

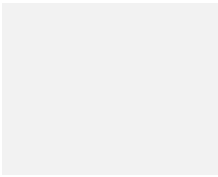
WORKS SPECIFICATION

Porth Hellick

Isles of Scilly Dune & Flood Defence Scheme

APRIL 2019

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VERSION CONTROL

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P1	09/04/19	MC	First Issue

This report dated 09 April 2019 has been prepared for Natural Resources Wales (the "Client") in accordance with the terms and conditions of appointment dated 11 October 2016 (the "Appointment") between the Client and **Arcadis (UK) Limited** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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0. Introduction

This specification appends the Work Information and either amends or includes additional clauses to the Civil Engineering Specification Water Industry (CESWI) 7th edition and the Environment Agency Minimum Technical Requirements (EA MTR) for NEC3 contracts (ref 412_13_SD01).

Clause numbering within this document refers to the CESWI & EA. A suffix "A" on the clause number indicates an additional clause. A suffix 'M' on the clause number indicated the clause is modified and states the points modified, omitted or substituted.

1. General

1.8 Levels and Reference Points

2. (M) All levels are in metres and relate to Ordnance Datum (Local). The local datum is St. Mary's which is 2.91m above Chart Datum.

4. (A) Upon completion of the works the Contractor will undertake a level survey. Measurement profiles shall be at intervals along the length of the dune approved by the *Supervisor*. These will generally be every 10m. The *Contractor* shall provide and maintain chainage markers at the approved measurement intervals until the level survey has been completed and accepted by the *Supervisor*. Chainage markers should be visible from both the land and seaward side of the structure. Surveyed sections shall extend to a distance of 2m beyond the edge of the dune toe.

2. Materials

2.162 Geotextiles

18. (A) Dune erosion control matting shall have the following properties:

Material Specification	
Product	Woven Coir Fabric
Colour	Natural Brown
Mesh Size	5-8mm
Number of Warp Treads	10.3 dm
Number of Weft Threads	6.8 dm
Warp and Weft Yarn Quality	Hand Twisted 200m/kg
Thread Diameter	4.5 – 5.5mm
Total Weight	750-850 g/m ²
Tensile strength MD Dry	9.99kN/m ²

The matting shall be installed to the manufacturer's guidelines. See appendix A

19. (A) Strata web formation geotextile or similar approved shall have the following properties:

Product	Ekotex 10 (1300) – Non woven	
	Unit	Specification
Dynamic perforation (cone drop) EN ISO 13433	mm	24
Tensile strength-MD EN ISO 10319	kN/m	11.5
Tensile strength-CD EN ISO 10319	kN/m	12
Elongation-MD EN ISO 10319	%	60
Elongation-CD EN ISO 10319	%	60
CBR Puncture Resistance EN ISO 12236	N	2000
Opening Size 0 ₉₀ EN ISO 12956	µm	61
Waterflow normal to the plane EN ISO 11058	l/m ² /s	96
MD= machine direction/ CD = cross direction		

