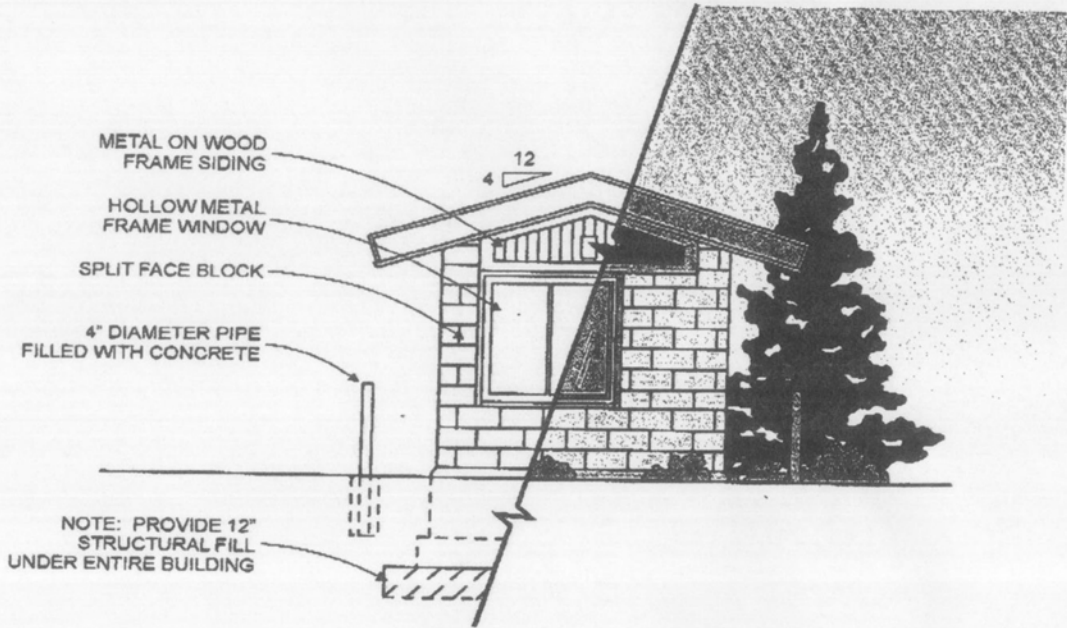


Attachment 7

Bureau of Reclamation Facility
Design Guidelines



RECREATION FACILITY DESIGN GUIDELINES



U.S. Department of the Interior
Bureau of Reclamation

September 2002

3. **Accessible Trails.**—All trails on Reclamation sites that are designated as accessible are to comply with UFAS and ADAAG.

I. **Recreation Area Roads:**

1. **Internal Vehicular Circulation.**—Reclamation should use the design standards for roads established by the U.S. Army Corps of Engineers and set forth in *Design of Recreation Areas and Facilities - Access and Circulation*. Consult that publication for a complete description of road layout and circulation criteria.

The preferred layout of a recreation area is one that features a main access road with secondary side roads. The side roads may lead to campgrounds, service or administrative areas, a trailer dump station, or other site amenities such as boat launching ramps. To minimize traffic through the campground, circulation throughout the recreation area should be designed to ensure that day-use facilities do not share the same roads with campground loops. Gates should be sited along the main access road so that all side roads may be closed, while allowing any combination of other roads to remain open. (See Appendix H - Recreation Areas Roads and Utilities.) Refer to the *Manual of Uniform Traffic Control Devices* for reflective warning symbols.

If possible, the main road for a campground should be located along an uphill edge of the site, with campground loop roads located between the main campground road and any focal landscape feature (such as a water body.) This layout minimizes unnecessary vehicular traffic on the loop roads and vehicle/pedestrian conflict between campsites and the shoreline.

2. **Design Criteria.**—Reclamation adopts the road standards established by the U.S. Army Corps of Engineers and set forth in *Design of Recreation Areas and Facilities - Access and Circulation*. Consult that publication for a complete description of road design criteria. Reclamation recreation roads typically should be designed to be two-way, two-lane, gravel or asphalt paved roads. Driving lanes should be 12 feet wide, and shoulders should be a minimum of 1 foot wide, gravel or asphalt. Where traffic is very heavy, the need for additional driving lanes should be evaluated. Grades on roads should be as level as possible, while allowing for positive drainage. Roads should be planned carefully to preserve major trees and clumps of vegetation, while considering safety factors. Campground roads should be one-way roads that are 14 feet wide. Shoulders should be a minimum of 1 foot wide, gravel or asphalt.
3. **Parking Lot Design Criteria.**—Reclamation should use the standards presented by SOBA in its *Handbook for the Location, Design, Construction, Operation, and Maintenance of Boat Launching Facilities, and Guidelines for the Design of Barrier-Free Recreational Boating and Fishing Facilities*, except where larger spaces are described in this document.

