

**Forest Service Handbook
National Headquarters - Washington Office
Washington, DC**

Forest Service Handbook 2309.13 – Recreation Site Handbook

Chapter 10 - Planning and Design of Developed Recreation Sites and Facilities

Amendment: 2309.13-2018-1

Effective date: January 25, 2018

Duration: This amendment is effective until superseded or removed.

Approved by: Glenn P. Casamassa, Associate Deputy Chief, NFS

Date approved: January 23, 2018

Responsible Staff:

Last Change: 2309.13-2013-2 to 2309.13_contents

Superseded Document(s):

Digest: Following is an explanation of the changes throughout the directive by section.

10: Establishes chapter, codes, and captions and sets forth direction for the planning and design of developed recreation sites and facilities. Recodes to this chapter direction previously set out in FSM 2333 on recreation site and facility planning and design.

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Recreation uses and values are important aspects of the ecosystems the Forest Service manage. Sustainable developed recreation site and facility design maintains and enhances the ecosystem services these landscapes provide, helps the Agency accomplish its stewardship goals, and connects people to the outdoors. Developed recreation sites and facilities provide the ability to engage large numbers of visitors, manage settings, and enhance visitor experiences. These sites and facilities are often the first encounter visitors have with the Forest Service, and their experiences offer opportunity to reflect Forest Service values and positively influence visitors' relationship to public lands.

This handbook serves as a roadmap for design and recreation professionals to follow as they navigate the design and planning process for the life cycle of developed recreation facility projects, including planning, design, and construction. This direction applies to developed recreation sites and facilities – sites consciously designed that have a development scale of 3, 4, or 5. While this handbook direction does not apply to dispersed use areas, the principles described in this handbook can be applied when design-related decisions to protect resources are required. The handbook assumes professional knowledge, skills, and abilities in design principles.

10.1 - Authority

See FSM 2301 for authorities governing the Forest Service's recreation program generally.

1. Architectural Barriers Act (ABA), as amended (42 U.S.C. 4151 et seq.). This Act requires that all facilities designed, constructed, altered, or leased by, for, or on behalf of a Federal agency comply with the applicable accessibility standards/guidelines.
2. Enforcement of Nondiscrimination on the Basis of Disability in Programs or Activities of USDA (7 CFR Parts 15e and 15b). The U.S. Department of Agriculture (USDA) regulations implementing section 504 of the Rehabilitation Act as it applies to programs and activities conducted by USDA are found at 7 CFR Part 15e. The USDA regulations implementing section 504 of the Rehabilitation Act as it applies to USDA-assisted programs are found at 7 CFR Part 15b. These provisions address program accessibility; requirements for accessible programs in new, altered, or existing facilities; accessibility transition planning; accessible communication requirements; and compliance procedures.
3. Sections 504 and 508 of the Rehabilitation Act, as amended (29 U.S.C. 794 and 794d). Section 504 of this Act (29 U.S.C. 794) prohibits Federal agencies and recipients of Federal financial assistance from denying a qualified person with a disability from participation in a program or activity solely due to their

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disability. Section 508 of this Act (29 U.S.C. 794d) requires that all electronic and information technology purchased or developed by a Federal agency allow persons with disabilities to have access to and use of the information and data that are comparable to the access and use provided to persons without disabilities.

10.2 - Objectives

Plan and design developed recreation sites and facilities consistent with the following objectives:

1. Follow a logical project development process.
2. Improve Agency economic sustainability through design choices that reflect lifecycle costs and efficient operation and maintenance.
3. Implement goals of the *Framework for Sustainable Recreation*.
4. Provide high quality developed recreation settings that facilitate meaningful connections with the outdoors for visitors.
5. Restore developed recreation settings that have been impacted by excessive or inappropriate use or declining ecosystem health.
6. Develop sites to harmonize with the surrounding natural environment.

10.3 - Policy

1. Emphasize public and employee safety, to the extent practicable and provided for in chapter 50 of this handbook, in all planning and design activities.
2. Developed recreation sites and facilities should be planned and designed to be sustainable, providing a broad set of recreation settings, opportunities, access, and scenic character compatible with the desired recreation opportunity spectrum (ROS) setting. Developed recreation sites and facilities should facilitate high-quality experiences promoting the visitor's connection with nature, while maintaining the ecological function of the surrounding area. Skillful application of site, facility, and interpretive planning and design is required to meet those purposes.
3. Ensure that all new or rehabilitated facilities, sites, (and programs) comply with applicable Federal and Forest Service accessibility guidelines and standards (FSM 2330.12, para. 1-5), including the Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) and the Forest Service Trail Accessibility Guidelines (FSTAG).
4. Focus planning and design activity on developed recreation sites that support the Forest's identified "recreation niche." Consolidate developed facilities to align the amount of infrastructure that can be sustained with appropriated and

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leveraged financial capacity. Consider closing developed recreation sites or facilities that no longer meet user preferences, are not socially, economically, or environmentally sustainable, or cannot be adapted to meet current needs.

5. Plan developed recreation sites and facilities in accordance with Executive Order 11988, “*Floodplain Management*,” the applicable land management plan, the applicable ROS setting assigned in the plan, and project-specific environmental analyses.
6. Plan, design, maintain, and decommission developed recreation sites and facilities in accordance with Executive Order 13693 “*Planning for Federal Sustainability in the Next Decade*,” which sets goals for sustainability aimed at improving environmental, energy, and economic performance, including reducing greenhouse gas emissions, increasing energy efficiency, reducing fleet petroleum consumption, conserving water, reducing waste, supporting sustainable communities, and leveraging Federal purchasing power to promote environmentally responsible products and technologies (FSH 7309.11, ch. 70, “Sustainable Buildings”).
7. Implement a set of Low Impact Development (LID) management approaches and technologies that utilize and/or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration, and use to replicate the pre-development hydrology in order to protect and preserve both water resources onsite and those downstream during a 95th percentile storm. Implementation of these measures complies with Section 438 of the Energy Independence and Security Act of 2007 which requires Federal agencies to develop and redevelop applicable facilities in a manner that maintains or restores storm water runoff to the maximum extent technically feasible.
8. Ensure the built environment and resource conditions at developed recreation sites are consistent with applicable Scenic Integrity Objectives, Forest Service Built Environment Image Guide, and applicable land management and vegetation management plans.
9. Develop or improve developed recreation sites and facilities to enhance natural and cultural resource-based activities typically associated with a natural environment.

10.4 - Responsibility

10.4a - Regional Foresters

At the Regional Forester’s discretion, the following responsibilities may be delegated to the Forest Supervisor, unless specifically reserved to the Regional Forester.

Regional Foresters are responsible for:

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1. Seeking partnerships with other entities to share in the development, cost, and labor of providing recreation opportunities.
2. Approving any overnight facilities located in high hazard areas such as a floodplain.
3. Identifying and updating regional priorities for the recreation capital investment program. This responsibility is reserved to the Regional Forester.

10.4b - Forest and Grassland Supervisors

Forest and Grassland Supervisors are responsible for:

1. Preparing, reviewing, and approving design narratives, site plans, and construction and/or contract drawings for developed recreation sites.
2. Developing recreation sites and facilities in accordance with standards and guidelines in the applicable land management plan.
3. Using existing monitoring information to inform the development of recreation sites.

10.4c - District Rangers

District Rangers are responsible for acting as a liaison between the project and the Forest Supervisor to ensure consistency with priorities, standards, and application of handbook direction.

10.5 - Definitions

Accessible. A site or facility that is in compliance with the most stringent applicable Federal or Forest Service accessibility standards at the time the site or facility is constructed or altered.

Built Environment Image Guide (BEIG). A guide used for building and maintaining structures so that they are integrated with the environment aesthetically, culturally, and ecologically (see Forest Service publication FS-710).

Camping Unit. A discrete area within a campground that usually includes a camp living area, a parking spur, and one or more constructed features, such as a picnic table and a cooking or campfire area. Each camping unit in a campground can be used for overnight camping and has a designated persons-at-one-time capacity (PAOT), to be determined and documented at the local level.

- a. Camping Unit - Group. A camping unit designed to accommodate larger groups of 20 or more people.

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- b. Camping Unit - Multiple. A camping unit designed to accommodate larger groups. Typically, a double camping unit accommodates twice the capacity of a single camping unit. A triple camping unit accommodates three times the single unit capacity.
- c. Camping Unit - RV. A camping unit with parking spur of sufficient length to accommodate larger vehicles and/or camping trailers. RV camping units may or may not have utility hook-up connections.
- d. Camping Unit - Single. A camping unit designed to accommodate single campers or small groups, such as families.
- e. Camp Living Area. The area in a camping unit that contains constructed features, such as a picnic table, grill, fire ring, and other related elements, and that may be located adjacent to or near a campsite parking spur. Multiple camping units incorporate additional constructed features to support shared group use and include some individual features such as a campfire area shared by the entire group.
- f. Campsite Parking Spur. The space in a camping unit that is designed for vehicular access and parking and that includes a driveway and vehicle parking area.
- i. Driveway. The section of a campsite parking spur connecting the road accessing a campground and a vehicle parking area.
- ii. Vehicle Parking Area. The section of a campsite parking spur where camping vehicles, such as cars, motorcycles, vans, recreational vehicles, and trailers, are parked.

Conceptual site plan. For purposes of this chapter, a schematic, conceptual plan showing proposed site features or opportunities. Conceptual site plans may be conceptual in style but meet the objectives and show the design elements described in the design narrative. A conceptual site plan is drawn to scale.

Convenience Facility. Facilities intended to provide a source of comfort to forest visitors, rather than solely meeting their health and safety or resource protection needs. It may include flush toilets, showers, bathhouses, laundry facilities, and electrical hookups. See section 10.8.

