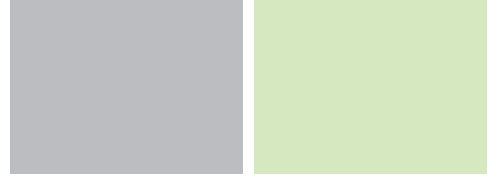


# Grasscrete

the environmental paving solution





the original ...the best,  
that's the Grasscrete World



## Our history

Grass Concrete Limited is a UK based company founded upon the principles of establishing environmental awareness in construction. Since our establishment in 1970 many of our aspirations that were then 'alternative' have now become part of mainstream policy adopted by governments and planners around the world.

Barely an issue in those days, the company set out to change traditional thinking towards paving technology. The company's credentials have grown with that of its original product, the unique Grasscrete paving system. Alongside this original invention further paving systems have been introduced as well as a range of earth retaining walls and green roofing solutions.

## Why Grasscrete?

With architects and engineers now embracing environmental technology, the relevance of Grasscrete has never been greater. A product ahead of its time has found its era.

As probably the world's only supplier of a complete range of grass reinforcement products, we are able to say that Grasscrete stands alone in its unique capabilities. Though often thought of as a generic reference for grass reinforcement, it's much more than that and, indeed, shouldn't be confused with other types of grass paving.

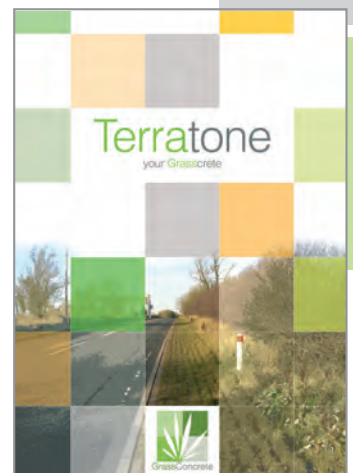
The lightweight Grasscrete void former can be easily and cost effectively shipped throughout the World. Availability is enhanced by an extensive network of International Licensees.

# applications

- Vehicle parking
- Access roads
- Fire and emergency access
- Laybys / pull ins
- Highway verges
- Abnormal load diversions
- SUDS (sustainable urban drainage system)
- Helipads
- Military installations
- Slope protection
- Drainage channels
- Flood prevention
- Swales
- Spillways



Grasscrete is available in soil tone concrete. Please ask for further details of Terratone



# structural performance

Grasscrete combines the environmental appeal of natural grass with the engineering principles of reinforced concrete.

This unique cellular structure is created using the Grasscrete void former; vacuum formed with a patented anti-static coating to prevent concrete adhesion as well as enabling easy packing and separation.

## Key benefits

### Resists differential settlement

Modular, pre-cast concrete or plastic systems rely significantly on grass for stability by forming a composite tensile matrix. Under constant trafficking the combination of load and vibration can loosen root anchorage, leaving the surface prone to settlement in a syndrome known as 'elephant tracking'.

By contrast Grasscrete isn't structurally influenced by grass and can therefore be trafficked before grass establishment. The reinforced structure resists differential settlement and the flat, upper surface and pocket shape minimises vibration.

### Ground heave

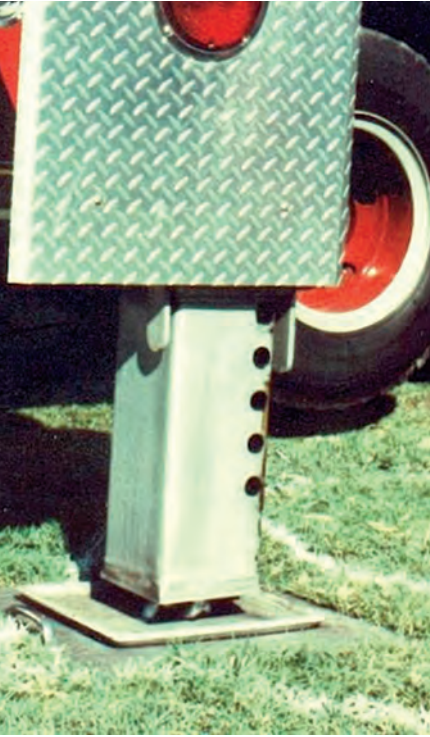
Grasscrete's unique pocket profile enables the release of frost heave and hydro-static pressure. These benefits enable the system to be used over frost influenced ground and in demanding slope protection works.

