CESWA-CO-O (11-2-240a) 19 March 1990

MEMORANDUM THRU Ch, Const-Ops Div

FOR SEE DISTRIBUTION

SUBJECT: Master Plan Revisions/Updates and OMPs

1. For a number of years we/you have been putting in the O & M budget a request for funds to do the Master Plans and OMPs. We never receive any funds to do this work because it does not have a high enough priority. This is and will be a good reason for not completing these documents.

2. I am no longer satisfied with having a good reason for not completing these documents and I hope you all are of the same opinion. I think it is time we told ourselves to get off center and do the best job we can with the resources we have. Therefore, I am asking you all to get started on completing these documents at the Project level. I know you cannot devote someone to this task full time with all the other things going on, especially with the recreation season starting up, but this doesn't stop you/us from spending whatever effort we can, even if it is only a page at a time.

3. I suggest that you start on the Master Plan first because we do not have an approved OMP to use as a guide. Huck is working on the Santa Rosa OMP with Jerry and we expect it to be completed in the near future. For those of you that have made an OMP for a Project that you recently left then I encourage you to start on your OMP.

4. With regards to updating the Master Plan I suggest that you make a copy of the current Plan and mark it up as needed. If typing becomes a problem give us a call and we will try to support you from this office and if that fails we can look at a contract for typing. Copying of the current Plan may be better accomplished here, if so ask Dean.

5. The point of contact for this is Dean, please keep him informed as to what you are doing and your needs. I expect Dean and Huck to help in every way they can. I have told Dean that he is to assist and not restrict his activity to reviewing whatever you all send to us, Dean is to be a part of the building of the documents so as to eliminate as much of the review as possible.

6. I don't think I need to say anymore as it would be redundant. I think you all know where I'm coming from and where I wish to go. Operations has a reputation of getting things done so let's do the best we can with what we have in the time we have. THANKS

for THOMAS J. FARRELL, P.E.
Chief, Operations Branch

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MASTER PLAN
CONCHAS LAKE, NEW MEXICO
UPDATED 1976

PREFACE

This is a major revision and updating of the 1947 project Master Plan, submitted in compliance with ER 1120-2-400. The next scheduled revision should be during 1981.

This revision of the Master Plan includes an evaluation of changes in public use and changes in the standards for recreation facilities at Corps of Engineers water resource projects.

Changes are recommended in the plan of recreation development to enable the project to more appropriately meet demonstrated present and estimated future needs for public recreation.

This Master Plan will become the official plan for development of project recreation facilities upon approval by the Chief of Engineers, at which time, the PB-3 for the project will be revised to reflect the recommended change in public use development.

SUMMARY

This Master Plan for New and Existing Development of Conchas Lake consists of twelve different sections. Section I is the Introduction giving the purpose and scope of the report, purpose and authorization of the project, governing public laws, and prior design memoranda. Section II is the project summary covering location, project data, and reservoir operation. Section III is the status of operating projects concerning operational chronology, project development, and chronology of expenditures. Section IV is the recreational and environmental resources of the project area consisting of geology, climate, archaelogy, history, environmental considerations, scenic qualities, hydrology, and recreation. Section V is the factors influencing and constraining project development and management. Section VI is the physical plan of development concerning existing and future allocations of project lands, inventory of existing facilities, the basic concept of development; landscape plans; transportation network; and design for the water supply and sewage system. Section VII is the proposed schedule for development and estimated costs. Section VIII is the design load analysis and other design criteria. Section IX is special problems. Section X is on coordination with other agencies and possible funding sources. Section XI is findings and conclusions; Section XII is the recommendations.

The project lands have been divided as: South Area I, South Area II, Central Area, East Area, and the North Area (See Plates 9-11) for purposes of planning. Immediate and future improvements have been designated in accordance with land use availability, need, demand, and cost.

The South Area of project lands at Conchas Lake has been divided into 2 parts, South Area I and South Area II, because these two areas are physically separated by topography and by the main internal road.

The project resources subject to analysis, management, and development within the scope of this Master Plan include the reservoir pool and approximately 3,530 acres of Government fee-owned lands. The normal minimum pool covers 3,310 surface acres at elevation 4,155 which includes acres of the project fee lands. Thus at normal minimum pool elevations there are 3,530 acres of project lands and 3,016 surface acres of water. Approximately 742 acres of project fee lands are licensed to the State of New Mexico and operated by the State Park and Recreation Commission as Conchas Lake State Park. An additional 33 and 27 acres are licensed respectively to the Boy Scouts of America and the U.S. Air Force for quasi-public recreation uses.

The initial increment of recreation development proposed in this Master Plan calls for the addition of 100 units of individual family camping, 110 units of individual family picnicking, and 5 group picnic units of 5 tables each. These facilities are in addition to the presently designated 203 units of overnight facilities and 23 units of picnic facilities

at Conchas Lake. The initial increment of development also includes the upgrading of boat launch facilities and existing comfort station; the addition of 4 new comfort stations and 2 wash houses, the paving of access and circulation roads, the closure of selected undesignated roadways.

PREVIOUSLY ISSUED REPORTS

ITEM NO.	SUBJECT	DATE SUBMITTED OR SCHEDULED
1	Preliminary Data, Conchas Reservoir Project South Canadian River, N.M. (Complied in Office of Div. Engr. Lower Miss. Valley Div., Vicksburg, Miss.)	July 1935
2	Report on Pressure Testing Conchas Dam Site	10 July 1936
3	South Canadian River, Conchas Dam, Government Estimate for Construction of Main Dam and Wing Dams and Appurtenant Works	March 1937
4	Minutes of Meeting with Members of the District Consulting Board, 6 & 7 December 1937 on the North & South Abutments of the Main Dam	10 Jan. 1938
5	Report on Emergency Spillway Design	29 Jan. 1938
6	Design & Construction of Conchas Dam, New Mexico, Volumes I & II	No date
7	Report on Text Dam No. 2, Conchas Dam Project	01 Feb. 1944
8	Master Recreation Plan, Conchas Dam Project	Feb. 1946
9	Interim Report on Physical Measurement, Conchas Dam, New Mexico	Sept. 1946
10	Survey (Review Report) on Flood Control, South Canadian River, Texas & Oklahoma (Tulsa District)	16 Sept. 1946
11	Master Recreation Plan, Conchas Dam Project	May 1947
12	Second Interim Report on Sedimentation in Conchas Reservoir, South Canadian River Watershed	April 1950
13	Summary of Possible Solutions For Navigation; Flood Control, Waterflow Retardation and Flood Forecasting; Drainage; and Domestic & Industrial Water Supply, Canadian River & Tributaries	May 1952
14	Review Report on Preliminary Examination of Advisability of Modifying Conchas Dam Project	Jan. 1954

PREVIOUSLY ISSUED REPORTS (Cont'd)

ITEM NO.	SUBJECT	DATE SUBMITTED OR SCHEDULED
15	Project Information for Task Force on Water Resources & Power Commission on Organization of the Executive Branch of The Government, Conchas Dam, N.M.	Oct. 1954
16	Investigations Project As Required by Federal Aid In Fish Restoration Act. Biological and Chemical Study of Conchas Reservoir. (By New Mexico Department of Game & Fish)	31 Mar. 1960
17	Design Memo on Additional Recreational Facilities	18 Dec. 1962
18	General Design Memoranda, Real Estate, For Conchas Reservoir, San Miguel, N.M.	17 Dec. 1965
19	Report on Sedimentation, Conchas Reservoir, Canadian River Basin, New Mexico, Resurvey of 1963	Dec. 1966
20	Conchas Reservoir Flood Control Regulation Manual	Oct. 1965 Rev.June 1967
21	Supplement to General Design Memoranda, Real Estate Interests, Conchas Reservoir, San Miguel County, New Mexico	05 Feb. 1969
22	Report For Supplemental Studies of Review of Design Features of Existing Project, Conchas, Reservoir	May 1969 Rev.Sept. 1969
23	Periodic Inspection & Continuing Evaluation of Completed Civil Works Structures, Conchas Reservoir	Nov. 1969
24	Report of Sedimentation, Conchas Lake, Canadian River Basin, New Mexico, Resurvey of 1970	Nov. 1971
25	Updated Master Plan for Public Use Recreational Development	Sept. 1976

SECTION I - INTRODUCTION

PROJECT AUTHORIZATION AND RELATED LEGISLATION

1.01 General. The "Conchas Dam" project was approved by the President of the United States on 29 July 1935, under the Emergency Relief Act and by Congress in the Flood Control Act of June 22, 1936 and amended by the Flood Control Act of 1938. The project was adopted under the following item. "Conchas Reservoir was to be located near the South Canadian River in New Mexico, for flood control, irrigation, and water supply source. These plans are contained in House Document number 308, 74th Congress, 1st Session; estimated construction cost, $12,270,000; estimated cost of lands and damages, $230,000." Public Law 738, 74th Congress date 22 June 1936 subsequently authorized execution of the project.

1.02 Local Cooperation. The State of New Mexico had committed itself to procure the lands and interests necessary for the emergency relief project and convey such to the United States Government. The project was subsequently adopted by Congress, and the State transferred all titles and easements acquired with borrowed money to the U.S. Government. New Mexico retained title to those lands acquired with state funds and today owns acreage along the upper reaches of the Conchas Arm. The project embraces a total of 23,642.2 acres, of which 20,112.6 acres are for flowage easement and 3,529.6 acres are fee owned. Of the fee owned land, the breakdown is as follows: 742 acres is leased to the State of New Mexico, 32.91 acres to the Boy Scouts of America, 27.0 acres to the Department of the Air Force, 0.776 acres to the Mountain Bell Telephone Company, and approximately 2,727 acres of land remain under the Operational control of the Corps.

1.03 Basic Legislation. The basic legislation relating to the development of the reservoir and land areas under the jurisdiction of the Department of the Army is contained in - Public Law 504, 76th Congress (H.R.8500) approved 1 May 1940. This is in consideration of the covenants and agreement of the State of New Mexico conveyed to the State, for public recreational purposes, an easement for the use and occupation of certain land and water areas owned or controlled by United States at Conchas Reservoir. Additional legislation relating to the development of reservoir areas under the control of the Department of the Army for recreational purposes is contained in Section 4 of the Flood Control Act approved 22 December 1944 (Public Law 534, 78th Congress 2nd Session) as amended by Section 207 of the Flood Control Act of 1962, as further amended by the Federal Water Project Recreation Act, Public Law No. 8972.

1.04 Legislation Granting Land to State of New Mexico. The land which constitutes Conchas State Park was originally granted to the State of New Mexico for 2.5 years for public recreational purposes by an easement deed dated 8 March 1943, by and between the United States of America and the State of New Mexico pursuant to authority contained in Public Law 504, 76th Congress, Chapter 180 in 3rd Session, approved 1 May 1940.

The State operated under this easement deed until 31 December 1965. On 1 January 1966, a new agreement in the form of a lease was executed between the U.S. Government and the New Mexico State Park and Recreation Commission for a peiod of 25 years.

PROJECT PURPOSE

1.05 Conchas Lake lies in the northeast section of New Mexico and provides for a multi-recreational facility for a population that extends into portions of five surrounding states within a 200-mile radius. The reservoir and adjacent project lands are used for not only recreation purposes and fish and wildlife conservation, but also provides for water storage for conservation, irrigation, and flood control. The dam's physical facility was built to assist in controlling floods coming from the South Canadian and Conchas Rivers with the design capability to provide a community with water supply and produce electric power for the surrounding area. With the completion of the dam, various accomplishments have resulted such as the following storage capacity as shown in the "Annual Status Report" for FY 1972.

1.06 Normal minimum pool at Conchas Lake is 70,500 acre-feet; irrigation storage measures 260,000 acre feet; flood control is 200,000 acre feet. Other cumulative project accomplishments shown in the 1972 Annual Status Report are $588,500 flood losses prevented, $5,780,000 in irrigation benefits, 800 acres leased, and 3,744,399 visitor days recorded.

1.07 Since the construction of the lake, facilities which have been developed include, the South Area, the south dock marina, the lodge, restaurant, golf course and launching ramps, and camping and picnic areas, and cabin sites. In the Central Area, picnicking facilities exist. In the North Area can be found the north dock marina, the north dock grocery and cafe, the auto and marina fuel service station, the mobile home park, boat repair shop, cabin rental, boat launching ramps and camping and picnic areas.

PURPOSE OF THE MASTER PLAN

1.08 This report presents an updated Master Plan of recreational land uses at Conchas Lake. The report directs development in an orderly and progressive system of defined projects in respect to the environmental resources and economics. This new physical plan will produce a set direction in which all efforts to conserve, enhance, develop, manage and use the project area will be in direct relation to land capabilities and use.

1.09 The existing land patterns are scattered and unrelated islands of land uses. This report's ultimate goal for the physical development will be the interfusion of man's physical elements with the natural process to preserve land. Rather than proposed total development, alternative

processes will be used that would utilize the most advantageous sites by limiting and controlling development. This pattern will generate a master plan of great flexibility because the natural characteristics of the land will be explored to determine the amount of activities and density which the land will accept.

PRIOR PERTINENT DESIGN MEMORANDA

1.10 The components listed in previously issued materials provide a list of reports, manuals, etc., that have been prepared about the project. The list of subjects starts with "Preliminary Data" report dated July 1935 and ends with this current plan. Although there is a total of 25 pertinent reports, no numbered design memoranda have been prepared for this project.

APPLICATION OF PUBLIC LAWS

1.11 Public Law 534, 78th Congress, 1944, as amended by Section 207 of the Flood Control Act of 1962, as further amended by Section 2 of the Land and Water Conservation Fund Act of 1965 and Section 210 of the River and Harbor Flood Control Act of 1968, authorizes the Secretary of the Army (Corps of Engineers) to construct, maintain and operate public park and recreational facilities at water resource development projects under the control of the Department of the Army.

1.12 Public Law 624, 85th Congress was an Act to amend the Act of 10 March 1934 to provide for more effective integration of a fish and wildlife conservation program with Federal water resource developments. The Act authorizes the use of funds to provide facilities for fish and wildlife conservation. Also, it requires all Federal agencies proposing or authorized to impound, divert, channel or deepen a stream or other body of water, to first consult with the United States Fish and Wildlife Service of the Department of the Interior and the particular state agency administering wildlife resources.

1.13 Public Law 72, 89th Congress, 1965, establishes outdoor recreational development as a primary benefit in the planning of any Federal navigation, flood control, reclamation, hydroelectric, or multiple-purpose water resource project. The act also provides that for projects authorized after calendar year 1965, for which a non-federal public body has agreed to administer project land and water areas for recreation, fish and wildlife enhancement, the non-Federal agency must bear not less than one-half the separable costs of the project allocated to these purposes and all costs of operation, maintenance, and replacement incurred therefor. The cost sharing provisions of Public Law 89-72 are being applied to the development of new recreation facilities at projects authorized prior to 1 January 1966 under current code 710 administration and funding policy. The State of New Mexico has expressed a desire to fulfill all applicable requirements of the non-federal sponsor. The letter of intent is included as Exhibit I to this report.

SCOPE OF REPORT

1.14 This plan provides for an orderly and progressive development of activities and support facilities to serve an ever growing population with increased leisure time and greater transportation mobility. This plan deals not only with coping with immediate problems, but also with continuing recreational demands created by population expansion.

SECTION II - PROJECT DESCRIPTION

LOCATION

2.01 Conchas Lake is located (Plate 1) on the South Canadian River, just below its confluence with the Conchas River. In the east central part of San Miguel County and within the boundaries of the Pablo Montoya Grant (See plate 2 for local political subdivisions), the lake extends about 11 miles southwest along the Conchas River and northwest along the South Canadian River for approximately 14 miles. It is approximately 24 miles north on State Highway 129 from its point of intersection with Interstate Highway 40 (U.S.66) at Newkirk, New Mexico, and 32 miles northwest on State Highway 104 from its point of intersection with Interstate Highway 40 at Tucumcari, New Mexico. Albuquerque, New Mexico is to the west. Most of the area surrounding Conchas Lake is privately owned cattle ranches.

PROJECT DATA

2.02 Basin Hydrologic Data. The head waters of the South Canadian River are in the Rocky Mountains, west of the City of Raton in northern New Mexico. It flows southward 150 miles to Tucumcari, New Mexico, and then eastward 550 miles across the remainder of eastern New Mexico, Texas and Oklahoma to the vicinity of Eufula, Oklahoma, where it joins the North Canadian River. From this point, the Canadian River continues eastward to its confluence with the Arkansas River near Muskogee, Oklahoma. The drainage basin (Plate 3) above the embankment has an area of 7,409 square miles and is composed principally of a mountainous portion with steep slopes and rapid runoff. The plains area has gentle slopes and a more rapid runoff rate than the plateau areas. The Conchas River Valley holds the larger portion of the reservoir storage, while most of the inflow is derived from the Canadian River and its tributaries.

2.03 The Resident Superintendent at Conchas Lake operates and maintains the reservoir gauge. The U.S. Geological Survey repairs, records and publishes the data. There are no inflow gauges immediately above the reservoir. The outflow gauge formerly located about 2.8 miles downstream is no longer used.

2.04 Basin Climate. (See Table 1) The climate of the region varies from subhumid in high mountains to the northeast and west, to semiarid in the lower elevations near Conchas Lake. The climate is characterized by abundant sunshine, low relative humidities and considerable annual and diurnal temperature range.

2.05 Average annual precipitation ranges from about 22 inches in the higher elevations to about 14 inches at low elevations. At Conchas Lake it is about 13.5 inches. July and August are the wettest months and usually account for 30 to 40 percent of the annual moisture.

TABLE 1

CLIMATE DATA PERTINENT TO CONCHAS LAKE

	Years of Record	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Ave. Maximum Temperature (^{o}F)	27	51.6	57.0	62.7	71.9	80.5	90.0	92.5	91.2	85.3	75.2	61.8	54.0	72.8
Ave. Minimum Temperature (^{o}F)	27	24.5	28.6	33.8	43.2	52.7	61.9	66.0	65.4	58.4	47.2	33.8	27.0	45.2
Ave. Relative Humidity (%)	12	54	49	40	34	36	32	39	39	40	40	42	50	41
Ave. Evaporation (Inches) Years of record		5	4	10	26	27	27	27	27	27	27	14	6	
Evaporation		3.09	4.11	7.53	9.67	11.47	13.25	12.57	11.46	9.58	6.93	4.34	2.81	96.81
Ave Monthly & Annual Precipitation (Inches)	27	.31	.41	.63	.88	1.73	1.32	2.43	2.43	1.43	1.03	.32	.50	13.42

SOURCES: U. S. Department of Commerce, Weather Bureau

2.06 Annual mean temperatures vary from 59 degrees in the lower elevations to 40 degrees in the higher elevations. Daytime temperatures during the summer often exceed 90° over the plains area, and occasionally at mountain stations. January is usually the coldest month with an average minimum temperature ranging from 25° in the lower elevations to 0° in the higher elevations.

2.07 Relative humidities are usually low, thus mitigating the effect of temperature extremes. The average relative humidity at Conchas is 41 percent.

2.08 June has the highest monthly average evaporation rate for the Basin, which is 13.25 inches. Winter evaporation rates are adjusted to long-term average by comparison with representative long term evaporation stations in New Mexico. Based on these adjustments, the estimated average annual pan evaporation rate at Conchas Reservoir is 104 inches. The estimated average annual lake evaporation is 97 inches.

2.09 The resident superintendent is responsible for operating a weather station at Conchas Lake. In addition, there are 37 other weather stations in and near the Canadian River Basin in New Mexico which supply weather data to the National Weather Service.

2.10 Reservoir Characteristics. The reservoir extends up the valley of the Conchas River about eleven miles and fourteen miles up the rocky canyons of the Canadian River, when the reservoir is at the elevation of the normal minimum pool. The surface elevations of the normal minimum, irrigation, and flood control pools are 4155, 4201, and 4218 feet, respectively.

PROJECT STRUCTURES

2.11 Dam and Reservoir Data. The reservoir, at maximum pool elevation of 4,230 feet, would cover 16,400 acres and contain 709,119 acre-feet of storage. The flood control allocation of 198,827 acre-feet is between elevations 4,201 and 4,218 feet. The crest of the service spillway is at elevation 4,201 feet. Irrigation storage available to the Arch Hurley irrigation district (also called the Tucumcari Project) is 259,631 acre-feet and extends from approximate elevation 4,155 to 4,201 feet. The average water surface available during the recreation season is about 6,000 acres at elevation 4,185.

2.12 The dam consists of a concrete gravity main section with earth dikes on each side having a combined length of about 3-3/4 miles. The gravity section is 1,250 feet long with a maximum height of 200 feet above streambed. The earth dikes are of varying heights up to 100 feet. The project involved about 836,000 cubic yards of concrete, 3,600,000 cubic yards of earth and rockfill, and 1,300,000 cubic yards of excavation. Pertinent project data are listed in Table 2.

TABLE 2
CONCHAS LAKE PERTINENT DATA

DRAINAGE AREA — 7,409 sq. mi.

RESERVOIR DATA

FEATURES	ELEVATION (FEET)	AREA (ACRES)	CAPACITY (ACRE-FEET)	CAPACITY (INCHES OF RUNOFF)
Top of dam	4,235	17,600	797,819	2.02
Maximum pool	4,230	16,400	709,119	1.79
Top of flood control & emergency spillway crest	4,218	13,700	528,951	1.34
Top of irrigation & service spillway crest	4,201	9,692	330,124	0.84
Top of permanent pool	4,155	3,000	70,493	0.18

Note: Above area and capacity figures are based on 1970 resurvey.

MAIN DAM

Concrete gravity section consisting of twenty-nine monoliths
Red River Valley Company irrigation outlet in monolith 5
Hydroelectric conduit and future water supply conduit in monolith 8
Eight regulating conduits in monoliths 10 through 17
Three future power conduits in monoliths 18 and 19
Five spillway sections from monoliths 9 to 18

Length	1,250 feet
Height (above stream bed)	200 feet
Elevation top of dam	4,235 feet
Roadway width	18 feet

EARTH EMBANKMENTS

Impervious core and pervious shells with rock riprap slopes

Southwing, length	3,750 feet
Northwing, length	900 feet
North dikes, length	2,550 feet
Top elevation	4,235 feet
Top of parapet	4,240 feet
South dike, length	6,390 feet
Maximum height	30 feet
Top elevation	4,240 feet
Saddle Dike, length	1,400 feet
Maximum height	5 feet
Top elevation	4,229 feet

SPILLWAYS

Service spillway - five 60-foot ogee weir sections, ungated, in main dam

Crest elevation	4,201 feet
Capacity at 4,218	77,000 c.f.s.
Capacity at 4,230	182,000 c.f.s.

TABLE 2 (cont'd)
CONCHAS LAKE PERTINENT DATA

Emergency spillway - concrete ogee weir	
Length	3,000 feet
Crest elevation	4,218 feet
Capacity at 4,230	450,000 c.f.s.

OUTLET WORKS

Six 4 by 5 foot conduits with tandem hydraulic gates in main dam

Capacity at:	One Conduit:	Six Conduits:
4,201	1,350 c.f.s.	8,100 c.f.s.
4,218	1,365 c.f.s.	8,190 c.f.s.
4,230	1,350 c.f.s.	8,100 c.f.s.

Two 46-inch diameter conduits with butterfly gates and needle valves in main dam

Capacity at:	
4,201	1,700 c.f.s.
4,218	1,720 c.f.s.
4,230	1,700 c.f.s.

IRRIGATION OUTLET WORKS

Located in south abutment of South Dike	
Circular tunnel 11 feet in diameter from inlet to centerline of South Dike	
Length	338 feet
Horseshoe tunnel 22 feet wide by 15 feet high from centerline to outlet gatehouse	
Length	310 feet
Two hydraulic slide gates on centerline between tunnel section	
Gate size	6 feet by 7.5 feet
Two 90 inch diameter steel conduits in horse shoe tunnel with 6 by 7 foot slide gate on each in outlet gatehouse	
Canal capacity	800 c.f.s.

2.13 Spillways. A service spillway, located in the main concrete dam, comprises five ungated 60-foot bays. The north dike contains an emergency spillway 3,000 feet in length. Both spillways are designed as uncontrolled concrete ogee sections. The crest of the service spillway is at elevation 4,201 feet above sea level, with the emergency spillway at 4,218 feet elevation. The design discharge rate of the service spillway is 77,000 c.f.s. with the reservoir water surface at the level of the crest of the emergency spillway (elevation 4,218). This discharge is equal to the estimated channel capacity of the Canadian River below the dam. Table 4 is a rating table for the Service Spillway. With the reservoir at maximum water surface (elevation-4,230), the service spillway would discharge about 182,000 c.f.s. and the emergency spillway 450,000 c.f.s., for a combined discharge of 632,000 c.f.s.

2.14 Outlet Works. Outlets through the main concrete dam are: six sluicing conduits 4 x 5 feet; two 46-inch regulating conduits; one 24-inch penstock for the small hydroelectric service unit; three 5-foot diameter penstocks for future power; one 18-inch conduit for irrigation supply to the Clabberhill Ranch. It will be noted that there is a reduction in the outlet capacities when the reservoir water surface is above elevation 4,210.0 feet; this is caused by backwater from the stilling basin due to the uncontrolled flow over the spillway. Releases through the 18-inch conduit to the Clabberhill Ranch are measured in a 3-foot Parshall Flume. The main irrigation headworks for supplying the Tucumcari Project is near the south Abutment of the south dike. The portion of the works upstream from the emergency gate chamber is a concrete pressure conduit 11 feet in diameter. Downstream from the gate chamber are two 90-inch steel conduits controlled by two 6 x 7.5 foot slide gates in the gatehouse at the lower end of the conduits which discharge into a stilling basin. The invert elevation of the canal leading from the stilling basin is 4,157.35 feet. The Bureau of Reclamation, in 1953, installed six pumps in the stilling basin of the irrigation headworks to pump into the canal when the reservoir is too low for gravity flow. They are vertical shaft propeller-type pumps, designed to lift 44.5 c.f.s. Pump design water surface in the stilling basin is 4,150 feet, with the bowl bottoms at 4,146.5 feet and the centerlines of the 30-inch discharge pipes at elevation 4,164.25 feet.

2.15 Provisions for Crest Gates. Provision for the future installation of crest gates on the service spillway were made during construction of the dam, by embedding the necessary gate fittings in the concrete and by constructing chambers to receive the gates in the five bays of the spillway. As designed, the drum gates contemplated for future installation would operate automatically to control the reservoir level through a range of 9 feet between elevation 4,201 (crest of spillway) and 4,210 (top of proposed gates). The automatic control would be accomplished by removing plugs provided between the reservoir and the gate

chambers, Then with a rise in the reservoir pool, the gate chambers would be flooded and the buoyant gates would raise to the fully closed position when the pool level reached elevation 4,210. At this point, a control mechanism located in the pier wells would go into operation and, with a continued rise in the reservoir pool level to 4,210.5 (with 6 inches of water spilling over the gates), the gates would gradually lower to the fully open position by the time the reservoir pool level reached elevation 4,212. Also, the gates would automatically raise when the reservoir level again receded below elevation 4,212 and would reach the fully closed position when the pool level returned to elevation 4,210.5. In this manner, a pool level of 4,210 would be retained. The gates would result in the storage of about 96,700 acre-feet which would spill from the reservoir under present condition.

RESERVOIR OPERATION

2.16 General Plan of Regulation. The Conchas Reservoir provides for flood control and irrigation storage. These specific functions are separated and independent except that retained floodwater is regulated for irrigation. The Tucumcari Irrigation District has been designated the authority to request release of irrigation waters to their system. Irrigation releases are also made to the Bell Ranch.

2.17 The reservoir storage capacity from elevation 4,155 to 4,185 feet is normally allocated to irrigation, and storage to elevation 4,185 is generally available for recreation. Flood control storage is from elevation 4,201 feet (service spillway crest) to 4,218 feet (crest of the emergency spillway). The service spillway is ungated; therefore, flood regulation above elevation 4,201 is automatic.