Design Narrative. A written document containing design criteria and direction for a proposed new or renovated Forest Service recreational facility that at a minimum addresses environmental issues, existing site conditions and limitations, and proposed and potential investments to facilitate recreational opportunities.

Developed Recreation Site. A discrete place containing a concentration of facilities, infrastructure, and services used to provide recreation opportunities to the public and evidencing a significant investment in facilities and management. Developed Recreation

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Sites are recorded in the Forest Service Natural Resource Manager (NRM) Recreation Sites database with a development scale of 3, 4, or 5. See section 10.8.

Development Scale. A classification of recreation areas or sites that distinguishes the degree of site amenities and alteration present within a spectrum based on resource protection and user comfort. See section 10.8.

Dispersed Recreation Area. A General Forest area with repeated dispersed use that has little or no Forest Service investment, and has a development scale of 0-2. See section 10.8.

Ecological Function. A natural force that shapes the landscape, such as climate, geology, soils, water, and vegetation.

Ecosystem Services. Benefits people obtain from ecosystems, including provisioning, regulating, supporting, and cultural services. Cultural services include: educational, aesthetic, spiritual and cultural heritage values, recreational experiences, and tourism opportunities (36 CFR 219.19).

Green Construction and Operations. Sustainable construction, management and maintenance of developed recreation sites by efficiently using energy and water, purchasing and employing products and materials with minimal environmental impact, and reducing consumption of resources in construction and daily operations (FSM 1313).

Green Building Certification System. A third-party evaluation system used by the Federal Government and the private sector for measuring the sustainability performance of new and existing buildings such as, but not limited to, Green Globes[®] and Leadership in Energy and Environmental Design[®] (LEED[®]) (FSH 7309.11, ch. 70).

Green Globes[®]. A third-party green building certification system that is both a guide for integrating green design principles and an assessment protocol (FSH 7309.11, ch. 70).

Hazard. Any condition or activity that can cause injury, illness, or death to individuals or damage to or loss of equipment or property, mission degradation, or damage to the environment.

High-Quality Experience. A high degree of the desired experience of a forest visitor is realized, with a high level of satisfaction, as measured through National Visitor Use Monitoring (NVUM), comment cards, social media, and other means.

Iconic Places. Congressionally-designated areas and national monuments, protected either by Congress through legislation or by the President via proclamation under the authority of the Antiquities Act. These sites include National Monuments (NM), National Volcanic Monuments (NVM), National Historic Scenic Areas (NHS), National Recreation Areas (NRA), Scenic Recreation Areas (SRA), and National Scenic Areas

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(NSA). Additionally, the Forest Service manages Wilderness Areas, Wild and Scenic Rivers, Historic Sites and Landmarks, and a network of National Scenic and Historic Trails.

LEED® (Leadership in Energy and Environmental Design). A third-party rating system and certification program developed and administered by the U.S. Green Building Council (USGBC) that provides guidelines for sustainable building design, operation, and maintenance (FSH 7309.11, ch. 70).

Life-Cycle Costing. An evaluation method that takes into account relevant costs over time of a building or facility location, design, systems, components, materials, and operations. The evaluation incorporates initial investment costs, future replacement costs, operation and maintenance costs, and salvage value. These values are adjusted to a consistent time basis and are combined in a single cost-effectiveness measure for comparative analysis (FSH 7309.11).

Natural Resource-based Recreation. A proposed or existing recreation activity that occurs in a natural setting where the visitor's experience is interdependent with attributes such as mountains, forests, geology, grasslands, water bodies, flora, fauna, and natural scenery (FSM 2340.5).

Persons at One Time (PAOT). A measure of capacity used to determine the number of persons for which a particular outdoor recreation feature is designed and built.

Picnic Unit. An outdoor space in a picnic area that is designed and constructed for picnicking and that contains one or more constructed features (such as a picnic table, grill, or other related elements).

Qualified Architects, Landscape Architects, or Engineers. Persons including professional Architects, Landscape Architects, or Engineers who have the required training, experience, and knowledge of the following: site planning; vehicle and pedestrian circulation; and various applicable building, electrical, mechanical, safety, and related codes normally associated with the design, construction, and operation of structures, buildings, water and wastewater treatment plants, mechanical systems, and similar facilities (FSH 7309.11).

Qualified Forest Officer. A Forest Service employee who, by training or experience, is sufficiently knowledgeable about the design and construction of buildings and related facilities to act for the authorized officer on assignments involving these facilities (FSH 7309.11).

Recreation Access. Visitor access to and within National Forests, through a variety of legally-authorized travel modes.

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Recreation Experience. Highly probable outcome of participating in a recreation activity in a specific recreation setting.

Recreation Facility. Anything human-built or -placed in the landscape, including individual features, infrastructure, and collections of features that support managed recreation opportunities and experiences (FSH 7309.11).

Recreation Opportunities. The availability of choices for users to participate in a preferred activity within a preferred setting, in order to realize those satisfying experiences which are desired.

Recreation Settings. Places where the combination of physical, biological, social, and managerial characteristics or attributes give those places value as locales for natural resource-based recreation.

Recreation Opportunity Spectrum (ROS). A system by which existing and desired recreation settings are defined, classified, inventoried, and monitored. Recreation settings are divided into six distinct settings (Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural, and Urban). Settings are based on the physical, social, and managerial setting characteristics (FSM 2310).

Risk. A combination of the likelihood that a negative outcome will occur and the severity of the subsequent negative consequences (36 CFR 219.19).

Risk Assessment. A process to identify potential hazards and analyze what could happen if a hazard occurs.

Safety. The condition of being protected from or unlikely to cause danger, risk, or injury.

Scenery Management. The art and science of arranging, planning, and designing landscape attributes and management practices relative to the appearance of places and expanses in outdoor settings (Agriculture Handbook Number 701).

Scenery Management System. The system for inventorying, analyzing, and managing scenery on National Forest System lands, which identifies scenic integrity objectives for sites based on their scenic character, distance zones and concern levels, and scenic attractiveness (Agriculture Handbook 701 and FSM 2380).

Scenic Character. A combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity (36 CFR 219.19).

Scenic Integrity. The state of naturalness or a measure of the degree to which a landscape is visually perceived to be "complete." The highest scenic integrity ratings are

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given to those landscapes that have little or no deviation from the scenic character valued by constituents for its aesthetic quality (FSM 2380).

Scenic Integrity Objectives. Desired scenic integrity within a defined area, as identified in a forest plan (USDA Handbook Number 701).

Sense of Place. The cultural and physical attributes of an area that provide meaning or value to communities and visitors. It characterizes the connection people have with specific landscapes (FSM 2310).

Site Plan. For purposes of this chapter, a scaled cartographic architectural design plan, series of plans or topographical maps showing the location of all distinguishing natural features, existing and proposed buildings, structures, service areas, roads, and boundaries for a developed recreation site. Site plans must provide for control of traffic, sanitation, public safety (to the extent practicable and provided for in chapter 50 of this handbook), site protection, grading, landscape planting, and use distribution. A site plan should include north arrow, graphic scale, date of completed design, and name of site, at a minimum.

Sustainable. Allowing for humans and nature to coexist in productive harmony, as well as fulfillment of social, economic, and other requirements of present and future generations (E.O. 13423).

Sustainable Recreation. The set of recreation settings, opportunities, access and scenic character on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations (36 CFR 219.19).

Sustainable Recreation Site Design Guide. A Forest Service technical guidebook presenting best practices, processes, references, and illustrations for implementing sustainable recreation design at National Forests and Grasslands developed recreation sites.

Universal Design. The design of programs and facilities for use by people of all abilities to the greatest extent possible, while maintaining the character and experience of the setting and providing access to programs and facilities for all, without separate or segregated access for people with disabilities.

Value Analysis. A function-oriented, systematic team approach to provide value in a product. Procedures for conducting value engineering are established by the Society of American Value Engineers, 60 Revere Drive, Suite 500, Northbrook, Illinois 60062, and Office of Management and Budget (OMB) Circular A-131 (FSH 7309.11).

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10.6 - References

1. Additional information regarding laws, regulations, standards, guidelines, and publications relating to accessibility is available on the Forest Service's website at <http://www.fs.fed.us/recreation/programs/accessibility>.
2. Additional information regarding Forest Service guidance and publications relating to the Recreation Opportunity Spectrum (ROS) and the Built Environment Image Guide (BEIG) is available on the Forest Service's website at <https://www.fs.fed.us/recreation/programs/beig/>
3. Additional information regarding Forest Service guidance, best practices, and publications relating to sustainable design, construction, and maintenance can be found on the Forest Service's website at <https://www.fs.fed.us/sustainable> and in FSH 7309.11, chapter 70. Information regarding laws, regulations, standards, guidelines, and publications relating to sustainable operations can be found at: <https://www.fs.fed.us/sustainableoperations/>.

