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Engineering and Design
RECREATION FACILITY AND CUSTOMER SERVICES STANDARDS

1. This Manual 1110-1-400 supercedes previous guidance for the rehabilitation of existing and the design and construction of new recreation areas and facilities, the provision of customer services, and recreation program evaluation activities at recreation areas managed by the U.S. Army Corps of Engineers.

2. Replace the existing EM 1110-1-400, dated 31 July 1987 with the attached publication.

3. File this sheet in front of this publication for reference purposes.

FOR THE COMMANDER:

19 Appendices
(See Table of Contents)

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This manual supersedes EM 1110-1-400, dated 31 July 87.

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CHAPTER 1

General Considerations

1.1 Purpose. This document provides general guidance for the rehabilitation of existing and the design and construction of new recreation areas and facilities, the provision of customer services, and recreation program evaluation activities at recreation areas managed by the U.S. Army Corps of Engineers (USACE). The overall purpose of this document is to establish a uniform level of quality nationwide by which Corps-managed parks will meet the needs of current and future park customers. The criterion herein applies to both new recreation areas and the rehabilitation of existing areas, and serves primarily as a conceptual design document for use by operations personnel when developing these public facilities. However, this document is not intended to circumvent the preparation of detailed final design plans for architectural/engineering features in accordance with applicable engineering or technical manuals and design standards.

1.2 Applicability. This manual applies to all Civil Works field activities responsible for the evaluation, design, construction, renovation, rehabilitation, management, and administration of all new or existing recreation developments on Government lands. Application of these standards in conjunction with initial development, major maintenance, or rehabilitation of Corps operated areas, including the replacement of individual sites or support items within a recreation area, shall provide system-wide consistency for planning, design and implementation of improvements, as well as provide a consistent level and quality of customer service.

1.3 Distribution Statement. Approved for public release, distribution is unlimited.

1.4 References. References are at Appendix A.

1.5 Glossary. A glossary of terms is at Appendix B.

1.6 Drawings. Drawings are at Appendixes C-H.

1.7 Photos. Photos are at Appendixes I-Q.

1.8 Background. As available land becomes more of a precious commodity, its creative use and maintenance becomes crucial to preserving and enhancing our quality of life. Outdoor spaces

are evolving to assume a more prominent and integral part of our daily existence. These facts dictate the need for quality outdoor recreational facilities that enhance the public enjoyment of the abundant natural, cultural, and historical resources of the United States. The public desires recreational spaces that allow contact and enjoyable experiences with these resources yet are not detrimental to fragile natural systems or a danger to important ecosystems, or significant cultural and historical resources.

1.9 Standardization. The Corps of Engineers is a major provider of outdoor recreation nationwide. It is the intent of this guidance to promote consistency in the provision of facilities and services to customers, yet allow flexibility to meet regional requirements based on environmental conditions and customer needs. Three levels of guidelines are presented herein for design, customer service, and evaluation procedures:

1.9.1 Required. Features that shall be included.

1.9.2 Recommended. Features that should be included if possible.

1.9.3 Optional. Features that may be included for customer convenience. The options offered for consideration are by no means an all-inclusive list of the features that may be applied.

1.10 Design Exemptions for Required Standards. It is recognized that circumstances may exist where application of certain required design standards may be impractical for reasons such as legal or political considerations. Design options that do not meet “required” standards may be used with approval from the District Chief of Operations. Exemptions should only be used in rare situations, must be fully justified, and the reason for the deviation clearly documented in writing. Copies of such exemptions shall be kept on file by the requesting office and the District Office. A sample exemption is at Appendix R.

1.11 Conceptual Plan. All types of development should begin with a conceptual plan. The conceptual plan should cover the entire park, including future plans, rather than considering work items on a piecemeal basis. The conceptual plan can be phased to accommodate budget requirements and should show the general layout of proposed work and include items such as the locations of roads and parking lots, structures, utility buffer areas, and other facilities such as playgrounds, playfields, and swim areas. Generally, the Operations Manager and onsite

operations staff should program/budget the work and ensure compliance with the Operational Management Plan (OMP) and Master Plan or General Design Memorandum. Other District elements will be consulted during this early phase.

1.12 Project Management Business Process. The design of all parks shall be accomplished through a fully coordinated team approach. A successful park design depends on the team's analysis and refinement of the initial conceptual plan into a completed design for improvements. The Project Delivery Team (PDT) should be fully empowered and include professionals with expertise in the Project Management process, Engineering, Planning, and Operations, and technical disciplines such as landscape architecture, civil engineering, recreation area management, environmental stewardship, operations and maintenance, and public safety. It is essential that a park staff representative serve on the design team from inception to completion, and that the PDT conduct site visits during the design and construction phases. Customers and stakeholders should also be involved in the planning phase through surveys or interviews. An example of a format that may be used for customer input is included as Appendix S.

1.13 Guiding Principles for the Design of Recreation Areas and Facilities. Although some of these items are discussed in greater detail in later sections, general considerations that each PDT shall address include:

1.13.1 Considering functional use, creative design, environmental harmony, and economy of construction.

1.13.2 Maintaining health, safety, security, and comfort of the customers in all aspects.

1.13.3 Meeting local and regional recreational needs, considering the present requirements as well as recreation trends and potential future needs.

1.13.4 Creating user friendly areas and facilities to serve all populations. This includes incorporation of universal access design principles to address accessibility and user diversity.

1.13.5 Considering economy of scale and life cycle costs. It is generally more cost effective to develop, operate and maintain a large comprehensive site than several smaller single use areas.

1.13.6 Enhancing revenue generation.

1.13.7 Basing the design of facilities on an area's anticipated average weekend day visitation during the peak season of operation.

1.13.8 Protecting resources from physical and aesthetic degradation. This includes correction of existing environmental problems such as erosion, siltation, soil compaction and vegetation loss.

1.13.9 Incorporating off-the-shelf products whenever practical.

1.13.10 Correcting existing design problems. This includes eliminating conflicting uses created by older designs that combined day use and camping within an area.

1.13.11 Providing for ease and economy in cleanup and maintenance.

1.13.12 Meeting stated management, resource use and sustainable development goals.

1.14 Master Plans. Developments shall be in accordance with the OMP and approved project master plans. If the proposed development is not included in the master plan, a master plan supplement is required.

1.15 Sustainable Design and Development (SD&D) and Environmental Management System (EMS). All park modernization and rehabilitation efforts shall employ a holistic approach to the design, construction, and operations of the engineered environment and shall be incorporated in an environmentally responsible and energy-efficient manner. Facilities shall meet current needs without compromising the ability of future generations to meet their needs.

1.15.1 SD&D includes efficient use of natural resources along with better performing, more desirable, and more affordable infrastructure and buildings. Some examples of SD&D techniques include incorporating natural lighting (skylights), solar heating and cooling units where efficient, natural ventilation, water-efficient plumbing fixtures, minimal disturbance of vegetated soils, indigenous plants to limit irrigation requirements, and long-lasting and/or recycled

materials and equipment. Contracting Division should be contacted for current procurement requirements. Additional SD&D guidance may be obtained through USACE Engineer Technical Letter 1110-3-491, "Sustainable Design for Military Facilities."

1.15.2 All new and renovated facilities shall comply with EMS standards. Environmental performance and continual improvement will be considered for all park area operation and maintenance activities. Further information is posted on the NRM Gateway Website on the "Environmental Management System (EMS)" page, at http://corpslakes.usace.army.mil/employees/envcomp/ems.html

1.16 Carrying Capacity. The PDT shall determine the carrying capacity to accommodate the anticipated number of users while minimizing impacts on the resources. Generally, geographical conditions, customer needs, and operational considerations will determine the carrying capacity. Facilities should be designed for anticipated average visitation on a weekend day during the peak season of operation. Future use trends should be considered to ensure adequate scale of development and anticipated changes in demographics and customer desires.

1.17 Revenue Generation. Special design consideration shall be given to areas where use fees will be charged. This generally relates to convenient fee collection and the proper separation of fee activities from nonfee activities.

1.18 Cultural, Historic, and Environmental Resources. Designs shall minimize the impact of development on cultural, historic, and environmental qualities of the site. Coordination with representatives from federal and state cultural, historic, and environmental agencies in the early stages of evaluation and design is encouraged. The PDT should become familiar with local environmental conditions and development requirements to preclude difficulties in obtaining certain permits and clearances prior to the construction phase.

1.19 Universal Accessibility (UA). Employing UA principles in facility design and delivery of customer services provides greater benefit to a wider range of users, enhances public participation, promotes choice and alternatives, lessens hazard risk to the user, minimizes physical effort, and provides the same opportunity for all users. It should not be assumed that features such as accessible picnic tables are needed only at fully accessible picnic sites. If a person with a disability has the strength or can get assistance in reaching what would

appear to be an inaccessible site, it will be a benefit to have appropriate equipment and facilities at the site once they arrive. Designing facilities to be UA from the beginning generally has minimal impact on the total construction costs of a new facility.

1.19.1 Applicable UA Standards. The term "Universal Accessibility" in this document refers to the most stringent current standards that apply. Current Corps policy and access to these standards are posted on the NRM Gateway Website on the "Accessibility" page, "Policy and Procedures" at http://corpslakes.usace.army.mil/employees/access/policy.html.

1.19.2 UA Facilities. UA facilities include all routes between accessible facilities and all types of facility support amenities. All new and updated facilities shall be designed to be universally accessible. Any new recreation facility purchases, such as picnic tables, grills, playground equipment, utility tables, and water fountains shall specify universally accessible items.

1.19.3 UA Programs. UA also includes programmatic access so that customers have full access to customer services such as interpretive programs and public information postings.

1.20 Codes and Other Requirements. The PDT shall comply with all applicable local, state, and federal codes, policies, and regulations throughout the design of recreation areas or facilities. Many local and state codes such as building codes, fire codes, electric codes, and universal accessibility requirements are more stringent than federal codes and standards. The more stringent code or standard shall be utilized. More recently dated standards shall supercede those cited herein, and such updates only need to be documented appropriately in the project files. Codes and requirements that will be followed include, but are not limited to:

- Occupational Safety and Health Administration (OSHA).
- National Electric Code (NEC).
- National Fire Prevention Code.
- American National Standards Institute (ANSI).
- USACE Engineer Pamphlet (EP) 310-1-6a and 6b, "Sign Standards Manual".
- USACE Safety and Health Requirements Manual, EM 385-1-1.

- USACE Technical Instructions (TI) 811-16, Lighting Design.
- Universal Accessibility Requirements.

1.21 Commercial Products. Emphasis should be placed on purchase and incorporation of off-the-shelf commercial products when available. Virtually all types of recreation facilities, structures, and equipment offering multiple design options, durability, and quality are available through commercial vendors or through General Services Administration. Most facilities, structures, and equipment can be made to order to include style, materials, texture, color, and numerous other options that have been proven in the market place across the country. Benefits of using off-the-shelf commercial products include:

1.21.1 Reduction of design cost.

1.21.2 Proven design and durability.

1.21.3 Reduced construction time.

1.21.4 Lower cost.

1.21.5 Orders for prefabricated facilities can be placed at any time of the year and change orders can be made prior to shipment.

1.21.6 Many of the products are modular in design and can be expanded or modified if the need occurs.

1.21.7 Most commercial products come with a warranty.

CHAPTER 2

General Guidance

2.1 Introduction. This chapter provides general guidance for elements that shall be considered when conducting site analysis and preparing designs for new construction or rehabilitation of all Corps-managed recreation areas.

2.2 General Considerations for Recreational Facilities. A general discussion of recreation facility considerations that should be addressed for all recreation areas is included below. More specific guidelines for these and a variety of other recreational facilities are included in Chapters 3-5.

2.2.1 Seasonal Fluctuations. Seasonal fluctuations in water levels shall be taken into consideration when designing and developing lake and riverside facilities to avoid the placement of facilities in hazardous or high maintenance areas. The 5-year flood frequency is a good general guideline when planning lakeside development, although there may be other factors to consider.

2.2.2 Separation of Uses.

2.2.2.1 To preserve their integrity, campgrounds shall be physically separated from day use areas and other potentially conflicting uses.

2.2.2.2 Typical day use activities, which include picnicking, swimming and boat launching, shall be physically separated from campgrounds, marinas, or other types of potentially conflicting uses.

2.2.2.3 Playgrounds should be located away from interpretive facilities, roadways, and nearby campsites due to noise considerations.

2.2.3 Playgrounds. Playgrounds are an important and necessary feature that should be centrally located within any recreation area. Topography, existing vegetation, and the type of playground equipment provided shall govern the specific layout and shape of each playground. Playgrounds should fit the diverse needs of all children. Opportunities should be provided for a variety of experiences including imaginative and physical play without disturbing the natural, park-like setting of the area in which it is located.

2.2.4 Interpretive Facilities. Interpretive facilities shall be considered in the design of every recreation area. Interpretive facilities include but are not limited to visitor centers, bulletin boards, and kiosks. They assist users in understanding the natural, historic, and/or cultural values of a project site. Interpretive exhibits may give insight into natural or significant cultural features of an area, or explain the significance and history of the project site surrounding the recreation area. Additional interpretation should include the history of the Corps of Engineers and the Corps' mission as an agency. Knowledge of the recreation area and its significance encourages the users' sense of responsibility and appreciation for an area and may help develop specific interests such as ecology and history. Interpretive facilities should provide learning through physical interaction and observation.

2.3 Site Survey and Mapping. Major projects require an accurate topographic map that locates important site features. Survey criteria are not absolute but should provide a visual basis to aid in the design of the area. Onsite personnel must participate in this process from the beginning. It is recommended that the map and survey information be incorporated into existing GIS systems. The minimum information that maps and site surveys should provide includes:

- Corps boundary limits.
- Construction limits.
- Pool fluctuation elevations that would affect facilities within the area.
- Shoreline areas requiring protection/stabilization.
- Major natural features including large trees or unusual rock formations that can be designed into the facility.
- Cultural resources.
- Historic properties.
- Roads.
- Utilities.
- Existing buildings and facilities that will remain or whose demolition and/or removal are part of the plan.
- Facilities to be constructed - current and future.

2.4 Incorporation of Existing Site Features and Vegetation. Existing site features, vegetation of significance, and aesthetic views should be preserved and incorporated into the designs for site improvements. Recreation area design should

locate facilities and roadways among existing trees and vegetation with minimum disturbance. Features such as rock outcroppings, riparian areas, and overlooks should be incorporated into designs as natural amenities and points of interest.

2.5 Grading.

2.5.1 Slope Recommendations. New park facilities should be sited to blend with existing contours and the lay of the land. Table 2.1 summarizes slope recommendations in new park facilities. Minimizing the amount of cuts and fills required for a project reduces construction and maintenance costs. Areas with slopes over 15 percent will require excessive earthwork and should be avoided, unless there is no acceptable alternative.

Table 2.1

Slopes for New Park Facilities – Campgrounds & Day Use Areas	
Allowable Range	2% - 15%
Most Economical Range	2% - 7%
Range Requiring Extra Cut & Fill	8% - 15%
AVOID: Slopes Requiring Excessive Cut & Fill	+15%

2.5.2 Cut and Fill Areas. Slope facing of all cut and fill should be designed for ease of maintenance and passage by pedestrian park customers. Cut and fill slopes in excess of 3:1 may require the incorporation of terraces, retaining walls, stone riprap, or other measures to hold the soil in place. Heavily sloped or terraced areas adjacent to pedestrian footpaths or routes require barriers to prohibit access or the incorporation of paths providing safe passage across the slope.

2.5.3 Grading Adjacent to Buildings. Grading adjacent to buildings shall slope away from the buildings for a minimum distance of 10 feet to ensure positive drainage and to eliminate standing water.

2.5.4 Minimum Slope for Nonpaved Areas. To avoid problems caused by standing water, the minimum allowable slope for non-paved areas, swales, or drainage is 1 percent.

2.5.5 Surface Water Flow and Drainage Collection around Recreation Facilities. Grading must direct surface water flow away from tent pads, hardened areas, picnic tables, or utility hookups. Park roads, parking areas, and walkways should be

graded to allow the natural flow of surface water. When possible, surface flows may be concentrated and collected in unobtrusive areas away from park customers and vehicular or pedestrian traffic. Drainage system designs should incorporate the use of smaller inlet structures at closer intervals within a collection basin in lieu of a few larger inlet structures that will concentrate flows and thereby interfere with the use or aesthetics of an area.

2.5.6 Grading Around Existing Trees. Grading should not occur within the drip line of existing trees since impacted trees usually require removal in 5 to 10 years. It is recommended that a professional landscape architect and/or forester be consulted to assess the potential impacts prior to grading around existing trees. Where grade changes under the drip line are unavoidable:

2.5.6.1 Care should be taken to minimize the disturbed area.

2.5.6.2 Impacted trees that do not pose hazards may remain in place to allow replacement trees to have a good growth start.

2.5.6.3 Replacement trees should be planted at the time of disturbance at a minimum of 2:1 replacement ratio to mitigate impacts to park users and enhance aesthetics (also see paragraph 2.6 below).

2.6 Succession Tree Planting Guidelines. Through succession planting a natural understory can be created that mimics nature and continually replenishes the canopy. Recommended actions to achieve goals of succession tree planting include:

2.6.1 Begin replanting before the old plant is removed.

2.6.2 Arrange replacement trees to take advantage of contrasts in texture and color and make the park more interesting. Integrate shrubs with upright plants to create a mosaic effect and an understory.

2.6.3 Avoid monocultures by planting a variety of trees within an area.

2.6.4 Design plant canopies to touch when the tree is mature. It is desirable to have a continuous leaf canopy that shades the ground, moderates the temperature, conserves

moisture, and discourages weeds. This can be achieved by planning layout according to each tree's:

- Growing habits.
- Root spread.
- Mature size.
- Light and shade tolerance.
- Water and nutrient needs.

2.6.5 Use close spacing to create a solid leaf canopy, but do not crowd planting to the point that disease problems or stunting result. Avoid overcrowding by interplanting fast-growing common shade species with slow-to-mature species.

2.7 Landscaping. Landscaping can generally be used to improve park aesthetics, control erosion, improve safety, and reduce maintenance costs. Aesthetic improvements include use of landscape materials to screen undesirable views such as service and storage areas, parking lots, dumpster and trash receptacle locations, electrical transformers, and other negative features.

2.7.1 Preserve Natural Appearance of Site with Use of Indigenous Landscape Elements. Landscape designs and plantings at Corps recreation areas should contribute to the natural appearance of the site. Many Corps locations have an abundance of existing landscape elements that can be used in new construction or rehabilitation projects, including trees, shrubs, groundcovers, grasses, flowers, boulders, stones, rocks, soil, and water. Use of indigenous landscape materials preserves the character of the recreation area and may result in lower maintenance costs. The following steps shall be used to preserve natural appearance and make maximum use of indigenous materials:

2.7.1.1 Conduct an inventory of existing plant and site features prior to commencement of design activities. The PDT should use this inventory to document which features are most conducive to the proposed development.

2.7.1.2 Design for large expanses of undeveloped areas to remain undisturbed. This avoids habitat fragmentation and enhances users' experiences within natural areas.

2.7.1.3 Protect existing plants and site materials during construction.

2.7.2 Landscape Design Criteria. The following required design criteria shall be applied (Photos I-3, I4, and I-5):

2.7.2.1 Obtain information on plant materials, availability, suitability, and quality through local and state nursery associations, agricultural extension offices, or state forestry offices.

2.7.2.2 Specify replanting of the site with a variety and range of plants indigenous to the area.

2.7.2.3 Avoid the introduction of exotic plants.

2.7.2.4 Avoid the use of toxic or thorny plants, especially in areas of high pedestrian traffic.

2.7.2.5 Provide visual interest with landscape materials, particularly at park entrances.

2.7.2.6 Provide seasonal interest by specifying a variety of trees, shrubs, and flowers.

2.7.2.7 Address seasonal maintenance requirements to include:

- Watering requirements for different types of vegetation.
- Weed control.
- Trimming of trees and shrubs.

2.7.2.8 Create buffers to improve traffic control, provide screening, or to separate differing uses and activities.

2.7.2.9 Promote security and safety through proper placement of landscape materials.

2.7.2.10 Emphasize low maintenance design considerations such as minimizing mowing and maintenance requirements and landscaping with drought-tolerant plants.

2.7.3 Minimize Mowing Requirements. Mowing is typically the costliest and most time-consuming vegetative management activity. Design features that should be included to reduce mowing efforts include (Photos I-3, I-4, and I-5):

2.7.3.1 Keep grassed areas to the minimum required for aesthetics, line-of-sight visibility, and fire and erosion control. Alternatively, maximum consideration should be given

to creating natural or low maintenance areas that do not require mowing.

2.7.3.2 Specify grass that requires mowing on gentle slopes only.

2.7.3.3 Do not specify grass in isolated, hard-to-reach locations.

2.7.3.4 Where mowing is required, specify edging material set flush with the grass, and use of other landscape materials to control grass growth.

2.7.4 Irrigation. Planting and irrigation should reflect the goals of sustainable design with minimal vegetative and mechanical maintenance, including landscaping with drought-tolerant plants. Planting and irrigation should also be designed to withstand park and climatic conditions and conserve water.

2.7.4.1 Commercial quality irrigation equipment, systems, material, and methods should be used.

2.7.4.2 Irrigation components such as valves and controllers that require regular maintenance should be protected using devices such as valve boxes with secured covers.

2.7.4.3 Valves should be clustered and easily accessible for ease of maintenance.

2.7.4.4 Automated irrigation systems and remote control operation should be used when possible to minimize cost and allow for effective water management.

2.8 Roads and Parking. EM 1110-2-410, Design of Recreation Areas and Facilities - Access and Circulation, contains detailed specifications for roadway designs (Chapter 2) and parking areas (Chapter 7). Access into a recreation area should be limited to a single road whenever possible to promote the safety and security of the visiting public and for ease of management of the recreation area. Additional guidance for roads and parking facilities is provided below.

2.8.1 Paving. Roadways and parking areas should be paved with asphalt when possible, typically constructed without curb and gutter. However, a variety of hardened surfaces are

available, and installation of one appropriate to regional climatic conditions is the standard.

2.8.2 Roads and Parking Placement to Maintain Park Character. Roadways and parking areas help create the customers' first impression regarding the quality and recreation experience an area offers. The design, layout, and orientation of roads and parking areas should:

2.8.2.1 Preserve a park-like character with minimal impact on the site, avoiding the appearance of a thoroughfare.

2.8.2.2 Avoid disturbance of significant park features and vegetation.

2.8.2.3 Provide convenient, enjoyable, and safe access to facilities.

2.8.2.4 Avoid significant barriers to pedestrians traveling between activity areas.

2.8.3 Roadway Design Guidelines. Table 2.2 summarizes roadway design guidelines for various road types.

Table 2.2

Roadway Design Guidelines			
Feature	**Two-Way Road**	**One-Way Road**	**Service Road**
Paved or hardened surface suitable for intended purpose	Required	Required	Required
Minimum paved width	24 ft (7.3 m) Required	14 ft (4.3 m) Required	
Width of shoulder base material on each side	2 ft (0.6 m) Required	2 ft (0.6 m) Required	1.5 ft (0.5 m) Required
Minimum clearing width for construction	30 ft (9.1 m) Required	20 ft (6.1 m) Required	
Crowned cross sections providing adequate slope for drainage	Required	Required	
Minimum overhead clearance	16 ft (4.9 m) Required	16 ft (4.9 m) Required	

Roadway Design Guidelines			
Feature	**Two-Way Road**	**One-Way Road**	**Service Road**
Minimum centerline turning radius for curves and turnouts	50 ft (15.2 m) Required	50 ft (15.2 m) Required	
No trees within: • 3 ft (0.9 m) of paving • ditches • back slope areas	Required	Required	
Widened to provide parallel, angled or perpendicular parking where needed	Optional	Optional	
Turnaround provided			Recommended
Special care taken to avoid being environmentally or aesthetically obtrusive			Recommended

2.8.4 Parking facilities. Parking area design should promote:

- Public safety.
- Effortless vehicle circulation.
- Convenient facility access and ease of parking by the user.
- The goal that a first time user can easily understand access into and out of the area.

2.8.5 Parking Area Design Guidelines. Parking areas shall be designed for customer convenience, safety, and ease of parking with well-defined striping, curbs, barriers, and signage to encourage orderly and proper parking. Circulation patterns should be simple, direct, and obvious to the driver. Pull-through parking shall be utilized to the maximum extent possible for RV units, buses, and vehicles pulling trailers to eliminate the need for backing. Parking spaces angled to the flow of traffic are encouraged for safety and user friendly aspects for all vehicles. In certain areas there may be a demonstrated demand for parking spaces larger than the standard. Site factors and actual demand will determine the number and location of these spaces. Table 2.3 summarizes parking area design

guidelines. Designs that exceed minimum engineering design standards are recommended based on customer experiences at Corps parks and trends toward larger vehicles and equipment.

2.8.6 Facility Parking Requirements. Parking area designs shall consider visitor needs specific to the facility offered. Table 2.4 summarizes recreational facility parking requirements for planning purposes.

2.8.7 Directional Markings. Directional markings include striping that meets current AASHTO (American Association of State Highway Transportation Officials) requirements and signage conforming to the Corps' "Sign Standards Manual."

Table 2.3

Parking Area General Design Guidelines (Drawings D-3, D-4, E-1, E-2)		
Item	**Recommended**	**Minimum Requirement**
Parking area	As close as practical to activity served	No more than 500 ft (152 m) from activity served
Parking grade	1-5%	8% maximum grade
Maneuvering aisles and access areas		
One way	20 ft (6.1 m)	15 ft (4.6 m) (wider recommended for perpendicular aisles)
Two way	30 ft (9.1 m)	24 ft (7.3 m)
Inside turning radius	30 ft (9.1 m) all vehicles	30 ft (9.1 m) oversized vehicle
Parking space, car, standard		
Perpendicular	9 ft x 20 ft (2.7 m x 6.1 m)	9 ft x 16 ft (2.7 m x 4.9 m)
Angled	9 ft x 20 ft (2.7 m x 6.1 m) (45-60 deg)	9 ft x 18 ft (2.7 m x 5.5 m)
Parallel	9 ft x 20 ft (2.7 m x 6.1 m)	8 ft x 20 ft (2.4 m x 6.1 m)

Parking Area General Design Guidelines (Drawings D-3, D-4, E-1, E-2)		
Item	**Recommended**	**Minimum Requirement**
Parking space, oversize vehicle Angled	10 ft x 50 ft (3.1 m x 15.2 m) (45-60 deg)	10 ft x 40 ft (3.1 m x 12.2 m)
Parallel	10 ft x 50 ft (3.1 m x 15.2 m)	10 ft x 40 ft (3.1 m x 12.2 m)
Parking space, launch ramp Angled pull-through	10 ft x 50 ft (3.1 m x 15.2 m) (45-60 deg)	10 ft x 42 ft (3.1 m x 12.8 m)
UA, all types		Add 5 ft (1.5 m) to minimum width for all types of spaces

2.8.7.1 Required Striping. Asphalt overlay or concrete roads and parking areas shall include striping as follows:

- Paved lots to indicate parking spaces and delineate access aisles.
- Roads in heavy traffic areas, where topographic conditions such as hills and curves dictate, to designate bicycle routes, and to address safety issues.

2.8.7.2 Required Signs. Directional signs and markings for traffic circulation will be placed when necessary for control and safety.

2.8.7.3 Optional Markings. Wheel stops or curbs may be used as a visual alignment indicator in unpaved parking areas.

Table 2.4

Facility Parking Guide for Planning Purposes		
Facility	**No. and Type of Spaces**	**Per**
Launch ramp	30 Oversize 5 Standard	Each launch lane Each launch lane
Swim area	1 Standard 1 Oversize	Every three swimmers Parking lot spaces may be increased based on local usage pattern
Picnic area	2 Standard	Each table
Campsite	1-3 Standard	Each campsite

Facility Parking Guide for Planning Purposes		
Facility	**No. and Type of Spaces**	**Per**
Restroom	# Of Standard Spaces That Will Fit Into Area	Parking area equal to length of restroom facility at a minimum
Playground	# Of Standard Spaces That Will Fit Into Area	Parking area equal to length of playground impact area
Fish cleaning station	1 Oversize	Every two fish cleaning spaces
Sanitary dump station	2 Oversize	Each dump unit
Amphitheater	1 Standard	Every four seats

2.9 Bicycle Routes. Bicycle routes or lanes should be considered in the design of new roads due to the increasing number of cyclists within Corps recreation areas. Improvements to existing roadways can also create lanes for cyclists in areas where bicycle use is prevalent. Considerations for bicycle routes are summarized in Table 2.5.

Table 2.5

Bicycle Route Design Features	
Comply with the AASHTO's "Guide To The Development Of Bicycle Facilities"	Required
Pavement markings and signs that adhere to the Federal Highway Administration's "Manual on Uniform Traffic Control Devices" and the Corps "Sign Standards Manual"	Required
Incorporate bicycle parking near access points and high use facilities	Recommended
Convenient to drinking water and restroom facilities	Recommended

2.10 Pedestrian Access. Pedestrian walkways, ramps, and steps provide access and circulation in recreation areas. Along with a UA ramp, limited use of stepped designs may be incorporated into some hardened areas, picnic sites, parking lots, and access to new buildings when necessary to fit within the existing topography, facilities and pathways (Photo I-1). Detailed specifications are contained in Chapter 5 of EM 1110-2-410,

"Design of Recreation Areas and Facilities - Access and Circulation." Additional guidance is provided in Table 2.6.

Table 2.6

PEDESTRIAN ACCESS DESIGN FEATURES	
Walkways and Ramps	
Designed with aesthetics in mind	Required
Used to connect high usage recreation facilities	Required
Does not impede service vehicle access to facilities	Required
Minimum width of 60 in. (1.5 m)	Required
Constructed of concrete or other hard surface types where applicable	Required
Ramps used for grade changes requiring less than three steps	Required
Whenever possible, ramps used in lieu of steps	Recommended
Use preferred longitudinal slope of less than 1:20 for ease of access	Recommended
Steps	
Include top and bottom steps of contrasting color	Required
Be designed with aesthetics in mind	Required
Have a minimum width of 60 in. (1.5 m)	Required
Handrail provided	Required

2.11 Utilities. Utilities are generally required for recreation areas and shall be designed to meet existing and anticipated future demands. Utilities should be designed to be functional, aesthetic, economical, easy to maintain, and user friendly.

2.11.1 Identify Utility Services Sources. Utilities planning includes identifying adequate and affordable sources of the utilities needed, which typically include:

2.11.1.1 Potable Water. Municipal or rural water systems shall be utilized when available. The development of water systems must address state and local regulations. Water supply must be adequate in quantity and quality to handle peak flow required to furnish water to restrooms, shower facilities, sanitary dump stations, drinking fountains, and irrigation for landscaped areas.

2.11.1.2 Sewage Treatment Facilities. Municipal sewage systems shall be utilized when available. The development of sewage systems must address state and local regulations. Sewage facilities must be designed to handle peak sewage discharge from restrooms, fish cleaning, and sanitary dump stations. When feasible, one wastewater treatment facility may service multiple recreation areas.

2.11.1.3 Electrical Services. Private power utilities serving the facility shall be contacted at the concept stage to ensure power is available in the vicinity and to ensure that utility connection charges are included in cost estimates. Where feasible, all electric power lines should be placed underground inside recreation areas. Lines between use areas and lines from site boundaries to use areas can be placed above ground only if they do not interfere with safety, maintenance, or aesthetics. Overhead lines should be placed where they do not become a safety hazard to sailboats and shall not be placed over access roads to boat launching ramps or parking lots (reference ER 1110-2-4401, “Engineering and Design - Clearances for Electric Power Supply Lines and Communication Lines Over Reservoirs”). Overhead power lines should be aligned behind forest cover out of view where feasible. Clearances shall be thoroughly checked in accordance with current codes and regulations.

2.11.1.4 Commercial Telephone Services. Accessible telephone or emergency call box service shall be provided in public use areas. At least one telephone or call box should allow for emergency calls to be made without coins. International symbol signs shall be used to denote phone or call box locations. Support amenities should include adequate parking, lighting, and shelter from the elements. Phone service should be provided at all entrance stations and maintenance facilities. Information on UA amenities such as volume control should be obtained through the local service provider.

2.11.1.5 Other Sources if Needed. Fuels such as propane or natural gas fuel systems may be used, but those systems and storage facilities must comply with Flammable and Combustible Liquids Code NFPA (National Fire Protection Association) 30.