2.18 Storage began in 1939 and the reservoir reached elevation 4,201 in May 1941. The reservoir has remained substantially full except for two periods of continuing drought and continuing demand for release of irrigation water. The first period was from 1955 through May of 1957. The second period began in the summer of 1962 and continued to June of 1965. The all-time maximum elevation of 4,208.1 was reached on 24 April 1942. The lowest elevation 4,155.6 was reached on 24 September 1954. The reservoir pool elevation excedence frequencies are shown below:

POOL ELEVATION EXCEDENCE FREQUENCIES

Frequency	Elevation
Once in 2 years	4195.7
Once in 5 years	4201.0
Once in 10 years	4201.5
Once in 20 years	4203.4
Once in 50 years	4207.5
Once in 100 years	4211.4

TABLE 3, CONCHAS RESERVOIR AREA-CAPACITY

BASED ON OCTOBER 1970 RESURVEY

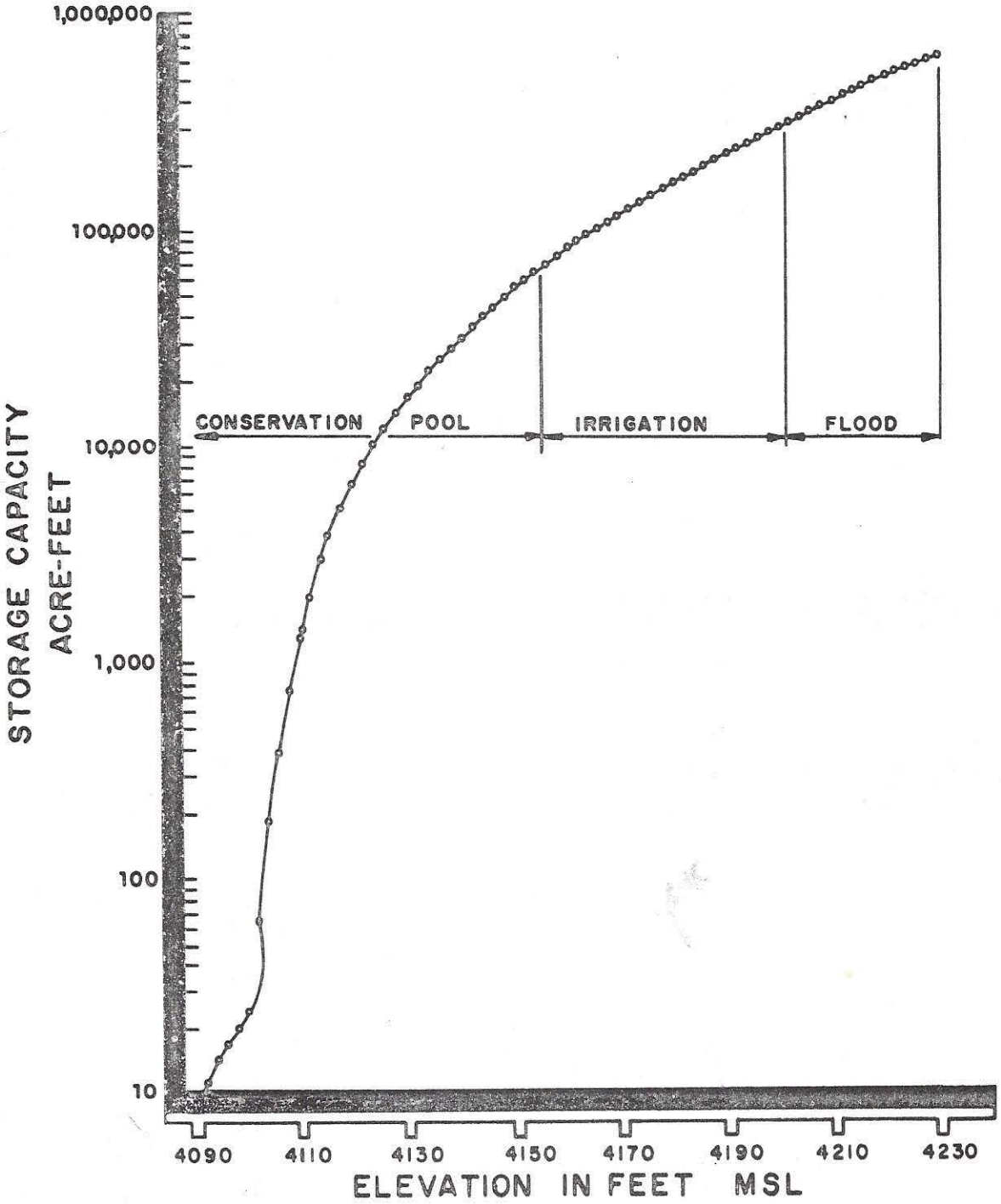
ELEV. (FEET) M.S.L.	SURF. AREA (AC)	STORAGE CAP. (AC-FT)	ELEV. (FEET) M.S.L.	SURF. AREA (AC)	STORAGE CAP. (AC-FT)	ELEV. (FEET) M.S.L.	SURF. AREA (AC)	STORAGE CAP. (AC-FT)	ELEV. (FEET) M.S.L.	SURF. AREA (AC)	STORAGE CAP. (AC-FT)	ELEV. (FEET) M.S.L.	SURF. AREA (AC)	STORAGE CAP. (AC-FT)	ELEV. (FEET) M.S.L.	SURF. AREA (AC)	STORAGE CAP. (AC-FT)
4,072		1	4,099	2	22	4,126	1,093	12,337	4,153	2,866	64,611	4,180	5,513	173,912	4,207	11,104	392,443
4,073		1	4,100	2	24	4,127	1,151	13,459	4,154	2,941	67,515	4,181	5,658	179,497	4,208	11,351	403,671
4,074		1	4,101	21	36	4,128	1,208	14,639	4,155	3,016	70,493	4,182	5,804	185,228	4,209	11,598	415,145
4,075		1	4,102	41	66	4,129	1,266	15,876	4,156	3,092	73,548	4,183	5,949	191,105	4,210	11,845	426,866
4,076		1	4,103	60	117	4,130	1,323	17,170	4,157	3,167	76,677	4,184	6,095	197,127	4,211	12,075	438,826
4,077		1	4,104	79	186	4,131	1,383	18,523	4,158	3,243	79,882	4,185	6,240	203,294	4,212	12,305	451,016
4,078		2	4,105	99	275	4,132	1,443	19,937	4,159	3,318	83,163	4,186	6,450	209,639	4,213	12,534	463,435
4,079		2	4,106	141	395	4,133	1,504	21,410	4,160	3,394	86,519	4,187	6,660	216,194	4,214	12,764	476,085
4,080		2	4,107	184	557	4,134	1,564	22,944	4,161	3,487	89,959	4,188	6,870	222,959	4,215	12,994	488,964
4,081		3	4,108	226	762	4,135	1,624	24,538	4,162	3,580	93,493	4,189	7,080	229,934	4,216	13,217	502,070
4,082		3	4,109	269	1,010	4,136	1,691	26,195	4,163	3,672	97,119	4,190	7,290	237,119	4,217	13,440	515,399
4,083	1	3	4,110	311	1,299	4,137	1,758	27,920	4,164	3,765	100,837	4,191	7,494	244,511	4,218	13,664	528,951
4,084	1	5	4,111	354	1,632	4,138	1,825	29,711	4,165	3,858	104,649	4,192	7,698	252,107	4,219	13,887	542,726
4,085	1	5	4,112	396	2,007	4,139	1,892	31,570	4,166	3,951	108,553	4,193	7,901	259,906	4,220	14,110	556,724
4,086	1	6	4,113	439	2,424	4,140	1,959	33,495	4,167	4,044	112,551	4,194	8,105	267,910	4,221	14,335	570,946
4,087	1	7	4,114	481	2,884	4,141	2,021	35,485	4,168	4,137	116,642	4,195	8,309	276,117	4,222	14,560	585,394
4,088	1	7	4,115	524	3,387	4,142	2,083	37,538	4,169	4,230	120,825	4,196	8,540	284,541	4,223	14,784	600,066
4,089	1	8	4,116	579	3,938	4,143	2,146	39,652	4,170	4,323	125,102	4,197	8,771	293,196	4,224	15,009	614,962
4,090	1	9	4,117	633	4,544	4,144	2,208	41,829	4,171	4,427	129,477	4,198	9,001	302,082	4,225	15,234	630,084
4,091	1	10	4,118	688	5,205	4,145	2,270	44,068	4,172	4,531	133,956	4,199	9,232	311,199	4,226	15,463	645,432
4,092	1	11	4,119	742	5,920	4,146	2,344	46,376	4,173	4,636	138,539	4,200	9,463	320,546	4,227	15,692	661,010
4,093	1	13	4,120	797	6,690	4,147	2,419	48,757	4,174	4,740	143,227	4,201	9,692	330,124	4,228	15,922	676,818
4,094	1	14	4,121	845	7,511	4,148	2,493	51,213	4,175	4,844	148,019	4,202	9,922	339,931	4,229	16,151	692,854
4,095	1	15	4,122	893	8,379	4,149	2,568	53,744	4,176	4,978	152,930	4,203	10,151	349,968	4,230	16,357	709,119
4,096	2	17	4,123	940	9,296	4,150	2,642	56,348	4,177	5,112	157,974	4,204	10,381	360,234			
4,097	2	19	4,124	988	10,260	4,151	2,717	59,028	4,178	5,245	163,153	4,205	10,610	370,729			
4,098	2	20	4,125	1,036	11,272	4,152	2,792	61,782	4,179	5,379	168,465	4,206	10,857	381,463			

Next scheduled resurvey of Conchas Lake FY 1983.

TABLE 4
SERVICE SPILLWAY RATING

ELEVATION IN FEET AND TENTHS M.S.L. - DISCHARGE IN C.F.S.

	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
4,201	0	18	53	108	173	253	349	446	542	659
4,202	735	886	1,040	1,190	1,340	1,490	1,640	1,800	1,950	2,100
4,203	2,250	2,470	2,690	2,910	3,130	3,350	3,570	3,790	4,010	4,230
4,204	4,450	4,720	4,980	5,240	5,510	5,780	6,040	6,300	6,570	6,840
4,205	7,100	7,420	7,740	8,060	8,380	8,700	9,020	9,340	9,660	9,980
4,206	10,300	10,700	11,000	11,400	11,700	12,100	12,500	12,800	13,200	13,500
4,207	13,900	14,300	14,700	15,100	15,500	16,000	16,400	16,800	17,200	17,600
4,208	18,000	18,450	18,900	19,400	19,800	20,200	20,700	21,200	21,600	22,000
4,209	22,500	22,980	23,500	23,900	24,400	24,900	25,400	25,900	26,300	26,800
4,210	27,300	27,800	28,300	28,800	29,300	29,800	30,400	30,900	31,400	31,900
4,211	32,400	32,900	33,500	34,000	34,600	35,100	35,600	36,200	36,700	37,300
4,212	37,800	38,400	38,900	39,800	40,100	40,600	41,200	41,800	42,400	42,900
4,213	43,500	44,100	44,700	45,300	45,900	46,900	47,100	47,700	48,300	48,900
4,214	49,500	50,400	50,800	51,400	52,400	52,700	53,300	54,00	54,600	55,300
4,215	56,000	56,600	57,200	57,500	58,000	59,200	59,900	60,600	61,300	61,900
4,216	62,600	63,300	64,000	64,700	65,400	66,100	66,800	67,500	68,200	68,900
4,217	69,600	70,300	71,100	71,800	72,600	73,300	74,000	74,800	75,500	76,300
4,218	77,000	77,500	78,000	78,500	79,000	79,500	80,000	80,500	81,000	81,500
4,219	82,000	82,600	83,200	83,800	84,400	85,000	85,600	86,200	85,800	87,400
4,220	88,000	88,700	89,400	90,100	90,800	91,500	92,200	92,900	93,600	94,300
4,221	95,000	95,800	96,600	97,400	98,200	99,000	99,800	100,600	101,400	102,200
4,222	103,000	103,900	104,800	105,700	106,600	107,500	108,400	109,300	110,200	111,100
4,223	112,000	113,000	114,000	115,000	116,000	117,000	118,000	119,000	120,000	121,000
4,224	122,000	123,000	124,000	125,000	126,000	127,000	128,000	129,000	130,000	131,000
4,225	132,000	133,000	134,000	135,000	136,000	137,000	138,000	139,000	140,000	141,000
4,226	142,000	143,000	144,000	145,000	146,000	147,000	148,000	149,000	150,000	151,000
4,227	152,000	153,000	154,000	155,000	156,000	157,000	158,000	159,000	160,000	161,000
4,228	162,000	163,000	164,000	165,000	166,000	167,000	168,000	169,000	170,000	171,000
4,229	172,000	173,000	174,000	175,000	176,000	177,000	178,000	179,000	180,000	181,000
4,230	182,000									



CONCHAS LAKE
ELEVATION-CAPACITY CURVE

Figure 1

2.19 The Area Capacity data for the reservoir are shown in Table 3 and Figure 1. The service spillway rating data are given in Table 4.

2.20 The resident superintendent is responsible for observing and reporting stages, flows, water data, and making releases of irrigation water to the Tucumcari Irrigation District as requested. The reservoir Regulations Unit of the District Hydraulic Section is responsible for collecting and recording hydrologic data, making flood predictions and issuing instructions for flood releases from the reservoir. Flood control regulation begins when the reservoir elevation reaches 4,201.0 feet, top of the irrigation pool, or is forecasted to exceed this elevation.

2.21 Plate 4, on the following page, shows sections of the dam, dikes, and irrigation headworks.

SECTION III - OPERATING PROJECTS - STATUS

PROJECT DEVELOPMENT & OPERATION CHRONOLOGY

3.01 The following information lists the development progress of Conchas Lake.

3.02 Camp Construction. Because of the remoteness of the project from the nearest town at the time of construction, a temporary construction camp was erected, which was sufficient to house 1400 workers and 125 families. The camp, located about 2 miles south of the main dam, was built with force account labor obtained from relief rolls in New Mexico and the Panhandle of Texas, during the winter of 1935 - 1936 and the summer of 1936. The construction provided employment for about 2500 workers at its peak and cost about $1,500,000. The project included the installation of a natural gas line from Tucumcari, New Mexico to the project site, a distance of 25 miles, for heating and power.

3.03 Access Road. Project construction was initiated when a "notice to proceed" was issued on 12 August 1935 for construction of an access road from Newkirk, New Mexico to the project site, approximately 24 miles.

3.04 Main Dam and Wing Dams. Foundation excavation for the Main Dam started on 20 December 1935 by government forces. A contract was awarded in October 1936 for construction of the Main Dam and Wing Dams and the work was completed in September 1939.

3.05 North Dikes and Emergency Spillway. Government forces started the construction of the North Dikes and excavation for the Emergency Spillway on 8 September 1938. About 5000 cubic yards of concrete was placed by government forces, with the remaining 67,000 cubic yards for the spillway, being placed by contract. The contract started 18 September 1938 and the work was completed 4 May 1939.

3.06 South Dike. In July 1937, funds appropriated by the Emergency Relief Act of 1937 were made available for construction of the South Dike. Because 95% of all persons employed on Projects using these funds were required to be on relief rolls, this work was performed with government owned plant and relief labor rather than contract. Construction started in August 1937 and was completed in April 1939.

3.07 Irrigation Headworks and Operating Equipment. Contract work was started on construction of the Irrigation Headworks on 19 October 1938 and completed 3 July 1939. The operating equipment, consisting principally of the slide gates and penstocks, was installed by contract starting 10 March 1939 and completed 29 September 1939.

3.08 Facilities for Operation and Maintenance. The buildings and utilities for the permanent operation and maintenance force were constructed about 2000 feet north of the Main Dam. The buildings were constructed in 1939 by contract. This segment of the project consisted of a headquarters building, housing offices, garage, storeroom and a standby power unit; a single residence for use by the "Superintendent of Operation and Maintenance", and four duplex residences for occupancy by the operating personnel. These are Pueblo style structures which are constructed of adobe brick with stucco exterior. The utilities were constructed by Government hired labor.

CHRONOLOGY OF EXPENDITURES

3.09 The following information outlines the chronology of expenditures by the Federal Government, State and private businesses at Conchas Lake.

3.10 Federal Government. Construction General: The total cost of the Conchas Dam Project was $15,453,319. Following is the cost of each of the principal components:

Surveys, Exploration and Design	$ 636,914
Main Dam and Wing Dams	8,642,182
North Dikes and Emergency Spillways	868,941
South Dikes	2,443,062
Saddle Dam	4,846
Irrigation Headworks	419,471
Irrigation Headworks Operating Equipment	147,015
Permanent Facilities for Operation & Maintenance	231,881
Right-of-way	165,909
Construction Camp and Roads	1,893,098
Total	$15,453,319

3.11 Code 710: This code designates funds for construction work. The costs assigned to this code were incurred during 1963, 1964 and 1965. $ 254,988

3.12 O&M of Public Use Facilities: These costs were incurred from 1963 through 1973 as illustrated in Table 5. $ 260,800

3.13 Non Federal Public. The New Mexico State Parks and Recreation Commission was granted a lease covering 742 acres which they administer as the Conchas Lake State Park. (See Plate 5) Table 6 is a record of State expenditures for capital investment and operation and maintenance since 1 July 1967.

3.14 The Kit Carson Council, Boy Scouts of America operate an aquatic camp covering about 33 acres. Table 7 is a record of their expenditures

for capital investment and operation and maintenance since 1968. There are no records for prior years available.

3.15 The data in Table 8 are records of total capital investment and operation and maintenance expenditures by the Conchas Lake concessionaires to the State Parks and Recreation Commission.

3.16 Twenty-seven acres were leased to the U.S. Air Force, Cannon Air Force Base in 1973, for use as a recreation facility. Plans have been completed for installation of utilities and construction is started. Approximately $50,000 is budgeted for these improvements.

TABLE 5

HISTORY OF OPERATION AND MAINTENANCE AND CAPITAL INVESTMENT COSTS BY THE CORPS OF ENGINEERS
RECREATION FACILITIES

FISCAL YEAR	O & M COSTS FOR YEAR	CUMULATIVE O & M COSTS AT END OF YEAR	CAPITAL INVESTMENT COSTS FOR YEAR	CUMULATIVE CAPITAL INVESTMENT AT END OF YEAR
1973	* $ 97,100	260,800	0	254,988
1972	26,300	163,700	0	254,988
1971	15,700	137,400	0	254,988
1970	19,700	121,700	0	254,988
1969	14,700	102,000	0	254,988
1968	** 26,500	87,300	0	254,988
1967	17,400	60,800	0	254,988
1966	12,800	43,400	0	254,988
1965	11,400	30,600	633	254,988
1964	11,000	19,200	199,815	*** 254,355
1963	8,200		3,236	54,540

* Includes recreation roads repair $ 58,300.
** Includes recreation roads repair $ 9,200.
*** Water distribution system, construct gravel roads, pave access road, clear recreation land, construct recreation facilities, improve access road.

TABLE 6

HISTORY OF OPERATION AND MAINTENANCE AND CAPITAL INVESTMENT COSTS BY THE NEW MEXICO PARK AND RECREATION COMMISSION

FISCAL YEAR	O & M COSTS FOR YEAR	CUMULATIVE O & M COSTS AT END OF YEAR	CAPITAL INVESTMENT COSTS FOR YEAR	CUMULATIVE CAPITAL INVESTMENT AT END OF YEAR
1973	$ 552,380	$ 2,157,616	$ 1,210,530	$ 5,446,785
1972	368,931	1,605,236	929,904	4,236,255
1971	340,065	1,236,305	1,047,900	3,306,351
1970	251,250	896,240	1,391,957	2,258,451
1969	239,053	614,990	628,339	866,494
1968	203,204	375,927	4,127	238,155
1967	172,723	---------	61,305	234,028

CAPITAL INVESTMENT ITEM

Detail information was not available.

TABLE 7

HISTORY OF OPERATION AND MAINTENANCE AND CAPITAL INVESTMENT COSTS
THE BOY SCOUTS OF AMERICA, KIT CARSON COUNCIL, INC.

FISCAL YEAR	O & M COSTS FOR YEAR	CUMULATIVE O & M COSTS AT END OF YEAR	CAPITAL INVESTMENT COSTS FOR YEAR	CUMULATIVE CAPITAL INVESTMENT AT END OF YEAR
1973	$ 7,486	$ 46,206	$ 1,941	$ 42,542
1972	5,015	38,720	724	40,601
1971	6,372	33,705	2,534	39,877
1970	8,864	27,333	21	37,343
1969	9,158	18,469	17,571	37,322
1968	9,311		4,551	19,751 *

CAPITAL INVESTMENT ITEM

Irrigation system.
Construction of new dining hall.

* This figure represents amount carried in Leasehold Improvement Account as of 31 December 1968. Account was kept on an accumulative basis.

TABLE 8

AVAILABLE OPERATION AND MAINTENANCE AND CAPITAL INVESTMENT COSTS BY CONCHAS LAKE CONCESSIONAIRES, 1969 THROUGH 1973

FISCAL YEAR	O & M COSTS FOR YEAR	CUMULATIVE O & M COSTS AT END OF YEAR	CAPITAL INVESTMENT COSTS FOR YEAR	CUMULATIVE CAPITAL INVESTMENT AT END OF YEAR
1973	$ 298,800	$ 1,217,800	$ 15,800	$ 175,696
1972	250,900	919,000	18,600	62,832
1971	237,800	662,100	23,600	37,232
1970	196,600	430,300	5,882	6,664
1969	139,370	121,606	782	

SECTION IV - RECREATIONAL AND ENVIRONMENTAL

RESOURCES OF THE PROJECT AREA

GENERAL

4.01 One of the most important elements in recreation planning is to gather and utilize the existing data on available resources of the region and project lands. This section is an analysis of important recreational and environmental resources. The basic information was taken from four sources: The Environmental Study of Conchas Dam and Reservoir, 1973, prepared by the Ecological Information Service; The Master Recreation Plan - Conchas Dam Project (Feb. 1946); and Recreation Facilities for Conchas Lake & Ute Lake (May 1965) prepared by Gordon Herkenhoff & Associates.

GEOLOGY

4.02 Conchas Lake is entirely surrounded by sedimentary rock of the Dockum group being Triassic in age. The northern, eastern and western banks primarily abut Santa Rosa sandstone, while the southern bank adjoins the Chinle formation.

4.03 Santa Rosa sandstone is the older formation, dark red in color and extending eastward into Texas and Oklahoma. It outcrops along the walls of the canyons of the Conchas and Canadian Rivers as they approach the reservoir.

4.04 Faulting, folding and other deformations are absent in these flat lying sedimentary rocks. Marine fossils can be found locally in outcrops and along the canyon walls of the Canadian and Conchas Rivers. Small caves may also be seen in these canyons and many were once inhabited by primitive man.

4.05 The soils of the Conchas Lake area follow the same pattern as the underlying lithology. On the North, West and East, the Conchas - Lathom association prevails; on the South the Lacita-Redona-Quay association is found.

4.06 The Conchas-Lathom association is a residual soil which is underlaid by Santa Rosa-sandstone, its parent material. This shallow-to-moderately-deep association is predominately rangeland supporting short and mid-grasses. In the shallower areas, as well as at outcroppings of bedrock, small stands of pinon and juniper may be supported. This alluvial and eolian deposit can be found locally.

4.07 The Lacita-Redona-Quay association overlies, and is forming from, alluvial deposits of the Chinle formation. It is characteristically deep and particularly susceptible to erosion. These soils are used primarily for grasses to support cattle.

CLIMATIC INFLUENCES UPON RECREATION

4.08 The climate is generally mild. The average daily minimum temperature is 45 degrees and the average daily maximum is 72.8 degrees. Average daily maximum temperatures reach 70 degrees or above during 7 months of the year (April through October, inclusive) as indicated in Table 1. This results in a long primary recreation season. High and low temperatures are moderated by a very low relative humidity. The general daily range of relative humidity is between 40% and 85% in the winter and between 20% and 70% in summer. There are nine months with mean precipitation under 2".

4.09 Seventy-two percent of the annual precipitation also occurs from April to October. The summer storms are usually intense and local and often are accompanied by electrical disturbances. However, the storms are of short duration. Wind velocities exceed 15 miles per hour 63% of the time. The wind is from the southwest quadrant of the compass 52% of the time.

4.10 The recreation season at Conchas Lake is constrained somewhat by seasonal changes. The winter weather is usually too cold for the enjoyment of water based activities, but there is not enough snow or lake ice for winter sports. Moderate temperatures accompany the Spring season, but strong winds can detract from the pleasure of outings and create hazards to boating. The summers, with clear weather, high midday temperatures and cool nights, and the fall seasons, are the most pleasant of the year.

ARCHAEOLOGY

4.11 Most of Northeastern New Mexico falls within the Southern Plains Area as described by Waldo R. Wedel in his "Prehistoric Man on the Great Plains". The principal inhabitants in this large region during most of the historic period were the nomadic Apache, Kiowa and Comanche groups in the west and the semi-horticultural Caddoan peoples in the east. Earlier occupation has been somewhat documented by archaeological research in Texas and Oklahoma. Eastern New Mexico, except for the Paleo-Indian sites, has been largely neglected. Fred Wendorf in his "The Archaeology of Northeastern New Mexico", described four major cultural periods for the region, the Early Hunting Groups Period, the Intermediate Gathering and Hunting Period, the Pueblo Panhandle Period, and the Historic Nomads Period.

4.12 The Early Hunters of late Pleistocene times are probably the best documented by excavation. These include the first proof that man had lived in the "New World" prior to the end of the Pleistocene, at Folsom, New Mexico. In the Intermediate Gathering and Hunting Period from the Early Hunters, until the incursion of Pueblo influence, about 1000 A.D.,

there is evidence of this. This group was also found along the Cimmarron and Canadian Rivers by E.B. Renaud and reported in his "The Archaeological Survey of the High Western Plains, Ninth Report, Northeastern New Mexico". The Pueblo and Panhandle Period began about 1000 A.D. and lasted into the sixteenth century. It is characterized by the influx of Puebloan pottery and other traits which permeated the area and to some extent, modified the basic gathering and hunting cultures. The final period, the Historic, began with the arrival of the Spaniards.

4.13 Archaeologically, this last period has been substantiated in its later manifestations by recent excavations in connection with the Jicarilla Apache land claims. Large concentrations of stone circles or tipi rings were investigated by Dr. Hibben near Ima.

4.14 Large flake tools and cores have been found throughout the region in the banks of various arroyos near Gallegos, New Mexico, in association with burned mammoth bones. Frank Roberts reported a similar occurrance between the two Tucumcari Buttes.

4.15 Signs of Ancient man have been found on Bell Ranch, adjacent to the lake, such as the base of a Folsom point, a Clovis point, old Apache camps yielding their finely made bird points, Comanche tepee rings, and many petroglyphs. Most of these are scattered throughout the ranch. However, some fine petroglyphs can be seen from a boat on the northern part of the lake just below Spring Canyon and at the Corps picnic and overlook area.

HISTORIC

4.16 This general area was inhabited by prehistoric hunters known as Folsom Man 9,000 to 10,000 years ago. It is not known if the region was continuously inhabited, but Pueblo Indians began to inhabit sites near the town of Cimmarron about 1000 A.D. Between the time of approximately 1540-1800 A.D. nomadic Plain Indians of the Apache group and then later the Comanche group lived in the area, thus discouraging settlement of colonists until 1835, when under Mexican rule, a settlement was established along Ocate Creek.

4.17 More specifically, Conchas Lake is located on land formerly a part of the historic Pablo Montoya Grant, which consisted of over 655,000 acres. (See Plate 2) In 1867, John S. Watts, an attorney of Santa Fe, acquired title to all of the Grant from one of Pablo's grandsons. In 1870, John S. Watts transferred title to a Canadian "promoter" named Wilson Waddingham. Within two years Waddingham conveyed his interest to the Consolidated Land, Cattle Raising & Wool Growing Company, but remained in control. This 1872 transfer may be said to be the beginning of the Bell Ranch period. The Bell Ranch Headquarters is of special historical importance because it has been declared a cultural property and is listed in the National Register Site Inventory.

ECOLOGY

4.18 Since its inception in 1939, Conchas Lake has been managed as a warm water fishery. There is no downstream fishery since overflow from the stilling basin into the Canadian River Channel is too limited in quantity to support a sport fishery. Aquatic vegetation in the lake is generally scarce except in limited shoal areas and near stream mouths at the upper ends of the lake.

4.19 Vegetation on the watershed varies from grasses, composites and creeping juniper typical of all pine meadows, to Pinon, Juniper, and grassland association, to the semi-arid Gramma Grass, Cactus, Mesquite and Juniper association typical of the area surrounding Conchas Lake. The water course entering the lake characteristically contains Cottonwood, Willow, Tarmarisk and Cattails.

ENVIRONMENTAL AND SCENIC QUALITIES

4.20 The terrain of the region is characterized by transitions among the Great Plains, the mesa lands of eastern New Mexico, and the Rocky Mountains of central and western New Mexico. The elevation range in the vicinity of Conchas Lake is between 4,000 and 5,000 feet with high exceeding 5,000 feet. In the northwestern extremity of the watershed, the mountains exceed 13,000 feet.

4.21 The existing recreation structures and facilities are located above elevation 4,200 except for boat launch ramps and floating marinas. The pool surface is generally at elevation 4,185, but there are occassional periods during which the pool elevation is as low as 4,155.

4.22 The rocky shores of the Canadian (northern) arm are picturesque, with interesting rock formations, high cliffs, and narrow waterways of tributary canyons. The vistas from the Conchas arm are more typical of the Great Plains grasslands with some shrubs and cacti. Mesquite and cacti are present. Few trees are seen except for the plantings in the recreation areas, but there are stands of juniper on the tops and talus slopes of the mesas. The mountain slopes in the western portion of the watershed are covered with conifer forest.

4.23 The quality of the water at Conchas Lake has consistently been good with the lake generally regarded as oligotrophic. Total hardness is in the range of 139 to 328 ppm which indicates reasonably high fertility. Apparent recent increases in plankton, attached algae and rooted aquatic vegetation in the reservoir, especially in upstream reaches of tributary canyons, is evidence of increasing productivity. Water quality could, if this proves to be a long-term trend, become a constraint upon recreation.

HYDROLOGY

4.24 In the mountainous western portion of the Canadian-Conchas drainage basin, water can be obtained from alluvium in the valleys or from the limestones of the Magdalena Group and sandstone of the Sangre de Cristo formation. Water depths range around 400 feet in the uplands to only a few feet in the valleys.

4.25 The chief sources of water on the high plateaus are the Dakota and Purgatoire formations, although some water is obtained from the Graneros shale and Greenhorn limestone north and northeast of Las Vegas. Water from the Dakota and Purgatoire is generally good, but water from the Graneros and Greenhorn is unfit for domestic use. Enough potable water can be pumped to provide water for stock and domestic supplies.

4.26 The plains area is supplied by the Santa Rosa sandstone and Chinle formation of the Dockum group. Depth of water is usually less than 200 feet. The quality of the water is fair, and quantities are sufficient to supply both stock watering and domestic demands.

RECREATION

4.27 Characteristics of Recreationists of Northeastern New Mexico. People utilizing the recreation facilities in the northeastern New Mexico area are not only from New Mexico, but also from the neighboring states of Texas, Oklahoma, Colorado and Kansas. A report specifically written on Characteristics of Recreationists of Northeastern New Mexico by New Mexico State University (Sept. 1971), Agricultural Experiment Station Research Report 209, states that the largest group of recreationists, 20 percent, traveled from 151 to 250 miles to a recreation facility. It was also found that they usually traveled in two-person parties (36 percent), followed by four-person parties (19 percent). The most popular length of stay was one-half to one day, (39 percent), and during this length of time the most popular recreation activity for adults was fishing (51 percent), with camping rated second at 15 percent and sight seeing as third with no rating stated.

4.28 More than half of the recreationists in the area felt that they would have spent more time sightseeing and fishing if incomes were increased 10 percent. Approximately 80 percent of those interviewed indicated that a 25 percent income increase would not influence them to change to another type of recreation activity.

4.29 Of the parties visiting the area, 60 percent were visiting only the Conchas Lake, with 30 percent visiting recreation areas not only in the state of New Mexico, but other states as well. The reasons stated for visitation of the recreation site at Conchas Lake were not particularly surprising in that 95 percent of the reasons were for the recreational facilities only, while 5 percent were partly recreational and partly business trips.

4.30 A study in 1973 by the State Park and Recreation Commission rated Conchas Lake the sixth recreation area out of twenty-six in visitation. Visitation analysis for Conchas Lake will be described in greater detail in Section VII.

4.31 Recreation at the Project Area. The existing recreational facilities receive maximum use during the primary season. The existing camping, picnicking, boat launching, parking, and sanitary facilities are not adequate. This results in a variety of recreation resource management problems.

4.32 Visitation increased consistantly from the time of initial project operation to the 1973 recreation season (See Table 9). However, public complaints have been received during the past few years by the Corps Resident Superintendent and the State Park Supervisor because of the inadequate facilities. The upgrading and expansion of roads, parking areas & playgrounds will undoubtedly increase visitation and provide for an improved recreation experience.

