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# Engineering a Better Solution

Maccaferri's motto is 'Engineering a Better Solution'; We do not merely supply products, but work in partnership with our clients, offering technical expertise to deliver versatile, cost effective and environmentally sound solutions. We aim to build mutually beneficial relationships with clients through the quality of our service and solutions.

## GLOBAL ENGINEERS

In the second half of the 19th century, we invented Gabions and dramatically changed the civil engineering landscape. We are still changing today. We work every day to find better solutions for our clients at every degree of latitude and longitude. Our worldwide network grows through innovation and diversification of sectors of activity and through an increasing range of high quality and environmentally friendly products and applications.

## OFFICINE MACCAFERRI GROUP PROFILE

Founded in 1879, our Group soon became a worldwide reference in the design and development of advanced solutions, with offices in over 70 countries and 30 factories worldwide.

Our mission is to pursue excellence through continuous improvement, while delivering to customers engineered solutions that are innovative, advanced and environmentally friendly. We are committed to outstanding safety, quality and sustainability, to create value for all stakeholders as well as our communities.

## MACCAFERRI APPLICATIONS

- |  |   |  |   |
|--|---|--|---|
|  RETAINING WALLS & SOIL REINFORCEMENT |  SOIL STABILISATION & PAVEMENTS                              |  DRAINAGE OF STRUCTURES   |  FENCING & WIRE                      |
|  HYDRAULIC WORKS                      |  BASAL REINFORCEMENT   |  SAFETY & NOISE BARRIERS  |  AQUACULTURE NETS/CAGES              |
|  ROCKFALL PROTECTION & SNOW BARRIERS  |  COASTAL PROTECTION, MARINE STRUCTURES & PIPELINE PROTECTION |  LANDSCAPE & ARCHITECTURE |  ENVIRONMENT, DEWATERING & LANDFILLS |
|  EROSION CONTROL                      |   |  |   |

This brochure may contain products and specifications that may not be available in every market. Please contact your local Maccaferri subsidiary to confirm the range and specifications available in your country. Maccaferri reserves the right to change product specifications without notice.

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# MACCAFERRI

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# RETAINING WALLS & SOIL REINFORCEMENT

## INTRODUCTION: RETAINING WALLS & SOIL REINFORCEMENT

Solving the geotechnical problems caused by differences in ground level is at the heart of what we do; helping clients create more space by retaining or reinforcing the ground.

We work with clients to provide cost-effective, value engineered and scalable solutions for earth retention and slope reinforcement in;

- M Infrastructure
- M Housing developments
- M Commercial & industrial sites
- M Mining



### Our solution philosophy

Wherever possible we select solutions that enable the re-use of site won materials, reducing the carbon footprint and the consumption of imported construction materials.

Many of our solutions have **Environmental Product Declaration** (EPD) assessments giving independent transparent and comparable environmental performance data.



### Quality and innovation

Many of our products are **BBA Certified, CE marked** and are made in our **ISO 9001** Certified factories ensuring you receive reliable and safe solutions.

Our new **PoliMac®** coating for our steel wire mesh products offers superior performance; now providing greater resilience against the predicted environmental exposure conditions in 120 years time.



### Solution range

From beautiful low-height retaining walls on a housing development site to massive structures supporting major highways, we can solve your earth retention problems;

- M Mass gravity retaining walls
- M Reinforced soil walls & slope reinforcement
- M Vertical walls with concrete facing panels

Whether you want your structure to have a lush vegetated finish, a blockwork face designed to look like masonry, or a stone-faced finish, we can help.



### Service and engineering

Our engineering teams are on hand to support and guide you through the best options to balance your technical, aesthetic and budget goals.

Uniquely, we are a manufacturer of materials as well as a designer and installer of solutions. We tailor the extent of our involvement on each project to meet the specific needs of our clients and the project.

Our support can range from technical advice, to a full element design right up to a construction service.

