UFC 3-210-03A
16 January 2004

UNIFIED FACILITIES CRITERIA (UFC)

PLANNING OF OUTDOOR RECREATION AREAS

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UNIFIED FACILITIES CRITERIA (UFC)

PLANNING OF OUTDOOR RECREATION AREAS

U.S. ARMY CORPS OF ENGINEERS (Preparing Activity)

NAVAL FACILITIES ENGINEERING COMMAND

AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

Record of Changes (changes are indicated by **1**\ ... /**1**/)

Change No.	Date	Location

This UFC supersedes TM 5-803-12, dated 3 Sepember 1986. The format of this UFC does not conform to UFC 1-300-01; however, the format will be adjusted to conform at the next revision. The body of this UFC is the previous TM 5-803-12, dated 3 Sepember 1986.

FOREWORD

\1\
The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with USD(AT&L) Memorandum dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. All construction outside of the United States is also governed by Status of forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the more stringent of the UFC, the SOFA, the HNFA, and the BIA, as applicable.

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TM 5-803-12

TECHNICAL MANUAL

PLANNING OF OUTDOOR RECREATION AREAS

HEADQUARTERS, DEPARTMENT OF THE ARMY
3 SEPTEMBER 1986

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TECHNICAL MANUAL

NO. 5-803-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *3 September 1986*

PLANNING OF OUTDOOR RECREATION AREAS

*This manual supersedes TM 5-803-12, dated 10 October 1975.

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

1-1. Purpose.

The purpose of the manual is to provide guidance for Morale Welfare and Recreation Managers, outdoor recreation directors, facilities engineers and designers in planning for outdoor recreation on military installations and in preparing the Installation Outdoor Recreation Plan. The Installation Outdoor Recreation Plan documents existing outdoor recreation on an installation, describes proposed outdoor recreation development, and helps to assure that adequate consideration is given to outdoor recreation during the preparation of the Installation Master Plan.

1-2. Scope.

The manual discusses the process for preparing an Installation Outdoor Recreation Plan from the evaluation of existing conditions; to the identification of potential recreation areas; to the determination of outdoor recreation needs; to the selection of appropriate outdoor recreation activities; to implementation through the development of a plan for physical improvements. Included in the manual are general considerations for facilities design as well as design criteria for specific outdoor recreation activities. This guidance applies not only to new outdoor recreation areas, but also to renovation and expansion of existing sites.

1-3. Objectives.

The Installation Outdoor Recreation Plan serves a number of objectives including:

-Assuring that planning for outdoor recreation is included as part of the Installation Master Plan.

-Improving the quality and quantity of leisure experiences for the soldier, his/her family and where possible, members of the DOD work force and the public.

-Providing an optimum variety, mix and location of outdoor recreation opportunities.

-Preserving and developing outdoor recreation resources to serve their highest and best use.

-Evaluating the effectiveness of existing and proposed outdoor recreation.

–Relating outdoor recreation plans to other installation plans.

-Promoting, at all levels of the installation organization, understanding and support for more effective outdoor recreation planning.

CHAPTER 2
OUTDOOR RECREATION PLANNING

2-1. Planning.

Planning for outdoor recreation on military installations is a continuing process, requiring update and revision as the installation changes, recreation demand alters, and existing facilities age. However, the Installation Outdoor Recreation Plan should demonstrate a long-range perspective by reflecting proposed development of the installation and observed trends in outdoor recreation activity both on and off the installation. Thus, in addition to a thorough knowledge of existing outdoor recreation on the installation, outdoor recreation planning requires interaction with the Installation Master Plan and research into available and potential outdoor recreation opportunities off-post.

2-2. Installation Master Plan.

The Installation Master Plan is a physical development plan which guides the installation's growth and change based on operational, social, economic, programmatic, environmental and legal considerations. The Installation Outdoor Recreation Plan is a Contributing Plan to the Installation Master Plan. Installation master plan maps may be used as base maps for outdoor recreation plan graphics. The master plan report may also be used as a guide for structuring an outdoor recreation plan report. The findings in the Installation Outdoor Recreation Plan should be synopsized and included in the Installation Master Plan. See TM 5-803-1 for specific guidance in master planning.

2-3. Outdoor Recreation Planning Process.

The outdoor recreation planning process has three principal steps: identification, evaluation, and implementation (fig 2-1). Subsequent chapters of this manual describe in detail the intended accomplishments of each step.

a. Identification. This step in the planning process involves the acquisition of data pertaining to on- and off-post conditions which influence outdoor recreation use and development. Much of the information necessary for this step is available in the Installation Master Plan or in the current Installation Outdoor Recreation Plan. Updated or supplemental information may be obtained from other sources if gaps exist in the information available on the installation.

(1) Sources of information. Outside sources of information include the following:

(a) U.S. Geological Survey: topographic maps, geologic quadrangles, hydrologic atlases, surface water discharge records, groundwater availability maps and water quality data.

(b) U.S. Soil Conservation Service: soil survey maps.

(c) U.S. Agricultural Stabilization and Conservation Service: aerial photographs.

(d) U.S. Fish and Wildlife Service: fish and wildlife populations, wildlife habitats, and endangered and threatened species ,

(e) National Oceanic and Atmospheric Administration: climatic conditions and annual summaries.

(f) U.S. Bureau of the Census: regional and local demographics.

(g) State Department of Parks and Recreation: recreation facilities and visitation.

(2) Off-post conditions. Off-post conditions include geographic location, regional and local transportation systems, local land use, regional and local socioeconomic conditions, local laws and regulations, climate, and public and private-sector recreation facilities and programs.

(3) On-post conditions. On-post conditions include elements of both the natural and man-made environment such as geology, soils, topography, hydrology, vegetation, fish and wildlife, aesthetic qualities, archeological and historic sites, circulation, utilities, existing recreation facilities, pollution, and dangerous or hazardous areas.

b. Evaluation. Using the information identified as pertinent to outdoor recreation development, an evaluation is made of the potential effects of both on- and off-post conditions upon outdoor recreation. The principle opportunities and constraints are summarized. In addition, the needs and requirements of the installation, with regard to recreation, are determined. This effort includes an evaluation of existing recreation activities and facilities, or supply, both on- and off-post as well as an evaluation of the potential user population and the record of their previous use of recreation, or demand. A comparison of supply and demand quantifies the recreation needs and requirements.

c. Implementation. Based upon the information gathered during identification and the determination of opportunities and constraints,

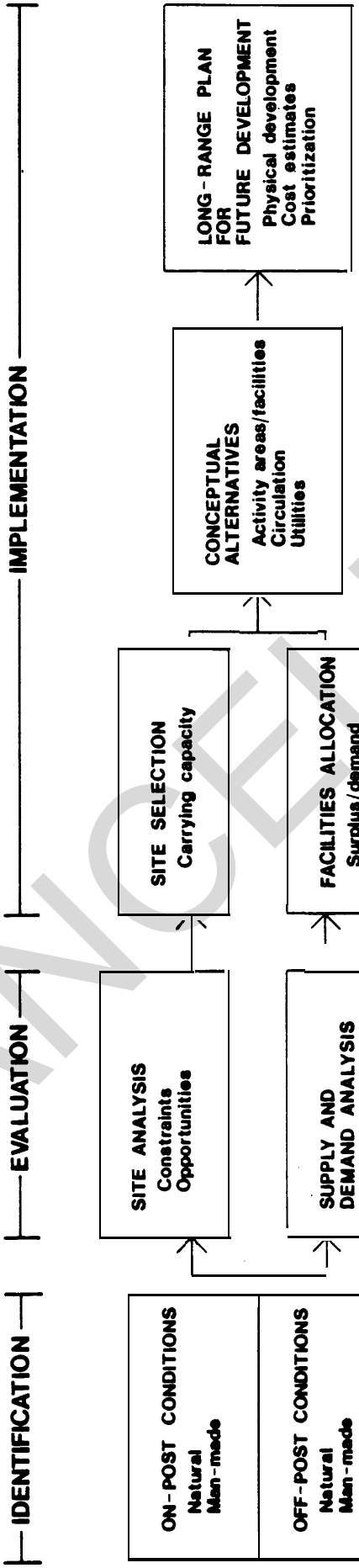

Figure 2–1. Outdoor recreation planning process.

needs and requirements made during evaluation, the implementation step begins. During implementation, conceptual alternatives for future development are presented. Selection of the most feasible alternative results in a long-range plan for future development.

(1) Conceptual alternatives. Conceptual alternatives reflect a synthesis of recreation needs and requirements with available recreation areas.

(a) Site selection. Using the evaluation of existing conditions as well as the comparison of supply and demand, the need for renovation or expansion of existing facilities and the construction of new facilities is explored. When new facilities are required, sites are selected on the basis of compatibility with surrounding land use, location with regard to the user population, accessibility, proximity to support facilities, availability of utilities, physical opportunities and constraints, and size.

(b) Facilities allocation. When initial site selection is complete, facilities allocation begins. The purpose of facilities allocation is to fit new facilities to the sites deemed most appropriate for use without exceeding a site's carrying capacity or ability to withstand use. Note is made of those sites which have reserve capacity for future development. When allocation of facilities to available sites equals demand of facilities by users, the physical concepts for development are prepared.

(c) Concepts. Concepts relate specific outdoor recreation activities and facilities to specific outdoor recreation sites. They depict and describe the types of outdoor recreation activities and facilities and indicate their locations and functional relationships. They also demonstrate responses to existing natural and man-made conditions on the sites.

(2) Long-range Plan for Future Development. The Long-range Plan graphically and verbally describes proposals for physical development of outdoor recreation on the installation, including the necessary circulation and utilities for support of the facilities. The Long-range Plan should be accompanied by a cost estimate for both new construction (including renovation) and operation and maintenance. Using the cost estimate, the Morale and Welfare Recreation Manager can prioritize the proposals and schedule their implementation.

CHAPTER 3
EXISTING CONDITIONS

3-1. General.

When planning outdoor recreation, it is important to prepare a complete and accurate assessment of existing conditions, both on and off the installation. The identification and evaluation of physical conditions result in the determination of the installation's opportunities and constraints. This determination is commonly called a site analysis. The identification and evaluation of social and economic conditions result in the determination of the installation's needs and requirements-commonly called a market analysis (described in chap 4). The steps of identification and evaluation are applied to the installation as a whole to formulate the overall Outdoor Recreation Plan. The same steps are later applied in greater detail to specific outdoor recreation areas to prepare the design for selected outdoor recreation facilities.

3-2. Off-post data identification and evaluation.

Off-post conditions which should be identified and evaluated are:

a. Geographic location. The regional area of the installation is normally the area within the jurisdiction of the regional planning agency. The vicinity of the installation is normally the area immediately surrounding the post which could affect or be affected by the installation's operation. Identify both the region and vicinity of the installation in order to determine the boundaries of influence of the off-post conditions described below as well as the area of recreation supply and demand, or market, described in chapter 4. When an installation has been placed in the context of its region and vicinity, the existing and/or proposed recreational activities (including federal, state, municipal and private facilities) should be investigated. This information will be particularity useful when determining market demand as described in chapter 4. Activities which are available to installation personnel within the surrounding area may not warrant duplication.

b. Climate. Among the climatic factors which affect outdoor recreation are temperature, precipitation, wind, sun azimuth (aspect), and altitude. The seasonal temperature and precipitation of an area influence the selection of recreational activities. Anticipated freezing temperatures and snowfall should help determine the investment in winter sports such as skiing or skating. Areas with high heat and humidity will have greater need for water-based activities. Siting outdoor recreation facilities to take advantage of prevailing breezes and orientation to the sun contributes considerably to their comfort in warm areas. Knowledge of prevailing wind and tide or drawdown conditions is critical to marine facilities. Obtain information about the local climate from the U.S. Weather Service station nearest the installation.

c. Geology. Knowledge of subsurface conditions within a region can provide clues to conditions, particularly those which may be detrimental, on the installation. Potential hazards include faults, fissures, instability, limited bearing capacity, and subsidence. Obtain information from the U.S. Geological Survey.

d. Hydrology. A general knowledge of the hydrology of the area is useful. Identify the location of watersheds and water bodies as well as potential problems such as areas prone to flooding, areas generating or receiving significant amounts of storm water runoff, or areas with water quality problems.

e. Wildlife habitats. Wildlife habitats may extend beyond installation or man-made boundaries. The introduction of recreation activity into wildlife habitats can cause serious changes.

f. Transportation. The principal element of the transportation system which affects outdoor recreation is the road system. Location of the installation near the interstate system will probably encourage more use of available recreation facilities by traveling and retired military personnel. Good access from surrounding communities will encourage use by civilian and military personnel living off-post. Another transportation element which may affect outdoor recreation is air traffic and any attendant noise and/or air pollution.

g. Land use. Land use adjacent to outdoor recreation is important not only in terms of how it may affect outdoor recreation areas but also in terms of how it may be affected by recreation activities. Some land uses are sensitive to the noise and traffic congestion which may accompany recreation. Among these sensitive uses are residences, schools, hospitals, and conservation areas. Other land uses, associated with air, water, noise or visual pollution, may have a detrimen-

tal impact upon recreation areas. Such land uses include sewage treatment plants, landfills, industry, highways, railroads, airports, and transmission lines. It is also important to be aware of proposed land uses and any land use or environmental regulations enacted by local jurisdictions. The surrounding vicinity can bean asset to an outdoor recreation area if it contains compatible land uses and, particularly, if it provides support facilities and services such as food and supply stores, equipment rental, laundries, utilities, protection by police and fire departments, and emergency medical aid.

3-3. On-post data.

