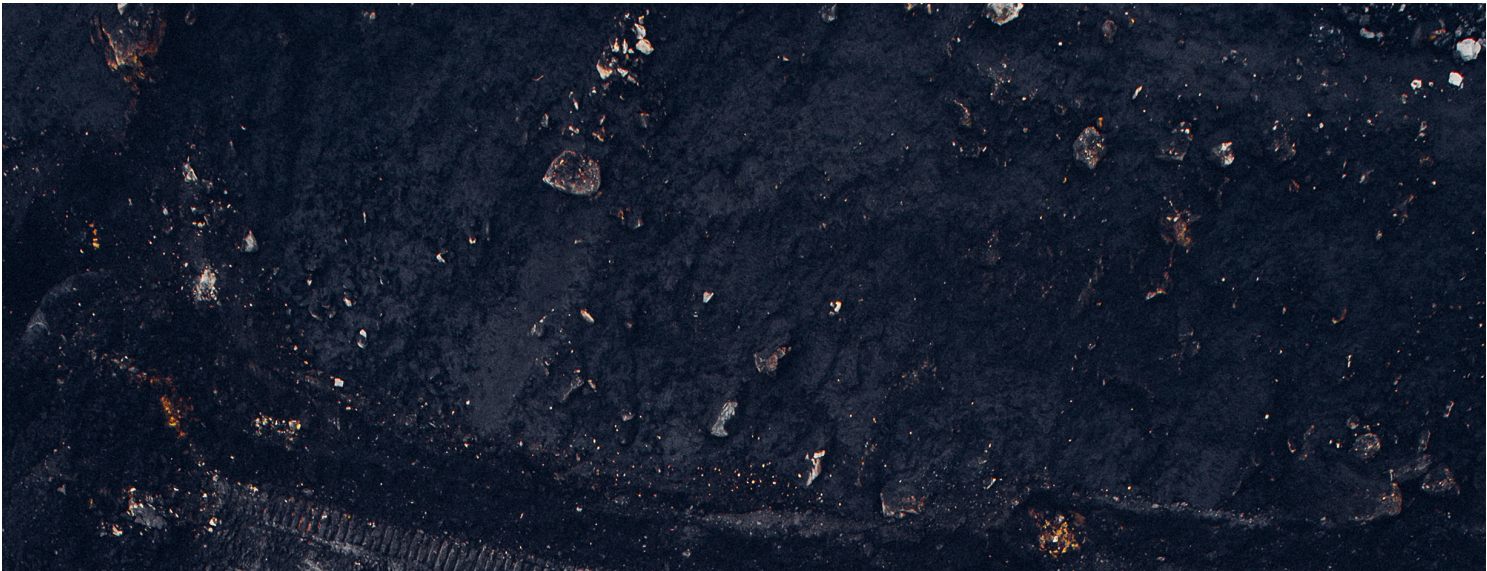




**MINING
SOLUTIONS**

GEOFABRICS®

Sustainable solutions



protect
contain
secure



Why use geosynthetic engineering in mining?

Geosynthetic engineering is the use of synthetic materials in civil engineering projects to achieve more cost effective, environmentally sound and safer construction outcomes. The design techniques bring particular benefits to mine sites, because geosynthetics maximise the use of site soils and avoid the need to import additional construction materials.

BENEFITS FOR MINERS

ECONOMIC

The fundamental benefit of using geosynthetics on mine sites is to save costs by replacing high volumes of soil material required to build civil engineering infrastructure. These costs can be substantial, especially in remote locations.

TECHNICAL

Geosynthetic design can remove the risk of variability in traditional engineering applications. The consistency of product across the full roll, eliminates the variability of soil construction methods. A miner can then strategically approach the same applications around the world with the same Geosynthetic solution.

ENVIRONMENTAL

By reducing volumes of soil material required, there is less need to quarry and fewer machines needed to build infrastructure, reducing the carbon footprint. Geosynthetic lining systems are equivalent or superior to traditional soil containment of waste and contaminants, and surface erosion systems protect waterways from dust and sediment.

