GRIPPLE®

Water Management

Anchoring solutions for erosion control and soil stabilisation

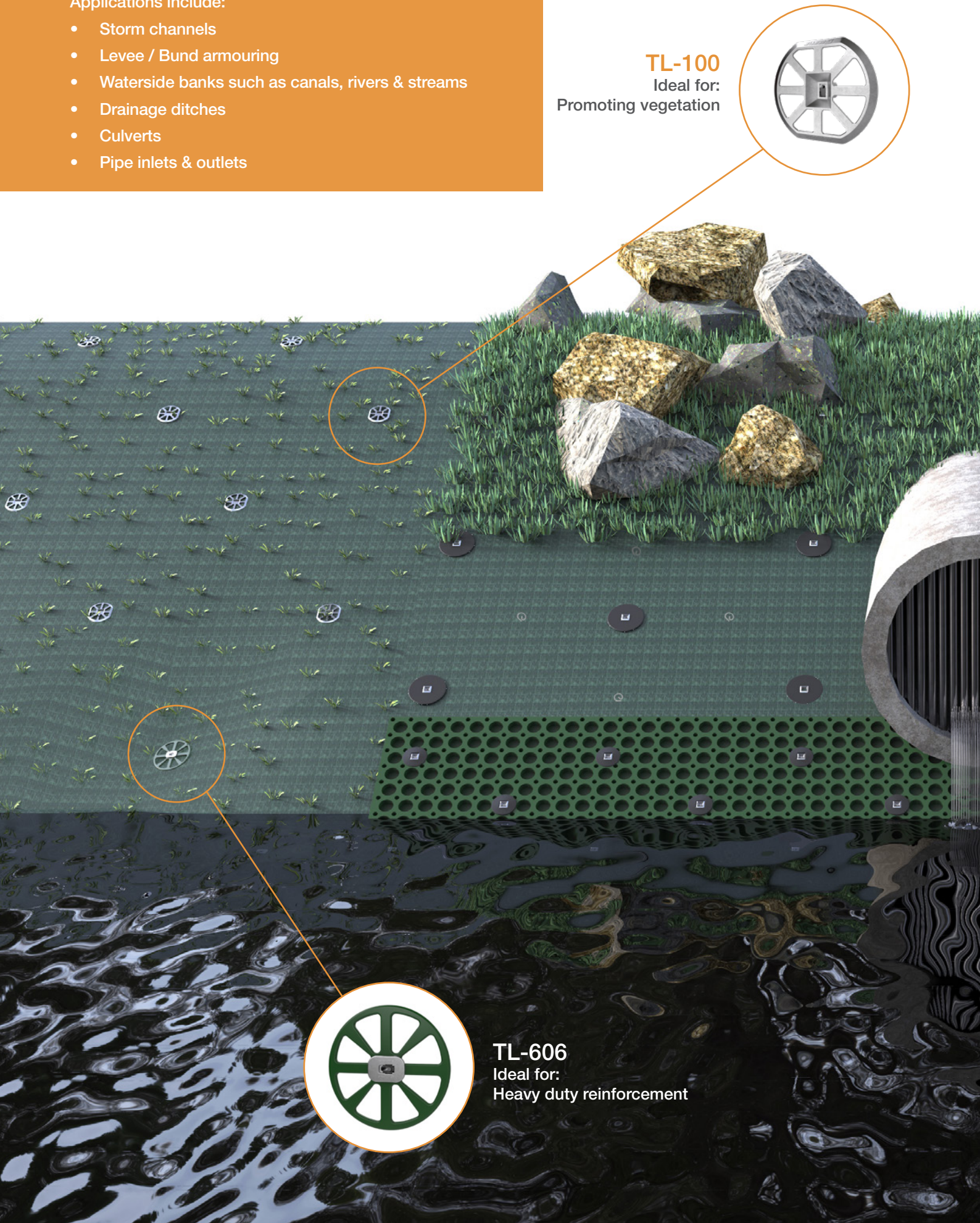
- Time and labour saving
- Immediate performance
- Lightweight and flexible
- Green solution

The Gripple Terra-Lock™ system provides strength to erosion control and soil stabilisation systems. This enables protection in applications where hydraulic flows and stresses are active.

