Natural Resources Conservation Service

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. This practice does not apply to travel ways routinely or primarily used for vehicular traffic. Access Road (PA 560) is applicable to those areas.

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). Trails and walkways shall be designed and constructed with consideration of site soil characteristics.

All planned work shall comply with all federal, state, and local laws and permit conditions and requirements. The landowner shall obtain all necessary permits prior to construction or any land clearing activities.

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.

A trail/walkway for agricultural access generally should not exceed a 10% grade, although short sections of 50 feet or less may be up to 20%. Break long, steep grades by the use of switch backs. 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%.

Trails or walkways shall be constructed with a crown or cross slope to drain water. The cross slope or crown shall meet the Table 1 slope requirements, measured perpendicular to the direction of travel.

Table1

Minimum Crowns and Cross Slopes	
Trail Width	Slope
≤ 6.0 Ft	1.0 In/Ft
6.1 – 11.9 Ft	0.75 In/Ft
≥ 12 Ft	0.5 In/Ft

Side slopes
Construction of embankments should be kept to a minimum. The walkway surface (Table 2) shall be installed above original grade on poorly and somewhat poorly drained soils so that drainage can occur. All earthfill and cut slopes need to be revegetated in accordance with Practice Standard Critical Area Planting, (PA342). Where upslope runoff is intercepted, it shall be conveyed in a stabilized swale outside the trail or walkway.

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 *Subsurface Drain (PA606)* or *Diversion (PA362)*, 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. Use the chart (Figure 1) in *Access Road (PA560)* 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, use *Stream Crossing (PA578)*. If a drainage feature is typically dry, use *Structure for Water Control (PA587)*. 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 the drainage culvert where watershed conditions or anticipated usage warrant a larger structure.

Bridges and Elevated Walkways
Design bridges in accordance with *Stream Crossing (PA578)*.

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).

Surface
A trail can have a vegetated or unvegetated surface if the soil surface will support the intended use.

The lane or walkway shall have a minimum surfacing based on soil drainage classes as contained in Table 2.

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.

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 *Heavy Use Area Protection (PA561)*.

Trail or Walkway Cross Section		
Cross Section Option	Soil Drainage Classification*	
	Well to Moderately Well Drained	Somewhat Poorly to Poorly Drained
Compacted earth**	X	
Minimum 2" surface material	X	
Minimum 2" surface material over 2" binder course over 4" base course	X	
Minimum 2" surface material over 6" base course***	X	
Minimum 2" of surface material over 6" base course over class IV geotextile (non-woven)		X
Minimum 2" of surface material over 2" binder course over 4" base course over class IV geotextile (non-woven)		X

Trail or Walkway Cross Section
* Based on site specific investigations due to soil complexes in local 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 a vegetated *Filter Strip (PA 393).* *** Select surface materials that are of the appropriate size and mixture when placed over the desired base course. Definitions **Surface Material**: PennDOT gradations Select Granular Material (2RC) or Driving Surface Rock Aggregate (Dirt & Gravel Roads DSA Mix); AASHTO/PennDOT No. 10 (stone dust); or cementitious coal combustion by-products. **Binder Course**: AASHTO/PennDot No. 57, No. 67, or 2A. **Base Course**: AASHTO/PennDOT No.1, No. 3 or No. 57.

Where an all-weather surface is needed, refer to the criteria in *Heavy Use Area Protection (PA561)*. Select a surface material for the walkway that is appropriate for the intended use and frequency.

When selecting the surface material for a walkway used by animals, consider the sensitivity of the animals' feet.

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 *Critical Area Planting (PA342)* or the NRCS State-approved seeding specification. 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 *Mulching (PA484)* for 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
Construct the trail/walkway wide enough to accommodate the movement of the animals and access by the operator for management and maintenance. For this purpose, minimum width shall be six (6) feet wide.

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 *Fence (PA382)*.

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 *Prescribed Grazing (PA528)* to plan the grazing system.

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

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 *Access Control (PA472)* to provide temporary or permanent exclusion from an area.

Width

Design the trail/walkway width to safely accommodate the intended use. The minimum width is determined by the type and class of trail. See the tables in Appendix A in 210-VI-LAN-04 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 where:

- compliance would cause harm to cultural, historic, religious, or significant natural features;
- compliance would substantially alter the nature of the setting;
- compliance would require construction methods or materials that are prohibited by Federal, State or local regulations; or
- compliance would 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. For agricultural operations, the width is determined by equipment width plus up to two (2) additional feet to allow for safe passage.

CONSIDERATIONS

General

Cultural resources, threatened or endangered species, wetlands, streambanks, floodways or other ecologically sensitive areas, and areas of special scenic value will be protected through the proper design and placement of trail(s) or walkway(s).

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 *Dust Control on Unpaved Roads and Surfaces (PA373),* to reduce the potential for generation and transport of particulate matter emissions, if warranted.

Other conservation practices, such as Use Exclusion (PA472) can be used in conjunction with trails or walkways to minimize the impact on sensitive areas.

Animal Access

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

For areas of high livestock concentration, such as around ponds, tanks, troughs, or other feeding areas, use Heavy Use Area Protection (PA561).

Where a trail or walkway meets a pasture, as part of a continuous grazing system and not part of a rotational system, the walkway should be widened in a V shape up to 5 times its normal width, over a length 5 times the normal width.

Pedestrian and Off-Road Vehicle Access
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. As 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.

OPERATION AND MAINTENANCE

Prepare a written Operation and Maintenance (O&M) plan for each site. As 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.

- Mending of fences and replacement of gates.

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

REFERENCES

These references were current at the time the CPS was developed. Use more recent editions, if available.

Using All-Weather Geotextile Lanes and Pads, Agricultural Engineering Digest AED-45, Midwest Plan Service, Ames, Iowa, 1999.

Constructing Mud Free Cow Lanes, Pequea-Mill Creek Information Series, College of Agricultural Sciences, Penn State University, University Park, Pennsylvania

United States Department of Agriculture, Forest Service. 2007. Trail Construction and Maintenance Notebook. Washington, DC.

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Wood, Gene. 2007. Recreational horse trails in rural and wildland areas: design, construction and maintenance. Clemson University.

American Association of State Highway and Transportation Officials. 2010. AASHTO Load and Resistance Factor Rating Bridge Design Specifications, 5th Edition. Washington, DC.

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