ZAC
Zoning Advisory Committee

17 October 2005

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Zoning Commission for the District of Columbia
Office of Zoning – Suite 210
441 4th Street, NW
Washington, D.C. 20001

Re: Case No. 04-34 (Text Amdt. -- Use of Pervious Parking and Driveway Surfaces)

Dear Chairman Mitten and members of the Commission:

In response to the Notice of Proposed Rulemaking (NOPR) in the D.C. Register of September 23, 2005 (52 DCR 8643), the Zoning Advisory Committee (ZAC)

- welcomes the proposal to allow (but not mandate) "porous or pervious concrete", "porous asphalt", and "grasscrete" as alternatives to "traditional impervious surfaces" for off-street parking places and parking lots, but
- urges that the Commission's final rule allow even more choices by amplifying the last sentences of proposed Sections 2117.4 and 2117.10, to read as follows:

In addition to traditional impervious surfaces, allowable all weather surfaces include porous or pervious concrete, porous asphalt, **mechanically-supported grass, gravel, crushed concrete, rock, or stone**~~Grasscrete [footnote omitted]~~, or a combination of such materials, but may not consist entirely of **unsupported** grass, gravel or both.

ZONING COMMISSION
District of Columbia
CASE NO. 04-34
EXHIBIT NO. 35

These changes would count "mechanically-supported" grass or gravel as "all weather surfaces" (excluding only "unsupported" grass or gravel). That would allow a broad range of competing products that have been used in the District of Columbia and elsewhere (and that might be suited for parking and driveway surfacing in particular instances), such as:

GeoBlock™ – installed adjacent to the White House in 1998 – and **GeoWeb™** – *plastics* products of ALCOA subsidiary Presto of Appleton, WI (see Appendix).

GrassTrac™ – mentioned by Commissioner Hillenbrand during the Commission's Public Meeting discussion (and illustrated in a prior ZAC submittal), a *metal* product distributed, trademarked and licensed by ACF Environmental Inc. of Richmond, VA, which has commissioned Bekaert Corporation of Atlanta, GA, to manufacture support grids that lie *under* the grass (rather than *cells* that give support from the sides).

Turf Block™ – a *cellular* concrete product that RCP Block & Brick, Inc. casts *off* site

In contrast, the narrower NOPR would count among "all weather surfaces" to be tolerated by D.C.Zoning Regulations only the proprietary product "**Grasscrete™**" or "a generic description for the product" (citing www.grasscrete.com) consisting of a *cellular* system made of *concrete* cast *on site* to support soil, grass, and vehicles rolling over the concrete. This is too narrow.

If the Commission decides against broadening alternatives to "traditional" parking surfaces, the rules should provide an escape procedure by which landowners may turn to the

Board of Zoning Adjustment or the Zoning Administrator to allow mechanically-supported grass or gravel and to grant relief for non-conforming gravel parking pads.

The ZAC proposal, filed on November 22, 2004, to eliminate the prohibition against use of pervious surfaces for all parking spaces and for driveways that access required parking spaces, has evolved into the current NOPR. It should be perfected and adopted as soon as possible.

Faithfully,

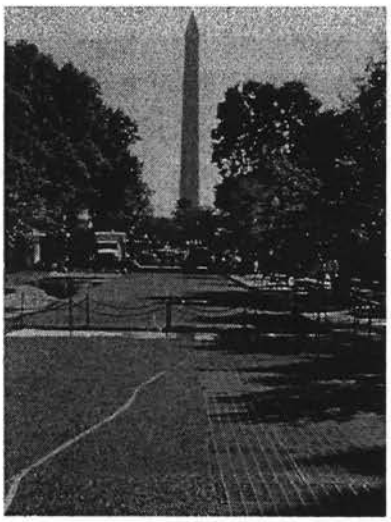
ZONING ADVISORY COMMITTEE
By: David J. Bardin, Chair, Green Subcommittee

Appendix

GeoBlock™ and **GeoWeb™** – are products of Presto Products Company of Appleton, WI, now a subsidiary of ALCOA. Downloaded and attached is Presto's description: "Porous Pavement Systems".

