A PROPOSED REGIONAL PARK FOR THE TRI-COUNTY REGION, LANSING, MICHIGAN

A Comprehensive Problem Report

for the Degree of M. L. A.

MICHIGAN STATE UNIVERSITY

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1964

A PROPOSED REGIONAL PARK FOR THE TRI-COUNTY REGION, LANSING, MICHIGAN

by

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A COMPREHENSIVE PROBLEM REPORT

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF LANDSCAPE ARCHITECTURE

School of Urban Planning and Landscape Architecture

1964

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CHAPTER I

INTRODUCTION

Today in Central Michigan, outdoor recreation is considered a special experience or pastime. To the early settlers of this region, outdoor recreation experiences were a way of life. When the pioneers reached this once glaciated land, they found the streams and lakes teeming with fish, and wild game roaming through the hardwood forests that covered the land. Clearing land, hunting, fishing, and farming were a way of life. Michigan changed from its primitive state to a rural agricultural state. During this time, the woods were leveled and the land was turned under and farmed. Types of outdoor recreation were still found in the daily routine. By 1950, Michigan was an urbanized state with over half of the population living in and around urban centers. The once plentiful outdoor recreation was not found in these urban centers. The vacuum in the supply of recreation created by urbanization necessitated travel, at times to distant areas, in order to satisfy personal or family recreational needs. Today, this demand for recreation can be verified by the number of people attending parks and recreation areas, and measured by the amount of money spent on recreation through entrance fees, the purchase of equipment,

and travel to and from places of recreation. It has been estimated that recreation is Michigan's second largest business.

The population is growing at a steady pace. This rate of growth is expected to continue unless stopped by a natural disaster or war. Some of the choice, available, recreation sites will be impossible to obtain in the future due to this rate of growth and its result--urbanization. This fact, the shortage of good recreational areas near urbanized centers, can be learned by studying other urban areas, some of which have supplied recreation for the inhabitants of the metropolitan region, and some which have neglected to supply recreational opportunities for their inhabitants.

The Tri-County area--Clinton, Eaton, and Ingham Counties--was once rural, but today the urban center, Lansing, influences most of the Region. Outdoor recreation in the past has been provided by the local municipalities and the State game areas in the Region. Now, many of the opportunities for outdoor recreation are very limited or nonexistent in the metropolitan region of Lansing. This scarcity developed because facilities have not been preserved or provided for the public.

By using the following assumptions, a comprehensive terminal project was prepared. The Tri-County Region of Michigan--Clinton, Eaton, and Ingham Counties--established

a Tri-County Regional Park Commission to develop and administer a regional park system in the Tri-County Region; that this writer was hired as a consultant by the Tri-County Regional Park Commission to help solve the recreation problems assessed by the Tri-County Regional Planning Commission in their report, "Outdoor Recreation--an inventory, January 1962." The recreation problem to be partially solved by the writer are as follows:

1. Inadequate facilities for water oriented activities.
2. Lack of large regional parks.

In order to partially solve the recreation problems of the Tri-County Region, the writer was hired to design a regional park around one of the proposed reservoir sites located in the Region. The first step in solving the problem statement will be to investigate the eleven proposed reservoir sites and pick the best site which will serve the Tri-County Region as an initial regional park of a proposed regional park system. Once the site is chosen, criterion will be prepared to guide the development of the site and the activities that will take place on the site. Once the boundaries are picked, a master plan and supporting drawings will be prepared.

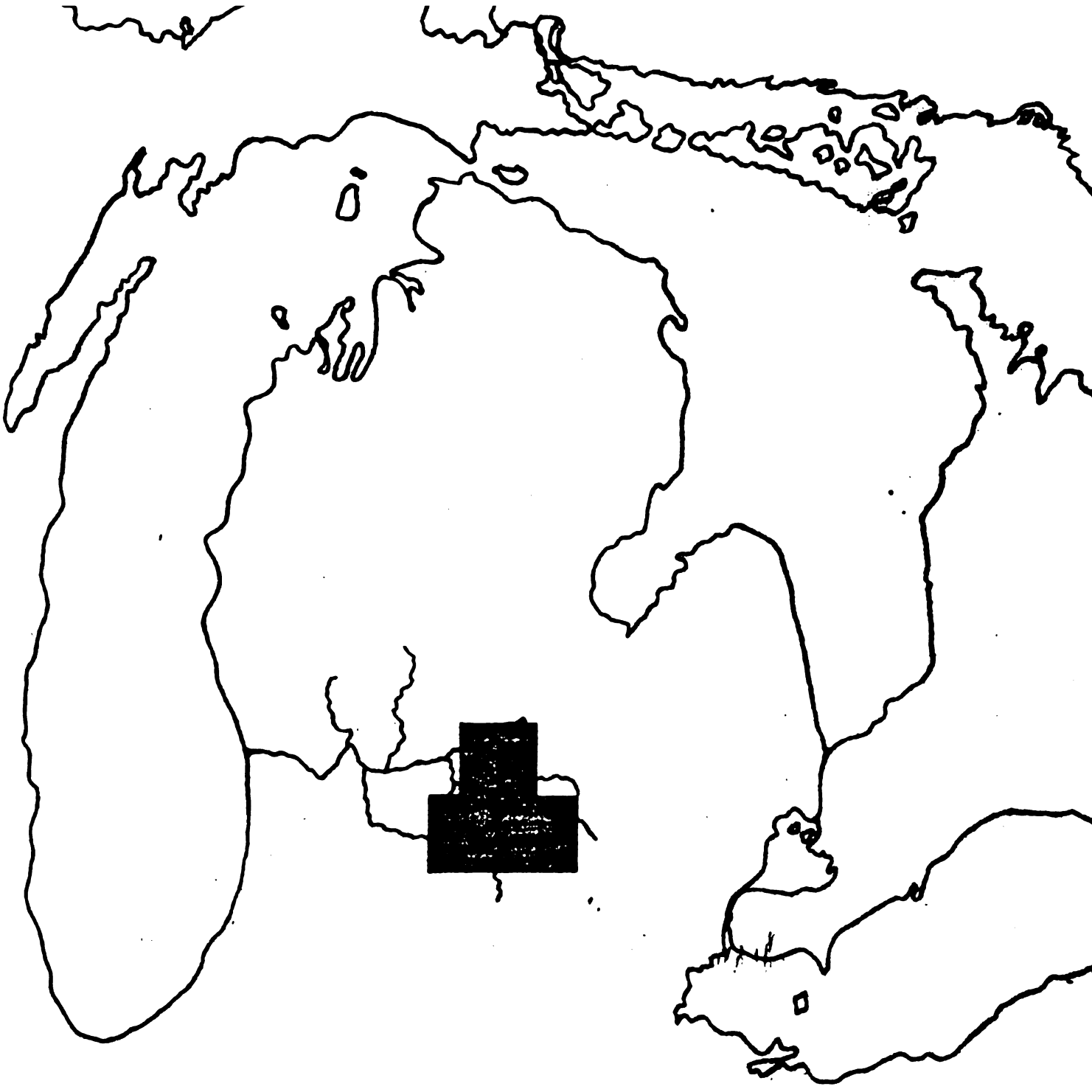
The report will be broken down into three divisions which will follow the general procedure previously described in the last paragraph. The first division will be The Region, concerned mainly with the development of concepts of

regional parks and recreational activities, and the choosing of a specific reservoir site for the proposed regional park. The second dividion will be The Site, concerned with analyzing the Region and site in relation to the design concepts of regional parks and the needs of the people in the Tri-County Region. The third division of the report will be The Park. In this division the site, design concepts, and the needs for recreation will be meshed together and the park will be designed.

The words "outdoor recreation" and "recreation" will be used interchangeably during the course of this report and will be defined in the following way. "Outdoor" is considered in the open air, while "recreation" is considered to be an activity that is anticipated with pleasure, and the actual experience of recreation produces refreshment of the mind and body. The afterthought of such activity should be one of pleasure. The combination of these two words, outdoor recreation, means an acceptable activity that takes place in the out-of-doors.

The Tri-County Region of Clinton, Eaton, and Ingham Counties will be referred to as the Region.

The book, "Outdoor Recreation for America," by the Outdoor Recreation Resources Review Commission will be referred to as the ORRRC Report. The reports prepared by the Michigan Water Resources Commission and the Battelle Memorial Institute are referred to as the MWRC Reports and the BMI Report respectively.



the REGION

CHAPTER II

THE REGION

This division of the report will be the influencing factor in the development of the regional park. The investigation of recreation and the choosing of a specific site will be accomplished in this section. The investigation of recreation will include a look at the concepts of regional parks in relation to the Tri-County Region, and an analysis of the existing recreation facilities in relation to the future demands for outdoor recreation by the people of the Tri-County Region. The specific reservoir site will then be chosen from one of the eleven sites recommended by the Michigan Water Resources Commission or the Battelle Memorial Institute. The boundaries of the park will then be established in accordance with the existing features of the site and with the demand of specific activities that will be provided in the park.

Concepts of Regional Parks

According to Webster's New Collegiate Dictionary, the word "regional" pertains to a section, territory, or division, as of the United States, which in this particular case is the Tri-County Region. A "park" is defined as public

land or water dedicated for public recreational purposes.

A regional park is one of the many different types of parks. In order to differentiate between the many different types, a definition by Mr. Philip D. Simonds is utilized. This definition appeared in his article, "The Birth of a Regional Park System." A regional park is "a member of a park family, one of a system of interrelated parks spotted in strategic locations within a defined governmental area so as to best serve the basic recreational needs of its people."[1] Regional park systems in the United States have many similar characteristics. Some parks within the system of parks are quite developed, offering a variety of activities, while some parks offer only limited activities for recreation. The type of development depends upon the quality and quantity of existing natural features (topography, vegetation, and water); the goals of the local people and administrators; and the availability of finances for such projects.

Generally speaking, regional parks in the United States have many of the following characteristics:

1. They serve the people by providing nonurban, day-use recreation. "Day-use" means that the area is primarily used for part or all of the day. Travel time to such

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[1]P. D. Simonds, "The Birth of a Regional Park System," Landscape Architecture, Vol. LIII, No. 3, p. 207.

an area is usually between thirty minutes and one hour. Overnight facilities are usually limited in number and in the length of stay.

2. They provide passive recreation although there may be areas of active recreation.

3. Parks preserve natural areas--an extension of the Olmsted idea of a large park in or near the city.

4. There is usually intensive development of such activities as golf, winter sports, picnicking, boating, and swimming.

5. The studies of archeology, ecology, geology, and history are usually incidental to the park's existence.

6. Park developers usually seek sites that include varied topography, natural vegetation, and water.

7. The park may be part of a "green-belt," helping to define the metropolitan boundary.

Utilizing similar characteristics to those listed above, the Outdoor Recreation Resources Review Commission (ORRRC) classified parks according to the scope of development and the quality of the natural resources present. This classification serves to guide the development of parks by utilizing classes as different zones within the park boundaries. Of the six classes, one is for historical and archeological sites; three classes are for areas that include unique natural features, large wilderness tracts, and natural environment areas; the last two classes are for those areas

near urban areas which are intensively used. The last two classes pertain to the Tri-County Region, since the Region is either urbanized or intensively farmed. These two classes are as follows:

> A. Class I - High Density Recreation Areas--are areas that provide facilities for all kinds of recreation appropriate to the terrain, location, and the ability of an area to accommodate large numbers of visitors. These areas are identified with "mass" use and large investments for development. Activities found in this type of an area are picnicking, boating, pleasure driving, and swimming.
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> B. Class II - General Outdoor Recreation Areas--are areas that utilize natural resources for specific recreational activities which they are particularly suited for, regardless of location. Generally they are readily accessible and equipped with a variety of man-made facilities, which may be substantially developed. These areas are less crowded and more extensive in nature than Class I areas. The activities included in this area are camping, fishing, water sports, nature study, and outdoor games. Class II areas may be provided in conjunction with projects other than recreational projects, such as reservoirs.[2]

Concepts of Space Within Parks

Parks consist of land, water, and vegetation. Spaces are created by these natural features. These spaces may be visual openness or enclosures, or they may be physical enclosures created by topography, dense vegetation, or bodies of water. These naturally defined spaces are usually linear in nature, for example, water running downhill carves the

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[2]Outdoor Recreation Resources Review Commission, Outdoor Recreation for America, U. S. Government Printing Office, Washington, 1962, pp. 101-104.

earth in a linear pattern. Since animals and men walk in a linear pattern, these spaces are quite natural. Some landscapes have a linear pattern that is strongly parallel, while others have the linear patterns crisscrossing each other. Once the pattern of naturally defined spaces is recognized, it is up to the designer to show empathy toward the natural landscape in his site design. Large open spaces occur where the linear patterns meet, for instance, at the shores of lakes, or on plateaus of the higher grounds. These spaces may be defined from topography maps, or from observation of the landscape. No matter how the spaces are defined, each space will best be suited for specific types of use. The long narrow spaces may be used for circulation, while the open spaces may be used for large developments that require intensive use. The low open spaces may be used for less intensive purposes due to drainage problems that are found in low places. The crowded spaces, like forests, are more comfortable to people than large flat expanses. Generally speaking, people like spaces that are transitions between two different types of spaces, examples being the edge of a woods, or the edge of a body of water. Thus by understanding the patterns of the landscape and the types of spaces they create, one can judge the quality of the land and how it should be used for development. Once the landscape has been defined, it is up to the designer to determine the best functions for each space and to begin his design.

Man-made Space

One has seen many examples of man-made spaces that create chaos and destroy the natural landscape. At times man has created spaces that show empathy and understanding to the natural landscape. Most regional parks have followed the efficient and orderly approach of development which stems back to Frederick Law Olmsted and the development of Central Park in New York City, and Yosemite National Park in California by the National Park Service. Both developments took place in the late nineteenth century. The basic principles behind this approach are ones of aesthetics, in which the man-made features fit the topography and natural site features, the materials used in construction are indigenous to the region, and the designer uses his imagination in preparing his plans.

Parks are to be enjoyed and to be used by the public. In order to protect people, parks must be designed, built, and administered in such a way that their health, safety, welfare, and morals are guarded. Therefore, adjacent spaces should be compatible, being used for purposes that relate to each other. Supervision for the compatible areas must be adequate and, where possible, be centralized, in this way eliminating extra facilities and personnel. It has been pointed out that the compatible areas should be adjacent. The opposite holds true for areas which do not have compatible uses. They should be segregated. Segregation may occur

by bodies of water, ravines, or ridge lines. While segregating unlike uses, it is best to provide easy access to all areas by the public and service personnel.

As far as possible, each activity should relate to its designed space with its particular topography. The relation of natural features to the assigned activity can be illustrated by the following examples: natural slopes are best for winter sports such as skiing and also for outdoor theaters; level ground is best suited for such activities as parking for cars, picnicking, and group games and sports; wooded areas are best for camping, hiking, and picnicking.

All areas meant for public use should provide certain facilities for the convenience of the public. Such facilities include drinking water, toilets, trash disposal receptacles, benches, shelters, a means of circulation, both pedestrian and vehicular, and parking for cars.

Since parks are built with public funds (which are usually minimum), a multi-use concept of facilities must be utilized where ever possible. The multi-use concept would provide maximum use of all the facilities. Facilities that are used heavily will need to be constructed of durable materials, be as maintence free as possible, and yet be inviting to the user. The designer must be careful when designating activities to particular spaces, for it is just as bad to overcrowd activities into small spaces and to combine unlike uses as it is to ignore the multi-use concept.

Overcrowding only causes confusion and congestion when utilizing these facilities. Crowded conditions also cause accidents. The most important point to remember when planning for activities is to provide for the people who are going to use the facility. If the activity has many participants, large and durable spaces will have to be provided. If the activity is used by only several people at a time, the space provided may be treated in a more delicate manner. A good example to illustrate this point may be found in pedestrian circulation paths. Which type of surfacing material would be utilized on a path or walk going from the only parking lot to a bath house--wood chips or concrete? Of course, concrete would be used because it is durable and can withstand the intensive use that this type of circulation artery would carry.

Concepts of Design for Specific Recreational Activities

In order to understand the proper setting for the many different activities which might take place in a regional park, a brief investigation will be made into each of these activities. The most popular "activity" in this country is relaxing. Many of the polls do not include this in their list of activities, but there is hardly a person who does not occasionally enjoy a vista, catch a second wind, or daydream. Relaxing is often part of other activities and seldom does one find a nice, quiet node available

exclusively for relaxing. Participation in this activity is hard to measure. An example of relaxation can be seen next to a swimming area where one can compare the number of bathers to the number of onlookers. The activity is swimming, but most of the people are relaxing.

Driving for Pleasure

Pleasure driving may be done on any road, the best being an uncongested parkway. The ideal place for pleasure driving would be in a regional park system or in any specific regional park. In a park where there are significant views and scenic spots, pull-offs should be provided. Depending on the size of the park, there could also be resting nodes with short nature trails and picnic tables. Roads, which would not cause drivers to double back on previously traveled roads, would encourage this activity and at the same time avoid congestion.

Walking for Pleasure and Hiking

Pleasure walking may take place on the city streets or in the rural areas of the country. In order to attract pleasure walkers to a regional park, paths, which include interesting natural features and sights, would have to be provided. This activity could be provided in conjunction with other activities such as nature walks and picnicking. Varied topography and wooded areas along the paths would make hiking and pleasure walking more enjoyable. A pleasure

walker is interested in enjoying his walk and, for this reason, the paths should be tailored to the pleasure walker and not to the hiker. A hiker is more intent on going to a particular place, and at the same time enjoying his trip by pleasant views, a place to camp, and solitude. The pleasure walker is interested in a short walk of less than an hour, that ends where it begins. Frequent resting spots should be provided, as well as shorter paths that lead back to the starting point. People of all ages will be using this type of walk, therefore, any inclinations should not be difficult for elderly persons or for families with baby carriages to manage. The surface of the walk should be of some natural material similar to the existing ground cover, yet be able to withstand the wear through constant use.

There are no paths near the Region especially for hikers. Hiking would be an activity which could be incorporated into a regional park system rather than one regional park. A hiking trail could be strung throughout the many parks and parkways in the regional park system, utilizing camp and picnic grounds in the parks as stopping-off points on a hike. In keeping with the multi-use concept, nature trails and pleasure walking paths could be part of the regional hiking trail.

Bicycling

Bicycling has the best possibility of being combined with hiking. A right-of-way could provide paths for

bicycling, hiking, and pleasure driving. The regional parks could provide nodes for picnicking or camping, and a place where the trails could deviate from the right-of-way. Unless a concession stand for bike rentals was available in the park, bicycle paths would have to lead from concentrations of people to the park. Whereas, if bicycles were available to rent, then paths for bicycles similar to pleasure walking trails could be provided and used in much the same way as the walking trails. The surface of the bicycle path is important. To encourage use, some sort of hard surface which is firm during periods of wet weather is best. A well-drained sand-gravel surface would be good, providing it was smooth and cohesive. Due to the nature of such activities as bicycling and hiking, that is the frequency of participation, it would be possible to combine such paths until they became overused; then another path could be introduced to parallel the first, segregating the two activities.

Horseback Riding

Horseback riding can be related to bicycling, pleasure driving, and walking. The rider could possibly have a choice of using the park facilities for several hours or for several days. Horses may or may not be provided by the park. If the rider must provide his own horse, then overland paths connecting points of interest should be provided. Again, this could be combined with a right-of-way of trails.

If a concession provides horses in a regional park, then paths of an hour or two in length should be provided. If the park is small, agreements could be made with surrounding neighbors to provide either horses or the use of a right-of-way crossing their land, if there are natural features condusive to recreation, such as woods, water, and interesting topography. Due to the safety factor, it would be best to segregate the bridle paths from all other trails in a regional park.

Swimming

Swimming was proposed by the ORRRC report as becoming the most popular activity in the year 2000.

As has been previously mentioned, facilities for sun bathers must be provided as well as those for swimmers. The sequence of events followed by a family entering the park for the purpose of swimming is to park the car and change clothes, and, while the children play in the water, the parents watch them and sun bathe while lying on a towel or lounge chair, which are part of the family's beach equipment. Therefore, a parking lot near the swimming area must be provided, as well as a bathhouse. A quick look at the intramural pool at Michigan State University will show that grass is preferred to concrete as a surface for sun bathing. The bathers only use the concrete when the grass is white with towels. The children in the family will prefer sand

to grass. The best material for a bathing beach is sand. Therefore, by providing a sand beach between the grass, sun bathing area and the water, all users will be satisfied. In order to facilitate the parents watching their children, the grass sitting area should be on a gentle slope facing the water. Thus, both the beach and the water will be visible to the parents whether they are lying down or sitting up. After the family's swim, they will most likely want to spread out their picnic lunch. Crumbs and spilled beverages bring insects and cause maintenance problems. By providing a picnic area adjacent to the swimming area, some of the problems could be alleviated. For the user who spends much of his time in a house or office, or for small children, the sun can cause discomfort during a long day at the beach. For this reason, portions of the sitting area could be provided with sun screens or covered by shade trees.

Although scuba diving is not a very popular sport and does not mix well with many water oriented activities, a portion of the swimming zone could be reserved for those persons who enjoy this activity. The bottom of a reservoir would not be as interesting a place to explore as an old, sunken ship in a lake, therefore scuba diving would be a minor activity in the park.

Picnicking

As had been pointed out in the discussion of the other activities, picnicking is an activity which is usually

combined with other activities. Therefore, it would be best to centrally locate the picnic grounds and let the other activities radiate from them. Very few people prefer to picnic in the broiling sun of a hot summer day. Therefore, locating the picnic grounds in a shaded area, as well as providing a few shelters, would be advisable. Generally when one goes on a picnic, many extras are brought along such as a portable barbecue, folding chairs, a basket of food, and a scotch cooler. Of course there is charcoal, athletic equipment, baby strollers, and blankets also. The amount of equipment that accompanies the user of picnic facilities necessitates the provision of parking facilities adjacent to the picnic tables. When placing tables throughout a picnic ground, the designer first must look at existing facilities to see where the most popular tables are located. Are they in the open fields, in the middle of the woods, or in an area that is on the edge of a woodland overlooking a field? From this designers experience of observing picnickers and seeing which tables they choose first, it was found that the tables near a parking area, on the edge of a woods, with a nice view, and without a lot of picnickers for neighbors are the most popular tables for family picnics.

Boating and Canoeing

Motor boating and water skiing have been a source of accidents in the United States in recent years. These

accidents are primarily due to the increased popularity of the two sports and to the high speed at which the boats travel. Taking into consideration both the nature of these two activities and the safety factor, a sufficient expanse of open water should be provided for these sports. Sailing and sailfishing are other water sports requiring adequate stretches of water. Canoeing and rowboating are more passive in nature and do not need as much water per boat as do the sports already mentioned. Therefore, it would be best to zone a body of water, keeping the fast boats from the slow boats, fishermen, and swimmers. The decision whether or not to zone could be made according to the size of the reservoir. It is better to provide for many activities rather than just one. If the body of water is large, active boats can be used; if the body of water is small or narrow, slower boats would be preferred, thus protecting the users from accidents.

Reservoirs lend themselves to canoeing and to canoe trips. Starting upstream from the dam in one portion of the regional park system, persons could rent canoes for the trip downstream. Making this trip could be similar to following a trail, where nodes to picnic and to camp are provided for the canoeist.

Hunting and Fishing

Hunting does not lend itself to a park environment.

If the water is zoned either by the time of day, the time of year, or by barriers across the water, fishing becomes a sport and an activity that is suitable to a regional park. The most important consideration for this sport is to provide the fisherman a place where he can find solitude. A fishing pier is necessary for the gregarious fishermen and for the children. Here the children can fish without being in a boat, and they can be controlled by their parents.

Winter Sports

Due to the nature of the topography of the Tri-County Region, opportunities for winter sports are limited. A suitable hill is necessary for good skiing and tobogganing. Since the glaciers passed over this Region, the topography tends to be level. The availability of winter sports such as sledding, tobogganing, skiing, ice skating, and ice fishing would create a yearround center of recreation for the Region. A family area for limited winter sports would be an asset to any northern region, provided it could afford the initial investment for such activities. For such a family area, the designer must consider the safety of all members of the family. The central feature of a winter sports center would be a warm shelter available to spectators and participants.

Golf

Golfing should be included in the list of activities for a regional park because of the amount of open space a golf course requires. Approximately one hundred and sixty acres are required for an eighteen hold golf course, which could easily be incorporated into the boundaries of a park. The golf course can provide the park with an activity which will pay for itself by green fees, will provide wholesome outdoor recreation for many people, and will be an activity that is compatible with most of the other activities. The course in itself can be used as a buffer to the park. Since golf is played in the open fields and on the borders of woods, it can serve as a transition from the humanized world to the natural setting of such activities as pleasure walking, nature walks, camping, and picnicking. The game of golf is made more interesting and challenging by varying topography. The need for variety in the landscape gives the designer an opportunity to utilize the multi-use concept by using the rough terrain of a golf course for the winter activities. A golf club house in the summer could serve as a winter sports center in the winter.

Camping

Camping falls into two categories--day camping and overnight camping. Day camping facilities are located relatively near an urban area and the people who will utilize

them. By locating them in this manner, the travel time to and from the camp is not too great. The people who use camping facilities usually want the opportunity to participate in swimming, nature walks, fishing, and active games. The users of day camps are quite often members of the Boy and Girl Scouts, or of the YMCA and YWCA. The designer should keep the following points in mind when providing this type of facility. These children are usually from the city and this is one of the few times they are able to enjoy living in the out-of-doors. They should be encouraged to stimulate their minds and imaginations and should be given the opportunity to investigate nature while they are in this environment.

The basic unit of an overnight camping facility is the family. Their length of stay in a camp ground will depend on the location of facilities, adjacent activities, and the quality of the camp ground. If the camp is near the place of work of the head of the family, the summer camp ground could become the summer residence. If the family is on a camping vacation, they will use the park as either a stopping-off camping spot on their way to a more distant camp ground, or as a semipermanent camp for a duration of several days. The campers will want many conveniences provided for their use, including good sanitary facilities, privacy from their neighboring campers and from pleasure drivers, segregation from other park uses, and overhead

protection for their camping spot.

Existing Recreational Facilities of the Tri-County Region

The purpose of an inventory is to find out what one has in stock. Once an inventory is taken of a subject, it is usually compared to the forecasted demand for that subject. In this case, an inventory of the existing recreational facilities in the Tri-County Region was taken by the Tri-County Regional Planning Commission, and the results were published in the book, Outdoor Recreation, An Inventory--January 1962. In their study the Tri-County Regional Planning Commission pointed out that the Region lacked large regional parks and water oriented facilities for recreation. This regional problem is the problem statement for this comprehensive report.

In order to discover the needs of the Region for recreation, a comparison will be made between the existing facilities and the projected demand for them. Since there are no studies available of the ability of a specific recreation facility to supply a specific number of hours of recreation for a certain number of people, the designer must use his ability and intuition to estimate the needs of the people of the Region. Standards have been prepared for cities and states as to the amount of land that is needed to provide an adequate amount of recreation and open space for the people of a particular political boundary. This

ratio does not take into account the human factor, the type of recreation desired and the physical features of a particular region. Land, water, and vegetation make quality recreation areas. If quality natural features exist in abundance, why should they be destroyed just because the standards are not large enough to include this land within the park boundary? This Region is fortunate enough to have a wealth of quality land and it would be unreasonable not to preserve as much of it as possible for future generations to enjoy.

The ORRRC made extensive studies of the needs and demands for recreation by the American people and published them in a book entitled, Outdoor Recreation for America in 1962. This report measured recreation by the amount of time Americans spent participating in the different activities and found out what activities they preferred to participate in during their leisure time. Therefore, in order to understand what the Regional people will need and prefer in the future years, the existing facilities will be measured in comparison to the projected desires of the people as stated in the ORRRC Report. The deficiencies will be noted and considered when choosing specific activities for the proposed regional park. An idea of the number of existing recreational facilities in the Tri-County Region can be obtained from Table I: A summary of outdoor recreation in the Tri-County Region.

The ORRRC Report shows that most Americans prefer

Table I.--A summary of outdoor recreation in the Tri-County Region.

Activity	Availability
Driving for pleasure	Interstate, state, and county highways; Michigan Tourist Council designates fall color routes for drivers. Parts of the Tri-County Region are included in this tour.
Walking for pleasure	City streets, city and public parks
Playing outdoor sports and games	Regional parks generally do not include this activity. City parks provide this pastime.
Swimming	Facility: Pool — Commercial: 0 — Public: 3 Beach — Commercial: 8* — Public: 2** *2,580 feet of shoreline total ** 400 feet of shoreline total
Sightseeing	Generally not an activity provided in regional parks.
Bicycling	City streets; no paths or trails provided.
Fishing	State fishing sites: two in Clinton County--8 acres or 1,042 feet of shoreline.
Attending sports events	Generally not an activity provided in regional parks.
Picnicking	Total Tables* County — Public — Private — Total Clinton — 201 — 110 — 311 Eaton — 176 — 24 — 200 Ingham — 1006 — 164 — 1170 Total — 1383 — 298 — 1681 *Many sites do not include stoves, shelters, drinking water, or sanitary facilities.

