gridforce

THE ULTIMATE IN GROUND REINFORCEMENT




www.gridforce.co.uk

Ground Reinforcement Uses

As Gridforce offers a unique and revolutionary tile system, it has many uses.

Technology & Key Features of Gridforce

Gridforce's lattice structure makes it ideal for slope reinforcement.

Gridforce meets the Building Regulations on Drainage and Waste Disposal for England.

Gridforce can be used to reinforce existing grass areas for access roads or parking.

The weight bearing capabilities of Gridforce mean that it can be used in many construction projects.

Gridforce will secure embankments and protect from erosion - ideal for pathways or angled surfaces.

Made from 100% Recycled Plastic.

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Contents	Page

The Importance of Sustainable Drainage Systems (SuDS)

Ongoing and increasing demand for housing and commercial/industrial development are the major factors driving the continuing urbanisation of our landscape. Add to this, climate change and the resultant changes in rainfall patterns, which have increased peak flow run-off rates, and the results are clear for all to see - overloading of drainage systems leading to their failure and consequent regular incidents of major flooding and pollution. In addition, increased flow rates also cause erosion and damage to local habitats through the pollutants from built up areas being washed into watercourses, harming fish and wildlife. As a consequence, the European Water Framework Directive requires that we manage our water resources in a more sustainable way and provide an enhanced level of protection to water quality. Sustainable Drainage Systems (SuDS) can make a key contribution in the reduction of urban flooding and pollution and are designed to return storm water to the water table as close as possible to where it falls.

The Building Regulations (Part H) state that, whenever possible, infiltration should be the method adopted for discharging storm water. This is further endorsed by the Environment Agency and SEPA, it's Scottish counterpart. The SuDS approach also embraces front gardens and, since 2008, planning permission has been required to lay traditional impermeable driveways that allow uncontrolled run off of rainwater from front gardens onto roads. In response to these needs, the Corden Group developed the Gridforce range of permeable ground reinforcement systems. The range comprises 5 combinations of size and shape to cater for all applications from footpaths to HGV traffic and industrial storage areas. Once laid, the grid units are filled with either stone or grass according to client requirements.

The Role of Gridforce

Gridforce offers a unique and revolutionary paver system which provides permeable ground reinforcement solutions across an extremely wide range of applications.

The Gridforce range possesses an unequalled combination of highly engineered design, choice of 5 paver options and manufactured in low density polyethylene. **LDPE not only produces high compressive strength but also gives the pavers a flexibility and resilience which enables the system to satisfy all client requirements from footpaths to car parks, emergency fire access routes and HGV overrun. It also offers significant advantages over pavers manufactured from high density polyethylene (HDPE) which are more susceptible, over time, to brittleness and fracture at low temperatures. This gives us the ability to offer a 10 year product guarantee.**

Gridforce is normally laid on a free draining stone base, eliminating the requirement for drainage pipework, and returning storm water to the water table, thereby relieving pressure on sewers. Depending on ground conditions, we may also be able to offer a reduced dig or no dig solution.

Advantages of Gridforce

- **10 year product guarantee**
- **Manufactured from LDPE which, coupled with unique design and robust interlocking lugs and slots, enables Gridforce to cope with HGVs and other industrial traffic.**
- Drains to water table, relieving pressure on sewer systems.
- Compliant with CE Marking regulations
- Complies with sustainable drainage best practice.
- Manufactured from 100% recycled plastic.
- Eliminates drainage pipework
- 5 paver options to cover all ground reinforcement applications.
- Cells can be filled with stone, or soil and seeded to achieve a grassed finish.
- Very high open area at surface (90%-96% dependent on paver selected) to maximize aesthetic appeal of stone or grass.
- Lightweight and easy to handle (unlike concrete units which contravene HSE manual handling limits)
- Pavers palletised in layers of 4 no. preconnected units to maximise installation speed (up to 100m² per person per hour).
- Patented interlocking system eliminates need to pin pavers together.
- Easily cut with hand or power saw.
- Free design advice and site/customer visits can be arranged.
- Supply only or supply and install options available.

