

Reinforced Earth System

A guide to the Abslope SM Reinforced Earth System for constructing steep vegetated slopes

Abslope SM is an economical and structurally flexible sustainable earth retaining slope system developed for road embankments, acoustic bunds, amenity slopes, land reclamation projects and housing developments to meet the demands of Engineers, Architects and Developers. The system consists of a proprietary steel mesh facing panel and retained earth, reinforced with ABG geogrids. The slope can be constructed to a face angle of 60° to 70° and the steel mesh facing is lined with a vegetation liner to assist establishment of a grassed slope face. The Abslope system provides an environmentally friendly and economic alternative to conventional retaining structures such as concrete gravity walls or gabion baskets.

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Abslope SM Benefits

more

- + Environmental compatibility
- + Slope stability
- + Carbon saving
- + Usable land
- + Flexible construction
- + Re-use of site-won materials

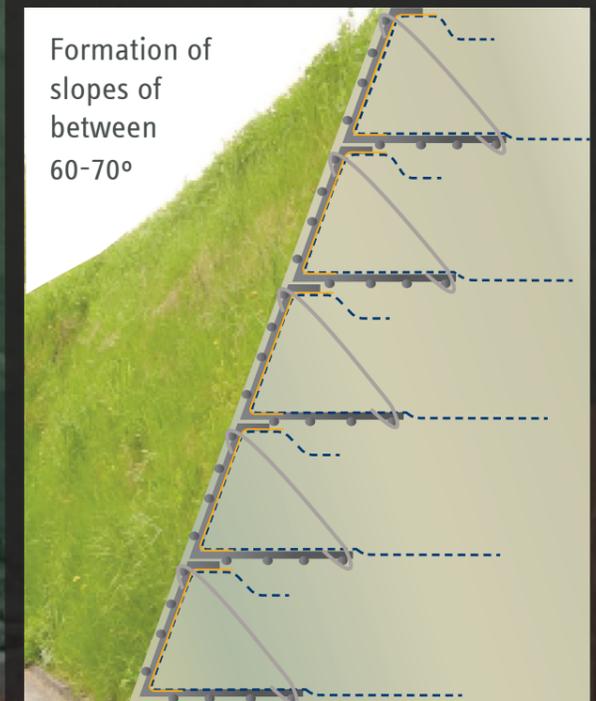
- Construction costs
- Construction time

less

Hydroseeding -

East Midlands Gateway Rail Terminal Embankment

Formation of slopes of between 60-70°



ABG Abslope SM System

Abslope SM - Introduction

Steep slope construction system with geosynthetic reinforcement and prefabricated steel facing units



System Components

The main components include ABG Geogrids, steel mesh facing units, vegetation liner, site-won fill, topsoil and drainage geocomposite



System Overview

Abslope SM enables the construction of steep vegetated slopes (to a face angle of between 60° to 70°) by incorporating steel mesh facing panels and geogrids to stabilise backfilled soil layers. ABG's proprietary Fildrain drainage geocomposite is also typically specified as part of the design to provide drainage to the back of the reinforced slope.

Abslope SM is an economical system, and enables structurally flexible earth retaining slopes to be constructed for:

- road embankments
- acoustic bunds
- amenity slopes
- land reclamation projects
- housing developments & National Trust properties