10.7 - Federal and Agency Requirements for Accessibility of Developed Recreation Sites and Facilities

1. Architectural Barriers Act (ABA) of 1968, as amended (42 U.S.C. 4151 et seq.). This Act requires that all facilities designed, constructed, altered, or leased by, for, or on behalf of a Federal agency comply with the applicable accessibility standards/guidelines.
2. Architectural Barriers Act Accessibility Standards (ABAAS) (41 CFR Part 102-76, Subpart C). These guidelines apply to all Federal agencies operating under the authority of the General Services Administration in buildings and constructed features addressed by the ABAAS, except where the agency has accessibility guidelines that set an equal or higher standard.
3. Enforcement of Nondiscrimination on the Basis of Disability in Programs or Activities of USDA (7 CFR Parts 15b and 15e). USDA regulations implementing Section 504 of the Rehabilitation Act as it applies to USDA-assisted programs are found at 7 CFR Part 15b. USDA regulations implementing Section 504 of the Rehabilitation Act as it applies to programs and activities conducted by USDA are found at 7 CFR Part 15e. These provisions address program accessibility; accessibility requirements for new, altered, or existing facilities; accessibility transition planning; accessible communication requirements; and compliance procedures.
4. Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG). Comply with the Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) in developed recreation areas. The FSOARG is an equal and higher

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standard than the ABAAS. When Agency programs, sites or facilities are not addressed in the FSORAG apply the ABAAS

5. Forest Service Trail Accessibility Guidelines (FSTAG). These guidelines apply to trails in the National Forest System when the trail is new, has a designed use of hiker/pedestrian and connects to a trailhead or to a trail that currently complies with the FSTAG.

6. Sections 504 and 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794 and 794d). Section 504 of this Act (29 U.S.C. 794) prohibits Federal agencies and recipients of Federal financial assistance from denying a qualified person with a disability from participation in a program or activity solely due to their disability. Section 508 of this Act (29 U.S.C. 794d) requires that all electronic and information technology purchased or developed by a Federal agency allow persons with disabilities to have access to and use of the information and data that are comparable to the access and use provided to persons without disabilities.

10.8 - Recreation Site Development Scale

The following chart displays the classification of recreation sites that distinguishes the degree of site amenities and alteration present within a spectrum based on resource protection and user comfort.

Recreation Site Development Scale

<i>Development Scale</i>	<i>Typical Recreation Opportunity Spectrum (ROS) Consistency</i>	<i>Typical Site & Facility Characteristics</i>	<i>Typical Management Emphasis</i>
0	May occur in any ROS setting	<ul style="list-style-type: none">• User-created dispersed use• No FS investment or amenities	May include monitoring of resource conditions
1	May occur in any ROS setting	<ul style="list-style-type: none">• Primarily user-created dispersed use area• Informal vehicle circulation and parking• Minimal FS investment, may include signage	Resource protection

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<i>Development Scale</i>	<i>Typical Recreation Opportunity Spectrum (ROS) Consistency</i>	<i>Typical Site & Facility Characteristics</i>	<i>Typical Management Emphasis</i>
2	May occur in any ROS setting	<ul style="list-style-type: none"> • Defined vehicle circulation and parking with minimal FS investment to accommodate user-created dispersed use area • Limited amenities may include signage, tables, fire rings. In rare instances may include vault toilet 	Resource protection
3	Roaded Natural	<ul style="list-style-type: none"> • Designed developed site with significant FS investment and delineation • Amenities may include signage, fire rings, tables, toilet, waste collection, potable water • Roads are surfaced; maintenance level 3 or 4 	Visitor comfort & Resource protection
4	Roaded Natural, Rural, Urban	<ul style="list-style-type: none"> • Designed developed site with significant FS investment and delineation • Amenities include signage, interpretive materials, fire rings, grills, tables, waste collection, potable water, flush toilets • Roads, parking, and paths are surfaced and may be paved; maintenance level 4 or 5 	Visitor comfort, Resource protection

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<i>Development Scale</i>	<i>Typical Recreation Opportunity Spectrum (ROS) Consistency</i>	<i>Typical Site & Facility Characteristics</i>	<i>Typical Management Emphasis</i>
5	Rural, Urban	<ul style="list-style-type: none"> Designed developed site with significant FS investment and delineation Amenities typically include signage, interpretive displays, fire rings, grills, tables, waste collection, potable water, flush toilets. May include utility hook-ups, showers, and laundry facilities. Roads, parking, and pathways are clearly delineated and are often paved; maintenance level 4 or 5. 	Visitor comfort, Resource protection

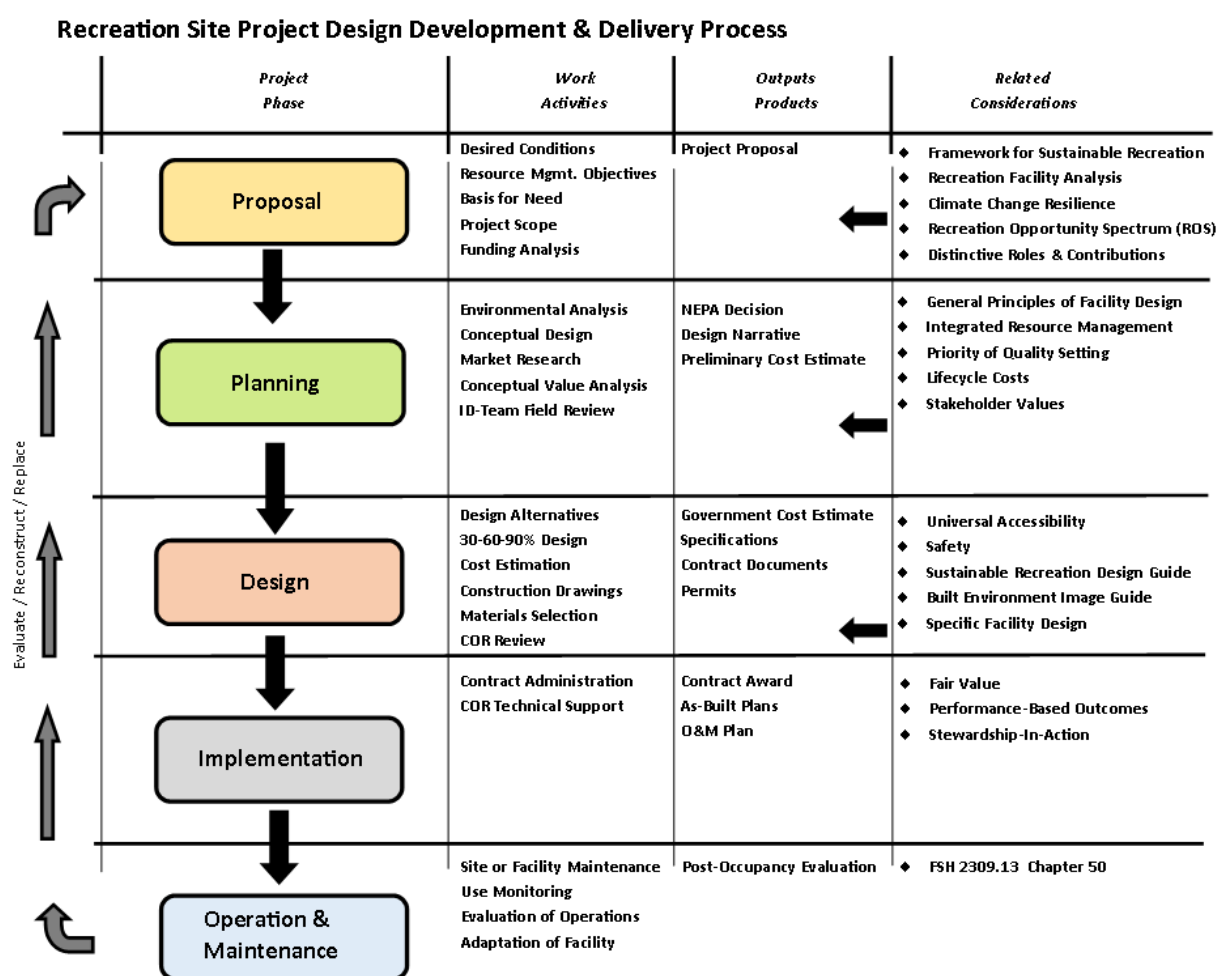
Note: Dispersed Site Scales 0-2 can occur across all ROS setting settings, however Developed Site Scales 3-5 are limited to more developed ROS setting settings.

11 - Developed Recreation Site Planning and Design

11.1 - Project Development Process

This section provides direction regarding the Project Development Process. This process should balance the effort of each step relative to the scope, scale, complexity and importance of the project. The technical guidebook, Sustainable Recreation Site Design Guide, provides greater detail and depth to assist design professionals in meeting the intent described in this handbook.

The following chart displays the typical Forest Service project development process, including work activities and outputs associated with each stage. A detailed description of each project phase is enumerated in sections 11.11 through 11.14b.



11.11 - Proposal

A project proposal describes the “what, why, where, when, and how” of a project.

11.11a - Needs Assessment

Articulate the reason a project is a priority investment. Describe the discrepancy between the existing condition and desired condition.

11.11b - Site Selection

Identify the most suitable lands available for the proposed developed recreation site that:

1. Minimize needs for additional site work and infrastructure while meeting program objectives. Before developing new sites, consider the ability to modify existing developed recreation sites to meet the program objectives.
2. Are associated with but do not adversely affect natural amenities or cultural features such as lakes, streams, rivers, meadows, historical recreational use, and scenic character.
3. Can support the natural settings, opportunities, access, scenic character and ecological functions throughout the useful life of the development.
4. Can be accessed by existing or planned public or National Forest System roads or National Forest System trails, waterways, or airstrips. Consider the site in the context of reducing road volumes in the forest. Does this site require the Forest to maintain a road it would otherwise eliminate or not maintain?
5. Have sufficient capacity and demand to allow economical operation and maintenance.
6. Permits mitigation of known high-risk conditions provided for in chapter 50 of this handbook.
7. Has the capacity to adapt to changing water conditions, energy needs, vegetation regimes, visitor demographics, economic outlook, and climate.

Where a practicable alternative exists outside the applicable floodplain, the proposed activity may not be located in the applicable floodplain. Where no practicable alternative is found, mitigation measures must be taken to reduce risk to an acceptable level. Where facilities are planned or exist in high-hazard areas, appropriate mitigation measures should be taken. These measures may include:

1. Changing the activity from overnight to day-use.
2. Signing and educational efforts.
3. Establishment of Evacuation Zones
4. Seasonal closures.

