



GEOSYNTHETICS LIMITED

Housing & Residential Solutions

our BUSINESS

A message from the Chairman



CHRIS FOXTON Chairman Geosynthetics Limited

We firmly believe that the value engineered (VE) solutions we offer, are the best value to suit your project and business specific needs, to meet the requirements of your clients. By combining our technical knowhow and practical experience, we can VE many applications.

Our technical and engineering teams are developing an enviable reputation for providing innovative and sustainable solutions. We will support and achieve your key objectives, by reducing resources, saving time and money, having a positive impact on health and safety, and the social and built environment.

We are not limited by our own manufacturing capabilities – by collaborating with our global manufacturing and UK industry partners, we have countless products at your disposal. They invest in the necessary performance testing, to provide us with the data we need for our numerous methods of analysis.

In developing a team of professional engineers, we have enabled them with the capabilities to VE a range of engineering problems. They have access to industry leading methods of analysis, tools and software. We are devoted to providing the most sustainable range of engineered product based solutions for your civil engineering projects, across all of the civil engineering market sectors.

"We will offer you the best value engineered solutions, not our only solution"

Our technical and engineering teams provide a key customer service - they are responsible for the production of our detailed analyses, Technical Recommendations (TRs), and application specific AutoCAD drawings.

By having access to both bespoke and internationally recognised methods of analysis, we can provide site specific solutions for your civil engineering projects. We will also collaborate with our industry partners to produce hybrid proposals, that combine our geosynthetic products and their geotechnical system solutions.

Our services extend beyond our doorstep - our team of experts are qualified to take our solutions to site, to share industry best practice and guidance during all of the pre-construction, enabling, main construction, in-service and maintenance phases.

We welcome your engagement, collaboration and partnership with Geosynthetics Limited, to help you achieve the most efficient solutions, based on your site-specific needs, supporting national and global, social and sustainability strategies.

Inspired solutions for civil engineering

MARKET SECTORS

Our value engineered solutions can be fully utilised by all of the civil engineering industry market sectors, to reduce their immediate and/or long-term impact on time, cost, health and safety, while having a positive impact on our environment.

Our customer categories remain consistent across all of the sectors – these include national and local adoption clients and stakeholders, principal designers, designers and specialist consultants, architects and planners, Tier 1 principal contractors and their Tier 2 & 3 subcontractors.

All of the sectors must target the same objectives, including the UK's HMG 'Construction 2025', the United Nation's 'COP26' and the UN's 2030 'Transforming Our World' agenda. We must all recognise that this decade is a "pivotal moment in the fight against climate change".

Alongside these ambitious targets, our customers have a diverse range of individual, commercial, social and sustainability focused KPIs.

These can be addressed by adopting our value engineered solutions and services.



HOUSING & RESIDENTIAL

Progress towards a target of 300,000 homes to be constructed per year during the 2020s will continue, which will see at least a million more homes built in the coming years.

Developers for all of these residential schemes should look at ways to exploit our value engineered solutions, to help counter rising material costs and the shortage of resources.

Our value engineered solutions and services will help developers maximise plot space and reduce construction resources.



HIGHWAY INFRASTRUCTURE

Highway infrastructure schemes can sometimes be very complex, as they can comprise a multitude of applications, each bringing with them their own challenges.

Clients, consultants and contractors may not have the specialist knowledge or in house resources to bring all of these challenges together under one roof, but our team of experts can help.

Geosynthetics Limited has a proven track record of offering multiple solutions for applications in the highway infrastructure market.



RENEWABLE ENERGY & UTILITIES

With the increase in wind, solar, nuclear, & other renewable energy schemes, there is also an increased burden on the power networks – which in turn need route upgrades.

These development sites and the subsequent energy network improvements, are generally built across areas with poor ground in increasingly remote locations.

In particular, VE of remote sites can have a significant impact, by reducing costs and the site construction programme.



RAILWAY INFRASTRUCTURE

The railway sector is undergoing major investment. It faces many construction challenges to ensure that our railway networks are kept in a safe and serviceable condition.

We can offer expertise on a range of applications such as embankment stabilisation, reinforced soil slopes and walls, along with temporary and permanent foundation solutions.

Railways have a narrow corridor, with access points in both rural and urbanised areas. Any reduction in resources are extremely beneficial.



