



Geotechnical

High quality geosynthetic systems for geotechnical and earthworks applications

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• Challenges in geotechnical engineering

Geotechnical engineering challenges range from soil instability to environmental considerations and demand for innovative solutions to ensure the success and safety of infrastructure projects.

Pioneering geotechnical engineer Karl Terzaghi famously quoted that "In engineering practices, difficulties through soils are almost exclusively not due to the soils themselves, but to the water contained in their voids. On a planet without any water there would have been no need for soil mechanics".

The variability found in soil composition, strength and behaviour poses a significant obstacle during the design and construction phases, and to solve the problem of water and saturated soils (especially with the advent of increased annual rainfall) competent geotechnical designs are required to minimise the risks of excessive settlement or even failure.

Engineers must navigate through these diverse geological conditions, from loose sandy soils to dense clays, adapting their designs to ensure stability.

Another challenge arises in the realm of slope stability with natural slopes and man-made embankments susceptible to erosion, landslides and other stability issues.

Ground engineering and earthworks drainage design solutions are critical to ensure that stabilisation, retaining walls and embankments are suitable for the specific soil conditions.

• The advantages of geosynthetics for geotechnical engineering

For more than 60 years, geosynthetics have been used extensively throughout the world to deliver innovative and cost-effective solutions that offer many advantages over traditional techniques and help to provide a sustainable alternative.

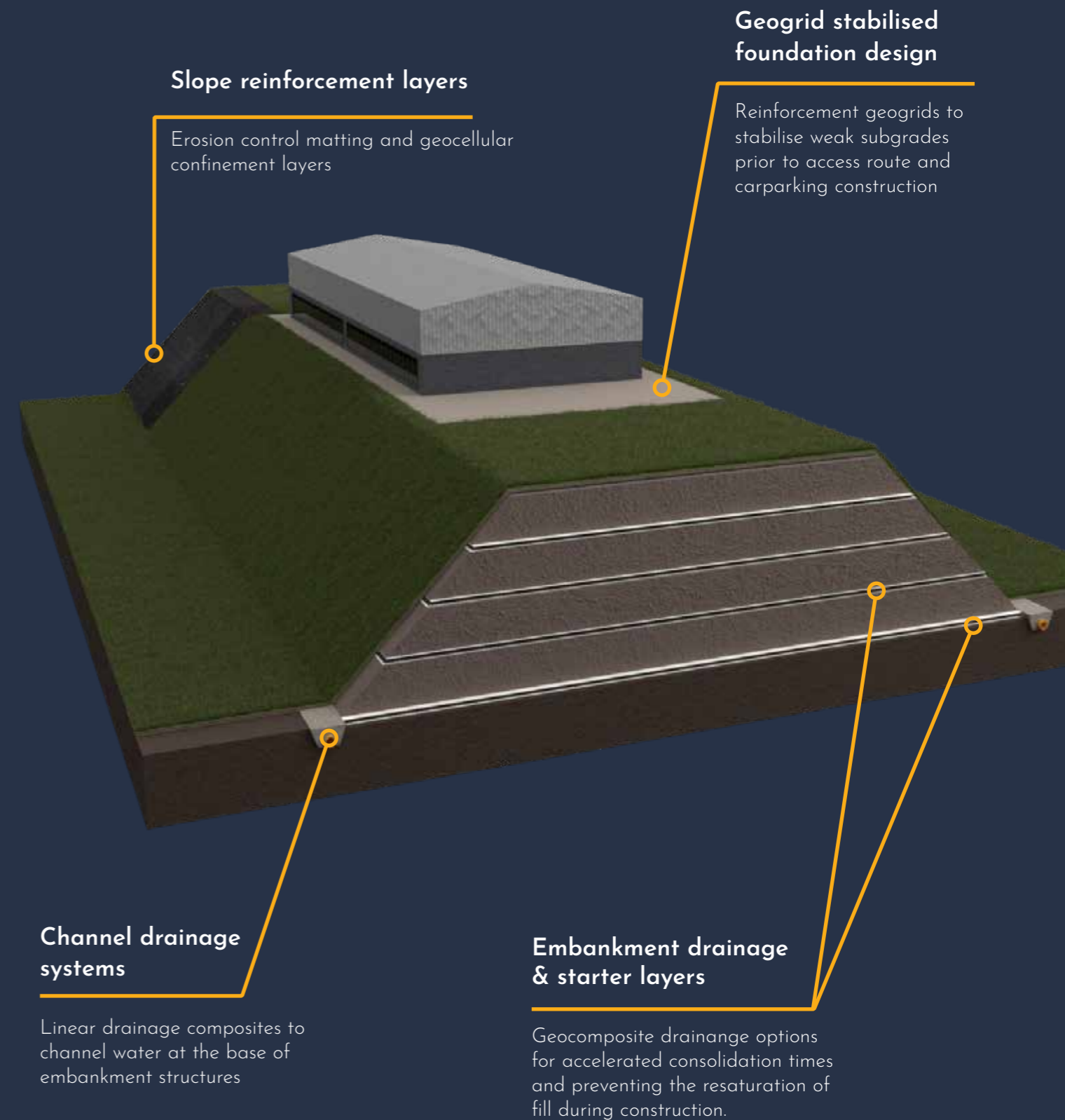
Innovative foundation solutions, such as geosynthetic reinforcement techniques, are employed to mitigate poor ground conditions and ensure the longevity of structures that marry stability with sustainability.

