



## Chapter 7— Planning Recreation Sites

The prerequisite for developing any recreation site is access and permission to use the area. Other factors that come into play include: user preferences, safety, budgets, legal requirements, site limitations, and climate. A good recreation site meets the needs of users, minimizes conflicts, and has an appropriate level of development, while protecting the natural environment. Careful planning is the key to a successful equestrian recreation site, whether it is a trailhead, single-party campground, group camp, or a combination of the three.

### User Needs

The needs of equestrians are similar to the needs of other users. For example, all recreationists need water. Riders not only need a water source, they need one that accommodates their stock.

Because riders' preferences vary greatly across the country, when planning recreation sites for equestrians, arrange a public meeting to gather input. Invite representatives from a wide range of equestrian organizations. If equestrian trailheads and

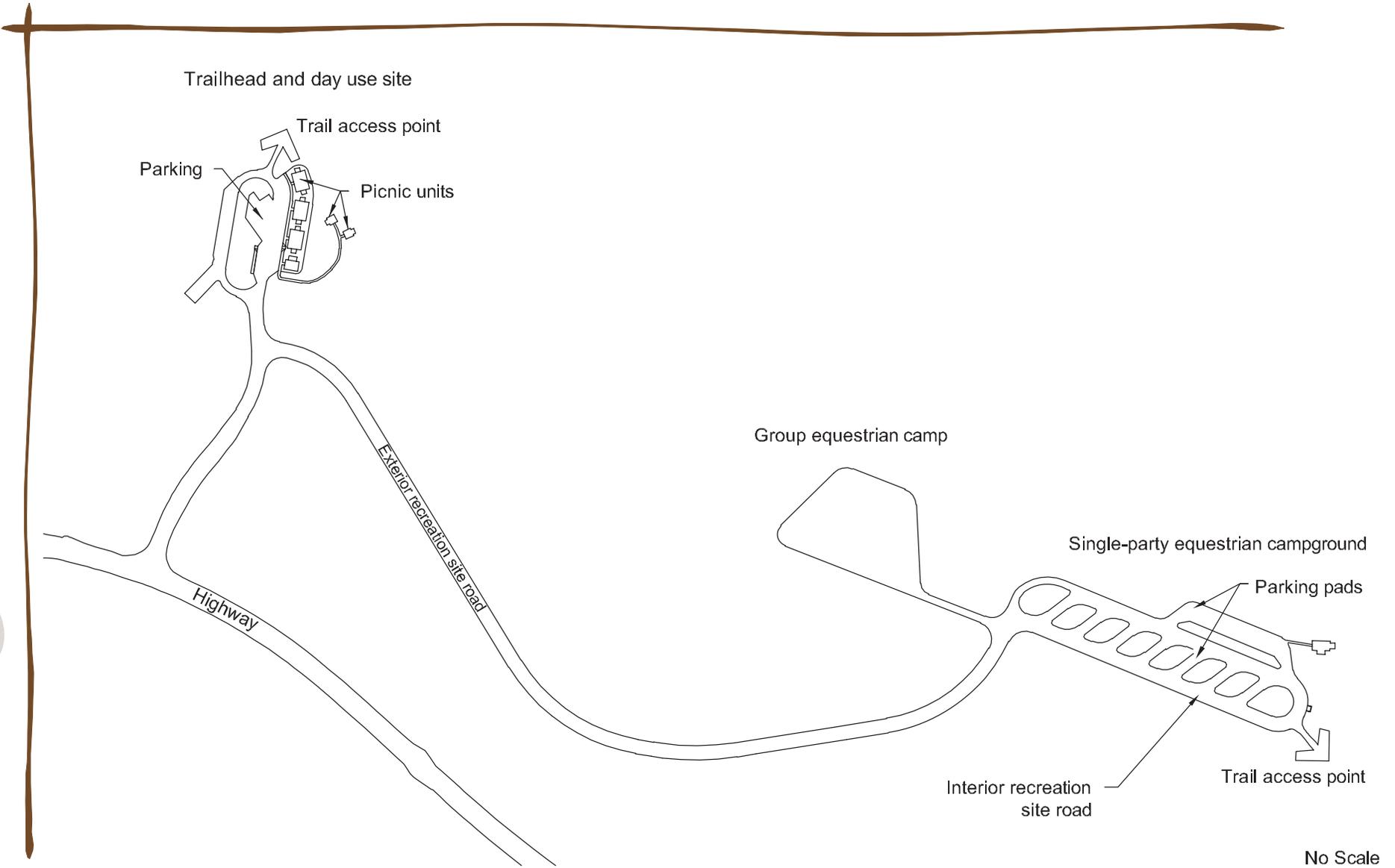
campgrounds are nearby, visit them. While there, ask riders what they like about the facilities and what they would like to improve.

### Site Conflicts

If recreation user groups are not fully compatible, safety may become an issue. For example, many children are not horsewise. They may play in ways that startle horses and mules. Adults who are not familiar with stock might unintentionally create problems as well. People, stock, and facilities could be harmed in such situations. Riders appreciate separation from other users in campgrounds, at trailheads, and at trail access points. Landforms, roads, streams, drainages, and vegetation can be used for separation. Suggested separation strategies include:

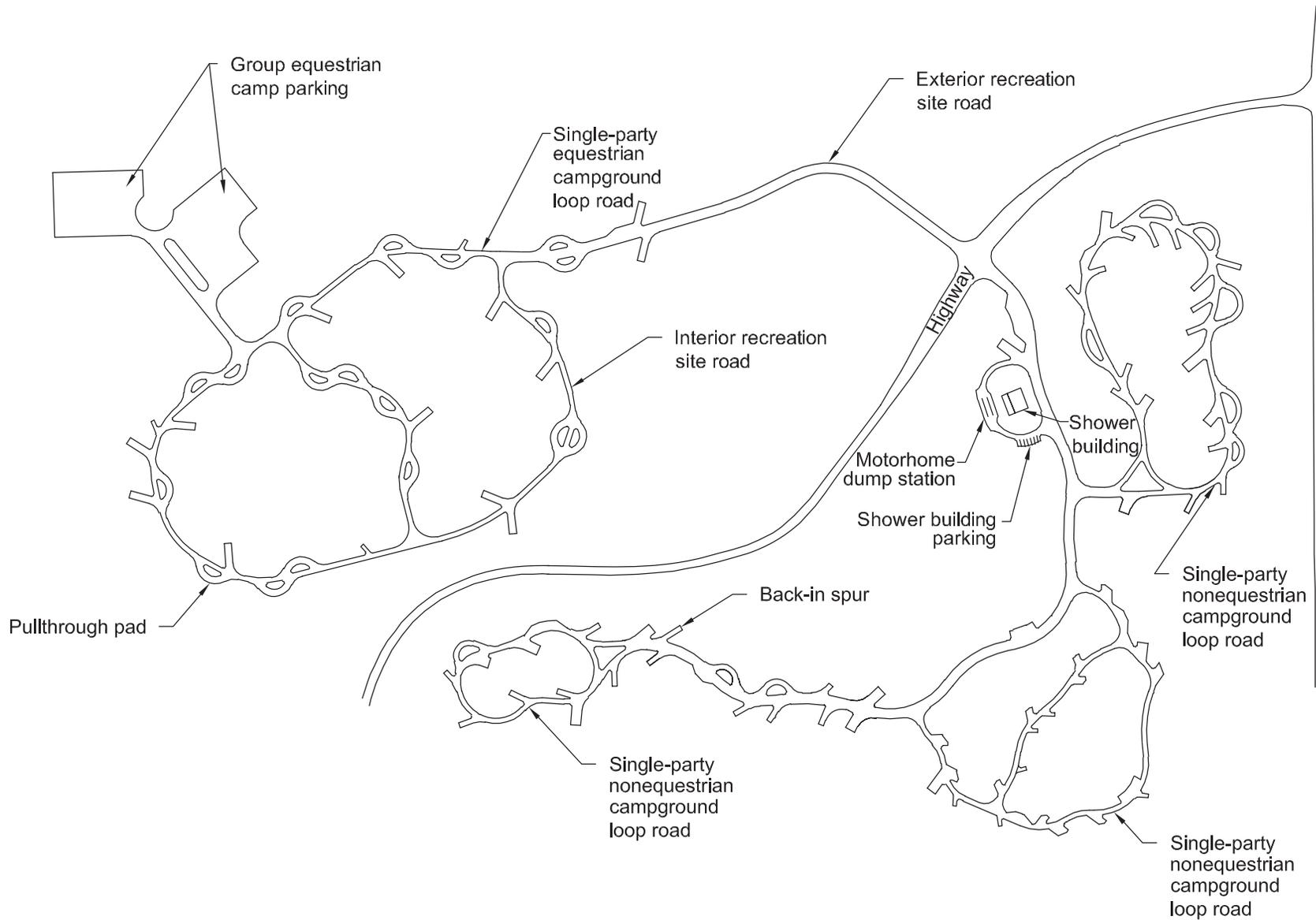
☆ Trailheads and campgrounds—Design sites to avoid disturbances between trailhead visitors and equestrian campers. Figure 7-1 shows a site where distance separates vehicles traveling to the campground from trailhead users.

- ☆ Equestrian and nonequestrian campgrounds—Restrict equestrian campgrounds to campers who have stock. Provide substantial separation between equestrian and nonequestrian campgrounds. Keep nonequestrian users away to reduce the potential for inadvertent injury. Figure 7-2 shows a site where equestrian and nonequestrian campgrounds are separated by distance and a highway.
- ☆ Single-party equestrian camping and group equestrian camping—Separate the single-party equestrian sites from those designed for groups. Single-party campers appreciate a buffer, because large groups may be loud.
- ☆ Equestrian and nonequestrian trailhead parking—Separate equestrians and other users at trailhead parking areas. Post signs indicating where users should park. The separation does not need to be extensive, because visitors don't stay in trailhead parking areas very long, making conflicts less likely. Figure 7-3 shows a trailhead with facilities and vegetation that separate conflicting user groups. Some agencies also provide separate trail access points for conflicting user groups. Signs should identify access points for different types of users and educate users about appropriate behavior around stock.



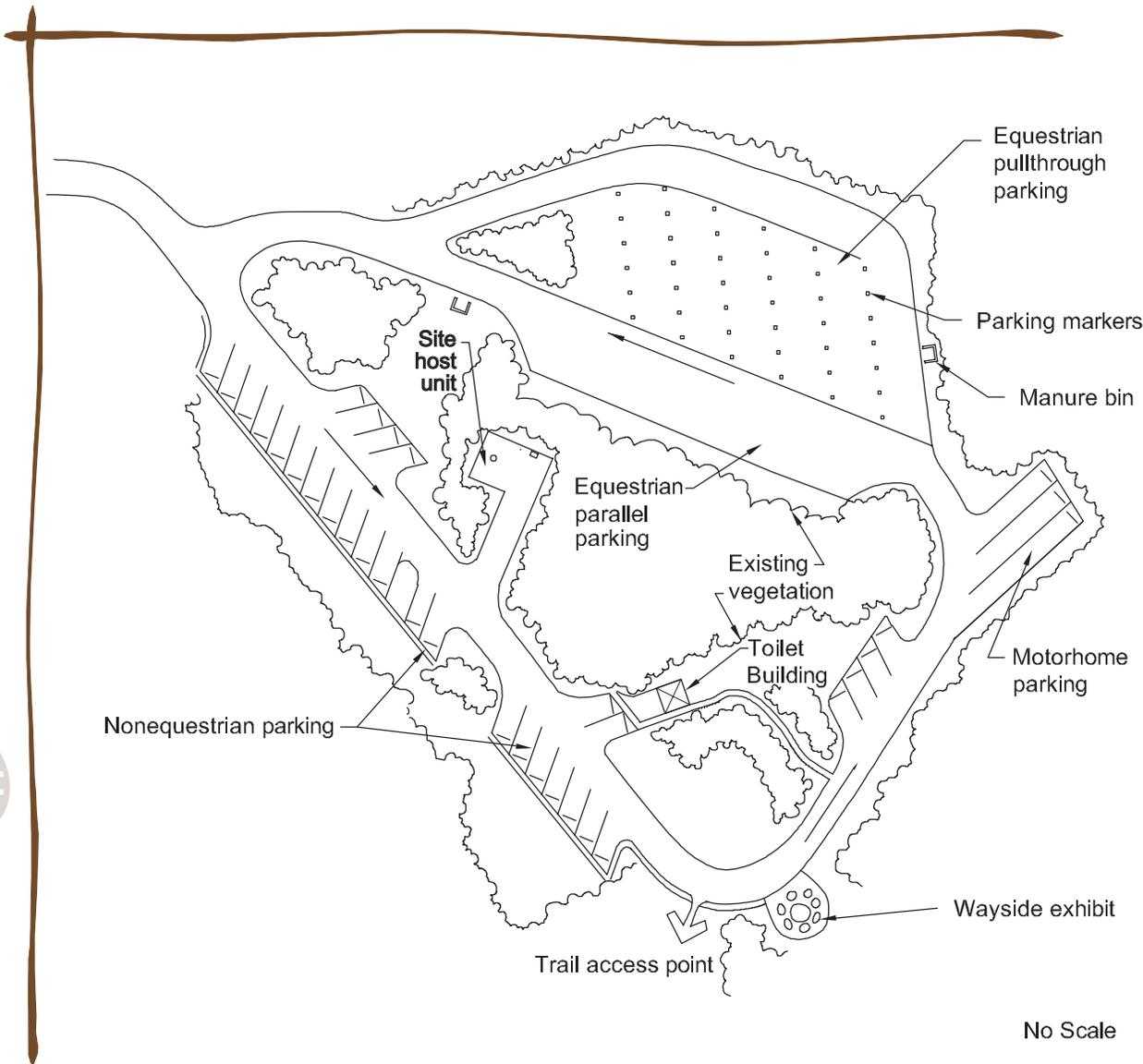
No Scale

Figure 7-1—A recreation site where distance separates vehicles traveling to the equestrian campground from the trailhead.