TABLE 9

VISITATION BY CALENDAR YEAR
CONCHAS LAKE, CORPS OF ENGINEERS

YEAR	ATTENDANCE	YEAR	ATTENDANCE
1948	28,500	1961	269,380
1949	49,500	1962	161,084
1950	58,500	1963	164,899
1951	71,800	1964	182,902
1952	84,600	1965	106,368
1953	61,600	1966	117,166
1954	69,400	1967	119,497
1955	121,600	1968	150,821
1956	97,300	1969	205,860
1957	194,600	1970	229,232
1958	244,300	1971	292,992
1959	396,500	1972	340,399
1960	370,390	1973	324,681
		1974	328,752

SECTION V - FACTORS INFLUENCING AND CONSTRAINING RESOURCE DEVELOPMENT AND MANAGEMENT

GENERAL

5.01 Conchas Lake with an average surface area of 8,000 acres is the largest body of water in northeast New Mexico. The lake and project lands have provided recreation primarily for residents of New Mexico, Texas, Oklahoma, Kansas and Colorado, in addition to transient tourists.

5.02 Attendance steadily increased from 1965 to 1972. There was a 4.6 percent reduction in visitation in 1973 as compared to 1972. This has been attributed to the restrictions on availability and sharply increasing prices of gasoline during 1973 and to the limited recreational facilities available. Less than 30 percent of the fee-owned area has been allocated to intensive recreational use.

DEMOGRAPHIC

5.03 Population. In 1970 San Miguel County had a total population of 21,951 persons. In the County there is only one major population center, Las Vegas which, with 10,000 plus residents, represents 63 percent of the county total. The age distribution is: under 5, 1,823; 5-17, 6,354; 18-44, 7,839; 45-64, 3,754; 65-plus, 2,181; with the median age 23.4 years. The population of the County declined by 7 percent from 1930 to 1970. However current statistics show that the population is starting to show a significant slow growth.

5.04 Economy. The economy of San Miguel County has declined over the last thirty years, like many small rural communities. Some of these communities have depended on subsistence farming and seasonal work in lumbering and mining. There are 97,889 acres of commercial timber in the county, although not all of it is available for cutting. There are four lumber mills still in existence, which do not run with any regularity. Present day mining consists of three sand and gravel operations and a beginning mica mine. Aside from these small operations, there has been no mining since the Pecos Mine closed in 1939. See Table 10.

5.05 The county's major source of income is derived from agriculture and the cattle industry. Seventy-five percent of the area in the county is classified as rangeland, with an average grazing capacity of 55 acres per year per head. Irrigated farmland is located along the relatively narrow valleys of the Pecos, Gallinas, and Sapello Rivers, and along Cow Creek and Tecolote Creek. About 4,380 acres of land are irrigated from the Canadian drainage basin. Crops include fruit, vegetables, and hay. A short growing season, combined with a shortage of water and additional land, limit the amount of farming possible in the county.

TABLE 10

1970

ECONOMIC DATA SUMMARY BY STATE FOR AREAS

WITHIN A 200 MILE RADIUS OF CONCHAS LAKE

	COLORADO		KANSAS	NEW MEXICO		OKLAHOMA		TEXAS	
	RANGE			RANGE		RANGE		RANGE	
Income Ranges:	Low	High		Low	High	Low	High	Low	High
Median Income	$4,703	$8,445	$6,981	$3,100	$15,273[2]	$7,655	$8,321	$5,889	$10,637
Per Capita Income	$1,318	$2,562	$3,167	$1,048	$ 4,540	$2,730	$2,840	$1,894	$ 3,458
Families Below the Poverty Level:									
No. Range of Individuals	61	3,221	78	83	10,124	125	440	18	5,865
Total No. of Families		7,529	78		36,341		565		22,453
Percentage of Families Below Poverty Level	11.2	36.7	8.1	12.5	37.9	10.3	11.5	5.8	25.1
Unemployment Ranges									
Range of Individuals	5	1,561	13	47	6,900	74[1]		9	1,252
Percentage of Labor Force	1.5%	8.9%	1.3%	2.6%	19%	1.7%		.4%	4.7%

1. Information concerning unemployment was unavailable for both counties.
2. Income Range figures are 1969 data.

Source: U.S. Department of Commerce-Bureau of Census (1970)

TABLE 11
POPULATION PROJECTIONS BY STATE FOR PRIMARY ZONE OF RECREATION INFLUENCE
1970 - 2000

State	1970	1975	1980	1985	1990	1995	2000
Texas (1)	689,239	736,200	792,300	852,825	913,500	969,231	1,025,633
New Mexico (2)	688,024	773,431	884,840	988,607	1,092,476	1,195,627	1,316,584
Colorado (3)	189,250	209,035	213,262	233,933	231,855	304,582	335,300
Oklahoma (4)	20,497	21,400	22,100	22,800	23,600	24,200	24,800
TOTAL	1,587,280	1,740,066	1,872,502	2,098,165	2,301,431	2,493,640	2,702,317

(1) U.S. Bureau of the Census - 1970
University of Texas Population Research Center (Series A) 1975-2000
Comprehensive Planning Branch, Texas Parks and Wildlife Department

(2) New Mexico Business, August 1972

(3) University of Colorado Graduate School of Business Administration

(4) Oklahoma Employment Security Commission

5.06 In recent years, Highlands University and the State Mental Hospital have provided some jobs for local residents, increasing the county's dependence on governmental sources of income.

5.07 The future economic potential for San Miguel County could include recreation and tourism business. According to a report entitled Characteristics of Recreationists of Northeastern New Mexico, it was pointed out that the largest group of recreationists (20%) for the northeastern New Mexico area, traveled from 151-250 miles and reported having a family income of $10,000-$11,000. Only 7% indicated incomes of $3,000 or less. Fifty percent of the people interviewed during recreation studies at Conchas Lake traveled a distance of between 150-250 miles and had an income range between $8,000-$9,000. This data corresponds with data attained from the Economic Data Summary since.

5.08 Of the five states containing counties within a 200 mile radius of Conchas Lake only two of the states, had income ranges that related to the incomes of the largest group of recreationists and none of them reported incomes of less than $3,000. See Table 10, Economic Data Summary from counties by state within a 200 mile radius of Conchas Lake.

5.09 Population Projection for Patronage Area. A 200 mile radius centered at Conchas Lake includes all or part of 33 counties in West Texas, 25 counties in New Mexico, 11 counties in Colorado, 2 counties in Oklahoma, and one county in Kansas. Seven of the New Mexico, four of the Colorado, and the one Kansas County are generally excluded as consistent users of Conchas Lake since they have easy access to large lakes in New Mexico, leaving 60 counties as the primary zone of recreation influence. The 200 mile radius was determined as a suitable distance, since 88% of the visitation originates within this area according to a Corps of Engineers Survey, 1972.

5.10 In San Miguel County, where Conchas Lake is located, the population for the year 2000 is projected to show an increase of 11,449 for a total population of 33,400. The population increase for all patronage areas of New Mexico is from 688,024 in 1970 to 1,316,584 in year 2000, a 91 percent increase.

5.11 To the east in Texas, the population in the counties within a 200 mile radius of Conchas Lake is projected to increase from 689,239 in 1970 to 1,025,633 in 2000. In the nearby counties of Colorado, the projections are from 189,520 to 335,300 and in Oklahoma, in counties 200 miles or less from Conchas Lake, from 20,497 to 24,800. Although the area around Conchas Lake is mainly rural, a substantial increase in population is foreseen which will greatly increase the demands on this area for recreational facilities.

5.12 Characteristics of Population. The 1970 Bureau of Census report shows that 1,587,280 people reside within the zone of recreation influence for Conchas Lake. Of 538,229 people employed, less than 10 percent are involved in agriculture, forestry and fisheries combined. The area is agricultural in character with a very low population density. Over 43 percent of the population derive their income from wholesale and retail trade and professional and related services. Of the total population, over 60 percent are less than 35 years old, indicating a predominance of young families which are frequent users of outdoor recreation facilities, especially those related to camping and water sports. The most recent income data for the patronage area is for the year 1970. The majority of the families have incomes of $7,000 per year or more. This relatively middle income indicates an ability of the population to afford to attend recreation areas such as Conchas Lake.

5.13 Topography and Geology. The Canadian River and tributaries rise on the eastern slope of the Rocky Mountains in the southern part of the Sangre de Cristo Range. The major tributaries flow easterly from the mountains across a high plateau into deep canyon sections where they unite with the Canadian River, which has a southerly flow. Mountain elevations rise from 7,200 feet to 13,000 feet, with the plateau ranging in elevation from 6,400 feet to 8,000 feet. The area from the plateau to the dam is comprised of ridges, low hills, and sandstone-capped high mesas in the northern portion, and rolling hills in the southern portion. This area varies in elevation from 4,200 feet to 7,000 feet.

5.14 The watershed slope has a southeasterly direction. Two deep box canyons form a "V" with the dam at the apex, creating the shape of the lake, the Canadian Arm of the lake extends northward approximately 14 miles from the damsite through a narrow canyon. The Conchas Arm extends southeasterly from the dam for eleven miles, wider than the Canadian Arm, with shallow shoals sloping out to the inundated canyon. Trementina, Large Cuervo, and Small Cuervo Creeks all enter the shallow end of the Conchas Arm near where the Conchas River enters. The region drained by the Canadian River and its tributaries includes mountains, plateaus, and plains.

5.15 Rocks of the northwestern portion of New Mexico include metamorphics of pre-Cambrian age, igneous materials found in pre-Cambrian, Tertiary, and Quaternary systems, and sedimentary stone ranging from Lower Pennsylvanian to Modern Times. Magdalena Limestone, of the Pennsylvania age, constitutes the prominent features of the mountainous part of western Colfax, Mora and San Miguel counties where the Canadian and its tributaries rise. In Colfax County, this group is overlain by the Sangre de Cristo formation composed of shale, sandstone, and conglomerate. Further south in Mora and San Miguel Counties, the Magdalena

limestone is overlain by Abo sandstone of Permian age. A partial view of these formations can be seen in the far western parts of the counties. Most of the northeastern part of New Mexico is underlaid by red beds that are continuous with the Dockum group of Texas and Oklahoma. The base of this group is the dark Santa Rosa sandstone exposed in the walls of the Canadian and Conchas Canyons. Fossils found in this sandstone date it Triassic. The Santa Rosa sandstone and the Chinle formation that overlaps it are responsible for mesas that speck the plains region surrounding Conchas Lake. This sandstone creates the exposed surface of the plains, and can be seen at the base of the Canadian Escarpment. Rocks of the Cretaceous Age cover nearly three quarters of the region's surface. The oldest formation is the Purgatorie sandstone, a coarse sandstone overlaid with silty shale. It is exposed in the Canadian Escarpment, and in the deep canyons of the Canadian, Vermejo, and Mora Rivers. This formation is rich with coal beds. It is overlaid by the Dakota sandstone, a hard, massive sandstone that forms the surface of much of the Canadian Plateau and the rimrock of the Canadian River Canyon. It is a fine to medium grained quartzite, varying greatly in thickness.

5.16 The soil within the Conchas vicinity is mostly of sandstone and shale origin. The Conchas area is predominately sandstone (thin sandy soils). The Canadian area is largely shale, resulting in a sand-clay mixture.

5.17 Accessibility. The project is accessible from both U.S. and State high-speed roads. It is 73 miles east of Las Vegas, New Mexico, by State Highway 104, which intersects with Interstate Highway 25 at Las Vegas. State Highway 104 passes the project entrance. Further, it is 24 miles north on State Highway 129 from its point of intersection with Interstate Highway 40 (U.S. 66) at Newkirk, New Mexico, and 32 miles northwest of State Highway 40 at Tucumcari, New Mexico.

5.18 The area within a 200 mile radius of Conchas Lake includes all or parts of 72 counties in West Texas, the Oklahoma Panhandle, Colorado and New Mexico. In Colorado this radius includes the cities of Walsenburg and Trinidad; in Texas, the city of Amarillo; in New Mexico, the cities of Albuquerque, Santa Fe, Clovis, Hobbs, Vaughan and Roswell.

5.19 Area of Influence. The accessibility of the project from the various states through Federal and State roads, is just one important factor to be considered in evaluating the factors of influence. Advertisement is another. There are some major types of advertisement for Conchas Lake - highway signs, travel publications and verbal communication. Highway sign advertising along Interstate 40 informs travelers of Conchas Lake State Park and available facilities. Service station personnel, motel operators and business people generally encourage out-of-state motorists to visit the lake. A study was made of the area of influence to determine employment and age distribution, income data, and education level

of the population. Most of the information was derived from Bureau of Census records. The area of influence was determined to be within a 200 mile radius of Conchas Lake. Two hundred miles is considered to be a reasonable driving distance to a large water-oriented recreation facility in the Southwest, especially in eastern New Mexico and West Texas.

5.20 Related Recreational Areas. The supply of outdoor recreation facilities for New Mexico Planning and Development Districts 2 and 4 (as established by the State of New Mexico for planning, collection of information and coordination of services) has been categorized by federal agencies, state agencies and Pueblo or Indian Reservations. New Mexico has a wide variety of recreational facilities as illustrated by the following list:

New Mexico State Parks

El Vado
Kit Carson
Rio Grande Gorge
Hyde Memorial
Coyote Creek
Murphy
Conchas Lake
Navajo Lake State Park
Storrie Lake
Villanueva
Santa Fe River
Alamogordo Lake
Clayton Lake
Ute Lake
Chicosa Lake
Oasis
Elephant Butte Lake State Park

National Forest

Santa Fe National Forest
Carson National Forest
Kiowa National Grasslands

National Park Service Area

Pecos
Capulin Mountain
Fort Union

BLM Recreation Areas

Navajo Dam
Navajo Peak
Rio Pueblo
Rio Grande Wild River
San Antonio Pot Mountain
Santa Cruz
Santa Fe River

Selected Recreation Facilities on Indian Land

Jicarilla Apache
Santa Clara

Bureau of Sport Fisheries and Wildlife

Las Vegas National Wildlife Refuge
Grulla National Wildlife Refuge
Maxwell National Wildlife Refuge

Other Facilities in Area of Influence

Lake Meredith, Texas

5.21 The supply inventory of major State Related Recreational Facilities as illustrated in Table 12 for Districts 2 and 4 indicates that Conchas Lake is the largest facility in the area (See Section VI, Physical Plan of Development for a listing and plan view of existing facilities) with the most diversified activities offered. There are four other recreational facilities in the region offering activities: Ute Lake State Park, located on the Canadian River in Quay County; El Vado State Park located 12 miles southwest of Tierra Amarilla on New Mexico 112; Storrie Lake State Park five miles north of Las Vegas on New Mexico 3 in San Miguel County; Alamogordo Lake State Park, located 16 miles north of Fort Sumner on U.S. 84.

5.22 Borrow and Spoil Areas. Borrow material required for future construction will probably have to come from outside the project area. The volume of available material is limited due to scarcity of soil cover over the base rock. Any spoil material would be disposed of in exhausted borrow areas.

5.23 Visitation. The popularity of the project is reflected in the annual visitation as shown in Table 9. There has generally been a continued increase in annual visitation. During the period 1960 through 1965 there was, however, a substantial decline in visitation. It is believed that the decrease was due primarily to the declining pool, the completion of Ute Reservoir Project about 70 miles from Conchas by the State of New Mexico and completion of Lake Meridith project near Borger, Texas, by the U.S. Bureau of Reclamation. Both of the new projects are on the Canadian River. A steady increase in visitation has occured since 1965. This can probably be attributed to the increase in stored water at Conchas and additions and improvements made by the New Mexico State Park and Recreation Commission. These include rehabilitation and expansion of the Lodge building, construction of a swimming pool and golf course, and the addition of camping facilities. The decrease in visitation from 1972 to 1973 is attributed to sharply increasing prices and the restrictions on the availability of gasoline.

5.24 Water Quality. Conchas Lake is geographically located in an area that under normal conditions would probably allow very little surface water pollution. However, recent increases in visible attached algae and rooted submerged aquatic macrophytes, especially in upstream areas of the reservoir suggest that nitrates and phosphates may be increasing. These nutrients are a potential problem because they are critical for the growth of algae blooms. Nitrates and phosphates in waters can come from fertilizers used on farmland and from sewage. Conchas at present, is not significantly affected by fertilizer runoff or sewage; very little of the land on the watershed above the reservoir is under irrigation; and most of the land is grazed at a fairly low stocking rate. The sewage pollution that might occur from the small villages above is probably negligible in the volume of water present

TABLE 12

MAJOR RELATED RECREATIONAL FACILITIES
IN NEW MEXICO

Parks & Monuments	District	Acres: Water Surface Acres	Acres: Land Acres	Facilities: Camping	Drinking Water	Playgrounds	Picnicking	Rest Rooms	Fishing	Boating	Boating Ramps	Water Skiing	Cabins	Airports	Golf Courses
STATE															
El Vado Lake	2	3,600	125												
Kit Carson	2		20												
Rio Grande Gorge	2		537												
Hyde Memorial	2		350												
Coyote Creek[1]	2		80												
Morphy Lake	2	15	300												
Conchas Lake	2	9,600	1,557												
Storrie Lake	2	1,100	84												
Villanueva	2		1,584												
Santa Fe River	2		5												
Sumner Lake	4	4,650	6,667												
Clayton Lake	4	170	476												
Ute Lake	4	4,200	633												
Chicosa Lake	4	60	640												
Oasis	4		194												
Lake Meredith Region[1]	1	16,504													

1. Texas Recreational Area.

Source: Outdoor Recreation: A Comprehensive Plan for New Mexico, 1971 State Planning Office, Santa Fe, N.M. and Northern Area Planning Organization, North New Mexico Economic Development District, July 1973

in the reservoir. Possible sources of pollution directly involved with the lake could be from sewage and wash water flushed from boats; from leaks, from sanitary facilities of the developments on the Conchas Arm of the lake; or from cattle watering points adjacent to the rangeland along the upstream shores. The water quality of the lake is continually checked, in order to maintain the quality standards that need be met for body contact water sports and fishing.

5.25 Adaptability of Project Structures for Public Use. Corps structures available for public use are: the overlooks on either end of the dam, roads traversing the dam structures, the main dam walkway, and other access roads. The area east of the Main Dam, South Wing Dam, South Dike, in which the irrigation headworks are located and emergency spillway and North Dike Number 2, could eventually be developed into pedestrian trails, horse trails and bicycle trails. This type of development could be supplemented with rest-stops that consist of benches & trash cans.

5.26 Administrative Requirements for Cost Sharing. Recreation development under the Code 710 Program (PL 89-72) requires local interest participation on a cost sharing basis, as established by a letter of intent to participate in such a program from the proper authorities. Such a letter has been received from the Governor of New Mexico and is included as Exhibit 1 of this Master Plan.

5.27 Environmental and Ecological Features. Conchas Lake is deep and oligotrophic with sufficiently good water quality. Fishery projects in the lake provide a source of recreation. Fish populations in Conchas Lake are stable, with twenty species from eight families represented. Crappie, walleye, large-mouth bass, channel and blue catfish, and blue gill are the most important game species present. The reservoir provides additional recreational value in the form of water sports including boating, swimming, and water skiing.

5.28 The lake also provides a wintering ground for the bald eagle, which is a rare and endangered valuable species. Occurrence of this species in the state has decreased considerably in the past twenty years, as it has throughout the country. In the 1950's as many as 50 bald eagles were reported wintering at Conchas. The eight or ten birds that presently winter there should be protected from unenlightened persons hunting on the lake. Birds of prey are a valuable resource and are protected by state laws. Other unique wildlife are discussed in Section VI.

5.29 The land immediately surrounding the lake has experienced no apparent changes to date; semiarid plains land extend up to the shore of the lake as it probably did to the canyon rim before any water was impounded. The land surrounding the lake and the quality of the water in the lake itself could possibly be affected by land use in the future.

5.30 At present, the sewage facilities in the north portion of the project recreation area, maintained by the State are hard pressed to meet the demands placed on them by the number of people using these facilities. In addition, the boat that the State maintains on the lake for sewage disposal is also not big enough to meet the demand. As tourism around the lake increases, the sewage problem on the water craft and in public grounds will continue to increase as well. The impact of the situation could cause a decrease in the quality of water at Conchas Lake.

5.31 Little physical or environmental impact has occured on the watershed above Conchas Lake to date. Approximately 14 miles of canyon was inundated on the Canadian arm, and 11 miles on the Conchas arm. Sediment flats of only a few acres have been created where the rivers enter the lake, and these are underwater some years. The land on the rivers above the lake is predominately used for cattle grazing, as it has been since the 1800's.

5.32 Below the dam, the Canadian Canyon has been enriched for a distance of approximately 2 miles. Cattails and phreatophytes serve as a trap for fine sediments from erosion of the disturbed canyon walls, and from fines that come through the dam. Below the 2 mile region, the channel returns to a semi-sandy streambed flowing through steep rocky canyon walls. The channels have degraded to bedrock. Resurveys of degradation ranges in the channel from below the dam to Ute Reservoir demonstrate no major additional scouring of the streambed since the 1940's, and no additional deposition of sediment. The dam has considerably decreased the amount of sediment which could enter Ute Lake from the Canadian River by acting as a filter for the water impounded behind it. Since Ute Lake suffers from a sediment problem from other sources, this filtering effect is important.

5.33 The channel has not experienced a major flood flow since the construction of the dam. Minor flood flows in the form of spillway discharge have been released into the canyon below the dam six times since the dam was completed.

SECTION VI -

PHYSICAL PLAN OF DEVELOPMENT

GENERAL

6.01 This section consists of an inventory of existing recreation facilities, an allocation of project lands to specific uses, and a plan for future recreation development. The management of project natural resources including vegetation, animal life, and cultural amenities is also considered. Threatened, endangered, or otherwise unique species of animal life are given special consideration because some 8 species are known to be of special concern in the project area.

6.02 Inventory of Existing Facilities. The existing recreation facilities, except for the Corps overlook, are located within Conchas Lake State Park. In the park are a total of 23 picnic tables, 126 camp units,18 camp trailer units, 3 playgrounds, 2 marinas, a 46-room lodge, 13 rental cabins, and a variety of support facilities. The detailed inventory of existing facilities at Conchas Lake has been grouped into the following planning areas: South Area I, South Area II, Central Area West, East Area and North Area. These were established for purposes of this Master Plan.

6.03 In the South Area I, there is a 9 hole golf course with a clubhouse and parking area, 58 private cottages, and the state staff residences, There are two new sewage disposal lagoons, and 2 water tower storage tanks, and one irrigation pond that is used for the entire South Area I and II. The following is a detailed inventory of existing facilities:

SOUTH AREA I

FACILITY	NUMBER AND DESCRIPTION OF FACILITY	
Single Family Residential Housing Lease Sites	58	.Cottages to large residences .Unpaved roads .Utilities above ground .Gas Butane .Water from Corps supply system
State Staff Residences	1 Wood Frame House 6 Mobile Homes	.Utilities above ground .Electricity .Telephone .Butane gas storage tanks .Water .Adjacent roads unpaved

SOUTH AREA I

FACILITY	NUMBER AND DESCRIPTION OF FACILITY	
Golf Course	9 hole course	.Public restroom
	1 Clubhouse	.Utilities
	1 Parking area	.Paved & unpaved roads
		.Water from Corps supply system
Sewage Disposal Lagoons	2 Lagoons	.Lagoons, fenced
	1 Pumphouse	
Water Tower	2 Towers	.Towers, fenced
Water Storage Pond	1 Holding Area	.Golf Course, irrigated

6.04 The South Area II includes two camping areas, South Area Campground and Juniper Campground. The South Area Campground has 59 individual campsites (18 with hookups for camp trailers). There are two types of camping facilities; 41 pull-thru camping sites located adjacent to the lake, and 18 back in between the camper-trailer sites. These facilities include a covered shelter, table, benches and fire grill. Also, in this campground are 2 comfort stations and 1 playground. The camper-trailer facilities include water, electricity, tables with benches, and a sanitary waste dumping station. The Juniper Campground has 8 tables, 5 fire grills, and 2 chemical portable restrooms. The South Area II has one picnic area with 12 tables and benches, grass and trees.

6.05 The boat launch facilities, located adjacent to the South Marina, consists of four ramps for high, medium and low water levels, a boat-trailer parking area, and 2 chemical portable restrooms. The South Marina and related facilities has covered boat docking slips, boat repair area, fuel tank and pumping station, fishing area, and fishing and boat supplies.

6.06 The major commercial developments are Conchas Lake Lodge, General Store and Minnows Sales. Conchas Lake Lodge is a 46 room facility with a lounge, restaurant, and parking area. The General Store sells groceries, dry goods, fishing and boating supplies and auto fuel. The Minnows Sales sells bait for fishing. The swimming pool, adjacent to the Conchas Lake Lodge, is open to the public.

SOUTH AREA II

FACILITY	NUMBER AND DESCRIPTION OF FACILITY	
Conchas Lake Lodge	46 rooms (3 Bldgs)	.Parking
	Restaurant	.Restaurant & Lounge
	Lounge	.Utilities
	Parking Area	.Water from Corps Supply System
	3 Kitchenettes Rooms	.Sewer
		.Paved Road

SOUTH AREA II

FACILITY	NUMBER AND DESCRIPTION OF FACILITY	
Juniper Campgrounds	8 Tables 5 Fire grills 2 Restrooms (chemical portable)	.Roads unpaved .Tables with benches .Scenic View .Trees .Tents & Trailer camping .Picnicking
Swimming Pool	1 Public pool 1 Bathouse	.Utilities
South Marina	3 Boat Docks Covered Slips 4 Cabled-Boat Mooring Areas 1 Floating Marina 2 Marine Fuel Pumps 1 Storage Fuel Tank	.Water from Corps supply system .Sporting Goods Store .Utilities .Fishing .Marine Fuel
	1 Boat Trailer Parking Area	.Roads Unpaved .Trailer Parking area unpaved .Trash cans .1 pr chemical portable toilets During high water marina is stationed north of General Store and west of the boat launch ramp. During low water marina is located just east of Juniper Campground
	4 Boat Launching Ramps 1 pr Restrooms	.For various levels .Courtesy pier
Picnic Area	12 Tables w/ Benches	.Trees .Grass .Water .Parking area unpaved .Trash receptacles .Table w/ benches

SOUTH AREA II

FACILITY	NUMBER AND DESCRIPTION OF FACILITY	
Minnows Sales	1 Bldg.	.Water from Corps supply system .Utilities .Parking
State Staff Residences	1 House 1 Garage	.Grass and trees .Utilities above ground .Water from Corps supply system .Sewage
General Store	1 Bldg.	.Water from Corps supply system .Utilities .Sewage .Groceries, Dry Goods, Fishing & Boating Supplies .Mail Box .Auto Fuel .Parking Area
South Area Campground	25 Metal Shelters 8 Adobe Shelters	.Pull-thru auto path unpaved .Trash receptacles .Water from Corps supply system .Comfort Station (parking area unpaved) .Fire Grills .Table w/ benches .Road unpaved
	1 Play Area	.1-swing .1-slide
	18 Trailer Campsites	.Water .Electricity .Parking Unpaved .18-tables with benches
	18 Tent Sites	.Water .18-shelters with tables & benches .Parking Unpaved
	2 Comfort Stations	.Parking
Storage Area	1 Site	.Fenced .Entrance road unpaved
Cannon Air Force Base Recreation Area	1 Site	.Under Construction
Irrigation Outlet & Conchas Canal	Head Work Length 700'	.Under Construction

6.07 The Central Area West has been developed as a camping area with 29 individual camping units. Each site includes a shelter, table, benches, and fire grill. This area also has one playground and 4 portable chemical restrooms. The area has only one access road.

CENTRAL AREA WEST

FACILITY	NUMBER AND DESCRIPTION OF FACILITY	
Campground	29 Metal Shelters	.Fire grills, table .Table, Benches & Fire grills .Unpaved Parking Area .Unpaved Roads .Trash Receptacles
	4 prs Restrooms	.Portable Chemical
South Dike	6,400' long	.Paved Road
South Wing Dam	3,900' long	.Paved Road
Main Dam	300' long	.Paved Road

6.08 The East Area is a natural area with some transversing roads. To the South of main dam is a lookout site for the public.

EAST AREA

Open Space	No Development 1 Lookout	.Roads paved & unpaved .Access road paved .Parking unpaved

6.09 The North Area includes four camping areas and one picnicking area. The Cove Camping Area includes 12 pull-thru camp sites, each with shelters, tables, benches and fire grills. There is a potable water supply and 4 portable chemical restrooms. The Upper Cove Camping Area has 4 camp units each with a shelter, table, benches and fire grill. No particular traffic pattern has been established for this area. The North Camping Area has 14 camp units, each with a shelter, a table, benches and a fire grill. Again there is no set pattern for traffic circulation or parking. This area includes sanitary facilities and one playground. Bell Point Campground has 8 camp units, each with a shelter, table, benches and fire grill. This area has 2 restrooms (chemical portable). There is a picnicking area located adjacent to the cafe, but it has no user facilities such as tables and benches.

6.10 There is one marina to service the North Area. It contains such facilities as: storage bins, marina fuel station, boat repair area, covered boat slips, and mooring facilities. To the east of the marina

are four boat launching ramp facilities. The first boat launching ramp is for high water level only and has a limited parking area for boat trailers. The other boat launching ramps are designed for medium & low water levels with adjacent boat trailer parking. The North Area also has a dry boat storage area and boat trailer parking areas located in the upper northeast section.

6.11 There is a limited amount of commercial activity in the North Area, such as North Dock Grocery and Cafe, cabin rentals and a trailer park. The North Dock Grocery and Cafe provide food, groceries, fishing and boating supplies, auto fuel service station and a dry boat repair shop. There are 13 fishermen cabin rentals. To the east of the cabins are 68 mobile homes that are to be phased out in 1982. There are two residential units to the west of the cabins occupied by the concessionaires of the North Area. Also located in the North Area is the Corps operation and maintenence area consisting of a public picnic area of 11 sites, an office and support building and residential units for staff members.