Geotechnical engineers employ various techniques, including slope stabilisation measures, reinforcement with geosynthetics, and geocomposite drainage systems to enhance slope stability and mitigate potential hazards.

Geocomposite drainage solutions also not only improve the structural stability of earthworks projects, but also minimise the project's environmental footprint.

For example as the main alternative method to granular drainage and 6C foundation materials geosynthetics save as much as 50-90% CO₂;

- **Geosynthetic consolidation layers vs crushed stone drainage blankets**
- **Geocomposites for vertical structural drainage vs concrete blocks**
- **Vegetated retaining wall systems vs stone, gabion and crib walls**



• Geosynthetics Manufacturing

ABG are specialist manufacturers of geosynthetics for use in civil engineering and geotechnical applications. Our earthworks solutions encompass:

- A comprehensive product range for highways, rail and landscaping engineering sectors
- Drainage geocomposite starter layers consisting of a combination of filter and protection geotextiles with integral cusped core
- Innovative reinforced earth retaining wall systems
- Erosion control products including Erosaweb® and many other specialist geotextile and geomembrane components
- Working platform and temporary works projects
- The protection of water resources and land stabilisation
- Integrated technical support; from detailed design to project installation guidance

• Geotechnical Solutions

Our product range delivers the key functions required for geotechnical engineering applications:

- Robustness to withstand installation and service life
- Superior drainage
- Stability and shear resistance solutions for steep slopes
- Accelerated consolidation rates
- Carbon footprint saving materials and construction techniques
- Geogrid, geocellular and geotextile based design solutions
- Professional indemnified project designs available

Typical applications:

- Earthworks Drainage
- Ground Reinforcement
- Landscaping & Erosion Control
- Retaining Walls & Reinforced Slopes
- Working Platforms & Subgrade Stabilisation



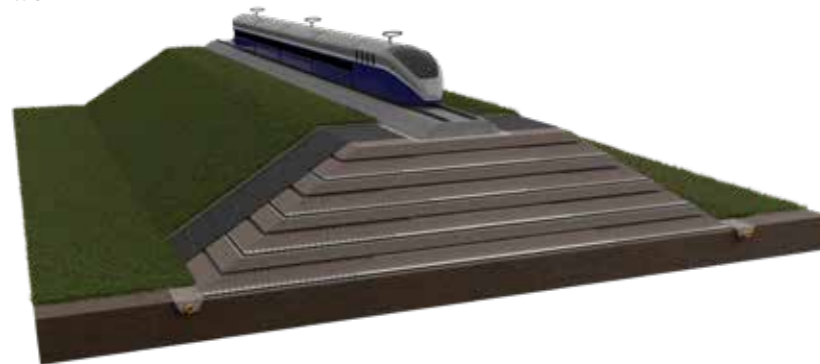
• Earthworks & Embankment Drainage

Drainage is a major consideration in all Civil Engineering schemes and well designed and effective drainage of earthworks plays a key part in the overall success of a project.

At ABG we are specialists in the design, manufacture and supply of geosynthetic drainage systems for civil engineering projects, including a range of advanced geocomposites.

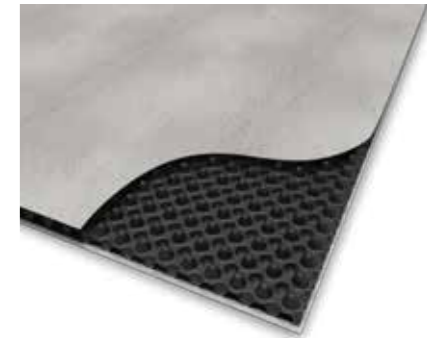
Our experience also includes a long track record of accelerating fill consolidation in embankments on a number of national infrastructure schemes.

When used in place of traditional drainage stone, geocomposite products deliver a significant reduction in the environmental impact, as well as reducing costs and installation times.