### Sub-base depth

With an allowable ground-bearing requirement of just 45kN/m<sup>2</sup>, Grasscrete can be installed over slimmer sub-bases than required for pre-cast or plastic types.

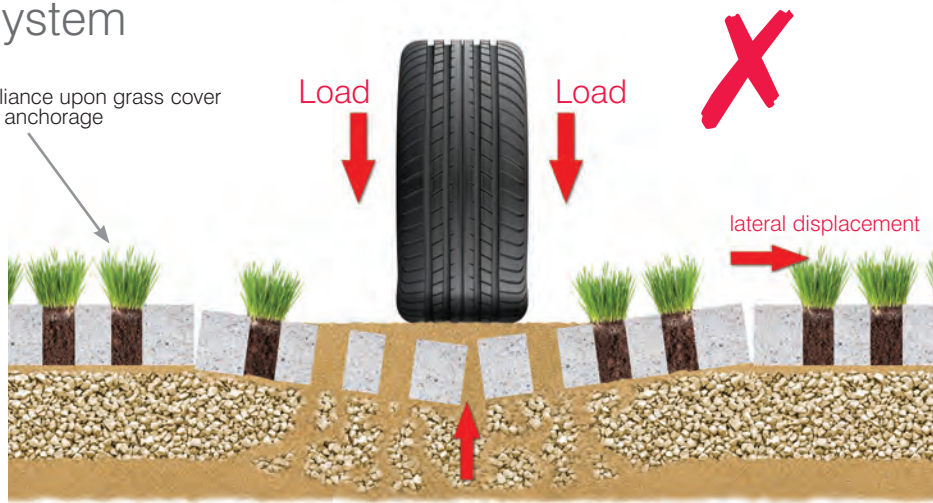
### Edge details

Modular pre-cast concrete or plastic systems require edge restraints or kerbs. For larger projects intermediate shear anchors may also be needed. Grasscrete however, requires no such details, enabling it to blend naturally with adjacent finishes with subtle delineation created by a monolithically cast solid concrete edge margin.



