

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**ACCESS ROAD**

(Ft.)

**CODE 560**

**DEFINITION**

A travel-way for equipment and vehicles constructed as part of a conservation plan.

**PURPOSE**

To provide a fixed route for vehicular travel for resource activities involving the management of timber, livestock, agriculture, wildlife habitat, and other conservation enterprises while protecting the soil, water, air, fish, wildlife, and other adjacent natural resources.

**CONDITIONS WHERE PRACTICE APPLIES**

Where access is needed from a private or public road or highway to a land use enterprise or conservation measure, or where travel ways are needed in a planned land use area.

Access roads range from seasonal use roads, designed for low speed and rough driving conditions, to all-weather roads heavily used by the public and designed with safety as a high priority. Some roads are only constructed for a single purpose; i.e. control of forest fires, logging and forest management activities, access to remote recreation areas, or access for maintenance of facilities.

**CRITERIA**

Access roads shall be designed to serve the enterprise or planned use with the expected vehicular or equipment traffic. The type of vehicle or equipment, speed, loads, soil, climatic, and other conditions under which vehicles and equipment are expected to operate need to be considered. Planned work shall comply with all federal, state and local laws and regulations.

Where general public use is anticipated, roads shall be designed to meet applicable federal, state and local criteria.

**Location.** Roads shall be located to serve the purpose intended, to facilitate the control and disposal of surface and subsurface water, to control or reduce erosion, to make the best use of topographic features, and to include scenic vistas where possible. The roads should generally follow natural contours and slopes to minimize disturbance of drainage patterns.

Roads shall be located where they can be maintained and where water management problems are not created. Wet flood plains should be avoided due to potential drainage and flooding problems.

To reduce potential pollution, roads shall be located away from watercourses. A minimum of 25 feet of native filter strip shall be left between the road and watercourses on level area with two (2) additional feet added for each additional percent of slope increase.

**Alignment.** The gradient and horizontal alignment shall be adapted to the intensity of use, mode of travel, the type of equipment and load weights, and the level of development.

Grades normally shall not exceed 10 percent except for short lengths (200 feet maximum). Maximum grades of 18 percent should only be exceeded if necessary for special uses such as logging roads, field access roads, fire protection roads or other roads not accessible for use by the general public.

Frequent grade changes generally cause fewer erosion problems than long, continuous gradients. Curves and switchbacks must be of sufficient radius for trucks and other large

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**NRCS, NC  
February 2008**

vehicles to negotiate easily. The radius shall be no less than 35 feet for standard vehicles and 50 feet for tractor-trailers.

The length of vertical curves, in feet, shall not be less than 7 times the algebraic sum of the intersection grades in percent. For example, a downhill slope of 8 percent intersects an uphill slope of 3 percent. The minimum length of the vertical curve shall be 77 feet.

For stream crossings, the road should be aligned so that it crosses perpendicular to the channel as much as possible.

**Width.** The minimum width of the roadbed is 14 ft for one-way traffic and 20 ft for two-way traffic. The roadbed width includes a tread-width of 10 feet for one-way traffic or 16 feet for two-way traffic. Each type of road also requires 2 feet of shoulder width on each side. Single-lane logging or special-purpose roads can have a minimum width of 10 feet, with greater widths at curves and turnouts. The two-way traffic width shall be increased approximately 4 feet for trailer traffic. The shoulder width may be either gravel or grass.

Turnouts shall be used on single lane roads where vehicles travel in both directions on a limited basis. Where turnouts are used, road width shall be increased to a minimum of 20 feet for a distance of at least 30 feet.

**Side Slopes.** All cuts and fills shall be designed to have stable slopes of a minimum of 2 horizontal to 1 vertical on heights more than 4 feet. For short lengths, rock areas, or very steep hillsides, steeper slopes may be permitted, if soil conditions warrant and special stabilization measures are installed. When maintenance by machine mowing is planned, side slopes shall not be steeper than 3 horizontal to 1 vertical.

Areas with geological conditions and soils subject to slides shall be avoided or treated to prevent slides.

**Drainage.** The type of drainage structure used will depend on the intended use and runoff conditions. Culverts, bridges, fords, or grade dips for water management shall be provided at all natural drainage ways. The capacity and design shall be consistent with sound engineering principles and shall be adequate for the class of vehicle, type of road,

development, or use. When a culvert or bridge is installed in a drainage way, its minimum capacity shall convey the design storm runoff without causing erosion or road overtopping. Table 1 lists minimum design storm frequencies for various road types.