Both natural and man-made conditions influence outdoor recreation. Among the factors which should be examined are:

a. Natural conditions.

(1) Geology. Geologic conditions within proposed recreation areas should be explored, particularly if the off-post evaluation of geologic conditions indicates potential problems in the general area. The primary problem to anticipate is unsuitability for construction due to inadequate bearing strength, difficulty in excavation, or hazards such as subsidence.

(2) Soils. The following soil characteristics should be examined when planning an outdoor recreation area: bearing capacity, instability, erodability, stoniness, depth to various soil strata, fertility, internal drainage, groundwater table and permeability. Soils which drain easily (i.e., are readily permeable) and which withstand intense use with minimum compaction are particularly suitable for recreation areas. Soil maps or identification of soil samples and engineering interpretations can usually be obtained from the Soil Conservation Service.

(3) Topography. While some sports, such as skiing or climbing, require steep or rugged topography, steep slopes, as a rule, are not suitable for outdoor recreation areas. However, flat areas may not provide enough physical or visual interest. Steep areas may have erosion problems while flat areas may have drainage problems. A moderately sloping topography not only makes outdoor recreation areas more attractive but also avoids soil and water problems which may increase with recreation use.

(4) Hydrology. Good drainage is a basic requirement for most outdoor recreation activity. However, flood plains and low-lying areas can accommodate some types of outdoor recreation in appropriate seasons of the year, especially if facilities incorporate flood designs. Wetlands only lend themselves to very limited and controlled recreational uses such as environmental or outdoor education.

(5) Water surfaces and frontages. While there are outdoor recreation activities which depend directly upon water, almost every recreation activity is enhanced by its presence. All water bodies (oceans, bays, lakes, ponds, rivers, streams) can contribute to the recreational experience, even if only in terms of views. Water used for water-contact activities, such as swimming, must meet health and safety standards. The temperature during the seasons, the level of solids in suspension, and the biological productivity should be checked before designating areas for water-contact activities. Because of the refreshing nature of water, every opportunity for physical and visual access to it should be explored.

(6) Vegetation. Existing vegetation is almost always an asset for recreation areas and should be given special consideration in the design of facilities. In addition to its aesthetic value, vegetation can provide both screening and shade to make recreation areas more comfortable. Vegetation serves as a useful buffer between recreation areas and other land uses, particularly if the other land uses are noisy or unattractive. Preservation of existing vegetation is preferable and more practicable than installation of new plant material which may take years to reach the maturity necessary for maximum effectiveness. In addition, threatened and endangered species of vegetation, as well as unique vegetative features (such as state champion trees) should be located and protected.

(7) Wildlife. There are both passive (e.g., bird-watching) and active (e.g., hunting) recreation activities which revolve around wildlife. The presence of wildlife also enhances recreation activities, such as camping and hiking, which are not directly related. Information concerning the species of fish and wildlife likely to occur within an area can usually be obtained from representatives of the state fish and wildlife or conservation departments or from field guidebooks of the local area. Many installations have wildlife management plans which are a valuable source of information. Where wildlife species do not interfere with military operations, measures to protect, maintain, and improve their natural habitat are generally required. Recreation facilities should not encroach upon the natural habitat of endangered or threatened species at the risk of disturbing the species.

(8) Visual conditions. While the aesthetic

value of visual conditions is difficult to determine on an objective basis, it is an important ingredient of the total pleasure of an outdoor recreation area. There are two principal aspects to visual conditions: 1; the viewshed and 2; views, both positive and negative. The viewshed is generally defined as the visual space in which an activity occurs. As such, its boundaries may extend beyond the actual area in which the activity occurs. Such physical factors as topography, vegetation and buildings shape the viewshed. To the extent that outdoor recreation is more enjoyable when a sense of separation from other facilities and activities is present, the viewshed is important. Also important are views into and out of the recreation area. Wherever possible, recreation areas should take advantage of and emphasize good views and vistas. Negative views which encroach upon the viewshed and which cannot be otherwise controlled should be screened. The design quality of recreation facilities also contributes to the aesthetic quality of recreation activities.

(9) Special features. Special features include rock outcrops, rapids and waterfalls, overlooks, national and state champion trees, and unusual plant material. Since special features tend to increase aesthetic value and provide extra interest, they should be incorporated in outdoor recreation areas wherever possible.

(10) Dangers and hazards. Some natural phenomena pose health and safety problems in or near outdoor recreation areas. Natural hazards include: waterfalls and rapids; grass, brush, and forest fires; flooding; poisonous plants, insects, and snakes; and bog and quicksand areas.

b. Man-made conditions.

(1) Access. As a rule, outdoor recreation areas need convenient access which may be provided by a central location or efficient transportation system. The proximity of an outdoor recreation area to housing areas increases use opportunities and encourages transportation other than the automobile (e.g., pedestrian, bicycle, bus). However, balancing the need for convenient access are the needs for a quality natural environment and physical separation from other activities.

(2) Land use. The significant factors for evaluation of land use are essentially the same for on- and off-post. One major difference is mission-related land uses such as training or testing areas or ammunition storage. Not all effects of these land uses are necessarily negative. For example, such limited but intense land uses can act as a protective buffer for wildlife habitat.

(3) Existing structures. The condition of any existing structures should be examined, and consideration given to their future use. Besides buildings, potentially useful structures include fences, stone walls, paths, roads, and dams. If there are already recreation facilities in an area, they should be reviewed for expansion potential and future relationships to any new outdoor recreation facility.

(4) Utilities. Major utilities which may be required for an outdoor recreation area include potable water, gasoline, oil, bottled gas, electricity, telephone, wastewater treatment, and solid waste collection and disposal. Since outdoor recreation areas are often remote from established utility systems, and outdoor recreation facilities are often spread out, provision of utilities can become an expensive proposition and should be faced early in the planning stage. When existing water supplies are not potable, investigation should be made into the availability, quality, and cost of well and surface supplies. Alternatives for disposal of sanitary wastes may similarly need to be explored. Federal, state, and local standards and permit requirements must also be investigated.

(5) Special interest areas. Special interest areas, such as archeological or historical sites, may be considered as an adjunct to recreation. Such sites often require special protective measures and limited or controlled access.

(6) Pollution. Noise, air, and water pollution all have detrimental impact upon outdoor recreation areas. Sources of pollution, including areas considerably removed, may affect an outdoor recreation area and should be identified. Data concerning the amount and severity of pollution, as well as any proposed control measure, should also be identified and evaluated.

(7) Dangers and hazards. Several man-made activities and structures pose health and safety problems in or near outdoor recreation areas. Among the human hazards are: low-flying aircraft, especially at training fields; railroad crossings; overhead and underground utilities; quarries; gas and oil wells; ammunition and explosives storage; firing ranges; and hunting areas.

CHAPTER 4
SELECTION OF RECREATION ACTIVITIES

41. General.

The selection of recreation activities is based on an analysis of supply and demand. Demand is the expressed or perceived needs and desires of the population. Supply is the existing recreation areas and facilities which satisfy that demand. In economics, a "market area" is a geographic area of supply and demand for commodities. In this manual, however, it is used to describe a geographic area of supply and demand for one or more types of outdoor recreation. It is important that the Morale and Welfare Recreation Manager determine the geographic boundaries of his 'market area and understand the current -L supply and demand of outdoor recreation resources within it. If supply fails to satisfy demand, existing recreation must be increased, expanded or renewed. On this basis, a selection of recreation activities can be made.

4-2. Statewide Comprehensive Outdoor Recreation Plans (SCORPs).

SCORPS, which can be obtained from the state agency administering parks and recreation, provide useful background information for recreation planning. SCORPs contain data on the locations and types of existing and projected recreation throughout the state. They also provide data concerning existing and projected recreation participation. This data makes a useful basis of comparison for installation recreation participation which in turn aids in forecasting trends and determining demand.

4-3. Approaches.

There are numerous approaches to analyzing recreation supply and demand. Generally, these approaches can be categorized as follows:

a. Resource. The resource approach is based on the natural or physical resources available for outdoor recreation. The resources regulate the quantities and types of recreation possible. Supply determines demand by limiting use to the human or natural carrying capacity of the resource.

b. Activity. This approach uses the record of past participation (usually attendance) in recreation to determine what future opportunities should be provided. Supply determines demand by defining the participant's preference for various recreation activities.

c. Economics. The economic approach uses the available economic base or fiscal resources to determine the quantities and types of recreation possible.

d. Behavioral. The behavioral approach focuses on recreation as an experience. It uses human behavior in leisure settings to determine the types of recreation possible.

All of these approaches are valid in recreation planning. However, the use of any single approach, to the exclusion of the others, precludes a thorough understanding of the determinants of recreation supply and demand. An ideal supply and demand analysis considers, to the extent possible based on available information, all aspects represented by these approaches (fig 4-1).

4-4. Determination of market area.

In order to determine supply and demand, first describe the market area. The market is based on the population to whom recreation is available.

a. User population. Normally, the user population for recreation is based on existing and projected populations within a given geographic area. On Army installations, the user population is limited to active military and civilian personnel and their dependents and to others as deemed appropriate by the installation commander. Use data collected for installation demographics to determine total numbers of population eligible for participation in installation recreation. Indicate the priority of participation for each group as defined in ARs 215-1 and 215-2.

b. Population composition. A number of factors influence which individuals participate in recreation. One set of factors encompasses the socioeconomic characteristics of the population. Compare the characteristics of the installation population with those of the general population described in the SCORP or other recreation planning guidelines and note any significant differences. These factors include:

(1) Age. Age influences the participant's recreation selection, particularly when recreation activities require significant physical strength and/or dexterity.

(2) Sex. In the past, sex greatly influenced the participant's recreation selection. However,

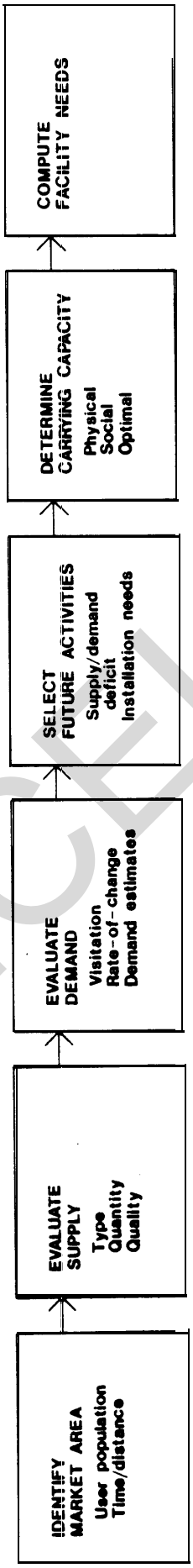

Figure 4–1. Market analysis process

there has been a significant increase in the participation by women in such activities as bicycling, hiking, hunting and fishing. Consequently, sex is a more subtle influence upon recreation selection, particularly among younger age groups. The most recent Morale Welfare and Recreation (MWR) user preference survey indicated very little difference in outdoor recreation activity preferences between men and women.

(3) Income, education and occupation. Income, education and occupation are closely related characteristics which influence recreation selection. Limited incomes tend to restrict participation while larger incomes provide a greater range of opportunities. Recreation which requires investment in equipment, even through rental, reflects a direct relationship between level of income and amount of participation. Such recreation includes camping, hunting, and skiing. The importance of income on military installations increases with the consideration of self-sufficiency. While income demonstrates greater influence on recreation selection, there are also relationships between levels of education and types of occupation and recreation selection.

(4) Seasons. Certain users of the installation population are seasonal or occasional in occurrence. These users include reserve units and private citizens or organizations allowed to use specific installation recreation for limited periods. Disaggregate these participants from the general installation population.

c. Market area. The installation's market area includes the installation and some portion of the surrounding region. This portion of the surrounding region is determined by the alternative recreation available off-post to installation personnel. Usually, the market area is defined by recreation accessibility. How easy or difficult is it for the user population to reach existing recreation areas off-post? How far can or will the user population travel to participate in outdoor recreation activities? The answers to these questions are often defined in terms of commuting times or distances. User surveys at individual recreation areas or data contained in SCORPs provide information about average distances travelled and time spent in participation in various types of recreation. Using this information, determine the average distanced travelled one-way by recreation participants in the region. Plot this distance as a radius on a map of the region with the installation as the center. This zone constitutes the practical limits of the market area (fig 4-2). Establishing two zones-one for day use and one for overnight use (which usually will be camping)-can be helpful. Generally, 80 percent or more of day use occurs within a radius of 50 miles. While overnight use may occur far beyond this boundary, the majority of overnight use occurs within a 100-mile radius. The quality of transportation systems within the region affects these boundaries.