# bimstore

### How we can help you

With over 140 years experience Maccaferri can help throughout all stages of the project process; feasibility, design, tender, or award.

- M Solution selection and optimisation
- M Value engineering
- M Budget estimates

Maccaferri products are available on BIMstore and you can get access through our website to download.

Contact us or visit our website for more information or a no obligation conversation on your next project.

MASS GRAVITY RETAINING WALLS  
GABIONS

Gabions create some of the most cost-effective retaining structures available.

Engineered from steel wire double-twist hexagonal mesh, these baskets offer long-term strength and flexibility. This enables them to accommodate post-construction movement and differential settlement without compromise.

Constructed with a flush or stepped face, gabion baskets are installed on a compacted granular levelling pad. They are then filled with locally quarried stone that is hand-placed on all exposed faces to ensure the best aesthetic.



Benefits of Woven Gabions:

- M** GalMac® advanced galvanised coating for up to 60 year design life
- M** PoliMac® coated option for up to 120 year design life
- M** Accommodates settlement
- M** Porosity helps drain soil fills
- M** Can incorporate mitred corners and tight radii
- M** Can accommodate fence post sleeves
- M** BBA-HAPAS certified and CE marked



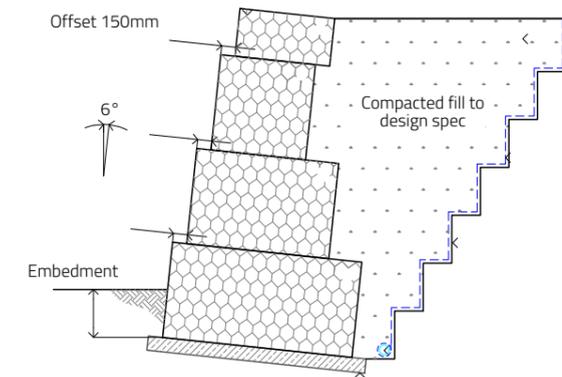
GABIONS

Our PoliMac® state-of-the-art protective coating to the double-twist woven wire mesh ensures long design life, even in the adverse exposure and climate conditions predicted in 120 years time.

**BBA HAPAS Certified** and **CE marked**, our woven mesh gabions provide quality, client reassurance and value for money.



Gabion Wall typical section



Welded mesh gabions

Welded gabion walls help achieve clean, uniform lines in areas where there is minimal risk of settlement or post-construction movement. This makes them particularly popular for architectural and landscaping applications.

Benefits of Welded Gabions:

- M** Welded finish creates clean, uniform lines
- M** GalMac® advanced galvanised coating for up to 60 year design life



## REINFORCED SOIL WALLS & SLOPE REINFORCEMENT

Reinforcing soils with geogrids enables them to accommodate greater loads, stand at steeper angles and settle less. By offering a range of geogrids and fascia types, we maximise the potential to re-use site-won soils as structural backfill to the reinforced soil structure. This embraces sustainability and reduces the quarrying and transportation of the granular fills more traditionally used with reinforced soil structures.



## GREEN TERRAMESH®

Green Terramesh® creates reinforced soil slopes with a vegetating face at an angle up to 70°.

The units feature a unique "lost-shutter" system which supports the face at the designated angle without the need for external formwork during construction.

A layer of quality topsoil behind the front face provides the growing medium for the vegetation.



Common benefits:

- M** BBA HAPAS Certified - up to 120 year life
- M** Flexible - accepts differential settlement
- M** GalMac® Al/Zn and PoliMac® coated woven mesh for unparalleled life
- M** Easy to construct and used in conjunction with our geogrids
- M** Pre-fitted components (shutter system, geomat Green Terramesh®, support brackets) reduce installation time and cost compared to other systems



## MINERAL TERRAMESH®

Mineral Terramesh® creates reinforced soil slopes with a rock faced finish at angles up to 80°. This "maintenance-free" system has an integral steel frame that delivers clean uniform lines.

