



Dealing With A Slope

How steep does a slope have to be to spell trouble?

Any area with a drop of one or more feet every for feet (25%) spells trouble for mowing and other maintenance. A crest that is not rounded off will also guarantee scalping with each pass of the mower.

slope	Pitch	recommendation
negligible	1%	Minimum for paved areas
slight	2%	Minimum for good lawn drainage
slight	5%	Maximum for lawn games and parking
moderate	10%	Maximum for most driveways and gardens
steep	20%	Optimal for a split level home
steep	33%	Absolute maximum for lawn maintenance
Very steep	<33%	MUST be stabilized

What plantings can be installed in place of turf on a slope?

There is a large variety of attractive plantings that can be installed in place of turf on sloping areas. Consider the sun to shade ratio, the texture of the soil, and the drainage prior to installation. Slopes will be more visually pleasing if covered with more than one type of plant.

Slope areas can be sprigged by using cuttings taken in winter or early spring from appropriate, fast-growing, vigorous plants. An 8-10 inch long cutting of 12 year old wood should be planted with three quarters of it buried. Sprigging is a good, inexpensive method of erosion control and can recycle fresh prunings from healthy plants. Proper spacing of slope plants is critical since they need especially firm anchoring. A few general guidelines are 8-10" on center for pachysandra, ivy and vinca, 12-15" on center for Euonymous and 24" on center for juniper. Place a 2-3" layer of bark, wood chips or other mulch following panting and keep a weather eye on water especially if run off is a problem.

Slope Location	Recommendation
Embankments	Prostrate juniper, Pachysandra, Hall's honeysuckle
Dry, sunny areas	Bear berry (can be hard to establish), fragrant sumac, regal privet, memorial and rugosa rose, sedum, sweet fern, yew or disease resistant juniper
Shady areas	Leucothoe, Andromeda, Mahonia, rhododendron, combine all with ground covers
Rock gardens	Campanula, Sempervivum, Sedum, rock cress, pinks, coral bells, candytuft

Does the type of vegetation on a slope make a difference to the speed of irrigation runoff and erosion? Can I save water if I plant the right types of plants?

Yes. As an example, engineering calculations tell us that the difference in time travel for less than 1.2 inch depth of water over a 100 foot distance with a slope of 25% is 0.42 minutes for bare ground, 5 minutes for dense grass, and 7.5 minutes for light brush, i.e., shrubs and ground covers.

Site preparation, with the additional worry of erosion, is extremely important. Test the pH and maybe even have a soil analysis done if erosion has previously been a problem. All weeds should be removed from the slope prior to planting. Erosion will be less if plenty of organic matter is incorporated into the soil. Make all incorporations with a rototiller to a depth of 6-8" where possible.

Can I subgrade to improve a slope's pitch and drainage?

The site in some cases can be subgraded to improve a slope's pitch by a rear mounted blade on a landscape tractor. Subgrading involves the movement and stockpiling of top soil, the realignment of the layer beneath the topsoil (don't compact it) and then replacing stockpiles of top soil. A minimum grade of 1-2% to a street or sub-surface drain sloping away from any building is suggested. Remember, too, that subgrading around trees is iffy: always maintain the original grade around trees or you can expect them to die. Avoid also depressions in the soil where water can accumulate.

Surface drainage on slopes can sometimes be incorporated into the landscape design by either providing weep holes in retaining walls or through incorporation of drains within walls. On rolling areas, drain tiles should be located in low areas along the base of slopes to gather seepage water. There should be a slope of at least 1% throughout the entire drainage system. Other forms of subsurface drainage are slit trenches, dry wells and surface catch basins. An underlying drain tile system connected to surface drain tile is the basic principle of a catch basin and these are best for promoting proper drainage of terraces on a slope. Sloping terrain also has a profound effect on trickle irrigation. In order to maintain uniform pressures on slopes greater than 5% it is often necessary to install compensating equipment right with your drip system. This is particularly important for providing appropriate conditions for rock garden plants.

When should I use retaining walls?

Retaining walls may be necessary if there is a sharp drop off. Dry stone is easiest---as each layer is finished, you need to backfill and firm the soil behind the wall. Use one part organic matter in your back fill mix to improve soil structure and drainage. You can use this mix between stone layers as a four inch layer of icing. Slope walls slightly back into bank with a pitch of 1-2 inches for every foot in height if you are using flat stones and 3-5 inches if using round stones. In this kind of system you don't necessarily need weep holes or footings, just a toe stone layer 6-8 inches below grade. Dry stone walls can be used as crevice gardens in sunny spots for herbs or rock garden plants. Avoid inserting plants too deeply or shallowly into these pockets.

Brick faced concrete block walls are more costly and labor intensive. In addition to weep holes, any wall over 3 feet must be reinforced and should have construction modifications that allow for joint expansion and contraction. Footings must extend below frost depth and thus will vary greatly from one part of the country to the other. Pressure treated timber walls, with tie backs every third layer, can be built without deep excavation for footings.

Are there other planting alternatives for slopes?

There are many alternatives to grass that don't involve either large retaining walls or ground covers. Stepped planting beds and cubs involve multiple small walls and level changes that are easy to take care of. Stone rip-rap is steeply sloping stone paving which can be planted with rock garden selections or vines in the joints. The rock garden effect can be achieved by using big boulders and plants to stabilize the slope BUT make sure that the stones are buried more than halfway for safety and stability. Irregular sloping and minimal pedestrian traffic make stepping stones an option as well. These can be placed artistically on a gentler slope. Wide stairs with landings every three feet can also be constructed and surrounded by low maintenance shrubs for an alternative to turf on tough slopes. Despite the fact that these stone alternatives to grass help to slow erosion, it must be remembered that they do increase runoff and can seriously reduce the amount of time it takes for water to flow off the sloped site and over what lies beyond.

I must have turf on the slope. Are there any tips that can make this task easier to manage?

If you absolutely must have grass on a slope, here are some tips that may make grass care easier. If you are going to sod a slope, place strips horizontally in staggered lengths to provide the best chance of rapid rooting with minimal erosion. Strips can be pegged into place with small wooden dowels. If seeding, try an erosion blanket which seed can come up through, or a spray mulch and seed combination. When mowing slopes, mow across rather than up and down to avoid tearing and make sure you wear shoes that give a firm grip because slippery turf clippings can be a cause of grief. You could also take the grassy meadow approach and let your grasses intermingle uncut with wildflower seed mixes.

Irrigating slopes: because it is nearly impossible to apply a week's worth of water with a single application on a slope. Instead make three separate 0.5 inch applications. Water the top of the slope, not the bottom or the middle. This should help to eliminate dry spots and wet spots at the bottom of the slope.