Table I.--Continued

Activity	Availability
Nature walks	City and county parks.
Boating	Total Sites (all sites moor boats) Public: 2; Commercial: 18 Rent boats: Public 0; Commercial 0 Launching facilities: Public 14; Commercial 8 County / Lakes* / Streams / Tributaries Clinton: 48 / 62 mi. / 257 mi. Eaton: 34 / 51 mi. / 156 mi. Ingham: 3 / 42 mi. / 192 mi. *Only one lake over 200 acres in size. Source: Michigan Conservation, June, 1943, Vol. XIII, No. 5.
Hunting	Due to safety reasons, this activity should not be included in a regional park. There are three state game areas in the Region for hunting.
Horseback riding facilities	There are no facilities listed.
Camping	The camp sites listed are primarily for day camping, with occasional overnight stays. Owner / Number Local governments: 5 YMCA-YWCA: 2 Boy and Girl Scouts: 4 Total: 11 There are no state, national, or regional park camping facilities in the Region.
Ice skating	Rinks are located in neighborhood parks.

Table I.--Continued

Activity	Availability
Sledding and tobagganing	Provided in public parks when topography permits.
Hiking	There are no trails provided.
Water skiing	A limited activity due to the nonavailability of water. See boating, this table.
Attending outdoor concerts and drama	There are no facilities provided.
Canoeing	Michigan State University provides canoeing for students on the Red Cedar River, East Lansing.
Sailing	Ten lakes have facilities on their shores. See boating, this table.
Mounting climbing	Eliminated since there are no mountains in the Tri-County area.
Snow skiing	One semiprivate area, Walnut Hills Country Club, East Lansing.

A complete inventory of recreation facilities in the Region may be found in Outdoor Recreation, an inventory--January, 1962, prepared by the Tri-County Regional Planning Commission, Lansing, Michigan.

the simple pleasures: swimming, sightseeing, pleasure walking, fishing, boating, and bicycling. Also, according to this Report, driving for pleasure, walking for pleasure, playing outdoor games and sports, swimming, and sightseeing are the most popular activities at present. The forcast for the year 2000 shows that swimming, driving for pleasure, playing outdoor games and sports, walking for pleasure, and sightseeing are to be the most popular activities, in that order. The report also shows graphically that some of the less popular activities such as horseback riding, camping, fishing, boating and canoeing would be participated in more frequently if the facilities for these activities were made available.

One significant factor for the increase in popularity and participation of recreational activities is the opportunity to participate.

> Opportunity to participate becomes a significant factor in outdoor recreation activity. When the facilities are there, people use them.[3]

This factor is also significant to the designer of recreational facilities--the number of persons participating in recreational activities varies directly with the quality and quantity of available recreational facilities. An example of the use of available facilities can be seen on the

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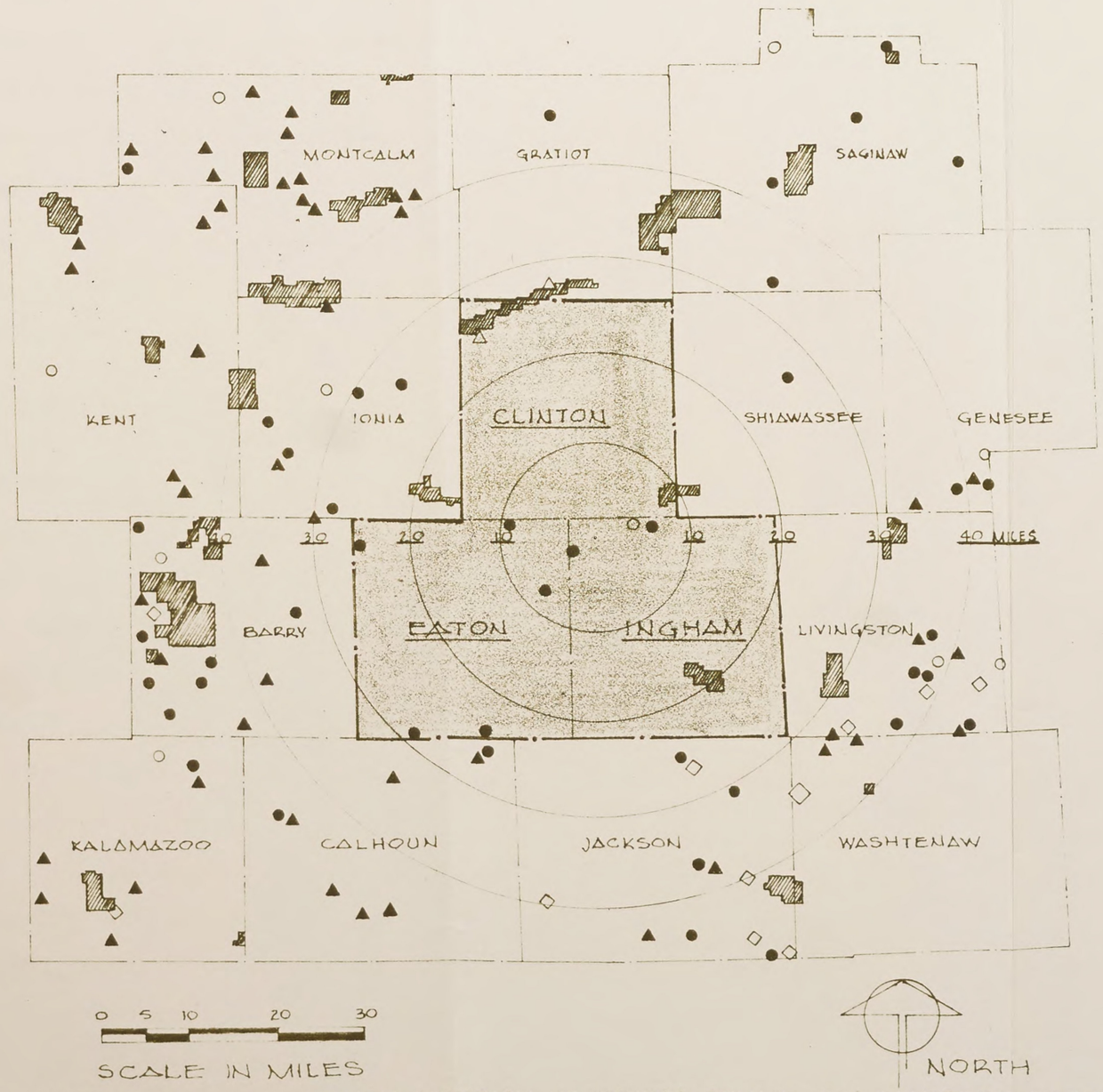
[3]Outdoor Recreation Resources Review Commission, op. cit., p. 40.

Michigan State University Campus where canoes are available to the students for use on the Red Cedar River. This activity is very popular with the students. Nowhere else in or around the Lansing-East Lansing area are canoes available to the public.

The quality and quantity of outdoor recreation facilities in neighboring communities surpass those in the Tri-County Region. There are two heavy concentrations of facilities that include camp grounds, winter sports, boating, and fishing. One area is located on an axis between Jackson and Flint to the east of the Region, and the second concentration runs between Kalamazoo and Grand Rapids to the west of the Region (see Figure I). These mentioned areas can only supplement recreation facilities in the Tri-County Region, not replace them, because of the travel time to reach them. Winter sports that require steep topography will have to be supplied out of the Region because of the physical nature of the Tri-County Region.

Looking critically at the facilities in the Tri-County Region, it is quite evident that the major shortage of recreation lies in the water oriented activities. It would be beneficial to the Tri-County Region to finance the construction of a reservoir that would provide the needed water oriented activities. The reservoir could be the focal point in a regional park which in addition would include other activities such as picnicking, walking for pleasure,

FIGURE I : RECREATION FACILITIES OF THE SURROUNDING REGION



LEGEND

- IMPROVED PUBLIC FISHING SITES ▲
- BOAT LAUNCHING FACILITIES ●
- WINTER SPORTS AREAS ○
- STATE GAME AREAS ▨
- CAMP GROUNDS ◇

BASIC DATA : TRI-COUNTY REGIONAL PLANNING COMMISSION "OUTDOOR RECREATION - AN INVENTORY - JANUARY 1962", P. 25.

and nature walks. The water activities could include swimming, fishing, and boating. The different forms of boating would depend on the ability of the site to be divided to segregate the uncompatible activities. Other activities that might be provided include golf, hiking, day camping, horseback riding, and bicycling, depending upon the nature of the chosen site. An analysis of the people and the site must be made before the exact activities can be proposed.

The Future Demand for Recreation in the Tri-County Region

The exact demand for recreation in the Tri-County Region has never been measured by polls or surveys. Attendance records show that the Lansing parks are heavily used. In 1963 the Lansing residents used the facilities more than 1.5 million times: over 40,000 rounds of nine-hole golf were played; 989,730 persons enjoyed picnics; and the public pools drew 59,877 persons, most of which were youngsters.[4] By considering the 1.5 million times of participation to equal activity days, each Lansing resident spent approximately fifteen activity days or parts of a day participating in outdoor recreation in the Lansing parks. This measurement does not include several of the most popular activities, according to the ORRRC Report, which include pleasure driving,

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[4] Lansing State Journal, 10 October, 1963, p. E-1.

sightseeing, walking for pleasure, and bicycling. This means the number of activity days of participation by the Lansing residents would increase considerably if these activities were included in the survey. In order to estimate the need for recreation by the residents of the Tri-County Region and the possible patterns of participation, the results of the ORRRC Report will be compared with the residents of the Region.

The ORRRC Report concluded that ninety percent of all adults in America participate in one or more outdoor recreational activities each year. If for no other reason than the yearly increase in the American population, there will be an increasing demand for recreation. The Report found that the demand for recreation follows different participation patterns. The patterns show that participation varies according to:

1. Region of the United States.
2. Place of residence.
3. Age.
4. Occupation, income, and paid vacations.
5. Education.

Region of the United States

In studying the regional influences of recreation, the ORRRC Report found that the popular activities varied from one region to another. In the North Central States, of which Michigan and the Tri-County Region are a part and

where surface water is plentiful, boating is the most popular activity. Due to the lack of surface water, boating is not the most popular activity in this Region. By providing a recreational reservoir, the shortage of surface water will be partially met, and boating might become as popular in this Region as it is elsewhere in Michigan and the North Central States.

Place of Residence

The place of residence--urban, suburban, or rural--is important in determining the types of popular activities. The closer to nature one lives, the more one is apt to participate in nature oriented activities. Rural and suburban residents participate in outdoor recreation more often than urban people and their preference for specific activities differ, as has been mentioned. These rural and suburban families are more likely to participate in camping, fishing, and hunting, while the urban people prefer sightseeing, pleasure driving, picnicking, and swimming.

Table II shows that the concentration of people in the Region lies in Ingham County. In fact, there are over twice as many people in Ingham County as there are in Clinton and Eaton Counties combined. The bulk of Ingham County's population lies in metropolitan Lansing (population 169,325). For a more exact distribution of the population in the Tri-County Region, consult Figure II. This figure shows the

Table II.--Distribution of people by county.[5]

County	Total	Percent rural farm	Percent rural nonfarm	Percent urban
Clinton	37,969	27.8	50.2	22.0
Eaton	49,684	21.0	40.2	38.8
Ingham	211,296	4.1	13.8	82.1
Region	298,949	-	-	-

distribution of population by township, corporated village, and city. By analyzing Figure II, one sees a definite dispersion of the urban areas (total 27), with a concentration of rural population around the boundaries of Lansing. This distribution is significant because it shows that approximately one-fifth of the Region holds two-thirds of the people. The ten townships around Lansing are basically suburban, and Lansing is of course urban. To correlate these population figures with the findings of the ORRRC Report, one finds that the activities desired by a majority of the people in the Region will be sightseeing, pleasure driving, picnicking, and swimming.

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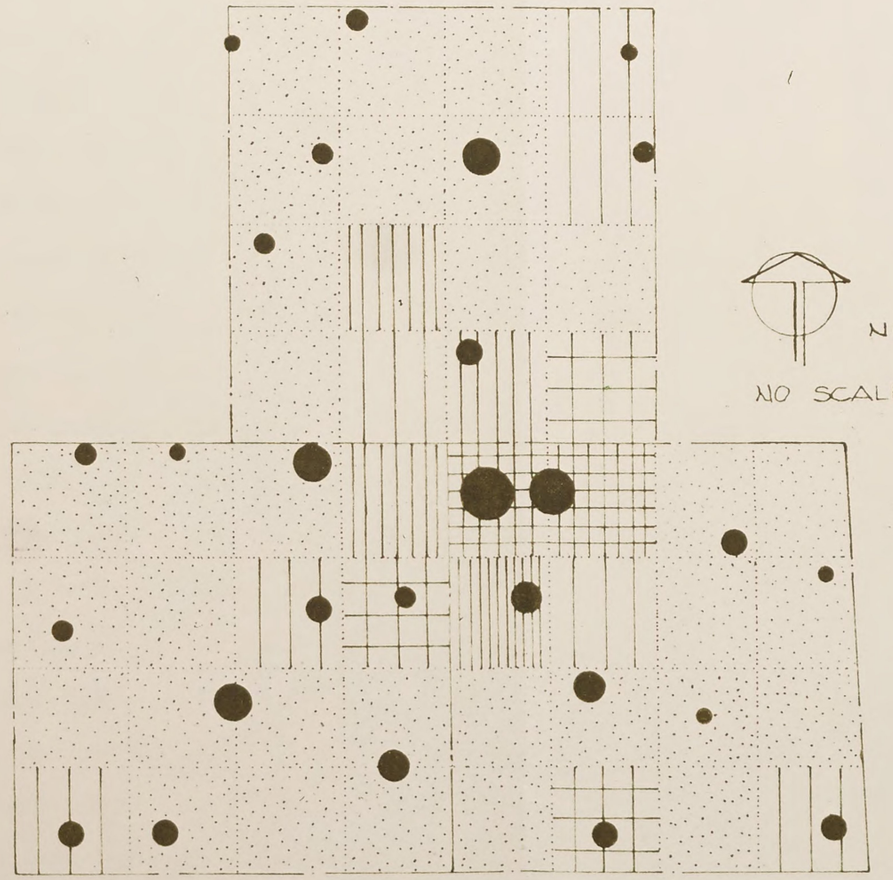
[5]Bureau of Census, U. S. Department of Commerce, 1960 Census--Michigan, 24-A, Number of Inhabitants, p. 24-16.

FIGURE II : DISTRIBUTION OF PEOPLE BY TOWNSHIP, VILLAGE, AND CITY.



NORTH

NO SCALE

URBAN POPULATION

LESS THAN 500

500 - 999

1000 - 2499

2500 - 4,999

5,000 - 9,999

10,000 - 39,999

40,000 AND OVER

RURAL POPULATION

500 - 1999

2000 - 2999

3000 - 4999

5000 - 9999

10,000 - 14,999

15,000 AND OVER

BASIC DATA: BUREAU OF CENSUS, U.S. DEPARTMENT OF COMMERCE, "1960 CENSUS, MICHIGAN 24-A, p. 24-16.

Table III.--Population by age.[6]

County	Total 1960	Total 1950	Age
Clinton	37,969	31,195	All ages
	20,720	18,358	Over 21
	15,908	11,605	Under 18
	3,175	2,975	Over 65
	24.8 - 27.4 median		
Eaton	49,684	40,023	All ages
	28,074	24,633	Over 21
	19,765	13,884	Under 18
	4,591	4,218	Over 65
	26.6 - 29.5 median		
Ingham	211,296	172,941	All ages
	121,161	110,024	Over 21
	76,645	51,671	Under 18
	15,622	12,090	Over 65
	25.4 - 26.5 median		
Lansing, City	107,807	92,129	All ages
	64,980	61,970	Over 21
	38,887	25,923	Under 18
	9,734	7,399	Over 65
	28.9 - 30.8 median		

[6]Bureau of Census, Michigan, 24-B, p. 24-135.

Table II.--Distribution of people by county.[5]

County	Total	Percent rural farm	Percent rural nonfarm	Percent urban
Clinton	37,969	27.8	50.2	22.0
Eaton	49,684	21.0	40.2	38.8
Ingham	211,296	4.1	13.8	82.1
Region	298,949	-	-	-

distribution of population by township, corporated village, and city. By analyzing Figure II, one sees a definite dispersion of the urban areas (total 27), with a concentration of rural population around the boundaries of Lansing. This distribution is significant because it shows that approximately one-fifth of the Region holds two-thirds of the people. The ten townships around Lansing are basically suburban, and Lansing is of course urban. To correlate these population figures with the findings of the ORRRC Report, one finds that the activities desired by a majority of the people in the Region will be sightseeing, pleasure driving, picnicking, and swimming.

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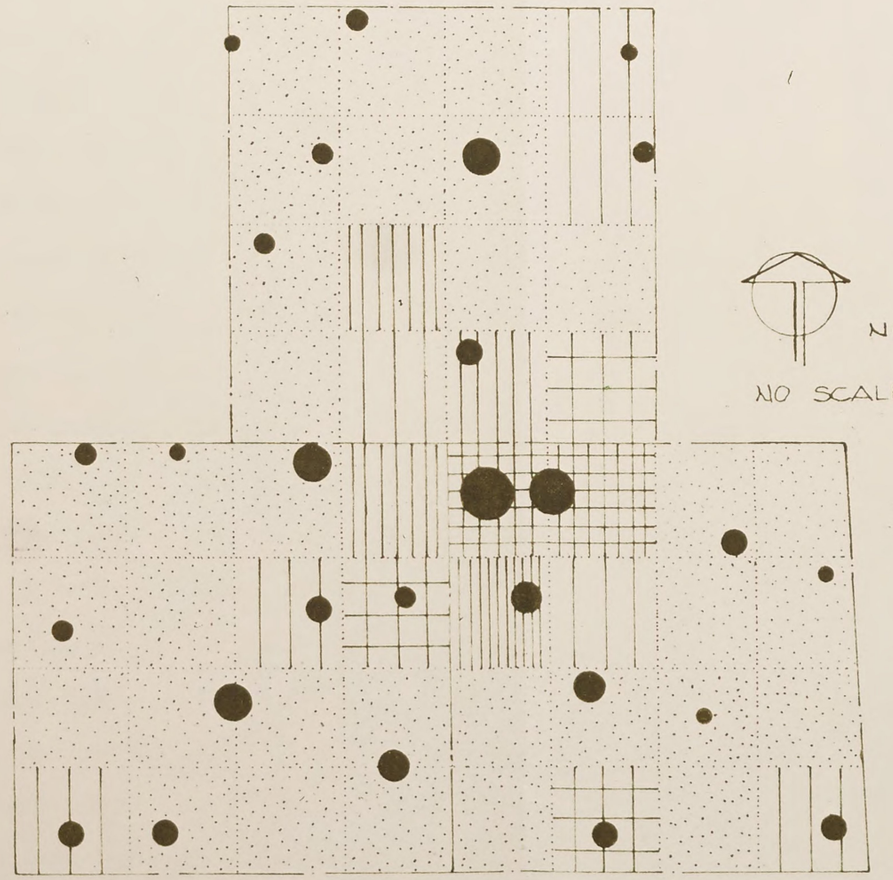
[5]Bureau of Census, U. S. Department of Commerce, 1960 Census--Michigan, 24-A, Number of Inhabitants, p. 24-16.

FIGURE II : DISTRIBUTION OF PEOPLE BY TOWNSHIP, VILLAGE, AND CITY.



NORTH

NO SCALE

URBAN POPULATION

LESS THAN 500

500 - 999

1000 - 2499

2500 - 4,999

5,000 - 9,999

10,000 - 39,999

40,000 AND OVER

RURAL POPULATION

500 - 1999

2000 - 2999

3000 - 4999

5000 - 9999

10,000 - 14,999

15,000 AND OVER

BASIC DATA: BUREAU OF CENSUS, U.S. DEPARTMENT OF COMMERCE, "1960 CENSUS, MICHIGAN 24-A, p. 24-16.

Age

The most important factor in determining participation in recreation is age. The ORRRC Report found that the older a person is the less he participates in outdoor recreation. By summing up the findings of the ORRRC Report on participation and age, one finds the following patterns:

1. People younger than twenty-five participate in all the activities the most.
2. People between the ages of twenty-five and forty-four participate in swimming, camping, fishing, and boating more than older people.
3. People between the ages of forty-five and sixty-four participate in sightseeing and walking more than the other age groups.
4. The most popular activity for people over sixty-five is walking for pleasure.

Looking at the ages of the people of the Tri-County Region (Table III), one sees that the median age is between twenty-six and twenty-eight. Clinton County has the youngest median and also has the largest rural population. Metropolitan Lansing has the oldest age median of almost twenty-nine. One can conclude that the population in the Region is evenly distributed by age. The difference in age medians among the three counties is not very significant in comparison to the different age groups and their demands for recreation. According to the median age in the Region, the activities

Table III.--Population by age.[6]

County	Total 1960	Total 1950	Age
Clinton	37,969	31,195	All ages
	20,720	18,358	Over 21
	15,908	11,605	Under 18
	3,175	2,975	Over 65
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Eaton	49,684	40,023	All ages
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	9,734	7,399	Over 65
	28.9 - 30.8 median		

[6]Bureau of Census, Michigan, 24-B, p. 24-135.

which would be the most popular and compatible in a regional park are walking for pleasure, boating, swimming, fishing, and nature walks.

Occupation

The occupation of an individual was found to influence the demand for recreation in the following ways:

1. Type of job.
2. Amount of pay.
3. Length of paid vacation.
4. Length of workday and workweek.

The vocation of a person often determines whether or not he will be interested in a particular activity. The man who works out in the woods all day might not want to spend his vacation camping. Whereas, the professional man who spends his working days indoors might well prefer to change his environment and go camping on his vacation. With the average national workweek being thirty-nine hours in 1960, and the projected workweek in 1976 being thirty-six hours, one can foresee more leisure time becoming available to Americans. Not too many years ago the average workweek was forty-four or more hours, and by decreasing from forty-four hours to the present average of thirty-nine hours, there has already been an increase in the demand for outdoor recreation. By the year 2000 the national workweek is expected to be down to thirty-two hours, thus giving Americans two more days

of leisure than their grandfathers and one more day than their fathers.

The higher standard of living and increased weekly salaries provide the means for financing leisure time activities. Recently, one of the major companies joined the universities by starting to give extended periods of leave to their employees. Again these trends indicate more leisure time for Americans in the future.

With the regional park being primarily a day-use park, paid vacation and shorter work days will influence the use of the park the most. Many of the activities will not require large investments, so the availability of money to the user will not be of added importance. During an extended vacation, the potential user will probably find another job or will travel extensively through other countries. The farmer and the self-employed work longer hours than the factory and the white-collared workers. Consequently the type of job has a bearing on the length of the workweek, and both have about the same influence on the demand for recreational activities.

The higher the salary a person receives, the more he participates in recreational activities, as compared to persons with lower incomes. Looking at the median income of persons in each of the counties in the Tri-County area, one sees that Clinton has the lowest median of $5,636, Eaton is next with $5,821, and Ingham has the highest income

median of $6,393. These income medians follow the population distribution in the Region, with Clinton County being the least, and Ingham County being the most, populated. Ingham County also has the highest percentage of urbanization of the three counties. For these reasons, the demand for recreation by Ingham County, and especially metropolitan Lansing, would be the greatest in the Region.

Employment in Lansing can be broken down into the following groups (Table IV):

1. The largest group of people are employed as machinery operators and as craftsmen.
2. The next largest group of people are employed as professional people.
3. Proprietors and managers comprise the fourth largest group of employees.
4. Service workers, sales workers, and clerical workers comprise the last group.

Persons comprising these groups tend to spend a large percentage of their leisure time participating in recreational activities, according to the ORRRC Report. This study is just one more verification of the theory that the Regional demand for recreation is generally localized in Lansing.

Assuming the basic unit for recreation participation is the family, average family incomes of Lansing will be considered (Table V). The table shows that those families where the head of the family is between the ages of forty-five

Table IV.--Occupation and income of the Lansing metropolitan area.[7]

Occupation	No. of Workers		Median Income in $		Percent of Population
	Male	Female	Male	Female	
Total	74,138	36,140			
Professional, technical	9,522	5,336	4,974	3,376	13
Farmers and farm managers	3,699	135	2,424	-	4
Managers, proprietors	6,909	1,142	6,958	3,779	10
Clerical and kindred	4,863	13,143	5,041	3,098	6
Sales workers	5,465	2,901	4,831	1,347	7
Craftsmen, foremen	14,777	495	5,594	2,742	20
Operatives	16,303	2,894	4,749	2,848	22
Private household workers	73	2,375	2,000	595	1
Service	4,940	5,650	3,129	1,407	7
Farm laborer, foremen	1,366	183	771	-	2
Laborers, except farm	3,076	203	3,140	-	4
Occupation not reported	3,145	1,683	4,496	2,044	4

[7]Bureau of Census, Michigan, 24-C, p. 24-492.

Table V.--Family incomes, Lansing metropolitan area, 1959.[8]

Families	Total	Median
Husband and wife	67,064	6,349
Head under 35	21,423	5,758
Children under 18	17,664	5,769
Children under 6	15,938	5,677
Head between 35-44	15,891	7,282
Children under 18	14,009	7,257
Children under 6	6,999	6,825
Head between 45-64	22,535	7,371
Children under 18	9,521	7,623
Head over 65	7,215	3,147
Children under 18	212	4,516
Other male head	1,381	5,743
Other female head	4,824	3,702

[8] Ibid., 24-C, p. 24-653.

and sixty-four, with children under eighteen, have the largest income. According to finances alone, one would expect that this group of families would have the largest percentage of participation in recreation than any of the other groups.

The ORRRC Report indicates that after a family earns $3,000, there is a marked rise in participation in recreation, with a maximum participation coming at the $7,500 level. With the majority of Lansing families earning over $3,000 each year, and many groups earning more than $6,000, one would expect that these incomes would encourage family

participation rather than discourage it.

As has been mentioned, activities preferred by the various income groups differ. While walking is generally the most popular for all groups, boating, fishing, camping, and horseback riding increase in popularity as incomes increase. The most popular activities in the $4,500 to $8,000 group, in which fall the majority of the Lansing people, were found by the ORRRC Report to be walking for pleasure, fishing, boating, camping, and horseback riding. According to family income, these activities would be the most popular activities in the Region.

Families participate in outdoor recreation together. Many family activities--swimming, walking, boating, and nature walks--are condusive to regional parks. As can be seen in Table VI, most people in this Region live in family units, the average size family being four people. This means that the family of four is a basic module to be used when designing a regional park for this Region.

Table VI.--Living units of the Region.[9]

County	Total Population	Total Living		No. of Persons per Household
		Households	Institutions	
Clinton	37,969	37,771	98	3.66
Eaton	49,684	49,046	638	3.46
Ingham	211,296	200,222	11,074	3.30

[9]Ibid., 24-B, p. 24-154.

Education

The ORRRC Report found that the more educated a person was, the more he participated in outdoor recreation. This education factor can be correlated with the income factor, since it is a generally accepted theory that the more educated a person is, the more money he will earn. The process of education provides a person with the opportunity of learning an activity under supervision while in school. The variety of activities can be seen in any course catalog. The outdoor activities include archery, hunting, fishing, golf, tennis, swimming, scuba diving, and canoeing. Once an individual has been introduced to these activities, he will create a demand for continued participation.

As factors for determining participation in recreation, the education levels of the counties in the Tri-County Region are related to the population of these counties. Clinton County has an average of 10.5 years of education per person, Eaton County has an average of 11.3 years, and Ingham County has the highest average of 12.1 years. According to the ORRRC Report this means that the greatest demand for more varied forms of recreation will come from Ingham County, since these people have had the most formal education.

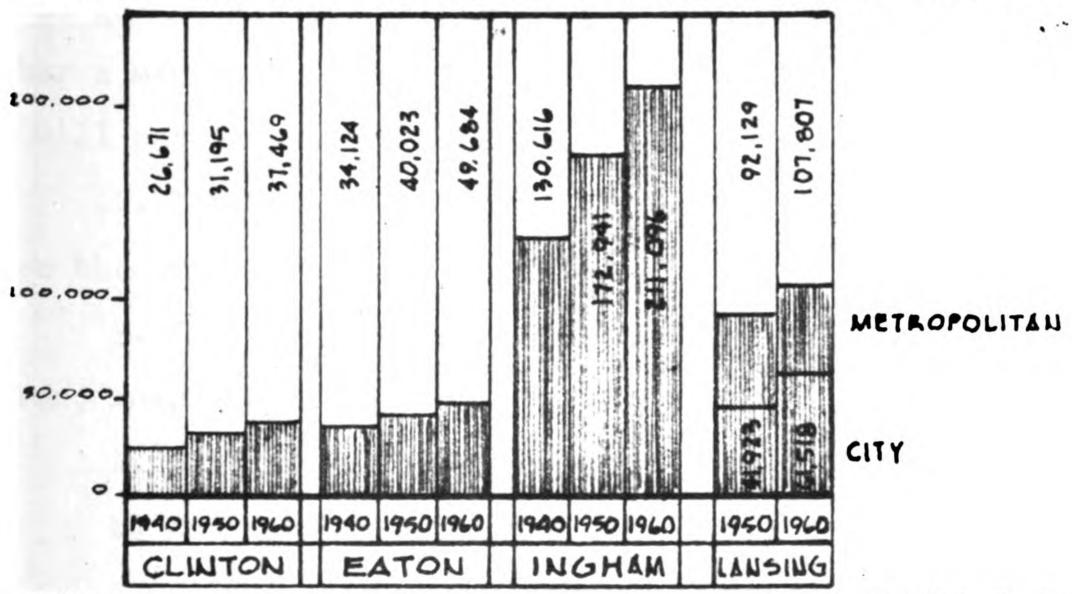
The most popular activities for people with one to four years of education at the high school level include driving for pleasure, sightseeing, swimming, walking, and playing outdoor games.

