



A PROPOSED RESORT CENTER
FOR THE
BIG BEND NATIONAL PARK

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I. INTRODUCTION

It is not often that the architectural planner has submitted to him a site of four hundred and seventy acres and is allowed a high degree of freedom in planning the area to serve the needs of a particular problem. Fundamentally, this thesis proposes to exemplify just such a case.

In the Southeastern section of the Big Bend country of Texas, recently acquired by the National Park Service, a site bordering the Rio Grande has been chosen on which to develop the only major tourist accommodations in the Big Bend National Park. This resort center, having excellent climate, is scheduled for year-round usage. With an abundance of space and a wealth of isolated serenity the resort offers a challenge not often afforded the architectural planner schooled primarily in urban space and principals. Hence, this is a planning study large in scope, but lacking in the design factors of urban life. It is, in contrast, a study of what people do when they are temporarily relieved from their ties to industry, the hurried pace of city life and the scenery that is all too familiar to them. Further, the study entails an exploration into the reasons and motives for national park visitation, as well as a study of what the park service has done to satisfy those motives and reasons with regard to varying living accommodations, recreational and cultural facilities.

The scope of the resort area chosen for this thesis

demands of the planner, first; a thorough study of the region, its climate, its culture, and the physical characteristics of the surrounding area. Secondly, (and perhaps mainly) it is a study of a particular site on which the elements that make up a national park activity center should be integrated with regard for the tourist and the administration. Last, it involves architectural groupings of several types of accommodations that are not out of character with the region or its people; groupings romantic enough to satisfy the visitor and realistic enough in matters of service and maintenance to serve their designated purpose.

II. DESCRIPTION OF THE PARK REGION

A. Geological Location and Approaches

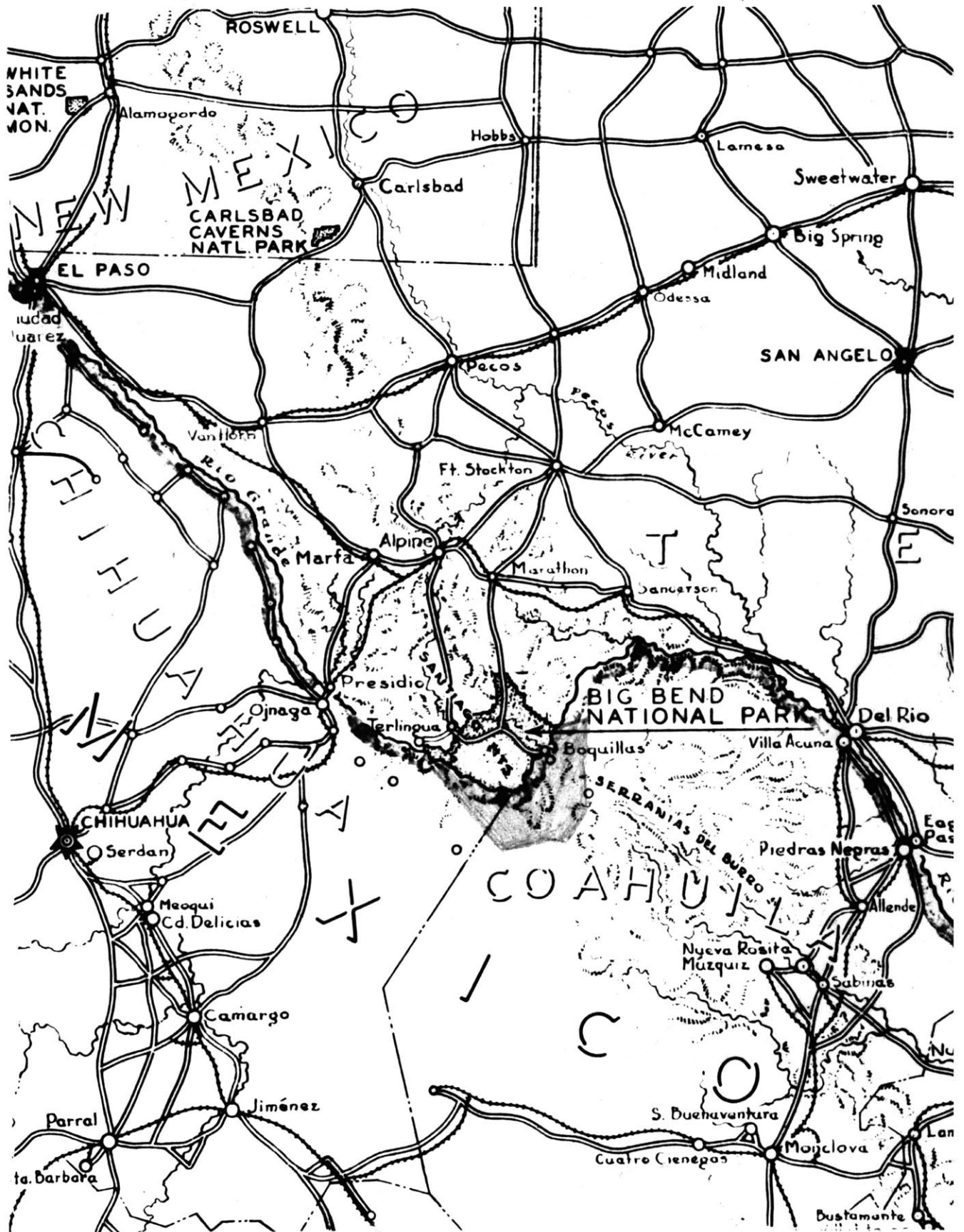
The Big Bend National Park with its 707,895,48 acres derives its name from that section of southwest Texas where the Rio Grande flows southeasterly between the States of Texas and Chihuahua and then makes a "big bend" to the north-east to form the boundary between Texas and Coahuila. No other area of the United States is so isolated as that in and adjoining the Big Bend National Park, and, consequently, the site to be the resort center. "No railroads, telegraph or power lines traverse the area".^{1.}

The nearest major highway is U. S. 90 through the towns of Marathon and Alpine. The approach roads from these towns and their entrances into the park are shown on the adjoining map. The approach road from Marathon handles 90% of the park visitors.

The Southern Pacific Railroad lines serve Marathon and Alpine, while airline service touches Big Springs and El Paso. Carlsbad, New Mexico, the nearest tourist attraction of the National Park System, is 316 miles north of the heart of Big Bend. Two minor Texas state parks lie approximately 100 miles north, while the closest metropolitan park is 300 miles away.

All the Southern approaches to Big Bend dwindle into

^{1.} Big Bend National Park Development Outline. U. S. Dept. of Interior, "General Information", Sheet 1, 1944.



paths and trails in the rugged mountain regions of the Mexican States of Coahuila and Chihuahua. These cart trails are to be improved when Mexico sets aside 900,000 acres, a tract where Pancho Villa maintained a remount station. Then the two areas will be combined as an international park. At such a time some approach from North-Central Mexico must be considered. No crossing into Mexico exists at present, but plans are pending for a bridge near Boquillas two miles down stream from the site proposed for the resort center. With the building of the bridge, more people will recognize the fact that the Rio Grande forms only a political boundary and that natural features on both sides of the river are very similar.

1.
Development reports indicate that the Mexican and American governments will never allow this park to serve as a detour for Pan American Highway traffic which is now routed into Mexico via Laredo, 300 miles southeast.

B. History

The United States received jurisdiction over the Big Bend area from the State of Texas through a deed of cession presented to President Franklin D. Roosevelt, June 6, 1944. Its history can be traced, however, for centuries. Briefly, it is divided into the following periods:

Indian (historic and prehistoric)
Spanish
Mexican
Texas Republic
United States

1. Big Bend Nat'l. Park Develop. Outline. Developed Areas, Sh.1

The rugged country has changed hands as often as the Rio Grande has changed its course. From basket-making Indians who threw darts the Apaches took the land which was subsequently retaken by the Comanches.

One of the first men of the outer world to see the area was Cabeza de Vaca. His reports on the Big Bend country brought the Spaniards with their horses which eventually provided transportation for the Comanches as they swept across thousands of miles each September down the Big Bend into Mexico on their trails of death.

The discovery of Spanish stirrups, a piece of eight, old guns, a gold-inlaid machete and a sword with a Toledo blade bring vividly to mind the days of Spanish reign.

Later under Mexico it was an area dear to Pancho Villa and his bandits.

As late as 1900 it was a haven for bad men of western boom towns. Land surveys and new trails caused ranchers to move westward and herds of longhorns and multicolored cattle roamed the hills and valleys. Some of them grazed conveniently close to the Rio Grande and occasionally amid rustlers' gunfire droves disappeared southward beyond the border.

Since border incidents of 1914 and 1916, there has been peace and quiet in the area. A growing desire on the part of the people of both countries to become acquainted has prevailed. The proposal to develop an international park exemplifies this friendliness. Joint administration and

visitation to the entire area by citizens of both nations should lead to cooperation and better understanding.

C. Physical Aspects

The Big Bend area of West Texas with adjacent portions of Mexico is semi-arid plains characterized by gravel covered slopes, arroyos, and washes. The general topography is interrupted by several conspicuous mountain belts through two of which, in addition to other highlands, the Rio Grande has carved spectacular canyons.

The Big Bend National Park with elevations ranging from 1800 feet to 7,835 feet, and its adjacent Mexican country with mountain ranges up to 11,000 feet, contain on a grand scale scenery typical of the arid desert, forested mountains, and winding river with contact zones where these contrasting types of topography meet and intermingle. It is a region into which the road winds amid constantly deepening solitude and ruggedness in that it is an almost unaltered area of mountainous Mexican border wilderness. "For those interested in what is truly an actual frontier in desert, in mountains, and in natural science the reward is rich".¹

Rising in the geographical center of the Park proper, the Chisos Mountains form a virtual green cloaked island in a sea of desert that was in all respects, millions of years previous, the bottom of an inland sea.

¹. Writers' Program of the W.P.A., Texas; Hastings House, N.Y., 1940.