Selected stone fill is placed in a thin layer behind the front face to create the desired aesthetic.



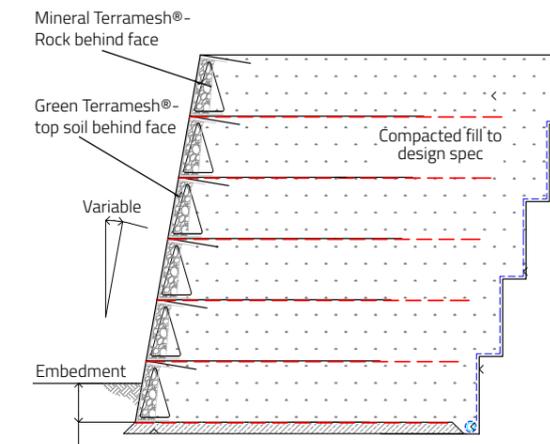
Simple and rapid to construct:

Delivered to the project site flat-packed, the Mineral and Green Terramesh® units are simply unfolded and struts positioned to hold the face shutter at the desired angle. As the geogrid is already part of the face system, backfilling placement and compaction can then commence.

Additional Maccaferri geogrids may be required on taller walls, or when marginal soils are used as structural backfill; these grids are simply laid beneath the Terramesh units without the need for a formal connection.



Green/Mineral Terramesh® typical section



## RETAINING SOIL WALLS & SLOPE REINFORCEMENT TERRAMESH SYSTEM®

Terramesh® is ideal for taller structures where you want the look of gabions with the cost-effectiveness of soil reinforcement.

Gabion Terramesh® consists of a double twist woven wire mesh gabion fascia unit and an integral factory-fitted soil reinforcement geogrid.

The system is straightforward and rapid to construct; gabion stone is placed in the face unit, and structural backfill is placed and compacted on the geogrids.



Benefits:

- M** BBA HAPAS Certified - up to 120 year life
- M** Flexible - accepts differential settlement
- M** GalMac® Al/Zn and PoliMac® coated woven mesh for unparalleled life
- M** Easy to construct and used in conjunction with our geogrids
- M** Saves on gabion stone costs vs traditional gabion walls



## MEGA STRUCTURES

Our various Terramesh® solutions have been used on some of the tallest reinforced soil structures in the world; over 75m high.

The factors for success of these structures include our:

- M** Ultra-high performance ParaLink® and ParaGrid® geogrids
- M** Tried and tested Terramesh® solutions
- M** Deep experience in engineering tall structures

All system components are **BBA Certified** for up to 120 years. With some of the most favourable long-term design strength geogrid characteristics these structures are technically efficient and cost effective.



**GEOGRIDS**  
THE HEART OF EFFECTIVE  
SOIL REINFORCEMENT

**PARADRAIN®**

ParaDrain® is a unique high-performance geogrid that combines soil reinforcement and drainage functions in one product.

It has been designed with sustainability in mind because it enables the re-use of marginal fills that would normally be disposed of off-site and replaced with quarried materials.



ParaDrain® improves the properties of marginal soils by reducing the pore water pressure thereby enabling their use as structural materials within reinforced soil structures.



Benefits:

- M** Enables the reuse of many site won fills
- M** Saves the quarrying and transport of traditional granular backfills
- M** Speeds up earthworks construction time due to earlier soil strength gain
- M** Reduces the time for differential settlement of the slope to within the construction phase.