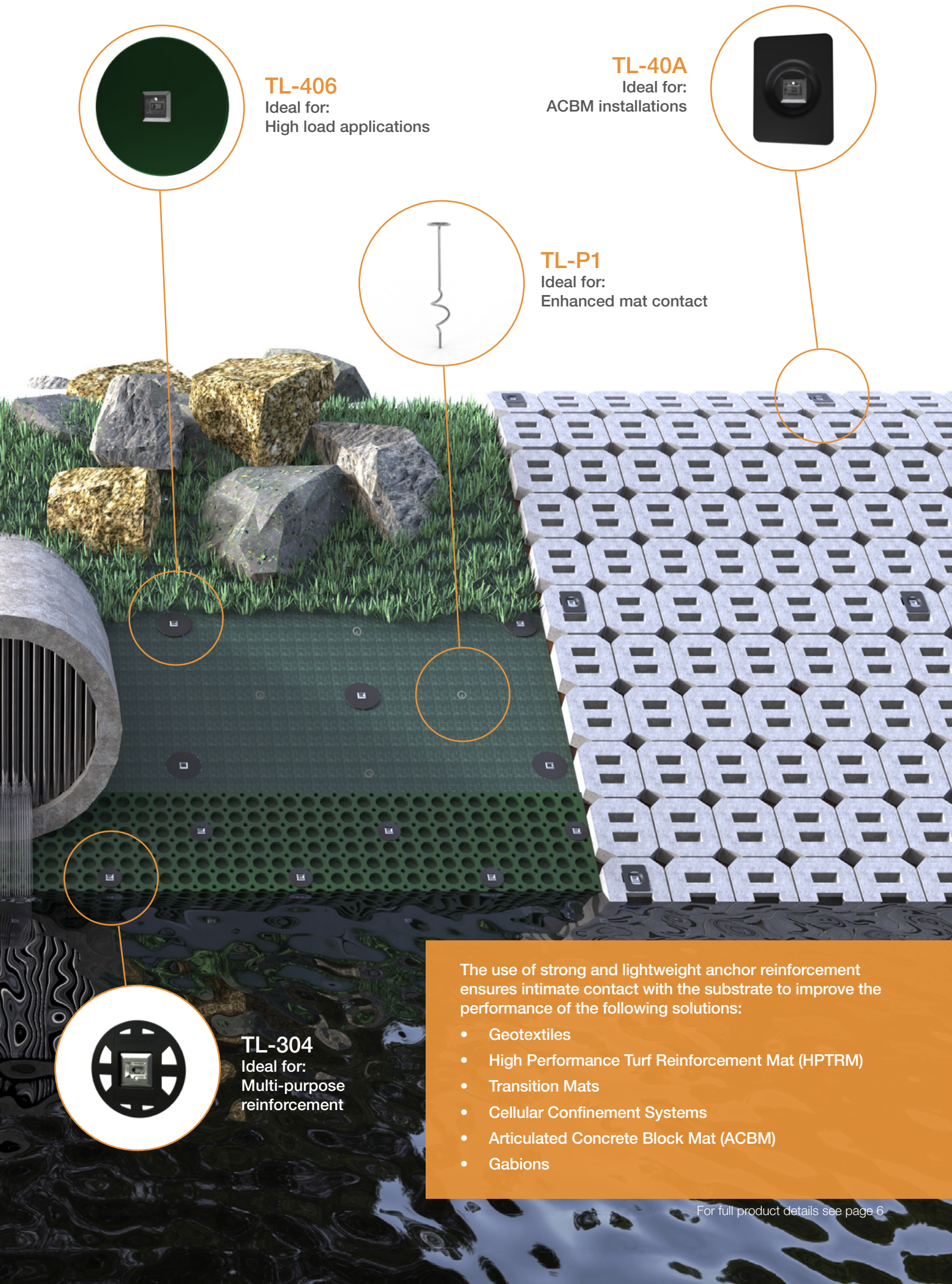
Applications include:

- Storm channels
- Levee / Bund armouring
- Waterside banks such as canals, rivers & streams
- Drainage ditches
- Culverts
- Pipe inlets & outlets