Recreation Facility Design Guidelines

To minimize soil erosion, trails should be located in areas that favor:

- Coarse or gravelly soil rather than clay and silty soil
- Vegetation composed of grasses rather than forbs or shrubs
- The toe of a slope rather than a side slope
- Flat slopes rather than steep slopes
- Low soil moisture rather than high soil moisture
- South and west exposures rather than north and east exposures

Surveying tools should be used to determine final alignment and grades; grades are not to be determined solely on visual judgement.

Foot trails are to include any short spurs that are necessary to access nearby destination points, in order to provide logical site circulation. Trails should be clearly marked and signed at access points, and distances to destinations should be posted.

2. Design Criteria.—

- a. **Gradient:** Trail grades should be no more than 10 percent and, preferably, less than 7 percent. On slopes over 25 percent, steps should be used, but only for short stretches. (See Appendix G - Trails.) Trails should be cross-sloped to drain at not less than 2 percent or more than 4 percent. Switchbacks should be as level as practicable.
- b. **Trail Width and Surface Material:** Trails should be sized and surfaced to accommodate their expected level of use and to minimize soil erosion and vegetation trampling. Connecting trails that link nonlocal destination points that are a considerable distance apart should be 18 to 24 inches wide. These trails should be soil surfaced. In localized areas where the soil cannot support foot traffic, the trail should be surfaced with compacted decomposed granite or aggregate base course (class 6.) If foot traffic on these trails is very heavy, the entire length of the trail should be surfaced with compacted aggregate base course. (See Appendix G - Trails.) In extremely heavy use areas, the trail should be paved with an accessible surface or concrete. Local trails within a campground or marina area should be a minimum of 60 inches wide and surfaced with decomposed granite or aggregate base course.

Boardwalks over wet areas and footbridges should be a minimum of 60 inches wide and include handrails on both sides. Railings are required for bridges higher than 30 inches off the ground and should be designed to meet codes and comply with UFAS and ADAAG. Footbridges on accessible trails are to be accessible and should include edge protection for security of wheelchairs at any turnouts. (See Appendix G - Trails.)

No overhead power lines are to be located over the parking area, launching ramp, approach roads to the ramp, or any other areas where a vehicle towing a boat trailer loaded with a fully rigged boat can travel.

7. **Boat Ramp Accessibility.**—Accessibility at a boat ramp focuses on three main areas of consideration: (1) parking, (2) toilet facilities, and (3) boat ramp/dock systems. Accessible parking spaces are to be the closest spaces to the activity the parking lot serves and are recommended to be within 300 feet of that activity. If this is not possible, a dropoff area should be located within 100 feet of the activity. Boat ramps are to conform to requirements of UFAS and ADAAG.

G. Fishing Facilities: New or rehabilitated fishing facilities built by Reclamation shall be accessible and comply with the standards in UFAS and ADAAG. (See Appendix F - Fishing Facilities.)

H. Foot Trails: Foot trails at Reclamation sites are to function primarily as paths connecting recreation facilities. The primary users are expected to be pedestrians traveling short to medium distances. Trails should be designed to connect one facility element to another with the least amount of environmental impact. As such, trails are to be sited to minimize soil erosion, damage to vegetation and wildlife, degradation of streams, cost of maintenance, and circulation conflicts between pedestrians and vehicles, while maximizing user safety and esthetic experience.

1. **General Layout Criteria.**—Trails should be designed to avoid the following areas:

- Where there are threatened or endangered species
- Where there is critical or sensitive habitat
- Where there are wetlands or permanently soggy soil conditions
- Where a trail would cause increased soil erosion, such as on excessively steep slopes

A trail may cross a wetland for the specific purpose of interpretation, and a trail may cross a wetland if the trail is raised on a walkway above the ground (for short distances only.) Trails should be aligned to avoid crossing roads, except very low-volume roads that service local circulation. If crossing a road is necessary, adequate and clearly visible signs must be posted on the road to give drivers approaching from either direction adequate warning of the crossing. When possible, trails should be aligned to avoid crossing streams. However, if crossing streams is necessary, the trail should be contained on a footbridge or other raised crossing facility. When a stream is crossed, the trail should be hard surfaced for 10 feet past the point of high soil moisture. If trails are located in wetlands or sensitive areas for the purpose of interpreting those landscapes, the trail should be raised and handrails should be incorporated on sections that are more than 30 inches off of the ground.