SAFETY

Geosynthetics are utilised to reduce staff exposure to dangerous working conditions including roof control in underground mining, and rockfall protection beneath unstable rock slopes.

ROADS

When installed in haul roads and trafficable working areas, the geosynthetic will:

- Support heavy load platforms
- Maximise performance of on-site material
- Reduce ongoing maintenance costs

RAIL

- Improve formation performance when constructed in poor ground conditions
- Reduce maintenance interruptions
- Reinforcement and drainage ensures minimal disruption to rail transport corridors
- Improve safety through rockfall and slope protection

SOFT GROUND & TAILINGS CAPPINGS

- Allow traffic and embankment construction over soft ground
- Facilitate tailings lifts and pit rehabilitations through capping reinforcement

SLOPES & RETAINING

- Enable construction of ROM walls and other retaining walls by utilising site material
- Protect areas prone to rockfall
- Increase slope stability

UNDERGROUND

- Ensure safer operations using mesh
- Prevent rockfalls impacting people and operations
- Improve road and drainage infrastructure

WASTE & CONTAINMENT

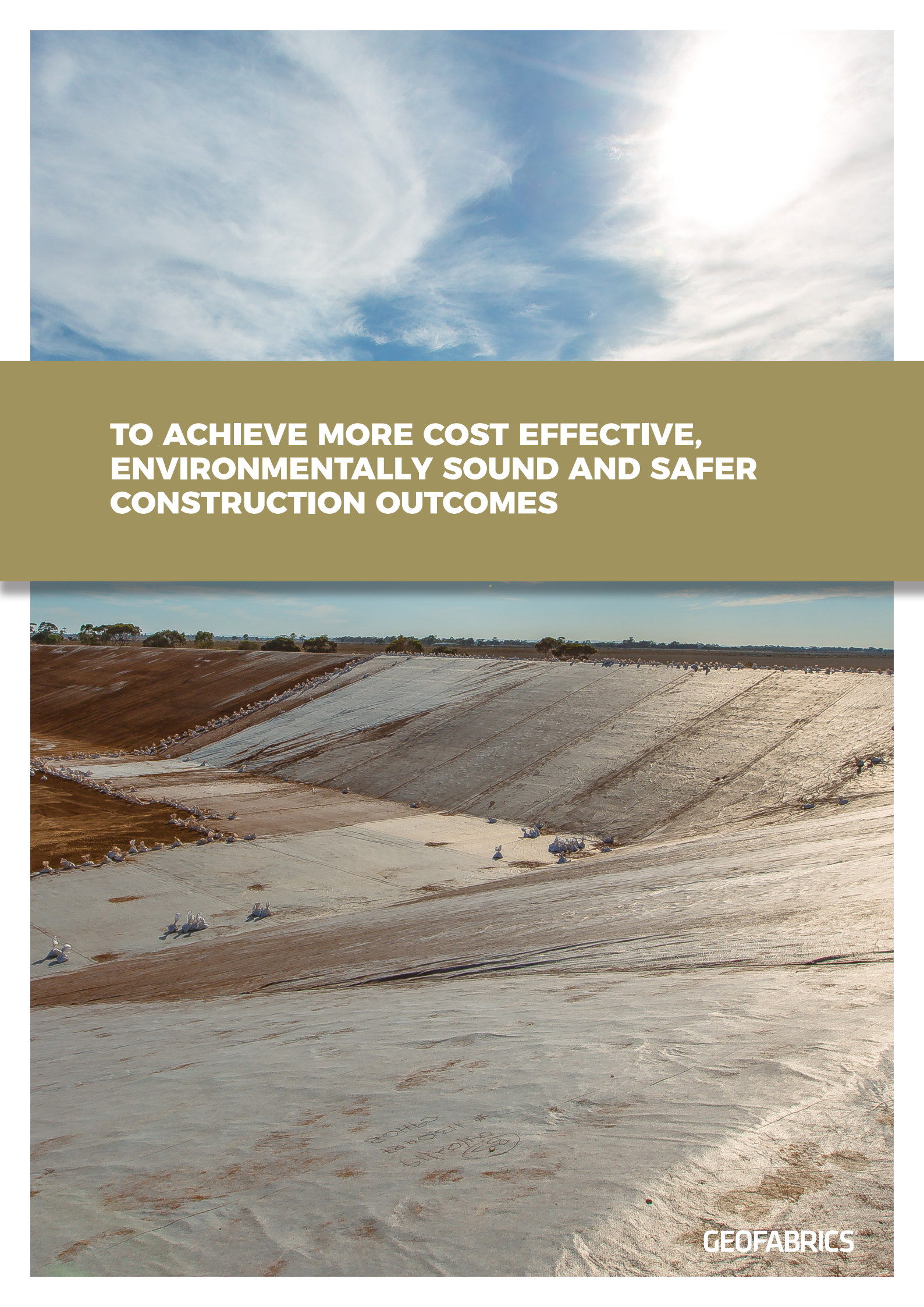
- Provide higher environmental protection than traditional seepage dams
- Pre-qualification testing can determine appropriateness and predict lifespan