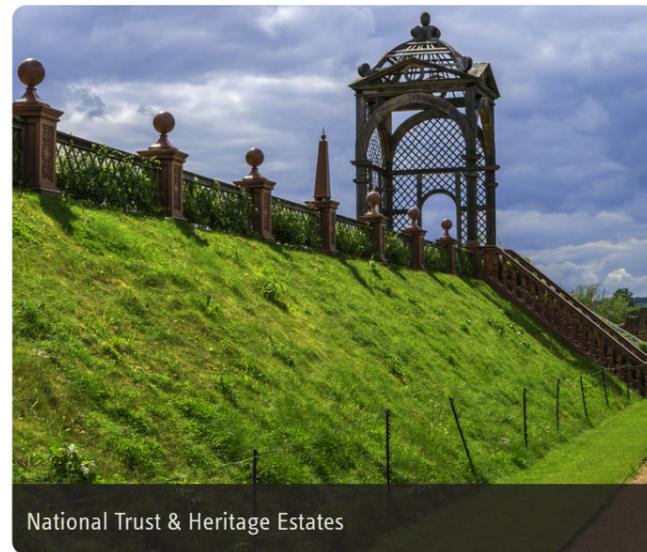


Highways Embankments

Vegetation

Grass or wildflower seed is added to the slope face to create an attractive and natural looking vegetated surface that blends in with the surrounding landscape and protects against erosion.

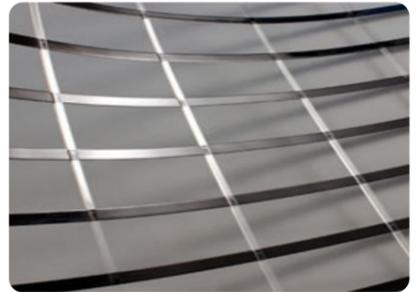
The retained topsoil surface of Abslope SM allows a free growth of plants and where fast vegetation cover is required, we recommend hydroseeding. Where slopes will be exposed to excessive sunshine or wind, provision for additional irrigation measures should be made*.



National Trust & Heritage Estates

ABG Geogrids

ABG Geogrids stabilise the reinforced earth fill and provide excellent tensile strength properties. Due to the interlocking effect of soils within the grid apertures, a reinforced earth structure with high internal strength is created. Dependant on the type of soil fill used and the load it needs to support, different strengths of ABG geogrids are available.



Steel mesh formwork panels

The Abslope SM system utilises a proprietary steel mesh facing panel. The prefabricated steel mesh is bent to the required angle to ensure the slope is constructed in accordance with the drawings and site layout. The relatively flexible nature of the facing element permits subsequent settlements of the fill without creating stability problems within the overall surface. Brace bars are included with the panels to secure the angle of the mesh against deformation during backfilling and compaction.



Site-won fill & topsoil material

Generally, locally available soil can be used for the fill material, provided it can be compacted adequately to an approved specification (e.g. MCHW). Care should be taken that large stones (> 75 mm) are removed, since these could damage the geogrids. Additionally, good quality topsoil with adequate water storage capacity should be added along the slope surface (maximum 150 cm wide from the front face).



