



Photo: VT ANR Lake Wise Program

The eroding shoreline was regraded and erosion control blankets were installed to stabilize the area. Native plants will be installed in the erosion control blankets along the Lake Iroquois shoreline in Williston, VT.

5.4 Slope Regrading



Description

Recontouring and stabilizing a slope adjacent to a lakeshore utilizing a biodegradable erosion control blanket composed of processed natural fibers. These blankets are used to roll over, cover, and protect the newly graded area.

Purpose

To establish a more gentle, natural shoreland slope allowing for increased soil permeability, improved sheet flow of stormwater runoff, and stabilized land surface for native plantings.

Conditions Where Practice Applies

Slope regrading is appropriate for lakeshore locations where the land surface must be recontoured to improve vegetation growth and/or water quality function. This practice applies for protecting and establishing newly seeded

or planted areas. It is applicable to slopes greater than 2:1 (H:V). Regrading is especially important where flowing water may occur before new vegetation is established or to protect existing stressed vegetation. Slope regrading is often a required part of the installation of other bioengineering techniques and best management practices.

Tips and Considerations

Several proprietary erosion control blanket (ECB) products are available. It is very important to select a fully biodegradable product that does not include synthetic netting or fill. Acceptable biodegradable products are composed of materials such as straw, aspen, or coconut fibers and jute netting. ECBs with synthetic netting can ensnare animals, such as snakes and birds, leading to injury or fatality. Furthermore, the plastic netting will not biodegrade and will eventually litter the shoreland with plastic.

Tightness of weave affects an ECB's functional longevity, which is typically 12-24 months for most applications. However, sites that are steeper with longer slopes generally require a product with a longer functional longevity. An ECB's erosion resistance is also affected by its material construction. When choosing an ECB, most vendors provide specifications which are very helpful, but these specifications vary among vendors. As such, it is important to ask the vendor about the product before purchase. Generally, selecting and installing eight-foot-wide by 100-foot-long rolls of biodegradable ECB work well for laying out and layering along shoreland slopes.

If cutting through the ECB with scissors or a knife, make an "X" for faster plantings. Alternatively, use a blow torch to burn a hole through the fabric for the plantings along the top level. Ensure that people do not walk over the ECBs after they are placed as this can bunch the blankets. During installation, limit foot traffic over ECBs to the minimum necessary for planting and watering. ECBs should only overlap with one other blanket along blanket edges (~ 10 inches to 15 inches of overlap) so that there is only a maximum thickness of two ECBs at any point.

Plans and Specifications

Underlying soils should be prepared according to the Vegetated Buffer standards to uncompact and enhance organic content. Seeding, if applicable, should be completed before installing the ECB. The type of ECB should be specified and installed for either a shallow slope or steeper slope orientation. Blankets can be

rolled out vertically (down the slope) for steeper slopes and horizontally (across the slope) for more gradual slopes and narrow slopes. Make sure to overlap blankets with lower sections, always overlapping upper sections to prevent erosion. Blankets should be affixed to the slope with biodegradable staples or stakes at a density specified by the manufacturer and keyed in at the top and bottom of the slope.

Plantings of live stakes, plugs, or container plants can be completed in the ECB after erosion control measures are in place. Dig or poke a hole in ground to ensure the plant is set deep enough for root stimulation. Tamp down soil and water plants. A ring of mulch, like leaf litter or hay, may be added to improve water holding capacity and stabilization of soil around each plant. See Vegetative Buffers and [Section 4](#) for further planting recommendations.

Maintenance Considerations

During vegetative establishment, inspect after storm events and after snowmelt for undermining/unfastening of the ECBs due to runoff, wind, animals, or ice and snow. As needed, refasten ECB, reseed, and upright plants. It is not unusual for this type of maintenance in the first one to two years until the plants are well established. Continue to inspect the site and ECB performance until full vegetation establishment, which is generally three years.