Up to
30%

Reduction in
construction
costs

6x

Improved
design-life



**TO ACHIEVE MORE COST EFFECTIVE,
ENVIRONMENTALLY SOUND AND SAFER
CONSTRUCTION OUTCOMES**

GEOFABRICS



**WORKING WITH CLIENTS TO DEVELOP
THE RIGHT GEOSYNTHETIC SOLUTION
FOR EACH PROJECT**



Who are Geofabrics?

Geofabrics are the only Australian manufacturer of geosynthetic products, with plants in Albury, New South Wales and Ormeau, Queensland.

Our success is based on strong partnerships with clients to solve their engineering problems. Our vision is to be a solution provider, to supply products that demonstrate cost savings, superior technical performance, safer operations and better environmental outcomes.

Technical leadership

GEOFABRICS GRID LABORATORY

We supply world-class technical leadership and engineering support through our innovation, research, industry education, design and independent testing services.

Our GRID (Geosynthetic Research, Innovation & Development) laboratory is a specialist facility that works with clients to develop the right geosynthetic solution for each project.

Based in south east Queensland, the laboratory houses a selection of key geosynthetic-specific test equipment. Testing is aimed at solving the real-world problems that designers, contractors and asset owners find on their site – to ensure the right solution is adopted.

- Analysis is performed according to Australian and International test methods
- Comprehensive test reports are generated, including results, photos, graphs, test conditions and details of the apparatus used
- Research is supported by industry leading suppliers in both laboratory and field trials across America, Europe and Asia

MINING DESIGN & INNOVATION HUB

Geofabrics Mining Design and Innovation Hub can provide our clients with specification reviews, design suggestions and certified designs for geosynthetic applications. We employ engineers who can review historic mining process and provide innovative solutions that are more cost effective and technically superior.

Our comprehensive design advice can include stability analysis, typical sections and standard details. Our team can also assist with product specifications and installation guidelines for tenders.

INNOVATION & EDUCATION

We provide technical and practical education to engineers about the use of geosynthetics in a range of infrastructure projects.

Our team conducts real-world, technical seminars for engineers and contractors to earn CPD hours through our Geofabrics University; we also run in-house workshops for our clients and undertake lectures at universities around Australia and in New Zealand.

We are proud to support the next generation of engineers through sponsorship of PhD candidates.

QUALITY & TRACEABILITY

Geofabrics manufactures in compliance with the Australian and International Quality Standards and are ISO 9001 assured. We operate two QA Laboratories in Australia – Albury is NATA Accredited, Ormeau GRID is GAI LAP accredited and products are tested frequently and transparently.

SUSTAINABILITY

We work to protect, contain and secure the physical environment using smart geotextile and geosynthetic products. We help our clients mitigate environmental risk through world leading research and innovative product development.

Geofabrics is a proud member of the Infrastructure Sustainability Council (ISC).

SITE INSTALLATION

Geofabrics has the largest regional footprint of any geosynthetic supplier in Australasia. We have branches in key mining regions, so we can deliver product where and when you need it and provide local expertise to support your project.

Product installation is critical to project success, local representation can ensure correct procedures and minimal delays.



