

Session 6

Stabilisation and Rehabilitation

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Introduction

- Effective rehabilitation protects the soil surface against erosion in the long term
- Can readily reduce soil loss to much less than 1% of the unprotected condition
- Rehabilitation should occur promptly and progressively as works are completed in individual areas

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Stabilisation Targets

- Healthy ground cover is the most effective erosion control
- 70-80% of ground surface should be protected from raindrop impact
- General Site Areas – seek 50% effective groundcover after 20 days inactivity in low rainfall periods and 60% effective cover after 20 days inactivity
- In high rainfall periods increase these by 10%
- For stockpiles require 60% effective cover if stockpile is to be left for more than 10 days

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Stabilisation Targets

- Diversion drains - seek to stabilise within 10 days with 70% effective cover, and ensure stable discharge area
- Waterways - when rain not forecast in next 3 days require 60% effective cover, and emergency measures on hand in case of rain to provide further protection. Within 10 days require 70% effective cover

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Options

Cover the soil surface:

- Re-Vegetation
- Mulch, woodchip
- Soil binders, bitumen emulsion, hydromulch
- Geosynthetics, RECPs
- Hard armouring – paving, rock lining, concrete etc.

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Soil Slopes

Flat <1 in 10

Mulch and vegetation, revegetation planting or seeds, soil binding, bonded fibre matrix, compost blankets, jute mesh and mats, mulch and vegetation, turf

Mild 1 in 10 to 1 in 3

Mulch and vegetation, revegetation planting or seeds, soil binding (hydroseed), bonded fibre matrix, compost blankets, jute mesh and mats, anchored mulch and vegetation, turf

Steep >1 in 3

Bonded fibre matrix, compost blankets, anchored jute mesh and mats, reinforced turf, cellular confinement system, rock armouring

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C-Factors

C-Factors listed in:

- Table E6 for slopes less than 33%
- Table E7 for slopes between 33 and 50%
- Table E8 for newly established grass – by growth stage
- Table E9 for newly established grass – by percentage ground cover
- Table E10 for long established vegetative cover

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Site Preparation and Topsoil

- Successful rehabilitation starts with good soil management and site preparation
- Deep rip, scarify, track walk or otherwise stabilise embankments along the contour
- Replace stored topsoil evenly over rehab surface (~75mm flat/gentle, 40-60mm steeper)
- Stabilise constructed surface using a range of appropriate measures

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Surface Roughening

- Topsoil far more likely to 'adhere' to roughened surface
- Track walking, contour ripping, scarification, terracing etc
- Up to 50% reduction in soil loss from properly prepared slopes
- Creates micro-contours to trap sediment and water
- Maximising vegetation 'strike'

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Example



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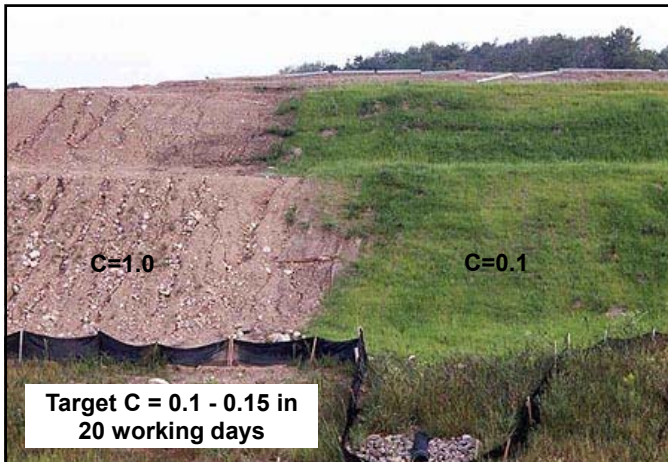


Re-vegetation

- Ideal, inexpensive method in most situations, but use with caution in concentrated flow and on steep slopes
- Annuals for temporary cover and fast establishment, often combined with perennials for longer term protection
- Require topsoil, water, fertiliser, soil ameliorants
- Seek specialist advice – Vegetation Management Plan

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Grasses

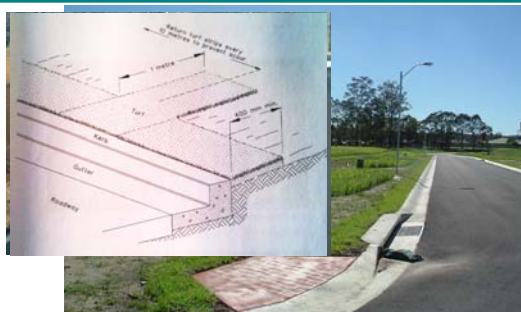


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Cover Crop and Turf Strips



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Jute and Native Grasses



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Hydroseeding



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Hydroseeding Issues

- Different to hydromulching
- Typically just seed, fertiliser and seed carrier (typically paper confetti), maybe wetting agent?
- Can be dislodged by raindrop impact or surface flows
- Can result in slumping of product down slope
- May include other soil ameliorants (lime, gypsum etc.)

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Native Mulch



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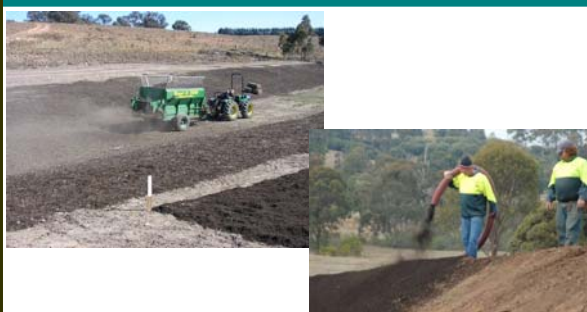
Mulch and Vegetation



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Compost Blanket



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Straw or Cane Mulch



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Problems



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Hydromulch



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Bonded Fibre Matrix (BFM)

C=0.0

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Bitumen Emulsion

- Water based emulsion, e.g. "Dustdown"
- ~\$1-\$2 per litre
- Diluted at rates 10:1 to 40:1
- Application at 1 diluted litre per m²

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Bitumen Emulsion

C=0.05

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Rolled Erosion Control Products

- Products that help stabilise the soil while vegetation establishes
- Particularly useful on steeper batters and in waterways where water velocity can be high
- Must be securely anchored to the ground
- Always follow manufacturer's advice on product selection and installation

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RECP Types

- Erosion Blankets
 - Jute mesh
 - Jute matting
 - Coconut fibre matting
- Plastic fibre meshes
 - Non-biodegradable nylons
 - Biodegradable polymers
- Reinforced turf

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Range of Products/Manufacturers



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Jute Mat



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Jute Mesh and Grass



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Jute Mesh



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Bonded Fibre Blanket



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Reinforced Turf



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Woven Plastic Mesh



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Cellular Confinement Systems

- Can be used to stabilise drains, chutes, banks or channels with low to medium velocity flows or steeper slopes
- Permanently fixed to stable soil base
- Topsoil used to fill “cells” prior to re-vegetation
- May also be filled with small gravel or other engineered drainage materials
- Can be used to construct temporary stream crossings

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CCS - Geoweb



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Permanent Armouring

- In high erosion hazard situations vegetation is often not suitable (e.g. waterways, steep embankments)
- Consider use of rock rip-rap, concrete, gabions, retaining walls etc.

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Gabion Baskets



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Rock Rip-Rap



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Poor Stabilisation?

- Poor stabilisation leads to ongoing erosion and pollution problems
- Often brought about by lack of proper design and failure to properly assess the site constraints and product capabilities

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Insufficient Cover



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Concentrated Flow - Inappropriate Product



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