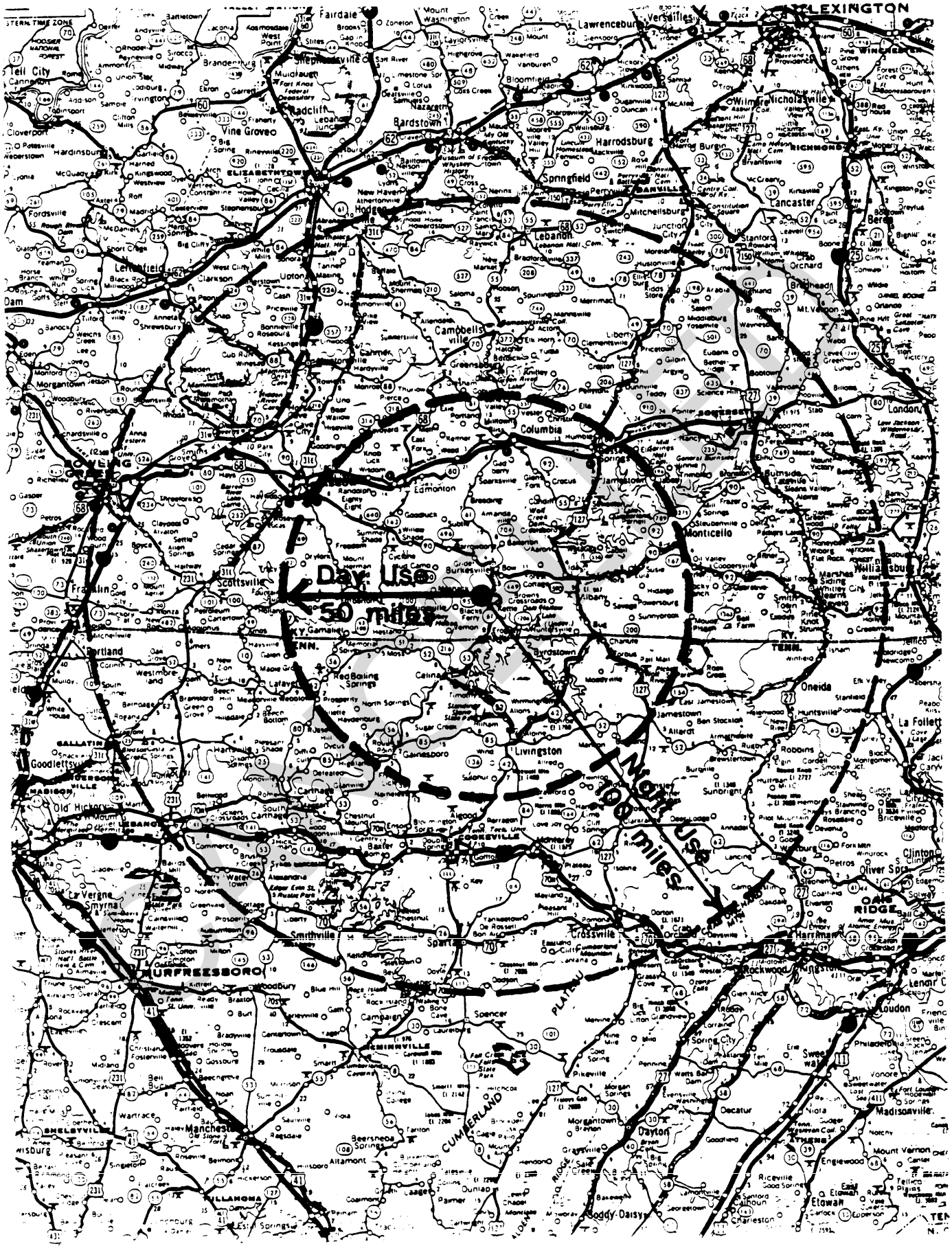

Figure 4–2. Recreation market area.

4-5. supply.

The identification and evaluation of supply describes the types, quantity and quality of recreation available to the installation population. Inventory existing and proposed recreation on the installation and within the recreation market area. Obtain information about recreation off-post from the State agency responsible for recreation and the SCORP, local parks and recreation departments, and recreation directories. Visits to individual areas and facilities by the Morale Welfare and Recreation Manager may be necessary. Be sure to recognize private-sector as well as public recreation. Inventory the information described below for each recreation area. Figure 4-3 illustrates an example tabulation of this information.

a. Location. Indicate location as well as travel distance or time (one-way) from the installations.

b. Activities. List available outdoor recreation activities as described in DA PAM 28-14. Quantify areas designated for various activities using the activities listed in table 4-1 as a guide.

Table 4-1. Recreation activities.

Activity	Quantity
Archery	No. of ranges
Bicycling	Miles of trail
Boating—Motor	Acres of water
Boating—Sail	Acres of water
Boating—Canoe/ Kayak	Miles of shoreline
Campgrounds	No. of sites
Cross-country Skiing	No. of acres
Fishing	Miles of shoreline
Go-Cart Tracks	No. of carts
Hiking	Miles of trail
Horseback Riding	Miles of trail
Hunting	No. of acres
Ice Skating (Rink)	Acres of rink surface
Ice Skating (Pond)	Acres of water
Jogging	Miles of trail
Marinas	No. of slips
Motor Sports	No. of acres
Nature Walks	Miles of trails
Off-Road Vehicles	Miles of trails
Recreation Lodging	No. of beds
Shooting	No. of ranges
Sledding	Miles of trail
Snowskiing	No. of lifts
Swimming (Beach)	Miles of beach
Travel Camps	No. of sites
Walking for Pleasure	Miles of trail
Waterskiing	Acres of water

c. Facilities. Describe facilities for outdoor recreation activities. Identify facilities developed in support of other recreation such as children's playgrounds. Identify facilities accessible to the handicapped. Examples of useful information include:

(1) Campgrounds. Indicate whether camping is primitive, tent, trailer, RV, cabins, or a mixture. Indicate whether camping is transient/ overnight or destination. Indicate if campgrounds provide bathhouses, laundries, or equipment rental and if camp sites provide utility hookups, grills and picnic tables.

(2) Trails. Separate improved from unimproved (or primitive) trails and indicate surfacing.

(3) Boating and marinas. Identify numbers of piers and launch ramps. Identify support facilities such as equipment rental and bathhouses. Inventory boat rentals to determine the number of craft available and schedules of operation.

d. Season. Indicate dates of opening and closing for recreation.

e. Fee structure. Indicate fees, including equipment rental, charged for recreation.

f. Quality. Briefly evaluate the quality of recreation areas based on such factors as attractiveness of facilities, adequacy of support services such as parking and restrooms, conservation of natural resources, and maintenance. This evaluation can be used for comparison between installation and off-post recreation areas.

g. Capacity. To facilitate comparison of supply with demand, indicate the number of participants or visits (on an annual basis) the recreation area or facility is designed to accommodate. If the original design or "use" standard is known, multiply the quantity of the recreation area or facility by the design standard. If the design standard is unknown, use a common outdoor recreation standard to compute capacity.

(1) Standards. Design standards are ratios of the optimum number of persons which a given outdoor recreation area or facility can accommodate per day or at one time. They are used to estimate the capacity of a given area or facility to provide outdoor recreation opportunities or, alternatively, to compute the number of facilities or amount of area needed for a particular outdoor recreation activity given an unexpected number of users. It is assumed that the amount of use of a facility, per day or at one time, will not exceed the design specifications of the facility, and therefore, the facility will withstand

Example Work Sheet

Activity/facility	Supply	Use standard	Existing capacity	Remarks
Camping, tent	300 sites	4/day	240,000/year	open mid-April to mid-October (200 days)
Picnicking	400 sites	8/day	640,000/year	same season as above
Trails, hiking	40 miles	30/mi./day	360,000/year	unimproved (300 days)
Trails, hiking	20 miles	100/mi./day	600,000/year	improved (200 days)

Figure 4-3. Summary of outdoor recreation supply.

sustained use at this level and continue to provide a satisfying user experience. Implicit in this assumption is the idea that use in accordance with the standards will result in minimal impact on the natural environment. Differences in soils, slope, microclimate, and other factors from site to site, however, often result in varying responses to the standards; hence the need to monitor impacts closely and modify the standards to the extent necessary to produce the desired results at every site.

(2) Sources. SCORPs, federal agencies, local parks and recreation departments, and private organizations representing various recreation activities provide guidelines for outdoor recreation standards. Another source is a nationwide survey of standards employed by state parks and various government agencies titled, "Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity." The standards were found to vary considerably from state to state and agency to agency depending upon a variety of factors, both physical and social. Consequently, the guideline report presented a "baseline" standard, which was the most frequently used standard encountered in the study, and then a range of values. The Morale Welfare and Recreation Manager should evaluate the baseline standard to determine if it is appropriate for his particular situation, and if not, should choose another value within the limits of the range, based upon his planning objectives. Specific factors affecting the selection of an appropriate use standard are discussed at length in the document.

h. Visitation. Determine current use or visitation.

(1) On-post. Evaluate annual summaries of visitation on file with the Physical Activities Branch. Examine visitation over the preceding five-year period or if information is available, over the preceding 10-year period in order to infer trends in recreation use. If summaries are not available, compile raw data from visitor counts and recreation surveys into a historical record of use. Try to stratify data by activity and month or season. When neither annual summaries nor raw data is available, estimate visitation by comparison with similar recreation areas or by reference to the per capita participation rates in the most recent SCORP. Multiply the installation user population by the per-capita rate for each activity.

(2) Off-post. If possible, obtain annual summaries of visitation for off-post recreation within the market area. If this data cannot be obtained, estimate use by reference to the per capita participation rates in the most recent SCORP.

4-6. Demand.

In recreation planning, the identification and evaluation of demand is an attempt to forecast future participation in outdoor recreation. Estimating recreation use is complex because it is influenced by a multitude of factors including: population, income, tastes, attitudes, leisure time, travel time, fuel prices, weather, competition, promotion, and quality of recreation. That these factors and their influence change over time only increases the difficulty of forecasting.

a. Methods. There are four basic methods for estimating demand. Each method has limits" tions associated with the difficulty in acquiring the necessary information or the reliability of the information obtained. See McGraw Hill publication Recreation ***Planning and Design*** for general information concerning these methods.

(1) Standards. The most common method of estimating demand is the use of standards based on a common denominator such as population or size of recreation market area. The premise of the population-based standard is that if the number of people requiring recreation is known, the application of a general standard to that number indicates the quantity and types of recreation which should be provided. However, population-based standards may not adequately account for variations in population characteristics and recreation areas. Although there are a variety of published standards, the most acessible and pertinent are usually those listed in the SCORP.

(2) Projections. Projections estimate demand on the basis of participation in existing recreation. Use counts measure participation in a recreation area and are then extrapolated to determine future demand. The simplest use count is the traffic count which can be measured mechanically or by personnel. Projections based only on current use assume that the population will continue to participate in recreation in the same numbers and manner in the future and that no new activities will be provided.

(3) Models and formulas. Models and formulas attempt to consider factors other than population and participation. They consider variables in both population characteristics and recreation areas. Models and formulas can project demand for improved as well as new sites. An example of a commonly used formula for recreation planning is Bursley's Formula which

considers a number of variables including attractiveness of the recreation area, population, character of the community, economic level of the community, and travel distance to the recreation area. The accuracy of models and formulas depends upon the accuracy of detailed information and, often, subjective observation.

(4) Surveys. Surveys provide not only factual data, but also data concerning the recreation experience. Surveys particularly provide the opportunity for recreation participants to express the desire for new and different activities. Surveys of the installation population can be made in the form of self-administered questionnaires, personal and telephone interviews, or field observations. However, because surveys depend on human response, they require skill in both preparation and administration to extract accurate information. They also require skill in evaluation to assure appropriate conclusions are drawn. The Army MWR survey results from installation, major command and army-wide levels, available from the installation MWR, should be used in developing outdoor recreation programs and projecting user demand.

b. Projected visitation. One means of determining projected visitation is to examine the visitation data (described in para 4-5h) to establish trends in recreation use.

(1) Rate of change. Calculate the rate of change in use of outdoor recreation areas and facilities in terms of percent per year, over the last five or 10-year period. This information can also be plotted on a graph to show whether use has steadily increased, decreased or remained stable. Once the pattern of use has been established, attempt to define the reasons for the pattern. The rate of growth of the user population is the most obvious reason for changes in recreation use. However, other factors contribute and should be identified. This is particularly important if the user population demonstrates a pattern different from that of recreation use. For example, if a steadily increasing pattern of recreation use appears while the user population remains stable or declines, other factors are influencing the trend. Consider such factors as: changes in population characteristics, changes in accessibility to recreation areas, improvement or decline in recreation areas and facilities, unusually poor or favorable weather conditions over several seasons, increased fuel costs, and changes in fee structure for entrance into recreation areas. Determine whether these factors will continue to influence demand and in the same way. Also attempt to anticipate new factors which could alter observed patterns of use in the foreseeable future, normally a five-year interval. Adjust the rate of change to reflect the influence of these factors.

(2) Demand estimates. Once the expected rate of change for each outdoor recreation activity has been established, estimate future visitation for all existing and proposed facilities in the market area. Make estimates by one of two principle methods.

(a) For activities with a previous record of use, extrapolate current use figures by a given percent (based on the rate of change) per year to the end of the planning period. As an example, Fort U. S., a hypothetical installation, is evaluating demand for camping. Use data for camping in the installation's market area indicates that, five years ago, visitation amounted to 117,000 visits (or visitors) per year. Camping visitation in the last calendar year, however, was 236,000 visits or an increase of 102 percent over visitation five years ago. This increase is equivalent to an average increase of about 20 percent per year. Evaluation of the visitation for the intervening years reveals a study year-to-year increase, although the amount of increase, on an annual basis, shows signs of tapering off in the most recent two to three-year period. As a result, the outdoor recreation director decides to estimate, conservatively, that visitation will continue to increase at an average rate of 15 percent per year for the next five years. The estimate of demand for camping is then obtained by the following formula:

$$1.15^5 \times 236{,}000 = 2.0113572 \times 236{,}000 = 474{,}680$$

This figure is rounded to an estimate of 475,000 visits annually by the end of the forthcoming five-year planning period.