**Table 1**

Road Type	Storm Frequency
Forest Access Roads, Farm Field Access Roads	2 year - 24 Hour
Farm Driveways, Recreation Facility Access Roads	10 year - 24 Hour
Public Access Roads, Camp grounds, Etc.	25 year - 24 Hour

An erosion-resistant low point or overflow area may be constructed across the access road to supplement culvert capacity on non-public use roads. Culverts, bridges, fords and hardened overflow areas should be installed so the road crossing does not significantly impact fish migration.

Outsloping may be used to remove small quantities of water from road surfaces. A road that is properly outsloped slopes slightly from the cut bank to the outside edge of the roadbed. The outslope should be only enough to divert the water, normally 1/4 inch to 3/8 inch per foot of width. On fill slopes, where it is necessary to protect the fill from eroding, the road should be insloped with cross drainage from the inside toe of slope to the downhill side.

Broad-based drainage dips may be used for drainage of access roads. Broad-based drainage dips are a dip and reverse slope in the road surface with an outslope in the bottom to provide natural cross drainage. The purpose of the dip is to prevent build-up of excess surface runoff and subsequent erosion. Because of construction characteristics, do not use dips on roads that have a grade greater than 10 percent. The dips should be installed during initial road construction using the following criteria:

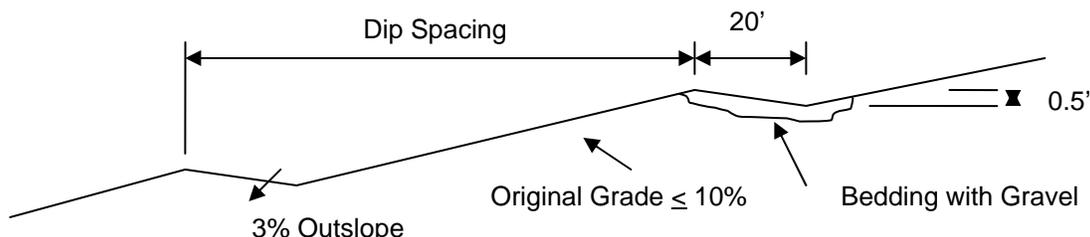
1. Construct a 20-foot long, 2.5 percent reverse grade in the road by cutting from upgrade of the dip location and using the cut material for the opposite reverse slope.
2. Use the following formula for dip spacing:  
Spacing (ft.) = 400 ft / slope + 100 ft
3. The dip and reverse slope sections may require bedding with gravel for stability.
4. Install dips such that runoff water from the outslope will outlet on flatter areas.
5. See Figure 1, Broad Based Drainage Dip, for additional information.

Ditch channels shall be designed to be on stable grades or protected with structures or linings for stability.

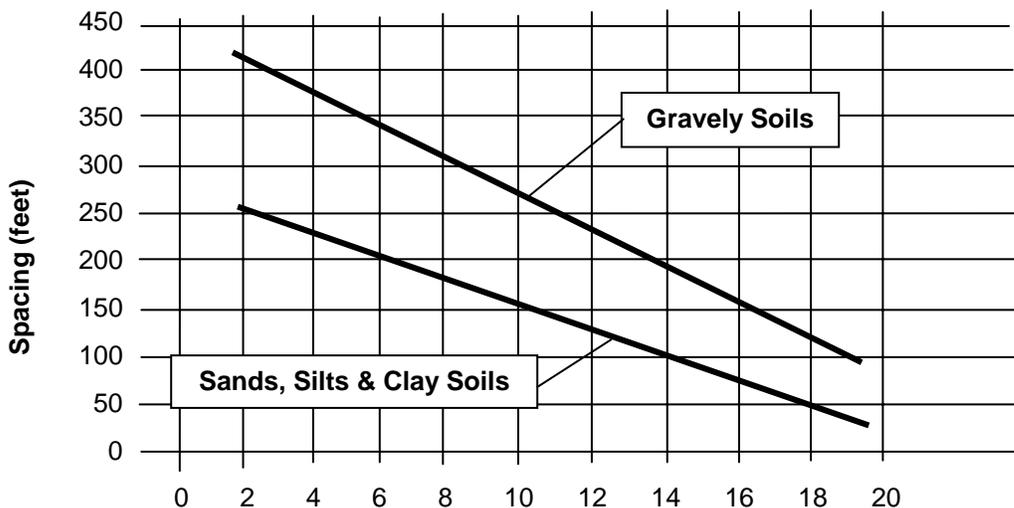
Water-breaks or water-bars may be used to control surface runoff on low-intensity use forest, ranch or similar roads. On steep grades where runoff and erosion is anticipated down the road, water bars should be considered. Water bars must be constructed of materials that are compatible with the use and maintenance of the road surface. Water bar discharge areas must be well vegetated or have other erosion resistant materials. See Figure 2, Maximum Spacing of Relief Culverts and Water Bars Based on Soil Type.