Gridforce Product Use Guide

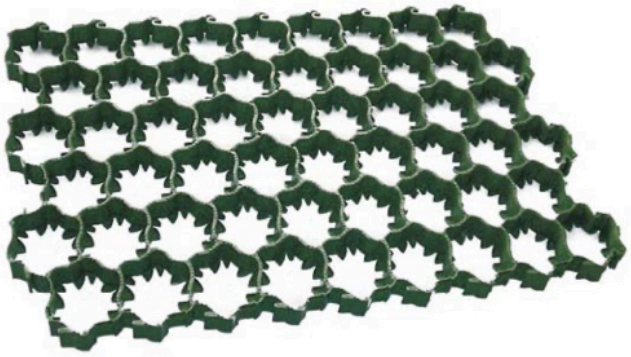
	Park 30	Park 40	GF 30	GF 40	GF 50	IR 35
Footpaths - Grass Fill		✓		✓	✓	
Footpaths - Stone Fill	✓	✓	✓	✓	✓	
Existing Grass Reinforcement		✓				✓
Domestic Drive - Grass Fill		✓		✓	✓	
Domestic Drive - Stone Fill	✓	✓	✓	✓	✓	
Grass Verge Reinforcement (Unless guaranteed car over run only)				✓	✓	
Overflow Car Parks - Grass or Stone Fill	✓	✓	✓	✓	✓	
Regularly Used Car Parks - Grass or Stone Fill		✓	✓	✓	✓	
Emergency Fire Lanes - Grass or Stone Fill				✓	✓	
Coach, Lorry, Dust Cart & Fork Truck Traffic - Grass or Stone Fill				✓	✓	

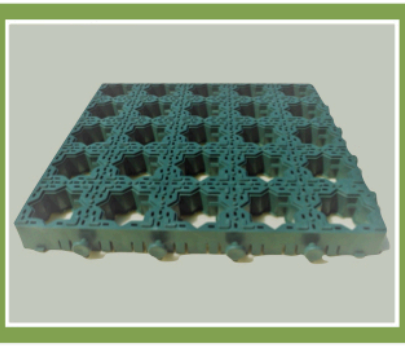
Gridforce Park Range

The tough and durable "Park" range is designed primarily for lighter duty installations. Gridforce Park's unique hexagonal structure provides excellent load bearing and ground surface stability for both vehicles and pedestrians and is suitable for domestic and less demanding commercial applications.

For Ground reinforcement of existing grass, either Gridforce IR 35 or Park 40 can be used to reinforce the grass, with the IR 35 generally used where regular trafficking will be required.

For an attractive and practical finish, Gridforce Park can be filled with stone or with soil and seed if a grassed finish is required.





	Park 30	Park40	IR 35
Recommended Infill Media	Decorative aggregates	Decorative aggregates/seeded topsoil or used without infill for grass reinforcement.	n/a, product used for reinforcing existing grassed areas
Applications	Driveways, additional parking, paths, patios and overspill or event parking	Driveways, paths, event parking, caravan parks, lawn & banking reinforcement, additional parking and ground reinforcement for landscape	Grass reinforcement for paths, access roads, overflow or event parking or caravan parks.
Maximum Load Capability of Pavers	1000 tonnes/m² (Filled)	1000 tonnes/m² (Filled)	Dependant on existing ground conditions
Axle Loading	10 tonnes	10 tonnes	
Material Properties	100% recycled low density polyethylene (LDPE) UV Stable with operating temperature range of -35˚C to 85˚C	100% recycled low density polyethylene (LDPE) UV Stable with operating temperature range of -35˚C to 85˚C	100% recycled low density polyethylene (LDPE) UV Stable with operating temperature range of -35˚C to 85˚C
Paver Specifications			
Depth	30mm	40mm	35mm
Length	580mm	580mm	389mm
Width	390mm	390mm	389mm
Wall Thickness	2.5mm	2.5mm	3mm
Cell Detail	54 Cells of 70mm x 70mm	54 Cells of 70mm x 70mm	5 x 5 eyelets
Open Surface Area	90%	90%	41.3%
Weight	0.75Kg per paver	1 Kg per paver	1.1 kg per paver
Area - 4 paver (2x2)	0.90m²	0.90m²	0.91m² (6 paver, 3x2)
Colours	Green. Other colours available subject to quantity	Green or Black. Other colours available subject to quantity	Green or Black
Transport Specification			
Number of Pavers Per Pallet	320	240	420
Area of Coverage Per Pallet	72m²	54m²	63.5m²
Pallet Size	780mm x 1160mm x 2550mm	780mm x 1160mm x 2550mm	778mm x 1167mm x 2550mm