"The 'Ponderosa Pine-Aspen-Douglas Fir-Arizona Cypress' forests of the high canyons and mountain tops predominate in the Chisos and are the first of four types of vegetative cover. The 'Pinyon-Juniper Woodline' Communities cover the lower mountain slope and foothills and the 'Desert Shrub' consisting of creosote bush, yucca, and varying species of cacti cover the lowlands, followed by the Aquatic Communities found along the Rio Grande and in certain localities of the Chisos Mountains".¹ In respect to flora and fauna, North and South, East and West meet.

Animal life varies with the vegetative cover. Bear, antelope, and mountain lions are found in the mountains. Coyotes and the Texas peccary haunt the low brush foothills, while the desert life consists largely of reptiles. Along the Rio Grande are beavers and opossum.

D. Climate

Being out of the storm and snow track that makes many national parks mere summer resorts, the park and region has a climate to serve winter resort needs as well, if not better, than it does summer occupancy. The Chisos Mountain area open from May until September will require blankets every night, while the warm canyons of the Rio Grande have extremely mild winters and average 340 days of sunshine per year.

¹.Big Bend National Park Dev. Outline, Vegetational Cover, Sh.1

Rio Grande Valley temperatures climb to 120° (in the sun) occasionally during the month of August, but with the humidity never over 38% and the breeze blowing constantly from the southwest. The hottest month is pleasant so long as shade is present.

Yearly rainfall averages 20 inches in the Chisos Mountains, 14 inches in the Sierra del Carmen of Mexico, and 8 to 10 inches in the desert lowlands and along the Rio Grande. "The rains are of the thunder shower type and are confined to a relatively small area; thus, some areas frequently do not receive any rainfall throughout the year."¹ Storms are most common between July 15 and September 15. One or possibly two light snows occur on the tops of the Chisos in December or January. Usually, the temperature in the mountains does not fall below 20° and in the Rio Grande Valley frost very seldom occurs.

E. Society and Culture

West Texas, being part of the semi-arid range lands of the Southwest, its mountains are rugged and its plains are hot and dry, and vision is limited only by the power of ones eye. In this vast country, only the most rugged individuals were able to earn an existance. Even the plants and animals were forced to develop protective facilities. The Big Bend region is superfluous in contrast to the rest of the West Texas picture, in that its mountains are more

¹. Big Bend National Park Development Outline. General Information, Sheet 2.

rugged, its plains more parched, its plant and animal life more varied, and its location more isolated.

The total population of the region before its establishment as a national park was 200 persons, 60 being "anglos" and the remainder Mexican. In this area the size of Rhode Island rarely were there more than thirty votes cast.¹ Ranching was the chief occupation of the "anglos" and their land holdings varied in size from 1000 to 500,000 acres.² On this acreage could be found a few small stores and roadside service stations. Few of these inhabitants took lengthy summer vacations, but they hunted, fished, attended local horse races and baseball games and often enjoyed a rail fence rodeo in a neighbor's corral. In addition, recreational activities of the Mexican population included colorful "bailes" and the celebrations continue for two or possibly three days. On the whole, they were a deeply religious though superstitious people.

Most of the Mexican families represented an element whose life had been a constant struggle for existence by utilizing every natural resource. They brought saplings from the mountains on the backs of their burros and whittled

1. Big Bend Nat'l. Park Development Outline. Sheet 1.

2. W.P.A. Writers' Project, Page 619.

it into furniture, or burned it for fuel. The goat herd served their needs for clothing, milk, cheese, meat, shoes and water bags, and from the bones, toys were carved for the babies. The native beeswax went into candles which sputtered before the shrines niched in the adobe walls of the shelters. The honey industry was one of importance. The bees were "herded" (as bee owners express it) to fields where the blooms of the desert cacti were at their best.

The rarity of money mattered little. Life was a continuation of hard work spiced on Sundays and holidays with the barbecues, rodeos, and fish frys. The Channel Catfish of the Rio Grande attain great size and fish fries were numerous. It was not uncommon to travel a hundred miles to attend one.

III. CONCEPTS OF PARK PLANNING

A. Recent Trends

Until recent years it was the policy of the National Park Service to build into areas under its jurisdiction, only such developments as public usage demanded. Probably because of inadequate funds and methods the development lagged far behind the demand. A lack of foresight caused spasmodic developments, and mistakes were sometimes made as in the case of a Grand Canyon grouping of cabins too close to the scenic attractions, hence, overnight tourists were subjected to the disturbance of a continual flow of sight-seers near their "domain".

Seemingly, the National Park Service has learned a lesson and its park planners usually adhere to a master plan that anticipates the changes in public usage and the need for expansion that is likely to come. Adequate study of motives and reasons for park visitation usually can determine the size and scope of the plant that will be necessary to handle the public wants. The features of a resort installation deemed most desirable on the part of the tourist can be obtained from the interpretive programs of the many national parks that serve as proving grounds for the mistakes in planning. Charts and graphs of Park Use Studies and Demonstrations^{1.} support some of the basic concepts in planning the installation that is to serve the demands of

1. U. S. Dept. of Interior, Park Use Studies and Demonstrations; U. S. Gov. Printing Office, Wash. D. C., Part 1.

those who visit national and state parks. The following is a brief analysis of several of the charts:

1. To fit the incomes of tourists accommodations should range from free camp grounds to a scale bordering a resort hotel.
2. The settings for the preparation and serving of meals should vary from the open campfire to a well-equipped kitchen and dining room.
3. The sizes of parties visiting park areas occur in the following frequency:

<u>Percent of Parties</u>	<u>Number of Persons in Party</u>
24%.....	4
21%.....	2
16%.....	5
14%.....	3
10%.....	6
5%.....	7
5%.....	1
5%.....	All others

These figures give scale to the composition of the cabins and their arrangement in space. Individuality of cabins is to be maintained, but youth groups and organized camping^{1.} will appreciate arrangements which have privacy, yet belong to a definite social unit.

4. Family composition most frequent in park visitation is 2 adults and 2 children and the favorite shelter

^{1.} Good, Albert H. Park and Recreational Structures stresses uses of 4-8-16-32 in cabin groupings.

of this class is a two-room cabin with a bath, or a housekeeping unit.

5. It is evident from the data gathered by the State and National Park Services, that the white collar professional group is the bulk of the park with some recent gains registered on the part of workers in industry and agriculture.
6. The program for children in large park areas is rather lax and much too often organized activities do not include them.
7. Well organized park programs which stimulate initiative and expression of talents receive most participants.
8. The presence of the trailer in national parks presents a problem warranting immediate solution.
9. Recreational choices of the park patrons are listed in the order of their popularity:
 - a. swimming
 - b. fishing
 - c. picnicking
 - d. touring
 - e. camping
 - f. hiking
 - g. boating
 - h. hunting
 - i. tennis
 - j. horse-back riding

These are some of the needs and desires of park patrons derived from compilations, and their consideration should formulate broader park programs.

There is still a psychological angle to park visitation that results in furthering the organization of cultural facilities that may be desired by many visitors. Although motives which prompt persons to visit national parks are many and varied, it is safe to say that the majority come to enjoy and obtain inspiration from the scenery, to relax and rest amid slow pace surroundings and to receive new viewpoints and new experiences, or to subject themselves to more primitive ways of life in order to be less inhibited.

In early days of visitation to the new Park, many will undoubtedly come out of curiosity. What does the new Park have to offer? How does it compare with the other national parks in superlative scenery, wealth of wild flowers, and abundance of wild life?

Regardless of their motives for coming, all will expect to enjoy their visit.

Enjoyment responses are physical, emotional and intellectual. The hiker, skier, mountain climber, horseman and fisherman responds with pleasure to the physical demands of his favorite sport. The artist (everyone is somewhat an artist at heart), stops to admire a beautiful sunset and is refreshed and inspired by superlative scenery. The student, hobbyist, and mentally active individual quickens with interest to a clear explanation of a previously unknown phenomenon of nature or mulls

over a question stimulated by some sight or sound until he can obtain, with satisfaction, a clarifying answer from someone who knows and whose interests provide an answer of even wider scope than the question requires.

It is anticipated that visitors to Big Bend National Park will come to the area for one of a number of reasons. Some will seek a favorable summer or winter climate for rest and relaxation; others will desire primarily to fish in the Rio Grande; hiking, climbing in the Chisos Mountains will motivate other visitors. Some will be interested in mountain scenery, the desert flower displays of early springtime, or the colorful spectacle produced by the ocotillo, the giant dagger, or the hedgehog cactus when one or another of these species reigns. Many visitors will seek the area because of the atmosphere of Old Mexico which prevails. The natives' many and varied uses of desert plants will interest many who visit border country. Big Bend is a region rich in folklore and the tales of Indian fights, border troubles, massacres, smuggling, the Texas Rangers and similar romantic epics will lend atmosphere to evening firelight gatherings. Visitors will seek the story behind the arrow points, mortar holes in ledges along the Rio Grande, and caves once occupied by prehistoric man.

Fossils are everywhere and the unfolding story of the great forces of nature which have preserved those early

forms of "sea life"^{1.} through millions of years is there to be traced. Many visitors who come to the Park for one reason will leave realizing that their greatest experience came from discovery of some fascinating feature whose existence they learned only by accident or through the assistance of a member of the park staff.

Some people will come to the Big Bend Park to exhaust pent energy - some, energy to regain. Whether the visitor seeks diversion, recuperation, education, alleviation, or social contacts, an attempt to serve these needs of the individual must be made.

The briefest and simplest manner in which to divide the national parks' public is according to its length of stay and its requirements upon the developed site. Such division is:

1. Enroute visitors
2. Outing visitors
3. Overnight guests
4. Visitors for indefinite stay

"Enroute visitors" stop out of curiosity and perhaps for food or comfort, and before leaving linger over the educational and cultural elements on the site. Their stay is rarely over three hours.

The "Outing visitor" expects to partake of the

1. "One unearthed clam shell measured 35 x 49 inches", Saturday Evening Post, "Our New Park on the Rio Grande", pg.106, December 2, 1944.

recreational features for which he sought the area. He may eat one, maybe two meals on the site and attempt to spend in five to six hours the maximum of energy. His interest in the organized park program will be limited because of his length of stay.

Various types of accommodations may interest the "Overnight guest" as well as various places for eating. The recreational and cultural facilities will be visited for a short period of time. Big Bend National Park will not have a great number of one night guests. The visitor present for an indefinite stay will do one of two things; (1) explore all of the possible elements the site and surrounding territory has to offer, (2) spend the entire visit doing one thing which has attracted him to the area.

