8-10. Turfing and landscaping the public use areas.- Landscape planting including trees, shrubs, vines, perennials, annuals, and turf establishment will be an integral component in the design of the recreation sites, areas, and facilities. The objectives of the beautification program include, but are not limited to harmonizing development with the surrounding environment, provision of shade, reduction of undesirable wind, noise, dust, and erosion, and enhancement of structures. Each public use area has been analyzed to determine what natural resources are available, which should be preserved, and how recreational facilities should be blended with the surroundings to best complement the area. In keeping with sound landscape architectural principles, the principal consideration should be to develop a planting plan which is simple, functional, esthetically pleasing, and economical to maintain. Plant species will be limited to those proven hardy and tolerant to specific site conditions. Generally plantings will be naturalistic and will avoid arboretum planting. A landscape plan for the recreation-intensive use areas will be presented for approval when completed.

IX
RECREATION FACILITIES PLAN OF DEVELOPMENT

IX - RECREATION PLAN OF DEVELOPMENT

9-01. General.- The purpose of the recreation plan of development is to delineate the areas selected for recreation development, to determine the type of use to which they should be put, and to present a functional plan of how the selected areas may best be developed and managed. This plan proposes to intensively develop Wilson H. Fox and Friendship Parks. When the pool is raised to its ultimate level, Willis Creek and Taylor Parks will be considered for intensive development in accordance with the demand at that time. All park areas and their associate facilities will be located on land under the jurisdiction of the Corps of Engineers.

9-02. Basis for selection of parks.- Wilson H. Fox, Taylor, Willis Creek, and Friendship Parks were first designated in Design Memorandum No. 7. The location of the parks is shown on plate IX-1. Several variables were analyzed during the selection of these parks, they include, but are not limited to, the following:

a. Access to existing roads;
b. Topography of the area;
c. Existing vegetation in the area;
d. The existence of scenic areas;
e. Availability of shoreline access for recreational activities;
f. Degree of shelter for boats; and
g. Water depths for swimming beaches and boat ramps.

9-03. Schedule of recreation development.- All initial recreation facility development will be completed by the time the project is placed in useful operation. Future development is essentially contingent upon future recreation needs and the realization of the ultimate pool. Table III-1 presents the proposed construction schedule.

9-04. Design criteria for recreation facilities.- Engineering design of the recreation facilities will be in accordance with criteria outlined in ER 1110-2-400, "Design of Recreation Sites, Areas, and Facilities," and EM 1110-2-400, "Recreation Facilities Planning and Design Criteria." Only approved design criteria will be used in the construction of recreation facilities. Specific design criteria for this project is outlined in chapter XI.

9-05. Friendship Park access road.- The proposed access road will provide access from FM Road 971 to Friendship Park. This road will follow the natural terrain as near as possible, and will be constructed on low fill to avoid excessive excavation. The design details and cost estimates of this road are included in appendix F. Plate IX-1 shows the location of the access road.

9-06. Cost estimate for proposed recreation facilities.- The estimated total cost for the construction of the proposed recreation facilities, not including engineering and design, and supervision and administration, is $2,978,500. All of the recreation development proposed in this plan will be provided on a noncost-sharing basis. A summary of the estimated cost for the proposed development is presented in chapter X.

9-07. Recreation facilities plan of development.- This section translates the land and water use plan into specifics for actual facility development. Proposals for facility development and associated sign layout will serve as the basis for preparation of plans and specifications. Table IX-1 presents pertinent acreage data for each of the four parks.

Table IX-1

ACRES AVAILABLE IN EACH PARK

Public Use Areas	Above Conservation Pool Elev. 504 msl	Above 5-Year Flood Pool Elev. 511 msl	Above Flood Control Pool Elev. 528 msl
Wilson H. Fox	385	345	310
Taylor Park	395	310	265
Willis Creek Park	225	165	60
Friendship Park	380	310	170
Total Acres	1,385	1,130	805

A description of each park is followed by a detailed cost estimate, a site plan showing planned development, and a sign plan.

a. Wilson H. Fox Park.- (Site plan plates IX-2 and IX-3; sign plan plates IX-4 and IX-5). This park has been designated to be developed as an intensive recreation use area with camping and picnic units, waterborne toilets, and other facilities as shown on the above plates. Table IX-2 presents the detailed cost estimates for this park. The park is located immediately upstream from the south end of the embankment. Access is provided by FM 1331. The terrain is characterized by cultivated flat uplands which slope toward a generally steep shoreline.

Table IX - 2

WILSON H. FOX PARK
DETAILS OF ESTIMATED COSTS FOR RECREATIONAL FACILITIES

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
1. Roads				
a. Park roads (BIT)(two-way)	Mile	$75,000	3.2	$240,000
b. Park roads (BIT)(one-way)		55,000	2.2	121,000
2. Parking areas, Paved (BIT)	S.Y.	5	12,927	64,635
3. Boat launching ramps (conc)	S.Y.			
a. 2-lanes 32 ft. wide		25	924	23,100
b. 4-lanes 68 ft. wide		25	1,964	49,100
4. Water supply systems	Each			
a. Lake pump and filter		5,100	2	10,200
b. Drinking fountains		220	4	880
5. Sanitary facilities(includes cost of sewage disposal facilities)	Each			
a. Masonry waterborne toilets		38,700	3	116,100
b. Service building (with toilets, showers, laundry facilities)		49,800	3	149,400
c. Bathhouse with toilets		47,600	1	47,600
d. Sanitary dump stations (trailer)		2,700	1	2,700
6. Utilities				
a. Water distribution lines	L.S.	-	-	36,000
b. Electric service lines	L.S.	-	-	44,600
c. Light standards, etc.	Each	500	9	4,500
d. Electrical hookup		50	50	2,500
e. Waterline hookup		40	100	4,000

Table IX - 2 (continued)

WILSON H. FOX PARK

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
7. Picnic and camping units	Each			
a. Picnic units		405	62	25,110
b. Camping units		445	100	44,500
8. Table shelters	Each			
a. Single (1-table)		555	162	89,910
b. Group (3-tables)		4,400	1	4,400
9. Floating docks (boating)	Each	2,200	1	2,200
10. Swimming beaches(improved sand)	L.S.	-	-	25,000
11. Signs and buoys	Each			
a. Park entrance signs (major)		1,150	1	1,150
b. Directional signs		70	12	840
c. Registration booths		100	2	200
d. Traffic signs		100	37	3,700
e. Buoys and anchors (sets)		1,500	3	4,500
12. Site improvement	L.S.			
a. Underbrushing				8,200
b. Turfing and revegetation		-	-	76,250
c. Marina excavation		-	-	25,000
d. Marina breakwater		-	-	50,000
13. Landscaping	L.S.	-	-	85,965
14. Gates (traffic control)	Each	500	2	1,000
Subtotal				($1,364,240)
Subtotal (rounded)				$1,364,200

b. Taylor Park.- (site plan plates IX-6 and IX-7; sign plan plates IX-8 and IX-9). Taylor Park is situated on the south shore of the lake approximately 2 miles west of the embankment. Access to the park is generally flat to gently rolling with a majority of the uplands in cultivation. This park will be initially developed as a day-use area with boat launching facilities, hiking trails, and a picnic area with limited supporting facilities. The detailed cost estimate for this development is presented in table IX-3. When the pool is raised to its ulitmate level, this park will be intensively developed according to the demand at that time.

Table IX - 3

TAYLOR PARK
DETAILS OF ESTIMATED COSTS FOR RECREATIONAL FACILITIES

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
1. Roads	Mile			
a. Park roads (BIT)(2-way)		$75,000	1.2	$90,000
b. Park roads (BIT)(1-way)		55,000	0.5	27,500
c. Hiking trails		2,500	1.8	4,500
2. Parking areas, (Paved)((BIT)	S.Y.	5	4,758	23,790
3. Boat launching ramps (conc. 3-lanes, 50 ft. wide)	S,Y.	25	1,611	40,275
4. Water supply systems	Each			
a. Lake pump and filter		5,100	1	5,100
b. Drinking fountains		220	3	660
5. Sanitary facilities	Each			
a. Masonry waterborne toilets		38,700	2	77,400
b. Frame toilets (conc vault)		2,500	2	5,000
6. Utilities				
a. Water distribution lines	L.S.	-	-	5,100
b. Electric service lines	L.S.	-	-	11,100
c. Light standards, etc.	Each	500	5	2,500
7. Picnic units	Each	405	50	20,250
8. Table shelters (single)	Each	555	50	27,750
9. Floating docks (boating)	Each	2,200	1	2,200
10. Signs and buoys	Each			
a. Park entrance sign (minor)		750	2	1,500
b. Directional signs		70	2	140
c. Traffic signs		100	13	1,300
d. Buoys and anchors (sets)		1,500	1	1,500

Table IX - 3 (continued)

TAYLOR PARK

Item	Unit	Unit Cost	Account 14 Quantity	Cost
11. Site improvement	L.S.			
a. Underbrushing		-	-	2,500
b. Turfing and revegetation		-	-	50,000
12. Landscaping	L.S.	-	-	40,500
13 Traffic control gates	Each	500	1	500
Subtotal				($441,065)
Subtotal (rounded)				$441,100

c. Willis Creek Park.- (site plan plate IX-10; sign plan plate IX-11). Willis Creek Park will be initially developed as a day-use area with a two-lane boat launching ramp. parking, and limited supporting facilities. Table IX-4 itemizes the cost estimate for the initial development. Future intensive recreation development will be deferred until the pool is raised to its ultimate condition. This park is located about 3 miles upstream from the embankment on the west shore of the lake. The topography consists of a flat cultivated upland field.

Table IX - 4

WILLIS CREEK PARK
DETAILS OF ESTIMATED COSTS FOR RECREATIONAL FACILITIES

Item	Unit	Unit Cost	Account 14 Quantity	Cost
1. Roads	Mile			
a. Park roads (BIT)(2-way)		$75,000	1.2	$90,000
b. Hiking trails		2,500	0.3	750
2. Parking areas (Paved)(BIT)	S.Y.	5	2,578	12,890
3. Boat launching ramps	S.Y.			
2-lanes, 32 ft. wide		25	1,031	25,775
4. Water supply systems	Each			
a. Lake pump and filter		5,100	1	5,100
b. Drinking fountains		220	1	200
5. Sanitary facilities	Each			
Frame toilets (conc vault)		2,500	2	5,000
6. Utilities				
a. Water distribution lines	L.S.	-	-	2,000
b. Electric service lines	L.S.	-	-	4,000
c. Light standards, etc.	Each	500	2	1,000
7. Table shelters (group,3-tables)	Each	4,400	1	4,400
8. Signs and buoys	Each			
a. Park entrance signs(minor)		750	1	750
b. Directional signs		70	2	140
c. Traffic signs		100	5	500
d. Buoys and anchors (sets)		1,500	1	1,500
9. Site improvement	L.S.			
a. Underbrushing		-	-	1,000
b. Turfing and revegetation		-	-	50,000

Table IX - 4 (continued)

WILLIS CREEK PARK

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
10. Landscaping	L.S.	-	-	$32,500
11. Traffic control gate	Each	$500	1	500
Subtotal				($238,005)
Subtotal (rounded)				$238,000

d. Friendship Park.- (site plan plate IX-12 and IX-13: sign plan plate IX-14). Friendship Park has been designated to be developed as an intensive recreation use area with camping and picnic areas, swimming beach, circulation roads, and other facilities as shown on the plates. The concession area will consist of dry boat storage, boat rentals, grocery store and bait and tackle shop. The park is situated on the north shore immediately west of the embankment. Access to the park will be provided by the proposed Friendship access road that will connect to relocated FM 971. The topography slopes gently towards the lake. An itemized cost estimate of the planned development is presented in table IX-5.

Table IX - 5

FRIENDSHIP PARK
DETAILS OF ESTIMATED COST FOR RECREATIONAL FACILITIES

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
1. Roads	Mile			
a. Park roads (BIT)(2-way)		$75,000	1.4	$105,000
b. Park roads (BIT)(1-way)		55,000	2.2	121,000
2. Parking areas (paved)(BIT)	S.Y.	5	8,695	43,475
3. Boat launching ramps (conc, 3-lanes, 50 ft wide)	S.Y.	25	2,000	50,000
4. Water supply system	Each			
a. Lake pump and filter		5,100	1	5,100
b. Drinking fountains		220	4	880
5. Sanitary facilities	Each			
a. Masonry waterborne toilets		38,700	1	38,700
b. Service building (with toilets, showers, laundry facilities)		49,800	1	49,800
c. Bathhouse with toilets		47,600	1	47,600
d. Sanitary dump station (trailer)		2,700	1	2,700
6. Utilities				
a. Water distribution lines	L.S.	-	-	14,000
b. Electrical service lines	L.S.	-	-	15,700
c. Light standards, etc.	Each	500	7	3,500
d. Electrical hookup		50	28	1,400
e. Waterline hookup		40	56	2,240

Table IX - 5 (continued)

FRIENDSHIP PARK

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
7. Picinic and camping units	Each			
a. Picnic units		405	50	20,250
b. Camping units		445	56	24,920
8. Table shelters	Each			
a. Single (1-table)		555	106	58,830
b. Group (8-tables or more)	L.S.	—	—	50,000
9. Swimming beach(improved sand)	L.S.	-	-	25,000
10. Signs and buoys	Each			
a. Park entrance signs(major)		1,150	1	1,150
b. Directional signs		70	3	210
c. Registration booths		100	1	100
d. Traffic signs		100	15	1,500
e. Buoys and anchors (sets)		1,500	2	3,000
11. Site improvement				
a. Underbrushing	L.S.	-	-	5,300
b. Turfing & revegetation		-	-	82,500
c. Excavation: boat channel		-	-	20,000
12. Landscaping	L.S.	-	-	80,420
13. Traffic control gates	Each	500	4	2,000
Subtotal				($876,275)
Subtotal (rounded)				$876,300

9-08. Area below the embankment.- The area immediately below the embankment is proposed as a low-density day-use area with a parking area, toilet, and a fishermen's hiking trail. Table IX-6 presents a detailed cost estimate of the proposed development. Access to the area will be provided by a road to be built as part of the embankment contract.

Table IX - 6

AREA BELOW THE EMBANKMENT
DETAILS OF ESTIMATED COST FOR RECREATIONAL FACILITIES

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
1. Masonry waterborne toilets	Each	$38,700	1	$38,700
2. Utilities				
a. Water lines	L.S.	-	-	10,000
b. Electric service lines	L.S.	-	-	7,400
c. Light standard	Each	500	2	1,000
3. Signs and buoys				
a. Directional signs	Each	70	2	140
b. Traffic signs	Each	100	4	400
4. Hiking trail	Mile	2,500	0.5	1,250
Subtotal				($58,890)
Subtotal (rounded)				$58,900

9-09. Project building.- The administration and maintenance building will be located near the left abutment of the dam about 250 feet south of relocated FM 971. The administrative section will consist of offices, toilets, employees' lunchroom, mechanical equipment room, and visitors' lobby. The maintenance section will contain the maintenance vehicles, the material and paint storage areas, the vehicle maintenance area, the shop area, a small tool and storage room, the workmen's washroom and toilet, the water well, and the water treatment room. Public access to the project office will be provided by the relocated FM 971. A detailed description of the project building, visitors' overlook, and access roads are presented in Laneport Design Memorandum No. 10. The location of the project building and maintenance area is shown on plate IX-1.

9-10. Visitors' overlook.- The visitors' overlook facility will be located on the south end of the embankment about 750 feet north of the spillway. It will overlook the lake and the spillway. The parking area for the overlook facility will be located a short distance from the structure. The location of the visitors' overlook facility is shown on plate IX-1.

CORPS OF ENGINEERS

U.S. ARMY

SORE FINGER WILDLIFE AREA

FRIENDSHIP PARK

WILLIS CREEK WILDLIFE AREA

L A N E P O R T

L A K E

WILLIS CREEK PARK

PECAN GROVE WILDLIFE AREA

WILSON H. FOX PARK

SAN GABRIEL WILDLIFE AREA

TAYLOR PARK

VICINITY MAP

LEGEND

APPROXIMATE LIMITS OF FEE ACQUISITION

TOP OF INTERIM CONSERVATION POOL ELEV. 504

APPROXIMATE LIMITS OF FLOWAGE EASEMENT ACQUISITION.

PUBLIC USE AREA

WILDLIFE AREA

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

GENERAL DEVELOPMENT PLAN

SCALE OF FEET

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

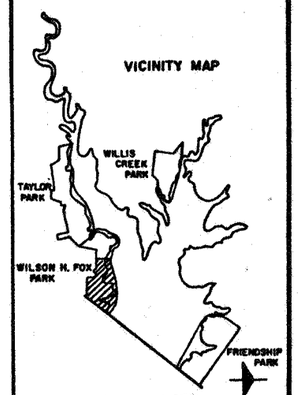
TO ACCOMPANY DESIGN MEMORANDUM NO.10 MASTER PLAN

CORPS OF ENGINEERS

U.S. ARMY

N

VICINITY MAP



LANEPORT DAM SITE

LEGEND

	EXISTING	PLANNED
	BY C OF E / BY OTHERS	BY C OF E
GRAVEL ROADS		
PAVED ROADS		
SECONDARY ROADS		
GRAVEL PARKING AREAS		
PAVED PARKING AREAS		
FRAME TOILETS (CONCRETE VAULT)	(FTC) / (FTC)	(FTC)
FRAME TOILETS (PIT TYPE)	(FTP) / (FTP)	(FTP)
MASONRY TOILETS (CONCRETE VAULT)	(MTC) / (MTC)	(MTC)
MASONRY TOILETS (WATER BORNE)	(MTW) / (MTW)	(MTW)
BOAT RAMPS	(BR) / (BR)	(BR)
BUILDING STRUCTURE (AS DESIGNATED)		
WATER WELLS (SUPPLY)		
WATER LINES		
ELECTRIC SERVICE LINES		
RESERVOIR INFORMATION SIGNS	(RI)	(RI)
PARK ENTRANCE SIGNS	(PE)	(PE)
DIRECTIONAL SIGNS	(D)	(D)
BUOYS		
REGISTRATION BOOTH	(RB)	(RB)
TREE COVER		
TRAFFIC COUNTERS	(TC) / (TC)	(TC)
SWIMMING BEACH		
LIMITS OF CONCESSION AREAS		
LIMITS OF LICENSE OR LEASE AREAS		
UPPER LIMITS (FLOWAGE EASEMENT)		
GOVERNMENT PROPERTY LINE		

CAMPING FACILITIES

AREA NO	ITEM	EXISTING BY C OF E	EXISTING BY OTHERS	PLANNED BY C OF E	PLANNED BY OTHERS
1	TABLES				
	FIREPLACES				
	TRASH CANS				
	SHELTERS				
2	TABLES				
	FIREPLACES				
	TRASH CANS				
	SHELTERS				
3	TABLES				
	FIREPLACES				
	TRASH CANS				
	SHELTERS				
4	TABLES				
	FIREPLACES				
	TRASH CANS				
	SHELTERS				
5	TABLES				
	FIREPLACES				
	TRASH CANS				
	SHELTERS				
6	TABLES				
	FIREPLACES				
	TRASH CANS				
	SHELTERS				

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

WILSON H. FOX PARK I

IN 2 SHEETS

SCALE IN FEET

200 0 200 400

SHEET NO. 1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1976

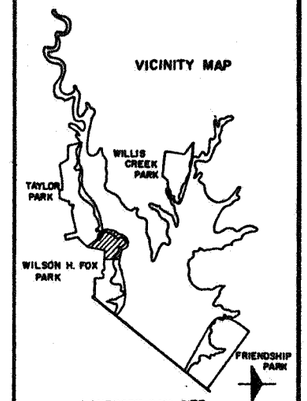
TO ACCOMPANY DESIGN MEMORANDUM NO. 18
MASTER PLAN

FILE BRAZ. NO. 18 PLATE IX-2

CORPS OF ENGINEERS

U.S. ARMY

VICINITY MAP



LEGEND

	EXISTING BY C OF E	EXISTING BY OTHERS	PLANNED BY C OF E
GRAVEL ROADS			
PAVED ROADS			
SECONDARY ROADS			
GRAVEL PARKING AREAS			
PAVED PARKING AREAS			
FRAME TOILETS (CONCRETE VAULT)	(FTC)	(FTC)	(FTC)
FRAME TOILETS (PIT TYPE)	(FTP)	(FTP)	(FTP)
MASONRY, TOILETS (CONCRETE VAULT)	(MTC)	(MTC)	(MTC)
MASONRY TOILETS (WATER BORNE)	(MTW)	(MTW)	(MTW)
BOAT RAMPS	(BR)	(BR)	(BR)
BUILDING STRUCTURE (AS DESIGNATED)			
WATER WELLS (SUPPLY)			
WATER LINES			
ELECTRIC SERVICE LINES			
RESERVOIR INFORMATION SIGNS	(RI)	(RI)	(RI)
PARK ENTRANCE SIGNS	(PE)	(PE)	(PE)
DIRECTIONAL SIGNS	(D)	(D)	(D)
BUOYS			
REGISTRATION BOOTH	(RB)	(RB)	(RB)
TREE COVER			
TRAFFIC COUNTERS	(TC)	(TC)	(TC)
SWIMMING BEACH			
LIMITS OF CONCESSION AREAS			
LIMITS OF LICENSE OR LEASE AREAS			
UPPER LIMITS (FLOWAGE EASEMENT)			
GOVERNMENT PROPERTY LINE			

POOL ELEVATIONS

CONSERVATION POOL	504.0
CONSERVATION POOL PLUS 6-YEAR FLOOD	511.0
POOL DRAWDOWN 6-YEAR	497.0

ACRES IN PARK

ABOVE CONSERVATION POOL	366

PICNIC FACILITIES

AREA NO	ITEM	EXISTING BY C OF E	EXISTING BY OTHERS	PLANNED BY C OF E	PLANNED BY OTHERS
1	TABLES FIREPLACES TRASH CANS SHELTERS			20 20 2	
2	TABLES FIREPLACES TRASH CANS SHELTERS			20 20 2	
3	TABLES FIREPLACES TRASH CANS SHELTERS				
4	TABLES FIREPLACES TRASH CANS SHELTERS				
5	TABLES FIREPLACES TRASH CANS SHELTERS				
6	TABLES FIREPLACES TRASH CANS SHELTERS				