No Scale

Figure 7-2—A recreation site where distance and a highway separate the equestrian and nonequestrian campgrounds.



### The Army Way

#### Trail Talk

The U.S. Army Corps of Engineers (2004) follows these guiding principles when designing recreation sites:

- ☆ Consider functional use, creative design, environmental harmony, and economy of construction.
- ☆ Maintain health, safety, security, and comfort of the users in all aspects.
- ☆ Meet local and regional recreation needs.
- ☆ Consider the present requirements as well as recreation trends and future needs.
- ☆ Create user-friendly areas and facilities to serve all populations. Universal design principles help ensure accessibility and user diversity.
- ☆ Consider economy of scale and life-cycle costs.
- ☆ Enhance revenue generation.
- ☆ Base the design of facilities on an area's anticipated average weekend day visitation during the peak season of operation.
- ☆ Protect resources from physical and esthetic degradation.
- ☆ Incorporate off-the-shelf products wherever practical.
- ☆ Correct existing design problems.
- ☆ Provide for ease and economy in cleanup and maintenance.
- ☆ Meet stated management and sustainable development goals.

Figure 7-3—A trailhead where facilities and vegetation separate conflicting user groups.



## Appropriate Levels of Development

Will a trailhead or campground have minimal equestrian facilities and offer an opportunity to get away from it all, or will there be extensive modern conveniences? The answer to this question describes the site's level of development. A recreation site's level of development accommodates the land management agency's master plan and the setting. This guidebook uses the terms *low*, *moderate*, and *high development* as subjective classifications describing the degree of manmade change in developed recreation sites. The levels of development for recreation sites roughly correspond with the *roaded natural*, *rural*, and *urban* recreation classifications of the *Recreation Opportunity Spectrum (ROS) Users Guide* (U.S. Department of Agriculture Forest Service 1982). The Wilderness Recreation Opportunity Spectrum (WROS) is beyond the scope of this guidebook. Normal development for ROS classes is defined as:

- ☆ **Roaded natural areas**—Rustic facilities provide some comfort for users as well as site protection. Contemporary rustic design is usually based on native materials, and synthetic materials are not evident. Site modification is moderate.
- ☆ **Rural areas**—Some facilities are designed primarily for user comfort and convenience. Synthetic but harmonious materials may be incorporated. The design may be more complex and refined. Site modification for facilities is moderate to heavy.

- ☆ **Urban areas**—Facilities are designed mostly for user comfort and convenience. Synthetic materials are commonly used. Facility design may be highly complex and refined, but is in harmony with or complements the site. Site modification for facilities is extensive.

## Site Selection

The ultimate site for equestrian trailheads and campgrounds has the following:

- ☆ **Convenient driving access**—The site has access roads that accommodate vehicles towing horse trailers. Many trail users prefer a site that is within 5 miles (8 kilometers) of a paved road.
- ☆ **Trail access**—The site accesses a trail system. Riders staying in a campground for several nights generally prefer to travel a different loop trail each day.
- ☆ **Mild terrain**—The site has somewhat level ground. As long as portions of the site are suitable for building, some existing natural drainages and landforms may serve as buffers between conflicting uses.
- ☆ **Good soil conditions**—The site has soils that percolate water quickly to avoid wet or muddy conditions. Such soils also withstand traffic without excessive compaction or erosion.
- ☆ **Areas of existing vegetation**—The site's tree canopy provides at least partial shade. An understory serves as a natural visual buffer. Vegetation serves to separate conflicting uses.

- ☆ **Areas of minimal vegetation**—The site has a natural opening surrounded by trees and shrubs that is suitable for parking areas, eliminating the need to remove existing vegetation.
- ☆ **Adequate size**—The site has sufficient area for the project. If the site is not large enough for the planned facilities, resource damage is likely.
- ☆ **Suitable landscape**—The site allows facilities to blend with the natural topography. Avoid a site that would make the recreation facilities prominent features when viewed from surrounding roads, trails, recreation sites, residences, or commercial properties.



### Gentle Slopes

### Horse Sense

Choosing trailhead and campground sites with steep terrain has its pitfalls. Steep terrain has design limitations and results in unsightly cuts and fills. The most desirable natural slope is about 1 to 3 percent, and the maximum is 4 percent. These gentle slopes allow construction of roads, parking areas, structures, camp units, and picnic units without extensive earthwork.

A thorough site analysis is invaluable. When archeological or cultural resources are present, or if plants or wildlife are classified as threatened or endangered, the complexity of planning and design can increase significantly. Deciding to build on flood plains may increase construction and maintenance costs.



### Designing Choices: ROS

The *Recreation Opportunity Spectrum (ROS) Users Guide* is an inventory and management tool used extensively on lands managed by the Forest Service. The ROS provides a framework for understanding environmental settings as they relate to recreation experiences, recognizing that the user's goal is to have satisfying experiences. Users achieve satisfaction by participating in their preferred activities in preferred environmental settings. For example, camping in an undeveloped setting offers some users a sense of solitude, challenge, and self-reliance. In contrast, camping in a setting with easy access and highly developed facilities offers some users more security, comfort, and social opportunities.

### Resource Roundup

The ROS framework is set up on a continuum—the spectrum—that helps managers provide broad recreation choices. The continuum encompasses six classes that range from primitive to urban (figure 7–4). The combination of activities, settings, and experience opportunities in each class determines management and development strategies. For example, a facility intended to create a safe, controlled environment for large numbers of people would be highly developed using modern materials and would offer ample conveniences. A more primitive area would have far fewer constructed features than an urban area, and the features would be smaller and made of natural materials. *The Recreation Opportunity Spectrum Users Guide* is available at <http://roadless.fs.fed.us/bgdocuments2>.



### Resource Roundup

#### Protecting Views: SMS and VRM

The Forest Service uses the Scenery Management System (SMS) to protect landscape views. The SMS presumes that land management activities—including construction of recreation sites—should not contrast with the existing natural appearance of the landscape. Regional character types are used as a basis for design. Form, line, color, and texture that blend with the landscape can be incorporated into the regional character type to minimize the visual impact of structures. This approach reinforces the concept that recreation sites should be visually subordinate to the landscape. The SMS is included in *The Built Environment Image Guide* (U.S. Department of Agriculture Forest Service 2001). The guide is available at <http://www.fs.fed.us/recreation/programs/beig>.

The Bureau of Land Management uses a similar concept, the Visual Resource Management (VRM) system, to maintain scenic values on public lands. The VRM system is a method of identifying and evaluating scenic values to determine appropriate levels of management. Managers can analyze potential visual impacts and apply visual design techniques so development is in harmony with the surroundings. More information is available at <http://www.blm.gov/nstc/VRM>.

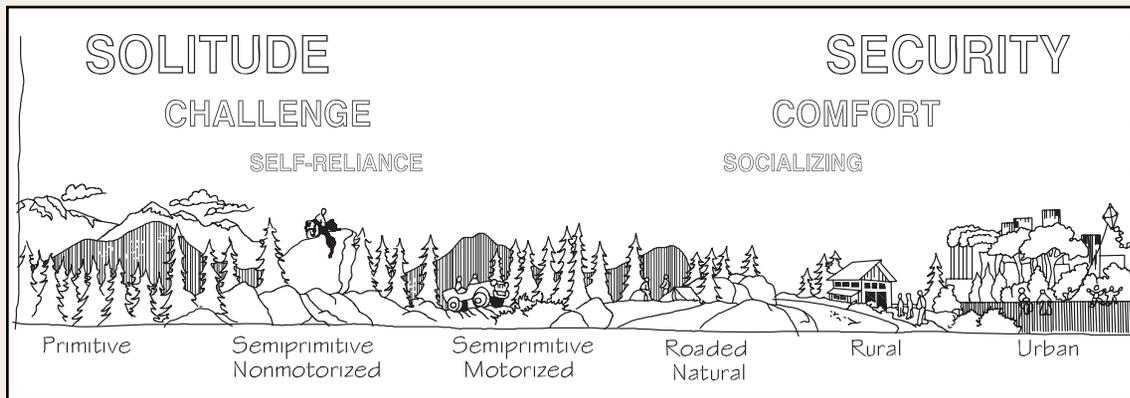


Figure 7–4—The Recreation Opportunity Spectrum provides inventory and management tools for recreation settings. The levels of trail development used in this guidebook roughly correspond with nonmotorized portions of the roaded natural, rural, and urban recreation classifications.



## Vegetation and Landscaping

A vegetation management plan usually is part of the recreation site master plan. Silviculturists, botanists, or other specialists evaluate existing conditions and species for health, hardiness, age, longevity, and similar factors that influence proposed landscape changes. Subsequent recommendations will vary by climate and region of the country. For example, in heavily forested sites it may be desirable to remove some vegetation, providing clear areas open to the sun. In hot climates, priorities may include saving existing vegetation and preserving shade.

## Toxic Vegetation

When planing equestrian amenities and facilities, avoid any vegetation that is toxic to horses and mules. If there's just a little toxic vegetation, remove it. Otherwise, consider moving the amenity away from the toxic vegetation. If it is impractical to avoid a large patch of toxic vegetation, post notices at information stations to alert riders about the hazards.

## Noxious Weeds

Noxious weeds affect the health of the recreation site. Seeds often arrive inadvertently in hay and straw, on vehicles and clothing, and in hair and manure. The seeds germinate and proliferate quickly. Address the issue with handouts, notices, and signs, as appropriate. Consult *Chapter 13—Reducing Environmental and Health Concerns* for more information regarding toxic and noxious vegetation.



### Tasty but Toxic

There are hundreds of toxic plants in North America, and many of them are common. *Ten Most Poisonous Plants for Horses* (EQUUS June 2004) ranks the ones of most concern to equestrians:

- ☆ Bracken fern (*Pteridium aquilinum*)
- ☆ Hemlock (*Conium maculatum*)
- ☆ Tansy ragwort (*Senecio* spp.)
- ☆ Johnsongrass and Sudan grass (*Sorghum* spp.)
- ☆ Locoweed (*Astragalus* spp. or *Oxytropis* spp.)
- ☆ Oleander (*Nerium oleander*)
- ☆ Red maple (*Acer rubrum*)
- ☆ Water hemlock (*Cicuta* spp.)
- ☆ Yellow star thistle and Russian knapweed (*Centaurea* spp.)
- ☆ Yew (*Taxus* spp.)

The article is available at [http://www.equisearch.com/horses\\_care/feeding/feed/poisonousplants\\_041105](http://www.equisearch.com/horses_care/feeding/feed/poisonousplants_041105).



### Toxic Plants Field Guide

Another popular reference is *Horse Owner's Field Guide to Toxic Plants* (Burger 1996). The guide describes well-known plants in the United States that are poisonous or otherwise dangerous to stock.

## Resource Roundup



### Toxic Plants Web Guides

- Several Web sites provide additional information about plants that are toxic to horses and mules:
- ☆ Cornell University provides the *Poisonous Plant Informational Database* (2006) with pictures of plants and affected animals, and information about the botany, chemistry, toxicology, diagnosis, and prevention of animal poisoning by natural flora. The information is available at <http://www.ansci.cornell.edu/plants>.
  - ☆ Manes & Tails Organization has *Poisonous Range Plants of Temperate North America* based on the *Merck Veterinary Manual* (2003). The Web site lists the vegetation's dangerous season, scientific name, common name, habitat and distribution, important characteristics, toxic effects, and includes remarks. The information is available at <http://www.manesandtailsorganization.org/toxic.html>.





### Amenities and Facilities

Equestrian facilities and amenities—trail access, water sources, toilets, corrals, and so forth—help determine the value of a site (figure 7-5). The most important elements at trailheads and campgrounds are trail access, convenient toilet buildings, and a sturdy place to secure stock. Potable water is highly desirable, although in some areas recreationists bring their own water. Table 7-1 summarizes the relative desirability of selected facilities and amenities at recreation sites. Figures 7-6, 7-7, and 7-8 show suggested placement of facilities and amenities at a trailhead, a single-party campground, and a group camp. Consult *Chapter 10—Securing Horses and Mules*, for more information about confinement options.