(b) For activities with no reliable use data (including data with gaps) or for new activities, modify current per capita participation rates and multiply them by projected future user population figures. If this approach is adopted, the SCORP usually has projections of future participation rates for various outdoor recreation activities for the State and sometimes for counties or regions within the state. For example, the market area population of Form U.S. is projected to be 199,500 by the end of the five-year planning period. The projected participation rate derived from the SCORP for camping at the end of this period is 1.86. (A participation rate is an estimate of per capita annual visitation; i.e., the average number of times an individual in the market will participate in an activity in a year's

time.) The estimate of future camping visitation is computed as follows: 1.88 x 199,500 = 375,060. This figure is rounded to an estimated 375,000 visits annually by the end of the planning period. The outdoor recreation director may wish to analyze the applicability of the SCORP rates to the installation user population and alternatively derive installation-specific participation rates from his own user population and use data.

4-7. Selection of activities.

Base the selection of future recreation on a comparison of supply and demand. After completing the computation for projected visitation, determine the quantity of recreation areas and facilities necessary to accommodate demand.

a. Demand surplus/deficit. Compare current and projected visitation with the capacity of existing recreation areas and facilities in the market area as described in paragraph 4-5g.

When the number for capacity is larger than or equal to the number for visitation, there is a demand surplus. The existing supply is sufficient to meet demand, and no additional areas or facilities are needed. When the number for capacity is smaller, there is a demand deficit and additional areas or facilities are needed.

b. Installation needs. It is important to determine what proportion of demand is being supplied by non-installation recreation in the market area and whether this is appropriate. If an installation is remote, it may be appropriate for all recreation to be supplied by the installation. If the installation market area provides a substantial number and variety of outdoor recreation opportunities, it may be disadvantageous for the installation to compete with all of the available outdoor recreation resources. Determine and prioritize which outdoor recreation activities should be provided by the installation. The ability of the installation to provide various recreation activities in terms of fiscal and natural resources and the accessibility of public and private-sector market area recreation in terms of time/distance and fee structures are major influences on these decisions.

c. Summary of supply and demand. Figure 4-4 shows an example for compiling information obtained during the evaluation of supply and demand and for providing a convenient basis of comparison for determining demand surplus or deficit.

4-8. Carrying capacity.

Carrying capacity is the amount of use a recreation area or facility can sustain over an extended period of time without damaging the recreation resource (physical) or experience (social).

a. Physical and social capacity. While recreation standards are designed to some extent to acknowledge carrying capacity, most standards are based on the concept of the maximum use a resource can withstand before physical damage occurs. Differences in natural resources as well as human perspectives often provide varying results in response to the standards. Factors negatively affecting physical capacity include: soil erosion, air or water pollution, reduction or elimination of fish and wildlife populations, and replacement of desirable vegetation with undesirable species. Factors negatively affecting social capacity include: overcrowding, poor maintenance, and poor aesthetic quality. The use standards described in paragraph 4-5g for determining the capacity of existing areas and facilities, as well as the Department of Interior publication "Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity" can be used to determine the overall carrying capacity of the installation. However, it is helpful to assess the optimal carrying capacity of individual recreation areas and sites.

b. Optimal capacity. To determine optimal carrying capacity for an area, consider both the physical and social capacities. The potential environmental impacts of recreation use, the attitudes of potential recreation users, and the goals and objectives of the outdoor recreation director should all be taken into account. Using the analysis of existing conditions, evaluate existing, proposed and potential recreation areas to see if there should be modifications to the standards previously used to determine capacity for each recreation activity. If there is a difference, adjust previously determined capacities for recreation areas and facilities based on the revised standard. The standard may also be modified simply through observation of the installation situation and the Morale Welfare and Recreation Manager's estimate of how this affects the standard.

4-9. Computation of facility needs.

There are a variety of published formulas for computing facility needs. The judgement of the applicability of any formula to an individual installation should be based on the experience and common sense of the Morale Welfare and Recreation Manager. For example, many formulas are based on peak usage, or the greatest use a facility is likely to receive at a given time. Peaks

Example Work Sheet

Activity/Facility	Existing Capacity	Visitation	Estimated Demand	Demand Surplus/ Deficit	Carrying Capacity	Facility Needs
Camping, tent	240,000	230,000	315,000	-135,000	525,000	169 sites
Picnicking	640,000	515,000	600,000	+ 40,000	100,000	—
Trails, hiking	600,000	610,000	650,000	- 50,000	100,000	6 miles

Figure 4–4. Summary of supply and demand and proposed facility needs.

generally occur on weekends or holidays. However, in most circumstances, recreation planners employ smaller numbers than those generated by peaks so that facilities are not overbuilt and underused. If a formula involves peaks, it is important to know if some adjustment is made for their inclusion. Just as the outdoor recreation director may need to revise recreation standards, he should also assess the value of any formula for his individual situation. Two fairly simple methods of computing facility needs are described as follows. If the number for demand in figure 4-4 is less than the number for optimum carrying capacity, use the demand deficit number in conjunction with the use standard to compute the amount of additional facilities needed to satisfy demand. Otherwise, the difference between the carrying capacity and the existing capacity forms the basis for computation. Following are examples of these methods of computation:

a. If the demand for a given activity is less than the optimal carrying capacity, the facility needs are computed by first, changing the figure for demand deficit to a positive number (change the sign) and then back-calculating to obtain the amount of new facilities needed. For example, it is estimated that the demand for tent camping in the area of Fort U.S. will be 375,000 visits per year in five years. The existing supply of developed campsites can sustain an annual use of 240,000 visits, and current visitation is nearly at capacity now. Ample land is available for new campsite development and carrying capacity is estimated at over 525,000 visits per year. The demand deficit for tent camping is 135,000 visits or 240,000 visits minus 375,000 visits. The facility needs are computed by first changing the demand deficit to a positive number and then dividing this number by the number of days in the year that camping facilities are available for use. In the area of Fort U. S., which is a north-temperate location with relatively harsh winters, campgrounds are closed from mid-October to mid-April. The length of the camping season is about 200 days. Therefore, the initial calculations are as follows:

Absolute value of – 135,000 = 135,000
135,000/200 = **675 visits/day**

The figure above is the daily or one-time-use capacity needed to meet unsatisfied demand. The next step is to divide this number by the average number of users per campsite which is 4 persons.

675/4 = 168.75

The market area needs 169 new developed campsites to meet the unsatisfied demand for tent camping.

b. If the demand for a given activity is greater than the carrying capacity, the remaining or surplus capacity is the basis for computation of facility needs. The forecasted demand for tent camping in the area of Fort Smith is 1,250,000 visits per year. The installation is in a north-temperate location and the area is substantially urbanized. Suitable land for development of additional campgrounds is scarce, and the carrying capacity is estimated to be 800,000 visits per year, less than the forecasted demand. The existing supply of 625 campsites is being utilized at capacity, which is 500,000 visits per year. The recreation season for tent camping in this location is mid-April to mid-October, or about 200 days, because of harsh winter weather. The facility needs in this instance are calculated by subtracting existing capacity from the carrying capacity:

800,000-500,000 = 300,000

The figure for remaining capacity is divided by the length of the recreation season to obtain the daily or one-time-use capacity:

300,000/200 = 1500 visits/day

This figure, in turn, is divided by the use standard of 4 persons per campsite to obtain the facility needs, or in this case, the maximum number of new campsites that potentially could be established according to the estimate of carrying capacity.

1500/4 = 375

Note that, in this example, it is not possible to meet the unsatisfied demand for camping as the demand exceeds the total capacity of the area to provide sites for this activity. The remaining portion of unmet demand should be satisfied by facilities in adjacent market areas if possible. Alternatively, additional unsatisfied demand can sometimes be met by improvement of existing facilities to increase their use capacity or changes in management such as extending the season of use.

4-10. Outdoor recreation land use.

Review existing and proposed outdoor recreation to determine its ability to adequately provide recreation activities and satisfy demand. Land use conditions vary considerably from one

installation to another. Some installations are fortunate enough to have a large land area designated on the Installation Master Plan for outdoor recreation use. At other installations, land use is more constrained, and the outdoor recreation director must compete with other installation interests for scattered parcels of undeveloped land with potential for recreation development. The selection of an acceptable location for new facilities involves an evaluation of existing land uses adjacent to the proposed site for compatibility y with the proposed use; distance of the proposed site from the intended user population; the accessibility of the site; proximity to convenience facilities; constraints to development imposed by soils, bedrock geology or other terrain features; availability of utilities; space requirements inherent with the proposed facility or activity; and the general desirability of the site.

a. Evaluation of outdoor recreation areas. Locate on an installation map all existing and proposed outdoor recreation areas (fig 4-5). Identify outdoor recreation facilities designated for the areas and their capacities. Evaluate the possibility for renovation or expansion of existing areas. Determine if renovation will improve areas and facilities to the point where their capacity will be increased, and if so, by how much. When the capacities for both existing and proposed areas and facilities yield a demand deficit, look for other potential outdoor recreation areas and identify them on the map. During this step, it may be useful to identify undeveloped areas around family housing areas or troop barracks. These areas are often uncommitted land which can later be designated for outdoor recreation use.

b. Community parks. The siting of as many outdoor recreation facilities as possible in a community park setting is encouraged during the land use and evaluation period.

c. Facilities allocation. When the carrying capacity of outdoor recreation areas has been reviewed and adjusted as necessary, allocate facilities to the recreation areas. Compute anticipated visitation for individual areas based on activities and facilities provided. Determine if outdoor recreation areas have surplus capacity.

4-11. Summary of outdoor recreation constraints and opportunities.

Prepare a written summary of outdoor recreation constraints and opportunities realized by the evaluation of supply and demand. Such constraints and opportunities include: limited carrying capacity restricting the development of outdoor recreation; demand deficit of installation outdoor recreation requiring the use of recreation off-post; demand surplus of installation outdoor recreation allowing potential use by the local community; and competition between installation and market area recreation resulting in diminished use of installation outdoor recreation areas.

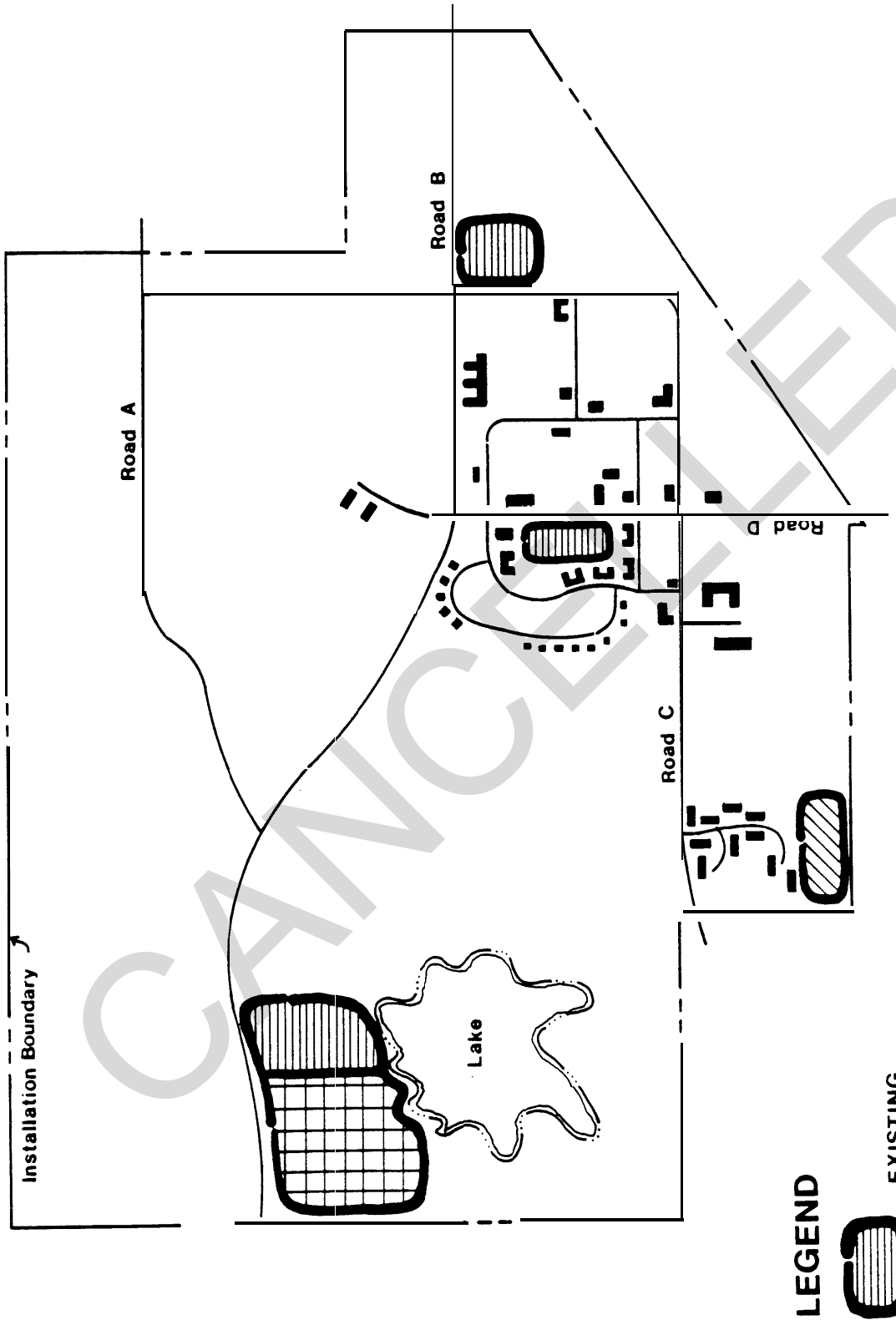

Figure 4–5. Existing, proposed and potential outdoor recreation areas.

CHAPTER 5
DEVELOPMENT OF THE LONG-RANGE PLAN

5-1. General.

