



**Natural Resources Conservation Service**  
**CONSERVATION PRACTICE STANDARD**  
**FOREST TRAILS AND LANDINGS**

**CODE 655**

**(ac)**

**DEFINITION**

A temporary or infrequently used route, path, or cleared area.

**PURPOSE**

This practice is used to accomplish one or more of the following purposes—

- Provide routes for temporary or infrequent travel by people or equipment for management activities
- Provide periodic access for removal and collection of forest products

**CONDITIONS WHERE PRACTICE APPLIES**

Trails and landings, including skid trails, are applicable on forest land. They typically connect to an access road (see Conservation Practice Standard (CPS) Access Road (Code 560)).

**CRITERIA**

**General Criteria Applicable to All Purposes**

Trails and landings will be of a size, gradient, number, and location to accomplish the intended purpose. Avoid locating trails and landings on poorly suited soils of low-bearing strength and sites such as wetlands, riparian areas, critical wildlife habitat, or other environmentally sensitive areas. Locate trails on the contour to the greatest extent possible and incorporate breaks in grade (rolling dips or rolled grades) for trails on slopes. Skid logs uphill (with front ends off the ground) as practicable to minimize mechanical displacement of soil. Trails and landings will be set back from water bodies and water courses. Stream crossings, if necessary, will be minimized in size and number.

Assure safe ingress and egress from trails and landings to junctions with access roads. Refer to criteria in CPS Access Road (Code 560), for travel ways including logging spur roads needing construction design and possibly surfacing to accommodate frequent, intensive, or repeated vehicular traffic.

Trails and landings must be located and minimized in number and size to reduce adverse onsite and offsite impacts such as accelerated erosion, slope failure, water quality and riparian area degradation, stream channel and streambank damage, hydrologic modification, aesthetics, unacceptable damage to advance regeneration or residual growing stock, or fragmentation of wildlife habitat.

Those trails and landings intended or anticipated for management activities in subsequent years must be designated for reuse to minimize the need for new trails and landings and associated site impacts.

Timing and use of equipment must be appropriate for site and soil conditions to maintain site productivity and minimize soil rutting, erosion, displacement, and compaction.

Drainage and erosion control measures must be integrated with trails and landings and located to minimize detrimental effects of concentrated flow, erosion and sedimentation rates both during and after trail/landing use. After usage, stream crossings will be restored and stabilized. Refer to applicable drainage and erosion-sedimentation prediction technology and use CPSs such as Critical Area Planting (Code 342), Structure for Water Control (Code 587), Stream Crossing (Code 578), and Mulching (Code 484), as well as State forestry best management practices.

***Seeding options for Forest Trails and Landings can be found within the 342 Critical Area Planting Specification Guide Sheet. See Table 2 – Logging and Haul Roads for four permanent seeding options. Another temporary seeding option is to seed winter/cereal rye at 112 lbs/ac. Follow seeding requirements including mulching with straw from Critical Area Specification.***

***Follow guidelines in Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont (AMPs). Water flows will be controlled using techniques such as water bars, crowning, rolling (broad-based) dips, in-sloping and out-sloping and culverts in limited circumstances. Areas of exposed soil must be seeded and mulched within 50 feet of streams. Ruts will be smoothed where there is potential for gullying.***

***Water bars can be constructed with hand tools, but excavators and bulldozers are more commonly used and generally more effective. It is best to start at the end of the forest trail and work toward the landing so that completed work is not damaged by the construction equipment. Water bars will be installed based upon the following guidelines as practicable.***

- ***Water bars will be installed at a downslope angle of ~30 degrees.***
- ***Water bars shall be at least 12" deep and installed with a ~3% out-slope when ledge and rock permit. Deep water bars (24-30"), should be used on roads that will be closed to traffic.***
- ***The outlet of the water bar shall extend beyond the forest trail and drain away from the road and onto undisturbed litter or vegetation. Rocks, slash or logs will help reduce erosion at outlet.***
- ***The uphill end of the water bar shall extend beyond the side ditch line of the road to fully intercept any water flow.***
- ***Water bars and other drainage measures should be spaced according to Table 1 (below) as outlet conditions allow.***

***Log Reinforced Water Bars (LRWB) are suggested when anticipated traffic volume is a concern or in areas especially prone to erosion and rutting such as steep sections of skid trail and on approaches to stream crossings where soil conditions may be wet. LRWBs will maintain their shape and will not become worn down during logging or other uses as compared to traditional water bars constructed from forest soil.***

***LRWBs will be installed 50 feet back from the edge of the stream. Use large low-grade or cull logs 16-20 inches in diameter. Be sure to anchor the ends of the log so it will hold in place when driving over it. Install them at a 10 degree angle to remove water from the skid trail and for ease of getting over them with equipment.***