TL-100
Ideal for:
Promoting vegetation



TL-606
Ideal for:
Heavy duty reinforcement



TL-406
Ideal for:
High load applications

TL-40A
Ideal for:
ACBM installations

TL-P1
Ideal for:
Enhanced mat contact

TL-304
Ideal for:
Multi-purpose reinforcement

The use of strong and lightweight anchor reinforcement ensures intimate contact with the substrate to improve the performance of the following solutions:

- Geotextiles
- High Performance Turf Reinforcement Mat (HPTRM)
- Transition Mats
- Cellular Confinement Systems
- Articulated Concrete Block Mat (ACBM)
- Gabions

For full product details see page 6

System Benefits

Green solution
Makes use of on-site material, minimising material transport and related emissions.

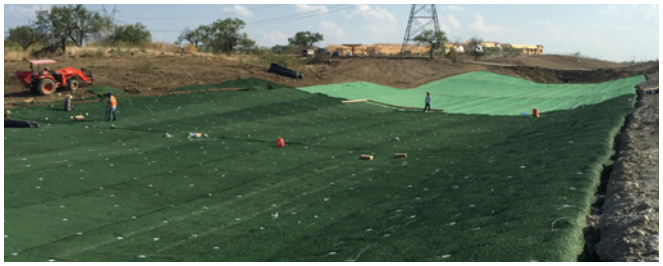
Aesthetic
Removes the need for unsightly hard solutions such as rip rap and concrete.

Sediment control
Intimate contact with substrate retains soil particles, minimising erosion and downstream sedimentation.

Resiliance
Utilises a system which reinforces vegetation allows the structure to ‘self heal’.

Lightweight
Adds minimal excess load to structure, reducing settlement and subsidence, especially in poor soils.

Efficient installation
Can be installed quickly and economically to vastly reduce time spent on-site protecting assets.



Slows flows
Use of vegetation within the structure acts to slow hydraulic flows, minimising potential problems elsewhere.

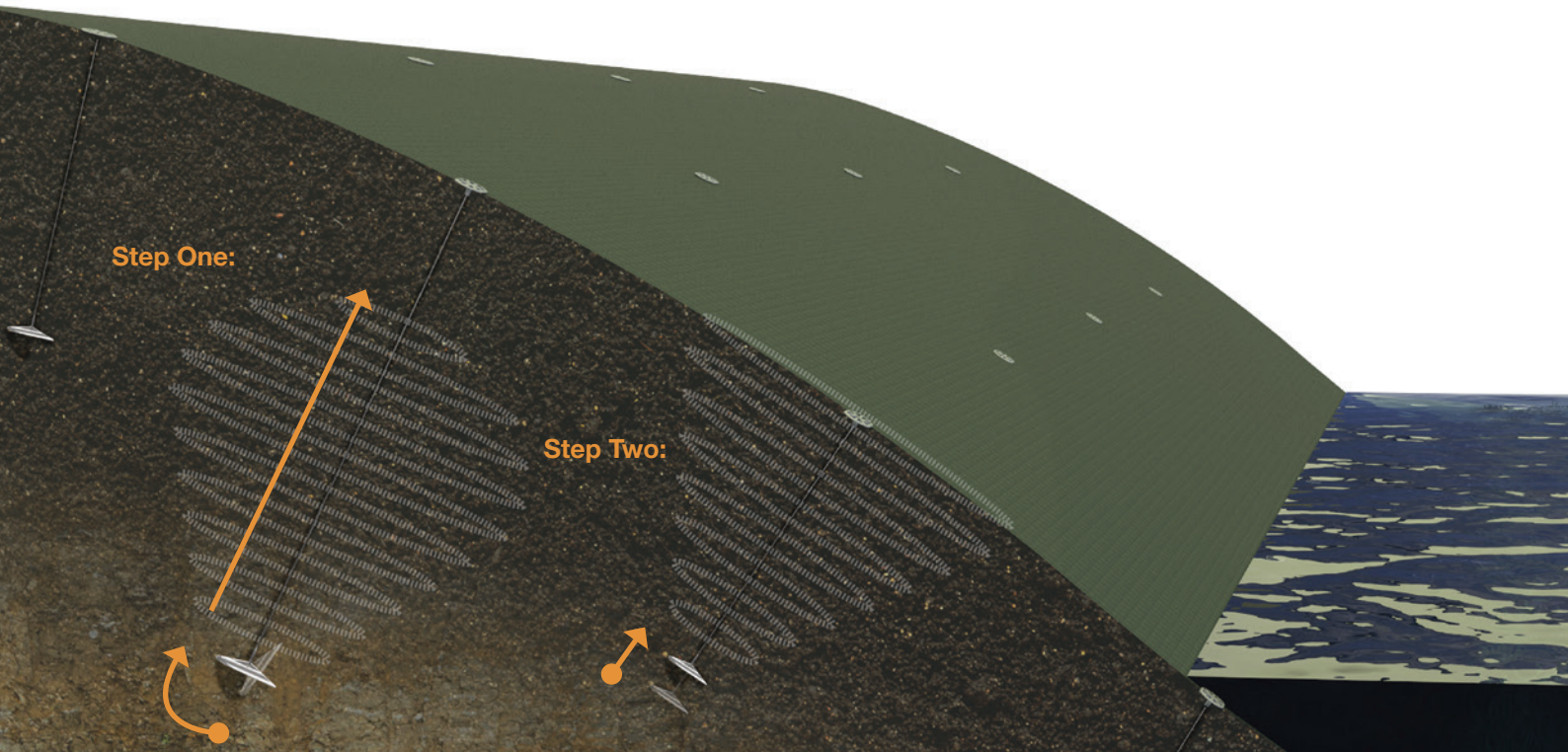
Durable
Manufactured using corrosion resistant materials to create a long term solution.