Gridforce GF Range

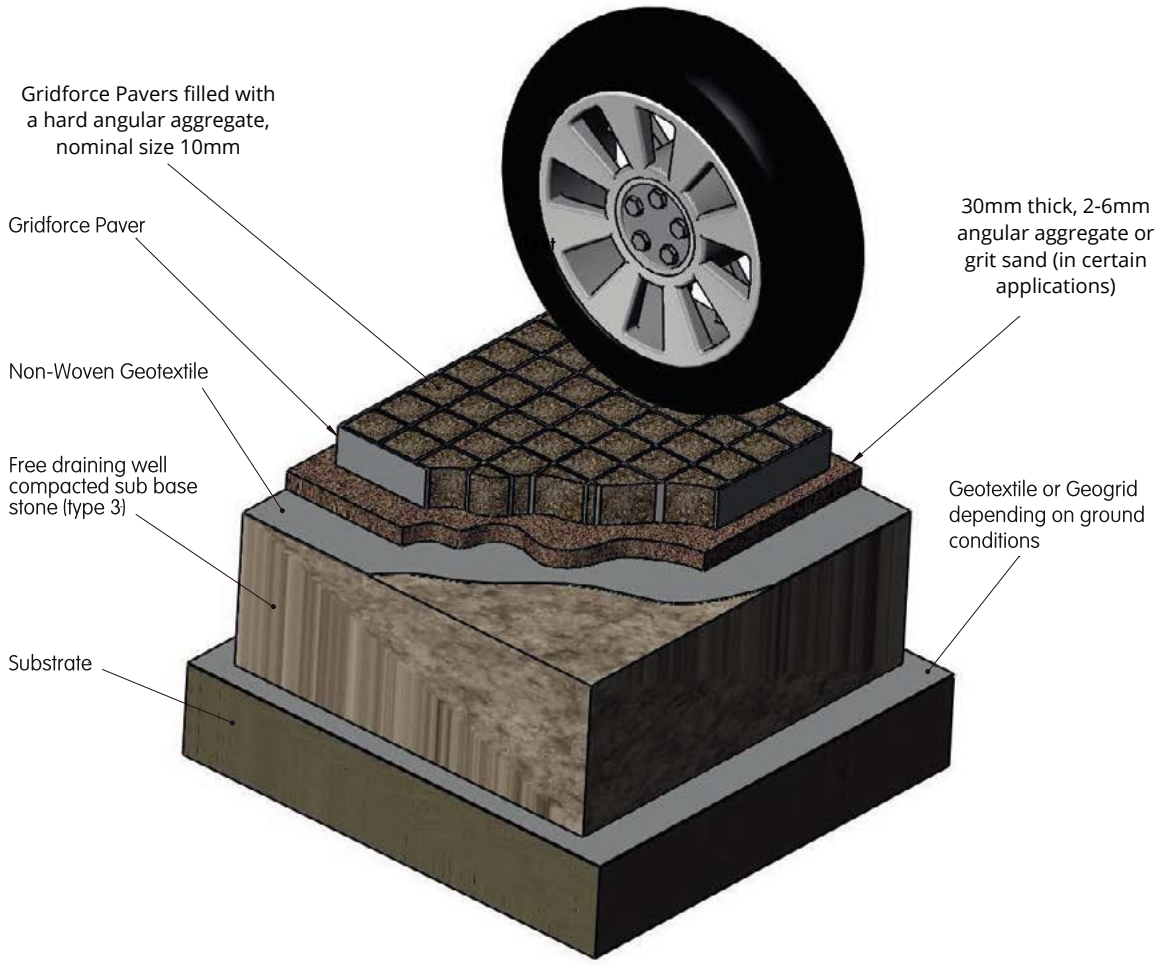
Gridforce GF range brings high strength, excellent durability and simple installation to heavy duty ground reinforcement applications and high traffic areas.