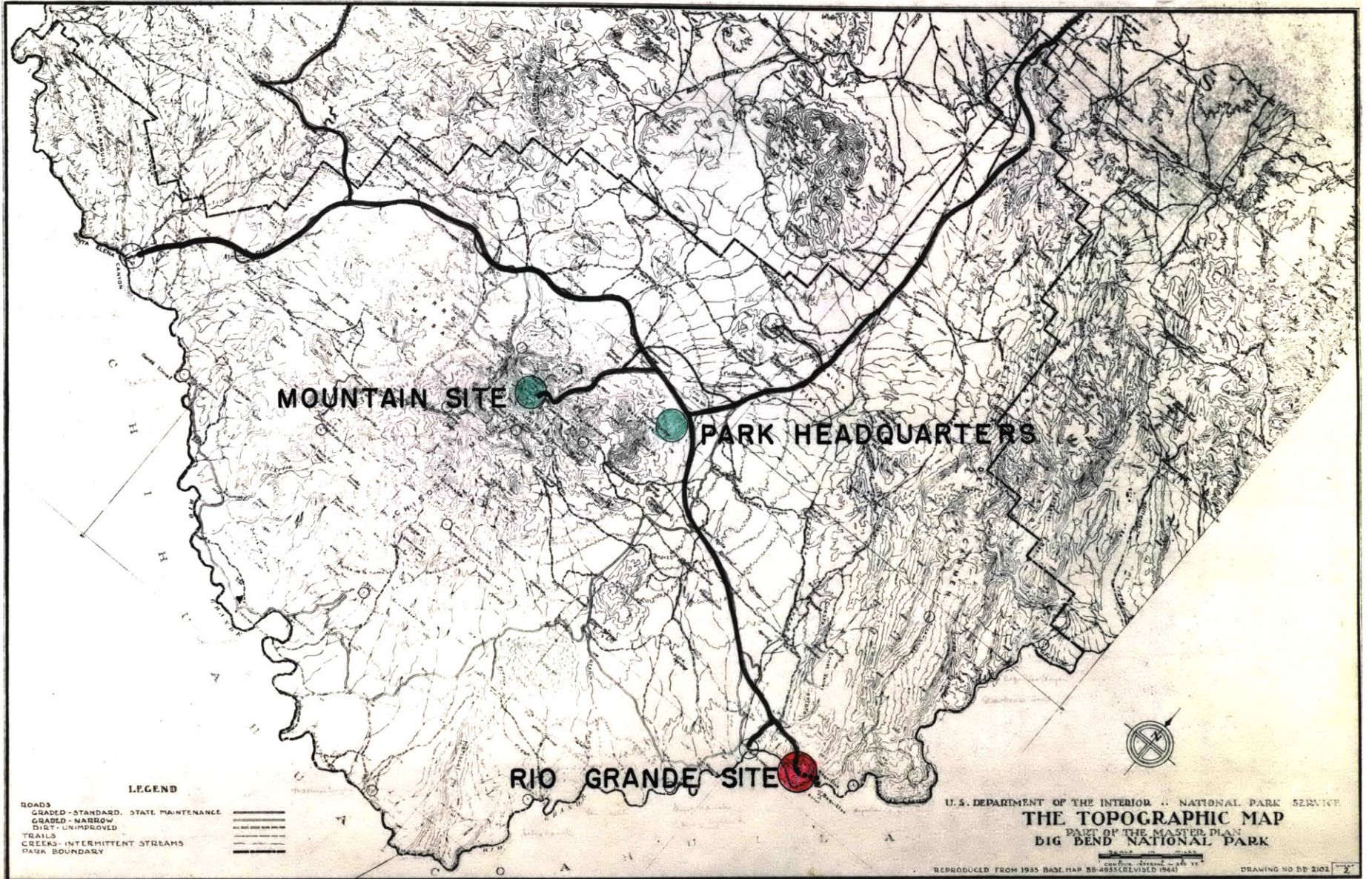
For the person with various interests, the organized park program will constitute a boon; for the one-hobby visitor it should tactfully broaden his interest in the park and its opportunities. Basically, these are the types for which one plans.

IV. THE MASTER PLAN - ITS PECULIARITIES

The master plan for the Big Bend National Park has been formulated by the National Park Service and no changes are anticipated with regard to this thesis.

The main approach roads from Marathon, Texas, enter the park through a checking station at Persimmon Gap, where almost immediately the Chisos Mountains loom into view as a green and purple mass above the desert. The road continues twenty-seven miles to the base of the mountains where it forks at a place called Panther Springs. In this area the park headquarters, administrative buildings, museum, and the adjoining residences will be situated.

A brief description of the services rendered by the west road fork seems appropriate before proceeding to the Rio Grande site that is used in this thesis. The west fork from the Park headquarters is an improved continuation of the state route 277 which rounds the Chisos Mountains and disappears into the southwest where it ends abruptly after 35 miles at the mouth of the Santa Helena Canyon. A spur of the road turns to the south and the heights of the Chisos where a lodge, store, grocery, stables and cabins will be open from May 1 to September 30. This represents the summer use area because of the cool mountain air. The development in this area is almost complete. From peaks in the area, one can see 150 miles into Mexico and coolly



MOUNTAIN SITE

PARK HEADQUARTERS

RIO GRANDE SITE

LEGEND

- ROADS
- GRADED - STANDARD, STATE MAINTENANCE
- GRADED - NARROW
- DIST - UNIMPROVED
- TRAILS
- CREEKS - INTERMITTENT STREAMS
- PARK BOUNDARY

U.S. DEPARTMENT OF THE INTERIOR .. NATIONAL PARK SERVICE
THE TOPOGRAPHIC MAP
 PART OF THE MASTER PLAN
BIG BEND NATIONAL PARK

REPRODUCED FROM 1935 BASE MAP 55-4955 (REVISED 1944) DRAWING NO DE 2102

survey the slumbering huts of the desert. Though scenery is inspiring on all sides, the choice vantage points are accessible through horse and pack trails to some sixteen campsites located high in the mountains a half days journey apart. A network of pack trails connects this mountain area with the major site proposed for development along the Rio Grande.

The border resort center is reached after a southeasterly drive of twenty-two miles from the Park headquarters at Panther Springs. First views of the site are obtained on the approach road from Boquillas Pass. The 470 acre site is an alluvial plain between two ridges and is entered from the northwest corner. At the present, the improvement of this road ends at the resort site, but upon the completion of a bridge at Boquillas two miles down stream, the road to that small village will be improved and will cross the Rio Grande into Mexico. Further improvements on the Mexican side will complete a loop from the Boquillas area westward through Mexico to a crossing contemplated at the end of former state route number 227 at Santa Helena Canyon.

Some aspects peculiar to Big Bend National Park with regard to similar units of the park system are to be noted. The Development Outline of the Big Bend National Park stresses the desire that the majority of the beauty spots of the area remain accessible only by horse and pack trails. This plan may be met with indignation on the part

of some patrons, but the desire to have the area remain an actual frontier has strong expression.

While many national and state parks can feature recreation based upon forests and bodies of water, the Big Bend Park is lacking in both. Only the Rio Grande Valley and a few sections of the Chisos Mountains have water in quantities to support community development.

The solitude of the area has been increased by the acquisition of all land in the area and subsequent removal of the human population. The enveloping solitude is felt not in terms of quiet deep woods where the immediate world is shut out by tall trees and vegetation, but rather by the insignificance that is felt in having a world of space in which to turn around.

In the respect that any architecture is easily seen and must with its low lines and horizontal character adjust willingly to the landscape.

Last, but not least, the international element has not, hitherto, been a consideration for park planners. The solution - that the final goal be an international park with joint administration - makes it a rare and interesting problem.

V. PROBLEM

A resort site bordering the Rio Grande has been chosen by the National Park Service, Region III Office at Santa Fe, New Mexico. The development of the 470 acre site and some of its architectural facilities is the proposed study of this thesis.

VI. PROGRAM

* A. COMMUNITY LODGE - ADMINISTRATION FACILITIES

Lobby and waiting area

Administration

Managing Desk

Business office

Director's office

Storage

Curio concession

Toilet facilities

Restaurant-dining area

Snack bar

Helps' dining room and lockers

Kitchen and needed facilities

Air condition, heating rooms

Storage

Shed for three cars

Barber Shop

Beauty Shop

Loggia or covered porch

* B. OUTDOOR THEATER

Open stage and dance floor

Seating area for 200 persons

Projector pedestal

* C. MUSEUM

Exhibit space

Small library

Storage

Preparation area

Handicraft shop

D. GENERAL STORE

Large provision storage

Groceries and camping equipment

FILLING STATION

Gas

Oil racks

E. RIDING STABLES BARN: CORRAL (EXPANDABLE)

Stalls for 30 horses

Feed storage

Equipment storage

Caretaker's room

F. BATHHOUSE ADJACENT TO SWIMMING

G. 50 CABIN SITES

Adjacent comfort stations - launderies

Small storage building

H. TENTING - TRAILER AREA

1 Comfort station - laundry building

I. 20 - 30 HOUSEKEEPING CABINS

* J. GUEST RANCH

Entry

Keeper's desk

Lounge - game room

Dining room

Kitchen-bakery necessary facilities

Air conditioning facilities for community rooms above

60 Rooms with baths - various accommodations

Play areas - grownups and children

Helps' bunkhouse

Car shed

Equipment - buildings

K. INFIRMARY

Two 2-bed wards

Isolation room

Nurses room

Baths and toilet

L. UTILITY BUILDING

Electrical generating equipment

Primary and secondary distribution

* Note: Items A, B, C, and J are chosen for architectural study along with this site development.