How It Works

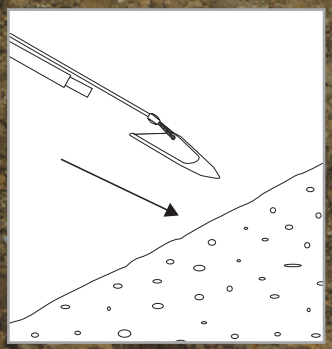
The Terra-Lock™ system gains its stability through the creation of a truncated cone of soil. This consolidated mass provides the resistive securing body and is formed in two steps:

Step One: After driving to the correct depth, the wire is tightened; this rotates the anchor so that the load bearing surface is parallel to the ground surface.
Step Two: The wire is further tightened to compress the soil above the anchor's bearing surface. The compression transfers towards the surface to form a cone of soil which prevents further anchor movement.

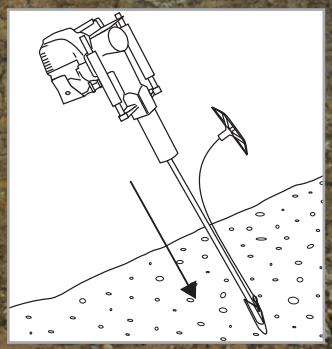
The load bearing capacity of the system is determined by: anchor size, anchor depth and soil shear angle. Due to the complex interaction between these factors, it is advisable that a geotechnical report is utilised as part of the engineering plans to ensure the appropriate anchor size and drive depth are selected.



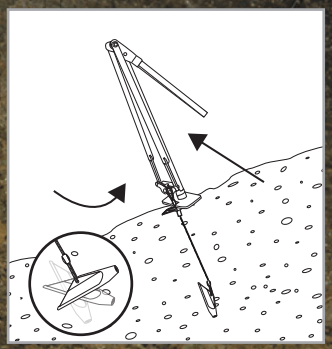
Installation



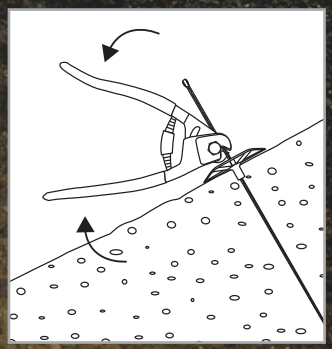
Drive:
Insert Drive Tool through the anchor and place against surface.



Use GPD to install the anchor at the required depth.