**PARALINK®**  
**PARAGRID®**

ParaGrid® and ParaLink® are used in conjunction with our Terramesh® soil reinforcement solutions to provide greater resistance to:

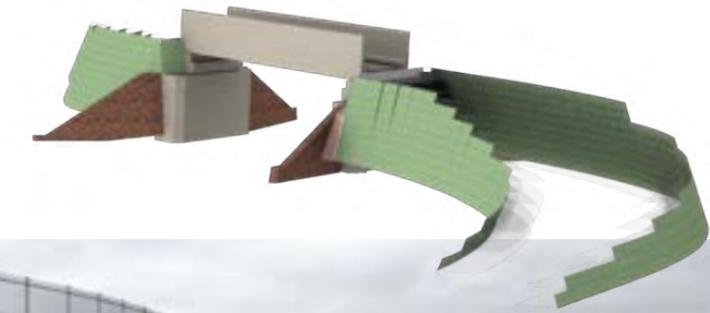
- M** Taller structures
- M** Higher surcharge loads
- M** Seismic activity

ParaLink® and ParaGrid® are amongst the most tried and tested geogrids in the world. Their unique robust structure gives them great resilience and reliability even in the most demanding applications.

This reduces client risk and enables a more efficient structure.



ParaGrid® wrapped-face noise bund at Gatwick Airport



ParaGrid® and ParaLink® reinforcing access ramps over railway

Benefits:

- M** BBA certified up to 120 year design life
- M** Most beneficial partial safety factors for LTDS
- M** Enables the reuse of many site won fills
- M** Reduces the quarrying and transport of traditional granular backfills
- M** Low creep polymer yarns protected by the toughest sheathing in the market



ParaGrid® reinforcement for quarry crusher wall



## REINFORCED SOIL WALLS MACWALL®

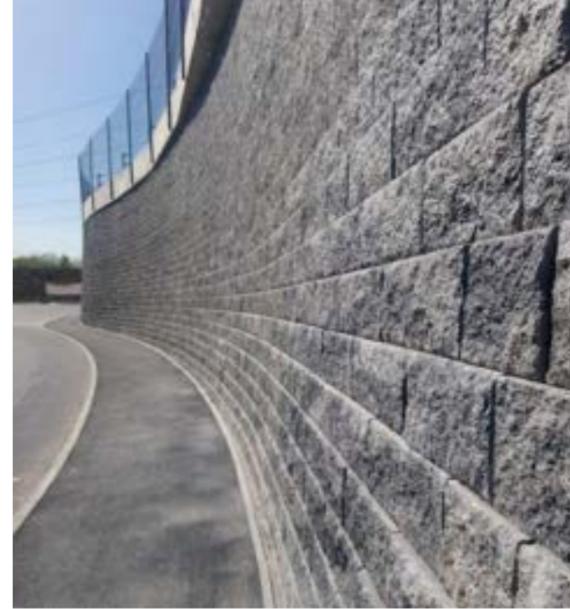
MacWall® is a segmental retaining wall system combining the aesthetics of a blockwork masonry wall with the reassurance of geogrid soil reinforcement.

ParaGrid® geogrid soil reinforcement is sandwiched between consecutive courses of MacWall® blocks. Structural backfill is placed and compacted on the geogrids.

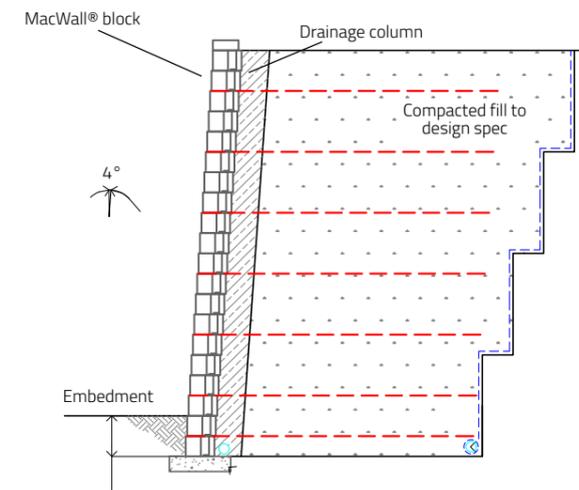
For more demanding MacWall® structures our Landmark® block features a 'positive connection' between block and geogrid for greater reassurance.