VII. DISCUSSION OF SOLUTION

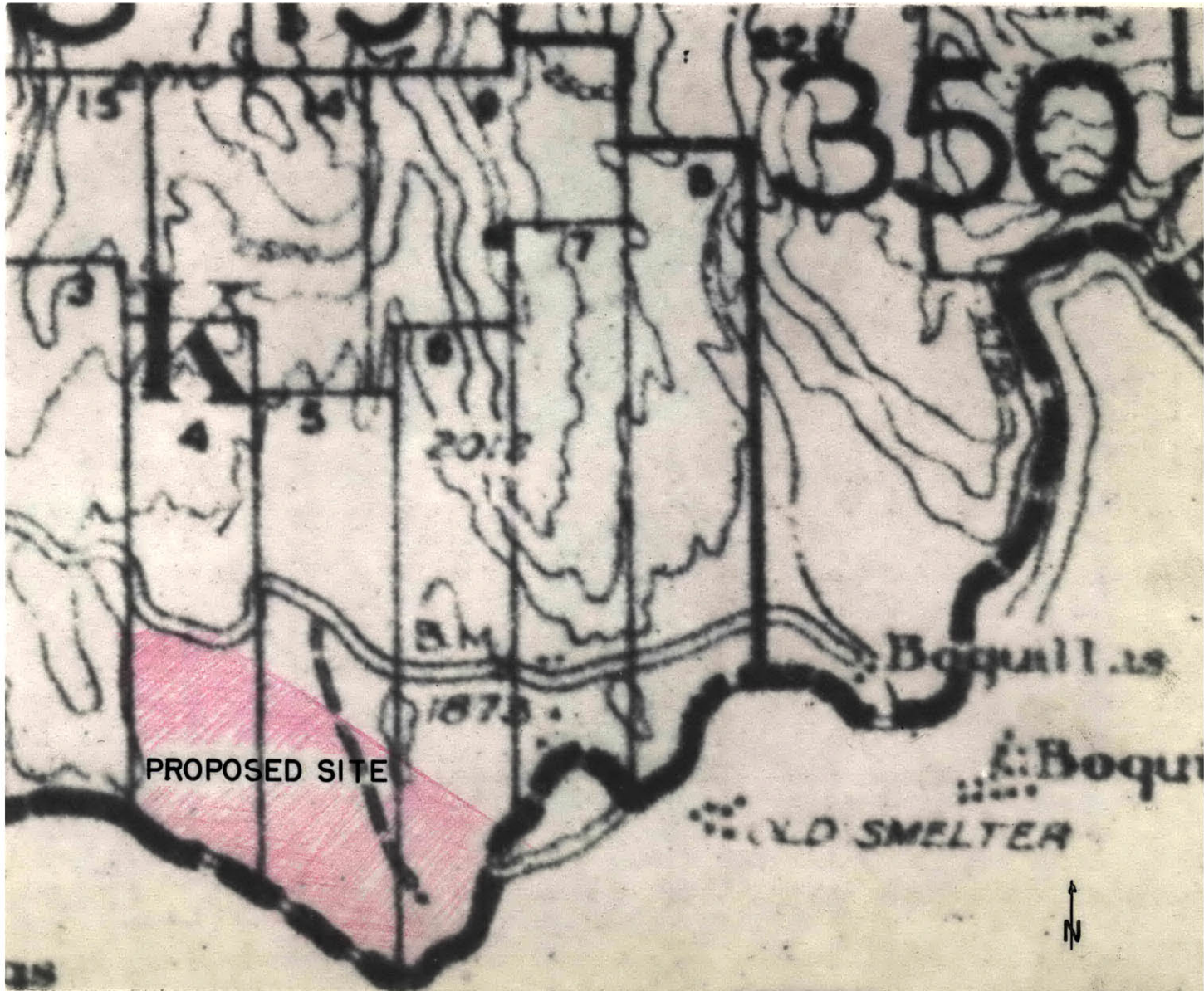
A. The Site

The 470 acre rectangular site has as its boundaries the approach road and steep foothills on the north, rocky ridges at its eastern and western extremes, and the Rio Grande as its southern and southwestern border. The land slopes gently from the approach road to within 200 feet of the river whereupon the grade assumes a slope of approximately 8%. It is in some respects a delta, an alluvial plain between two dry washes. The elevation of the river at high-water level is approximately 1,846 feet and rises to 1,910 feet at the northern border of the land to be used. One exception to the gentle slope is a rocky hill that forms somewhat of an "over look". This is in the southeastern section of the land.

The coverage is negligible. Mr. E. E. Townsend of Alpine, Texas, writes, "a handsome stand of cottonwoods are all that remain as evidence of the Graham property. In these trees are several springs, one of which is warm water. In back of the house on the down river side is a rocky hill. At times along the river banks there have been willow trees which were subject to the axes of Mexicans."¹

It is assumed that the water system will be worked out to the economy of the Park Service. Wells are obtained

¹. Townsend, E. E., Letter, August 13, 1947.



PROPOSED SITE

3500

2018

S.M.

1873

Boquillas

Boqui

OLD SMELTER



at 100 feet depths and the river water of the area is considered portable. It will probably be necessary for the Service to install some proven system if river water is extensively for domestic purposes. A purification plant between Boquillas and the resort center is assumed and in such case the water could be pumped to either the eastern ridge that borders the site, or the rock hill on the site in order that gravity flow could be attained in the area.

Electrical power on the site would be generated by Diesel generation equipment, primary-secondary distribution.

The sewage may require one or more pumping plants to carry it from the developed area for satisfactory disposal. It is expected that final disposal will be by subterranean tile. Garbage should be buried.

Irrigation was once a part of the citrus tree cultivation that existed upon the site. This feature is due for restoration. Insufficient site data is available to restore the project and hence, the amount of consideration given it is scarce. Only gross reconstruction would destroy this feature and this is not anticipated. Irrigation supply is to be desired for the development of trees and landscaping on the site. The irrigation system is appealing to the visitor whose occupation is agricultural in nature. The presence of citrus groves and apiaries upon the site are

also interesting agricultural aspects of the region.

The tourist types previously noted (enroute visitor, outing visitor, overnight guest, visitor for indefinite stay), serve as the best criteria upon which to base the site layout. The approach road for all tourists leads immediately to the lodge and its adjacent parking area. Housed in this area is the administration, the cultural element, dining and provisional facilities, and in some respects the recreational roots.

The lodge building is so situated that it effectively separates the tourist types most apt to infringe upon one another's privacy. Generally, the tourists like the feeling of "their own back yard".

For the enroute visitor the rest rooms, restaurant, information desk, and filling station, represent primary needs. The curio shop, picnic grounds, and museum are conveniently located for this group's use.

An outing visitor has certain plans upon arrival in the area, therefore, a wise use of his time is almost certain. Picnicing, hiking to the "over look" or other vantage points, swimming, fishing and possibly horseback riding, will serve his recreational needs. The lodge lounge or loggia will offer a place for rest and recuperation from strenuous activity before return trip home. The restaurant, filling station and store, the museum and curio shop may receive hurried patronage.

Most of the activity of two tourist types discussed above will take place in one area adjacent to the lodge, and that area represents their "domain". Because the overnight guests also have a desire for a "domain", the accommodation area stretches to the southwest along the river in an opposite direction from the area used by the patrons of brief visit.

The guests whose visit will be extended over a night or several nights will have accommodations in somewhat the same area, and their association with the lodge will be in accord with the usage they make of that building. The cabins which lack food preparation facilities will be located nearest the lodge. These cabins accommodate parties composed of two to six people. Fifty percent of them will be without baths and will depend upon the comfort station located in their area.

A large space belt, (presently it is brush land of mesquite and willow) separates the cabin grouping from the housekeeping sites and trailer camping can be a part of the area. Also, this represents a bathing site if river swimming is to be properly supervised. A utility building on the area provides laundry facilities and toilets for campers.

Housekeeping cabins are popular for those who choose to cook their own food. Families with children especially like this shelter type. Plans have been made for twenty housekeeping cabins with areas for cooking,

eating, living and sleeping and the majority have been provided with toilet facilities. The laundry buildings that are located on the extremity of the trailer area will serve this group also.

For those who prefer hotel accommodations there will be a "hacienda" or ranch hotel managed by the American plan. Horseback riding, swimming, tennis and fishing will interest most hotel patrons, although some will seek rest and relaxation.

In general, it will be frequented by guests of the higher income bracket, and will no doubt have many guests interested in the social contacts they will make. The "hacienda" has been placed a mile away from the resort center, in that it is a somewhat self-contained unit and its popularity and success likely depends upon its remaining out of the immediate area of the arriving curious tourists.

Stables for about thirty riding horses are located so as to be easily accessible for all who are interested. Most service points and mountain camping sites are accessible only by horse and pack trips, hence, heavy use of this feature is to be expected. Rail fence rodeos and Sunday afternoon softball games can be expected as recreational features. Swimming should be in a designated area of the Rio Grande in order to provide supervision necessary to prevent accidents befalling those unaccustomed to the

traits of the river. The river site for swimming should be found near the lodge or in the space belts between the cabin development and place where bathhouses are erected. Early spring and autumn rains in the mountains make the river a hazard for swimming about three months of the year, therefore, a proposed naturalistic pool located in the cottonwood groves of the Graham ranch deserves consideration. Waterflow could be obtained from the two springs in the area or by a windmill, although it might be impossible to completely change the water once a week.

VIII. RELATIONSHIP OF THE LODGE AND GUEST RANCH

The lodge has administrative powers over the cabins, campgrounds, and housekeeping groups. Upon arrival at the lodge the resident guest interested in those accommodations, registers at the administration desk. Those with cars will proceed to their destination. These accommodations will be numbered, therefore, little direction is needed. If area administration does prove necessary, "ranch hands" will aid in the direction of tourists; carrying those without transportation to their dwellings by buckboard or station wagon.

Lodge administration governs the entire area, but the ranch is expected to operate somewhat as a separate unit. Its visitors will not have to report to the lodge upon their arrival or departure, but the lodge administrators will be informed at all times of available accommodations at the guest ranch.

Communication between the different areas has been stated as an inter-park radio communication system. Ranch to lodge communication is, therefore, based upon this.

IX. LODGE

Generally, the lodge building contains the administering, lounging, eating, and food preparing facilities together with the dependencies to relate these features. Added to the grouping is the museum and open air theater. The building axis is approximately east west, thus permitting southern exposure. The lodge is so located as to command an inspiring view of the Sierra del Carmen Mountains, which furnish the scenery for the open air theater. A gentle hill crest permits easy drainage. All roads meet in this area, but the waterfront area is unmolested.