Manufactured to DIN 1072 standard, the GF range is ideal for use where larger vehicles or high traffic levels are present and is also approved for use on emergency access routes.

Incorporating three different depths to meet demanding specifications and diverse requirements, the 'GF' range is extremely versatile and is also certified as fire resistant to DIN4102 standard.

	GF 30	GF40	GF50
Recommended Infill Media	Decorative aggregates	Decorative Aggregates or Seeded Topsoil	Decorative Aggregates or Seeded Topsoil
Applications	Driveways, footpaths and walkways	Car parks, road extensions, driveways, emergency access routes, storage areas, footpaths, walkways, external works and civil engineering	Car parks, road extensions, driveways, emergency access routes, storage areas, footpaths, walkways, external works and civil engineering together with ground strengthening and banking reinforcement for landscaping
Maximum Load Capability of Pavers	1000 tonnes/m^2 (Filled)	1000 tonnes/m^2 (Filled)	1000 tonnes/m^2 (Filled)
Axle Loading	20 tonnes	20 tonnes	20 tonnes
Material Properties	100% recycled low density polyethylene UV Stable with operating temperature range of -35˚C to 85˚C	100% recycled low density polyethylene UV Stable with operating temperature range of -35˚C to 85˚C	100% recycled low density polyethylene UV Stable with operating temperature range of -35˚C to 85˚C
Paver Specifications			
Depth	30mm	40mm	50mm
Length	500mm	500mm	500mm
Width	500mm	500mm	500mm
Wall Thickness	3.0mm	3.0mm	3.0mm
Cell Detail	49 Cells of 70mm x 70mm	49 Cells of 70mm x 70mm	49 Cells of 70mm x 70mm
Open Surface Area	96%	96%	96%
Weight	1.1Kg per paver	1.4Kg per paver	1.6Kg per paver
Area - 4 paver (2x2)	1.0m^2	1.0m^2	1.0m^2
Colours	Black. Other colours available subject to quantity	Black or Green. Other colours available subject to quantity	Black or Green. Other colours available subject to quantity
Transport Specification			
Number of Pavers Per Pallet	320	240	192
Area of Coverage Per Pallet	80m^2	60m^2	48m^2
Pallet Size	1050mm x 1050mm x2550mm	1050mm x 1050mm x 2550mm	1050mm x 1050mm x 2550mm