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

WILSON H. FOX PARK II

IN 2 SHEETS

SCALE IN FEET

200 0 200 400

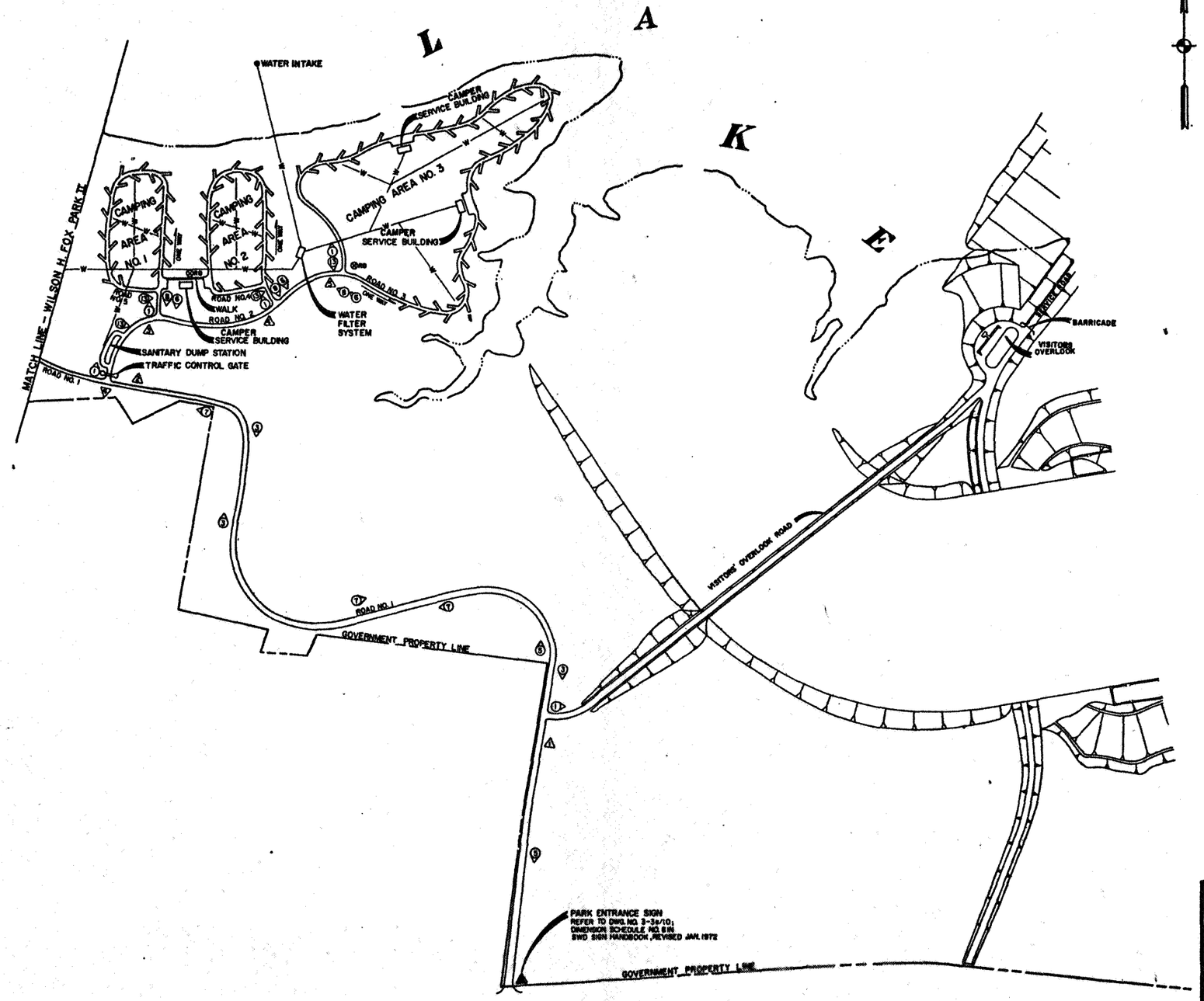
SHEET NO. 2

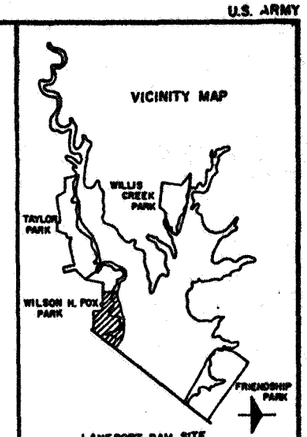
U.S. ARMY ENGINEER DISTRICT, FORT WORTH

MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO. 18
MASTER PLAN

FILE. BRAZ. NO. 18 PLATE IX-3





DIRECTIONAL SIGNS[1]

SYMBOL	SERIES	TYPE
⚠	RS 036 A[2] RS 015 A A	OVERLOOK PROJECT OFFICE FRIENDSHIP PARK
⚠	RS 041 A	SANITARY DUMP STA.
	RS 036 A RS 039 C RS 061 C RS 053 C RS 054 C	CAMPGROUNDS PICNIC AREA BEACH MARINA LAUNCH RAMP
⚠	RS 036 B RS 022 B RS 035 B	CAMPGROUNDS RESTROOMS SHOWERS
⚠	RS 036 B RS 022 B RS 035 B	CAMPGROUNDS RESTROOMS SHOWERS
⚠	RS 022 C RS 035 C RS 036 C	RESTROOMS SHOWERS CAMPGROUND

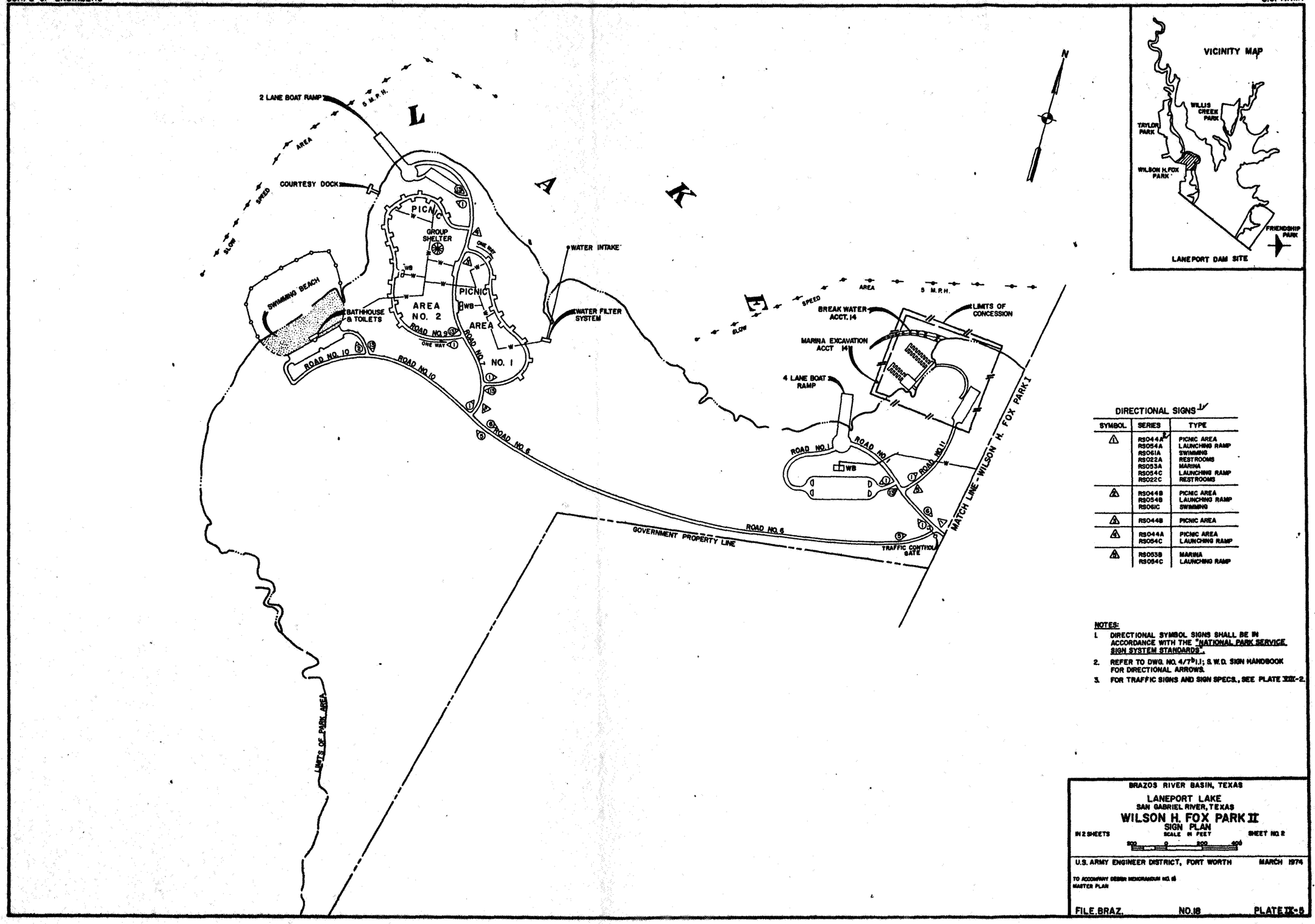
NOTES:
1. DIRECTIONAL SYMBOL SIGNS SHALL BE IN ACCORDANCE WITH THE "NATIONAL PARK SERVICE SIGN SYSTEM STANDARDS."
2. REFER TO DWG NO. 4/7 U.S.N.D. SIGN HANDBOOK FOR DIRECTIONAL ARROWS.

TRAFFIC CONTROL SIGNS

SYMBOL	SERIAL	TYPE
①	R1-1	STOP
②	R1-2	YIELD
③	W1-2L	CURVE LEFT
④	R4-7A	KEEP RIGHT
⑤	R2-1	SPEED LIMIT 30
⑥	R2-1	SPEED LIMIT 10
⑦	W1-2E	CURVE RIGHT
⑧	R6-2	ONE WAY
⑨	R11-2	ROAD CLOSED
⑩	W6-3A	TWO WAY TRAFIC
⑪	W11-2	PREDESTRIAN CROSSING. SLOW
⑫		
⑬	R5-1	DO NOT ENTER
⑭		CAUTION LAKE AHEAD SLOW TO 10 M.P.H.

NOTE:
SIZE, COLORING, AND LOCATION OF ALL TRAFFIC SIGNS SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES HIGHWAYS DATED JUNE, 1971.

BRAZOS RIVER BASIN, TEXAS
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS
WILSON H. FOX PARK I
SIGN PLAN
IN 2 SHEETS SCALE IN FEET SHEET NO. 1
100 0 200 400
U.S. ARMY ENGINEER DISTRICT, FORT WORTH MARCH 1974
TO ACCOMPANY DESIGN MEMORANDUM NO. 18
MASTER PLAN
FILE BRAZ. NO. 18 PLATE IX-4



DIRECTIONAL SIGNS [1]

SYMBOL	SERIES	TYPE
1	RS044A [2]	PICNIC AREA
	RS054A	LAUNCHING RAMP
	RS061A	SWIMMING
	RS022A	REST ROOMS
	RS053A	MARINA
	RS054C	LAUNCHING RAMP
	RS022C	REST ROOMS
2	RS044B	PICNIC AREA
	RS054B	LAUNCHING RAMP
	RS061C	SWIMMING
3	RS044B	PICNIC AREA
4	RS044A	PICNIC AREA
	RS054C	LAUNCHING RAMP
5	RS053B	MARINA
	RS054C	LAUNCHING RAMP

NOTES:

1. DIRECTIONAL SYMBOL SIGNS SHALL BE IN ACCORDANCE WITH THE "NATIONAL PARK SERVICE SIGN SYSTEM STANDARDS".
2. REFER TO DWG. NO. 4/7[b]1.1; S.W.D. SIGN HANDBOOK FOR DIRECTIONAL ARROWS.
3. FOR TRAFFIC SIGNS AND SIGN SPECS., SEE PLATE XIII-2.

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

WILSON H. FOX PARK II
SIGN PLAN

IN 2 SHEETS SCALE IN FEET SHEET NO. 2

200 0 200 400

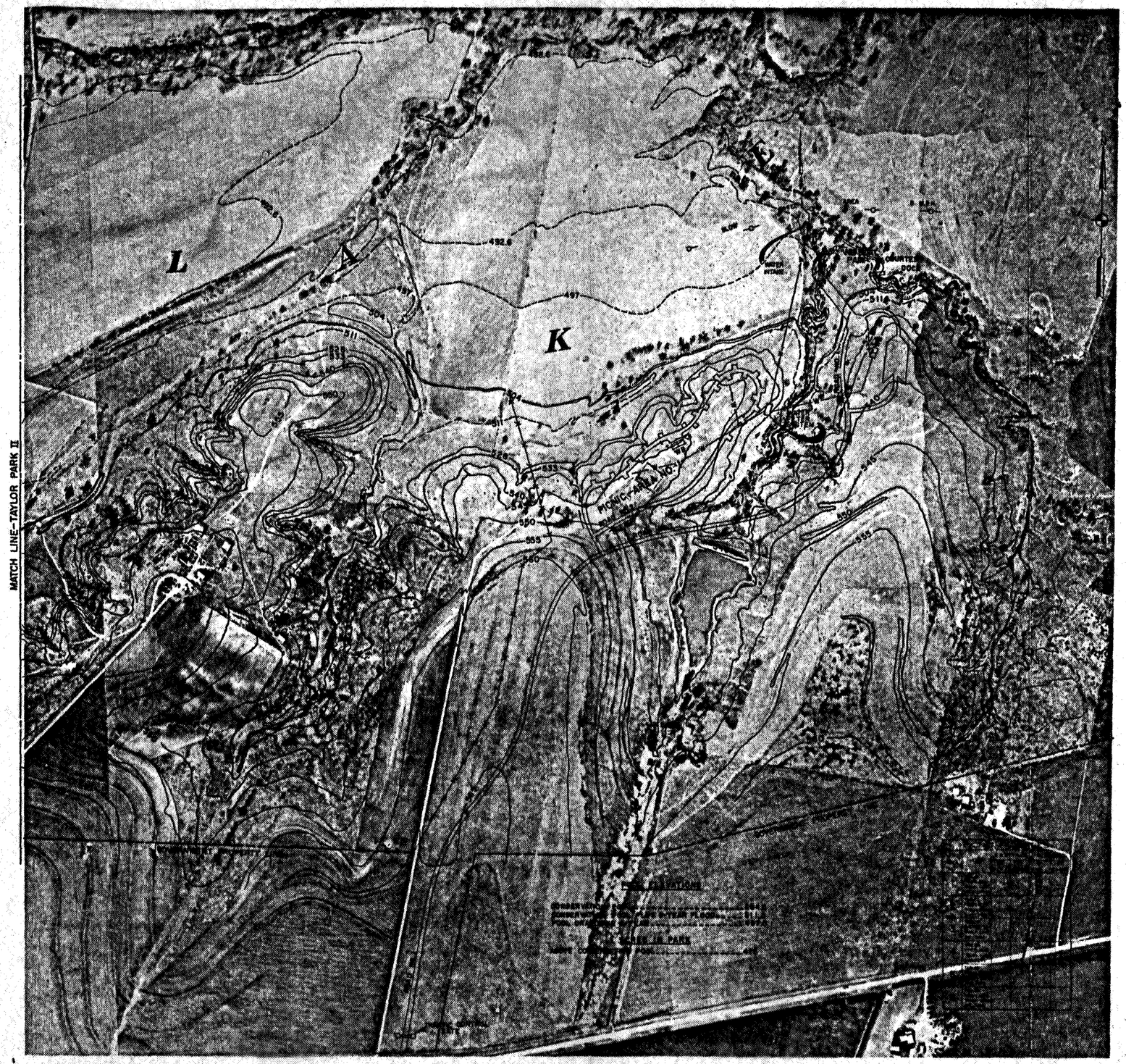
U.S. ARMY ENGINEER DISTRICT, FORT WORTH MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO. 18 MASTER PLAN

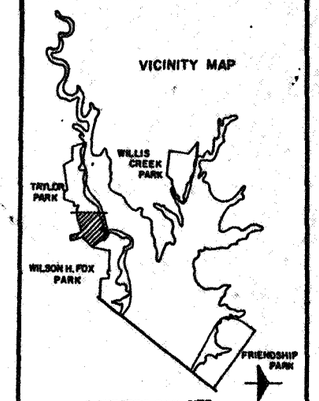
FILE BRAZ. NO. 18 PLATE IX-5

CORPS OF ENGINEERS

U.S. ARMY



VICINITY MAP



LEGEND

	EXISTING		PLANNED
	by C of E	by OTHERS	by C of E
GRAVEL ROADS			
PAVED ROADS			
SECONDARY ROADS			
GRAVEL PARKING AREAS			
PAVED PARKING AREAS			
FRAME TOILETS (CONCRETE VAULT)	FRAME (C)	FRAME (C)	FRAME (C)
FRAME TOILETS (PIT TYPE)	FRAME (PIT)	FRAME (PIT)	FRAME (PIT)
MASONRY TOILETS (CONCRETE VAULT)	MASONRY (C)	MASONRY (C)	MASONRY (C)
MASONRY TOILETS (WATER BORNE)	MASONRY (WB)	MASONRY (WB)	MASONRY (WB)
BOAT RAMPS			
BUILDING STRUCTURE (AS DESIGNATED)			
WATER WELLS (SUPPLY)			
WATER LINES			
ELECTRIC SERVICE LINES			
RESERVOIR INFORMATION SIGNS			
PARK ENTRANCE SIGNS			
DIRECTIONAL SIGNS			
BUOYS			
REGISTRATION BOOTH			
TREE COVER			
FENCE			
SWIMMING BEACH			
LIMITS OF CONCESSION AREAS			
LIMITS OF LICENSE OR LEASE AREAS			
UPPER LIMITS (FLOWAGE EASEMENT)			
GOVERNMENT PROPERTY LINE			

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

TAYLOR PARK I

IN 2 SHEETS

SCALE IN FEET 200 0 200 400

SHEET NO. 1

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

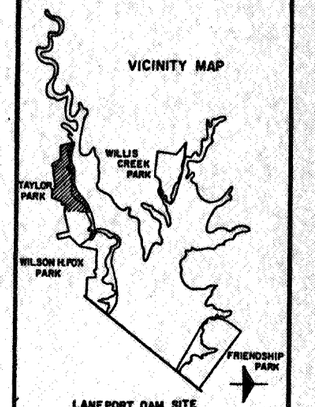
TO ACCOMPANY DESIGN MEMORANDUM NO.18 MASTER PLAN

FILE BRAZ. NO.18 PLATE IX-6

CORPS OF ENGINEERS

U.S. ARMY

VICINITY MAP



LEGEND

	EXISTING BY C.O.E.	EXISTING BY OTHERS	PLANNED BY C.O.E.
GRAVEL ROADS			
PAVED ROADS			
SECONDARY ROADS			
GRAVEL PARKING AREAS			
PAVED PARKING AREAS			
FRAME TOILETS (CONCRETE VAULT)	F(C)	F(C)	F(C)
FRAME TOILETS (PIT TYPE)	F(E)	F(E)	F(E)
MASONRY TOILETS (CONCRETE VAULT)	M	M	M
MASONRY TOILETS (WATER BORNE)	MWB	MWB	MWB
BOAT RAMPS			
BUILDING STRUCTURE (AS DESIGNATED)			
WATER WELLS (SUPPLY)			
WATER LINES			
ELECTRIC SERVICE LINES			
RESERVOIR INFORMATION SIGNS			
PARK ENTRANCE SIGNS			
DIRECTIONAL SIGNS			
BUOYS			
REGISTRATION BOOTH			
TREE COVER			
FENCE			
SWIMMING BEACH			
LIMITS OF CONCESSION AREAS			
LIMITS OF LICENSE OR LEASE AREAS			
UPPER LIMITS (FLOWAGE EASEMENT)			
GOVERNMENT PROPERTY LINE			

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

TAYLOR PARK II

IN 2 SHEETS

SCALE IN FEET

200 0 200 400

SHEET NO.2

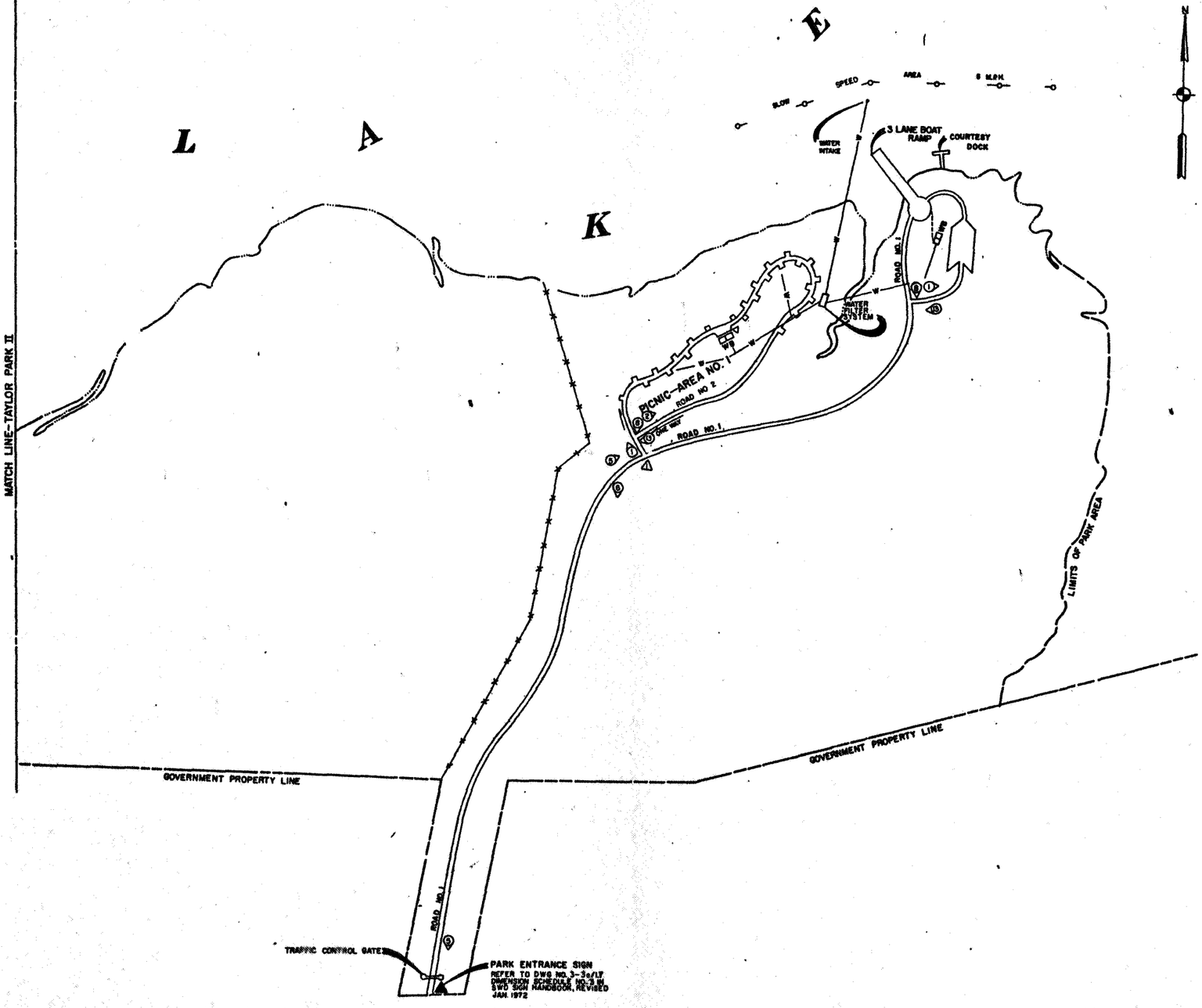
U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

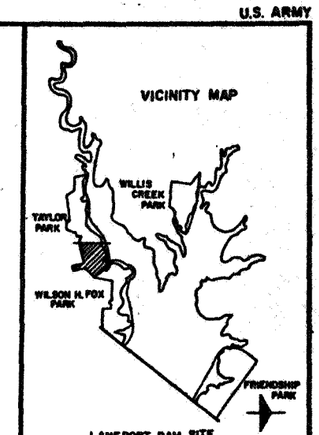
TO ACCOMPANY DESIGN MEMORANDUM NO.18 MASTER PLAN

FILE BRAZ. NO.18 PLATE III-7

CORPS OF ENGINEERS

U.S. ARMY





DIRECTIONAL SIGNS

SYMBOL	SERIES	TYPE
⚠	RS044B	PICNIC AREA
	RS022A	RESTROOMS
	RS054C	LAUNCHING RAMP

NOTES:

1. DIRECTIONAL SYMBOL SIGNS SHALL BE IN ACCORDANCE WITH THE "NATIONAL PARK SERVICE SIGN SYSTEM STANDARDS"
2. REFER TO DWG. NO. 4/7[8]LI, S.W.D. SIGN HANDBOOK FOR DIRECTIONAL ARROWS.
3. FOR TRAFFIC CONTROL SIGNS AND SIGN SPECS SEE PLATE XIII - 2.