NORTH AREA

FACILITY	NUMBER AND DESCRIPTION OF FACILITY	
North Dock Marina	Storage- Dry Dock Storage	.Water .Electricity
	Marina Fuel Station	
	Floating Boat Repair Shop	
	Covered Boat Slips	
	6 Cabled Boat Mooring Areas	
	2 Marina Storage Tank (adjacent land)	
	2 Boat Launching ramps	.High water level .Low water level .1 Courtesy pier .Unpaved boat trailer parking each site .Road unpaved .The high water boat launching ramp has barricade in front
	1 pr Restrooms (chemical)	.Trash receptacles
Corps Picnic Area	11 units Comfort Station	

NORTH AREA

FACILITY	NUMBER AND DESCRIPTION OF FACILITIES	
North Dock Grocery, Cafe Auto Fuel & Dry Boat Repair Shop	2 Bldg.	.Water from state supply system .Utilities .Restrooms .Store groceries, fishing & boating supplies .Auto Fuel .Unpaved entrance & parking area
	1 Ice bldg. Coin operated	.Electricity
	1 pr Restrooms (septic tank)	.Trees & Grass
	1 Picnic Area	.Trash Receptacles
Minnow Lake Store	1 Floating Dock	.Electricity .Parking unpaved .Road unpaved
Cove Camping Area	8 Metal Shelters 4 Adobe Shelters	.Trash Receptacles .Tables, benches .Fire grills .Road unpaved .Pull-in unpaved
	1 Potable Water Outlet	
	4 pr Restrooms (chemical)	
Upper Cove Camping Area	4 metal shelters	.Tables, benches & fire grills .Road unpaved .Trash receptacles
North Camping Area	3 Metal Shelters 3 Open tables	.Water supply from state system .Road .Parking pads
	8 Adobe Shelters	.Tables, benches & fire grills
	1 Children's Play Area	.2-Swings .2-Slides
	1 Comfort Station	
Bell Point Campground	4 Metal Shelters 4 Adobe Shelters	.Water .Roads & Parking Pads .Trash Receptacles

NORTH AREA

FACILITY	NUMBER AND DESCRIPTION OF FACILITIES	
Dry Boat Storage	1 Site	.Fenced-in area .Entrance Road
Mobile Home trailers	68	.Water .Utilities .Trees .Entrance Road .Septic Tank
Cabin Rental	13	.Electricity .Water .Parking .Entrance Road
	1 Comfort Station	.Restrooms, showers, sinks .Septic tank
Residential	2 Single family detached housing	.Drive .Utilities .Water .Septic Tank .Entrance Road
U.S. Army Corps of Engineer	1 Office & maintenance bldg.	
	1 Warehouse & storage yard	
	1 Water Tank	
	1 Single Family detached	.Water .Utilities
	4 Single Family duplex	.Sewer .Trees & Grass
	1 Boat Launching Ramp	
	1 Floating Boat Pier	
	1 Picnic Area with 11 tables	.Trash Receptacles .Tables w/ benches
	1 Comfort Station	.Grass & Trees .Water .Electricity .Paved Road
North Dike 1	1,400' long elev. 4,232'	
North Dike 2	1,150' long elev. 4,232'	

6.12 Proposed upgrading and expansion of recreation facilities. The upgrading and expansion of facilities as proposed in this section are based upon the facility needs as established in Section VIII of this Master Plan. The determinations are based generally on the methods provided in IWR Research Report 74-R1, Plan Formulation and Evaluation Studies - Recreation, with some deviations.

6.13 Recreation Facilities; General. The upgrading and expansion of recreation facilities will be necessary in order to provide for present levels of public use without deterioration of project natural resources. Expansion of facilities will also provide for the supply of a greater percentage of the demand for water related public recreation within the zone of recreation influence, although; it is not possible or even desirable to provide for all of the estimated demand.

6.14 With an average water surface of approximately 6,000 acres available for recreation, approximately 240 boats can be simultaneously accommodated at Conchas Lake. There is an average of 3.4 persons per party. It is estimated that about one-half of the parties are boating and with an expected average turnover rate of about two for boaters. This indicates a Maximum Practical Instant Loading of about 3,250 persons at the project for an average, non-holiday weekend day during the recreation season and during a summer of average storage. Based on the existing average annual visitation of 303,000 over the 5-year period 1969-1974, the Instant Loading is 2,600 persons or about 750 parties. These groups are occupied primarily with camping (310 parties) picnicking (250 parties), boating only (130 parties), and sightseeing (60 parties).

6.15 Camping Facilities. Camping facilities are proposed to be expanded in the North Area, South Area I, and South Area II. The Bell Point and North Campgrounds will be combined and expanded to about 70 units. This will require that the cottage and mobile home rentals, as well as the concessionaire residences be relocated to the east as shown on plate 15. The 16 units of camping in Cove and Upper Cove areas will be converted to picnicking. The South Picnic Area will be converted to camping and expanded to 25 units; South Area Campground will be expanded to 80 units, and Juniper Park campground will be expanded to 35 units. This will provide the currently needed 100 additional units of camping as indicated in the Design Load Analysis. The approximately 30 to 40 units of camping which will need to be added as of 1985 and additional similar increments which will need to be added at approximate 5-year intervals there after, may be located in South Area I as indicated on plate 13.

6.16 Picnic Facilities. With the conversion of 12 picnic units in the South Picnic Area to camping, about 110 individual and 5 group picnic units are proposed for the first increment of development.

The Cove and Upper Cove campgrounds in the North Area will be converted to approximately 60 individual picnic units and 2 group units as shown on plate 15. About 30 additional shelters will be added to the Central Area, the northern portion of which will be designated camping while the southern portion will be designated picnicking. There will be 1 group picnic shelter in the southern portion of the Central Area. It is anticipated that the picnic units will be more compatible with the designated beach and swimming area. An additional 25 picnic units with shelters and 2 group units will be sited in South Area I as shown on plate 13. Future increments of picnic facilities which will be needed as of 1985, and at 5-year intervals thereafter, will be added here and possibly to the east.

6.17 Boat Launch Facilities. There is a need for one additional boat launch lane in the elevation range 4185-4190 and for 5 lanes in the range 4190-4202. These deficiencies are to be met by extending existing ramps. However, a detailed elevation survey and inspection of the existing ramps will be needed prior to plans and specifications so that a decision can be made as to which ramps to extend. An additional boat launch ramp is proposed in the North Area for the year 1985 (see plate 15). The boat launch parking areas are generally deficient and proposed improvements are discussed later along with the parking and transportation systems.

6.18 Swimming Area and Beach Facilities. Two designated swimming areas with sand beaches and rock-buffered water areas are proposed. The beach and swimming area at the Central Area (see plate 14) is proposed for the first increment of development and the facility for the North Area is to be implemented based on the observation and recommendations of project personnel.

6.19 Water Skiing Take-off and Landing Area. The southernmost point in the Central Area is to be designated as a water skiing take-off and landing area. This area has been popular for this purpose for some time.

6.20 Transportation System and Parking Areas. The boat launch ramp approach roads and parking areas are currently poorly delineated. The circulation roads through recreation areas are in a similarly poor condition. This Master Plan includes proposals for the bituminous paving of approximately square yards of roadways and parking areas. The areas and locations are tabulated in the cost estimate. There is also a need to improve the access to the North Area and the Central Area. The present access includes a dangerously narrow, 2 way road section across the main dam. The corrective action, which would not be included among the code 710 recreation developments, consists of approximately 2 miles of new access road and one

bridge downstream from the dam and dikes, approximately as shown on plate . As is evident on the aerial photo bases for plates 9 through 11, many non-surfaced and undesignated roadways have spontaneously developed on project lands. The closure of undesignated roadways is provided for in the Master Plan through berms and landscaping.

6.21 Water Supply and Distribution. The existing water supply and distribution systems at the North Area and the South Areas can be retained essentially as they are until 1985. Additional distribution lines will be needed as indicated in plate 16. Approximately 5,400 lineal feet of new water supply lines will be required to serve the additional and upgraded recreation facilities as proposed in this Master Plan. Sizes of lines and exact locations will be determined later.

6.22 Sewage Collection and Treatment. The Corps Area and North Area at Conchas Lake are served by septic tanks and drain fields as is the South Dock, the South Area is served by a pair of evaporative lagoons. The evaporative lagoons have proven adequate in capacity and are anticipated to be adequate under conditions of the proposed improvements provided that inflow lines are appropriately upgraded. Details pertaining to the sizing and location of lines and the possible location of additional sewage lift stations will be determined later. A new evaporative lagoon is proposed for the North Area as shown on plate 16.

6.23 Landscaping. The plan for landscaping will emphasize the use of species of locally common trees and shrubs to define designated activities and trafficways. This will create natural aesthetics with low watering and maintenance requirements. Designated intensive open space and play fields will be grassed with durable varieties of grass which will need regular care and watering such as is the case with the existing golf course.

6.24 Land Use Allocation and Water Surface Zoning. The project lands and waters are to be allocated as shown in plate 12. The specific land uses are as follows:

a. Project Operations. These lands are necessary for project operations and are not accessible to the general public. Included here are the main dam, the dikes and wing dams, the emergency spillway, and the Corps operations area and personnel residences. Approximately 130 acres are allocated to this use.

b. Operations: Recreation - Intensive Use. The intensive recreation developments are restricted to these lands. Included are camping, picnicking, games, swimming, playground, boat launching, parking, commercial, and quasi-public facilities and developments. Approximately 446 acres of project lands are allocated to this use at Conchas Lake of which some 45 acres are presently occupied by vacation home

developments. These are summer vacation homes which are occupied under interim lease agreements between private individuals and the State of New Mexico Park and Recreation Commission (South Area) as well as cabins and trailers which are rented to individuals (North Area by the concessionaire.

c. Operations: Recreation - Low Density. This includes approximately 700 acres of project lands located primarily to the east of the project structures (see plate 12). The recreation - low density lands will be subject to the development of trails and the maintenance of service roads.

d. Operations: Natural Area. Project operation lands to the south of the State of New Mexico South Area (see plate 5 and 12) are allocated as a natural area. This includes some 716 acres for which no specific facilities other than Corps service roads are planned.

6.25 The water surface at Conchas Lake, for any pool elevation, is open to public use. No specific zoning of the water surface has been undertaken as a part of this Master Plan; however, a normal minimum pool is identified on plate 12 for purposes of illustrating what is generally available for surface water activities. It has not been necessary to zone areas near the outlet works or the emergency spillway as off limits to boaters, because there is no outflow from the reservoir except on rare occasions. The physical plan of development includes a provision for the marking of the area around the outlet with temporary buoys and "no boating" signs during periods of discharge from the reservoir.

6.26 Management of Vegetation, Fish, and Wildlife. Since there are no true forest vegetation types on project lands at Conchas Lake (The closest approach is the band of salt cedar growing near the highwater line.) and since overgrazing of project lands has not been a significant problem, active vegetation management is needed only in terms of establishing and maintaining appropriate landscaping in public use areas. Plantings and improved maintenance of landscape vegetation are needed for wind breaks and aesthetic enhancement in the recreation areas.

6.27 Several rows of Siberian elms have been planted along roadways and in the camping and picnicking parts of the state park. These trees have done only moderately well, apparently due to insufficient water. In view of the likelyhood that Dutch Elm Disease may eventually reach New Mexico and kill the Siberain elms, these plantings should be backed up with other species of desease resistant trees. These should include the native species such as desertwillow, juniper, velvet ash, netleaf hackberry and Arizona cypress. Others that might be tried include Arizona Walnut, Little Walnut and Arizona Sycamore. Desertwillow is now growing well in the headquarters area. It is possible that planting stock of some of these species might be procurred from the Soil Conservation Service or the Forest Service. Plantings outside the recreation areas are not deemed necessary.

6.28 Pruning and Thinning. There is no indication that pruning is needed on any of the plantings. This is a measure that will need attention with increased planting of trees. The trees in the Corps of Engineers headquarters area have been well cared for and pruned as needed. In planting of trees care will be taken that watering is adequate and that traffic hazards do not develop at intersections and other areas due to poor visibility. Such problems usually can be corrected by judicious prunning. The only other thinning that might be considered would involve the thinning of tamarisk (salt cedar) stands as mentioned in the Fish and Wildlife Management Plan. This is very low priority and would be undertaken only as volunteer projects for the Boy Scouts or other such groups which might need conservation projects to work on. Trees would be thinned to approximately 20 feet between trunks. Thinning will accelerate the assertion of dominance of the better trees and in turn improve them for nesting. Since the tamarisk on Federal Land do not occur on pasture lands there would be no range management implications. The production of grass could be increased in the grazed area in the west end by control of mesquite. This, to a certain extent, would be counter productive to wildlife habitat.

6.29 Currently approximately 319 acres of land, are unfenced and grazed by adjacent landowners. Because New Mexico is an open range state, the Corps will have to fence this land to exclude cattle and properly control and manage the land. Approximately 3 miles of boundary fence will be required at a cost of about $53,000. These monies have been requested for the FY-77 Operation and Management budget, and the boundary will be fenced as soon as they become available.

6.30 Pest and Disease Control. No evidence was found that pest and disease control need be a consideration at this time. However if it should be determined that dutch Elm Disease has reached the area care should be taken in the cutting and burning of all diseased portions of the elm trees. Dutch Elm Disease is a primary killer of American elm and is considered to weaken Siberian elm. Thus the American elms in the headquarters plantings would be very vulnerable to disease and the Siberain elms should be watched closely.

6.31 Aquatic Weeds. Lake level fluctuations have acted to check the spread of rooted aquatic plants at Conchas. Aquatics cannot be expected to increase much beyond their current status due to the uncertainty of lake levels and the fact that areas supporting aquatics this year may be under 20 feet of water next year. Since the mean depth of light penetration is 7.3 feet, plants never have the opportunity to spread before they are either inundated beyond their abilities to recuperate or left on dry land. Aquatic vegetation is scarce except in shoal areas and at stream mouths at the upper end of the lake, and there in limited quantities only. Pondweeds and Chara spp are found in the shoal areas while cattail and arrowhead are found at stream mouths. The vegetation is not abundant enough to present

control problems, nor does it provide enough escape areas for rough fish fingerlings that might become a major problem. It does however provide moderate cover and aids in invertebrate reproduction. Little can be done to manage aquatic vegetation since much of it is located in areas outside the jurisdiction of the Corps and other managing agencies.

6.32 Fish and Wildlife. Title and ownership of fish and wildlife resources rests with the State of New Mexico regardless of ownership of the land. The New Mexico Department of Game and Fish, by State statutes, has the authority to preserve, manage, regulate, and control fish and wildlife resources within the State boundaries. Both the U.S. Fish and Wildlife Service and the New Mexico Department of Game and Fish are responsible for management of migratory birds and animals. The Corps, as a landowner, has the responsibility to restore, improve, and preserve fish and wildlife through wise land use and habitat development.

6.33 Fishery Management. Conchas Lake is managed as a warm water fishery by the New Mexico Department of Game and Fish. Primary emphasis is placed on largemouth bass, crappie, walleye pike, bluegill, and channel catfish. Efforts to stock green sunfish, rainbow trout, and northern pike have been abandoned due to a variety of management problems and failures. Important nongame species include gizzard shad, carp, and river carpsucker.

6.34 Commercial Fishing Operations. There is no past history of commercial fishing on Conchas Lake. The abundance of carp, a proven marketable fish in many areas, indicates that netting might be profitable both to the commercial fisherman and the operating agency. Should carp become a nuisance and a market found to be present or potential, the State of New Mexico will be encouraged to use this method (netting) to control overpopulation. The problems presented by a commercial operation are recognized at the project level but it is felt that these are far outweighed by positive aspects of controlling carp population. Commercial fishing is currently practiced at other New Mexico lakes and the success of other operations will be reviewed before any recommendations are made for Conchas.

6.35 Habitat Improvement. The Corps is limited in what it can do toward habitat improvement/maintenance due to the small area of lake bed owned and the fact that the State has the primary responsibility in this area. A very limited habitat improvement plan is being instituted by project personnel. This will consist primarily of forming artificial escape areas by placing brush in selected sites in the lake (fee-owned areas). Brush or trees will not be cut for this purpose but any removed for other purposes will be so used. Judicial placement of these underwater brushpiles will provide shelter in areas otherwise devoid of escape areas. Project personnel also stand ready to assist the New Mexico Department of Game and Fish in any project aimed at fish habitat improvement/maintenance if so requested.

6.36 Terrestrial Mammals. Table 28 is a list of primary mammal species that receive management consideration at Conchas Lake. Each species is assigned a letter designation(s) to indicate its relationship to fee-owned property. T indicates that the animal is not known to inhabit government property but frequents it to cross, graze, etc. H indicates that the animal is an inhabitant of fee-owned or immediately adjacent lands. O indicates that the animal is or was an inhabitant but has not been observed in recent years. In addition to the species listed in table 28 there are numerous other mammals, reptiles, and amphibians that are important in the predator-prey food chain and management policies will consider all organisms.

Table 13: Conchas Lake, Primary Mammal Species.

Common Name	Scientific Name	Classification
Barbary sheep	Ammotragus lervia	T
Mule deer	Odocoileus hemoinus	T, H
Pronghorn antelope	Antilocarpa americana	T
Beaver	Castor canadensis	T
Badger	Taxidea taxus	T, H
Mountain Lion	Felis concolor	T
Bobcat	Lynx rufus	T
Porcupine	Erethizon dorsatum	T
Coyote	Canis latrans	T
Muskrat	Ondatra zibethica	H
Raccoon	Procyon lotor	T, H
Red fox	Vulpes fulva	T
Swift fox	Vulpes velox	T
Black-tailed jackrabbit	Lepus californicus	T, H
Desert cottontail	Sylvilagus auduboni	T, H
Black-tailed prairie dog	Cynomys ludovicianus	O
Rock squirrel	Citellus variegatus	H

6.37 Bird Species. During the spring and fall migration periods Conchas Lake is host to a significant number of migratory waterfowl and the mourning dove. Table 29 lists the various waterfowl species that either use, or can be expected to use, Conchas Lake and the time of the year they might be found. A indicates all year, S indicates summer and W indicates winter.

Table 14: Conchas Lake Waterfowl and Their Season of Occurrence.

Common Name	Scientific Name	Season
Canada goose	Branta canadensis	W
White-fronted goose	Anser albifrons	W
Mallard	Anas platyrhynchos	A
Gadwall	Anas strepera	A

Table 14: Conchas Lake Waterfowl and Their Season of Occurrence (Cont'd).

Common Name	Scientific Name	Season
Pintail	Anas acuta	W
Green-winged teal	Anas carolinensis	W
Blue-winged teal	Anas discors	A
Cinnamon teal	Anas cyanoptera	S
American widgeon	Mareca americana	W
Shoveller	Spatula clypeata	S
Redhead	Aythya americana	S
Ring-necked duck	Aythya collaris	W
Canvasback	Aythya valisineria	W
Lesser scaup	Aythya marila	W
Common golden-eye	Bucephala clangula	W
Bufflehead	Clangula hyemalis	W
Ruddy duck	Oxyura jamaicensis	S
Hooded merganser	Lophodytes cucullatus	W
Common merganser	Mergus merganser	W
American coot	Fulica americana	A

6.38 In addition to these migratory waterfowl, Conchas Lake also supports many species of predatory birds, song birds, and has several covies of scaled quail. There are also several species of shore birds and an occasional gull. Management is directed primarily at the migratory waterfowl, doves, and quail but the effect on all species is considered before any policy is instituted.

6.39 Food Plots and Cover Establishment: A small program to supplement existing food and cover has been started. Seeds of Russian olive, Elaeagnus angustifolia, have been gathered for planting in the project nursery. The resulting seedlings, when 2-3 years old, will be transplanted to selected sites in the field. Some of these transplants will be pruned to form dense shrubs while others will be allowed to form trees. This will result in cover, nesting and den areas, and food for wildlife. Experimental plantings of various trees, shrubs, etc., will be carried out in the project nursery with great care to avoid introducing pest or invasion species. All lands available to wildlife management and suitable to food and/or cover plots will be so utilized.

6.40 Habitat Improvement and Maintenance. Habitat on existing lands will be improved by the planting of selected species of shrubs and trees, by the encouragement of desirable native plants, and by disturbing what now exists as little as possible. The maintenance of the present habitat will be accomplished primarily through the exclusion of conflicting uses and the judicious use of fire, irrigation, and selected methods of mechanical and chemical pest control.

6.41 Designation of Hunting Areas. All fee-owned lands on Conchas Lake have been posted with "No Hunting" signs. The amount of land not in usage conflicting with hunting (i.e., camping, operation and maintenance, commercial activities, etc.) is so small to eliminate safe hunting conditions. This problem is compounded by the meager population of resident species classified as game. One small herd of deer and some 3 or 4 small covies of scaled quail might be classified as resident though much of their time is spent on adjacent private property. These two factors preclude the use of hunting as a management tool or to meet the demand of recreationist for this aspect of recreation. Acquisition of additional lands could result in sufficient area and population for a safe and satisfying hunting program.

6.42 Possible Rare, Endangered, or Otherwise Unique Wildlife at Conchas Lake. A variety of fish and wildlife are of special concern at or in the vicinity of Conchas Lake as indicated below:

a. Southern Redbelly Dace (Phoxinus erythrogaster). This 2 to 4 inch long minnow is listed as endangered (Group I) on the New Mexico State list of endangered species. It is locally common in a few small tributaries of the Canadian River. This fish could be present in the lake but none have been reported.

b. Crayfish (Orconectes deanae). This crayfish has been recently reported as a new species known only from Conchas Lake, the Conchas River, and the Conchas irrigation canal in San Miguel and Quay Counties.

c. Soft-shelled Turtle (Trionyx spp.). Within the State of New Mexico, the Midland Smooth Soft-shelled Turtle (Trionyx muticus muticus) is known only from the Canadian River immediately above and about 30 miles below Conchas Lake. The Texas Spiny Soft-shelled Turtle (Trionyx spiniferus hartwegi) has been reported from the Cimarron River in extreme northeastern Union County and from the Canadian River just below Conchas Lake. Both species are listed as possibly subject to becomming endangered in the future (Group II) on the New Mexico list.

d. Bald Eagle (Haliaeetus leucocophalus). Several adults overwinter at Conchas each year. It is anticipated that the majority of bald eagles within the contiguous 48 states are to be listed as endangered by the United States Departement of Interior.

e. Peregrine Falcon (Falco peregrinus). The peregrine falcon is listed as endangered by both the U.S. Department of Interior and the State of New Mexico (Group II). Its range includes Conchas Lake but no confirmed or reliable sightings are known.

f. Zone-tailed Hawk (Buteo albonotatus). This hawk was recently

added to the New Mexico Group II list of threatened wildlife. As with the peregrine, its range appears to include Conchas but no sightings are reported from project lands.

SECTION VII

COST ESTIMATE
AND
SCHEDULE OF DEVELOPMENT

7.01 Cost Estimates and Schedule of Development. The proposed development of recreation facilities and related utilities at Conchas Lake is subject to available funding. Therefore it is necessary to recognize a level of priority for each proposed improvement. Also, certain of the proposed improvement, as for example the visitor center, are anticipated to be implemented solely be the state of New Mexico with no Federal cost sharing. Table 14 through 17 indicates cost and level of priority. Upon approval of the Master Plan, the proposed development will be entered into the PB-3 for Conchas Lake.

7.02 Plan for Facility Development. The plan and schedule for development and expansion of recreation facilities are partitioned into four 5-year increments so that the lake may accomodate increasing rates of public use without there being an excess of facilities at any given time. The first increment of development, as proposed in this Master Plan will provide only for existing rates of public use. The total cost of the facilities proposed in this Master Plan is $3,454,000 based on August 1976 prices. Cost estimates have not been included for development beyond 1980.

CONCHAS LAKE, NEW MEXICO
RECREATION FACILITIES
DETAILED COST ESTIMATE
(AUGUST 1976 PRICES)

TABLE 15

	ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
	NORTH AREA				
1.	Sewage Disposal System	L.S.	---	---	$350,000
2.	Water Treatment Plant	L.S.	---	---	$ 10,000
3.	North & Bell Point Campgrounds:				
	a. Shelter (Single)	Ea.	48	$ 4,000	$192,000
	b. Existing Comfort Station (Upgrade)	Ea.	1	10,000	10,000
	c. Wash House/Comfort Station	Ea.	1	40,000	40,000
	d. Water Line	L.F.	2,200	15	33,000
	e. Area Flood Light & Pole	Ea.	1	600	600
	f. Electrical Destribution, U.G.	L.F.	5,000	6.5	32,500
	g. Sewer Line	L.F.	1,000	20	20,000
	h. Circulation Road (12 ft. paved)	L.F.	4,000	8	32,000
	i. Access Road (22 ft. paved)	L.F.	1,000	15	15,000
	j. Parking Area (paved)	S.Y.	1,800	6	10,800
	k. R.V. Parking Spurs (paved)	S.Y.	3,000	6	18,000
	l. Foot Trails (Gravel)	L.F.	1,200	2	2,400
	m. Signs	Ea.	8	75	600
	n. Landscaping	L.S.	---	---	5,000
				Subtotal	$411,900
4.	Cove & Upper Cove Campgrounds (Convert to Picnic):				
	a. Convert 16 Camp Units to Picnic Units				N/C
	b. Shelter (Single)	Ea.	44	$ 4,000	$176,000
	c. Comfort Station	Ea.	2	35,000	70,000
	d. Water Lines	L.F.	2,600	15	39,000
	e. Area Flood Light & Pole	Ea.	2	600	1,200
	f. Electrical Distributing, U.G.	L.F.	4,000	6.5	26,000
	g. Sewer Lines	L.F.	3,250	20	65,000
	h. Foot Trails (Gravel)	L.F.	2,500	2	5,000
	i. Circulation Road (18' Paved)	L.F.	3,200	12	38,400
	j. Parking Area (Paved)	S.Y.	3,200	6	19,200

TABLE 15 (Cont'd)

ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
4. Cove & Upper Cove Campgrounds (Convert to Picnic): (Cont'd)				
k. Signs Ea.	Ea.	12	75	900
l. Landscaping	L.S.	---	---	3,000
			Subtotal	$443,700
5. Relocate Concessionaire Residence & Rental Cabins - State of New Mexico.				
6. Upgrade & Extend Existing Boat Launch Facilities:				
a. Extend Ramps	S.Y.	350	$ 20	$ 7,000
b. Parking Area (Paved)	S.Y.	1,600	6	9,600
c. Approach Road (24 ft. paved)	L.F.	1,000	17.5	17,500
d. Signs	Ea.	4	75	300
e. Landscaping	L.S.	---	---	500
			Subtotal	$ 34,900
7. Designated Swimming Area:				
a. Sand Beach (1 ft. thk)	S.Y.	500	$ 4	$ 2,000
b. Buoy Markers	L.S.	---	---	3,000
c. Rock Buffer	C.Y.	440	25	11,000
d. Signs	Ea.	4	75	300
			Subtotal	$ 16,300
8. Close Non-Designated Roadways:				
a. Scarify	Ac.	1.2	$ 500	$ 600
b. Landscape	L.S.	---	---	1,600
			Subtotal	$ 2,200
9. Sanitary Dump Station	Ea.	1	$15,000	$ 15,000
			Subtotal	$1,284,000
			Contingency (20%)	257,000
			Total Contract Cost	$1,541,000
			E & D	154,000
			S & A	154,000
Total Estimated Development Cost - North Area				$1,849,000

TABLE 16

ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
CENTRAL AREA				
1. Develop and Designate Seperate Camp and Picnic Areas:				
a. Access Road (24 ft. Paved)	L.F.	4,400	$ 17.5	$ 77,000
b. Parking Area (Paved)	S.Y.	3,500	6	21,000
c. Foot Trail (Gravel)	L.F.	13,000	2	26,000
d. Shelter (Single)	Ea.	34	4,000	136,000
e. Shelter (Group)	Ea.	1	15,000	15,000
f. Vault Toilet	Pr.	1	5,000	5,000
g. Signs	Ea.	8	75	600
h. Landscaping	L.S.	---	---	2,400
			Subtotal	$283,000
2. Designated Swimming Area:				
a. Sand Beach (1 ft. Thk)	S.Y.	500	$ 4	$ 2,000
b. Rock Buffer	C.Y.	440	25	11,000
c. Buoy Markers	L.S.	---	---	1,700
d. Signs	Ea.	4	75	300
			Subtotal	$ 15,000
			Subtotal	$298,000
			Contingency (20%)	60,000
			Total Estimated Contract Cost	$358,000
			E & D	36,000
			S & A	36,000
Total Estimated Development Cost - Central Area				$430,000

TABLE 17

ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
SOUTH AREA I				
1. New Picnic Area:				
a. Shelter (Single	Ea.	25	$ 4,000	$100,000
b. Comfort Station	Ea.	1	35,000	35,000
c. Water Line	L.F.	2,300	15	34,500
d. Sewer Line	L.F.	1,500	20	30,000

TABLE 17 (Cont'd)

ITEM		UNIT	QUANTITY	UNIT COST	ITEM COST
1.	New Picnic Area: (Cont'd)				
e.	Lift Station and Force Main	L.S.	---	$ ---	$ 30,000
f.	Area Flood Light & Pole	Ea.	1	600	600
g.	Electrical Distribution, U.G.	L.F.	3,000	6.5	19,500
h.	Circulation Road (18 ft. Paved)	L.F.	1,600	12	19,200
i.	Parking Area (Paved)	S.Y.	1,600	6	9,600
j.	Foot Trails (Gravel)	L.F.	1,000	2	2,000
k.	Signs	Ea.	8	75	600
l.	Landscaping	L.S.	---	---	3,000
				Subtotal	$284,000
				Contingency (20%)	57,000
				Total Estimated Contract Cost	$341,000
				E & D	34,000
				S & A	34,000
Total Estimated Development Cost - South Area I					$409,000

TABLE 18

ITEM		UNIT	QUANTITY	UNIT COST	ITEM COST
	SOUTH AREA II				
1.	Juniper Campground:				
a.	Shelter (Single)	Ea.	27	$ 4,000	$108,000
b.	Comfort Station	Ea.	1	35,000	35,000
c.	Water Lines	L.F.	500	15	7,500
d.	Area Flood Light & Pole	Ea.	1	600	600
e.	Electrical Distribution	L.F.	600	6.5	3,900
f.	Sewer Lines	L.F.	750	20	15,000
g.	Circulation Road (18 ft. Paved)	L.F.	2,000	12	24,000
h.	R.V. Parking Spurs (paved)	S.Y.	1,600	6	9,600
i.	Parking Area (Paved)	S.Y.	900	6	5,400
j.	Foot Trails (Gravel)	L.F.	1,800	2	3,600
k.	Signs	Ea.	8	75	600
l.	Landscaping	L.S.	---	---	2,000
				Subtotal	$215,200

TABLE 18 (Cont'd)

	ITEM	UNIT	QUANTITY	UNIT COST	ITEM COST
2.	South Area Campground:				
	a. Shelter (Single)	Ea.	11	$ 4,000	$ 44,000
	b. Existing Comfort Stations (Upgrade)	Ea.	2	10,000	20,000
	c. Area Flood Light & Pole	Ea.	2	600	1,200
	d. Electrical Distribution, U.G.	L.F.	600	6.5	3,900
	e. Circulation Roads (18 ft. Paved)	L.F.	1,650	12	19,800
	f. Circulation Roads (12 ft. Paved)	L.F.	8,000	8	64,000
	g. Parking Area (Paved)	S.Y.	1,200	6	7,200
	h. Signs	Ea.	8	75	600
	i. Landscaping	L.S.	---	---	2,900
				Subtotal	$163,600
3.	South Marina Campground:				
	a. Shelter (Single)	Ea.	13	$ 4,000	$ 52,000
	b. Comfort Station	Ea.	1	35,000	35,000
	c. Area Flood Light & Pole	Ea.	1	600	600
	d. Electrical Distribution, U.G.	L.F.	1,000	6.5	6,500
	e. Circulation Road (12 ft. Paved)	L.F.	1,200	8	9,600
	f. R.V. Parking Spurs (Paved)	S.Y.	1,200	6	7,200
	g. Sewer Line	L.F.	1,000	20,000	20,000
	h. Signs	Ea.	4	75	300
	i. Landscaping	L.S.	---	---	1,000
				Subtotal	$132,200
4.	Sanitary Dump Station.	Ea.	1	$15,000	$ 15,000
5.	Vehicle Parking For Games Area.	S.Y.	1,000	$ 6	$ 6,000
				Subtotal	$532,000
				Contingency (20%)	106,000
				Total Estimated Contract Cost	$638,000
				E & D	64,000
				S & A	64,000
Total Estimated Development Cost - South Area II					$766,000

SECTION - VIII

DESIGN LOAD ANALYSIS AND DESIGN CRITERIA

8.01 General. The estimated future recreation visitation to Conchas Lake is based partially on visitor surveys at the project, the 1970 New Mexico Outdoor Recreation Demand Survey, and the project population from within the primary zone of recreation influence (plate 7). The method of estimating reservoir recreation use which is provided for in Corps Technical Report No. 2, Estimating Initial Reservoir Recreation Use, does not apply well to the situation at Conchas Lake because it is difficult to find a genuinely comparable project and because Conchas Lake is far beyond the stage of initial recreation use.