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5. Reduce the number of people, activities, structures, and facilities in the applicable floodplain.

11.12 - Planning

11.12a - Site Inventory and Program Analysis

The purpose of a site inventory is to become as familiar with the site as possible in order to evaluate and determine the site's characteristics, problems, and potentials. The site inventory influences the suitability of a site for the proposed land use and is a brief written and/or graphic description of all the site's physical, biological, cultural, and recreational attributes. Not all elements may be needed, relative to the scope, scale, complexity, and importance of the project.

The site inventory and program analysis could include:

1. Physical attributes, including:
 - a. Geology - landforms, seismic hazards, depth to bedrock.
 - b. Climate - solar access, fog pockets, winds (prevailing, winter), seasonal average temperatures.
 - c. Hydrology - surface drainage, water chemistry (salinity, nitrates, and phosphates), depth to seasonal water table, aquifer recharge zones, seeps, and springs.
 - d. Topography - elevation, slope, aspect.
 - e. Soils - bearing capacity, porosity, stability, erodibility, fertility, acidity (pH).
2. Biological attributes, including:
 - a. Wildlife - protected species habitats.
 - b. Vegetation - plant communities, specimen trees and invasive species, protected species habitat.
3. Cultural attributes, including:
 - a. Land use - prior land use, land use on adjoining properties.
 - b. Legal - political boundaries, land ownership, land use regulations, easements, and deed restrictions.
 - c. Utilities - sanitary sewer, storm sewer, electric, gas, water, telecommunications.
 - d. Circulation - street function, safety, efficiency; traffic volume, speed.

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- e. Historic - Existing cultural/heritage characteristics and features including buildings and landmarks, archaeological sites.
 - f. Sensory - visual quality, noise, odors, views.
4. Recreational attributes, including:
- a. Recreation Opportunity Spectrum (ROS), environmental education potential, including interpretation.
 - b. Sustainable capacities, limiting factors.
5. Safety issues;
6. Existing constructed features, including overhead and underground utilities;
7. Boundaries of natural shorelines, floodplains, wetlands, and other riparian areas and the key landscape components and functions that enable these systems to remain healthy, such as tree drip lines;
8. Scenic character description, key scenic attributes of project area (character trees, rock outcroppings, viewsheds, and so forth), existing scenic integrity, and ecological trends which could affect scenic character; and
9. All access routes to and from the site.

A site topographic survey must be conducted by a professional land Surveyor, professional Landscape Architect, or Engineer. The product of the survey will be a base map with all the site information needed to prepare a site plan and will include as a minimum:

- 1. Baseline and elevation control;
- 2. Ownership and jurisdictional boundaries;
- 3. Elevation contours;
- 4. Existing constructed features, including overhead and underground utilities;
- 5. North arrow, scale, date, and identifying information; and
- 6. Digital file location information.

11.12b - National Environmental Policy Act

Direction related to requirements for consideration and documentation of environmental effects, including direction for required public engagement, consistent with the National Environmental Policy Act (NEPA) is documented in FSM 1900.

11.12c - Design Narrative

Early in the design process and in preparation for development of the design narrative, the Designer and Program Manager should discuss and document the management objectives, design criteria, and limiting factors for each proposed developed recreation site. Preparation of a design narrative is typically a post-NEPA effort, and describes how any conditions described in a NEPA decision will be met. The level of effort focused on preparing a design narrative should relate to the level of complexity and controversy associated with the project. Use detailed physical and social surveys, if available, in crafting the design narrative. The approved design narrative should produce attractive, sustainable facilities highlighting special features of the site and its sense of place.

At a minimum, the design narrative for a developed recreation site must address the purpose and need of the project and its responsiveness to the following:

1. Existing forest plan direction relevant to the site, including context and sideboards.
2. Site location, including a site map.
3. Management objectives, relevance to recreation niche, and criteria for the site.
4. Existing physical conditions, social trends, and use patterns.
5. Minimization of impacts on soils, vegetation, wildlife, cultural resources, and natural resources.
6. Minimization of potential hazards to public safety, to the extent practicable and provided for in chapter 50 of this handbook.
7. Past, present, and proposed recreation opportunities and other uses.
8. Actions outlined in the program of work in the applicable Recreation Facility Assessment or an equivalent document.
9. Market analysis and demographics for the user base, including references to the State Outdoor Recreation Plan (SORP), and Tribal use.
10. Development scale (see sec. 10.8), applicable ROS setting (see sec.11.15), current and proposed persons at one time to be served by the site, and operational and maintenance requirements. Consider the lowest facility development scale to meet program needs. Document rationale for maintaining or altering the development scale of an existing site.
11. Desired water, sanitation facilities, site furnishings, and other constructed features or amenities.

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12. Design criteria and the architectural theme for the site. Identify specific values, functions, and characteristics of the site contributing to the local sense of place. Define characteristics of the setting and amenities contributing to a high quality experience.

13. Preliminary implementation and life-cycle cost estimates and possible facility re-investment mechanisms for example, fees, Federal Energy Regulatory Commission (FERC), or Granger-Thye offset.

A design narrative must be prepared by a qualified Landscape Architect or Engineer and approved by the Responsible Official (sec. 11.11c) prior to preparation of final site plans and submission of requests for capital expenditure on developed recreation sites and facilities. See FSM 2330.04c and FSM 2330.04d for direction on approval authority.

Consider a cultural landscape report/study to determine boundaries of historic/cultural landscapes and periods of significance.

11.12c - Engineering Report

1. In close coordination with development of the design narrative, an engineering report for each developed recreation site project should be prepared in accordance with FSH 7409.11, ch.70. Information in the engineering report should be discussed in the design narrative in sufficient detail to aid in planning. The format and length of the report will vary depending on the scope of the project.

2. Evaluate existing energy, water systems, and components and consider updating or removing underused facilities to promote conservation and reduce long-term costs and environmental effects. For example, replace existing inefficient components such as single-paned windows, incandescent lighting, and manually operated lights.

3. Evaluate potential energy sources, considering efficiency, greenhouse gas emissions, and other environmental costs in calculations.

4. Identify the design storm event (for example, a 95th percentile storm event) and associated considerations.

11.1.3 - Design

11.13a - Site Analysis

The site analysis is a comprehensive review and data compilation of the physical, biological, and cultural attributes as well as the land suitability of a selected site. The site data, when compiled and analyzed, will be unique to each site and will inform how to best formulate a design for the intended use.

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Prior to developing a site design, a site analysis of the following physical factors, as relevant to the site and project, will be considered and evaluated in context of the project objectives and design program:

1. Condition of drainage flowlines.
2. Erosion issues.
3. Hierarchy and condition of existing travel routes.
4. Flood zones.
5. Focal points and views (rock outcrops, water features, and so forth.).
6. Frost levels.
7. Historic/archeological features.
8. Positive and negative views.
9. Precipitation.
10. Solar aspect.
11. Soils characteristics.
12. Slope.
13. Valued vegetation.
14. Wetlands.
15. Wildlife habitat.
16. Wind patterns.
17. Deferred maintenance levels.

11.13b - Conceptual Development Plans and Alternatives (30 percent Design)

The conceptual development process is adapting the program to the unique features of the site and occurs after the site analysis. Use schematic conceptual plans to organize spatially proposed site features or opportunities. Sometimes more than one concept plan needs to be developed to show a range of potentially viable configuration options, and sometimes two or more different concepts are merged to create a final concept plan.

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1. Alternative conceptual site plans presenting different design alternatives will be developed by a qualified Landscape Architect to meet the objectives described in the design narrative. A conceptual site plan is drawn to scale.
2. In the case of complex developed recreation site planning projects, use an ID Team to provide regular review and input.
3. The District Ranger shall identify any potential conflicts between conceptual design plans and any relevant issues. Prior to starting final construction drawings, address any issues or conflicts identified by the District Ranger. Document approval of a conceptual plan by the District Ranger or other Line Officer.
4. The conceptual plan should include proposed:
 - a. Vehicular and pedestrian circulation patterns.
 - b. Location of parking areas.
 - c. Locations of buildings.
 - d. New planting areas.
 - e. Location of utility areas.
 - f. Locations of other rights-of-way.
 - g. Planned site development capacity.
 - h. General locations of storm water management best management practices (BMPs).

11.13c - Design Development Plans (50 percent Design)

Accomplishing a site development plan involves a design process of determining how the conceptual land use plan will be articulated. It includes a variety of detailed information that does not appear on the conceptual plan.

1. Each proposed developed recreation site must have a site plan, prepared by a qualified Landscape Architect or Engineer, prior to construction. Site plans must be approved by the Responsible Official (sec. 11.11e) prior to construction, restoration, rehabilitation, adaptation, or expansion of a facility at a recreation facility, site, or area.
2. The approved site plan must illustrate the location of all distinguishing natural features, existing and proposed buildings, structures, service areas, roads, and boundaries for a developed recreation site. Site plans must provide for control of traffic, sanitation, public safety (to the extent practicable and provided for in

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chapter 50 of this handbook), site protection, grading, landscape planting, and use distribution.