Lock:
Use JackJaw® to remove Drive Tool and load lock system.



Use Gripple Wire Cutter to cut wire below grade if required.

Terra-Lock™ System

Terra-Lock Terminations (above ground)

A variety of terminations are offered to secure a variety of TRM & HPTRM matting.

TL-A2
TL-A3
TL-A4

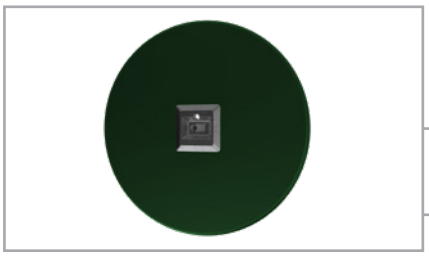
TL-100

Secures TRM and HRTRM whilst promoting vegetation regrowth in erosion control and soil stabilisation applications.

TL-A2
TL-A3
TL-A4

TL-304

Two piece, low profile design, with a multi-purpose, injection moulded load bearing plate.



TL-A2
TL-A3
TL-A4

TL-406

Two piece design incorporation a rubber coated steel bearing plate and a 4 mm wire tendon for higher load applications.

TL-A2
TL-A3
TL-A4

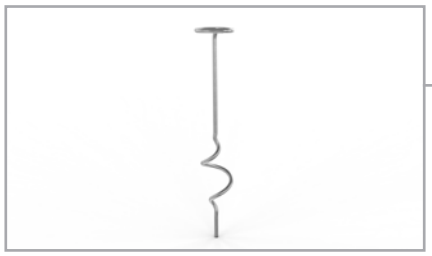
TL-40A

Bespoke high load design for use with Articulate Concrete Block (ACB) installations.

TL-A2
TL-A3
TL-A4

TL-606

Heavy duty, designed for high level security. Open face aids vegetation growth whilst maintain strength.



Chuck - See page 7

TL-P1

The high load anchoring pin is designed to hold all types of turf reinforcement matting, erosion blankets, geotextiles and landscaping fabrics.

Terra-Lock Anchors (below ground)

Anchors provide drive efficiency and maximum load capacity across a range of ground anchoring solutions. Pre-assembled kits require no crimping, ensuring significant time and labour savings delivered by easy and efficient installation.

TL-A2

Surface area - 1,940 mm²
System Working Load - 225 kg
Ultimate Load - 500 kg

TL-A3

Surface area - 3,870 mm²
System Working Load - 1,250 kg
Ultimate Load - 1,800 kg

TL-A4

Surface area - 7,740 mm²
System Working Load - 1,250 kg
Ultimate Load - 2,250 kg

Tools & Related Products

System Installation

We offer a range of tools to ensure that the Gripple Terra-Lock™ system is installed with ease and efficiency.

GPD

The Gripple Petrol Driver provides quick installation of Gripple's range of anchors. Weighing only 15 kg, it is lightweight and portable.

JackJaw®

Multi function tool extracts Drive Tool and load locks system. Available with load cells for immediate testing.

Drive Tool

Purpose engineered for toughness and durability. Capable of installing anchors in hard ground.

TL-P1 Installation

Standard Chuck

Installs pins to full depth without damaging mat. Automatically disengages when pin reaches full depth.

Extended Chuck

Installs pins where long reach is required. Automatically disengages when pin reaches full depth.

Accessory

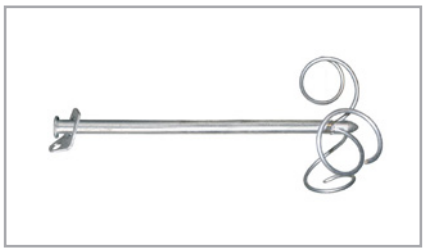
Wire Cutters

The Wire Cutters are suitable for cutting wire rope. Available in two sizes: up to 4 mm diameter and up to 6 mm diameter.

Other Products

Contractor Tool

The all-metal tool can be used with minimum effort to apply tension.



Rock Anchor

Stand alone anchor for use in rock or other tough soils.

Dynamic Range

The Dynamic Range of fasteners and tensioners is ideal for high load anchoring and structural bracing.

