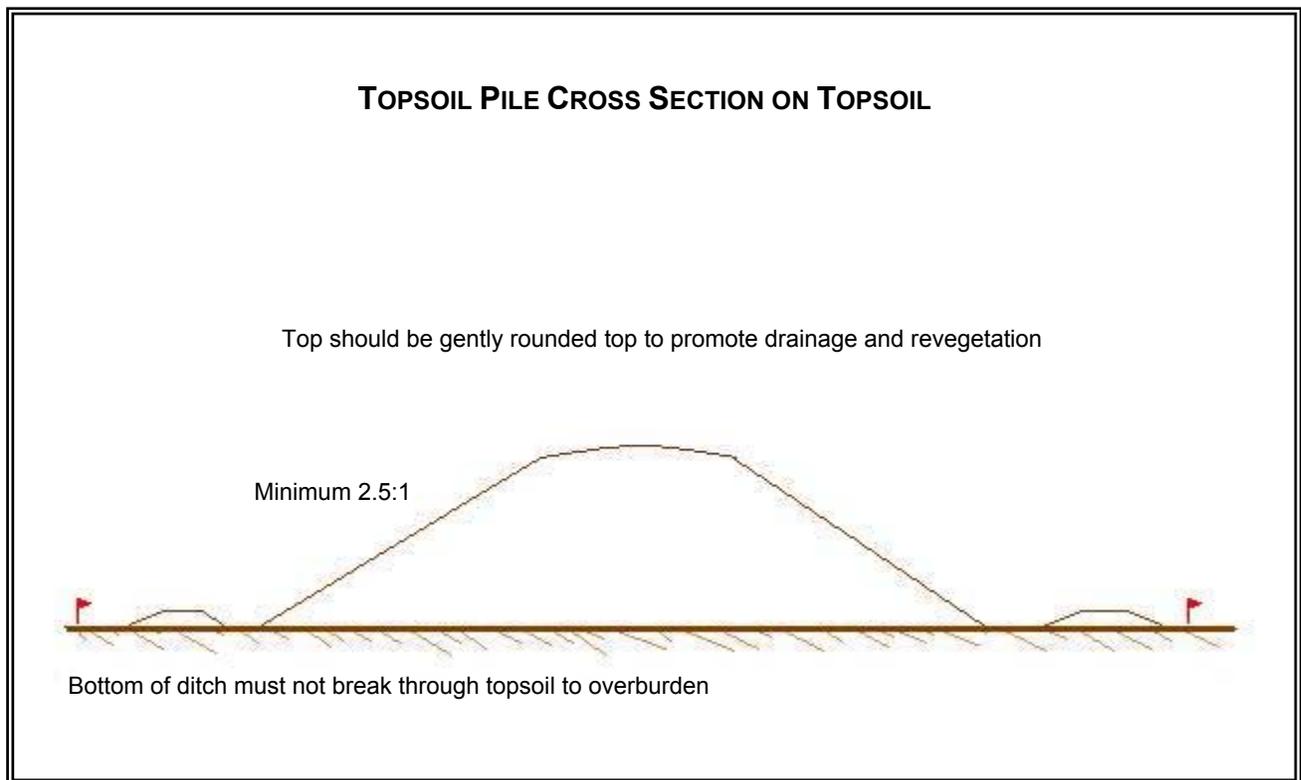


Topsoil Handling Quick Guide

PURPOSE

This quick reference guide will help earthwork contractors keep topsoil handling activities in compliance. The topsoil resource must be preserved and protected by preventing contamination of topsoil with overburden while at the same time salvaging all possible topsoil. Water resources must also be protected by limiting sedimentation through adequate revegetation and the construction of control structures such as berms and ditches around the stockpiles. Preservation and protection methods and requirements will vary by agency and company.

