CONSERVATION PRACTICE STANDARD
TRAILS AND WALKWAYS
CODE 575
(Ft.)

DEFINITION
A trail is a constructed path with a vegetated or earthen surface. A walkway is a constructed path with an artificial surface. A trail/walkway is used to facilitate the movement of animals, people, or off-road vehicles.

PURPOSE
A trail/walkway is used to accomplish one or more of the following purposes:

- Provide or improve animal access to forage, water, working/handling facilities, or shelter;
- Facilitate improved grazing efficiency and distribution;
- Protect ecologically sensitive, erosive, or potentially erosive sites;
- Provide pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations;
- Provide trails/walkways for recreational activities or access to recreation sites.

CONDITIONS WHERE PRACTICE APPLIES
This practice applies on all lands where management of animal or human movement is needed.

The practice applies to a trail/walkway constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use the Maryland conservation practice standard for Access Road (560) for that purpose.

CRITERIA
General Criteria Applicable to All Purposes
Design the trail/walkway to accommodate the planned use and site constraints. Minimize erosion and adverse on-site and off-site impacts to areas such as riparian zones, stream channels, streambanks, or wildlife habitat (e.g., fragmentation or restriction of wildlife movement).

Clearing. Design clearing widths and heights to accommodate the safe use of the trail/walkway. Use NRCS Trails and Walkways Design Aid, 210-VI-LAN-04, for guidance, as needed.

Grades. Design trail/walkway grades to safely accommodate the planned use and to reduce the potential for erosion from runoff.
Design the cross-slope (the surface perpendicular to the direction of travel) or crown of the trail/walkway to allow water to drain off without creating erosion.

**Side Slopes.** Design all cuts and fills to have stable slopes that are a minimum of 2 horizontal to 1 vertical. For short lengths, rock areas, or very steep hillsides, steeper slopes may be permitted if soil conditions warrant and special stabilization measures are installed.

Where possible, avoid areas with geological conditions and soils that are subject to slides. When the area cannot be avoided, treat the area to prevent slides.

**Turns.** Design turning radii based on the intended use of the trail/walkway.

**Water Control.** Divert concentrated water flows away from the trail or walkway by installing surface or subsurface drainage measures, such as the Maryland conservation practice standards for Subsurface Drain (606) or Diversion (362), as needed. Surface cross drains, such as broad-based or rolling dips, may be used to control and direct water flow off the trail/walkway surface. Refer to the Maryland conservation practice standard for Access Road (560) for maximum spacing requirements. Protect the outlets of drainage measures to limit erosion.

Avoid traversing wet soil areas whenever possible. If unavoidable, provide an all-weather surface or elevate the walkway above ponded water or wet soil areas.

Avoid locating the trail/walkway where runoff will flow directly from the trail/walkway into a stream or body of water. To the extent possible, place the trail/walkway along the contour and avoid placement perpendicular to the contour.

Where a trail/walkway crosses a stream or watercourse (dry or intermittent), use the Maryland conservation practice standard for Stream Crossing (578). Where a trail/walkway crosses an intermittent drainage ditch, follow the requirements for Structure for Water Control (587). At a minimum, design drainage culverts to carry the flow from the 2-year, 24-hour storm event. Use a larger storm event to design any structure where watershed conditions or anticipated usage warrant the increase.

**Bridges and Elevated Walkways.** Design bridges in accordance with the Maryland conservation practice standard for Stream Crossing (578).

Design walkways in a manner that is consistent with sound engineering principles and adequate for the use and type of walkway. For elevated walkways, use the maximum loading anticipated during normal use plus a safety factor of at least 1.5. For elevated walkways that will only be used for pedestrian traffic, use the AASHTO Guide Specification for Design of Pedestrian Bridges for design or state guidelines, whichever is more restrictive.

Design bridges and elevated walkways that will be used for horses or other large livestock for a uniformly applied load of not less than 200 pounds per square foot (psf).

**Surfacing.** A trail can have a vegetated or un-vegetated surface if the soil surface will support the intended use.

If a trail is planted to vegetative cover, protect the vegetation from traffic until it is fully established and capable of withstanding the expected traffic. Establish a vegetative surface in accordance with the criteria in the Maryland conservation practice standard for Critical Area Planting (342).