8.02 Population Within the Recreation Zone of Influence. The present and projected population within the primary zone of recreation influence for Conchas Lake are as follows:

Table 19: Population Within the Recreation Zone of Influence.

	YEAR						
	1970	1975	1980	1985	1990	1995	2000
Population (thousands)	1,590	1,740	1,870	2,100	2,300	2,500	2,700

8.03 Participation Rates by Activity. The percent of population participating in various outdoor recreation activities and number of times that participants tend to engage in the activity per year (as indicated for New Mexico Planning and Development District No. 2 in the New Mexico Outdoor Recreation Demand Survey) are given below. The figures in parentheses indicate approximately the number of activity occasions per activity which would occur per capita among residents of District No. 2.

Table 20: Participation Rates by Activity.

Activity	Percent of Population Demanding	No. of Times Participants Engage Per Year	Per Capita Activity Occasions per Year
Sightseeing	50	5	(2.5)
Picnicking	71	4	(2.8)
Camping	19	3	(0.6)

Table 20: Participation Rates by Activity. (Cont'd)

Activity	Percent of Population Demanding	No. of Times Participants Engage Per Year	Per Capita Activity Occasions Per Year
Lake Fishing	57	8	(4.6)
Boating	13	6	(0.8)
Water Skiing	7	6	(0.4)

8.04 The activities rated above in Table 20 are expected to account for most of the recreation visitation to Conchas Lake. Other activity related to golfing, horseback riding, bicycling, and the lease area summer homes also contribute to the total visitation. The activities listed in Table 20 are regarded as "primary" at Conchas Lake and the "other" activities are regarded as "secondary" for purposes of estimating future visitation.

8.05 Estimated Future Annual Activity Occasions Based on Primary Activities. The anticipated future annual activity occasions of recreation demand originating from within the zone of influence for primary activities are derived as the product of the percapita activity rate in Table 20 (figures in parentheses) and the projected population for the zone of influence.

Table 21: Estimated Future Annual Activity Occasions for Primary Activities.

	Annual Activity Occasions (Thousands)				
Activity	1980	1985	1990	1995	2000
Sightseeing	4,681	5,245	5,754	6,234	6,756
Picnicking	5,243	5,875	6,444	6,982	7,566
Camping	1,124	1,259	1,380	1,496	1,621
Lake Fishing	8,614	9,652	10,587	11,471	12,431
Boating	1,498	1,679	1,841	1,995	2,162
Water Skiing	749	839	921	997	1,081
TOTALS	21,909	24,549	26,927	29,175	31,617

8.06 Conversion of Demand Activity Occasions to Visitor Days. The conversion of activity occasions of recreation demand for the primary activities in the zone of influence of Conchas Lake to activity (visitor) days was made at the rate of 2.5 activity occasions per visit. This indicates that the potential recreation visitation to reservoir recreation areas will range from about 8.7 million to 12.6 million for the zone of influence over the period 1980 to 2000. At present, based on an average annual visitation over the past 5 years of 303,000, the project would be satisfying roughly 3.5 percent of

the 1980 demand for the primary activities originating from within the primary zone of recreation influence. This indicates that with appropriate facilities, Conchas Lake is capable of much greater public use than has been recorded during the past.

8.07 Project Increased Visitation to 2000. Assuming that Conchas Lake continues to provide for something on the order of three and one-half percent of the recreation demand from within the zone of influence, project future annual visitation to the year 2000 is expected to be as indicated in Table 22. The estimates in Table 22 are somewhat conservative in that they do not consider use from beyond the zone of recreation influence.

Table 22: Estimated Future Annual Visitation at Conchas Lake.

	YEAR				
	1980	1985	1990	1995	2000
Visitation	300,000	344,000	377,000	408,000	443,000

8.08 Project Instant Loading. Tables 23 through 27 include estimated project instant loadings for the present through the year 2000. Note that the first increment of development proposed in this Master Plan will provide the expansion and upgrading of facilities necessary to provide for present levels of use.

8.09 Maximum Practical Use. A level of maximum practical use for Conchas Lake has been derived based on 25 percent of visitors boating and a future boating turnover rate of 2. With an average water surface of about 6,000 acres and a space standard of 25 acres per boat, the instant loading for boaters is 240 boats or 816 persons. If the boating turnover rate is 2 and 50 percent of the visitors are boating, the instant loading for the project is approximately 3,250 persons. This level of instant loading corresponds to an annual visitation of 760,000. Note that the maximum practicable level of use is about equal the projected use for the year 1990.

8.10 Facility Needs. Public recreation facilities are presently deficient at Conchas Lake. There are indications that recreation facilities are depressing recreation use.

8.11 Camping Facility Needs. There are presently 203 units of overnight facilities at Conchas Lake. This includes 13 rental cabins and the 46 rooms at the commercial lodge. Based on Table 23, there is a need for a total of 310 camp units. For purpose of establishing immediate facility needs, the rental cabins and lodge rooms are counted among the camp units. This will insure that the 110 camp units proposed for the first increment of development is a conservative goal. Tables 24 through 27 indicate that as of 1985 and at 5-year intervals thereafer, additional increments of 30 to 40 camp units will be needed.

Table 23: Conchas Lake, Project Instant Loading, Existing Condtions.

Existing Ann. Vis.(5 yr. ave. 1969 - 1974)	303,000
70% during May - Sept	212,100
65% /2 per weekend day (23 weekends)	2,996
35% of visitors camping (turnover = 1)	1,050
30% of visitors picnicking (turnover = 1)	900
20% of visitors sightseeing (turnover about 3)	200
15% of visitors boating only (turnover = 1)	450
Project Instant Loading	2,600

Number of parties per activity based on 3.4 occupants per vehicle:

camping = 310	picnicking = 250
sightseeing = 60	boating only = 130

Instant Loading (No. of parties) = 750

Table 24: Conchas Lake, Project Instant Loading, 1985 Conditions.

1985 Ann. Vis. (based on Exhibit 2)	344,000
70% during May - Sept	240,800
65% /2 per weekend day (23 weekends)	3,402
35% of visitors camping (turnover = 1)	1,190
30% of visitors picnicking (turnover = 1)	1,020
20% of visitors sightseeing (turnover about 3)	226
15% of visitors boating only (turnover = 1)	510
Project Instant Loading	2,950

Number of parties per activity based on 3.4 occupants per vehicle:

camping = 350	picnicking = 300
sightseeing = 70	boating only = 130

Instant Loading (No. of parties) = 800

Table 25: Conchas Lake, Project Instant Loading, 1990 Conditions.

1990 Annual Visitors (based on Table E-2-4)	377,000
70% during May - Sept	263,900
65% /2 per weekend day (23 weekends)	3,729
35% of visitors camping (turnover = 1)	1,305
30% of visitors picnicking (turnover = 1)	1,120
20% of visitors sightseeing (turnover = 3)	250
15% of visitors boating only (turnover = 1)	560
Project Instant Loading	3,235

Number of parties per activity based on 3.4 occupants per vehicle:

camping = 385 picnicking = 330
sightseeing = 75 boating only = 165
Instant Loading (No. of parties) = 955

Table 26: Conchas Lake, Project Instant Loading 1995 Conditions.

1995 Annual Visitors (based on Table E-2-4)	408,000
70% during May - Sept	285,600
65% /2 per weekend (23 weekends)	4,036
35% of visitors camping (turnover = 1)	1,415
30% of visitors picnicking (turnover = 1)	1,210
20% of visitors sightseeing (turnover = 3)	270
15% of visitors boating only (turnover = 1)	605
Project Instant Loading	3,500

Number of parties per activity based on 3.4 occupants per vehicle:

camping = 420 picnicking = 360
sightseeing = 80 boating only = 180
Instant Loading (No. of parties) = 1,040

Table 27: Conchas Lake, Project Instant Loading, 2000 Conditions.

2000 Annual Visitors (based on Table E-2-4)	443,000
70% during May - Sept	310,100
65% /2 per weekend day (23 weekends)	4,382
35% of visitors camping (turnover = 1)	1,535
30% of visitors picnicking (turnover = 1)	1,315
20% of visitors sightseeing (turnover = 3)	290
15% of visitors boating only (turnover = 1)	655
Project Instant Loading	3,795

Number of parties per activity based on 3.4 occupants per vehicle:

camping = 450 picnicking = 390
sightseeing = 90 boating only = 190
Instant Loading (No. of parties) = 1,120

8.12 Picnic Facility Needs. There are presently 23 formally recognized units of picnicking at Conchas Lake. Based on Table 23, there would be an immediate need for approximately 225 additional units. However, it is known that many picnickers tend not to use developed facilities; therefore, a more conservative number of picnic units (100 individual family units and 5 group units) is proposed for the first increment of development. Tables 24 through 27 indicate that as of 1985 and at 5 year intervals thereafter, additional increments of about 30 picnic units will be needed.

8.13 Boat Launch Facility Needs. There are presently 10 boat launch ramps on Corps fee lands at Conchas Lake. These are distributed at various elevations such that between 6 and 10 launch lanes are available for use at any given water surface elevation. Locations and approximate elevations of the ramps are given in Table 30.

Table 28: Conchas Lake, Boat Ramp Data.

Location	Elevation Range	No. of Parking Spaces	No. of Lanes
Juniper Point			
S. Area II	4156.5-4185	not delineated	2
"	4184-4190	"	2
"	4190-4204	"	2

Table 28: Conchas Lake, Boat Ramp Data. (Cont'd)

Location	Elevation Range	No. of Parking Spaces	No. of Lanes
Minnow Sales			
S. Area II	4185-4200	not delineated	2
S. of Upper			
Camp N. Area	4155-4184	"	2
"	4159-4184	"	2
"	4179-4189	"	2
W. of Upper			
Cove Camp N.			
Area	4155-4185	"	2
"	4159-4181	"	2
"	4189-4204	"	2

8.14 Based on the present average annual visitation of about 300,000, Conchas Lake would require 9 boat launch lanes to accomodate about 375 launchings for the average, non-holiday weekend day during the recreation season. The data from Table 30 can be summarized approximately as follows:

Elevation Range	No. of Launch Lanes
4155-4160	6
4160-4185	10
4185-4190	8
4190-4204	4

8.15 The summary of the data from Table 30 indicate that boat launch facilities are deficient by 3 lanes for the 4155 to 4160 range, by 1 lane for the 4185 to 4190 range, and by 5 lanes for the 4190 to spillway elevation range. Since recreation use of Conchas Lake has tended in the past to drop in response to lower water levels, and since water surface elevations as low as 4158 occur infrequently, no additional launch ramp development is proposed for the 4155 to 4160 range. The additional launch lane needed within the 4185-4190 range will be provided by extending an existing ramp. The specific ramp to be extended will be selected at the time of plans and specifications. The deficiency of 5 lanes in the 4190 through spillway elevation range is below the 5 year pool (4198.5). It is anticipated that the deficiency will be corrected through extending one existing ramp and constructing one additional ramp. Based on tables 24 through 27, it is expected that one additional launch lane will be needed as of 1985 and an additional lane will be needed at 5 year intervals thereafter.

8.16 Swimming Area and Beach Facility Needs. No specific counts of swimmers have been made at Conchas Lake. However, it is estimated that approximately 20 percent of the persons among the instant

loading are swimming; this project would need to accomodate about 500 swimmers simultaneously on the average, non-holiday weekend day during the recreation season. By the year 2000, the swimmer instant loading will be about 750 persons. Thus 2 designated swimming areas with sand beaches are proposed, one for implementation with the first increment of development, a second for implementation when needed based on the observations of project personnel. The current instant loading of approximately 500 swimmers requires about 0.6 acres of beach. The initial beach development proposed for the Central Area is approximately 3/4 acre.

8.17 Water Skiing Take-off and Landing Area. A designated water skiing landing and take-off is located in the Central Area.

8.18 Parking Area Needs. Based on a current total instant loading of 750 parties, it is apparent that spaces for about this number of vehicles are needed. It is difficult to assess the number of spaces presently available because most of the existing parking areas are poorly delineated and the individual spaces are not marked. Upgrading of parking areas is considered in the text along with the transportation system.

8.19 Water Supply. Potable water needs at Conchas Lake are estimated based on 10 gallons per visitor day where non-waterborne facilities are present and 30 gallons per visitor day where waterborne are provided. Based on present instant loading of 2,600 persons and the provision of waterborne facilities at all areas except the Central Area, it is expected that approximately 85% of the visitors would be using waterborne facilities, this results in a need for a total water supply capacity of 70,000 gallons per day subsequent to the upgrading and expansion of recreation facilities. The potable water supply need would increase by approximately 8,000 gallons (for the average, non-holiday weekend day during the recreation season) as of 1985 and by about 8,000 gallons at 5 year intervals thereafter. The present water supply storage capacity is 90,000 gallons; however, an estimated 21,000 gallons per day is utilized by the residents of the lease area, leaving 69,000 gallons to be allocated to 24 hour storage for the recreation areas. This present storage capacity is approximately equal to the water supply demand for the average, non-holiday weekend day. The recreation demand for potable water is expected to increase by about 8,000 gallons (for the non-holiday weekend day) by 1985 and by 8,000 gallons at 5 year intervals thereafter. No expansion of the water supply system is proposed until 1985 other than to provide lines for the expanded facilities. As of 1985, however, unless there is no longer a need to supply the privately leased homesite areas, it will be necessary to increase the potable water storage. The pumping, filtering, and chlorinating capacity of the water supply systems should be adequate to at least the year 2000.

SECTION - IX

SPECIAL PROBLEMS

9.01 General. Special problems exist at Conchas Lake in several areas of resource management. Poorly designated roads and parking areas, allocation of recreation-intensive use lands to private homesites, and structural developments on flood easement lands in the vicinity of Hooverville are of the greatest concern at the present time. A possible future problem is the eutrophication of the lake.

9.02 Roads and Parking Areas. Since many of the existing roads and parking areas at Conchas Lake are poorly delineated and are not surfaced, traffic patterns tend to become congested and parking is inefficient and disorderly. The delineating and paving of roads and parking areas, as proposed in this Master Plan, will solve this problem and will help to reduce blowing dust. The closure of undesignated roadways will also help to reduce blowing dust and will improve project aesthetics.

9.03 Private Homesites on Project Fee Lands. Approximately 45 acres of Corps fee lands in South Area I are now occupied by 58 private cottages and summer homes based on a lease agreement which will be expired as of 1 January 1982. The design load analysis for this Master Plan indicates that unless the water supply allocated to the private homes can be diverted to public recreation facilities as of 1985, additional water supply storage will be needed. Also, the fee lands occupied by private leaseholders are the most appropriate areas for future expansion of camping and picnicking facilities as of 1980. Because of difficulties relating to the termination of private use of these 45 acres, it is anticipated that other, less desirable areas which are less aesthetic and are a greater distance from the reservoir shoreline will need to be developed.

9.04 The development of private structures on flood easement lands, as is the case in the Hooverville area, will result in flood damages in the event that flood pool elevations exceed approximate elevation 4203. The extent of flood damage will be generally proportional to the pool elevation above 4203. This problem, however, is not subject to resolutions via the proposals in the Master Plan.

9.05 Possible Future Eutrophication of Conchas Lake. Some possible early signs of eutrophication have been observed in limited areas of the lake. Water quality data do not indicate that any significant deterioration is occurring. However, the careful monitoring of sewage facilities will be necessary to provide for early detection of any possible pollution.

9.06 While both the Resident Superintendent and the Ranger have citation authority, any situation requiring detention or arrest would create a real problem in that there is no help readily available. San Miguel County has no deputy in the area and the county seat is some 75 miles away thereby precluding assistance from that source. The Quay County officers located in Tucumcari are only 35 miles away but cannot operate in this county. The State Police in Tucumcari have agreed to assist in any emergency situation when possible. Even when an officer is available, five or ten minutes is consumed locating and using a telephone to call for help and 30 more minutes used to make the trip. This situation could be improved by the installation of "Police Band" radios in citation equipped vehicles with crystals for both San Miguel County and the State Police. The isolated location of the lake will always be a problem but the radio would make contact with help more immediate and the mere knowledge of the radio and its implications are often all that is needed.

SECTION - X

COORDINATION WITH OTHER AGENCIES

10.01 General. Conchas Lake development was coordinated with Federal, State local and private organizations that had a direct or indirect interest in the project or surrounding area. Following is a list of agencies, organizations, and individuals involved.

a. FEDERAL AGENCIES

(1) Bureau of Sport Fisheries and Wildlife. The development of a Fish and Wildlife Mangement Plan was accomplished by the Bureau and this office.

(2) Bureau of Outdoor Recreation. Coordination with BOR concerning financial support of recreational development at Conchas Lake (Conchas State Park).

(3) Environmental Protection Agency. Water quality.

(4) U.S. Department of Interior-Denver Federal Center. Information concerning Construction Costs of Recreation Facilities.

(5) U.S. Department of Interior-National Park Service (Washington, D.C.) Information concerning the listing of Bell Ranch Headquarters on the National Register of Historic Places.

b. STATE AGENCIES

(1) Governor's Office. Cost sharing.

(2) State Planning Office. Cost sharing agreement.

(3) New Mexico Park and Recreation Commission. Coordination of recreational facilities development and management.

(4) New Mexico Game and Fish Department. Fish and game propagation and hunting area.

(5) New Mexico State Highway Department. Maintenance of roads leading to Conchas Lake and traffic volume determinations.

(6) New Mexico Environmental Improvement Agency. Water and air quality control, liquid waste collection and treatment, and solid waste management.

(7) New Mexico Department of Development. Historical data and future development.

(8) University of New Mexico Anthropology Department. Members of the Department were helpful in offering guidance during our archeological research.

(9) University of New Mexico Institute of Social Research and Development. The Institute's research library and archives were made available for research into all factors concerned with the area of influence.

(10) Texas Parks & Wildlife Department. For information on population projections and use of the Texas Outdoor Recreation Comprehensive Plan.

(11) University of New Mexico - Parish Library. Information concerning construction cost.

(12) Colorado State Government - Division of Planning. Information concerning population projections and economic data about the State of Colorado.

(13) Bulletin Office-Department of Agricultural Information. Numerous booklets that are directly and/or indirectly related to the Conchas Lake area.

(14) Kansas State Park and Resources Authority. Information requested is unavailable at this time due to the fact that the agency is in the process of updating the State Outdoor Recreation Plan for Kansas.

(15) Greater Southwest Regional Planning Commission. (State of Kansas). No information was attained.

c. LOCAL AND OTHERS

(1) City of Tucumcari Historical Museum. Historical data.

(2) Mrs. Mattie Ellis. The widow of George F. Ellis, author of "Bell Ranch as I Knew It". Mrs. Ellis contributed her personal knowledge and historical data of the area.

(3) Ecological Information Service. This organization prepared an environmental study of Conchas Lake and area.

(4) Zia Chapter, Paralyzed Veterans of America, Inc. Information on the American National Standard for accessibility to the handicapped.

(5) Conchas North Dock Corporation: Marshall Warren. Information on operation expenses for the North Dock Area at Conchas Lake.

SECTION XI

FINDINGS AND CONCLUSIONS

11.01 The findings and conclusions are many and varied covering the physical, social, economic and political considerations.

a. Although the area around Conchas Lake is rural, a substantial increase in population may be foreseen which will affect the needs and demands of the future. The area of influence is within a 200 mile radius and includes the states of Oklahoma, Texas, Colorado, Kansas and New Mexico.

b. The most popular family activities are picnicking, pleasure driving and fishing.

c. Three of the major problems are overcrowding at the water edge, undesignated roads, and inadequate facilities to serve the public. Land use activities and functions represent a scattering of land uses without organization and awareness of land use interrelationships.

d. The survey of existing conditions of physical improvements reveals dis-repair indicating a tremendous need for upkeep and proper maintenance.

e. Lack of control for activities and functions has caused damage to vegetation and the ecosystem, and produced the problem of blowing dust along with a decrease in scenic value.

f. The cost development scheduled is based on two factors: the first is that the existing facilities should be brought up to an acceptable standard, and second is all new proposed facilities should then be constructed.

SECTION XII

RECOMMENDATIONS

12.01 This master plan for Conchas Lake analyzes the existing conditions of the current recreational areas, and offers suggestions for changes over the next 20 years. This report offers direction for development of Conchas Lake beyond current demands, to anticipate and create new demands for the future. Therefore, recommendations are being offered to make Conchas Lake attractive, exciting and comfortable:

a. With the current state of disrepair, the first increment of development (1975-1979) should be for upgrading and replacing existing structures, facilities, and adding those facilities needed to support current requirements.

b. The improvements must involve the Corps, State, and private lessees working in a coordinated effort to upgrade and expand facilities.

c. The implementation of each development area be reviewed at the beginning of each period to determine if the budget is adequate to complete the suggested improvements or if a phase development budget implementation is to occur.

d. Laws and regulations be enforced both on the water and land.

e. The East Area have no physical structure development other than foot and equestrian trails, because of the existing marsh area.

f. The planned phase-out of homes occur by 1982 because they are not compatible with the new proposed land use.

g. Residential units and cabins be relocated because they are not compatible with the new proposed land uses.

EXHIBIT I

STATE OF NEW MEXICO
OFFICE OF THE GOVERNOR
SANTA FE
87501

BRUCE KING
GOVERNOR

February 14, 1974

Colonel James L. Sutton, C.E.
District Engineer
Albuquerque District
U. S. Corps of Engineers
Post Office Box 1580
Albuquerque, New Mexico 87103

Dear Colonel Sutton:

It is my understanding that the Corps of Engineers has adopted two methods of further recreation development at Corps water resources projects. In this regard, please be advised that the State of New Mexico desires to participate in the development of Conchas Lake recreation facilities on a cost sharing basis with the federal government.

David W. King, State Planning Officer, has visited with the State Park & Recreation Commission concerning this matter. He informs me that this method will be acceptable with the agency objectives for the recreation facilities at Conchas Lake, operated by the Commission. Under this program, the agency would be required to pay 50% of the recreation development costs and to assume all costs for the operation and maintenance, including replacement of recreation facilities. Please be assured that the Commission is aware of this arrangement.

In the event you should have questions about this matter, please direct them to Mr. Richard W. Mutz, Director, State Park & Recreation Commission, Post Office Box 1147, Santa Fe, New Mexico, 87501, 505/827-2974.

Thank you for your cooperation.

Sincerely,

Bruce King

BRUCE KING
GOVERNOR

Courtesy Copy to:
Mr. Richard W. Mutz, Director
State Park & Recreation Commission

NEW MEXICO
STATE PARK AND RECREATION COMMISSION

JERRY APODACA
GOVERNOR

SAM GRAFT
DIRECTOR

141 E. DE VARGAS
P. O. BOX 1147
SANTA FE, NEW MEXICO 87503
(505) 827-2726

March 16, 1976

Colonel Robert G. MacLennan
District Engineer
Corps of Engineers
P. O. Box 1580
Albuquerque, New Mexico 87103

Dear Colonel MacLennan:

We are pleased to formally announce that the State Park and Recreation Commission was appropriated the sum of $240,000 from the General Fund for the purpose of designing and developing park improvements at Conchas Lake State Park.

The State money must be matched by Corps of Engineers funding according to the law (see attached legislation). It is our understanding that the Corps currently has $120,000 for fiscal year 77. It is hoped that your District Office can secure an additional $120,000 for use on a timely basis in matching the $240,000 available by the State.

It is our intention to design and contract for a $480,000 project, thus eliminating the need for two design exercises and splitting of bids on any project elements. We would certainly encourage your efforts in securing the additional $120,000.

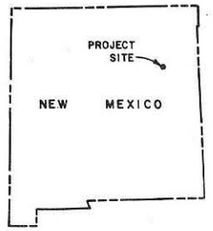
Thank you very much for your cooperation and assistance during the legislative session, and we hope to be contracting with you on this most important project to one of our better state parks in New Mexico. Please keep us advised of your proposed actions.

Sincerely,

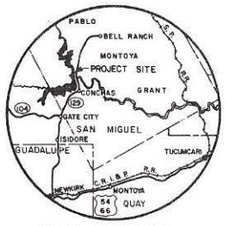
SAM GRAFT
DIRECTOR

SG:REC:cm

Enclosure

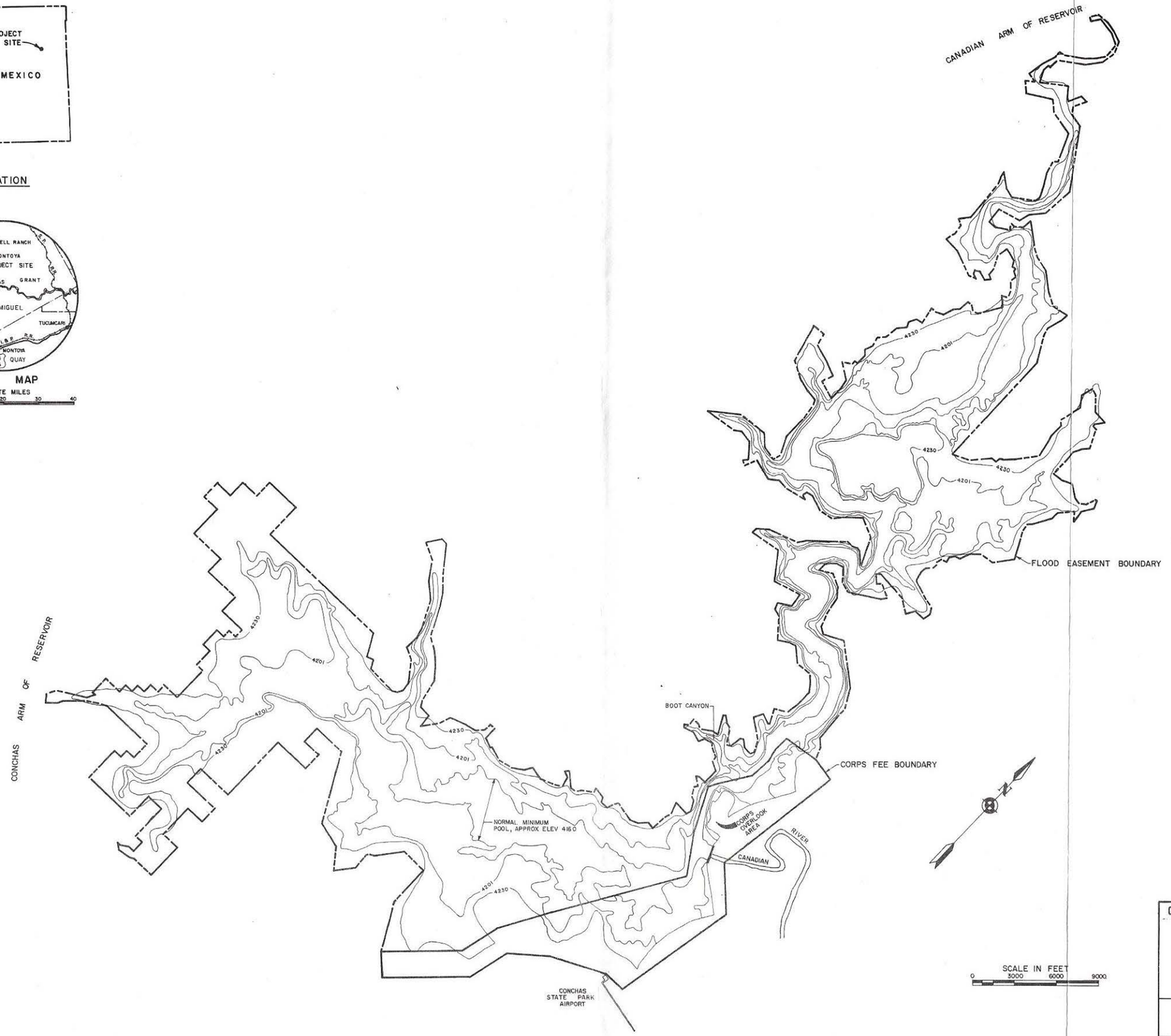


LOCATION



VICINITY MAP

STATUTE MILES



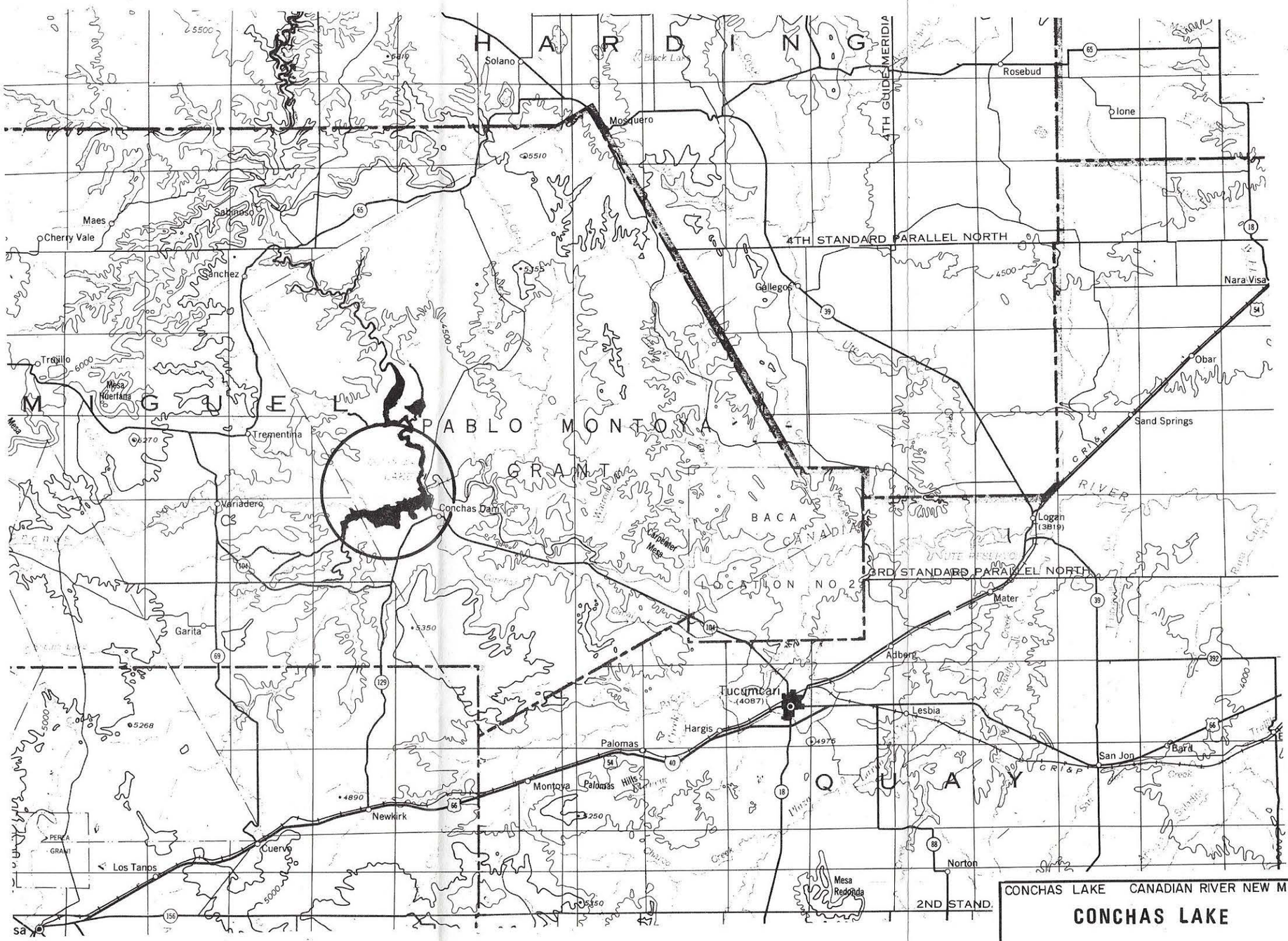
CONCHAS LAKE CANADIAN RIVER NEW MEXICO

CONCHAS LAKE
LOCATION, VICINITY, & PROJECT BOUNDARIES

U S ARMY ENGINEER DISTRICT, ALBUQUERQUE, N. M.