A. Materials and Construction

Concrete slab foundation will be used throughout with an acid-stain on the floors of the loggia and dance floors to subdue the effects of bright sunlight. A wood framing system will be used throughout the building with the loggia posts of Douglas fir with the bark peeled. All finishes are to be natural and saw cuts exposed. The adjoining museum building is of adobe with concrete slab on rock fill for foundation. The interior surfaces will be plastered.

B. Heating and Air Conditioning

A dual system is proposed for heating and ventilating inasmuch as duct work can serve both purposes. Heating and ventilating utility rooms are adjacent. A heating system which burns fuel oil and circulates warm air will be used. Heat will be needed very few days of the year. Air

conditioning is by means of adiabatic condensation. This system is extensively used in most areas of West Texas because of the low humidity. Temperatures in July and August will demand fulltime use of the system for that period.

C. Cost

The National Park Service listed the lodge building at \$95,000 in a 1943 estimate. No construction costs are available from the region. The method of construction and use of native material are my contribution to keeping the cost down.

X. GUEST RANCH

A wide scope of accommodations is completed by this ranch hotel addition to the resort layout. Each guest or party has a room with bath and an outdoor patio or balcony. Dining, lounging, and meal preparation is concentrated apart from the sleeping area and is air conditioned. The guest ranch is located in the southwestern extremity of the site in order to be as isolated as possible from the area of heavy activity. The land is the crest of a ridge near the Rio Grande and slopes to the river's edge. Sleeping wings are so placed in "steps" up the slope that view of the river is not obstructed.

A. Materials and Construction

Foundations and flooring will be concrete or rock fill. Adobe wall construction is used throughout and will support roof framing. The interior walls will be plastered.

B. Heating and Air Conditioning

Electrical radiators in each room were considered practical for the climate, but not to the methods in which electrical power is generated. The warm air heating system fired by fuel oil is used. A heating unit should be located in each sleeping wing with duct work leading through to the individual rooms.

All sleeping rooms have cross ventilation and not air conditioning. An adiabatic condensation system is used to cool the dining room and kitchen areas of the ranch.

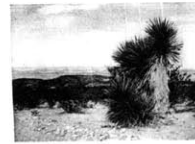
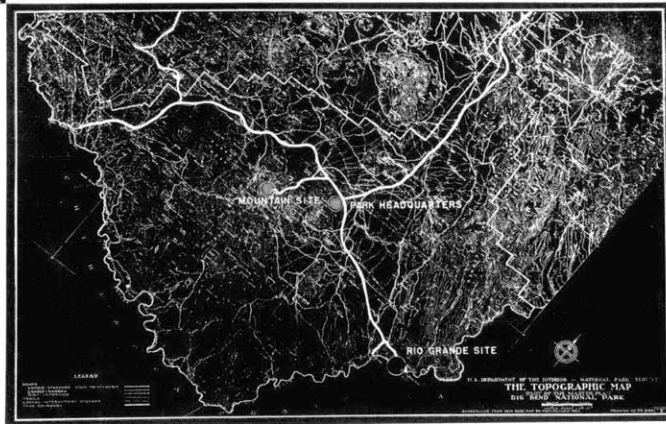
C. Cost

The number of rooms was not specified in the proposals sent by the National Park Service. In the 1943 estimate sheet based upon pre-war prices, the appropriation to be made was \$105,000. This limit is far exceeded in my solution, with regard to current building costs, but the materials used and the manner in which the building wings can be added are factors in making this building adaptable to further financial appropriations.

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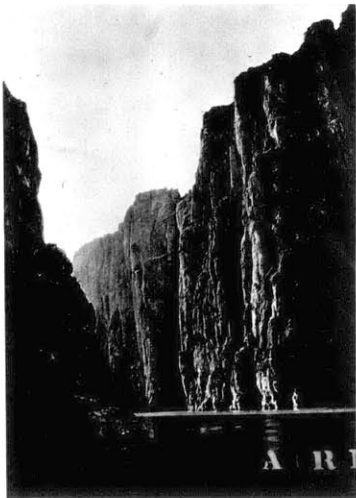
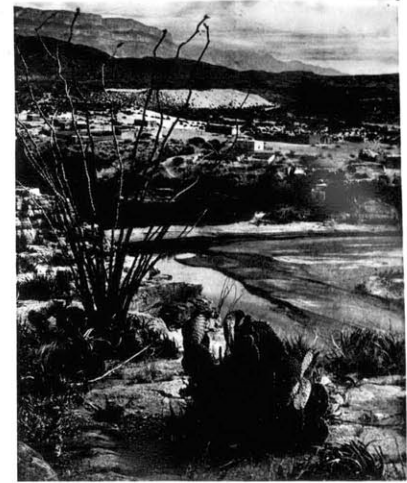
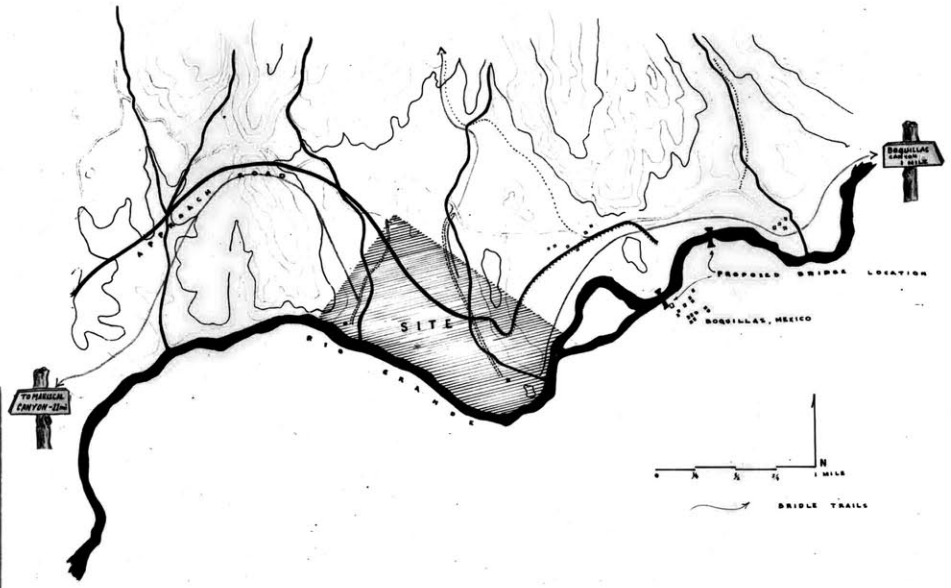
LOCATION AND APPROACHES



A RESORT CENTER FOR BIG BEND NATIONAL PARK

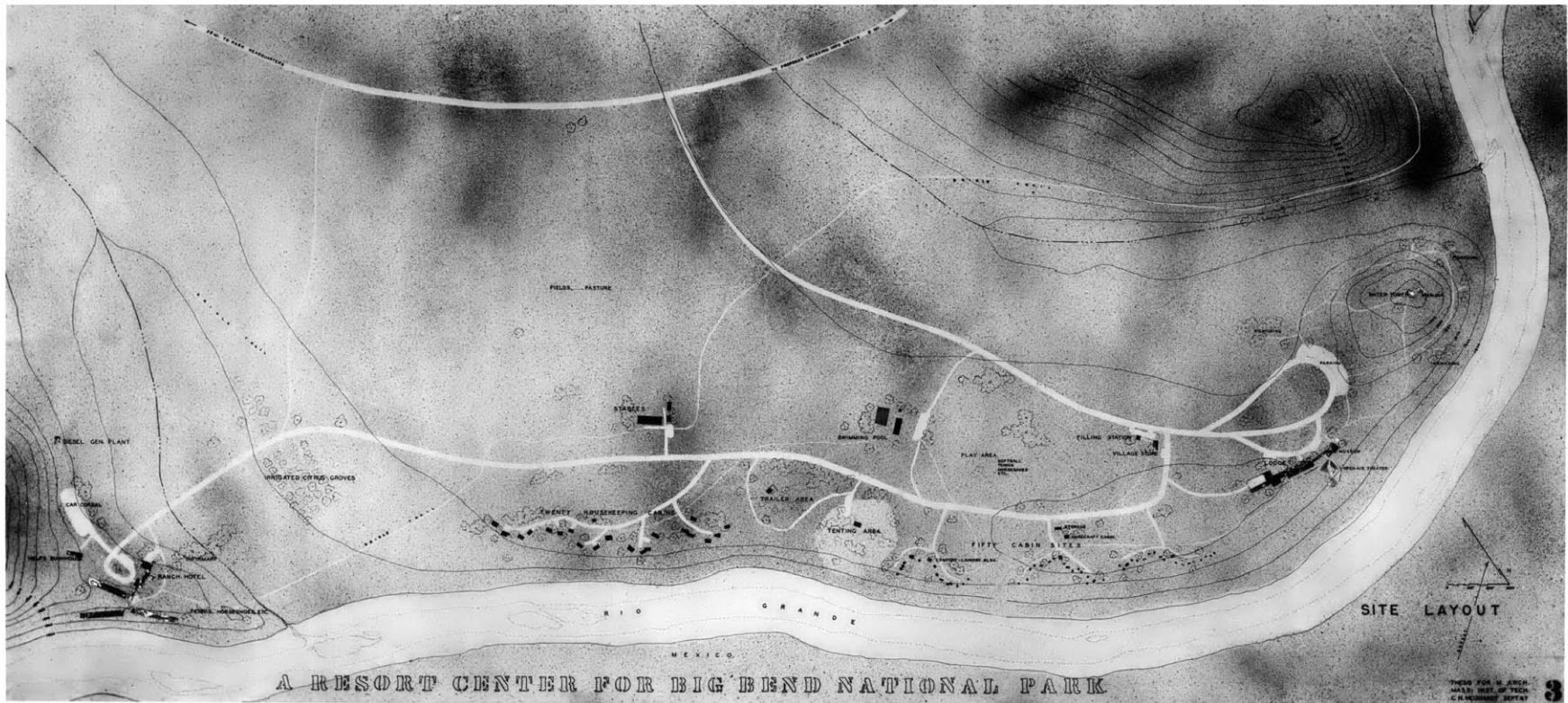
THESIS FOR M. ARCH.
MASS. INST. OF TECH.
C. H. NEUHARDT SEPT '47