Chapter 3 described the evaluation of the physical and cultural environment of the installation as it pertains to development of outdoor recreation. Chapter 4 described the evaluation of the recreation supply and the means of estimating demand, carrying capacity, and facility-needs. This chapter explains how the outdoor recreation director should translate the facility needs into a plan for long-range development.

5-2. Conceptual alternatives.

The conceptual phase of planning for outdoor recreation synthesizes the needs of the installation with the particular opportunities and constraints of specific sites.

a. Goals and objectives. When developing a conceptual approach for a long-range recreation plan, the outdoor recreation director should first prepare a set of goals and objectives he intends to achieve. The solution of problems and deficiencies revealed during the evaluation phase often represent desirable goals and objectives. Among the goals an installation might determine to achieve are:

–Provision for all or a defined amount of outdoor recreation on the installation.

-Provision of new outdoor recreation experiences.

-Consolidation of facilities.

-Equitable distribution of facilities.

–Provision of highest-quality facilities.

-Conservation of natural resources.

–Improvement of the natural environment.

–Improvement of operations, maintenance, and security in recreation areas.

Objectives are means of accomplishing goals and should be responsive to the particular combination of natural and man-made conditions in the recreation area. Objectives should be based on such factors as:

–Physical requirements of outdoor recreation activities and facilities.

–Separation or connection between individual outdoor recreation activities.

–Separation from or connection to adjacent land use.

–Controlled access.

–Efficient access and circulation.

-Convenient and efficient siting of facilities.

–Ease of operations, maintenance and security.

-Efficient utility service.

-Protection of natural resources.

-Resolution of site problems.

-Enhancement of site.

-Potential for phased development.

-Potential for expansion.

Not all objectives need be based on physical design considerations. Management decisions such as hours of operation and maintenance schedules also influence the ultimate quality of the recreation experience. However, the goals and objectives give direction to the decision-making process as it evolves during conceptual planning.

b. Site analysis. Often, the outdoor recreation director has an idea of where to locate activities and facilities based upon his knowledge of the installation, the pattern of existing land use, a subjective impression of site capability, installation user desires, and installation land use policies. This information is sufficient for the initial allocation of facilities. Later, however, the director must evaluate his selection to be certain that there are no factors which render the site unsuitable for the proposed use or place it in conflict with adjacent uses. For this purpose, a site analysis which depicts the principal opportunities and constraints can be useful (fig 5-1). When evaluating a site for suitability, consider the following:

(1) Compatibility. Are adjacent land uses compatible with the proposed recreation? Do activities on adjacent land generate noise or vibration that will detract from the recreation experience? Conversely, will the proposed recreation use generate noise that is incompatible with an adjacent land use? Do activities on adjacent land generate unacceptable levels of smoke or dust? Are there unacceptable visual intrusions in the adjacent landscape such as dilapidated buildings, overhead transmission lines, billboards, and so on?

(2) Safety and vandalism. Are there safety hazards? For example, consider a picnic site, near a housing area, in a wooded tract which is tucked away out of sight of all buildings and streets. While the site offers an excellent natural setting in the midst of a built-up area, it is likely, after dark, to become a “hang-out” and any facilities are exceptionally vulnerable to vandalism due to the seclusion of the site. Such a location should not be selected unless appropriate lighting and/

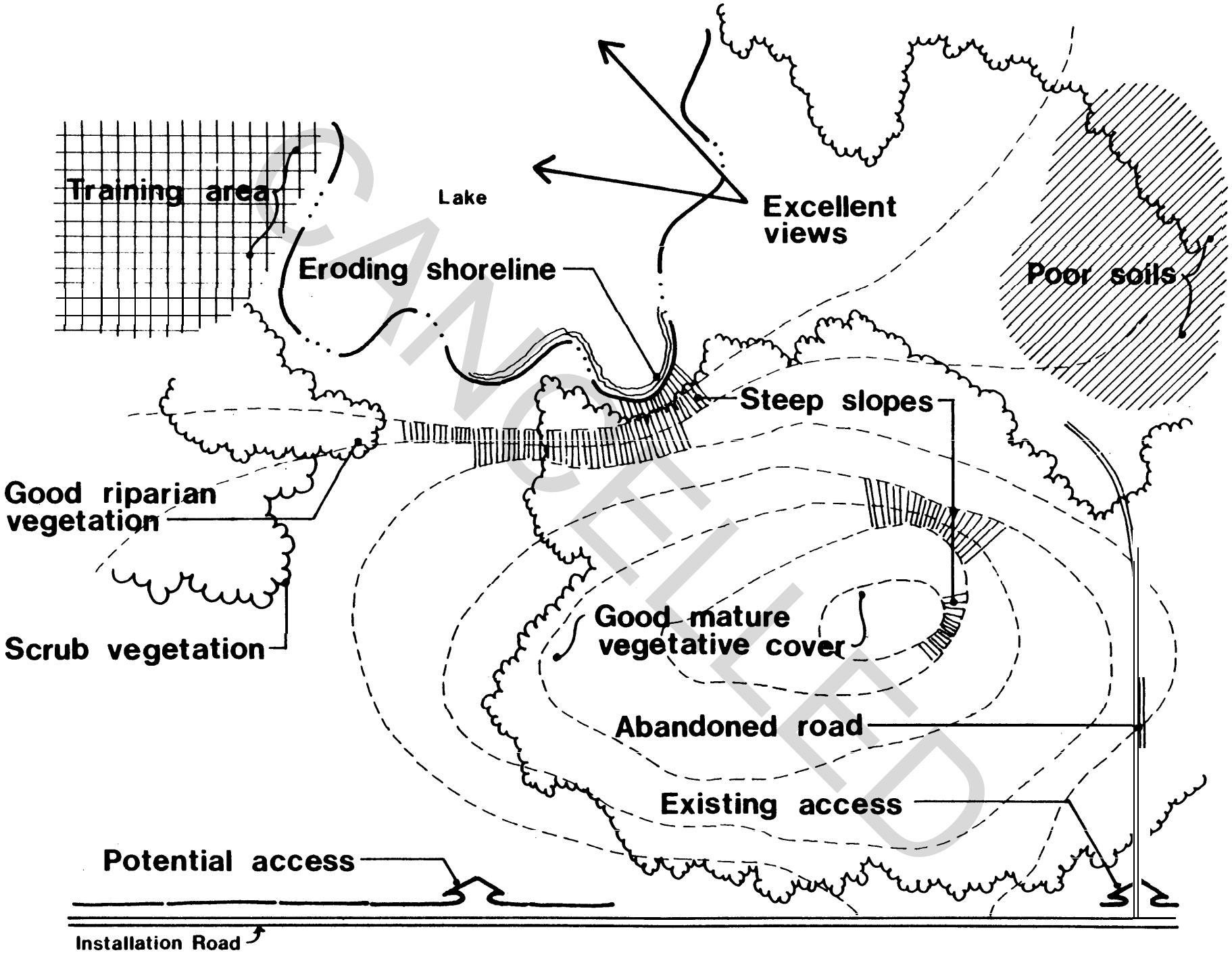

Figure 5-1. Site analysis.

or patrol can be provided, or unless the site can be given enhanced visibility, vandal-proof facilities, or controlled access after hours. Look first for obvious hazards to health and safety and then, consider the remoteness or seclusion of a site as a contributing factor to potential safety.

(3) Access. Does the user population have ready access to the site? Is the existing transportation system adequate to handle the anticipated traffic? Does the pattern of circulation to and from and within the site facilitate access and use, or does it thwart or discourage use?

(4) Proximity to convenience facilities. Are comfort and other support facilities within convenient reach of the site?

(5) Physical constraints. Do the soils of the site have a fragipan (a compacted soil layer beneath the surface) or high water table? Does pending of surface runoff occur and last for long periods? What is the erosion potential of the site? What is the depth to bedrock? Is there an aquifer? How steep is the site? Are there rare, threatened or endangered plants or animals or any other vulnerable natural or cultural features on the site?

(6) Availability of utilities. If the intended use requires support structures, are utilities available (gas and/or electric service, telephone, water) ? If not, is it feasible to provide utilities?

(7) Space requirements. For a quality outdoor recreation experience, outdoor recreation space standards prescribe a certain amount of space per user. Such standards were used in the analysis of supply and demand and in the estimation of carrying capacity and should be used throughout the planning process to determine how many of the gross number of facilities can be accommodated at any particular location.

(8) Agreement with goals and objectives. The desirability of a site for a given activity is not always dependent on such factors as accessibility or physical constraints. The outdoor recreation director should make continuous reference to his goals and objectives. As an example, consider a director faced with selecting a site for a new day-use picnic and play area. Two sites have the capacity to accommodate the required amount of facilities. One site near other existing day-use areas would make an excellent site on the basis of physical features, access and so on, while the other site is a less attractive site with moderately intrusive adjacent land uses and poor access. However, in the evaluation of demand, a user complaint surfaced in regard to the clustering of day-use sites on one side of the installation to the inconvenience and disadvantage of persons living in the housing units on the other side of the base. A goal of the recreation plan is to establish a more equitable distribution of day-use facilities. Therefore, the less attractive, less accessible site may be selected because of its proximity to the disadvantaged user population in order to satisfy this specific goal.

c. Functional relationships. Functional relationships express the degree of dependence between activities on the installation. Functional relationship diagrams depict ideal arrangements of outdoor recreation activities for each outdoor recreation area in order to achieve optimal efficiency, convenience and support. They indicate which activities require physical connections or separation in order to achieve this optimal situation. The diagrams illustrate the relative importance of the activities to each other. The express need for connections between activities later serves as the basis for planning circulation (fig 5-2).

d. Conceptual alternatives. Almost every site can be developed in a variety of ways. Conceptual alternatives graphically illustrate the general location of proposed recreation activities and facilities, circulation and utilities (fig 5-3). They also depict the way the activities, facilities, circulation and utilities are influenced by the site's particular opportunities and constraints. The outdoor recreation director should list and prioritize the advantages and disadvantages of each concept for comparison. The most favorable concept becomes the basis for the Long-Range Plan for Future Development. Often, the final concept may incorporate ideas and features from more than one of the alternatives.

5-3. Site selection guidelines for outdoor recreation activities.

The following criteria should be considered when planning for various outdoor recreation activities. The activities discussed do not constitute a comprehensive list, but are representative of the most common forms of outdoor recreation. The factors discussed under each activity should serve as general guidance for selecting a site or locating an activity on a site.

a. Camping, primitive (undeveloped sites). Participants in this activity generally do not expect, and will not tolerate or accept, high-use densities. Both the vegetative and topographic characteristics of the site affect the perceived closeness of the campsites. A 100-acre area that is heavily wooded and moderately sloping can

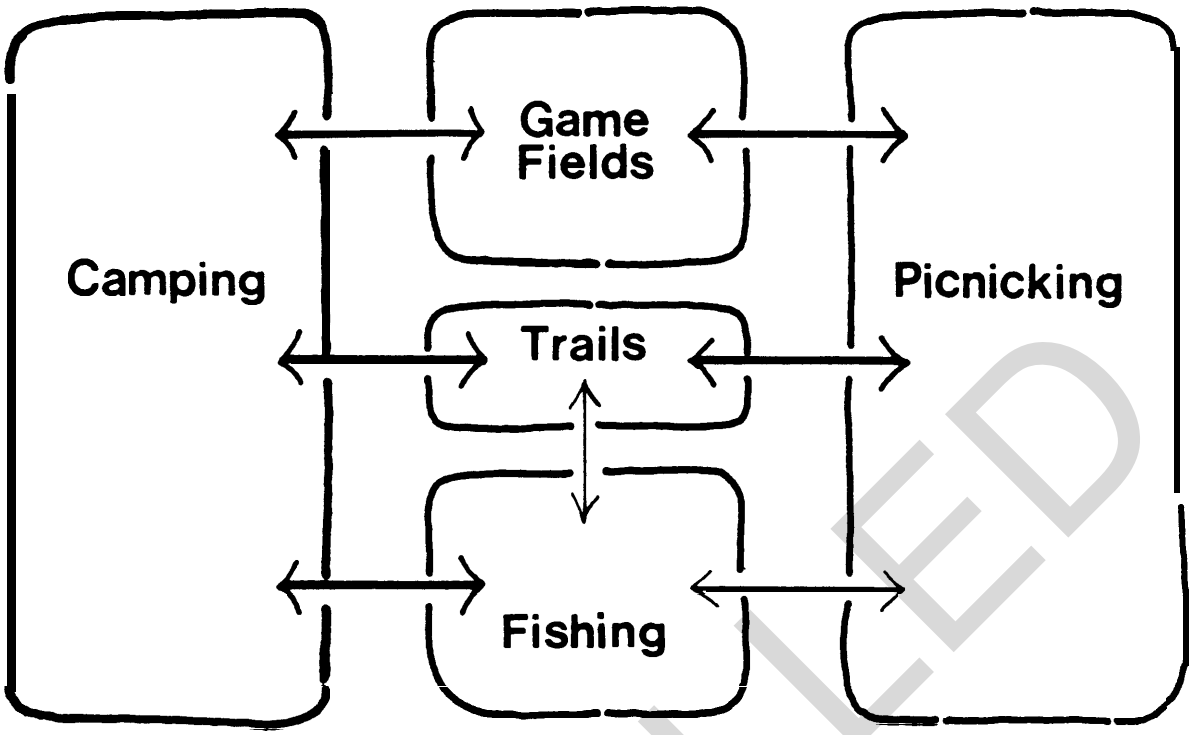

Figure 5-2. Functional relationship diagram.