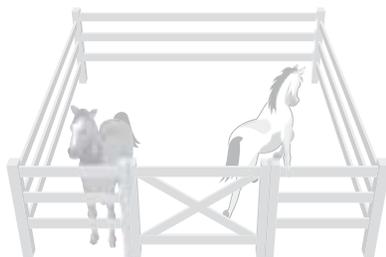


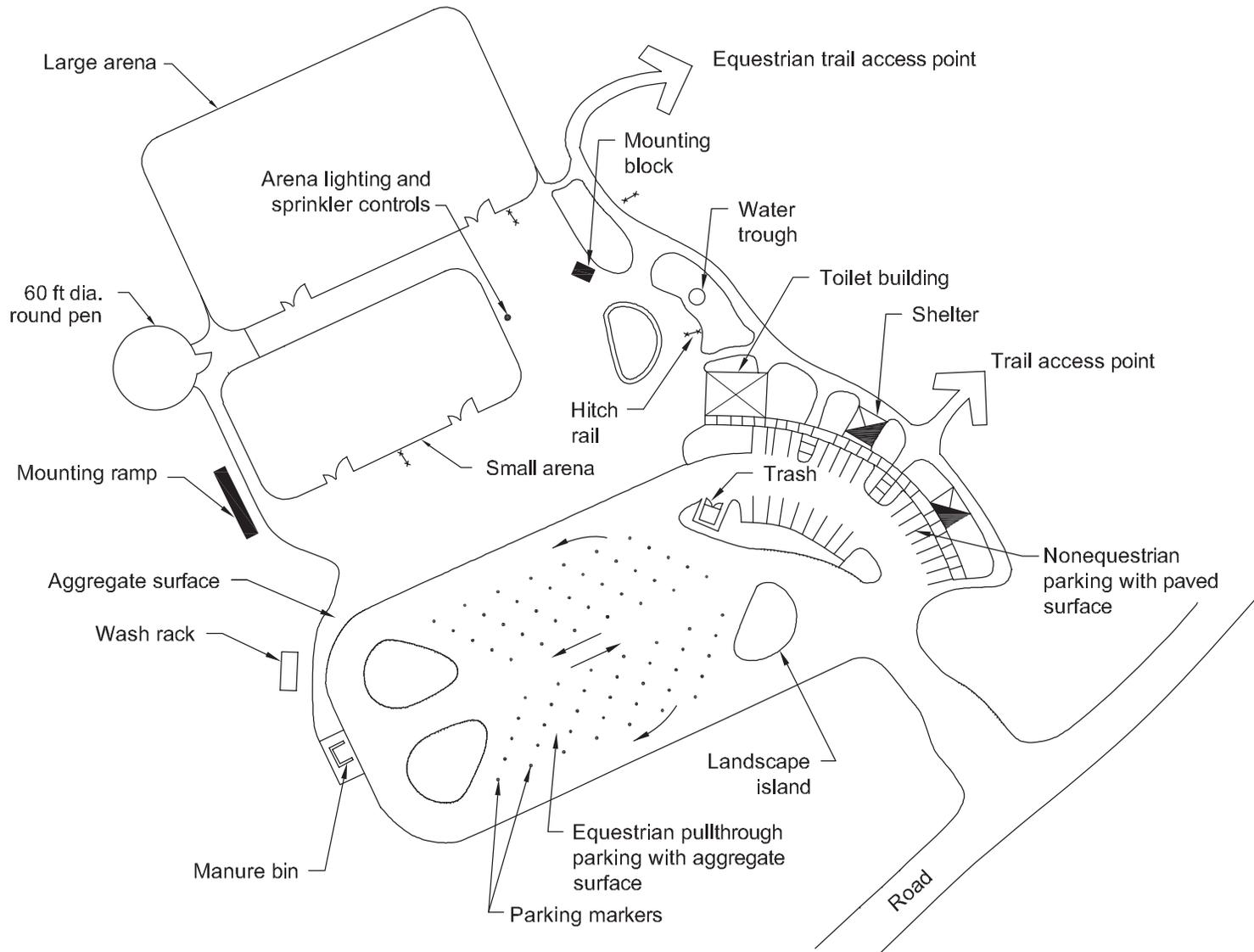
Figure 7-5—This open camp unit has parking, an area for setting up a tent, a fire surface, and a picnic table. Other campground facilities include a manure bin, toilet buildings, and common water hydrants. In the region where it is located, this campground is considered high development. In other areas, this campground would be considered low to moderate development. —*Courtesy of Kande Haertel.*

Table 7-1—Suggested recreation facilities at equestrian trailheads and campgrounds.

Facility	Basic	Often provided	Optional
Trail access	X		
Water sources*		X	
Toilet building	X		
Shower building (campground only)			X
Wash rack			X
Mounting ramp**			X
Loading ramp			X
Mounting block		X	
Manure disposal***		X	
Highline or corral		X	
Hitch rail	X		
Arena or round pen			X

\* In some areas, recreationists bring their own water.  
\*\* Mounting ramps must be accessible, if they are provided.  
\*\*\* Manure disposal is not required in all areas of the country.





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Figure 7-6—Suggested locations for facilities at an equestrian trailhead with a high level of development.

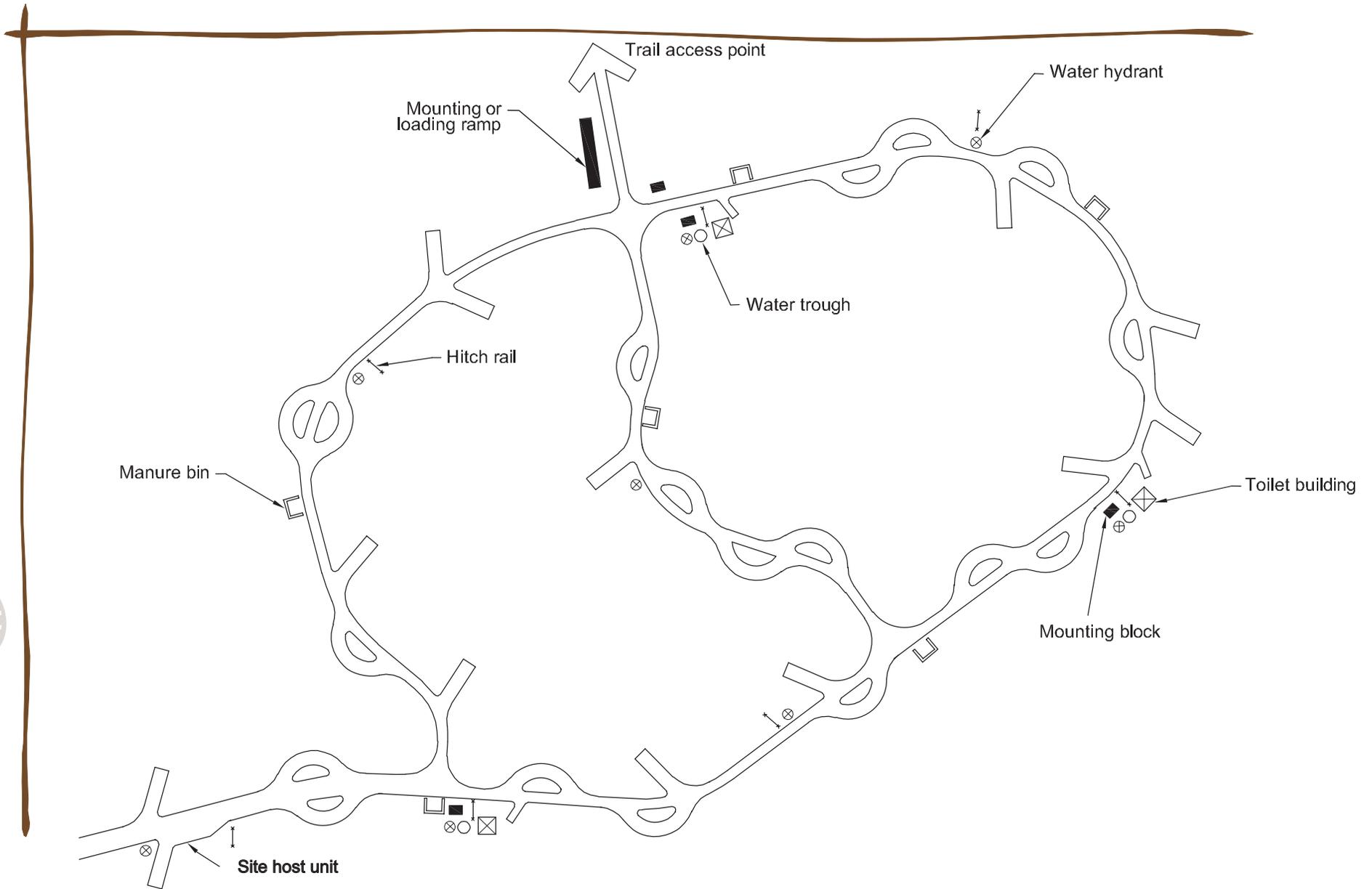


Figure 7-7—Suggested locations for facilities at a single-party equestrian camp unit with a moderate level of development.

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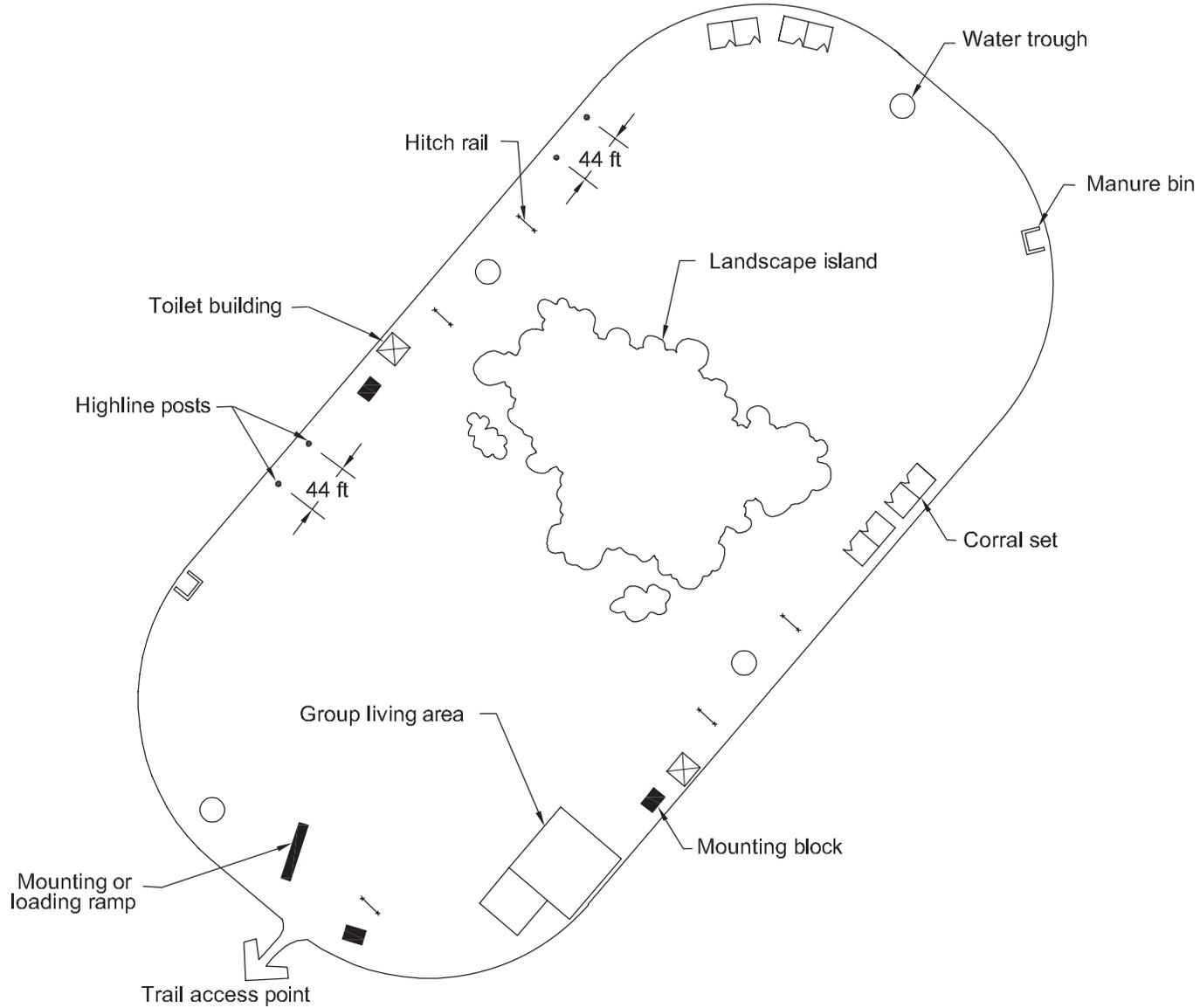


Figure 7-8—Suggested locations for facilities at an equestrian group camp with a moderate level of development.