2.11.2 Designate Utility Corridors. A designated corridor for placement of utility systems and infrastructure should be established to facilitate new construction and the prompt location of system problems when they occur. Design and placement should be accomplished by a certified professional to

ensure that the corridor works in concert with other park systems. Ideal complementary systems are open play areas, campground perimeters, roadways, trails, or large drainage systems. Utility corridors should be kept open and free of trees and brush. A good alternative use for utility corridors could be wildlife plantings.

2.11.3 Consider Aesthetics of Utilities Placement. Power and communication lines inside recreation areas should be placed underground. Care should be taken to maintain good as-built drawings of underground utilities. Conspicuous utilities such as storage tanks and onsite wastewater treatment systems shall be fenced and screened. Odor-generating utilities should be remote to and downwind of park user activities.

2.11.4 Provide Adequate Lighting. Adequate lighting for safety, security, and accessibility shall be designed into all facilities and recreation areas when available at reasonable cost. This includes lighting access to buildings and major facilities. Reference USACE Technical Instructions (TI) 811-16, Lighting Design, and the USACE Safety and Health Requirements Manual, EM 385-1-1, for recommended lighting levels. Lighting considerations are summarized in Table 2.7.

Table 2.7

LIGHTING CONSIDERATIONS	
Locations to be Lighted	
Boat ramps	Required
Parking lots with nighttime use	Required
Major road intersections	Required
Information facilities with nighttime use	Required
Public phones	Required
Maintenance areas	Required
Service facilities	Required
Installation Considerations	
A minimum of two light sources shall be used for interior lighting (Table 3.8)	Required
Mounted high enough to minimize the effect of glare and to prevent vandalism	Recommended
Spillover light pollution such as sky glow, light trespass and glare should be addressed through height, shields for uplight and directional aim	Recommended
Breakaway posts used along roadways	Recommended

Use of battery- or solar-powered lights where electrical service is not available (Photo I-2)	Optional

2.11.5 Provide Adequate Drinking Water. Adequate fountains and hydrants shall be provided in recreation areas. Drinking water shall be convenient to group activity areas and major facilities. Fountains and communal hydrants shall meet accessibility requirements.

2.12 Trash Removal Services. Trash services shall be provided for all recreation areas. Each receptacle shall be easily accessible by park users and service vehicles. Receptacle distance from user activities should be considered due to the potential for odor. The guidance in Table 2.8 is relative to the type and location of trash receptacles.

Table 2.8

TRASH RECEPTACLES CONSIDERATIONS	
Large Receptacles (Dumpsters)	
Set on a level, well-drained gravel or concrete pad	Required
Have a service area for receptacles designed to support weight and maneuver space requirements of service vehicles	Required
Located near the park exit or central to the park	Recommended
Small Receptacles	
Secured to prevent overturning or theft	Required
Have lids secured to the receptacle	Required
Located near high usage areas such as group shelters, restrooms, parking areas, and along major walkways (Photos I-6 and I-7)	Recommended
Grouped where practical	Recommended
Screened when practical	Recommended
Recycle Containers	
Provided for the public to deposit recyclable materials (Photos I-8, I-9, and I-10)	Optional

2.13 Protection and Control. Access to recreation areas should be controlled to protect the general public and project resources. A controlled entrance will improve safety, reduce vandalism, and provide for controlling the hours or season an area is available for use. Special consideration shall be given to each fee area, which should have a single, well-designed

entrance layout whenever possible to enhance orderly fee collection while controlling entrance and exit to the area.

2.13.1 Gates and Barricades. Control gates and barricades will generally be located at main park entrances and other access points that must be temporarily closed for maintenance, quiet hours, or seasonal closure.

2.13.2 Fencing. Fencing should generally only be constructed for access control, traffic control, screening, and safety purposes. Care must be exercised in determining the type and location of fencing. Where fencing is necessary it should be of the minimum height and design possible to be unobtrusive and still accomplish the required function.

2.14 Signs. Signs shall be provided only where needed to regulate traffic, warn of hazardous conditions, establish restrictions, and provide information. The number of signs should be kept at a minimum. Symbol signs shall be used whenever feasible. Detailed guidance on all traffic, warning and information signs and their placement shall conform to EP 310-1-6a and 6b, the Corps' "Sign Standards Manual."

2.15 Water Safety Alerts. Buoys, buoy lines, markers, signs and other means shall be provided to alert users to restricted areas, swimming areas, danger zones, slow speed areas, boat lanes, etc., and shall conform to the U.S. Coast Guard's "U.S. Aids to Navigation System" and EP 310-1-6a and 6b, the Corps' "Sign Standards Manual."

CHAPTER 3

Structures

3.1 Introduction. This chapter provides design guidance for structures in Corps-managed recreational areas when they are included in new construction or rehabilitation of facilities.

3.2 Universal Accessibility (UA). All newly constructed or rehabilitated structures shall be universally accessible in accordance with paragraph 1.19. Due to this blanket requirement, the need for universal accessibility will apply to, but not be mentioned with, each specific item covered in this chapter. Some specific mentions of UA have been added for emphasis on certain items.

3.3 Entrance Stations. Entrance stations are buildings located at park area entrances and designed for fee collection, security, and dispensing customer information. Table 3.1 contains guidance on entrance station design features. Drawings C-1 and C-2 and photos in Appendix J demonstrate some suggested layouts.

Table 3.1

Entrance Station Design Features	
Location	
Placed to provide one single point of entry to the recreation area	Required
Located to accommodate incoming and outgoing traffic flows, as dictated by local conditions including terrain and traffic volume	Required
Located in the center of the road whenever possible (Photo J-1)	Recommended
Located a minimum of 200 ft (61 m) from the intersection of the park access road and the main highway	Recommended
Placed to accommodate dual entry lanes to allow entry and exit by vehicles not required to stop at the entrance station (Photos J-2, J-3, and J-4)	Optional
Appearance & Maintenance	
Designed so that the exterior appearance of the entrance station building is in keeping with the theme of the recreation area (Photo J-2)	Required

Entrance Station Design Features	
Appearance & Maintenance	
Facility finishes, both interior and exterior, are selected for low maintenance and a high level of durability (Photo J-2)	Required
Safety and Security	
Provide for secure placement of a vault or safe	Required
Designed to accommodate daily, seasonal, or partial park closure for safety, security, and economy	Required
Have security gates to completely close the park	Recommended
Provide a turnaround area so that vehicles that cannot be accommodated can exit without entering the fee area (Photos J-1 and J-2)	Recommended
Have roadways marked appropriately to direct traffic flow (Photos J-1 and J-3)	Recommended
Placement of customer service parking to eliminate the need to cross traffic from the customer service parking area to the entrance station is encouraged. If a crosswalk is unavoidable, it should be marked (Drawing C-3, Photos J-5 and J-6)	Recommended
Design exterior windows for an unobstructed view of both incoming and outgoing traffic	Recommended
Have exterior lighting covering at least a 100-ft (30.5-m) radius around the building. Illumination may range from 5 lux (½ FC) at the edge of the radius to 20 lux (2 FC) within 25 ft (7.6 m) of the structure	Recommended
Provide public telephones outside or near the entrance station	Recommended
Provide a secure room out of view of the general public for counting fee collections and preparing vouchers	Optional
Provide a security camera and/or burglar alarm	Optional
Provide a power gate arm to regulate entering traffic	Optional
Customer Accommodations	
Designed to promote customer recognition of the park entry. Visual indicators besides the building itself may include items such as park entrance signs and gated access points	Required

Entrance Station Design Features	
Customer Accommodations	
Designed for ease in collecting fees and distributing information to park customers. This includes provision of a customer service parking area located out of the flow of traffic. The parking area shall be sized to accommodate full-length RV units plus towed units	Required
Entrance station shall be UA for customers	Required
Provide an outside service window, a customer walk-in area, or both (Photos J-7 and J-8)	Required
Provide walk-in area (Photo J-8)	Recommended
When an outside window is provided, it will include an overhang or porch for customer protection during inclement weather. The overhang or porch shall be placed to provide adequate clearance to prevent injury to customers or damage to their equipment (Photos J-9 and J-10)	Recommended
Automatic gates that can be operated from inside the entrance station and that allow after-hours departures (Photo J-11)	Recommended
Provide self-pay capability such as honor vault or automated pay station	Recommended
Provide Internet hookup to customers in close proximity	Optional
Entrance Station Worker Accommodations	
Entrance station shall be UA for attendants	Required
Provide interior work area sized to accommodate all required equipment (computers, printers, radios, weather radios, safes, etc.) and provide an adequate workspace (Photo J-12)	Required
Provide adequate power and lightning/surge protection for HVAC, computer, and communication equipment	Required
Provide a heating and cooling system adequate to protect computer equipment and provide comfort for attendants and customers	Required
Provide a unisex bathroom	Recommended

3.4 Group Shelters. Group shelters can range from small shade structures covering one or two picnic tables, to large screened or enclosed structures. The character and size of the structure should be consistent with the design theme and typical group

sizes that use the park. A plaza approach combining multiple shelters and related amenities should be considered to serve large groups and extended family gatherings (Photo P-1). Consideration should be given to the use of pre-manufactured shelters for durability, ease of construction, and ease of maintenance. Table 3.2 contains guidance on group shelter design features (Drawing H-1).

Table 3.2

Group Shelter Design Features	
Location	
Located no more than 30 to 50 ft (9.1 to 15.2 m) from parking areas, with an optional drop-off area included adjacent to the shelter to accommodate universal accessibility and for loading and unloading of supplies (Photo P-4)	Recommended
Located within 500 ft (152.3 m) of a restroom	Recommended
Located in close proximity to an open field for play space where terrain permits (Photos Q-5 and Q-6)	Recommended
Maintenance and Access Considerations	
Sited on a concrete pad that extends a minimum of five ft beyond the edge of the support posts to accommodate universal access, designed for positive drainage (Drawing H-1, Photos P-2 and P-5)	Required
All floors and access surfaces designed to provide adequate drainage	Required
Vehicular service access for maintenance	Required
Roof trusses flush against the roof to reduce sites where birds can build nests (Photo P-3)	Recommended
All interior surfaces designed for pressure cleaning	Recommended
Amenities to be Provided (Photos P-5, P-6, P-7, P-8 and P-9)	
Electrical outlets with GFCI	Required
Two water hydrants: one near a pedestal grill, one near the shelter	Recommended
Group pedestal grills within 15-20 ft (4.6–6.1 m) of shelter	Recommended
Utility table either under the roof or near the grill	Recommended
Picnic tables	Required
Convenient trash facilities	Required
Convenient restroom facilities	Required

Group Shelter Design Features	
Amenities to be Provided	
Restrooms built into the shelter	Optional
Screening or enclosure of the shelter	Optional
Horseshoe pits, volleyball court, playground equipment, etc. provided nearby	Optional
Lighting to be Provided	
Inside the shelter, lighting levels for nighttime use should range from 150 to 200 lux (15 to 20 FC)	Recommended
Exterior lighting that illuminates the area within a 50-ft (15.2-m) radius of the structure. Illumination levels may vary from 5 lux (½ FC) at the outer edge of the radius to 20 lux (2 FC) adjacent to the lighting source	Recommended
Light fixtures with vandal-resistant protective covers	Recommended
Light switches, timers, motion detectors, and/or photocells should be used when practical	Recommended

3.5 Restroom and Shower House Buildings. Restrooms shall be provided within campgrounds and day use areas. Shower houses shall be provided at campgrounds and at beaches when feasible. Table 3.3 describes location and parking considerations.

Table 3.3

Restroom and Shower House Buildings Locations and Parking			
Feature	Day Use Areas Restrooms	Campgrounds Restrooms	Shower Houses
Located no farther than 500 ft (152.3 m) from nor closer than 75 ft (22.9 m) to any campsite, picnic site, or swim area	Recommended	Recommended	N/A
Located no farther than 500 ft (152.3 m) from nor closer than 75 ft (22.9 m) to the facility they serve	N/A	N/A	Recommended

Restroom and Shower House Buildings Locations and Parking			
Feature	Day Use Areas Restrooms	Campgrounds Restrooms	Shower Houses
Located in close proximity to the access road	Optional	Optional	Recommended
Located within 100 ft (30.5 m) of parking areas	Recommended	Optional	Optional
Parking spaces proportionate to the size of the building (Drawing C-9)	Required	Required	Required

3.5.1 Minimum Facilities. The minimum restroom facility that shall be provided for users is a unisex restroom. Vault or self-contained restrooms may be used to supplement waterborne facilities or when sewage treatment facilities are not available (Photo K-1).

3.5.2 Unisex Facilities. The provision of unisex restroom facilities shall be considered in the design of all restroom and shower house buildings (Photos K-1, K-2, K-4, and K-5). Advantages of unisex facilities to our customers include the following:

3.5.2.1 Caregivers can assist the elderly or persons with disabilities.

3.5.2.2 Customers with security concerns can immediately view the facility in its entirety when opening the door, instead of walking into the typical multi-user facility with partitions that make it difficult to determine if anyone else is in the room.

3.5.2.3 Single parents can either go into the facility with a child of the opposite sex, or can check the facility before the child enters the restroom alone.

3.5.3 Common Building Features. Table 3.4 describes considerations for all restroom and shower house buildings where water and sewage treatment are available.

Table 3.4

Common Building Features for All Restrooms and Shower Houses Where Water and Sewage Treatment Are Available	
Feature	
UA Accessible	Required
Toilet partitions constructed from solid, vandal-resistant panels	Required
Privacy latches for stalls and dressing areas	Required
Lighting (Table 3.8)	Required
Sinks	Required
Potable water faucet	Required
Trash receptacle	Required
Urinals for 50% of men’s toilet fixtures at non-unisex facilities	Required
Provide 50% more toilet fixtures for women than men at non-unisex facilities	Required
Minimum ventilation rate of 2 cubic ft per minute (cfm) per square ft (9 liter per second per square meter) (Para. 3.5.9)	Required
Automatic flushers for stools and urinals	Recommended
Motion-activated faucets and hand driers	Recommended
Window screens where insects are a nuisance	Recommended
Door hardware that prevents slamming to reduce noise and wear and tear	Recommended
Diaper-changing station where adequate room and usage warrant	Recommended
Heating and air conditioning where warranted for extended season use	Optional

3.5.4 Specific Building Features. Table 3.5 describes building features specific to day use area restrooms, campground restrooms, and shower houses.

Table 3.5

Specific Building Features for All Restrooms and Shower Houses Where Water and Sewage Treatment Are Available			
Feature	Day Use Area Restrooms	Campground Restrooms	Shower Houses
At least one restroom facility will be waterborne	Recommended	Recommended	N/A

Specific Building Features for All Restrooms and Shower Houses Where Water and Sewage Treatment Are Available			
Feature	Day Use Area Restrooms	Campground Restrooms	Shower Houses
Provide a minimum of 1 stool per gender, per 30 parking spaces	Required	Optional	Optional
Provide a minimum of one restroom fixture per gender, for each 25 campsites	N/A	Recommended	Recommended
Sinks inserted into counters for increased user convenience (Photo K-6)	Optional	Required	Required
1 sink per each 25 campsites per gender	N/A	Recommended	Recommended
Additional sinks for women	Optional	Optional	Optional
Electric hand dryer or paper towel dispenser, 1 per every 2 sinks	Optional	Required	Required
Shelving above sinks and clothing hooks nearby (Photos K-7 and K-10)	Optional	Required	Required
Shelf for toiletries in shower stall (Photo K-8)	N/A	N/A	Required
GFCI protected electrical outlets, 1 per every 2 sinks (Photo K-6)	Optional	Required	Required
Mirror, vandal proof, 1 above each sink	Optional	Required	Required
Drinking fountain	Required	Required	Required
Provide a minimum of one showerhead per gender, for each 25 campsites	N/A	N/A	Recommended
Install showerheads so that water is directed away from door opening	N/A	N/A	Recommended
Provide a minimum of one fully equipped (privacy latch, toilet fixture, showerhead, sink, mirror, hand dryer) unisex shower unit at each campground	N/A	N/A	Required

Specific Building Features for All Restrooms and Shower Houses Where Water and Sewage Treatment Are Available			
Feature	Day Use Area Restrooms	Campground Restrooms	Shower Houses
An individual dressing area for each shower stall (a bench, shelf, and clothing hooks (Photo K-9))	N/A	N/A	Required
Coin-operated laundry facilities. Where provided, should include washers, dryers, and a fiberglass or hard plastic utility sink	N/A	N/A	Optional

3.5.5 Building Interior Finishes. Table 3.6 summarizes considerations for building interior finishes.

Table 3.6

Building Interior Finishes	
Surfaces without a waterproof impenetrable finish painted with permanent waterproof paint, facilitating removal of graffiti	Required
Light in color	Recommended
Designed for pressure-wash cleaning	Recommended
Low maintenance, highly durable materials	Recommended

3.5.6 Building Exterior Finishes. Exterior finishes shall be neat and clean, in keeping with the theme of the recreation area and blend with environment. Special consideration should be given to facility finishes and designs that are low maintenance, have a high level of durability, and are in keeping with the theme of the recreation area and/or region.

3.5.7 Building Floors. Table 3.7 summarizes considerations for building floors.

Table 3.7

Building Floors	
Comprised of non-skid materials, such as non-skid porcelain or ceramic tile, poured-in-place epoxy flooring, or any other durable waterproof material	Required

Building Floors	
Sloped a minimum of ¼ in./ft (1:50) toward shower and floor drains for quick and complete drainage of water	Required
Color choice visually separates floors from walls, partitions, and other interior features	Required
Floor and wall have a 70% contrast at the base (Photo K-11)	Required

3.5.8 Building Lighting. Lighting and color shall be designed to provide consistent, uniform lighting levels both inside and out for the safety and security of customers. Table 3.8 contains lighting considerations.

Table 3.8

Building Lighting	
Interior	
Dark areas avoided in all areas of the facility	Required
A minimum of two light sources to accommodate UA. May be accomplished with windows on two walls or a combination of sources, i.e. electric lighting, skylight, or window	Required
Light and color sufficient on floor surfaces that objects are visible to all users	Required
Lighting levels range from 100 to 200 lux (10 to 20 FC)	Recommended
Skylights installed to provide sufficient daytime illumination and reduce utility costs	Recommended
Timers, motion detectors, and/or photocells control interior lighting when practical	Recommended
Exterior	
Vandal-resistant, bug-proof exterior lighting be provided	Required
Exterior lighting illuminates the area within a 50-ft (15.2-m) radius of a building	Recommended
Illumination levels vary from 5 lux (½ FC) at the outer edge of the radius to 20 lux (2 FC) adjacent to the facility	Recommended

3.5.9 Ventilation. A minimum ventilation rate of 2 cubic ft per minute (cfm) per square ft (9 liter per second per square meter) shall be incorporated in restrooms and shower houses. All aspects of indoor air quality should be examined when determining ventilation rates. Additional factors that contribute to

adequate ventilation should also be considered in new construction and renovation activities. This includes architectural style since high, vaulted ceilings provide better cross-ventilation than low and flat ceilings. Also, lighter interior wall colors tend to be cooler. Other factors to consider include the size of the building (square footage), the number of urinals and/or stools, and local building codes.

3.6 Change Houses. The use of stand-alone change houses is discouraged. Whenever possible, change houses should combine change areas with sanitary facilities. Shower houses that combine shower facilities as well as sanitary and change facilities are encouraged, and free-standing shower facilities outside the change house shall be considered where a shower house cannot be provided. Table 3.9 summarizes standards for change houses when provided:

Table 3.9

Change Houses	
Exterior of the structure in keeping with the theme of the recreation area	Required
Located no farther than 500 ft (152.3 m) from the swim area (Photo K-12)	Recommended
Freestanding open-air or outdoor showers used where practical to reduce cost, located outside the change house for sand removal (Photos K-13 and K-14)	Recommended
Showers utilize multilevel showerheads (Photos K-13 and K-14)	Recommended
Dressing areas include individual stalls with doors and privacy latches	Recommended
All surfaces designed for pressure wash cleaning	Recommended
A 3- to 4-ft (0.9- to 1.2-m) roof shelter considered for protection from the rain and sun when open-air structure is the only facility provided	Optional

3.7 Fish-Cleaning Station Design Guidance. Table 3.10 provides considerations for fish cleaning stations (Photos L-1, L-2, and L-3).

Table 3.10

Fish-Cleaning Stations	
Potable water available	Required
Interior light levels ranging from 500 (152.3 m) to 700 lux (50 to 70 FC)	Required
Exterior lighting illuminates the area within a 50-ft (15.2-m) radius of the fish cleaning station with an outer edge minimum of 5 lux (½ FC), increasing to 50 lux (5 FC) next to the structure	Required
Located away from other user activities	Recommended
Ties into the recreation area or municipal sanitary systems when possible	Recommended
Allows ease of access for pumping if a holding tank is used	Recommended
Provides adequate parking, including pull-through spaces sufficient to accommodate both vehicles and trailers	Recommended
Timers, motion detectors, and/or photocells used to control interior lighting	Optional

3.8 Sanitary Dump Stations. Table 3.11 provides considerations for sanitary dump stations (Drawing C-8, Photos L-4 and L-5).

Table 3.11

Sanitary Dump Stations	
Sanitary dump station provided for each park containing a campground (except primitive areas)	Required
Each station equipped with a 4-in. (100 mm)(minimum) sewage pipe with hinged cap	Required
Sewage pipe encased in a concrete pad extending to the discharging camping unit. The pad located for access from the driver side of the vehicle (Drawing C-8 and Photos L-4 and L-5).	Required
Sewage pipe pad extends a minimum of 2-ft (0.6 m) on all sides of the sewage pipe and slopes 2-3% toward the sewage pipe from all directions	Required
Provide two separate water supplies, each clearly marked: wash down and potable water. Wash-down faucet with anti-siphon valve located at the dump station.	Required

Sanitary Dump Stations	
The potable water supply may be located separate from but near the dump station	Optional
Sited on the right side of the road near the campground exit	Recommended
Additional **or dual** stations provided for campgrounds with more than 125 sites	Recommended
Parking area level or sloped so that the vehicle tilts slightly toward the sewage pipe to help empty the holding tank	Recommended
Area paved consistent with adjoining roadway	Recommended
Area within a 50-ft (15.2-m) radius lighted to an average of 20 lux (2 FC)	Recommended
Trash receptacles provided	Recommended

CHAPTER 4

Support Items

4.1 Introduction. This chapter provides design guidance for support items included in Corps-managed recreational areas during new construction or rehabilitation of facilities. The quality of camping, picnicking, or other recreational experiences is often contingent upon the quality, type, and design of support facilities available. The challenge to the designer and manager is to provide aesthetically harmonious, functional facilities that are durable, vandal-resistant, and economical to install and maintain.

4.2 Universal Accessibility. All support items procured for new construction or rehabilitation of facilities shall be universally accessible. This is in accordance with paragraph 1.19, which states that any new recreation facilities purchases, such as picnic tables, grills, playground equipment, utility tables, water fountains, etc., shall specify universally accessible items. Due to this blanket requirement, the need for universal accessibility will apply to, but not be mentioned with, each specific item covered in this chapter except in areas of special emphasis.

4.3 Picnic Tables. Many standard designs exist for construction of tables. There are also commercial sources of well-built, economical, prefabricated units and components. The choice of design and construction materials should be based on long-term economy, site-specific functional requirements, durability, comfort, safety, aesthetics, and ease of maintenance or repair. Table design will depend on the individual park site and typical usage. Factors to be considered for customer service are shown in Table 4.1. Some table types and associated considerations include:

4.3.1 Portable tables facilitate off-season storage and provide flexibility in meeting varying site conditions and public use demands.

4.3.2 Heavy-duty tables are durable, minimize theft, and allow rearrangement to accommodate user preference.

4.3.3 Lightweight tables may have to be secured to prevent theft or large-scale displacement.

4.3.4 Fixed tables should be considered in areas prone to frequent flooding.

Table 4.1

Picnic Table Checklist	
Location/Placement	
Level placement	Required
Placed 10 ft (3 m) away from a fire ring or grill	Required
Sited away from the edge of impact areas, steep slopes, or other obstacles	Required
Ideally, located where afternoon shade is available	Recommended
Located on delineated impact areas reinforced to avoid site deterioration	Recommended
On picnic sites, may be located without impact area in areas free of roots or stumps, provided soil compaction and erosion will not be a problem	Optional
Construction & Design Features	
The standard table shall accommodate UA	Required
Rounded or chamfered edges	Required
No protruding bolts or other safety hazards	Required
When anchored, anchoring method eliminates safety hazards such as protruding stakes and chains	Required
All parts splinter-resistant and treated with coatings approved for human contact	Required
Attached benches	Recommended
Rust-resistant metal and hardware	Recommended

4.4 Utility Tables. Utility tables are optional equipment at campsites and picnic sites. They may be used in conjunction with fire ring/grills and pedestal grills (Photos I-11 and I-12).

4.5 Fire Rings and Grills. Where local conditions permit campfires, fire rings/grills shall be provided at campsites and group camping areas to contain campfires and prevent random campfire scars. At picnic areas, a pedestal grill may be provided. Large grills are desirable for group use. Table 4.2 provides guidance for location and placement of fire rings and grills.

4.5.1 Fire Rings. Fire rings can be made of metal, firebrick, or natural stone. Circular units best fit the shape of a fire and are aesthetically attractive. Combination fire

rings and grills should be considered when replacing existing equipment. Common bricks and masonry should not be used in/under fire rings due to the potential to explode.

4.5.2 Grills.

4.5.2.1 Individual Grills. Pedestal grills shall be provided at picnic sites. They may be provided at campsites where campfires are prohibited and at universally accessible campsites. Pedestal grills should have adjustable grate height settings, rotation capability, and have a hinged or removable grate for easy cleaning.

4.5.2.2 Group Use Grills. Large grills should be provided at each group picnic shelter or group picnic area (Photos P-5 and P-8, P-10). Group grill units should meet the same general specifications as individual grills.

Table 4.2

Fire Ring/Grill Checklist	
Location/Placement	
Placed a minimum of 10 ft (3 m) away from overhanging vegetation	Required
Located within the hardened living area or impact area	Required
Placed out of the circulation paths (Photos I-11 and M-3)	Required
Fire rings placed on a base of gravel, pumice, fire brick, or other porous material, with drain tile if necessary, to facilitate drainage of rainwater	Required
Firmly anchored to prevent relocation	Recommended

4.6 Lantern Hangers. A lantern hanger is required at all campsites for camper convenience and tree protection. The hanger may be portable to meet specific camper needs. Hangers may have single or double lantern holders. At selected sites more than one lantern hanger may be provided. Table 4.3 provides guidance for location and placement of lantern hangers (Photos I-12, I-13, and I-14).

Table 4.3

Lantern Hanger Checklist	
Location/Placement	
Located within the hardened living area	Required
Placed out of the access path	Required
Placed so lanterns illuminate the table and doorway of the camping unit	Required
Distance from the ground to the lantern holder approximately 6.5 ft (2 m)	Recommended
Provide moveable and/or swivel hangers	Optional

4.7 Water Hydrants. Table 4.4 provides guidance for location, placement, construction, and design features of water hydrants.

Table 4.4

Water Hydrant Checklist	
Location/Placement	
Individual water hydrants located on the driver side of the campsite to accommodate normal RV hookups (Drawing C-6)	Required
Sited at least 5 ft (1.5 m) off the camp pad and protected to the extent practical to minimize risk from vehicles	Required
Campsites with electric hookups should have water hydrants	Recommended
Construction & Design Features	
UA lever handles standard for all hydrants	Required
In cold climate regions, protect hydrants and tubing against freeze with self-draining, frost-proof sill cock or other acceptable drain-back means and provide low-point gravity-flow drain lines with force air connections	Required
Back-flow prevention valves installed in accordance with applicable state and local laws	Required
Feeder lines to individual campsites shall not exceed 45 psi (310 kPa) since greater pressures may damage recreational vehicle water lines	Required

Water Hydrant Checklist	
Construction & Design Features	
A slip-resistant, firm and stable surface, sloped to drain away from the user and conforming to UA requirements, provided for access to hydrants at UA camp and picnic sites	Required
A bordered gravel splash block placed beneath the faucet of all community water hydrants	Required
Provide water hydrants (valve box with cover) to facilitate cleanup of intensive-use areas such as restrooms, group use, and shelter areas	Optional
Include self-closing hose bib	Optional

4.8 Trash Services. Trash collection shall be provided at recreation areas. Dumpsters should be utilized where commercial services are available, and when it is cost-effective. Collection sites should be easily accessible by the public and centrally located where practical. Table 4.5 provides guidance on location and placement.

4.8.1 Individual Receptacles. Where use of a centralized dumpster is not practical or cost-effective, individual receptacles should be grouped and placed in convenient locations.

4.8.2 Carry In-Carry Out. A carry in-carry out trash policy may also be an option at some locations.

4.8.3 Recycling. Recycling containers should be provided where services are available (Photos I-8, I-9, and I-10). Consistent with local management policy and goals, non-profit groups may provide recycle containers.

Table 4.5

Trash Services Checklist	
Dumpster Location/Placement	
Placement locations obvious and easy to access by park users and service vehicles, generally near the park exits or at central locations within a park	Required
Prevailing winds considered in locating the site if odors are likely to be a problem	Recommended
Located on well-drained concrete pads	Recommended

Trash Services Checklist	
Dumpster Location/Placement	
Consideration given to the road surface and the amount of truck maneuvering required to provide ease of access and to prevent excessive road damage	Recommended
Site screened by natural vegetation, attractive fencing or other aesthetically pleasing screening material	Recommended
Construction & Design Features	
Grouped and located at convenient locations	Required
Secured receptacle holders to prevent overturning and relocation	Required
Lids secured to the can or holder	Required
Animal-proof covers or holders where such disturbances occur	Recommended
Located an adequate distance from campsites and picnic sites due to the potential odor	Recommended

4.9 Benches. Benches should be provided as appropriate at sites such as picnic areas, campgrounds, playgrounds, overlooks, vistas, and rest stops along trails to enhance the recreational experience. They should be strategically located near swim or play areas to enhance adult supervision. As a general rule, benches should be safe, comfortable, durable, and attractive, and designed to blend with the surrounding setting. At least 50% of all benches should be sited for shading from the afternoon sun.

4.10 Self-Pay Stations. Self-pay stations for collection of use fees are optional facilities provided for customer convenience and to meet local management needs. Self-pay stations may stand alone as the primary means for fee collection, or complement other fee collection methods. Self-pay stations may be simple honor vaults or may be automated units that can be drive-up or gate automated, may accept tokens, credit cards, or currency, may operate traffic lights, etc. The units should be constructed of commercial quality vandal-resistant materials. Table 4.6 contains guidelines for self-pay stations. Generally, the self-pay station area design shall accommodate:

- Customer convenience, safety, and ease of use.
- Aesthetics, economy, and ease of maintenance.
- Protection from vehicle traffic.
- Good lighting and visibility.
- Security of funds.

4.10.1 Honor Vaults. Honor vaults are commercially available and shall be set in concrete to prevent theft. Guidelines on acceptable honor vault systems are available in Appendix O of EP 1130-2-550 (Photos I-15, I-16, I-17, and I-18).

4.10.2 Automated Self-Pay Stations. Automated self-pay stations should be factory wired, assembled, tested, and warranted for service. The availability of electric and phone service should be confirmed early in the planning process. Electrical service is required for area lighting, automatic gate arms, area security, etc. Use of telephonic remote access is encouraged for effective management to verify credit cards, enable remote communication and troubleshooting, change messages, conduct spot audits, and verify facility alarms. The planning process for automated units should include exploration of the latest technology since rapid advancements may supercede this guidance.