The Future Demand for Recreation

The future demand for recreation can be forecasted from the rate of increase in the population of the three counties since 1940. The growth has been positive in all counties. This expansion alone is a good indication that the population will demand more recreational facilities, but one must also take into consideration the factors of education, added leisure time, more available money, and paid vacations. By looking at Table VII one can see how the growth rates of the Tri-County Region have increased since 1940. Unless there is a major war or disaster, these rates of increase will continue to grow as the war babies start having children in the next few years.

The greatest amount of growth has occurred in Ingham County. Since the rate of growth has been constant for the last twenty years, it is expected to continue at this same, if not greater, rate. Again, this growth would be due to the war babies having children, and also to the expansion of industry in this area. The amount of construction in the Lansing area is considerable at present. In addition, several industries have recently announced expansion plans, and the future of Lansing looks healthy. This increase in growth shows the need for additional parks and preserved land especially near Lansing.

TABLE VII: POPULATION GROWTH RATES OF THE TRI-COUNTY REGION



SOURCE: U.S. DEPARTMENT OF COMMERCE, "U.S. CENSUS OF POPULATION 1960- MICHIGAN, NUMBER OF INHABITANTS," p. 24-16 AND 24-17.

Summary of the Demand for Recreation

In summarizing the demand for recreation in the Tri-County area, one can conclude the following:

1. The majority of the people seeking outdoor recreation will be from metropolitan Lansing and from the rural nonfarm areas in the Tri-County Region. The recreation seeker will be white, about twenty-seven years old, a high school graduate, have an occupation that is likely to be either a machine operator, a proprietor, or a service worker, and will have an income of about $6,000.

2. The majority of people live in households of between three and four people.

3. The most desired activities by the people in the Region, which would be compatible to regional parks, are:

a. Driving for pleasure
b. Motor boating
c. Swimming
d. Picnicking
e. Walking for pleasure
f. Fishing
g. Camping
h. Nature walks
i. Horseback riding
j. Golfing
k. Winter sports
l. Hiking
m. Water skiing
n. Canoeing
o. Sailing
p. Bicycling

4. The projected, most desired activities should be provided for the people in the proposed park.

Table VIII shows a complete breakdown of the expected demand for recreation by the people of the Tri-County Region.

TABLE VIII: A SUMMARY OF THE EXPECTED DEMAND FOR RECREATION IN THE REGION

ACTIVITY / POPULARITY OF ACTIVITIES ACCORDING TO:	DRIVING FOR PLEASURE	WALKING FOR PLEASURE	SPORTS & GAMES	SWIMMING	BICYCLING	FISHING	PICNICKING	NATURE WALKS	BOATING	HORSEBACK RIDING	CAMPING	WINTER SPORTS	HIKING	WATER SKIING	CANOEING	SAILING	GOLF
MIDWEST REGION OF THE U.S.								1									
PLACE OF RESIDENCE: URBAN	x	x			x		x	x									
RURAL						x				x	x						
AGE GROUPING: UNDER 25				ALL ACTIVITIES ARE POPULAR IF FACILITIES PROVIDED													
25 – 44				1		3		4		2							
45 – 64	1						2										
OVER 65		1															
MEDIAN AGE		1		3		4		5	2								
RACE: WHITE	x			x			x			x							
NONWHITE		x	x														
MEDIAN OF INCOME		1				2			3	5	4						
MEDIAN OF EDUCATION	1	3	4	2													
FAMILIES (ACTIVITIES FOR)	x			x			x	x	x								
MOST POPULAR ACTIVITIES	x	x	x	x	x												
NO DESIRE TO PARTICIPATE IN MORE OFTEN	x			x		x	x		x								
WOULD LIKE TO PARTICIPATE IN MORE OFTEN	x			x		x	x										
NEW ACTIVITIES EXPECTED TO PARTICIPATE IN						x			x	x	x						

Site Selection

The primary deficiencies of opportunities in outdoor recreation in the Tri-County Region are concerned with water and its nonavailability, as was pointed out by the Tri-County Regional Planning Commission.[10] The proposal for this comprehensive project calls for the development of one of the eleven proposed reservor sites in the Region. The initial reservoir study was made by the Michigan Water Resources Commission (MWRC) in 1961. The Battelle Memorial Institute (BMI) completed a more detailed study for the proposed reservoirs in 1963.

A site for the proposed regional park will be selected in the following manner. The eleven proposed sites will be investigated, and the best reservoir site will be chosen as the central core for a regional park. The park boundaries will then be delineated according to the needs of the people in the Tri-County Region, and in relation to the aesthetic and natural features of the specific area.

Proposed Dam Sites

Water held by dams can serve people in many ways; these include water supply, low flow augmentation, recreation, hydroelectric power, and flood control. Both the MWRC and

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[10] Tri-County Regional Planning Commission, op. cit., p. 26.

the BMI made studies of the water in this Region. Both organizations were primarily concerned with the quality of ground water and its availability for use within the Region. Utilization of the reservoirs for recreation was considered a secondary purpose, although both Reports were aware of the demand for water oriented recreational activities.

The multi-use concept in relation to reservoirs and impounded waters can be misleading. In the case of the Tri-County Region, where a reservoir can be used for more than one purpose, one must consider these purposes and compare them. In order to eliminate conflicting interests in the reservoir facilities, a priority list of uses must be established. The item at the top of the list would determine how the reservoir would be utilized at all times. In this manner there would not be misunderstandings when the water level was too low for swimming, or there was not enough water in the reservoir to augment the flow of a river during droughts.

The Michigan Water Resources Commission pointed out in their Report, concerning the Tri-County Region, that there are water problems existing.[11] The conclusions of the Report stated that during periods of low stream and river flow many cities, and particularly metropolitan Lansing, overburden

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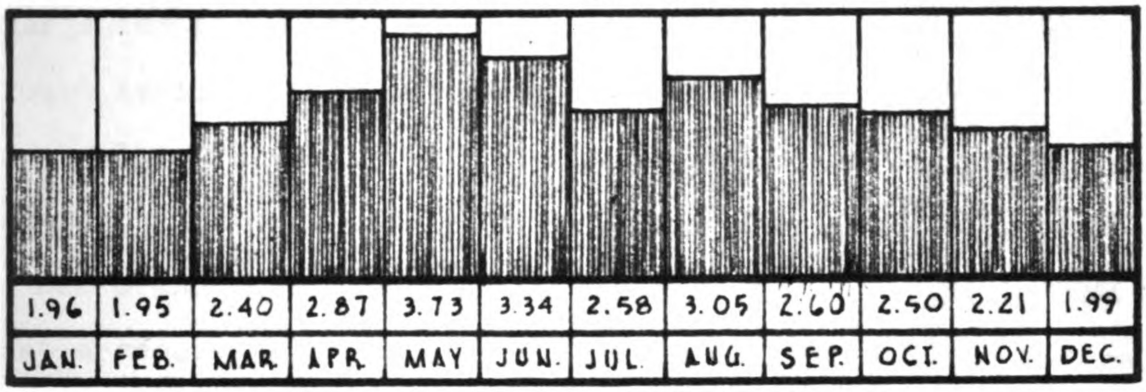
[11] Michigan Water Resources Commission, Water Resource Conditions and Uses in the Upper Grand River Basin, Lansing, p. 135.

the waters with waste. Floods are a problem in the Region although they do not occur yearly. The most serious flooding areas are Sycamore Creek at Mason, the Grand River at Eaton Rapids and Lansing, and the Red Cedar River at East Lansing. Inundation also occurs in Maple Rapids State Game area where the Maple River flows, but the damage is negligible here since it is a natural area. The third Regional problem concerns water supply. At the present time, wells provide the Region with water for home use. With increasing demands for water by metropolitan Lansing, the wells might have to be supplemented by ground storage facilities.

In order to see how the different proposed reservoirs might be utilized in relation to the Regional water supply, a look at supply figures and stream flow records is necessary. The average annual rate of precipitation for Lansing is 31.18 inches. Table IX shows the average monthly precipitation rates for Lansing.

To correlate reservoir use and monthly precipitation rates, a look at the amount of run-off is necessary. The purpose is to see when the times of high and low flow occur. In this case, the Grand River at Lansing will be used as an example for the Region, and the year 1960 will be the representative year. The mean discharge for the year was 1,080 cubic feet per second. Table X shows the monthly mean discharge.

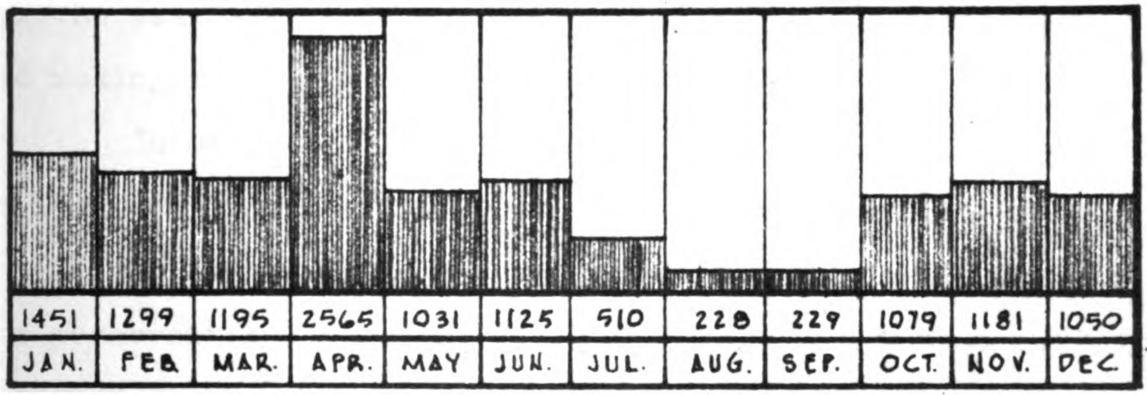
TABLE IX: AVERAGE MONTHLY PRECIPITATION RATES FOR LANSING IN INCHES



1.96	1.95	2.40	2.87	3.73	3.34	2.58	3.05	2.60	2.50	2.21	1.99
JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.

SOURCE: MICHIGAN WATER RESOURCES COMMISSION, "WATER RESOURCE CONDITIONS AND USES IN THE UPPER GRAND RIVER BASIN," LANSING, p. 135.

TABLE X: MONTHLY MEAN DISCHARGE OF THE GRAND RIVER AT LANSING FOR THE YEAR 1960 IN CUBIC FEET PER SECOND



1451	1299	1195	2565	1031	1125	510	228	229	1079	1181	1050
JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.

SOURCE: MICHIGAN WATER RESOURCES COMMISSION, "WATER RESOURCE CONDITIONS AND USES IN THE UPPER GRAND RIVER BASIN," LANSING, p. 47.

By comparing the two tables, run-off and precipitation, one can see that the two cycles are not consistent with each other. The rainfall cycle reaches a low in December, January, and February, whereas the monthly mean discharge for those months was higher than all other months, except April. The peak run-off occurs in April after the snow melts. Even though the months of May, June, and August provide the most rainfall, the mean monthly discharge rate on the Grand River is very low at this time. One might say that a reservoir could be utilized to catch the flood waters in the spring and save this water for recreation and low flow augmentation in the late summer. This reasoning is fine, except that the reservoir water level would drop during the peak season for recreation, leaving exposed banks and making the beach unuseable for swimming.

In order to catch flood waters, a reservoir should be left empty. One might say that since the records of the Tri-County Region show that the run-off is low in the summer, the reservoir could be left full during this low flow period and used for purposes other than flood protection. The MWRC felt that this alternative would be a gamble, since records are not very complete for the past years. To summarize the preceding arguments concerning the multi-use concept for the reservoir, the following statements are presented. Due to the shortage of recreation involving the use of water in the Tri-County Region, this report is giving recreation

top priority for the use of the water in the reservoir. This decision eliminates the use of low flow augmentation for the reservoir because the two uses conflict during the summer. The reservoir could be utilized to catch floodwaters in the spring, but, during the summer, the water level would have to remain constant for recreation.

The Battelle Memorial Institute's Report was concerned with water in the ten townships in and around Lansing.[12] These townships included Watertown, Dewitt, Bath, Oneida, Delta, Lansing, Meridian, Windsor, Delhi, and Alaiedon. As in the MWRC Report, recreation was given second priority for the reservoir sites, although specific sites were designated for recreational reservoirs. A summary of the proposed reservoir sites may be found in Table XI. All of the sites are located on a map of the Upper Grand River Basin (Figure III).

In choosing the specific reservoir site for a proposed regional park, one must first consider the need for water oriented activities in or near metropolitan Lansing. Secondly, due to the lack of recreational waters, the primary use of the reservoir should be for recreation. Even if the reservoir was used for flood control, a problem would arise.

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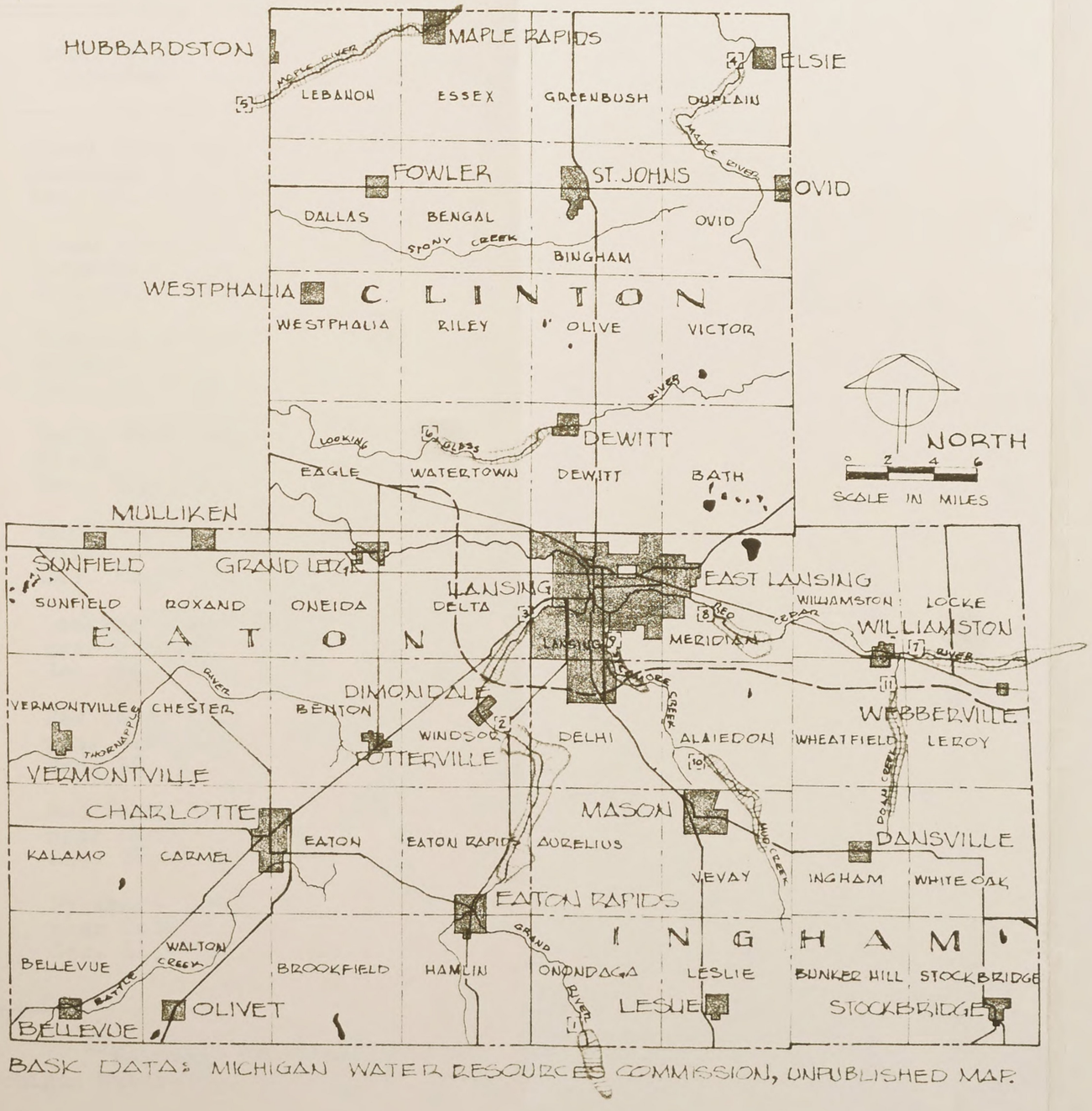
[12]Battelle Memorial Institute, Alternative Long Range Water Use Plans for the Tri-County Region, Michigan, Tri-County Regional Planning Commission, Lansing, 1964.

During the spring, when the water level would be lowered to receive the flood waters, fish habitats would be destroyed.

From Table XI one sees that most of the reservoir sites have a suggested use, either to augment the low flow of a river or to prevent floods. The reservoirs across the Grand River near Millett, across the Red Cedar near Okemos, and across Sycamore Creek near Holt, although near Lansing and in areas where the water could be used for recreation, are proposed to augment the low flow of the Grand and Red Cedar Rivers. Other reservoir sites proposed for low flow augmentation include those on Mud Creek near Mason, Doan Creek near Williamston, the Grand River at Onondaga, the Red Cedar near Williamston, and the Maple River near Muir, but these sites are at a distance from Lansing. The above mentioned reservoirs could be used for flood control.

The only proposed reservoir to supplement the water supply of the Region was across the Grand River at Dimondale. Two reservoirs were proposed for recreation only: one, on the Maple River near Elsie; the other, on the Looking Glass River near Wacousta. The Maple River reservoir site is over twenty air miles from Lansing and from the largest concentration of people in the Region. In addition, other recreation areas are located at this distance from Lansing on the periphery of the Region (see Figure I). By deduction, the Looking Glass River reservoir site near Wacousta is the best sites for a regional park, since it is easily accessible by the majority of the people in the Tri-County Region.

FIGURE III : PROPOSED RESERVOIR SITES OF THE REGION



BASK DATA: MICHIGAN WATER RESOURCES COMMISSION, UNPUBLISHED MAP.

LEGEND

POLITICAL BOUNDRIES

- COUNTY
- TOWNSHIP
- VILLAGES AND CITIES

HIGHWAYS

- INTERSTATE HIGHWAY
- MAJOR ROADS

WATER

- STREAMS AND RIVERS
- LAKES
- PROPOSED RESERVOIRS

PROPOSED DAM SITE

1. GRAND RIVER AT ONONDAGA
2. GRAND RIVER AT DIMONDALE
3. GRAND RIVER NEAR MILLETT
4. MAPLE RIVER NEAR ELSIE
5. MAPLE RIVER NEAR MUIR
6. LOOKING GLASS RIVER NEAR WACOUSTA
7. RED CEDAR RIVER NEAR WILLIAMSTON
8. RED CEDAR RIVER NEAR OKEMOS
9. SYCAMORE CREEK NEAR HOLT
10. MUD CREEK NEAR MASON
11. DOAN CREEK NEAR WILLIAMSTON

LEGEND

POLITICAL BOUNDRIES

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8. RED CEDAR RIVER NEAR OKEMOS
9. SYCAMORE CREEK NEAR HOLT
10. MUD CREEK NEAR MASON
11. DOAN CREEK NEAR WILLIAMSTON

Table XI.--A summary of proposed reservoir sites.[13]

No.	Reservoir location	County	Recommended MWRC	Recommended BMI	Proposed[1] use
1	Grand River at Onondaga Sec. 33, T 1N, R 2W	Ingham*	x	x	low flow
2	Grand River at Dimondale Sec. 15, T 3N, R 3W	Eaton	x	x	water supply
3	Grand River near Millett Sec. 35, T 4N, R 3W	Eaton	x		low flow
4	Maple River near Elsie Sec. 11, T 8N, R 1W	Clinton	x	x	rec.
5	Maple River near Muir Sec. 10, T 7N, R 5W	Clinton*	x		low flow
6	Looking Glass River near Wacousta Sec. 15, T 5N, R 3W	Clinton	x	x	rec.
7	Red Cedar River near Williamston Sec. 32, T 4N, R 2E	Ingham*	x		low flow
8	Red Cedar River near Okemos Sec. 28, T 4N, R 1W	Ingham	x	x	low flow
9	Sycamore Creek near Holt Sec. 11, T 3N, R 2W	Ingham	x	x	low flow

[13] Battelle Memorial Institute, op. cit., p. 106. Michigan Water Resources Commission, op. cit., p. 122.

Table XI--Continued

No.	Reservoir location	County	Recommended MWRC	Recommended BMI	Proposed use[1]
10	Mud Creek near Mason Sec. 33, T 3N, R 1W	Ingham	x		low flow
11	Doan Creek near Williamston Sec. 17, T 3N, R 2E	Ingham	x		low flow

*Not completely in the Tri-County Region
**Estimated

[1]MWRC and BMI
[2]BMI
[3]MWRC

Table XI--Continued

No.	Distance from Lansing	Refill[2] potential	Upstream[3] quality	Storage Capacity in acre-feet
1	20 miles	good	unknown	57,000
2	10	excellent	B	18,000
3	5	excellent	A	14,000
4	23	excellent	A	11,900
5	25	excellent	A	74,000
6	8	excellent	A	8,000
7	18	fair	A	30,000
8	8	excellent	B	25,000
9	5	poor	B	19,000
10	14	poor	A**	20,000
11	17	very poor	A**	40,000

*Not completely in the Tri-County Region
**Estimated

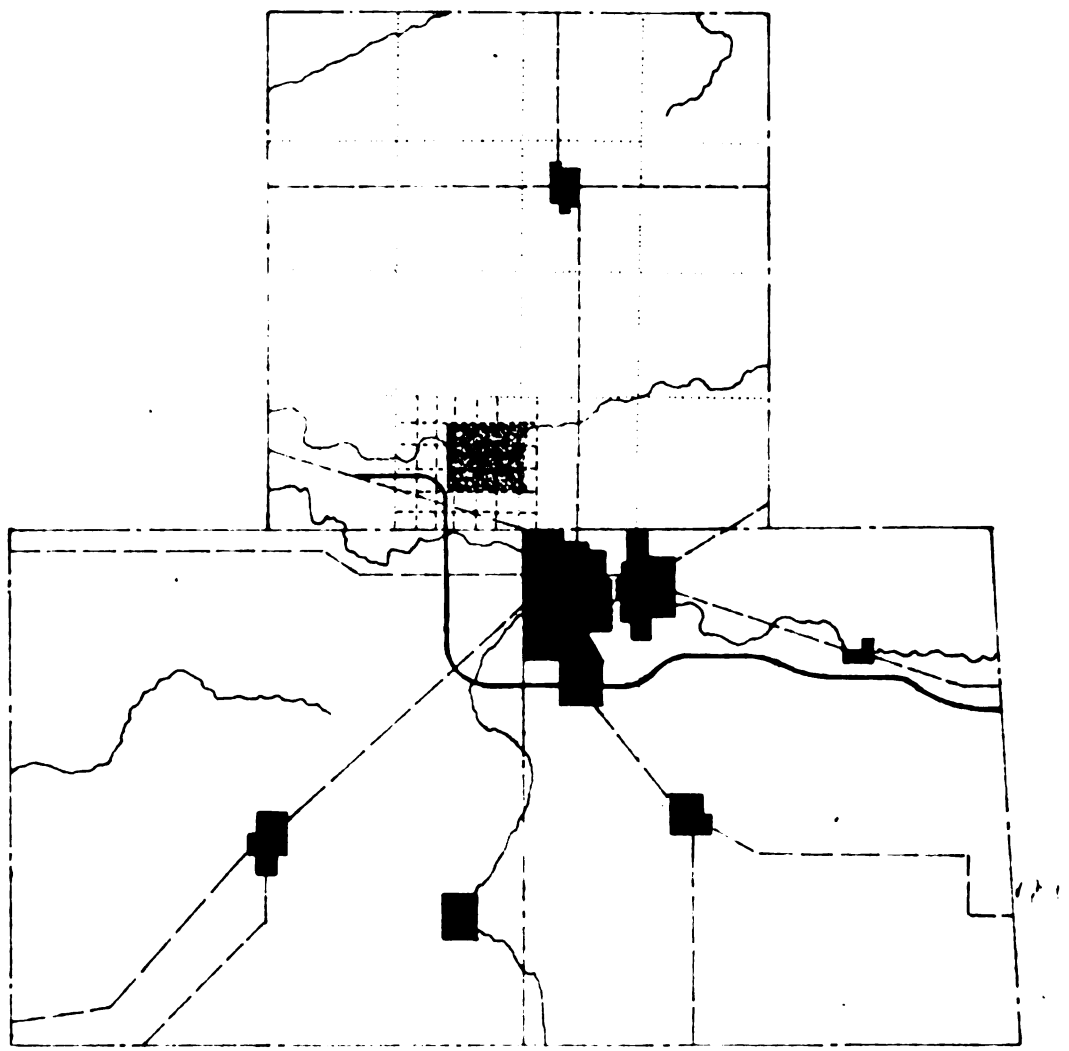
[1]MWRC and BMI
[2]BMI
[3]MWRC

Table XI--Continued

Number	Water Surface[3] in acres	Inundation[3] damage
1	5,690	small
2	1,830	medium
3	440	small
4	1,900	medium
5	8,400	small
6	1,360	small
7	5,770	large
8	2,230	medium
9	1,600	large
10	3,300	medium
11	2,700	medium

*Not completely in the Tri-County Region
**Estimated

[1]MWRC and BMI
[2]BMI
[3]MWRC



the SITE

CHAPTER III

THE SITE

This section of the report will be devoted to the examination of the proposed reservoir site. First, there will be a general description of the proposed site to explain the present character of the land. Then, the natural factors of the site, subsurface, surface, and climatic conditions will be investigated. The results of these studies will be placed together in the form of a landscape analysis and the proposed park boundaries will then be delineated.

Site Description

The proposed reservoir site, which is to be the central attraction of the regional park, is located in Section 15 of Township 5 North and Range 3 West in Clinton County, which is the approximate location of the dam site which was proposed by the Michigan Water Resources Commission and the Battelle Memorial Institute (see Figure VII). This location for the dam was chosen because the Looking Glass River Valley narrows down here, and the foundation soil is a mineral soil rather than an organic soil. The high water mark of the reservoir was determined through the interpolation of contours on a United States Geographic Survey Map of the Dewitt Quadrangle.

The criterion for selecting the ultimate height of the reservoir was not to disturb the town of Dewitt. This town lies upstream from the dam by about four miles. Howe Road runs west from Dewitt and parallels the proposed reservoir. The high water level was picked so that this road would not have to be relocated farther north. The elevation of the road along this portion of the reservoir is about 800 feet. Since those portions of Dewitt are higher in elevation than the road, the water level of the reservoir should stay below 800 feet; if not, the road will have to be raised. This portion of the Looking Glass River Valley is narrow and the banks are short and steep. Few benefits would be added for recreation at this point of the reservoir to go to the extra construction costs of exceeding the elevation of 800 feet. Therefore a tentative elevation of 790 feet has been set for the reservoir. This contour crosses the valley floor on the west side of Dewitt, and therefore, the buildings along the river in Dewitt would not be endangered by the proposed water level.

The main portion of the proposed reservoir is located in the central portion of Sections 15, 14, and 13, running north for a mile and east through Dewitt. The Looking Glass River Valley is generally narrow. The widest portion of the reservoir is about a quarter of a mile across. There are several shallow, narrow, stream entrances which give added

width in places, but these usually have bottoms of organic soils.

The proposed reservoir runs down the middle of the three sections. This course gives it the distinction of acting as a property line for the properties to the north and to the south. A gravel road follows each of the section lines running east and west. The farmsteads and residential homes along both of these roads have been located near the road, since the land near the river is wet and steep. The land-use pattern shows that the houses occupy that portion of the property near the road. If the land is farmed, the crops are between the buildings and the River Valley. The land along the River Valley is forested with deciduous trees.

Those roads which run north and south are punctuated by both farmsteads and residences. The residences are located at the corners of the sections, while the farmsteads are along the road. The general visual image of the River Valley, as seen from the east-west roads, is obscured by the trees. In many places, the view is hidden by the relief. There are two panoramic views of the site; both are opposite each other on the west end of the reservoir. By utilizing the minor ridge lines between the road and the Valley, a boundary line can be made so that the farms may continue to operate, thereby protecting the park boundaries. Protection will also occur on the south side of the Looking Glass River where some residences are located.

Where the proposed reservoir starts to narrow down and run to the north, several land-uses have ruined the land for development as a park. A major subdivision was started on the east side of the River, and three gravel pits were located between the roads and the River Valley, with one of the gravel pits being used in combination with a dump. These land-uses are not aesthetically pleasing or compatible to a regional park. Considerable time and money would be needed to correct such land-uses.

There are several natural lakes in the area. These lakes are near the roads, are in low depressions, and have bottoms of organic matter.

The proposed site is in no danger from new highways. There is a proposed interstate highway to the south, and the only paved roads in the immediate area are Airport Road and Howe Road. Airport Road runs across the proposed reservoir.