accommodate more campsites per acre than a 100-acre open field. This activity can take place in areas that are moderately environmentally sensitive because of problems with vegetation, slope or soils. Such areas cannot withstand active recreation use but are appropriate for this low-density form of use.

b. Camping, tent and trailer (developed sites). Recreation participants in this form of activity will generally expect, tolerate and accept higher use densities than for primitive camping. However, the size of the recreation area affects this use. A generally unfavorable cumulative effect is perceived when there are many recreation participants located over a very large area. For this reason, very large activity areas should generally be developed and operated at a lower capacity level than smaller areas. The number and quality of site amenities also affects a person's willingness to tolerate higher levels of use, and so does proximity to off-site convenience, comfort and support facilities. This relatively intensive recreation use requires a site with only slight-to-moderate environmental constraints. The type of vegetation on the site determines both the degree of privacy afforded by the site and the ease of locating and constructing campsites. Lower campsite density is indicated if the area has slopes steeper than 10 percent.' As a rule-of-thumb, about 2 percent of the total campsites should be developed and reserved specifically for use by the handicapped. Good drainage is essential to any camping site. Good drainage requires topography with sufficient slope (5 percent being ideal for camping areas) and soils which allow water to permeate quickly to avoid muddy conditions. The soils should also withstand continuous traffic without adverse compaction or erosion.

c. Hiking. Recreation participants engaged in hiking on trails in or near an urban or built-up area will generally expect, tolerate and accept higher use densities than participants who travel to remote locations to engage in this activity. Also, participants on trails with scenic natural features and interesting views or vistas will tolerate higher use densities than on a trail relatively lacking in such amenities. The type of vegetation and topographic characteristics found along the trail affects the perceived closeness of other groups of hikers. Also, paved or gravelled trail surfaces can sustain more use than unimproved trails. Steep terrain is appropriate for trail development provided switchbacks are used to keep trail gradients shallow and users are discouraged from shortcutting the switch-

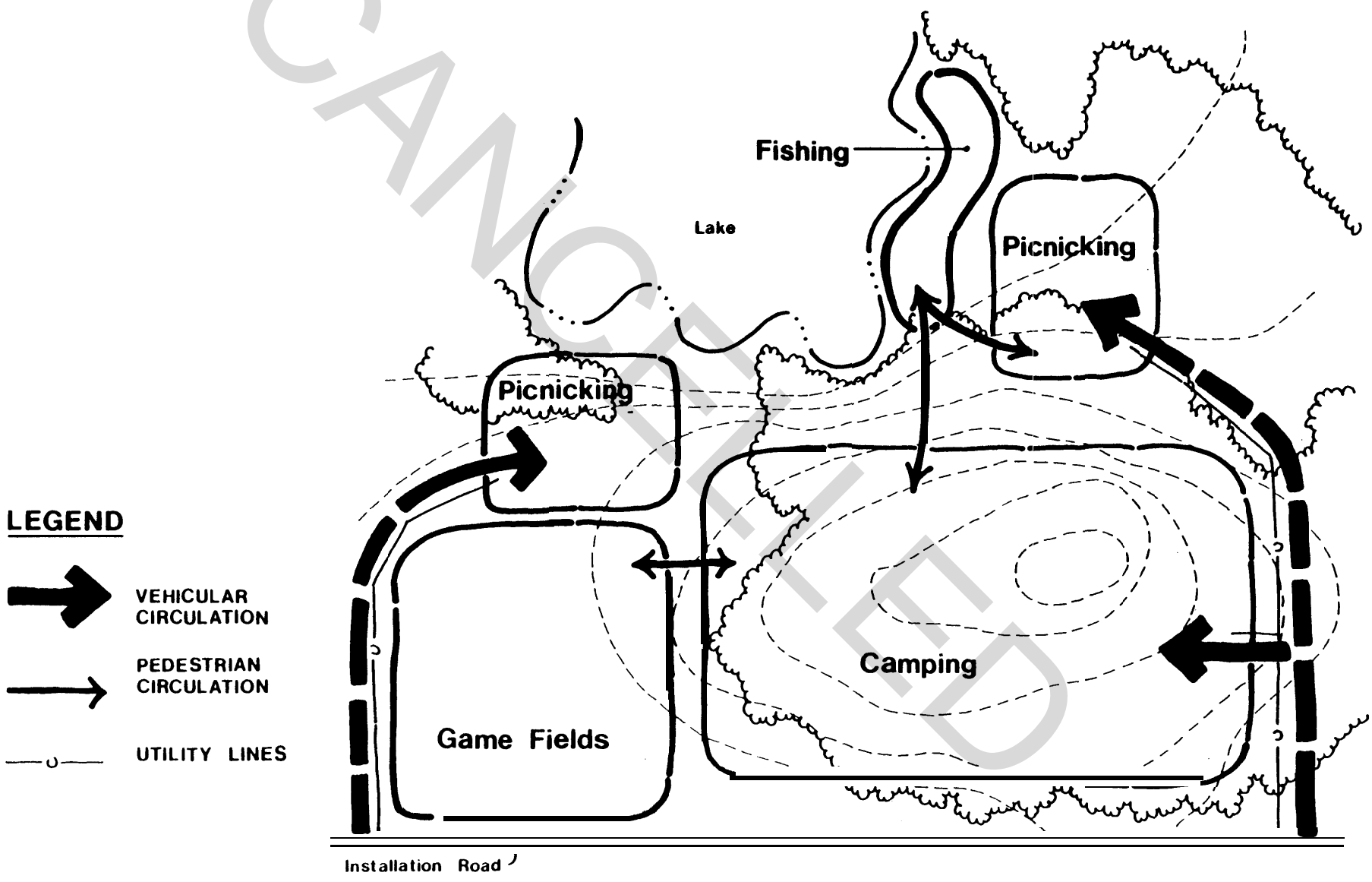

Figure 5–3. Conceptual alternatives.

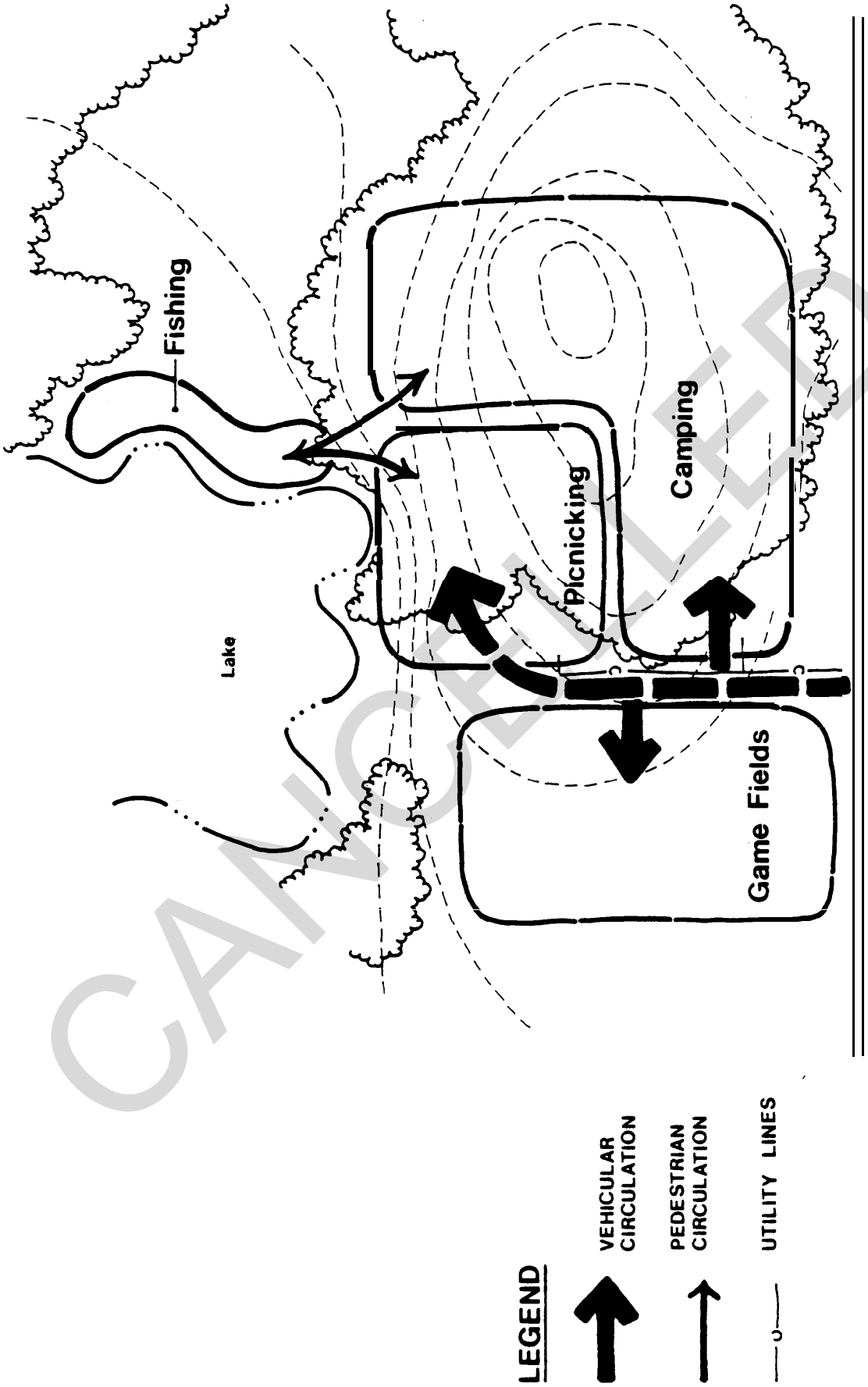

Figure 5–3. Conceptual alternatives (continued).

backs. On slopes of 12 to 20 percent or more, trail designs should incorporate erosion control measures to include trailside drainage swales, tile culverts, and baffles on long, sloping trail surfaces. Nature and interpretive trails should not exceed a length of about one mile, corresponding to an average visit of one hour or less, and should be closed loops. Trails for the handicapped should be provided only on level terrain, and should be hard-surfaced trails wide enough to accommodate wheelchairs. Trails for the handicapped should not exceed one-eighth mile and should form a closed loop. Backpacking trails are commonly 7 to 14 miles in length, representing approximately a one-day outing. Cross-country trails are commonly 20 miles or more in length and have camping areas (primitive or developed) at intervals of about 10 miles. Appropriate support facilities for hiking include trailhead parking areas, comfort facilities, drinking fountains, interpretive signs and perhaps a visitor center or visitor contact station (either a manned or unmanned facility). Trails, in turn, are commonly support facilities for nature centers.

d. Bicycling. Bicycle routes or trails should be at least 5 miles in length to make the ride interesting; must be hard-surfaced and wide enough for two cycles to ride side-by-side; should run past points of scenic or historic interest when possible, and should avoid busy intersections and streets. The route chosen should be nearly level and should pass some shade trees for more pleasant summer cycling. Reference TM 5-803-5 . for additional guidelines.

e. Picnicking. This activity requires a site that can sustain high levels of use, usually one with soils with only slight to moderate limitation due to slope, compaction potential or erosion potential. The type and amount of vegetation on the site affects the density that participants are willing to tolerate as well as the ease of locating and constructing picnic sites. Participants at a picnic site in or near an urban setting will tolerate higher use levels than participants who have travelled to a remote location for this activity. Shape of the site also affects use. Generally, linear-shaped picnic areas can accommodate higher densities than square or rectangular areas because of the adverse cumulative perception of many recreation participants located over a wide area.

f. Off-Road vehicle (ORV) riding. Sites selected for this activity must be on soils able to withstand compaction and with low erosion potential. As a rule-of-thumb, ORV trails on sandy soils are better than trails on clay soils. To be challenging, an ORV course typically should include some moderately steep terrain. The course must be designed to minimize erosion and to control silt and sediment-laden runoff. Incompatible adjacent land uses include housing, primitive camping, other tent camping, nature and interpretive centers and trails, fishing ponds, lakes, and hunting areas (unless the ORV season of use is curtailed for an interval before and during hunting season). ORV users accept higher use levels if the course is challenging and there are comfort and other convenience and support facilities in close proximity to the site. Users traveling to remote locations for this activity are generally seeking a quasi-primitive recreation experience and are less tolerant of higher use levels.

g. Horseback riding. Equestrian trails should be located in an area with a diversity of interesting topographic and natural features including both level and moderately steep or rolling terrain, woodland vegetation and open fields, and interesting natural or cultural features. Trails with such amenities will support higher use levels than those lacking interesting features. The type of vegetation and topographic characteristics found along the trail affect the perceived closeness of the groups of riders. Trail surfaces that are stable support the highest use. Equestrian trails should be on dry, sandy soils; wet, clay soils are easily damaged by this use. Horseback riding is generally considered incompatible with hiking or ORV use. Equestrian trails should run between 5 and 20 miles in length in a loop system which starts from and returns to the horse facility area. Ample space for parking and unloading horse trailers should be included among the facilities, as well as the stables, corrals, and riding rings which make up an equestrian complex. These facilities should be separated from all other recreation facilities and located downwind (according to the prevailing winds during the summer months) from them. Although equestrian facilities require a large amount of open space, some shaded areas can provide welcome relief.

h. Swimming beach. This activity requires a body of water of sufficient depth to allow swimmers to swim and dive without striking the bottom and a beach area to include some provision for sunbathing. Limiting factors include the size of the beach area and water quality. Incompatible activities include power boating, water skiing and fishing. The quality of site amenities and proximity of convenience, comfort and support

facilities influence the level of use.

i. Water skiing. This activity requires a body of water of navigable depth and of sufficient size to allow the operation of power boats capable of traveling a minimum of 20 m.p.h. The body of water should be devoid of protruding or overhanging obstacles. Swimming and fishing are incompatible with this activity.

j. Fishing. Fishing requires a body of water of sufficient size; a lake or pond of one surface acre or more or a stream of at least fourth order (based on the hierarchy of tributaries developed by R. E. Horton—see references) that is either well-stocked or naturally abundant with fish. The availability of fish influences the level of use the body of water will sustain, as does the size of the body of water. In general, warmwater fisheries will sustain higher use levels than cold-water fisheries (for example, trout streams). For bank fishing, the stability of bank soils is an important factor. Support facilities include boat launch ramps, marina slips and other docking or pier facilities, trails, concessions, parking areas and restrooms. Incompatible adjacent activities include power boating, water skiing and, for bank fishermen, ORV trails along the bank.

k. Boating. This activity requires a body of water of navigable depth, either a large lake or a flowing stream of fourth order or higher. For power boating, incompatible activities include sailboating (to some degree), canoeing, rafting, swimming and fishing. For canoeing and rafting, a stream with a steep gradient and white-water is desirable. One or more rapids of Class II or higher make the stream a sufficiently exciting and challenging recreation experience. Support facilities include boat launch ramps, marina slips, docks, concession facilities, boat and motor maintenance facilities, fuel pumps and storage tanks, parking areas and restrooms.