Design Criteria

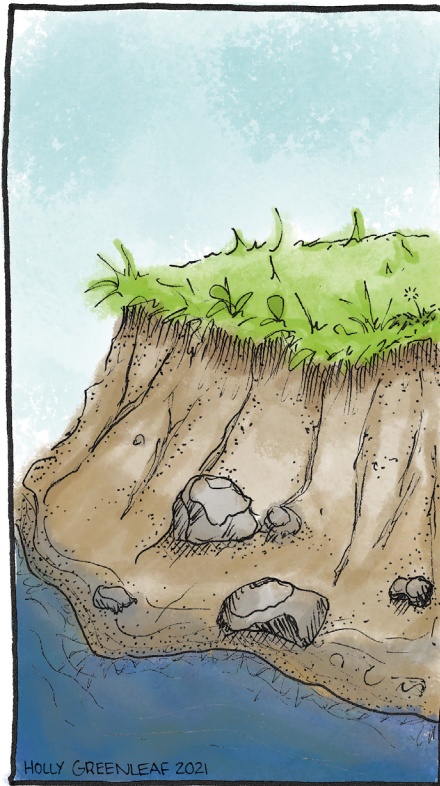
Dimension	Name	Typical Unit	Guidelines	Description
A	Regraded Slope Pitch	Foot:Foot, Percent (%)	>3:1 (33%) slopes and shallower slopes in sensitive areas require erosion control blankets. Generally, slopes >1:1 (100%) should not be created for vegetation establishment.	Ratio of horizontal run to elevation rise of buffer as measured from the top of bank adjacent to the lakeshore to developed lands (managed turf or impervious area).
B	Functional Longevity	Months	Typically 12 months for slopes 4:1-3:1. 18 months for slopes 3:1-2:1. 24 months for slopes 2:1.	Duration of the product permanent structure integrity, after which erosion and stabilization protection will be provided primarily by vegetative growth.
C	Orientation	Horizontal or Vertical	<2:1 horizontal installation, >2:1 vertical installation.	Blankets on slopes <2:1 should be rolled horizontally across the slope to expedite installation. Blankets on slopes >2:1 should be installed vertically down the slope which will require greater effort for installation but is better suited for high slope conditions.



Depending on site conditions, erosion control blankets can be installed vertically or horizontally, as shown along this Vermont shoreline.

Photo: VT ANR Lake Wise Program

REGRADING THE SLOPE



BEFORE

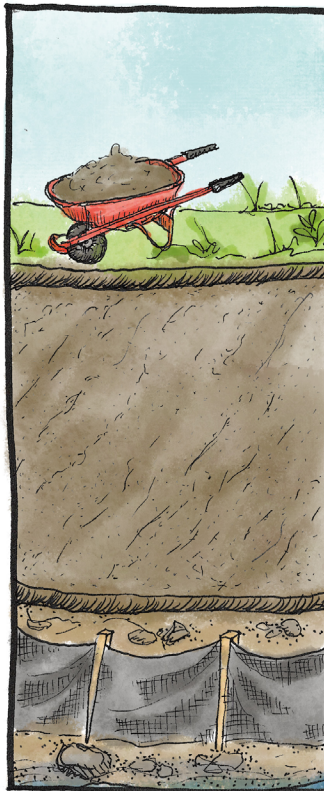
Install a silt fence or turbidity curtain depending on water depth