## Trail Access Points

The primary feature of a successful equestrian trailhead and campground is a well-planned trail system. Once riders have established their camp, they don't like to transport stock to another location. Provide access to numerous loop trails directly from horse camps and trailheads. *Consult Chapter 4—Designing Trail Elements* for more information regarding loop trails.

Trail access points should be in places that are convenient, easy to find, and avoid user conflicts. If a recreation site has both a trailhead and a campground, provide separate trail access points leading from each facility and merge them some distance away. Because stock tend to defecate in the first half mile (0.8 kilometer) of a ride, separating trail access points for riders and other recreationists also reduces the manure on trails used by others.

7 Locate campground trail access in a public area that minimizes disturbance to visitors in single-party camp units. Trail access is best located at the end of a loop road or road intersection. These locations encourage riders to use the road instead of riding through someone else's camp unit. In group camps or trailhead parking areas, locate trail access points at the end of parking areas (see figures 7-6, 7-7, and 7-8).

## Utilities

Recreation site utilities may include storm drainage, water, waste disposal, and power systems. The main factors that determine which utilities to provide at a recreation site are the site's proximity to existing utilities, the budget, and the level of development.

Sewer-, water-, and power-system design varies by geographic region. For example, water conservation is important in arid regions. Urban areas have access to existing water systems that may be sophisticated, while some northern regions use wells that require frost-free hydrants. Electrical systems may access a power grid or use solar power. No matter what system is chosen, utility design must be completed by qualified engineers and adhere to applicable local, State, and Federal building and regulatory codes

Installing utility lines in a recreation site can affect vegetation and esthetics, often leaving a bare corridor the width of a road. Sensitive design minimizes these impacts by placing utility lines parallel and adjacent to the edges of new roads, along abandoned roads, or on a route that is already devoid of vegetation. If this is impractical, use the newly cleared area for pedestrian routes or structures. Where feasible, bury powerlines.



### Resource Roundup

#### According to Code

The International Code Council (ICC) Web site lists the most widely adopted series of building codes in the United States. The ICC develops the codes used to construct residential and public buildings and is dedicated to fire prevention and structure safety. More information is available at <http://www.iccsafe.org/cs>.

## Storm Drainage Systems

Storm drainage systems should carry off surface water without affecting site esthetics. Grades must direct surface waterflow away from living areas, toilet buildings, and hardened surfaces. Recreation site roads, parking areas, and pathways also must be sloped slightly to drain. Wherever possible, concentrate and collect surface flows in areas that are not visible. It may be possible to minimize impact on the land by using several small inlet structures close to one another instead of one large inlet. Regardless of the complexity of the system, proper design must follow State law and will require an interdisciplinary team that includes an engineer, hydrologist, and landscape architect.



### Water Sources

Provide convenient stock water access—an average 1,500-pound (6,680-kilogram) animal needs about 15 gallons of water daily—more if the animal is active. Fifteen gallons of water weighs about 125 pounds (56.7 kilograms), quite a load to haul in buckets. Suitable water sources include water hydrants and water troughs.

### Water Hydrants and Troughs

When stock share water sources, there is a potential for disease transmission. Because of this, many riders bring their own water and don't permit their horses and mules to use a shared source. Some riders prefer filling their own bucket at a hydrant, and then they take the bucket to the animal (figure 7-9) or bring the animal to the bucket. Other riders prefer the convenience of having a water trough. To meet the needs of all riders, provide both water hydrants and troughs. At a minimum, provide a water trough and hydrant at each toilet building and at trail access points. Riders also appreciate hydrants at group gathering areas. For user convenience, consider installing hydrants as suggested in table 7-2.

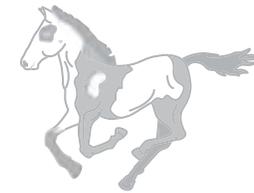


Figure 7-9— An average horse requires about 1 gallon of water daily for each 100 pounds of body weight. Trail stock generally weigh between 750 and 1,500 pounds. Draft horses, such as these Percherons, can weigh 2,000 pounds or more. —*Courtesy of the Forest Preserve of DuPage County, IL.*

Locate hydrants and troughs along the outside edges of loop roads, at intersections, or along the perimeter of parking areas. These locations encourage users to travel the road instead of cutting through camp units (see figures 7-6, 7-7, and 7-8). In highly developed areas where one hydrant serves two campsites, designers may want to incorporate split faucets and controls. Split faucets are not commonly available, but can be custom fabricated. Local health and safety codes may require backflow prevention systems or other considerations for custom configurations.

Table 7-2—Suggested placement guidelines for water sources in recreation sites.

Facility	Maximum distance from camp unit, picnic unit, or horse trailer (feet)
Water hydrant	150
Water trough	300





### Accessible Hydrants and Handpumps

In areas with existing water lines, water access for riders with disabilities usually is not a problem. Many hydrant models are commercially available to meet needs at these sites. The *Americans with Disabilities/Architectural Barriers Act Accessibility Guidelines* (ADA/ABAAG) require that the controls can be operated with one hand without tight grasping, pinching, or wrist twisting. The force required to operate the control can't be more than 5 pounds (2.3 kilograms), and control heights must be between 15 and 48 inches (about 381 to 1,220 millimeters) above the ground. To be accessible, the handpump (figure 7-10) must be on a firm and stable surface that is clear of any obstructions for at least 60 by 60 inches (1,524 by 1,524 millimeters). This design allows someone in a wheelchair to approach the hydrant from the front or side, turn around, and leave. If the hydrant is an unusual design with the handle and spout on different sides of the post, be sure that people can access both sides.

Because available options for stand-alone handpumps that meet accessibility requirements are limited, MTDC designed the accessible handpump shown in figure 7-11. The pump complies with the grasping, turning, and operating force restrictions for people with disabilities. The design works with wells that are about 50 feet (15.2 meters) deep. No commonly available handpumps meet accessibility requirements for wells deeper than 50 feet.



Figure 7-10—This accessible hydrant has easy-to-use controls, a drain, and a firm and stable surface for wheelchairs.

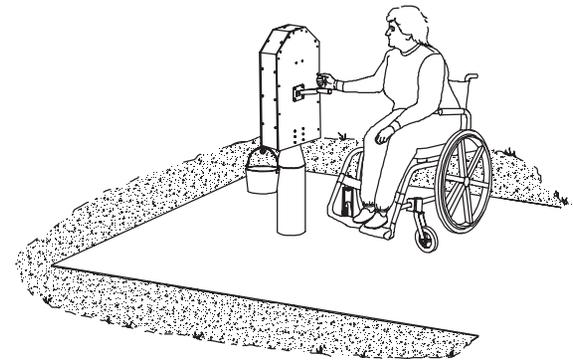


Figure 7-11—An accessible handpump for shallow wells.

### Water Troughs

Most horses and mules are comfortable using traditional, economical metal or plastic stock tanks—also called *troughs*. Avoid using low troughs—1-foot (0.3-meter) high or less—that sit on the ground. Curious stock may paw at them and get their hoofs caught or flip the trough. Figure 7-12 shows a trough that is 2 feet (0.6 meter) high and suitable for an area with a low to moderate level of development. The trough features a convenient automatic fill device with a protective screen that prevents curious stock from damaging it. Cold climates require frost-free hydrants. Figure 7-13 shows a trough suitable for a high level of development. Many riders prefer watering their stock in clean, freshly filled water troughs.

#### Resource Roundup



#### Accessible Handpump

For information regarding the accessible shallow-well handpump, see *New Accessible Handpump for Campgrounds* (Kuhn and Beckley 2005) at <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm05712311>.

This Web site requires a username and password. (Username: t-d, Password: t-d)



Figure 7-12—Stock can paw at a short trough and flip it. A tall trough, such as this one, is a better choice. A screened cage protects the automatic fill device from curious stock or other animals.



Figure 7-13—This attractive water trough is convenient, but costly.

Horses and mules suck water into their mouths through lips that they keep mostly closed. They can get a hearty drink from a water source that is only a few inches deep. Some innovative shallow troughs fill for a single animal's use. After the animal has finished, the remaining water flushes into the drainage system. The raised shallow basin permits stock to see in all directions while drinking (figure 7-14). These troughs are appropriate only in



Figure 7-14—A raised water basin allows stock to see in all directions when drinking. This style is suitable for areas with a high level of development.

highly developed sites. Table 7-3 shows the relative characteristics of water troughs and indicates the suitable level of development for each type.



**Horse Sense**

**Watering Holes**

You can lead a horse to a public water source, but it may not drink. A dehydrated horse may not drink because its judgment is clouded by lack of salt. A healthy horse may refuse water that smells or tastes differently than the water it is used to drinking. Many riders prefer watering their animals in clean, freshly filled water troughs.

Table 7-3—Characteristics and suitability of stock water troughs.

Water trough material	Rust-resistant	Economical	Suitable level of development
Concrete	X		High
Metal		X	Low, moderate, and high
Plastic	X	X	Low, moderate, and high





Horses and mules are not the only animals that use water troughs in recreation sites. Small wildlife in search of water may jump up on the edge, or reach into, stock water troughs. If they lose their balance, they can fall in and drown. A wildlife ramp (figure 7–15) supplies an escape route for small, trapped animals. Contact the appropriate wildlife and conservation agency for applicable regulations and design guidelines.

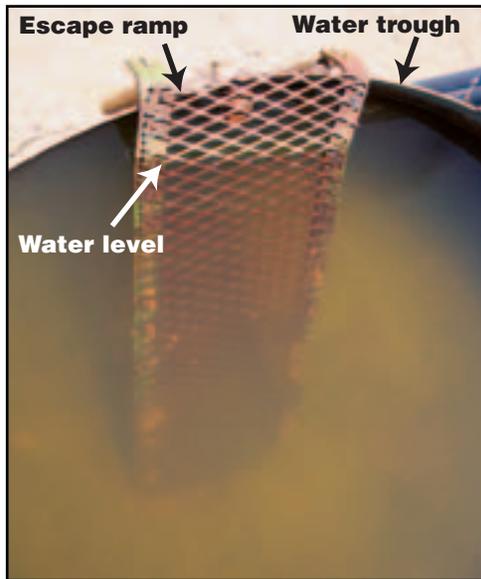


Figure 7–15—Water troughs with an escape ramp are lifesavers for small, thirsty wildlife that otherwise might have drowned after falling in.

Water troughs require a surrounding area that is clear of vegetation, signs, and other obstructions. When surroundings are clear, stock can drink from either side and avoid conflicts. The size of the wearing surface will vary according to the size of the water trough. Figure 7–16 illustrates a 4-foot water trough that has an adequate clear area with an aggregate

wearing surface. Water troughs also require regular maintenance. To prevent them from getting plugged, drain debris and standing water regularly. Mosquitoes that carry serious stock diseases, such as West Nile virus, breed in standing water. In some areas of the country, water troughs must be scrubbed frequently to remove scum, algae, or mineral deposits.