- Benefits:
- M** Split-face finish for authentic stone look
  - M** Choice of colours to complement development
  - M** Can incorporate curves, corners and steps
  - M** Quick, mortar-free dry build
  - M** BBA certified option



MacWall® typical section



## VERTICAL WALLS WITH CONCRETE FACING PANELS

MacRES® is suited to high-load, demanding applications that require a vertical faced structure.

The system consists of ParaWeb® geostrips to provide the soil reinforcement function which are attached to pre-cast concrete facing panels.

Tried and tested for over 30 years, the BBA Certified synthetic geostrips are available in a range of strengths to optimise construction efficiency and can be used with aggressive soils / environments.



Reading Viaduct



Queensferry Bridge



Various face-finishes available

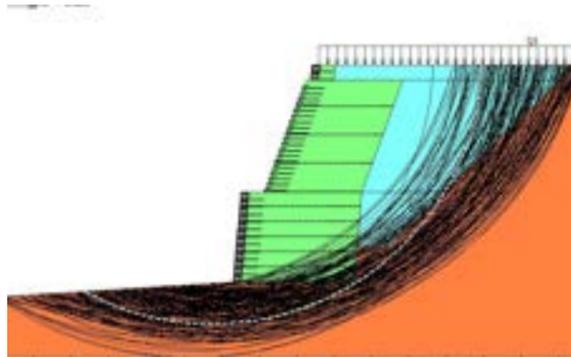


## OTHER RETAINING SOLUTIONS

### TIMBER CRIB RETAINING WALLS

Popular in housing developments, these walls combine timber header and stretcher units to create a cribwork structure. Our timber crib system is made from Radiata pine that has been sourced from PEFC certified forests and treated for long-term durability.

The cribwork is filled with local stone and its clean interlocking lines can be softened with planting.



### CUBIROC GABIONS

Our Cubiroc units are pre-filled heavy-duty woven mesh gabion units.

Made off-site and transported into the works, Cubiroc adds speed of construction to the traditional benefits of gabions, increasing productivity during limited work-windows;

- M** Railway possessions
- M** Motorway night working
- M** Retaining walls in water
- M** Emergency repairs



### COMPLEMENTARY SOLUTIONS

When installing a retaining structure, there are often occasions where other engineering interventions are required. Amongst other solutions, Maccaferri can provide;

- M** Stabilisation of soft ground and access to work areas
- M** Erosion control on vulnerable cut slopes
- M** Basal reinforcement of embankments constructed over soft ground, voids or old mine workings
- M** Stream and riverbank stabilisation



MacMat® R erosion protection for vulnerable slopes



ParaLink® basal reinforcement beneath embankments

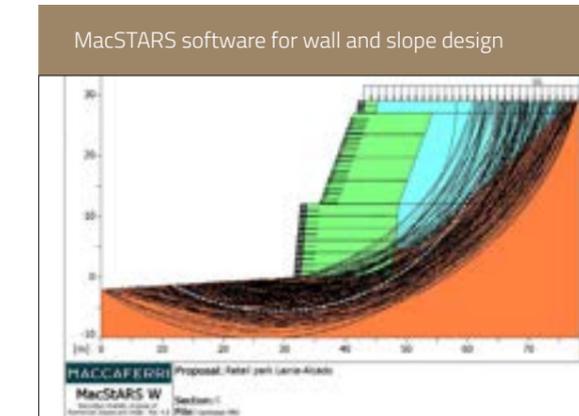
### DESIGN AND TESTING

#### Technical Support

Maccaferri has developed various suites of software to design our solutions. Simple user interfaces enable engineers to compare potential solutions and then to rationalise the final design.

#### Testing

Our products are rigorously tested, not only in our ISO9001 controlled factories, but also to improve the products and endow them with the performance needed to resist the environmental conditions of tomorrow.



MacSTARS software for wall and slope design