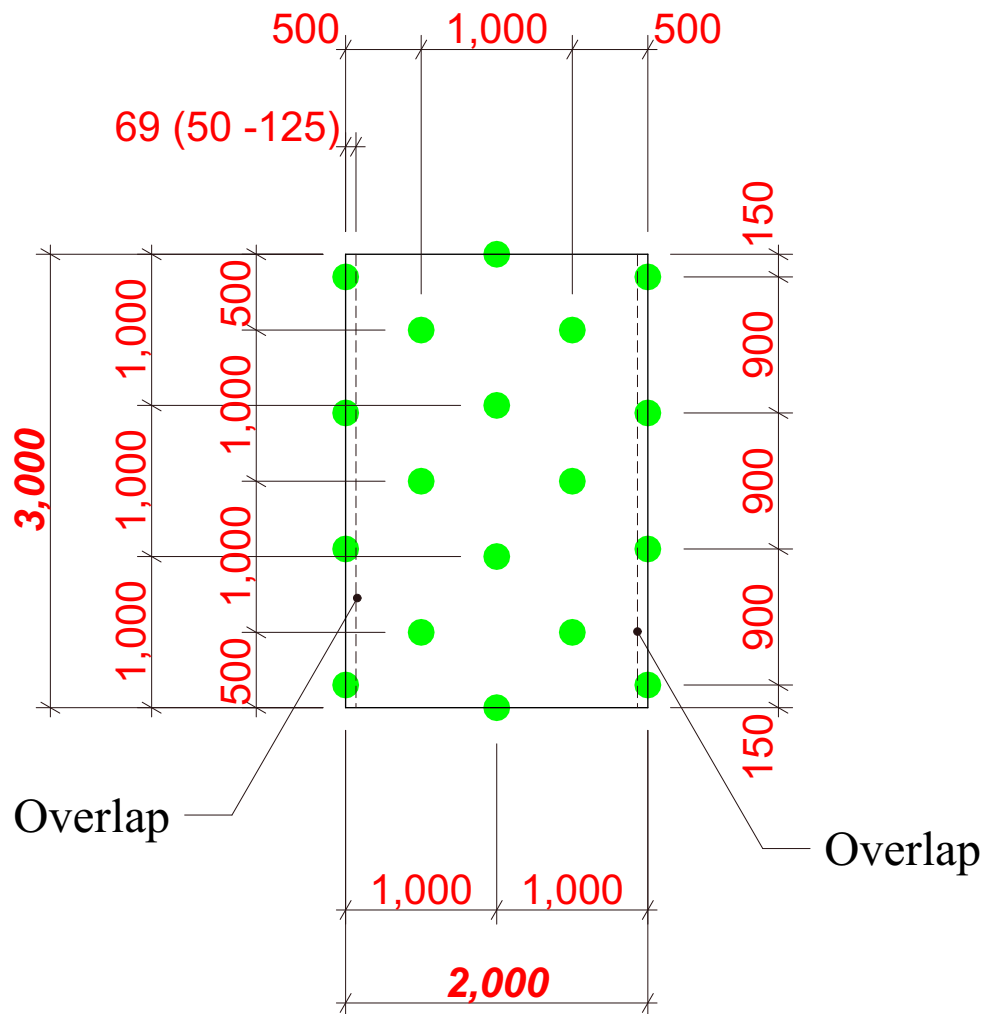
20. (A) Dycel Block formation geotextile or similar approved shall have the following properties:

Product	Ekotex 30 (4500) – Non woven	
	Unit	Specification
Dynamic perforation (cone drop) EN ISO 13433	mm	9.31
Tensile strength-MD EN ISO 10319	kN/m	31.50
Tensile strength-CD EN ISO 10319	kN/m	32
Elongation-MD EN ISO 10319	%	60
Elongation-CD EN ISO 10319	%	60
CBR Puncture Resistance EN ISO 12236	N	5400
Opening Size O_{90} EN ISO 12956	μm	56
Waterflow normal to the plane EN ISO 11058	l/m ² /s	43
MD= machine direction/ CD = cross direction		

APPENDIX A

Manufacturer's Installation Guidance

x03 peg m2 layout



18 pegs per 6m² (3m x 2m) sheet
(Average 03 pegs per m²)

Project:

-

Title:

STAPLE PATTERN GUIDE

Client:

-

Drawing No:

01

Scale:

1:50@A4

Date:

22 Aug 2013

Rolled Erosion Control Product (RECP)

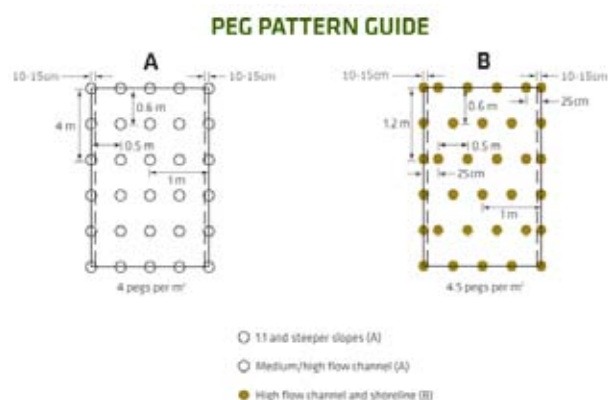


Fig 1

Slope Installation

Please note the slope installation guide outlines our general recommendations for installing Salix's temporary and/or permanent RECPs on sloping applications.