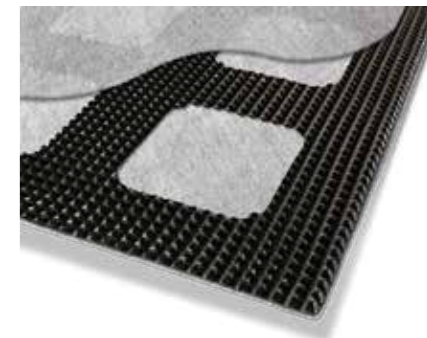


• Earthworks Drainage Solutions

Fildrain® sub-surface drainage using a horizontal layer of geocomposite to replace the need for granular starter layers, as well as relieving pore pressure and accelerating consolidation. Available bonded to a range of geotextiles to suit the ground conditions and site specific application.



Pozidrain® G geocomposite has a lattice structure core which offers superior interface friction performance for drainage applications on steep slopes. A primary application for earthworks projects is for the rapid consolidation and settlement of new embankment structures.



Pozidrain® K all-in-one geocomposite system comprises an impermeable back HDPE cusped drainage core and a geotextile bonded on one or both sides. This version of Pozidrain delivers long term creep resistance of up to 250kPa for resistance to installation loads. The addition of an "L" flat selvedge down one edge of the Pozidrain rolls enables a pressure seal between adjacent rolls for leakage prevention.



• Earthworks Drainage & Consolidation with Pozidrain®

Magna Park in Lutterworth provides a high-quality business park environment specifically focused on logistics and distribution. Covering over 550 acres, it is bounded by the M1, M6 and M69 motorways, making it the first choice for logistics due to its strategic position in the centre of the country.

The Pozidrain G geocomposite drainage layer was used to provide drainage above the 150mm Class 6C platform and PVDs at a 1.5m grid spacing.

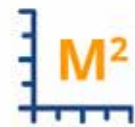
Pozidrain was also installed within the embankment fill at 3m vertical spacings to provide accelerated consolidation.

The use of Pozidrain G geocomposite instead of drainage stone resulted in an impressive 86% / 2,998 tons of CO₂ saving in this design.

Product:
Pozidrain® G

Project:
Magna Park Logistics,
Lutterworth

Quantity:
400,000m²



400,000m² of 4mm Pozidrain



2,998 tons of Co2 saved compared to traditional methods



31 Pozidrain deliveries compared to 8,000 aggregate deliveries



A total of 86% Co2 saving

● Ground Stabilisation

Our design department has many years' experience in designing unpaved roads, car parks and windfarm access roads over very weak CBR subgrades. We are able to offer cost-benefit advice on which solution is best suited to your project, utilising one - or a combination of - geogrids, geocells and geotextiles that deliver a lower carbon footprint.

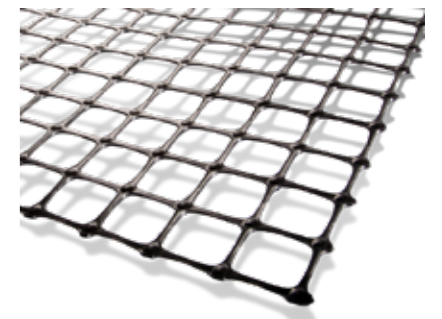
Working platforms are temporary structures made up of granular fill, typically between 300mm to 800mm thick, that provide a suitable foundation for heavy construction plant and machinery to carry out operations such as crane lifts and piling. The aggregate base installed for the platform is designed to reduce the pressure imposed on the underlying formation to an acceptable level.

A poorly constructed working platform with inadequate drainage can quickly deteriorate and become unsafe to support the movements and loading from large equipment, resulting in potential rig overturning accidents or vehicles sinking into the weak sub-soils.



● Ground Stabilisation Solutions

ABG geogrid ranges solve a variety of geotechnical design challenges: from ground reinforcement, sub-base aggregate reduction, basal reinforcement and paved and unpaved road foundations; through to permeable paving construction, retaining walls and steep-sided soil embankments. Options include biaxial, triaxial and fibre reinforced grids.



Abweb geocellular panels for slope reinforcement and ground stabilisation applications. Abweb pockets are smooth and unperforated for use in car parking, tree root protection and access road containment applications.



Terrex NW is a range of high performance, thermally bonded needle-punched non-woven UV-stabilised polypropylene geotextiles. Their main range of application is in separation and drainage of granular stone layers. Appropriate grades of Terrex NW may be used to provide a protection layer to geomembrane liners and other materials.



Working platform stabilisation

The historic Pooley Bridge was destroyed during the 1 in 700 year Storm Desmond in December 2015. Cumbria County Council funded a £7M replacement bridge project to restore the connection for communities on both sides of the river in Pooley.