***Ditches and culverts are primarily associated with forest roads but they may also be used on larger forest trails depending on the topography and frequency of use. Pipe culverts are used to move water under the road before it gains sufficient flow to erode the ditch on the uphill side of the road.***

***Spacing of culverts used for ditch drainage shall be determined according to Table 1 (below). Culverts will be installed at a 30 degree angle down grade and will angle downhill at least 4 degrees when ledge and rock permit for self-cleaning and will outlet onto rock, gravel or logs to prevent scouring resulting in soil erosion. Cover culvert with compacted backfill to a depth equal***

**to half the culvert diameter, or at least one foot deep. Use NRCS design procedures or AMPs for sizing culverts for ditch drainage.**

**Table 1 – Recommended Distance Between Drainage Structures on Logging Roads (AMPs)**

<b>% Road Grade</b>	<b>Distance Between Water Bars (feet)</b>	<b>Distance Between Culverts (feet)</b>	<b>Distance Between Turn-Ups, Dips &amp; Pole Culverts (feet)</b>
<b>1</b>	<b>400</b>	<b>450</b>	<b>500</b>
<b>2</b>	<b>250</b>	<b>300</b>	<b>300</b>
<b>5</b>	<b>135</b>	<b>200</b>	<b>180</b>
<b>10</b>	<b>80</b>	<b>140</b>	<b>140</b>
<b>15</b>	<b>60</b>	<b>130</b>	<b>130</b>
<b>20</b>	<b>45</b>	<b>120</b>	<b>120</b>
<b>25</b>	<b>40</b>	<b>65</b>	<b>-</b>
<b>30</b>	<b>35</b>	<b>60</b>	<b>-</b>
<b>40</b>	<b>30</b>	<b>50</b>	<b>-</b>

## **CONSIDERATIONS**

Consider impacts to wildlife from increased fragmentation of the forest stand. Creation of openings can benefit some wildlife species (e.g., early successional and edge species) yet be detrimental to others (e.g., forest interior species).

Trails and landings, particularly after usage, may be utilized and managed for wildlife food and cover plantings. Refer to appropriate criteria in wildlife habitat practice standards, (e.g., CPSs Upland Wildlife Habitat Management (Code 645), and Early Successional Habitat Development/ Management (Code 647)).

Properly located trails and landings of sufficient width and location may be utilized and managed as firebreaks.

Favor native species for revegetating trails and landings. Measures will be used to protect against invasive species.

***Pipe style culverts should be a last resort in a forest setting on skid roads. They require frequent maintenance and can easily clog in a forest setting leading to destruction of existing skid roads. Consider other low cost and low maintenance water conveyance alternatives such as fords (e.g log corduroy or stone lined).***

## **PLANS AND SPECIFICATIONS**

Specifications for applying this practice must be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation. ***The Forest Trails and Landings Vermont Conservation Practice Job Sheet 655 shall be used to describe the specifications for applying this practice.***

## **OPERATION AND MAINTENANCE**

Regular and timely inspections for adverse effects will be conducted with trails and landings and associated measures maintained or restored as necessary.

Trails and landings utilized and managed as firebreaks will be properly maintained to accomplish this purpose while maintaining acceptable mitigation of other concerns.

Access to trails and landings must be controlled when and where needed for erosion abatement, safety and liability, and reduced maintenance costs. Use CPS Access Control (Code 472) as needed.

Trails and landings no longer needed may be decommissioned. Use CPS Road/Trail/Landing Closure and Treatment (Code 654).

***Trails should be inspected during the establishment period to ensure that drainage systems and structures for water control are properly functioning and that vegetation has attained full coverage where specified. After construction, it is expected that the roads are not driven on for 6 months to a year depending upon local site conditions and specifications in job sheet.***

## REFERENCES

***Acceptable Management Practices (AMP) for Maintaining Water Quality on Logging Jobs in Vermont. VT Forests, Parks and Recreation. 2017.*** [http://fpr.vermont.gov/forest/vermonts\\_forests/amps](http://fpr.vermont.gov/forest/vermonts_forests/amps)

***Best Management Practices for Forestry: Protecting Maine's Water Quality. Maine Forest Service. Third Edition. 2017.*** [http://www.maine.gov/dacf/mfs/publications/handbooks\\_guides/bmp\\_manual.html](http://www.maine.gov/dacf/mfs/publications/handbooks_guides/bmp_manual.html)

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<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/13887/ec1110.pdf?sequence=3>.

***A Landowner's Guide to Building Forest Access Roads. USFS. 1998.***  
<http://www.na.fs.fed.us/SPFO/pubs/stewardship/accessroads/accessroads.htm>

University of Minnesota. 2013. Broad-based dips. Forest management practices fact sheet: Managing Water Series. <http://www.extension.umn.edu/environment/trees-woodlands/forest-managementpractices-fact-sheet-managing-water-series/broad-based-dips/>.