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

TAYLOR PARK I
SIGN PLAN

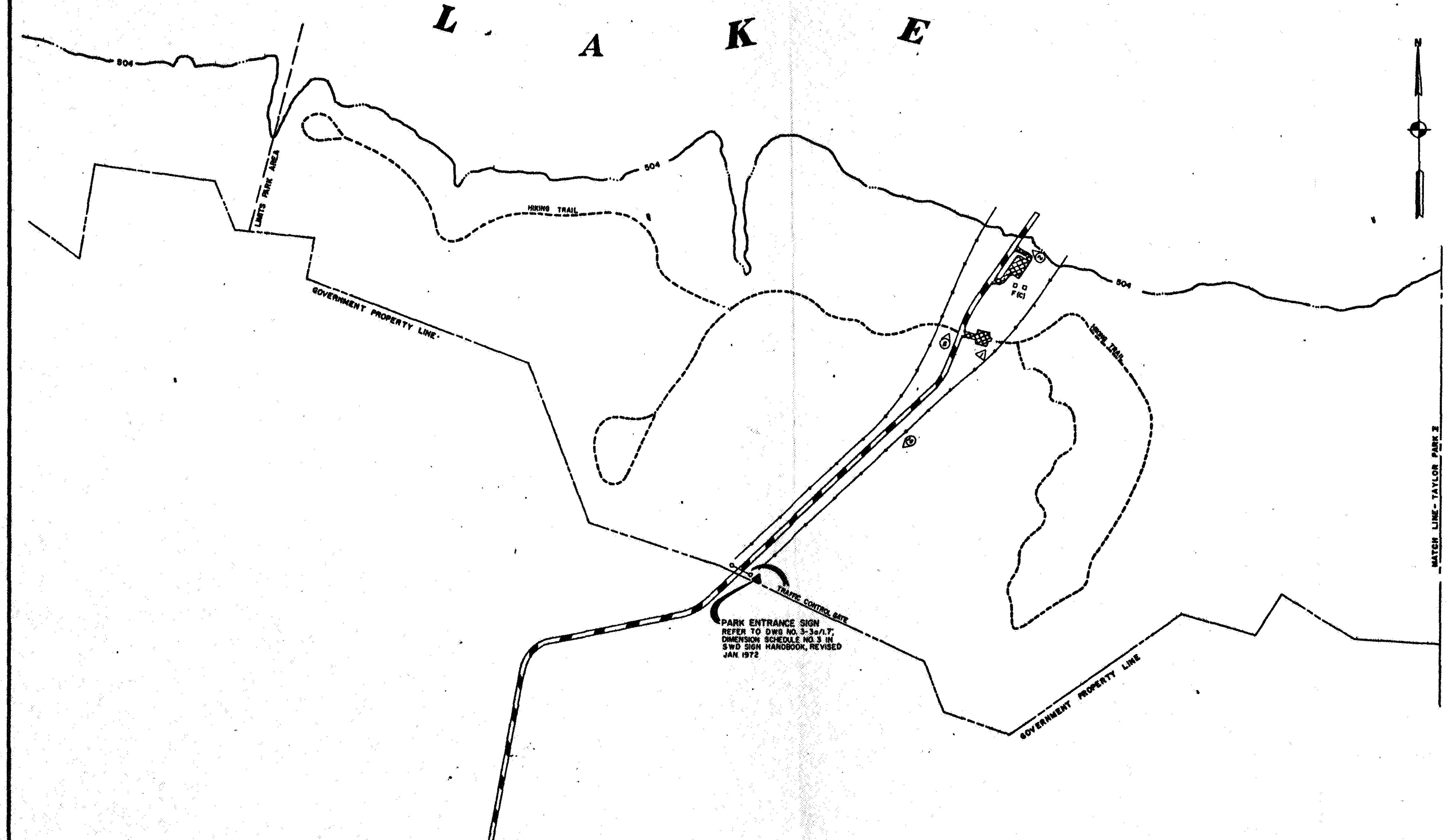
IN 2 SHEETS — SCALE IN FEET: 200 0 200 400 — SHEET NO. 1

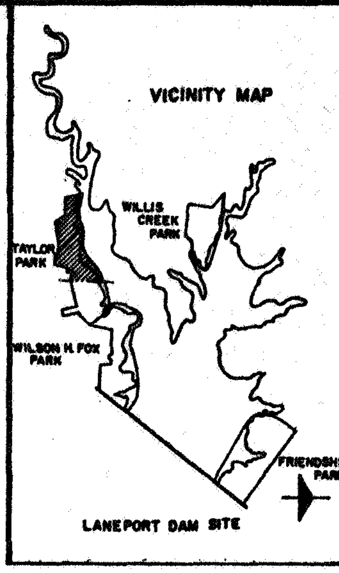
U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.18
MASTER PLAN

FILE BRAZ. NO.18 PLATE IX-8

CORPS OF ENGINEERS U.S. ARMY





DIRECTIONAL SIGNS 1/

SYMBOL	SERIES	TYPE
⚠	RS068B 2/ RS054C RS022B	HIKING TRAIL LAUNCHING RAMP RESTROOMS

NOTES:
1. DIRECTIONAL SYMBOL SIGNS SHALL BE IN ACCORDANCE WITH THE "NATIONAL PARK SERVICE SIGN SYSTEM STANDARDS."
2. REFER TO DWG NO. 4/7b 1.1; S.W.D. SIGN HANDBOOK FOR DIRECTIONAL ARROWS.
3. FOR TRAFFIC SIGNS AND SIGN SPEC., SEE PLATE VIII-2.

BRAZOS RIVER BASIN, TEXAS
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS
TAYLOR PARK II
SIGN PLAN
SCALE IN FEET
IN 2 SHEETS SHEET NO.2
200 0 200 400

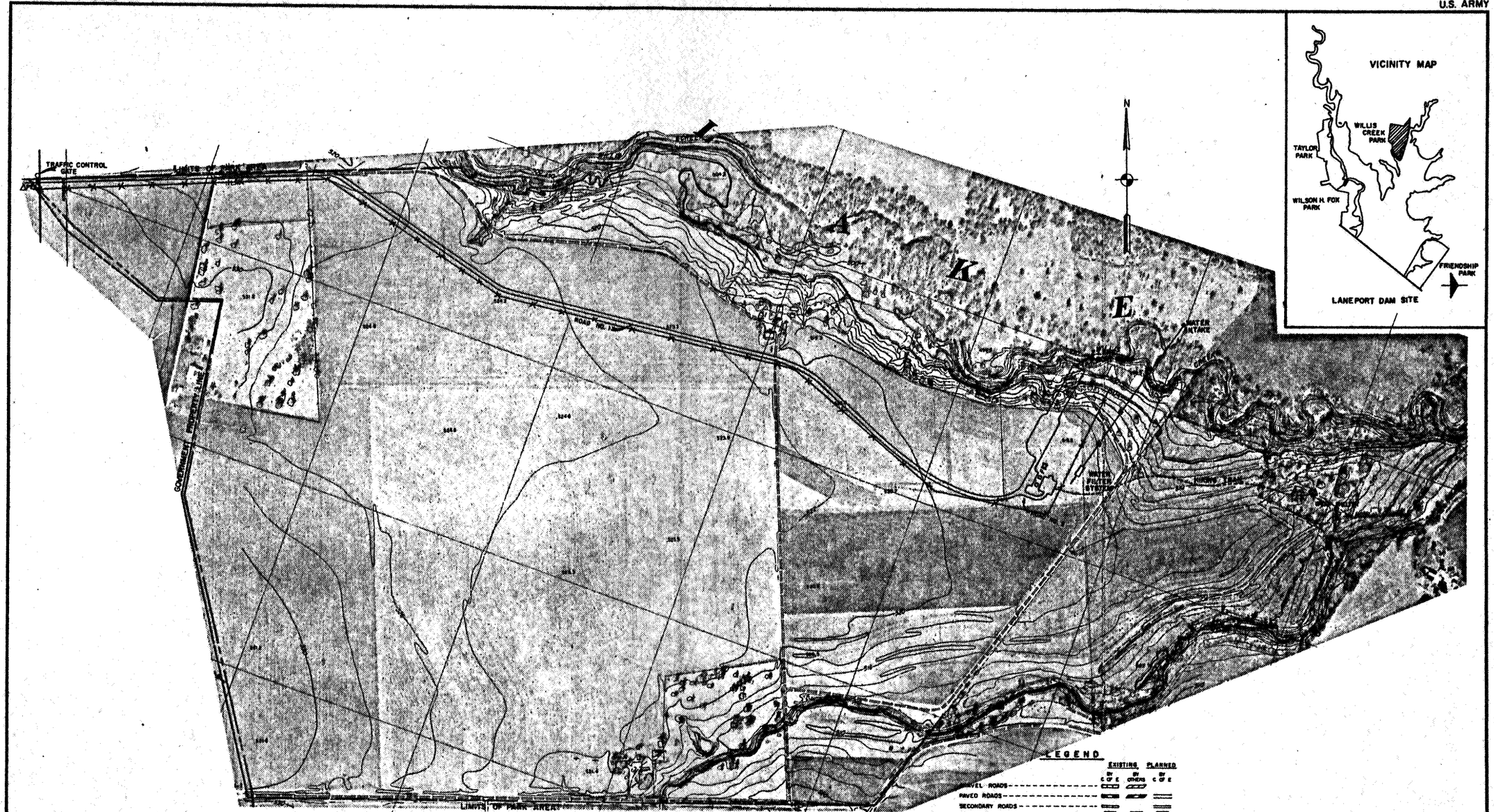
U.S. ARMY ENGINEER DISTRICT, FORT WORTH MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.16
MASTER PLAN

FILE BRAZ. NO.18 PLATE IX-9

CORPS OF ENGINEERS

U.S. ARMY



POOL ELEVATIONS

CONSERVATION POOL	504.0
CONSERVATION POOL PLUS 5-YEAR FLOOD	511.0
POOL DRAWDOWN 5 YEAR	497.0

ACRES IN PARK

ABOVE CONSERVATION POOL	229

LEGEND

	EXISTING BY C O E	EXISTING BY OTHERS	PLANNED BY C O E
GRAVEL ROADS			
PAVED ROADS			
SECONDARY ROADS			
GRAVEL PARKING AREAS			
PAVED PARKING AREAS			
FRAME TOILETS (CONCRETE VAULT)	(12)	(12)	(12)
FRAME TOILETS (PIT TYPE)	(12)	(12)	(12)
MASONRY TOILETS (CONCRETE VAULT)	(8)	(8)	(8)
MASONRY TOILETS (WATER BORNE)	(8)	(8)	(8)
BOAT RAMPS	(2)	(2)	(2)
BUILDING STRUCTURE (AS DESIGNATED)			
WATER WELLS (SUPPLY)			
WATER LINES			
ELECTRIC SERVICE LINES			
RESERVOIR INFORMATION SIGNS	(2)	(2)	(2)
PARK ENTRANCE SIGNS	(2)	(2)	(2)
DIRECTIONAL SIGNS	(2)	(2)	(2)
BUOYS			
REGISTRATION BOOTH	(1)	(1)	(1)
TREE COVER			
FENCE			
SWIMMING BEACH			
LIMITS OF CONCESSION AREAS			
LIMITS OF LICENSE OR LEASE AREAS			
UPPER LIMITS (FLOWAGE EASEMENT)			
GOVERNMENT PROPERTY LINE			

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

WILLIS CREEK PARK

SCALE IN FEET

200 0 200 400

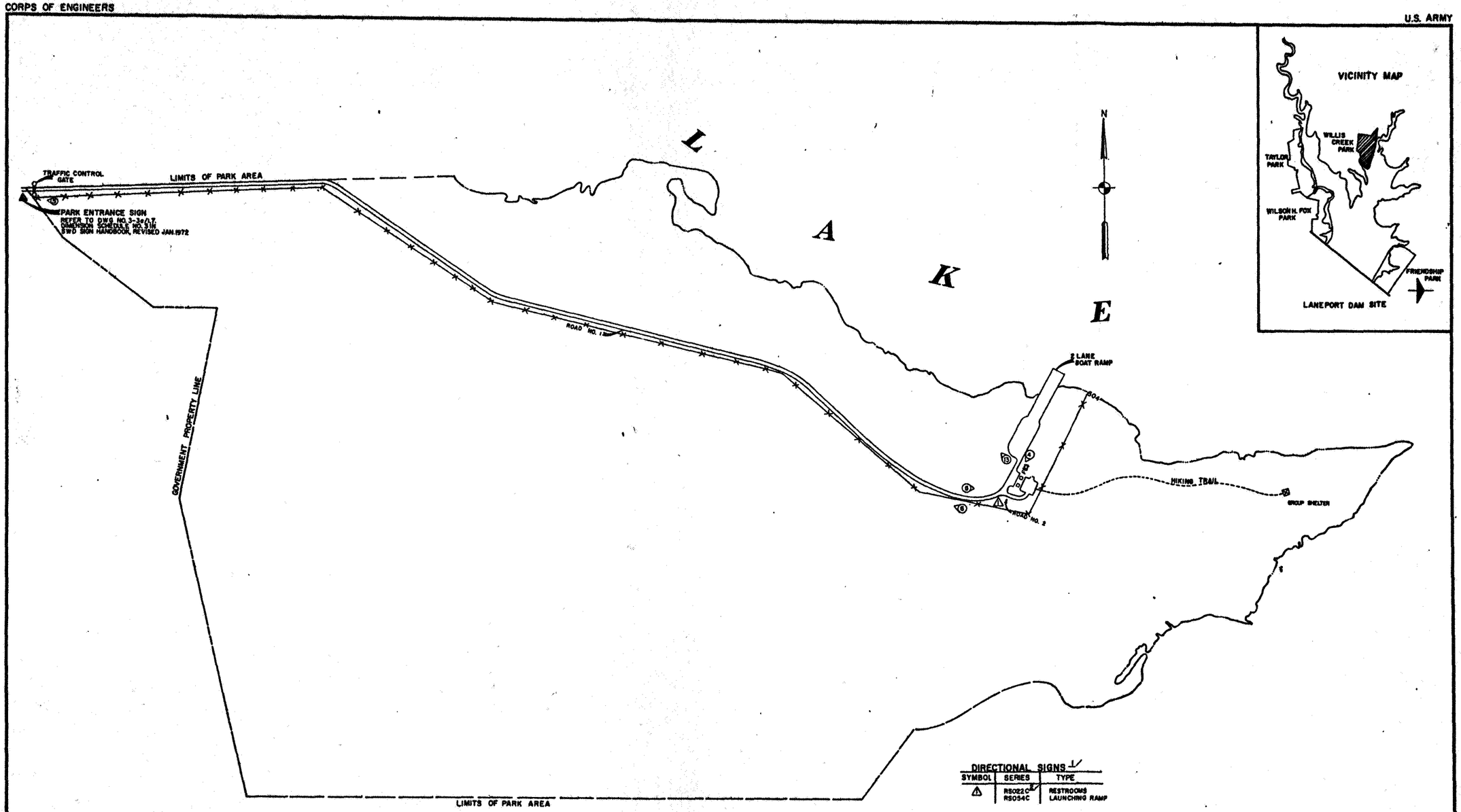
U.S. ARMY ENGINEER DISTRICT, FORT WORTH MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.19
MASTER PLAN

FILE BRAZ. NO.18 PLATE IX-10

CORPS OF ENGINEERS

U.S. ARMY



DIRECTIONAL SIGNS 1/

SYMBOL	SERIES	TYPE
⚠	RS022C 2/ RS054C	RESTROOMS LAUNCHING RAMP

NOTES:

1. DIRECTIONAL SYMBOL SIGNS SHALL BE IN ACCORDANCE WITH THE "NATIONAL PARK SERVICE SIGN SYSTEM STANDARDS."
2. REFER TO DWG. NO. 4/7[b] I.I; S.W.D. SIGN HANDBOOK FOR DIRECTIONAL ARROWS.
3. FOR SIGN SPECS AND TRAFFIC CONTROL SIGNS SEE PLATE XXX.

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

WILLIS CREEK PARK

SIGN PLAN

SCALE IN FEET

200 0 200 400

U.S. ARMY ENGINEER DISTRICT, FORT WORTH . MARCH 1974

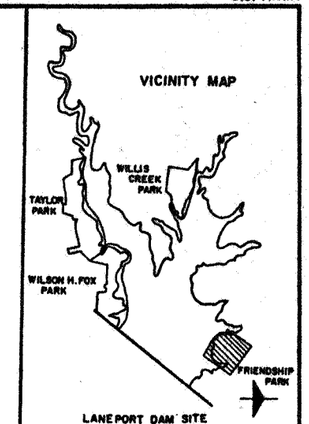
TO ACCOMPANY DESIGN MEMORANDUM NO.18
MASTER PLAN

FILE BRAZ. NO.18 PLATE IX-11

CORPS OF ENGINEERS

U.S. ARMY

MATCH LINE FRIENDSHIP PARK II



LEGEND

	EXISTING	PLANNED
GRAVEL ROADS		
PAVED ROADS		
SECONDARY ROADS		
GRAVEL PARKING AREAS		
PAVED PARKING AREAS		
FRAME TOILETS (CONCRETE VAULT)		
FRAME TOILETS (PIT TYPE)		
MASONRY TOILETS (CONCRETE VAULT)		
MASONRY TOILETS (WATER BORNE)		
BOAT RAMPS		
BUILDING STRUCTURE (AS DESIGNATED)		
WATER WELLS (SUPPLY)		
WATER LINES		
ELECTRIC SERVICE LINES		
RESERVOIR INFORMATION SIGNS		
PARK ENTRANCE SIGNS		
DIRECTIONAL SIGNS		
BUOYS		
REGISTRATION BOOTH		
TREE COVER		
FENCE		
SWIMMING BEACH		
LIMITS OF CONCESSION AREAS		
LIMITS OF LICENSE OR LEASE AREAS		
UPPER LIMITS (FLOWAGE EASEMENT)		
GOVERNMENT PROPERTY LINE		

PICNIC FACILITIES

PICNIC AREA NO.	ITEM	EXISTING BY C OF E	EXISTING BY OTHERS	PLANNED BY C OF E	PLANNED BY OTHERS
1	TABLES FIREPLACES TRASH CANS SHELTERS			55 55 55 55	
2	TABLES FIREPLACES TRASH CANS SHELTERS				
3	TABLES FIREPLACES TRASH CANS SHELTERS				
4	TABLES FIREPLACES TRASH CANS SHELTERS				
5	TABLES FIREPLACES TRASH CANS SHELTERS				
6	TABLES FIREPLACES TRASH CANS SHELTERS				

CAMPING FACILITIES

PICNIC AREA NO.	ITEM	EXISTING BY C OF E	EXISTING BY OTHERS	PLANNED BY C OF E	PLANNED BY OTHERS
1	TABLES FIREPLACES TRASH CANS SHELTERS			55 55 55 55	
2	TABLES FIREPLACES TRASH CANS SHELTERS				
3	TABLES FIREPLACES TRASH CANS SHELTERS				
4	TABLES FIREPLACES TRASH CANS SHELTERS				
5	TABLES FIREPLACES TRASH CANS SHELTERS				
6	TABLES FIREPLACES TRASH CANS SHELTERS				

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

FRIENDSHIP PARK I

IN 2 SHEETS

SCALE IN FEET 200 0 200 600

SHEET NO. I

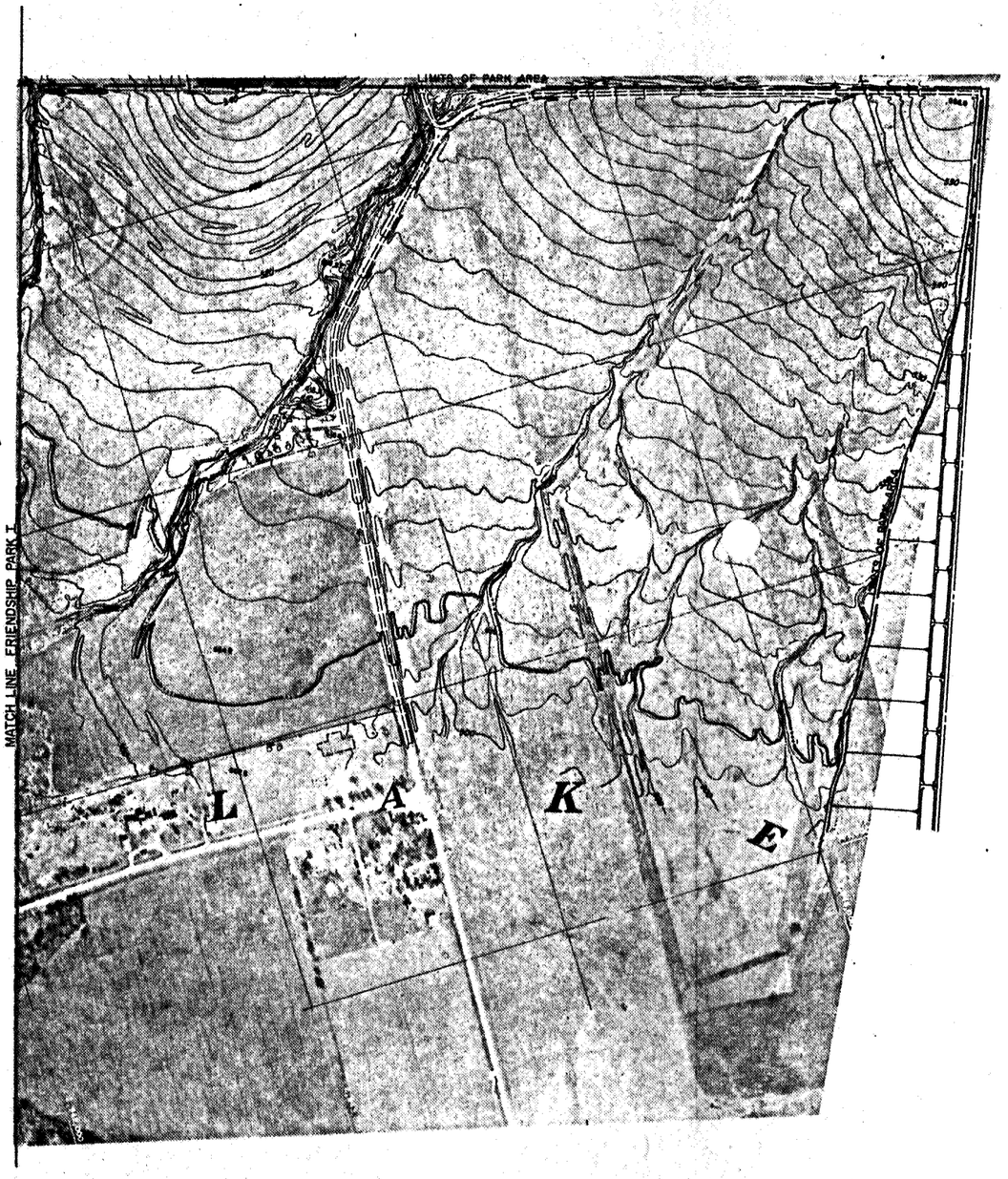
U.S. ARMY ENGINEER DISTRICT, FORT WORTH MARCH 1974

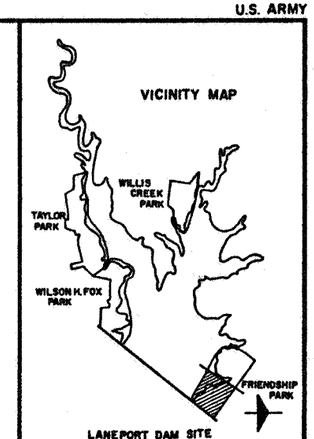
TO ACCOMPANY DESIGN MEMORANDUM NO. 18
MASTER PLAN

