

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION GUIDE SHEET

FOREST TRAILS AND LANDINGS

(Hv)

CODE 655

Definition

Trails constructed and/or repaired for skidders, forwarders, felling machinery, and other equipment and often require little or no excavation, and are usually for intermittent use.

Landings - cleared areas in the harvest area where trees, logs and other products are brought from the woods for merchandizing and transfer to over-the-road vehicles.

Purpose

- Provide infrequent access to forest stands for management activities.
- Provide periodic access to forest products for piling, sorting, or storing before being loaded onto trucks for transport.

This practice specification provides guidelines for intermittent access to forest stands for management, and for periodic access for removal and collection of forest products.

For travel-ways that will be designed and used frequently or repeatedly by vehicular traffic, refer to the Access Road Practice Standard and Specifications (560)

For installing or repairing water course crossings, refer to the Stream Crossing Practice Standard and Specifications (578)

Applicants are responsible for obtaining and complying with all federal, state and local permits, laws, and regulations that may apply.

Documentation

All categories require the following design information (Refer to elements of [design/project plan](#)):

1. Landowner and Design Preparer name and address.
2. Property Location, including town and county, and NRCS Field Office.

3. Practice name, code, justification, extent, estimated cost, and time schedule.
4. Description of specific work to be performed and its location and size, as well as written instructions for contractor and /or owner, include type, size, and location of culverts and/or other cross-drain structures.
5. Description of layout and marking methods. The landing and trails be designated with paint. If other marking methods are used, design will have specifically written guidelines.
6. Maps of property and practice locations, including a lat/long for boundary corners and practices. (GIS data preferred).
7. Specifications for the protection of other natural resources including but not limited to water, soil, and wildlife and non-target plants.
8. The design shall also identify where and if recommended treatments also necessitate application for permits or variances from local, state or federal regulations.
9. Detailed specifications, modifications and as-builts including type of erosion control and/or drainage work, stream crossings and maintenance requirements.

Trail Layout

Locating and laying out trails in advance can prevent problems. Consider the terrain, where the wood is, the lean of the timber, available equipment, the grade, soil conditions, skidding distance, filter areas along streams, and stream crossings. Good planning may reduce the skidding costs, and can reduce or eliminate the need for additional BMPs and structures.

If possible, lay out trails for winter harvests in advance when there is no snow on the ground.

Ideally, lay out trails on bare ground during wet seasons.

Whenever possible, lay out main trails to avoid water bodies and their associated filter areas, wet spots, seeps, and the bases of slopes.

Keep trails out of stream channels and off the banks of water bodies.

Construct trails on the contour, if it is safe to do so.

Plan to divert water from the trails to the undisturbed forest floor.

Minimize trail sections on steep slopes (>15%) wherever possible.

Plan to harvest during appropriate soil and weather conditions (preferably on dry or frozen ground).

Before you use old trails in the harvest area, consider whether water will run in them and where this water goes. Use existing trails only if runoff can be kept out of water bodies by:

- diverting water from the trail (for example, by using waterbars); and
- using brush or other materials to prevent ruts from developing or deepening
- If old trails are deeply rutted and the site cannot be harvested without additional rutting, consider harvesting on frozen ground and/or relocating the skid trails

Prior to being trail layout design will be developed. The design will provide the TPS with a contour map of the plan trail including placement information which as culverts, waterbars, and type of water crossing if needed.

Trail and Landing Installation

- Filter areas, broadly speaking, are forested areas bordering water bodies that provide important functions, especially filtering sediment and debris from runoff and preventing pollutants from reaching water bodies
- Trail design and layout should not impair the function of filter areas
- Trail locations should generally follow natural contours and slopes to minimize disturbance of drainage patterns
- Trails should be located where they can be maintained to ensure water management problems are not created. Avoid long level sections that are hard to drain and long steep

sections with sharp curves that are dangerous. Locate outside of filter strips except for approaches to stream crossing

- Maintain filter areas along streams and other surface waters to control sediment movement
- See Filter Areas (Code 393) for Standard and Specifications. Also check for federal, state and local regulations for minimum setbacks from water bodies
- Trail grades normally should not exceed 10 percent except for short distances. If necessary, for short distances, maximum grades of 20 percent or more may be used, Keep trail distances to less than a half mile, if possible, and avoid long, steep grades
- Water diversions will be sufficient in order to minimize the amount of run-off that reaches water bodies. These diversions can include cross-drainage structures, ditches, turnouts, and other structures that divert water away from the road and disperse it into areas of undisturbed forest floor
- Trails shall have a minimum tread width that should be appropriate for the equipment being used, with greater widths at curves and turnouts
- All cuts and fills for trail should minimize excavation and side slopes designed should be stable for the particular site conditions
- Areas with geological conditions and soils subject to slides should be avoided or treated to prevent slides
- Construct permanent wetland crossings only if there is no reasonable alternative. Otherwise design wetland crossings that will remain stable and will not restrict water flow during wet periods, especially during high water flow
- For temporary access through wetlands, use slash/brush, wooden mats, or similar support materials that will be removed after completing the work
- For Standards and Specifications relating to permanent access through wetlands, See Access Road (Code 560) and Stream Crossing (578)
- Design and locate trails and landings to move surface water into drainage ditches or filter strips where possible
- Plan trail and landing construction for dry and low water flow times of the year