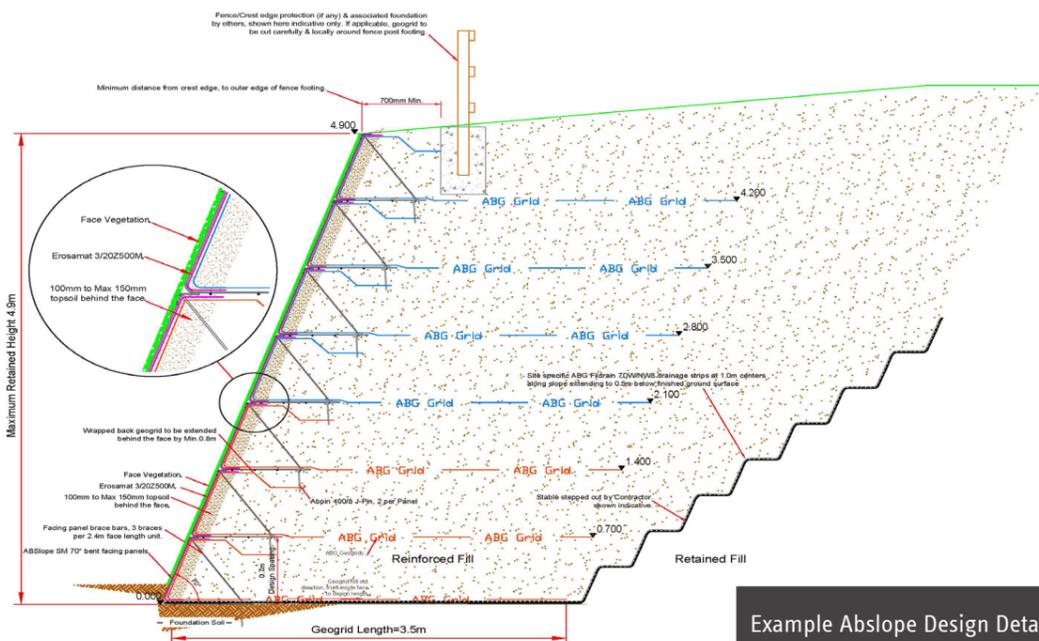
Vegetation liner

ABG's HDPE vegetation liner is wrapped around the inside of the steel mesh to facilitate grass propagation and to protect the roots from being displaced during heavy rainfall. UV stabilised liner options are available to prevent degradation of the material before planting cover has been established*.



Drainage geocomposite

ABG's proprietary Fildrain geocomposite is typically specified as part of the Abslope design to provide seepage water drainage at the back of the reinforced earth structure. The cusped core delivers excellent in-plane flow, and the integral outer geotextile filter prevents soil from clogging the drainage channels.



Example Abslope Design Detail

*Successful establishment of vegetation cover is the responsibility of the landscaping contractor.

Abslope SM - Construction Sequence

Site drawings and detailed installation instructions are provided for each project, a brief summary of the initial key steps are shown below.

1 Excavate firm, level base

2 Abslope steel mesh panels

Place panels to the level base, overlap adjoining panels by 100mm and tie together using steel wire. The back of the panel is positioned and fixed to the ground using steel pins.

3 Fildrain geocomposite

Where specified, roll Fildrain from the top of the cut slope and pin to the ground. Position flat to the back of the slope and underneath the steel mesh panels.

4 Vegetation liner

Cut liner to size and run up and over the inside of the steel panels. Fix to the mesh using cable ties and drape over the outside of the panel by approximately 200mm.