GeoBlock was installed in East Executive Drive (between the White House and the Treasury) in October 1998 and used for several years. The site is part of President's Park, managed by the National Park Service and exempt from D.C. Zoning Regulations. Photographs of the installation work follow [provided by ACF Environmental, Inc. of Richmond, VA]:

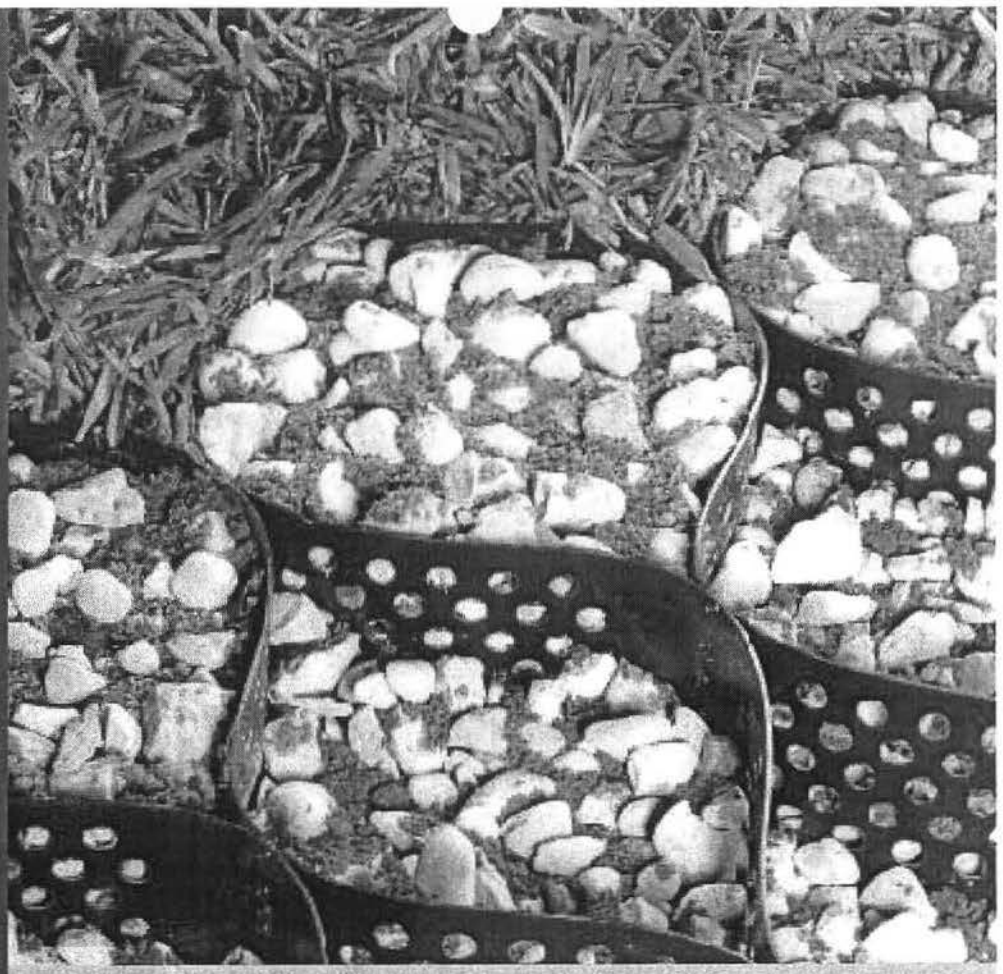




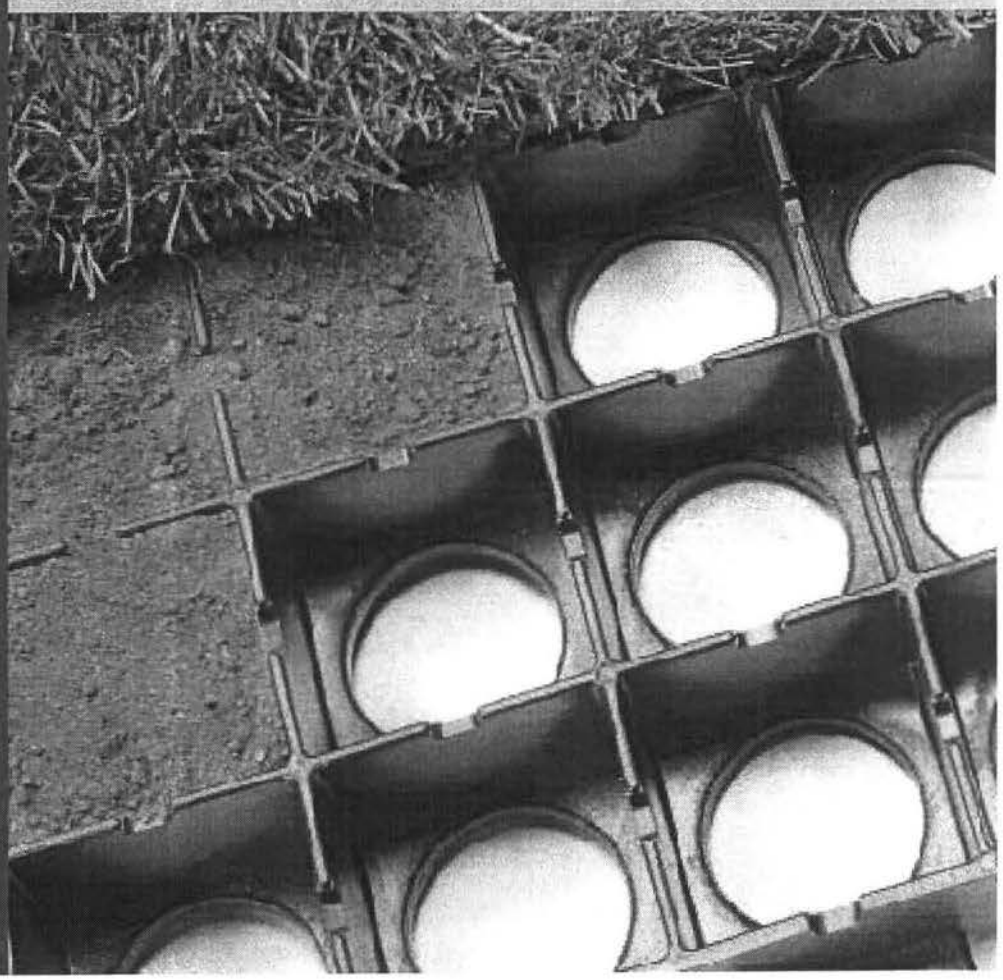
Attachment: Presto "Porous Pavement Systems"