REGRADE

Till/scarify subsoil across slope 4" deep

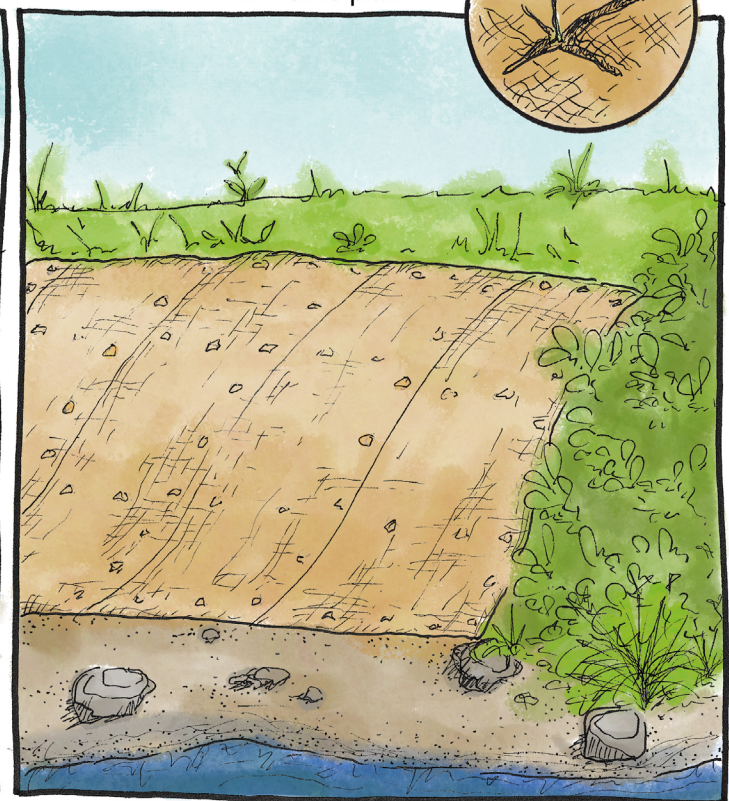
Dig trenches 6" deep and wide at the top and bottom of the slope to anchor the ECB



ADD TOPSOIL & SEED

Select screened, weed-free topsoil

Seed with native species



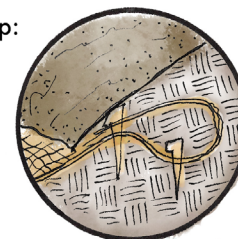
Cut "X" or burn hole in ECB to plant



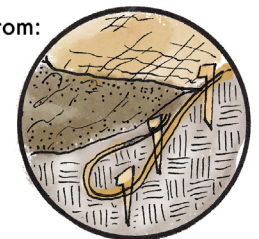
PLACE & SECURE EROSION CONTROL BLANKETS (ECB)

Anchor top & bottom in trenches, use biodegradable pins

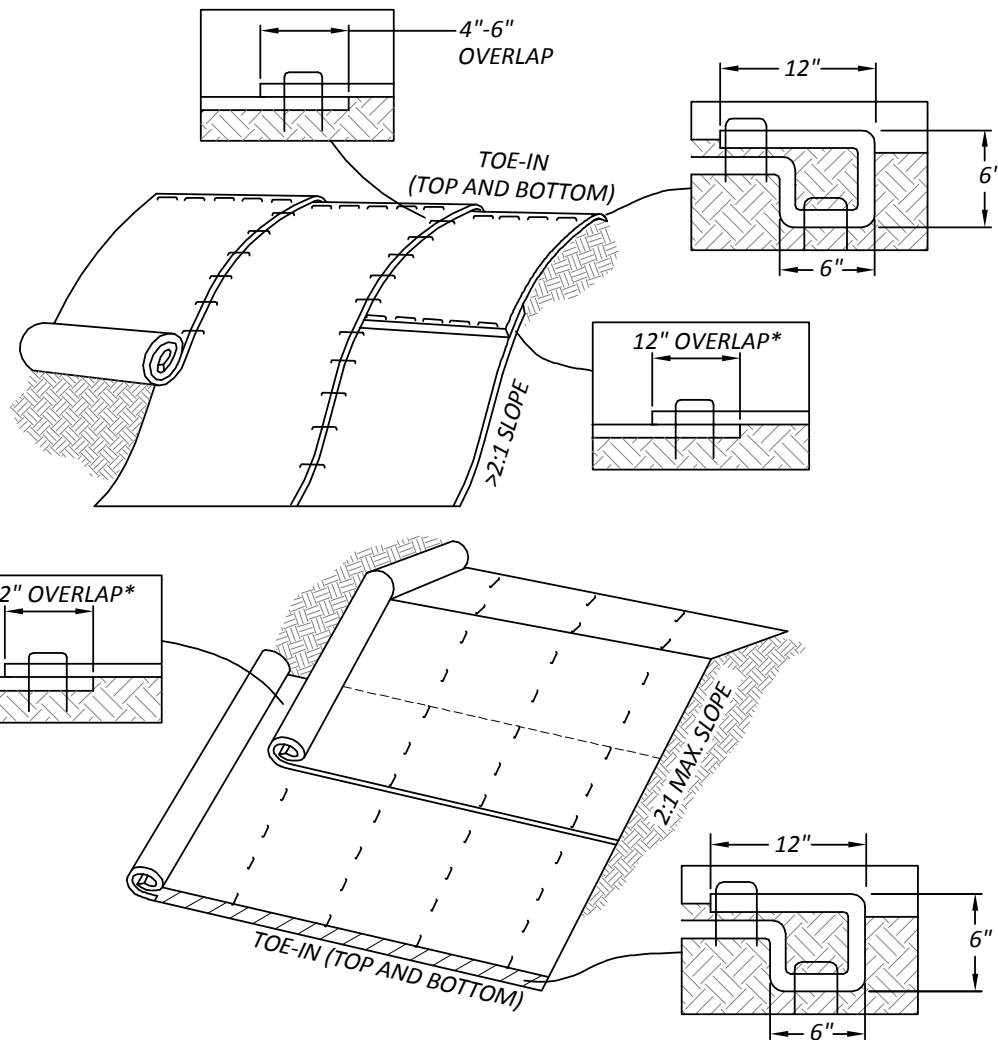
Top:



Bottom:



*ECB can be placed horizontally along more gradual slopes



*WHEN IN CLOSE PROXIMITY TO WATER'S EDGE, OVERLAP LOWER SHEET OVER UPPER SHEET TO PROTECT AGAINST WAVES, WIND AND ICE.

NOTES:

1. GRADE AND/OR FILL AREA TO DESIRED SLOPE. ADD TOPSOIL WHERE APPROPRIATE. REMOVE ROCKS AND DEBRIS FOR GOOD SOIL CONTACT.
2. IF SEEDING, CREATE PROPER SEEDBED AND BROADCAST SEED MIX. GOOD SOIL SURFACE PREPARATION IS ESSENTIAL FOR SUCCESSFUL SEED GERMINATION/VEGETATION ESTABLISHMENT AND EROSION PREVENTION.
3. AVOID HYDROSEEDING NATIVE SEED MIXES. PLUGS MAY BE PLANTED THROUGH THE BLANKET.
4. APPLYING FERTILIZERS NOT RECOMMENDED ALONG WATERWAYS.
5. ON SLOPES NO STEEPER THAN 2:1, ROLL OUT BLANKETS PARALLEL TO WATER EDGE. ON STEEPER SLOPES, ROLL OUT BLANKETS PERPENDICULAR TO WATER EDGE.
6. OVERLAP ALL SEAMS A MINIMUM OF 4" (6" RECOMMENDED). SECURE BLANKETS WITH BIODEGRADABLE FASTENERS AT DENSITY SPECIFIED BY BLANKET MANUFACTURER.
7. TOE IN FABRIC A MINIMUM OF 6" ON TOP AND BOTTOM OF SLOPES. BOTTOM OF SLOPE MAY ALSO BE SECURED WITH A BIOLOG.
8. MAINTENANCE: DURING VEGETATIVE ESTABLISHMENT, INSPECT AFTER STORM EVENTS FOR EROSION BELOW BLANKET. IF ANY AREA SHOWS SIGNS OF GULLY EROSION, PULL BACK THAT PORTION OF BLANKET AND ADD AND COMPACT SOIL AS NEEDED, RESEED/PLANT, RELAY FABRIC AND STAPLE. AFTER VEGETATION ESTABLISHMENT, CONTINUE TO CHECK AREA PERIODICALLY.

EROSION CONTROL
BLANKET

LAKELIKE BIOENGINEERING
CONSTRUCTION DETAILS