Roadside ditches shall be adequate to provide surface drainage for the roadway and deep enough, as needed to serve as outlets for subsurface drainage. At a minimum, the roadside ditch shall be 1.0 foot below the top of road surface to provide internal drainage.

**Figure 1  
Broad Based Drainage Dip**



**Figure 2  
Maximum Spacing of Relief Culverts and Water Bars Based on Soil Types**



## Road Grade (%)

**Surfacing.** Access roads shall be given a wearing course or surface treatment if required by traffic needs, soil, climate, erosion control, or particulate matter emission control. The type of treatment, if needed, depends on local conditions, available materials, and the existing road base. If these factors or the volume of traffic is not a problem, no special treatment of the surface is required. On weak bearing capacity soils such as silts, organics, and clays, the surface treatment should be underlain with a geotextile material specifically designed for road stabilization applications when the road is used on a regular basis.

Unsurfaced roads may require controlled access to prevent damage or hazardous conditions during adverse climatic conditions.

Toxic and acid-forming materials shall not be used on roads. This should not be construed to prohibit use of chemicals for dust control and snow and ice removal after considering potential impacts on stabilizing vegetation.

Utilize additional conservation practices to reduce the potential for generation and transport of particulate matter emissions.

**Traffic Safety.** Passing lanes, turnouts, guardrails, signs, and other facilities as needed for safe traffic flow shall be provided. Traffic safety shall be a prime factor in selecting the angle and grade of the intersection with public highways. Preferably, the angles shall be not less than 85 degrees. The public highway shall be entered either at the top of a hill or far enough from the top or a curve to provide visibility and a safe sight distance. The clear sight distance to each side shall not be less than 300 feet or as required by local regulations.

**Erosion Control.** If soil and climatic conditions are favorable, roadbanks and disturbed areas shall be vegetated as soon as possible and skid trails, landings, logging, and similar roads shall be vegetated after harvesting or seasonal use is completed (see Critical Area Planting, Code 342). If the use of vegetation is precluded and protection against erosion is needed, protection shall be provided by non-vegetative materials, such as gravel or other organic or inorganic material (see Mulching, Code 484), or in accordance with local regulations.

Roadside channels, cross drains, and drainage structure inlets and outlets shall be designed to be stable (see Structure for Water Control, Code 587). If protection is needed, riprap or other similar materials shall be used.

Watercourses and water quality shall be protected during and after construction by erosion-control facilities and maintenance. Filter strips, water and sediment control basins, and other conservation practices shall be used and maintained as needed.

**Construction Operations.** Construction operations should be carried out in such a manner that erosion and air and water pollution are minimized and held within legal limits. Construction shall include the following requirements as necessary for the job:

1. Trees, stumps, roots, brush, weeds, and other objectionable material shall be removed from the work area.
2. Unsuitable material shall be removed from the roadbed area.
3. Grading, sub-grade preparation, and compaction shall be done as needed.
4. Surfacing shall be done as needed.
5. Measures must be in place to limit the generation of particulate matter during construction.

## CONSIDERATIONS

Consider visual resources and environmental values during the planning and designing of the road system.

When available, consider using organic biodegradable materials as a surface treatment.

Locate access roads to minimize potential adverse impacts upon wetlands, waterbodies, wildlife habitat, and air quality. Consideration should be given to the following:

- Effects on downstream flows or aquifers that would affect other water uses or users.
- Effects on the volume and timing of downstream flow to prohibit undesirable environmental, social, or economic effects.
- Effects on fish passage when using culverts and other stream crossings.
- Short-term and construction-related effects of this practice on the quality of on-site downstream water courses.
- Overall effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances that would be carried by runoff from construction activities.
- Effects on wetlands and water-related wildlife habitats that would be associated with the practice.
- Establishing vegetation on road shoulders wider than the 2-4 ft.
- Limiting the number of vehicles and vehicle speed will reduce the potential for generation of particulate matter and decrease safety and air quality concerns.

## PLANS AND SPECIFICATIONS

Plans and specifications for constructing access roads shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

## OPERATION AND MAINTENANCE

An operation and maintenance plan will be developed and carried out for the life of the practice:

1. Inspect culverts, roadside ditches, water bars and outlets after each major runoff event and restore flow capacity as needed.
2. Minimize the damage to vegetative buffers adjacent to the road when it is necessary to chemically treat the road surface to maintain erosion protection.
3. Maintain vegetated areas in adequate cover to meet the intended purpose(s).
4. Fill low areas in travel treads and re-grade, as needed, to maintain road cross section.
5. Inspect roads with water-bars and outsloping periodically to insure proper cross section is available and outlets are stable.
6. Conservation practices that limit particulate matter emissions should be incorporated into long-term maintenance plans.