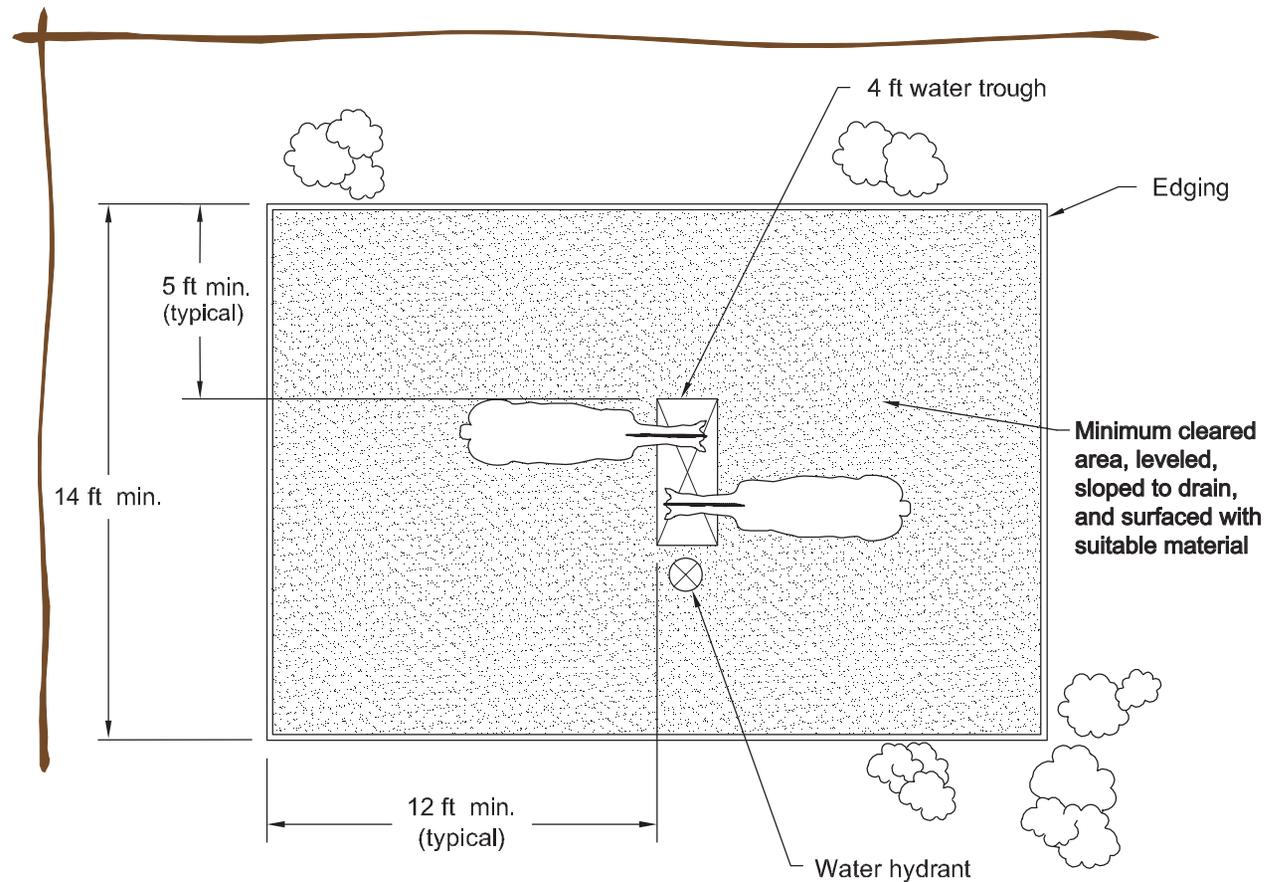


Figure 7–16—A 4-foot water trough installed on a wearing surface.



### Wash Racks

Wash racks are optional amenities appreciated by riders to clean and cool their stock after a ride. Figure 7-17 shows a wash rack that accommodates four tethered trail animals. Some premanufactured wash racks have a chain that latches behind the animal to prevent it from backing out. A clear, somewhat level area at the entrance to the rack allows the handler to maneuver the animal (figure 7-18). Wash racks can be purchased prefabricated, or they can be custom built. When providing wash racks, locate them around the perimeter of parking areas, in landscape islands, or along the outside edge of loop roads (see figure 7-6).



Figure 7-17—Metal rails separate four stalls in this wash rack. A single hydrant and hose in the center serve all four stalls.

Regardless of the wash rack configuration, the water source must be installed in a clear area that has a *wearing surface*—material, such as crushed gravel, that reduces mud. Some agencies provide a hose at

the wash rack. If hoses are stolen frequently, they can be stored in a secure location accessible only by the camp or site host. Riders sometimes carry hoses in their horse trailers.

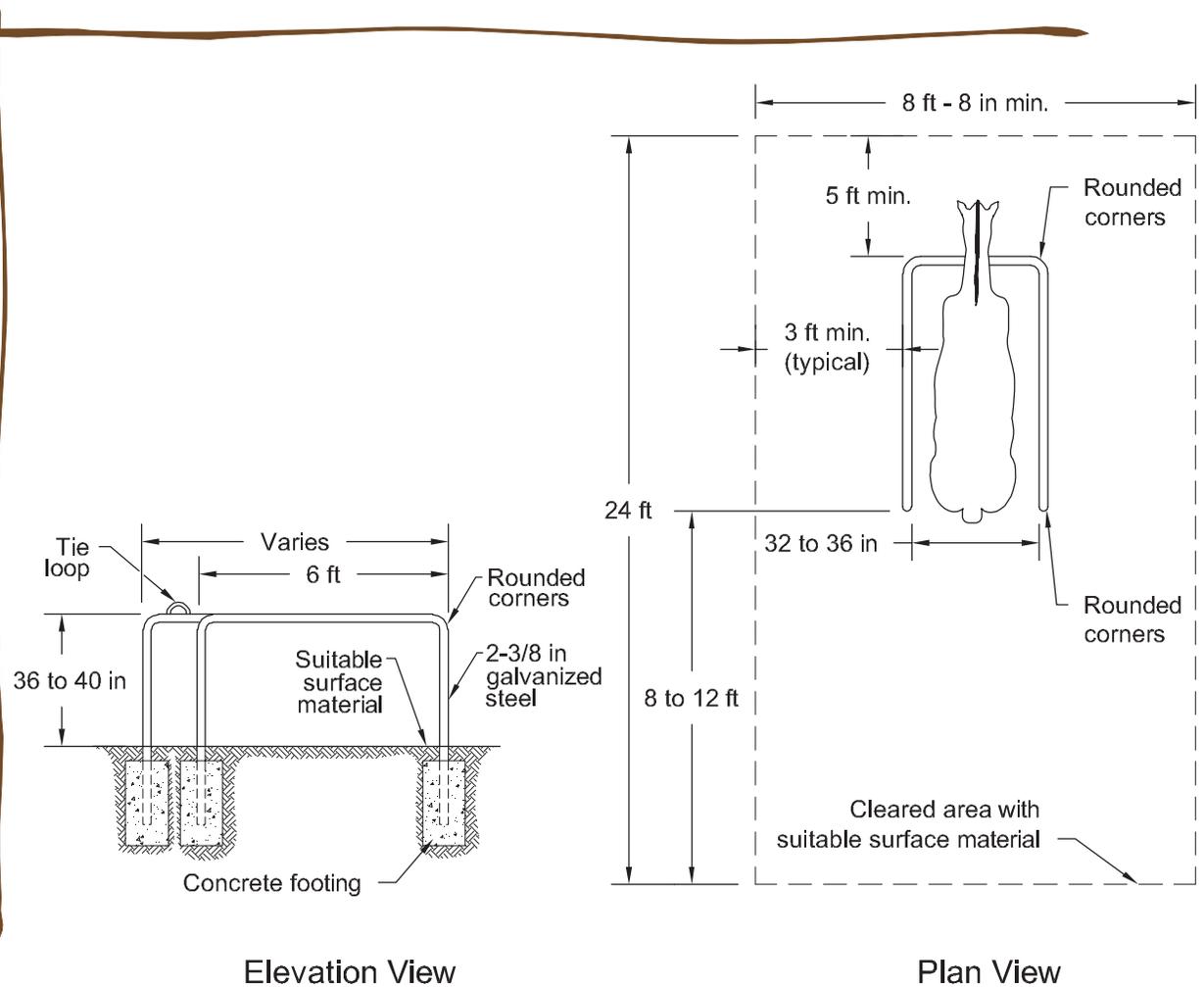


Figure 7-18—A single-horse wash rack.



**Drainage Overflow**

Provide proper drainage for overflow and spills at water hydrants, water troughs, and wash racks to minimize maintenance and avoid problems. Standing water quickly becomes a muddy mess. If the water is stagnant, it can attract insects, such as mosquitoes. Design drainage systems to prevent runoff into nearby waterways, particularly with wash racks, because they produce lots of runoff that often contains soap.

**Wet-Area Wearing Surfaces**

Surfacing the area around water hydrants, troughs, and wash racks reduces maintenance. Suitable materials include pea gravel, crushed rock without fines, sand, or a combination of aggregate and sand. Sand is generally not recommended for horse areas because horses and mules will get sick if they eat sand and it builds up in their digestive system. Horses and mules rarely are fed or left unattended near water devices, so sand can be used for drainage there. Use edging to contain loose surface materials. Suitable edging materials include concrete curbs, steel, wood timbers, or recycled plastic. An example of edging is shown in figure 7-19.

Concrete forms a durable wearing surface that is firm and stable. However, smooth concrete gets slippery when wet. Apply a heavy, rough-broom finish when installing concrete. This safety precaution is especially important at wash racks. In areas where vandalism is not an issue, heavy rubber mats placed on top of the concrete may be suitable.

Regardless of the material used, the wearing surface must be sloped away from the water source to handle runoff. Include a drain if the wearing surface is concrete.

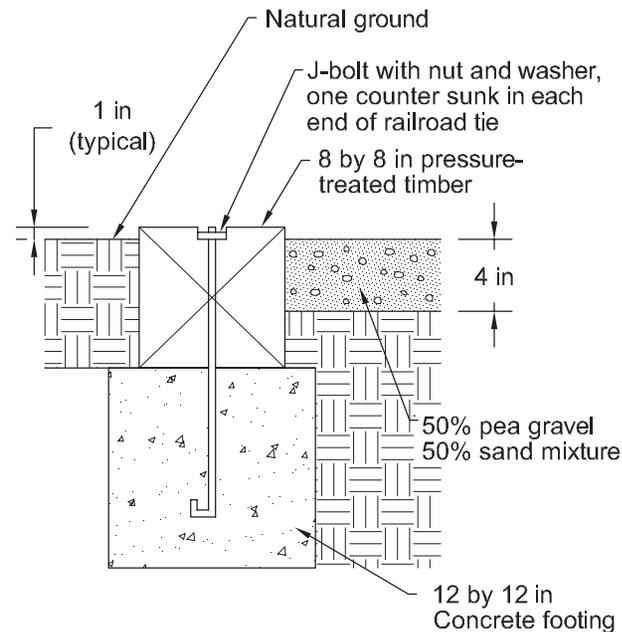


Figure 7-19—Timber edging detail for a hydrant or trough.



## Power and Lighting

Before installing exterior lighting, consider the drawbacks of artificial light in a natural setting. Exterior and interior safety lighting should be provided at toilet and shower buildings, if lighting is suitable for the level of development. Reserve additional area lighting strictly for recreation sites with a high level of development. Lights may be helpful at information stations and group gathering areas. If trailhead facilities—such as arenas or round pens—are open at night, site lights are an option. User-activated or timed lighting controls (figure 7–20) reduce the overall effect of light at the site. Figure 7–21 shows one recommended lighting fixture for trailhead parking areas, arenas, and round pens. Follow applicable local and State regulations for lighting systems.

Added utility options for equestrian campgrounds include access to electricity, full-service hookups, and a sanitary dump station. Many recreationists appreciate electrical outlets near the serving table in a group gathering area. These options are only appropriate in a large campground with a high level of development.

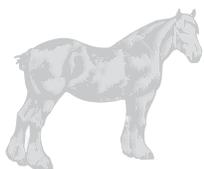


Figure 7–20—Timing mechanisms are convenient and reduce light pollution.



Figure 7–21—Fixtures that direct light downward reduce light pollution.



### Night Light

### Resource Roundup

The mission of the International Dark-Sky Association is to preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting. Information regarding the effects of light pollution and possible solutions is available at <http://www.darksky.org>.



## Structures

An architectural theme is highly desirable for structures at a recreation site. Match form, materials, textures, colors, and finishes of toilet buildings, shower buildings, and shelters. In general, avoid bright colors and select materials and finishes that blend with the setting and climate, such as earth-toned hues.

The services of a qualified engineer or architect are required if toilets, shower buildings, or shelters are custom designed. Structure design must comply with applicable Federal, State, and local building regulations and codes. All buildings constructed or altered by a Federal agency since 1968, or by a State or local government since 1991, also must comply with applicable accessibility guidelines.

When designing structures, keep the safety of horses and mules in mind. Even where equestrian routes and human facilities are separated, escaped stock may find their way to areas with structures. Avoid sharp corners, projections, or tight spaces, and don't design small openings that attract bees and wasps. Horses and mules are very susceptible to bee stings. They may react violently when stung.



### By Design: BEIG

Although developed for use on Forest Service lands, the *Built Environment Image Guide for the National Forests and Grasslands* (U.S. Department of Agriculture Forest Service 2001) may be a useful model for other locations. Known as the BEIG, the guide provides design guidance for toilet buildings, site furnishings, wayside structures, and signs—or the built environment. Eight architectural character types are defined by geographic location. The designs project the overall Forest Service image while echoing local values, heritage, and culture. Following the BEIG facilitates an integrated approach to planning and design, including early collaboration among planners, designers, specialists, managers, and maintenance personnel. It ensures that facilities fit their natural and cultural settings. Buildings and other constructed features should incorporate the principles of sustainability and accessibility as an integral part of their architectural character. The text of the BEIG is available at <http://www.fs.fed.us/recreation/programs/beig>.



### Eye for Color: VRM

The BLM's Visual Resource Management system addresses more than location issues and surface disturbance. VRM also looks at design elements—form, line, color, and texture. Strategies include color selection, earthwork, vegetative manipulation, and reclamation and restoration. These techniques are used in conjunction with a visual resource contrast rating process. More information about BLM design techniques is available at <http://www.blm.gov/nstc/VRM/destech.html>.



### Material Standards

ASTM International is one of the largest voluntary standards development organizations in the world, producing technical standards for materials, products, systems, and services. More information is available at <http://www.astm.org>.