COMMERCIAL & BUILT ENVIRONMENT

Due to the increased development of residential areas and public amenities, there is a requirement for more shopping facilities, retail parks, commercial sheds and inland ports.

The Clients, developers and architects of these sites, should look for ways to improve the environment, increase biodiversity and reduce the amount of waste generated from site.

Be it a green roof, noise bunds, gabions, protection of existing trees, soft landscaping or parking zones, we are confident we have a solution for you.



COASTAL & ENVIRONMENTAL

Due to the effects of global warming, coastal and inland waterway levels pose a much higher risk of floods, with threats to businesses, property, people and their livelihoods.

All of these sectors generate waste water and require general drainage systems. We have a range of SUDS, water storage, and surface and waste water management solutions.

We are always looking to further develop ways to manage and control water, through the use of innovative and sustainable solutions.

STUDY

ROCKBOX AND TENAX

Forge Bank Co Housing Reinforced Slope

The

BACKGROUND

Forge Bank Co Housing Scheme is made up of 41 houses designed and built to the highest of eco-friendly standards.

Our Client's

REQUIREMENTS

Due to it being built on a steep slope, the development required a solution for reinforcing the slope whilst maintaining a low carbon footprint and utilising existing materials.



Our Value Engineered SOLUTION

The solution provided by Geosynthetics Limited combined site won materials with Tenax Geogrids and Rockbox Gabions to create a strong and reliable structure which maintained the ecological values of the project.

The most challenging structure was "Terrace E". This section of the design called for a 7.5m high reinforced structure. The development also needed to incorporate the column foundations for the 3 bed house above.

Due to the on site soil being a cohesive glacial till it was determined that a reinforced earth wall comprising of Tenax TT uniaxial geogrids would minimise the footprint of the development and more importantly accommodate the column foundations. Due to the distance between the column foundations to the face of the structure a Tenax LBO biaxial geogrid was introduced for secondary reinforcement to eliminate "Bulging" at the face.

The face of the structure needed to fit in with the natural aesthetics of the site to achieve this a single skin of welded Rockbox units were secured to the face of the wall with a series of mechanical connections.Duodrain drainage composites were also placed behind the reinforced soil area to alleviate pore pressure. The solution allowed the use of site won soils and dramatically reduced the footprint of the structure whilst providing a finish in keeping with the rest of the development.

Lancaster Cohousing



STUDY

TENAX TT, T BLOCK & EKOTEX Meadowside Development Retaining Wall

The BACKGROUND

As part of the Section 278 works for the Meadowside housing development, a retaining wall was specified beneath the existing main road and access road into the scheme. This retaining structure needed to also accommodate a vehicle containment barrier.

Our Client's REQUIREMENTS

The initial design brief was to provide an aesthetically pleasing and cost effective alternative to a traditional reinforced concrete wall, whist satisfying the requirements of the adopting authority.



Our Value Engineered SOLUTION

The Geosynthetics Engineering team prepared a technical recommendation and from this were able to demonstrate that a reinforced soil wall would meet the requirements and offer significant cost reductions over a concrete wall.

The geometry of the site dictated that a vertical retaining wall to a maximum height of 5.4m would be required with a vegetated battered slope above. The T Block wall system was proposed to provide a maintenance free aesthetically pleasing finish to the structure.

The T Block wall system utilises the unique T Clip connector which provides a mechanical connection between the Tenax TT geogrid and the precast T Block. The strength of this connection is a factor in allowing the design of a value engineered reinforced soil retaining wall.

BLOOR HOMES®



STUDY

PRODUCTS

Lovell Homes - The Fitz, Cockermouth Rivel Faced Reinforced Soil Wall

The

BACKGROUND

New housing site which required extensive cut and fill operation to achieve an upper and lower plateau for construction of residential properties

Our Client's REQUIREMENTS

The site was intersected by a beck running from the A66 above the site down to the River Derwent. The watercourse was to be realigned and would form the transition point between the upper and lower plateaus.



Our Value Engineered SOLUTION

The scope of works called for 4 reinforced soil structure varying in heights from 3m to 5m. The largest structure was designed to take a highway loading on the top and utilise a 70 deg face with a vegetated finish.