Where an all-weather surface is needed, refer to the criteria in the Maryland conservation practice standard for Heavy Use Area Protection (561). Select a surface material for the walkway that is appropriate for the intended use and frequency.
Materials. Personnel with appropriate NRCS engineering approval authority shall inspect all materials. Materials must conform to the material specifications. Other materials may be used as approved by the responsible engineer. Technical documentation should support the use of “other” materials.

Concrete - Concrete must meet the minimum requirements of Maryland Department of Transportation, State Highway Administration, Standard Specifications for Construction and Materials, Section 902, 4,000 psi, air-entrained, Type IA cement. Other mixes may be used, when design computations are completed with a slump of 3-5 inches and 5% air entrainment.

Asphalt - Asphalt shall meet the requirements of Maryland Department of Transportation, State Highway Administration, Standard Specifications for Construction and Materials, Section 504. Choose a mix type appropriate for the surface application.

Stone, Surface Material - Stone used for surface material must meet the requirements of Maryland Department of Transportation, State Highway Administration, Standard Specifications for Construction and Materials, Sections 901.01 and 901.02 respectively or appropriate AASHTO Standards. Maximum size stone shall be 100% passing the 3/8-inch sieve and 95% to 100% passing the No. 4 sieve.

Stone, Base Course - Gravel and rock riprap must meet the requirements of Maryland Department of Transportation, State Highway Administration, Standard Specifications for Construction and Materials, Sections 901.01 and 901.02 respectively or appropriate AASHTO Standards. Recycled concrete may be substituted if appropriately sized. The maximum stone size shall be 3 inches and the minimum stone size shall be 3/4-inch.

Geotextile - When required, geotextile may be woven or nonwoven and must meet the requirements of Maryland Department of Transportation, State Highway Administration, Standard Specifications for Construction and Materials, Section 921.09, Class SE.

Erosion Control. Include provisions to control water and wind erosion during construction. Where possible, establish vegetation on disturbed areas as soon as practicable. Use the criteria in the Maryland conservation practice standard for Critical Area Planting (342). Use vegetation adapted to the site. Give preference to native plant species where compatible with land use and existing plant species.

If soil, shade, or climatic conditions prevent establishment of vegetation, use the criteria in the Maryland conservation practice standard for Mulching (484) to erosion control.

Safety and Use Control. Incorporate use control and the safety of the users into the design of the trail/walkway. Where needed, install directional and warning signs, handrails, gates, fencing, and other safety devices. Provide protection from slides and falling rocks, as needed.

Additional Criteria Applicable to Provide or Improve Animal Access to Forage, Water, Working/Handling Facilities, or Shelter

When needed to facilitate movement of animals through a series of paddocks or pastures, design gate openings and trails/walkways for efficient flow of animals.

Where fencing is needed to keep animals confined to the trail or walkway, use the Maryland conservation practice standard for Fence (382).

Design and construct Trails and Walkways with consideration of site soil conditions and characteristics. Construct the trail/walkway wide enough to accommodate the movement of the animals and access by the operator and equipment for management and maintenance.

Provide a vegetative grass strip equal to or greater than the width of the walkway on the lower side of the walkway unless the area is permanent pasture. Exclude livestock from the vegetative grass strip with

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fencing unless the area is permanent pasture.

Construct trails and walkways in such a manner that accelerated erosion will not occur. A maximum of 10% slope is allowed. For distances up to 100 feet, 20% slopes are allowed when drainage structures are provided according to Table 1 criteria.

Table 1

<table>
<thead>
<tr>
<th>Maximum Distances Between Drainage Structures</th>
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<tr>
<td>Walkway Slope (%)</td>
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<tr>
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</tr>
<tr>
<td>1</td>
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<tr>
<td>2</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>20</td>
</tr>
</tbody>
</table>

Install drainage structures such as culverts, open top culverts, and wooden, earthen, or approved water bars to safely dispose of surface water. Spacing for these structures are in Table 1. Convey runoff to stable outlets at velocities that are non-erosive to the soil conditions. Do not discharge drainage structures that convey walkway runoff directly to streams. An appropriate filter area is required.

Construct the trails and walkways with a crown or cross slope to shed water. Cross slope and crown requirements are shown in Table 2. Measure the slope perpendicular the walkway.