## Pre-cast system

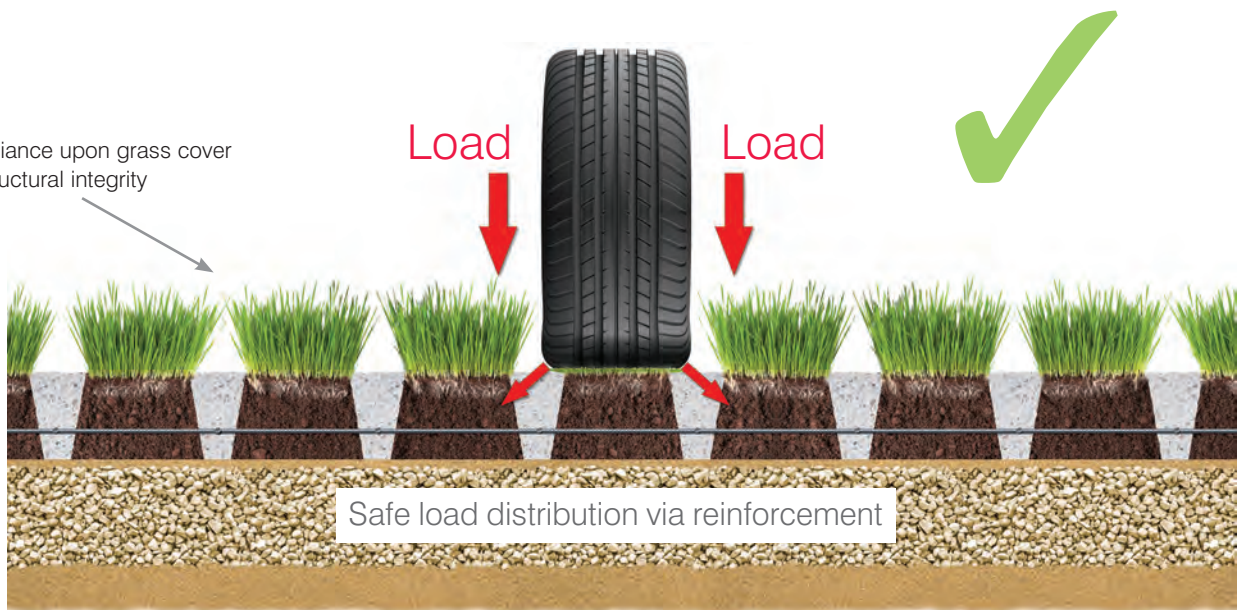
Reliance upon grass cover for anchorage



Sub-base deforms causing sub-grade to pump to surface

## Grasscrete

No reliance upon grass cover for structural integrity



# key environmental benefits

## Permeability

- Permeation rate up to 90% that of original ground
- Helps to reduce shrinkage in underlying clays
- Reduces on and offsite drainage requirements
- Works with BREEAM, LEED and BASIX environmental systems

## Filtration

- Natural bio-filter created by organic/granular layers

## Flood prevention and control

- Reduces surface water run-off
- Highly effective armouring layer for fast flowing water movement and storage
- Gives a hard engineering solution a soft landscape feel

## Greenespace

- Promotes a feeling of greenspace well-being
- Helps to reduce the Urban Heat Island Effect
- Digests CO<sub>2</sub> at ground level emission source

## Recycling

- Significant re-cycled content in void former manufacture
- Promotes re-use and re-cycling of topsoils and aggregates in construction

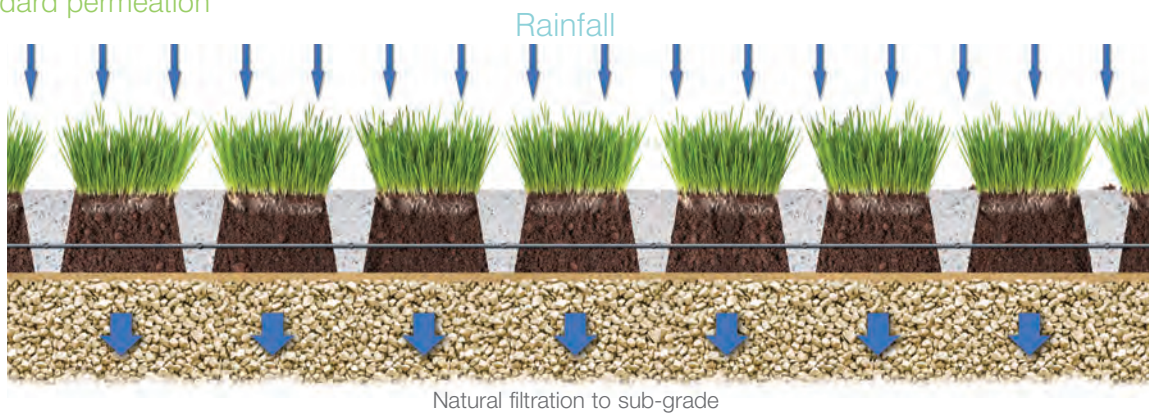
## Carbon mileage

- Lightweight formers and patented nesting reduces transported volume
- Combines with locally sourced materials for construction