Table 4.6

Self-Pay Stations (Photos I-15, I-16, I-17, I-18, I-19, I-20, and I-21)	
Access, Location, Parking & Lighting	
Located to maintain sight distance for safety and facility identification	Required
Vehicle circulation simple, direct, and obvious to the driver	Required
Vehicles exiting the pay station oriented toward the park interior	Recommended
Located near entry to a recreation area and adjacent to access gates, entrance stations, vehicle pull-offs, or other areas away from traffic	Recommended
In areas without an entrance station, located a minimum of 200 ft (61 m) from the main road	Recommended
Access to the pay station paved consistent with adjoining roadway	Recommended
Parking located outside of traffic flow and within 50 ft (15.2 m) of the pay station	Recommended
Parking and access provide pull-through capability and accommodate vehicles towing trailers	Recommended
Parking that does not require crossing traffic and includes a marked pedestrian walkway to the pay station	Recommended

Self-Pay Stations (Photos I-15, I-16, I-17, I-18, I-19, I-20, and I-21)	
Access, Location, Parking & Lighting	
Lighted within a 50-ft (15.2-m) radius to an average of 20 lux (2 FC) in accordance with guidance provided in 2.10.4.1.	Recommended
Funds Security Features: Automated Self-Pay Stations	
Reports features that allow ongoing audits of the system, including records of funds retrievals (Photo I-20)	Required
Customer Accommodations	
User instructions conveniently posted and easy to understand	Required
Park information conveniently posted, including rates, area map, park rules, emergency phone numbers	Recommended
Walk-up service provided due to height differential on various vehicles	Recommended
Designed to accommodate daily seasonal or partial park closure for safety, security, and economy	Recommended
Additional Customer Accommodations: Automated Self-Pay Stations	
Accommodation for visually- and hearing-impaired customers	Recommended
Programmed in multiple languages where needed	Recommended
Change dispenser	Recommended
Dispensing unit for magnetic pre-coded permits that allow return visits (i.e., same-day returns for day use)	Recommended
Oriented, shielded, or screened for sunlight glare reduction	Recommended
Back-up capability such as honor vault incorporated for “down time”	Recommended

4.11 Other Support Facilities. Other facilities may be provided to meet specific customer and safety needs. As with all park facilities, the design and planning of miscellaneous service facilities should be considered with long-term economy and public safety in mind. Some collateral support facilities, such as sanitary facilities, drinking fountains, telephones, and informational signs, are covered in other chapters of this manual.

CHAPTER 5

Specific Areas

5.1 Introduction. This chapter provides design guidance for specific types of recreation areas when they are included in new construction or rehabilitation of facilities.

5.2 General Considerations. Chapters 1 and 2 outline general considerations that apply to the design and rehabilitation of specific areas. Three topics that are covered in detail in those chapters are also mentioned here for emphasis.

5.2.1 Universal Accessibility (UA). All new and updated facilities and environments shall be designed to be universally accessible. The target is for 100 percent of facilities such as campsites and picnic sites to be universally accessible. The standard that must be met is that the minimum number of universally accessible facilities such as campsites and picnic sites comply with current UA guidance (Para. 1.19).

5.2.2 Consideration of Seasonal Fluctuations. When designing and developing lake and riverside facilities, seasonal fluctuations in water levels shall be taken into consideration to avoid the placement of facilities in hazardous or high-maintenance areas. When planning lakeside development, the five-year flood frequency is a good general guideline although there may be other factors to consider (Para. 2.2.1).

5.2.3 Utilities Placement. Power and communication lines inside recreation areas should be placed underground. If overhead power lines are absolutely necessary they shall be placed where they will not become a safety hazard and in accordance with ER 1110-2-4401, “Engineering and Design - Clearances for Electric Power Supply Lines and Communication Lines Over Reservoirs” (see also Paras. 2.11.1.3 and 2.11.3).

5.3 Campgrounds. Camping areas are provided at projects as designated in an approved master plan or other approved documents. Various levels of campground development can be provided to satisfy diverse camper preferences. Camper surveys indicate a preference for water-oriented campsites. Table 5.1 contains some general considerations for campgrounds (Drawing C-1).

Table 5.1

Campgrounds – General Considerations	
Physically separated from day use areas	Required
Single point of entry to the campground provided	Required
Designed and developed to offer a variety of facilities and camping experiences	Required
Existing vegetation preserved for screening, buffering, and shade. Climate and geographic location mandate amount of shade and screening that is desirable for each development	Required
Access to sanitary dump station provided (except primitive areas) (Para. 3.8, Drawing C-8, Photos L-4 and L-5)	Required
Additional (or dual) sanitary dump stations provided for campgrounds with more than 125 sites	Recommended
Automatic gates that can be operated from inside the entrance station and that allow after-hours departures (Photo J-11)	Recommended
All campsites in an area have firm and stable access routes to the hardened living area	Required
All Park Attendant campsites in the campground are universally accessible	Required
RV sites placed on relatively flat areas to avoid: - Sloped sites that will not accommodate RVs - Excessive site work required to create level site	Recommended
Camping spurs should follow existing topography (Photos M-7 and M-8)	Recommended
Use more rugged terrain with fewer level areas for more primitive campsite developments	Optional

5.3.1 Campsite Types and Placement. Campgrounds may be developed with a range of campsite types from fairly primitive tent-only sites to highly developed multipurpose sites that will accommodate modern recreational vehicles (Drawings C-4, C-5, C-6, and C-7). Campgrounds may also include group and multi-unit campsites (Photo M-12). This provides a diversity of camping opportunities to accommodate different user types and groups, including persons with disabilities (Photos M-5 and M-6). Campsites may also be more efficiently sited within a campground

by utilizing a range of campsite types with differing spatial and spacing requirements.

5.3.1.1 Group Campsites. Where feasible, group campsites may be provided within a campground or in close proximity to an existing campground (Photo M-12). Ideally, group sites should be located some distance from other campers to prevent noise conflicts. Communal facilities such as shelters with picnic tables and group grill, shower houses, campfire circles, and open gathering spaces may be included in these areas.

5.3.1.2 Park Attendant and Volunteer Campground Host Campsites. Campsites of this type should be located near the campground entrance, preferably inside the gates (Photo M-13). This facilitates attendants' observation of both the entrance station and activities within the campground, and helps campers easily locate attendants in the event of an emergency. While the configuration of these sites may be similar to other campsites within a campground, they should be separate and screened for privacy.

5.3.2 Campsite Amenities and Support Items. Table 5.2 summarizes amenities and support items to be provided for typical multi-purpose campsites, tent-only sites, and campsites designated for Park Attendants including Volunteer Hosts. Guidelines for many of these items are addressed in Chapter 4 – "Support Items," the remainder are outlined in later sections of this chapter.

Table 5.2

Campsite Amenities and Support Item Checklist				
Item	**Multi-Purpose Site**	**Park Attendant Site**	**Tent-Only Site**	**Group Site**
Hardened impact area	Required	Required	Required	Required
Water (within 500 ft (152 m))	Required	Required	Recommended	Required
Picnic table	Required	Required	Required	Required
Fire ring/grill	Required	Required	Required	Required
Lantern hanger	Required	Required	Required	Required

Campsite Amenities and Support Item Checklist				
Item	**Multi-Purpose Site**	**Park Attendant Site**	**Tent-Only Site**	**Group Site**
Restroom (within 500 ft (152 m))	Required	Recommended	Required (except for primitive sites)	Required
Trash service	Required	Required	Required (except for primitive sites)	Required
Level parking spur	Required	Required	Recommended	Required
Access to additional parking	Required	Required	Optional	Required
Additional on-site parking (1-3 spaces)	Recommended	Recommended	Optional	Required
Individual water hookup	Recommended	Required	Optional	Optional
Individual electrical hookup	Recommended	Required	Optional	Optional
Individual sewage hookup	Optional	Required	Optional	Optional
Utility table	Optional	Recommended	Optional	Recommended
Pedestal grill	Optional	Optional	Optional	Optional
Group grill	Optional	N/A	Optional	Required
Tent pad (minimum 16 ft X 16 ft)	Optional	Optional	Optional	Optional
Shower house access	Recommended	Optional	Recommended	Recommended
RV pull through	Optional	Optional	N/A	Optional
Level, hardened spur for RV	Recommended	Required	N/A	Recommended

Campsite Amenities and Support Item Checklist				
Item	**Multi-Purpose Site**	**Park Attendant Site**	**Tent-Only Site**	**Group Site**
Multi-unit sites (Drawing C-5) (# based on user demand)	Optional	N/A	Optional	N/A
Individual shade shelter	Optional	Optional	Optional	Optional
Group shelter	Optional	N/A	N/A	Recommended
Small storage building	N/A	Recommended	N/A	N/A
Dedicated telephone line	N/A	Required	N/A	N/A

5.3.3 Campsite Design Guidelines. Table 5.3 provides general guidelines for individual campsite design.

Table 5.3

Campsite Design Guidelines (Drawing C-4)		
Item	**Criteria**	**Clarification**
Minimum width of vehicle spur	12 ft (3.7 m) Required	Widths greater than 12 ft (3.7 m) encouraged to provide extra parking at the site
Back-in campsite, standard length where terrain allows	Minimum 70 ft (21 m) Required	Site length measured from edge of road at the shortest side of the campsite. Shorter lengths acceptable if terrain and land base restrictions dictate. At least 30 ft (9.1 m) (where the RV will park) shall be level.
Back-in campsite alignment	40-60 deg angle Recommended	Angle measured from center line of road

Campsite Design Guidelines (Drawing C-4)		
Item	**Criteria**	**Clarification**
Pull-through campsite, spur width	Minimum 12 ft (3.7 m) wide Required	With 30-ft minimum turning radius in camping unit parking area measured from edge of road at the shortest side of the campsite
Pull-through campsite, parking area length	Minimum 70 ft (21 m) Required	Minimum length of parking area within the pull-through, measured from edge of road at the shortest side of the campsite
Pull-through campsite access	On right side of road Recommended	On right side of road when facing direction of traffic flow, so that RV living area faces away from the road
Campsite spacing, standard when terrain allows	Minimum 50-100 ft (15.2-30.5 m) Recommended	Measured center-to-center. Center defined as middle point of the hardened living area and hardened parking area combined
Campsite spacing, minimum overall average regardless of terrain	Minimum 75 ft (22.9 m) Recommended	Minimum overall average of center-to-center campsite distances in any one campground
Vertical curve	15 ft (4.6 m) Recommended	Measured from access road intersection with spur, when greater than 5 degrees up- or down-slope from access road to spur (Drawing C-5)
Placement of low-profile wheel stop	Minimum of 1 ft (0.3 m) from back edge of site Recommended	Wheel stop itself is optional. If placed, this is the recommended location
Campsite parking material	Crusher run or graded aggregate base rock Recommended	For ease of maintenance, initial economy, customer convenience

Campsite Design Guidelines (Drawing C-4)		
Item	**Criteria**	**Clarification**
Parking spaces for additional vehicles	Recommended	Built into the site as space allows
Natural buffer between campsites	Optional	Buffer of plants or trees (either existing or planted) encouraged where practical

5.3.3.1 Hardened Living Areas. The configuration of the campsite living area is dependent upon terrain, vegetation, or placement of the individual site amenities. The living area should fit within the site, conforming to the existing character as much as possible. Limited use of stair-stepped or terraced configurations in the living area is permissible when necessary due to terrain, and the living area may be sited in close proximity to existing trees or vegetation. Table 5.4 provides guidance for hardened living areas (Photos M-1, M-4, M-5, and M-6).

Table 5.4

Campsite Hardened Living Areas Checklist (Drawings C-4, C-6, and C-7)	
A hardened living area with a fine crushed stone or other hard surface provided for each campsite	Required
Bordered by concrete curbing, plastic timbers, or other approved materials	Required
Located on the passenger side of a back-in or pull-through spur	Required
Covers an area up to 625 ft^2 (62 m^2)	Required
An 18-ft (6.1 m) unobstructed area, measured from the utility pedestals into the hardened area, provided to accommodate RV slide-outs	Recommended

5.3.3.2 Utilities. Table 5.5 provides guidance for placement of utilities for campsites.

5.3.3.3 Tent Pads. Tent pads may be provided at selected campsites. The location of tent pads may vary due to terrain or existing vegetation. Table 5.6 provides guidance for tent pads.

Table 5.5

Utilities Checklist (Drawings C-4, C-6, and C-7)	
Water (Also reference table 4.4 for location/placement and construction and design features)	
As a minimum, one water spigot shall be provided per four campsites.	Required
Electric Pedestals	
Have 50-, 30-, and 20-amp (GFCI) hookups located at the pedestal (Photo M-15)	Required
Located: - Eleven ft from the center of the pad - Between 5 and 15 ft (1.5 and 4.6 m) from the back of the pad - At the driver side rear of the campsite	Required
Sewer Hookups	
Provided at individual sites where demand exists and local factors allow for installation	Optional
Where provided, sewer hookups located on the driver side minimum of 5 ft (1.5 m) forward of the utility pedestal	Recommended

Table 5.6

Tent Pads Checklist	
Have a hardened surface to provide a durable all-weather surface for campers. Crushed stone (screenings) is recommended surface	Required
Bordered by concrete curbing, plastic timbers, or other approved materials	Required
Minimum of 16 ft x 16 ft (4.9 m x 4.9 m) standard size	Required
Can be detached from the living area as long as the tent pad remains in close proximity with a pathway connecting both elements	Optional

5.4 Day Use Areas. Day use areas are provided at projects as designated in an approved master plan or other approved documents. Typical day use activities include picnicking, swimming, and boat launching (Drawings D-1 and D-2). Water

frontage, shade, and an aesthetic view enhance day use activities. Table 5.7 contains general considerations for day use areas. Guidance for specific types of day use areas is provided in the sections that follow.

Table 5.7

Day Use Areas – General Considerations	
Physically separated from campgrounds, marinas, or other types of potentially conflicting uses	Required
Activities and facilities easily accessible by vehicles and pedestrians	Required
Convenient, adequate parking provided	Required
Existing vegetation preserved for screening, buffering, and shade. Climate and geographic location mandate amount of shade that is desirable for each development.	Required
Designed to provide natural settings and to protect the environment	Required
At major day use areas, automatic gates which can be operated from inside the entrance station	Recommended

5.4.1 Boat Launch Ramps / Lake and River Access. Boat launch ramps shall provide convenient and safe public access to the water (Drawings E-1 and E-2). Table 5.8 provides guidance on design features for these facilities. Additional information on ramps and ramp facilities is available in EM 1110-2-410, Chapter 4.

Table 5.8

Boat Launch Ramps/Lake And River Access Design Features	
General (Photos N-1, N-2, N-3, and N-4)	
Each lake provides ramp access for extreme high and low water conditions	Recommended
Upper limit of launch lane extends a minimum of 1 ft (0.3 m) above ordinary high water elevation (Drawing E-3)	Recommended
Lower limit of a launch lane extends a minimum of 4 ft (1.2 m) below the typical low water elevation (Drawing E-3)	Recommended
Minimum launch lane width of 15 ft (4.6 m) (Drawings E-4 and E-5)	Required

Boat Launch Ramps/Lake And River Access Design Features	
General (Photos N-1, N-2, N-3, and N-4)	
Launch ramp slopes (Drawing E-3): - Minimum of 12 degrees - Maximum of 16 degrees	Required
Launch ramps' placement avoids areas subject to high wind and wave action, strong currents or high sedimentation	Recommended
Reinforced retaining walls not less than 1 ft (0.3 m) thick and 2 ft (0.6) deep constructed at the edges of all poured-in-place ramps to prevent undercutting (Drawing E-6)	Recommended
All launch ramp sites protected from wave erosion. Ramps with: - Low exposure use riprap or quarry run rock at a minimum - Moderate exposure incorporates breakwaters or jetties	Recommended
Capacity (Drawings E-4 and E-5)	
Minimum of two lanes for standard launch ramps, with actual number of lanes determined by usage demand (Photo N-2)	Required
Additional launch lanes considered where launch line waiting time exceeds 10 min during peak periods, and carrying capacity makes additional lanes feasible (Photo N-1)	Recommended
Approach	
Access roads to launch ramps require a deliberate turn from the approach onto the ramp (Drawing E-2). If a deliberate turn is not possible, use traffic control devices such as barricades, traffic islands, or berms to alert drivers that access roads are in direct alignment with the ramp	Required
A vertical curve (minimum of 15 ft (4.6 m)) constructed at the top of the ramp to: - Enhance the driver's vision while backing a trailer - Prevent dragging on the ramp surface at the juncture of the ramp apron (Drawing E-3)	Required
A ramp approach apron turnaround included with a minimum diameter of 75 ft (22.9 m) (Drawing E-4)	Recommended

Boat Launch Ramps/Lake And River Access Design Features	
Surface & Materials	
Launch ramp and ramp approach turnaround apron constructed of reinforced concrete: minimum thickness of 6 in. over a 6-in. base of compacted aggregate	Required
A finished launch ramp surface of 1 in. by 1-in. “V” grooves to provide maximum traction and make the surface self-cleaning: - Aligned at 60 degrees to the longitudinal axis - “V” groove direction alternated from lane to lane to aid in launch lane delineation (Drawing E-4)	Required
Poured-in-place concrete ramps preferred. Pre-cast concrete units used where site conditions dictate.	Recommended
Access & Amenities	
Courtesy Docks provided (Para. 5.4.2)	Required
UA loading platform or other UA boarding means provided (additional information at NRM Gateway Website on the “Accessibility” page) (Drawings E-1 and E-2, Photos N-11 and N-12)	Required
Area lighting illuminates the launch ramp, parking area, and tie-down area	Required
Water safety, emergency phone numbers, and Title 36 regulations posted on protected bulletin boards that are located so that boaters see them before entering the water (Drawings E-1 and E-2)	Required
Restroom provided within 500 ft (152 m)	Required
Ramp sites easily accessible from main access roads	Recommended
Tie-down lane, turnout or temporary parking spaces for boat rigging and de-rigging provided at each launch ramp area to minimize traffic congestion at the approach and exit. Room to park and walk around vehicle and trailer out of the traffic lanes provided (14 x 100 ft (4.2 x 30.5 m) minimum) (Drawings E-1 and E-2, Photo N-4)	Recommended
Reflectors and/or painted lines used to delineate boat launching lanes	Recommended

Boat Launch Ramps/Lake And River Access Design Features	
Access & Amenities	
Flexible markers installed along the exterior edges to help boaters identify the ramp's edge	Optional

5.4.2 Courtesy Docks. Courtesy docks shall be provided at launch ramps for short-term docking, loading of gear, and passenger safety and convenience. Docks shall have a minimum width of 6 ft (1.8 m) and a minimum length of 20 ft (6.1 m). Docks should be located to avoid boat traffic congestion and ensure continued use of the ramp. Fixed piers or stationary loading docks should be used if the water fluctuation difference is less than 3 ft or when wind, wave, and rapid current action make other types impractical. Portable facilities such as floating docks, cable- guided docks, and push-pull docks on skids, or multilevel fixed piers should be used when water levels fluctuate more than 3-ft. Table 5.9 contains design guidance for courtesy docks.

Table 5.9

Courtesy Dock and Fishing Pier/Dock Design Features (Drawings F-1, F-2, F-3, and F-4) (Photos N-5, N-6, N-7, N-8, N-9, and N-10)	
General	
Maximum height of the deck above the water is 30 in. (0.8 m)	Required
Rust-resistant hardware	Required
Non-skid decking surface	Required
Rot-resistant construction materials	Required
Facility type: - Fixed pier where water fluctuates less than 3 ft (0.9 m) - Floating docks and platforms where water fluctuates more than 3 ft (0.9 m)	Recommended
Sidewalk access to docks (minimum 5 ft (1.5 m) wide)	Recommended
Flotation	
Fully encapsulated units resistant to oil, gas, marine organisms, and ultraviolet light	Required
Flotation units do not become waterlogged if punctured	Required
Gangways	
Minimum width 48 in. (1.2 m)	Required

Courtesy Dock and Fishing Pier/Dock Design Features (Drawings F-1, F-2, F-3, and F-4) (Photos N-5, N-6, N-7, N-8, N-9, and N-10)	
Gangways	
Handrails (34 in. high (0.9 m)) located on both sides if slope greater than 1:20 for UA. Guardrails 42 in. (1 m) high with an intermediate rail 21 in. (0.5 m) high (Drawing F-4)	Required
Capability to withstand a minimum live load of 50 psf (2393 pascal)	Required
Maximum gap height between the structure and the gangway lip not to exceed 1 in. for UA	Required
Attachments of the gangway to the dock, pier, or platform centered	Recommended
Special Considerations for Fishing Piers/Docks (Drawing F-3) (Photos N-13, N-14, N-15, N-16, N-17, and N-18)	
Fishing facilities such as piers and docks sized to carrying capacity and demonstrated need	Required
When safety railing is installed, 42 in. (1 m) high with a mid-rail 21 in. (0.5 m) high is the standard height, with lower sections dispersed throughout for UA	Required
Fishing rod notches are encouraged, spaced a maximum of 6 ft (1.8 m) apart (Photos N-17 and N-18)	Recommended

5.4.3 Shoreline Access and Fishing Facilities. Fishing platforms, piers, and docks are encouraged to enhance shoreline access and fishing opportunities. Where sufficient demand exists, fishing facility accommodations may be provided in conjunction with parking areas, picnic areas, and campgrounds. However, care should be taken to avoid interference with non-compatible facilities such as swim areas, boat ramps, or operational structures. Fishing facilities should be sited a minimum distance of 200 ft (61 m) from the edge of restricted use zones. Typical fishing access improvements may include:

- Road access.
- Parking area.
- Sanitary facilities.
- Trash facilities.
- Drinking water.
- Fee collection facilities.

- Signs and bulletin boards.
- Gate, fence, or other restrictive barrier.
- Fish-cleaning station.
- Fixed fishing pier.
- Floating fishing facility or icehouse.

Table 5.9 contains guidelines for fishing piers and docks. Table 5.10 contains guidelines for shoreline access and other fishing facilities.

Table 5.10

Shoreline Access and Fishing Facility Design Features	
Safe access to shoreline fishing developed in accordance with current UA standards, with target of 100% accessibility	Required
Where UA not possible, access may be: - Steps - Ramps - Grouted riprap	Required
Handrails provided in conjunction with stairways or ramps	Required
All concrete surfaces have rough-broom finish	Required
Located in areas that are safely and easily accessible to users, with adequate parking	Recommended
Fish habitat provided near the facility to improve fishing opportunities	Recommended
Of the possible amenities, emphasis on provision of: - Seating - Fishing wells - Fish-cleaning stations (Para. 3.7) - Shade - Trash receptacles	Recommended

5.4.4 Designated Swim Areas. Designated swim areas may be provided at lakes and rivers as authorized in the project master plan or other approved documents. Swim areas may be designed in support of multiple use activities, as single use areas, for use by a specific group or in conjunction with facilities such as shelters. Designs with moderate slopes allow for larger areas to be delineated and provide greater dispersion of swimmers. Historic water levels during the typical operating season should be assessed prior to final site selection. The slope of the land both above and below the water line is one of the determining

factors in the site selection for a good swim area. Moderate slopes are preferred because they allow larger areas to be buoyed to provide for greater dispersion of swimmers.

5.4.4.1 Swim Area Capacities. Swim area sizing should be based on the assumption that approximately 60 percent of the total number of bathers will be on the swim area at one time, with 30 percent in the water and 10 percent elsewhere. As a rule of thumb, a turnover factor of 3 will be used for design purposes. Ideally 50 ft^2 of sand and turf and 30 square feet of swimming area inside the buoyed safety area should be provided for each person. Swim area capacities will vary according to the attendance, supervision, size of swim area, anticipated usage, and type of swim area experience desired. Any space standard used to compute swim area capacity should be flexible enough to accommodate these factors. Parking areas should be sized to prevent overcrowding of swim areas.

5.4.4.2 Swim Area Design and Safety. Water quality and swim area planning must go hand in hand. The effects of the proposed swim area's physical site features on future operation and maintenance requirements must be considered as well. Safety of all users is the controlling factor at designated swim areas. It is paramount that the underwater swim area gradient be smooth and constant and that the underwater limit of this gradient be delineated in a manner that the user can easily recognize. These criteria meet user expectations for safe wading in a visually identified area. Table 5.11 contains swim area design and safety guidelines.

Table 5.11

Swim Area Design Guidelines (Drawings G-1, G-2, G-3, and G-4) (Photos O-1 and O-2)	
Pollution Protection & Water Quality	
Barriers and coves often offer protection against wind and wave action, but dead-water coves should be avoided. Swim areas shall be located where adequate water circulation is present to: - Assure continued acceptable water quality - Remove surface debris that may deposit on the swim area	Required
Swim area sites located in areas where extensive sedimentation will not be a problem	Required

Swim Area Design Guidelines (Drawings G-1, G-2, G-3, and G-4) (Photos O-1 and O-2)	
Pollution Protection & Water Quality	
Design of swim areas provides protection from boats, fuel spillage, and drainage from sewage and boat wakes	Required
Runoff and drainage with pollution potential from any area upland of the swim area must be diverted.	Required
Diversion methods should complement the swim area development and minimize impact to the site. Acceptable diversion methods include: - Grassed swales - Terracing - Inlets - Landscaped walls	Recommended
Gradient (Drawing G-4)	
Daily, seasonal, and yearly water level fluctuations due to irrigation, flood control, evaporation, power generation, or other factors must be considered in swim area design to assure optimum utilization	Required
Swim area gradient smooth and constant, without underwater obstructions, and designed to eliminate sudden changes in grade or drop-offs in the 0 to 5-ft (0 to 1.5-m) depth	Required
Slopes in the underwater portion of swim areas: - Range from 2% to 5% - Do not exceed 10%	Required
The maintained underwater gradient shall extend a minimum of 10 ft (3 m) beyond the delineated swim area	Required
The maintained underwater gradient shall be designed for water depths not to exceed 6 vertical ft (1.8 m) at the normal pool elevation typically experienced during the swimming season	Required
Delineation & Safety (Drawing G-3)	
Swim area limits shall be delineated (Photo O-1). Options include: - Floating pipeline - Buoy line	Required

Swim Area Design Guidelines (Drawings G-1, G-2, G-3, and G-4) (Photos O-1 and O-2)	
Delineation & Safety (Drawing G-3)	
A minimum of two depth markers (delineating each 1-ft (0.3-m) change in water depth) installed in the designated swimming area. The number of depth markers installed adequate for all water users to determine the water depth (Photo O-1)	Required
The recommended water depth within the delineated swim area is 3-ft (0.9-m), and should not exceed 5-ft (1.5-m)	Recommended
A minimum of 2 “Boats Keep Out” buoys installed not less than 100-ft (30.5-m) beyond the delineated swim area	Required
Water safety, emergency phone numbers, and Title 36 regulations posted on protected bulletin boards that are located so that swimmers see them before entering the area	Required
An effective means of communication for emergency services such as a nearby pay phone or call box provided at each designated swim area	Recommended
Life-saving devices such as a ring buoy and line, and/or a 10- to 12-ft (3- to 3.7-m) pole (shepherd’s hook) may be located at designated swim areas	Optional
Beach Surface	
Sand beach locations usually need a minimum depth of 20 in. (0.5 m) of sand	Recommended
A compacted gravel base for sand beaches overlying silt to prevent mud rising through the sand layer	Recommended
Concrete beaches may be installed	Optional

5.4.4.3 Swim Area Amenities. Swim areas are integral parts of many recreation area developments and should offer customer-focused amenities. Table 5.12 is a swim area amenities checklist.

Table 5.12

Swim Area Amenities Checklist (Drawings G-1 and G-2)	
Restrooms within 500 ft (152 m) of all designated swim areas (Table 3.3)	Required
Change facility or shower house provided (Para. 3.6, Photos K-12, K-13, and K-14)	Recommended
Swim areas developed with vehicular access in mind: - Vehicular access points do not interfere with other uses, create safety hazards, or adversely impact the area - Design teams consider entrances that are separated from other uses, and allow operational staff to control access into the swim area	Recommended
Parking areas located within 500 ft (152 m) of the swim area	Recommended
Parking requirements based on swim area capacity (Table 2.4)	Recommended
Walkways, ramps, and stairs provided between parking areas, support facilities and the swim area. A firm and stable path to the ordinary high-water mark provided to allow users to cross sand and other obstacles to the water	Recommended
Adequate seating provided to encourage adult supervision. Approximately 50% of seating areas should be shaded through vegetation, shelters, arbors, or other means	Recommended
Trash collection facilities convenient to the swim area to reduce the need for swim area cleanup	Recommended
When practical, a grass sunbathing area may be provided adjacent to the swim area and separated from parking areas with an adequate buffer zone. Shading of the grass area should not exceed 50%. Existing trees preserved where practical	Optional
In highuse areas, consideration should be given to screening the beach from the parking lot and access road to discourage cruising and resulting traffic problems	Optional

5.4.5 Picnic Sites. Table 5.13 provides guidelines for individual and multi-table picnic sites. Group shelter

guidelines may be referenced at paragraph 3.4. Single or Multi-Table Picnic Site Amenities. Table 5.14 is a checklist of amenities for a standard picnic site.

Table 5.13

Picnic Site Design Guidelines (Drawing H-2)	
Separated from non-compatible uses such as campgrounds and marinas by a minimum of 200 ft (61 m)	Required
Scattered throughout a day use area, and developed to provide water frontage, shade and aesthetic views	Recommended
Located within 500 ft (152 m) of a restroom facility	Recommended
Trees or structures shade at least 50% of sites (Photos P-11, P-12, and P-13)	Recommended
Located in conjunction with other amenities like swim areas, open fields, and playgrounds	Recommended
Located at least 50 ft (15.2 m) from main park circulation roads	Recommended
Parking located from 40 to 200 ft (12.2 to 61 m)from the picnic site	Recommended
Picnic sites separated a minimum of 30 ft (9.1 m) from center to center of hardened pad	Recommended
In addition to individual picnic sites, consider multi-table picnic sites of 2-6 tables to accommodate customer demand (Photo P-14)	Recommended

Table 5.14

Picnic Site Amenities Checklist (Drawing H-2)	
Access to trash facilities. At parks using individual trash receptacles, one container provided for every four tables	Required
Pedestal grill	Required
Access to drinking water	Recommended
At a multi-table site, a larger grill should be provided (Photos P-5, P-8, P-10)	Recommended
Concrete pad and/or shelter (shade) (Photos P-11 and P-12)	Optional

5.4.6 Playgrounds. Playgrounds should be integrated within the site with access to parking and safe pedestrian access routes that provide separation from vehicular traffic. Playgrounds should be located in close proximity to other high-use activities such as group use facilities. The shape or limits of playgrounds are influenced by the existing conditions of the site and the play components that are provided. The playground area may be defined to allow the placement of desirable trees within the limits of the playground to provide shade. The National Recreation and Parks Association (NRPA) is a good source of information on playground safety and inspector certification. The Architectural and Transportation Barriers Compliance Board ("Access Board") has developed accessibility guidelines for newly constructed and altered play areas that supplement the Americans with Disabilities Act Accessibility Guidelines (ADAAG) (see NRM Gateway Website on the "Accessibility" page, "Policy and Procedures" at http://corpslakes.usace.army.mil/employees/access/policy.html). Table 5.15 contains playground design guidelines (Photos Q-1, Q-2, Q-3, and Q-4).

Table 5.15

Playground Design Guidelines	
All play areas, surfaces, and facilities shall meet: - Consumer Product Safety Commission (CPSC) guidelines for safety - American Society for Testing and Materials (ASTM) Standard Consumer Safety Performance Specifications for Playground Equipment for Public Use - When in conflict, the stricter standard will prevail	Required
Benches shall be provided at every playground, to encourage adult supervision of children. At least one to be located in the shade	Required
Restroom located within 500 ft (152 m)	Required
Drinking fountain provided near the playground	Required
Site graded for adequate drainage	Required
Slides positioned to face north or east in order to avoid heat from southern or western sun exposure	Recommended
Low tree limbs removed to discourage climbing	Recommended

Playground Design Guidelines	
Play area built above the ground with edge material raising the finished grade of the playground area a minimum of 6 in. (150 mm), bordered by concrete curbing, plastic timbers, or other approved materials	Recommended
Provide a separation of uses for children between the ages of 3 and 5 and the ages of 6 and 13 when possible	Recommended
Safety, low maintenance, and durability are primary concerns in choosing playground equipment. Pre-manufactured, modular, commercial-grade equipment is the most durable in most instances.	Recommended
Minimum of one playground provided for each park where activities such as camping or picnicking take place	Recommended
Located a minimum of 50 ft (15.2 m) from any roadway	Recommended
Trees or structures shade approximately 50% of the playground from direct sunlight	Recommended

5.4.7 Open-Field Play Areas. Open-field play areas typically support team sport activities such as soccer, volleyball, and badminton, and serve large groups and extended family gatherings. Two to four acres of open-field should be provided for these activities where demand exists and terrain permits. Open-field play areas should be provided for all age groups, with consideration given to participation by persons with disabilities. These areas shall be designed with distinct boundaries to separate users from spectators and minimize environmental impacts. Table 5.16 contains open-field play area guidelines (Photos Q-5 and Q-6).