FILE. BRAZ. NO. 18 PLATE IX-12

CORPS OF ENGINEERS

U.S. ARMY





LEGEND

	EXISTING BY C OF E.	EXISTING BY OTHERS	PLANNED BY C OF E
GRAVEL ROADS			
PAVED ROADS			
SECONDARY ROADS			
GRAVEL PARKING AREAS			
PAVED PARKING AREAS			
FRAME TOILETS (CONCRETE VAULT)	(FC)	(FC)	(FC)
FRAME TOILETS (PIT TYPE)	(FP)	(FP)	(FP)
MASONRY TOILETS (CONCRETE VAULT)	M	M	M
MASONRY TOILETS (WATER BORNE)	MWB	MWB	MWB
BOAT RAMPS	BR	BR	BR
BUILDING STRUCTURE (AS DESIGNATED)			
WATER WELLS (SUPPLY)			
WATER LINES			
ELECTRIC SERVICE LINES			
RESERVOIR INFORMATION SIGNS	RI	RI	RI
PARK ENTRANCE SIGNS	PE	PE	PE
DIRECTIONAL SIGNS	D	D	D
BUOYS			
REGISTRATION BOOTH	RB	RB	RB
TREE COVER			
TRAFFIC COUNTERS	TC	TC	TC
SWIMMING BEACH			
LIMITS OF CONCESSION AREAS			
LIMITS OF LICENSE OR LEASE AREAS			
UPPER LIMITS (FLOWAGE EASEMENT)			
GOVERNMENT PROPERTY LINE			

POOL ELEVATIONS

CONSERVATION POOL	504.0
CONSERVATION POOL PLUS 5-YEAR FLOOD	511.0
POOL DRAWDOWN 5-YEAR	482.0

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

FRIENDSHIP PARK II

IN 2 SHEETS — SCALE IN FEET — SHEET NO. 2

200 0 200 400

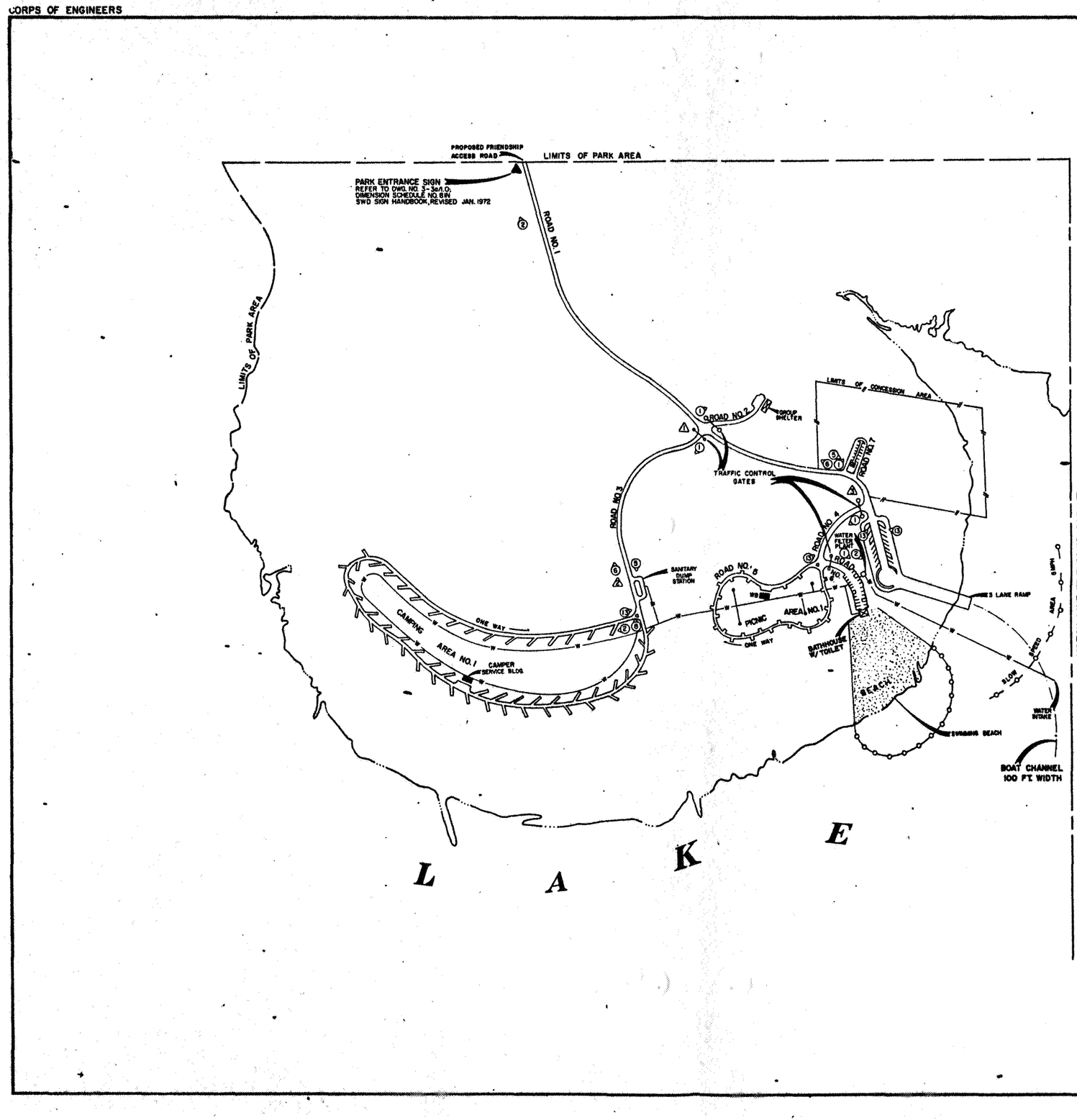
U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

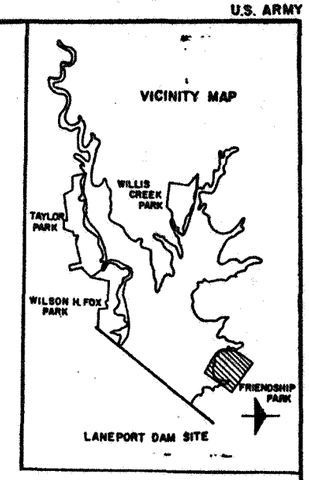
TO ACCOMPANY DESIGN MEMORANDUM NO. 10
MASTER PLAN

FILE BRAZ. NO. 18 PLATE II-13

CORPS OF ENGINEERS

U.S. ARMY





DIRECTIONAL SIGNS 1/

SYMBOL	SERIES	TYPE
⚠	RS-036B 2/ RS-041B	CAMPING SANITARY DUMP
⚠	RS-041A	SANITARY DUMP
⚠	RS-061B RS-033B RS-054C	BEACH SHOWERS LAUNCHING RAMP

NOTES:

1. DIRECTIONAL SYMBOL SIGNS SHALL BE IN ACCORDANCE WITH THE NATIONAL PARK SERVICE SIGN SYSTEM STANDARD.
2. REFER TO DWG. NO. 4/7 [illegible] SWD. SIGN HANDBOOK FOR DIRECTIONAL ARROWS.
3. FOR TRAFFIC CONTROL SIGNS AND SIGN SPECS SEE PLATE [illegible]-2.

BRAZOS RIVER BASIN, TEXAS
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS
FRIENDSHIP PARK I
SIGN PLAN

IN 2 SHEETS — SCALE IN FEET (200 0 200 400) — SHEET NO. I

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO. 18
MASTER PLAN

FILE BRAZ. NO. 18 PLATE IX-14

N

SCALE 1"=400
400 0 400 800

BRAZOS RIVER BASIN, TEXAS
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS
RECREATION DEVELOPMENT
AREA BELOW THE EMBANKMENT

U.S. ARMY ENGINEER DISTRICT, FORT WORTH NOV 1974

TO ACCOMPANY 8TH INDORSEMENT TO DESIGN MEMORANDUM NO.18
MASTER PLAN

FILE BRAZ. NO.18 PLATE IX-18

X
COST ESTIMATES

X - COST ESTIMATES

10-01. General.- The estimated costs by account number for the overall plan of development, including engineering and design, and supervision and administration, is presented in table X-1. The major components under cost account number 01 for the perpetual Friendship Park access road easement are shown in table X-2. A summary of the major line items under cost account number 02 is outlined in table X-3.

Table X - 1

SUMMARY OF COST ESTIMATES BY COST ACCOUNT NUMBERS
(Rounded to the nearest hundred dollars)

Cost Account Number	Item	Cost Estimate
01	Lands and damages (Friendship Park access road)	$4,900
03	Revegetation, wildlife habitat improvement, perimeter fencing, and firebreaks	1,647,200
14	Recreation development (including construction cost for Friendship Park access road)	3,063,100
30	Engineering and design	394,500
31	Supervision and administration	329,600
Total		$5,439,300

Table X - 2

LANDS AND DAMAGES: Cost account number 01

Item	Description of Work	Cost Estimate
Friendship Park access road	Perpetual road easement (4.98 acres)	$2,600
	Contingency (25 percent)	650
	Administrative costs	1,600
Total		($4,850)
Total (rounded)		$4,900

Table X - 3

REVEGETATION, CATTLEGUARDS, PERIMETER FENCE, AND FIREBREAK:
Cost account number 03

Location	Description of Work	Cost Estimate
San Gabriel, Willis Creek, and Sore Finger Wildlife areas	Wildlife habitat improvement and erosion Control	$1,564,000
San Gabriel, Willis Creek, and Sore Finger Wildlife areas	Cattleguards	8,400
Perimeter of Government Land	Fencing	71,200
Perimeter of Government Land	Firebreaks	3,600
Total		$1,647,200

10-02. Summary of recreation development and cost.- A cost summary for each park and wildlife area under cost account number 14 is presented in table X-4. The summary of the detailed cost of the recreation facilities proposed for the parks and the area below the embankment is presented in table X-5. Detailed estimates of cost for each park is presented in chapter IX. The estimated construction costs of the planned recreation facility development is based on a Fort Worth District computer program which maintains current construction cost.

Table X - 4

SUMMARY OF COST ESTIMATES BY PARKS AND WILDLIFE AREAS:
Cost account number 14

Park Area	Cost Estimate
Wilson H. Fox	$1,364,200
Taylor	441,100
Willis Creek	238,000
Friendship	876,300
Recreation development below the embankment	58,900
Subtotal	$2,978,500

Table X - 4 (continued)

Wildlife Area		Cost Estimate
Pecan Grove		-
San Gabriel		$4,100
Willis Creek		3,000
Sore Finger		1,000
	Subtotal $8,100	
Other major items		
Friendship Park access road		$76,500
	Subtotal $76,500	
Total		$3,063,100

Table X - 5

SUMMARY OF DETAILED COST ESTIMATE OF RECREATIONAL FACILITIES
Cost account number 14

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
1. Roads	Mile			
a. Park roads (BIT)(2-way)		$75,000	7.0	$525,000
b. Park roads (BIT)(1-way)		55,000	4.9	269,500
c. Hiking trails		2,500	2.6	6,500
2. Parking areas (BIT)Paved	S.Y.	5	28,958	144,790
3. Boat launching ramps(conc)	S.Y.			
a. 4-lanes, 68 ft. wide		25	1,964	49,100
b. 3-lanes, 50 ft. wide		25	3,611	90,275
c. 2 lanes, 32 ft. wide		25	1,955	48,875
4. Water supply systems	Each			
a. Lake pump and filter		5,100	5	25,500
b. Drinking fountains		220	12	2,640
5. Sanitary facilities	Each			
a. Masonry waterborne toilets		38,700	7	270,900
b. Service building (with toilets, showers, laundry facilities)		49,800	4	199,200
c. Bathhouse with toilets		47,600	2	95,200
d. Sanitary dump station (trailer)		2,700	2	5,400
e. Frame toilets (conc. vault)		2,500	4	10,000

Table X - 5 (continued)

Item	Unit	Unit Cost	Account 14 Quantity	Account 14 Cost
6. Utilities	L.S.			
a. Water distribution lines				$67,100
b. Electric service lines				82,800
c. Light standards, etc.	Each	500	25	12,500
d. Electrical hookup		50	78	3,900
e. Waterline hookup		40	156	6,240
7. Picnic and camping units	Each			
a. Picnic units		405	162	65,610
b. Camping units		445	156	69,420
8. Table shelters	Each			
a. Single (1-table)		555	318	176,490
b. Group (3-tables)		4,400	2	8,800
c. Group (8-tables or more)	L.S.	-	1	50,000
9. Floating docks (boating)	Each	2,200	2	4,400
10. Swimming beach (improved sand)	L.S.	-	2	50,000
11. Signs and buoys	Each			
a. Park entrance signs (major)		1,150	2	2,300
b. Directional signs		70	21	1,470
c. Registration booths		100	3	300
d. Traffic signs		100	74	7,400
e. Buoys and anchors (sets)		1,500	7	10,500
f. Park entrance signs (minor)		750	3	2,250
12. Site improvement	L.S.			
a. Underbrushing				17,000
b. Turfing and revegetation				258,750
c. Marina excavation				25,000
d. Marina breakwater				50,000
e. Boat channel excavation				20,000
13. Landscaping	L.S.			239,385
14. Traffic control gates	Each	500	8	4,000
Total				($2,978,475)
Total (rounded)				$2,978,500

10-03. Operation and maintenance costs.- The estimated annual cost of operation and maintenance and real estate management is listed in table X-6.

Table X - 6

FUNDS REQUIRED FOR OPERATION AND MAINTENANCE

Recreation Facilities		
Operation and maintenance of facilities (includes contract cleanup, mowing, grading and maintenance of roads, repair of structures, nature areas, etc.)		$120,000
Project office		10,000
District office staff functions		10,000
Subtotal	$140,000	
Real estate management services		
Real estate records, reports and audits		1,000
Compliance inspections		1,500
Utilization		1,500
Outgrants		6,000
Crops, timber, and gravel		500
Other		2,000
Subtotal	12,500	
Total		$152,500

10-04. Comparison of costs.- The approved 1 July 1973 PB-3 has been updated by price level as of 1 March 1974. A comparison of the estimated costs by cost account numbers with the updated PB-3 is presented in table X-7.

10-05. Analysis of change in cost.- The updated PB-3 cost estimate as presented in table X-7 only represents the approved cost for the initial development. The current cost estimate of $5,439,300 is also representative of the initial development. A comparison of the estimate of cost with the PB-3 shows a significant increase in cost. This amounts to $2,154,300 in the total project cost. The reasons for the differences in cost for each cost account are explained in the following paragraphs:

Table X - 7

COMPARISON OF COSTS

Cost Acct. No.	Item	Present Cost Estimate	Approved PB-3	Difference
01	Lands and damages	$4,900		+ $4,900
03	Revegetation	1,647,200	$1,525,000	+122,200
14	Recreation development	3,063,100	1,533,000	+1,530,100
30	Engineering and design	394,500	125,000	+269,500
31	Supervision and administration	329,600	102,000	+227,600
Total		$5,439,300	$3,285,000	$2,154,300

a. Lands and damages.- The $4,900 increase is due to the addition of the Friendship Park access road. The cost increase includes a perpetual road easement, severance damage, 25 percent contingency, and administrative costs.

b. Revegetation.- The approved PB-3 does not contain an allowance for fencing, fireguards, and cattleguards. Because of our responsibility to protect project resources and to achieve economic management and smooth administration of the project, it is necessary to include $83,200 in the budget for these items. A revised estimate of the cost for revegetation has resulted in an increase of $39,000. This amounts to an increase of $122,200 in cost account 03.

c. Recreation facilities.- A $1,530,100 increase in cost is primarily due to the following:

(1) The design standards for the facilities presented in the preliminary master plan DM No. 7, have been revised to comply with the updated planning and design criteria outlined in ER 1120-2-400 and EM 1110-2-400. This required action resulted in an increase in the number and type of recreation facilities as well as a corresponding cost increase of $1,358,600. A critique of the significant changes is as follows:

(a) There is a significant increase in the number of miles of road to provide the necessary circulation.

(b) The number of picnic and camping facilities have been increased to serve the design day load.

(c) The overnight camping areas in Wilson H. Fox and Friendship Parks are provided with individual water and electrical hookups.

(d) A significant increase in the number of sanitary facilities is planned to accommodate the anticipated recreation use.

(e) Waterborne toilets are being installed in lieu of frame and masonry vault toilets where practical.

(f) An improved water supply and electrical system is provided to serve the recreation facilities.

(g) A detailed sign plan has provided a more accurate sign cost.

(2) An increase of $76,500 is due to the fact that that the current PB-3 does not contain an allowance for the Friendship Park access road.

(3) The excavation of a marina site and one 100-foot wide boat channel, as well as the construction of a marina breakwater, has resulted in an increase of $95,000. The current PB-3 does not reflect a cost for these items.

d. Engineering and design, supervision and administration.- The $269,500 increase in engineering and design, and the $227,600 increase in supervision and administration are directly correlated to the increase in the other project costs.

10-06. Computation of benefits.- Economic benefits resulting from the outdoor recreation development and the fish and wildlife aspects of the project are based on demand. In supplement number 3 to Design Memorandum No. 4, General, for Laneport, the average annual visitation was computed to be 1,500,000 recreation days for ultimate development (stage II), assuming the project was completed by 1970. The benefits were computed on the basis of 1,050,000 recreation days for general recreation at $0.50 per recreation day, 445,500 fisherman days at $1.00 per fisherman day, and 4,500 hunter days at $1.50 per hunter day, for a total of $978,000. During the development of the master plan, the stage II development was computed to be 936,000 recreation days. Based on the criteria

established in Supplement No. 1, Senate Document No. 97 (87th Congress, 2d session), Evaluation Standards for Primary Outdoor Recreation Benefits," the unit value of $.50 per recreation day as used in the general design memorandum was adjusted to meet the current criteria of $1.00 per recreation day. The result of the reevaluation of visitation and unit costs is reflected in the following table.

Table X - 8

SUMMARY OF BENEFIT COMPUTATIONS

Design Memorandum No. 4, General		
Average annual visitation (ultimate development)		1,500,000
Recreation, general	1,050,000 recreation days @ $0.50	$525,000
Fishing	445,500 man days @ $1.00	446,000
Hunting	4,500 man days @ $1.50	6,800
Total		($977,800)
Total (rounded)		$978,000
Design Memorandum No. 18, Master Plan		
Average annual visitation (ultimate development)		936,000
Recreation, general	655,200 recreation days @ $1.00	$655,200
Fishing	278,000 man days @ $2.00	556,000
Hunting	2,800 man days @ $3.00	8,400
Total		($1,219,600)
Total (rounded)		$1,220,000

XI
FACILITY LOAD AND OTHER DESIGN CRITERIA

XI - FACILITY LOAD AND OTHER DESIGN CRITERIA

11-01. General.- The purpose of establishing design criteria is to provide guidelines for insuring that the public is provided with a safe, high quality recreation development that will enhance their outdoor experience and minimize the damage to the environment. Because each project has different site characteristics, design criteria that are appropriate in one situation may not apply to another. Therefore, determination of design criteria and facility load has been based on analysis of each situation in regards to its particular requirements and characteristics. The design criteria and guidelines presented in Engineer Regulations 1110-2-400, 1120-2-400, 1130-2-400, 1165-2-400; Engineer Manual 110-2-400, Technical Manual 5-822-2, as well as the following comments, will be used as guidelines in planning new facilities. Every effort will be made to meet program requirements and to preserve and enhance the natural features of the area.

11-02. Roads.-

a. Existing roads.- Existing State and county roads which provide access to the various sites will be used wherever practicable. In addition, the State and county should be encouraged to continually improve existing roads that provide access to the project. All necessary rights-of-way which have been purchased or will be purchased by the Government to provide access from existing roads to public use areas will be 200 feet minimum width. Existing roads within public use areas are to be utilized where possible; when used, they will be maintained in proper condition at all times.

b. Park roads.- The park roads will provide 2-way transportation to and from the county roads and will terminate at boat ramps, swimming beaches, marina and 1-way loops which will provide picnicking or camping. Typical sections for 1-way or 2-way loop roads are shown on plate XI-1. Specific guidance for the planning and design criteria of access, park, and service roads is presented in TM-5-822-2.

c. Alinement.- Alinement of the roads will conform to the natural contours to minimize cut and fill and reduce the number of long tangents. Natural open areas will be used for alinement to minimize tree removal.

d. Speed limits.- Speeds on 1-way and 2-way park roads will be 30 mph and 10 mph respectively. Cooperation with local law enforcement agencies will be established to insure reasonable and safe speed limits for all project roads.

11-03. Parking.-

a. Parking systems.- Two different systems of parking will be used at the project. Parking areas for boat launching ramps, restrooms, swimming beaches, and the marina will employ large numbers of concentrated parking spaces due to the anticipated public use. Occasional plantings will interrupt the broad expanse of paving. The second system will use single parking spaces which are skewed or perpendicular to 1-way loop roads.

b. Parking spaces.- The parking areas will be sited in such a manner as to be in harmony with the environment as much as possible. In addition parking areas will be designed to avoid vehicular backing onto heavily traveled access roads. The minimum parking space for automobiles will be 10 feet by 20 feet. Car-trailer spaces will be 10 feet by 40 feet for 90-degree head-in parking and 10 feet by 35 feet for 45 degree parking with 25-foot access lanes. A car-trailer parking space at least 10 feet by 40 feet will be provided for each camping space. Specific instructions for each activity are provided in EM 1110-2-400.

11-04. Boat launching ramps and courtesy docks.- Boat launching ramps will be 14 feet wide or multiples thereof, with the length governed by the slope of the land and estimated water level fluctuations. The upper and lower vertical limits and the slope of the ramps will be in accordance with paragraph 3a of appendix A of EM 1110-2-400 wherever practicable. Boat ramps will be constructed of concrete according to approved plans and will be located so as to minimize hazards to boating operations. Ramps will be provided with riprap protection as required. Floating courtesy docks will be provided at boat ramps and along the shoreline in camping areas. The minimum requirement for a courtesy dock is an expected 40 boat launchings per normal weekend day.

11-05. Marina site.- A marina site will be located in Wilson H. Fox Park. This marina site was selected because it provides adequate, safe, and dependable water access, and moorage space for the enjoyment of the visitor. The character of the marina site and its natural features have been fully appraised so that the most scenic parts of the site will remain undeveloped. Siting of the marina will be in accordance with ER 1110-2-400 and EM-1110-2-400. The initial development at the site will include access roads and parking areas.

11-06. Walks.- Walks will be constructed within developed recreation areas as needed. They will be designed to provide convenient and safe pedestrian access and circulation to parking areas, bathhouses, comfort stations, and other facilities. Preservation of natural features is also stressed in siting walks.

11-07. Trails.- Trails will be built on project lands as required to provide access for bank fishermen, hikers, and bird watchers, and to interconnect recreation areas or sites. In heavy use areas, trails will be surfaced with permanent materials such as bituminous surfacing to control erosion and lessen the impact upon the site. Topography, grade, and vegetation should influence the site planning for trails.

11-08. Structures.-

a. Architectural design.- The basic theme underlying facility design is to harmonize development with the surrounding environment, while providing a design that is simple, functional, and economical to maintain. This can be done only by allowing the project to take on a character which will blend with its surroundings. The structures, therefore, should be constructed of local material, using up-to-date technology to keep the initial cost and maintenance at a minimum.

b. Siting.- The proposed recreation facilities will be sited above the ultimate 5-year flood pool (elevation 515.0 feet msl) insofar as practicable without jeopardizing the use intended for the facility. Siting of sanitary facilities shall be in accordance with the "Rules and Regulations Governing Preparation of Plans and Specifications for Public Works Projects" of the Texas State Board of Health. EM 1110-2-400 also outlines the basic criteria for planning and siting structures.

c. Visitors' overlook.- Specific plans and design criteria for the visitors' overlook are presented in Lanepoit Lake, San Gabriel River, Texas, Design Memorandum No. 10 (Revised), Project Building, Visitors' Overlook and Access Roads."