### Resource Roundup





### Toilet Buildings

Prefabricated toilet buildings are commonly available and generally cost less than a customized structure. Designs appropriate for recreation sites generally accommodate one, two, or four people. If pressurized water is available at the site, provide riders with a washbasin where they can clean up after a ride. Toilet buildings may include storage areas for maintenance equipment, wheelbarrows, rakes, and shovels used for manure disposal.

The three most common toilet systems available for recreation sites are vault, composting, and flush. The proper system for a particular site depends on the level of development and the availability of water. Proper sanitation requires strict compliance with all applicable laws, ordinances, and regulatory provisions.



#### Resource Roundup

##### Sweet Smelling Toilets

The Forest Service’s Technology and Development Program has produced several practical reports for designing, choosing, constructing, and locating toilet and shower buildings. The reports are available at <http://www.fs.fed.us/t-d/pubs>. Search the site using the keywords toilet and shower. This site requires a password. (Username: t-d, Password: t-d)

Louisiana State University Ag Center and Research Extension has construction plans for a Campground Comfort Station (1969). The structure is constructed of concrete block and has toilets, showers, and washbasins. The electronic document is available at [http://www.lsuagcenter.com/en/our\\_offices/departments/Biological\\_Ag\\_Engineering/Building\\_Plans/recreation/equipment/Campground+Comfort+Station.htm](http://www.lsuagcenter.com/en/our_offices/departments/Biological_Ag_Engineering/Building_Plans/recreation/equipment/Campground+Comfort+Station.htm)

A vault toilet has a belowground storage chamber that requires regular pumping, usually performed by a commercial operator. When placed properly, built correctly, and maintained regularly, vault toilets do not smell. Fans may be needed for ventilation—solar fans are an option in areas with no electricity. Composting systems are environmentally friendly and odorless, but require substantial maintenance. Because many users prefer flush toilets, they may be the best option where water is available and the level of development is suitable. Table 7–4 summarizes toilet system characteristics. Figures 7–22, 7–23, and 7–24 show toilet buildings appropriate for low, moderate, and high levels of development. Figure 7–22 is a premanufactured building commonly used at Federal recreation sites.



Table 7–4—Characteristics of toilet systems for recreation sites.

Toilet system	Appropriate level of development	Water is required	High maintenance	Easily vandalized	Economical	Preferred by visitors	Preferred by maintenance staff
Vault	Low and moderate				X		X
Composting	Low and moderate		X	X		X	
Flush	High	X	X	X		X	



Figure 7-22—This prefabricated toilet building is a style commonly used at Federal recreation sites. It is suitable for areas with low to moderate levels of development.



Figure 7-24—This combination toilet and shower building is suitable for some recreation sites with high levels of development.

### Shower Buildings

Although showers are not a necessity, riders appreciate the convenience of a shower building at the campground after long rides. Shower buildings require maintenance, water, heat, and grey water disposal. Before planning shower buildings at recreation sites, consider whether they are appropriate for the level of development. Thoroughly evaluate and weigh the drawbacks against the benefits. If providing a shower building is economically feasible, include one—the campground will be popular with riders.

Shower buildings usually are custom designed and follow two basic layouts. The first layout has individual shower stalls, each with its own exterior door. The stalls may be unisex or gender specific. The second layout has a single large room with numerous stalls and is gender specific. A shared shower room is more cost effective than individual stalls, but offers less privacy.

### Shelters

Shelters provide protection from the elements, offer convenience, and can add an attractive touch to a recreation site. Incorporate shelters in heavily used areas—camp units, picnic units, group gathering areas, and information stations. The size of shelters for camping or picnicking depends on the number of tables that are needed. Table 7-5 shows recommended shelter sizes for one to six picnic tables. Often, it's less expensive to purchase a premanufactured shelter than to construct a custom shelter. Figure 7-25 shows a camp or picnic unit shelter. Figure 7-26 shows an information station with a shelter.

Table 7-5—Recommended shelter sizes to accommodate picnic tables.

Number of picnic tables*	Shelter size (feet)
1	16 by 16
2	16 by 24
3	16 by 39
4	24 by 34
6	34 by 39

\* One picnic table seats about six people comfortably.



Figure 7-23—This toilet building is suitable for recreation sites with moderate levels of development.





Figure 7-25—An effective shelter can have a simple design.



Figure 7-26—Information stations often incorporate a shelter. Install a hitch rail nearby for equestrians.

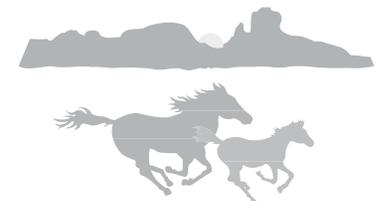
### Structure Locations

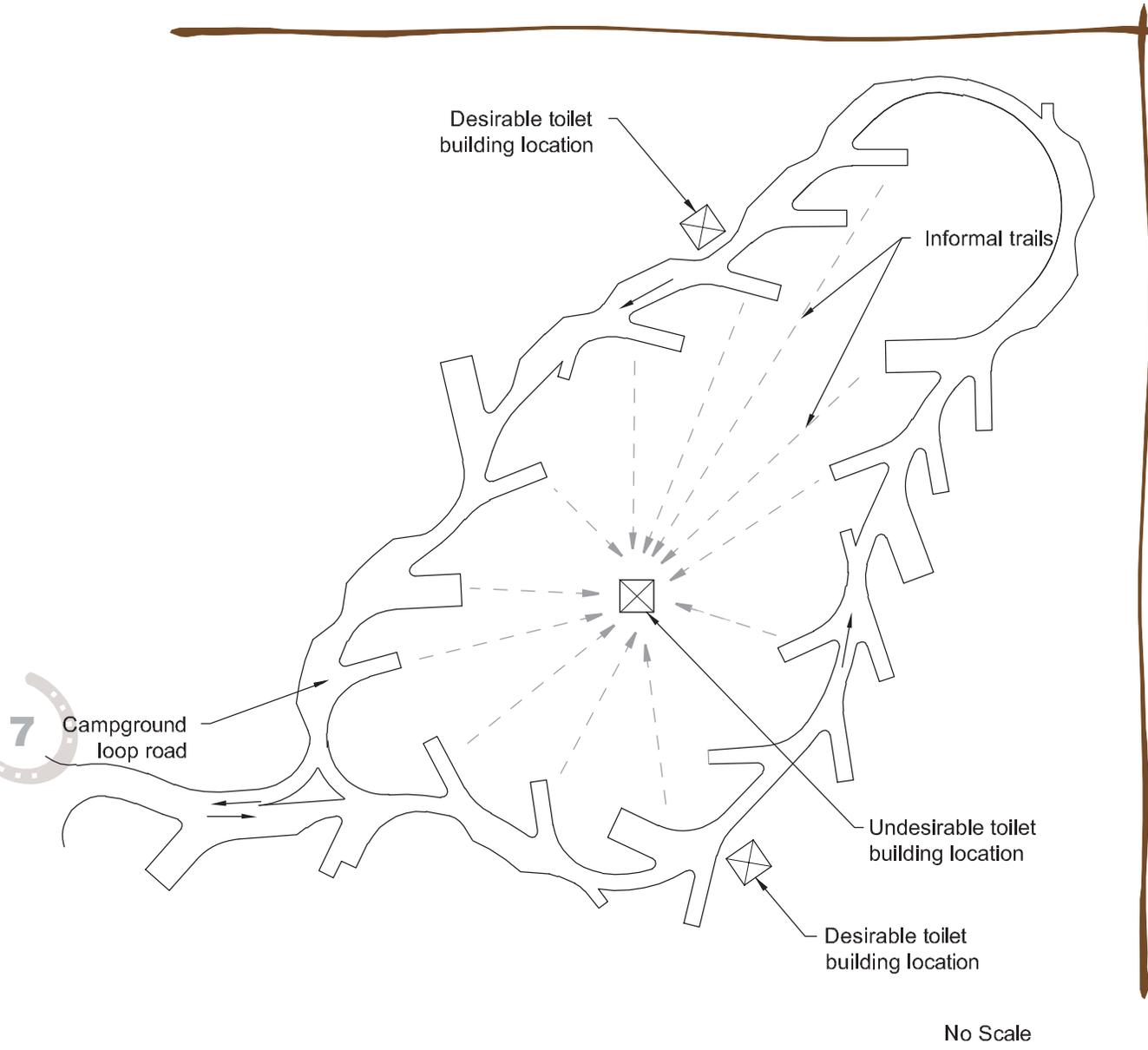
For ease of construction and maintenance, locate toilet, shower, and shelter structures in an area with well-drained soil and little hard rock. Pick open areas to reduce the vegetation that must be removed. Make sure that structures are a safe distance from dropoffs and water bodies. Solar collectors should be placed where they will not be shaded during the day.

Although it may seem logical to locate toilets and shower buildings in the center of a loop road, this arrangement has problems. A toilet building located in the loop center does reduce the travel distance from camp units, but it also requires many trails for users (figure 7-27). Campers will make their own routes if there are no trails—to the detriment of vegetation along the way. A centrally located

building also means campers are disturbed when others walk past or through their parking pad. This is especially true if the passerby is on a horse or mule.

The preferred location for a toilet or shower building is along the outside edge of a loop road or at a road intersection. The road serves as a pedestrian passageway. It also helps preserve the vegetation buffer in the center of the loop. Locate toilet buildings near trail access points so riders can use facilities before and after a ride. Place toilet and shower buildings around the perimeter of trailhead and group camp parking areas or in landscape islands (see figures 7-6, 7-7, and 7-8). For user satisfaction, place toilet buildings at least 75 feet (22.9 meters) from camp units, picnic units, and horse trailers, and no more than 500 feet (152.4 meters) away.





No Scale

### Manure Disposal

Horses and mules produce lots of manure. The manure can attract insects and it's probably smelly. The appropriate manure disposal system for a recreation site depends on the site's proximity to solid waste disposal facilities, the costs of disposal, and applicable health regulations. In some areas of the country, especially in remote areas, manure cleanup may not be customary. Some land managers suggest scattering manure in vegetation around the recreation site. Many places prohibit this practice because it encourages the growth and spread of weeds.

In recreation sites where it is not feasible to arrange for manure disposal, land managers often institute a pack it in, pack it out policy—requiring riders to pick up the manure and take it home with them, a practice that can be difficult to enforce. To encourage compliance, site hosts, entry station personnel, or a self-service dispenser could supply plastic garbage bags.

Hauling manure may be the best option for sites near a community that will dispose of solid waste or when the managing agency has its own garbage truck. A temporary manure storage bin is used by some agencies (figure 7–28). The bin has walls on three sides, and the fourth side has an opening that is wide enough for maintenance equipment. A concrete bottom makes it easy to remove manure. Proper

Figure 7–27—Campers create informal paths when toilet buildings are in the center of a campground loop. Placing toilet buildings along the outside of campground loop roads reduces problems caused by shortcuts.



Figure 7-28—When manure disposal units are convenient, riders are more likely to clean up after their stock. Proper drainage is essential.

drainage is critical to prevent rainwater or snowmelt from pooling in the bin or flowing out of the manure disposal bin into nearby waterways.

Some agencies provide dumpsters with lids to minimize flies and odors. A concrete dumpster pad provides a sturdy surface for garbage trucks. See figures 7-6, 7-7, and 7-8 for suggested placement of manure bins. For user satisfaction, place manure disposal units at least 75 feet (22.9 meters) from camp units, picnic units, and horse trailers, and no farther than 300 feet (91.4 meters) away.

The easier it is for riders to dispose of manure, the more likely they will do so. To make cleanup easy, provide tools—wheelbarrows, manure rakes, and shovels (figure 7-29). If the site is prone to vandalism, have the site host store the tools. If this is not feasible, encourage recreationists to carry rakes

and shovels in their horse trailers. Determine whether manure and other waste may be mixed. If manure must be disposed of in different containers than other waste, install signs that explain the rules. Figure 7-30 shows a simple sign for manure disposal. See *Chapter 13—Reducing Environmental and Health Concerns* for more information.



Figure 7-29—Riders are more likely to clean up after their stock when tools and containers are provided.



Figure 7-30—Signs encourage riders to dispose of manure properly.

## Mounting Blocks and Ramps

Other convenient—and greatly appreciated—equestrian amenities include mounting blocks, mounting ramps, and in some areas, stock loading ramps for trucks or trailers with elevated beds. These amenities serve a broad range of riders.

Installing mounting blocks or ramps in areas where riders normally dismount and mount can increase usage of trails, trailheads, or campgrounds. Many riders have difficulty getting on and off a horse or mule. Young children, small or older riders, and people who are not athletic may find it a long reach to get a foot in a stirrup without assistance. Many riders in this situation search out large rocks, stumps, or mounds to give themselves a boost. Such objects can be unstable or slippery. Provide a mounting block or ramp instead.