- 1. Soil preparation** - Create a smooth surface removing any clods, debris or foot imprints in the soil to ensure full mat to ground contact when rolled out. This will ensure that young grass grows through the mat and does not get trapped underneath. No soil is placed on top of the matting after installation.
- 2. Seeding** - Seed the prepared soil before rolling out RECP
- 3. Anchor trench** - Create an anchor trench around whole perimeter approximately 15cm deep x 15cm wide. Begin installation by unrolling the RECP 30cm beyond the top edge of the anchor trench. Anchor the RECP with a row of pegs approximately 30cm apart in the bottom of the trench. Backfill and compact the trench after pegging. Apply seed to the compacted soil and fold the remaining 30cm portion of RECP back over the seed and compacted soil. Secure RECP over compacted soil with a row of pegs

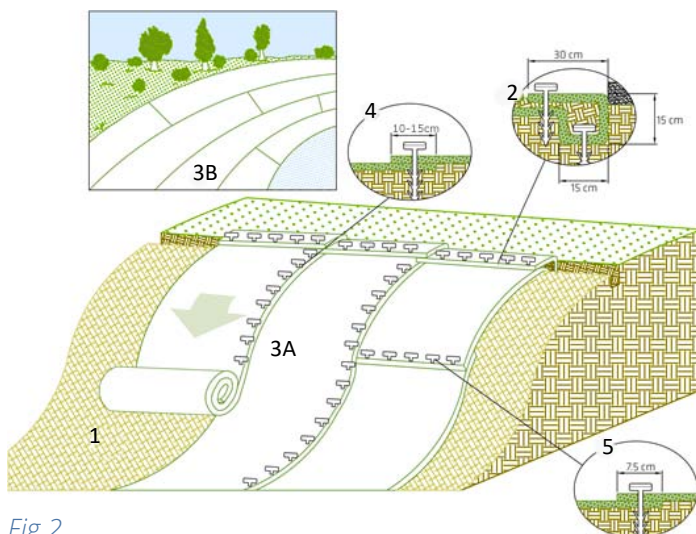


Fig 2

spaced approximately 30 cm apart across the width of the RECP (Fig 2-2).

4. Roll the RECP (Fig 2-3A) down or (Fig 2-3B) horizontally across the slope. RECPs will unroll with the correct side against the soil surface. All RECPs must be securely pegged to the soil surface by placing pegs in appropriate locations as shown in the peg pattern guide above (Fig 1).

5. The edges of parallel RECP rolls must be pegged with a 10-15cm overlap (Fig 2-4).

6. Consecutive RECP lengths joined down the slope must be overlapped end-over-end (shingle style) with an approximate 7.5cm overlap (Fig 2-5). Peg through overlapped area, approximately 30cm apart across entire RECP width.

*Note: In adverse soil conditions longer pegs/ stakes or earth anchors may be necessary to properly secure the RECP.

PEG PATTERN GUIDE

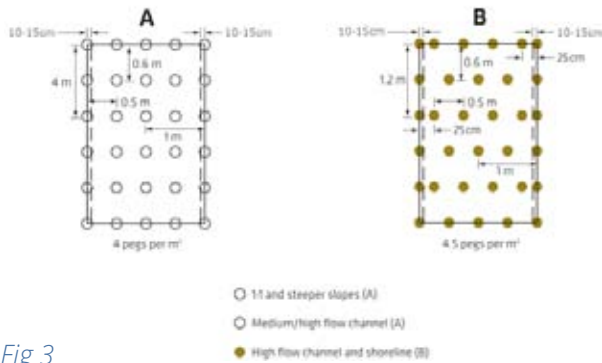


Fig 3

Channel Installation

The following channel installation guide outlines our general recommendations for installing Salix's temporary and/or permanent RECPs in high flow applications.