The vegetation on the proposed site is deciduous, except where two fields have been planted with coniferous plantations. The trees of the lowlands and River Valley are not as suitable for recreation as the trees of the upland soils. Those upland woodlots are good for recreation because the underbrush is scant and the trees are mature enough to protect and shelter people and facilities. Wildlife also inhabits the woodlots. Farming has destroyed the vegetation on much of the land, but the woodlots hold cover and concealment

for small game. The woodlots are so small that the large game using these areas as part of their natural habitat, just pass through, rather than establish a permanent residence. The small game can find enough protection in the River Valley and the woodlots to exist.

The birds of the area use the woodlots and River Valley for nesting sites. These birds range from the predators, like the hawk, to the small seed and insect eaters, like the sparrow and warbler. Many birds were seen preparing to nest during the spring of 1964. Plants still holding last year's nests were found in both the Looking Glass River Valley and the woodlots. The hawthorn species of trees was especially popular as nesting sites for songbirds.

Subsurface Conditions

Of all the natural elements, glaciers influenced the proposed site the most. This area has been covered with ice four times, the last covering disappearing about 12,000 years ago. The retreat of the ice was gradual and the present ground forms resulted from the ice and the melted ice leaving freighted rock debris, or glacial drift, over the bed rock. The bed rock was mainly composed of granite that was overlaid with sedimentary rock. The ground forms left by the glaciers include an old lake bed, which now serves as a channel for the Looking Glass River, moraines to both the north and the south of the river, and a till plain, or ground moraine, on the south side of the river.

Soils

The soils of the proposed site fall into one great soil group--the Gray-Brown Podzolic. All of the soils have the following characteristics:

1. The soils have been developed in a cool, moist climate.
2. The profile has a veneer surface of organic matter. The next horizon has been leached and is gray in color. This horizon, in turn, is underlaid by another leached horizon. The subsoil is next and it holds an accumulation of iron and humus.
3. The soils have been deposited by the receding glaciers.

Locally, there are other soils which have been formed by deposition, including the sands and gravels, peats and mucks.

The soils of the Region were classified by series, type, and phase, by the Department of Agriculture in their soil survey of the Region. In classifying soils for recreational uses, the series was found to be the most important. A soil series includes soils which have the same horizon, similar characteristics and arrangements in soil profile, and have developed from the same type of parent material. In other words, the soils in a series have essentially the same color, structure, natural drainage conditions, and range in relief. Most soil series have a name of a place or geographic feature.

The class of a soil means the texture of a soil. The texture refers to the amount of clay, silt, loam, or sand present in a representative sample. The different classes of soil series have the same internal drainage characteristics. The class of a soil is important when considering the ability of a soil to retain moisture. The more sand a soil contains, the more quickly it provides drought conditions for vegetation during dry spells. In classifying soils for recreational uses, all soils of the same series were combined and not rated by class, whereas the principle mapping unit on the generalized soils map was the class of the soil.

The phase of a soil is a variation within the series. The differences are minor soil characteristics, including the degree of erosion, differences in relief or stoniness.

Table XII contains a complete list of soils on the proposed reservoir site. The soil relationships on the site may be found on the generalized soils map (Figure IV).

A detailed study of all the soils on the proposed site was made, for the reason that soils provide the foundation for plants and for improvements to the land. If a particular soil will not provide a suitable foundation for a proposed use, the proposal will never become a success. By first deciding what are to be the proposed activities of the site, and then finding out what are the desired soil

FIGURE IV: PERCEPTUAL STUDY LEGEND

CULTURAL FEATURES

LIVING UNIT

SCHOOL

COMMUNITY HALL

PAVED ROAD

GRAVEL ROAD

GRAVEL PIT ~ DUMP

BRIDGE

NATURAL FEATURES

VEGETATION: DECIDUOUS

CONIFEROUS

HEDGE ROW

RELIEF: FLAT

STEEP

WATER: LAKE

STREAM OR RIVER

INTERMITTENT STREAM

POORLY DRAINED AREAS

POSSIBLE FROST POCKETS

FP

MISCELLANIOUS

PREVAILING WIND: SUMMER

WINTER

PANORAMIC VIEW

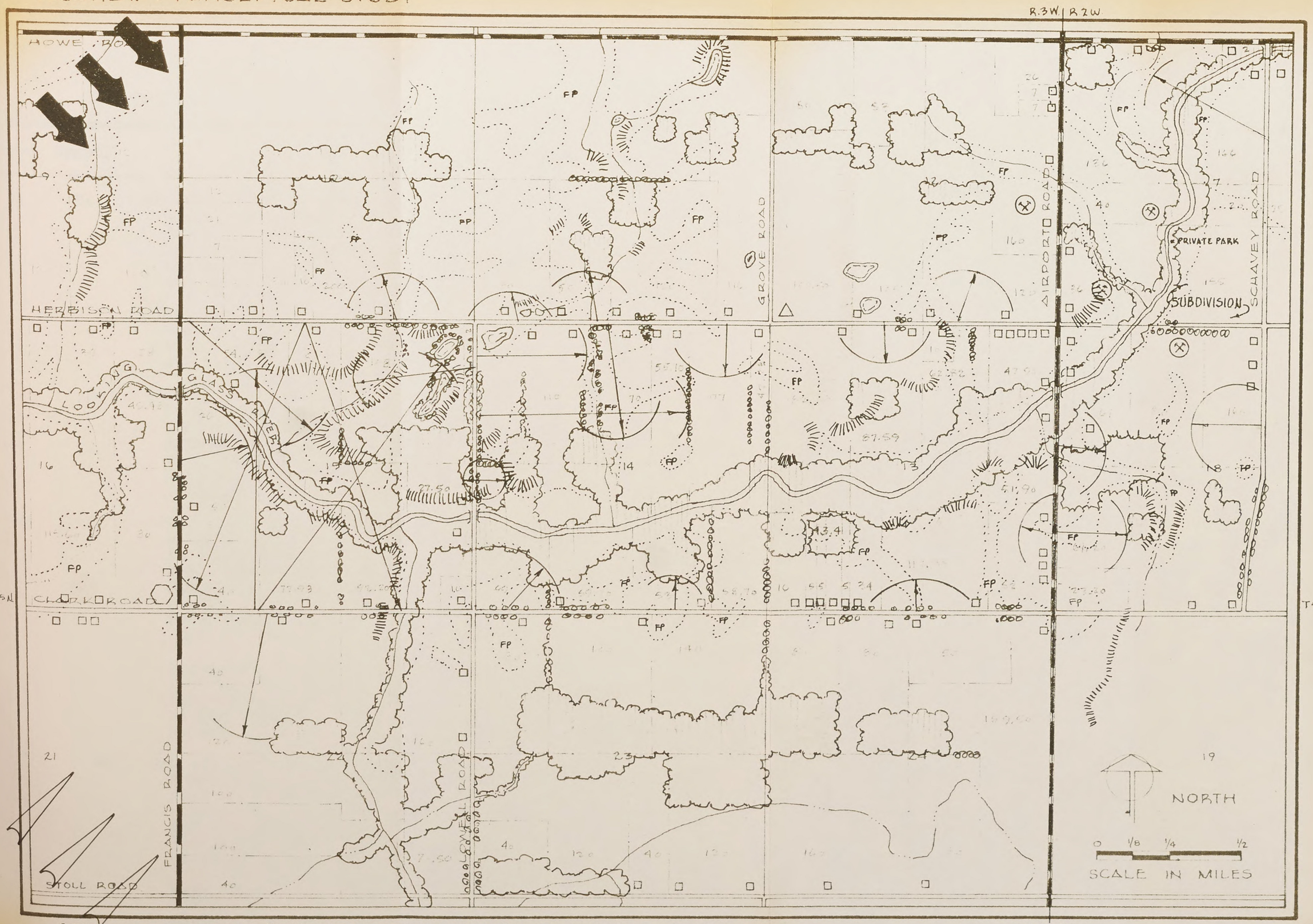
TERMINUS OF VIEW

SURVEY LINES: TOWNSHIP

SECTION AND NUMBER 17

PROPERTY LINES AND ACRES 20

FIGURE IV : PERCEPTUAL STUDY



SOURCE: TRI COUNTY PLANNING COMMISSION AND FIELD CHECKED 25 MARCH 1964.

R 3W R 2W.

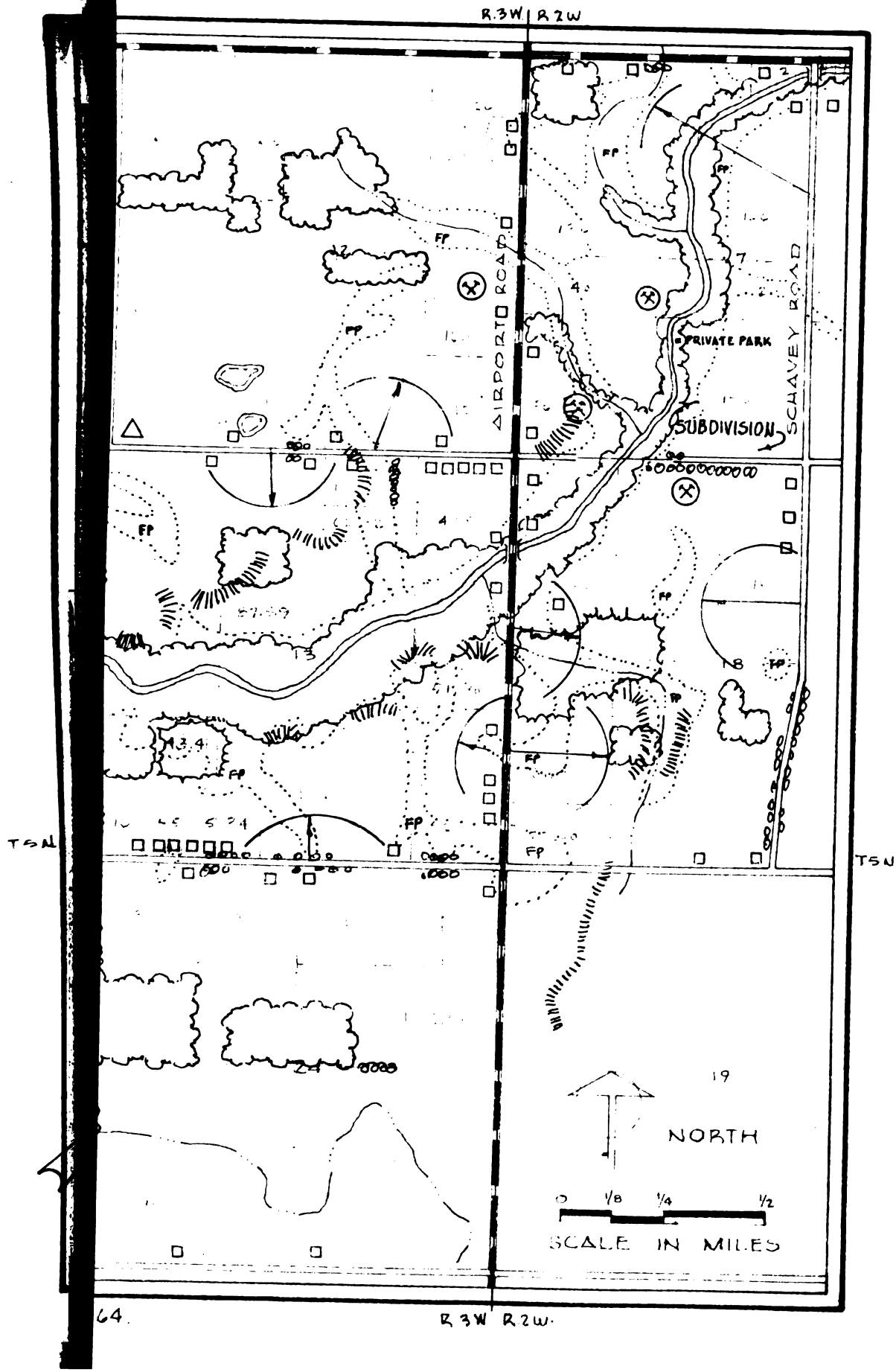

R.3W | R.2W
AIRPORT ROAD
SCHAVEY ROAD
PRIVATE PARK
SUBDIVISION
FP
T5N
NORTH
0 1/8 1/4 1/2
SCALE IN MILES
R.3W R.2W.

Table XII.--Soils survey inventory

Number	Symbol	Characteristics
1.	Bl	Bellefontaine loamy sand, light grayish-brown friable loamy sand; generally low in organic matter with strong acid reaction; low natural fertility and moisture retaining capability; found on strongly rolling and hilly areas. Vegetation: Oak, hickory, elm, black cherry, dogwood, hophornbeam, American hornbeam, sassafras, juniper, sugar maple and beech; little undergrowth.
	Bs	Bellefontaine sandy loam, light grayish-brown sandy loam, medium to strongly acid, contains small quantities of finely divided organic matter, gravel common throughout soil and on the surface; external drainage is good; internal structure porous, plants suffer during dry seasons.
2.	Bo	Brady loam, dark grayish-brown friable loam, slightly acid in reaction, medium to high in organic matter and containing numerous small pieces of gravel and some cobblestones; external drainage is low, soil is porous and allows perculation to ground water table; land-use--woodlots and pasture. Vegetation: A dense stand of large, tall, individual trees; elm, ash, swamp white oak, basswood, silver maple, shagbark hickory; vines and a few shrubs; little undergrowth.
3.	Bm	Bronson loam, medium or dark grayish-brown friable loam, medium to slightly acid in reaction, contains numerous pieces of gravel; a substratum of clay occurs at a depth ranging from 4 to 8 feet; external drainage is slow; internal drainage is retarded by the clay substratum. Vegetation: Sugar maple, beech, oak, hickory, basswood, scattered silver and red maple.

Table XII.--Continued

Number	Symbol	Characteristics
4.	Br	Brookston loam, dark gray or black granular loam, neutral to slightly acid in reaction; occurs in depressions and subject to frequent floodings; internal and external drainage poor.
		Vegetation: See Brady loam.
	BW	Brookston-Washtenaw complex, occupies low lying flat areas and depressions; drainage fair to poor.
5.	Cm	Carlisle muck, occurs in lake basins and drainage valleys as a border of other organic soils; deeper deposits are characterized by a surface layer 10 to 12 inches thick of dark brown granular organic material.
		Vegetation: Elm, red maple, swamp white oak, and ash, willow, aspen, basswood; vines; herbaceous vegetation.
6.	Cs	Coloma loamy sand, loose incoherent yellow-gray sand, acid in reaction, contains low percentage of organic matter; lenses of somewhat clayey material, a few stones may be present in places; soil porous, external drainage is usually good; natural fertility low.
		Vegetation: See Bellefontaine soils.
7.	Cl	Conover loam, medium to dark grayish-brown friable loam, slightly acid to alkaline in reaction, well supplied with organic matter; usually occupies areas of level to undulating relief; internal drainage and external drainage slow.
		Vegetation: Elm, ash, basswood, oaks, hickory, fewer beech, sugar maple, walnut, and butternut.

Table XII.--Continued

Number	Symbol	Characteristics
8.	Fl	Fox loam, light grayish-brown friable loam, medium in organic matter, slightly acid in reaction. Vegetation: Open stand of medium-size trees; red, white, black oaks, hickory dominant; herbaceous undergrowth.
	F	Fox sandy loam, light grayish-brown friable sandy loam, medium to low in organic matter, medium to strongly acid in reaction; underlaid by calcareous, stratified gravel; gravel pits are common in this soil; runoff is slow; the pervious character of this soil allows internal drainage; low in fertility.
9.	Gd	Gilford loam, dark grayish-brown friable loam, slightly acid, poorly drained, occupies level land; medium to high in organic matter; impervious clay occurs in most places at depths of 3 to 5 feet; at borders of swamps soil is mucky; surface runoff slow. Vegetation: Elm, red maple, ash, shagbark hickory, and swamp white oak.
10.	Gy	Griffin sandy loam, dark gray or black sandy loam bottom soil; subject to flooding. Vegetation: Elm, ash, silver maple, sycamore, cottonwood, cherry, walnut, butternut, tulip tree, basswood, hackberry, aspen, willow; vines; shrubs; grasses; herbaceous plants.
11.	Hl	Hillsdale loam, grayish-brown friable loam, medium in organic content, good retention of plant nutrients and moisture. Vegetation: See Hillsdale sandy loam.

Table XII.--Continued

Number	Symbol	Characteristics
12.	Hs	Hillsdale sandy loam, light grayish-brown friable sandy loam, medium to strongly acid in reaction; contains low to medium percent of finely divided organic matter; gravel common throughout the soil; external drainage free to excessive; internal drainage porous in character, allows free perculation. Vegetation: Oaks and hickory dominant; sugar maple, beech, elm, and cherry few to abundant; medium-sized trees; small amount of undergrowth.
	Hs////	Hillsdale sandy loam, rolling phase, same as Hillsdale sandy loam except that it is found on steeply sloping and rolling to hilly land; land-use is generally wood lots.
13.	Hm	Houghton muck, to depth of 6 to 8 inches, slightly acid, dark-brown or black finely fibrous organic material; occurs as borders to lakes and in wet and difficult to drain areas. Vegetation: Marsh type of vegetation, grasses and sedges dominant; shrubs, such as Potentilla, Cornus, black birch, scattered tamarack, and willows.
14.	Km	Kerston muck, occurs in wet bottom soils of mixed muck and mineral soil, slightly alkaline to neutral reaction. Vegetation: See Carlisle muck.
15.	Mm	Maumee loam, occurs in small patches near swamps, dark brown soil mixed with mucky organic matter; underlaid in most places by moist or wet material of either sand, sandy loam, or clay; occurs in low areas, at the edge of swamps and in level areas in small patches.

Table XII.--Continued

Number	Symbol	Characteristics
		Vegetation: Elm, ash, red maple, and swamp white oak; marsh grasses, reeds, and sedges.
16.	Ml	Miami loam, medium grayish-brown friable loam, slightly acid, medium to low in organic matter, easily penetrated by roots; usually an abundance of lime at a comparatively slight depth; small quantities of gravel and a few stones are common throughout the entire soil mass.
		Vegetation: Hardwood forest in dense stands; medium to large individual tree growth; very little herbaceous or shurbby undergrowth; dominant trees include sugar maple, beech, white oak, elm, white ash, hickory, basswood, red and black oak.
	Ml//////	Miami loam, rolling phase, slopes exceed 15% gradients; underlying drift usually contains a high percentage of coarse material, otherwise the soil is much like miami loam; external drainage is rapid, often causing sheet and gully erosion; land use is generally woodlots.
	Ms	Miami silt loam, similar to Miami loam except for a higher percent of silts and clays; occurs on till plains; land-use is generally crops.
17.	Ol	Oshtemo loamy sand, light grayish-brown sandy loam, acid in reaction; occurs on level land surfaces that do not allow for free runoff; soil extremely porous, allowing for free internal drainage; low in fertility.
		Vegetation: See Fox loam.

Table XII.--Continued

Number	Symbol	Characteristics
18.	Rp	Rifle peat, surface material ranges from 3 to 8 inches in depth; granular and mucky in character; reaction is medium to strongly acid; surface is underlaid by medium to strongly acid brown that increases with depth. Vegetation: Tamarack, aspen, red maple, elm, an occasional black spruce and paper birth; shrubs include Vaccinium, choke-berry, and Cornus; sedges and grasses abundant.
19.	Wa	Wallkill loam, occupies depressed areas, soil consists of a covering of eroded material; soils are generally wet. Vegetation: See Washtenaw loam.
20.	Wl	Washtenaw loam, occupies depressed areas, medium to high in organic matter; subject to late frosts and flooding; soil consists of eroded material. Vegetation: Elm, black ash, red maple, willow, swamp white oak, walnut, and butternut; shrubs and herbaceous vegetation.

FIGURE V: GENERALIZED SOILS MAP

BASIC DATA: SOILS SURVEY CLINTON COUNTY, USDA, 1942.

characteristics for each activity, by mapping the soils, the relationship between the desired uses and the soils can be seen. These relationships can then be compared to the existing land-use patterns, existing vegetation, and the proposed reservoir. As a result of these comparisons, a design that is sympathetic, and land-uses that are compatible, to the soils can be proposed. In other words, the design and the proposed uses will be indigenous to the particular soil and to the microclimate of the immediate area, as much as possible. Other factors will influence the development of the site.

The soils of the proposed site will be rated as to their suitability for a proposed land-use. In order to rate a soil series for a potential land-use, the following suitability ratings will be utilized:

1. Most favorable - the soil presents no serious limitations to the use in question.

2. Very favorable - the soil presents some limitation to the use. The limitation is not serious and is easy to overcome.

3. Favorable - the soil presents moderate limitations. The limitations need to be recognized, but they can be overcome or corrected.

4. Somewhat unfavorable - the soil presents serious problems and has severe limitations for use which need to be recognized. Use tends to be questionable as the limitations are hard to overcome.

5. Unfavorable - the soil presents such severe limitations for use that extreme measures are needed to overcome the problem. Usage tends to be undesirable or unsound.

The general land-uses found in a regional park include recreation areas, building sites, and circulation areas. In order to see which soil mapping units are appropriate for each use, an explanation of the characteristics needed for each land-use is necessary. The desired characteristics are as follows:

Buildings: The buildings in a regional park will be generally one story, or possibly two stories, high. They will need to be serviced by a septic tank, since there are no sanitary sewers in the vicinity. The maximum land slope should be less than ten percent and no more than fifteen percent.

Circulation: Circulation is divided into two categories, pedestrian and vehicular. The pedestrian circulation will be on both hard surfaced and natural ground walks and paths. Those paths on natural ground

must drain enough to withstand use in wet weather. The hard surfaced walks will be similar to hard surfaced roads; the base must be strong enough to carry the required loads. There must also be sufficient drainage from the base soil to prevent frost heaving and the forming of ice crystals. Topography must be under ten percent slope for all vehicular traffic, and pedestrian traffic over steep grades should be supplimented by steps.

Recreation: Generally speaking, recreational activities use the natural features, for in most cases, there is no cross-traffic over these areas. Where there is traffic or special uses, the soils will be rated accordingly.

Golf courses: Golf courses will generally not be limited by topography. The soils must be able to withstand heavy use, particularly during the dry season in the late summer. The drainage must be good to facilitate play during wet and rainy seasons of the year.

Picnicking and camping: Generally it is best to use level, well-drained sites. The soil must be able to withstand heavy use and to generate good vegetative growth.

Reservoir developments: There are two parts to reservoir development. First, there is the

embankment material which holds the water in place. Second, there is the soil which serves as the shoreline. The embankment material is clay, while the shoreline material is sand. It is best to have a gentle sloping shoreline for the safety of the users. Those areas around the shores which will be used heavily, must be able to drain freely in damp weather and be able to produce good vegetative growth.

Ground Water

Ground water in the area of the site is found in the sandstone bed rock and in the glacial till. Several of the soils are characterized by their ability to retain water, both late in the spring and throughout the summer. Other soils in the uplands are well-drained and, during dry periods in the late summer, supply little or no water to the plants. The ground water should cause little or no trouble in the regional park as long as the main areas of development are on the upland soils.

Surface Conditions

The surface conditions of the proposed site have been altered very little since the last retreating glacier. This glacier left moraines, a till plain, and an old lake bed. These glacial features give to the land characteristics of low undulations or swells of smooth contour, grading into

Table XIII.--Classification of soils for recreation.

No.	Soil Type	Golf Course	Build-ings	Septic Tile Field	Camping & Picnicking
1	Bellefontaine	3	1	1	1
2	Brady	3	3	4	4
3	Bronson	2	2	2	2-3
4	Brookston	4	4	4	4-5
5	Carlisle	5	5	5	5
6	Coloma	3	5	5	1
7	Conover	3	2-3	3-4	3
8	Fox	1-2	1	1	1
9	Gilford	4	4	4	4
10	Griffin	5	5	5	5
11	Hillsdale Loam	1	1	3	2
12	Hillsdale SL	2	1	2	2
13	Houghton	5	5	5	5
14	Kerston	5	5	5	5
15	Maumee	4	5	5	5
16	Miami	1	1	3	2
17	Oshtemo	3	1	1	1
18	Rifle	5	5	5	5
19	Wallkill	5	5	5	5
20	Washtenaw	5	5	5	5

Table XIII.--Continued

Symbol	Reservoir		
	Borrow Embankment	Shore Line	Circulation
Bs Bl	5	1	1
Bo	5	4	4
Bm	4	3	2
BW Br	4	4-5	4-5
Cm	5	5	5
Cs	4	1	1
Cl	2-3	3-4	3
F Fl	4	1	1
Gd	4	4	4
Gy	5	5	5
Hl	3	1	1
Hs	2	3	3
Hm	5	5	5
Km	5	5	5
Mm	5	5	5
Ml Ms	2	3	3
Ol	5	1	1
Rp	5	5	5
Wa	5	5	5
Wl	5	5	5

Rating System for Recreation Uses

1 Most Favorable
2 Very Favorable
3 Favorable
4 Somewhat Favorable
5 Unfavorable

SOILS LEGEND

PROPOSED DAM SITE

PROPOSED IMPOUNDMENT

SOIL FOR: EMBANKMENT MATERIAL

CIRCULATION

GOLF COURSES

PICNICKING AND CAMPING

BEACHES

BUILDINGS

TILE FIELDS

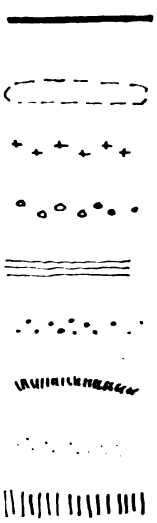
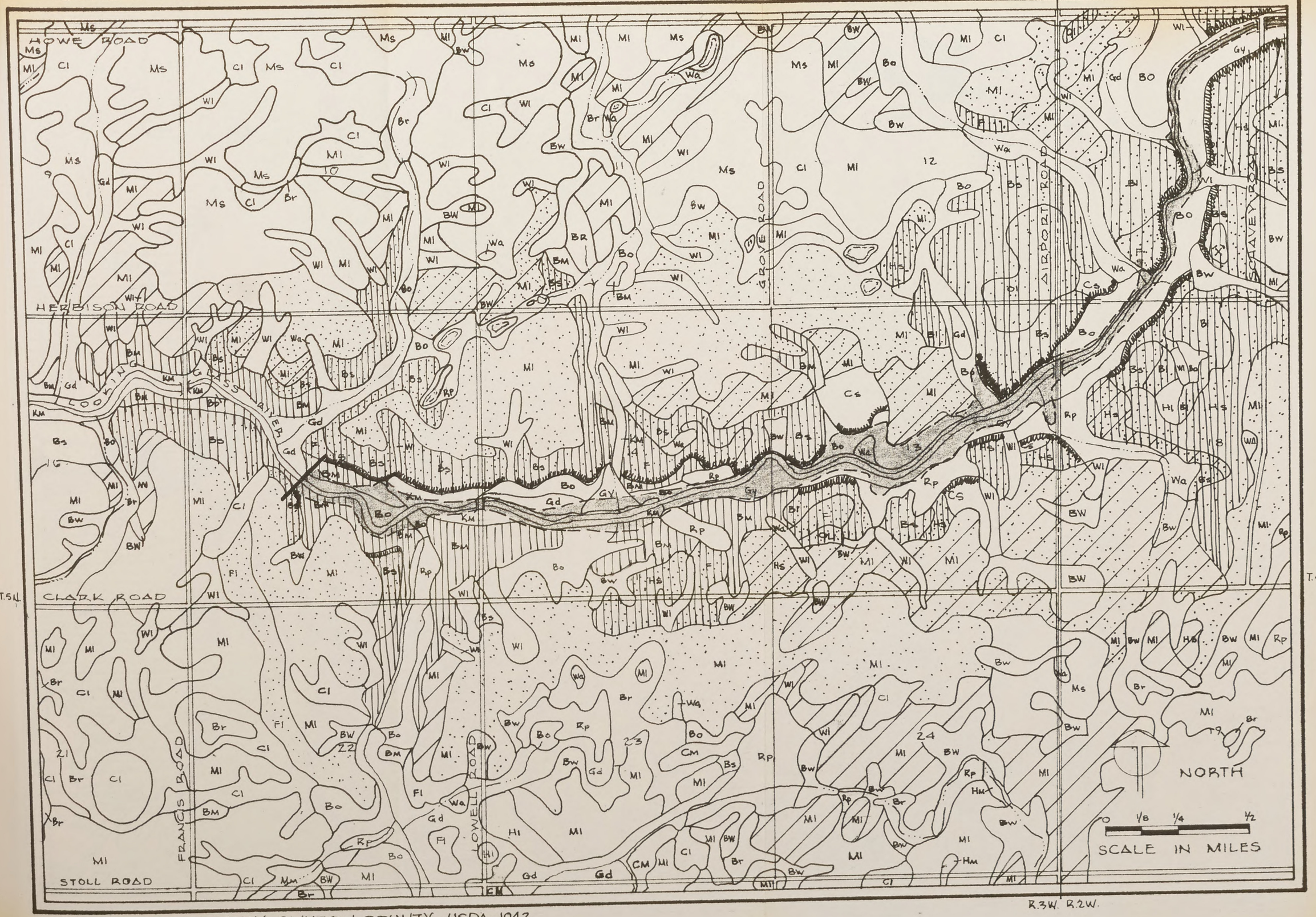


FIGURE VI: SOILS FOR EMBANKMENT MATERIAL AND CIRCULATION

FIGURE VII: SOILS FOR BEACHES, BUILDINGS, AND TILE FIELDS.



BASIC DATA: SOIL SURVEY CLINTON COUNTY, USDA, 1942.