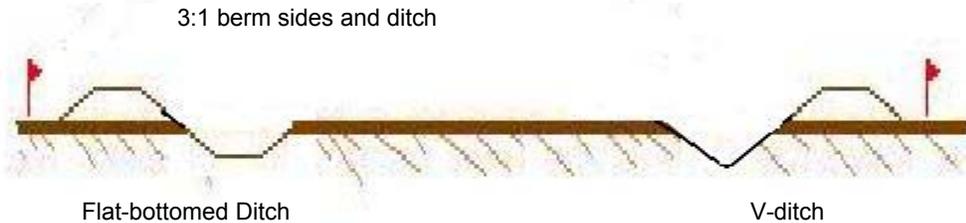


1. Place stakes at the limits of expected disturbance including any ditch or berm.
2. Pile slope: To get a slope that is stable to preserve the topsoil resource. At angle of repose $\sim 1.5H:1V$, any inspecting agency will likely require grading to a flatter slope. Flatter slopes provide a safer working surface for final grading, seeding, and surveying. The steeper they are, the smaller the pile foot print, greater erosion potential, and harder to survey and grade. Most piles vary between $4h:1V$ and $3H:1V$. A slope of $2.5:1$ can be revegetated with dual-wheel four-wheel drive farm equipment.

TOPSOIL PILE CROSS SECTION ON OVERBURDEN

1. When placing topsoil on overburden, fill/cover the overburden between the pile and the berm/containment ditch. This prevents the mixing of overburden and topsoil during runoff events when the flowing water would mix the topsoil pile and berm sides with the ditch bottom of overburden if it were not covered.

TOPSOIL PILE CONTAINMENT STRUCTURES

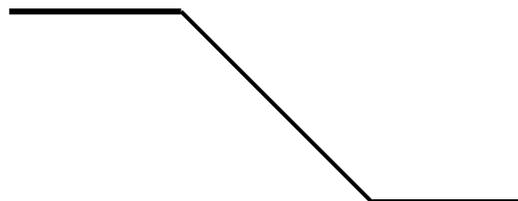


1. A containment structure of some kind is required for all topsoil piles to prevent contamination of the resource and to control sedimentation. The containment structure can be a berm or a ditch. If the pile is constructed on topsoil, the berm must be constructed of topsoil. If the pile is constructed on overburden, the berm may be of topsoil or overburden, but care must be exercised to prevent topsoil contamination.
2. In most cases a berm is the best structure because it can be vegetated, is stable during major runoff events, and it prevents the mixing of topsoil and overburden in steep topography. Sufficient capacity must be provided by the berm to prevent overtopping during precipitation events.
3. To keep a berm competitive with a ditch, build it with the topsoil placed in the pile and cross section it as part of the pile.
4. At the low spot around the pile, where water collects, build the berm stouter and higher. When the pile is constructed on topsoil, build an overflow spillway on undisturbed topsoil at a foot below high water line. Next to the spillway, undercut the ditch side 6 inches to 9 inches so the flows will first go to the low area to infiltrate and then just the backwater would flow out the spillway and not breach a deep section of berm or ditch.
5. When a ditch is constructed, care must be exercised to prevent mixing of topsoil and overburden. A flat-bottomed ditch is preferred for long-term piles as the flat-bottomed ditch has a greater capacity than a v-ditch and can be more readily revegetated. When quick removal of the pile is anticipated, a substantial v-ditch can be installed with a blade or dozer.
6. V-ditches work well in dry years. However, they are generally a blade cut that is thrown up to look effective. Since they are not compacted during placement, they will fail more readily if saturated by water. Since v-cut ditches are not usually graded for re-vegetation, they are a weed source for many years. In steep topography and areas of shallow topsoil, a v-ditch will cut into the under lying overburden. The bladed-up berm is then a mixture of overburden and topsoil. In addition, the v-ditch will blend topsoil and overburden during runoff events and the runoff will go at a greater velocity in a narrow cut v-ditch compared to a native grassed surface.