1. Soil preparation - Create a smooth surface removing clods, debris or foot imprints in the soil to ensure full mat to ground contact when rolled out. This ensures young grass grows through the mat and does not get trapped underneath. No soil is placed on top of the matting after installation.

2. Seeding - Seed the prepared soil before rolling out RECP

3. Channel Bed - Create cross channel anchor trenches. For very low flow applications use standard top edge anchor trench details (Fig 4-2A). Where there is a risk of high flows provide extra protection to the bottom and upstream edges by using Salix pre-filled Rock Rolls in the anchor trenches (Fig 4-2B). When using pre-filled Rock Rolls lay the RECP in to the anchor trench and place the Rock Roll on top to secure it. Blind with fill to match the existing channel.

Roll centre width of RECP in the bottom of channel bed in direction of water flow (Fig 4-3). RECPs will unroll with the correct side against the soil surface. All RECP lengths must be securely fastened to soil surface by placing pegs in appropriate locations as shown in the staple pattern guide (Fig 3B). Place consecutive RECP lengths overlapping end-over-end (shingle style) with a 10-15cm overlap (Fig4-4). Use a double row of pegs staggered 4-10cm apart and 10cm on centre to secure RECP lengths.

4. Channel side slopes - Create top edge anchor trench approximately 15cm deep by 15cm wide. Begin installation by unrolling the RECP 30cm beyond the top edge of the anchor trench. Anchor the RECP

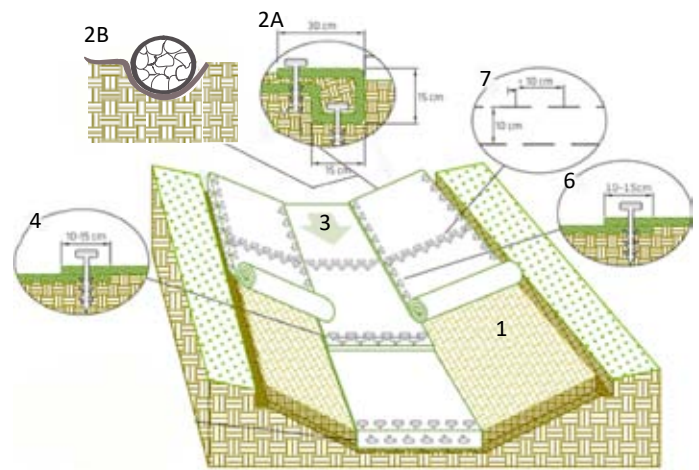


Fig 4

with a row of pegs approximately 30cm apart in the bottom of the trench. Backfill and compact the trench after pegging. Apply seed to the compacted soil and fold the remaining 30cm portion of RECP back over the seed and compacted soil. Secure RECP over compacted soil with a row of pegs spaced approximately 30 cm apart across the width of the RECP (Fig 4-2A).

Roll the RECP down or horizontally across the slope. RECPs will unroll with the correct side against the soil surface. All RECPs must be securely pegged to the soil surface by placing pegs in appropriate locations as shown in the peg pattern guide above (Fig 3B). Adjacent RECP lengths must be overlapped 10-15cm and pegged.*

In high flow applications use a double row of pegs every 9-12m staggered 10cm apart and 10cm on centre over entire width of the channel as additional pegging to secure the RECP.

The terminal end of the RECP lengths must be anchored with a row of pegs approximately 30cm apart in a 15cm deep x 15cm wide trench. Backfill and compact the trench after pegging (Fig 4-2A). In high flow channels that exceed 2m/s consider placing pre-filled Rock Rolls on the upstream and downstream anchor trenches (to match the channel bed) (Fig 4-2B).

*Note: In adverse soil conditions longer pegs/stakes or earth anchors may be necessary to properly secure the RECP.