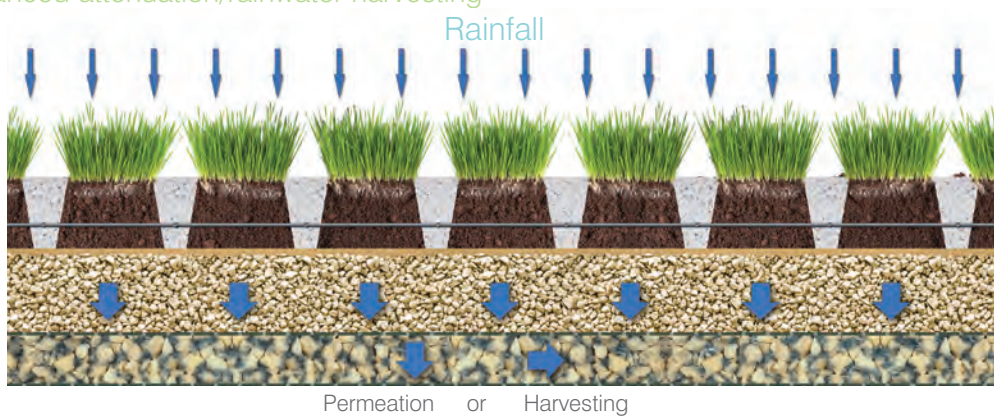


# sustainable drainage technology(SUDS)

Standard permeation

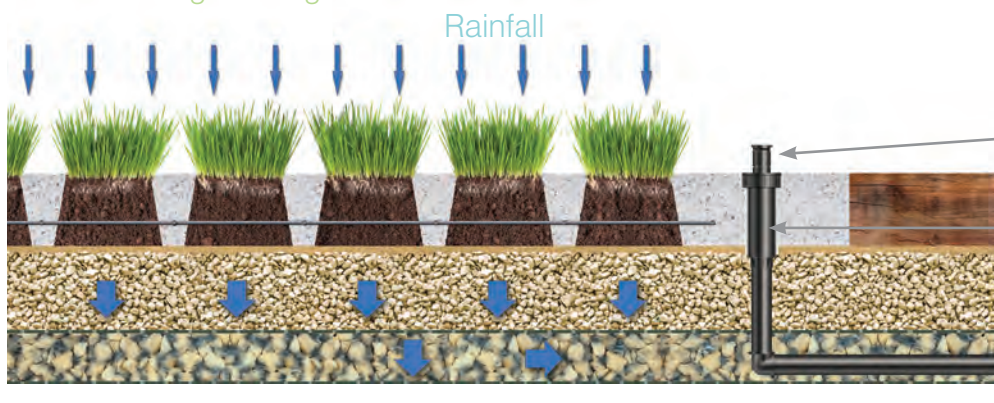


Advanced attenuation/rainwater harvesting



- ← Needle punched geo-textile
- ← Low fines granular layer
- ← Geo-textile

Rainwater harvesting with irrigation



- ← Pop-up sprinkler (can be solar powered)
- ← Riser pipe on ring main
- ← Needle punched geo-textile
- ← Low fines granular material
- ← Low permeability geo-textile