3. Where overnight facilities are located in a high-hazard area such as a floodplain, the site plan must be approved by the Regional Forester, or as delegated. See FSM 2330.04c and FSM 2330.04d for approval authority.
4. Develop an estimate of probable construction cost.
5. Coordinate with the assigned Contracting Officer and Contracting Officer's Representative if the project will be implemented by non-Forest Service personnel. If the project will be implemented using force-account staff, review project details and intent with staff that will oversee construction efforts.
6. Depending on a project's setting and scope, prepare a vegetation management plan to create and maintain a natural appearing environment that emulates the existing landscape. Include locations and specifications for planting trees, shrubs, and ground cover in site plans when needed for erosion control, screening, site construction restoration, to provide shade, aesthetics, noise reduction, and as a natural traffic control barrier. Landscape and vegetation management must safeguard or, if necessary, regenerate ecosystem benefits. Note: Consult appropriate regional and local resources, including State Cooperative Extension Service plant lists, for additional guidance on planting best practices.
 - a. Whenever possible, make use of natural features and native vegetation at developed recreation sites. Consider desired vegetation characteristics (that is, low growing to preserve views), resolutions to identified vegetation health/visitor safety issues, treatments to create fire resiliency/defensible space, and the necessary regeneration to sustain desired vegetation into the future.
 - b. Avoid use of non-native plant species, and coordinate with a Botanist or other qualified professional to minimize proliferation of invasive species. Consult with interdisciplinary specialists to determine best species and re-vegetation methodologies (seeding, sticks, container stock, and so forth).

11.13e - Final Site Development Plans (95 percent Design)

The design professional(s) shall accurately draft the Final Site Development Plans to scale, illustrating all proposed facilities, and incorporating all review comments from staff and/or onsite evaluation of the Preliminary Site Development Plans. The plans shall be prepared indicating either complete or phased construction. The Final Site Development Plans shall consist of the following:

1. Site Plan. Illustrate the type and placement of all facilities, including layout details. All facilities must be labeled or keyed with plan set sheet numbers and quantities summarized in a facility summary legend.

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2. **Construction Layout Plan.** The layout plan must provide dimensioned placement information for all facilities, traffic control structures, and information for locating any other improvements or facilities on the site. Illustrate the road layout and major proposed facilities and structures. Include typical cross-sections and/or desired grading profiles, if necessary, to illustrate how the road, major facilities, and structures fit the site.
3. **Grading Plan.** Proposed grading plans must include all contour changes necessary for grading the site. Include spot elevations in instances where contour changes would not be clear. Also, include typical sections in intensively developed areas. Use arrows showing direction of surface water flow.
4. **Planting plans and plant lists,** when applicable, must show type, number, and placement of all plant materials. Typical installation details or supplemental specifications must include prescriptions for soil amendments, fertilizer, watering, soil preparation, and mulching, as necessary.
5. **Sign Plan.** The sign plan shows the location of all regulatory, directional, and informative signs used in the project, and construction details for the mounts.
6. **Utility Plan(s).** Utility plans include detailed location, materials, and installation details to be used for water, sewer, and electrical systems. Water and sewage system design must show plan and profile of the lines, along with the location of valves and hydrants, to clearly indicate the complete facility (see the Water and Sanitation Handbook for additional information).
7. **Architectural Plans.** These plans include detailed plans for shelters, sanitation facilities, and other structures, including structural engineering and other needed details.
8. **On-Site Review.** Using the layout plan, stake or flag the centerline of roads, structure corners, and other major site features for field review. The Line Officer, responsible staff, Landscape Architect, Engineers, and other specialists as needed, should make a site inspection. If necessary, make adjustments at this time to fit the major structures, facilities, and roads to the ground.
9. **Specifications.** In accordance with FSM 7310, prepare specifications for construction of the project to complement the plans and to cover all of the detailed information above. Specifications included on the drawings are acceptable for small-scale projects.
10. **Cost Estimate.** Prepare an accurate estimate of probable construction cost as well as a Schedule of Items.
11. **Contracting.** Coordinate with the assigned Contracting Officer and Contracting Officer's Representative if the project will be implemented by non-

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Forest Service personnel. If the project will be implemented using force-account staff, review project details and intent with staff that will oversee construction efforts.

11.13f - Contract Documents (100 percent Design)

When the project has received final approval, the Landscape Architect or Engineer may finalize construction drawings and required contract documents.

The final package of construction drawings will include all information necessary to lay out and construct the entire development, whether it is accomplished by force account crews or contract. The complete set of final construction drawings must ensure the intended development of the site, even when the designer is not available. Obtain and document final approval of the total design package. The complete documents will serve as the basis for a contract between the Agency and those constructing the project.

11.14 - Implementation

11.14a - Designer/Construction Coordination

The Contracting Officer's Representative, or equivalent, shall involve the qualified design professional in a pre-grading review after staking of facilities according to approved construction plans and also during construction of the project, if change orders are needed. This ensures fidelity to plan intent and agreement on any modifications needed to reflect unanticipated field changes.

11.14b - As-Built Drawings

1. Unforeseen difficulties encountered during construction that require deviation from approved plans must require changing the record drawings to reflect the "as-built" status of the development. Revise the site layout drawings to show any changes made during construction, reconstruction, or maintenance, and retain the resulting as-built drawings in the project file.
2. The as-built drawings must show or be accompanied by drawings displaying the location of waterlines, electrical and other utility lines, sewer lines, drain fields, drains, joints or unions, and valves, as well as changes in water, wastewater, and sewage treatment systems (FSM 7413.6 and 7413.7).
3. After construction of the developed recreation site, send the "as-built" plans, to the managing Forest Service office. Ensure as-built plans are completed, received, and cataloged.

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11.15 - Recreation Opportunity Spectrum Influence on Site Design

The recreation opportunity spectrum (ROS) is a system by which existing and desired recreation settings are defined, classified, inventoried, and monitored. Recreation settings are divided into six distinct settings (Primitive, Semi-Primitive Non-Motorized, Semi-Primitive Motorized, Roaded Natural, Rural, and Urban). Settings are based on the physical, social, and managerial setting characteristics. The following chart displays these settings and site design intent.

ROS Influence on Site Design

ROS setting	Site Design Intent
Primitive	Predominately unmodified. Motorized access not provided or permitted. No improvements or facilities. Water supply is undeveloped and natural. Rustic, natural materials only. Minimum controls are subtle. Vegetation is natural, with no treatments except for fire use. Scenic integrity is Very High. Little to no regimentation. Spacing informal and extended to minimize contacts among users - typically less than 3 parties visible from camping sites.
Semi-Primitive Non-Motorized	Predominately natural or natural appearing. Motorized access not provided or permitted, though closed or temporary roads may be present. Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of users. No facilities. Water supply is undeveloped and natural. Rustic, natural materials only. Interpretation is through self-discovery. Minimum controls are subtle. Vegetation is predominately natural with treatments only to enhance forest health. Scenic integrity is Very High. Minimum or subtle regimentation. Spacing informal and extended to minimize contacts among users – 6 or less parties visible from camping site.
Semi-Primitive Motorized	Predominately natural appearing, motorized use visible and audible. Motorized access provided and permitted through Maintenance Level 2 roads and motorized trails. Rustic or rudimentary improvements and facilities designed primarily for protection of the site rather than the comfort of users. Water supply is undeveloped and natural. Rustic, natural materials only. Interpretation is mostly through self-discovery, though sign may be present on site and at trailheads. Controls are subtle. Few treatment areas should be visible, and only then widely dispersed and consistent with natural vegetation patterns. Scenic integrity is High or Moderate. Subtle regimentation. Spacing informal and extended to minimize contacts among users – 6 or less parties visible from camping site.
Roaded Natural	Natural appearing with nodes and corridors of development. Primary access may be over high-standard roads and trails (Maintenance Level 3-5). Facilities generally provide equally for protection of the site and comfort of users, including vault toilets and warming huts. Water supply is often developed. Contemporary, rustic design of improvements is usually based on use of native materials. Interpretation is simple roadside signs and some interpretive displays. Inconspicuous vehicular traffic controls usually provided. Vegetation treatment is evident but in harmony with the scenic character. Scenic Integrity is High to Moderate. Regimentation is present but subordinate to the setting. Development density is generally 3 family units per acre, with opportunities to socialize.

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ROS setting	Site Design Intent
Rural	Site heavily modified. Access is typically high-standard roads and trails (Maintenance Level 3-5), with mass transit sometimes available. Extensive use of artificial surfacing of roads and trails. Some facilities designed strictly for comfort and convenience of users, such as flush toilets. Facilities can include utility hookups. Water supply is developed, and showers are common. Facility design may incorporate synthetic materials. Interpretation is roadside exhibits and interpretive programs. Vehicular traffic control usually obvious. Vegetation treatments are often visible, but blend with the landscape. Scenic Integrity is High to Moderate. Regimentation is obvious, including regular encounters with staff. Development density is 3 to 5 family units per acre. High interaction among users is common, other people in constant view.
Urban	Highly developed site modifications and facilities. Access is usually by high-speed highways. Facilities mostly designed for comfort and convenience of users and usually include flush toilets. May include bathhouses, laundry facilities, and utility hookups. Water supply is developed, and hot water and showers are common. Synthetic materials commonly used. Interpretation is exhibits in staffed visitor centers, highly developed and formalized. Formal walks or surfaced trails present. Regimentation of users is obvious and extensive. Vegetation is often planted, manicured and maintained. Scenic Integrity can range from High to Low. Development density is 5 or more family units per acre. High interaction among users is common, other people in constant view.

12 - General Principles of Site and Facility Design

Design must be appropriate for the locale and applicable ROS setting, durable, and adequate for the facility's intended function and expected level of use.

This section provide general direction to inform project planning and design and is organized broadly by performance topic.