Other Anchoring Solutions

Rootball Kit

Tree anchor system designed to stabilise newly planted trees using strap tensioning system.

Tree Bracing Kit

Enables newly transplanted semi-mature trees to be braced and guyed to stabilise and prevent leaning.

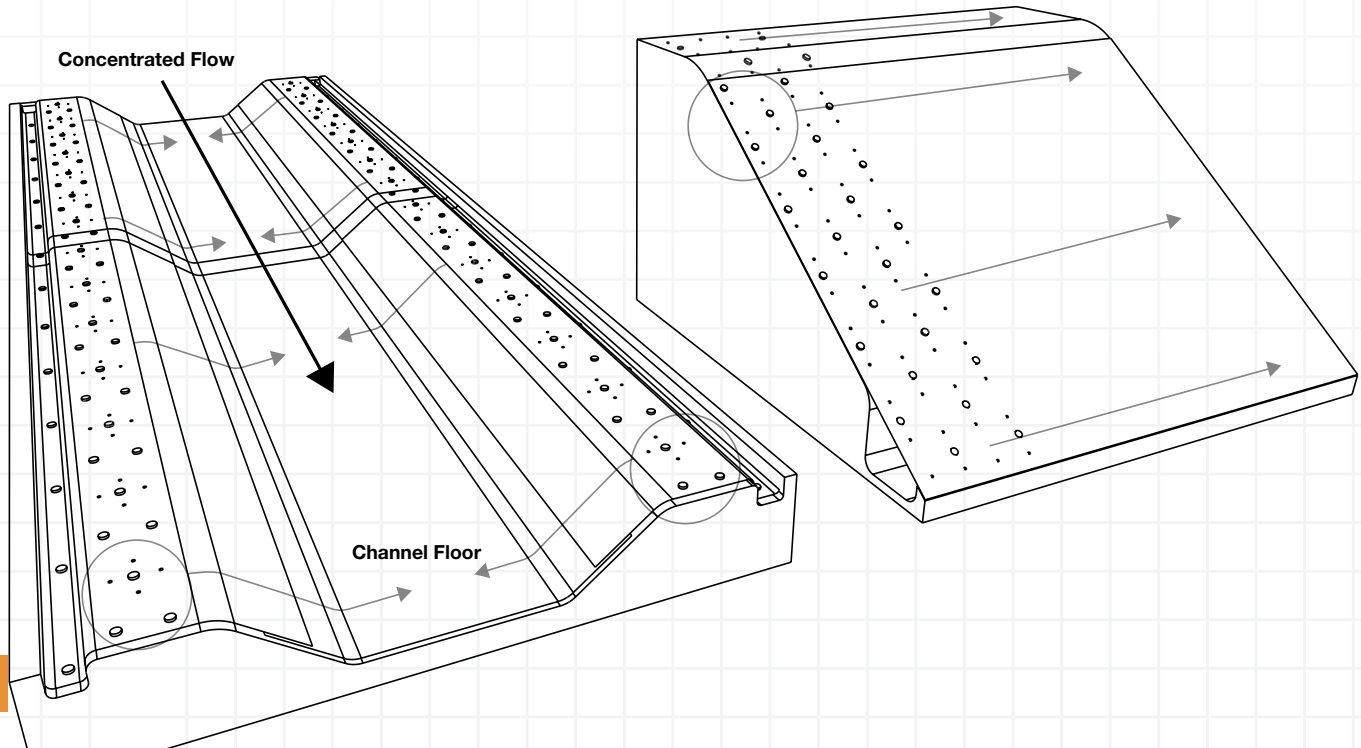
Anti Buoyancy Kit

Anchor system which prevents the flotation of pipes or duct in wet concrete and soils.

Technical Support

Gripple provides engineering design support to ensure you specify the optimal Terra-Lock™ system to meet your project requirements. Once ground characteristics have been established, our technical team can calculate anchor loads and design performance; whether through initial site evaluation, preparation of technical drawings, supporting submittals or onsite testing to validate designs. The Gripple Technical Support Team can work with you at every stage of a project to realise the complete turn-key solution.

