Session 6

Stabilisation and Rehabilitation

1 Centre for Environmental Training cet

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

3 Centre for Environmental Training cet

Stabilisation Targets

- General Site Areas
  - Low rainfall period (Mar-Nov)
    - C = 0.15 (50% effective groundcover) after 20 days inactivity
  - High rainfall period (Dec-Feb)
    - C = 0.1 (60% effective cover) after 20 days inactivity
    - C = 0.05 (70% effective cover) after a further 60 days
- Stockpiles
  - If stockpile is to be left for more than 10 days, stabilise to C = 0.1 (60% effective cover)

4 Centre for Environmental Training cet

Stabilisation Targets

- Diversion drains
  - Stabilise within 10 days, C = 0.05 (70% effective cover), and ensure stable discharge area
- Waterways
  - When rain not forecast in next 3 days C >0.1 (i.e. less than 60% effective cover), and emergency measures on hand in case of rain to reduce C <0.1
  - Within10 days C=0.05 (70% effective cover)

5 **Page 14 of BB pocket book** Centre for Environmental Training cet

Options

Cover the soil surface:

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

6 Centre for Environmental Training cet

Soil Slopes

Flat <1 in 10

Mulch and veg., reveg planting or seeds, soil binding, bonded fibre matrix, compost blankets, jute mesh and mats, mulch and veg, turf

Mild 1 in 10 to 1 in 3

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

Steep >1 in 3

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

7

Centre for Environmental Training

cet

C-Factors

8

Appendix M of BB

Centre for Environmental Training

cet

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

9

Centre for Environmental Training

cet

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'

10

Centre for Environmental Training

cet

Example

11

Centre for Environmental Training

cet

Contour Ripping

Slope Tracking or Track Walking

Centre for Environmental Training

cet

Centre for Environmental Training

cet

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 – Veg. Mgmt. Plan

14

Centre for Environmental Training

C=1.0   C=0.1

Target C = 0.1 - 0.15 in 20 working days

Grasses

Pasture

C=0.05   C=0.05   Native

C=<0.01

Turf

16

Centre for Environmental Training

Cover Crop and Turf Strips

Page 73 of BB pocket book

17

Centre for Environmental Training

Jute and Native Grasses

Jute Mesh C=0.2

18

Centre for Environmental Training

6.3   **Centre for Environmental Training**

Port Macquarie-Hastings Council
Practical E&SC
August 2020

Hydroseeding

19

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)

20

Native Mulch

Woodchip 16t/Ha C=0.08

21

Mulch and Vegetation

22

Compost Blanket

23
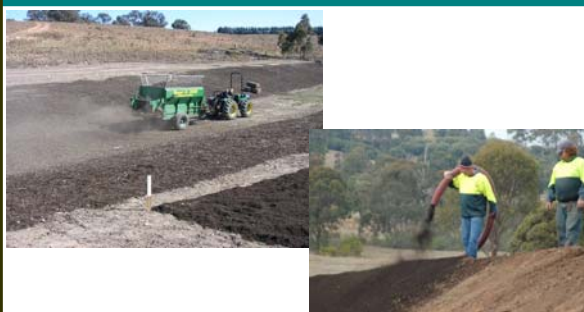
6.4   **Centre for Environmental Training**

Straw or Cane Mulch

Pneumatic or Mechanical application

Centre for Environmental Training

25

Problems

Centre for Environmental Training

26

Hydromulch

C=0.05 - 0.1

Centre for Environmental Training

28

Centre for Environmental Training

A full-page slide deck of six presentation slides.

Bonded Fibre Matrix (BFM)

C=0.0

32

Centre for Environmental Training

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 m^2

33

Centre for Environmental Training

Bitumen Emulsion

C=0.05

34

Centre for Environmental Training

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

35

Centre for Environmental Training

RECP Types

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

36

Centre for Environmental Training

Range of Products/Manufacturers

37

Centre for Environmental Training

Jute Mat

C=0.07

38

Centre for Environmental Training

Jute Mesh and Grass

Combined C=<0.01

39

Centre for Environmental Training

Jute Mesh

C=0.1 to 0.6 + veg.

40

Centre for Environmental Training

Reinforced Turf

C=<0.01

42

Centre for Environmental Training

Centre for Environmental Training

Woven Plastic Mesh

C=0.05

43

Centre for Environmental Training

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

44

Centre for Environmental Training

CCS - Geoweb

C=<0.01

Source: Geoweb ®

45

Centre for Environmental Training

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.

46

Centre for Environmental Training

Gabion Baskets

C=<0.01

47

Centre for Environmental Training

Rock Rip-Rap

48

Centre for Environmental Training

Centre for Environmental Training

Port Macquarie-Hastings Council
Practical E&SC
August 2020

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

Centre for Environmental Training

49

Insufficient Cover

Centre for Environmental Training

50

Concentrated Flow Inappropriate Product

Centre for Environmental Training

51

Centre for Environmental Training