THE SITE ENVIRONMENT

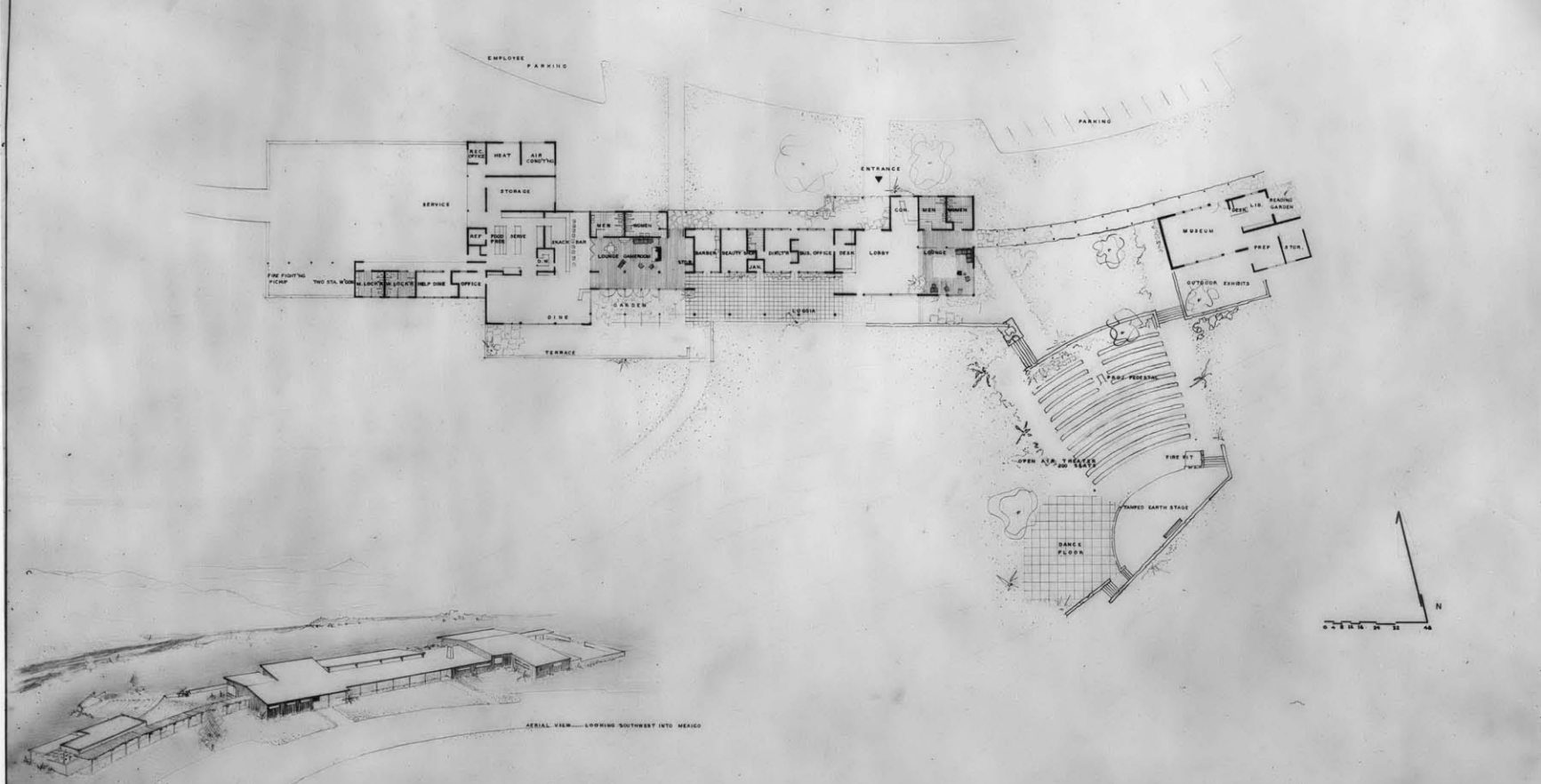


A RESORT CENTER FOR BIG BEND NATIONAL PARK

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C. H. NEUHARDT SEPT. '47



LODGE PLAN



A RESORT CENTER FOR BIG BEND NATIONAL PARK

THESIS FOR M. ARCH.
MASS. INST. OF TECH.
C. H. NEUMAYR SEPT 1941

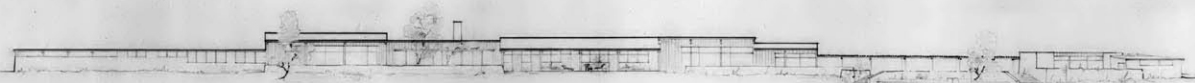
LODGE ELEVATIONS.....SECTIONS



NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION

RESTAURANT

GAMEROOM

LOGGIA

OPEN AIR THEATER

MUSEUM



OPEN AIR THEATER



RESTAURANT - KITCHEN



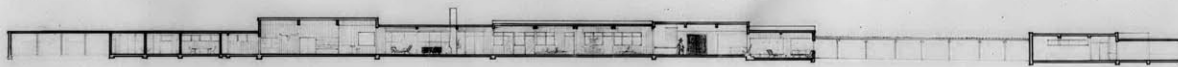
GAMEROOM - LOUNGE



LOGGIA - OFFICES



LOBBY



SECTION

SECTIONS

A RESORT CENTER FOR BIG BEND NATIONAL PARK

THESIS FOR M. ARCH.
MASS. INST. OF TECH.
C. H. NEUHARDY SEPT '47

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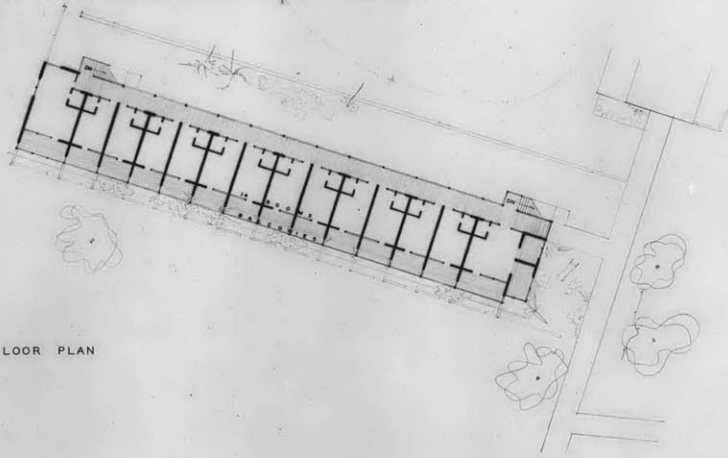
RANCH HOTEL PLAN



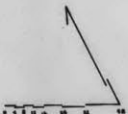
A RESORT CENTER FOR BIG BEND NATIONAL PARK

THESIS FOR M. ARCH.
MASS. INST. OF TECH.
C. H. NEUMANN SEPT 1957

RANCH HOTEL SECOND FLOOR ... SECTIONS



SECOND FLOOR PLAN



TWO STORY SECTION



HILLSIDE SECTION

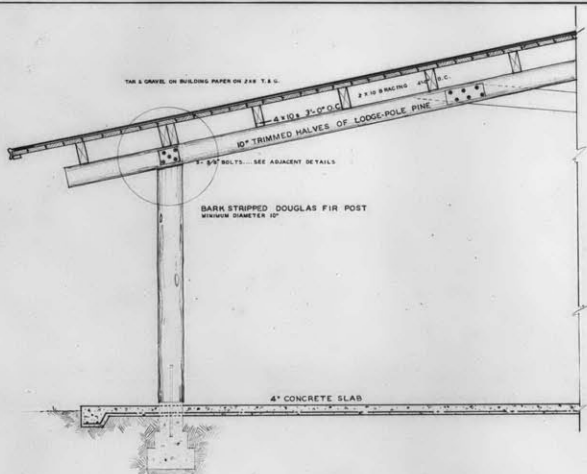


ONE STORY SECTION

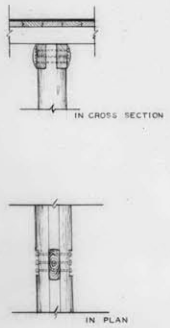
A RESORT CENTER FOR BIG BEND NATIONAL PARK

THESIS FOR M. ARCH.
MASS. INST. OF TECH.
G. H. NEUHARDT SEPT. '47

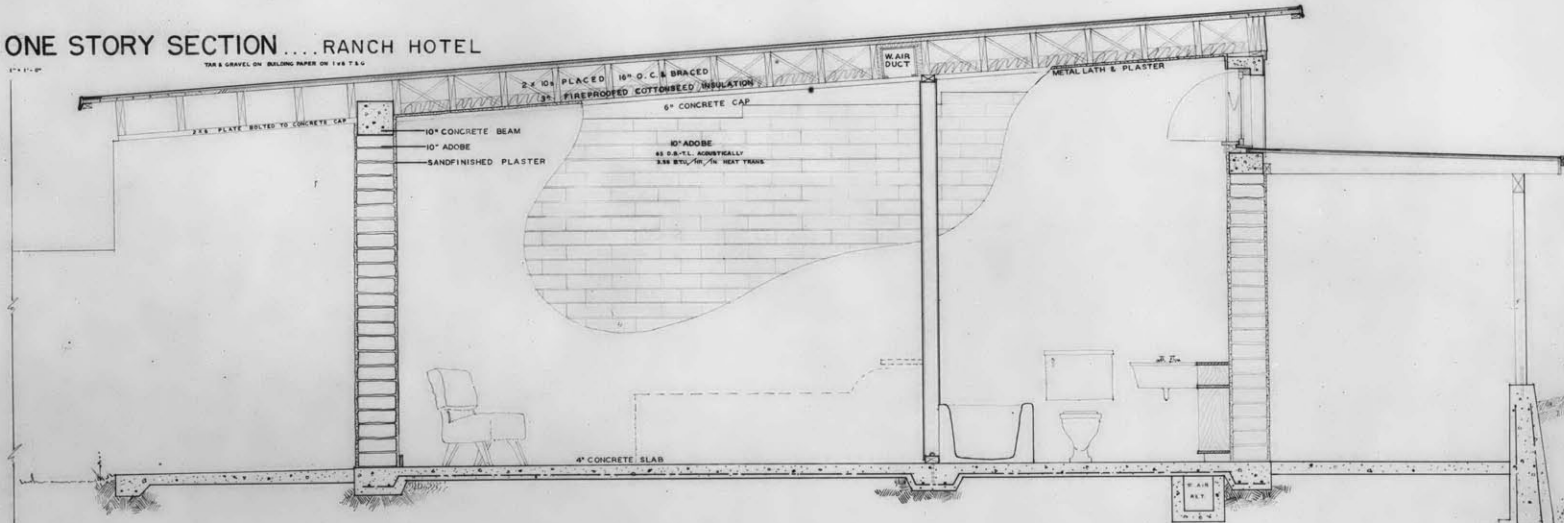




LOGGIA DETAIL LODGE
 1/8" MINIMUM S.W. COSTA
 1/4" x 7'-0"