- Cross wet areas on frozen ground if possible
- To allow stabilization of any exposed soils, plan construction of trail or trails sufficiently in advance of road use
- If landings already exist, determine if they can be reused with adequate erosion controls. If not, relocate them
- Active landings typically expose relatively large amounts of disturbed soil. Locate landings away from water bodies
- Locate landing so water runoff from adjacent roads and trails doesn't accumulate. Maintain erosion controls
- Preferred sites are:
 - on well-drained soils;
 - on gently sloping (not flat) ground; and
 - outside filter areas.
- Optimize landing size to meet the requirements of the equipment, the quantity and type of products, and safety
- Surface the landing with wood chips, stone, or aggregate if it will help stabilize the surface and shed water. Use these materials on top of geotextiles or other stabilization materials, if necessary. Plan for removal of stabilization materials after use as necessary to facilitate wildlife plantings or regrowth of trees
- During construction, install temporary sediment barriers (such as hay bales, water bars, erosion control mix, mulch or silt barriers) to keep any moving soil from entering flowing water and filter areas
- Maintain the landing surface to keep water from collecting or channeling (i.e. back blade or grading)
- Maintain water diversion structures on roads and trails to keep water from entering the landing

Water Control Measures - Water Bars and Diversions

- Water bars or broad-based dips can be used on trails to divert surface water away from stream crossings into a filter area or sediment and debris basin
- Locate water diversions as appropriate on steep sections of the trail (see table)

- Make water bars at least 6-12 inches deep, 6-12 inches high, and install them at an optimum 30-degree angle to the trail
- Extend the water bar inlet and outlet 1 foot or more beyond the trail to keep the diverted water from re-entering the trail
- Use the terrain to incorporate natural skid humps into the trail layout, to help divert water from the trail
- Outlet area should be stable ground cover such as stone, grass sod, undisturbed forest floor, or slash
- Space water diversions using the following table as a guide;

Trail Grade Spacing

Percent (%)	Feet
1 – 2	250 – 400
3 – 5	135 - 250
6 – 10	80 - 135
11 -15	60 – 80
16 – 20	45 – 80
21+	<45

Note: The steeper the slope, the closer together the water bars should be.

Water Control Measures - Culverts for Cross Drainage

- Culverts are covered with a minimum of 12 inches of fill, or manufacturer's specifications.
- Extend the inlet and outlet ends beyond the edges of the trail
- Adequate headwalls are installed to protect the culvert from erosion
- Protect the outlet area from erosion with stable ground cover such as stone, grass sod, undisturbed forest floor, or slash
- Ensure that water exiting the structure at the outfall is dispersed to areas of intact forest floor for infiltration
- Be sure that outlet is even with the ground (not "hanging"). Do not saturate or disperse water onto fill slopes. Use down spouts or other measures to disperse water below fill

Maintenance of Trails, Landings and Water Control Measures

- Stay alert to weather forecasts of significant rain or substantial thawing. Consider:
 - limiting equipment use, working in a different area, or doing other work until the site dries up or refreezes;
 - applying brush to soft areas to distribute the equipment's weight before problems develop; and
 - installing additional temporary diversions, especially water bars, to prevent water from running in the trail; and
 - reinforce existing BMP's and consider adding additional BMP's in anticipation of increased flows
- Repair and reshape running surface as needed
- Clear obstructions and debris from ditches and culverts
- Inspect and repair water bars and sediment traps
- Inspect, reset, and/or replace damaged culverts. Be sure outlet is not "hanging". Do not saturate or disperse water onto fill slopes. Use down spouts or other measures to disperse water below fill
- On chronic problem areas or where failures have occurred, implement additional measures to disperse surface water and control soil erosion

Trail Erosion Control w/o Vegetation, Slopes < 35%

Rehabilitation of existing forest trail segments on a 20% slope and a 4% grade by addressing legacy resource issues for long-term use.

The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages.

This includes designing and installing measures such as cross drains, rock drains, relief drains, out sloping rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation.

Other practices such as Stream Crossing and Critical Area Planting may be needed. Resource concerns include: excessive sediment in surface waters, concentrated and sheet & rill flow erosion, soil compaction, and habitat degradation.

Grading and Shaping with Vegetative

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Establishment

Rehabilitation of existing forest access trails and landings to addressing rutting, erosion, and sedimentation

Typically the trail is a single, seasonal road on gently sloping terrain requiring sustained erosion control measures.

The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages and to establish a vegetative cover.

This may include designing and installation measures such as cross drains, rock drains, relief drainage, out sloping, rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation.

Other practices such as Stream Crossing and Critical Area Planting may be needed. Resource concerns include: excessive sediment in surface waters, concentrated and sheet & rill flow erosion, soil compaction, and habitat degradation.

Temporary Stream Crossing

Stream crossings can have a significant negative impact on water quality. However, these impacts can be minimized by making sure your temporary crossings are properly installed.