# slope protection

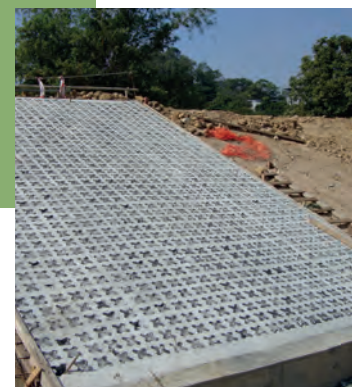
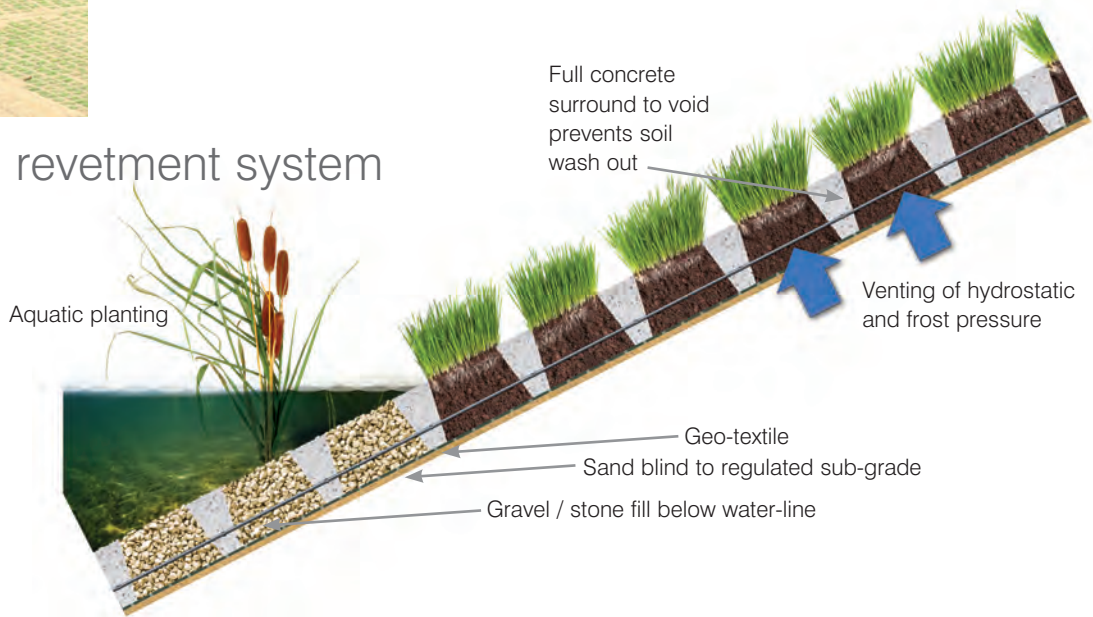
Grasscrete has been flow tested to rates in excess of 8 metres per second, enabling it to be used in exacting locations.

The Grasscrete construction phase also holds a number of key advantages for contractors when compared with pre-cast systems:

- The cast insitu process enables bays to be cast in varying locations and sequences safe in the knowledge that they will all eventually come together. This compares to the need to follow a strict linear process for installing pre-cast blocks to ensure that bonding is maintained.
- Site storage and handling requirements are minimised with one 12 metre long container of Grasscrete formers being able to cover the same area as forty 12 metre long loads of pre-cast blocks.
- In addition to normal topsoil and grass infill the Grasscrete pockets can also be filled with 20-5mm graded gravel for below water-line locations.
- The "at risk" period during the temporary works is much less for Grasscrete as it will perform without grass growth. This compares to pre-cast block types where grass growth is essential to maintaining stability.