TOPSOIL EDGE CONSTRUCTION



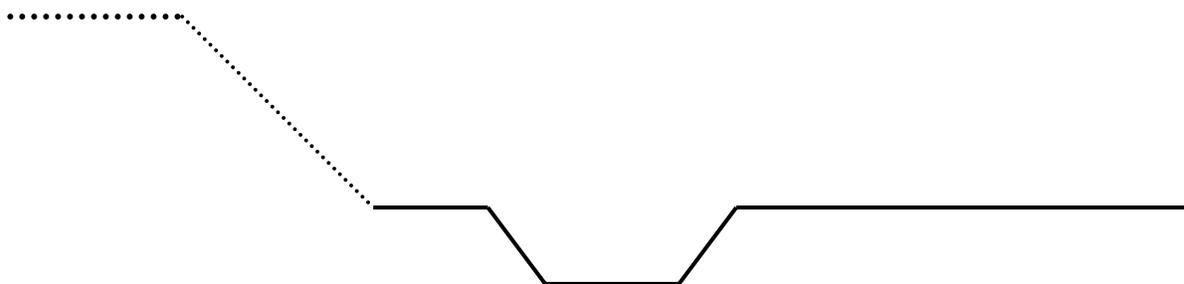
Topsoil Depth of 2-ft or less



Topsoil Depth Greater Than 2-ft

The idea is to maintain a very visual topsoil edge to show limits of activity and the start of future work. At about 2 vertical feet, topsoil edges become a safety hazard. So where topsoil depth is above 2 feet, the edge should be sloped to ~3H:1V.

TOPSOIL EDGE DITCHES

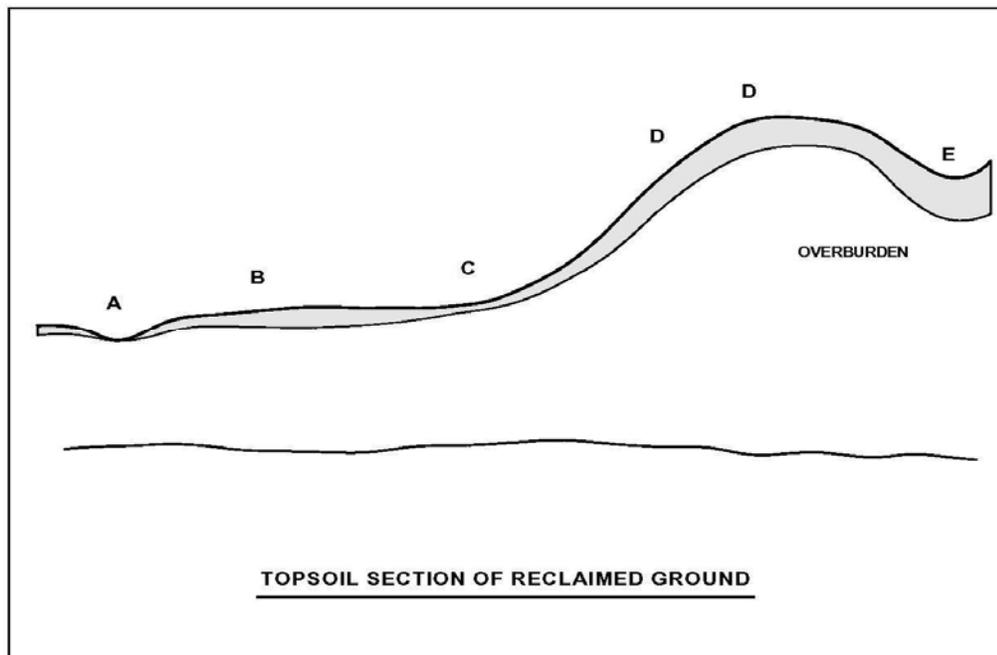


Purpose: To protect the topsoil resource. Where the overburden slopes away from the topsoil edge, no ditch should be needed.

When the stripped surface slopes to the topsoil edge, a ditch is needed to route runoff away from the topsoil. A cut flat bottom ditch is the most stable and protects the topsoil edge the best. In some cases a vee ditch may be an economical choice when gradients are not too extreme and erosion is not expected to block the vee ditch.

If topography is too irregular, ASCMs, sediment fence, or dug outs should be considered.

TOPSOIL SPREADING



Where non-uniform depths are desired, the supervisor must direct the operators on exact placement locations and amount. This requires a constant presence in the field and a good mental picture of the desired result. It also requires careful surveying to ensure placement amounts are accurate.