FILE NO
SC-CD-DM-B-1

PLATE 1



CONCHAS LAKE CANADIAN RIVER NEW MEXICO

CONCHAS LAKE

LOCAL POLITICAL SUBDIVISIONS

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO.
SC-CD-DM-B-2

PLATE 2

LEGEND

ARKANSAS RIVER BASIN

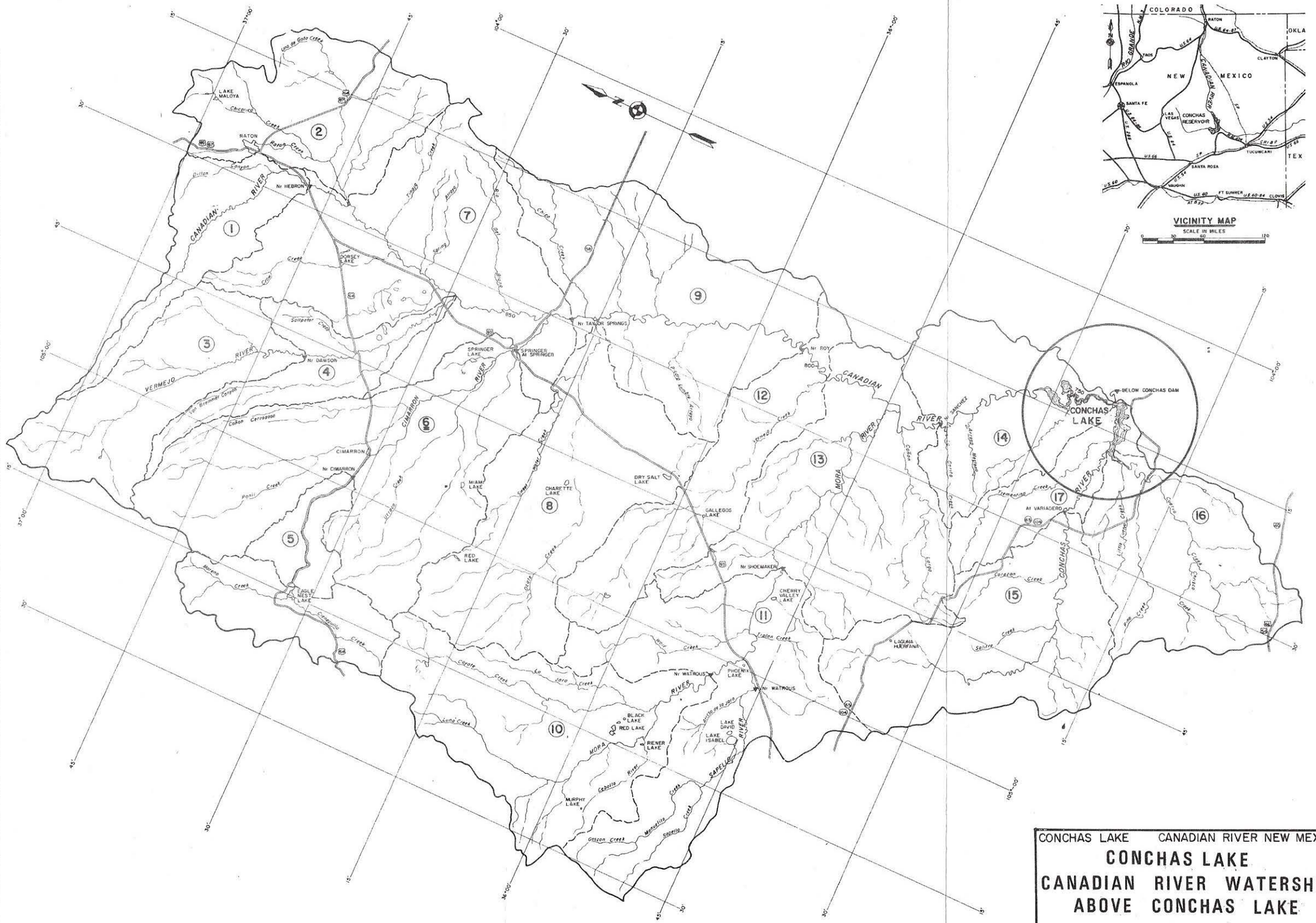
CANADIAN RIVER NEW MEXICO

LEGEND

- 850 RIVER MILES ABOVE MOUTH
- WATERSHED BOUNDARY
- SUB-WATERSHED BOUNDARY
- PERENNIAL STREAM
- EPHEMERAL STREAM
- ROADS
- RESERVOIR
- STREAM GAGE
- (9) UNIT HYDROGRAPH AREA

N

SCALE IN MILES
0 10



VICINITY MAP
SCALE IN MILES
0 30 60 120

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

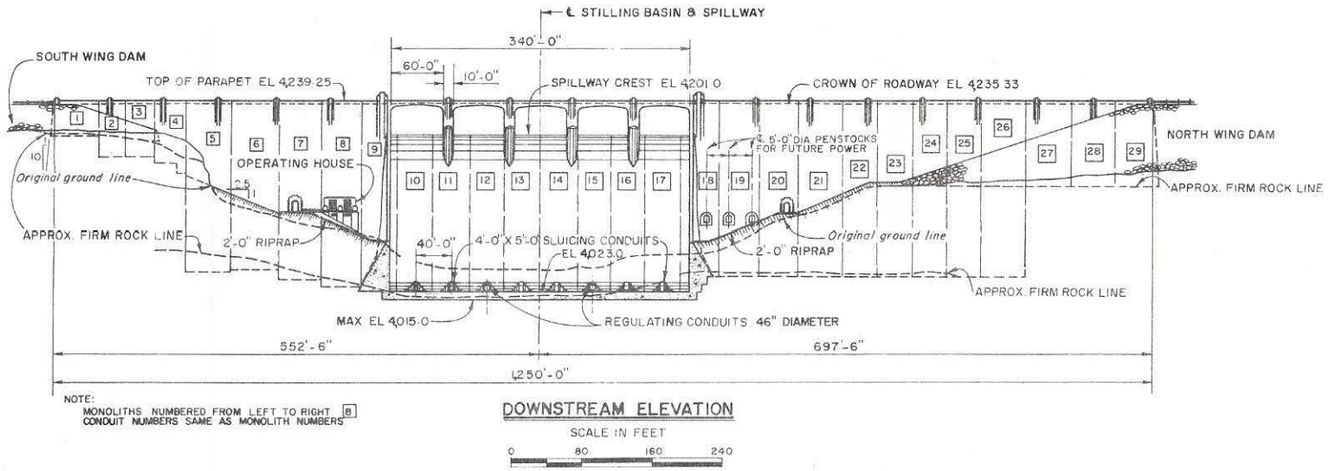
CONCHAS LAKE
CANADIAN RIVER WATERSHED ABOVE CONCHAS LAKE

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO.
SC-CD-DM-B-3

PLATE 3

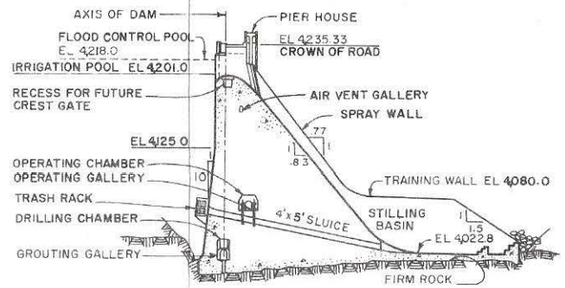


NOTE:
MONOLITHS NUMBERED FROM LEFT TO RIGHT
CONDUIT NUMBERS SAME AS MONOLITH NUMBERS

DOWNSTREAM ELEVATION

SCALE IN FEET

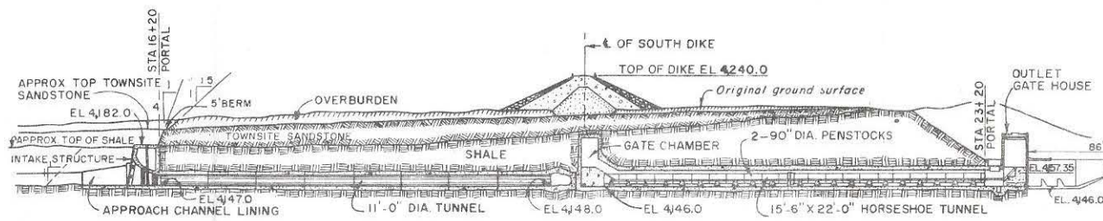
0 80 160 240



MAIN DAM
SPILLWAY SECTION

SCALE IN FEET

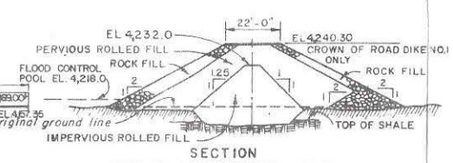
0 80 160 240



IRRIGATION HEADWORKS
PROFILE ON ℄ OF TUNNEL

SCALE IN FEET

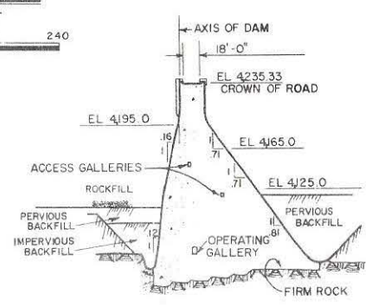
0 60 120 180



SECTION
NORTH DIKES NOS. 1 & 2

SCALE IN FEET

0 20 40 60 80



MAIN DAM
NON-OVERFLOW SECTION

SCALE IN FEET

0 100 200 300

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

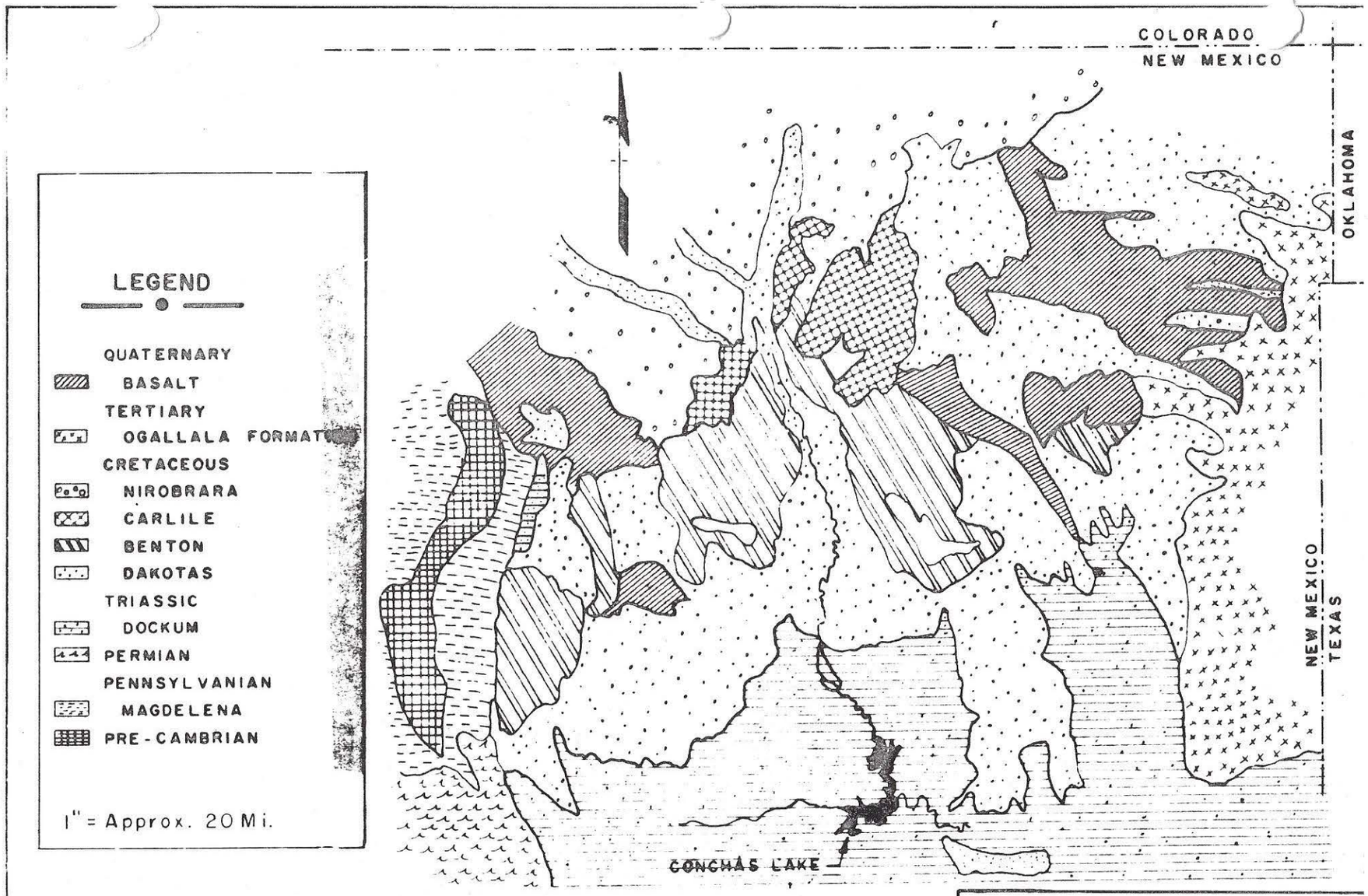
CONCHAS LAKE
DIKES AND IRRIGATION HEADWORKS SECTIONS

SCALE AS SHOWN

U.S ARMY ENGINEER DISTRICT ALBUQUERQUE NM

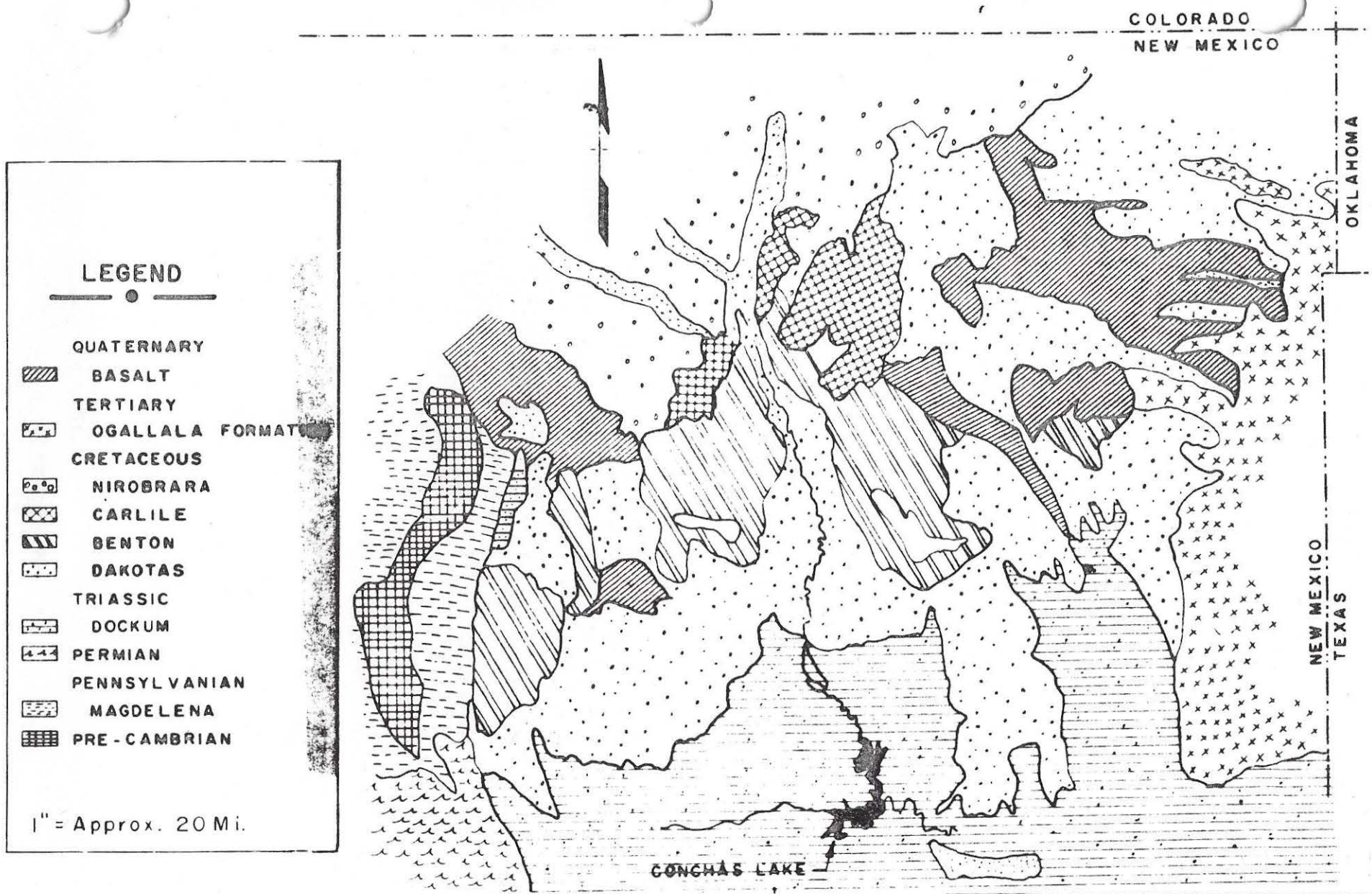
FILE NO.
SC-CD-DM-B-4

PLATE 4



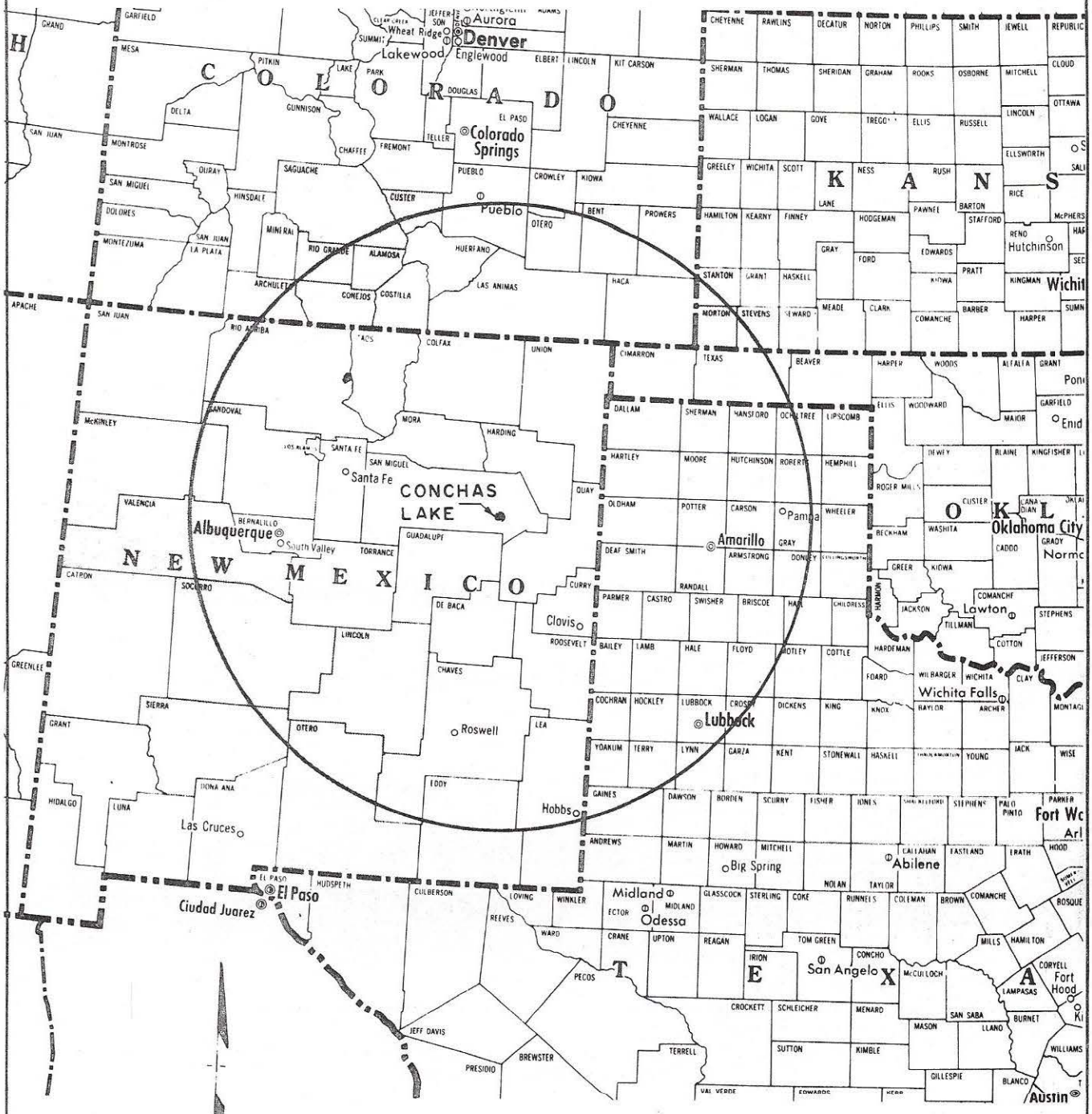
GEOLOGIC MAP OF THE CANADIAN RIVER WATERSHED ABOVE CONCHAS LAKE

PLATE 6



GEOLOGIC MAP OF THE CANADIAN RIVER WATERSHED ABOVE CONCHAS LAKE

PLATE 6

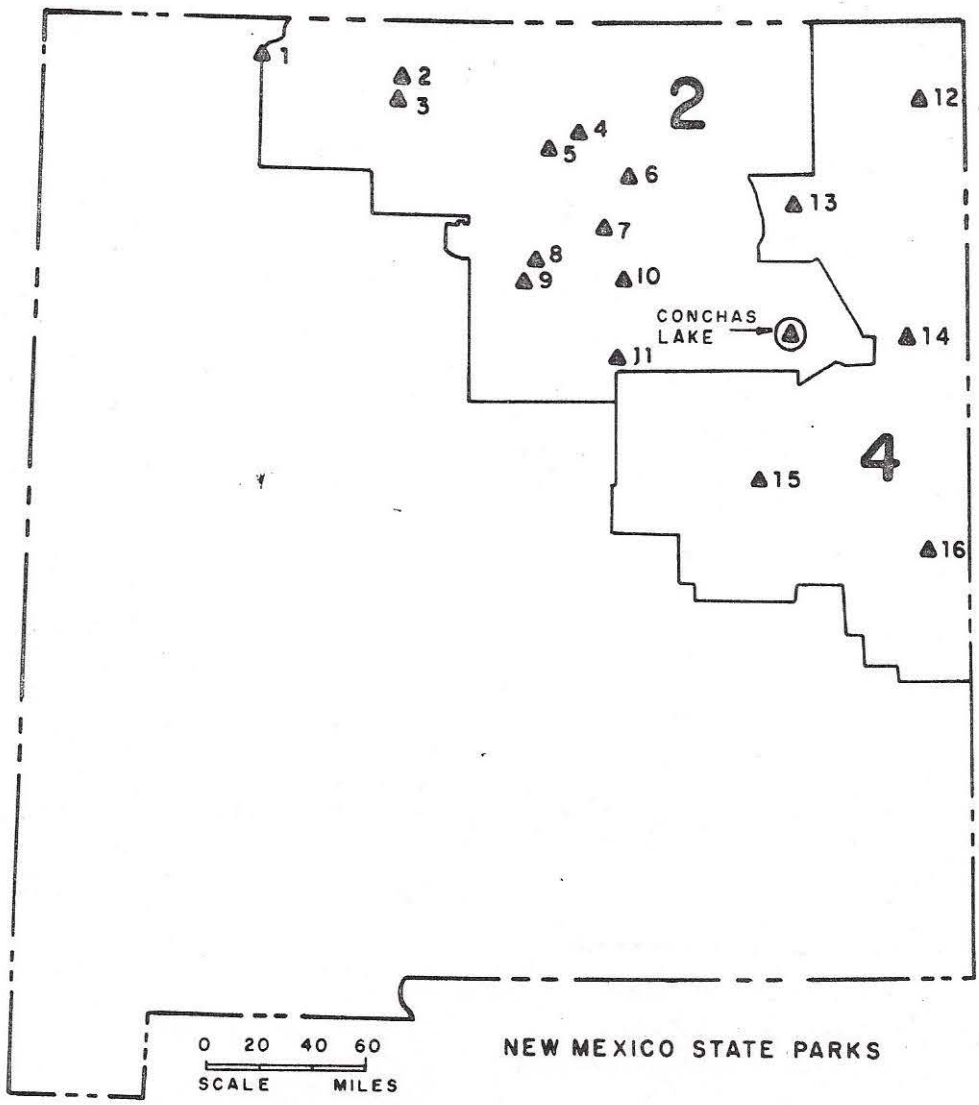


COUNTIES EXCLUDED BECAUSE OF COMPETING NEARBY FACILITIES

PRIMARY ZONE OF RECREATION INFLUENCE

200 MILE RADIUS

PLATE 7



1 NAVAJO LAKE
2. HERON LAKE
3. EL VADO LAKE
4. KIT CARSON MEM.
5. RIO GRANDE GORGE
6. COYOTE CREEK
7. MORPHY LAKE
8. HYDE MEM.
9. SANTA FE RIVER
10. STORRIE LAKE
11. VILLANUEVA
12. CLAYTON LAKE
13. CHICOSA LAKE
14. UTE LAKE
15. SUMNER LAKE
16. OASIS

COMPETING RECREATIONAL FACILITIES IN NEW MEXICO

PLATE 8

JUNIPER CAMPGROUND (8 UNITS)

BOAT TRAILER PARKING

PUBLIC SWIMMING POOL

BOAT LAUNCH RAMPS

SOUTH DOCK MARINA LOW WATER LEVEL

CONCHAS LAKE LODGE

BOAT MOORING

IRRIGATION OUTLET

SOUTH DIKE

PARKING SOUTH PICNIC AREA (18 UNITS)

SOUTH DOCK MARINA

STATE STAFF HOUSING

BOAT LAUNCH RAMP

MINNOW SALES

STATE STAFF RESIDENCES

GENERAL STORE

FEE BOUNDARY

CHILDRENS' PLAY AREA

CANNON A.F.B. RECREATION AREA (UNDER CONSTRUCTION)

SOUTH AREA CAMPGROUND (77 UNITS, 18 W/ UTILITY HOOKUPS)

COMFORT STATION

STATE STORAGE YARDS

SEWAGE DISPOSAL LAGOONS

PUMPHOUSE

COTTAGES (PRIVATE)

SOUTH AREA II

SOUTH AREA I

EAST AREA

GOLF COURSE

STATE STORAGE AREA

CLUB HOUSE

STATE ADMINISTRATIVE OFFICES

WATER TANKS

CONCHAS LAKE CANADIAN RIVER, NEW MEXICO

CONCHAS LAKE

EXISTING RECREATION FACILITIES SOUTH AREA 1, SOUTH AREA 11 EAST AREA IN PART

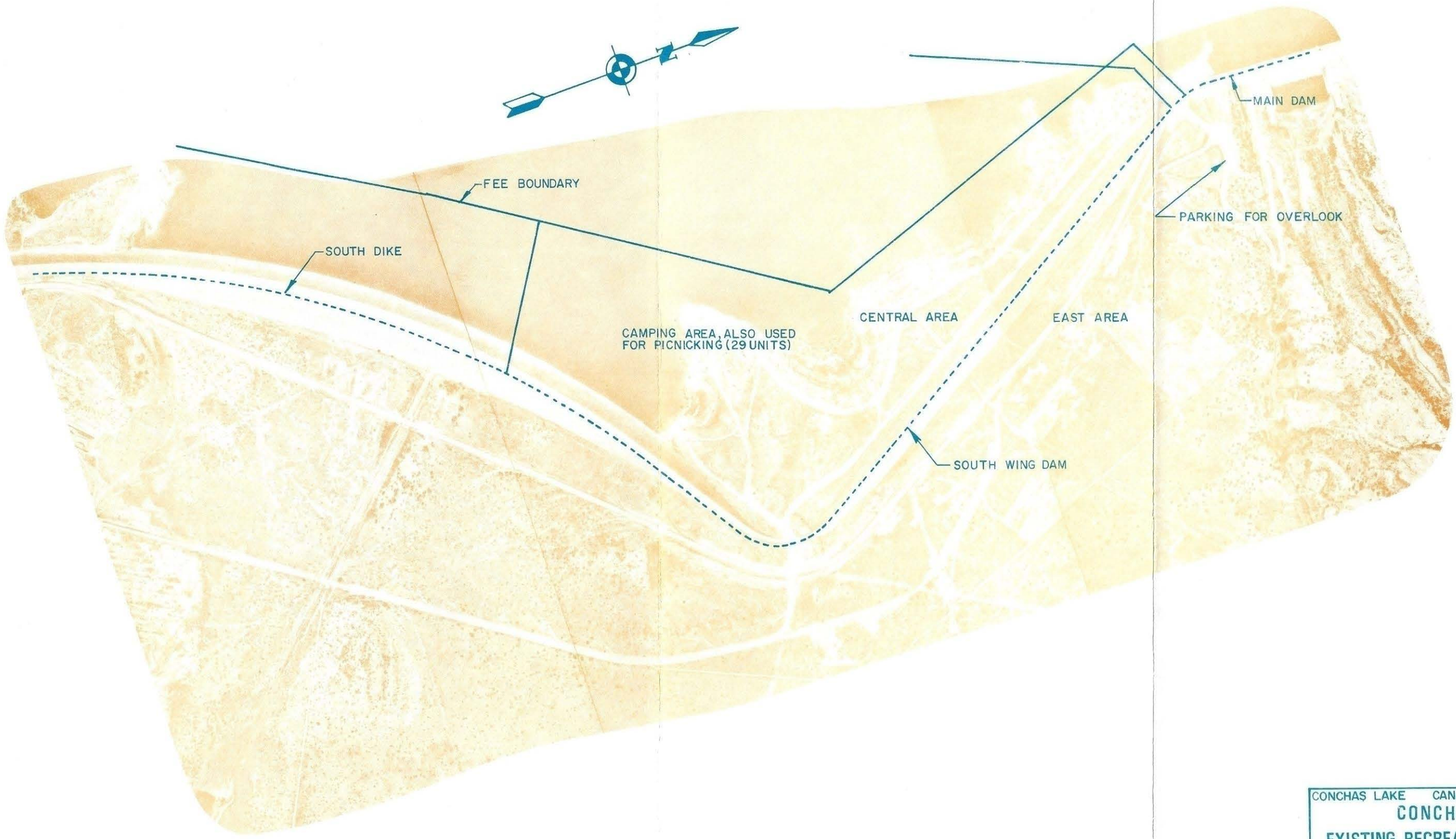
SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO.