Table 2

<table>
<thead>
<tr>
<th>Minimum Crowns and Cross Slopes</th>
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<tbody>
<tr>
<td>Trail Width</td>
</tr>
<tr>
<td>≤ 6.0 Ft</td>
</tr>
<tr>
<td>6.1 – 11.9 Ft</td>
</tr>
<tr>
<td>≥ 12 Ft</td>
</tr>
</tbody>
</table>

Travel lanes that are constructed across the slope that create a diversion for surface runoff shall be kept to a minimum. On poorly or somewhat poorly drained soils, construct the walkway so the settled finish grade is above the original ground so that drainage can occur (See Table 3). Side slopes above ground shall be a maximum of 1 ½ : 1 (H:V). All earthfill and cut slopes need to be revegetated in accordance with the Critical Area Planting Standard (MD 342). Where a diversion is created, convey the runoff in a stabilized swale outside the trail or walkway to a stable outlet. Design the swale to carry the 2-year, 24 hour storm.

Sensitivity of the animal’s feet with respect to the intended purpose of the trail or walkway will be included as a design parameter in selecting the surface material for trails or walkways. The type of surface treatment will be the landowner’s decision. The design of the surface treatment/cross section shall meet the requirements for the Maryland practice standard Heavy Use Area Protection (MD 561) or written recommendations and operation and maintenance requirements from the Maryland Extension Service.
Table 3 contains the minimum cross section of the trail or walkway based on soil drainage class.

<table>
<thead>
<tr>
<th>Cross Section Option</th>
<th>Soil Drainage Classification*</th>
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<tbody>
<tr>
<td></td>
<td>Well to Moderately Well Drained</td>
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<tr>
<td>Compacted earth**</td>
<td>X</td>
</tr>
<tr>
<td>Minimum 6” MSHA CR-6 over MSHA Class SE Filter Fabric, as needed</td>
<td>X</td>
</tr>
<tr>
<td>Minimum 6” surface material over 6” base course material, MSHA Class SE Filter Fabric as needed.</td>
<td>X</td>
</tr>
<tr>
<td>Minimum 6” surface material over 6” base course material over MSHA Class SE Filter Fabric</td>
<td></td>
</tr>
</tbody>
</table>

*Based on site specific soils investigations and information from the soil surveys.
**Compacted earth, including weathered shale, shall be used only on slopes less than 5% where the walkway runoff is directed across a pasture or Vegetated Treatment Area (MD 635)

Consider the adequacy of natural surfacing. If trails and walkways are seeded or planted to vegetative cover, vegetation will be protected from grazing until fully established and capable of withstanding grazing and/or trampling. Establish vegetative cover in accordance with the Critical Area Planting Standard (MD 342). Where maintaining vegetative cover is not possible, follow the Heavy Use Area Standard (MD 561) for adequate surface protection.

Use conservation practice standard MD 382, Fencing when needed to keep animals confined to the trail or walkway until the desired destination is reached. The trail or walkway cross section shall extend to the inside of the fence posts.

**Additional Criteria to Facilitate Improved Grazing Efficiency and Distribution**

When one of the purposes of a grazing plan is to improve animal distribution or to allow better pasture utilization, a trail/walkway may be needed to facilitate animal movement. Use the Maryland conservation practice standard for Prescribed Grazing (Code 528) to plan the grazing system.

**Additional Criteria Applicable to Pedestrian or Off-Road Vehicle Access for Agricultural, Construction, Maintenance Operations, or Recreation**

Base the design requirements on the type and class of trail or walkway described in NRCS Trails and Walkways Design Aid, 210-VI-LAN-04. When a trail/walkway will have multiple uses, design for the most restrictive criteria. When needed, use the Maryland conservation practice standard for Access Control (472) to provide temporary or permanent exclusion from an area.

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**Width.** Design the trail/walkway width to safely accommodate the intended use. The minimum width is determined by the type and class of trail. Refer to the tables in Appendix A in LAN 4 for design parameters.

**Accessibility for Recreation.** The Americans with Disabilities Act of 1990 (ADA) requires outdoor recreation access routes and some hiker/pedestrian trails to be accessible to people with disabilities. Address accessibility requirements for new construction and when existing facilities are being altered. Compliance with the ADA outdoor recreation guidelines is not required when compliance would:

- Cause harm to cultural, historic, religious, or significant natural features;
- Substantially alter the nature of the setting;
- Require construction methods or materials that are prohibited by federal, state or local regulations; or,
- Not be feasible due to terrain or the prevailing construction practices.