12.1 - Sustainability

1. Consider the lowest facility development scale to meet program needs.
2. Design for flexible capacity operations, allowing managers to scale up or down to meet future demand and site conditions. For example, include the ability to close loops or sections of sites to reduce future operations and maintenance.
3. Ensure that the designed capacity of a developed recreation site is environmentally sustainable and appropriate for the applicable ROS setting.
4. A diversity of stakeholders should be engaged in the design process, both within the Forest Service and outside the Agency, including regulatory agencies and interest groups. Many values, perspectives and understandings exist for any given location. The more “pieces of a puzzle” the design team has, the better planning and design decisions can be made. Engage key players throughout the process, and incorporate their input where practical to improve the outcome and build trust and collective ownership of Agency design decisions.
5. Design teams should think long-term and advocate for life-cycle based decisions for the future of the environment, Forest Service management, and visitor needs. They should understand the life-cycle implications of choices with respect to maintenance, resilience, and adaptability to changing conditions.
6. Design structures to be easily adapted or modified for future needs.
7. Design opportunities to interpret and educate the public about the sustainable elements on site. Identify and design interpretive education for site users about decreasing and conserving water and energy use.

12.2 - Visitor Experience and Social Considerations

1. Recognize the quality of design and construction affects the quality of visitor experience. Design choices tell a story about how we respect the public and the landscape.
2. Remember the user. Design teams should imagine themselves in the visitor's role and look at the landscape and proposed design idea from their perspective.

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Teams should engage users directly (if user is willing) to see what they think can add to the team's understanding.

3. Whenever practicable, separate overnight, day use, and trailhead facilities with sufficient spacing and vehicular circulation to allow independent use of each site setting and minimize conflicts between user groups.
4. Generally, do not provide sports facilities or playground equipment at developed recreation sites. However, where appropriate and where demand requires, provide open areas visually compatible with the surrounding landscape which can be used for gatherings or "free play". Outdoor experiential educational opportunities may also be provided if they are compatible with the site.
5. Convenience facilities may include flush toilets, showers, bathhouses, laundry facilities, and electrical hookups. Typically, showers and individual utility hookups are not provided outside of Rural and Urban ROS settings.
6. Section 10.8, displays the types of convenience facilities normally provided at developed recreation sites, depending on development scale. Section 11.15 displays the typical characteristics of a developed site depending on the ROS setting.
7. Where appropriate, provide site amenities conducive to alternative transportation (bike stands, electric recharging stations, and so forth.).
8. Ensure that designs for convenience facilities are consistent with the principles and guidelines in the BEIG and comply with the FSORAG and, where applicable, the ABAAS.

12.3 - Site Character, Aesthetics, and Appearance

1. Use finished grades and native plant species, where appropriate, at developed recreation sites to preserve scenic character by blending site modifications and structures with the natural terrain.
2. Capitalize on the unique character of the landscape. Designs should express the inherent beauty of the site and should yield facilities that provide enjoyment for visitors but are simple to maintain, sturdy, safe, and appropriate for the applicable ROS setting. Facilities should visually harmonize with the surrounding landscape as much as possible in accordance with the site's scenery management objectives and the BEIG.
3. Site designs for developed recreation sites should minimize landscape and wetland impacts and where possible mitigate prior disturbance. Designs should provide for well-planned and located pedestrian and vehicular circulation, follow universal design standards, and protect valuable settings and scenic views. Good

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site design will preserve vegetation to the greatest extent practical, eliminate or mitigate adverse impacts on water resources, and preserve significant natural features.

4. Preserve scenic character and natural conditions at developed recreation sites to the greatest extent possible consistent with necessary fire defensible space, safe and efficient vehicular circulation, and program requirements.
5. Emphasize views and interaction with cultural elements on site to foster a connection to the site's history. For example, consider framing views from trails of a historic building or culturally significant landscape feature. Locate parking away from key historic features or views.
6. Prune trees and mow lawns only when necessary for public health and safety, to the extent practicable and provided for in chapter 50 of this handbook. Avoid urban flowerbeds, painted or whitewashed rocks or trees, and other types of landscaping foreign to the natural environment.
7. Protect scenic features, such as character trees, rock outcroppings, and viewsheds.
8. Grading should not occur within the drip line of existing trees when possible to minimize impacts associated with any changes to the surrounding grade. Consult with a professional Landscape Architect, Arborist, and/or Forester to assess the potential impacts prior to grading around existing trees. Where grade changes under the drip line are unavoidable, take care to minimize the disturbed area.
9. The appearance of developed recreation sites must be appropriate for the setting and the development scale of the site and must be consistent with the principles and guidelines for form, materials, and color in the BEIG. The appearance of a developed recreation site communicates Agency values to the public and influences visitor behavior and experience.
10. The design for developed recreation sites and built features should reflect the form, line, color, and texture of its natural and cultural setting to produce an attractive facility that fits within its surroundings.
11. Place utility wires underground, where feasible.
12. Use standard Forest Service paint colors to maintain a consistent brand identity at facilities and developed recreation sites. These paint colors are referred to as Federal Standard-595C (FED-STD) and can be found in the Sign and Poster Guidelines for the Forest Service (EM 7100-15).
13. Avoid reflective and light-colored materials that contrast with scenic character.

14. Paint the back side of metal signs to be dark and non-reflective.

12.4 - Circulation

1. Define the type of vehicle that the site will be designed to accommodate. Define the minimum turning radius required for this design vehicle.
2. Construct and maintain roads to accommodate visitor vehicles as well as vehicles used for administrative purposes such as fire, emergency, and septic pumper trucks (FSM 7720 and 7730).
3. Confine all vehicles, towed as well as self-propelled, to roads and parking areas. Use natural barriers, existing vegetation, and topography to control motor vehicle use at developed recreation sites. Where these natural features are inadequate, consider installing barriers using wheel stops, bollards, boulders, fencing, or other means.
4. Design the site to encourage walking between features. Locate direct, but not necessarily straight, paths or walkways to concentrate pedestrian use where it would most naturally occur and can best be accommodated. The width of paths should be at least 36 inches.
5. Maximum grades for internal site roads should not exceed 10 percent.
6. Minimize grading cuts and fills in order to maintain or maximize scenic characteristics of the site and intrude as little as possible on the landscape (FSM 7721.1).
7. When pedestrian circulation does not utilize internal site roads, separate vehicular and pedestrian uses as much as possible.
8. Design camp loop roads so that they can be closed by a single gate during seasons of reduced demand.
9. Minimize the number of two-lane roads. Avoid the need for visitors to drive in reverse, with the exception of back-in campsite parking spurs.
10. Accommodate a variety of camping spur and pull-through configurations.
11. Provide turn-around opportunities for trailers and large vehicles.
12. Provide for adequate queuing at campground or fee site entrances to avoid vehicles stopping along access roads or highways.
13. To enhance efficiency of administration, design developed recreation sites with a single entrance. Design to minimize unnecessary operation and

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maintenance travel. Where feasible, provide alternate egress route which could be used if rapid evacuation of site is required.

14. Design for traffic calming within sites, to reduce speeds and noise. For example, narrower roads, islands, bump out vegetation areas, and one way routes.

12.5 - Accessibility

Ensure that all new, altered, or reconstructed buildings, constructed features, interpretive media, and programs at developed recreation sites incorporate universal design and comply with the applicable accessibility guidelines/standards for people of all ages, abilities, and cultures in an integrated setting, to the greatest extent possible while maintaining the site character and visitor experience.

1. Review site Accessibility Transition Plan and incorporate identified changes, where feasible, to bring features and site into compliance with accessibility standards.
2. Document any justified conditions for departure where current accessibility standards cannot be accomplished. Maintain documentation in project record.

12.6 - Resource Protection and Restoration

1. Confine vehicles to existing or planned roads and parking areas.
2. In the vicinity of heavily used improvements, use surface-hardening methods that are appropriate to the recreational setting, architectural theme, and level of development.
3. Locate and design facilities to serve their intended function with the least impact on Tribal use, scenery, and the natural landscape.
4. Design access routes and site features around soils constraints. Locate features on suitable soils. Define vehicle and non-motorized circulation routes and parking locations to avoid steep slopes and sensitive soils. Provide structures such as boardwalks to minimize impacts of travel routes in wet areas. Identify limits of acceptable disturbance. Design to direct use to acceptable locations, through natural and constructed barriers.
5. Decompact, scarify, and incorporate organic material in previously compacted areas to be restored. Minimize disturbing roots of trees where feasible.
6. Minimize building and construction footprints by identifying disturbed sites for potential reuse.

12.7 - Water, Toilets, and Waste

1. It is not necessary to furnish potable water at every developed recreation site. If no potable water is provided at a developed recreation site, post the location of the nearest potable water source.
2. When potable water is provided at developed recreation sites, locate water hydrants so that each can serve several use areas or camping units. Maximum distance from day use sites or camping units is dependent on ROS Setting:
 - a. Semi-Primitive Motorized: 300 feet.
 - b. Roaded Natural: 150 feet.
 - c. Rural / Urban: 100 feet.
3. If potable water is part of program, locate where users need water most, such as at trailheads. Typically, locate hydrants near toilets so one hydrant can serve several camp or picnic units.
4. All potable water facilities at developed recreation sites must comply with FSM 7420, the FSORAG, and Federal, State, and local regulations pertaining to drinking water sources.
5. Wells with single hand pumps may serve 15 to 20 units.
6. Use low-flow fixtures to conserve water use.
7. The design and maintenance of trash receptacles should prevent access or disturbance by wildlife.
8. Where practicable, use large, centralized trash receptacles or clusters of receptacles, which are usually more cost-effective than small, scattered receptacles.
9. Where appropriate, screen trash receptacles at developed recreation sites to blend with natural features and constructed facilities at the sites. Co-locate with other infrastructure. Consider amenities to facilitate separation of recyclable materials from other waste.
10. Encourage visitors to pack out their trash.
11. Include amenities for pet waste at sites with high concentrations of this use.
12. Design and install RV sanitary stations (also known as dump stations) at developed recreation sites where commercial RV sanitary stations are not

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available within a reasonable driving distance, and on-site sewer or septic utilities are present.