SC-CD-DM-B-9

PLATE 9



CONCHAS LAKE CANADIAN RIVER NEW MEXICO

CONCHAS LAKE

EXISTING RECREATION FACILITIES
CENTRAL AREA IN PART
EAST AREA IN PART

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO.

SC-CD-DM-B-10

PLATE 10

SAND AND GRAVEL BORROW

BOY SCOUTS AQUATIC RECREATION AREA

NORTH AREA

CORPS RESIDENCES

WATER TOWER

WAREHOUSE

NORTH WING DAM

EMERGENCY SPILLWAY

COMFORT STATION

OVERLOOK

CORPS ADMINISTRATION & MAINTENANCE BLDG

NORTH WING DAM

PICNIC AREA

EAST AREA

NORTH DOCK MARINA

MINNOW SUPPLY

NORTH DOCK GROCERY, CAFE AUTO FUEL & REPAIRS

HOUSE BOAT

BOAT MOORING

PLAY-GROUND

BELL POINT CAMP AREA (8 UNITS)

BOAT TRAILER PARKING

BOAT LAUNCH RAMP HIGH WATER

COMFORT STATION

BOAT MOORING

PICNIC AREA

NORTH CAMP AREA (14 UNITS)

WATER TANK

COVE CAMP AREA (12 UNITS)

UPPER COVE CAMP AREA (4 UNITS)

CONCESSIONAIRE SINGLE FAMILY RESIDENCES

BOAT LAUNCH RAMP & TRAILER PARKING LOW WATER

WATER STATION

COTTAGE RENTAL (13 UNITS)

MOBIL HOME RENTAL (68 UNITS)

DRY BOAT STORAGE

EAST AREA

FEE BOUNDARY

CONCHAS LAKE CANADIAN RIVER, NEW MEXICO

CONCHAS LAKE

EXISTING RECREATION FACILITIES NORTH AREA, EAST AREA IN PART

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT, ALBUQUERQUE NM

FILE NO. SC-CD-DM-B-11

PLATE 11

RECREATION POOL

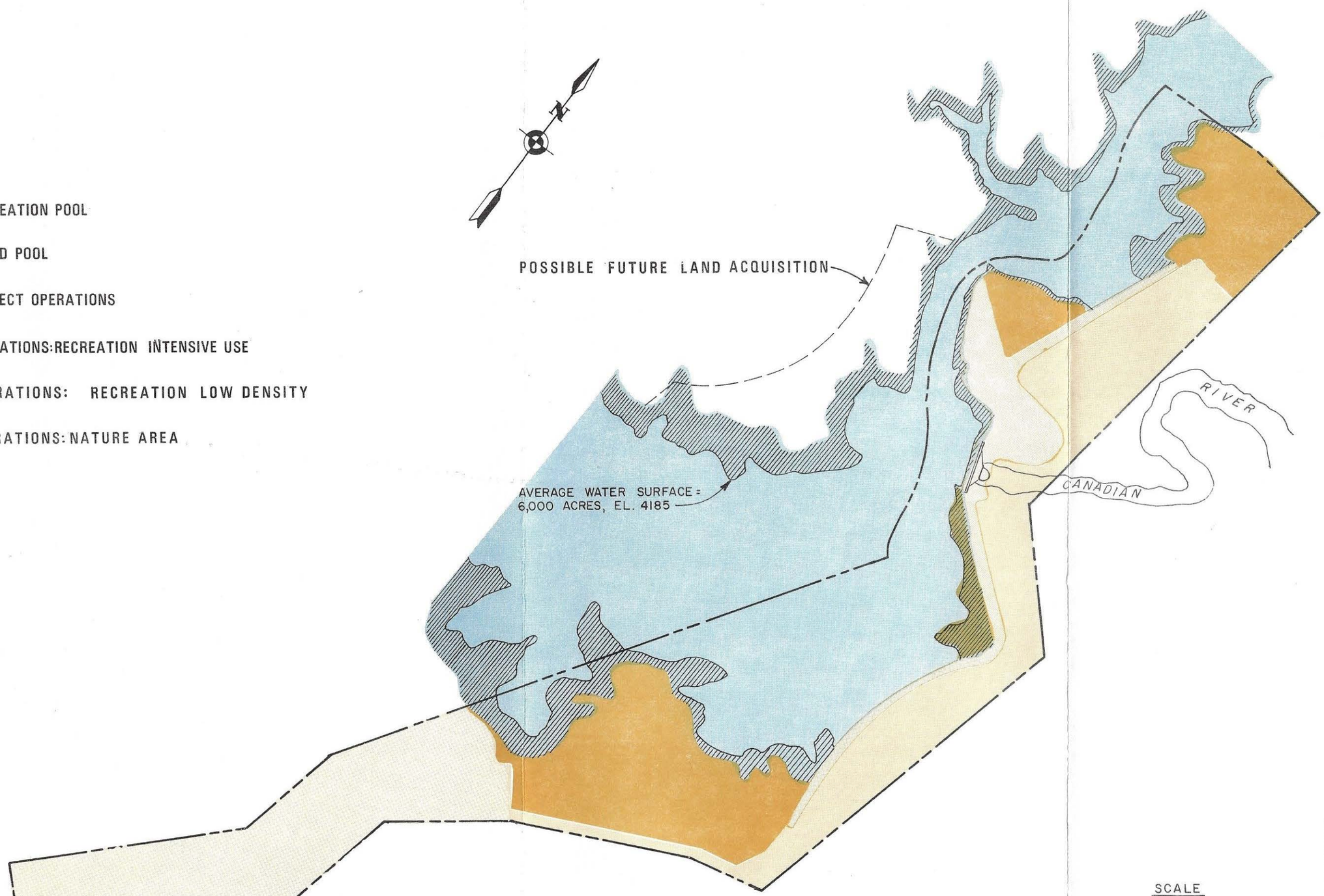
FLOOD POOL

PROJECT OPERATIONS

OPERATIONS: RECREATION INTENSIVE USE

OPERATIONS: RECREATION LOW DENSITY

OPERATIONS: NATURE AREA



LAND USE ALLOCATION

SCALE

0 2000 3000

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

CONCHAS LAKE

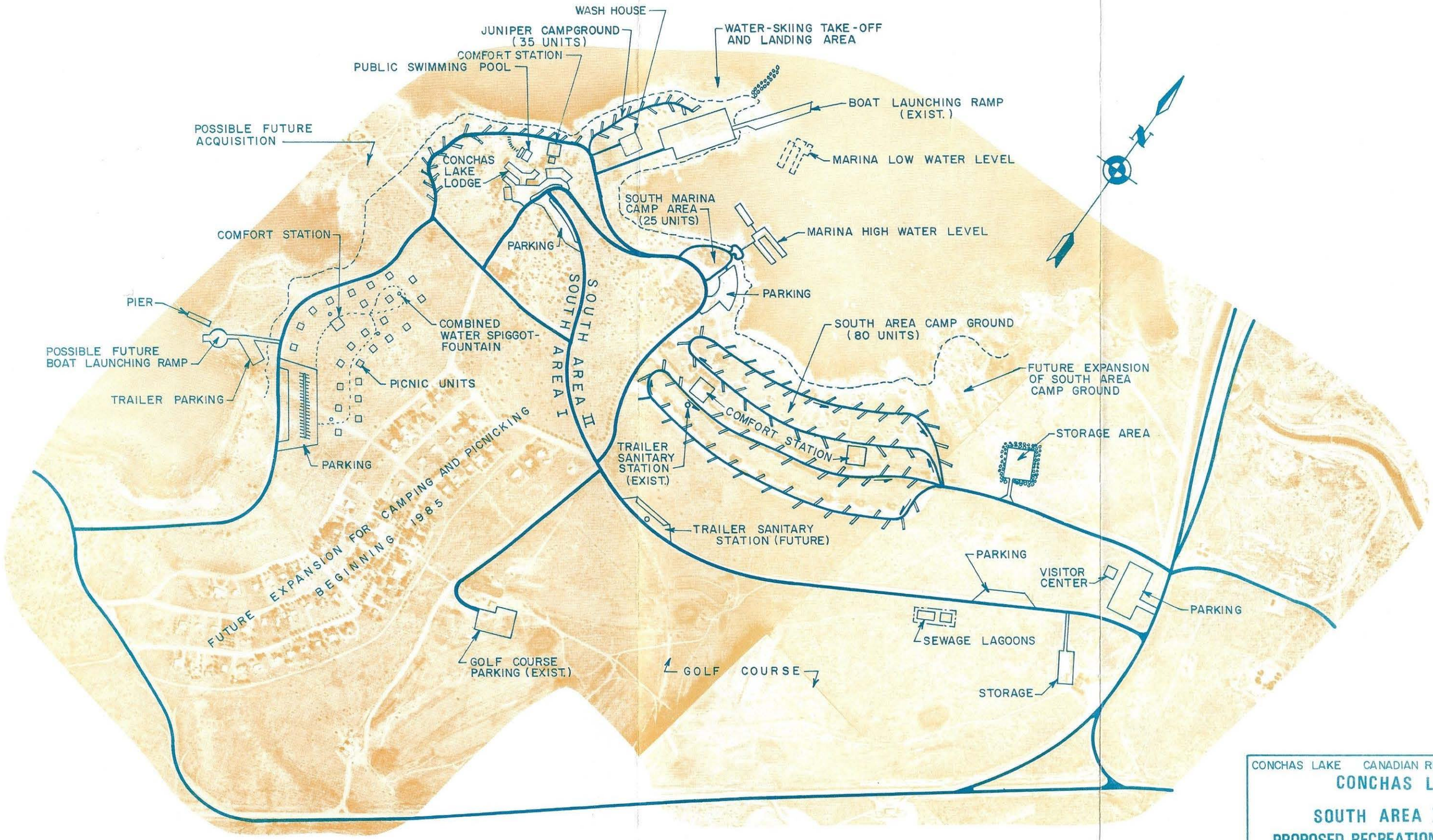
LAND USE ALLOCATION

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO. SC-CD-DM-B-12

PLATE 12



CONCHAS LAKE CANADIAN RIVER NEW MEXICO

CONCHAS LAKE

SOUTH AREA I & II

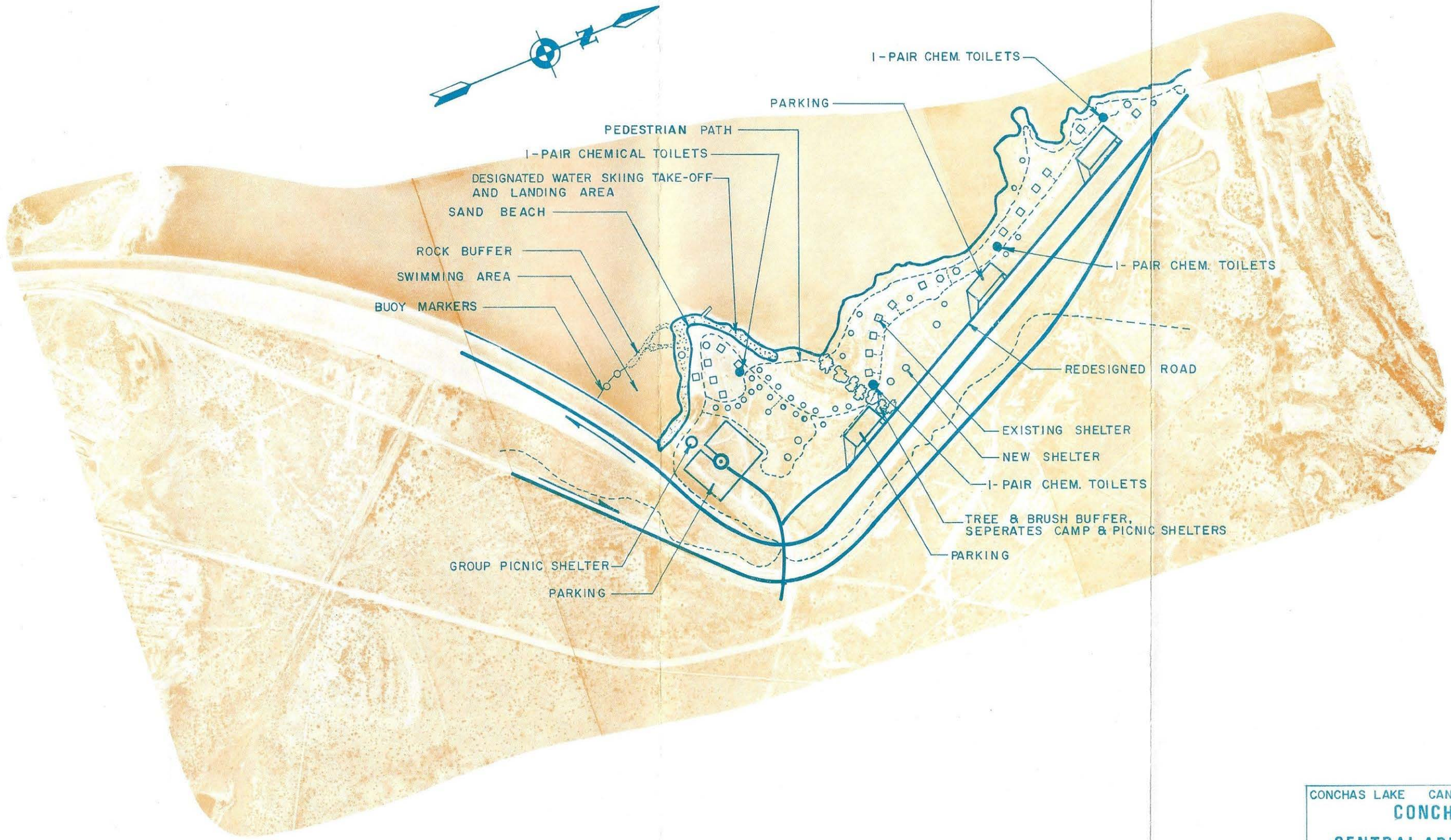
PROPOSED RECREATION FACILITIES

SCALE: 1"=660'

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO. SC-CD-DM-8-13

PLATE 13



CONCHAS LAKE CANADIAN RIVER NEW MEXICO

CONCHAS LAKE

CENTRAL AREA – PROPOSED RECREATION FACILITIES

SCALE: 1" = 660'

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO. SC-CD-DM-B-14

PLATE 14

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

CONCHAS LAKE

NORTH AREA

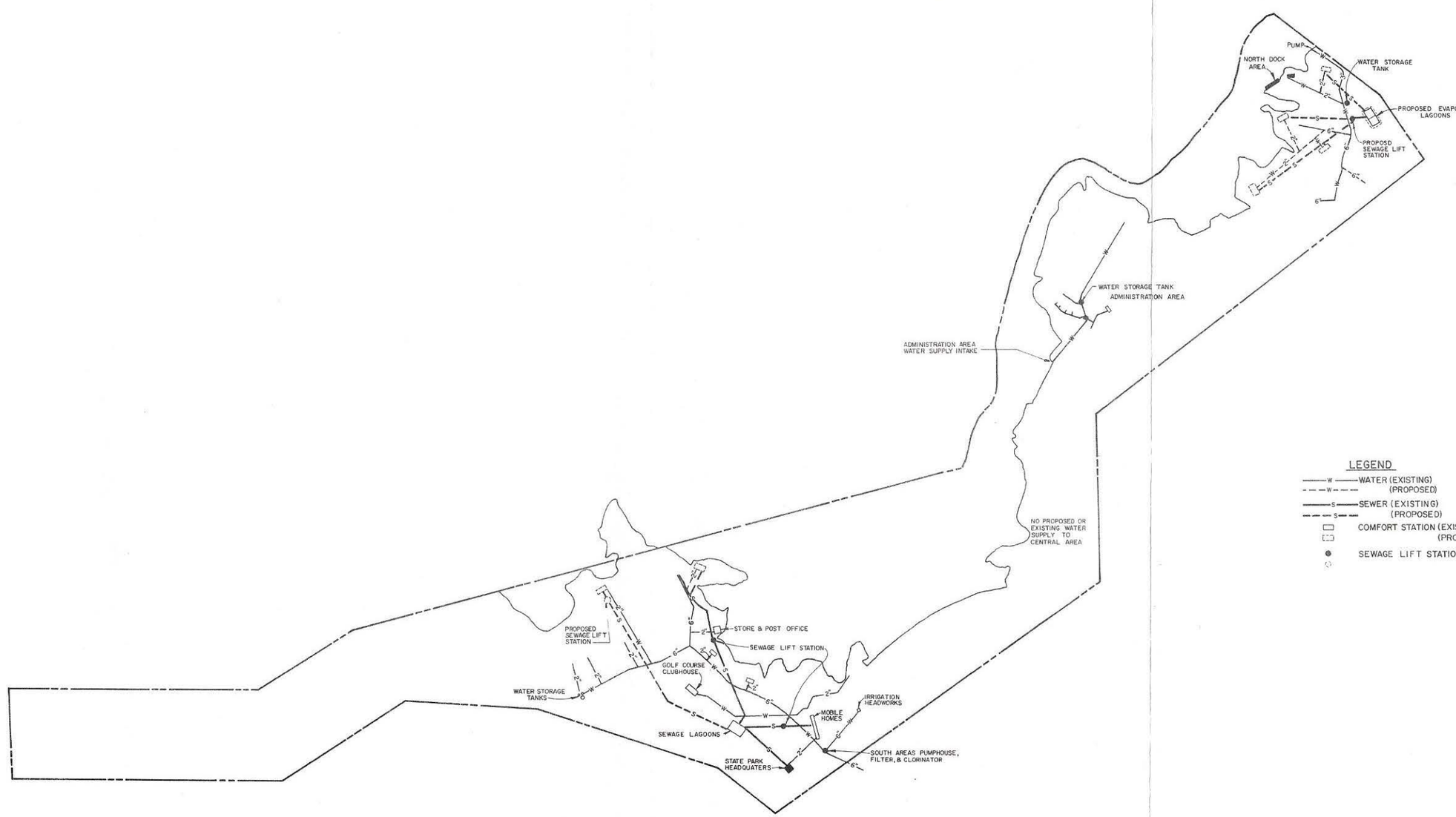
PROPOSED RECREATION FACILITIES

SCALE: 1"=660'

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO. SC-CO-DM-B-15

PLATE 15



LEGEND

- WATER (EXISTING)
- WATER (PROPOSED)
- SEWER (EXISTING)
- SEWER (PROPOSED)
- COMFORT STATION (EXISTING)
- COMFORT STATION (PROPOSED)
- SEWAGE LIFT STATION (EXISTING)
- SEWAGE LIFT STATION (PROPOSED)

CONCHAS LAKE CANADIAN RIVER, NEW MEXICO

EXISTING & PROPOSED ADDITIONAL WATER SUPPLY & SEWAGE

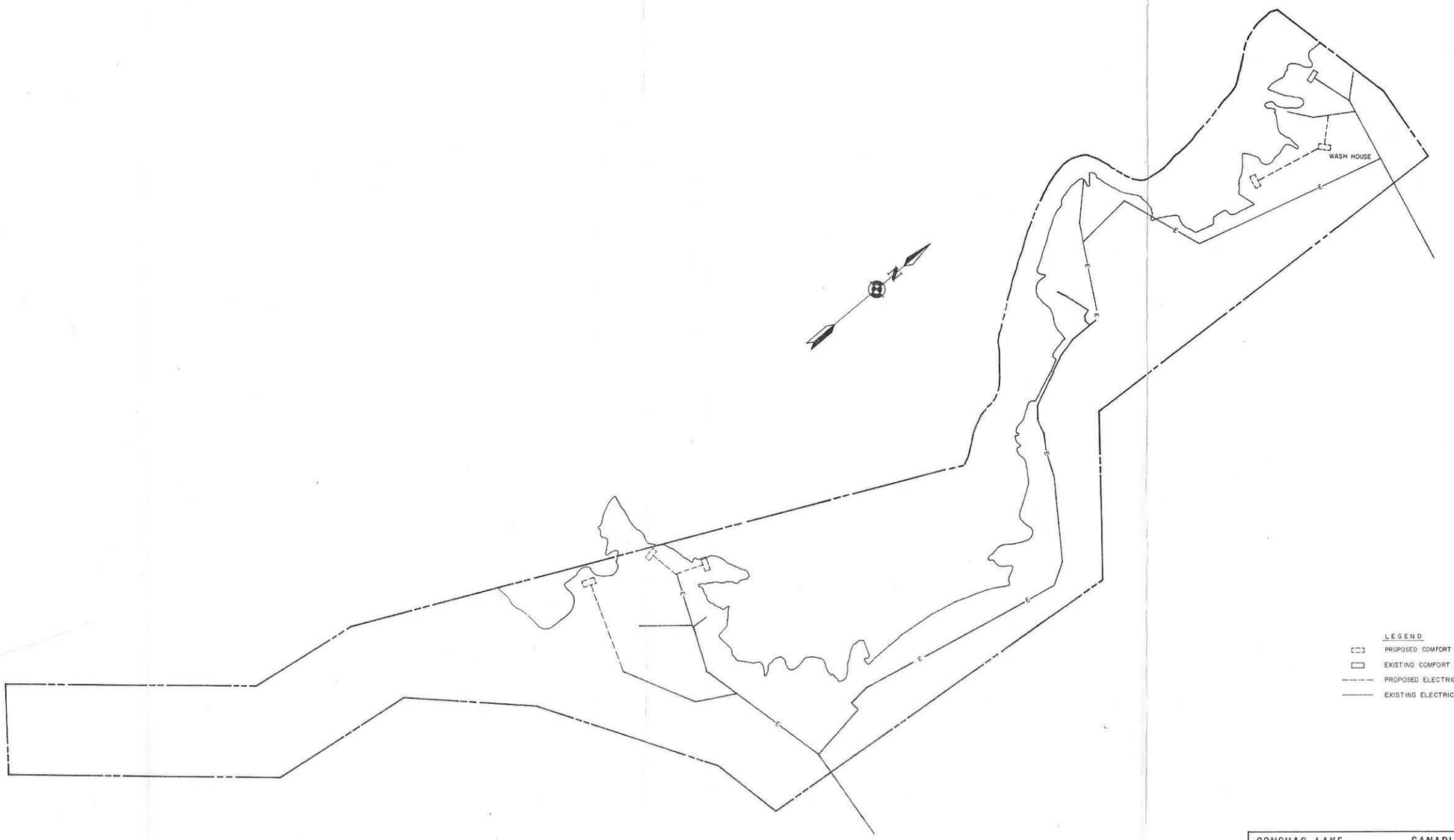
US ARMY ENGINEER DISTRICT, ALBUQUERQUE, N.M.

FILE NO. SC-CD-DM-B-2

PLATE 16

CORPS OF ENGINEERS

US ARMY



SCALE: 1"=1000'

LEGEND

- PROPOSED COMFORT STATION OR WASH HOUSE
- EXISTING COMFORT STATION OR WASH HOUSE
- PROPOSED ELECTRICAL LINES
- EXISTING ELECTRICAL LINES

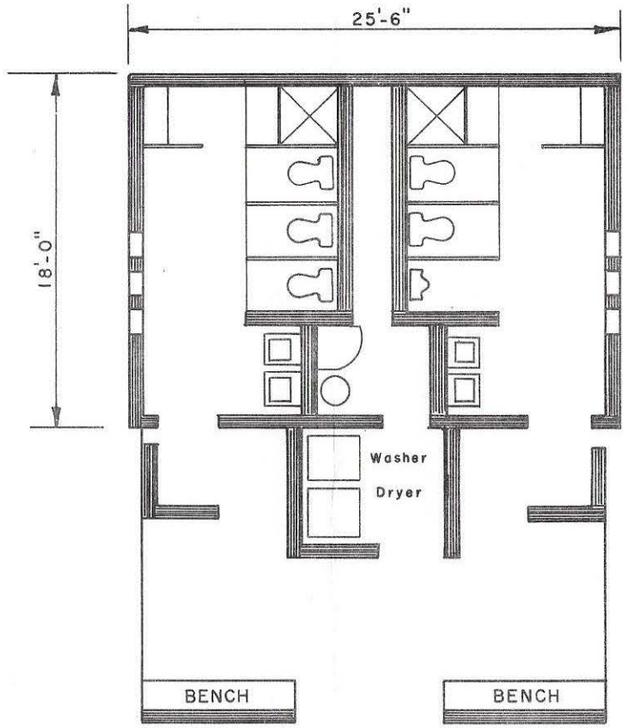
CONCHAS LAKE CANADIAN RIVER, NEW MEXICO

EXISTING & PROPOSED ADDITIONAL ELECTRICAL SYSTEM

US ARMY ENGINEER DISTRICT, ALBUQUERQUE, N.M.