(A) Applications where cells to be infilled with stone



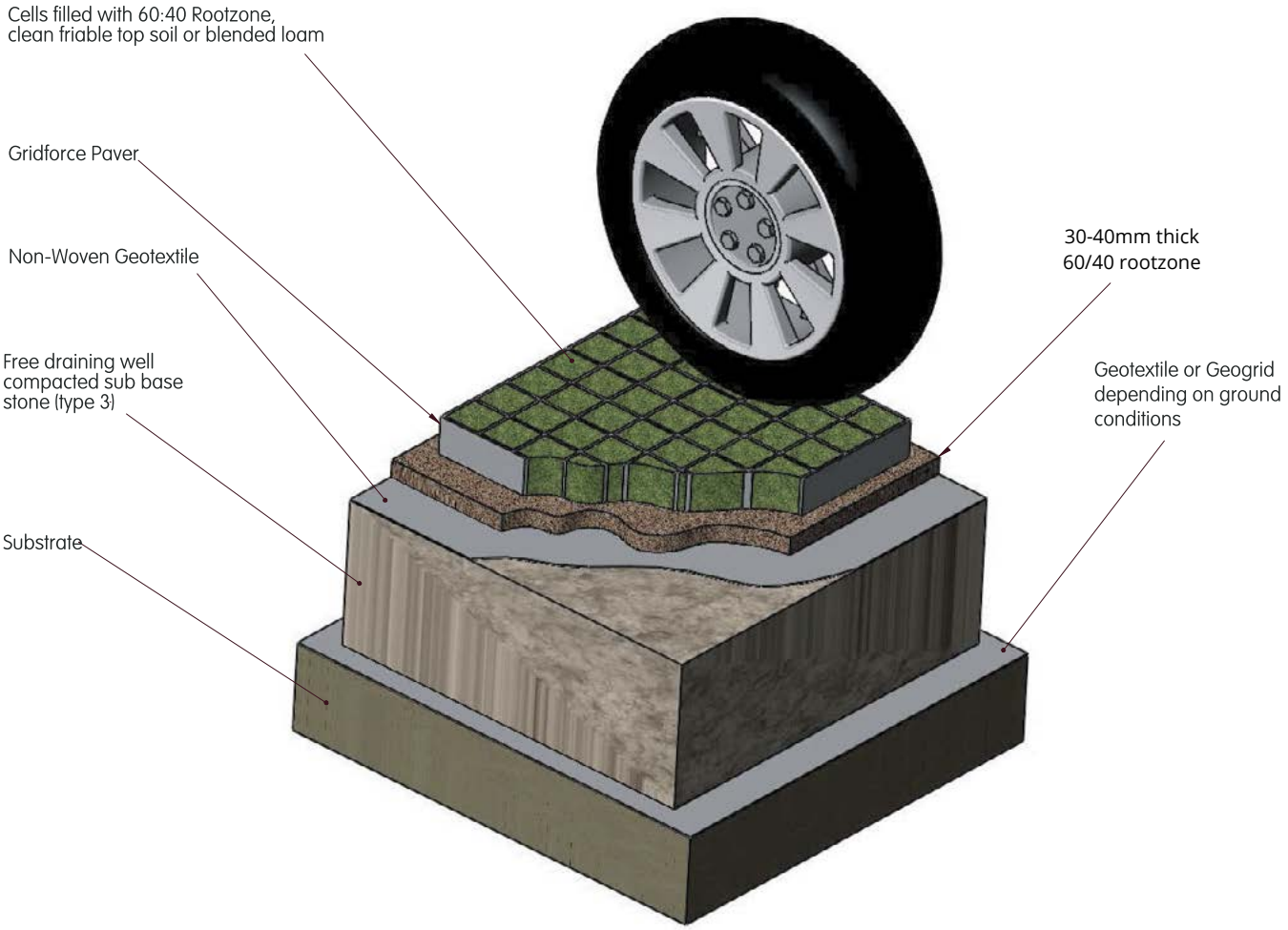
The base should consist of a free draining crushed stone, which may need to be supported with a geotextile or geogrid depending on ground conditions. Although often used, MOT Type 1 is not suitable as it is, in most cases, not free draining. **MOT Type 3 is appropriate**. Depth of stone will depend on the drainage characteristics of the existing ground. Assuming reasonably free draining ground then the base for a car park would typically be 150-200mm of stone depending on existing ground conditions (see below), a non-woven geotextile is then installed and overlaid with a 30mm bedding layer as specified in the diagram.