Make an accessibility evaluation to determine the required level of accessibility for a trail/walkway design. Refer to NRCS Trails and Design Aid, 210-VI-LAN-04 for accessible trail design procedures.

*Note: Specific programs may dictate criteria in addition to, or more restrictive than, those specified in this standard.*

**CONSIDERATIONS**

**General.** When planning the trail/walkway, consider the effect on areas of special scenic value.

To protect water quality, consider the location of the trail/walkway relative to its use and purpose.

Contribute to food safety by channeling animals away from sensitive sites where pathogen transfer might occur.

In areas that are vulnerable to wind erosion, or have frequent dry, loose surfaces that can easily create mechanically-generated particulate matter (i.e., dust), use a surfacing material with a coarse texture for a walkway requiring non-vegetated surface treatment. Coarser materials will have larger particle sizes that are less easily entrained in the air and will minimize the potential for dust formation.

An unvegetated trail can be a prime source of dust emissions resulting in a particulate matter resource concern. Utilize additional conservation practices, such as NRCS CPS *Dust Control on Unpaved Roads and Surfaces (Code 373)*, to reduce the potential for generation and transport of particulate matter emissions, if warranted.

**Animal Access.** To facilitate maintenance of a walkway, consider putting the fence outside of the surface material.

**Pedestrian and Off-Road Vehicle Access.** A trail/walkway for agricultural access generally should not exceed a 15% grade, although short sections of 50 feet or less may be up to 50%. Break long, steep grades by the use of switchbacks. The grades of general use pedestrian and equestrian trail/walkway should generally not exceed 10%. Grades for other uses may be steeper, such as cross-country skiing, which may be as steep as 50% for difficult trails. Hiking trails may be as steep as 20%.

For a recreational trail that starts from a roadway, adequate parking for users may need to be provided as part of the design.
A trail/walkway for agricultural purposes may need to incorporate staging areas where equipment, supplies or harvested crops can be stockpiled.

Consider saving and maintaining key trees and other vegetation that have scenic value, provide shade, reduce erosion and runoff, provide habitat for fish and wildlife, or add to the visual quality of the area. Some selective cutting or trimming of trees or other vegetation may be necessary to provide and maintain scenic vistas at overlooks. At overlooks, keep tree removal or trimming to the minimum needed to provide an unobstructed view of the most salient features present.

**PLANS AND SPECIFICATIONS**

Provide plans and specifications that describe the requirements for applying the practice to achieve its intended purpose. At a minimum, include:

- A plan view showing the location of the trail/walkway;
- Typical cross-sections for each reach of the trail/walkway showing the width, typical side slopes, and any surfacing needed;
- Profile for each reach;
- Details of water control structures and other appurtenances;
- Erosion protection measures;
- Material quantities;
- Construction specifications;
- Fencing, as needed;
- Safety features, as needed;
- Expected application types, amounts, and frequency of dust suppressants, if needed.

**Supporting Data and Documentation.** Refer to the STATEMENT OF WORK for all the deliverables that apply to this practice.

**OPERATION AND MAINTENANCE**

Prepare a written Operation and Maintenance (O&M) plan for each site. At a minimum, the plan must include the following:

- A schedule for inspections at least annually and after significant runoff events. The inspections must include drainage structures, trail/walkway surfaces, vegetation, fencing, bridges and elevated walkways, and safety features, as appropriate. For bridges and elevated walkways that are open or accessible to the public, conduct inspections in accordance with AASHTO Guide Manual for Bridge Element Inspection.
- Maintenance activities:
  - Removal of sediment from water control features;
  - Repair of eroded areas or damaged surface materials;
Grading and shaping of the trail/walkway to maintain design grades and dimensions;

Application of dust control measures, as needed;

Repair of safety or control features, as required;

Re-seeding of areas where vegetation has been damaged or destroyed;

Periodic removal and management of manure accumulations, as needed.

For multiple adjacent vegetated animal trails, include a rotation plan to allow for recovery of vegetation and for improvement of traffic-supporting conditions.

REFERENCES


USDA, Natural Resources Conservation Service. Conservation Practice Standards. Maryland Field Office Technical Guide, Section IV.