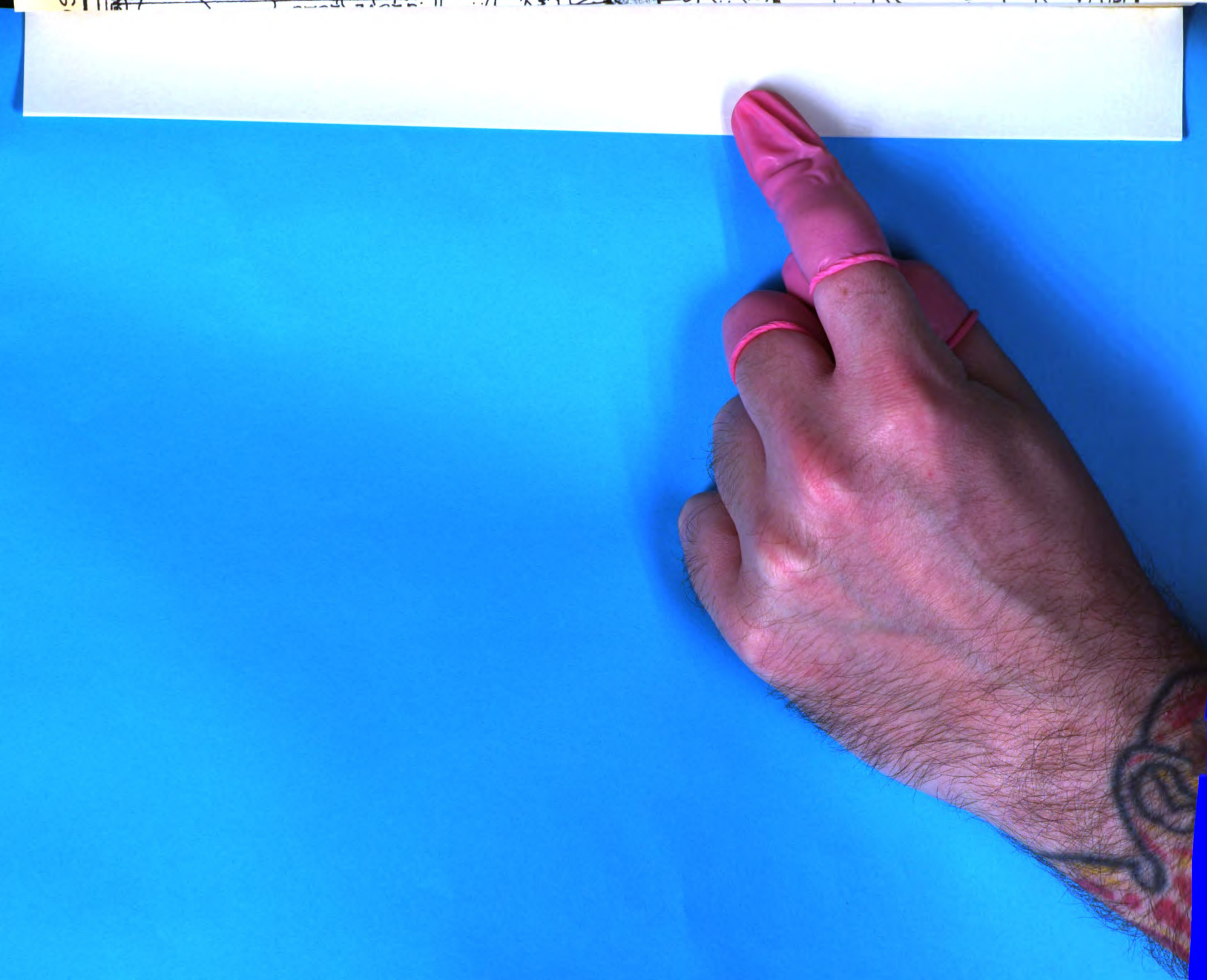
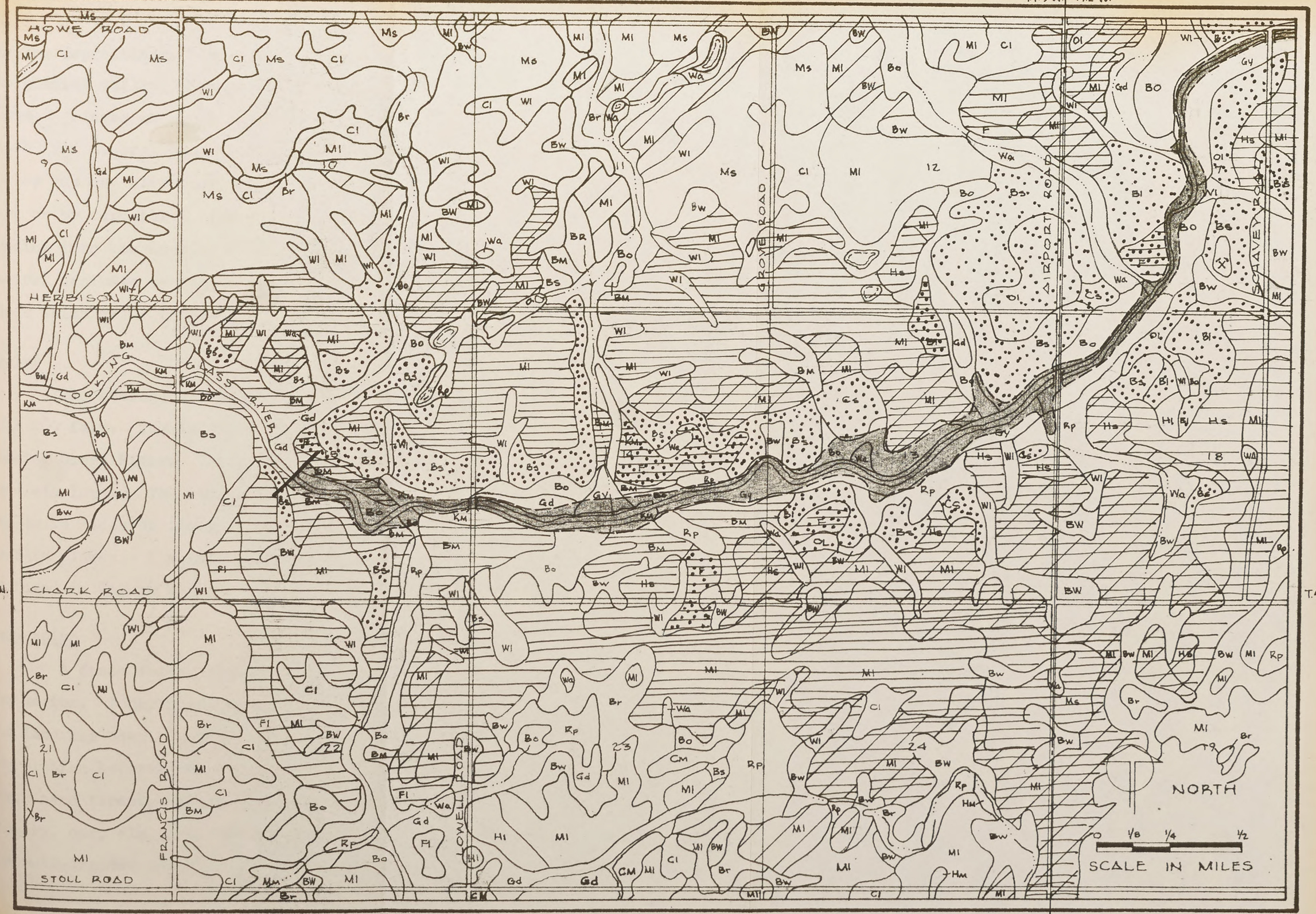


FIGURE VIII: SOILS FOR GOLF COURSES, PICNICKING, AND CAMPING.



BASIC DATA: SOIL SURVEY CLINTON COUNTY, USDA, 1942.

shallow depressions. Long steep slopes are uncommon. The old glacial valley, through which the Looking Glass River flows, ranges in depth from twenty to forty feet and in width from several hundred yards up to a half mile. The valley has not altered the original surface either by dissection or by deposition. Very few tributaries have developed leading into the Looking Glass River. As a result of a poor natural drainage system, there are numerous areas of wet lands which occur in depressions and on level plains.

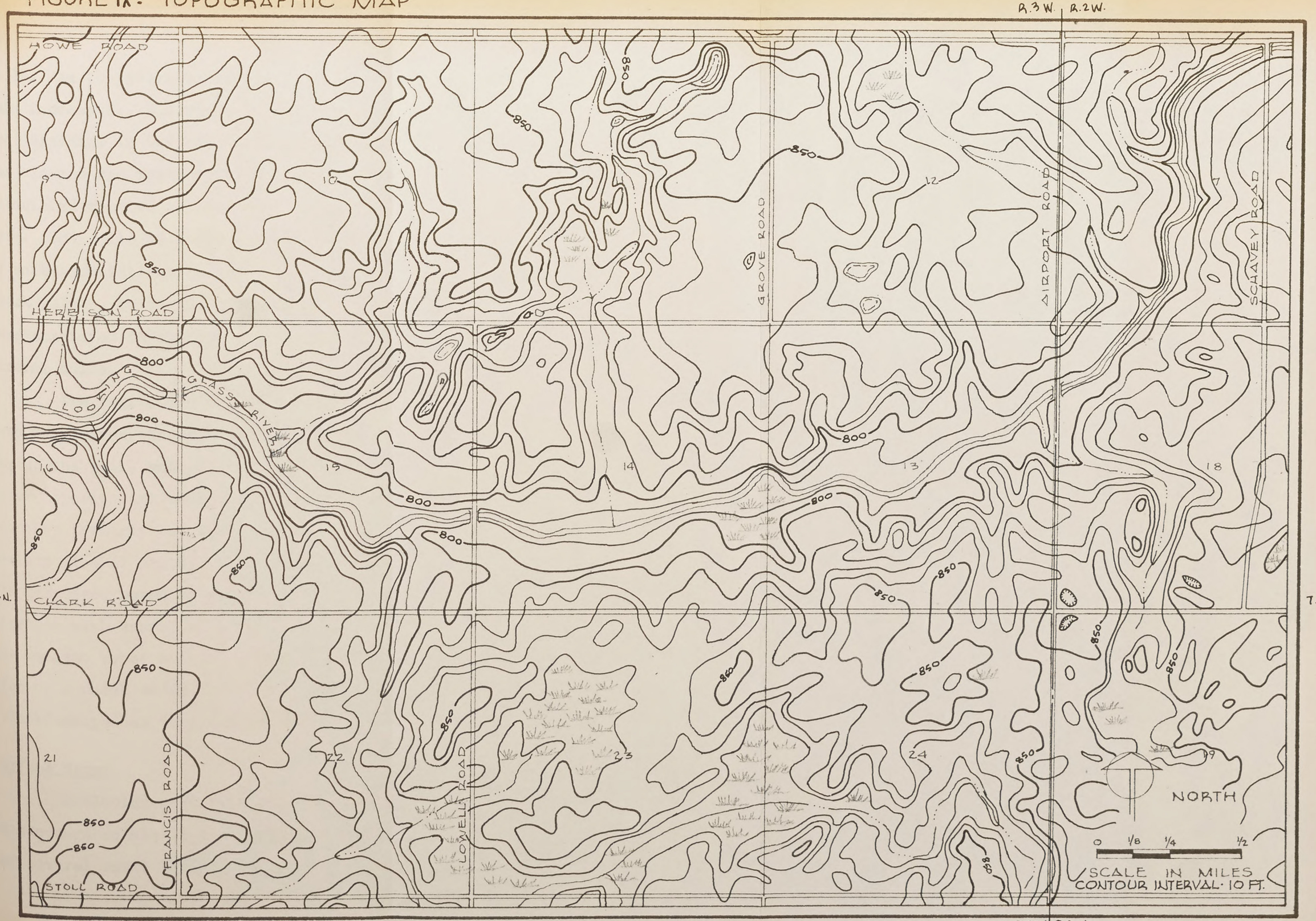
Relief

The average elevation above the mean sea level is over 800 feet. The lowest point occurs in the valley of the Looking Glass River. This point is about 781 feet above the mean sea level. The highest points occur on both the north and south sides of the river where the elevation is over 860 feet in places. A topographic map of the proposed site may be found in Figure V.

Vegetation

A dense forest growth of deciduous trees once covered the Region. Today much of the forest has been cut down, and the land has been devoted to agriculture. There is a general correlation between the trees and the soil. A hard maple-beech type forest, which included the associated species of hickory, oak, elm, ash, basswood, and black cherry, covered the well-drained uplands of intermediate to heavy textured

FIGURE IX: TOPOGRAPHIC MAP



BASIC DATA: U.S.G.S. TOPOGRAPHIC MAP, DEWITT QUADRANGLE, 1950

soils. As the soils became more sandy, the percentage of oaks increased. The sandiest soils supported white pines. Poor drainage in the lowland mineral soil was favorable to the elm-ash-red maple-swamp white oak assocation and to the associated species of basswood, shagbark hickory, and sycamore. The soils of intermediate drainage supported species of both associations in proportion to the available drainage. Black walnut, butternut, ironwood, sassafras, and cottonwood were scattered throughout all the forest associations on mineral soils.

The vegetation on the muck and peat swamps varies with the degree of decomposition of the organic material making up the soil, and with the height of the water table. The drier deposits are made up of highly decomposed materials, and they formerly had a forest cover similar to the poorly drained mineral soils. The poorly drained deposits, in which the less decomposed materials occur, support a tamarack cover, together with aspen, willow, red maple, and various shrubs. The wettest areas support a leather-heath bog type vegetation or a marsh sedge and grass cover. The soil vegetation relationships may be found in both Figure VI and Table XII.

Surface Water

Excluding precipitation, the surface water of the site occurs mainly in the form of the Looking Glass River and several small lakes. There are several small streams

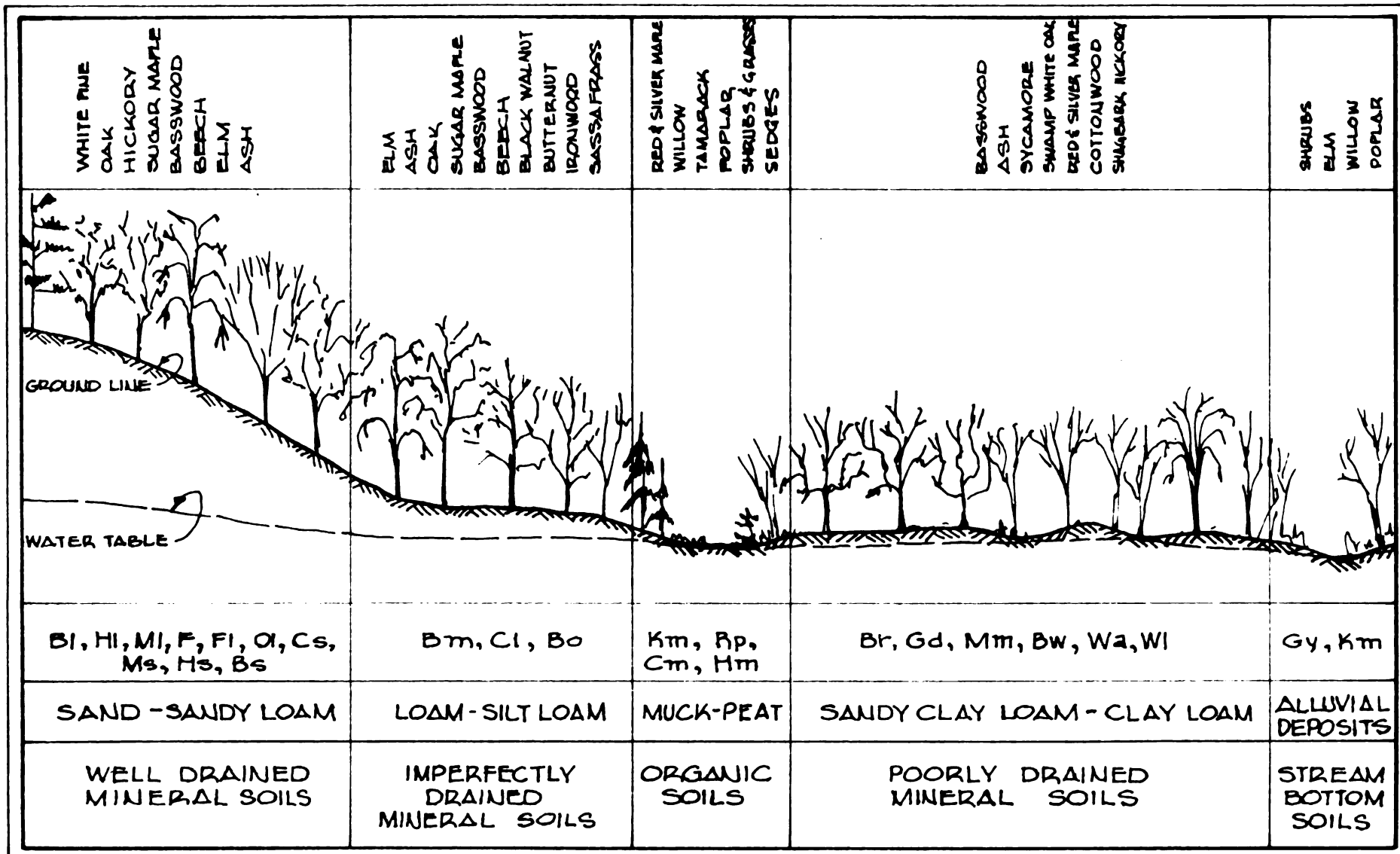
dissecting the land, but they mainly drain lowlands, and during the dry seasons, many are intermittent. The Looking Glass River itself has a more constant flow and a greater low flow than the other rivers in the Tri-County Region. This attribute is due to the ground water which is stored in the glacial till and to the swamp and marsh lands of the watershed. These facts also indicate that the stream is not subject to the floods, and especially the flash floods, as are the other rivers of the Region. The small lakes which occur in the area are found in depressions in the upland soils, with their immediate shoreline soils being peat or muck.

Climate

The climate of the Region is influenced by the Great Lakes. The salient features of the climate are moderately cold winters and mild, pleasant summers with moderate precipitation and low wind movement. The periods of extremely hot or cold weather are for short durations.

Since the proposed regional park site is only several miles northwest of Lansing and the closest weather station is in Lansing, Lansing's readings will be assumed to be representative of the proposed site. Precipitation is almost uniformly distributed throughout the year. The average monthly rainfall may be found in Table IX. The winter precipitation is slightly below that of the summer. Torrential rains and hail storms are rare. Precipitation during the growing

FIGURE X : A CROSS-SECTION SHOWING THE SOIL-VEGETATION RELATIONSHIPS



season is sufficient to insure satisfactory growth for most plants. Those plants on the sandy soils often suffer, to a certain extent, from a shortage of moisture during the hottest part of the summer. During the spring of the year, those areas which are level or depressed and are made up of the heavier soils are wet. Some frost heaving to the plants, such as grasses, can be expected in these wet areas, but generally there is a sufficient snow cover on the ground to protect the plants.

The frost free season of the area is approximately a period of one hundred and sixty days. The latest killing frost on record was May 28, and the earliest killing frost was September 8. Usually those days between May 4, and October 11, are frost free. The coldest temperatures are above -15° below zero, making the Region suitable for plants which will grow in zone 5b, according to the Department of Agriculture.[14] Table XIII shows the average monthly temperatures for Lansing.

The prevailing winds for the area are from the west. Winds of high velocity and tornadoes are uncommon. High humidity exists throughout the year, but the atmosphere is not uncomfortably humid. The sun shines between sixty-five

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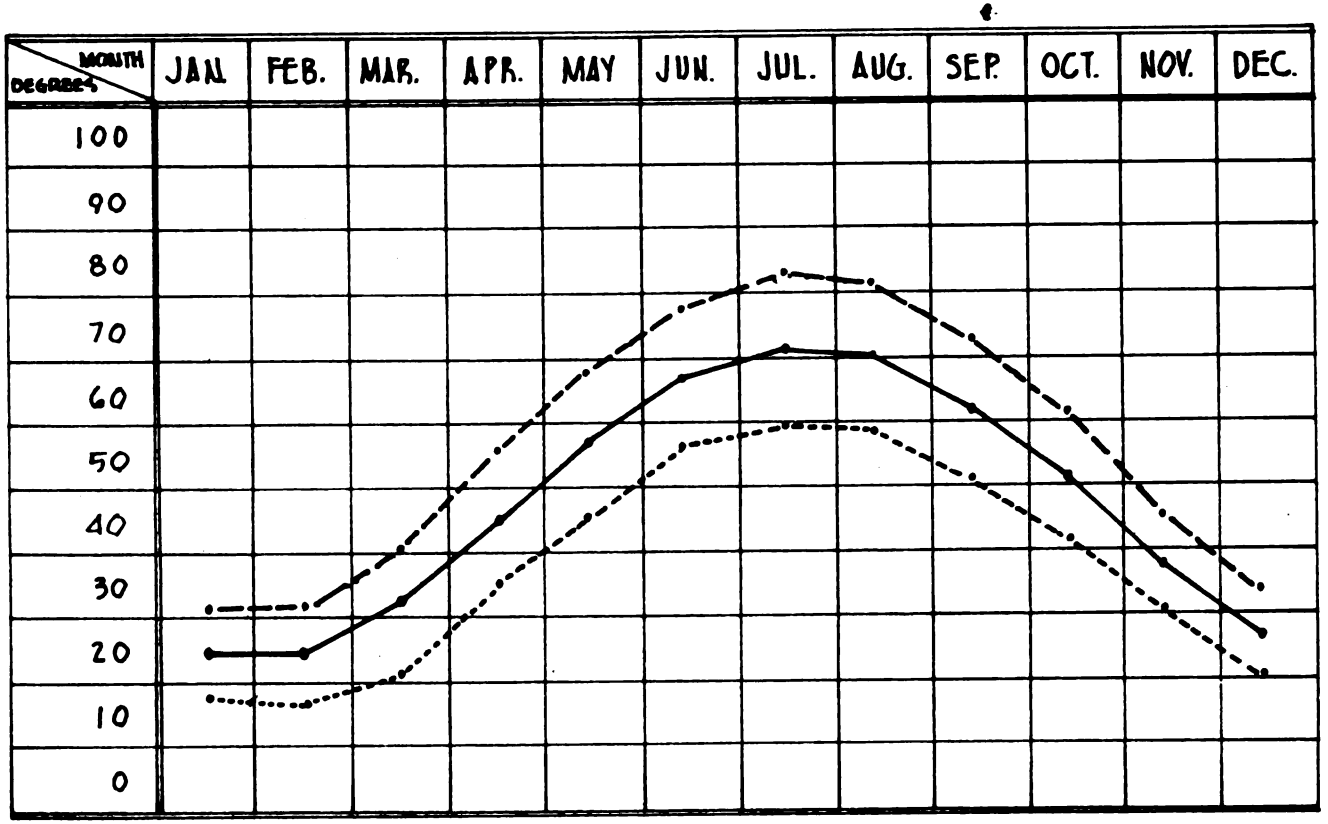
[14]Department of Agriculture, Plant Hardiness Zone Map, Miscellaneous Publication No. 814, U. S. Government Printing Office, Washington, D. C., 1960.

and seventy percent of the possible time in the summer, and between twenty and twenty-five percent of the possible time during the winter. The angle of the sun and the time of sunrise and sunset at the solstices may be found on Table XIV. All movements of the sun will be between these two extremes. Therefore, when positioning recreation facilities in relation to the desired position of the sun at a particular time, these extremes will be used as a guide, thereby incorporating all positions of the sun.

Landscape Analysis

The proposed reservoir and regional park lie in the outlying suburbs of Lansing. There are several areas where groupings of houses have started. There are also several subdivisions in the immediate area. Before too long, this area will be developed to a much greater extent. This proposed park could well be the central recreation feature for the residences in northwest Lansing and Lansing's metropolitan region. Because of the interstate highways which surround Lansing, and the future interstate highways which will completely surround Lansing, the park will be readily accessible to all of the Lansing residents. The outlying communities of the Region will also have good roads leading to the park. There are three paved roads in the vicinity of the park, the most important one being Airport Road. This road would bring most of the users to the park. The other

TABLE XIV: AVERAGE MONTHLY TEMPERATURES - LANSING, MICHIGAN[15]



MAXIMUM AVERAGE - 57.1°
AVERAGE - 47.6°
MINIMUM AVERAGE - 38.2°

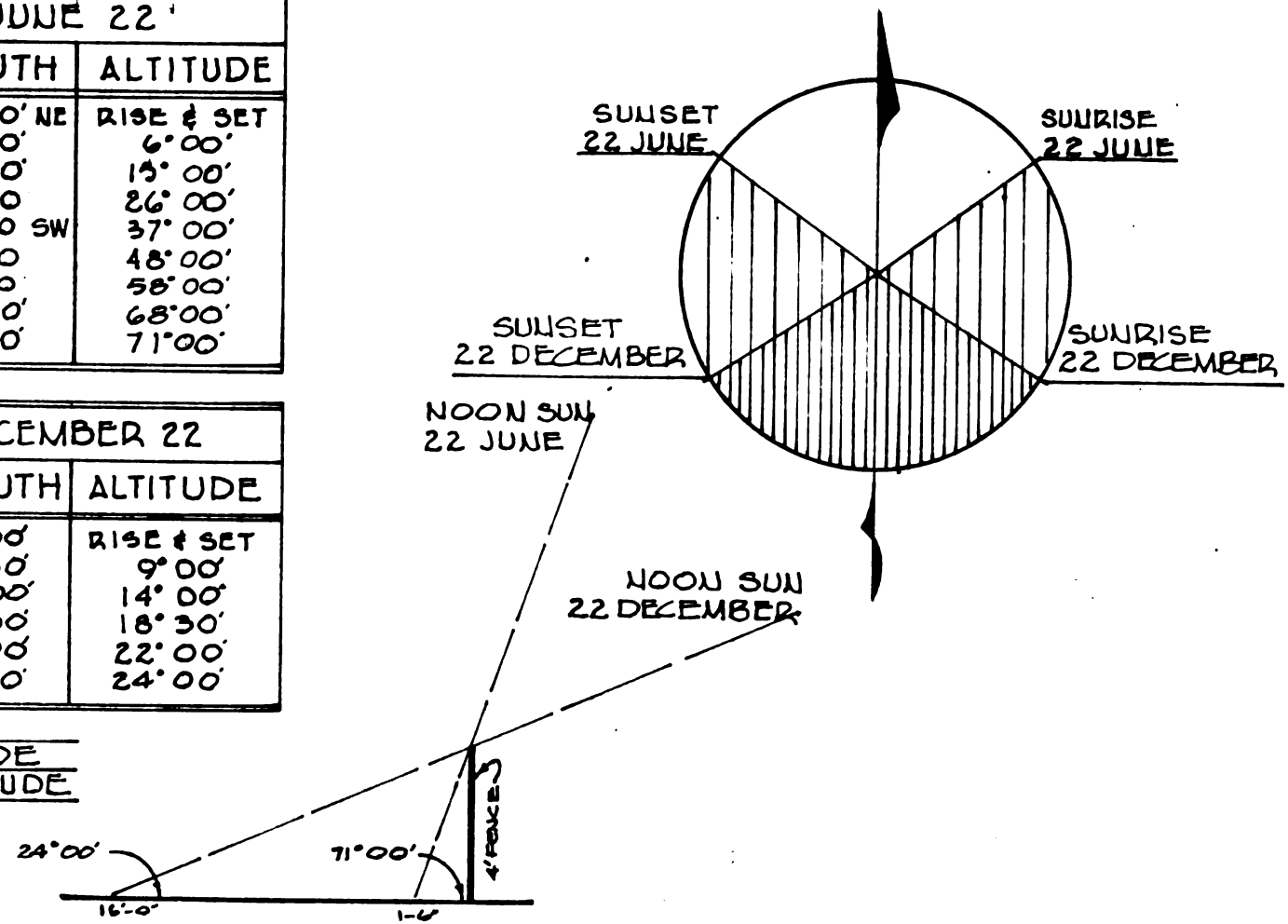
[15] U.S. DEPARTMENT OF COMMERCE, Op. cit., p.3.

TABLE XV: POSITIONS OF THE SUN FOR LANSING, MICHIGAN AT THE SOLSTICES

SUN. TIME		JUNE 22	
A.M.	P.M.	AZIMUTH	ALTITUDE
4:20	7:40	36° 00' NE	RISE & SET
5	7	27° 30'	6° 00'
6	6	17° 30'	15° 00'
7	5	8° 30	26° 00'
8	4	88° 30 SW	37° 00'
9	3	77° 30	48° 00'
10	2	62° 30	58° 00'
11	1	38° 00'	68° 00'
12	12	0° 00'	71° 00'

SUN TIME		DECEMBER 22	
A.M.	P.M.	AZIMUTH	ALTITUDE
7:30	4:30	58° 00'	RISE & SET
8	4	53° 30'	9° 00'
9	3	42° 00'	14° 00'
10	2	29° 00'	18° 30'
11	1	15° 00'	22° 00'
12	12	0° 00'	24° 00'

42° 30' N LATITUDE
85° 00 W LONGITUDE



SUN ANGLES FOR SOLSTICES

two roads are not between the majority of the users and the park and are therefore not important.