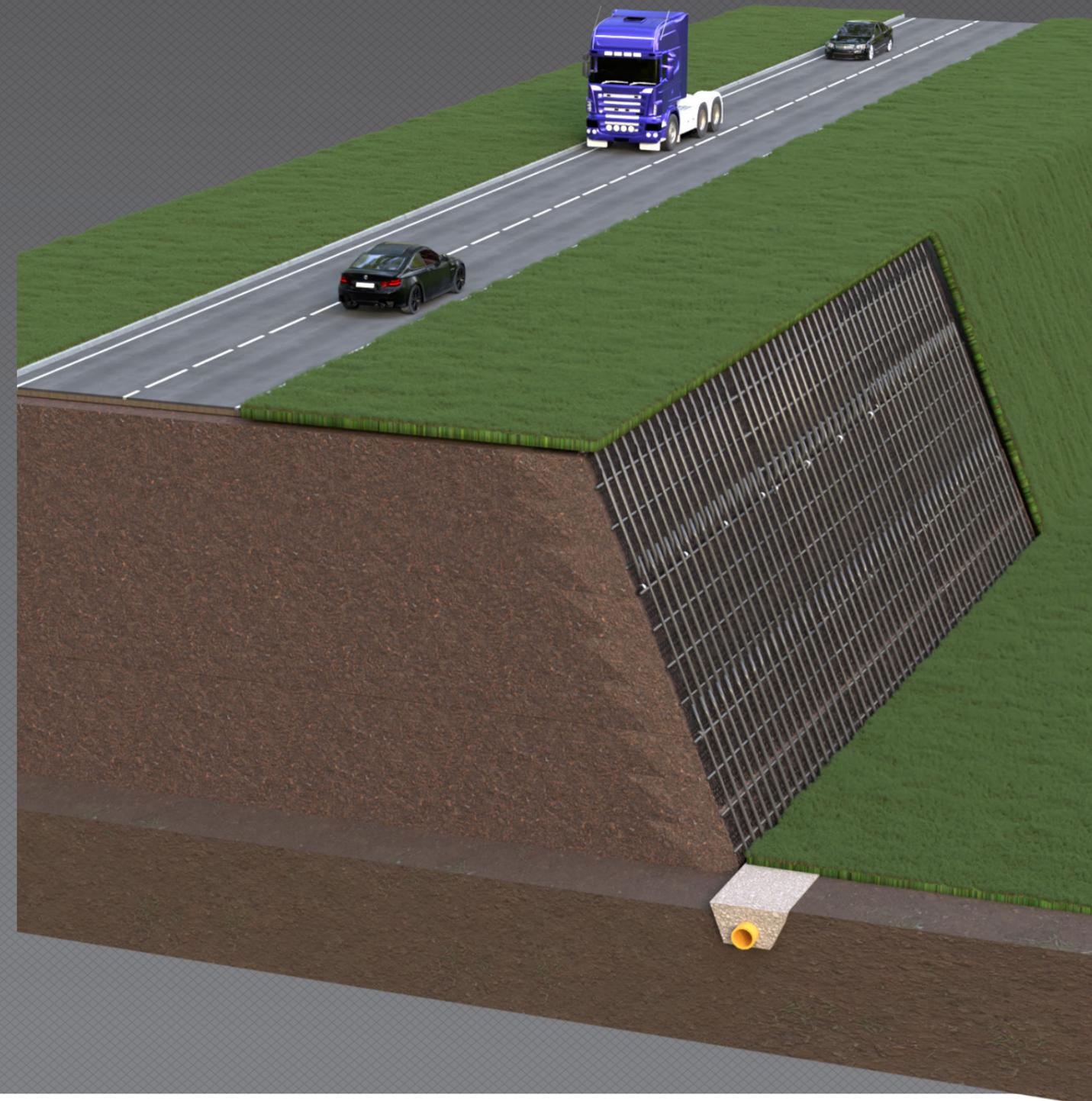
5 Geogrid

Cut to correct dimensions and roll up and over the inside of the steel mesh, drape down the front of the panel by approximately 800mm. Geogrid extends along the ground at the base of the Abslope panels to the back of the cut slope. Geogrid is tensioned in position at the back of the slope against a fill layer.

Abslope SM - Construction Sequence

Refer to site site specific drawings and install instructions for full details.

6 Topsoil layer placed to the inside corner of the Abslope panels to facilitate grass establishment. Backfill placed and compacted in lifts until full height of reinforced Abslope system is reached, ready to be hydroseeded, or alternatively can be pre-seeded during placement of topsoil layer.



Abslope - Applications & Design Service

Reinforced slope system provides a flexible option for highways, rail and building developments.

Abslope for Highways & Rail applications

The cost effectiveness and adaptability of the Abslope SM system provides highway and rail engineers with a versatile and lower carbon footprint option compared to traditional methods such as reinforced concrete walls.

Building Developments

Where large building and enabling works projects (including supermarkets, logistics parks and housing developments), encompass significant site elevation changes, the Abslope system offers a more natural aesthetic to gabion or crib walls and savings of up to 75% over conventional construction methods such as reinforced concrete are typically possible.



1 Embankment following initial hydroseeding



2 Embankment with grass established a few weeks later

Design Service

ABG's experienced civil engineers are on hand to provide initial suitability assessments and standard design details to help create an outline budget cost.

If the system is deemed to be appropriate following the initial project assessment, a more detailed design and calculation report will be prepared, with drawings issued for construction as well as specification and installation details. Indemnified designs are available where required and the system can be built using ABG's BBA certified geogrids.

The construction of Abslope SM requires no special foundations apart from a stable formation to provide the adequate bearing capacity, so construction time may be significantly reduced and the system can be built using standard construction plant.

It should be noted that reinforced soil structures can accommodate relatively large differential settlements, and the allowable bearing capacity requirements can often be relaxed accordingly.