## The natural revetment system





# installation

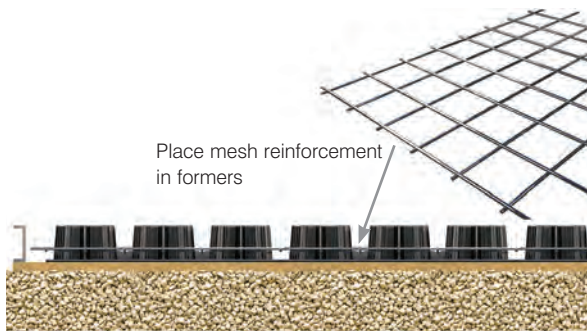
## 1. Preparation



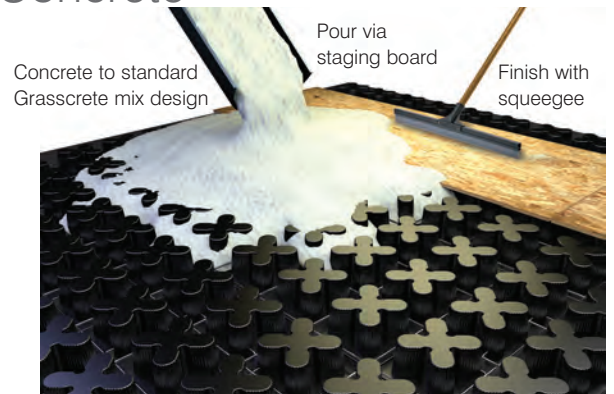
## 2. Lay formers



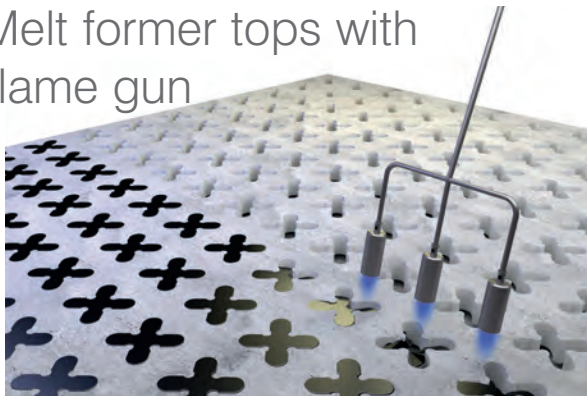
## 3. Mesh reinforcement



## 4. Concrete

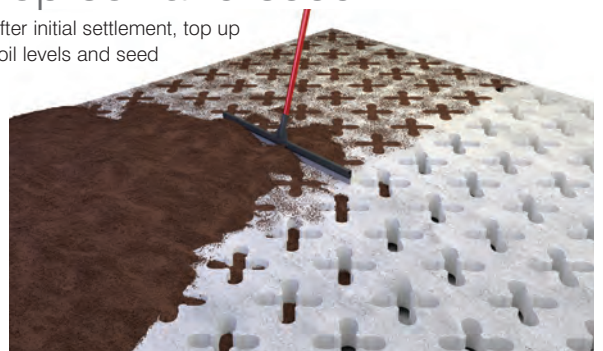


## 5. Melt former tops with flame gun



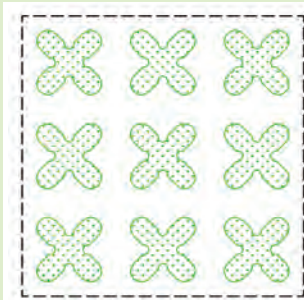
## 6. Top soil and seed

After initial settlement, top up soil levels and seed



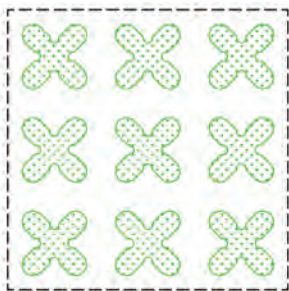
# Types

## GC3



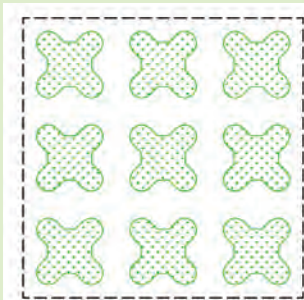
Void former size:	600 x 600 x 76mm
Paving depth:	76mm
Mesh reinforcement:	BS4483 Ref. A142 or A193 (200 x 200 x 6mm dia. or 200 x 200 x 7mm dia.)
Concrete coverage:	22m <sup>2</sup> /m <sup>3</sup>
Topsoil coverage:	24m <sup>2</sup> /m <sup>3</sup>

## GC1



Void former size:	600 x 600 x 100mm
Paving depth:	100mm
Mesh reinforcement:	BS4483 Ref. A193 or A252 (200 x 200 x 7mm dia. or 200 x 200 x 8mm dia.)
Concrete coverage:	15.50m <sup>2</sup> /m <sup>3</sup>
Topsoil coverage:	18m <sup>2</sup> /m <sup>3</sup>

## GC2



Void former size:	600 x 600 x 150mm
Paving depth:	150mm
Mesh reinforcement:	BS4483 Ref. A252 or A393 (200 x 200 x 8mm dia. or 200 x 200 x 10mm dia.)
Concrete coverage:	11.50m <sup>2</sup> /m <sup>3</sup>
Topsoil coverage:	12m <sup>2</sup> /m <sup>3</sup>