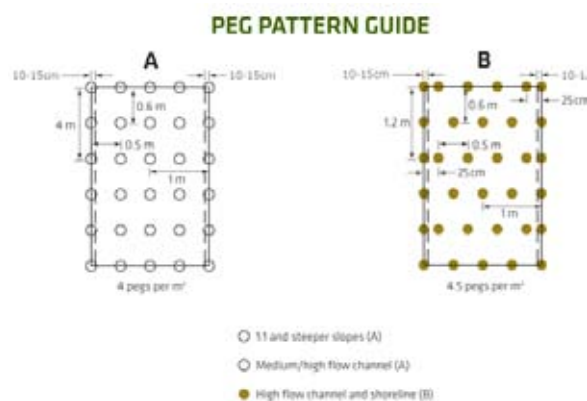


Fig 5

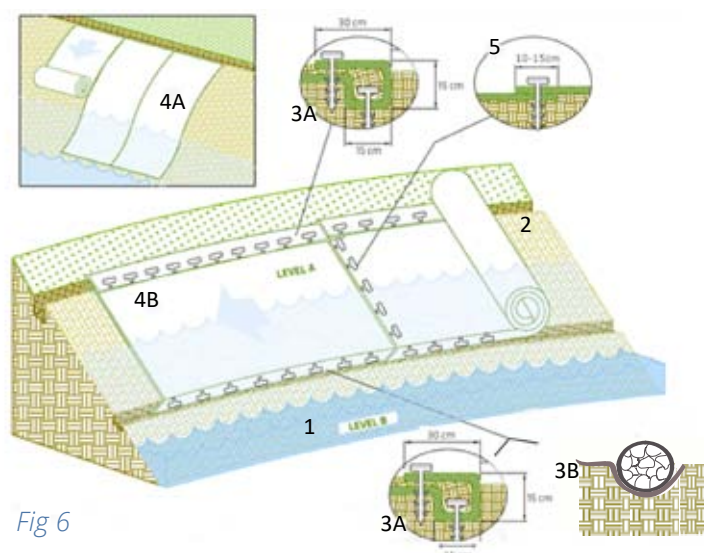


Fig 6

Shoreline Installation

This guide outlines our general recommendations for installing Salix's temporary and/or permanent RECPs along shoreline and stream bank applications.

1. For easier installation, lower water level from level A to level B before installation.
2. **Soil preparation** - Create a smooth surface removing any clods, debris or foot imprints in the soil to ensure full mat to ground contact when rolled out. This will ensure that young grass grows through the mat and does not get trapped underneath. No soil is placed on top of the matting after installation.
3. **Seeding** - Seed the prepared soil before rolling out RECP
4. Begin at the top of the shoreline by anchoring the RECP in 15cm deep x 15cm wide trench with approximately 30cm of RECP extended beyond the upslope portion of the trench. Anchor the RECP with a row of pegs approximately 30cm apart in the bottom of the trench. Backfill and compact the trench after pegging. Apply seed to the compacted soil and fold the remaining 30cm portion of RECP back over the seed and compacted soil. Secure RECPs over compacted soil with a row of pegs spaced approximately 30cm apart across the width of the RECP (Fig 6-3A).

5. Roll RECP either down the shoreline (Fig 6-4A) for long banks (top to bottom) or horizontally across the shoreline slope (Fig 6-4B). RECPs will unroll with the correct side against the soil surface. All RECP lengths must be securely fastened to soil surface by placing pegs in appropriate locations as shown in the peg pattern guide (Fig 5B).
6. The edges of all horizontal and vertical seams must be pegged with a 10-15cm overlap (Fig 6-5). In stream bank applications, seam overlaps should be overlapped (shingle style) in the predominant flow direction.*
7. The edges of the RECP lengths at normal water level must be anchored by placing the RECP in a 30cm deep x 15cm wide anchor trench. Anchor the RECPs with a row of pegs spaced approximately 12-30cm apart in the trench. Backfill and compact the trench after pegging (Fig 6-3A). For installation below normal water level, use of Salix pre-filled Rock Rolls or Rock Mattresses on top of the RECP may be recommended (Fig 6-3B). Bottom anchor trench can be eliminated when using pre-filled Rock Mattresses over RECP along the bottom edge.

**Note: In adverse soil conditions longer pegs/stakes or earth anchors may be necessary to properly secure the RECP.*

RECP Installation guide Version 1.0

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