Submittals | CAD | Specifications | Testing | On-Site



Case Study

Loyn Bridge, Lancashire

Client	Lancashire County Council
Contractor	LCC Operations
Gripple Terra-Lock™ System	TL-100 & TL-A3 - Installed with Gripple Petrol Driver and JackJaw®. TL-P1 Installed With Drill & Chuck.
Application	Securing HPTRM for Slope Reinforcement
No. of Systems	150 TL systems, TL-100 & TL-A3 and 600 TL-P1

Loyn Bridge, a three span narrow masonry arch bridging the river Lune between Hornby and Gressingham was at risk of damage due to erosion of the bank of the River Lune upstream.

To armour the bank and ensure the continued structural integrity of the bridge whilst providing a finish in keeping with the stunning natural environment, the Terra-Lock™ system was installed by LCC Operations in conjunction with an erosion control geotextile. This was secured by an anchor trench at the crest of the slope and rock rolls at its toe. Cuttings from willow trees further upstream were planted through the geotextile to complete the installation.

The Terra-Lock™ anchor was installed quickly and easily using the Gripple Petrol Driver, and then instantly load-locked by the JackJaw®. The erosion control geotextile was secured in place with the integral TL-100 top termination, specifically selected as vegetation re-growth was a primary objective.

Using the Terra-Lock™ system eliminated the need to crimp at the surface to secure the mat in place, reducing the contractor's time on site. The patented TL-P1 high load pins were specified and deployed around the anchors. The pins improve intimacy between the geotextile and the newly seeded soil below, as well as to further aid re-establishment of natural vegetation. These were installed with a general purpose 18v combi-drill and bespoke chuck in less than half the time normally taken to install rebar pins or stakes, and provided superior pull-out loads.

Case Study

Cobnor Point, West Sussex

Client	ABP and Natural England
Contractor	Land & Water
Gripple Terra-Lock™ System	TL-100 & TL-A3 - Installed with Gripple Petrol Driver and JackJaw®.
Application	Securing HPTRM for Slope Reinforcement
No. of Systems	-

Cobnor Point was identified as an area that suffered heavily from erosion. It could have been at risk of flooding, which would have affected the agricultural land and heritage features. In the past, the shoreline was defended using several different methods including large stones, sandbags full of cement and rip-rap. However, the area remained at risk from tidal flooding, providing reason to find an alternative and more secure solution.

As a result, a new northern embankment was constructed and armoured using the Terra-Lock™ system and erosion control mat. The matting extended across both sides of the embankment and terminated in a clay-filled trench at the toe of the wet side.

The Terra-Lock™ anchor enabled straightforward penetration of the mat without tearing or otherwise damaging it. The installation of the Terra-Lock™ anchor provided immediate and effective stabilisation of the mat. This was further reinforced by the TL-100, helping to maintain intimate contact between the mat and subgrade surface. Similarly, the open face of the TL-100 allowed for vegetation re-growth and presented an ideal solution to preserving the natural appearance of the eroding shoreline.

The project benefited from the wide range of installation tools including the Drive Tool, JackJaw® and the Gripple Petrol Driver. Paired with the Terra-Lock™ system, the overall install time was reduced to a minimum.

Case Study

C-41A Repair, Okeechobee

Client	South Florida Water Management District
Contractor	Dickerson (Prime), B&Z (Sub)
Gripple Terra-Lock™ System	TL-100 3 mm (1/8”) Stainless Steel Wire TL-A2
Application	Securing HPTRM
No. of Systems	5,000

C-41A, Okeechobee, Florida, is a major waterway managed by the local water management district. The local soil is extremely soft and consists mainly of very fine sand and silt. As a result, erosion is a constant issue as it causes major damage to the banks of the waterway as well as heavy siltation of the channel which could damage local habitats and infrastructure.

As part of a previous conservation project, the banks were protected using HPTRM. The mat on this occasion was laid using only rock ballast at the head and toe. This was then overlaid with turf. Subsequent to the work, the rocks at the bottom of the slope had been washed away, which then led to the HPTRM floating up and losing any effectiveness by exposing the toe to undermining.