GEOFABRICS
UNIVERSITY



35+
Years of
reliable supply

GEOFABRICS



**CAPPING LAYER
REINFORCEMENT**

**BALLAST
STABILISATION**

MUD PUMPING

**WASTE &
CONTAINMENT**

**TAILINGS DAMS
& HEAP LEACH PADS**

DEWATERING

**EROSION
CONTROL**

**ROAD
INFRASTRUCTURE**

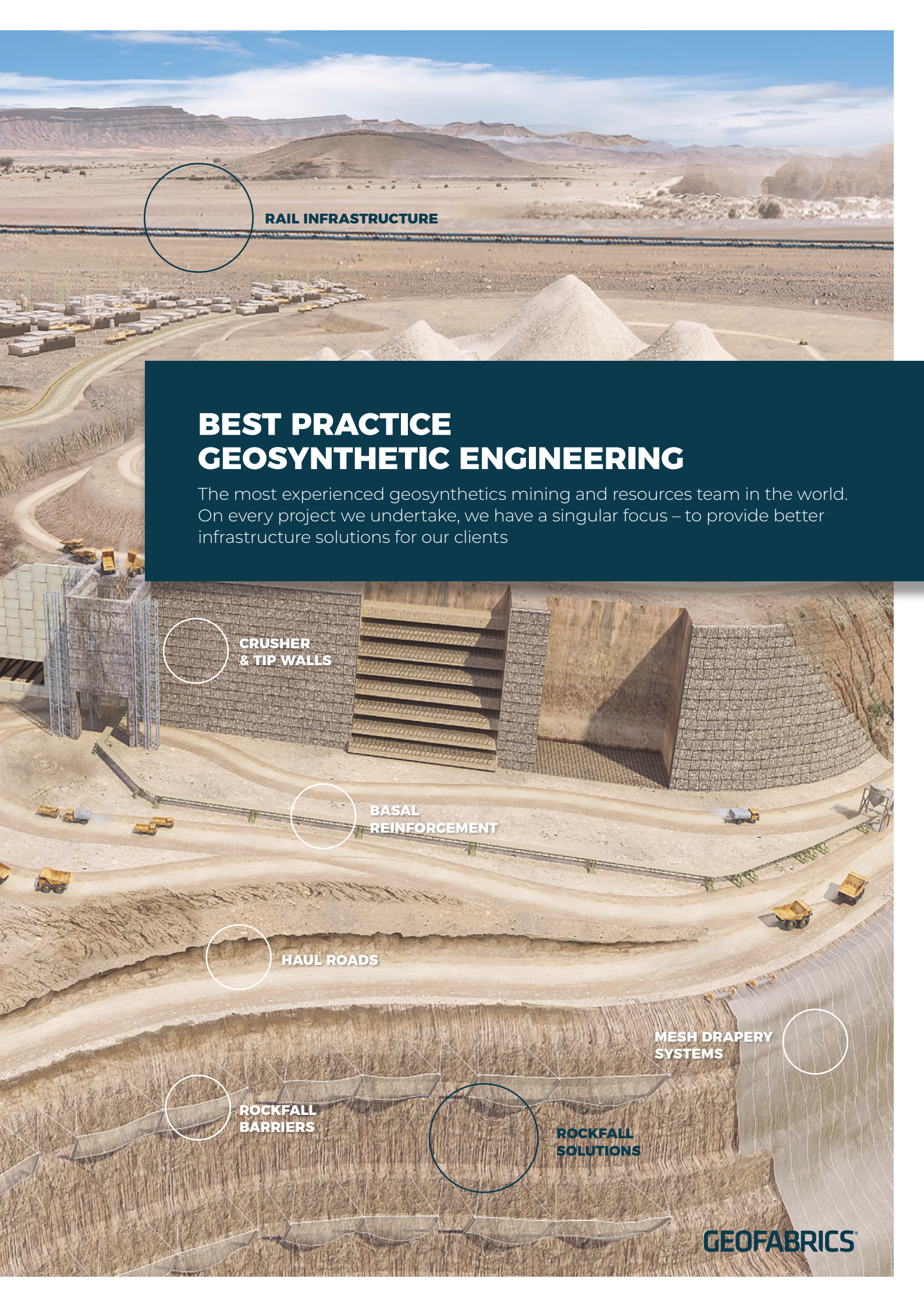
**REINFORCED
SOIL WALLS**

**UNDERGROUND
MINING**

**ROOF & RIB
SUPPORT**

**TUNNEL
PORTALS**

**CABION HYDRAULIC
STRUCTURES**



RAIL INFRASTRUCTURE

BEST PRACTICE GEOSYNTHETIC ENGINEERING

The most experienced geosynthetics mining and resources team in the world. On every project we undertake, we have a singular focus – to provide better infrastructure solutions for our clients