Geosythetics worked with the property developer and the local authority to go through the AIP adoption process. All structures were designed in accordance with BS8006 and utilised Stratagrid reinforcement and a green face achieved with steel mesh formwork and landlock erosion control matting to prevent the wash our of soils and accelerate the establishment of vegetation.

The end result gave a very aesthetically pleasing natural appearance which was in keeping with the local environment. Alternative solutions for this project would have resulted in hard faced retaining structures such as RC Concrete retaining walls with a brick skin which would have been both expensive to construct and visually harsh.





STUDY

ROCKBOX, HELICALS & EKOTEX Dickens Manor, Solihull Balancing Pond

The BACKGROUND

Dickens Manor is a residential development in Solihull in the West Midlands. Within the outline design of the scheme a requirement was identified for a balancing pond to be incoporated as part of the sustainable urban drainage system.

It was decided that this could become a feature of the development and that an aesthetically pleasing edge detail and combined retaining structure would be required.



Our Client's REQUIREMENTS

The project developer contacted Geosynthetics to seek assistance with a design and supply package.

After conducting a review of the site requirements including soil analysis, topography and location of property foundations.

Our Value Engineered SOLUTION

Geosynthetics proposed a gravity gabion retaining structure that could accommodate the close proximity to both bridge abutments and foundations whilst allowing the formation of complex curves.

Geosynthetics were able to provide assistance to the site installation team and introduced the use of helical fastenings to assist with the speed of assembly. All RockBox units were dispatched from stock and the material order was routed via a preferred merchant stockist inline with our merchant policy.





STUDY

TENAX Longforth Farm Working Platform (Piling Mat)

The

BACKGROUND

Bloor Homes were building a new residential development at Longforth Farm near Wellington in Somerset. Due to the presence of an area of soft soils on the site.

The designers determined a piled foundation was the most appropriate solution.



Our Client's REQUIREMENTS

Bloor Home approached Geosynthetics Limited to investigate the possibilities of optimising the BRE 470 piling mat design they had been provided.

Geosynthetics were able to demonstrate utilising the Tenax Reinforced Soil Raft Concept, that a reduction in platform thickness could be achieved by introducing a high modulus geogrid.

Our Value Engineered SOLUTION

The initial design called for 500mm granular material and the inclusion of a 60kN/m geotextile.

The Geosynthetics calculation allowed a reduction in thickness to 360mm with the introduction of the Tenax HM Geogrid. The result was a combined saving in excavation, muck away and imported granular material. This provided an overall cost saving for the developer.



This case study demonstrates the benefits of utilising extruded geogrids to help distribute heavy loads and reduce the thickness of a granular material required utilising the BR470 design method. Our "Reinforced Soil Raft" method utilises the specific modulus characteristics of the Tenax geogrid to optimise the solution and generate further savings.



STUDY

CELLWEB TRP

Keats Way Tree Root Protection

The

BACKGROUND

Following the recommendations in Arboricultural Practice Note 12 and BS 5837 2005 and 2012, three dimensional cellular confinement systems have been widely used as a no dig solution in the construction of new hard surfaces within root protection areas (RPA's).

Geosynthetics Limited were approached by JPP Consulting Civil and Structural Engineers regarding a new residential development on land off Keats Way, Rushden Northamptonshire. The area of land to be developed could only be accessed from Keats Way and a new access road would need to be constructed.

The only feasible route for the new road would pass through the RPA of a large Beech tree. The Beech was considered to be of high amenity value and was to be retained within the new development, which meant that a 'no dig' tree root protection system would need to be used for the construction of the access road. The road ultimately needed to be adopted by the local council.



Our Client's REQUIREMENTS

Geosynthetics Limited were approached by JPP Consulting Civil and Structural Engineers regarding a new residential development on land off Keats Way, Rushden Northamptonshire.

Technical Requirements:

- 2.4m change in levels
- Curve Design
- Vegetated embankment face

Our Value Engineered SOLUTION

The Engineering department at Geosynthetics Limited calculated a site specific technical recommendation and proposed the solution. The solution used layers of 200mm depth Cellweb®TRP stacked on top of each other to increase levels.

The system was terraced to create a gradual reduction in levels as the route progressed north towards the new development. This solution was adopted and a full design was carried out by JPP Consulting Civil and Structural Engineers.