13. Gray water infiltration sumps may be provided at a developed recreation site when necessary to prevent pollution and/or erosion.

12.8 - Materials

1. Select materials for developed recreation sites in accordance with the BEIG to visually harmonize with their natural setting.
2. Consider life-cycle costs and environmental consequences when selecting materials. Document advantages of superior, potentially more expensive materials compared to less expensive, short-lived choices. Use sustainable materials to minimize operation and maintenance costs and to extend the useful life of the facilities.
3. To the extent feasible, select materials for developed recreation sites containing recycled content and/or are rapidly renewable. Select materials which are chemically benign and/or non-toxic.
4. Use materials extracted, processed, and manufactured locally, and reduce, reclaim, and recycle materials on site, when feasible.
5. As part of a demolition plan, develop and implement a materials waste management plan encouraging the salvage and recycling of construction, demolition, and land clearing waste.
6. Select exposed materials and surface finishes resistant to vandalism and easy to remove graffiti from.

12.9 - Grading and Drainage

1. Design storm water management and green infrastructure features as landscape amenities. Use grading and drainage plans, as needed, at developed recreation sites to route snowmelt and storm water runoff to protect facilities and minimize impacts on visitors and environment. Consider snow melt and runoff in locating facilities and camping units at developed recreation sites. Direct runoff from parking areas and off roofs of buildings to appropriate areas for infiltration. Infiltrate storm water runoff on-site utilizing Low Impact Development principles, such as micro-basins. Filter pollutants to maintain or enhance the water quality of on-site and off-site receiving water bodies.
2. Minimize the use of impervious surfaces to areas needed to meet program goals. Consider the use of permeable surfaces where feasible.

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3. Manage storm water on-site to protect ground and surface water to minimize impacts to riparian, shoreline, and floodplain systems. Locate toilet and garbage amenities away from surface water and in proximity to public use areas.
4. Use road and trail design principles to divert and disperse storm water runoff, such as rolling dips, out-sloping, and grade reversal. Out-slope roads only if the terrain and climate are favorable.
5. Incorporate catch basins with water spigots to improve percolation and move excess water away from spigot area.
6. Grading adjacent to buildings must slope away from the buildings to ensure positive drainage and to eliminate standing water. Establish building finish floor elevations to prevent runoff entering building while still providing accessibility.
7. Design drainage to follow previously undisturbed patterns as much as possible. Ensure drainage features have low-profile gradients and use energy dissipating structures, such boulders, concrete baffles, and large woody debris.
8. Grade roads, parking areas, and walkways to allow for the natural flow of surface water. Grading must direct surface water flow away from tent pads, hardened areas, picnic tables, or utility hookups. When possible, surface flows may be concentrated and collected in unobtrusive areas away from forest visitors and vehicular or pedestrian traffic. Minimize drainage structures that accelerate storm water flow velocities.
9. 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, hydrology, or aesthetics of an area.

12.10 - Safety

1. All outdoor recreational activities, including activities at developed recreation sites, have a degree of inherent risks due to the natural setting in which they occur.
2. Incorporate design elements in site plans for developed recreation sites to promote public and employee safety.
3. Design facilities to minimize conflicts with wildlife and enhance compatible viewing opportunities. Specify use of animal-proof site furnishings to prevent spread of waste and litter.

12.11 - Lighting and Dark Skies

Utilize best practices to preserve night sky quality and mitigate effects of light trespass in sensitive areas.

12.11a - Avoidance

1. Light only when required for safety of visitors and staff, to the extent practicable and provided for in chapter 50 of this handbook.
2. Maximize distances of lighting from sensitive areas.

12.11b - Screen

Utilize physical barriers and existing terrain to reduce light trespass.

12.11c - Direction and Shielding

1. Mount lights and direct downward.
2. Use partial shields and limit up-tilt.
3. Point lights away from sensitive areas.

12.11d - Adjust Duty Cycle

1. Use motion sensor controls in infrequently used areas.
2. Use timers to control lighting only during night hours of typical use.

12.11e - Brightness

Use the smallest amount of total lighting possible to still meet the lighting need.

12.11f - Color and Spectrum

1. Use amber light when color rendering is not critical.
2. Limit light to 3500 degree Kelvin when color rendering is critical.
3. Avoid blue/white light spectrum when possible.

12.12 - Signs

1. Install signs and posters at developed recreation sites where necessary or helpful to visitors, but keep them to a minimum. Consider using multiple languages or universally understood symbols.

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2. Follow the Sign and Poster Guidelines (EM-7100-15) and regional guidelines when installing information boards at the developed recreation site.
 - a. Information (such as maps, hours of operation, seasons of use, allowable uses, access and use restrictions, and special notices) is accessible to visitors and is posted on information boards in a welcoming, professional, and uncluttered manner.
 - b. Posters are easy to read, well-spaced, and understandable by their intended audience.
 - c. Where the primary language of a significant number of visitors is not English, provide messages in the primary languages spoken by those visitors.
3. Follow the National Guidelines for Recreation Fee Signing (Jan. 2007) when posting recreation fee signing at developed recreation sites.
4. Do not post accessibility signs, symbols or designations at individual camping units that meet accessibility standards.

12.12a - Regulatory Signs

Provide bulletin boards at a central location at developed recreation sites for posting rules, regulations, length of stay limits, and other information. Notify the public of the conditions of occupancy and use at each developed recreation site. Signs should be positive in tone and should explain the reasons for regulation.

12.12b - Interpretive Signs

1. As appropriate for the site, applicable ROS setting, and development scale, provide interpretation and education through various media to enhance visitor appreciation of natural settings and cultural resources, enjoyment of recreation opportunities at the areas served by the facility, and understanding of site protection measures and responsible recreation behaviors.
2. Ensure consistency with the local interpretation and conservation education plan. Ensure that interpretation and educational media and infrastructure are relevant and enable all people to enjoy, learn about, and care for the National Forest System (FSM 2390).
3. Design informational facilities to comply with relevant accessibility standards.
4. Consider developing design and signage guidelines for the Forest and specific projects to provide consistency between sites and support a sense of place. Provide clear and intuitive wayfinding and interpretive information consistent with the site's ROS setting and development scale.

12.13 - Energy Conservation

1. Consider solar power and other renewable energy sources for any energy needs on site. For example, if showers are provided at a developed recreation site, consider use of solar heating to reduce heating costs and energy use.
2. Use passive solar design heating/cooling principles to reduce building energy consumption and carbon emissions.
3. Use natural daylighting within buildings to reduce electric lighting demands.
4. Use efficient lighting to reduce energy consumption. This includes the use of LED bulbs or other energy efficient bulbs. Incorporate electrical timers and motion detectors.

12.14 - Fire Protection

1. Where fires for cooking or warming purposes will be allowed at developed recreation sites, install fire-containing devices for proper fire control.
2. Locate fire-containing devices at developed recreation sites away from trees, shrubs, and other flammable features.
3. Construct and maintain a firebreak around facilities to reduce potential wildfire impacts.
4. Use fire-resistant materials that are historically and architecturally consistent with the setting, as well as construction techniques, such as enclosing overhangs and eaves, to minimize the risk of fire damage.
5. Consult the National Fire Protection Association's Firewise Communities Program for locally appropriate planting and landscaping strategies.

13 - Site Types and Features

This section provides specific direction relevant to planning and design for specific developed recreation site types or features.

13.1 - Toilets

1. Locate toilets adjacent to existing or planned roads for ease of maintenance and access. For example, vault toilets should be close enough to road for pumping and routine maintenance access.
2. Locate toilets to prevent formation of numerous trails from camping units to toilet facilities.

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3. When locating toilets, consider prevailing winds for venting odors (FSH 7409.11, ch. 10 and 40).
4. Comply with State and local requirements regarding setback of toilets from open water.
5. Provide a sufficient number of toilets to accommodate the site's capacity. As a general rule, provide one toilet riser for every 35 PAOT, including camping units intended for RV use.
6. Design toilet buildings to prevent unsanitary conditions and pollution, to minimize maintenance, and to comply with the ABAAS.
7. Ensure that designs for toilet buildings at developed recreation sites are consistent with the principles and guidelines in the BEIG. The design narrative and engineering report for a developed recreation site must specify the type of toilet facility appropriate for the site.
8. In determining the type of toilet facility to install, consider construction, delivery access requirements, operation, and maintenance costs; availability of potable water and sewer connections; soil conditions and other environmental factors; accessibility; and the ROS setting and development scale for the site.
9. Size the toilet vaults and septic tanks relative to size of pump trucks. Vault size should not exceed expected available pump truck capacity.
10. Provide vegetative screening at those campsites nearest the restrooms to maximize privacy and minimize disturbance from the activities at the comfort station.
11. Typically, do not install interpretive or regulatory signs on toilet buildings.

13.2 - Camping Units

1. **Camping Unit.** A camping unit typically includes the camp living area with an adjacent space for a tent or recreational vehicle (RV), a parking spur, and one or more constructed features, such as picnic tables, a fire ring, and a cooking surface (a pedestal grill or grill attached to a fire ring). The camp living area should be placed in proximity to the parking spur. All camping units and associated constructed features and access routes must comply with the accessibility standards. Locate units at least 25 feet from the edge of the campground road and at least 100 feet from lakes, streams, toilets, and main roads.
2. **Host Unit.** In addition to the camping unit constructed features, the host unit may include water, sewer, and electrical hookups. The host unit should be located for purposes of visitor convenience and monitoring. Situate the host unit prominently so that visitors to the site are aware of the host's presence. Place

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signs informing the public that a host is in attendance at the entrance to the developed recreation site and at the host's campsite.