The poor, silty sandy clay ground at the river's edge needed a reinforcement solution to support and manoeuvre the large cranes required to lift the bridge into position.

The positioning of the cranes was precarious, with high loadings and shear stresses being generated close to the river's edge onto underlying weak ground, creating a risk of the crane over-turning into the water.

ABG's design engineers were appointed to calculate the unreinforced and reinforced platform thicknesses to support loadings up to 401 kPa.

A subgrade foundation design utilising 4 layers of high tensile strength Abgrid 30 / 30 geogrid was verified as suitable to support the 1,200 tonne crane commissioned to lift the 285 tonne stainless steel span into place.



Product:
Abgrid & Terrex

Project:
Pooley Bridge,
Lake District, UK

Quantity:
15,000m²



● Green Slopes & Earth Retaining Walls

ABG's range of Reinforced Earth Retaining systems include green / vegetated surfacing options to suit the desired aesthetics of the project. Face angles ranging from 26° to 70° can be achieved and a design life from 60 years up to 120 years.

ABG's earth retaining solutions include the Webwall, Abslope SM and Abslope EM systems, with designs adapted to suit our client's budget and site specific requirements.

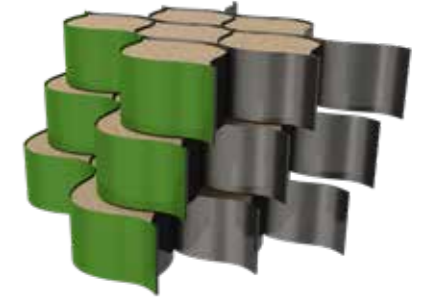
ABG's involvement in the design and construction of reinforced earth retaining walls extends to over 25 years, from when we first developed and launched our own range of ground engineering solutions.

These systems include a comprehensive range of geogrids and geotextiles for earth reinforcement and the development of Webwall®, our own cellular retaining wall system designed as a sustainable and cost saving alternative to gabions and crib wall constructions.



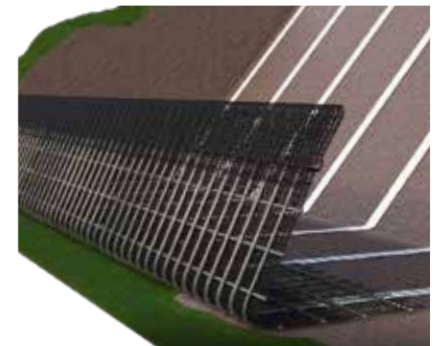
● Green Slopes & Earth Retaining Walls

Webwall® is formed from horizontal layers of Webwall geocell panels, each panel being expanded and filled layer by layer until the required height is achieved. Using Webwall geocell for green faced walls enables near vertical faces to be built quickly and easily, with the added benefit of using site won materials as fill.



Abslope SM is a geogrid-reinforced steep soil slope system with steel mesh face to create grassed slopes between 60° to 70°.

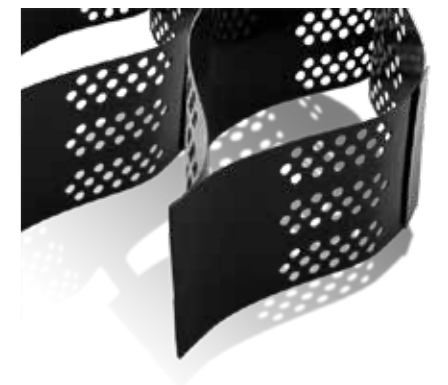
Abslope EM is a geogrid-reinforced soil slope for embankments up to 45° with a vegetation liner on the face to support a naturally vegetated surface.



ABG Geogrids solve a range of geotechnical design challenges for retaining walls and steep-sided soil embankments. Options include biaxial, triaxial and fibre reinforced grids.



Erosaweb geocellular panels for slope reinforcement and ground stabilisation applications. The panels are perforated to allow drainage through the geocell pockets.



● Green Slopes & Earth Retaining Walls

Chesterwell is a new residential development situated to the north of the historic town of Colchester.

To achieve sufficient rainwater storage, a sizeable attenuation pond was required to blend in with the contours of this shallow valley site. A sympathetic retaining wall system was required for two sides of the pond.

ABG's in-house Design Department proposed a curvilinear Webwall, reinforced using geogrids with behind slope structural drainage achieved using Fildrain drainage geocomposite.

Webwall geocell is a three dimensional cellular confinement system, that when combined with geogrid reinforcement, enables the use of locally won fill material to form a steep retained surface, reducing the requirement to import structural fill.

The green front cells are filled with topsoil and then planted.

Product:
Webwall®

Project:
Chesterwell Development,
Colchester, UK

Quantity:
1,000m²





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