STUDY

STRATAGRID

Southam Grange Reinforced Soil Slope

The

BACKGROUND

A new residential site in Southam for Bloor homes which required a 2.5m high x 185m long acoustic bund to help screen the new residential development from adjacent industrial premises.

On the crest of the bund an acoustic fence would be installed giving a total height of 4.5m. Geosynthetics developed a reinforced soil solution for the entire structure using Stratagrid uniaxial geogrids in a wraparound installation with landlock placed on the face to prevent soil wash pout and encourage vegetation growth.



Our Client's REQUIREMENTS

In order to mitigate the import of fill material the solution comprised the use of a site won cohesive subsoil with a minimum internal friction angle of 26 degrees to be utilised.

The bund which extended to 9m wide at the base was founded on relatively weak soils and it was necessary to construct a starter foundation layer of 300mm Type 1 incorporating a layer of Tenax geogrid to assist with load distribution and prevent any settlements.

Our Value Engineered SOLUTION

The structure was designed in accordance with BS 8006 This approach allowed significant savings to be made by utilising site won soils rather than importing a suitable material and in doing so also prevented the site won soils from being taken off site.

In addition the bund also reduced the overall height of the acoustic fence generating further savings. The solution once completed vegetated very quickly and provides a natural looking acoustic earth bund in keeping with the surroundings.



This case study highlights the benefits of reinforced soils solutions providing a natural looking green structure. The use of site won soils has benefits in reducing associated costs of export of site won soils and import of granular soils.

STUDY

1.0MM DRS LLDPE IMPERMEABLE MEMBRANE, FLOWTEX, PROTECTION FLEECE Liberty Gardens, Syston - Balancing Pond Balancing Pond

The BACKGROUND

Stormwater Management Limited were approached by P Hughes Construction who required the installation of LM1.0mm DRS (Double Rough Sided) Impermeable Membrane and a double layer of Flowtex Protection Fleece for the sloped embankment areas of a balancing Pond on a new Taylor Wimpey housing development.

MARKET SECTOR: \bigcirc **LOCATION:** \bigcirc Barkby Road, Syston Leicestershire, LE7 2AH **DEVELOPER:** Taylor Wimpey **CONTRACTOR:** P Hughes Construction **CONSULTANT:** JPP Consulting & Civil Engineers

Our Client's REQUIREMENTS

Consulting Engineers JPP Consulting had specified DRS impermeable membrane as a textured finish was required for the Balancing Pond to prevent movement of the growing medium.

Our Value Engineered SOLUTION

Materials were supplied by Geosynthetics Limited via MAP Building & Civil Engineering Supplies Ltd and installed by Stormwater Management Limited.

Stormwater Management Limited are an Integrated Service Provider. By organising the two site visits required we discussed and agreed with the contractor the application and installation process. We liaised with the Merchant regarding the materials order plus its delivery and effectively co-ordinated with the installation team to ensure a mutually agreed start date for the project.





This case study highlights how the issue of cover soil deployment can be overcome utilising a textured membrane and protection fleece. The lining system was design to be 100% watertight and the double welded joints were air tested to demonstrate compliance. The membrane has excellent resistance to chemical attack and will ensure no pollutants can enter the underlying soils.



STUDY

BENTOTEX Braintree **Balancing Pond**

The BACKGROUND

Stormwater Management were approached by Tamdown Group for the supply and installation of a Clay liner which was required for a balancing pond on a housing development site in Braintree Essex.

Our Client's REQUIREMENTS

Client drawings specified a 1:3 slope angle and our Bentotex 50 Clay Liner was recommended for the project.



MARKET SECTOR: \bigcirc



LOCATION: London Road, Braintree Essex. CM7 2FB



CONSULTANT: Wormald Burrows Partnership Ltd



CONTRACTOR: Tamdown Group

Our Value Engineered SOLUTION

Bentotex is a high specification geosynthetic clay liner, comprising of high quality natural sodium bentonite encapsulated between two woven and non-woven needle punched polypropylene geotextiles.

Bentotex adopts unique self-seaming overlap technology which does not require any additional treatment of its longitudinal edges and offers a robust construction with a long performance.