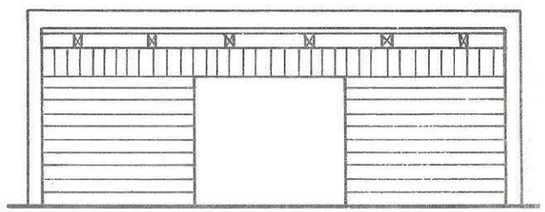
FILE NO. SC-CD-DM-B-2

PLATE 17

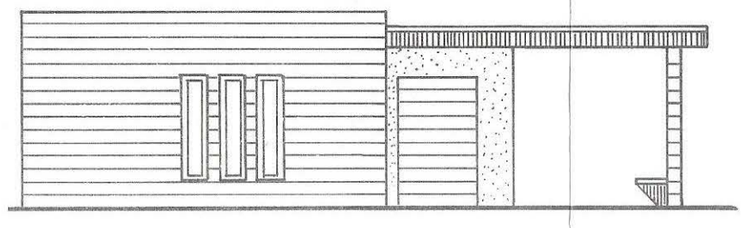


FLOOR PLAN

SCALE 1/8" = 1'-0"



FRONT



SIDE

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

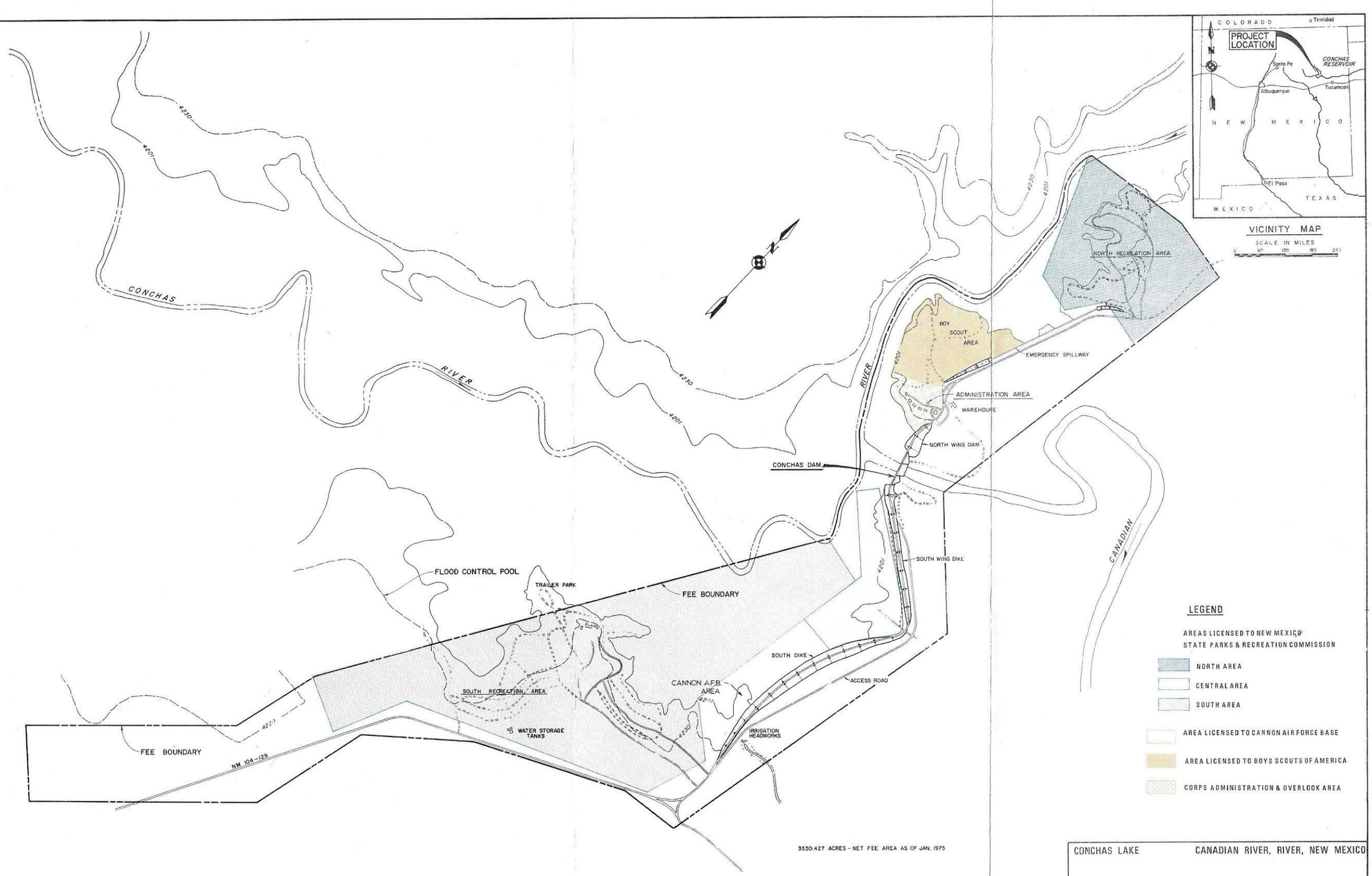
WASH HOUSE

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO

PLATE 19



3530.427 ACRES - NET FEE AREA AS OF JAN. 1975

CONCHAS DAM & RESERVOIR

SCALE: 1"=1000'

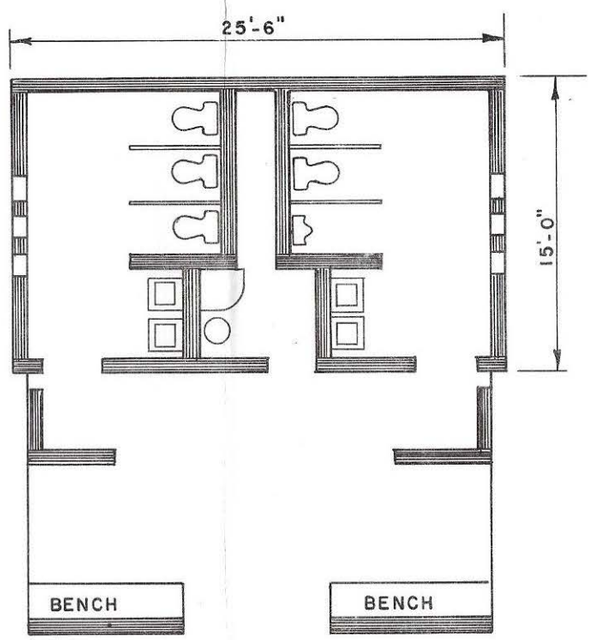
CONCHAS LAKE — CANADIAN RIVER, RIVER, NEW MEXICO

CORPS FEELANDS & LICENSE AREAS

U S ARMY ENGINEER DISTRICT, ALBUQUERQUE, N.M.

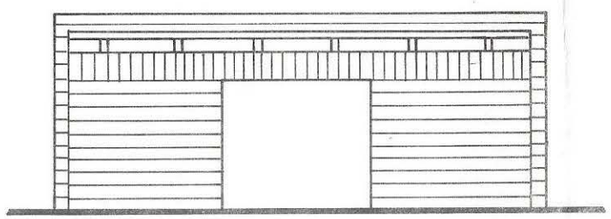
FILE NO
SC-CD-DM-B-2

PLATE 5

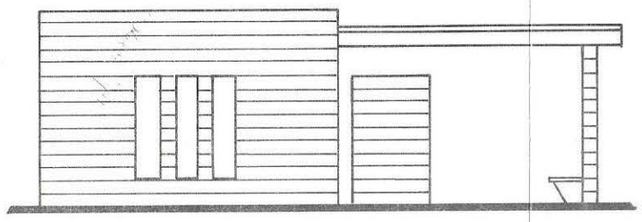


FLOOR PLAN

SCALE 1/8" = 1'-0"



FRONT



SIDE

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

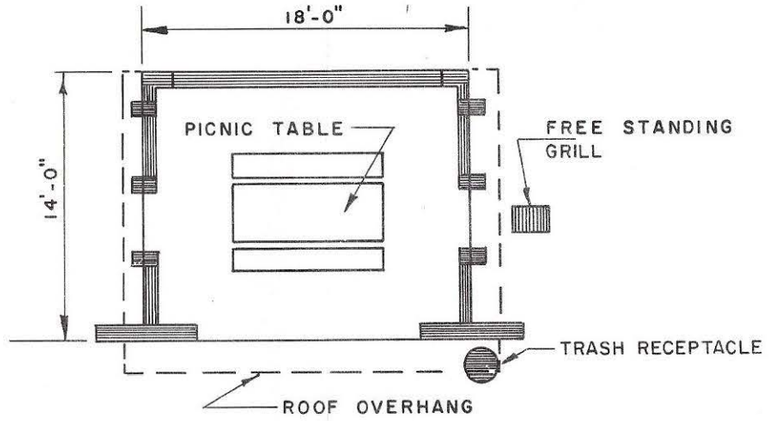
COMFORT STATION

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

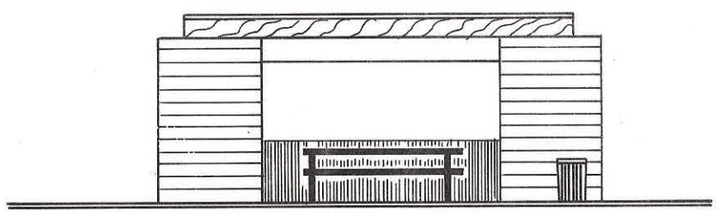
FILE NO

PLATE 20

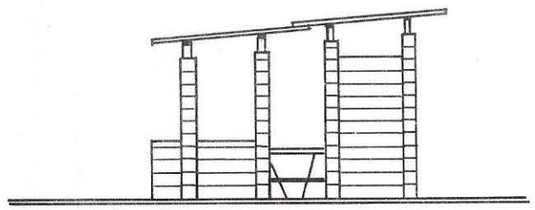


FLOOR PLAN

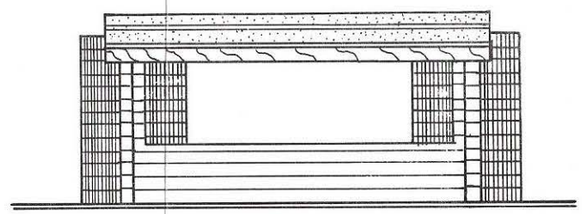
SCALE 1/8" = 1'-0"



FRONT



SIDE



REAR

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

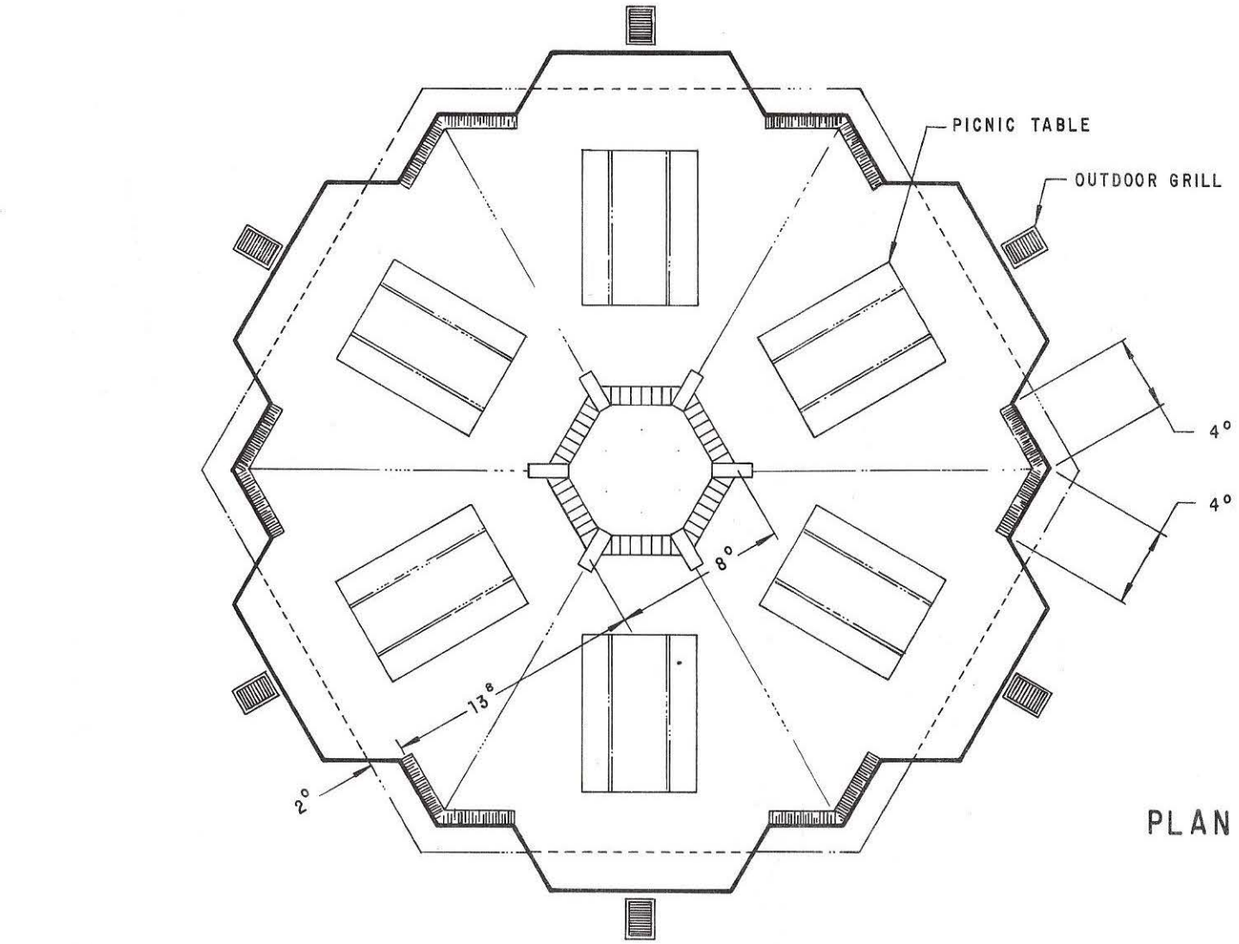
CAMP OR PICNIC SHELTER
TYPICAL

SCALE AS SHOWN

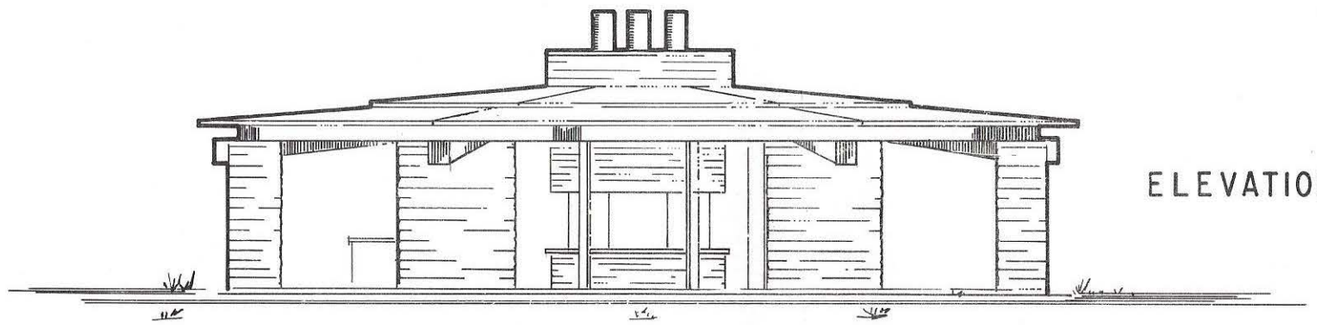
U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO.

PLATE 21



PLAN



ELEVATION

Scale: 1/8" = 1'-0"

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

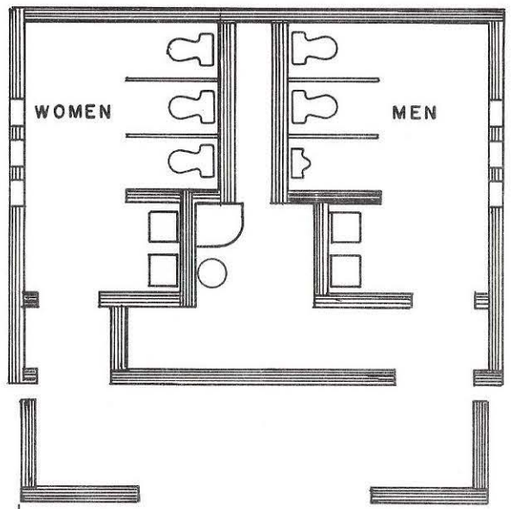
GROUP PICNIC SHELTER

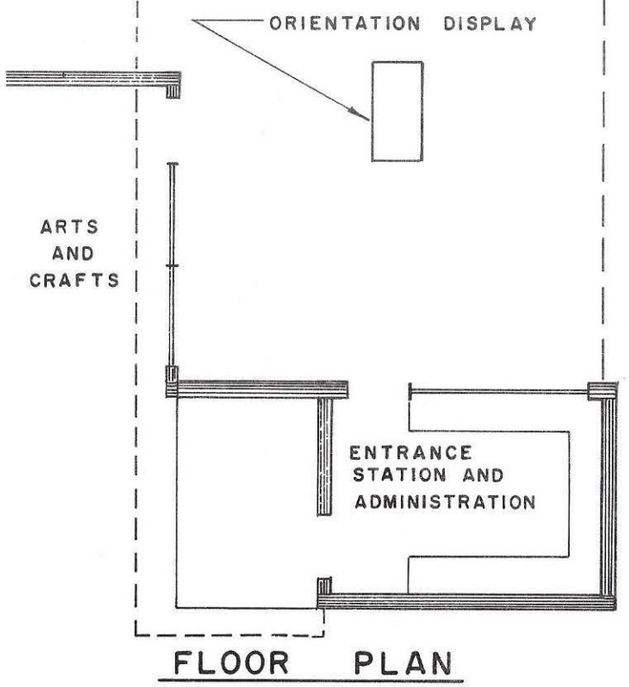
SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

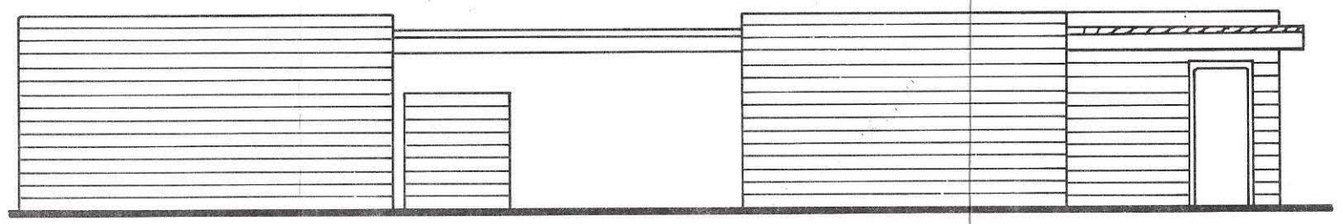
FILE NO

PLATE 22

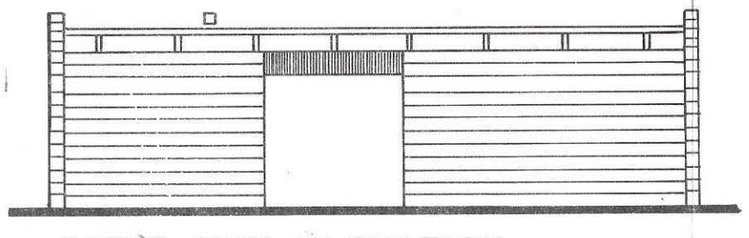




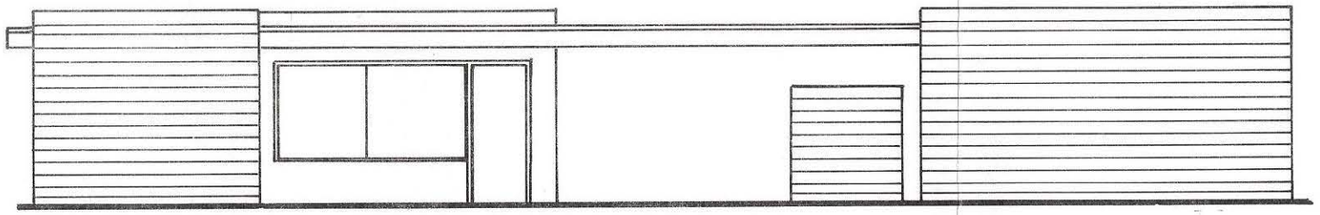
FLOOR PLAN



FRONT ELEVATION



RIGHT SIDE ELEVATION



REAR ELEVATION

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

VISITOR CENTER

TO BE IMPLEMENTED BY

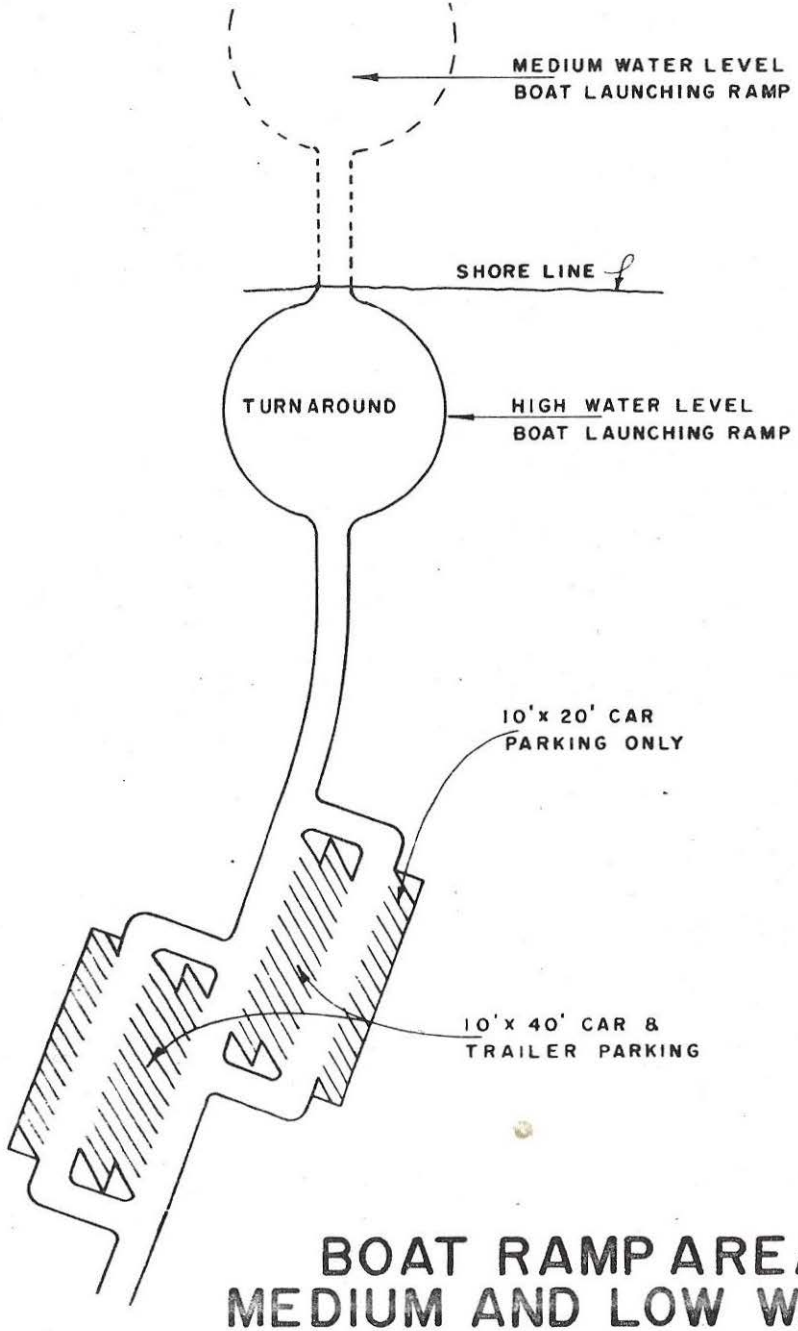
STATE OF NEW MEXICO

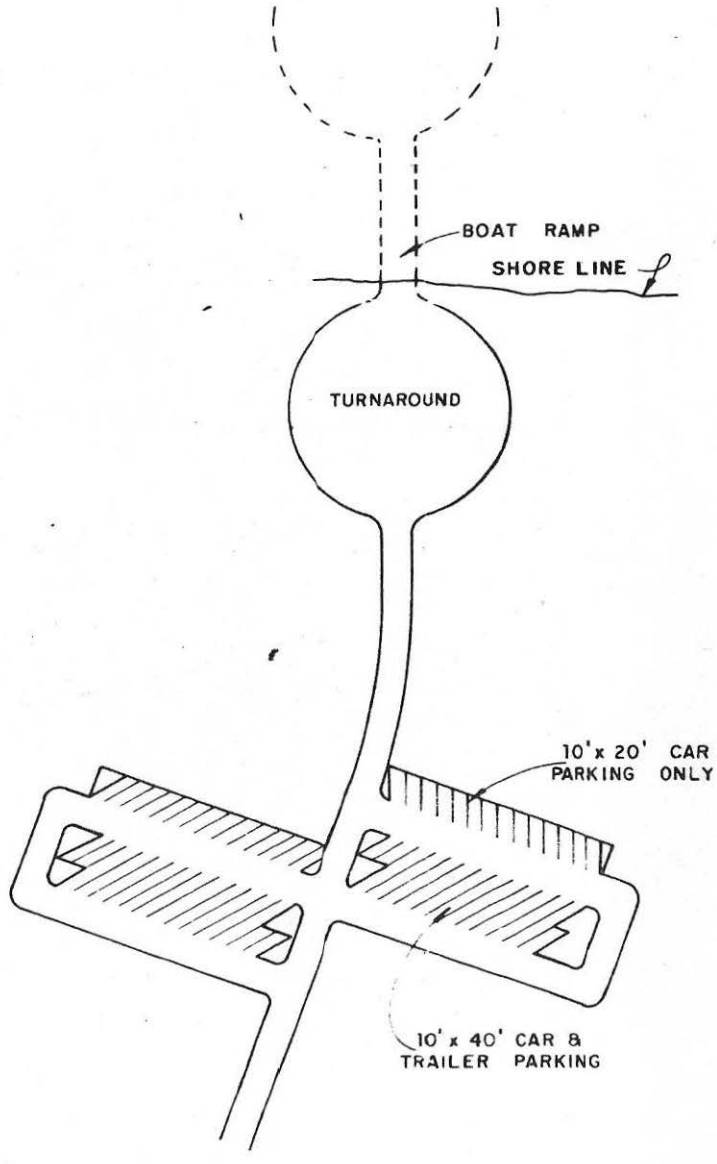
SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

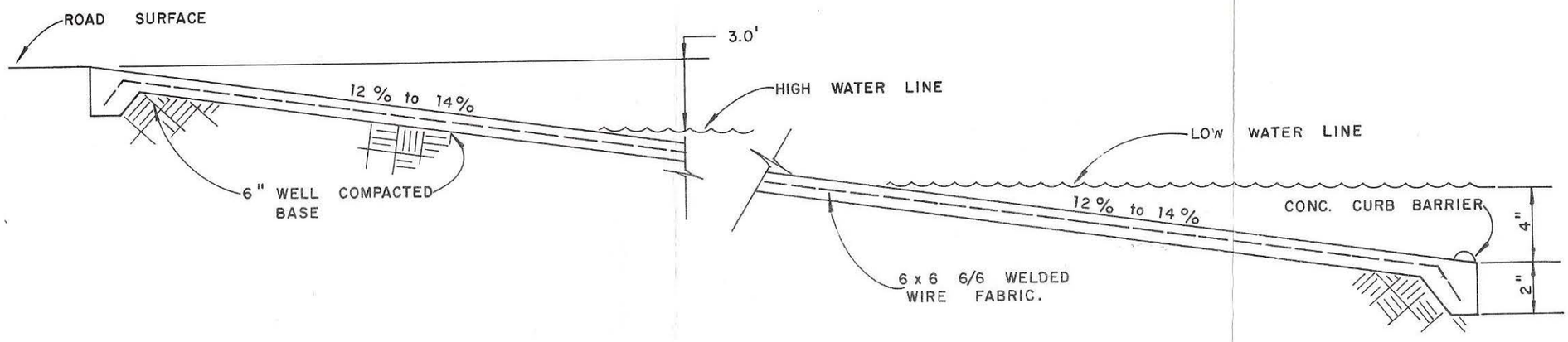
FILE NO

PLATE 23

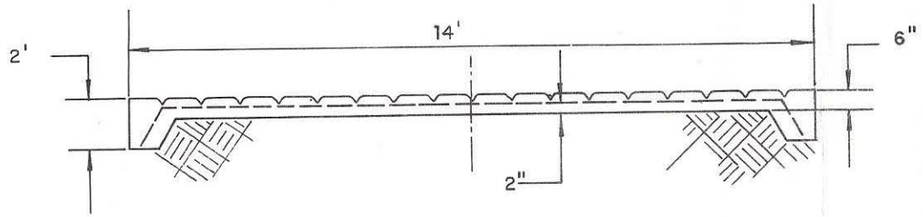




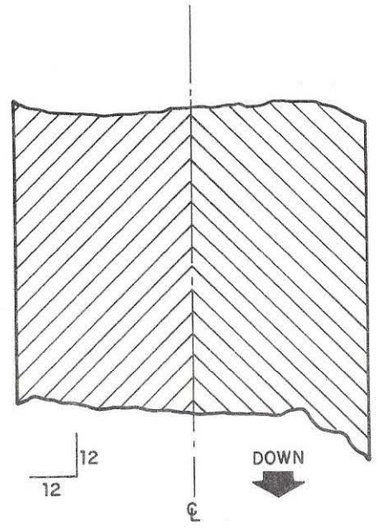
BOAT RAMP AREA FOR HIGH, MEDIUM AND LOW WATER LEVELS



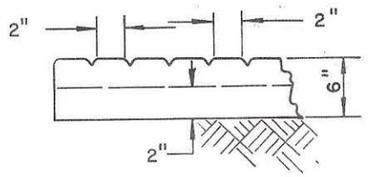
LONGITUDINAL SECTION
NO SCALE



CROSS SECTION
NO SCALE



SURFACE
NO SCALE



GROOVE DETAIL
NO SCALE

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

BOAT LAUNCH RAMP DETAILS

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO

PLATE 25

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

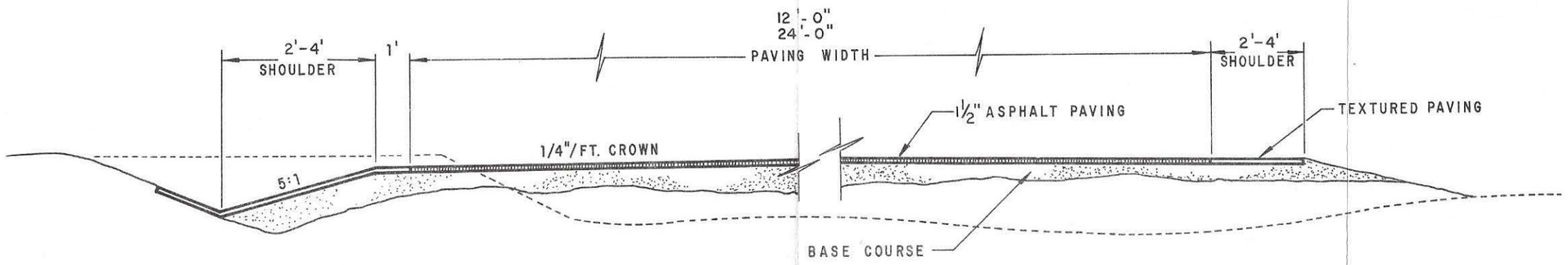
SWIMMING BEACH
TYPICAL

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

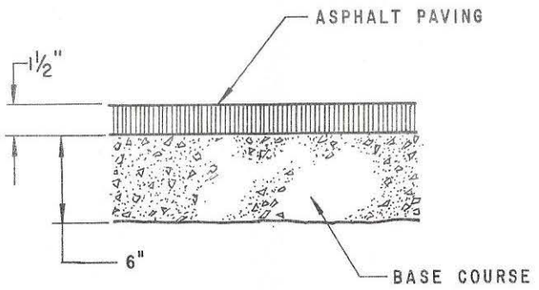
FILE NO

PLATE 26

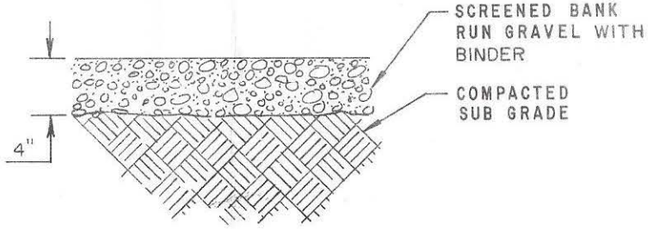


TYPICAL ROAD

No Scale

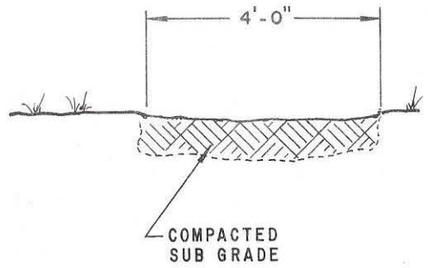


ASPHALT PAVING



GRAVEL
(ALTERNATE)

PARKING AREAS



FOOT TRAILS

CONCHAS LAKE CANADIAN RIVER NEW MEXICO

ROADS, PARKING AREAS, AND FOOT TRAILS

SCALE AS SHOWN

U.S. ARMY ENGINEER DISTRICT ALBUQUERQUE NM

FILE NO.

PLATE 27