**CRUSHER
& TIP WALLS**

**BASAL
REINFORCEMENT**

HAUL ROADS

**ROCKFALL
BARRIERS**

**MESH DRAPERY
SYSTEMS**

**ROCKFALL
SOLUTIONS**

GEOFABRICS



Roads & rails

Geosynthetic engineering allows for the construction of roads and rail in areas deemed previously unsuitable, enabling access to coastal, tailings and soft sludge environments. They can also improve safety in a range of other mining construction applications.

Reducing
aggregate
depths by up to

30%

in road
construction

50%

reduction of
structural infill
depth with
Geoweb

HAUL ROADS, MINE ROADS & CONSTRUCTING ON SLUDGE

The cost of constructing roads on mine sites is insignificant when compared to the cost of maintaining them. Geofabrics geosynthetics are used in roads to ensure the best construction performance using the site resources available, to both minimise construction costs and prevent costly maintenance disruptions.

Geofabrics provide solutions that encompass all road types, from temporary access tracks to high volume haul roads.

- New road construction on soft ground and general unpaved roads
- Utilisation of site soils
- Improved structural performance of haul roads
- Serviceability of haul roads to maintain cycle speeds, reduce maintenance, ensure safer operations and reduce truck depreciation

- Improved road surface performance of working and high traffic areas
- Embankments in coastal areas

In the age of mine automation, better roadway surfaces also translate to higher production volume output, and higher returns for investors.

RAIL INFRASTRUCTURE

The Geofabrics Rail Division has critical design expertise and a long project history in the utilisation of geosynthetics for the construction and maintenance of rail formations.

- Improved bearing capacity of in situ subgrades to enable formation construction
- Improved structural performance of ballast and reduced soil importation
- Extended maintenance intervals and reduced costs by maintaining track alignment

Slopes & walls

Geofabrics offers a range of engineered slope, embankment and retaining wall solutions used to construct mining infrastructure projects.

SLOPE STABILITY & ROCKFALL

- Improved surface stability of mild slopes, water courses and spillways
- Large height Mechanically Stabilised Earth (MSE) retaining and crusher walls
- Protection of mine staff and assets from instability of rock faces
- Independently verified rockfall mitigation systems

To support the design of retaining walls, slopes, and embankments, we provide access to expert technical specialists who use advanced design

software to ensure fast, accurate, and customised solutions for every project.

The Geofabrics team of engineering specialists are available to give technical advice and can provide in-house or seminar training. Our team can also provide certified designs if required.

- Rockfall protection of working areas and infrastructure
- Veneer protection for slopes
- Reinforced and steep slopes
- Retaining and crusher walls

RECOMMENDED ROAD & RAIL PRODUCTS

Bidim Green non-woven geotextile
Mirafi PET high strength woven geotextile
Mirafi RSi multifunctional woven geotextile
Bitac multi-laminate road tape
Sealmac Green paving fabric geotextile
AR-GN geocomposite
Biaxial geogrid
Triaxial geogrid
GlasGrid asphalt geogrid
Megaflo Green socked slotted drain pipe