Bentotex does not require specialist welding equipment, however it must be installed by an experienced team. Stormwater Management Ltd were able to offer a quick turnaround on the supply and installation of the materials.



This case study demonstrates the benefits of utilising Bentotex GCL for stormwater attenuation ponds. The coversoils utilised as surcharge material will vegetate over time providing a natural green solution. Bentotex does not require any specialist jointing and can be easily deployed with a overlap joint due to the impregnated jointing bands provided as standard across the bentotex range.





ENGINEERING SERVICES

Our technical and engineering teams produce detailed analyses, Technical Recommendations and AutoCAD drawings, to demonstrate the suitability of our products when combined in a value engineered solution. These engineering services are a complementary overhead, which can be used in mutual collaboration with our customers.

Having access to both tailored and internationally recognised methods of analysis, we can provide site specific solutions for your civil engineering projects. We will also collaborate with our industry partners to produce hybrid proposals, that combine our geosynthetic products and their geotechnical system solutions.

Our specialist geotechnical consultancy partners can provide fee based design and engineering services, such as detailed designs covered by their professional indemnity insurance, and Cat.2 & Cat.3 checks.



"We are so much more than just a product supplier."



Image: Elan Valley Aqueduct, Bleddfa, Wales.

A working platform was constructed at a height of over 13m, on a sloping site, with a 160m long retaining wall using site won fill. A **68% cost saving** was achieved and a **47% reduction in tCO**₂e.



EDUCATIONAL CPDS & PROVISION OF TECHNICAL LITERATURE

For customers who would like to increase their knowledge in this subject matter, we share best practice, through general CPD training events. Supporting literature is available at any stage.



BESPOKE SEMINARS TRAINING ON METHODS OF TECHNICAL ANALYSIS

For individuals and/or organisations that require a more detailed understanding of the value engineering process, bespoke workshops can be tailored to suit your specific needs.



PRODUCT SPECIFICATION GENERAL ADVICE & APPLICATION GUIDANCE

Where generic specifications have been written based on technical properties, or 'products of a similar approved specification' can be procured, we can provide product based technical advice.



CONCEPTUAL ADVICE FOR FEASABILITY & PLANNING STAGES

In the early conceptual stages of a scheme, we can recommend generic application cross sections and/or indicative value engineered cost savings.



DETAILED ANALYSIS & CAD DRAWINGS FOR CUSTOMER ADOPTION

Our collaborative efforts can progress to the production of detailed value engineering analyses. Our VE proposals can be issued with AutoCAD drawings for adoption in to the works.



TECHNICAL RECOMMENDATIONS DESIGN & TENDER STAGES

Once drawings and specifications are being generated for the tender documents, we can support the design consultants and tender bid companies with our TR's.

SITE SUPPORT DURING MOBILISATION & CONSTRUCTION PHASES

We have the knowledge to take our solutions to site, providing complementary installation and construction advice, during the enabling, main construction and maintenance phases.



FEE BASED SERVICES DESIGNS & DRAWINGS FOR CONSTRUCTION

Our specialist geotechnical consultancy partners can provide fee based services, such as Cat.2 & Cat.3 checks, and detailed designs covered by professional indemnity insurance.



HIGHWAY INFRASTRUCTURE



HOUSING & RESIDENTIAL



RENEWABLE ENERGY & UTILITIES



RAILWAY INFRASTRUCTURE



COMMERCIAL & BUILT ENVIRONMENT



COASTAL & ENVIRONMENTAL



FOUNDATION SOLUTIONS



REINFORCED SOIL SOLUTIONS



TREE ROOT PROTECTION



PERMEABLE PAVEMENTS



LANDSCAPING SOLUTIONS



WATER MANAGEMENT

Geosynthetics Limited Fleming Road Harrowbrook Ind Est Hinckley, Leicestershire LE10 3DU

Tel: 01455 617 139 Fax: 01455 617 140 Email: sales@geosyn.co.uk

Please contact our head office to arrange a phone call, meeting, presentation or seminar:-

- Learn how we share best practice, through collaboration with the civil engineering sectors.
- Understand how our solutions and applications can reduce the impact on your own environment.
- Gain further information on the extensive portfolio of engineered products* used in our applications.

*For information on the products used in our value engineered solutions, refer to our product catalogue.