11-09. Picnic units.- Each family picnic unit will consist of a parking space, a table with canopy, a trash receptacle, and a cooking grill. A typical picnic unit is shown on plate XI-2. Several multitabled picnic units are planned to accommodate group use. A typical group picnic unit includes a group shelter that has three picnic tables, cooking grills, and a trash receptacle. The plan, elevations, and details of a group picnic shelter are shown on plate XI-3.

11-10. Camping unit.- Each camp unit shall consist of a parking area of sufficient dimensions to accommodate an automobile with a typical recreational trailer in tow. Next to each parking area will be the campsite consisting of a table with benches, an electrical outlet, water faucet, trash receptacle, and a cooking grill. Plate XI-4 shows the typical arrangement of the camping components.

11-11. Utilities.-

a. Water supply.- Because of the undependable water bearing formations, potable water in each public use area will be provided from water filtration and treatment plants using lake water. However, municipal water will be used wherever practicable. All facilities for water supply and public use will be coordinated with the Texas State Department of Health according to their general type and location. These facilities should be designed in accordance with EM 1110-2-4201 and should meet the standards required by Federal, State, and local laws.

b. Electrical supply.- The lake area is served by the Texas Power and Light Company and the Bartlett Electric Cooperative, Inc. The power lines can be extended as required for project needs. All power lines in all major recreation sites will be placed underground unless special conditions make such an installation impracticable. The design and construction of any electrical facility will conform to the companies' standards and will comply with Government codes.

c. Telephones.- When public telephones are required, they can be housed in a basic structure or in specially provided park-adapted telephone structures with markings harmonious to the adjacent recreation area. There are telephone communication facilities in proximity to the project. These communication facilities are owned and operated by the Southwestern Bell Telephone Company and the General Telephone Company of the Southwest. Telephone service can be provided as the need arises. The location of the lines should be underground in all major development areas unless it is impracticable. Additional guidance is contained in EM 1110-2-400.

d. Sewage treatment and disposal.- The design criteria concept for sewage treatment facilities is based upon the best available, practicable, and economical treatment and disposal system that meets Federal, State, and local requirements. Specific guidance is presented in applicable portions of TM-5-814-3, in the USPHS manual, "Septic Tank Practices," and in the Texas State Department of Health manual, "Rules and Regulations for Public Waterworks Projects." Reference should also be made to the Federal Water Pollution Control Act of 1972 (Public Law 92-500). At present, biological sewage treatment plants are proposed to process the sewage generated by the waterborne toilets, service buildings, change shelters, and sanitary dump stations. Other elements included in this treatment system will be lift stations, manholes, collector lines, effluent discharge lines, and electric service lines.

e. Sanitary dump stations.- Sanitary sewage dump stations to serve self-contained mobile campers are proposed at strategic points in designated public use areas. The waste accumulated from the dump stations will be pumped into tank trucks and hauled to the treatment sites.

Since the sanitary dump station wastes are more concentrated and contain nonbiodegradable materials, they will be screened and run through a comminutor before entering the treatment plants. Solids removed by screening will be disposed of in sanitary landfills or local municipal sanitary disposal facilities. The locations of these proposed stations are shown on the respective park maps.

f. Solid waste disposal.- Local municipal waste disposal facilities and contracts with off-project sanitary collectors will be used whenever practical. Sanitary landfills on project lands will be used only until a more practical and economical alternative can be found. The landfill areas will be located in an isolated area and will conform with all Federal, State, and local requirements. The solid waste disposal plan will be coordinated with responsible local health officials.

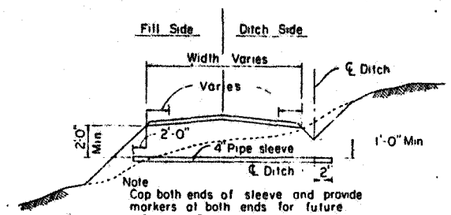
11-12. Site improvements.-

a. Vegetative improvements.- A vegetative management plan including a protection, development, and improvement program, will be prepared in accordance with ER 1130-2-400, and will be submitted when completed. A turf and landscaping plan for all graded and disturbed areas in the vicinity of the project building and visitors' overlook and access road has been prepared and is presented in Laneport Lake, Design Memorandum No. 10 (Revised). In addition, a landscaping plan for the public use areas will be submitted when completed. Plate XI-5 shows a typical landscaping plan for a toilet, sanitary dump station, service building, and change shelter.

b. Clearing for road right-of-way in public access areas.- The clearing limits of the park roads will be confined within the top of the back slope and the toe of the fill area as far as practicable. In order to prevent the needless destruction of desirable trees and shrubs, the back slope shall be warped around such growth. Excessive ditching will be eliminated in order that vegetation may grow as close to the roads as possible. Selective clearing will be performed to encourage desirable growth on the back slopes. Selective clearing will be performed or supervised by trained district personnel after on-site analysis.

c. Site preparation.- Only a minimum of grading and clearing should be done in preparation for construction of recreation facilities. Since the cover is very limited, the decision whether to save or cut a tree should be made on an individual basis as the result of careful judgment and thorough consideration of site conditions. Additional reference is provided in EM 1110-2-400 and ER 1110-2-400.

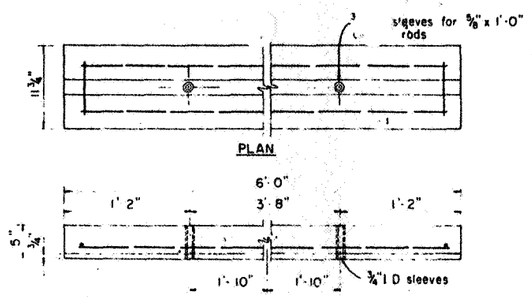
11-13. Signs and interpretive guidance.- The objectives of a sign and interpretive guidance program at Laneport will be to provide appropriate signs, markers, and displays for the proper protection and administration of the project resources and to guide, inform, educate, and protect the visiting public. Signs, markers, and displays needed to accomplish these objectives will be developed and placed in accordance with instructions outlined in EM 1110-2-400, ER 1110-2-400, ER 1130-2-400, and the Handbook on Signs issued by the Southwestern Division, Corps of Engineers.



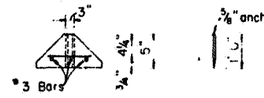
Note
Cap both ends of sleeve and provide markers at both ends for future reference See appropriate plans for location and lengths

4-INCH PIPE SLEEVE INSTALLATION DETAIL

N T S



Notes
1. Approved standard manufactured stops may be used, provided the anchors extend a minimum of 6" below wheel stop
2. Placement at 90° parking will be 1'-0" inside pavement edge.



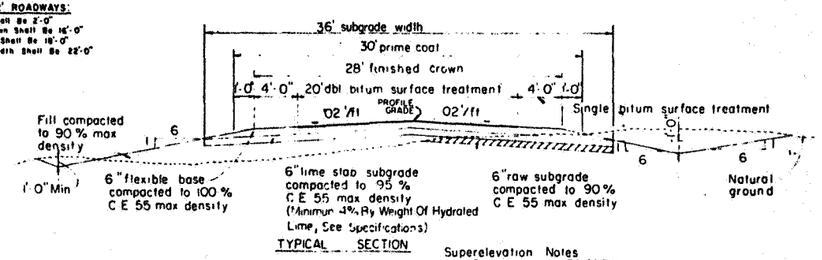
WHEEL STOP DETAIL

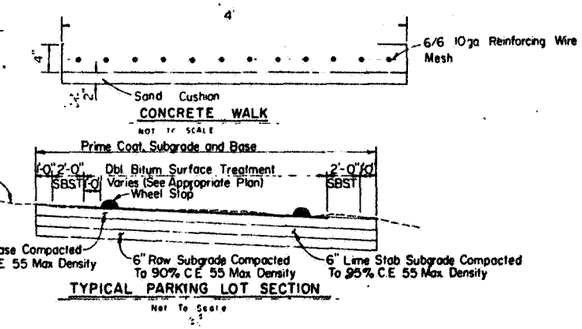
Not To Scale

ROADWAY NOTES:

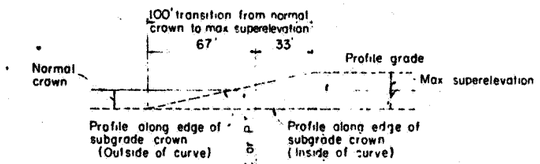
FOR 12' ROADWAYS:

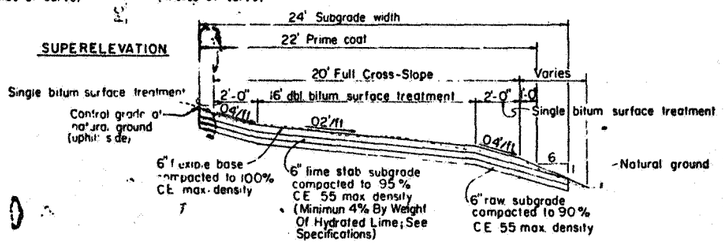
Shoulders Shall Be 2'-0"
Finished Crown Shall Be 16'-0"
Prime Coat Shall Be 18'-0"
Subgrade Width Shall Be 22'-0"



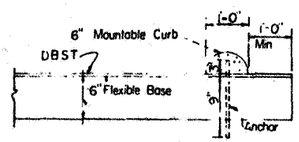


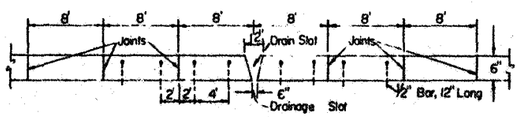
Superelevation Notes
1. Design speed = 30 M P H
2. Max superelevation will consist only of roving the adverse crown
3. Transition length will be 100' in all ca... with 67' outside the curve and 33' inside the curve
4. No superelevation required on short secondary roads where speeds will be less than 30 M P H.





FULL CROSS-SLOPE SECTION
(Camp Areas As Indicated On Plans)



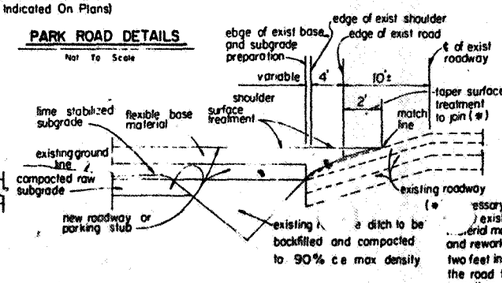


MOUNTABLE CONCRETE CURB DETAILS

NOTES
1. CURB WILL BE 12" FROM EDGE OF PAVEMENT
2. JOINTS WILL BE EVERY 8 FEET, ¼" TOOLED DUMMY JOINT
3. ANCHORS (½"x12") EVERY 4 FEET

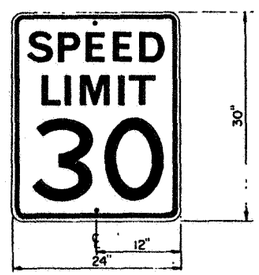
PARK ROAD DETAILS

Not To Scale

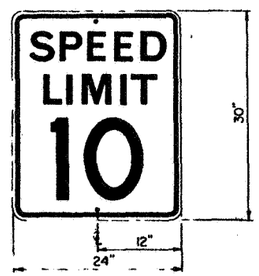


JUNCTION - NEW TO EXISTING ROADWAY

NOT TO SCALE



NO 1



NO 2

NOTE
Size, coloring, and location of speed limit signs shall be in accordance with the "Manual on Uniform Traffic Control Devices for Streets and Highways" dated June, 1971 Speed limit signs shall be R2-1

Speed limit signs and all traffic control signs shall be reflective sheeting.

TYPICAL SIGN DETAILS

Scale: 1 1/2" = 1'-0"

BRAZOS RIVER BASIN, TEXAS
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

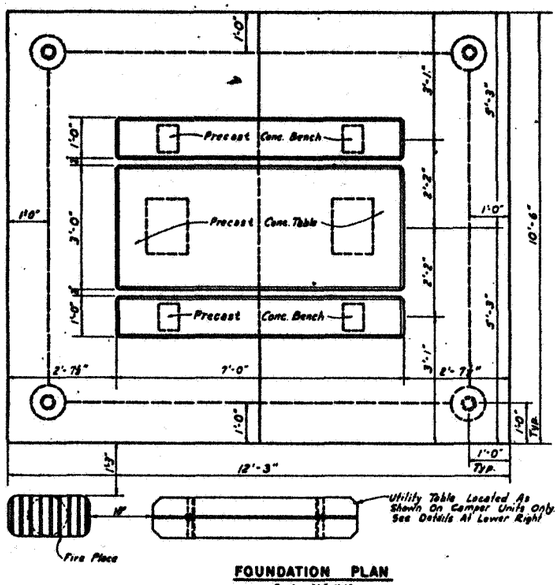
TYPICAL DETAILS

CURBS, DRAIN PIPE, WHEEL STOPS, ROADS, PARKING LOTS, FENCE

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

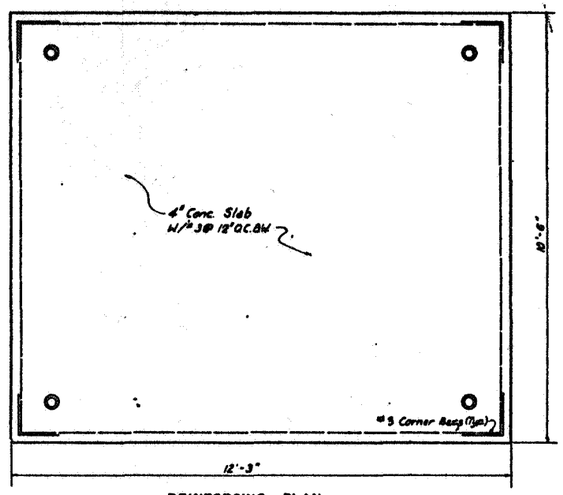
TO ACCOMPANY DESIGN MEMORANDUM NO.18 MASTER PLAN

FILE BRAZ. NO.18 PLATE III-1



FOUNDATION PLAN

Scale: ¼"=1'-0"



REINFORCING PLAN

SCALE 3/8" INCH = 1'-0"

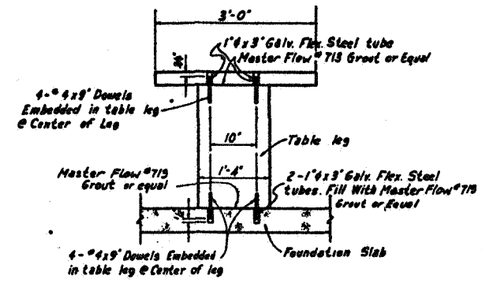
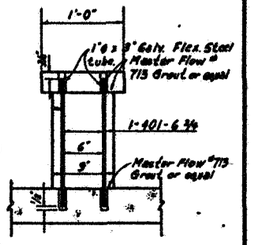


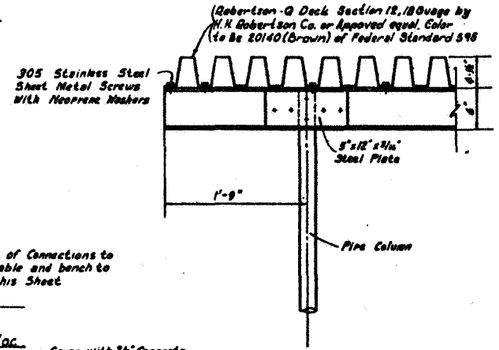
TABLE DETAILS

SCALE 1" INCH = 1'-0"



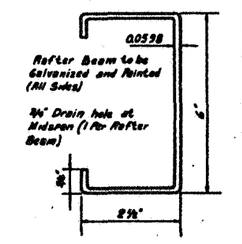
BENCH DETAILS

SCALE 1-1/2" INCHES = 1'-0"



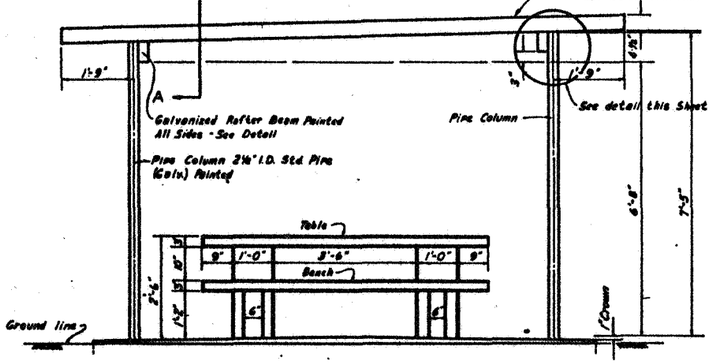
SECTION A - A

SCALE 1-1/2 INCH = 1'-0"



RAFTER BEAM

NO SCALE



SIDE ELEVATION

SCALE 3/8" INCH = 1'-0"

Note:
For No. of Shelters Required For each Picnic area, See Plan Sheets. Shelters Shall be installed Over Picnic Units as Directed.

(End Elevation Similar With Roof Overhang 1'-9" From ℄ Columns)

TYPICAL PICNIC TABLE AND BENCH UNIT WITH SHELTER

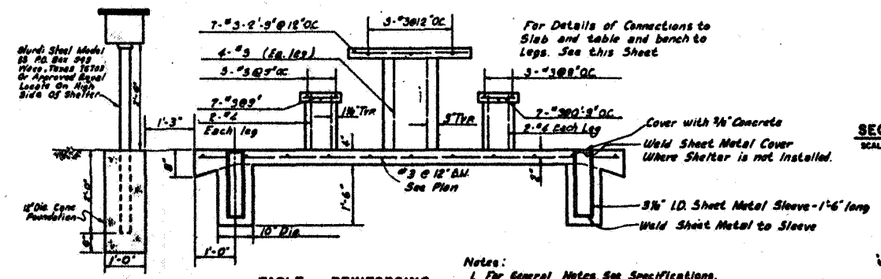


TABLE REINFORCING

SCALE 3/4" INCH = 1'-0"

Notes:
1. For General Notes, See Specifications.
2. Location of Picnic Tables and Shelters will be determined at the Park Site by the Contracting Officer.
3. All Concrete Shall have a Specified Compressive Strength of 3000 p.s.i. at 28 days.
4. Concrete may be Precast or Cast in Place at the Contractors Option.
5. All Exposed Concrete edges to be Chamfered ½".
6. All tops or Extensions of reinf. to be 30 dia. min.
7. Pipe Columns Shall be Grouted in Pipe Sleeves with "Master Flow® 713 or Equal.
8. All bolts, Washers and nuts Shall be Galvanized.

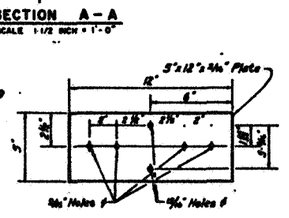
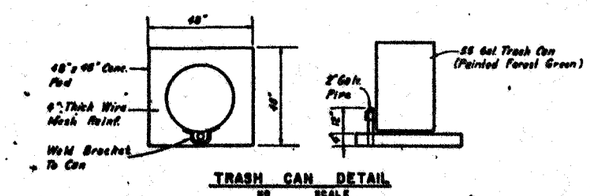


PLATE DETAIL

NO SCALE

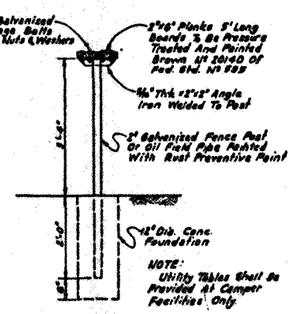
COLUMN BEAM CONNECTION

NO SCALE



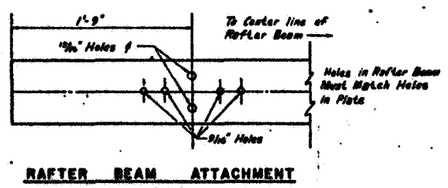
TRASH CAN DETAIL

NO SCALE



UTILITY TABLE

Scale: ¾"=1'-0"



RAFTER BEAM ATTACHMENT

NO SCALE

BRAZOS RIVER BASIN, TEXAS

LANEPORT LAKE

SAN GABRIEL RIVER, TEXAS

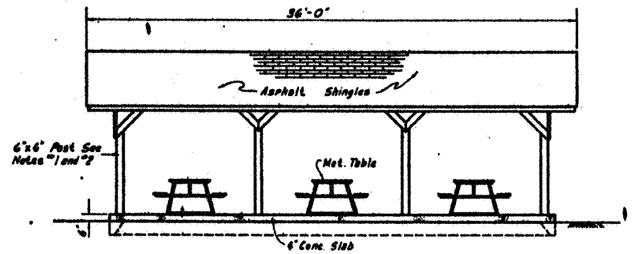
TYPICAL PICNIC UNIT FACILITY

(TABLE WITH CANOPY, FIREPLACE, TRASH CAN)

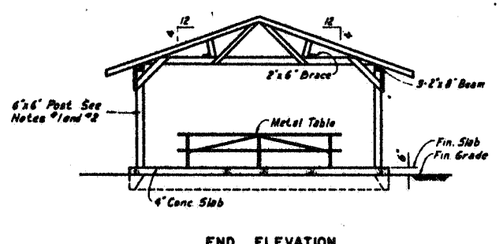
U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO. 18 MASTER PLAN

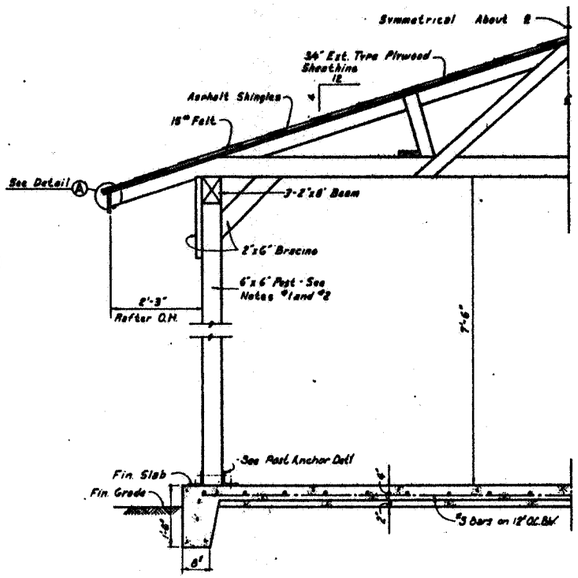
FILE BRAZ. NO. 18 · PLATE XI-2



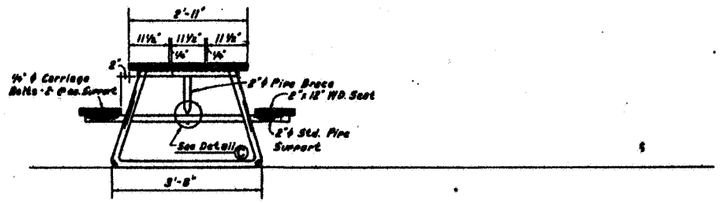
ELEVATION
SCALE 1/4" INCH = 1'-0"



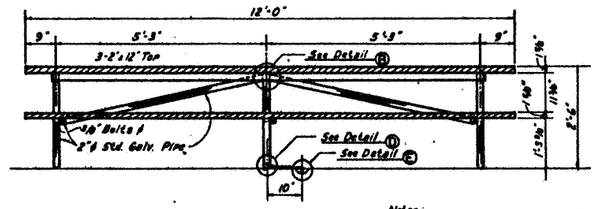
END ELEVATION
SCALE 1/4" INCH = 1'-0"



SECTION PLAN
SCALE 3/4" INCH = 1'-0"

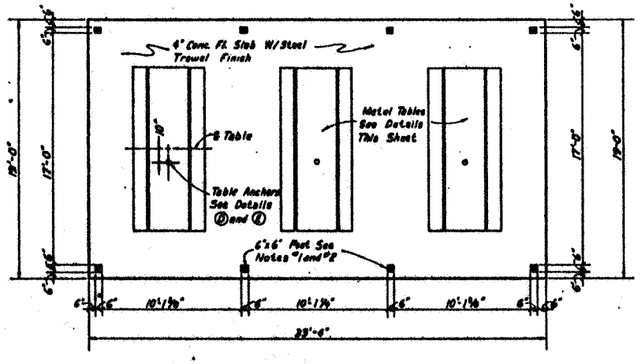


END VIEW
SCALE 3/4" INCH = 1'-0"

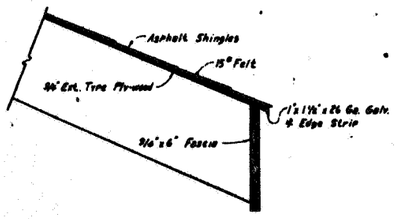


SIDE VIEW
SCALE 3/4" INCH = 1'-0"

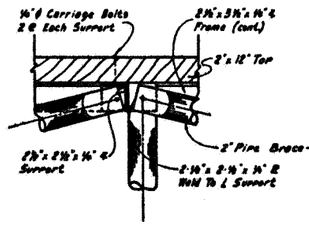
Notes:
1. All Pipe Shall Be 2"ϕ Std. Pipe Galvanized After Bending Operation is Completed
2. All Bolts Shall Be Zinc Plated and Peened. (Or nuts shall be Spot Welded)



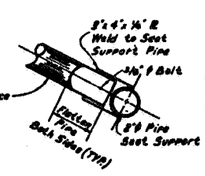
FLOOR PLAN
SCALE 1/4" INCH = 1'-0"



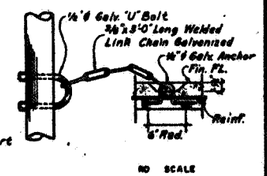
DETAIL A
NO SCALE



DETAIL B
(SECTION)



DETAIL C
(SECTION)

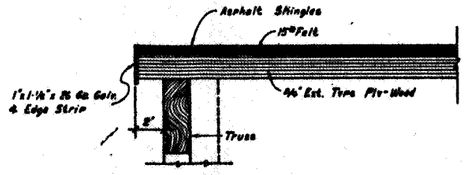


NO SCALE

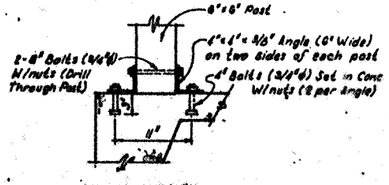
DETAIL D
(PLAN)

DETAIL E
(SECTION)

METAL TABLE DETAILS
SCALE 3" INCHES = 1'-0"

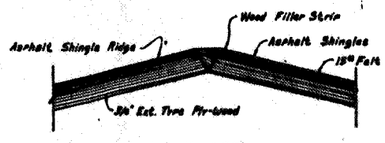


TYPICAL RAKE SECTION
NO SCALE



POST ANCHOR
SCALE 1½" INCH = 1'-0"

BOLT SETTING
NO SCALE



RIDGE DETAIL
NO SCALE

Notes:
1) Stain Columns, Braces, Fascia, Hanging Rafter, Trim and Edge Blocking As Specified.
2) All 4"x6" Post Shall be Southern Pine, Pressure Treated To Resist Fire and Flame Spread, Termites, Insects, and Decay, in Accordance with Federal Specs. MIL-F-1 19140A.
3) Concrete Floor Slab Shall Have A Light Broom Finish After Troweling.
4) Wooden Table Tops And Seats Shall Be Pressure Treated in Accordance With Federal Specs. MIL-P-19140A And Obtained As Specified.
5) Color For Wood To Be Brown No 20140 Of Federal Standard 595.