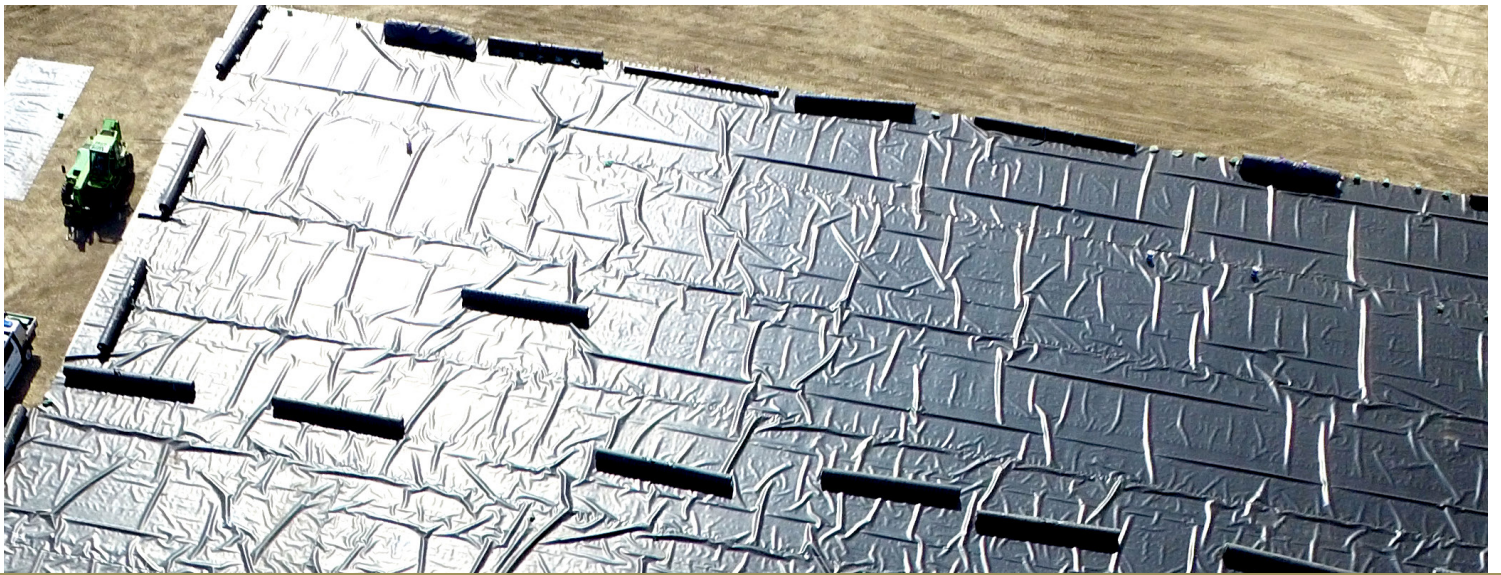
Geoweb cellular confinement geocell
Tracktex Green anti-mud pumping geocomposite
Miragrid GX geogrid
Slope reinforcement geogrids

RECOMMENDED SLOPE & ROCKFALL PRODUCTS

Rockfall netting
Steelgrid rockfall drapery system
Geomesh wire mesh systems

ALLOWING FOR SAFE CONSTRUCTION IN SOFT AND UNSTABLE ENVIRONMENTS





TAILINGS LINER AND CAPPING SOLUTIONS THAT PROVIDE ADVANCED ENVIRONMENTAL PROTECTION



Waste & water

The environmental perception of tailings and mine waste storage is a key challenge facing the industry after recent catastrophic dam failures around the world. The industry is now implementing higher engineering controls for containment and improved monitoring of waste storages.

Tailings & waste

Geofabrics provides tailings liner and capping solutions that provide higher environmental protections over traditional seepage dams. Our drainage and dewatering solutions provide economic benefits in terms of water re-use and storage volumes, and we offer techniques to repurpose tailings waste.

We have the technical capabilities and solutions to facilitate the most cost effective pit and tailings closure rehabilitation.

The Geofabrics GRID Laboratory can pre-qualify recommended geosynthetics with performance testing and impart lifetime predictions.

Tailings and waste storages observe design conditions of elevated stresses, temperatures and exposure conditions not seen in traditional civil engineering. Coupled with liquors containing elevated chemistry properties, the durability of the geosynthetic poses a key regulatory question, which the GRID laboratory has demonstrated through testing for over ten years.

DRAINAGE & DEWATERING

Mineral heavy mine tailings are often challenging to refine and transport for disposal. Geofabrics has a range of solutions for drainage, dewatering, channels and spillways.