Table 5.16

Open-field Play Area Guidelines	
Open-field play areas located in conjunction with other facilities such as parking, restrooms, and group shelters	Recommended
Consider additional amenities such as benches, trash receptacles, trails, fencing and lights for nighttime activities	Recommended
Areas sited so that the need for pedestrians to cross roadways is eliminated	Recommended

Open-field Play Area Guidelines	
Where pedestrian crossings do occur: - Provide an adequate line of sight and stopping distance along the roadway - Adequately sign and mark crossings - Consider use of speed-control devices such as rumble strips or speed bumps	Recommended
Game facilities such as volleyball, badminton, soccer, and softball each should be orientated in a north/south direction to prevent participants from looking directly into the sun in the morning and evening	Recommended

5.4.8 Interpretive Facilities. Interpretive facilities may be used to interpret man-made, natural, and cultural resources. They may also be provided to interpret major lake features, resources, events, Corps history and mission, or management practices.

5.4.8.1 Amphitheaters. Amphitheater facilities should be constructed of materials that are indigenous to the site or reminiscent of a local character and style so that the structure blends with the natural environment of the park. Durable construction materials that can withstand exposure to weather and the year-round impacts of users should be used (Photo M-16). Table 5.17 contains amphitheater design guidelines (Drawing C-10).

Table 5.17

Amphitheater Design Guidelines	
Sited to minimize distracting noises from boats, campsites, or other activities	Required
Impact areas such as walkways, aisles and the area in front of benches surfaced with gravel or crushed stone to provide a firm and stable surface	Required
Accessible seating areas and companion seats	Required
Permanent seating provided, fanning out from the stage	Recommended
Seating capacity: One seating space per campsite, day use site, or average number of group users at the facility being served	Recommended
Target audience has easy access from a trail or road	Recommended

Amphitheater Design Guidelines	
Located within 500 ft (152 m) of a parking area or pedestrian access	Recommended
Sited in a north-south direction to avoid direct exposure to the late afternoon sun	Recommended
Slope of the site does not exceed 30 degrees	Recommended
A flat or gently sloped area included within the area for lawn chairs, blankets, etc.	Recommended
Fire rings located downwind from the screen and seating area	Recommended
Vehicle and exterior lights screened to prevent them from shining on the projection screen or stage area	Recommended
Lighting with adjustable illumination levels provided along walking paths and in the stage area	Recommended
Drinking fountain and restroom provided within 500 ft (152 m)	Recommended
Stage/backdrop provided for use during slide shows or movies	Recommended
Projection screen no larger than 12 ft x 12 ft (3.7 m x 3.7 m), painted flat white surrounded with a dull black border	Recommended
Electricity with GFCI provided to support necessary equipment, with all electrical outlets and switches protected to prevent vandalism and misuse	Recommended
A speaker podium, stage area, campfire circle, and lockable storage area for supporting equipment may be provided	Optional

5.4.8.2 Campfire Circles. Campfire circles are interpretive facilities that are located near group gathering areas or interpretive facilities. One or more campfire circles may be located in an area served by a larger amphitheater for presentations without audiovisual support, including user-initiated activities. A 10-ft (3-m) vertical clear space above the campfire circle should be provided to avoid damage to trees. Campfire circles should be constructed on a coarse aggregate porous base to promote drainage.

5.4.8.3 Kiosks. Kiosks are stand-alone interpretive structures that may serve a variety of purposes within recreation areas. They are typically comprised of a covered structure with provisions for small bulletin boards, and pockets for distribution of information. Provision of Internet service may be considered. Kiosks typically display both permanent and

temporary information, and may include: emergency phone numbers, hours of operation, general park information, Title 36 regulations, special events, location maps, site features, camping registration and fees. Table 5.18 contains kiosk design guidelines.

Table 5.18

Kiosk Design Guidelines	
Kiosks shall be located in selected areas of high activity where interpretation can be effective, and many people will have access to the posted information. Ideal locations include main entrances near parking areas, trailheads, and group picnic sites or restrooms	Required
The kiosk area as well as the materials posted on the kiosk must meet UA requirements (posted height of materials, font, etc.)	Required
Provide bilingual or multilingual information where appropriate	Recommended
During the evening hours, a light source should be provided so that the kiosk is readable and safe in low light conditions	Recommended
Kiosks may include multimedia presentations	Optional

5.4.8.4 Bulletin Boards. Bulletin boards can be used to display permanent or temporary information. Table 5.19 contains design guidelines for bulletin boards.

Table 5.19

Bulletin Board Design Guidelines	
As a minimum, a secured bulletin board, protected from the elements (i.e. provide a roof overhang and/or lexan cover) installed in each recreation area	Required
Roof overhangs constructed to provide adequate clearance to prevent injury to customers	Required
The bulletin board shall meet UA requirements. The materials posted shall also meet UA requirements (posted height of materials, font, etc.)	Required
Provide bilingual or multilingual information where appropriate	Recommended

Bulletin Board Design Guidelines	
Bulletin boards may be freestanding, mounted on existing exterior structures (Photo I-6), or installed in buildings	Optional

5.4.8.5 Wayside Exhibits/Overlooks. Table 5.20 contains design guidelines for wayside exhibits and overlooks.

- Wayside Exhibits. Wayside exhibits are a form of interpretive signage that may include plaques and markers along roadways or at scenic overlooks. Wayside exhibits provide interpretation without the service of staff members. The information on these panels is usually permanent and specific to the location.
- Overlooks. Overlooks are usually larger scale interpretive areas that may be developed to provide a view of features with outstanding scenic value, unique interest to the visitor, or a view of a lake.

Table 5.20

Wayside Exhibits and Overlooks Design Guidelines	
Location	
Waysides and overlooks adjacent to steep slopes located so that a minimum of vegetation clearing is necessary	Recommended
Where wholesale clearing is unavoidable for the desired site, consult a professional geotechnical engineer about the potential slope destabilization that should be factored into final site selection or site work	Recommended
Exhibits	
Exhibits placed approximately 90 degrees from the parking area and screened using natural or man-made materials to discourage vandalism by persons in passing vehicles	Recommended
Weather- and vandal-resistant display materials used	Recommended
Overlooks	
Design ensures the safety of the viewing public	Required
Design of overlook in harmony with the surrounding area and relates to the feature being viewed	Recommended
Adequate parking provided	Recommended

Wayside Exhibits and Overlooks Design Guidelines	
Location	
Interpretive signs, plaques, or other interpretive devices incorporated into the design	Optional
Sanitary facilities provided	Optional

5.4.8.6 Visitor Centers. Visitor centers are being addressed separately by a Visitor Center Initiative Team and are beyond the scope of this document. Visitor center guidance and policy is available on the NRM Gateway Website "Visitor Center Program" page.

5.4.9 Trails. EM 1110-2-410, "Design of Recreation Areas - Access and Circulation," contains detailed specifications for trails.

5.4.10 Marinas. RESERVED

CHAPTER 6

Customer Service Standards

6.1 Purpose. This chapter establishes Customer Service Standards for the USACE recreation program.

6.2 Policy. A Customer Service program shall be established and implemented at each Corps project. This program shall be designed to accomplish the following goals:

6.2.1 Ensure that interactions with our customers project a positive image of the Corps and are responsive to customer needs and expectations.

6.2.2 Provide adequate communications channels for the public.

6.2.3 Provide the customer with timely and accurate information.

6.2.4 Provide the customer with quality facilities and services that ensure a clean, safe, and healthful recreation area environment.

6.2.5 Monitor customer needs and satisfaction levels, and incorporate appropriate organizational responses into annual work plans, budget requests, and future development plans.

6.3 Customer Outreach. Managers and project staff should take advantage of conferences, workshops and other outreach activities to better identify and meet the needs of our customers. It is imperative that we understand our current and potential customers, including emerging and underserved populations such as ethnic groups and persons with disabilities. More information is available on the “Customer Service” page on the NRM Gateway Website.

6.4 Interaction With Our Customers. Park Rangers, Park Managers, maintenance staff, administrative staff, park attendants, visitor center staff, volunteers, and other employees are public relations representatives for the Corps of Engineers. All dealings with the public shall be conducted in a professional manner that presents a positive image. Standards for these interactions include:

6.4.1 Employees shall not discriminate against any customer for any reason. All customers should feel comfortable in our areas.

6.4.2 Employees shall maintain a professional appearance.

6.4.3 Employees shall greet customers in a friendly, courteous, respectful, professional and appropriate manner in all situations.

6.4.4 All employees shall be responsive to and demonstrate a willingness to promptly help customers. Customers are a part of our job, not an interruption.

6.5 Communication Channels. Project offices will maintain multiple channels of communication with customers. Table 6.1 summarizes the communications channels. Customer inquiries should be handled as soon as possible, with interim replies if a concern cannot be addressed expeditiously. Quick response builds customer loyalty. Locations with multiethnic use should provide language skills training for staff and recruit bilingual staff to ensure effectiveness of communications with customers. Bilingual or multilingual information for the various communication channels should be provided where appropriate.

Table 6.1

Customer Communications Channels for Project Offices	
Maintain regular hours of operation for in-person visits, with office hours posted at prominent locations	Required
Webpage, regularly updated	Required
Email address	Required
After-hours voicemail or answering machine	Required
Fax	Required
Telephone: - Avoid automated answering systems during normal business hours - Provide a toll-free telephone number when economically feasible - Call forwarding to cell phones - Volunteer office help	 Recommended Recommended Optional Optional

6.6 Customer Feedback. Gathering and analyzing customer feedback is crucial to our ability to provide high-quality services that meet customer expectations. This will allow each

project to establish a baseline of customer satisfaction with facilities and services, and to track trends over time.

6.6.1 Gathering Customer Feedback.

6.6.1.1 Customer Comment Cards. At a minimum, the Office of Management and Budget (OMB)-approved customer comment cards developed by the Engineer Research and Development Center (ERDC) will be utilized to gather customer feedback. The NRM Gateway is the source for the current version of and the instructions for administering customer comment cards (see the “Customer Service” page on the NRM Gateway Website).

6.6.1.2 Surveys. Surveys (excluding the OMB-approved customer comment cards) must be coordinated through ERDC to ensure that appropriate OMB approval is in place for all feedback mechanisms used.

6.6.1.3 Customer Discussions. Casual one-on-one conversations with customers in recreation areas are encouraged to supplement formal surveys. The “Customer Discussion Guide” and procedures (Appendix S) posted on the NRM Gateway provide a tool to gather such information.

6.6.1.4 Listening Sessions. On-site group listening sessions in recreation areas have proved to be extremely successful methods of gaining customer feedback.

6.6.1.5 Project Open Houses. Open houses give customers the opportunity to air their concerns and are an effective tool to gauge how we are doing.

6.6.2 Analyzing Customer Feedback. Customer feedback will be evaluated at the project level to identify customers’ current satisfaction levels, the kind and quality of services and facilities desired, and the associated relative importance. Results from customer comment cards and the “Customer Discussion Guide” can be analyzed locally using analysis software packages that are available on the NRM Gateway (see the “Customer Service” page on the NRM Gateway Website). ERDC is available to provide analytical support on customized surveys to meet individualized local needs.

6.6.3 Response. Based on customer feedback, managers should respond to the needs of current users, under-served populations, and predict future trends. This includes incorporating needed facilities and services into annual and

long-range work plans for the project. The goal is improvement in customer satisfaction over time.

6.6.4 Trends Analysis. Annual customer feedback data will be analyzed and compared with previous years' results to identify trends. Long-term survey results will provide the manager with trends in customer satisfaction levels over time. Notable or unusual trends should be shared with others who may be affected through lessons learned posted on the "Customer Service" page on the NRM Gateway Website.

6.7 Local Levels of Services.

6.7.1 Local Determination. Because peak and non-peak operating seasons and customer needs vary from project to project, it is necessary that levels of service be determined locally. Customer feedback should be utilized to establish and refine acceptable levels of service. Feedback must be current to assure local service standards are accurate.

6.7.2 Service Categories. Local service levels meeting customer needs shall be developed for:

- Safety and security
- Cleanliness of facilities
- Appearance and maintenance of grounds and facilities
- Available, friendly, knowledgeable and efficient staff
- Recreation Use Fee collection, e.g., method, type, cycletime, user friendliness

6.7.3 Best Management Practices. The NRM Gateway Website page on "Customer Service" should be referenced for best management practices regarding local levels of services to improve customer satisfaction.

CHAPTER 7

Evaluation of Recreation Program and Facilities

7.1 Purpose. This chapter establishes the policy for the evaluation of facilities and services in Corps-operated recreation areas.

7.2 Policy. It is the policy of the Corps of Engineers that an evaluation program shall be established and implemented at each project. This program's activities shall be designed to accomplish the following goals:

7.2.1 Ensure Appropriate Customer Service Levels. Consistent application of the program should help maintain and improve customer service levels at Corps-managed recreation areas throughout the Nation.

7.2.2 Conduct Management Review of Operational Performance. The program will establish a mechanism for management review of the recreation program's operational performance.

7.2.3 Establish Funding Priorities. The program shall establish a mechanism to assist management in prioritizing and funding corrective action items necessary for efficient park operations.

7.3 Evaluation Program. The evaluation program consists of three components:

7.3.1 Routine Evaluations. Routine daily reporting of project conditions shall be performed at the project level to ensure that high levels of customer service are maintained. Corps personnel, contractors, volunteers, or a combination thereof may accomplish this. Reporting methods normally used include a log or work order program. The routine evaluations shall facilitate timely identification and correction of safety problems, cleanup of areas and facilities, and accomplishment of minor maintenance and repairs.

7.3.2 Annual Evaluations. An in-house annual evaluation shall be conducted to verify the safety and functional operation of all recreation facilities. A project level team consisting of managers, rangers, and maintenance and contract personnel should perform annual evaluations. Use of peers from other areas is encouraged. Evaluations shall include review of

facilities, structures, roads, ramps, equipment, and utilities. Safety-related deficiencies shall be corrected prior to opening the recreation area or facility for public use.

7.3.3 PDT Periodic Evaluations. Every 5 years, a PDT consisting of division, district, and onsite personnel shall conduct an overall evaluation of each project's recreation program operational efficiency. Care should be taken to form a PDT that is interdisciplinary in nature, including elements such as Environmental, Planning, Design and Safety. The evaluations shall examine the design and condition of facilities, structures, roads, ramps, equipment, signs, and utilities for their adequacy to meet current and future customer needs. Policy compliance will also be reviewed. Prior to the evaluation, the PDT shall be provided a synopsis of customer feedback (comment card results, congressional inquiries, etc.) received about the adequacy and functionality of area facilities.

7.3.3.1 Periodic Evaluation Scope. Operations Division at the district level will develop a systematic plan for the evaluation. If a system of condition indices is developed, it should be accomplished at this time. At a minimum the systematic evaluation shall examine the condition/adequacy and safety of the following:

- Roadways and parking areas
- Launch ramps, walkways and floor surfaces
- Overall park appearance
- Overall environmental conditions, e.g., health and vigor of vegetation, erosion
- Sites and amenities
- Stability and integrity of structures
- Water delivery and sanitation systems
- Electrical systems, wiring, piping, plumbing, telephone and communications
- Docks and other water-related facilities
- Compliance with UA requirements
- Security features
- Carrying capacity and use patterns
- Management issues or problems
- Compliance with basic policies, i.e., visitor assistance, security of use fees collections, etc.
- Customer services, looking at future trends and projected customer needs

- Markets being served, and how well market needs are being met
- Operational efficiency

7.3.3.2 Evaluation Report Contents. The periodic evaluation report shall present the results of each evaluation. Major elements of this report should be:

- Executive Summary. An executive summary of the major items found in the evaluation shall include a statement about the project's ability to continue acceptable and safe recreation program operations.
- Evaluation of Recreation Areas. The report shall include a brief evaluation of each recreation area regarding its ability to serve customer needs and future requirements.
- Photos. Color digital photographs shall support the narrative, and include appropriate descriptive captions.
- Proposed Corrective Actions. A brief discussion of improvements needed shall include proposed corrective actions, related maintenance concerns, and designation of the action office. A cost estimate should also be provided to assist in development of the OMP annual and 5-year work plans and for development of the Operations and Maintenance (O&M) budget.
- Items Needing Further Evaluation. The report shall note any conditions that need more in-depth evaluation to determine the cause or extent of a problem. The report shall also indicate proposed methods and time frames for followup examinations.
- Reference to Prior Reports. Subsequent reports should reference the previous periodic reports to ensure that all previously noted corrective actions were adequately addressed.

7.3.3.3 Exit Briefing. The PDT shall conduct an exit briefing with the Operations Manager/Lake Manager before leaving the site. The briefing will include an overview of the findings, and identify items requiring immediate attention. The responsible party for accomplishing each corrective action will be identified at the exit briefing.

7.3.3.4 Distribution and Use of Evaluation Reports. Within 60 days after the evaluation is completed, the Project Manager shall provide a written report of the major findings to the Lake/Operations Manager for comment prior to forwarding to the Chief of Operations for review and approval. The report

should be permanently retained in appropriate files at the project office and be available to evaluation teams conducting subsequent evaluations. The report should be referenced when justifying and prioritizing line item funding in future funding cycles.

7.4 Budget Requests. Based on results of annual and periodic evaluations, the Operations Manager/Lake Manager should insure that major findings are scheduled and included in the next O&M budget request.

APPENDIX A

REFERENCES

A-1. Referenced Publications

EM 385-1-1
USACE Safety and Health Requirements Manual

ER 1110-2-4401
Engineering and Design - Clearances for Electric Power Supply Lines and Communication Lines Over Reservoirs

EM 1110-2-410
Design of Recreation Areas and Facilities – Access and Circulation

EP 310-1-6a and 6b
The Corps Sign Standards Manual

EP 1130-2-550
Projection Operations - Recreation Operations and Maintenance Guidance and Procedures, Appendix O, Program Integrity: Honor Vaults

TI 811-16
USACE Technical Instructions, Lighting Design, CEMP-E, 3 August 1998

TL 1110-3-491
Engineering and Design – Sustainable Design for Military Facilities, CECW-ETE, 10 May 2001

American Association of State Highway Transportation Officials
Guide to the Development of Bicycle Facilities

Federal Highway Administration
Manual on Uniform Traffic Control Devices

National Fire Protection Association
Flammable and Combustible Liquids Code NFPA 30.

U.S. Coast Guard
U.S. Aids to Navigation System

A-2. Referenced URLs

Natural Resources Management Gateway Website
- Accessibility Page
  - Policy and Procedures
- Customer Service Page
  - Lesson Learned
- Visitor Center Program Page

http://corpslakes.usace.army.mil/

International Dark-Sky Organization http://www.darksky.org/

A-3. Related Publications

ER 1130-2-500
Project Operations - Partners and Support (Work Management Policies), Chapter 10: The Corps of Engineers Volunteer Program

EP 1130-2-500
Project Operations - Partners and Support (Work Management Guidance and Procedures), Chapter 10: The Corps of Engineers Volunteer Program

ER 1130-2-550
Interpretive Services and Outreach Initiative

ER 1165-2-26
Water Resources Policies and Authorities – Implementation of Executive Order 11988 on Flood Plain Management

Executive Order 11988
Floodplain Management

Beckley, Bob 2000
"Accessible ramps and boarding platforms for boaters," Tech. Rep. 0023-2837-MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center

California Dept. of Boating and Waterways 2000
"Layout, Design, and Construction Handbook for Small Craft Boat Launching Facilities," Department of Boating and Waterways; Sacramento, CA

California Dept. of Transporation (Caltrans) 2001
"Highway Design Manual," 5th ed., Division of Design; Caltrans Publication Unit, Sacramento, CA

Dunn, R.A. 2002
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APPENDIX B

GLOSSARY

Accessible
The availability of a facility, program, or service to all persons regardless of any mobility, vision, hearing, learning, or other impairment.

Access Road
A road that permits vehicles to move between an existing public thoroughfare and the recreation site or area.

Accessible Route
Firm and stable route as defined by most stringent applicable UA standards. As currently defined by both UFAS and ADAAG: A continuous unobstructed path connecting all accessible elements and spaces of a building or facility. Interior accessible routes may include corridors, floors, ramps, elevators, lifts, and clear floor space at fixtures. Exterior accessible routes may include parking access aisles, curb ramps, crosswalks at vehicular ways, walks, ramps, and lifts.

Accessibility Data Management System (ADMS)
ADMS is a computer system designed to facilitate the management of accessibility programs within government. ADMS helps government agencies meet accessibility mandates by providing managers with consistent and thorough methods to evaluate programs and facilities.

Amenities
Facility support elements which would not normally stand alone such as electrical hookup, security lights, tent pad, showers as part of a restroom, etc.

Amphitheater
An open air (usually) structure used for the presentation of interpretive or other programs.

Auxiliary Parking
Additional parking.

Bench
A piece of furniture used for seating.

Boat Ramp
A developed, improved surface for the launching of boats. Concrete is the standard surface for newly constructed ramps.

Boat Tie-up
An area along the shoreline where boats can temporarily dock and are secured with a rope attached to a fixed element.

Bulletin Board
A board where park information can be posted.

Campfire Circle
An area with a fire containment structure used for group gatherings.

Campsite
Facility developed and designated for camping by an individual or a family.

Camp Spur
The parking area of a campsite adjacent to the hardened living area. This includes the camper pullout/back-in or camper pull-through referenced by OMBIL as recreation facility amenities.

Campground
An area consisting of many campsites that are accessed along the same road and served by at least one restroom facility with or without showers.

Change House
Facility for changing and storing clothes for swimmers. May or may not have toilet facilities.

Circulation Road
A road within the recreation area.

Compacted Aggregate
Compacted stone, gravel, or granular material.

Condition Indices
Numerical rating system associated with condition of a park.

Courtesy Dock
Loading dock provided to visitors for loading and unloading boating equipment and people.

Day Use Area
An area where multiple uses/activities are accessible during the day only.

Double Campsite
A campsite that can accommodate two camping parties.

Drinking Fountain
A fountain that provides potable water for drinking.

Entrance Station
Building designed for use at the entrance to a park area for purposes such as fee collection, security, and visitor information.

Environmental Management System (EMS)
An organizational framework that consistently addresses the environmental effects that operations or processes may have on the environment. The framework also strives for continuous improvement in an organization's business practices regarding how they interact with the environment.

ERDC
U.S. Army Engineer Research and Development Center

Fire Ring/Grill
A piece of equipment in which fires can be built.

Fishing Access Dock
A dock provided to visitors for fishing.

Footcandle (FC)
Measure of light falling on a surface. One footcandle equals one lumen per square foot.

Guideline
A basic direction that should be followed.

Group Camp Site
Group of camp pads usable by groups of campers.

Hardened Area
Areas that have been improved with compacted aggregate to withstand high impact of park users or to provide UA.

Information Kiosk
A structure used for disseminating information.

Interpretive Facilities
Facilities that provide interpretive information to the public (i.e. bulletin board, kiosk, brochure rack or a visitor center).

Lantern Hanger
A campsite amenity for hanging lanterns.

Long Vehicle
A bus, RV, or any vehicle pulling a trailer.

Loop Road
A circulation road that closes on itself.

Lumen
The amount of light cast upon 1 ft^2 of the inner surface of a hollow sphere of 1-ft radius with an international candle in its center.

Lux
One lux equals one lumen per square meter. The metric equivalent to the footcandle (FC). One FC equals approximately 10 lux.

Master Plan (MP)
The MP is the basic document guiding Corps of Engineers responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the project lands, waters, and associated resources. The MP deals in concepts, not in details of design or administration.

Multi-purpose Campsite
A campsite suitable for tent, RV, or combination of equipment.

Multi-unit Campsite
A campsite suitable for multiple camping units (Drawing C-9).

Non-Peak Season
The recreation area operating season when visitation is historically lowest.

Office of Management and Budget (OMB)
OMB’s primary mission is to assist the President in overseeing the preparation of the federal budget and to supervise its administration in Executive Branch agencies. OMB also oversees and coordinates the Administration’s procurement, financial management, information, and regulatory policies. OMB approval

is required for public feedback mechanisms such as customer surveys.

Operational Management Plan (OMP)
Detailed management and administration functions are handled in the operational management plan (OMP), which translates the concepts of the MP into operational terms. The OMP is prepared as a separate document, and outlines in detail the specific operation and administration requirements for natural resources and park management, consistent with the approved MP.

Operations and Management Business Information Link (OMBIL)
A Web-based business information gateway that allows Corps employees easy access to information about the Operations and Maintenance program, including recreation areas and facilities.

Open-field Play Areas
Open fields where organized or unorganized sporting events may occur.

Ordinary High Water Mark (OHW)
That line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Overlook
An interpretive feature that addresses a view or feature of the park.

Park Attendant
Individual(s) who usually reside in the park and are designated as the park visitor’s contact for fee collection, information, security, or emergency purposes.

Park Manager
The manager of the recreation facilities and areas on the lake.

Project Delivery Team (PDT)
Cross-functional team that is part of the U.S. Army Corps of Engineers’ Project Management Business Process.

Peak Season
The recreation area operating season when visitation is historically the highest and all of the recreation areas and facilities are open to public use.

Picnic Area
Area consisting primarily of picnic sites.

Picnic Site
Facility developed and designated for picnicking by an individual or a family.

Playgrounds
Facility designed for children to climb, swing, slide, etc.

Project Management Business Process (PMBP)
The business process for execution of all work accomplished by the U.S. Army Corps of Engineers.

Potable Water
Drinking water.

psi
Pounds per square inch.

Pull-Off Area
A vehicular staging area adjacent to a park access or circulation road, entrance station, boat ramp, etc.

RV
Recreational vehicle.

Restroom
Building with some type of toilet facilities; may or may not contain showers or laundry.

Restroom with Vault Toilets
A non-waterborne facility that is periodically serviced to remove waste.

Sanitary Dump Station
Facility for disposal of raw sewage.

Screenings
Fine granules from crushed stone used on hardened impact sites.

Service Road
Normally a one-lane restricted-use road for maintenance, delivery of supplies to facilities, or to meet UA requirements.

Sewage Treatment
The removal of harmful solids, biological matter, etc. by such methods as sewage lagoon, septic system, municipal treatment system, etc.

Shower House
A building used for bathing and restroom purposes.

Sink
A restroom lavatory.

Stakeholders
Parties who may be affected by agency decisions and actions (i.e., user groups, elected officials, commercial interests).

Standard
Widely accepted practice that allows for regional or specific difference.

Sustainable Design and Development (SD&D)
SD&D is the design, construction, operation, and reuse/removal of the built environment (infrastructure and buildings) in an environmentally and energy-efficient manner. The main principle of sustainable design is to meet the needs of the present without compromising the ability of future generations to meet their own needs.

Swale
A depression for transporting runoff water.

Swimming Area
An area developed and designated for swimming.

Tent Pad
A hardened area specifically set aside for the erection and anchoring of tents.

Toilet
A restroom furnishing or plumbing stool.

Trash Receptacles
Individual containers for park refuse.

Turnaround
An area where a vehicle can maneuver to travel in the opposite direction from which it was originally oriented.

Universal Access (UA)
Meets the most stringent current accessibility standards that apply to ensure the availability of a facility, program, or service, to integrate all persons, regardless of any mobility, vision, hearing, learning or other impairment, and to assure all persons have the opportunity to achieve similar experiences.

Utility Pedestal
Provides in one unit one or all of the following features: electrical outlets, lighting, television, telephone, and individual metering.

Utility Table
A campsite amenity for setting utensils, etc. when preparing meals.

Vertical Curve
A curve on the longitudinal profile of a road providing a change of gradient.

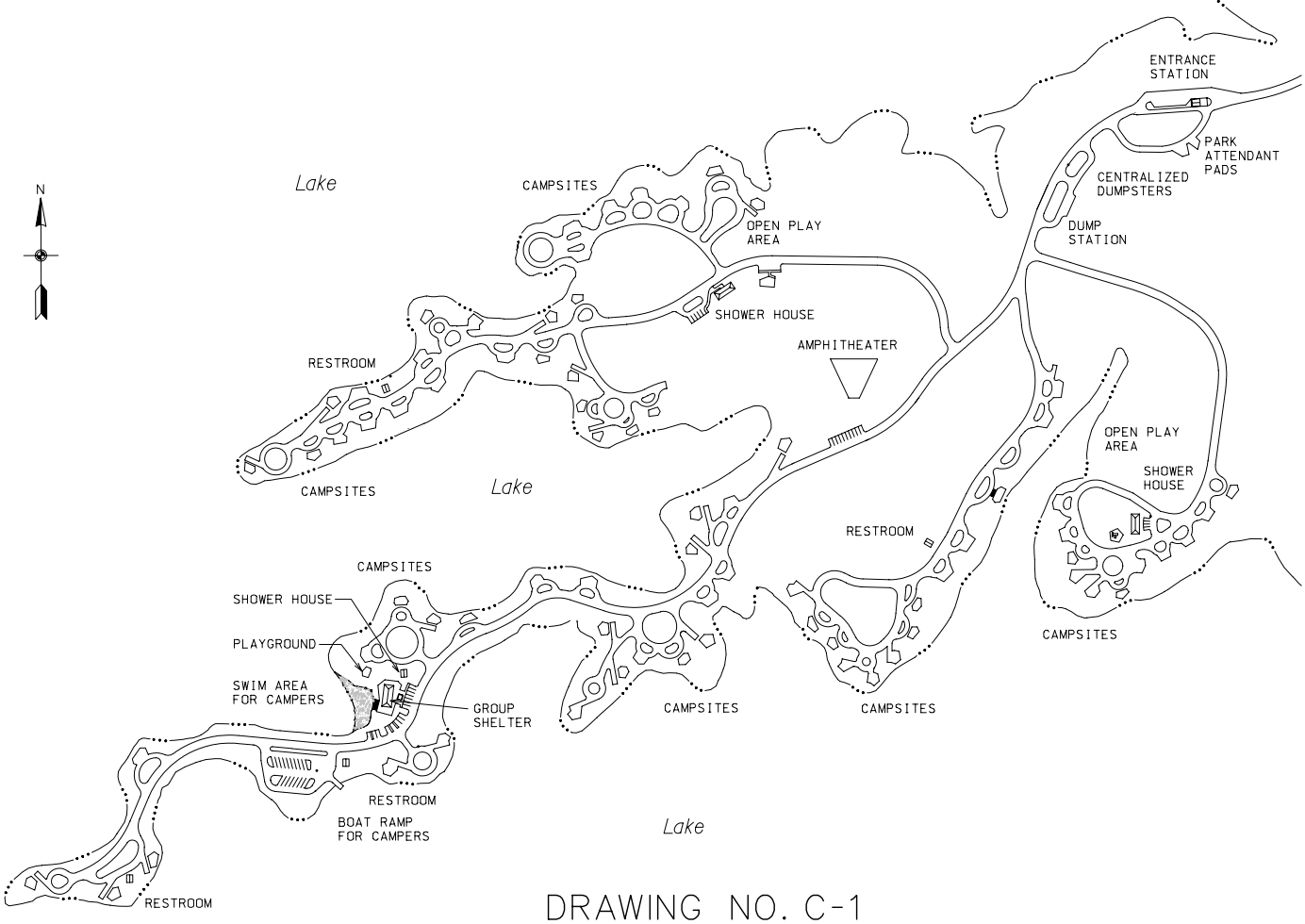
Water Hydrant/Water Spigot
A faucet where water can be retrieved.

Wayside Exhibit
A permanent outdoor interpretive exhibit (normally an illustrated panel) placed along a trail, roadway, or other recreation area feature. Since wayside exhibits relate to specific places and features, they can be tailored to a variety of interpretive purposes.