Gridforce pavers are laid onto the bedding layer prior to filling with free draining angular stone nominal 10-20mm. Some clients prefer to cover the pavers under a layer of stone, but for a neat and more manageable finish, full enclosure of all stone within the cells is recommended. Free design advice is available and site/client visits can be arranged. Gridforce is available as supply only or as supply and lay.

Application / Load	CBR (%) Strength Of Subgrade Soil	Type 3 Sub-Base Thickness (mm)
Fire truck and occasional HGV Access	≥ 6 = 4 < 6 = 2 < 4 = 1 < 2	150 175 250 380
Light vehicle access and overspill parking	≥ 6 = 4 < 6 = 2 < 4 = 1 < 2	100 150 200 300

The calculations above are for guidance only and consideration must be given to the volume of traffic and loadings imposed upon the system.

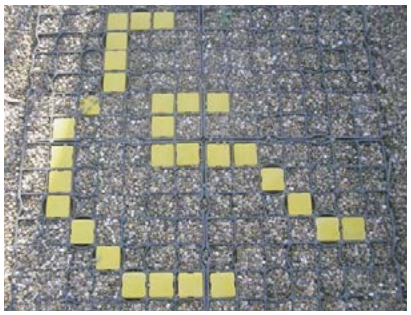
(B) Applications where grassed finish is required



The base should consist of a free draining crushed stone. Although often used, MOT Type 1 is not suitable as it is, in most cases, not free draining. **MOT Type 3 is appropriate**. Depth of stone will depend on the drainage characteristics of the existing ground. Assuming reasonably free draining ground then the base for a car park would typically be 150-200 mm of stone depending on existing ground conditions (see previous page), well compacted and overlaid with a 30mm bedding layer as specified above. Pavers are filled with 60:40 rootzone or clean friable topsoil but, for best results, consideration should be given to filling cells with blended loam.

Accessories

Non woven geotextile, Geogrid, Pins and white or yellow parking marker blocks are available. We also supply yellow parking marker indicators (GF pavers only) to form disabled parking bay logos (see right).



Where gradients are severe, a degree of pinning of pavers maybe required. - please contact us for advice.

Supply and Install Service

In addition to being the leading supplier of permeable ground reinforcement paver systems, we offer a full supply and installation service. Our installation teams operate nationally, are fully accredited and carry out installations across the whole spectrum, from domestic drives to car parks and heavy duty applications. Work is completed to a consistently high standard and, of course, our installation package can include site surveys and assessments, working alongside the qualified design engineer.

Installation of Gridforce

(A) Stone Infill to Cells

1. Excavate existing ground and compact surface
2. It may be necessary to lay a non-woven geotextile or geogrid, dependent on ground conditions.
3. Lay and compact free draining stone base Type 3 (NOT MOT Type 1) which should be within + or - 10mm of specified depth [see table on page 8].
4. Lay non-woven geotextile at this point or directly below grid.
5. Screed a bedding layer, 30mm of up to 10mm angular stone or grit sand.
6. Lay pavers, starting from the correct corner of the site so that subsequent pavers slot easily onto previous. Continue laying pavers, fanning out in a forwards and sideways direction. Grids may require pinning on sloped surfaces.
7. Fill cells with angular, free draining stone, ideally 10-14mm nominal size.
8. Ensure tops of all paver cells remain visible. Clients may prefer to cover the pavers with a layer of stone but best practice is to contain all stone within the cells

NB Cutting of pavers - Pavers are easily cut by a hand or Stihl saw, leaving minimum 15mm gap between grid and edge.
It is preferable to fill such gaps with stone alone.