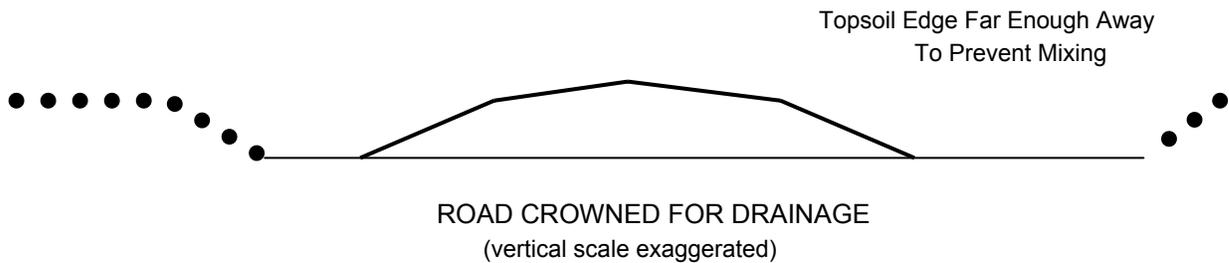
Too shallow topsoil replacement will cause poor to no vegetative cover. This is illustrated on many highway borrow areas and road cuts where less than a foot of topsoil was replaced over a sterile subsoil. Significant wind erosion can rapidly occur on unvegetated re-spread topsoil.

Staking frequency is critical to controlling topsoil spread depth. Serious errors in placement can result if staking and compliance with staking are lax.

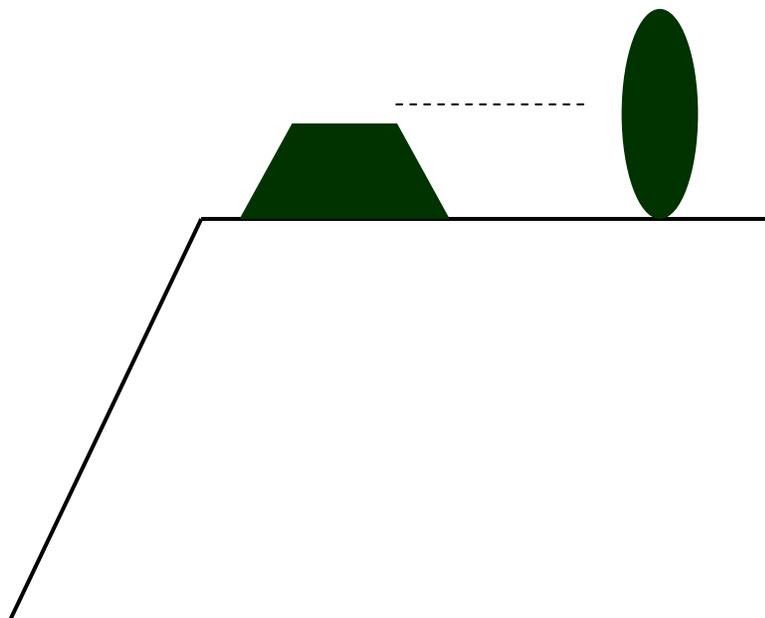
1. Set a stake pattern of ~ 60 feet wide rows with in line stakes a bit more frequent ~45 to 50 feet. Mark the fill depth on the stakes and fill the area in between the stakes leaving the stakes standing. Upon reaching the correct depth on both sides of the stake, for the length of the fill area, then fill in the stake line to the previously established depth. Very irregular topography may require additional staking.

SCRAPER HAULAGE ROAD CROSS SECTION THROUGH TOPSOIL AREA

Key: Prevent the blending of topsoil into the road material by the road maintenance equipment. Strip the road running width plus enough for road maintenance materials. If the road maintenance berms are not maintained, the blade will likely pull topsoil onto the road for leveling.



HIGHWALL OR SIGNIFICANTLY ELEVATED ROAD BERM



The berm shall be $\frac{1}{2}$ the height of the largest tire that uses the road. The berm shall not be undercut.