Appendix C

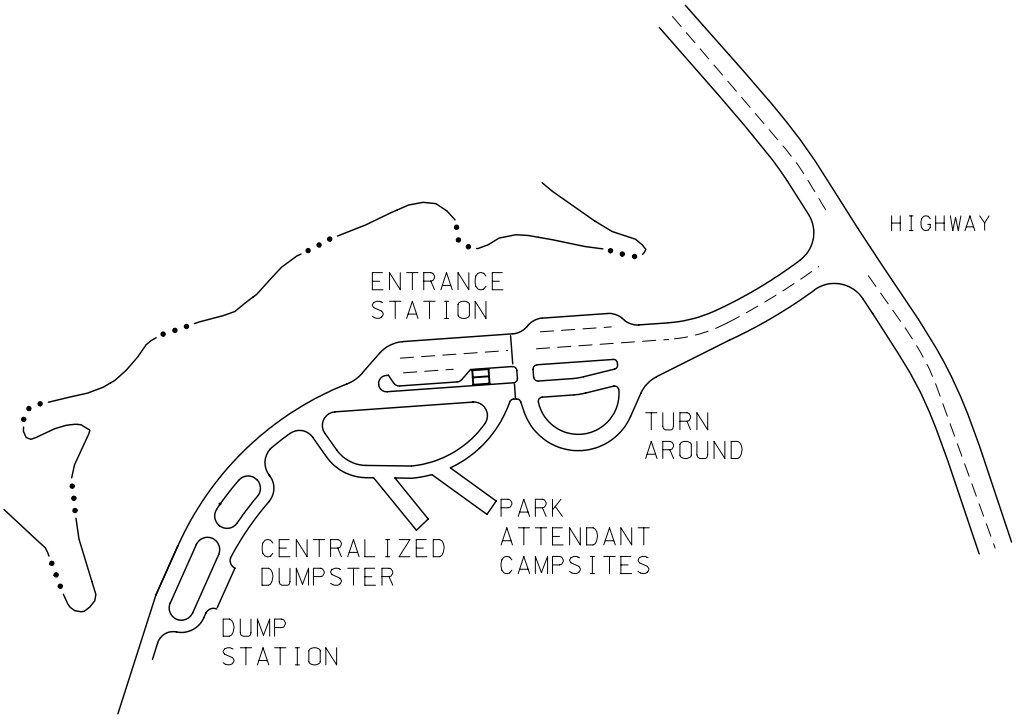
Drawings

Campgrounds and Entrance Stations



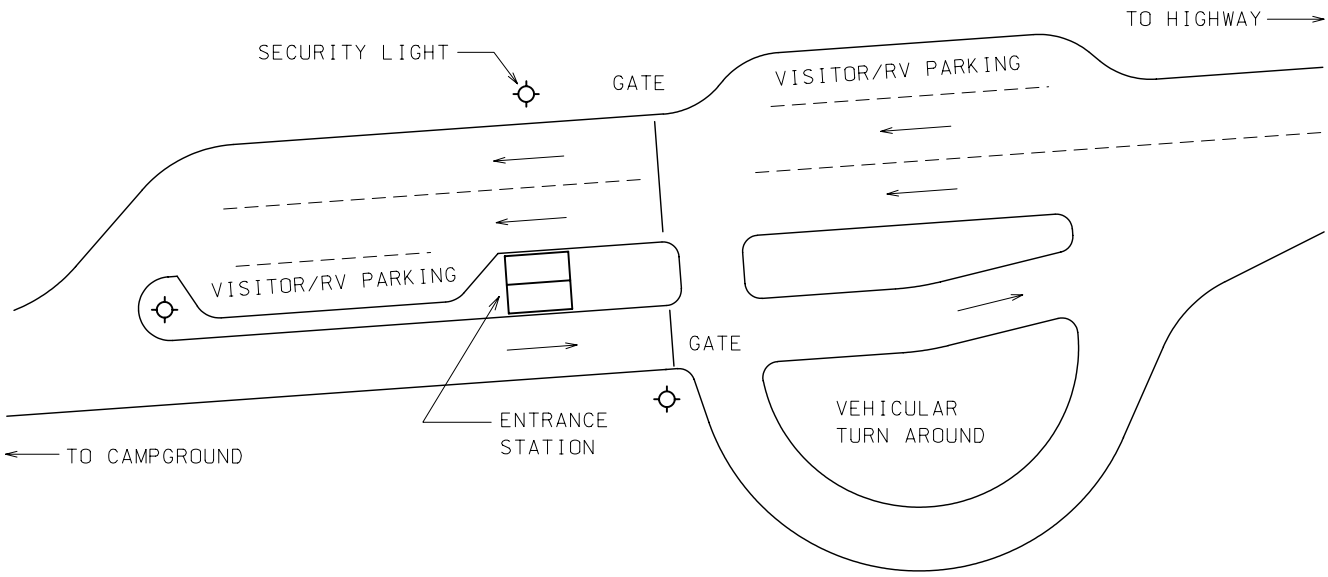
DRAWING NO. C-1
CAMPGROUND OVERVIEW

NOTE:
SEE TABLES 3.1 AND 5.1



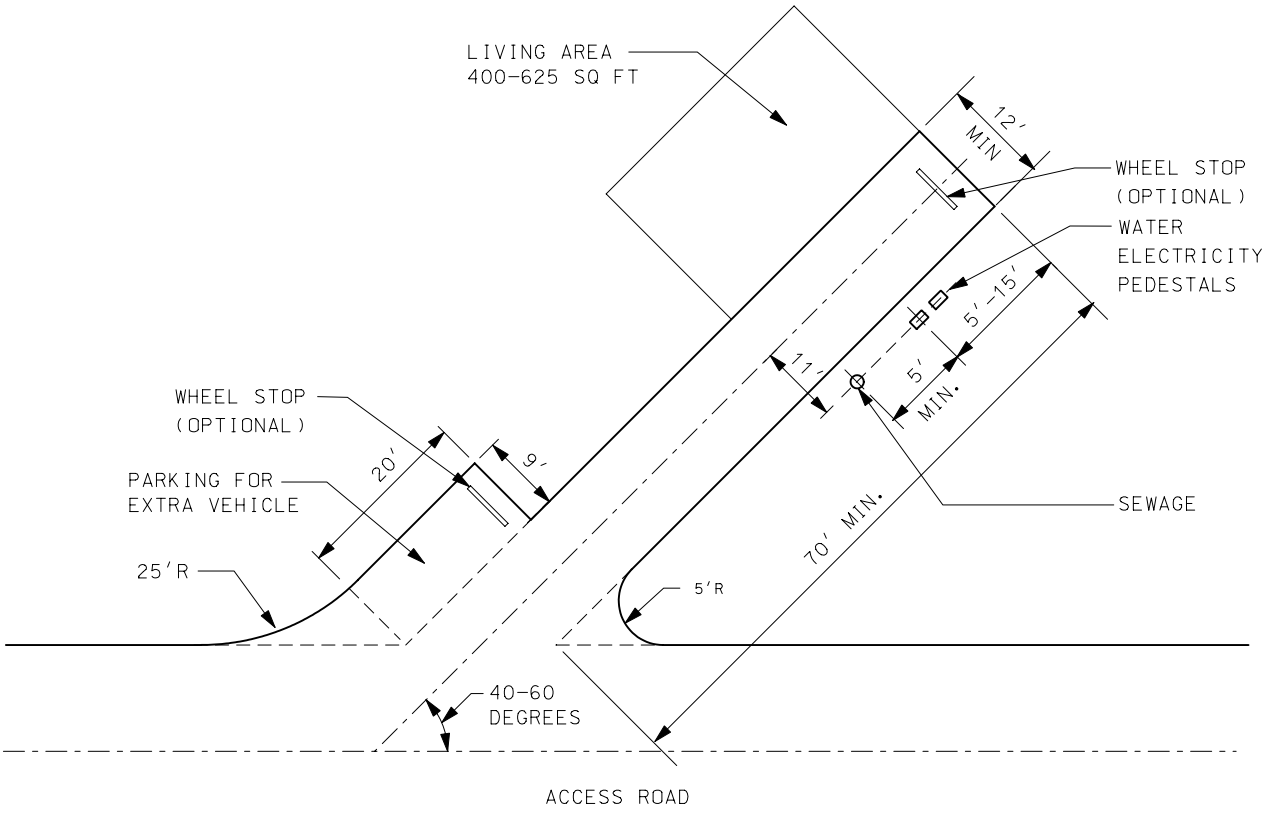
DRAWING NO. C-2
ENTRANCE STATION SITE

NOTE:
1. MINIMUM 200' RECOMMENDED FROM HIGHWAY INTERSECTION TO THE ENTRANCE STATION
2. SEE TABLE 3.1



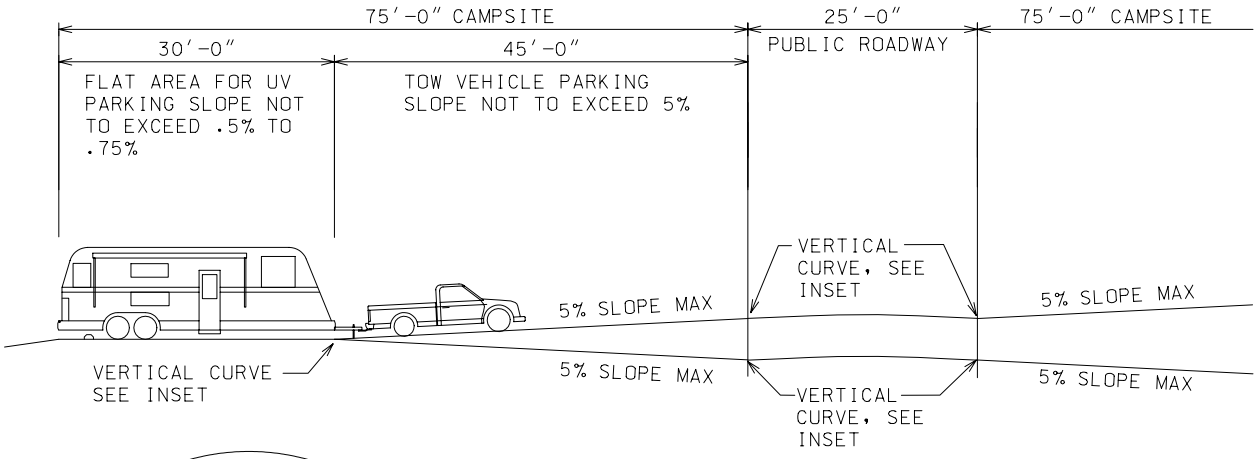
DRAWING NO. C-3
ENTRANCE STATION

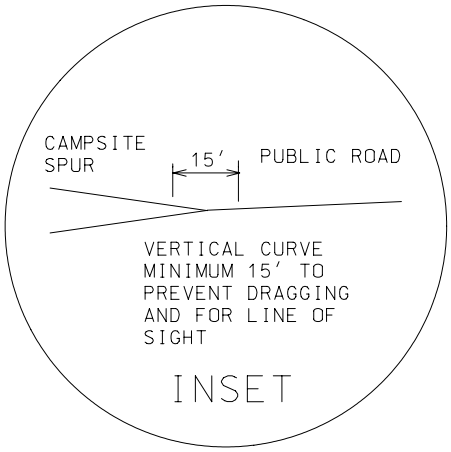
NOTES
1. OPTIONAL TWO LANES ENTRY ROAD.
2. TURN-AROUND LOCATED OUTSIDE ENTRANCE GATE
3. SEE TABLE 3.1



DRAWING NO. C-4
TYPICAL BACK-IN CAMPSITE

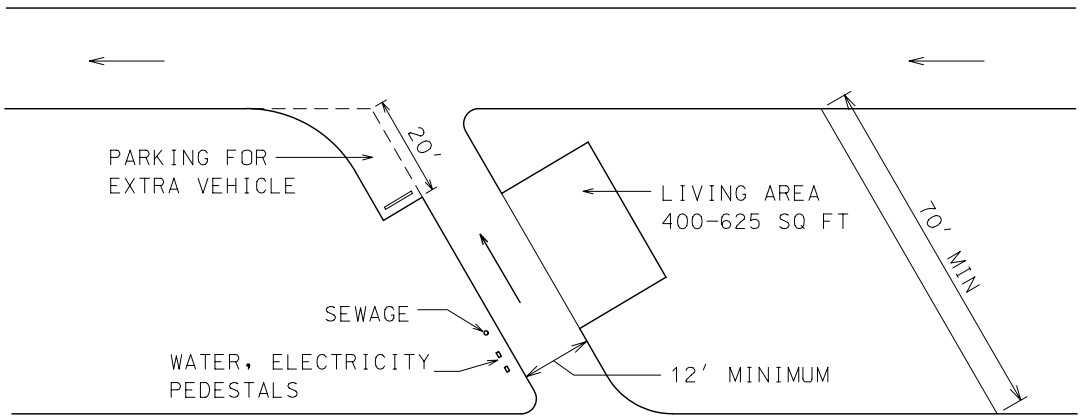
NOTES:
1. UTILITIES SHALL BE A MINIMUM OF 11′ FROM THE CENTER OF THE PAD ON THE DRIVER'S SIDE.
2. WATER & ELECTRICITY SHALL NOT EXCEED 15′ FROM END OF PAD
3. SEWAGE SHALL BE LOCATED MINIMUM 5′ FORWARD OF UTILITY PEDESTALS.
4. SLIDE OUT CLEARANCE 20′ MAXIMUM.
5. SEE TABLES 5.4, AND 5.5



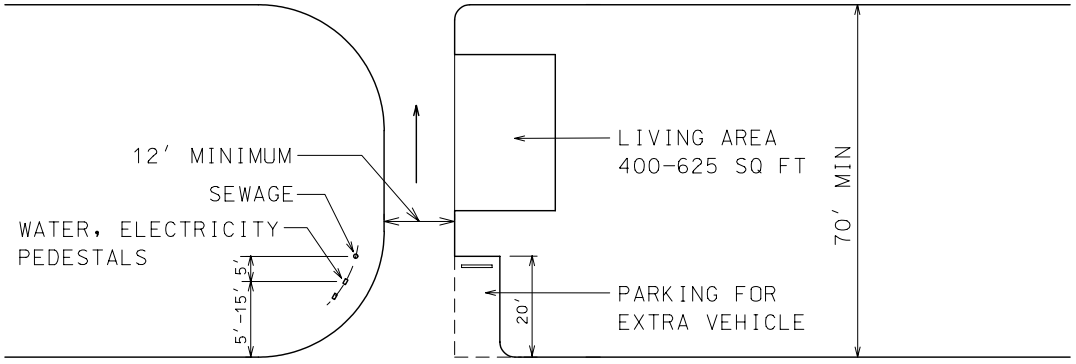


DRAWING NO. C-5
TYPICAL BACK-IN CAMPSITE SECTION

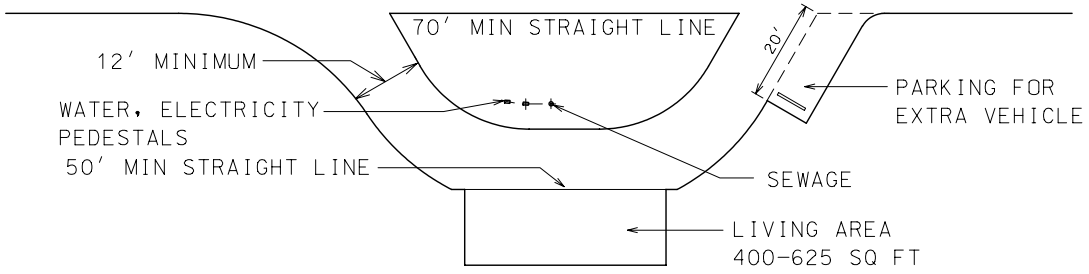
NOTE:
SEE TABLE 5.3



PULL THROUGH CAMPSITE - TYPE 1



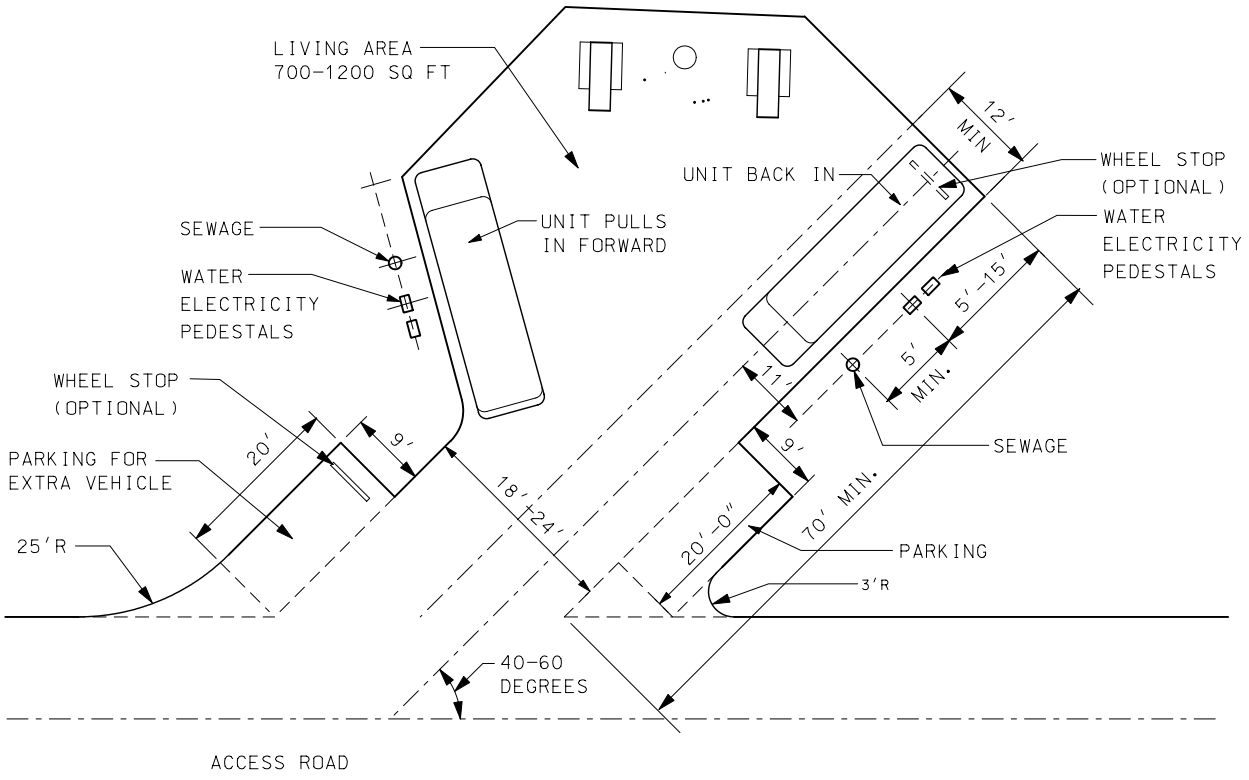
PULL THROUGH CAMPSITE - TYPE 2



PULL THROUGH CAMPSITE - TYPE 3

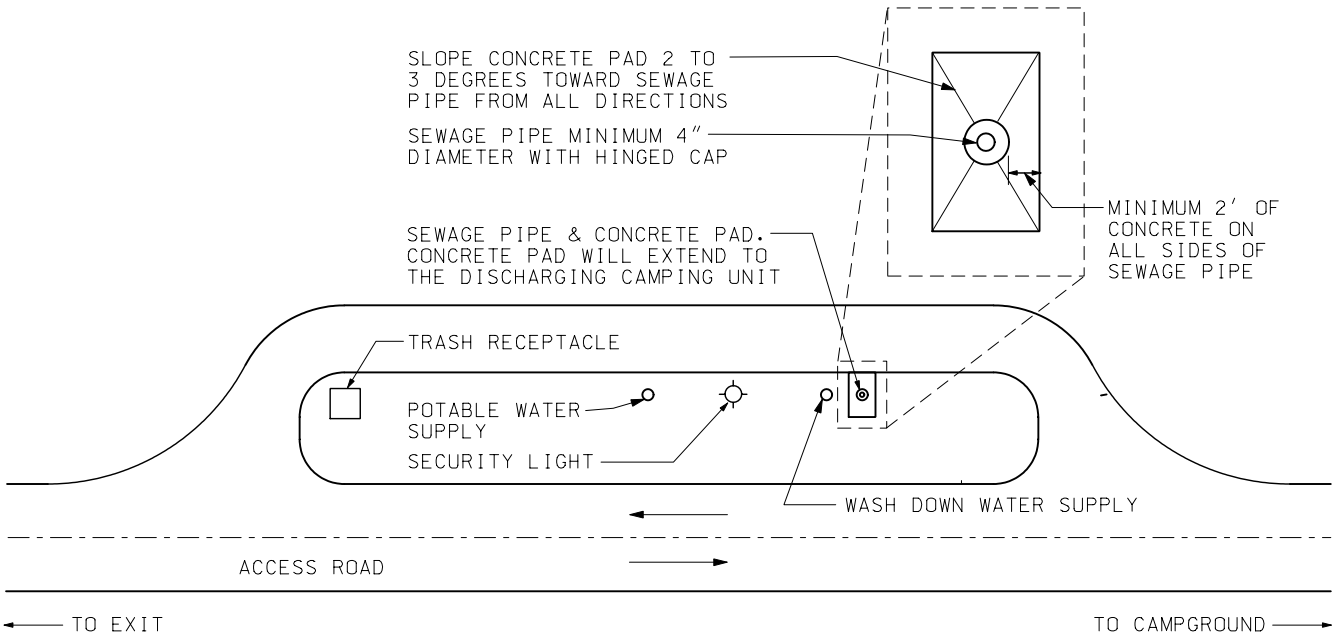
DRAWING NO. C-6
PULL-THROUGH CAMPSITE EXAMPLES

NOTE:
1. USE SAME SPECIFICATIONS FOR UTILITIES AS TYPICAL BACK-IN CAMPSITES.
2. SEE TABLES 4.4, 5.3, 5.4 AND 5.5



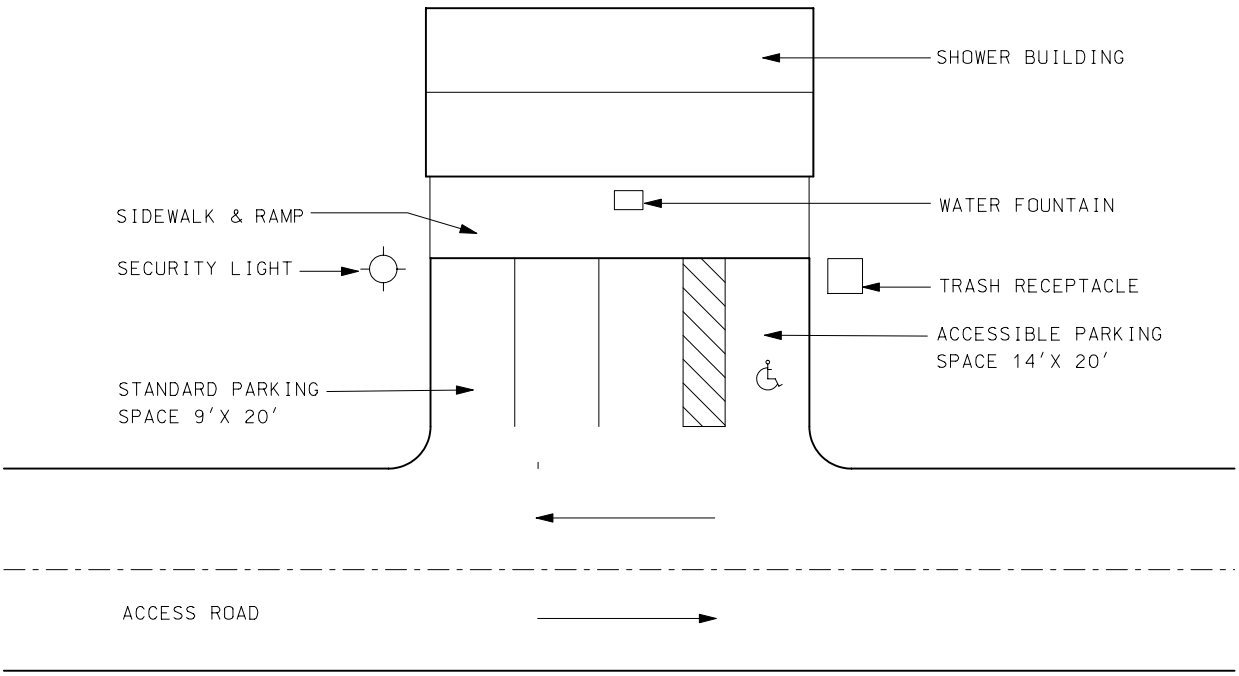
DRAWING NO. C-7
TYPICAL MULTI-UNIT CAMPSITE

NOTES:
1. UTILITIES SHALL BE A MINIMUM OF 11' FROM THE CENTER OF THE PAD ON THE DRIVER'S SIDE.
2. WATER & ELECTRICITY SHALL NOT EXCEED 15' FROM END OF PAD
3. SEWAGE SHALL BE LOCATED MINIMUM 5' FORWARD OF UTILITY PEDESTALS.
4. SLIDE OUT CLEARANCE 20' MAXIMUM.
5. SEE TABLES 5.4 AND 5.5



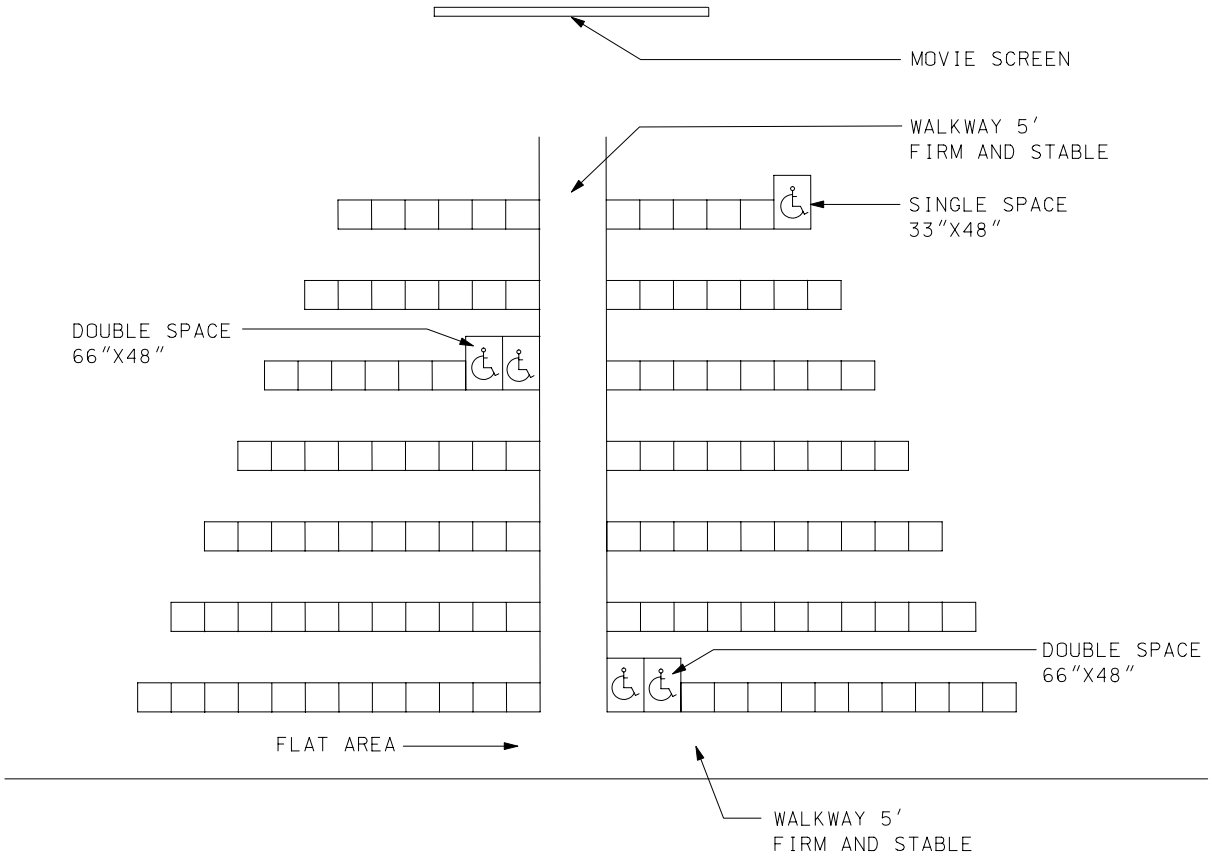
DRAWING NO. C-8
SEWAGE DUMP STATION

NOTES:
1. SEE TABLES 3.11 AND 5.1
2. PARKING AREA SHOULD BE SLOPED SO THAT THE VEHICLE TILTS SLIGHTLY TOWARD THE SEWAGE PIPE TO HELP EMPTY THE HOLDING TANK.