(B) Grass Infill to Cells

1. Excavate existing ground and compact surface
2. It may be necessary to lay a non-woven geotextile or geogrid, dependent on ground conditions.
3. Lay and compact free draining stone base Type 3 (NOT MOT Type 1) which should be within + or - 10mm of specified depth [see table on page 8].
4. Lay non-woven geotextile at this point, dependent on application.
5. Screed a bedding layer, 30mm of grit sand or 60/40 rootzone.
6. Lay pavers, starting from the correct corner of the site so that subsequent pavers slot easily onto previous. Continue laying pavers, fanning out in a forwards and sideways direction. Grids may require pinning on sloped surfaces.
7. Fill cells with clean friable top soil, blended loam or 60/40 rootzone.
8. Ensure tops of all paver cells remain visible so infill settles just below top of pavers.

NB Cutting of pavers - Pavers are easily cut by a hand or Stihl saw, leaving minimum 15mm gap between grid and edge.
It is preferable to fill such gaps with stone alone.



Installation of Gridforce

(C) "Mini-Ex" Reduced dig system

Reduced or no-dig installations may be feasible, depending on ground conditions and proposed usage. Please contact us for advice.

For schemes where existing ground conditions are firm and free draining, the gridforce GF "Mini-Ex" reduced dig system is suitable for light traffic and pedestrian use. It is particularly relevant where funding is limited and where there are constraints on excavation - for example where tree roots are close to the surface.

1. Excavate existing ground to depth of approximately 70mm and consolidate well.
2. Roll out "Mini-Ex" geogrid onto the prepared surface, overlapping joints by at least 200mm and pin down using Gridforce securing pins
3. Evenly spread a minimum 30mm of coarse grit sand or angular stone over the base geogrid and consolidate, ensuring that the geogrid is not exposed.
4. Lay pavers, starting from the correct corner of the site so that subsequent pavers slot easily onto previous. Continue laying pavers, fanning out in a forwards and sideways direction. Grids may require pinning on sloped surfaces.
5. Fill cells with angular, free draining stone, ideally 10-20mm nominal size or clean friable top soil, blended loam or 60/40 rootzone.

(D) Gridforce Grass Reinforcement system using either Gridforce IR 35 or Park 40 (Flip and Clip) products.

In certain situations, it may be appropriate to dispense with a conventional base when installing Gridforce pavers. If the existing ground is grass covered, reasonably even/undamaged and considered to be suitably free draining, then the Gridforce products, IR 35 or Park 40 (Flip and Clip) can be used for this application. The Gridforce products can be pressed into the existing grass without the conventional dig-out and build up of a sub-base. This cost effective solution allows for ground reinforcement without the expense of a full installation and is also ideal where root protection is a primary concern.

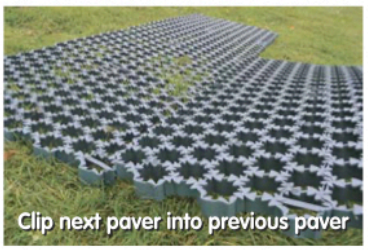
Built for performance, safety and strength, while able to provide excellent sustainable drainage system, the Gridforce system can be used for a variety of building and landscaping applications which include soil, turf and grass-based lawn reinforcement designs.

Tough cell construction and excellent design means the Gridforce system is a brilliant erosion control tool maintaining a level surface structure and offering weather-resistance you won't find elsewhere. Constructed from 100% recycled plastic, Gridforce cell lawn-reinforcement system is designed with superior durability and strength, ensuring a long-lasting transformation of your lawn or turfed area.

This solution is ideal for ground protection used for overspill event parking or additional parking requirements that will stop vehicles rutting or becoming stuck.

Installation guidelines:

1. No real preparation is required although it is advisable to cut the grass short.
2. Lay the IR 35 paver on the grass or turn the Park 40 paver upside down and lay it on the grass. Take the next paver, correctly orientated, line up edge with the first panel and apply foot pressure to complete connection.
3. When laying is complete, use a roller or vibrating roller to push pavers into the ground. If possible, leave the pavers about 10mm proud of the surface to allow the grass to breath and aid growth.



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