A more secure solution was provided by the Gripple Terra-Lock™ system. This time when the HPTRM was installed, anchors were placed underwater at the toe and all along the slope to the head. This ensured the HPTRM maintained intimate contact with the subgrade surface, thus providing the erosion protection required.

The system makes use of the time saving, purpose-designed TL-100 which provides security, aids the ease of installation and has minimal impact on vegetation growth. This component coupled with the range of Gripple installation tools ensures a swift, straightforward and correct set up is achieved every time.

Case Study

Matanhail Pump House Link Drain Canal, India

Client	Haryana Irrigation Department
Gripple Terra-Lock™ System	TL-100-TLA3, TLP2 Pins and G-MAT C350
Application	Slope stability of drainage channel

After successfully completing Phase I of the Jhajjar Drain Canal project at Beri-Dujana Drain Canal, Gripple was commissioned for Phase II of the project at the Matanhail Pump House Link Drain Canal.

Located in Jhajjar - Haryana in India, the channel had been eroding due to inflow from surrounding fields and from water passing through the drain. There were failures of the embankment tœ due to the water pressure and there was clear evidence of undermining causing instability along the channel. There was also rill and gully erosion encroaching to the road above.

A solution was needed to provide erosion control, prevent scouring and to provide dimensional stability. Most importantly, the solution needed to comply with National Green Tribunal (NGT) guidelines regarding non-use of concrete lining for drain canals by providing a permeable media for water flowing into the canal alleviating pore water pressures.

The Gripple Terra-Lock™ system, comprising of TL-100-TLA3 Anchors, TLP2 (Helical) Pins and G-MAT C350 (erosion control mat of 100% coconut fiber matrix incorporated into 3-Dimentional turf reinforcement matting) was proposed and installed for a length of 130 meters and 7 to 8 meters in height at an inclination of 45 degree to 50 degree slope. The solution met all of the above requirements as the system allows water flow without soil loss and by design stabilises the structure.

Compared to traditional concrete and riprap methods, the Gripple Terra-Lock™ system is more flexible, lightweight and faster to install. Minimum excavations are required, and there are reductions in material and labour costs. Gripple systems are also more environmentally friendly and æsthetically pleasing.

Erosion in the channel before Gripple install

During the installation of Gripple solution

Completed installation

Case Study

Beri-Dujana Drain Canal, India

Client	Haryana Irrigation Department
Gripple Terra-Lock™ System	TL-304, TL-A3, TL Pins and G-MAT T50
Application	Hydraulic and Slope Stablity, Erosion control

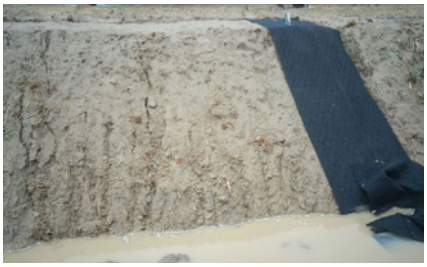
The Beri-Dujana Drain Canal is located in Jhajjar - Haryana in India. Previously concrete was used to line the bed and embankment of the drain canal, however over time it started to fail in various places due to erosion caused by water inflow from the surrounding fields and from water passing through the drain. There were failures of the embankment toe and concrete lining on the bed of the channel due to pore water pressure, and failure to the entire concrete lining along the embankment.

To solve the problem a solution was needed to provide erosion control, prevent scouring and provide dimensional stability. Most importantly, the solution needed to comply with National Green Tribunal (NGT) guidelines regarding non-use of concrete lining for drain canals by providing a permeable media for water flowing into the canal alleviating pore water pressures.

The Gripple Terra-Lock™ system, comprising of TL-304 Anchors, TL Pins and G-MAT T50 was proposed and installed for a test length of approximately 15 meters and 3.5 to 4 meters high. The solution met all of the above requirements as the system allows water flow without soil loss and by design stabilises the structure.

Compared to traditional concrete and riprap methods, the Gripple Terra-Lock™ system is more flexible, lightweight and faster to install. Minimum excavations are required, and there are reductions in material and labour costs. Gripple systems are also more environmentally friendly and aesthetically pleasing.

Failure of the concrete in drain canal



During installation of Gripple solution

80 days after installation

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