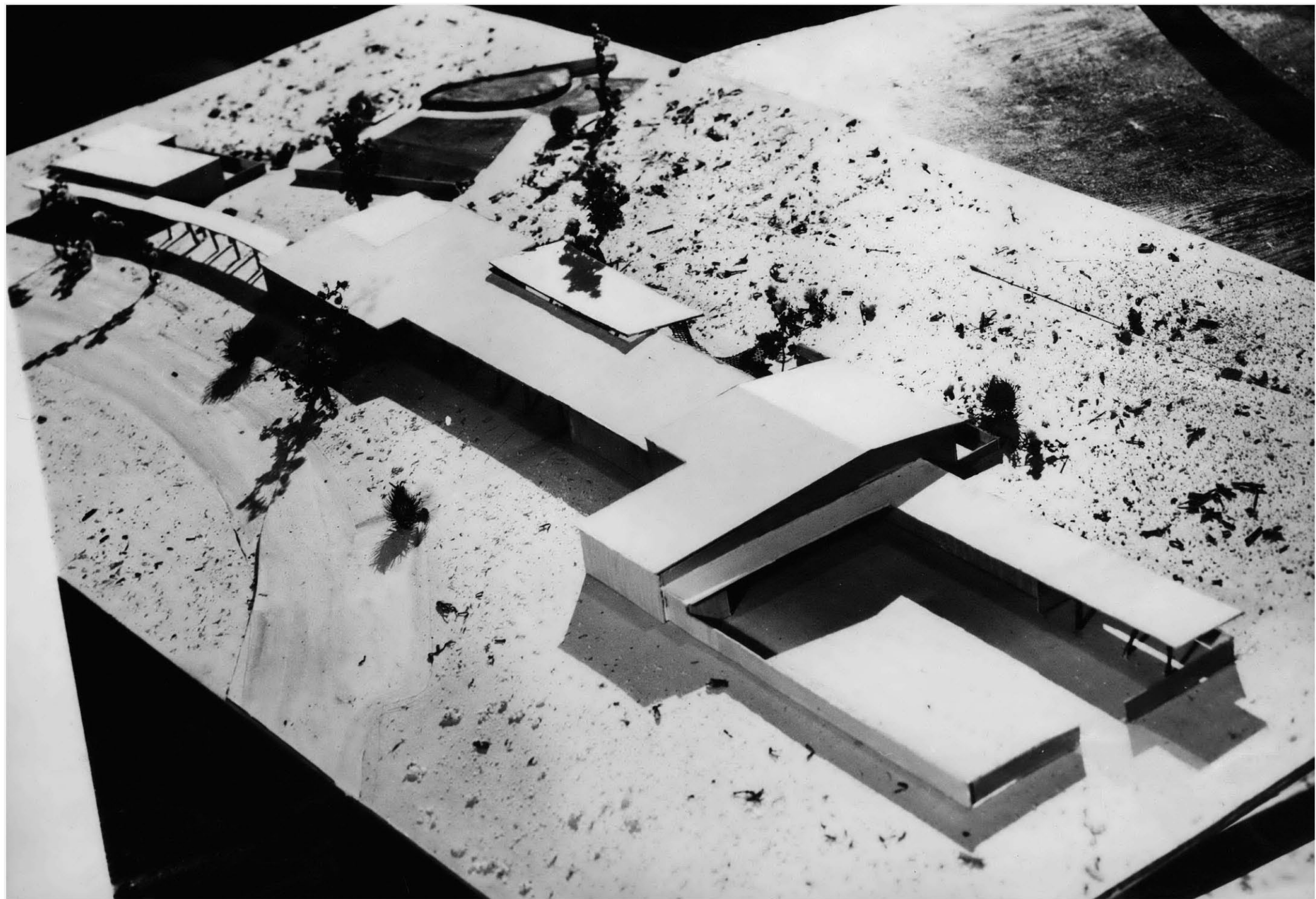
ONE STORY SECTION ... RANCH HOTEL

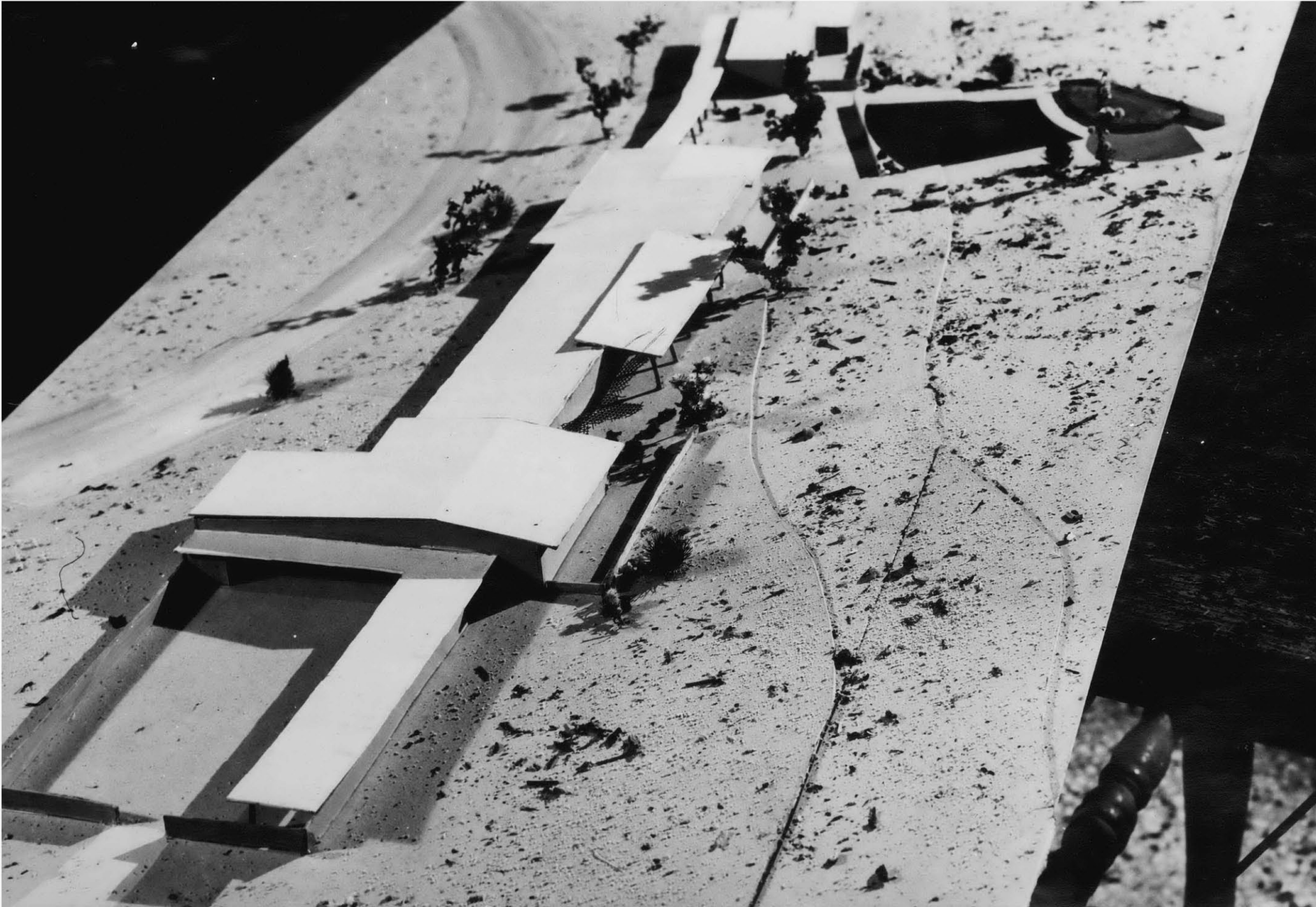


A RESORT CENTER FOR BIG BEND NATIONAL PARK

THESIS FOR M. ARCH.
 MASS. INST. OF TECH.
 C. H. NEUHARDT SEPT '47







CORRESPONDENCE ADDENDA

48

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Region Three
Santa Fe, New Mexico

June 26, 1947.

Mr. Charles H. Neuhardt,
276 Westgate West,
M.I.T. Housing,
Cambridge, Mass.

Dear Mr. Neuhardt:

Reference is made to your letter of June 21 acknowledging receipt of the Master Plan and other data on Big Bend National Park which you requested for your Master's thesis. We were very glad to provide such information as we had and regret that the topography for the principal sites proposed for development is not available.

It is very improbable that we will make a survey of the headquarters or river areas before late this summer or fall. It would not be advisable to plan on having this information by August 1.

There will be no charge for the prints sent you.

Sincerely yours,

E. T. Scoyen,
Acting Regional Director.

UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

Region Three
Santa Fe, New Mexico

July 28, 1947.

Mr. Charles H. Neuhardt,
276 Westgate West,
M.I.T. Housing,
Cambridge, Mass.

Dear Mr. Neuhardt:

Reference is made to your letter of July 22 regarding materials for buildings which you are designing for Big Bend National Park as your thesis.


We did use adobe bricks in the construction of the cabins in the basin of the Chisos Mountains. These received no protection other than priming and painting with a special adobe paint. The walls seem to be standing up better than was anticipated considering that the material used is subject to considerable volume change between wet and dry conditions. It is believed that more suitable material for adobes exists along the river, and it is probable that adobes will be used for construction in this area. However, if adobe is used we would add cement to produce a more durable brick.