ABG - Associated Products



Erosion Control

ABG offer a range of temporary and permanent erosion control turf reinforcement mats and geocellular components for protection against erosion and for the retention of soils on steep slopes.



Drainage

ABG drainage geocomposites offer very high flow capacity and provide a cost effective alternative to traditional stone groundwater drainage solutions.



Tree Root Protection

The Abweb TRP system is a no dig solution for preventing damage to tree root structures and greatly reduces the depth of imported stone required.



Webwall Retaining Walls

Webwall is a geosynthetic system designed for the construction of flexible retaining walls. It uses a geocellular mattress which is laid in layers, with each expanded and filled with site won materials in order to form a structure with a stepped vegetated face.

About ABG

ABG is a market leader in the design, development, manufacture and technical support of high performance geosynthetic systems for use in a wide range of civil engineering, environmental and building projects.

Formed in 1988, based in Meltham, in the heart of the Pennines, ABG have developed an excellent reputation for developing quality products and delivering outstanding service. The ability for rapid product development ensures that the most innovative, up to date and cost effective solution can be found for many engineering problems.

Technical support is provided by our trained and experienced staff, many of whom are Chartered Civil Engineers. This extensive support extends to full design, design validation, feasibility studies, cost advice and advice on meeting regulatory requirements.

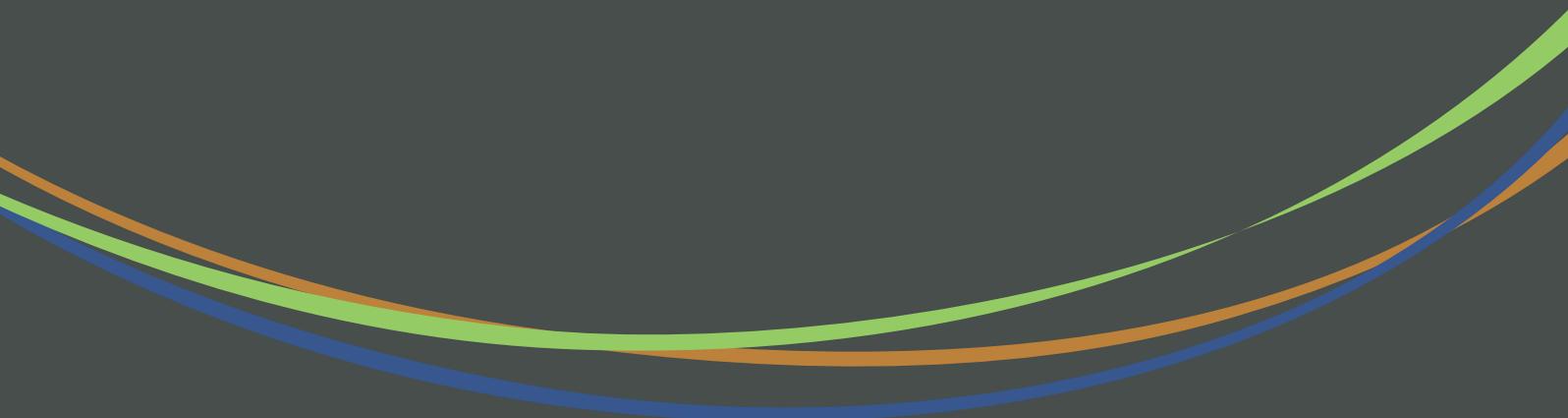
Part of this technical support includes developing and driving knowledge within our active markets, including working with both international and local regulatory bodies on developing guidance and best practice in the use of innovative geosynthetics to solve complex engineering issues.

In support of the construction industry's objectives to reduce the carbon footprint of civil engineering activities, ABG has signed up to the UK Civil Engineer's Emergency Climate Change Declaration. As part of this commitment, ABG has appointed leading carbon management consultants Carbon Footprint Ltd to verify the exact carbon emissions for each of the products we manufacture for geotechnical and Sustainable Drainage applications. This enables precise embodied carbon data to be given for a customer's project and supply chain assessments.

To discuss your project specific requirements contact us.

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