DRAWING NO. C-9
SHOWER FACILITY AND PARKING OVERVIEW

NOTES:
1. MINIMUM PARKING AREA SAME WIDTH AS BUILDING LENGTH.
2. STANDARD GRADE OF 1-5%.
3. SEE TABLE 3.3



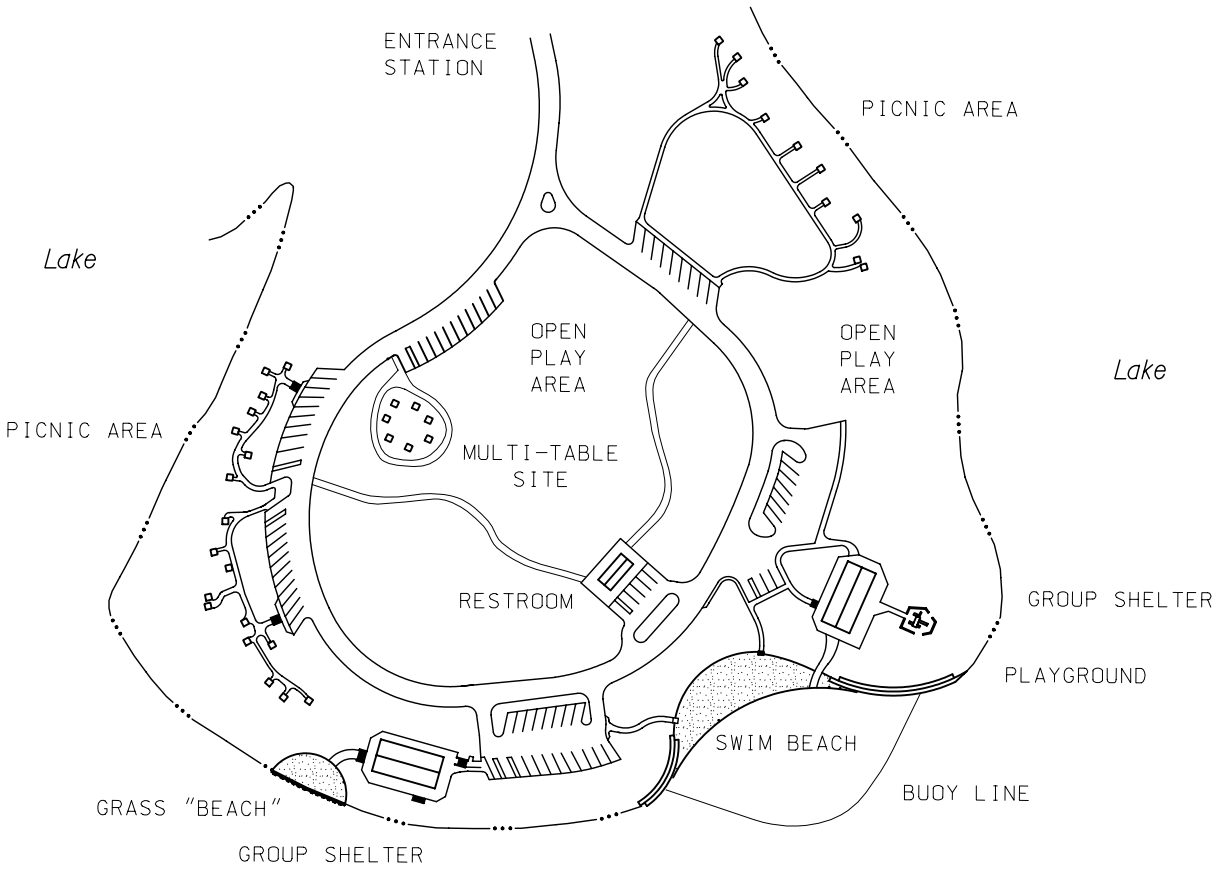
DRAWING NO. C-10
AMPHITHEATER

NOTES:
1. AMPHITHEATER SHOULD BE ORIENTED IN A NORTH-SOUTH DIRECTION.
2. AMPHITHEATER SLOPE SHOULD NOT EXCEED 30 DEGREES.
3. ELECTRICITY WITH GFCI SHOULD BE PROVIDED FOR SUPPORT EQUIPMENT.
4. MAIN PATHWAYS SHOULD BE LIGHTED WITH ADJUSTABLE ILLUMINATION LEVELS.
5. CONSULT UA GUIDELINE FOR SPECIFIC ACCESSIBILITY STANDARDS.
6. SEE TABLE 5.17

Appendix D

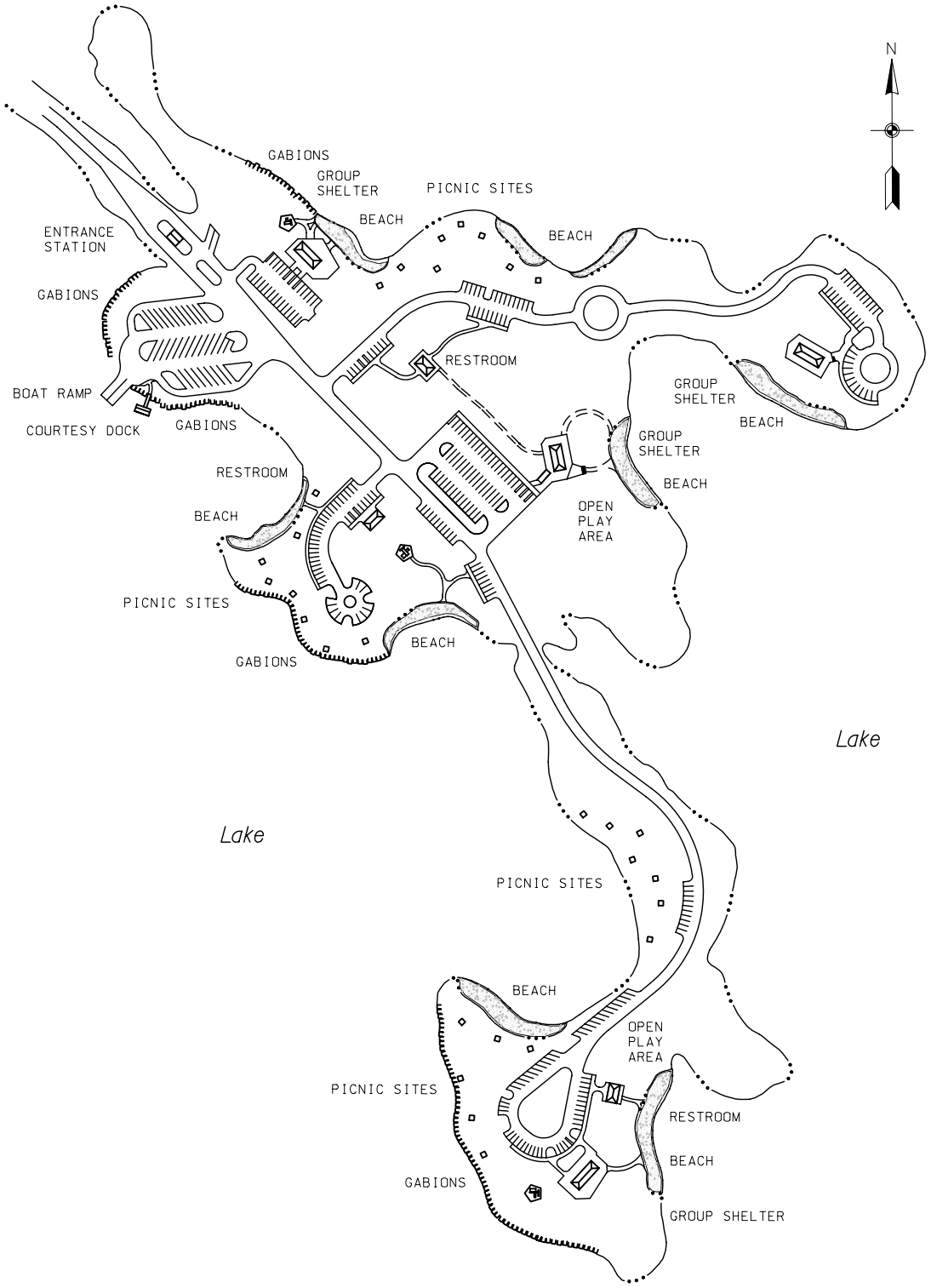
Drawings

Day Use and Parking Overviews



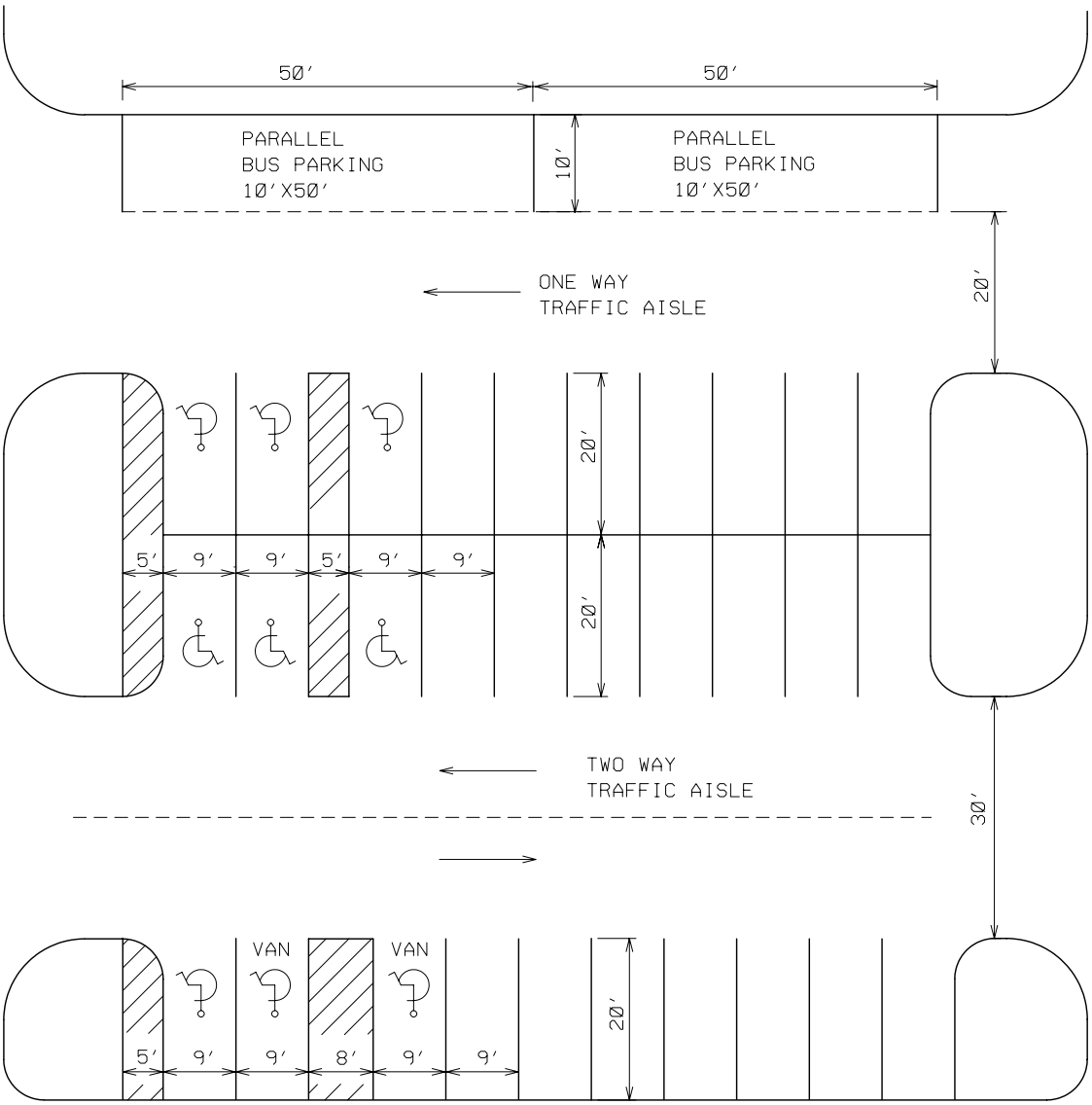
DRAWING NO. D-1
DAY USE AREA OVERVIEW NO. 1

NOTE:
SEE TABLE 5.7



DRAWING NO. D-2
DAY USE AREA OVERVIEW NO. 2

NOTE:
SEE TABLE 5.7

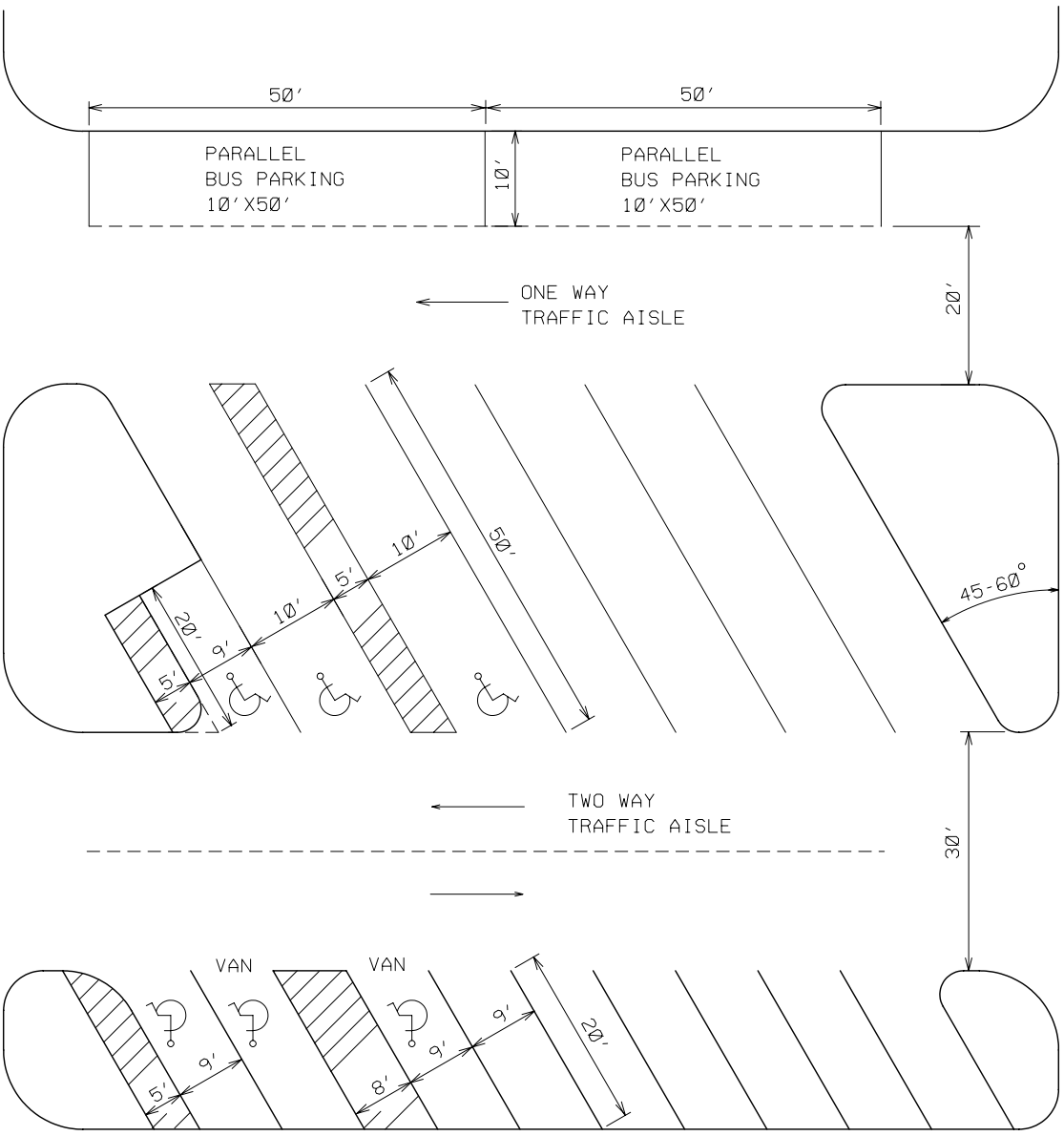


DRAWING NO. D-3
PARKING OVERVIEW-PERPENDICULAR SPACES

NOTES:

1.	STANDARD AUTOMOBILE	9′X20′
2.	STANDARD BUS	10′X50′
2.	ONE WAY AISLE	20′ WIDE
3.	TWO WAY AISLE	30′ WIDE
4.	STANDARD UA HATCH MARKS	5′ WIDE
5.	VAN ACCESSIBLE HATCH MARKS	8′ WIDE

6. SEE TABLE 2.3
7. SEE UA GUIDELINES FOR SPECIFIC REQUIREMENT.



DRAWING NO. D-4
PARKING OVERVIEW-ANGLED SPACES

NOTES:

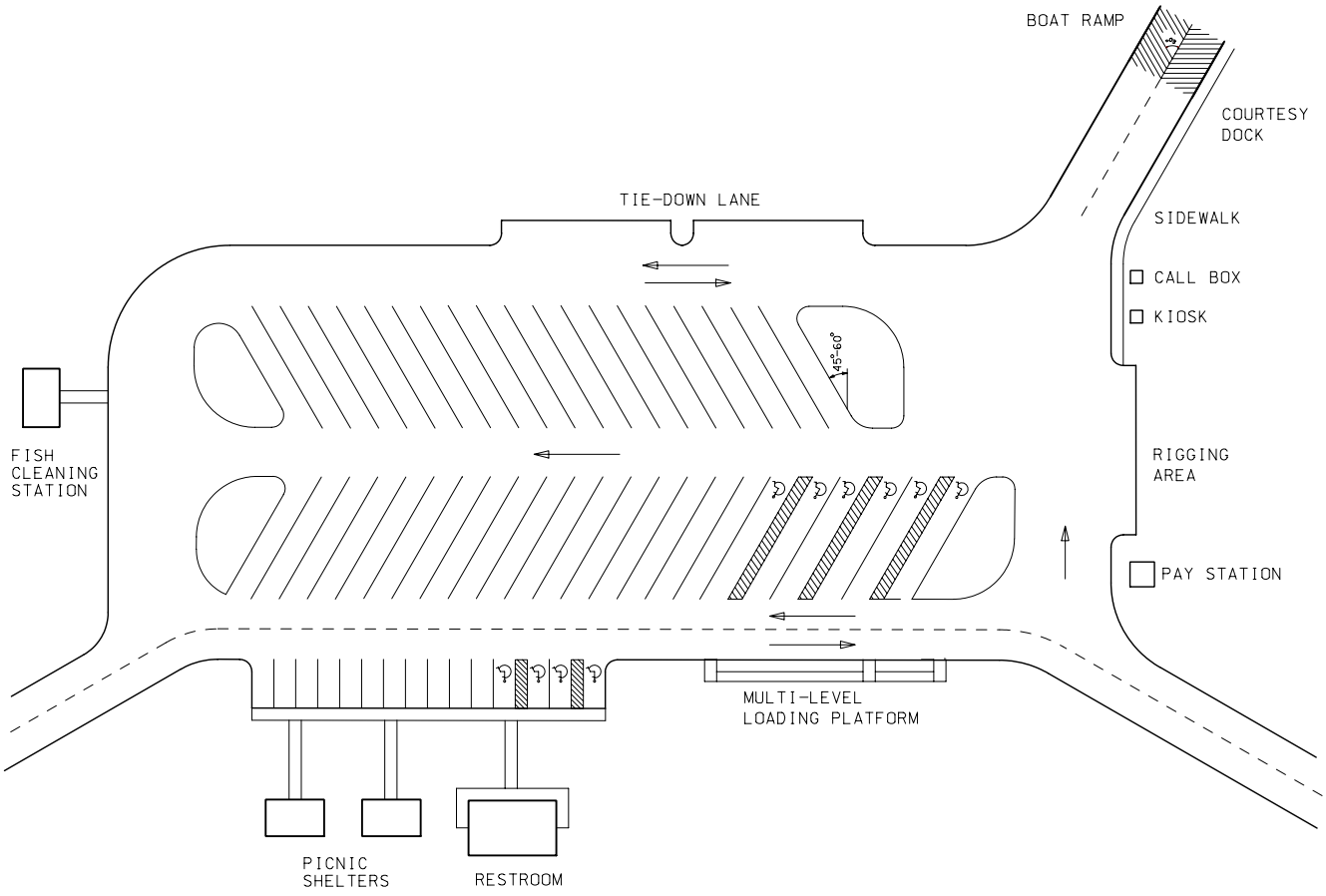
1.	STANDARD AUTOMOBILE	9′X20′
2.	STANDARD BUS	10′X50′
3.	STANDARD PULL THROUGH	10′X50′
3.	ONE WAY AISLE	20′ WIDE
4.	TWO WAY AISLE	30′ WIDE
5.	STANDARD UA HATCH MARKS	5′ WIDE
6.	VAN ACCESSIBLE HATCH MARKS	8′ WIDE

7. SEE TABLE 2.3
8. SEE UA GUIDELINES FOR SPECIFIC REQUIREMENT

Appendix E

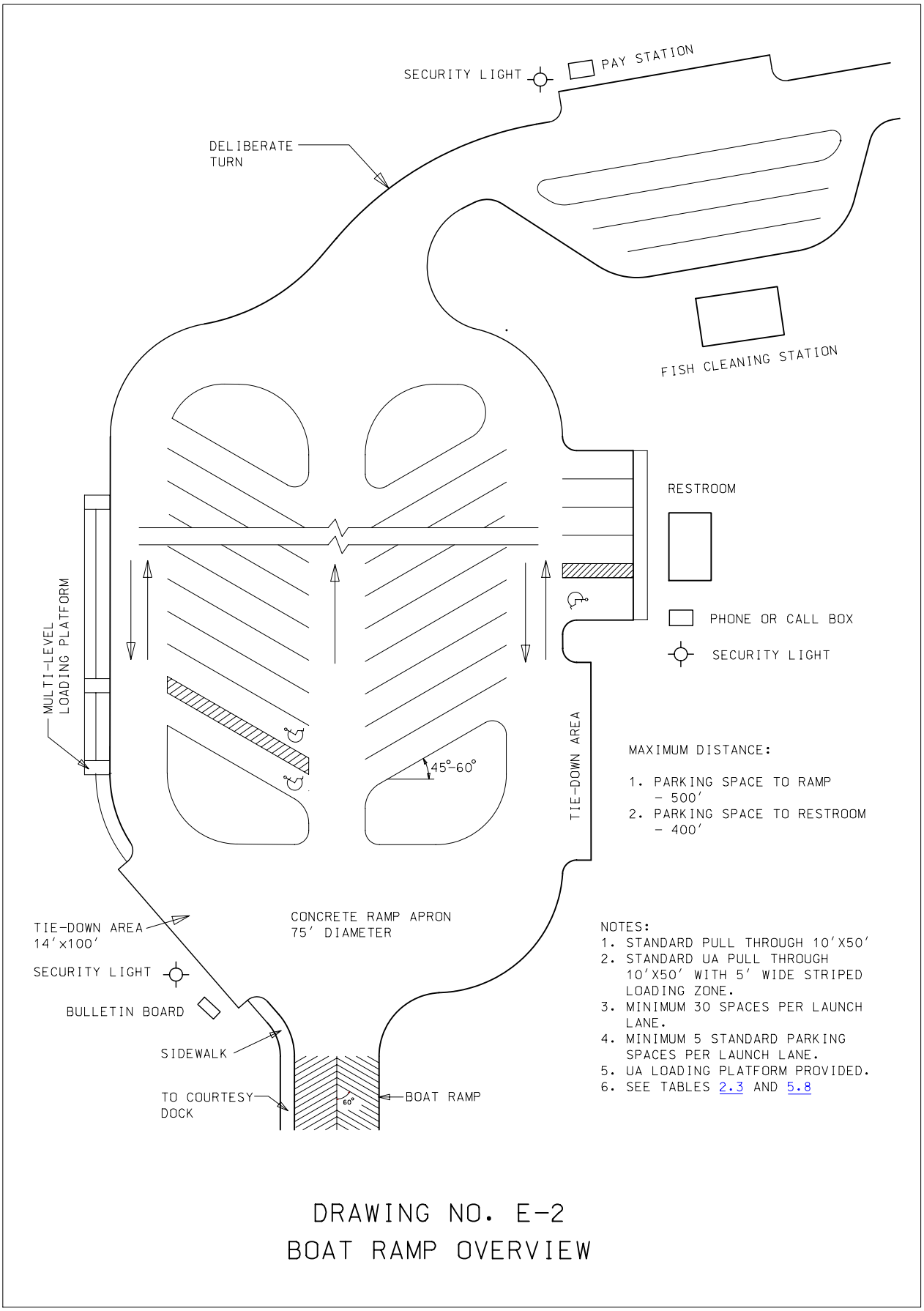
Drawings

Boat Ramps

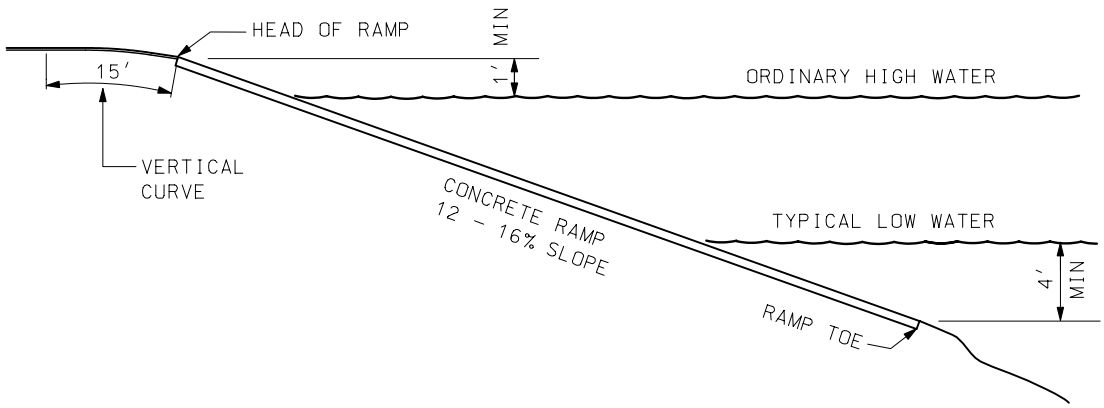


DRAWING NO. E-1
RAMP & PARKING OVERVIEW

NOTE:
SEE TABLE 5.8

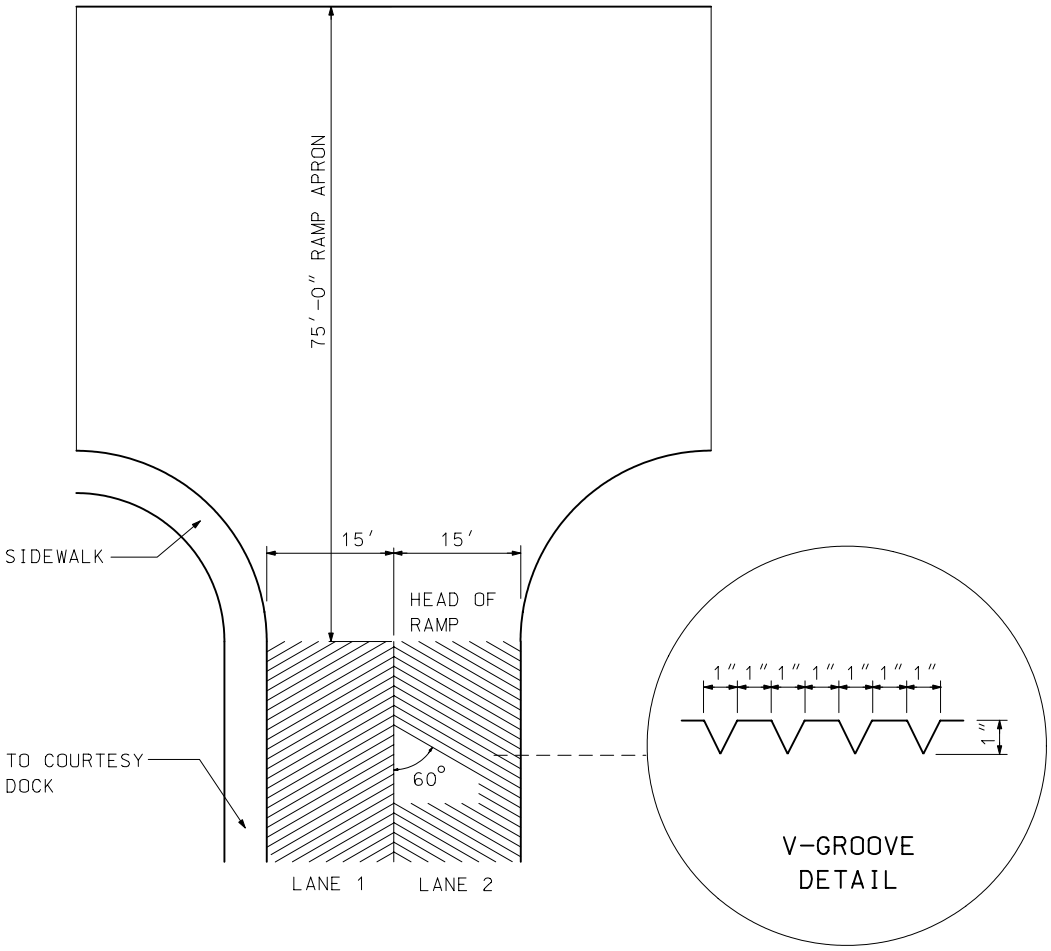


DRAWING NO. E-2
BOAT RAMP OVERVIEW



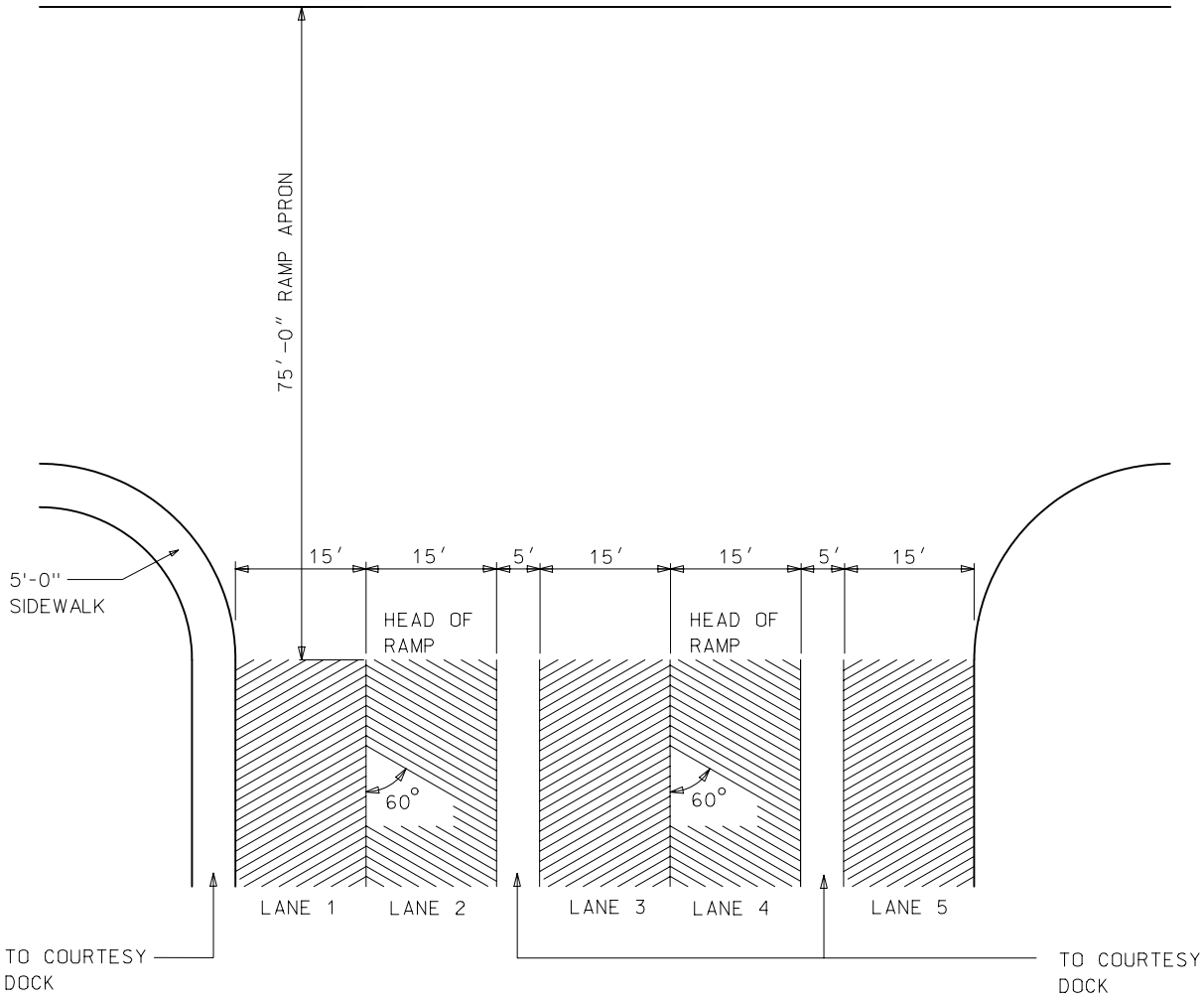
DRAWING NO. E-3
BOAT RAMP SECTION

NOTES:
1. UPPER LIMIT OF LAUNCH LANE EXTENDS A MINIMUM OF 1 FOOT ABOVE ORDINARY HIGH WATER ELEVATION.
2. LOWER LIMIT OF A LAUNCH LANE EXTENDS A MINIMUM OF 4 FEET BELOW THE TYPICAL LOW WATER ELEVATION.
3. SEE TABLE 5.8



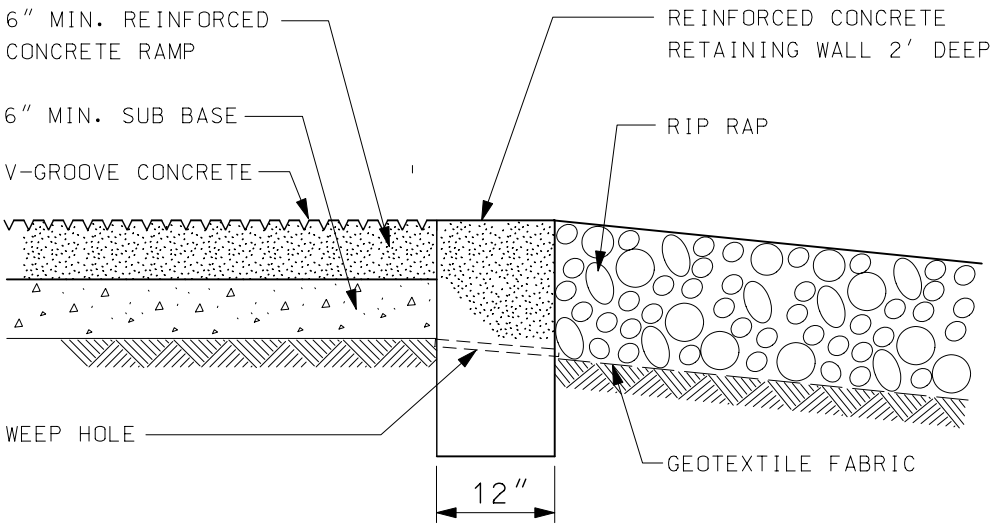
DRAWING NO. E-4
BOAT RAMP – 2 LANES

NOTES:
1. CONCRETE RAMP APPROACH APRON MINIMUM 75 FEET DIAMETER.
2. V-GROOVE FINISH.
3. SEE TABLE 5.8



DRAWING NO. E-5
BOAT RAMP - MULTI-LANE

NOTE:
SEE TABLE 5.8



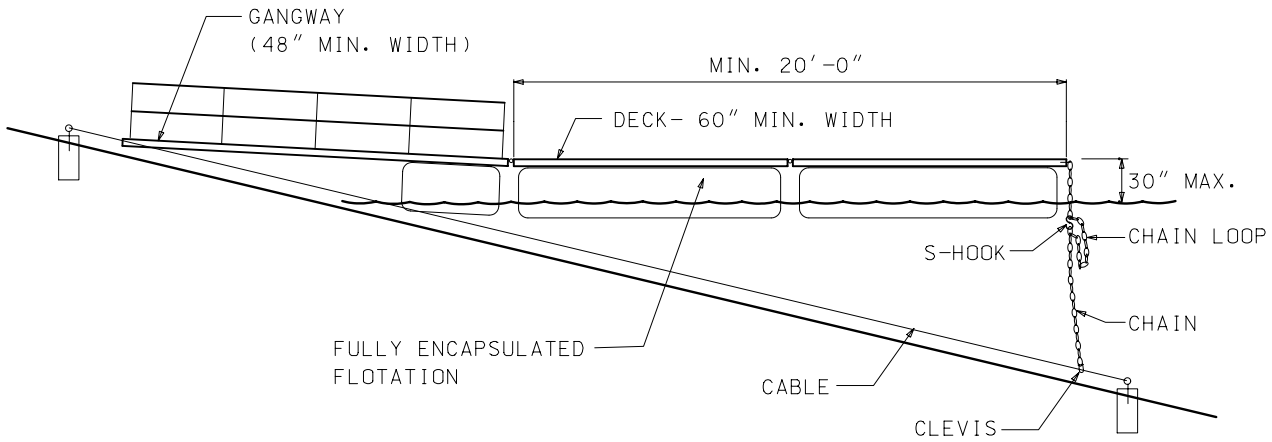
DRAWING NO. E-6
LAUNCH RAMP RETAINING WALL