- Designed specifically to the chemistry of the liquor to be detained
- Ensure that atmospheric exposure (UV, temperature) does not compromise the liner design life
- Ensure chemical compatibility of geotextile components and both GCL internal and external shear strength will survive site stresses
- Reliable waterproofing systems engineered to suit challenging site conditions

RECOMMENDED WASTE & CONTAINMENT PRODUCTS

Polymeric geomembranes
Elcoseal geosynthetic clay liner
Teranap bituminous geomembrane
Texcel R non-woven staple fibre geotextile

- High robustness to survive challenging subgrades and cover soils

Geofabrics has a range of options that link to interface shear testing and hydraulic testing with a range of liquors at the GRID laboratory.

PROTECTION, CUSHION & FILTER GEOTEXTILES

Used to either serve a protection function for the Geomembrane Lining system, or serve a critical filter function when placed in direct contact with the waste or tailings.

- Critical to maximising drainage performance of both through flow and solids retention
- Prevents clogging of drainage aggregate or more critical Geonets
- Increase dam capacity
- Improves tailings stability
- Allows maximum recovery of dam water for re-use onsite

DRAINAGE & LEAK DETECTION

A Geofabrics Drainage Geocomposite can be used to capture groundwater volumes below the lining system, and drain tailings liquor heads acting on the basal lining system.

- Maximise solids retention to prevent clogging of fine particles into the Geonet system

Megaflo Ultra removes water from your structure faster than any other drainage system. It has very high strength and is designed for use under excessive loads, such as very deep tailings dams.

The technology built into the Bidim C offers an effective, lower cost means for designers and installers to undertake liner integrity surveys in newly constructed containment projects.

Over
10 years
of Geofabrics
GRID Laboratory
testing data

Protection is
becoming a
critical part
of a mine's
Social License
obligations



Underground mining

Underground mining is a distinct segment of the mining sector, with coal and other minerals being extracted from depth for processing.

Being underground demands high safety. Strata control and the maintenance of underground roads, need to be undertaken in confined spaces. These challenges, as well as protection of portal entrances and water quality considerations, make our range of underground mining solutions quite exciting for mine operators.

STRATA CONTROL - RIB & ROOF SUPPORT

Tensor Mining Grids have been widely used in Australia over the past 20 years as an alternative to steel mesh as strata control in underground coal mines. Tensor Mining Grid is a high strength, lightweight flame-retardant, self-extinguishing polymer grid. The grid provides supplemental support of the roof and ribs of a combustible underground opening (such as within a coal mine), to prevent roof materials from falling, and rib materials from spalling.

In recent years, a range of stronger polymer mesh grades have been added to the portfolio, providing mine operators with greater flexibility in their use of light-weight polymer mesh compared to traditional steel meshing systems.

UNDERGROUND ROADS

Whilst the road network in underground mines are critical to the efficiency and safety of a mine's operations, some mines require frequent maintenance of their road network due to water ingress, soil conditions or vehicle loads.

Geofabrics has completed many projects using Tensor geogrids, Solmax Reinforcement or Geoweb Geocells:

- Maintenance cycle for the underground road network is greatly extended
- Maintenance costs reduced
- Mine productivity increased

PORTAL ENTRANCES

At every mine portal entrance, there is a need to minimise or eliminate falling debris from the rock face above the portal.

For many years, Geofabrics has worked with mine operators or drilling contractors to create a safe working environment through the use of rockfall netting and other rockfall control systems.

COAL WASHDOWN & SEDIMENT PONDS

Underground mining can be a dirty business, and we have solutions to help mine operators achieve greater performance and environmental outcomes – including the use of Solmax Geotube dewatering systems for coal wash down areas.

Sediment ponds around the mine sites are also common. Elcoseal GCL is often used as a simple-to-install lining system or HDPE geomembrane with the Bidim Green non-woven geotextile.

Concrete Canvas Hydro, a concrete impregnated fabric backed with a geomembrane, which sets when hydrated, can also be used in secondary containment bunds.