BRAZOS RIVER BASIN, TEXAS
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

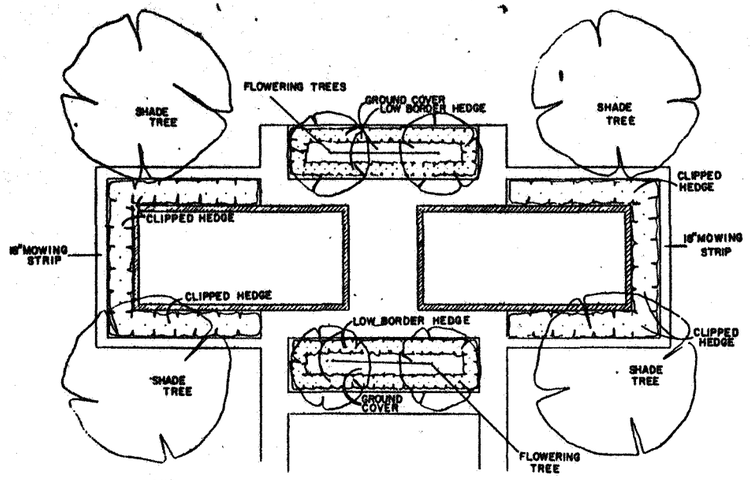
GROUP PICNIC SHELTER

PLAN, ELEVATIONS, AND DETAILS

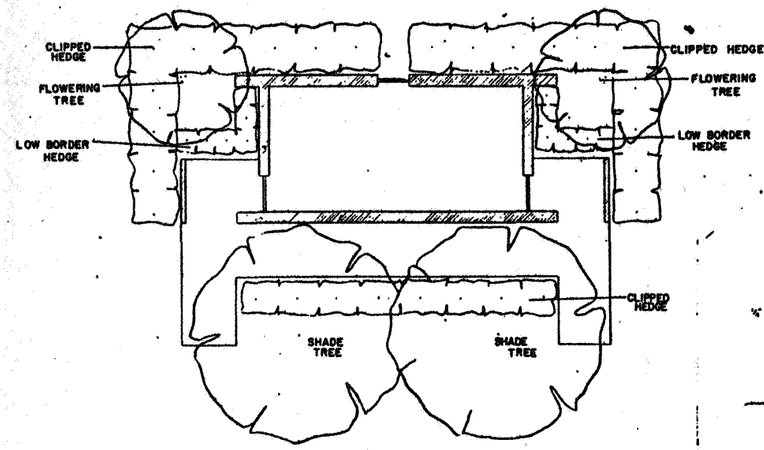
U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO. 18
MASTER PLAN

FILE BRAZ. NO. 18 PLATE XI-3



SERVICE BUILDING AND CHANGE BUILDING



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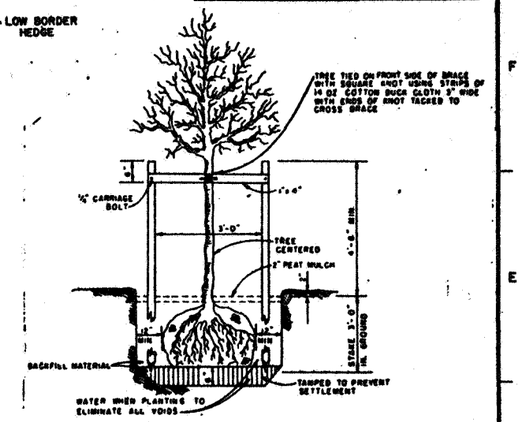

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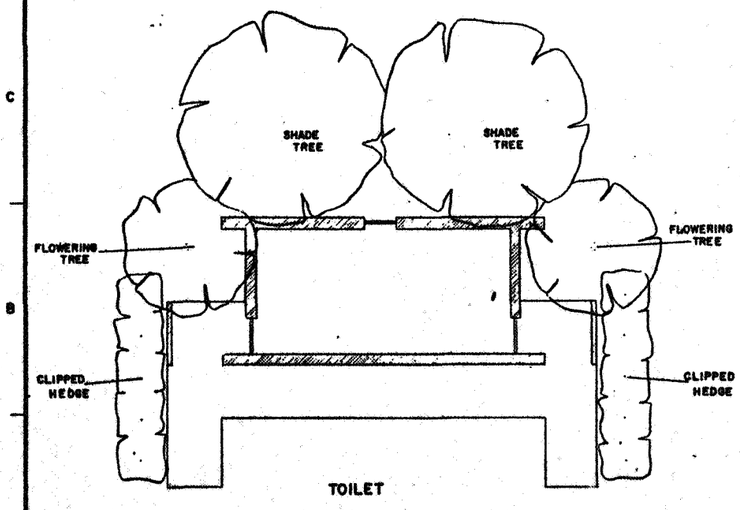

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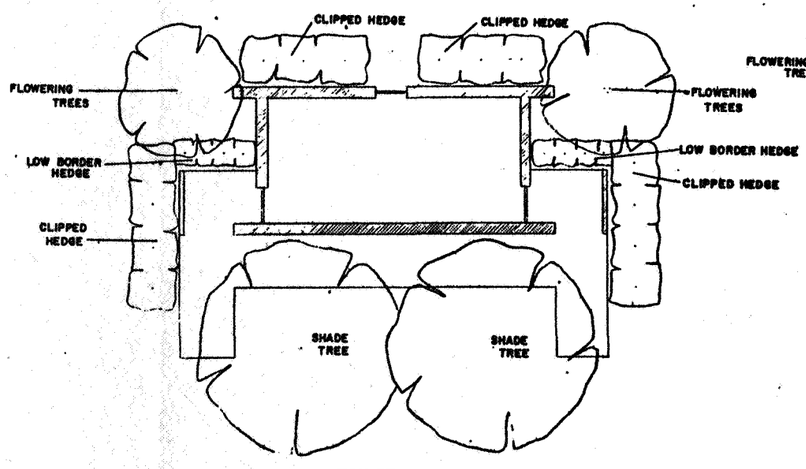

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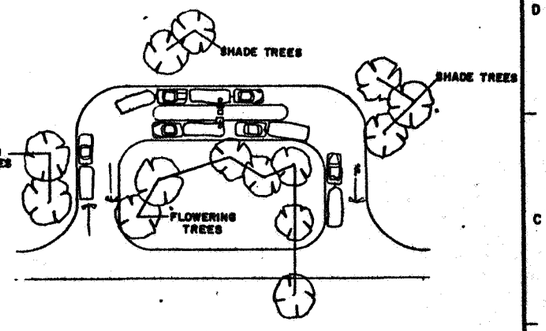


SANITARY DUMP STATION

BRAZOS RIVER BASIN, TEXAS
LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

TYPICAL
LANDSCAPING PLAN AND DETAILS

U.S. ARMY ENGINEER DISTRICT, FORT WORTH — MARCH 1974

TO ACCOMPANY DESIGN MEMORANDUM NO.18
MASTER PLAN

FILE BRAZ. — NO.18 — PLATE XI-B

XII
SPECIAL PROBLEMS AND CONSIDERATIONS

XII - SPECIAL PROBLEMS AND CONSIDERATIONS

12-01. General.- Anticipated problems and features requiring special consideration because of their direct relationship to successful operation of the recreation and resources managment program are discussed below.

12-02. Environmental protection.- The following measures will be undertaken in accordance with EM 1110-2-38 and Draft Specification CE-1300 to aid in the preservation of the environment.

a. Access roads.- To avoid additional landscape scars the limits of roadway clearing will not exceed 10 feet beyond the toe of fills or the top of cut back slopes. In other than solid rock, the harsh appearance of roadway will be subdued by rounding off the tops of excavated slopes. All downed trees, loose rock, rubble, and other debris created by construction activities will be cleared from the area.

b. Recreation facilities and construction.- During construction of the recreational facilities, all construction activity will be kept within the established limits of the construction area. Any area scarred by construction activities will be regraded to approximate natural topography and will be revegetated to blend with the surrounding landscape.

12-03. Beautification.- Beautification will be considered in facility design, in relocations, in excavation and spoil areas, and in clearing, landscaping, and planting plans. The criteria covering most of the beautification requirements are found in ER 1110-2-400, ER 1130-2-400, ER 1165-2-2, ER 1165-2-400, and EM 1110-2-400.

12-04. General appearance standards.- Standards of appearance for all Government buildings, project structures, signs, and other facilities will be established, with all facilities required to be kept in first class repair. Public appraisal of Corps project areas is often based on the appearance and adequacy of project facilities. Continuing study, appraisal, updating, and maintenance of all project structures and facilities are critical functions of project administration.

12-05. Boundary surveys and monumentation.- Boundary lines will be surveyed and monumented as soon as possible in accordance with the provisions of ER 1120-2-400 and ER 405-1-200. Early completion of boundary monumentation is essential to control encroachments of Government property. These boundary line markers should be checked periodically by field personnel to ascertain if any changes have been made to the location of markers or boundary lines either by accident or impropriety. Boundaries and markers should be readily distinguishable at all times.

12-06. Fencing.- In order to achieve economic management and smooth administration of project lands, the boundary of the project will be fenced. The project boundary will be fenced to prevent encroachments, disputes over boundary lines, and trespassing by free-ranging livestock and related damage or degradation of natural and developed resources. It will also be done to help control access by funneling vehicles to established entries and roadways. This, in turn, should help prevent off-road vehicle traffic. By affecting control of people and livestock, the fence will reduce administration problems and the costs associated with investigating and reporting encroachments.

12-07. Firebreaks.- Since the project is located in a region characterized by high fire danger, a firebreak will be developed and maintained along the perimeter of the project. Firebreaks will be tied to natural breaks such as the lake or roads. Just below ridge lines and hilltops opposite to the direction in which fire is expected to come are the best locations to prevent the spread of wildfire. Downslope breaks will be provided with waterbars to prevent erosion.

12-08. Special provisions for the handicapped.- Provisions for physically handicapped persons will be made in accordance with ER 1110-2-102, particularly in regard to site grading, sidewalks, parking areas, ramps, and toilet facilities.

12-09. Civil disturbances.- Because of the recent trend towards violent and disruptive demonstration and other civil disturbances, the reservoir manager and his staff should be constantly aware of any signs of potential disturbance. ER 1130-2-313, SWDR 1130-2-4, and SWDR 1130-2-7 provide guidance on this subject.

XIII
ADMINISTRATION MANAGEMENT

XIII - ADMINISTRATION AND MANAGEMENT

13-01. General.- The concept behind the management of both created and natural project resources is to provide continued enjoyment and maximum sustained use by the public of the lands, waters, and associated recreational resources consistent with their carrying capacity and their esthetic and biological values. In accordance with this concept, the policies regarding the administration and management of the project have been formulated to make the majority of the lake and the Government-owned land available to the visiting public to the fullest extent compatible with an orderly and planned development. These policies control the administration, management, and development of the project area, but will not conflict with the operation of the project for its authorized purposes. They will be based on legislation enacted by Federal, State, and local governmental agencies, and experience gained in the operation and development of similar projects and public parks. The administration and management of the project are accomplished jointly through the district office and field personnel of the Fort Worth District.

a. District office.- District office personnel will be concerned principally with the project's operation and management in accordance with purposes for which the project was authorized; the nature, location, construction codes, and requirements of development and improvements; coordination and reconciliation of activities relative to policies and regulations; coordination with representatives of other agencies and individuals; processing of leases, licenses, and permits not delegated to field personnel for issuance; and public relations.

b. Field office.- Field office personnel assigned to the project will be concerned with direct operation, maintenance, and management of the project; supervision of all activities conducted on the impounded water and land over which the Government acquires fee title or a lesser interest; protection and maintenance of Government properties and interests; and requirement of high standards of public health and safety. The field personnel will be trained in the rudiments of fire and mosquito control. Sufficient materials and equipment will be made available at the project for the field personnel to conduct these activities when the conditions demand. The reservoir manager will enter into cooperative agreements with local Governmental agencies for particpation in suppressing fires without cost to the Federal Government when the need arises. The reservoir manager will be delegated as much authority as is practicable in order to maintain expeditious and beneficial administration and management of the project. He will be furnished with copies of all rules and regulations pertaining to maintenance and management of the project, including a manual outlining project procedures, policies, responsibilities, and duties.

13-02. Staffing and organization of the project.- Sound and efficient management requires that the staffing and organization at each project should provide for expertise in disciplines necessary for light construction, maintenance of facilities, and effective administration and management of the project and its related resources. Based on the above criteria, the Government personnel necessary for this phase of the project will be composed of a reservoir manager, three reservoir rangers, an outdoor recreation planner, a clerk-typist, a reservoir maintenance foreman, three reservoir maintenance workers, and seasonal labor as required. Table XIII-1 gives information regarding proposed project personnel. The total annual cost of the proposed personnel is estimated to be $121,500.

Table XIII - 1

PROJECT PERSONNEL

Resident Engineer, GS-13 (part-time - 10%)	$3,500
Reservoir manager, GS-11	15,000
Outdoor recreation planner, GS-09	13,000
Clerk-Typist, GS-05	7,500
Reservoir ranger, GS-09	13,000
Reservoir rangers (2), GS-07	21,500
Reservoir maintenance worker foreman, WS-05	10,500
Reservoir maintenance workers (3), WG-08	25,000
Laborers (2), WB-03	12,500
PERSONNEL COSTS	$121,500

13-03. Operation and maintenance of the project.-

a. Operating agency.- The operation and maintenance of Laneport Lake will be a Federal function and will be administered by the Corps of Engineers under the direct control of the District Engineer, Fort Worth, Texas.

b. Operation and maintenance personnel.- It is the policy of the Corps of Engineers to limit full-time specially trained operation and maintenance personnel to the minimum number required for proper operation and maintenance of project facilities. Seasonal maintenance should be performed by hired labor or contract labor when it is in the best interest of the Government. Repairs involving substantial costs or extraordinary maintenance should be accomplished by contract in lieu of hired labor whenever it is to the advantage of the Government.

13-04. Park areas.- The four parks will be administered and managed in accordance with ER 1130-2-400, ER 405-1-800, ER 405-1-830, ER 405-2-835, EC 405-2-12, SWDR 1130-2-7, the Operations and Maintenance Manual, and the master plan.

13-05. Commercial sites and services.- Commercial sites have been designated in both Wilson H. Fox and Friendship Parks. Concession leases will be granted in a fair and impartial manner by advertising and awarding the lease in accordance with ER 405-1-830.

13-06. Access by adjacent property owners.- Owners of lands adjacent to the project will be allowed reasonable access to the lake in accordance with SWDR 1130-2-7 dated 25 September 1968. This does not mean that the adjacent owners are conveyed any right to Government-owned lands, nor does it mean that these owners have any private rights for lease thereof for access or recreational purposes. The use of Government-owned roads by adjacent property owners shall be in accordance with SWDR 405-2-9, dated 11 December 1970.

13-07. Land and water zoning.- The land and water areas of the project have been zoned to insure safety, and protect property and the resources of the project. All zoned areas will be clearly and appropriately designated with approved signs and/or buoys. Temporary zoning for special events of short duration may be permitted after approval by the reservoir manager. SWDR 1130-2-7 contains detailed instructions regarding zoning of land and water areas.

13-08. Fishing and hunting.- Fishing and hunting on Government-owned lands and water will be in accordance with applicable Federal, State, and local laws; enforcement will be the responsibility of Federal and State agencies. In addition, fishing and hunting will be in accordance with the project land and water zoning plan. Reservoir managers should refer to SWDR 1130-2-100 and Title 36 for guidance.

13-09. Interim use .- Lands not required for immediate or near-future use for public use, fish and wildlife, and project operations may be leased for nonprofit group activities and grazing purposes, may be designated for hunting, or may be left idle for soil restoration through native plant succession. Grazing will be used as a management tool.

13-10. Archeological and historical studies.- Any further investigations concerning excavation or historical study will be administered in accordance with ER 405-1-875. Only the National Park Service, either directly or through cooperating agents, is authorized to survey or excavate historical or archeological sites located on Federal lands. Other applicants will be so advised so that the National Park Service may make such arrangements with the applicant as are authorized.

13-11. Protection of biological resources of project lands and waters.- A biological management program for Laneport Lake is planned for the purpose of deriving maximum benefits from the project resources, while still preserving them for future generations. The Corps of Engineers will solicit the assistance of and coordinate the efforts of the U.S. Fish and Wildlife Service, the Environmental Protection Agency, the U.S. Public Health Service, the Texas Parks and Wildlife Department, and the Texas Department of Health in the implementation of this program.

13-12. Visitor and facility protection.-

a. Law enforcement.- Enforcement of civil and criminal laws at the reservoir will remain the responsibility of duly constituted officers of Federal, State and local government agencies. The Corps of Engineers, through field personnel, will cooperate fully with all law enforcement officers responsible for the enforcement of laws relative to civil actions, game and fish conservation, archeological disturbance and vandalism, public health and sanitation, boating, and prevention of pollution. Citation authority covers refuse dumping and the provisions of Title 36 only. Where practicable, the resource manager will provide rangers to man selected park areas on a 24-hour basis during peak recreation periods to provide protection and reduce vandalism. The policy of the Corps of Engineers regarding law enforcement is contained in ER 190-2-3.

b. Pest control.- Insecticides, herbicides, and other chemicals may be used to control insects, weeds, and other pests which may be harmful to the health and safety of the public or detrimental to the natural features of the project when they cannot be controlled by other methods. The use of biological or mechanical control other than chemical pesticides is encouraged where practicable and where such methods will not prove harmful to the ecosystems. All spraying and control activities will be coordinated through the Fort Worth District biologist and local and county health officials. ER 1130-2-232 (Pest Control Program for Civil Works Projects) and instructions on the labels will be followed when using and handling all pesticides, insecticides and other chemicals. A mosquito surveillance program will be conducted during periods when mosquitoes are most active (April to October). Mosquito samples will be forwarded to the Fort Worth District biologist, and analyzed for species and numbers. The results of the sampling will be made available to any interested agency upon request.

c. Pollution control.- The control of air and water pollution and solid waste disposal shall be in accordance with Executive Order No. 11507 on Prevention, Control and Abatement of Air and Water Pollution at Federal Facilities, and the Executive

order dated 23 December 1970 entitled Administration of Refuse Act Permit Program. All project personnel will maintain constant vigilance for sources of pollution to the reservoir and its stream tributaries. Guidance for this program is contained in ER 1165-2-116. Additional pollution control will be administered in accordance with ER 1130-2-400, ER 405-1-800, and the Operation and Maintenance Manual.

13-13. Health and safety.-

a. Safety.- A comprehensive safety program will be developed for all project land and water areas. Chapter XVII presents general guidance for the safety program until such time as a project safety plan can be added to the master plan as an appendix.

b. Health and sanitation.- The development and use of the reservoir are planned for the public interest and the utmost consideration has been given to the maintenance of high standards of public health and safety. The State health laws, rules, and regulations are applicable to all facilities constructed and provided at the project. Commercial operators and licensees are also required to abide by the State health laws, rules, and regulations. Disposal of waste, trash, and debris will not be permitted on Government land without authorization, and then only in accordance with State laws and at designated locations.

c. Solid waste disposal.- All feasible solutions to solid waste disposal should be given thorough consideration, and studies should include discussions with the responsible local health officials. Solid waste disposal may be by contract with off-project sanitary collectors when such a method is economically and administratively feasible. Where practicable, arrangements should be made for disposal of solid wastes on nonproject lands. Where this is not feasible, disposal will be accomplished on the project by means of land fill in isolated areas or by incineration.

13-14. Boating.-

a. General.- All boating activities on Laneport Lake will be in accordance with applicable State laws or acts covering boats, boating, and water safety, and SWDR 1130-2-7. Boaters will be encouraged to comply with such laws and regulations. These boating laws and regulations will be posted at launching ramps, public use areas, and the project office.

b. Mooring policy.- The mooring policy will be in accordance with the instructions presented in ER 1130-2-333 and SWDR 1130-2-7. In accordance with paragraph 17 of ER 1120-2-400

power boats should be accommodated in conjunction with the operation of any marina concession. Sailing activities will also be accommodated in a like manner except where it is impracticable. A lakeshore management plan will be added to this water plan as an appendix as soon as guidelines are available.

c. Unsafe operation.- Authorized project personnel will issue citations in accordance with ER 190-2-4. The reservoir manager will also report any unsafe operation of boats to the local authorities charged with enforcement of the State boating and safety laws. In the period before arrival of law enforcement authorities, the reservoir manager will take action as deemed appropriate to protect life and property.