NOTE:
SEE TABLE 5.8

Appendix F

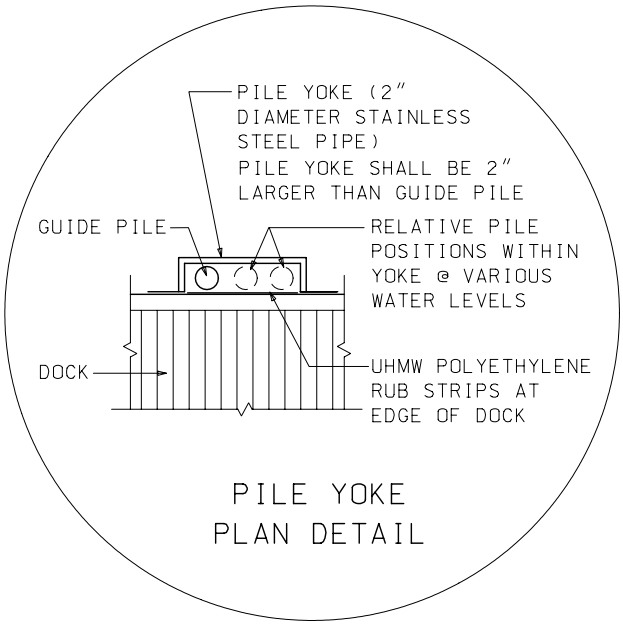
Drawings

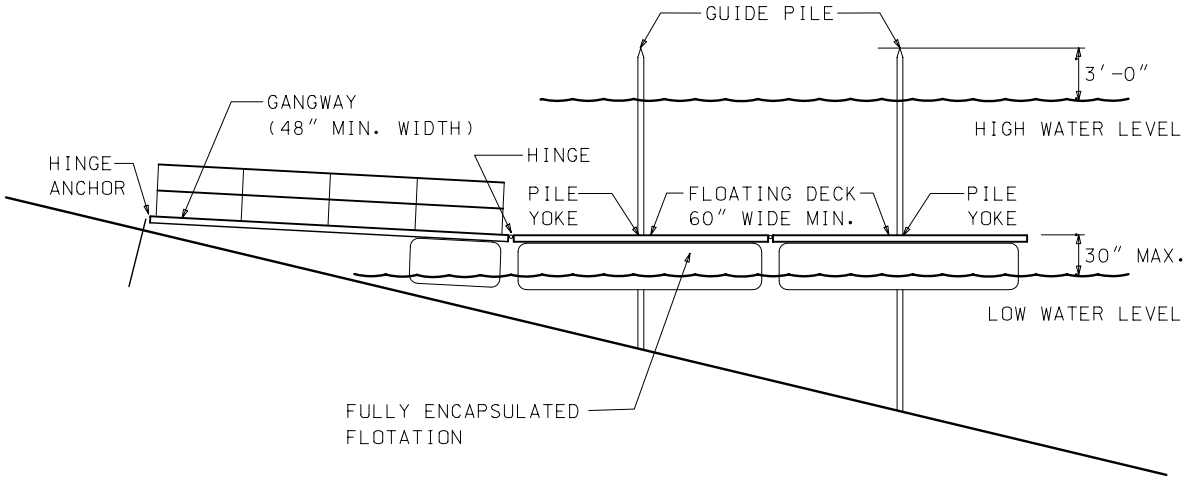
Courtesy Docks and Fishing Piers



DRAWING NO. F-1
COURTESY DOCK

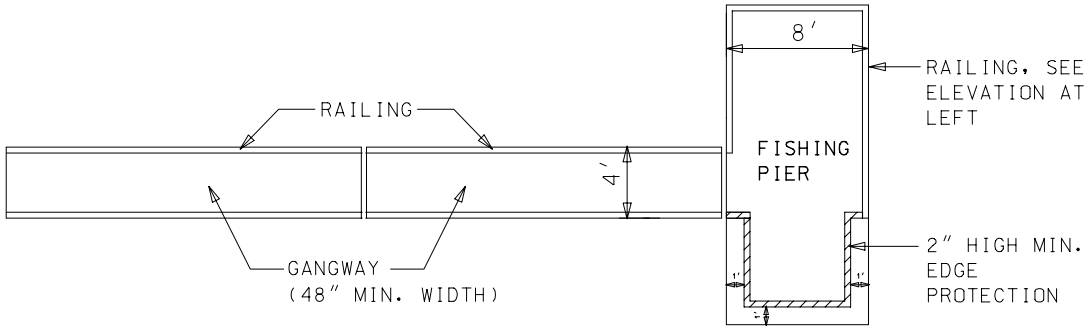
NOTES:
1. FOR GANGWAYS WITH SLOPE GREATER THAN 1:20, HANDRAILS ARE REQUIRED.
2. MAXIMUM HEIGHT FROM THE DECK TO WATER 30".
3. INSTALL DOCK STABILIZATION CHAIN ASSEMBLY TO KEEP DOCK IN PLACE.
4. SEE TABLE 5.9



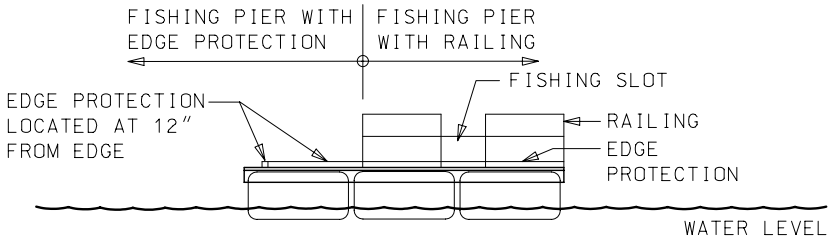


DRAWING NO. F-2
COURTESY DOCK WITH GUIDE PILE

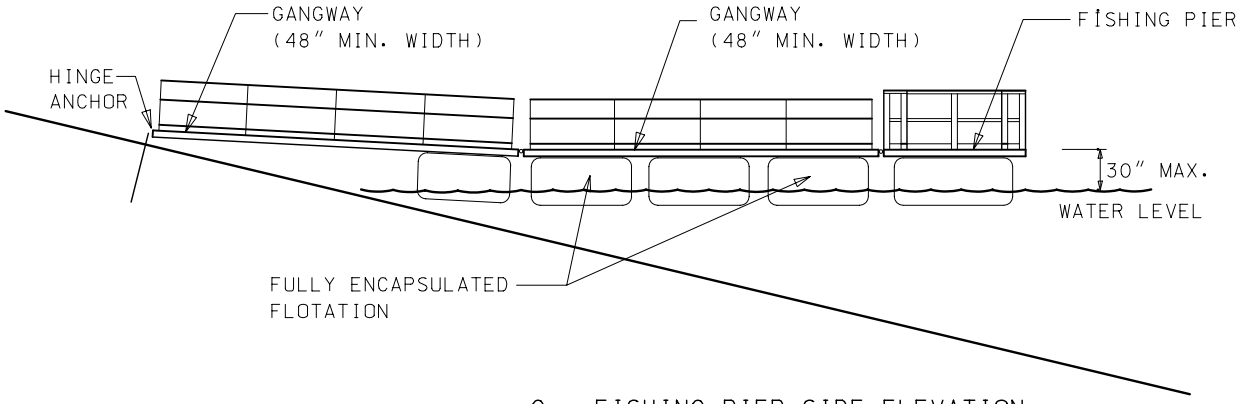
NOTES:
1. THIS SYSTEM IS PARTICULARLY USEFUL WITH ANNUAL FLUCTUATIONS OF LESS THAN 20 FEET.
2. ALLOWS THE DOCK TO BE PERMANENTLY LOCATED AND IS SELF ADJUSTING TO CHANGING WATER LEVELS.
3. GUIDE PILE ELEVATION SHOULD BE A MINIMUM OF 3 FEET ABOVE ORDINARY HIGH WATER.
4. GUIDE PILE PLUMB TOLERANCE IS 1 INCH PER 10 FEET.
5. THE WIDTH OF PILE YOKE IS CALCULATED FROM WATER FLUCTUATION.
6. SEE TABLE 5.8



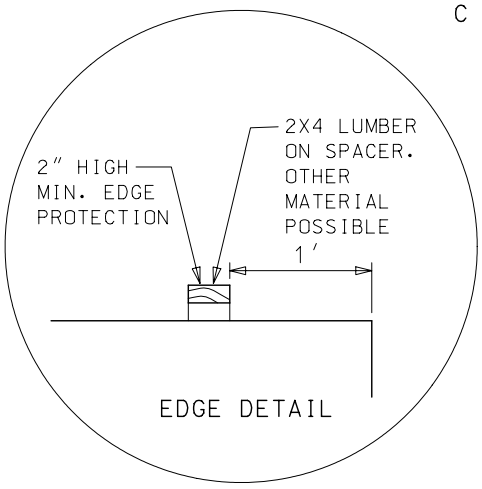
A – FISHING PIER PLAN



B – FISHING PIER ELEVATION

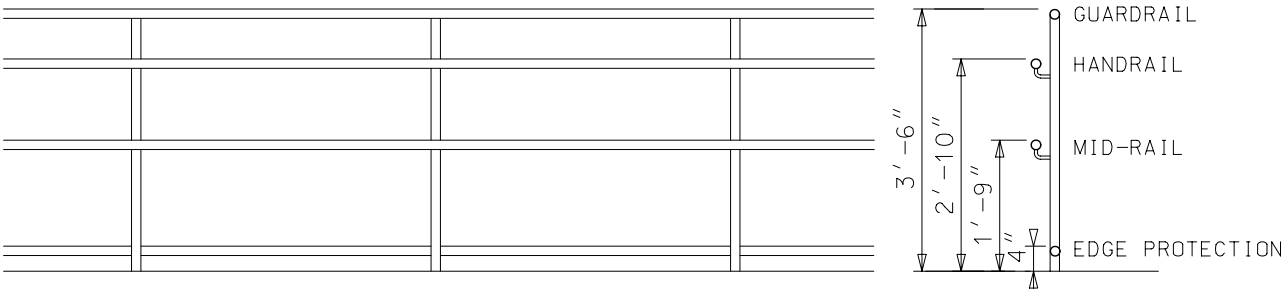


C – FISHING PIER SIDE ELEVATION



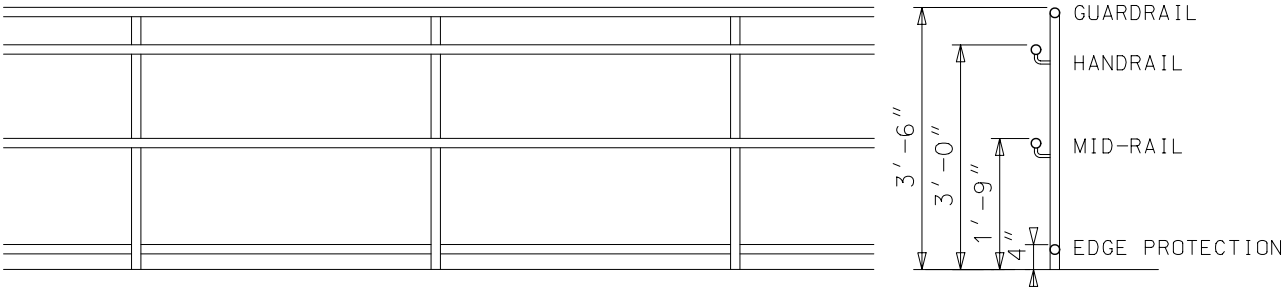
DRAWING NO. F-3
FISHING PIER

NOTES:
1. EDGE PROTECTION MUST BE PROVIDED
   -WHERE HANDRAILS ARE PROVIDED EDGE PROTECTION IS FLUSH WITH DECK EDGE.
   -WHERE HANDRAILS ARE NOT PROVIDED EDGE PROTECTION MUST BE INSET 12 INCHES FROM DECK EDGE.
2. AT LEAST 25% OF RAILING MUST BE 34″ MAXIMUM ABOVE DECK SURFACE.
3. SEE TABLE 5.9



ELEVATION SECTION

A – GANGWAY RAIL



ELEVATION SECTION

B – PIER/DOCK/PLATFORM RAIL

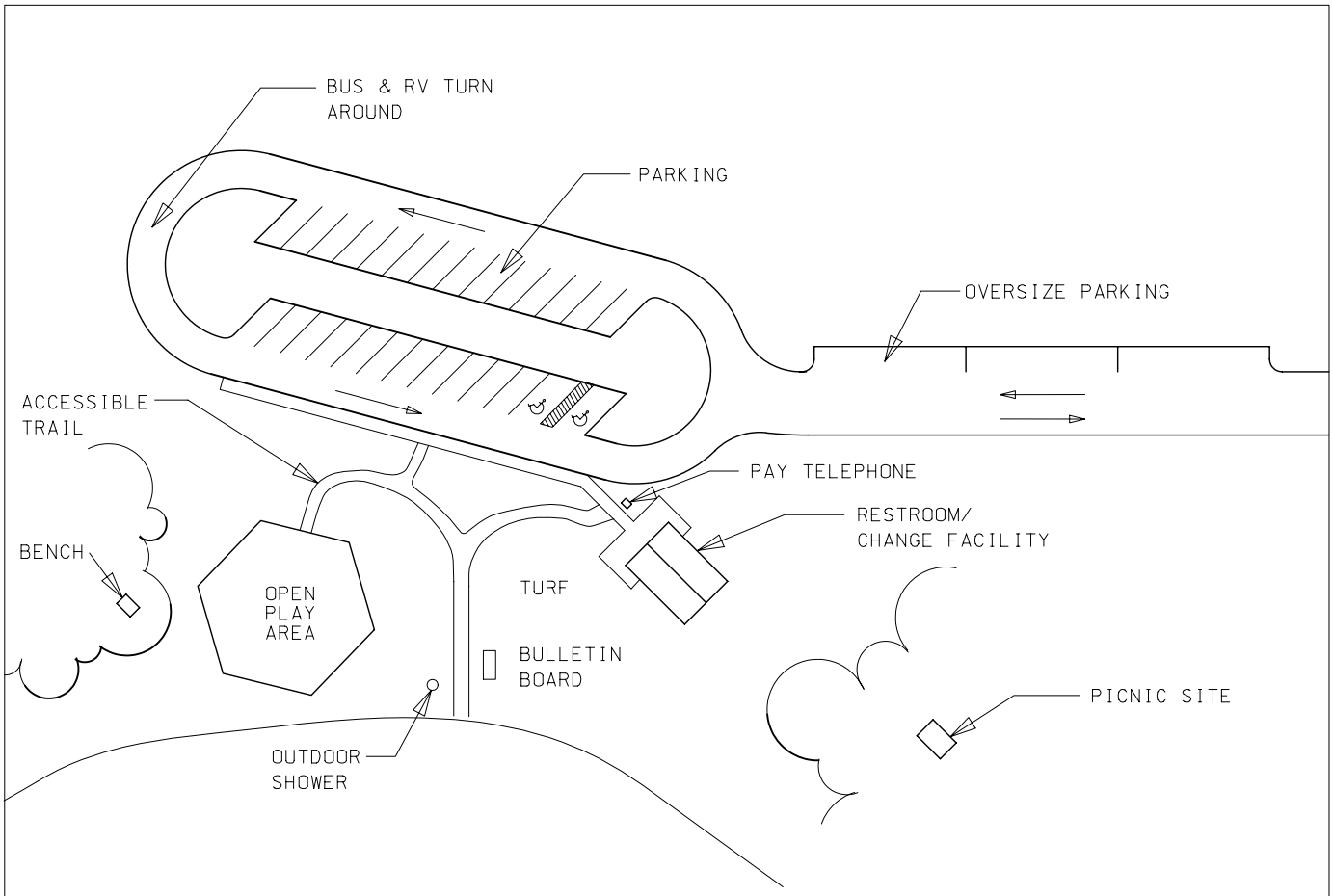
DRAWING NO. F-4
HANDRAIL AND GUARDRAIL

NOTE:
1. GANGWAY HANDRAIL SHALL BE 34" ABOVE DECK.
2. PLATFORM HANDRAIL SHALL BE 36" ABOVE DECK.
3. SEE TABLE 5.9

Appendix G

Drawings

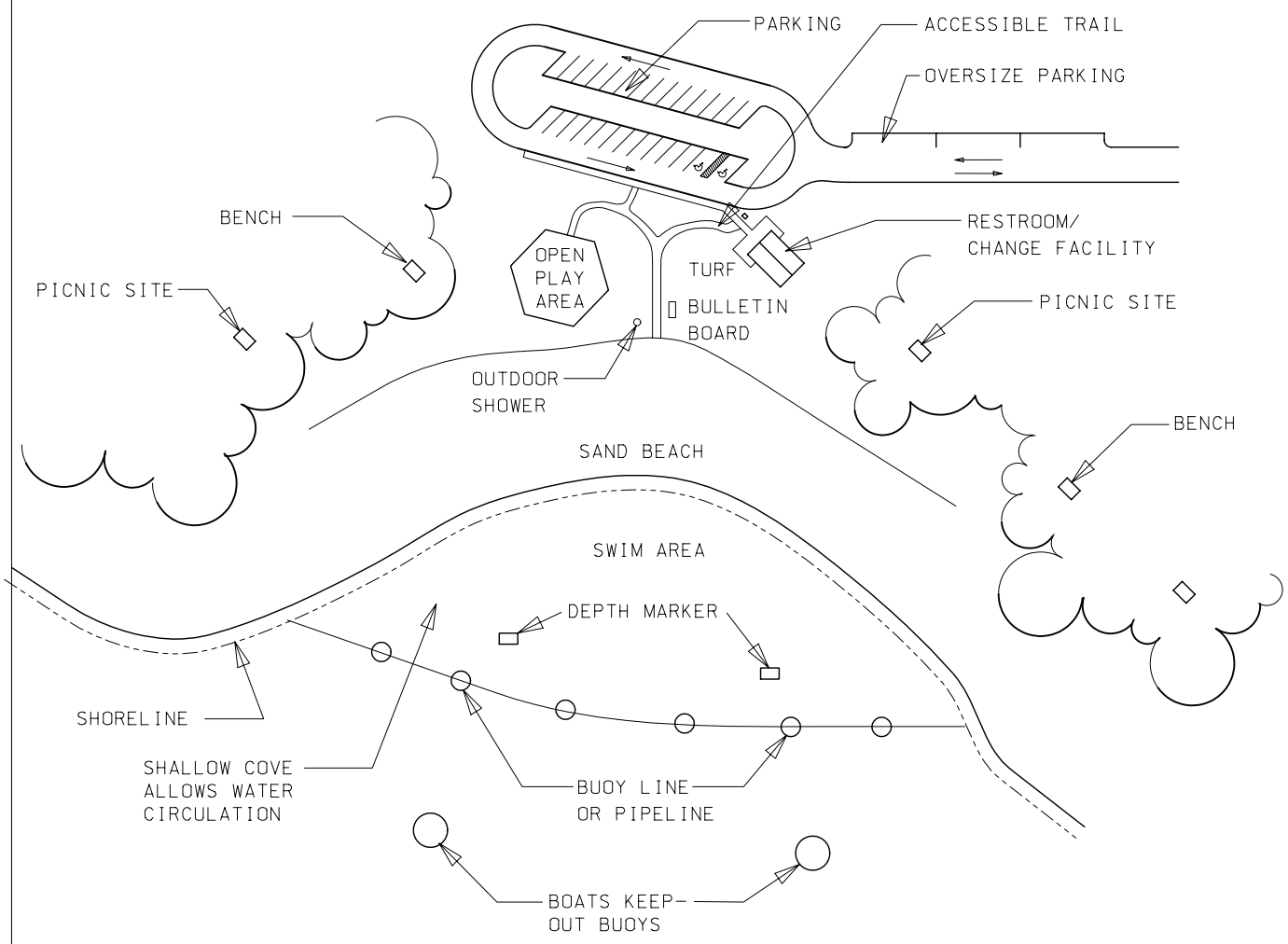
Swim Areas



DRAWING NO. G-1

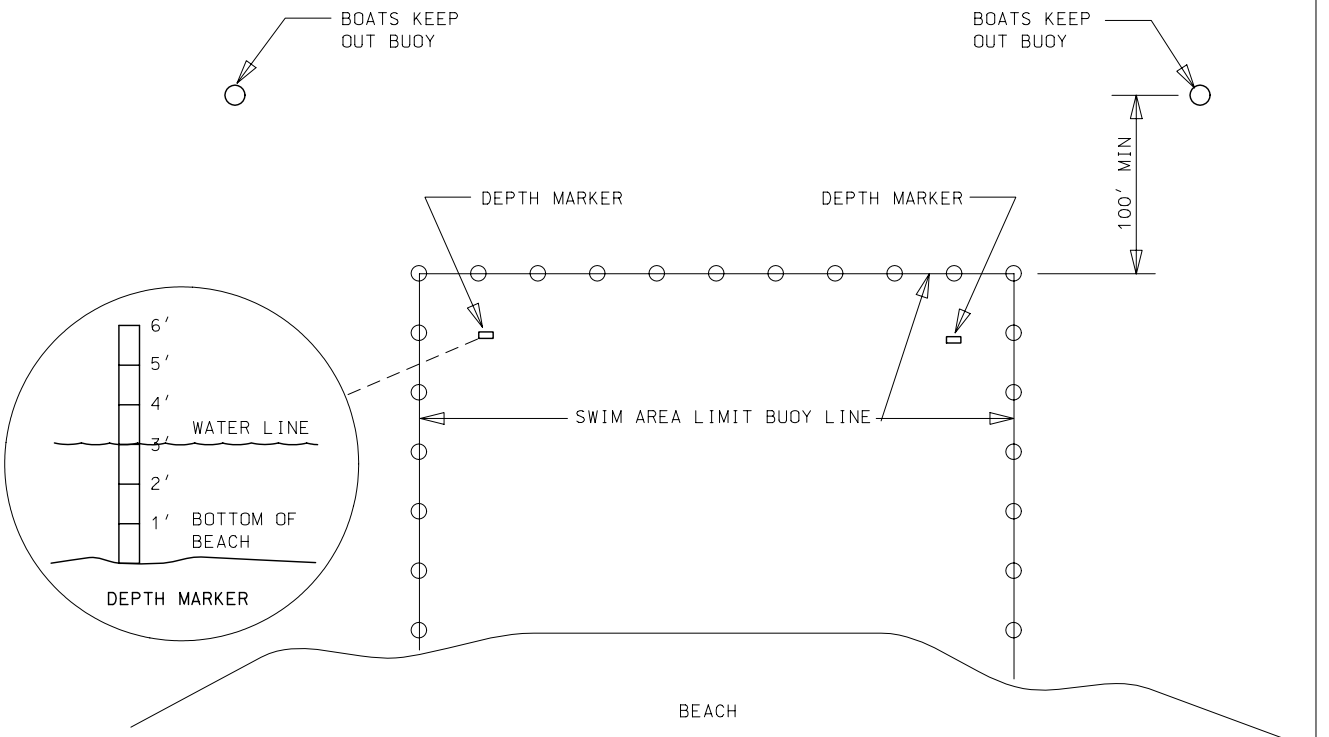
SWIM AREA PARKING AND SUPPORT FACILITY OVERVIEW

NOTES:
1. PROVIDE BUS AND LARGE RV TURN AROUND AT END OF PARKING AREA.
2. PROVIDE SHADED SEATING FOR ADULT SUPERVISION NEAR BEACH AREA



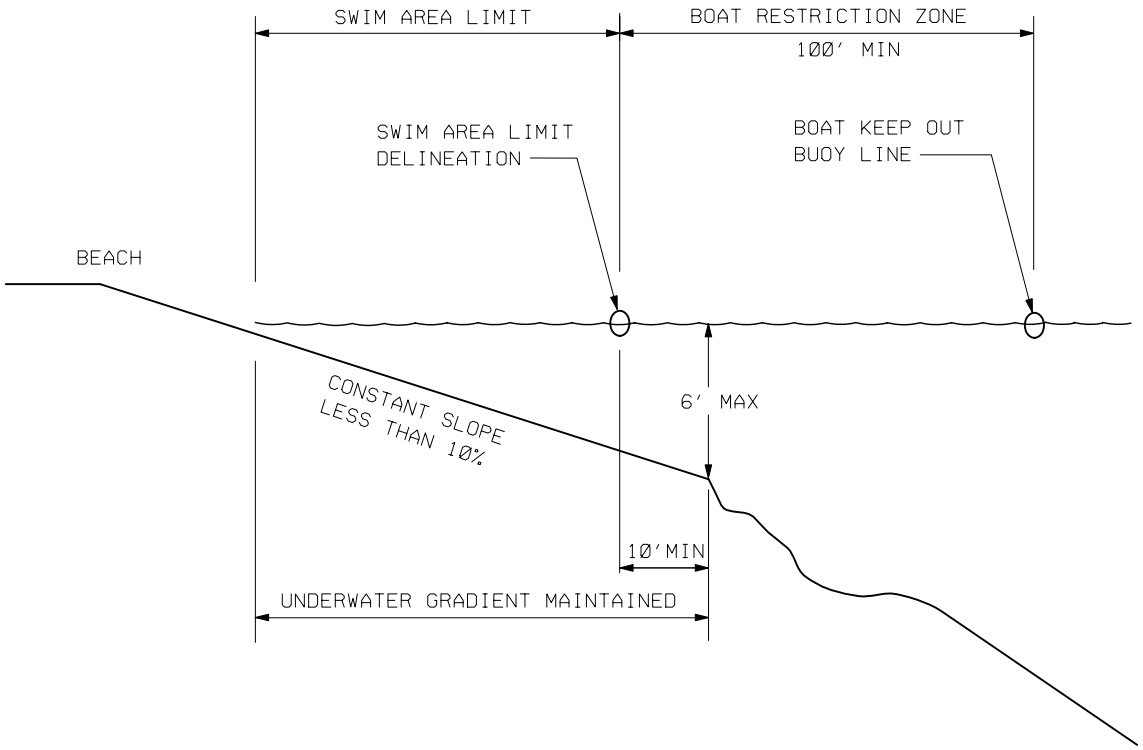
DRAWING NO. G-2
SWIM AREA OVERVIEW

NOTES:
1. STANDARD PARKING SPACE FOR EVERY 250 SQUARE FEET OF BEACH AREA.
2. OVERSIZE PARKING SPACE FOR EVERY 10,000 SQUARE FEET.



DRAWING NO. G-3
DESIGNATED SWIM AREA

NOTES:
1. THE SWIM AREA LIMITS SHALL BE DELINEATED.
2. A MINIMUM OF TWO DEPTH MARKERS INSTALLED IN THE DESIGNATED SWIMMING AREA.
3. TWO BOATS KEEP OUT BUOYS.
4. SEE TABLE 5.11



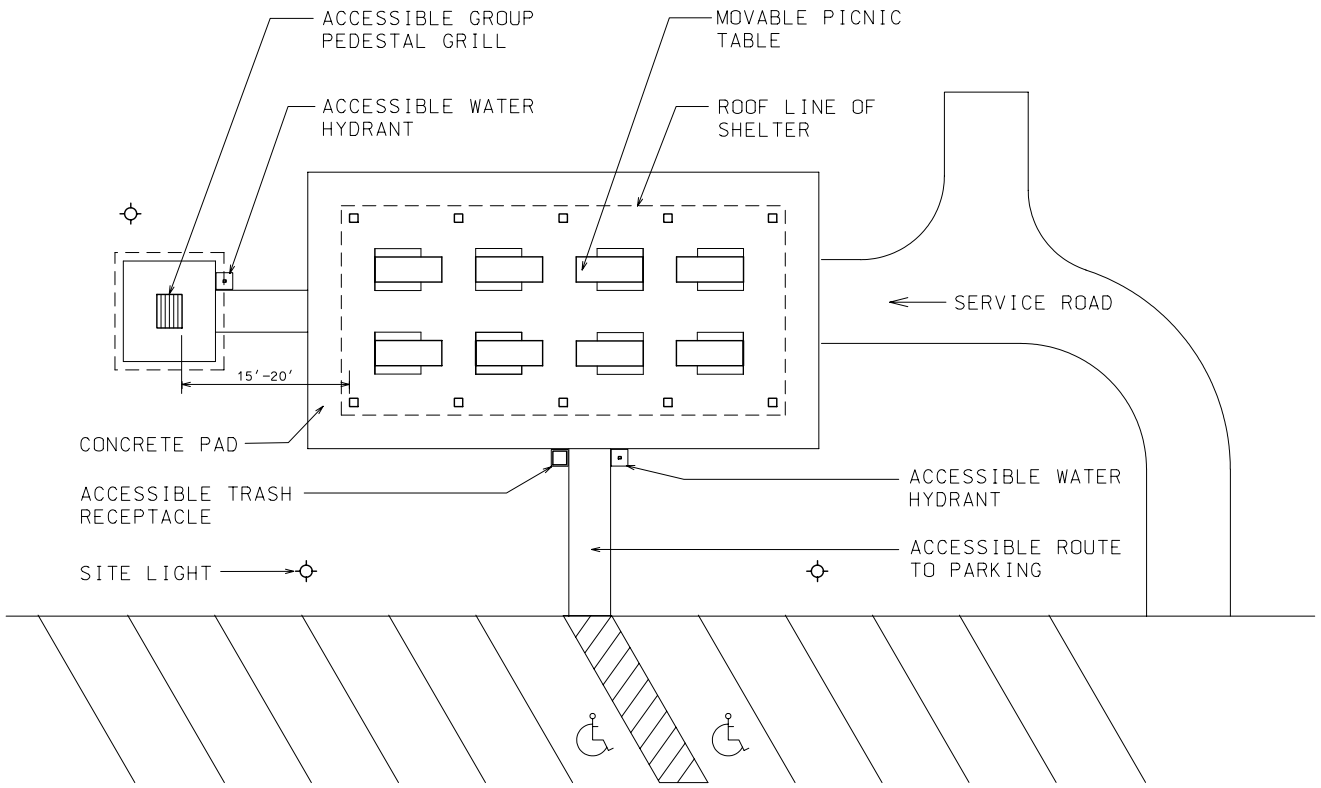
DRAWING NO. G-4
DESIGNATED SWIM AREA SECTION

1. THE DELINEATED SWIM AREA DEPTH SHALL NOT EXCEED 5 FEET. TYPICAL DELINEATED SWIM AREA DEPTHS RANGE FROM 3-5 FEET.
2. A SMOOTH UNDERWATER GRADIENT SHALL BE MAINTAINED A MINIMUM OF 10 FEET BEYOND THE DELINEATED SWIM AREA LIMIT. THE MAINTAINED UNDERWATER GRADIENT SHALL BE DESIGNED FOR WATER DEPTH NOT TO EXCEED 6 VERTICAL FEET BELOW THE NORMAL SUMMER POOL ELEVATION.
3. SEE TABLE 5.11