1. Hunting. This activity requires sufficient natural habitat, either forest, open or marshland, depending on the type of game animal sought. In general, the greater the diversity of the vegetation in the hunting area, the more wildlife it will produce, and the more hunting it will sustain. Incompatible activities or incompatible adjacent land uses include any development or traffic-generating activity without adequate buffering.

m. Archery, gun, skeet and trap shooting. These activities should be located in an area remote from any residential development or traffic-generating activity. Support facilities include various support buildings, target structures, parking areas and comfort facilities.

n. Skiing, snow. Facilities for this activity should only be developed on installations in latitudes where mean annual snowfall is sufficient to justify them (100 inches of snow per year without snowmaking equipment and an average of 80-85 skiing days annually). For alpine skiing, steep slopes are required. On installations with gently or only moderately steep terrain but significant annual snow accumulation, Nordic or cross-country skiing is the preferred form of the activity. Support facilities for this activity will include ski equipment rental and maintenance facilities, lodges, ski lifts or tow ropes and ski trails. Incompatible activities include mainly snowmobiling. Ski slopes for alpine skiing should have a north-northeast exposure with sufficient tree cover to provide shade. The physical quality of the slope is important. Slopes should be graded and seeded for greater safety, easier maintenance, and better performance. Slopes which are slower can normally support more skiers per acre. Beginners' slopes should range from 5 to 20 percent; intermediate slopes from 20 to 35 percent; and expert slopes from 35 percent upwards. The minimum vertical drop for a ski area is approximately 180 feet, with 350 feet more desirable. A vertical drop over 200 feet may require a chair lift. Rope tows should not be used over distances longer than 1,300 feet or slopes greater than 25 percent. There must be adequate waiting space at the base of ski lifts, but large open areas on top of the mountain should be avoided. Ski trail development should be undertaken only for natural snow and should have a minimum 40-foot width. However, snow-making equipment, which necessitates a substantial water supply, is often essential to economic skiing operations. Skiers are particularly sensitive to aesthetic conditions and negative towards crowding. One-half acre per skier results in a relatively crowded condition on trails. Any ski areas located within an hour's drive from large population centers might consider allowing night skiing. Cross-country skiing is becoming increasingly popular. As a rule, conditions which are good for cross-country hiking and horseback riding are good for cross-country skiing. These three recreational activities can also take advantage of joint facilities. Trails adequate for two people to ski abreast or pass each other should be approximately 6 feet wide. Trails should also have trail markers above the snow line and stopping points for winter vistas.

o. Sledding and tobogganing. Slopes for sledding and toboganning should have a north-

northeast exposure surrounded by evergreen shade. Sledding slopes may range from 5 to 40 percent with a level run-out at the bottom; slopes for toboganning may range from 10 to 45 percent with level run-out space. The steepness of the slope will affect the distance necessary for safe maneuvering. The steeper the slope, the fewer sleds or toboggans can be accommodated per acre. Snow conditions including the speed of the slope and the stability of the snow cover, will also affect the acceptable number of sleds or toboggans. A commonly recommended number is 40 sleds per acre. Since snow conditions vary from day to day, control over the use of the slopes may need to be administered on a daily basis. Constructed toboggan slides are desirable for safety on crowded slopes.

p. Snowmobiling. This activity requires the appropriate climate and a moderately rolling terrain. Support facilities include snowmobile rental and maintenance facilities, snowmobile trails and one or more wedges (tracked vehicles) to create and maintain trails and tow inoperable snowmobiles. Incompatible activities include chiefly snow skiing and ice fishing. Snowmobile trails may be as short as 5 miles, but should preferably be 15 to 30 miles long. Trail systems should consist of a major single-loop trail which begins and ends in the departure zone and several secondary trails which enter and exit in one direction from the major loop. The desirable width for a one-way trail is 8 feet and for a two-way trail, 12 feet. The maximum sustained grade on a trail should not exceed 8 percent, although it maybe as high as 25 percent over short stretches. Trails should not be located on hillsides unless absolutely necessary. Trails should be located away from avalanche-hazard areas and water crossings and, if possible, major road crossings. Trails must also avoid hazards such as fences, guy wires and cliffs. Existing recreation trails can be used for snowmobiling, or abandoned railroad grades and logging trails can be adapted. Trails designed with some variety are the most popular. This can include combinations of straight and winding stretches, level and rolling topography, and dense and open vegetative cover. Trails should also take advantage of views and vistas, scenic overlooks, and special natural features. However, snowmobile trails can damage the natural environment if proper precautions are not taken. Trails should not be travelled if the snow depth is" less than 4 inches. Even then, areas which receive heavy use require continuous maintenance.

q. Fitness trails. Fitness trails may be developed in a variety of ways. They may include a measured jogging path or a physical fitness trail which combines jogging with calisthenics. The physical fitness trail normally includes 16 to 20 exercise locations. It is conceived as a loop. Both length and shape (circular or elliptical) depend on the topography of the area. The trail starts with a one-way track of 200-300 yards to the first exercise location. Each of the other locations follow at intervals of 50-100 yards, beginning with warm-up exercises, then progressing to more difficult exercises. Near the half-way point of the trail there should be a stairway of 30-40 steps if the natural contours permit. A "Walking Backward" sign for stretching the legs should also be included near the half-way point of the trail and located in a relatively level area. The distance between the last station and the finish should cover approximately 100-200 yards to allow a sufficient cooling down period. The trail should be 6 to 8 feet wide to allow for two people side by side and to accommodate service vehicles. It should be 1-1/2 to 2 miles in length. Trail gradients should provide adequate drainage yet prevent soil erosion. Topography of the site and type of soil are therefore very important. The surface can be existing turf, soil or materials such as cinders, fine gravel or asphalt, depending upon terrain and the amount of traffic anticipated. The exercise stations are simple to construct. They should be in a level area and large enough to contain equipment and to accommodate the joggers. Stations requiring no equipment should be 10 to 12 feet minimum.

54. Long-Range Plan for Future Development.

Once the optimum mix and location of facilities is determined, the outdoor recreation director puts the elements of the recreation plan into their final form. A more detailed graphic is prepared depicting the distribution of activities. facilities, circulation and utilities accompanied by text describing and quantifying the facilities at each site (figure 5-4). The text should also include:

a. Cost estimates. Determining the cost of proposed facilities is best accomplished by comparison of actual costs of recently constructed facilities which are similar or identical and located either at the installation or at a comparable site within the region. If such comparable are unavailable, there are various cost-estimating handbooks in print. Cost estimation of proposed

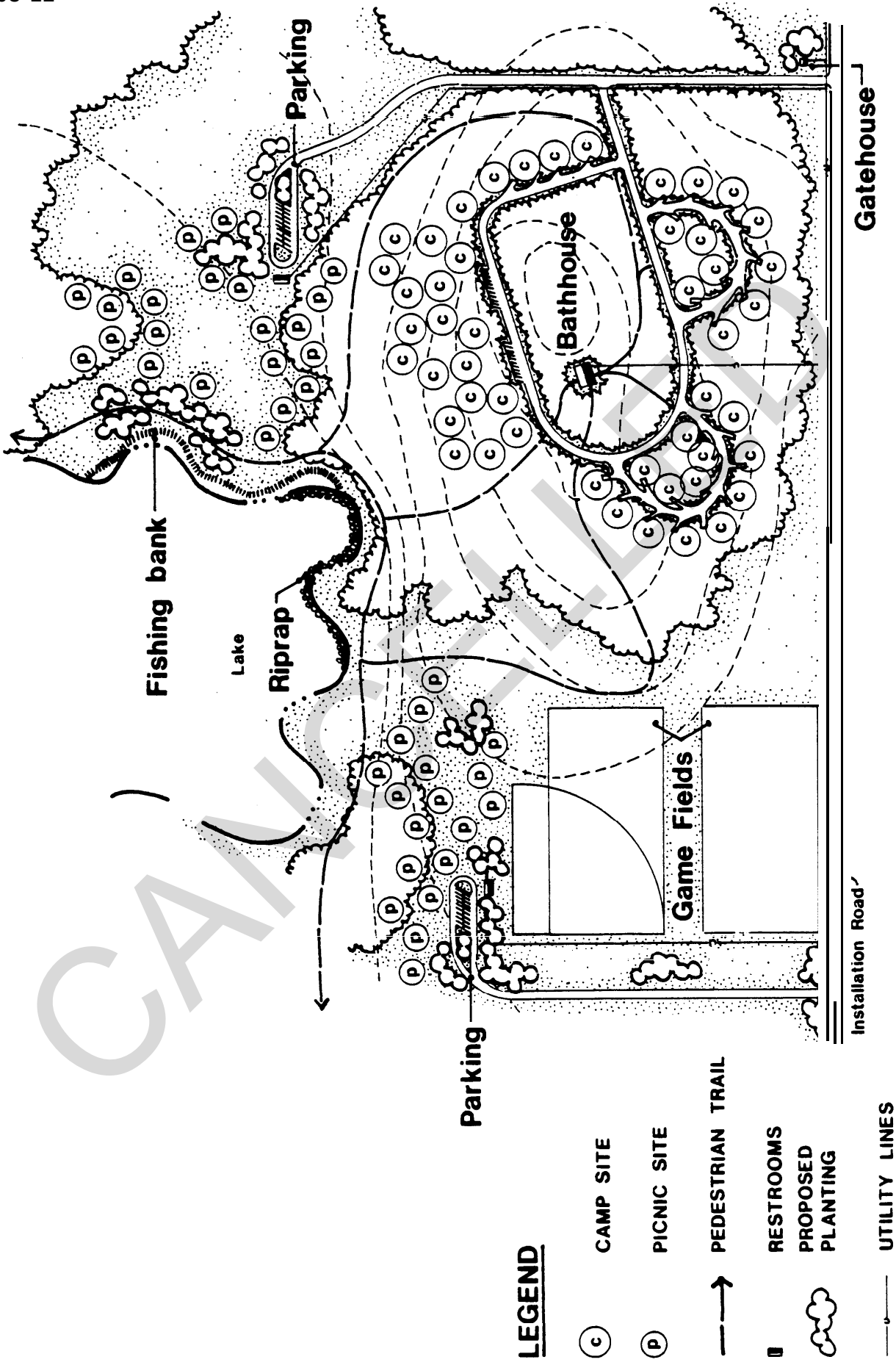

Figure 5–4. Long-Range Plan for Future Development

facilities should involve consideration of both construction costs and operation and maintenance (O & M). Construction costs are one-time costs and should include, in addition to dollar amounts for materials and labor, an amount for design fees. O & M costs are on-going and should be computed on an annual or per annum basis as the sum of annual employee salaries, anticipated utilities and materials costs, and annual repair and maintenance costs.

b. Prioritizing projects. Following the determination of project costs, the outdoor recreation director should prioritize the proposed facilities as a means of phasing the implementation of the Installation Outdoor Recreation Plan. In consideration of the trend towards activities to become self-sufficient, high priority should be given to any facilities that are income-generating. Other high-priority projects should include those that have high-use potential, those that have low O & M costs following construction, and those that support or expand existing facilities. After prioritization of all proposed development, the Morale Welfare and Recreation Manager should phase implementation by assigning the highest priority projects for immediate implementation (first 12 month-period), and then phase the establishment of the remaining proposed facilities over the duration of the planning period. This facilitates the development of budget proposals to submit for implementation of plan recommendations. Seldom will the funding situation permit the simultaneous implementation of all proposed developments. Phased implementation is commonly the answer to successful accomplishment of Installation Outdoor Recreation Plan recommendations.

c. Rationale, A written rationale, including the criteria used in the site selection and facilities allocation, serves as part of the basis for the assessment of the environmental effects of implementing the recommendations of the plan. The justification for the selection of each site is cited in this information, including adverse effects avoided by the selection.

CHAPTER 6
GENERAL SITE PLANNING GUIDELINES AND ARCHITECTURAL CHARACTER

6-1. General.

This chapter provides general guidelines for planning outdoor recreation sites and buildings. More detailed guidance for site planning is found in TM 5-8035. Detailed building design and construction criteria are also located in the technical manuals listed in Appendix B. Other sources of information include state park and recreation agencies, federal agencies such as the National Park Service and U.S. Forest Service, and others such as the Tennessee Valley Authority. The National Park and Recreation Association, as well as the various associations representing individual recreation activities, can often provide useful guidance.