3. Separation of Tent and Walk-In Camping Units from RV Camping Units. Consider the user experience in decisions to co-locate or separate units intended for RV or tent use. Camping units should provide for use of the maximum variety of camping equipment, except where local terrain, utility restrictions, or patterns of use indicate that separation is practical and desirable.

4. Tent Camping Unit. Tent camping units are appropriate where terrain restrictions and lack of practical utility services preclude development of a spur to accommodate recreational vehicles (RVs). The parking spur should be at least 16 feet wide, and is not the focal point of use. A tent camping unit normally should include a space for at least one parked vehicle, a level tent pad, table, and fire ring.

5. RV Camping Unit. The parking spur is the focal point of use for RV camping units. Utility connections, typically water and electricity and in some instances sewer, can be provided. Provide at least 210 square feet of usable camping space next to the spur. RV camping units should include a parking spur that is at least 50 feet long or a pull-through spur, a picnic table, and a grill, or fire ring. Design the parking spur to facilitate RV pull-through or back-in parking. Parking spurs should be at least 16 feet wide. Locate utility connections, where provided, within the last half of the parking spur, on the passenger side of the vehicle.

13.2a - Utility Hookups

1. Do not provide individual utility hookups at National Forest campgrounds except when the following criteria are met and documented:
 - a. No opportunity for private sector development or expansion.
 - b. A contrast with urbanization can be maintained.
 - c. Daily fees can be set at a rate that will pay for the additional construction cost and operation and maintenance.
 - d. Night-time heat and humidity conditions render sleep unrealistic without air-conditioning.
2. Consider infrastructure improvements to provide wireless internet service, and/or cellular network coverage where this utility service is available.

13.22 - Group Recreation Sites

1. Avoid intermingling facilities for large group use with facilities designed for single-family use.

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2. **Site Design.** The design for group recreation sites may vary, but should remain consistent with the development scale of adjacent developed recreation sites.
3. **Roads and Parking Areas.** Where possible, provide entrance gates so that the sites can be reserved. A service road that permits a vehicle to bring food to the food preparation area is frequently necessary. The capacity of the parking area must be consistent with the PAOT for the site.
4. **Cooking Facilities.** Where appropriate, provide each camping unit at a group recreation site with a large fire grill or similar type of cooking surface. A food preparation table may be needed in most group campgrounds, and a food service table is needed in both group campgrounds and picnic areas.
5. **Potable Water.** Where potable water is provided, it should be available near the food preparation area. Locate toilets at least 100 feet from the food preparation area.
6. **Other Improvements.** Fire rings may be desirable at group recreation sites. Construct covered shelters where appropriate, such as in areas that require shade for users. Open areas for recreational activities may be provided, but do not furnish play equipment or sports facilities for these areas.

13.23 - Overflow Camping Areas

Overflow areas accommodate visitors who want to remain in an area for a short duration, usually one night or a weekend, but cannot find a vacant spot at either public or private development, and cannot be reasonably turned away late in the day or reasonably expected to return home.

1. Provide no other amenities besides sanitation facilities at overflow camping areas.
2. Design overflow camping areas to enable sites, loops, or other portions of the areas to be easily closed or opened, depending on the demand for use.

13.3 - Recreation Rental Cabins

1. Identify opportunities to preserve and maintain historic buildings under the recreation rental cabin program. Preserve the historic character of recreation rental cabins by selecting appropriate furnishings, restoration materials such as paint color, flooring, and landscaping.
2. Complete a recreation rental cabin feasibility plan for the administrative unit or ranger district.

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3. Complete an analysis to address demand, needed capital improvements, and long-term maintenance for recreation rental cabins.
4. Select potential recreation rental cabins that will meet the national quality standards (FSH 2309.13, sec. 53.1- 53.14).
5. Recreation rental cabins must comply with ABAAS.

13.4 - Picnic Areas at Day Use Facilities

Picnic areas should have enough tables to accommodate their designed PAOT and, as appropriate, a cooking surface (pedestal grill, utility table, or grill attached to a fire ring).

13.5 - Boat Launches

1. Separate boat launches from developed swimming areas.
2. Design boat ramps with a grade of between 12 and 15 percent.
3. Consider the prevailing direction of high winds and the extreme fluctuations in water level.
4. Situate overhead structures, such as utility lines, so as to avoid their being hit by masts, especially where sailboats are taken in and out of the water.
5. Size the ramp and parking area based on anticipated average weekend demand for the boat launch. Consider an overflow parking area for peak holiday demand.
6. Use bulletin boards to provide users information and conditions of occupancy and use of the developed recreation site and adjacent waters, to the extent practicable and provided for in chapter 50 of this handbook.
7. Install boat mooring facilities at a developed recreation site when it is accessed primarily by boat and when characteristics of the bottom of the body of water or shoreline do not permit boats to be drawn up safely on the beach for short-term or overnight storage.
8. Incorporate amenities for cleaning recreational equipment to prevent aquatic invasive species transport.
9. Follow applicable State standards for water safety, including applicable State standards for safety equipment.

13.6 - Developed Swimming Areas

1. Where frequent swimming occurs, evaluate the need for a developed swimming area and the ability to protect natural resources after the area is constructed.
2. Follow State standards for developed swimming areas in natural bodies of water.
3. Construct developed swimming areas only where it is possible to mitigate known high-risk conditions. High-risk conditions include but are not limited to:
 - a. Frequent waves or breakers over 4 feet high.
 - b. A rough, rocky bottom.
 - c. Submerged stumps, snags, rocks, and other features which could result in entanglement.
 - d. Unpredictable water level fluctuation of more than 1 foot per hour.
 - e. Current velocity of more than 5 miles per hour.
 - f. Dangerous undertows and riptides.
 - g. Sharp metal, glass, and other dangerous debris.
 - h. An underwater gradient greater than 10 feet in the first 100 feet from shore.
4. If desirable, install a picnic area in the vicinity of a developed swimming area. In locating a picnic area at a developed swimming area, consider public health and safety, to the extent practicable and provided for in chapter 50 of this handbook, and resource protection. Do not locate picnic areas on sandy beaches or in close proximity to open water.
5. When they are necessary at a developed swimming area, locate toilets, dressing rooms, or bathhouses near the beach and within reasonable walking distance of a central parking area. Dressing rooms or bathhouses are not usually necessary in developed swimming areas adjacent to a developed recreation site, unless it is a day use area.
6. Do not install diving boards or rafts at developed swimming areas.
7. Ensure that new or reconstructed beach access routes at developed swimming areas comply with accessibility standards.
8. At developed swimming areas include:

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- a. Posting warning signs of relevant risks, including lack of life-guard.
- b. Delineation of the area to designate no-boating zones, for example, with buoys and floating lines, when waters serve both swimmers and motorized boaters.

13.7 - Developed Hot Springs

Develop hot springs on National Forest System lands only when necessary for resource protection.

13.8 - Federally Owned Target Ranges

1. Construct target ranges on National Forest System lands when they will be consistent with the applicable land management plan and will enhance national forest management by addressing public safety, providing recreation opportunities, and consolidating dispersed target shooting.
2. When establishing a new site for or adding facilities to a target range, consult reference materials related to siting decisions early to determine whether the areas proposed are suitable. Consult chapter 3, section 3.5, of the National Shooting Sports Foundation's *Environmental Aspects of Construction and Management of Outdoor Shooting Ranges*, which provides information on range siting and orientation and includes a site checklist, a summary of ecological criteria for range siting, and recommendations about the type of sites to avoid when locating target ranges. Also consult the U.S. Environmental Protection Agency (EPA)'s *Best Management Practices (BMP) Manual* and section 1, chapter 3, article 2, of the *NRA Range Source Book* for further information about making siting decisions.
3. Review FSM 2343.9 and 2721.71 and FSH 2709.14, chapter 70, sections 71-71.9b, for further direction on requirements related to target ranges, including special use authorizations, National Environmental Policy Act analysis and documentation, environmental stewardship plans, and safety plans.

13.9 - Parking Areas

1. Design parking areas at developed recreation sites to provide adequate and safe public access, to the extent practicable and provided for in chapter 50 of this handbook, with minimum maintenance costs (FSM 7721.1).
2. Minimize grading cuts and fills in order to maintain or maximize natural characteristics of the site and intrude as little as possible on the landscape (FSM 7721.1).
3. Separate vehicular and pedestrian uses at developed recreation sites as much as possible.

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4. Provide parking areas that serve the typical site users, including those with disabilities. Parking may be separated from the destination features at developed recreation sites, if connected with an accessible Outdoor Recreation Access Route. Avoid placing vehicle parking between areas with views and dominant view attraction.
5. Provide adequate parking at developed recreation sites. Consider the possibility of encouraging alternative transportation options, such as mass transit, shuttles, or trail connections, when initially sizing a parking area or considering an expansion.
6. Where needed, provide trailer and bus parking with an adequate turning radius.
7. Locate parking areas to conform to the terrain and vegetation. Break up large parking areas with topography and screening where feasible, provide a series of connected smaller parking areas rather than a single very large parking area.
8. Design parking areas at developed recreation sites to minimize impacts on hydrology and ecological functions. Consider green infrastructure solutions for retaining and infiltrating stormwater runoff and reducing heat island effects. Refer to the Sustainable Recreation Site Design Guide for more information.
9. Especially in day use sites, cluster parking in central areas with a well-designed path system to features. Design picnic sites so that they are fairly close to parking.
10. Design overflow-parking areas for temporary storage of towed vehicles including automobiles, boats and trailers. Overflow lots should have a limited stay rule to prevent resource damage.