13-15. Visitor interpretation and education.- A visitor interpretation and education program will be developed to inform and educate the public with regard to the purposes and concept of operation of the project and the rich historical, archeological, and natural features of the area. This program will be developed in accordance with ER 1130-2-400 and SWDR 1130-2-7.

XIV
VEGETATIVE MANAGEMENT PLAN

XIV - VEGETATIVE MANAGEMENT PLAN

14-01. General.- The purpose of this section is to provide a conceptual management plan for development of the vegetative resources. The broad objectives of this proposed plan are to conserve, improve, and manage the vegetative resource for its best use and provide proper stewardship for the benefit of the general public. Specifically, this plan proposes to develop and restore project lands currently under cultivation to appropriate vegetative cover while enhancing and conserving the existing vegetative cover. This plan will consider the physical characteristics, vegetative management areas, and the management measures.

14-02. Administration of the vegetative management plan.- The Fort Worth District will be responsible for administering and implementing this plan. Coordination will be maintained within the district to insure effectiveness of the plan. When the project becomes operational the project manager and his staff will assume the primary responsibility for the plan.

14-03. Physical characteristics.-

a. Existing vegetation.- The present land use of the project is predominately agricultural, with approximately 94 percent under cultivation. The remaining 6 percent is grassland and bottomland. Plates XIV-1 and XIV-2 graphically depict the present land use and the existing vegetative cover and wildlife habitat. Paragraph 4-07 presents a detailed narrative of the existing vegetation.

b. Climate.- Williamson County has a mild, moderately humid climate as indicated by paragraph 2-03. The recorded annual rainfall ranges from 8 to 60 inches with an average of 32 inches. The long frost-free season extends from approximately March 6 to November 26. Consequently, the ground is rarely frozen and then only to a depth of a few inches.

c. Topography.- The project is located in the geo-physical region called the Blackland Prairie. This is a region that is characterized by gently rolling hills, low relief and mature valleys.

d. Soil types.- This project is characterized by several heterogeneous soil series which were formed from native prairie grass conditions. The uplands soils are dominated by the Houston Black soil series. The principal soil series found in the lowland area is the Frio series. Table IV-2 presents soil characteristic information for each soil series. A description of the soils found within the project boundaries is presented in paragraph 4-06.

14-04. Vegetative management areas.-

a. Recreation - intensive use areas.- Wilson H. Fox, Taylor, Willis Creek, and Friendship Parks have been selected as recreation intensive use areas; their locations are shown on plate IX-1. The parks have 1,385 acres available for public use at the top of the conservation pool, elevation 504.0 feet msl. The existing vegetative cover is readily depicted on plates XIV-1 and XIV-2. Table XIV-1 provides a detailed breakdown in acres of the existing vegetative cover for each park.

Table XIV - 1

VEGETATIVE COVER AND LAND USE
Intensive Use Areas

Parks	Agriculture Use (Acres)	Grassland (Acres)	Bottomland (Acres)
Wilson H. Fox	305	78	2
Taylor	120	265	10
Willis Creek	200	24	1
Friendship	330	48	2
Total	955	415	15

The specific objectives of the vegetative plan for the intensive use areas are to protect the existing vegetation, restore lands currently in cultivation to appropriate vegetative cover, and to landscape the parks to protect the natural resources while enhancing the recreational experience of the visitor. Paragraph 14-05 outlines the management measures proposed to accomplish these objectives.

b. Recreation - low density use area.- There are approximately 268 acres of land in this land use allocation. Plate XIV-1 shows the location of the area as well as the existing vegetative cover. Table XIV-2 presents the land use and vegetative cover situation. In this area, special management efforts will be made to maintain and improve the existing vegetative cover. Particular attention will be given to maintaining a plant cover natural to the area. A restoration program will also be initiated to insure that the cultivated areas are restored to appropriate vegetative cover. The management measures proposed in paragraph 14-05 will be utilized to accomplish these objectives.

Table XIV - 2

VEGETATIVE COVER AND LAND USE
Low Density Use Areas

Land Usage	Agriculture Use (Acres)	Grassland (Acres)	Bottomland (Acres)
Low density use area	100	160	8

14-05. Management measures.- The following management measures will be employed to implement the vegetative management plan in the intensive use and low density use areas:

a. Preservation of existing vegetative cover.- Since the project area has been under long periods of intensive cultivation, native climax vegetation exists only in areas not practical for agricultural use, such as ravines, creekbeds, and on steep slopes. Because many of these areas are located in an area having a high erosion potential, the existing vegetation will be preserved to protect the nature resource. Furthermore, these areas will serve as the framework for revegetation and enhancement programs.

b. Establishment of vegetative cover.- The primary emphasis of this management measure will be to establish and maintain appropriate vegetative cover on cultivated lands as soon as possible. Coastal and common Bermuda or buffalograss are proposed for the area below the 5-year flood frequency, and a mixture of native and introduced grasses should be planted above the 5-year flood. Bermuda and buffalograss are also recommended for the intensive use areas. Table XIV-3 presents a recommended list of grasses for revegetation. In park areas to be intensely developed several years hence, nursery run tree seedlings will be planted. Table XIV-4 presents a list of the recommended native trees. The intensive use areas will be landscaped with trees, shrubs, vines, and ground cover as proposed in the next management measure.

c. Landscaping.- Landscape planting in the parks will be designed to provide shade and shelter from the sun and wind, seasonal color, some food and cover for wildlife, transitions at buildings, signs, and roadways. For shade and shelter, trees native to the region will be selected, such as those shown in table XIV-4. Selections for seasonal color will include evergreen cedars and junipers in winter with their berries, white and red flowering plum and redbud in the spring, deep green of all the trees and bright white and yellow flowers of honeysuckle in summer and finally, the turning of leaves particularly on sumac, willow, and ash, and the bright red berries on yaupon and possum haw.

Table XIV - 3

GRASSES RECOMMENDED FOR REVEGETATION

Land Usage	Flora
Intensive use areas; bottomland areas below the 5-year flood pool	Bermuda grass buffalograss
Areas above the 5-year flood pool	KR bluestem Kleberg bluestem little bluestem big bluestem sideoats grama Indiangrass Texas wintergrass common vetch Madrid sweet clover

Table XIV - 4

NATIVE TREES RECOMMENDED FOR PLANTING

Common Names	Scientific Name
Cedar elm	Ulmus crassifolia
Pecan	Carya illinoensis
Post oak	Quercus stellata
Hackberry	Celtis laevigata
Honey locust	Gleditsia tricanthos
Red cedar	Juniperous virginiana
Texas persimmon	Diospyros texana

Plantings in the parks that produce berries and fruits or grow in thickets like multiflora rose provide additional food and cover for wildlife. Near the project buildings, signs, and road right-of-ways plant selections will be of the more hardy ornamental varieties combining low maintenance with good effect. These hard geometric forms can be softened and blended with the surroundings by properly using such plants as are indicated in table XIV-5.

14-06. Wildlife management areas.- Since a majority of the project lands have been allocated for management as wildlife areas, the vegetative manipulative practices necessary to insure a successful fish and wildlife management program are presented in Fish and Wildlife Plan, section XVI.

Table XIV - 5

TREES, SHRUBS, VINES, AND GROUND COVER RECOMMENDED FOR LANDSCAPING

Common Names	Scientific Names
Trees	
Arizona ash	Fraxinus arizonica
Cedar elm	Ulnus crassifolia
Post oak	Quercus stellata
Redbud	Cercis canadensis
Arizona cypress	Cupressus arizonica
Huisache	Acacia farnesiana
Shrubs	
Chinese photinia	Photina serrulate
Laredo mahonia	Mahonia trifoliata
Yaupon	Ilex vomitoria
Possum haw	Ilex decidua
Eleagnus	Eleagnus pungens
Sage	Leucophyllum frutescens
Russian olive	Eleagnus augustifolia
Adamsneedle	Yucca filamentosa
Mescalbean	Sophora secondiflora
Lilac chastetree	Vitex agnuscastus
Vines and Ground Cover	
Star jasmine	Trachelospermum jasminoides
Carolina jessamine	Gelsemium sempervireus
Honeysuckle	Loniera japonica
Grape	Vitis sp.

14-07. Project management plan.- The Operations Division will prepare a detailed project vegetative management plan within the scope of ER 1130-2-400. It should be finalized and submitted for approval by higher authority as soon as practicable, but not later than 3 years after the project becomes operational.

XV
FIRE PROTECTION

XV - FIRE PROTECTION

15-01. General.- The primary responsibility for the preparation, administration, and implementation of the fire protection plan will be that of the reservoir manager and his staff. The protection plan should be prepared according to ER 1130-2-400. It should be finalized and submitted for approval by higher authority as soon as practicable, but no later that 3 years after the project becomes operational. The objectives of the plan are to prevent, detect, and suppress all fires that may occur on the project lands, or on adjacent lands from which they will spread to project lands.

15-02. Cooperative agreements.- This plan will include or provide for cooperative agreements with State, county, and local agencies for mutual assistance in fire detection and suppression, training of personnel, procedures in case of fire, and provision for necessary equipment and tools to be readily available for prompt suppression activities.

15-03. Training.- A training program for field personnel will be established when the project becomes operational. This training program will cover methods of fire prevention, safety characteristics and behavior, methods of attack, use of hand tools, and use of power equipment.

15-04. Equipment.- Each Corps vehicle will carry fire tools at all times, with additional tools available at the project building. Power equipment specifically designed for fire suppression will be stored at the project building. All tools and equipment shall be checked and serviced at regular intervals to ensure serviceability.

15-05. Suppression and prevention.- A public information program will be initiated to aid in the detection and reporting of fires. News releases, signs, and other means will gain the support of the general public, and will give information on how and where to report fires. High fire danger periods are broadcast daily by the area radio stations. During these times Corps employees will periodically check high risk areas. The park manager will be responsible for the organization of firefighting crews. This will assure that every employee will have a specific duty during a fire. The place and telephone number for reporting fires during nonduty hours will be posted at the project office. Provisions will be made for fire suppression during nonduty hours. The primary means of communication between park manager and fire-fighting crews will be by radio. Hand-carried radios will be of assistance on large fires and on those fires not accessible to vehicular mounted radios. Fire prevention signs with information about fire safety and reporting fires will be placed at the entrance

to public use areas. Additional signs throughout the areas at places such as water wells, picnicking and camping sites, and stenciled fire prevention slogans on refuse containers will assist in promoting fire prevention. Any leases or contracts for use of project lands will contain fire prevention and suppression clauses.

XVI
FISH AND WILDLIFE MANAGEMENT PLAN

XVI - FISH AND WILDLIFE MANAGEMENT PLAN

16-01. General.- The purpose of the fish and wildlife management plan is to conserve, improve, and maintain the fish and wildlife habitat. This plan will serve as a conceptional guide until a more detailed resource management plan can be developed. The implementation of this plan is the first step towards achieving the goals of the Fish and Wildlife Coordination Act (Public Law 85-624).

16-02. Administration of the fish and wildlife management plan.- The Corps of Engineers will assume the basic responsibility for developing and implementing the fish and wildlife habitat management plan. The responsibility for managing resident fish and game species is essentially that of the Texas Parks and Wildlife Department. The Bureau of Sport Fisheries and Wildlife of the Texas Park and Wildlife Department assumes a dual responsibility for the management of migratory bird species. In recognition of the above responsibilities, the Corps policy is to encourage these agencies to assume responsibility for the management of the fish and wildlife resources at this project.

16-03. Coordination.- The fish and wildlife plan has been coordinated with the Bureau of Sport Fisheries and Wildlife (BSF&W) and the Texas Parks and Wildlife Department (TP&W). Both agencies have expressed their desire to cooperate and assist in planning for the management of these natural resources. During November 1973, representatives of the BSF&W and the TP&W participated in a final reconnaissance of the Laneport Lake project. Many of their recommendations have been incorporated into this plan. The official report from the BSF&W has been included at the end of this section.

16-04. Wildlife Management Plan.- The primary objective of the wildlife management plan is to make desirable species more available for human use whether it is for study, esthetics, hunting, or photography. This objective will be met by protecting the existing habitat, improving low quality habitat, and developing new habitat. Basically, the wildlife management plan will deal with manipulating the food and cover resource. The first step in implementing this plan is to analyze the wildlife management areas and to indicate the species to be managed.

a. Wildlife management areas.- Pecan Grove, San Gabriel, Willis Creek, and Sore Finger wildlife areas have been designated for wildlife management. A summary of the acreages in each wildlife area is shown in table XVI-1.

Table XVI - 1

WILDLIFE MANAGEMENT AREAS

Area	Acres
Pecan Grove	630
San Gabriel	2,640
Willis Creek	1,950
Sore Finger	1,496
Total	6,716

Plates XIV-1 and XIV-2 show the location of the management areas as well as depicting the existing vegetative cover and wildlife habitat. Table XVI-2 provides a detailed breakdown of the existing habitat and vegetative cover for each wildlife area.

Table XVI - 2

VEGETATIVE COVER AND LAND USE

Wildlife Areas	Agricultural Use Cultivation (Acres)	Grassland Upland Game Habitat (Acres)	Bottomland Habitat (Acres)
Pecan Grove	572	2	56
San Gabriel	2,548	56	36
Willis Creek	1,940	8	2
Sore Finger	1,478	8	10
Total	6,538	74	104

b. Resident wildlife resource.- Laneport Lake and the flood plains of the San Gabriel River are almost devoid of wildlife habitat and populations due to intensive cultivation. The principal wildlife species found in the project area include bobwhite quail, mourning dove, fox squirrel, cottontail rabbit, raccoon, opossum, ringtailed cat, and waterfowl.

c. Species to be managed.- The wildlife management plan will be oriented toward the principal wildlife species indigenous to the Blackland Prairie vegetational region. The principal sporting animals occurring on project lands include bobwhite quail, mourning dove, fox squirrel, cottontail, raccoon, and waterfowl. Fortunately, tailor-made plans for managing upland game species

such as bobwhite quail will also greatly benefit cottontails, raccoons, opossums, songbirds, and small game animals. Because the project is expected to receive considerable use by waterfowl during periods of migration, water fowl management will be an important part of the program. Waterfowl management measures would also satisfy many of the needs of furbearing animals and wading birds as well.

d. Management measures.- The second step of the wildlife management plan is to implement a combined vegetative and wildlife habitat restoration program. The following management practices will be utilized to implement the management plan.

(1) Seeding and planting of grasses and forbs for wildlife food and cover as well as for erosion control.- The primary emphasis on this management measure will be placed upon establishing appropriate vegetative cover to protect and enhance the resource. The main area involved will be the lands above the conservation pool. Bermuda and buffalograss are recommended for the area between the conservation and the 5-year flood pool. A mixture of native and introduced grasses should be planted above the 5-year pool. Table XIV-3 presents a list of the recommended grasses for revegetation. As a supplement to native upland game food and cover plants, portions of the upland should be planted in strips with the species listed in table XVI-3. It is recommended that these strips be at least 66 feet wide and no further than 330 feet from areas of woody vegetation.

Table XVI - 3

UPLAND PLANTS RECOMMENDED FOR WILDLIFE FOOD AND COVER PLANTINGS

Common Name	Scientific Name
Lespedeza	Lespedeza spp.
Corn	Zea mays
Sorghum	Sorghum spp.
Brown top millet	Panicum ranosum
Japanese millet	Echinochloa frumentacea
Common sunflower	Helianthus annuus
Maximillian sunflower*	Helianthus maximiliani
Engelmanndaisy*	Engelmannia pinnatifida

*May be obtained at the Soil Conservation Service Plant Center, Knox City, Texas.

(2) Preserve and enhance fragments of existing habitat.- Areas such as fencerows, roadside ditches, abandoned homesites, and areas frequently flooded provide the primary sanctuaries for the

existing habitat. Because these areas are important sources of food and cover, they will be protected. Furthermore, these areas will serve as a framework for future food and cover plantings. The interspersion of trees, shrubs, and vines along fencerows, roadsides, ditches, and other land divisions will improve and diversify the existing habitat. Table XVI-4 presents a list of trees, shrubs, and vines recommended for wildlife food and cover plantings.

Table XVI - 4

TREES, SHRUBS, AND VINES RECOMMENDED FOR WILDLIFE FOOD AND COVER PLANTINGS

Common Name	Scientific Name
Oak	Quercus spp.
Pecan	Carya illinoiensis
Hackberry	Celtis laevigata
Osage orange	Maclura pomifera
Black locust	Robinia psuedo-acacia
Wild plum	Prunus spp.
French mulberry	Callicarpa americana
Flowering dogwood	Cornus florida
Sumac	Rhus spp.
Hawthorn	Crataegus spp.
Rattan-vine	Berchemia scandens
Grape	Vitis spp.
Greenbrier	Similax spp.
Japanese honeysuckle	Lonicera japonica

(3) Cover restoration and habitat development.- In many instances, the existing fencerows and roads do not adequately separate the large cultivated fields for optimum wildlife use. Subdividing these fields into smaller tracts with strips of woody vegetation would greatly increase the carrying capacity for most of the upland game species. A combination of the various plant species presented in table XVI-4 should be planted in blocks or strips at least 66 feet wide to enhance and extend the present wildlife habitat. A series of brush piles will also be built in open areas to provide cover and protection for quail, cottontail, and songbirds. Brush piles should be at least 25 feet in diameter and should be within 100 yards of larger units of woody escape cover, or feeding areas.

(4) Disking.- To encourage the growth of native wildlife foods and regulate plant succession, disking strips of presently cleared lands is recommended as a management measure. Disking should be in strips alternating with fallow strips, each approximately 20 feet in width. Disked strips should be adjacent to and extending as far as 100 yards from suitable cover.

16-05. Fisheries management plan.- The fundamental objective of the fisheries management plan is to conserve, maintain, and enhance the quality and quantity of the desirable game fish habitat. The Corps of Engineers can accomplish this objective by encouraging, assisting and cooperating with the Texas Parks and Wildlife Department.

a. Fisheries management area.- The Bureau of Sport Fisheries and Wildlife indicated that the management area would consist of approximately 4,400 acres of high quality fish habitat during the first stage of development. This acreage will be increased to 6,320 acres when the pool is raised to its ultimate level.

b. Resident fishery resource.- The principal fishes of the San Gabriel River and its tributaries include largmouth bass, spotted bass, warmouth, channel catfish, flathead catfish, bluegill, sunfish, longear sunfish, gray redhorse, spotted gar, and several species of minnows.

c. Species to be managed.- Although the fisheries resource is essentially the responsibility of the Texas Parks and Wildlife Department, the Fort Worth District will supply all possible aid and assistance to secure an adequate management program. Largemouth bass, white crappie, and channel catfish will provide the best fishing in the early years of the reservoir. In later years, rough fish such as carp, buffalofish, and gizzard shad may dominate unless a successful fish management plan can be developed by the Texas Parks and Wildlife Department.

d. Management measures.- The following management measures will be utilized to initiate the management plan.

(1) Protecting existing habitat.- The primary emphasis of the fisheries plan will be placed upon protecting the existing habitat. Flooded trees and shrubs, shoreline grasses, and emergent aquatic vegetation will provide cover necessary for juvenile fish. The clearing plan for Laneport Lake design memorandum number 25 proposes that no vegetation will be removed from the project area unless required for project construction and efficient reservoir operation.

(2) Seining areas.- No special provisions will be needed for seining areas because existing croplands and pasture lands will be adequate for that purpose when inundated.

16-06. Resource protection.- Protection of the wildlife management areas is a vital part of game management. This plan proposes the installation of a perimeter fence and fireguard.

Fencing will serve to protect the wildlife resource by excluding vehicles and providing control of livestock intrusion. Boundary fences will also reduce the incidence of accidental trespassing and encroachment.

16-07. Operations Division management plan.- Appendix D (Fish and Wildlife Management Plan) to the master plan will be prepared by Operations Division within the scope of ER 1130-2-400. It should be finalized and submitted for approval by higher authority as soon as practicable, but no later than 3 years after the project becomes operational. The development of this plan will implement section 3 of the Fish and Wildlife Coordination Act (Public Law 85-624). Further guidance for the fish and wildlife plan is contained in SWDR 1130-2-7 and ER 1105-2-129.

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

RB

March 21, 1974

District Engineer
Corps of Engineers, U. S. Army
Post Office Box 17300
Fort Worth, Texas 76102

Dear Sir:

This responds to your request of November 1, 1973, for Bureau of Sport Fisheries and Wildlife participation and input in the development of a vegetative plan favorable to wildlife resources at the Laneport Lake Project site, San Gabriel River, Texas.

We have reviewed your Design Memorandum No. 18 and inspected the project site with personnel of your staff and members of the Texas Parks and Wildlife Department. Based upon the information obtained from the above sources, we offer the following suggestions and comments.

The Laneport Lake project area supports a limited amount of wildlife habitat. Historically, lands in the project area have been intensively cultivated thus limiting woody vegetation to some fencerows, roadsides, home sites, and flood-prone areas.

Areas immediately adjacent to the San Gabriel River, Willis Creek, and along various minor drainages support a high percentage of the remaining woodlands. Riparian corridors support an overstory of pecan, American elm, cottonwood, willow, Bois d'arc, white oak, post oak, cedar elm, and lesser amounts of soapberry, overcup oak, and chinaberry. Undergrowth of Smilax, Prunus, Japanese honeysuckle, and additional shrubs and herbaceous growth is limited except for old fields in the bottoms. Woody vegetation tends to change to hackberry and Bois d'arc and some mesquite with distance from bottoms. Practically all wooded areas will be inundated.

Federal acquisition of these lands is expected to preclude their use as agricultural cropland resulting in the invasion of native grasses and Johnsongrass. The discontinuance of agriculture will benefit upland game somewhat by providing a greater quantity and

diversity of wildlife cover and native food plants. However, a vegetation management program will be necessary to overcome limiting factors influencing upland-game populations and bring about an increase in their numbers.

Four areas have been designated by the Corps as potential wildlife management areas. These areas and their acreages as given in your Design Memorandum No. 18 are as follows:

Sore Finger Wildlife Area	1,496 acres
Willis Creek Wildlife Area	1,950 acres
San Gabriel Wildlife Area	2,640 acres
Pecan Grove Wildlife Area	630 acres

This is a total of 6,716 acres of available land designated for wildlife use and management purposes.

Game species occurring on project lands include the bobwhite and mourning dove. Both species offer management potential. Other wildlife, however, including cottontails, raccoons, opossums, and songbirds also would greatly benefit from the implementation of a vegetation management plan for wildlife.

A vegetation management plan should not overlook the importance of preserving and enhancing existing habitat. Fencerows, roadsides, ditches, abandoned home sites, and odd areas, would continue to provide an important food and cover source for wildlife resources with appropriate management. Furthermore, these areas should serve as focal points for future food and cover plantings. Interspersed plantings of trees, shrubs, and vines, along fencerows, roadsides, ditches, and other land divisions would improve and diversify the existing bobwhite, cottontail, and songbird habitat. Table I lists a number of plants recommended for their wildlife value.

Table 1. Trees, Shrubs, and Vines Recommended for Wildlife Food and Cover Plantings

Common Name	Scientific Name
Oak	*Quercus* spp.
Pecan	*Carya illinoensis*
Hackberry	*Celtis laevigata*
Osage orange	*Maclura pomifera*
Black locust	*Robinia pseudo-acacia*
Wild plum	*Prunus* spp.
French mulberry	*Callicarpa americana*
Flowering dogwood	*Cornus florida*
Sumac	*Rhus* spp.
Hawthorn	*Crataegus* spp.
Rattan-vine	*Berchemia scandens*
Grape	*Vitis* spp.
Greenbrier	*Smilax* spp.
Japanese honeysuckle	*Lonicera japonica*

Vegetative improvements in blocks of habitat formed by abandoned home sites and odd areas would provide better escape cover for small game. Protection by a screen of black locust and greenbrier would reduce human intrusion and preserve the sanctuary value of the coverts.