## Mounting Blocks

Riders of all abilities and ages can use mounting blocks. A mounting block resembles a short staircase that ends in midair (figure 7-31). The rider climbs the stairs to reach the saddled animal standing at the elevated end. Mounting blocks may be made of wood, steel, concrete, plastic, fiberglass, or a combination of these materials (table 7-6). Structures that are more permanent, for example those made of concrete or steel, are most suitable at trailheads or campgrounds that have easy access for construction equipment. Permanent structures also discourage



Figure 7-31—Riders may have trouble using this mounting block, because the handrails limit the maneuvering space. Options include removable or foldable handrails and rails that don't extend all the way to the end of the platform.

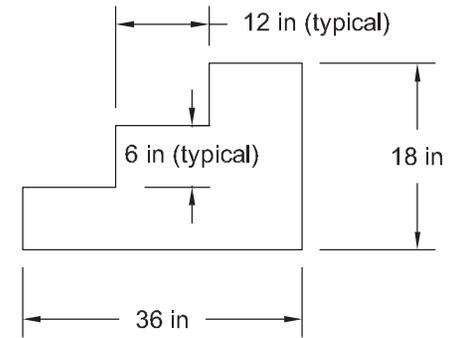
Table 7-6—Characteristics of construction materials for equestrian mounting blocks.

Material	Relative cost	Vandalism potential	Construction difficulty
Plastic or fiberglass	Low	High	Low
Wood	Low	Moderate	Moderate
Steel	Moderate	Moderate	High
Concrete	Moderate to high	Low	High

theft. Structures made from wood, fiberglass, or plastic are easier to transport, install, and place along trails.

To meet accessibility requirements, the treads on mounting blocks must be at least 11 inches (about 279 millimeters) deep and 36 inches (about 914 millimeters) wide (figure 7-32). Risers should be uniform and measure between 4 and 7 inches (about 102 and 178 millimeters) high. Mounting blocks with an overall height of 16 to 28 inches (about 406 to 711 millimeters) are common. The need for handrails is under debate. While handrails keep users from falling off platforms, the animal, rider, assistants, or equipment can be caught or squeezed against the handrails.

Riders usually mount from the left side of the animal, passing their right leg over the horse's back. Handrails on the right-hand side of the stair may interfere with the rider's leg movement. This makes a compelling case for leaving handrails off mounting blocks, or for installing handrails that stop before the top step. To meet the ADA/ABAAG requirements, when handrails are used they must have extensions—also called *returns*—at the top and bottom. In this case, returns extending into the animal's space are not appropriate.



Elevation View

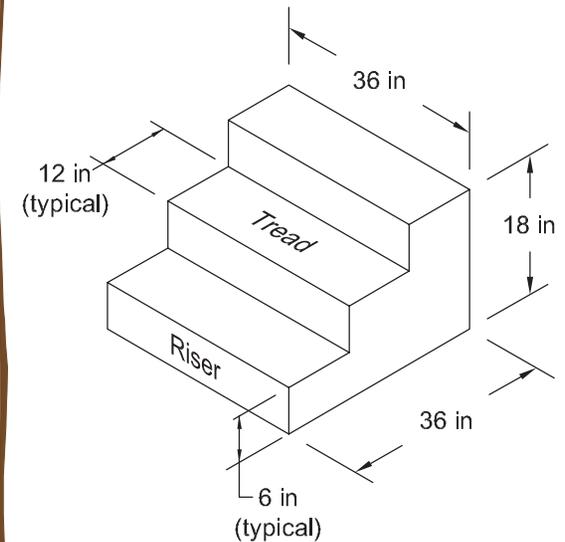


Figure 7-32—An equestrian mounting block that meets guidelines.



### A Leg Up

### Horse Sense

Mounting a horse or mule successfully requires considerable coordination. The rider must grasp the saddle, reins, and sometimes a riding whip; step into the stirrup; raise up; lift a leg over the animal's back; sit down; get the loose foot in the stirrup; and find balance—all while maintaining control of the animal. Problems or serious injuries can occur if the animal moves before the rider is settled solidly in the saddle (figure 7-33).



Figure 7-33—Riders are not safely seated until both feet are firmly planted in the stirrups and the animal is under control.

Locate mounting blocks 8 to 10 feet (2.4 to 3 meters) from trail treads and fence gates (figure 7-34). Farther may be better in heavily used areas. Position mounting blocks at least 3 feet (0.9 meter)

away from fences—completely avoiding fences with barbed wire. Situate the mounting block parallel to

the trail tread or fence line, with the steps facing the fence. This arrangement provides the most space

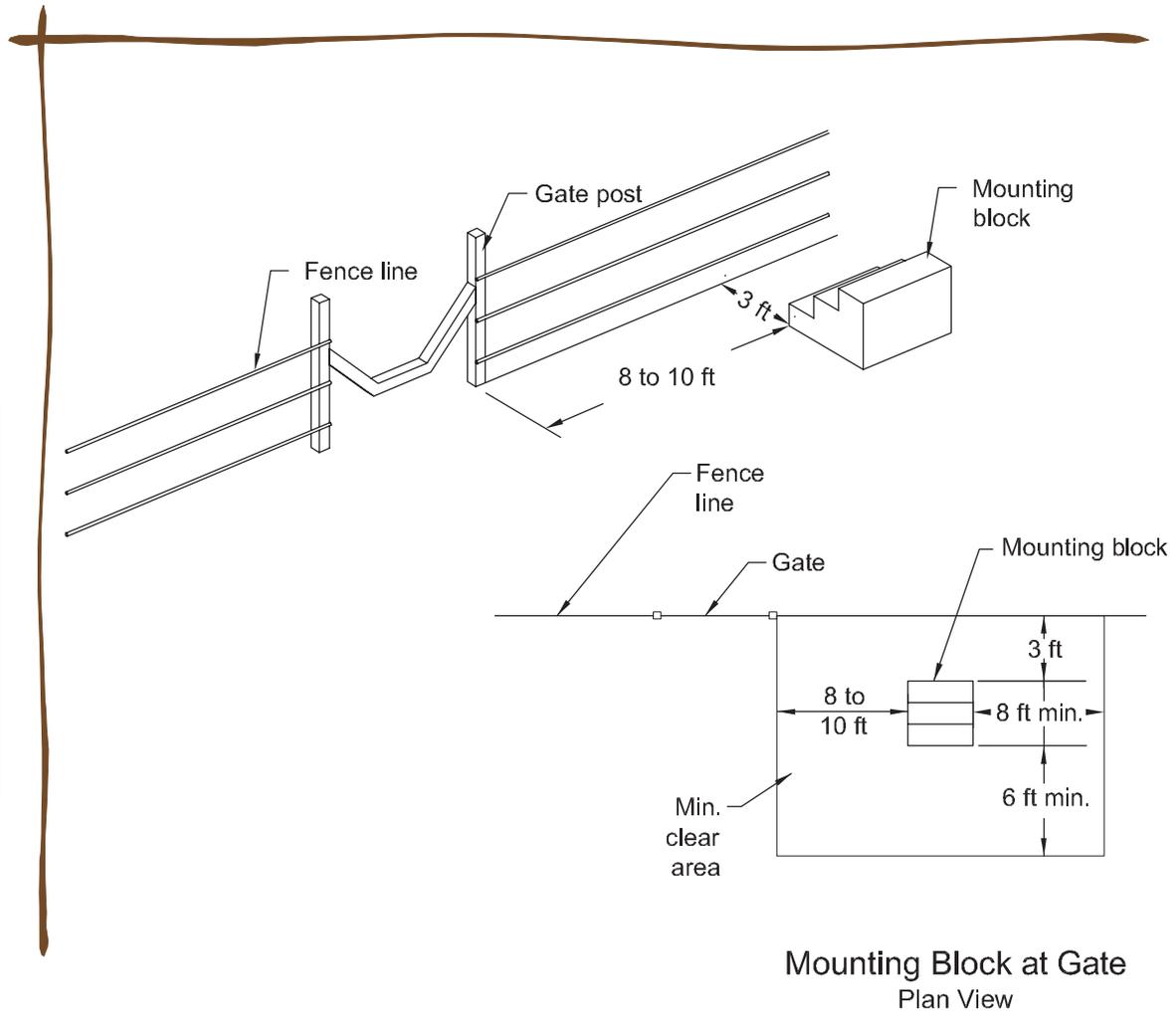


Figure 7-34—Suggested placement for equestrian mounting blocks. The trail gate shown is not accessible to people with disabilities if the bar across the opening is higher than 2 inches from the ground.

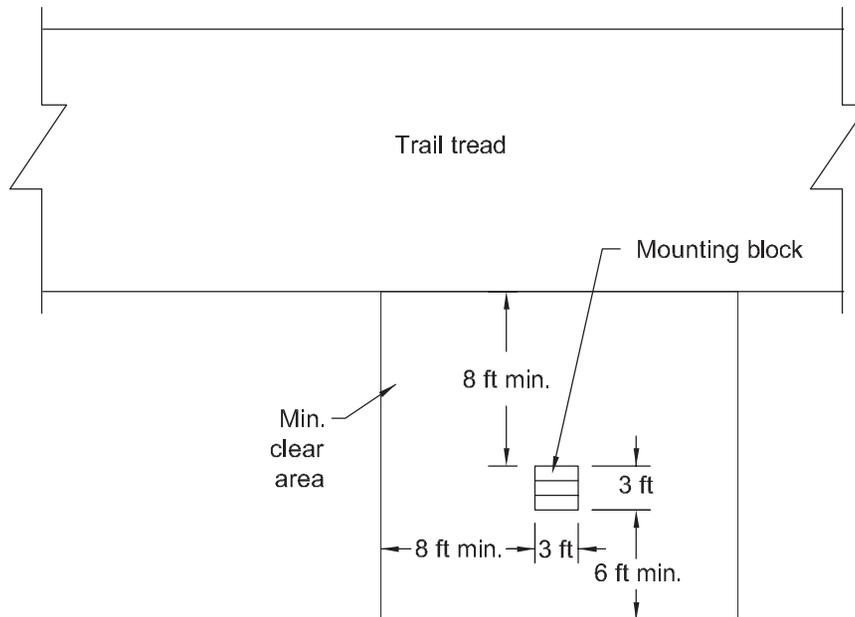


for maneuvering horses and mules. The space on both sides of the animal must be free of obstacles.

See figures 7-6, 7-7, and 7-8 for some suggested locations for mounting blocks in recreation sites.

### Mounting and Loading Ramps

Some riders require more assistance than afforded by a mounting block. They appreciate mounting ramps—gradual inclines leading to an elevated platform. Mounting ramps elevate the rider to the height of a saddled animal or waiting carriage. Some riders using mounting ramps also require the help of assistants (figure 7-35).



Mounting Block Along Trail  
Plan View



Figure 7-35—This mounting ramp has offside steps and a horse chute in the middle. Assistants can stand on both sides and in front of the horse and rider. Caution: at this site, handrails and railings were not included to leave space for assistants. Safety must be the overriding factor when deciding how to place railings on mounting ramps.

A variety of types, sizes, and inclines are suitable for mounting ramps, depending on the space available, natural grade, and potential use. Wood and grass-covered slopes are often used for ramps in low





Figure 7-36—Access to this mounting ramp is from an accessible path behind and to the left of the grassy surface. The horse stands in the chute at the right. When the ramp is not in use, removable rails block the open end.

development areas with sloped terrain (figure 7-36). Mounting ramps in flat terrain that has moderate to high development often are constructed with manmade materials, such as concrete or steel. No matter what the setting or level of site development, the approach to the ramp must have a firm and stable surface to meet accessibility requirements.

When access routes are steeper than 5 percent, the routes must meet accessibility guidelines for ramps. Ramps that rise more than 6 inches (152 millimeters) above the ground require handrails and an *edge protector*—a curb or other barrier that extends at

least 4 inches (102 millimeters) above the ramp edge. Ramps with a rise of more than 6 inches must have handrails with extensions. Accessible ramps must be at least 36 inches (914.4 millimeters) wide between the handrails, with space at the bottom and the elevated end for a 60-inch (1,524-millimeter) turning radius. At any change of ramp direction, there must be a level landing with a 60-inch turning radius. Figure 7-37 shows a sturdy mounting ramp. Although this mounting ramp gives access for all users, to meet accessibility guidelines for ramps, handrails with extensions and curbs would be required. Building codes and safety standards require intermediate rails.



Figure 7-37—Although this mounting ramp allows access for all users, to meet accessibility guidelines it needs curbs, handrails with extensions, and closely spaced rails. Ramps must meet accessibility requirements if they are part of a travel route that is required to be accessible by Section 206 of the *ADA/ABA Accessibility Guidelines*.

Ramps with a dropoff that is more than 30 inches (762 millimeters) must have a guardrail that is 42 inches (1,067 millimeters) high with intermediate rails or fence material that won't allow passage of a 4-inch (101-millimeter) sphere through the openings in the railing. Guardrails are required for a simple and obvious reason—to keep people from falling off the platform. Make the rails removable on the side facing the animal. Figure 7-38 shows an accessible mounting ramp with a platform where an assistant could stand. Figures 7-39 and 7-40 show a simple mounting ramp on sloped terrain in the Hoosier National Forest.