RECOMMENDED UNDERGROUND MINING PRODUCTS

Mining geogrid
Triaxial geogrid
Mirafi PET high strength woven geotextile
Geoweb cellular confinement geocell
Rockfall netting
Geotube dewatering container

Elcoseal geosynthetic clay liner
HDPE Geomembrane
Bidim Green non-woven geotextile
Geosynthetic cementitious composite mat



**MINIMISE OR ELIMINATE FALLING
DEBRIS FROM THE ROCK FACE ABOVE
THE PORTAL ENTRANCE**





Unmatched expertise & support

We draw from our years of experience in the Australasia resource sector to tailor design and provide geosynthetic solutions to best meet our client's performance and economic requirements.

Our superior technical support includes early stage testing to validate product selection, design and construction suggestions, certified designs if required; as well as installation systems to increase safety and productivity during installation.

Our comprehensive design advice for projects can include R&D testing, stability analysis, typical sections and standard details. We can also assist with product and installation specifications for tenders.

By employing a national team of engineers, and forming strategic alliances with multi-national consulting engineering practices, our technical support for geosynthetics is unmatched throughout Australasia.

We support our design advice with a suite of design software which assists engineers in developing cost effective solutions to exacting international design standards. We offer our software suite free of charge to our clients and it offers the ability to run a range of design scenarios to cover differing ground and loading conditions to minimise the design risk for a project. Our team of engineering specialists are available to give technical advice in the use of the software as well as provide in-house or seminar training.

We can also provide on-site installation training as well as guidelines and diagrams to assist contractors or maintenance crews.

QUALITY & TRACEABILITY

Geofabrics manufactures geosynthetics under management systems that comply with the Australian and International Quality Standards and are ISO 9001 assured.

We operate two quality assured testing facilities in Australia – Albury is NATA Accredited, Ormeau GRID is GAI LAP accredited and products are tested frequently and transparently.

Our products have traceability from the test results to the roll number and production batch, providing confidence in the quality and consistency of our products in accordance with our latest published specifications.

The information on the labels can be traced via a clear audit trail to the date, name and place of manufacture and the relevant quality assurance test results. In addition, our geotextiles are clearly printed for identification once they are unwrapped and rolled out.

Our commitment to world class quality provides our clients with the confidence that the product delivered is as per their project specifications, ensuring performance and life-cycle costs are optimised.

AUSTRALIAN MANUFACTURING

Many of the products we supply are manufactured in our two production plants in Albury (NSW) and Ormeau (QLD). We employ more than 100 manufacturing staff and we return more than \$10 million per annum into the regional communities in which we operate.

Our Megaflo Green, Elcorock and Filterwrap products carry the mark of Australian-made logo.

WHERE YOU NEED US

Geofabrics has the largest regional footprint of any geosynthetic supplier in Australasia. We have branches throughout Australia, New Zealand and the Pacific. Within Australia, we have branches in every state as well as offices in strategic regional centres along the east coast staffed by our own employees.

This means that we can deliver product where you need it, when you need it while providing local expertise to support your project.





**OUR COMMITMENT TO WORLD CLASS
QUALITY PROVIDES OUR CLIENTS
WITH CONFIDENCE**





AUSTRALIAN-MADE GEOFABRICS

Geofabrics is the only geotextile manufacturer in Australia, with plants in Albury and Ormeau. We pride ourselves on providing unrivalled service to our customers. We can recommend the best geosynthetic product to achieve the objectives of your project and ensure it's available when you need it.

Over 40 years of experience allows our technical staff to provide practical support, based on local conditions. We are proud to have been recognised in the Australian Financial Review (AFR) Most Innovative Company list in 2020 with Bidim Green.

In 2021, Geofabrics ranked #1 in AFR's Most Innovative Company for Manufacturing and Consumer Goods for Sorbseal.

With a view to the future, we are committed to improving the sustainability of our business by reducing waste to landfill, lowering our carbon emissions and investing in our people.

— FINANCIAL REVIEW **BOSS** —
MOST INNOVATIVE
COMPANIES



Visit **geofabrics.co** or call 1300 60 60 20 (AU)
or **geofabrics.co.nz** or call 0800 60 60 20 (NZ)

GEOFABRICS®
Sustainable solutions