Since the reservoir stretches approximately three miles east of the dam to just west of Dewitt, and those areas which are developed along the reservoir are where it runs north and south, the best area for the regional park is from the head of the reservoir to where it turns north. This area includes sections 13, 14, and 15. Those portions of the River Valley immediately downstream from the reservoir would best be used as natural areas to catch the water in case of the failure of the dam. The particular land-use in this area could either be agriculture or cover crops. The main purposes of this land would be to provide a pleasing setting for the park and to serve as a catchment area in an emergency.

On examining that portion of the reservoir which runs east and west, it is evident that the northern shore of the reservoir would receive the most sun. In case of a bend in the shoreline, that portion of the shore which received the afternoon sun would be best for a bathing beach. A building which has a view across the reservoir might better be located away from the western sun, so that, when the sun is low in the evening, it will not produce a glare across the surface of the water, into the eyes of the people. The north side of the reservoir also has the best soils, differences in relief for bathing beaches, and viewing places across the water.

Where the reservoir runs north and south, the existing land-uses are not compatible to a regional park. A subdivision is being built on the east side of the River Valley and there are several gravel pits which are not compatible to regional recreation. This portion of the reservoir is also narrow and could best be utilized as a trailway in combination with a parkway running to the east. The best soils for beaches occur on the west bank of the reservoir. This exposure for a beach would not be as warm as a beach with a western exposure; the useable period of the day and of the season would be shorter.

The wind and climate of the Region fail to impose serious threats to the users. The optimum season for outdoor use would be between March and November. This season would fluctuate depending on the weather conditions.

The reservoir takes on a linear shape. This long, narrow body of water should be utilized by activities that are compatible to such a form. The banks of the reservoir are close together, and they would offer people in the water a feeling of protection. The reservoir would not be extremely deep; the depth in places would only be several feet. In some places the soils are organic. Since there are many trees growing in the River Valley, there might be stumps on the bottom, thus limiting the use of power boats. Considering the number and speed of motorboats in comparison to the scale of the reservoir, boating could be a hazardous activity

on crowded days. Water skiing would be particularly hazardous under these conditions. Canoes, rowboats, and motorboats for fishing and sightseeing would be more compatible to a regional park of this size. Sailing would be limited because of the prevailing westerly breezes which would parallel the axis of the reservoir.

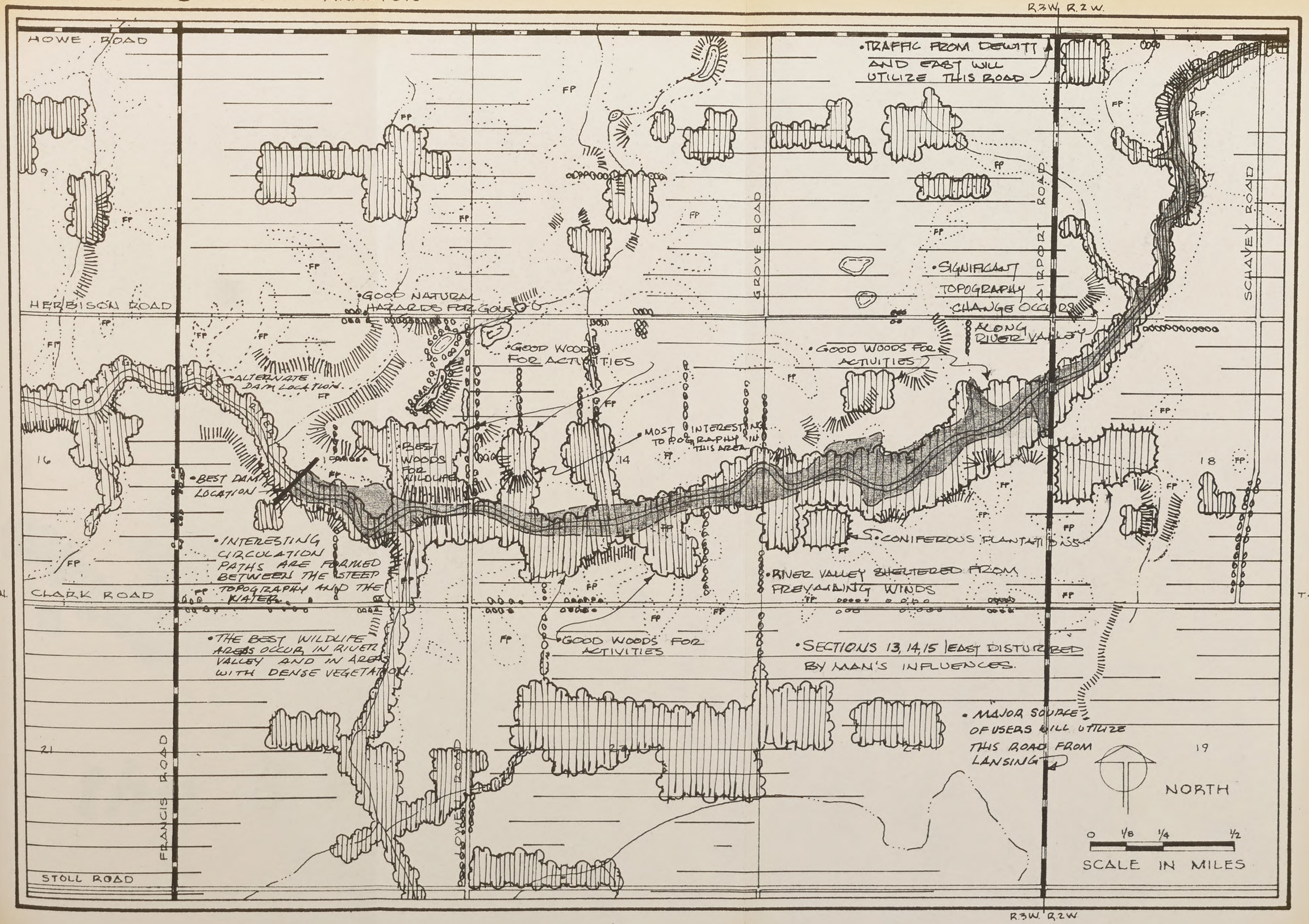
The soils of the proposed park do not form a barrier for the proposed activities of the park. The soils range from the organic, which may best be utilized in natural wildlife areas, to the well-drained, which, due to their characteristics of providing drought conditions for plants during dry summers and of not taking heavy use, might best be left for natural areas also. The soils which fall in between the organic and the well-drained, are the imperfectly drained and the poorly drained. These soils should be used for recreational activities. The poorly drained soils might be underdrained to accommodate more intensive uses during the wet seasons. Where soils are to be utilized for uncompatible activities, extra construction costs will be required to remedy the problems which might arise.

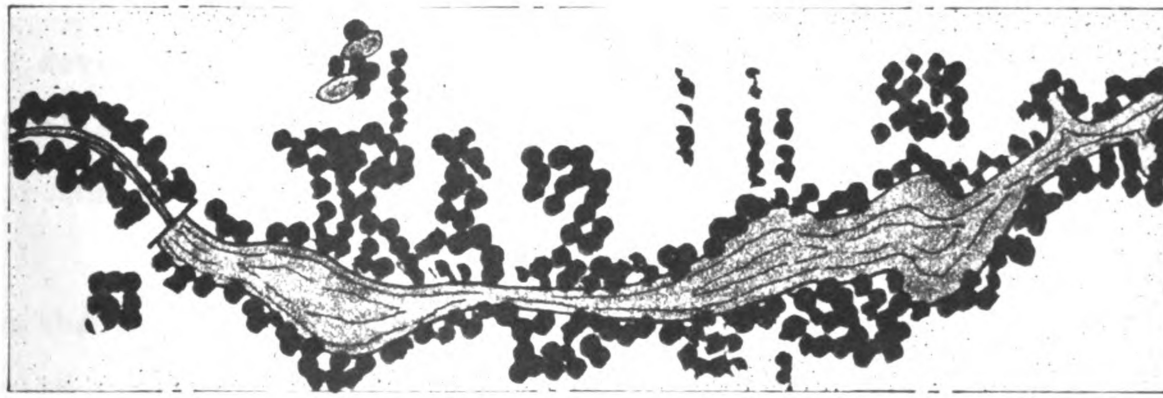
The existing vegetation in the area is located where people will want protection and cover. The trees help to delineate the River Valley, and the woodlots are close enough to the reservoir to provide picnic and camp grounds. The vegetation also shelters small game and birds. The wildlife, vegetation, and water will provide interesting trails and walks for the users.

The four lakes in the area are located in depressions of organic soils, thus eliminating the possibility of using them for water activities with beaches. The relief is interesting enough around the lakes to give them a pleasant setting. The vegetation on the organic soils of the lake bottoms is not very interesting. The land-use surrounding these lakes is cropland. Therefore, the best activity for this area would be a golf course, which would provide a pleasant setting for the interior of the park.

In conclusion, and in choosing the boundaries for the regional park, it seems apparent that the three sections, 13, 14, and 15, provide the Region with adequate opportunities for the development of the regional park. Those activities expected to be the most desired by the people in the Tri-County Region include: driving for pleasure, boating, swimming, picnicking, walking for pleasure, fishing, camping, and nature walks. Of these activities, motor boating and camping are not compatible to the reservoir size and to its proximity to Lansing. Additional activities which can be provided in the park include: canoeing, rowboating, golf, horseback riding, hiking, day camping, and bicycling.

FIGURE XI : LANDSCAPE ANALYSIS





the PARK

CHAPTER IV

THE PARK

The development plans for the regional park will be derived through the design process. First, a circulation and land-use plan, otherwise known as the conceptual plan, will be made. From the conceptual plan, a master plan of the entire site will be prepared. Then and only then will detailed site plans be drawn. Here the areas including the nature center, the golf course and club house, the swimming and boating facilities, and the maintenance area, will be studied at a larger scale. Perspectives and elevations will be developed simultaneously with the detailed plans. The final step will be to make an approximate cost estimate. for the development of this regional park.

Since water for recreational purposes does not exist in the Region, the prime objective of the regional park will be to provide a reservoir and to develop the surrounding area for recreational activities; in doing this, a portion of Central Michigan's natural countryside will be preserved for the pleasure of the Region's future citizens. To begin, the acquisition of the three sections, 13, 14, and 15, is proposed, allowing the existing road net to be the boundary of the park. The previous section of this report shows that

the land surrounding the reservoir site is desirable for a regional park, thus enhancing the quality of the reservoir. The perceptual study, Figure IV, shows that most of the humanized areas adjacent to the site are adjacent to the section lines, and that the roads that follow these section lines do not provide extremely good views into the park for the passing motorists. Therefore the privacy of the users of the park is ensured.

The examination of outdoor recreational activities shows that many of the expected popular activities in the Region can be provided in this area. These activities include hiking, nature walks, boating and canoeing, fishing, swimming, bicycling, and horseback riding. The park also is ideally located along a River Valey so that crosscountry hiking and canoe trails can pass through the park, where overnight accommodations can be provided.

Conceptual Plan

Upon studying the site, the needs of the Region, and the existing site conditions, a conceptual plan was made. The results of the study show that the north side of the River Valley is best situated for recreational activities. The majority of the users will arrive at the park site by way of Airport Road, and logically the best place for an entrance is north of the Looking Glass River on Airport Road. The site has three other boundaries and a road on each boundary line, but these are indirect approaches to the park. One

alternate route to the park would be to move the people from Airport Road to the road that runs parallel to the south bank of the Looking Glass River, down to the proposed dam site, across the dam to the north side. This route would not only be costly, but would destroy many acres of park land which could be used for passive recreation.

The distance between the reservoir and the north boundary is generally about half a mile. The vegetation is generally sparse and the topography, nearly level. The best way to move the users into the activity areas on the north shore is along a road bordering significant changes in topography with cul-de-sacs leading to the activity areas. To conserve open space, the main road would also be a cul-de-sac. In the case of emergencies, a main service road would lead to the park boundary near the end of the main cul-de-sac. The other objective in limiting the road system, beside conserving open space, is to make the users get out of their cars to see the features of the park.

By concentrating activities around cul-de-sacs, more open space is provided around the reservoir. Also, control of the users is easier when the activities are centrally located. In order to provide a minimum of driving from activity to activity, central parking lots are provided, and those activities which are likely to be utilized by a visitor on the same day, were placed together.

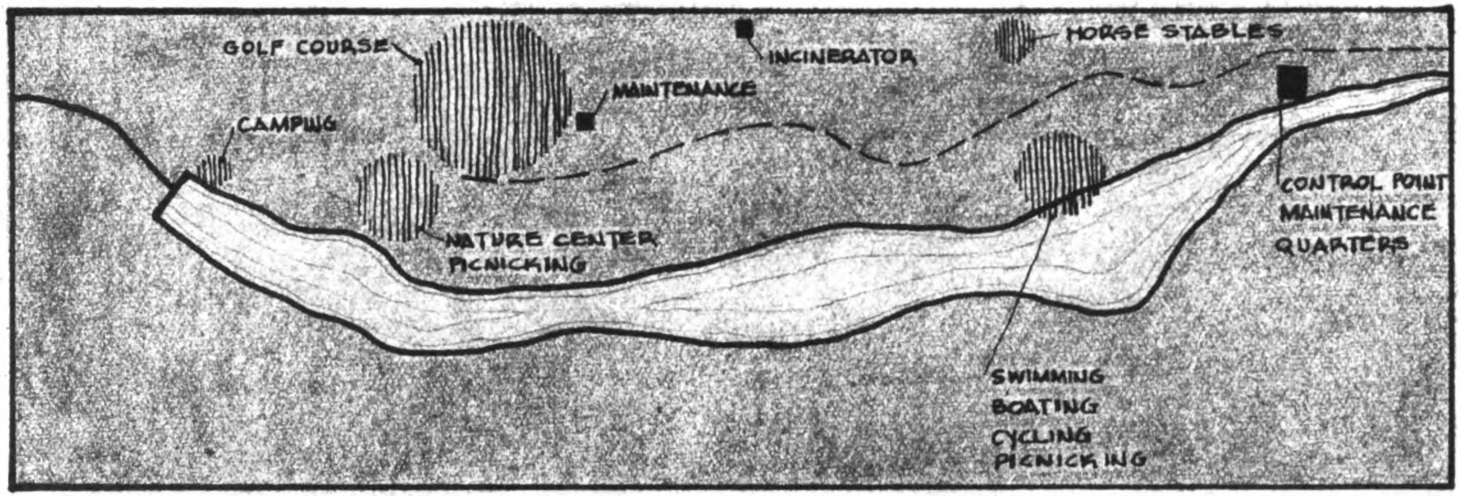
The control point and the main park office, the

maintenance facilities, and the quarters for the key park personnel, are located near the main park entrance. This specific site was chosen because the soils are adequate for supporting these structure.

The four areas where people will gather for recreation are the swimming beach, horse stable, the nature center-golf course area, and the camping area for the users of the hiking and canoe trails. The rest of the park has been left as open space to provide an aesthetic setting for the reservoir, and passive recreation for those users of the nature trails. A schematic diagram designating the proposed land-uses and circulation may be found on Figure XII. The conceptual plan may be found on Figure XIII. The activity centers were chosen because of the natural features present at the specific sites.

The soils study of the park shows that the best areas for beaches was on the north shore of the reservoir. The best soils for beaches are located on poor sites for swimming beaches. One site is too steep; one is completely wooded; and the third is in an inlet, bordered by two streams. The latter site is subject to the accumulation of debris. The beach site was chosen because the soil was favorable for beach development, and the land was situated where the current would sweep the shore clean of debris, and there was a gentle slope into the water. There was also a woodland near by for picnicking. Boat and bicycle concessions will be located

FIGURE XII: SCHEMATIC LAND-USE DIAGRAM

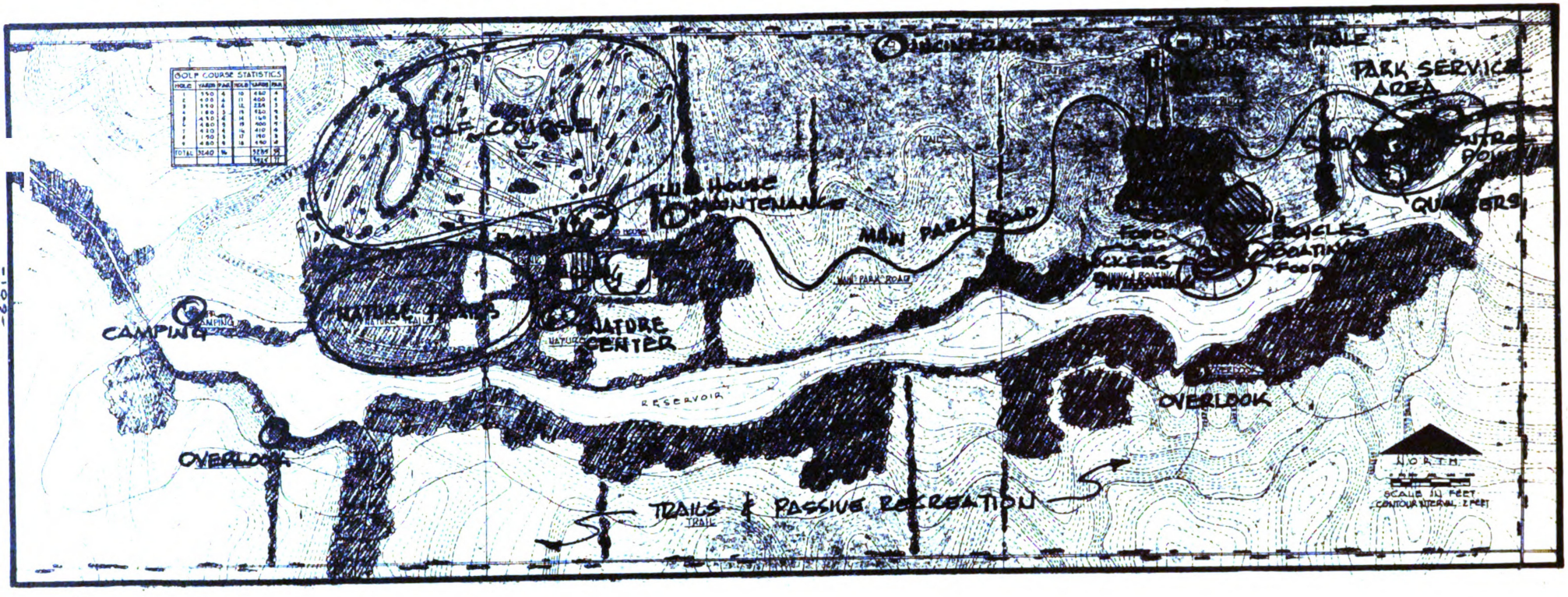


MAJOR PARK ROADS
RESERVOIR
ACTIVE RECREATION
PASSIVE RECREATION AND TRAILS
MAINTENANCE FACILITIES

NORTH

SCALE 2.5" = 1 MILE

FIGURE XIII: CONCEPTUAL PLAN



adjacent to the swimming area for expected use by the swimmers who become tired, and by sun bathers who have had enough sun.

The horse stable is isolated for two reasons. First, the existing barns are near the perifery roads; second, because of the unpleasant odors that radiate from the stables during the summer months. The soil of the chosen site is good for growing hay for the horses.

The location of the nature center and the golf course was determine by the soils, vegetation, topography, and wildlife. The golf course holds four natural lakes and rolling topography, while the nature center overlooks the reservoir and is adjacent to a second growth beach woodlot. The land adjacent to the nature center is a popular habitat with the wildlife. Deer have been observed browsing in the general area, and birds, both songbirds and predators, nest in this area. Wildflowers are also found abundantly in the River Valley and woodlots.

The last area where people will collect is a camp ground on the north bank of the reservoir. The Looking Glass River has the potential of becoming a canoe trail, where people can spend a day, or several days, paddling down the River. This camp ground would serve as an overnight stopping point for such people. Similarly, a hiking trail could be staked out connecting several regional parks in the future. This trail would be similar to one that stretches across Michigan farther north of the Region. The specific

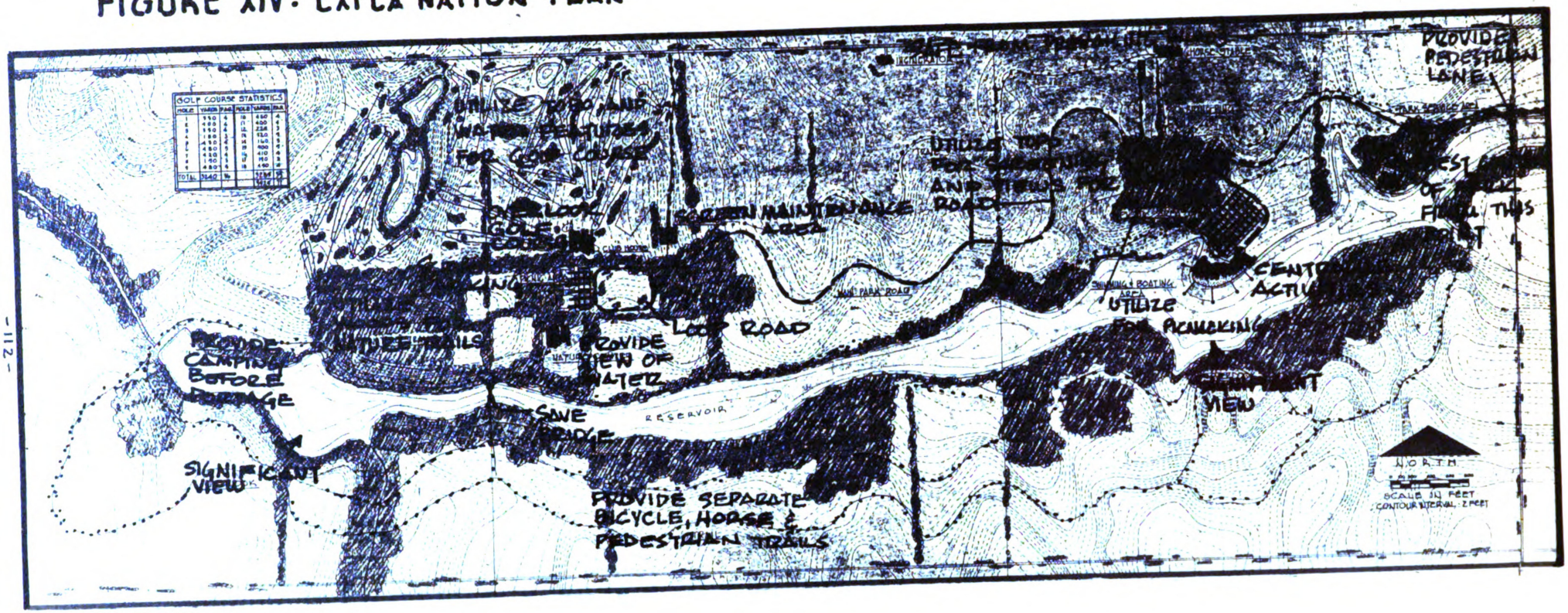
site was chosen because the canoers would have to make a portage at the reservoir, and the soils at this site are suitable for camping; so logically, this site becomes a good place for an overnight stop.

The rest of the park will be left in its natural state, serving as an aesthetically pleasing site for a reservoir. In this natural area will be bicycle trails, horseback riding paths, and hiking trails. The hiking trails would be near the River, and the bicycle trails and horse paths would be located farther away from the reservoir on higher ground. Several lookouts and sanitary facilities will be located on the south side of the reservoir. The movement of people across the reservoir would be accomplished by utilizing the proposed dam, saving the existing bridge, and forming an extra lane on the Airport Road bridge for park users. The existing bridge is made of iron girders and has a wooden floor. This bridge could be raised high enough to allow boats to pass underneath it, and at the same time, give some character to the park.

Master Plan

Basically the park can be broken down into two parts--open space and developed areas. The most significant portion of the park is the water. In order to preserve the quality of the water, as much of the shoreline as possible should be left undisturbed. This plan proposes two major areas and three minor areas of activities which are to be

FIGURE XIV: EXPLA NATION PLAN



PARKING
VEHICLES
PEDESTRIAN
BUILDINGS

FIGURE XV: MASTER PLAN

connected by a single road ending in a cul-de-sac. The open spaces of land and water form an aesthetically pleasing site for the reservoir, and provide the space for people to go and investigate the park.

The road system is designed to move the people to and from the activity areas. By keeping the main park road next to a significant change in topography, which occurs at the start of the River Valley, the visitors are kept in the main portion of the park and are given the opportunity to overlook the water and the vegetation. The road is designed for a maximum speed of thirty miles per hour, except where the cul-de-sacs occur, and there the designed speed is twenty miles per hour.

Once the user reaches an activity area, a storage parking lot is available for parking the car. The parking lots are laid out so that the car is parked and the user goes to his designation without crossing a main entry point of the parking lot, thus separating the people from vehicles for their stay in the park.

Park Service Area

The control point is designed to control the people entering and leaving the park. The control point is a gate that will control all vehicles and hikers that pass through the park. The main park office is also located at this point, as well as the quarters and maintenance areas.

FIGURE XVI: SCHEMATIC DIAGRAM

PARK SERVICE AREA

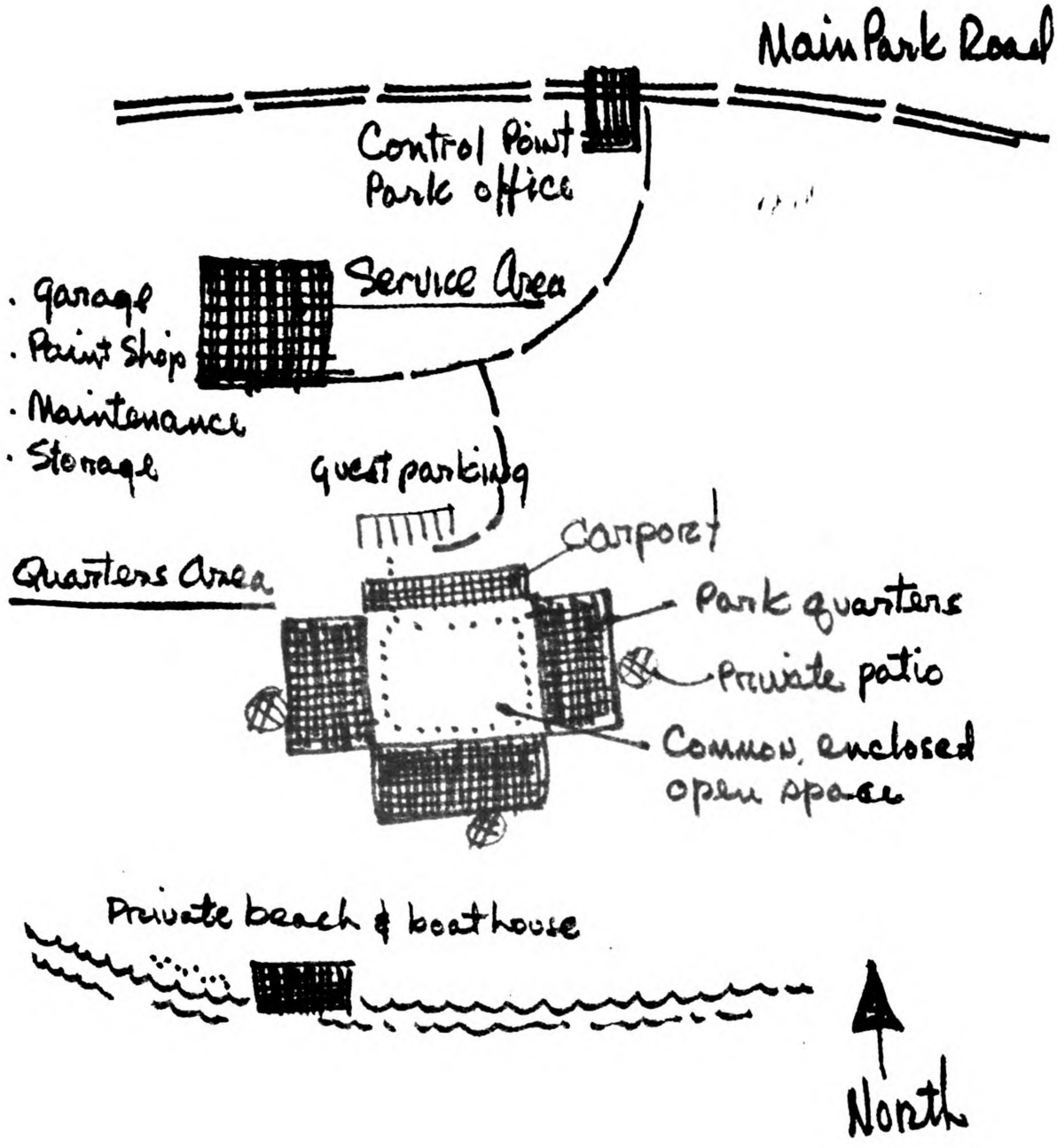
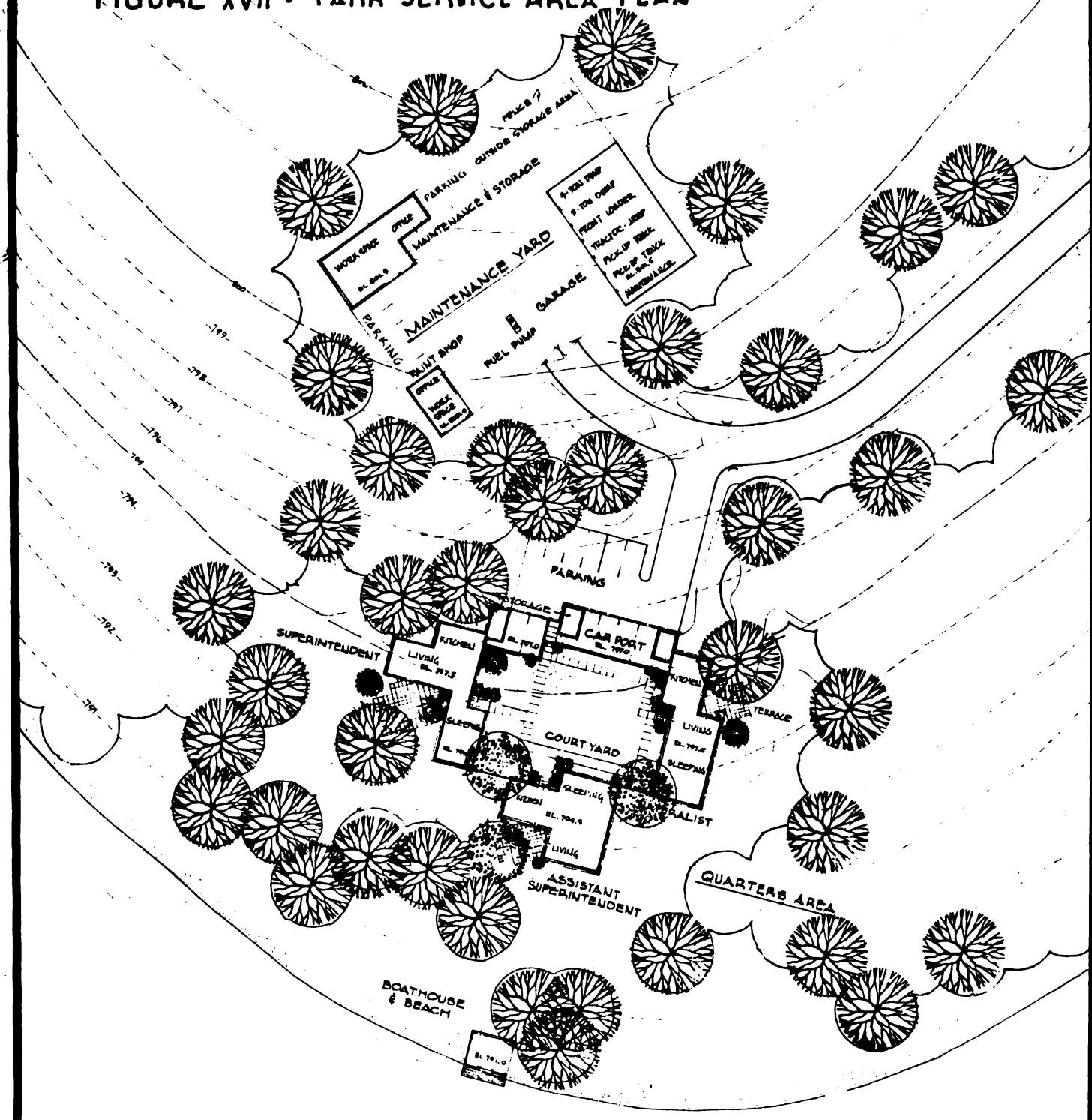


FIGURE XVII : PARK SERVICE AREA PLAN



PARK SERVICE AREA

NORTH

0 10 20 40 60

SCALE IN FEET

CONTOUR INTERVAL-1 FOOT

EXISTING CONTOURS ----

PROPOSED CONTOURS ——

Quarters have been provided for the park superintendent, naturalists, and assistant park superintendent as a fringe benefit to attract competent personnel. The quarters are isolated so they will not be disturbed by the park visitors. The maintenance area has been placed in this area for close contact with the park office and control point.