Appendix H

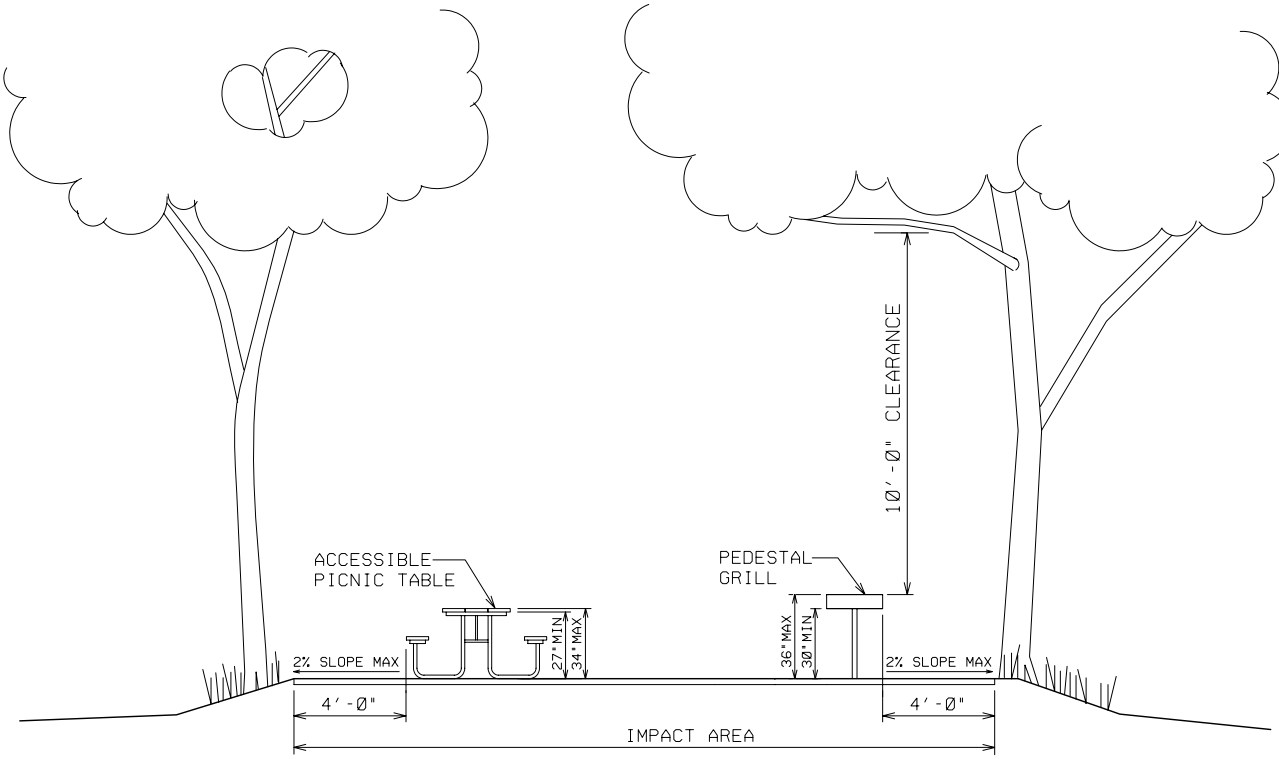
Drawings

Picnic Facilities



DRAWING NO. H-1
GROUP SHELTER LAYOUT

NOTES:
1. SIZE OF CONCRETE PAD SHALL BE 5' LARGER THAN THE SHELTER ON ALL SIDES.
2. SIZE OF GROUP GRILL PAD SHALL BE 4' LARGER TO MAKE THE GROUP PEDESTAL GRILL ACCESSIBLE
3. SEE TABLE 3.2



DRAWING NO. H-2
ACCESSIBLE PICNIC SITE SECTION

NOTES:
1. PEDESTAL GRILL OR FIRE RING PLACED 10 FEET FROM THE PICNIC TABLE.
2. PICNIC TABLE SITED AWAY FROM THE EDGE OF THE IMPACT AREA, STEEP SLOPES OR OTHER OBSTACLES.
3. SEE TABLE 5.13

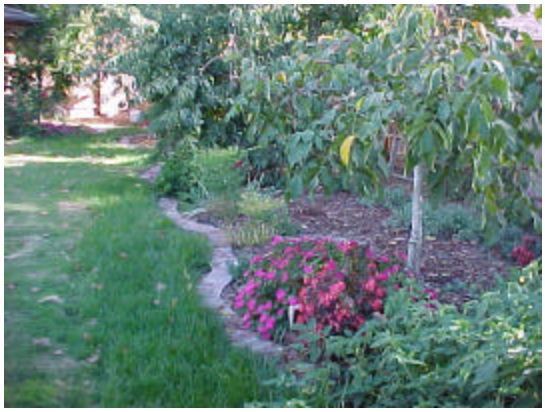
Appendix I

Photos

Support and Access Items

Photo I-1. UA ramp combined with steps. Tulsa River Parks, OK. Along with a UA access ramp, limited use of stepped designs may be incorporated when necessary to fit within the existing topography, facilities, and pathways (Para. 2.10)

Photo I-2. Solar-powered lighting. Dordon Creek Boat Ramp, J. Strom Thurmond, SC. Solar is an option to provide lighting at areas where electrical service is not available (Table 2.7)



Photos I-3 (Left) and I-4 (Right). Landscape features, Examples 1 (Fresno, CA) and 2 (Sanger, CA). Edging set flush with the ground to enable mowing. Plants are drought tolerant and low maintenance. Low maintenance vegetative area has weed barrier fabric and mulch to prevent weed growth. Irrigation devices are hidden in vegetation (2.7.3.4)

Photo I-5. Clovis, CA. Landscape features, Example 3. Low maintenance isolated area in the median eliminates mowing requirements. Flowers and trees (all indigenous, drought tolerant) established with weed barrier fabric and mulched to prevent weed growth. Irrigation hidden in vegetation. Edging set flush with ground level. Paras. 2.7.2 and 2.7.3

Photos I-6. C.J. Brown Dam and Reservoir, OH. Trash receptacle provided close to high use facilities, Example 1. Receptacle door is animal proof. Unit is UA, based on height, and the fact that the doors open to the side instead of being lifted up (Table 2.8). Also note bulletin board (Table 5.19)

Photo I-7. C.J. Brown Dam and Reservoir, OH. Trash receptacle provided close to high use facilities, Example 2. Double unit doors are animal proof design. Receptacle is UA based on height, and the fact that the doors open to the side instead of being lifted up (Table 2.8)

Photos I-8 (Left) and I-9 (Right). Low-cost recycle containers, Examples 1 and 2. Recycle containers offered at Cranfield Park, Norfork Lake, AR and Saylorville Lake, IA respectively (Table 2.8)

Photo I-10. Two-compartment recycle container. An example of a commercially available recycle container provided at Lake Success, CA

Photo I-11. Utility table. J. Strom Thurmond Lake, SC. Utility tables are a customer convenience at campsites and picnic sites and may be used in conjunction with fire ring/grills or pedestal grills (Para. 4.4)

Photo I-12. Utility table with electrical outlet and lantern hanger. Pettit Bay Recreation Area, Tenkiller Ferry Lake, OK. This style of utility table has a built-in electrical outlet (Para. 4.4). It also incorporates a lantern hanger (Para. 4.6)

Photo I-13. Free-standing lantern hanger. Clearwater Lake, MO. Free-standing lantern hanger within hardened living area, located outside circulation path (Table 4.3)

Photo I-14. Lantern hanger incorporated into railing. Damsite Park, Pomme de Terre Lake, MO. Lantern hanger placement and construction blends with campsite (Table 4.3)

Photo I-15. Honor vault - day use area, Example 1. Pomme de Terre Lake, MO (Para. 4.10.1)

Photo I-16. Honor vault - day use area, Example 2. Snake Creek Recreation Area, Tenkiller Ferry Lake, OK. This example includes a shelter for users that incorporates lighting and a pay phone (Para. 4.10, 4.10.1)

Photo I-17. Honor vault at entrance station, Example 1. West Overlook Day Use Area, Coralville Lake, IA. Honor vaults may be used in conjunction with an entrance station, or may be primary fee collection method for a campground or day use area (Para. 4.10.1)

Photo I-18. Honor vault at entrance station, Example 2. J. Strom Thurmond Lake, SC. This style of vault incorporates associated signage on the unit itself (Para. 4.10.1)

Photo I-19. Automated self-pay station. Hensley Lake, CA. Note that an honor vault is also provided for alternate fee collection method (Table 4.6)

Photo I-20. Automated self-pay station – funds retrieval. Hensley Lake, CA (Table 4.6)

Photo I-21. Automated self-pay station – wheelchair access. Hensley Lake, CA. Unit allows front access for customers in wheelchairs (Table 4.6)

Appendix J

Photos

Entrance Stations

Photo J-1. Entrance station island. Winfield Campground, J. Strom Thurmond Lake, GA. Note recommended center of roadway entrance station location, turnaround incorporated into entrance station approach, and roadway markings to direct traffic flow (Table 3.1)

Photo J-2. Entrance station features. Brushy Creek Park, Lake O' the Pines, TX. Note building design and landscaping are in keeping with the theme of the area, and low-maintenance building exterior. Optional dual lanes and recommended turn-around incorporated for customer convenience (Table 3.1)

Photo J-3. Dual lanes, Example 1. Canadian Park, Canton Lake, OK. This is the view exiting the park. Note the dual entrance lanes, arrows on pavement designating traffic flow (Table 3.1)

Photo J-4. Dual lanes, Example 2. Taylor Ferry Park, Ft. Gibson Lake, OK. Note dual entrance lanes, traffic control gate, customer parking in front of building so pedestrians do not cross traffic lanes (Table 3.1)

Photo J-5. Customer parking, entrance view. Petersburg Campground, J. Strom Thurmond Lake, SC. Note pullover customer parking area on left so pedestrians do not cross traffic lanes (Table 3.1)

Photo J-6. Customer parking, exit view. Petersburg Campground, J. Strom Thurmond Lake, SC. On left, pullover customer parking on each side of entrance lane for entering customers, and pedestrian crosswalk. On right, head-in parking for exiting customers (Table 3.1)

Photo J-7. Customer service window and walk-in area. Brushy Creek Park, Lake O' the Pines, TX. Customers are shown entering walk-in area of entrance station. Note that an outside service window is also provided (Table 3.1)

Photo J-8. Customer walk-in area. Modoc Campground, J. Strom Thurmond Lake, SC. Customer walk-in area in entrance station (Table 3.1)

Photo J-9. Customer service window overhang, Example 1. Littcarr Campground, Carr Creek Lake, KY. A retractable RV awning installed to provide customers with protection from the elements while they conduct business at this drive-up outside customer service window (Table 3.1)

Photo J-10. Customer service window overhang, Example 2. Cordoniz Recreation Area, Eastman Lake, CA. An automated retractable awning is installed at this walk-up outside customer service window (Table 3.1)

Photo J-11. Automatic gate. Hickory Creek Park, Lewisville Lake, TX. Automatic gate can be operated from inside the entrance station and allows after-hours departures

Photo J-12. Interior work area. Ridge Road Campground, J. Strom Thurmond Lake, GA. Interior work area for park attendants sized to accommodate all required equipment (Table 3.1)

Appendix K

Photos

Restrooms, Shower Houses, and Change Houses

Photo K-1. Unisex vault restroom. Dordon Creek Boat Ramp, J. Strom Thurmond Lake. Example of the minimum restroom facility that may be provided (Paras. 3.5.1 and 3.5.2)

Photo K-2. Unisex restroom with family room. Lake Balboa, Los Angeles Department of Recreation and Parks, Los Angeles District. Example of a unisex restroom building (Paras. 3.5.1 and 3.5.2)

Photo K-3. Prefab restoom building. High Bank Recreation Area, Cave Run Lake, KY. Installation of a prefab building shows some advantages of using commercially available units (para. 1.21)

Photo K-4. Prefab unisex shower house. Nemo Park, Pomme de Terre Lake, MO. Installation of a prefab building shows some advantages of using commercially available units (Paras. 1.21 and 3.5.2)

Photo K-5. Unisex shower house with family room. Nemo Park, Pomme de Terre Lake, MO. Example of a prefab unisex shower house with a family room (Para. 3.5.2)

Photo K-6. Sinks incorporated into countertops. North Fork Campground, Rough River Lake, KY. Customers like the additional counter space. Also note that a GFCI protected outlet is provided for every two sinks, and motion-activated faucets have been included (Tables 3.4 and 3.5)

Photo K-7. Sinks and customer convenience items. Redman Creek Campground, Wappapello Lake, MO. Note that GFCI protected outlets are provided, as well as a shelf, mirrors, hand dryer, and clothing hooks (Tables 3.4 and 3.5)

Photo K-8. Shower stall. Redman Creek Campground, Wappapello Lake, MO. Note that a shelf large enough for toiletries is provided in shower stall (Table 3.5). Also note UA rails and bench

Photo K-9. Individual dressing area. Redman Creek Campground, Wappapello Lake, MO. Dressing area for shower stall has door with privacy latch, includes bench and clothing hooks. Shelf large enough for toiletries not visible in photo (Tables 3.4 and 3.5)

Photo K-10. Clothing hooks. Clothing hooks are a welcomed customer convenience in shower and sink areas. This type offers enough hooks for clothes, towels, toiletry article bags, etc. (Table 3.5)

Photo K-11. Interior color contrast. Robinson Point Park, Norfork Lake, AR. Note the required floor and wall contrast at base (Table 3.7). Also note that this is a UA stall

Photo K-12. Change house. Sandy Park, Canton Lake, OK. Example of a change house provided for beach area (Para. 3.6)

Photo K-13. Change house outdoor shower. Sandy Park, Canton Lake, OK. Outside shower provides for sand removal. Note multilevel shower heads (Table 3.9)

Photo K-14. Beach area outdoor shower. Nemo Swimming Beach, Pomme de Terre Lake, MO. Example of a low-cost outdoor shower with multilevel showerheads (Table 3.9). This type of shower can easily be adapted to meet UA guidelines

Appendix L

Photos

Fish-Cleaning and Sewage Dump Stations

Photo L-1. Fish-cleaning station. Hensley Lake, CA. Note that this fish-cleaning station is shaded and protected from the elements, is UA, is located within 50 ft of parking area, has interior and exterior lighting fixtures, and is isolated from other activities (Table 3.10)

Photo L-2. Interior view of fish-cleaning station. Hensley Lake, CA. Note that this fish-cleaning station has a UA maneuver area, is sited on a concrete pad, and that two water hydrants are provided (Table 3.10). UA utility sink should be a feature of new units

Photo L-3. Customer using fish-cleaning station. Carter Cove Park, Nimrod Lake, AR. This station includes two water hoses with spray nozzles, a 2-hp grinder with timed start/stop switch and custom cover (fish remains go into septic tank and leach field), GFCI receptacles, and night lighting (Table 3.10)

Photo L-4. Sewage dump station. Petersburg Campground, J. Strom Thurmond Lake, GA. This view shows wash down and signage. The potable water spigot is outside of photo (Table 3.11)

Photo L-5. RV customer using sewage dump station. Note that drain and water are on driver side of RV (Table 3.11)

Appendix M

Photos

Campgrounds

Photo M-1. Shaded and water-oriented campsite. Pomme de Terre Lake, MO. This campsite satisfies customer preferences for shade and proximity to the lake or river (Table 5.1 and Para. 5.3)

Photo M-2. Shaded UA campsite. Wilbur D. Mills Park, Pine Bluff Project, AR. This campsite is UA (Para. 5.2.1) and has a shelter to provide shade since existing vegetation is not available (Table 5.1)

Photo M-3. Campsite amenities. Modoc Campground, J. Strom Thurmond Lake, SC. View of typical campsite amenities, to include utility table, fire ring/grill, pedestal grill, lantern hanger, and UA picnic table (Table 5.2)

Photo M-4. Hardened living area. Moutardier Campground, Nolin River Lake, KY. Fine crushed stone surface provided (Para. 5.3.3.1)

Photo M-5. Designated UA site, Example 1. Acorn Valley Campground, Saylorville Lake, IA. Fully concreted campsite (Para. 5.3.1)

Photo M-6. Designated UA site, Example 2. Pettit Bay Recreation Area, Tenkiller Ferry Lake, OK. Fully concreted campsite (Para. 5.3.1)

Photo M-7. Camping spur follows terrain – Example 1. Pomme de Terre Lake, MO. (Table 5.1). This photo also demonstrates hardened living area located on the passenger side, timber border, provision of room for RV slideouts, and required site amenities (Table 5.4)

Photo M-8. Camping spur follows terrain – Example 2. Note how cut and fill are avoided by building this back-in site on the contour (Table 5.1)

Photo M-9. Back-in site – multiple vehicles. Pomme de Terre Lake, MO. This photo demonstrates 70-ft spur length that provides additional parking space to accommodate car and boat trailer along with RV. Site provides room for RV slideouts (Tables 5.2 and 5.3)

Photo M-10. Pull-through site – multiple vehicles. Pomme de Terre Lake, MO. This shaded campsite demonstrates 70-ft parking area length with room for extra vehicle, level and hardened parking area, and individual utility hookups (Tables 5.2 and 5.3)

Photo M-11. Pull-through site – double. Ortona South Campground, Lake Okeechobee Waterway, FL. Note landscape plantings for buffer and aesthetics are indigeneous, low-maintenance, sustainable. Shade provided by combination of trees and shelter (Table 5.1)

Photo M-12. Group camping area. Sugar Bottom Group Camping Area, Coralville Lake, IA. Where feasible, group campsites may be provided within a campground or in close proximity to an existing campground (Para. 5.3.1.1)

Photo M-13. Park attendant campsite. Petersburg Campground, J. Strom Thurmond Lake, GA. Located near the campground entrance, inside the gates. Vegetation screens living area for privacy. Sign helps campers easily locate attendants in the event of an emergency (Para. 5.3.1.2, Table 5.2)

Photo M-14. Group shelter in campground. Ortona South Campground, Lake Okeechobee Waterway, FL. This communal gathering point for campers was constructed after a local Customer Care Survey indicated local demand (Table 5.2, Para. 6.3)

Photo M-15. Electrical Pedestal. Pedestal with 50-, 30-, and 20-amp (GFCI) hookups (Table 5.5)

Photo M-16. Low-maintenance amphitheater. City of Los Angeles outgrant, Lake Balboa, Los Angeles District. Amphitheater is constructed of low-maintenance materials that are indigenous to the site. This is an example of a sustainable design. Note that top section is UA (Para. 5.4.8.1)

Appendix N

Photos

Boat Ramps, Docks, and Piers

Photo N-1. Multi-lane boat launching ramp. Pomme de Terre Lake, MO (Table 5.8)

Photo N-2. Two-lane boat launching ramp. Scotts Ferry Boat Ramp, Thurmond Lake, SC. Courtesy dock is provided, but out of photo (Table 5.8)

Photo N-3. Wave erosion protection. Hensley Lake. Riprap or quarry run rock is the minimum protective edging provided to protect boat launching ramps from erosion due to wave action (Table 5.8). Also note guide cable anchoring system (Para. 5.4.2)

Photo N-4. Boat tie-down lane. Lake Springs Day Use Area, J. Strom Thurmond Lake, GA. Temporary parking designated by signs and pavement markings provides a tie-down lane for boat rigging and de-rigging. This minimizes congestion at launching ramps (Table 5.8)

Photo N-5. Courtesy dock, Example 1. Lake Kaweah, CA. This dock has articulated hinge to prevent trip hazard, and can be pushed or pulled to accommodate changing water levels. It has chain assembly anchoring system to prevent drift. Note non-skid deck (Table 5.9)

Photo N-6. Courtesy dock, Example 2. Ouita Boat Ramp Access Area, Lake Dardanelle, AR. Floating design (Table 5.9)

Photo N-7. Courtesy dock, Example 3. Amity Boat Ramp, Thurmond Lake, GA. Floating design, recycled plastic decking (Table 5.9)

Photo N-8. Courtesy dock, Example 4. Ste. Marie Park, Lower Arkansas River. This fixed dock features handrail/ladder combinations for assistance in entering boats (Table 5.9)

Photo N-9. Courtesy dock, Example 5. Taylor Ferry Recreation Area, Fort Gibson Lake, OK (Table 5.9)

Photo N-10. Courtesy dock, Example 6. Pendleton Bend Park, Lower Arkansas River. This dock's multilevel design accommodates changing water levels (typically only 1-2 ft of fluctuation at this site) (Table 5.9). New or renovated dock of this type should provide UA access to each level

Photo N-11. UA boat loading platform, Example 1. Spadra Park, Lake Dardanelle, AR. Constructed by the Arkansas Game and Fish Commission, this design provides several gates along the length of the dock and stable support as customer enters boat (Table 5.8)

Photo N-12. UA boat loading platform, Example 2. Carter Cove Park, Nimrod Lake, AR. This is a custom design with a series of ramps and landings that are 1.5 ft apart in elevation. When one landing becomes unusable due to rising water, the next one is usable (Table 5.8)

Photo N-13. Fishing pier, Example 1. Bull Shoals Park, Bull Shoals Lake, AR. This design includes a fishing well in the center of the floating pier (Tables 5.9 and 5.10)

Photo N-14. Fishing pier, Example 2. Prairie Creek Recreation Area, Beaver Lake, AR. This UA pier includes a fishing well, and resulted from a partnering effort between the Corps, the Arkansas Game & Fish Commission, and local bass clubs (Tables 5.9 and 5.10)

Photo N-15. Fishing pier, Example 3. Nimrod Lake, AR. This fixed fishing pier is not located in a park, but at the end of a gravel lake access road on the bank of an underwater stream. Local senior anglers chose the location because of the good fishing (Tables 5.9 and 5.10)

Photo N-16. Fishing pier, Example 4. Trout Stream Access Point, Tenkiller Ferry Lake, OK. This UA pier is a fixed design. Note the access ramp in foreground (Tables 5.9 and 5.10)

Photo N-17. Fishing pier, Example 5. Below dam, J. Strom Thurmond Lake, SC. This shows recommended amenities including lowered section in railing for UA, rod holders, and benches. Visible at right edge is shade shelter roof. A picnic table is just outside the photo (Tables 5.9 and 5.10)

Photo N-18. Fishing rod notches. Pomme de Terre Lake, MO. This shows fishing rod notches in fishing pier railing (Table 5.9)

Appendix O

Photos

Swim Areas

Photo O-1. Beach delineation and depth marker. J. Strom Thurmond Lake. The required swim area limit delineation is accomplished using floating pipeline. Note the required depth marker delineating each 1-ft change in water depth (Table 5.11)

Photo O-2. UA ramp to swimming area. Cranfield Park, Norfork Lake, AR. A concrete ramp from the parking lot to the swimming area enables wheelchair users to access the water (Para. 5.2.1)

Appendix P

Photos

Picnic Facilities

Photo P-1. Plaza approach for picnic shelter placement. Rockland Recreation Area, Old Hickory Lake, TN. This example of a plaza approach combines multiple shelters and related amenities to serve large groups and extended family gatherings (Para. 3.4)

Photo P-2. Picnic shelter concrete pad. Clarks Hill Park, Hannah Point Shelter, J. Strom Thurmond Lake, SC. Note that concrete pad extends beyond the edge of the support posts for UA, and is sloped to drain away from the shelter (Table 3.2)

Photo P-3. Picnic shelter roof trusses. Overlook Area, Monroe Lake, IN. Note that roof trusses do not allow birds to roost or build nests (Table 3.2). This shelter constructed from a prefab kit. Also note railings incorporated on sidewalk for UA

Photo P-4. Picnic shelter parking. Starkey Park, Beaver Lake, AR. This shelter has convenient parking that accommodates UA and loading and unloading of supplies. Also note placement with a scenic lake view (Table 3.2)

Photo P-5. Picnic shelter features, View 1. Millerton State Park, CA. Concrete pad extends beyond shelter for UA. All surfaces designed for pressure washing. Group size grill, long utility table with GFCI outlets, and nightlight provided. French drain included (visible adjacent to grill) (Table 3.2)

Photo P-6. Picnic shelter features, View 2. Millerton State Park, CA. Shelter is UA. Convenient to restrooms, water fountain, trash receptacle, and GFCI outlet visible on post (Table 3.2)

Photo P-7. Picnic shelter features and amenities, View 1. Cave Run Lake, KY. Shelter is UA, has concrete apron, and is convenient to restroom and playground equipment (Table 3.2)

Photo P-8. Picnic shelter features and amenities, View 2. Cave Run Lake, KY. Shelter has low-maintenance vinyl siding at gable ends. Extended concrete apron accommodates UA grill, UA drinking fountain, and garbage containers with UA (side opening) doors (Table 3.2)

Photo P-9. Picnic shelter amenities. W.P. Franklin South Recreation Area, Okeechobee Waterway, FL. This shelter area offers optional amenities of horseshoe pits (foreground) and a volleyball court (background) (Tables 3.2 and 5.13)

Photo P-10. Small shelter. Hensley Lake, CA. Shelter offers four tables, is totally UA, includes group fire area and benches, and group size grill (Table 3.2)

Photo P-11. Covered table. Starkey Park, Beaver Lake, AR. Shade structure constructed to provide shade for table (Table 5.13). Located in conjunction with other amenities, and in this case offers shaded seating that encourages adult supervision of swimming area (Table 5.12)

Photo P-12. UA covered table. West Dam Day Use Area, J. Strom Thurmond Lake, GA. Shade structure constructed to provide shade for table (Table 5.13). Note UA features: concrete walk and pad, and split bench design that allows wheelchairs or strollers to pull up to the table (Para. 5.2.1)

Photo P-13. Single picnic site. Lake Springs Day Use Area, J. Strom Thurmond Lake, GA. Table located on delineated impact pad (Table 4.1), includes shade, pedestal grill, and scenic view (Tables 5.13 and 5.14)

Photo P-14. Multi-table site. Overlook Area, Taylorsville Lake, KY. In addition to individual sites, groupings of picnic tables are recommended to accommodate customer demand. Note that water fountain, pedestal grills, garbage cans, and hardened surface are provided (Table 5.13)

Appendix Q

Photos

Playgrounds and Open-Field Play Areas

Photo Q-1. Playgrounds separated from other uses. Pendleton Bend Park, Lower Arkansas River. Playgrounds should be located far enough away from other uses such as campsites and interpretive facilities to avoid noise disturbances (Para. 2.2.2.3)

Photo Q-2. UA playground, Example 1. Robinson Point Park, Norfork Lake, AR. Note the wheelchair ramp (Para. 5.2.1)

Photo Q-3. UA playground, Example 2. Illinois Interstate Highway Rest Area. Note rubberized surface (Para. 5.2.1)

Photo Q-4. Playground features. West Dam Day Use Area, J. Strom Thurmond, GA. Playground has edge material that raises finished grade a minimum of 6”, wood fiber play surface, and approximately 50% of the area is shaded (Table 5.15)

Photo Q-5. Open-field play area, Example 1. Parksville Day Use Area, J. Strom Thurmond Lake, SC. Open-field play areas should be provided where demand exists and terrain permits. Not visible in this photo are adjacent shelter and other day use facilities (Para. 5.4.7)

Photo Q-6. Open-field play area, Example 2. Shady Creek Recreation Area, Mississippi River Project, Pool 16, IA. Open-field play areas adjacent to shelters and other day use facilities provide multi-cultural recreational opportunities (Para. 5.4.7)

APPENDIX R

SAMPLE DESIGN EXEMPTION

CESPK-CO (MARKS Number) 12 December 2002

MEMORANDUM FOR: Pine Flat Lake

SUBJECT: Design Standard Exemption, Pine Flat Lake's Deer Creek Launch Ramp

1. Section 1.10 of EM 1110-1-400 authorizes the Chief of Operations to grant exemption from design standards for new or rehabilitated facilities in rare circumstance.

2. Water fluctuation exceeding 300 ft makes the 8 percent parking slope standard impractical and cost-prohibitive to construct at the Deer Creek location. Attempting to create parking areas at the required slope would require 11 separate parking areas over the length of the ramp and increase construction cost in excess of $10,000,000. The Deer Creek launch ramp is therefore granted an exemption from the design standard limiting parking areas to 8 percent slope.

3. Rehabilitation will incorporate parking areas adjacent to the ramp at the slope of the ramp. This will negate the requirement for additional parking areas while meeting the public need.

4. A copy of this memorandum is to be retained in your files.

(Name)
Chief Operations Division

CF: Operations Technical Branch

Appendix S

Corps of Engineers Facility and Services
Customer Discussion Guide
Format, Procedures, and Description of Data Fields

CE Facility & Services CUSTOMER DISCUSSION GUIDE	No: ____	Date:	Time:	Weekday Weekend
		Project:		Area:
Day Use ___ Campground ____		Campsite No.:		Campground Class: A B C
• Camping Equipment on Site		Tent Van Pick-up Camper Pop-up Camper Towable Trailer Class C Motor Home Class A or Luxury Coach Other _____		
WHO:				
• Major rec. activities		Picnic Camp Swim Water Ski Boat Sightsee Fish Hunt Other_____		
• Project(s) visited				
• Frequency of use		First Visit *Holiday Use*: All major holidays Memorial Day 4th of July Labor Day *Non-Holiday Use*: 1-3 visits/year 4-10 visits/year More than 10 visits/year		
• Group type		Single Family Friends Family & Friends Multi-Family Other_____		
• Local resident		Yes No		
• Shoreline resident		Yes No		
• First-time visitor		Yes No		
• Only use CE projects?		Yes No		
• Ethnicity		White Hispanic Black Asian/Pacific Native American Other		
WHAT:				
Observations by the customers on:				
• Favorite facilities/services				
• Needed improvements				
• Problem areas				
• Concerns				
• Additional facilities/services needed				
• Things we do that are not needed				
WHY:				
• Reason customer selected *this* area today				
• How this area compares to other areas they visit				
OTHER:				
• Additional comments				

Customer Outreach - CE Facilities & Services
Customer Discussion Guide

Procedures and Description of Data Fields

PROCEDURES: Following are recommended procedures for customer contacts using the Customer Discussion Guide.

1. Give customers advance notice: Customers need a heads up to be thinking along the lines of the Customer Discussion Guide topics. Particularly for camping areas, you may have contract gate attendant distribute a card to incoming campers a day or so before sampling the area, with wording such as:

> Do you have ideas about facilities and services in this recreation area? A Corps of Engineers representative will be in the area to talk to campers on May 31st between 2 – 4 p.m. Please be thinking about suggestions you can give if your campsite is selected for an interview.
>
> If you do not get to talk directly to the Corps representative you can still give us your ideas by jotting them down on this card and returning it to the Park Attendant before you leave.
>
> Thank you for your help.

2. Sample selection: Consider using a random number generator to select customers to be interviewed; for instance, to select campsites in a campground. This is not to imply statistical significance for the results, but works well to get a good distribution across the recreation area. Customers also readily accept the answer that they were randomly selected when they ask, "Why did you pick me?" and those who ask, "Why didn't you pick me?"

3. Initiating customer contact: An example of a simple script to start the conversation:

"Hello, my name is _____. I'm with the Corps of Engineers _____office. We want to make sure we have satisfied customers, and we're talking to a random sample of customers

today to get ideas on what we should do (or not do) to meet your needs."

4. Recording results: Not every group or individual will give information to match each of the blocks on the format. Try to steer the discussion to get information, but depend on a conversational approach rather than a stream of direct questions. It may be most productive to record information after leaving the customer(s), since otherwise they may become distracted or uncomfortable wondering what is being written down, and not give as much detail.

DEFINITIONS: The following definitions are provided to assist in recording the results of customer interviews on the Customer Profile format.

No.: Customer Discussion Guide reference number. For each project begin with 1 and number consecutively.

Date: Date of interview

Time: Time interview begins

Weekday/Weekend: Designate if interview occurs on weekday or weekend day

Project: Project name

Area: Name of the recreation area where interview occurs

Day Use/Campground: Recreation area type

Campsite No.: If interviewing a camper, the campsite they are occupying

Campground Class: If interviewing in a campground, indicate whether a Class A, B or C facility

Camping Equipment on Site: If interviewing a camper, from the choices provided on the format, circle the type of equipment they have on the site. Below are some examples to assist with determination of equipment type:

Towable Trailer

Class C Motor Home

Class A or Luxury Coach

WHO:

Major Rec. Activities: From the choices provided on the format, circle all the major recreation activities in which the customers indicate they participate at the project.

Project(s) Visited: Write in names of other Corps projects that the customers use.

Frequency of Use: Circle the choices that describe the customers' frequency of use for both holidays and non-holidays.

Group Type: From the choices given on the format, circle the description of the group.

Local Resident: Prior to beginning interviews, the definition of "local" for this project needs to be determined by project personnel. On the format, indicate by circling "yes" or "no" if the customer meets that criterion.

Shoreline Resident: On the format, indicate by circling "yes" or "no" if the customer is a shoreline resident.

First-time visitor: On the format, indicate by circling "yes" or "no" if the customer is a first-time visitor to the project.

Only use CE projects: On the format, indicate by circling "yes" or "no" if the customer uses Corps projects exclusively for their major recreation activities.

Ethnicity: From the choices given on the format, circle the ethnicity of the customer(s) being interviewed based on visual observation.

WHAT, WHY, and OTHER:

Observations by the Customers on: In the blocks provided, note customer comments on the various topics listed.

Analysis of Results. Software to analyze results is available on the NRM Gateway on the Customer Service page.