Mounting ramps can serve dual purposes—to help riders mount and to unload animals from stock trucks (figure 7-41). Figure 7-42 shows a combination ramp that serves people with disabilities and stock.

A startled animal can bolt or hurt a rider who is not in position to fully control the situation. Loading ramps should be in areas that are quiet, away from areas with high activity, such as arenas or popular round pens (see figures 7-6, 7-7, and 7-8). Provide enough space around the mounting ramp for several people to stand and move while assisting the rider.

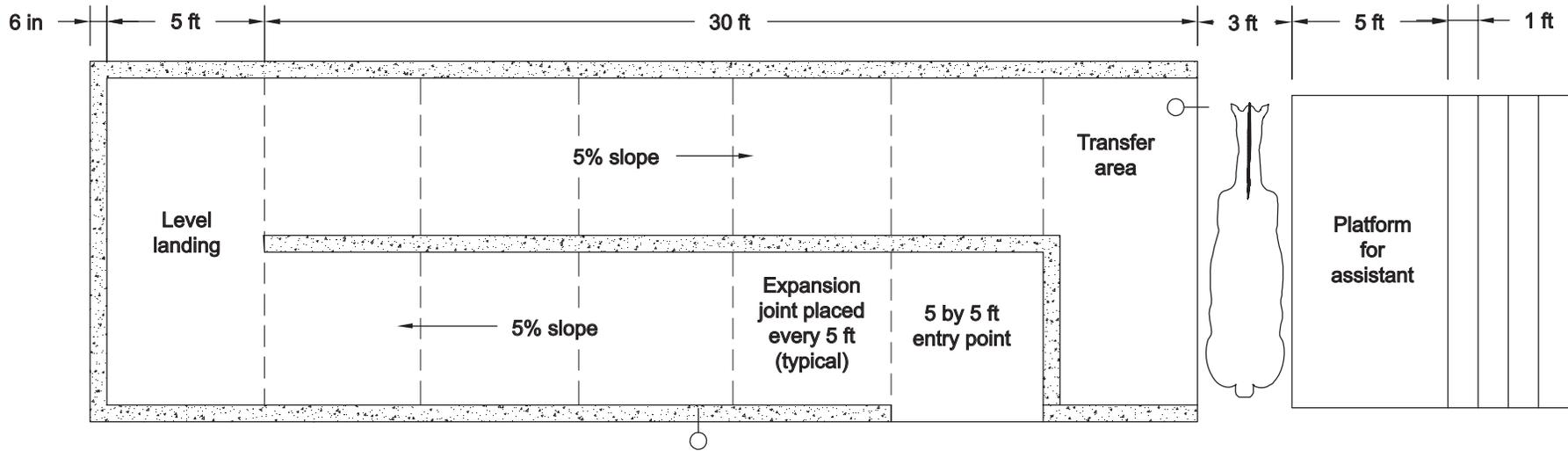


Figure 7-38—An accessible mounting ramp with a platform where an assistant could stand.



Figure 7-39—This ramp has a firm and stable surface on the mounting side, allowing access by people who use wheelchairs. The chain serves as a safety device that can be unhooked before mounting the horse or mule.

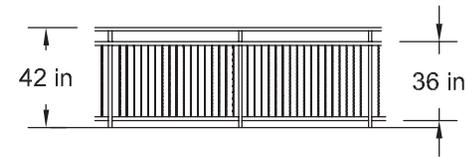
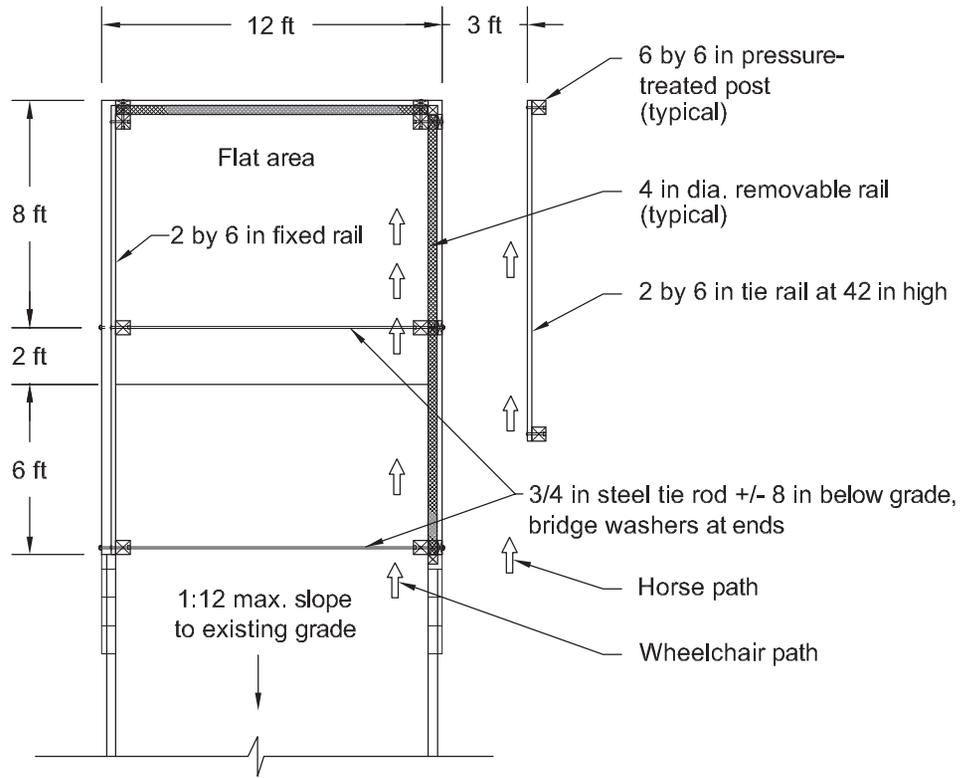


Figure 7-40—The horse stands between the ramp and the trees on the left, facing the viewer.



Figure 7-41—Stock trucks usually have a drop-down panel or slide-out deck for unloading. If a stock ramp is not available, the truck can be backed up to a slope and the drop-down panel can bridge the gap between the tailgate and the ground.

7



Note:

To meet accessibility requirements there must be a 42 in guardrail with intermediate rails that do not allow a 4 in sphere to pass through or there must be fencing that will not allow a 4 in sphere to pass through.

Plan View

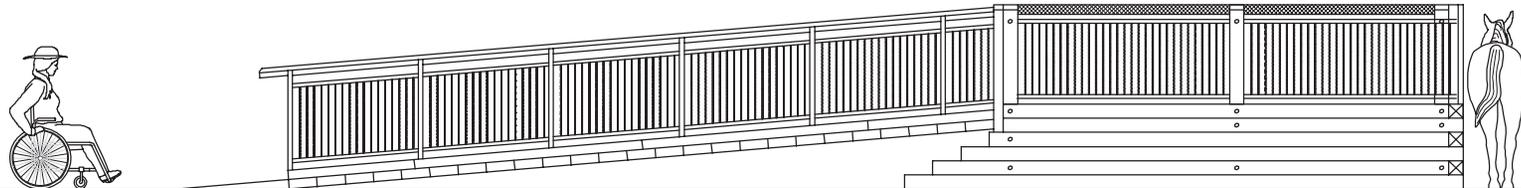
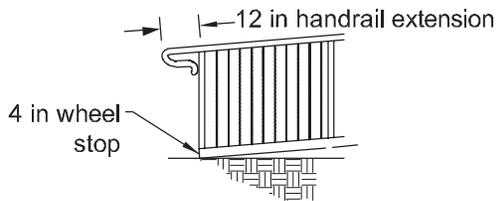


Figure 7-42—A combination ramp with wheelchair and stock-loading access.



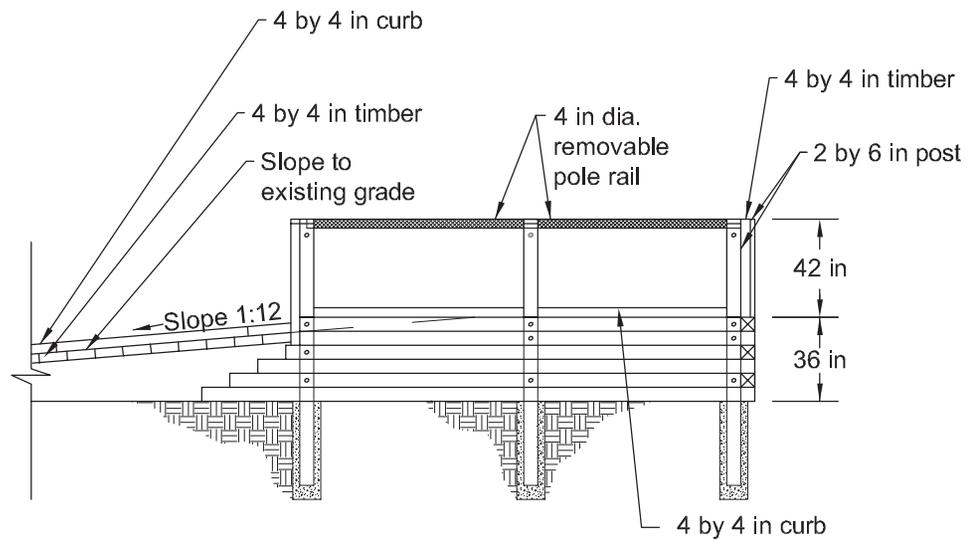
Notes:

1. All posts have beveled tops.
2. Removable rails sit loose in pockets.
3. All nuts and washers facing users are countersunk.
4. A firm and stable surface is required for wheelchairs.
5. All wood is pressure-treated.



Note:

To meet accessibility requirements there must be a 1 1/4 to 2 in dia. handrail with extension.



Elevation View

Figure 7-42—(continued)



Figure 7-43 shows a mounting ramp at Hidden Horse Campground in the Klamath National Forest. Designers evaluated accessibility requirements and safety. The design considers the needs of riders with a range of disabilities, as well as stock of many sizes. The important features of the ramp are:

- ☆ A wheelchair-accessible platform that is tall enough to allow mounting without the use of stirrups.
- ☆ Firm and stable surfaces on the platform and path—in this case, hard rubber mats.
- ☆ A multipurpose platform for assistants that
  - » Keeps the animal straight and in position.
  - » Can be used by assistants.
  - » Serves as a mounting block for more able riders.

- ☆ Steps on two sides of the assistant's platform and the wheelchair-accessible platform allow assistants to walk alongside as the animal departs.
- ☆ Access to the chute from both sides so the animal can be mounted from either direction.
- ☆ Beveled edges to avoid injuries to animal and rider or snagged stirrups.
- ☆ No railings, gates, walls, or fences near the chute to spook the animal or injure people.

Some designers would make a case for having handrails on the steps and platform, on the side away from the horse chute. This would prevent an assistant from accidentally falling off.

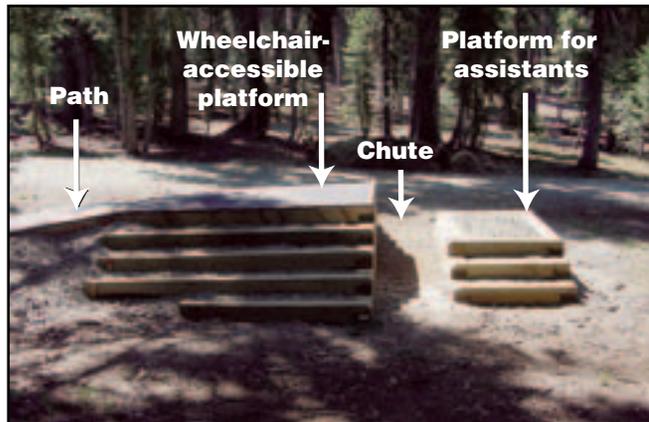
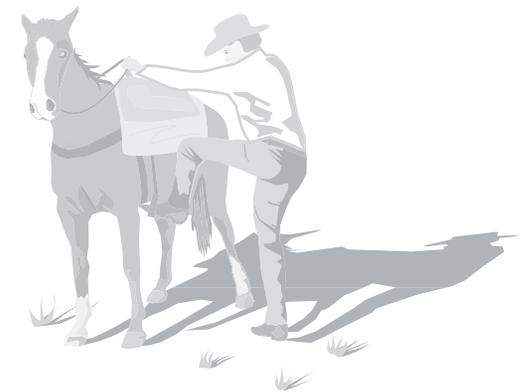


Figure 7-43—The horse stands in the chute between the wheelchair-accessible platform and the platform for assistants. Users approach from the path on the left. Assistants can stand on either platform. Caution: At this site, handrails and railings were not included to leave space for assistants. Safety must be the overriding factor when deciding how to place railings on mounting ramps.





7