Agricultural tracts in the project uplands are typically in large acreages. Often the existing fences, roads, and field boundaries are too widely separated for optimum wildlife use. Subdividing large fields to a maximum size of 25 acres with strips of woody vegetation would greatly increase the carrying capacity for bobwhites, cottontails, songbirds, and other wildlife. Mixed plantings of species listed in Table 1 in strips at least 30 feet in width would provide excellent wildlife habitat. The addition of these trees and shrubs also would provide a needed source of nesting habitat for mourning doves and several species of songbirds.

To encourage the growth of native wildlife foods and regulate plant succesStion, disking of presently cleared lands should be a part of the vegetative plan. Disking should be in strips alternating with fallow strips, each about 20 feet in width. Disked strips should be adjacent to and extending as far as 100 yards from suitable cover. The disking during January and February, as prescribed,

on a three-year rotation basis would greatly stimulate the growth of croton, ragweed, partridgepea, daisy, bristlegrass, wildbean, broomweed, and snow-on-the prairie.

Burning also could be used as a tool in wildlife habitat management. Three-year rotational burning of 5-acre blocks would retard plant succession and improve nesting habitat for bobwhites. Burning should be conducted between the closing of the hunting season (February 15) and the end of March. This measure would provide many of the benefits derived from disking and could serve as an alternative if properly controlled and administered when moisture conditions were such that only partial burning would occur.

As a supplement to native upland-game food and cover plants, portions of the upland could be planted with the species listed in Table 2.

Table 2. Upland Plants Recommended for Wildlife Food and Cover Plantings

Common Name	Scientific Name
Lespedeza	Lespedeza spp.
Corn	Zea mays
Sorghum	Sorghum spp.
Brown top millet	Panicum ranosum
Japanese millet	Echinochloa frumentacea
Common sunflower	Helianthus annuus
Maximillian sunflower*	Helianthus maximiliani
Engelmanndaisy*	Engelmannia pinnatifida

*May be obtained at the Soil Conservation Service Plant Center, Knox City, Texas

Two planting procedures should be considered:

(1) Portions of the disked strips adjoining cover may be planted with the prescribed plants to create an edge effect and provide additional food for bobwhites, mourning doves, and songbirds. Seeding would be done by either drilling or broadcasting.

(2) Entire field areas may be seeded by drilling to provide a food crop for waterfowl, mourning doves, and songbirds. At least 500 acres of the grain crops specified in Table 2 may be planted annually in a field rotation system. Isolated areas near large bays and inlets would be best suited for plantings for waterfowl.

The great expanse of gently sloping fertile land within the 5,980-acre 5-year flood pool between elevations 504.0 and 511.0 feet offers excellent opportunities for waterfowl management. Portions of the Sore Finger, Willis Creek, and San Gabriel Wildlife Areas (Plate 1) provide at least 1,000 acres of flood pool land suitable for waterfowl food planting and controlled flooding. Other portions of the 5-year pool also should provide wildlife food and cover.

Rotational plantings of at least 200 acres of small grains (Table 3) should be implemented in conjunction with controlled flooding. The fall and winter inundation of these plantings could be accomplished by one of two methods:

(1) Inundation by impounded floodwater during the fall months or, if flooding does not occur, then by reservoir operations designed to inundate portions of the flood pool.

(2) A system of dikes constructed above the conservation pool elevation to hold water on the planted areas. Water to inundate the diked areas could be obtained by pumping or through retention of runoff or floodwater storage.

Table 3. Waterfowl Food Plant Recommended for Areas of Controlled Flooding

Common Name	Scientific Name
Wild Millet*	Echinochloa crusgalli
Japanese Millet*	Echinochloa frumentacea
Rice Cutgrass	Leersia oryzoides
Smartweed	Polygonum spp.
Chufa	Cyperus esculentus
Bulrush	Scirpus spp.

*Planted in late spring or summer and partially flooded during fall and winter

The manipulation of the flood pool through reservoir operation appears to be the most economical method of inundation; however, during unusually dry years this method may be impractical.

The remaining land within the 5-year flood pool should be seeded with various mixtures of the plant species listed in Table 3. The species included within these mixtures would be selected according to site and moisture conditions. This measure would serve to provide an assortment of food and cover plants for waterfowl, numerous shorebirds, and songbirds. Once established, the prescribed plants also would reduce wave action and its erosive effect on the lake's shoreline.

In addition to the vegetation management plan as proposed, other measures including protection of wildlife habitat and flexible hunting regulations are encouraged. Fencing of wildlife management areas should be completed prior to the initiation of vegetation management. This would serve to protect vegetation by excluding unauthorized vehicles and livestock. Furthermore, boundary fences would reduce the incidence of accidental trespass on adjoining private property.

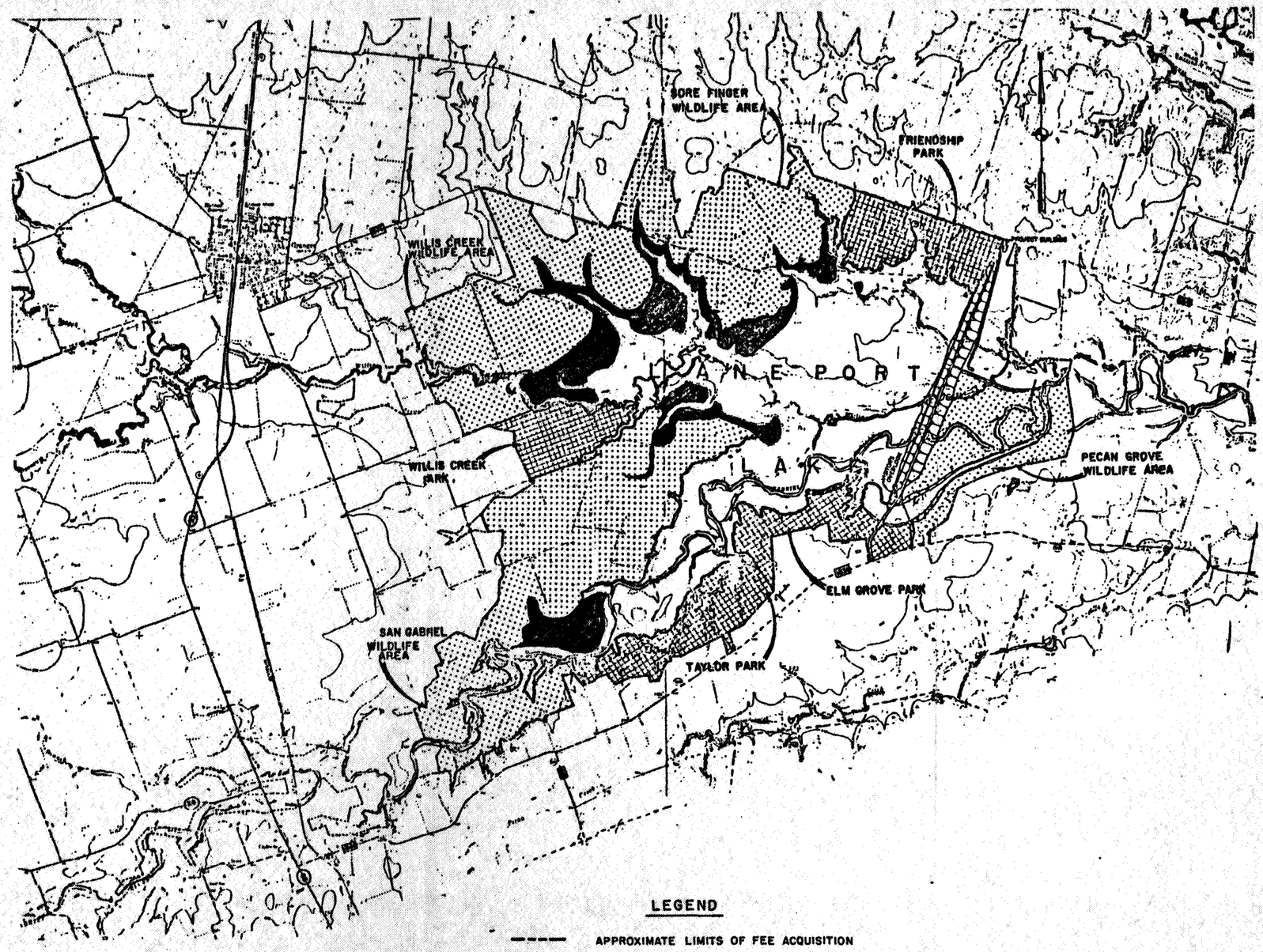
We appreciate the assistance provided by your staff during the study. We hope the material presented will assist your planners in developing a vegetation management plan for wildlife at the project site.

Sincerely yours,

W O Nelson

Regional Director

cc:
Executive Director, Texas Parks and Wild. Dept., Austin, Tex.
Field Supervisor, BSFW, Div. of River Basin Studies, Fort Worth, Tex.



LEGEND

- APPROXIMATE LIMITS OF FEE ACQUISITION
- TOP OF INTERIM CONSERVATION POOL ELEV. 504
- APPROXIMATE LIMITS OF FLOWAGE EASEMENT ACQUISITION
- PUBLIC USE AREA
- WILDLIFE AREA
- POTENTIAL WATERFOWL AREA

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

Brazos River Basin, Texas
LANEPORT LAKE
San Gabriel River, Texas

ALBUQUERQUE, NEW MEXICO — REGION 2

DATE: | PLATE

XVII
PROJECT SAFETY PLAN

XVII - PROJECT SAFETY PLAN

17-01. General.- The objective in developing a project safety plan is to identify common hazards and unsafe conditions in the major phases of project operations in accordance with ER 1130-2-400. Application of these regulations is mandatory to all missions under the command of the Chief of Engineers.

17-02. Coordination.- A detailed project safety plan will be developed by the reservoir manager as soon as possible and will be added to the master plan as an appendix. It should be coordinated with the Texas Parks and Wildlife Department and the U.S. Coast Guard.

17-03. Implementation.- Project personnel will be instructed on a continuing basis regarding safe practices, safety equipment use, and safety requirements relating to employees and visitors. Specific safety requirements will be emphasized as they relate to office and shop facilities, public use structures, sanitary systems, potable water facilities, insect and poisonous plant control, and roads and trails. Emergency equipment and instructions for its use will be located for convenient and efficient use.

XVIII
CONCLUSIONS AND RECOMMENDATIONS

XVIII - CONCLUSIONS AND RECOMMENDATIONS

18-01. Conclusions.-

a. It is believed that by implementing this master plan, the natural and created resources of the project can be maintained and adequately developed to meet the project's optimum usage within the scope of the authorized purposes.

b. It is believed that this master plan is in compliance with the Corps resource management objectives of providing a planned development program which will provide continued enjoyment and maximum sustained use by the public of the lands, water, and associated recreational resources consistent with their carrying capacity and their esthetic and biological values. The plan is flexible and will allow adjustments to be made in relation to future public needs.

18-02. Recommendation.- It is recommended that the master plan for Laneport Lake involving development for public use and land management be approved as proposed herein.

APPENDIX F

APPENDIX F

FRIENDSHIP PARK ACCESS ROAD

GENERAL

1. Purpose.- This appendix presents the basis for design and preparation of plans and specifications for the construction of the access road to Friendship Park, Laneport Lake, Texas.

2. Project location.- Laneport Dam is located about 10 miles northeast of Taylor, Texas, and is at river mile 31.9 on the San Gabriel River. The reservoir is located in Williamson County, Texas. Location of the project is shown on plate VIII-1.

3. Proposed work.- The access road will be constructed to provide access to the Friendship Park. The road will begin at a point on the relocated State Highway F.M. No. 971. It will follow the natural terrain to the extent possible, and will be constructed on low fill. The road will be a two-lane road, with 10-foot double bituminous surfaced traffic lanes and 6-foot single bituminous surfaced shoulders. It will have a 200-foot wide right-of-way, with fence (woven wire) along the right-of-way. Details of the road are shown on plate F-1.

4. Operation and maintenance.- The road will serve only as an access to the park for recreation, therefore, it will be operated and maintained by the Government.

5. Other plans considered.- There were no other plans considered for access to the park. No route other than the existing alignment is considered feasible, based on field reconnaisance.

DESIGN CONSIDERATIONS

6. Traffic count and design criteria.- Based on visitation projections, the average daily traffic during the 6-month peak (April through September) is estimated to be 770 vehicles per day (two-way). The construction of this road is based on design elements and criteria as specified in TM 5-822-2 to meet the requirement of a class "E", two lane road in rolling terrain which will accommodate 70-1000 vehicles per day. The new road will have a design speed (and speed limit) of 35 mph. The maximum degree of curve is 3°30' desirable (10°30' absolute), and the maximum grade 6% desirable (9% absolute).

7. Pavement design.

a. General.- This project entails the construction of flexible pavement for the access road to serve the Friendship recreation area. The preliminary pavement section contained herein is based on incomplete design data and is intended for interim use.

b. Design.- The following tentative pavement section is recommended for the Friendship access road. It was derived by using criteria in TM 5-822-5, a design index of 1 and CBR values of 5 and 12 for raw and lime-stabilized subgrade compacted to 90 and 95 percent of maximum density, respectively.

Course	Thickness	% Max Density
Double Surface Treatment	--	--
Base Course	6"	100 min.
Lime-Stabilized Subgrade	6"	95 min.
Raw Subgrade	6"	90 min.
Fill	--	90 min.

8. Construction materials.- The construction materials will meet the requirements of the Texas Highway Department 1972 Standard Specifications.

a. Surfacing.

(1) Bituminous materials.- THD Item 300, EA-CRS-2 for surface treatments, MC-30 for prime coat.

(2) Aggregate - THD Item 304, Precoated, Class B, Type PD, Grades 2 and 4.

b. Base course.- THD Item 248, Type A, Grade 1

9. Traffic signs.- Traffic signs will conform with the manual of "Uniform Traffic Control Devices" for streets and highways, dated 1971, approved by the U. S. Department of Transportation, Federal Highway Administration.

10. Intersections.- The intersection of the access road with State Highway No. F.M. 971 will be a standard "tee" type as approved by the Texas State Highway Department.

11. Turfing.- All unpaved graded and disturbed areas within the right-of-way will receive turfing treatment. Perennial warm season grass will be established by fertilizing, tilling, seeding and mulching. The turfing work will be accomplished during the period from 1 March to 1 June following completion of the road construction. Approximately 2.4 acres will require turfing treatment. Existing trees within the right-of-way that are not required to be removed for construction of the road will be conserved and protected. Estimated cost of the turfing work is $1,215. The design and execution of the work will be in accordance with guidance set forth in EC 1110-2-13 and multiple letter SWDGB-5, dated 10 December 1965, subject: Beautification of Civil Work Projects, EC 1110-2-13.

DRAINAGE

12. Drainage structures.- Concrete pipe culverts at station 5+10 and 17+60 will be used to provide the necessary road cross-drainage. These culverts will pass the peak runoff from a storm having a frequency of once in ten years with minor ponding at the culvert intake. The minimum slopes for concrete pipe culverts (n = 0.013) will be 0.50 percent. The design discharges for the pipe culverts are shown in table 1 and were computed by the Rational Method. This table also shows the drainage areas, times of concentration, and rainfall intensities. Reinforced concrete headwalls and aprons will be provided at the pipe culverts.

ALTERATION OF EXISTING UTILITIES

13. Utility relocations.- None.

REAL ESTATE

14. General.- The estate to be acquired for the road right-of-way will be a perpetual easement. The right-of-way will be fenced for the entire length of the road.

15. Estimated acreage and number of ownerships.- The required acquisition of land for the road right-of-way will cover approximately 4.98 acres with one private ownership.

ESTIMATE OF COST

16. Estimate of cost.- The estimate of cost for the work proposed in this appendix is shown in table 2.

SHEET 1 OF 1
DATE 6 March 1974
COMPUTED BY MDJ

TABLE 1

DRAINAGE STRUCTURE
DESIGN DATA

PROJECT LANEPORT LAKE
LOCATION SAN GABRIEL RIVER
DIVISION SWD
DISTRICT FWD

APPENDIX F

ROAD STATION	FREQUENCY OF STORM (YEARS)	TIME OF CONCENTRATION (MINUTES)	INTENSITY (INCHES PER HOUR)	RUNOFF COEFFICIENT	ESTIMATED DRAINAGE AREA (ACRES)	DESIGN DISCHARGE (CFS)	OUTFALL VELOCITY (FPS)	REQUIRED STRUCTURE SIZE	
5+10	10	20	5.2	0.40	12.34	25.7	6.7	30"x46' RCP	
17+60	10	20	5.2	0.40	7.35	15.3	5.8	24"x46' RCP	

NOTES:

(1) Based on Rainfall Intensity-Duration-Frequency Curves, Austin, Texas, by Weather Bureau Cooperative Studies.

(2) For condition of 10 year frequency storm runoff.

(3) Based on slope of 0.5 percent.

REMARKS

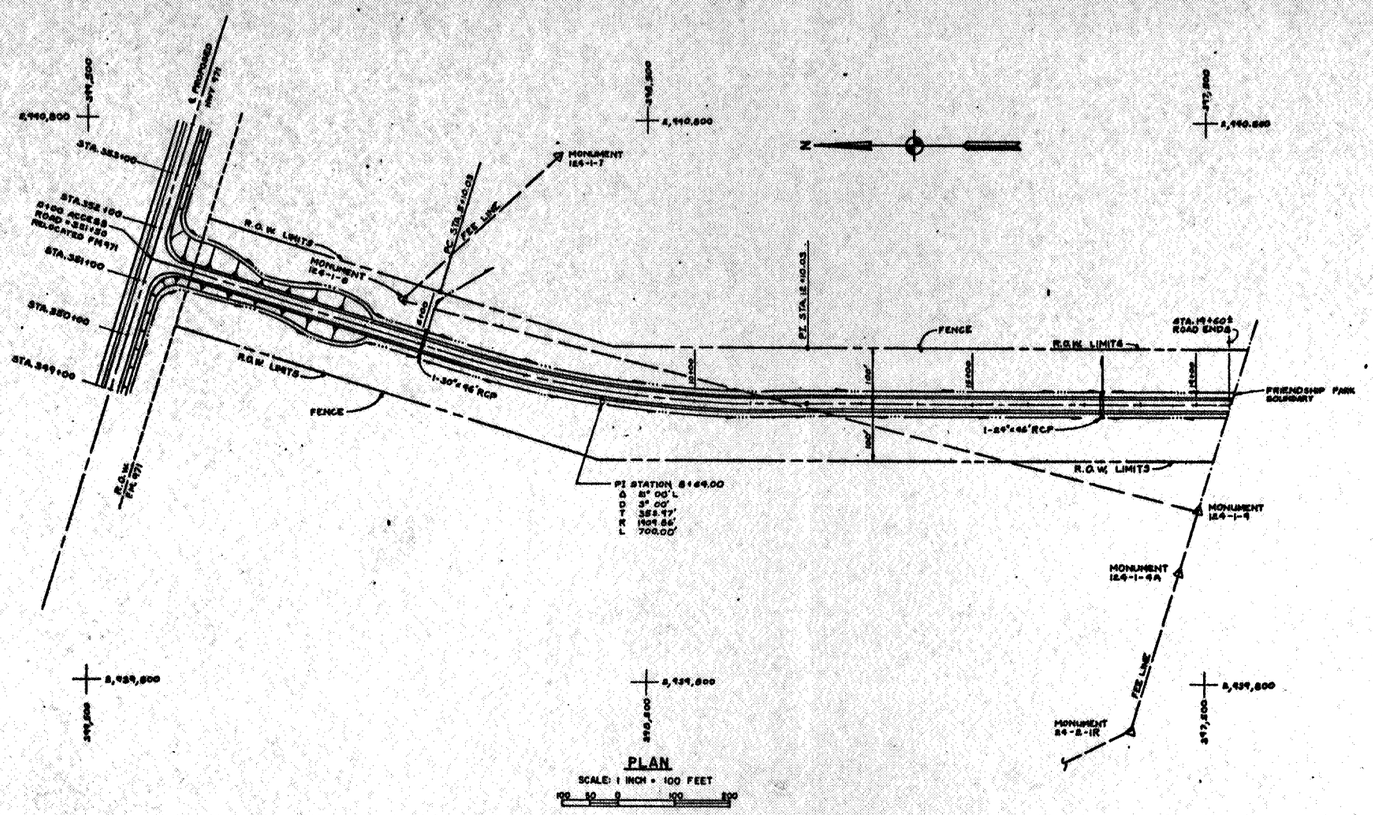
TABLE 2
ESTIMATE OF COST
(Based on March 1974 price level)

Cost Acct No.	Item	Unit	Quantity	Unit Cost $	Amount $
01.	LANDS AND DAMAGES				
	Perpetual Road Easement, Incl. 25% Contingencies (4.98 Acres)	L.S.	-	-	3,250
	Administrative Costs	L.S.	-	-	1,600
	TOTAL, LANDS AND DAMAGES				$ 4,850
02.	RELOCATIONS - None				
14.	ROAD				
	Excavation, stripping (9")	C.Y.	1,064	0.65	692
	Borrow excavation	C.Y.	6,930	2.75	19,058
	Motor grader work	Sta.	16.0	200.00	3,200
	Compacted roadway fill	C.Y.	5,775	0.30	1,733
	Base course, 6-inch	C.Y.	1,185	11.00	13,035
	6" Lime stabilized subgrade	S.Y.	8,890	1.35	12,002
	Bituminous prime coat	Gal.	2,570	0.70	1,799
	Bituminous surface material	Gal.	2,600	0.75	1,950
	Surface aggregate	C.Y.	81	20.00	1,620
	Pipe culvert, 30" RCP	L.F.	46	11.00	506
	Concrete headwalls, 30"	Ea.	2	400.00	800
	Pipe culvert 24" RCP	L.F.	46	8.00	368
	Concrete headwalls, 24"	Ea.	2	200.00	400
	Erosion control (turfing)	Acre	2.43	500.00	1,215
	Traffic control signs	Ea.	4	75.00	300
	Traffic paint (yellow)	L.F.	2,000	0.30	600
	Traffic paint (white)	L.F.	4,000	0.30	1,200
	Fence, woven wire	L.F.	4,000	1.50	6,000
	SUBTOTAL, ROAD				$66,478
	Contingencies, 15%±				10,022
	TOTAL, ROAD				$76,500
30.	ENGINEERING AND DESIGN				6,500
31.	SUPERVISION AND ADMINISTRATION				5,650
	TOTAL COSTS				$93,500

18. Comparison of present estimate with latest approved estimate.- Funds for the work proposed in this appendix was not included in the PB-3 because the need for this improvement was determined subsequent to submission of the general design memorandum.

RECOMMENDATIONS

19. Recommendations.- Recommend this appendix be approved as the basis for design and preparation of plans and specifications for the construction of the access road to Friendship Park, Laneport Lake, Texas.



PLAN

SCALE: 1 INCH = 100 FEET

TYPICAL SECTION
ROAD GRADER WORK

NOT TO SCALE

TYPICAL SECTION EMBANKMENT

NOT TO SCALE

PROFILE

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: M.O.J.
DRAWN BY: K.L.M.
CHECKED BY:

LANEPORT LAKE
SAN GABRIEL RIVER, TEXAS

ACCESS ROAD — FRIENDSHIP PARK

PLAN, PROFILE AND SECTION

SUBMITTED BY:
ENGINEER:
INV. NO.
DATED:
CONTR. NO.
DRAWING NUMBER
SHEET NO. OF
SEQUENCE NO.