Crossing where Fish and other aquatic may be impeded from moving up or down stream refer to NRCS conservation practice standard *Fish Passage 396*

Stream crossings encompass the entire section of a trail as it crosses the filter area on both sides of the stream, including:

- the channel itself;
- the stream banks; and
- the trail approaches

Temporary crossings are generally in place for up to several months.

Temporary stream crossings include:

- portable bridges,
- temporary culverts or pipe arches,
- logs or pole fords, or
- brush

Use temporary structures to keep equipment out of flowing water, to prevent sediment from entering the water, and/or to protect the banks and stream bottom. Portable, removable structures such as

bridges, mats, and culverts (when they are installed without additional fill) have the advantage of being reusable.

Select appropriate crossing locations, based on site and stream conditions.

- Minimize the number of stream crossings needed. By locating all of the crossings during the planning stage, you may be able to reduce the number of crossings needed
- Identify the best available sites for stream crossings. Look for:
 - relatively straight, narrow channels, and stable stream sections;
 - level or gently sloping banks and approaches (on both sides) that are stable;
 - approaches that are more or less at right angles to the channel;
 - hard stream bottom (for crossings where the structure rests on the stream bottom, e.g., pole fords or slash); and
 - areas away from important fish spawning habitat.
- Install crossings when the soil is dry or frozen and the water level is low
- Minimize impacts to gravel or cobble streambeds where fish may spawn
- Select a type of crossing structure that is appropriate for the structure and shape of the stream and the adjacent terrain. Cable or otherwise connect the crossing structure to a tree or other reliably stable object to prevent it being washed downstream during high flows and creating an obstruction and related problems
- Base the opening size on the highest expected stream flows or other legal requirements

Building Temporary Cross

Minimize disturbance to the stream banks, channel, and streambed during installation, use, and removal.

Minimize and stabilize exposed soils on the approaches within the filter area. During operations, you can stabilize the approaches with brush or other materials.

Install diversions on the approaches to prevent channeled runoff from entering the stream from the

trail or road, and to disperse it into adequate filter areas.

Build the narrowest roads and trails possible in the filter area and at the crossing.

Minimize work during wet weather or when the soil is saturated.

Stabilize crossing approaches with brush or similar materials, before and during operations.

Protect the approaches by extending temporary bridges well beyond the stream bank.

Install any temporary, portable bridges so that all portions of the bridge are above the stream's normal high water mark.

Keep abutments back from the banks, if possible.

Maintaining Temporary Crossing

Do not allow ditches to terminate directly into the stream or the filter area. Runoff should be dispersed onto the undisturbed forest floor before it reaches the filter area.

Make sure the approaches within the filter area are stabilized

When grading or rock-raking approaches, do not drag material onto the crossing

Stabilize the soil on stream crossing approaches in the filter area by using slash, brush, or log corduroy.

If there is rutting or channeling on the crossing approaches, disperse the water flow to an undisturbed, stable filter area using water bars or similar structures.

Closing Temporary Crossing

Remove temporary structures, slash, and/or other materials from below the normal high water mark when the crossing is no longer used. Do not remove debris that has fallen into the stream naturally.

Leave brush in place on the approaches and banks (above the normal high water mark) to ensure ongoing stabilization when you closeout.

Remove bed logs used for temporary bridges unless doing so may cause more disturbances.

After the harvest, stabilize the remaining exposed soil on the approaches in the filter area. Use additional brush, hay, or other materials. If large areas are disturbed, spread grass seed and mulch.

Close out of Trails and Landings

- Identify the long-term monitoring and maintenance needs, decide who is responsible for these tasks
- Install diversions such as water bars on trails before leaving a site permanently or suspending operations for more than the time it takes for spring thaws or predicted storms to increase water flows. Frequent monitoring is necessary to prevent an event that will render all previous water control worthless.
- Diversions should be installed wherever water channels could develop that will carry runoff to water bodies or their filter areas.
- At close out, seed, mulch, or otherwise stabilize the landing to establish a vegetative cover. This is particularly important near water bodies and filter areas. If the soils in the landing are severely compacted, some site preparation may be necessary before vegetation can take root.
- At close out, remove any temporary erosion control structures that may fail due to lack of maintenance. Plan to maintain permanent erosion measures.
- If seeding is considered, use Critical Area Planting (Code 342) Standard and Specifications for species, timing and methods of application.

References

Site Location of Development. September 1983. State of Maine Department of Environmental Protection, Maine Revised Statutes Annotated, Title 38, Chapter 3 and Regulations Adopted by the DEP (see pages 44-49).

The Land Use Handbook, Erosion Control on Logging Jobs. Preliminary Revision March 1995. Land Use Regulation Commission, Maine Department of Conservation.

Woodlands of the Northeast, Erosion & Sediment Control Guides. 1977. USDA, Soil Conservation Service and Forest Service.

A Landowner's Guide to Building Forest Access Roads. July 1998. USDA Forest Service, NA-TP-06-98.

Best Management Practices for Forestry: Protecting Maine's Water Quality. 2004. Department of Conservation, Maine Forest Service.