# Specification

## Grasscrete cast on site reinforced cellular paving.

Grasscrete formers type GC.....\*, .....\*mm deep laid on a consolidated sub-base with a 10/20mm blinding layer of sand. Steel mesh reinforcement to BS4483 reference .....\*, weighing .....\*kg/m<sup>2</sup>. Concrete 30MN/m<sup>2</sup> at 28 days with air entrainment of 3%. 10mm maximum aggregate and a .....\*mm slump placed around formers and mesh and levelled to tops of formers. (*Where coloured concrete is required please suffix the GC former type reference with "Terratone" eg "GC3/Terratone".*) After 48 hours melt exposed tops of formers and fill with soil. Following settlement sow Grassmix No.....\* at a rate of 50g/m<sup>2</sup> and top up with fine friable topsoil, apply fertiliser as necessary.

Expansion joints shall be incorporated at maximum 10 x 10m centres and shall consist of 25mm wide pre-soaked softwood filler.

Or for GC2 with A393 mesh only, and normally only when used for heavy load transference:

Expansion joints shall be incorporated at maximum 10 x 10m centres and shall consist of 25mm wide foamboard filler with 20mm diameter x 300mm long sawn mild steel dowels at 400mm centres with cap and debond to one side. Joint shall be sealed with cold applied sealant.

*\*Refer to data in Grasscrete Types table and Specification Guide for items to be completed.*

# Specification guide

## Vehicular use

Maximum vehicle weight	Grasscrete type	Depth	Reinforcement	Minimum Sub-base depth*	Sub-base type
0 - 3.4 tonnes	GC3	76mm	A142	100mm	(UK) Specification for Highway Works Clause 803 Type 1 sub-base (International) 40mm down crushed stone granular sub-base
3.4 - 4.3 tonnes	GC3	76mm	A193	150mm	
4.3 - 10.8 tonnes	GC1	100mm	A193	150mm	
10.8 - 13.3 tonnes	GC1	100mm	A252	150mm	
13.3 - 30.0 tonnes	GC2	150mm	A252	150mm	
30.0 - 40.0 tonnes	GC2	150mm	A393	200mm	

\*Assumes a free draining allowable ground bearing of 45kN/m<sup>2</sup> which should also be sufficient to enable construction plant/delivery access.

## Water environment

Water flow rate	Grasscrete type	Depth	Reinforcement	Preparation (all types)
Up to 4.5 metres/second	GC3	76mm	A142	Trimmed earth sub-grade Sand blind Suitable geo-textile Fine protective cover of sand
Up to 6.0 metres/second	GC1	100mm	A193	
Up to 9.0 metres/second	GC2	150mm	A252	

## Seed specification

Mix	Sowing rate	*Specification (temperate European)	Application
No. 1	35gms/m <sup>2</sup>	50% perennial ryegrass 20% slender creeping red fescue 25% strong creeping red fescue 5% browntop bent	Vehicular parking, amenity areas
No. 2	30gms/m <sup>2</sup>	20% chewings fescue 20% slender creeping red fescue 30% strong creeping red fescue 25% hard fescue 5% browntop bent	Fire paths, shaded low maintenance areas
No. 3	20gms/m <sup>2</sup>	25% perennial ryegrass 20% strong creeping red fescue 30% hard fescue 10% smooth stalked meadow grass 10% browntop bent 5% white clover	Slopes, road verges  *For other climate types please contact us

Further specification information can also be found under NBS reference Q21-125

Please contact us for further information and advice relating to special mixes for applications such as water courses and spillways.

**Grass Concrete Limited**

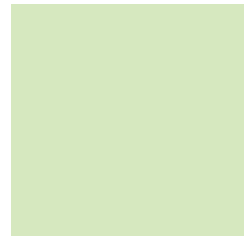
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A full range of brochures and technical guides are available upon request



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