6-2. Environmental constraints and opportunities.

a. Certain aspects of the environment of an installation may serve to constrain outdoor recreation development in one way or another. The most common environmental or physical constraints include soils limitations; unstable or unsuitable geologic formations; rare, threatened or endangered flora or fauna; air quality limitations; water quality limitations; and cultural features such as archaeological or historic sites.

(1) Soils limitations. Common soil-related constraints include:

(a) Slope. Slopes are important considerations in outdoor recreation planning both from the viewpoint of the environmental constraints they pose and the environmental impact related to their alteration. Steep slopes in an area designated for recreation use increase the difficulty and the cost of establishing recreational facilities and decrease the density of use that the area could otherwise sustain. Disturbance of steep slopes is associated with the potential for erosion and/or slope failure.

(b) Erosion potential. Soils on steep slopes, with light vegetative cover or where vegetation has been removed, and composed of loose soil materials are conducive to erosion. Areas having soils with high erosion potential can sustain only low-density, passive forms of recreation use.

(c) Compaction. Certain soils, particularly clay soils, cannot withstand repeated trampling or bear the weight of continuous vehicular traffic without becoming compacted into a concrete-like consistency. Compacted soils resist root growth and become devoid of vegetation, leading to soil erosion. Soils that are easily compacted constrain recreational use to low density, passive forms of recreation.

(d) Shallow depth to bedrock, and stoniness. Shallow soils are easily compacted. Shallow depth to bedrock constrains facilities development since construction on such soils may require excavation of bedrock which escalates the cost of development. Soils with significant amounts of rock fragments on the surface are unsuited to use for certain types of recreation such as children's play areas or picnic grounds.

(e) High water table. Soils in lowlands or on level to gently sloping uplands that have low permeability or a fragipan may hold water for long periods after rainfall and remain saturated, limiting their use for recreation.

(f) Low weight-bearing capacity. Steep slopes composed of weak soils with low weight-bearing capacity are prone to mass movements such as mudflows, slides and soil creep. Construction of recreation facilities such as access roads or support buildings is prohibited unless the weak soil materials is brought in. This, of course, greatly escalates the costs of development.

(g) Slow permeability. Soils that do not percolate sufficiently may constrain development that requires sewage disposal by means of a septic tank and lateral drain field system or that requires construction of a sewage lagoon or an overland-flow irrigation disposal system.

(2) Unstable geologic formations. The most common unstable geologic formations in most portions of the continental United States are soluble limestones and plastic clay shales. Soluble limestones underlie karst topography which is characterized by the presence of numerous sinkholes. Karst areas may have large subsurface caverns or voids beneath them, and construction of recreational support buildings in such areas should be preceded by subsurface investigations to ascertain the absence of such voids. Plastic clay shales on steep to moderately steep slopes become unstable when wet. Development on slopes underlain by shale is prone to slumping and sliding following periods of heavy

rainfall. Drainage on slopes underlain by shale formations is a crucial development consideration.

(3) Rare, threatened and endangered species. Camping and hiking are two popular forms of outdoor recreation and the most desirable locations for campgrounds and trails are often in outstanding natural environments. Such environments sometimes contain rare, threatened or endangered species of plants or animals. Site selection for recreation facilities in natural areas should be preceded by a determination of the presence or absence of rare, threatened or endangered species. If present, facilities development should be prohibited on or immediately adjacent to sites occupied by such species. The use of federal funds for the construction of any facility that would impact the critical habitat of any plant or animal on the Federal Endangered Species List is expressly forbidden by the provisions of the National Environmental Policy Act (NEPA).

(4) Air quality limitations. Air quality factors are generally constraints to recreational development only in urbanized areas where the local air quality control region is not in compliance with the Clean Air Act for one or more air quality contaminants. Some outdoor recreation activities at installations in or near urban areas may be traffic-generating. Automobiles are non-stationary sources of particulate pollution and photochemical oxidants. The latter contribute to the development of ozone. If the local area is in non-compliance for particulate, photochemical oxidants or ozone, air quality considerations may constrain the development of traffic-generating forms of outdoor recreation facilities.

(5) Water quality limitations. Swimming and water-skiing are primary-contact forms of water-related outdoor recreation; i.e., the participant is emersed in a body of water. If water quality in the body of water intended for such use is not in compliance with federal standards under the Clean Water Act for primary contact recreation, such uses (and related developments such as beaches and bathhouses) are prohibited. Water quality conditions may also constrain developments such as parking lots, which have potential to discharge contaminated surface runoff into adjacent bodies of water, or package sewage treatment plants if they will produce unacceptable effluent loads in an adjacent body of water.

(6) Cultural features. Significant archaeological or historic sites or artifacts (either National Register properties or nominees to the National Register of Historic Places) may constrain recreational development either on or immediately adjacent to such features.

b. Some aspects of the environment of an **in**stallation may be actually conducive to recreational development; i.e., may provide unique opportunities or serve as inducements to development of certain facilities. For example, the highest elevation on a particular installation may sometimes lend itself to the development of a scenic overlook. Geologic features such as cliffs, boulder fields, ledges, rock shelters, caves and arches will generally influence site selection for trails, campgrounds and picnic areas. Similarly, a body of water of any size, from a brook in a forested tract to the seashore, is a recreational asset and an inducement to recreational facility development (from streamside trails and picnic sites to beach bathhouses and concession facilities). Waterfalls and rapids are other examples of special natural features that attract or invite recreational development in their immediate vicinity.

6-3. Vehicular circulation and parking.

a. Roadways. Roadways serving outdoor recreation facilities may be paved surfaces, or in some instances, gravel-surfaced, such as an access road to a remote lake used for fishing. As a general rule, access roads should be asphalt in order to reduce dust production. Layout of access roads should follow the topography, taking advantage of level ridgetops and naturally-occurring gentle inclines, wherever possible, to minimize the need for cut-and-fill operations and keep construction costs low. Recreation access roads should have a maximum design speed of 15 to 25 miles per hour, which will permit roadway curves with shorter than normal turning radii. Two-way approach roads should be a minimum of 20 feet wide. The low design speeds make it feasible and appropriate to split roads around large, specimen trees or wind then through rock outcrops, both enforcing the slow speeds and giving the road aesthetic character. Such design devices help create a transition experience; it becomes evident to the occupants of a vehicle, just from the character of the road they are on, that they are entering a recreational site.

b. Entrance drives. Entrance drives to recreation sites with support buildings should terminate at a turn-around near the building entrance. The turn-around should be designed to accommodate the turning radius of a bus.

Vehicular circulation in recreation areas, and particularly in campgrounds, should be one-way to minimize congestion and enhance safety.

c. Parking. Parking areas should have sufficient design flexibility to permit incorporation of interesting natural features such as specimen trees, rock outcrops or boulders into the parking area. If such features are not present, the parking area should be broken by grassed medians or planting beds to give it a recreational character and avoid the appearance of a barren rectangle of asphalt. Some spaces for large recreation vehicles and buses should be provided in addition to spaces for cars, and at support buildings, one or more spaces immediately adjacent to the entrance walkway should be designated for the handicapped.

6-4. Pedestrian circulation.

In campgrounds and at other locations where pedestrian activity is not heavily concentrated, pedestrian walkways or trails should be paved with pine bark, gravel or similar natural material. Where use is heavily concentrated however, as at a support building in a campground, walkways should be of concrete or asphalt and should be designed to accommodate the peak visitation load. Provision for shade should be considered and benches should be provided at intervals along walkways. A portion of the walkway in front of a support building should be a covered walkway with benches to provide some shelter against sun and rain for persons awaiting transportation.

6-5. Service and maintenance access.

Support buildings in recreation areas should have a separate access lane provided for service and maintenance vehicles. This lane should be a spur off the public access route and should connect directly with service access doors at the side or rear of the building.

6-6. Safety.

Design of access roads in recreation areas for slow speeds (1$25 mph) has previously been mentioned as a means of enhancing user safety. Within sites such as campgrounds or picnic areas, very slow design speeds (10-15 mph) are appropriate and can be enforced, if necessary, by installation of signs or speed bumps. Support buildings can contribute to safety by having first aid supplies and fire extinguishers available, and telephones for use in the event of an emergency. In the case of a larger support building with a full-time staff person, it maybe desirable to have some tools and equipment on hand for simple repairs to cars or recreational vehicles.

6-7. Vandal-proofing.

Remote or otherwise isolated or unmanned recreation facilities should be vandal-proofed to the extent that funding will permit. Vandal-proofing may include: provision of lighting around buildings and along walkways; gated entrance roads closed and locked after dark; polished metal rather than glass in mirrors in restrooms; picnic tables and other campground furniture composed of concrete with wooden seats bolted to the concrete forms; and increased patrol of areas with a history of vandalism.

6-8. Use by the handicapped (barrier-free design).

All recreational support buildings should be accessible by the handicapped. Handicapped access is facilitated by provision of oversized and specially marked parking spaces adjacent to entrance walkways, curb cuts to permit wheelchair access from parking lots, appropriate door widths sufficient to accommodate wheelchairs, entrance ramps for wheelchairs, and restroom facilities designed for use from a wheelchair.

6-9. Architectural character.

a. Architectural style. Support buildings and other structures designed for outdoor recreation at a particular installation should have a distinctive style that identifies them immediately with outdoor recreation, and this style or character should be consistent for all outdoor recreation facilities throughout the installation. Architectural character is developed through selection of a particular building style, color scheme, materials and graphics. The adoption of a consistent architectural style with attendant repetition of detail has the advantage of generally being more economical with regard to construction and maintenance costs than use of diverse architectural styles. When there are existing structures with a desirable architectural style, this style should be adopted to assure continuance of a consistent and harmonious visual relationship among installation outdoor recreation facilities. In the absence of a distinctive and desireable style among existing structures, a contemporary style should be selected since people generally react favorably to designs that are fresh, current and familiar.

b. Color. The selection of a color scheme emphasizing natural colors, earth tones and

pastels is encouraged for outdoor recreation facilities since color schemes of this nature will assist the recreation facilities in blending harmoniously with their environment and allow site features to remain the primary focal point of visitor interest.

c. Materials. The use of natural materials (wood and stone) indigenous to the region in the construction of outdoor recreation facilities is encouraged. Signs and graphics such as entrance signs, trailhead markers and interpretive signs and exhibits should also be constructed of wood and stone, although metal signs set in stone foundations also make appropriate and attractive interpretive exhibits. The latter are more costly to produce but last longer than wooden signs and exhibits. The use of plastic, plexiglass, fiberglass, plywood, compressed fiberboard and glass should be kept to a minimum.

6-10. Landscape details.

Formal landscaping and foundation planting should only be provided around major facilities or in developed recreational areas. Landscape planting should be simple, functional and easy to maintain. The use of hardy indigenous plant materials is encouraged; use of exotic species should be kept to a minimum. The principal functions of landscape planting should be: to screen undesirable features or visual intrusions, to provide shade and privacy, to create windbreaks to enhance structures, to assist structures in blending unobtrusively with the surrounding environment, and to restore the natural or native landscape. Planting plans for disturbed areas should be designed to enhance or maintain vistas, and all planting plans should include plant materials requiring minimal maintenance.

6-11. Adaptive re-use.

At some installations, the outdoor recreation is housed in facilities that were not designed and built as outdoor recreation support facilities. Often, outdoor recreation has acquired cast-off facilities or World War II-vintage, “temporary” structures. An objective of the Installation Outdoor Recreation Plan under these circumstances should appropriately be, where feasible, the demolition and replacement of structures that are clearly outdated and substandard. Where this is not a feasible option, adaptive re-use is the objective. Adaptive re-use involves the renovation of structures to establish an appropriate architectural character consistent with the identity of outdoor recreation. Sometimes, exterior treatment alone may suffice to accomplish this objective; i.e., the application of exterior wood paneling or cedar shingles, a new exterior color scheme, and so on. At other times, interior remodeling may be necessary. The opportunity to incorporate innovative and contemporary energy-saving features should not be overlooked. Such features include increased insulation, storm doors and windows, exterior and interior caulking, solar water heaters or other solar interior heating and cooling systems, wood-burning stoves, and heat-pumps.

APPENDIX A
REFERENCES

Government Publications

Department of the Army

AR 215-1	Morale Welfare and Recreation: Administration of Army MWR Activities NAFI
AR 215-2	Morale Welfare and Recreation: The Management and Operation of Army MWR activities NAFI
DA PAM 28-14	Program Guide for Outdoor Recreation Personnel
TM 5-803-1	Master Planning
TM 5-803-5	Installation Design

Department ***of the Interior***

Urban Research and Development Corporation, 528 North New Street, Bethlehem, PA 18018

Guidelines for Understanding and Determining Optimum Recreation Carrying Capacity, BOR Contract No. 5-14-07-5 (1977).

Nongovernment Publications

Gold, Seymour M.; McGraw-Hill Book Company, New York, NY ***Recreation Planning and Design, (1980).***

Horton, R. E.; Geological Society of America, Box 1940, Boulder, CO 80301; "Erosional Development of Streams and their Drainage Basins, Hydrological Approach to Quantitative Morphology," Geological ***Society of America. Bulletin.,*** Volume 56; pp. 27$370 (1945).

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The proponent agency of this publication is the Office of the Chief of Engineers, United States Army. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to HQDA (DAEN-ECE-1), WASH DC 20314-1000.

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To be distributed in accordance with DA Form 12-34B, Requirements for TM 5-803-12: Outdoor Recreation Facilities.

☆U.S GOVERNMENT PRINTING OFFICE: 1986 - 491 - 000/ 45004