The design for the quarters area gives the park personnel close contact with each other and access to the water. By grouping the houses near each other, a common yard is formed for the social benefit of the residents, and as an area for keeping small children under control. Each house is designed to have an individual terrace for private gatherings. The carport is designed to screen the maintenance area from the front of the house, and to enclose the fourth side of the quadrangle. The houses are to have three bedrooms, living room, kitchen, and eating area. A storage area for the residents has been provided in the carport which has stalls for six cars.

The maintenance area will house enough equipment to maintain the park minus the golf course. This area will include the following buildings:

1. Garage - this building will house two five-ton dump trucks, two pickup trucks, a jeep and a front loader. There will be enough room for maintenance space, sanitary facilities, and storage space.

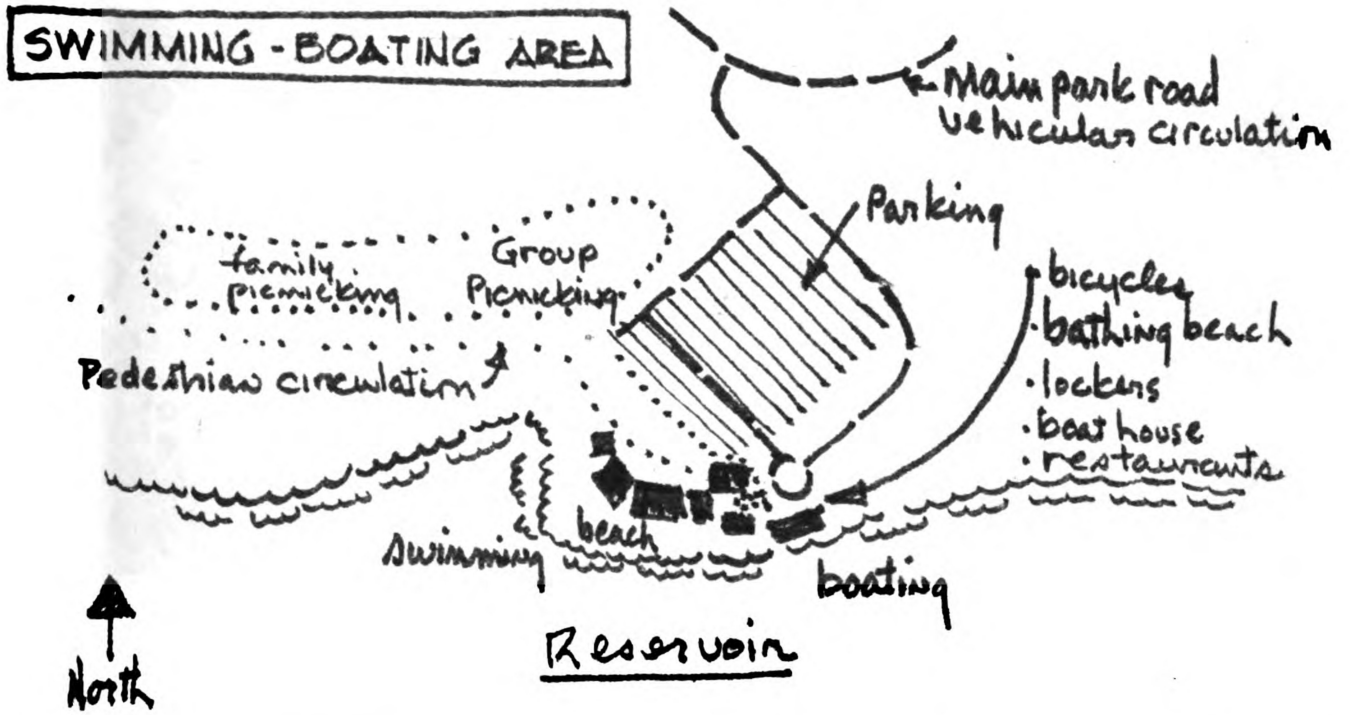
2. Paint shop - paint, gasoline and oil will be stored here. There will be enough space to do the required painting of park equipment. The fuel pump will also be controlled from this building.
3. Storage and Maintenance building - the assistant park superintendent will utilize this building for his office to direct the maintenance of the park. The rest of the building will serve to maintain the park's benches, signs, and buildings.

Swimming and Boating Area

This area is expected to be the busiest point in the park during the summer months. People will come to the park to swim, and by offering them other compatible activities, their stay will be more enjoyable. The focal point of this area will be the beach. The users will reach the beach upon leaving their car, will obtain a key from the bath house, and change into their swimming suits in a locker. Once on the beach, the user can either participate in swimming, boating, bicycling, or hiking. A picnic ground is located near by so the user can enjoy a picnic lunch in the shade of some trees.

The bathhouse and beach were designed with the following concepts in mind. First, to ease the maintenance problem by keeping the users together, which is accomplished by the way the lockers are arranged. By renting those lockers

FIGURE XVIII: SCHEMATIC DIAGRAMS



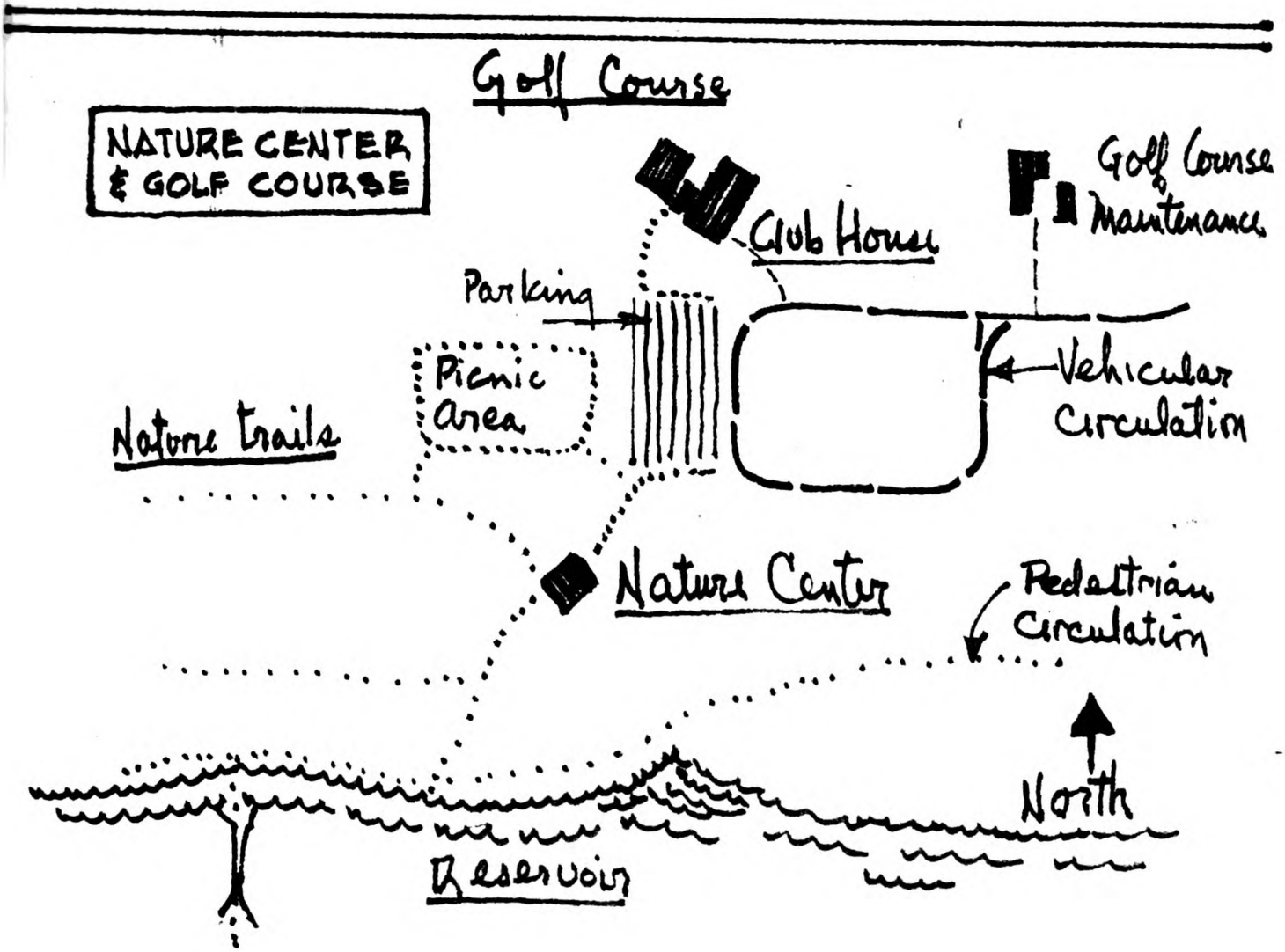
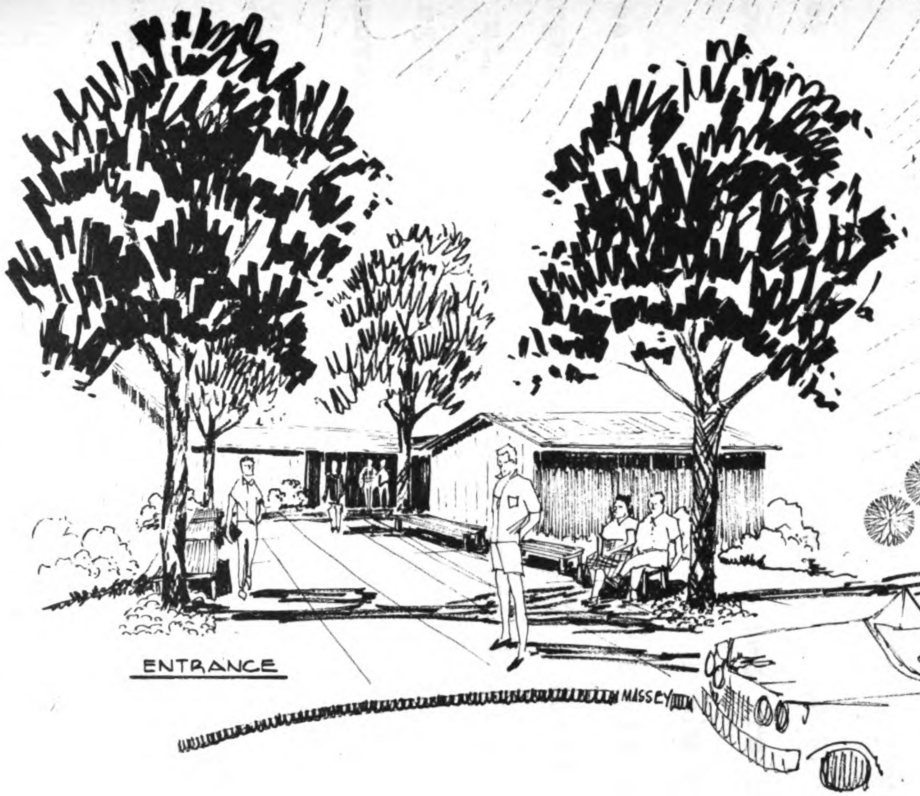
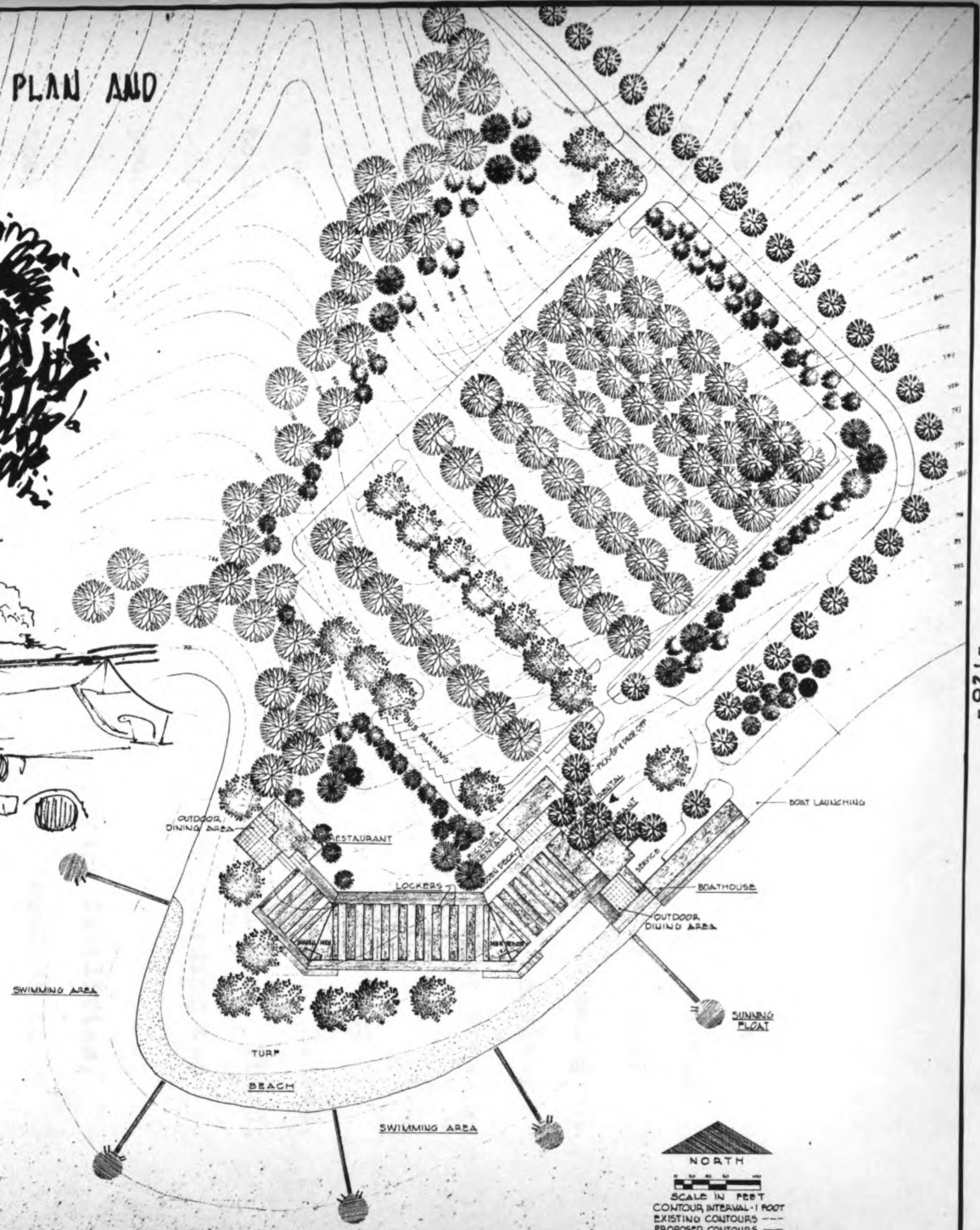


FIGURE XIX: SWIMMING AND BOATING AREA PLAN AND ENTRANCE PERSPECTIVE





SWIMMING AND BOATING AREA

closest to the bathhouse first and those fartherest away last, a pattern of beach and swimming area occupation is established. The swimming area is divided into small areas. Each area may be opened or closed, depending on the crowd. When few people are on the beach, only one or two swimming areas will need to be opened. Then, as more people arrive, more areas will be opened. These individual swimming areas will also be used for special outing groups.

Floats are placed in the water for the following reasons. First, to keep people in the activity area. Second, to delineate the swimming and diving board facilities. Third, to place lifeguards in advantageous spots for guarding the people.

To encourage the use of the other park facilities, they are placed near the swimmer and grouped together to show the bather what other activities are available.

The picnic area will overlook the reservoir. Those areas nearest the beach will be for small groups and families. Larger groups of people will utilize facilities farther away. By utilizing the edge of the woods for families and by putting shelters for larger groups in the woods, noise will be removed from the beach.

Riding Stables

The riding stables, as previously stated, are located in an existing barn. The purpose of utilizing an existing

structure is to save the added expense of building a barn, when good barns are readily available. Parking is provided for the users adjacent to the barn. The horseback riders will have a riding ring and trails, winding throughout the park, for their use. These trails will be separated from all hikers where ever possible by means of vegetation and topography.

Nature Center

The nature center is located away from active crowds of noisy people. The adjacent golf course will provide a boundary to ensure peace and quiet in the nature area. The reservoir is the southern boundary of the area, isolating the nature center and providing a lowland habitat for the nature lovers. Once in the parking lot, the user will have the choice of golf or nature activities. The nature center is adjacent to the parking area. The purpose of this building is to interpret the natural features of the park for the people. Once the people are oriented by a museum type display, they can walk on the nature trails, learning about the natural history of Central Michigan. The nature trails will be less than an hour in length and adjacent to the hiking trails so the people can continue walking around the park if they desire.

A picnic area is provided for the users of the nature center. People stopping at this picnic area for the purpose of picnicking, will also be tempted to explore the nature center and the trails.

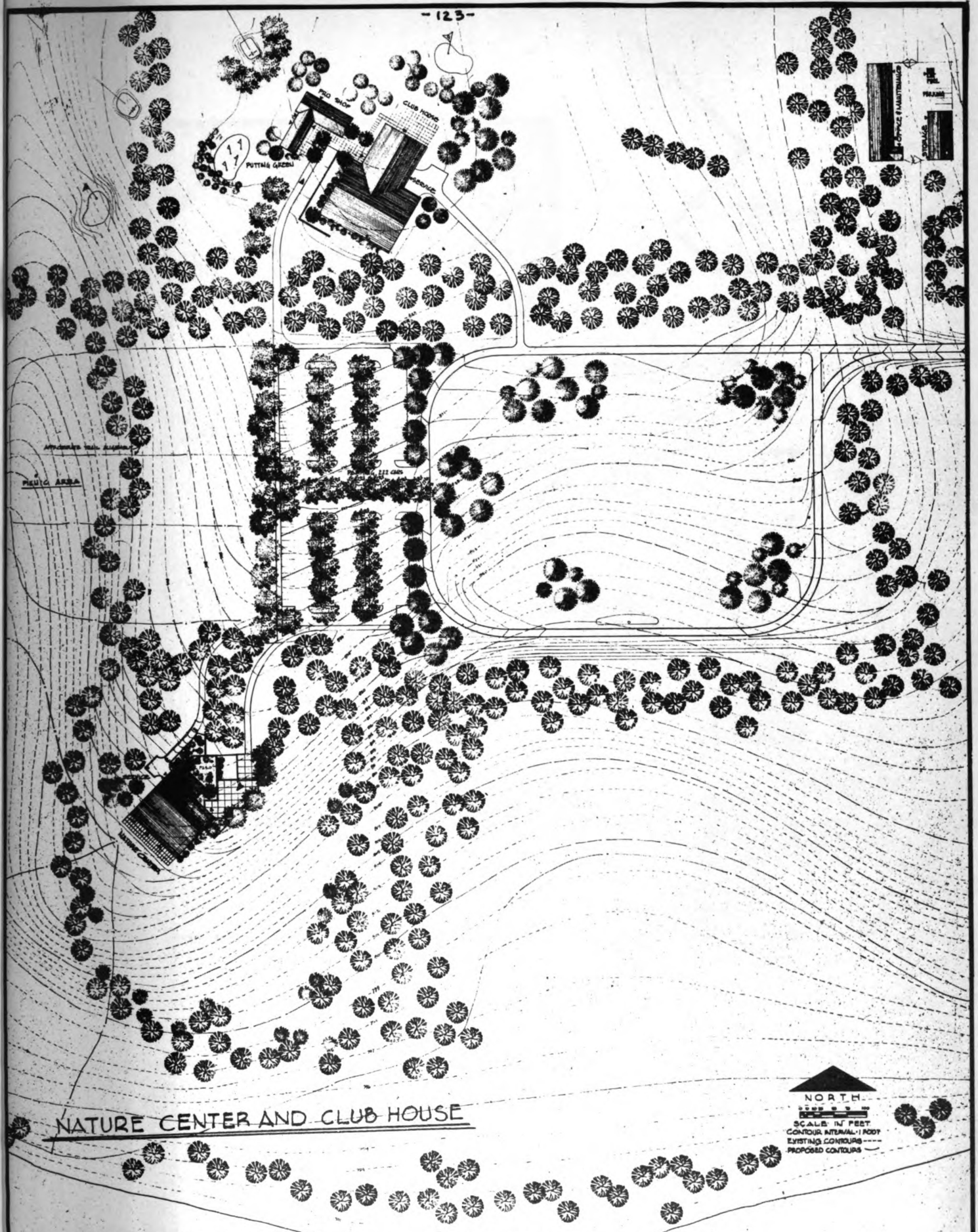
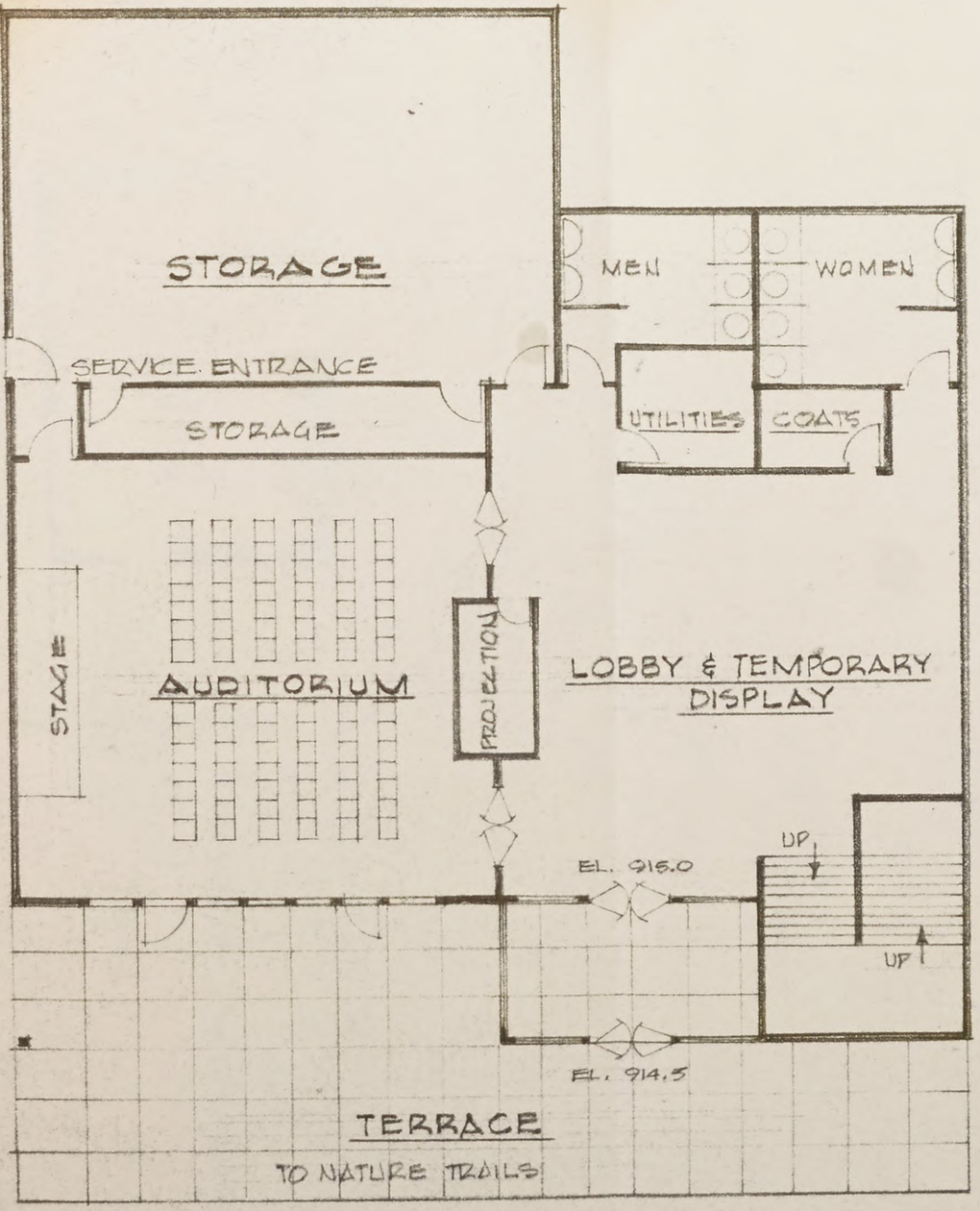
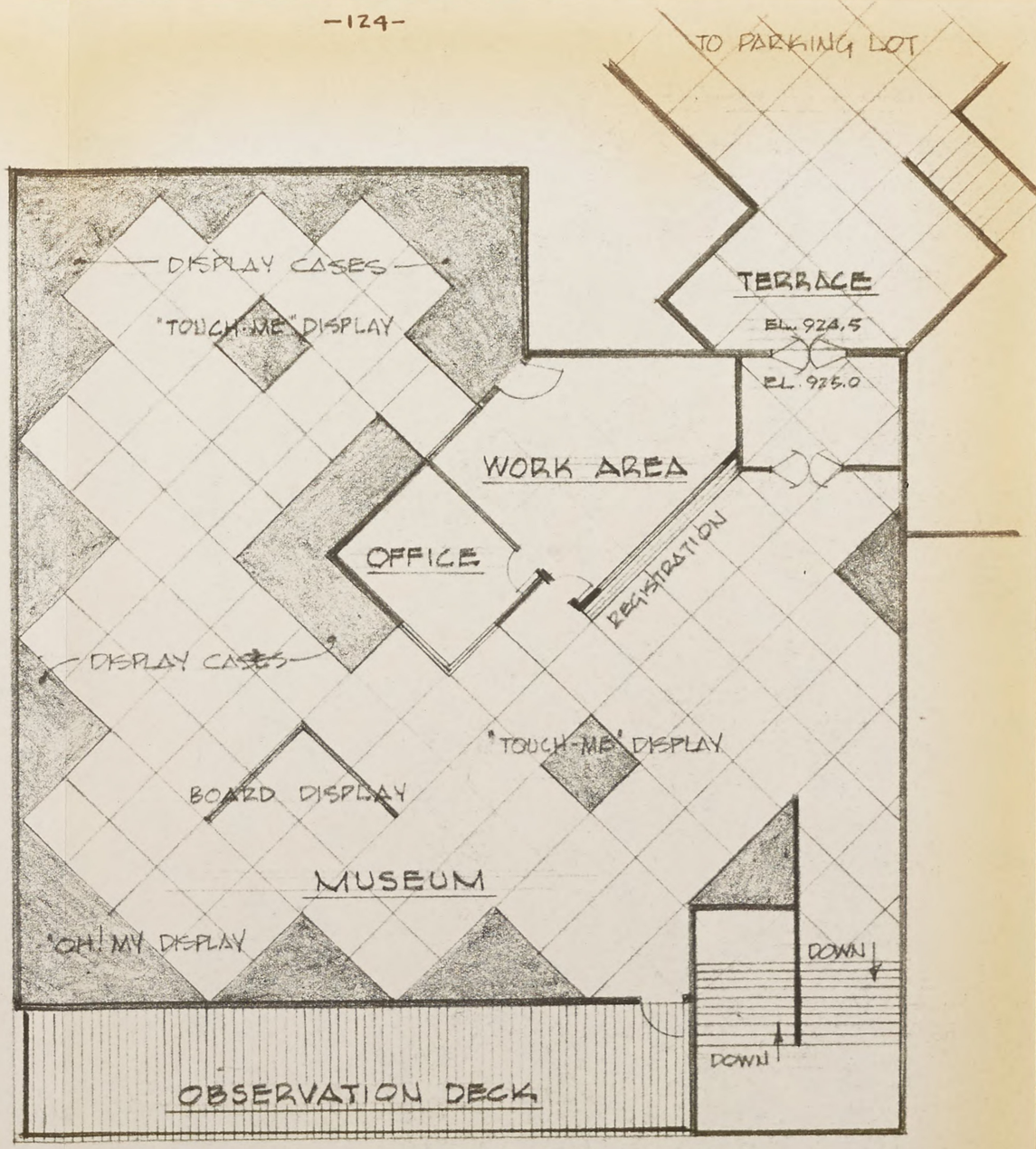