Adobes are comparatively permanent under certain conditions and we have used them in several areas in the southwest with various results. Where adobe construction is a definite economy, it is probable that we will continue to use them, but in future construction we plan to use some type of stabilizing material such as cement or bitumens with the clay to obtain a more reliable product.

We have done practically no construction in our areas since the beginning of the war and are not in a position to give you current costs based on our experience. Costs on private construction, principally housing, in Santa Fe is running around \$9.00 per square foot and higher but varies considerably. Pumice block is taking the place of adobe and tile which were previously used. The cost of adobes here is reported to be around \$75 to \$80 per thousand in the wall. Adobe bricks vary in size but are usually about 4 inches x 10 inches x 1 1/4 inches.

We have not used poured rock construction and have no costs on this type. A house designed by Wright and using this type of rock construction is being built about 25 miles from Santa Fe, but I have not investigated costs. Rock masonry is being considered for developments in the vicinity of the Chisos Mountains because large slides are to be found in this area. A considerable part is of convenient size, is irregular in shape, very hard, and can be used economically only without cutting.

Sincerely yours,


Lyle E. Bennett,
Architect.

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UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Big Bend National Park
Marathon, Texas

September 2, 1947.

Mr. Charles H. Neuhardt,
276 Westgate West,
M.I.T. Housing,
Cambridge, Mass.

Dear Mr. Neuhardt:

I have your letter of August 28 with certain enclosures regarding your thesis problem - architectural drawings for the proposed buildings at the Daniels-Graham ranch site, Big Bend National Park. I have sketched the approximate boundary of the mesquite, willow, and brush thicket along the Rio Grande from the Daniels house down to the Graham house. It is an irregular line, as you can see from the enclosed photograph. I have also sketched the belt of tamarisk or salt cedar that is found near the Daniels ranch and the belt of cottonwoods near the Graham ranch; also shown is the approximate location of the two springs near the Graham ranch. I believe that this data will probably help you in your problem.

Also, I am enclosing a photograph of the area. This is a photograph looking ~~North~~^{South} eastward down the Rio Grande. The house in the middle foreground is the Daniels ranch house. The other two in the picture are some of the outlying buildings. From this picture you can see the brush thicket along the river, and also the belt of tamarisk trees, and the outline of a few of the irrigation ditches. Down at the far end of the river flat you will see another belt of trees which is the belt of cottonwoods at the Graham ranch. There are some half dozen or so buildings around the Graham ranch, none of which amount to anything. This photograph, No. 9519, was taken by one of the Region Three Office staff, and if you will write to the Region Three Office at Santa Fe, New Mexico, and call for prints from that negative number I am sure that they will give you all you need. This particular one is our file copy and it will be appreciated if you will return it to us.

I am returning your postal note as there are no charges for this service.

If in the future we may be of any further assistance, please do not hesitate to write us.

Very truly yours,

Ross A. Maxwell,
Superintendent

Enclosures

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UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Region Three
Santa Fe, New Mexico

September 9, 1947.

Mr. Charles H. Neuhardt,
276 Westgate West,
M. I. T. Housing,
Cambridge, Massachusetts.

Dear Mr. Neuhardt:

Reference is made to your letter requesting information on the type of fuel which would be appropriate for the proposed river development at Big Bend National Park.

Until we have made a more thorough study of the problem any statement made at this time is somewhat of a guess. We obtained comparative costs of fuels for the Basin development which indicated that both light fuel oil and liquified petroleum gas would be reasonable in cost and more satisfactory in comparison with other fuels.

The mild temperature at the river location should permit a safe bulk Butane gas installation and would be most satisfactory for both space heating and cooking. Where space heating only is required, oil would be cheaper but would be satisfactory only when the building units are large enough to justify central heating systems. A warm air or hot water system using oil for fuel would have the advantage of being useable for cooling and this may be necessary if much summer use develops. Evaporative cooling is fairly satisfactory in arid climates and a forced air system would be adaptable to evaporative cooling and heating.

We have not used electricity for heating and cooking except where commercial power is available at reasonable cost or the development is such as to require considerable electric power for uses other than heating. The installation, operating and maintenance costs of other than fairly large plants is usually prohibitive in comparison with other systems. However, more study would need to be given to comparative costs to rule out electricity entirely.

For your information the comparative cost for 100,000 BTU for fuel delivered at Alpine is 10-11¢ for No. 1 oil and 22-24¢ for

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Butane-Propane gas in bottles. Bulk Butane should be much lower in cost than the mixed gas in bottles. Coal delivered at the park headquarters costs about the same as gas. The above costs include deductions for average furnace efficiencies.

Sincerely yours,

Lyle E. Bennett,
Regional Architect.

PRIORITY LIST PROJECT CONSTRUCTION PROGRAM

- PHYSICAL IMPROVEMENTS
 MINOR ROADS AND TRAILS
 MAJOR ROADS

PRIORITY	INDEX NUMBER	AREA Big Bend National Park	STATE Texas	LOCATION	SHEET	OF	ESTIMATE
		Rehabilitation of Buildings		Various Locations			\$ 6,975.00
		Rehabilitation of Utilities		" "			4,825.00
		Telephone System		Basin to S. Rim			4,000.00
		Rehabilitation of Miscellaneous Items		Various Locations			1,135.00
		Irrigation System		Daniels-Graham R.			5,000.00
		Campground		Basin Area			6,720.00
		Comfort Station (Campground)		Basin Area			4,000.00
		Water System		Panther Spr. Hdqrs.			20,000.00
		Sewer System		Panther Spr. Hdqrs.			15,000.00
	•	Utility Bldg. (Carpenter Sh. Power Hse)		" " "			7,000.00
		Electric Power System		" " "			10,000.00
	•	Residence No. 1		" " "			13,000.00
	•	Residence No. 2		" " "			10,000.00
	•	Residence No. 3		" " "			9,000.00
	•	Residence No. 4		" " "			9,000.00
	•	Residence No. 5		" " "			9,000.00
	•	Administration Building		" " "			30,000.00
	•	Comfort Station		" " "			4,000.00
	•	Utility Bldg. (3 units) Supplemental		" " "			15,000.00
	•	Residence No. 6		" " "			10,000.00
	•	Residence No. 7		" " "			10,000.00
	•	Residence No. 8		" " "			9,000.00
	•	Residence No. 9		" " "			9,000.00
	•	Dormitory		" " "			20,000.00
		Salvage Fence		BBNP area			40,000.00
		Construct Boundary Fence		E, W, N boundary			40,000.00
	<input type="checkbox"/>	Lodge Dormitory (Employees)		Basin			15,000.00
		Sewer System		"			20,000.00
		Water System		"			25,000.00
		Electric Power System		"			20,000.00
	<input checked="" type="checkbox"/>	Housekeeping Cabin Duplex		Basin Cabin Group			4,000.00
	<input type="checkbox"/>	Guest Lodge Cabin		Basin			20,400.00
	<input type="checkbox"/>	Guest Lodge Cabins		"			20,000.00
	<input checked="" type="checkbox"/>	Housekeeping Cabins		"			12,000.00
	<input type="checkbox"/>	Barn and Corral		"			7,000.00
	<input type="checkbox"/>	Chisos Lodge		"			75,000.00
	<input type="checkbox"/>	Temporary Store and Living Quarters		"			4,000.00
		Water System		Daniels Ranch			17,000.00
		Sewer System		" "			20,000.00
		Electric Power & Distribution		" "			20,000.00
	<input checked="" type="checkbox"/>	Utility Building		" "			30,000.00
	<input checked="" type="checkbox"/>	Guest Room Group No. 1		" "			100,000.00
	<input checked="" type="checkbox"/>	Lodge		" "			95,000.00
		Campground		Santa Elena Canyon			5,780.00
		Campground		Boquillas (Daniels)			5,780.00
		Fire Patrol Cabin		Boot Spring			4,000.00
		Fire Lookout Tower		Emory Peak			5,000.00

(For Major Roads only)

RECOMMENDED

Superintendent

Date

P.R.A. District Engineer

Date

Regional Director

Date

PRIORITY LIST PROJECT CONSTRUCTION PROGRAM

- PHYSICAL IMPROVEMENTS
- MINOR ROADS AND TRAILS
- MAJOR ROADS

PRIORITY	INDEX NUMBER	AREA <u>Big Bend National Park</u>	STATE <u>Texas</u>	SHEET	OF
		NAME OF PROJECT	LOCATION	ESTIMATE	
		North Entrance Road - Route 1, Sec B	Mail Box to Park Headquarters	\$115,000	
		Boquillas Road - Route 2, Sec A	Park Hdqtrs. to) Dugout Wells)		
		& Santa Elena Road - Route 3, Sec A	Park Hdqtrs. to) Route 4)	562,000	
		& Tornillo Bridge No. 1	Route 1 - Sec B)		
		Boquillas Road - Route 2, Sec C	Tornillo Creek to Daniels Ranch	231,000	
		Boquillas Road - Route 2, Sec B	Dugout Wells to) Tornillo Creek)	633,000	
		& Tornillo Bridge No. 2	Route 2 - Sec C)		
		North Entrance Road - Route 1, Sec A	N. Park Entrance to Mail Box	598,000	
		Basin Road - Route 4	Route 3 to Basin	314,000	
		Santa Elena Road - Route 3, Sec B	Route 4 to Oak Creek Wash	391,000	
		Santa Elena Road - Route 3, Sec C	Oak Creek Wash to) West Entrance)	431,000	
		& West Entrance Road - Route 5	Route 3 to West) Boundary)		
		Santa Elena Road - Route 3 Sec D	Route 5 to Santa Elena Canyon	760,000	
		North Entrance Road - Route 1 -All (Bituminus Paving)	N. Entrance to Park Hdqtrs.	188,000	
		Boquillas Road - Route 2 - All (Bituminus Paving)	Park Hdqtrs. to Daniels Ranch	135,000	
		(Basin Road - Route 4 (Santa Elena Road - Route 3 ((West Entrance Road - Route 5 (Bituminus Paving All)	Route 3 to Basin) Park Hdqtrs to) Santa Elena Can.) Route 3 to West) Boundary)	289,000	

COMMENDED

(For Major Roads only)

Superintendent	Date	P.R.A. District Engineer	Date	Regional Director	Date
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