FIGURE XX: NATURE CENTER AND GOLF COURSE PLAN

FIGURE XXI: NATURE CENTER

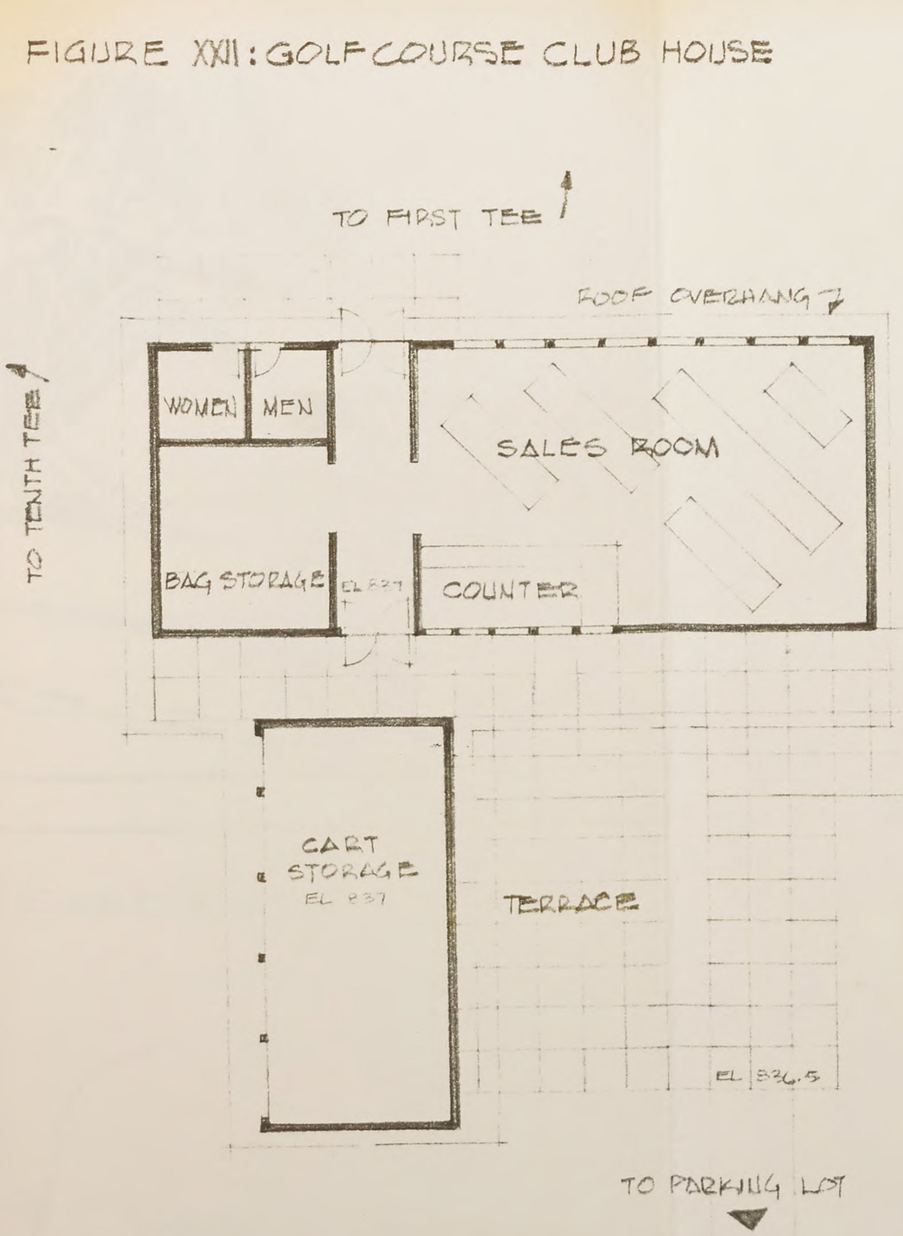


FIRST FLOOR
SCALE 1/16" = 1'-0"

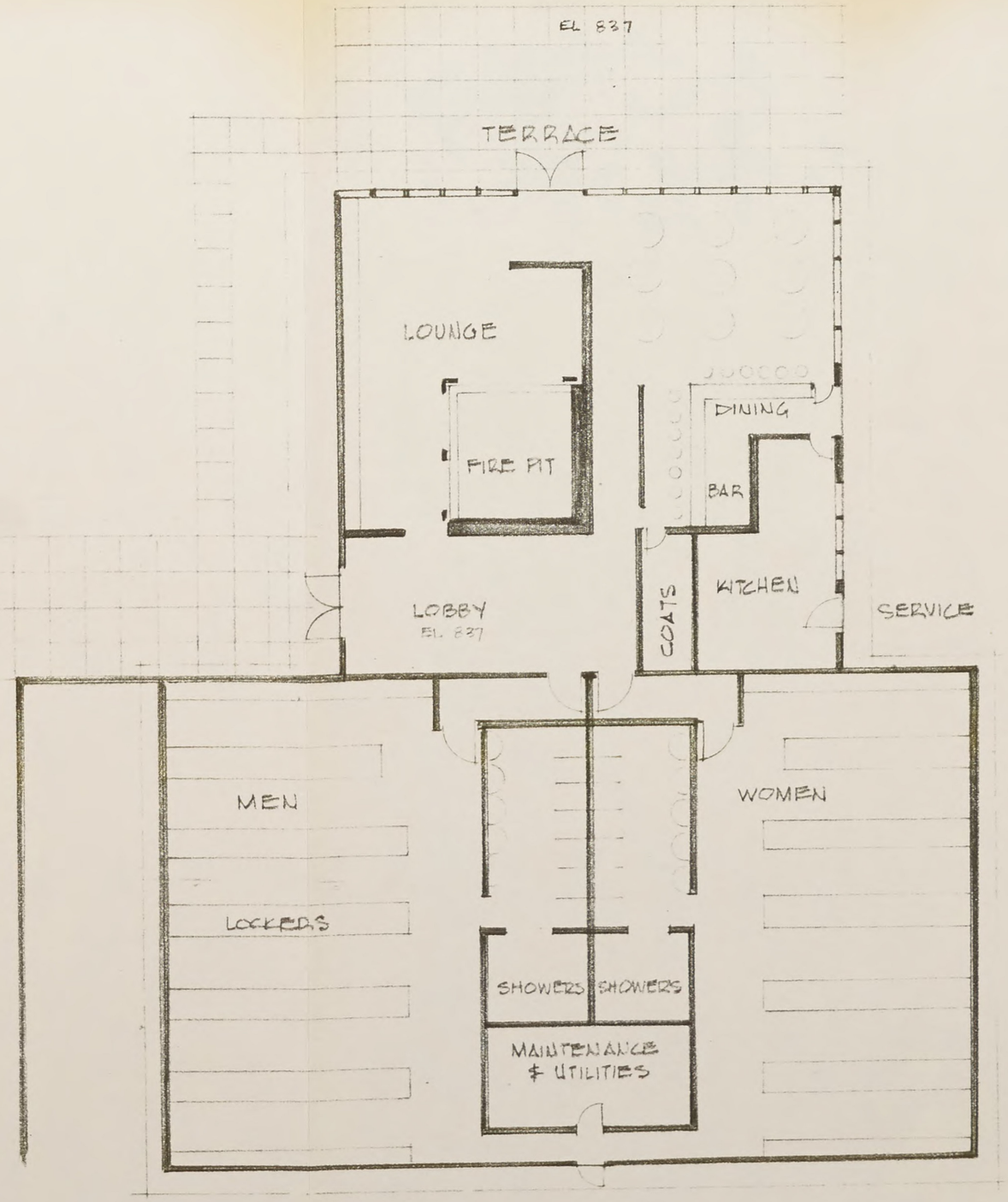


SECOND FLOOR
SCALE 1/16" = 1'-0"

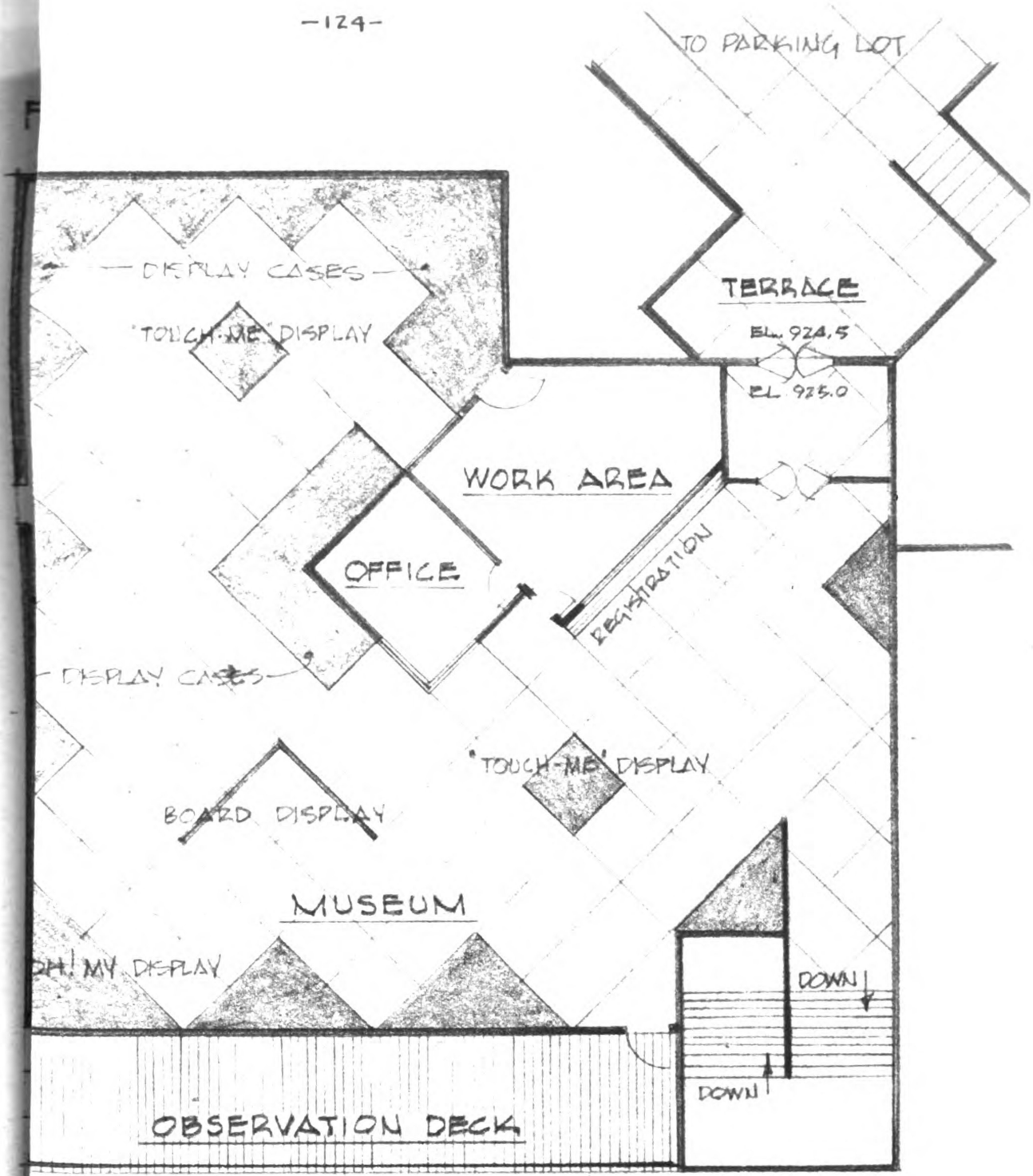
FIGURE XXII: GOLF COURSE CLUB HOUSE



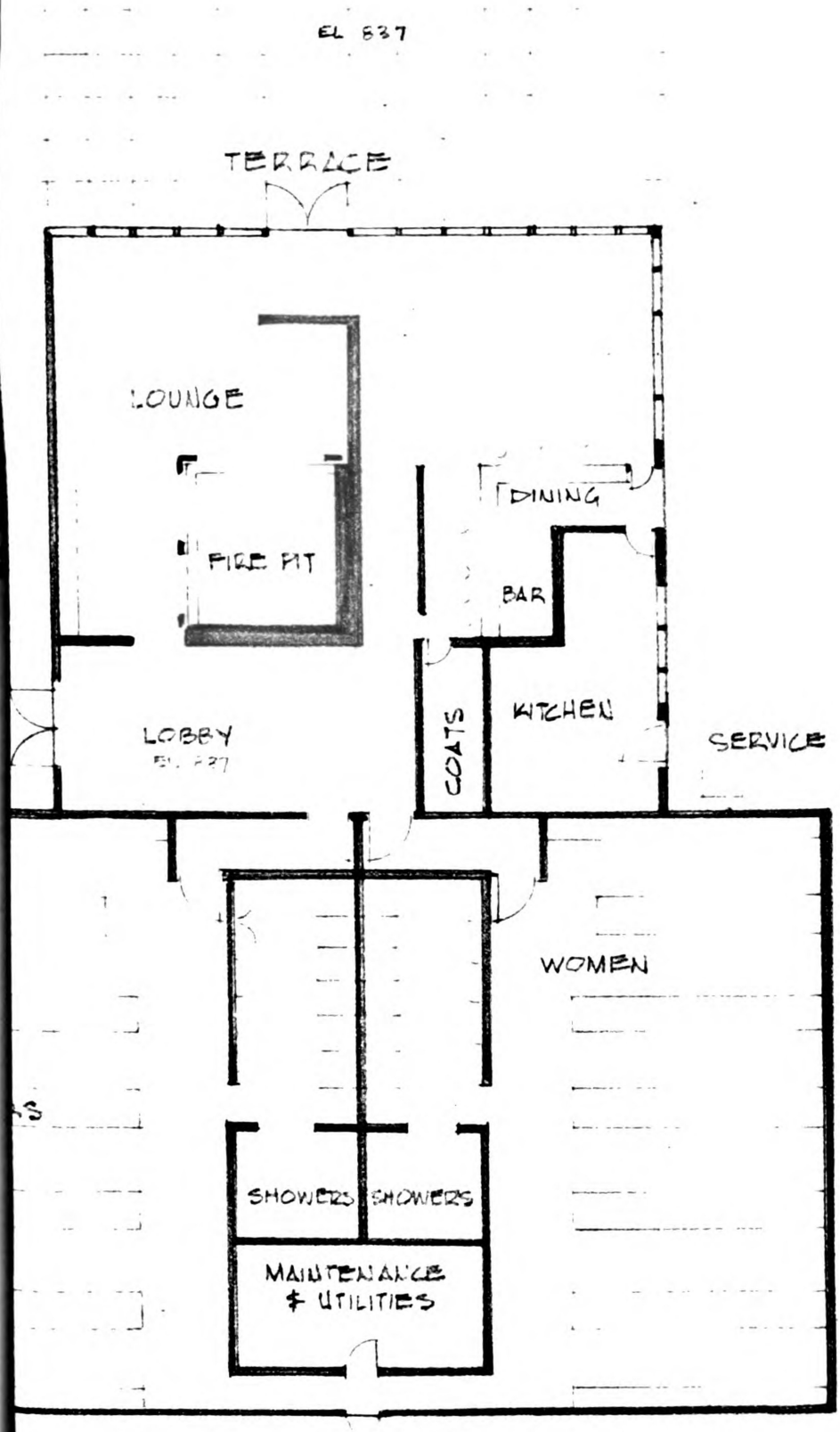
PRO SHOP
SCALE 1" = 20'-0"



CLUB HOUSE
SCALE 1" = 20'-0"

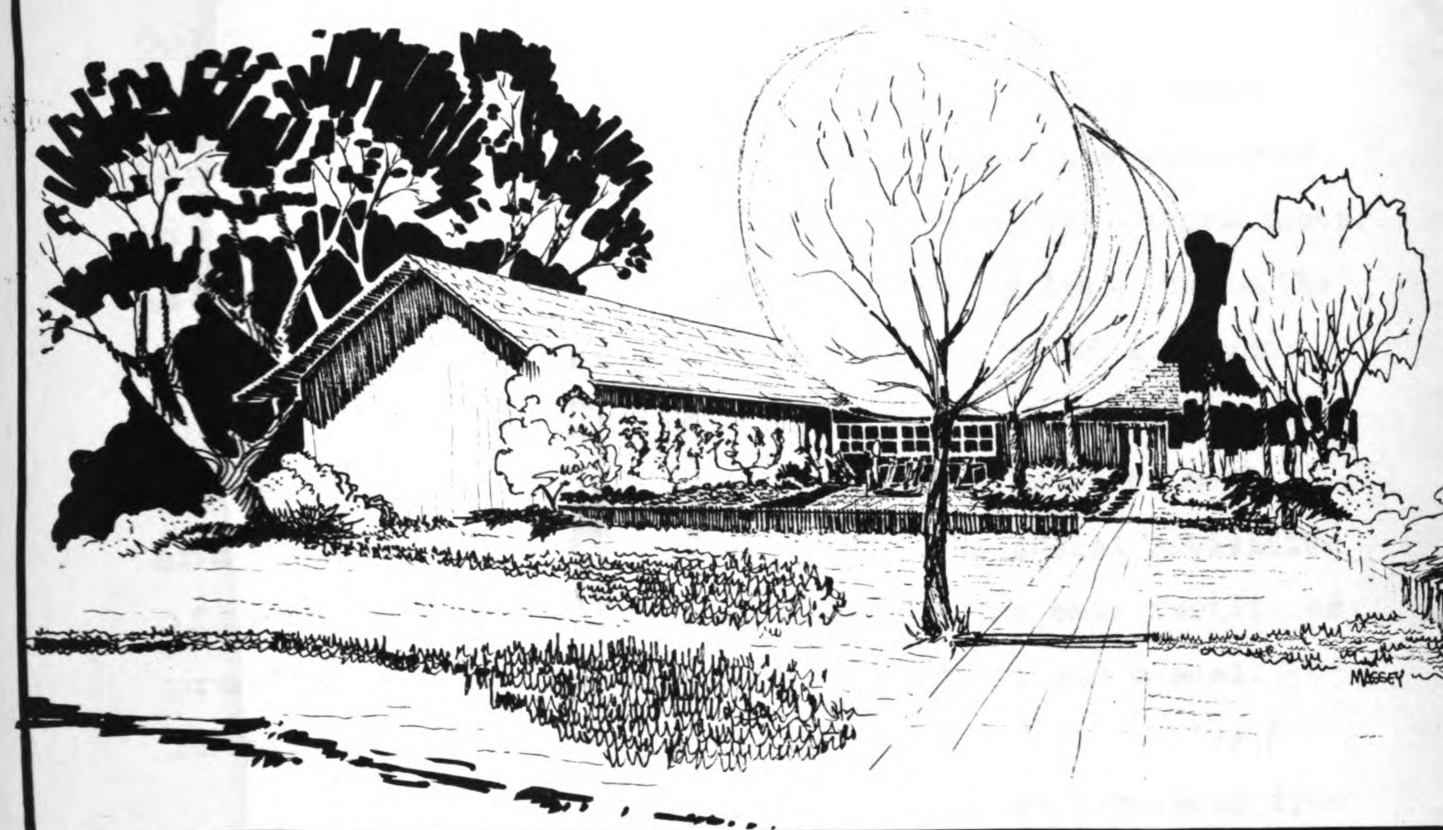


SECOND FLOOR
SCALE 1/16" = 1'-0"


EL 837
TERRACE
LOUNGE
FIRE PIT
DINING
BAR
KITCHEN
COATS
SERVICE
LOBBY
EL. 837
WOMEN
SHOWERS
SHOWERS
MAINTENANCE
& UTILITIES

USE
0'-0"

FIGURE XXIII : ENTRANCE TO CLUB HOUSE



ENTRANCE TO NATURE CENTER

Golf Course and Club House

The golf course was sited by means of the soils, topography, and natural hazards. The club house was sited in such a way to enable both the patrons of the nature center and the golf course to use the same parking lot. Since the golf course is for public use, many features of a private country club have been eliminated. It is expected that the golfer will play a round of golf, catch a snack or meal, and then go home. For these reasons, the social activities of a private club would be eliminated. The only facilities provided here are lockers, a lunch counter, and a small lounge.

The pro shop and starters window are separated from the club house and are near the first and tenth tees. In this manner, the waiting golfers do not interfere with the functions of the club house.

A maintenance yard has been provided for the golf course, since golf courses require continuous maintenance during the golfing season. For this reason, the maintenance facilities should be adjacent to the course, saving time and labor moving equipment to the course.

The course is laid out as two nine hole courses. Between the ninth and tenth holes, the players are given the opportunity to stop by the club house for refreshments and to use the rest rooms. The par for the course is seventy-one. There are nine par four holes, five par three holes,

and four par five holes. All of the holes are laid out to avoid the early morning and late afternoon sun. To add to the challenge of the course, the holes are aligned over and parallel to the natural lakes.

The maintenance facilities are designed to house enough equipment to maintain the golf course. These facilities include a building that will store and maintain the equipment, have sanitary facilities and a small office. Another building is provided to store the compost and fertilizer.

Camping Ground

This area has been made accessible to the potential users. The facilities provided the campers are limited to sanitary facilities. The users are expected to sleep on the ground. Fire places will be provided to limit the fire hazard, and picnic tables will be provided for the convenience of the users. It can be expected that these activities, hiking or paddling across Michigan, will become much more popular as the opportunity to participate in them becomes available. These activities should be planned in detail when the expected demand can be predicted.

Fishing

No special facilities have been provided for fishing, but boats and a place to launch boats are available. Since motor boats will not be allowed on the water, the

entire surface, except next to the swimming area, will be suitable for fishing.

Bicycling

Bicycles have been provided for those people who would like to explore the park in this manner. The trails for the bikes will be separated as much as possible from the horse paths and the nature trails. A wood chip surface would provide an excellent surface for riding bicycles. In order to encourage this activity, a bicycle rental area is provided in the swimming-boating area.

Winter Sports

Due to the level topography and the lack of steep, long slopes, sledding, tobogganing, and skiing were eliminated as activities to be provided in the regional park. Ice skating could be provided on the reservoir in the swimming area and also on the natural lakes on the golf course. Ice fishing could also be provided on the reservoir, outside the ice skating-swimming area. The ice near the swimming area could be opened for skating, and the restaurant utilized as a shelter. The lockers could also be rented as a place to change skates, as well as a place to store other equipment.

Other winter activities in the park could include hiking and nature walks. The nature center could remain open during the winter months, providing a continuous interpretation program.

Space Allocation

In planning this regional park, the expected desired activities by the people of the Region were matched to the physical characteristics of the chosen site. The following activities were chosen and planned for in the following manner.

Swimming: Using the available beach as the limiting factor, and assuming that the occupants of each car would occupy one hundred square feet of beach, parking for eight hundred cars would be necessary. This capacity crowd would only occur on special days of the year. Therefore, a parking lot of only five hundred spaces for cars and ten spaces for buses is provided, and the ground to the east of the parking lot would be utilized for larger crowds.

The lockers, where four by five cubicals are ideal for family use, are planned for in the same manner. The proposed park is near Lansing and many people will probably come in their bathing suits, rather than pay the locker rental fee. There are four hundred and forty-two lockers available for rental.

The building where the lockers are rented also holds an emergency first aid room, and a locker room for employees.

Boating: The boathouse holds one hundred canoes and forty row boats that can be rented to the public. A boat launching area for hand powered boats lies to the east of the boathouse.

Bicycling: The bicycle rental building holds one hundred bicycles that can be rented. Privately owned bicycles can be brought to the park and used on the trails. Parking facilities for people planning to ride bicycles can be either of the two large parking lots.

Picnicking: The two picnic areas are adjacent to the major day use areas. Picnic facilities are provided so that one half of the daily expected users can picnic at a time. The picnic facilities are planned by the acre, with one acre holding twelve tables, four stoves, and four trash receptacles. The picnic site adjacent to the swimming area has four picnic shelters to accommodate large groups of people.

Golf: The golf course is designed as a standard par 71, eighteen hold golf course. The course covers over two hundred acres and includes four natural lakes. The minimum size for such a course is one hundred and sixty acres. The club house provides for the daytime needs of the golfer only.

Fishing: No special provisions are needed. The activity could take place utilizing the existing facilities.

Winter Sports: No special provisions are made. The activity can utilize the swimming area and its proposed facilities.

Circulation

Nature Walks: The nature program is based around a nature center which includes a museum and an auditorium, which seats small groups of under one hundred people. The exhibits are temporary and are generally displayed for periods of months rather than years. For this reason, a large storage area is provided. The exhibit display cases are designed to be flexible enough to allow alterations as the exhibits are replaced; space for all types of exhibits is available. Types of exhibits include free standing "touch me" exhibits, space models, animal cages, bulletin boards, and "Oh, look at that!" surprise exhibits.

The nature walks will follow the museum tour. The trails would have signs along the way which interpret the park. The paths should be of a soft, natural material like wood chips.

Hiking Trails and Canoe Trails: These facilities could be provided if there was a great enough demand for them in the Region. The park would become an overnight stop. A camping ground is provided next to the dam where the canoers will have to make a portage. Facilities are limited to sanitary facilities,

drinking water, picnic tables, and stoves. These initial facilities could expand as the need arose.

Horseback Ridings: This activity is centered around an existing barn. A riding ring is provided, but the main attraction would be the trails that cover the park. Where possible, these trails would be separated from the hikers and bicyclers. The parking lot was planned by assuming that two and a half people come in every car. Since fifty horses are planned for initially, twenty parking spaces are provided. These facilities can be expanded if the need should arise.

Park Service Facilities

Control Point and Office: This area will ensure that the park operations run smoothly. Only a small entrance gate and an office of six hundred square feet is provided.

Maintenance Facilities: There are two areas--one near the entrance to the park; the other at the opposite end of the park for the golf course.

The main entrance area includes a garage of 2400 square feet. Vehicles stored here include two, five-ton dump trucks, a front loader, two pick-up trucks, a tractor, a jeep, and a space for maintenance, parts, and lockers. The other two buildings

are a paint shop of seven hundred square feet and a storage and maintenance building of 1500 square feet.

The golf course facilities include a maintenance shop and office of 6000 square feet and a shed to store fertilizer and compost of 3000 square feet.

Quarters Area: Three ranch type houses of approximately 1850 square feet each and a six stall carport with three storage areas are provided for the park personnel. The buildings enclose a common open space which serves as a safe playground for children and an activities area for the residents. A boathouse and swimming area are also provided.

Utilities: The utilities required to operate the site include waste disposal by a septic tank and tile field, an incinerator, a well for water supply, and electric service which runs parallel to all four of the park boundaries.

Cost Estimate

Land		$384,000.
Reservoir		
Dam	40,000.	
Site preparation	60,000.	100,000.
Circulation		
Roads	300,000.	
Parking lot	150,000.	
Trails	5,000.	
Bridges	70,000.	525,000.
Maintenance - Quarters		
Maintenance area	20,000.	
Quarters	50,000.	70,000.
Activities		
Swimming-boating	200,000.	
Horse stables	10,000.	
Golf course	280,000.	
Picnic grounds	10,000.	
Nature center	40,000.	
Lookouts	2,500.	
Campground	1,500.	544,000.
Utilities		
Sewage	6,000.	
Incinerator	5,000.	
Electric	2,000.	
Water	1,500.	14,500.
TOTAL		$1,637,500.

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