Porous Pavement Systems

Prest®



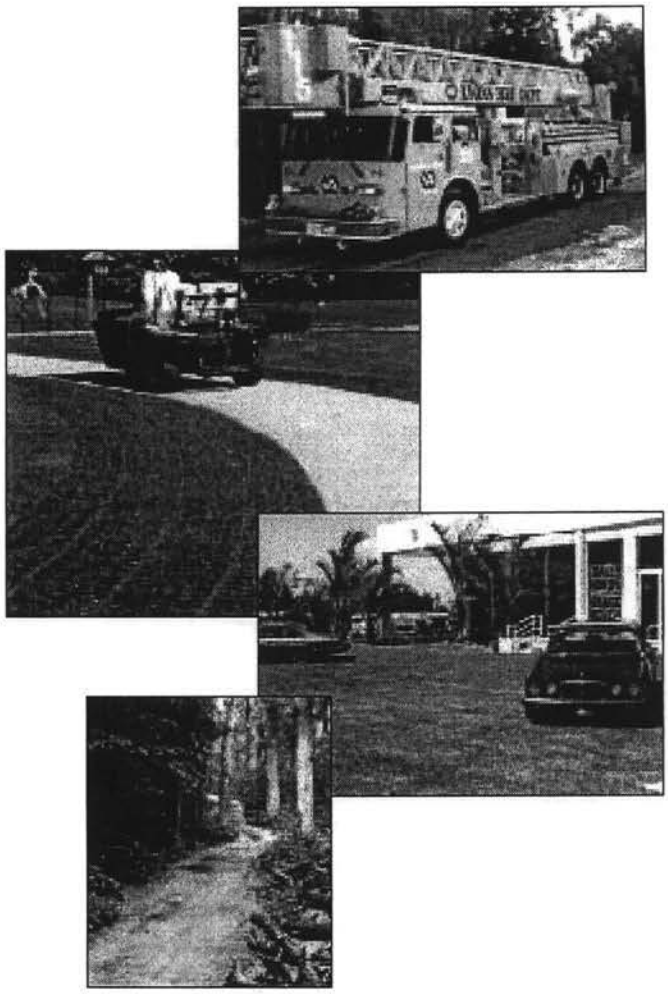
Leaders in Advanced Geotechnology™



Environmental Concerns

The Geoblock® and Geoweb® systems are a result of Presto's innovation, providing porous pavement solutions in traffic areas where the natural beauty of grass and permeability of aggregate are desired. Systems that address environmental issues, such as aesthetics and storm water runoff, while supporting a wide variety of loading conditions.

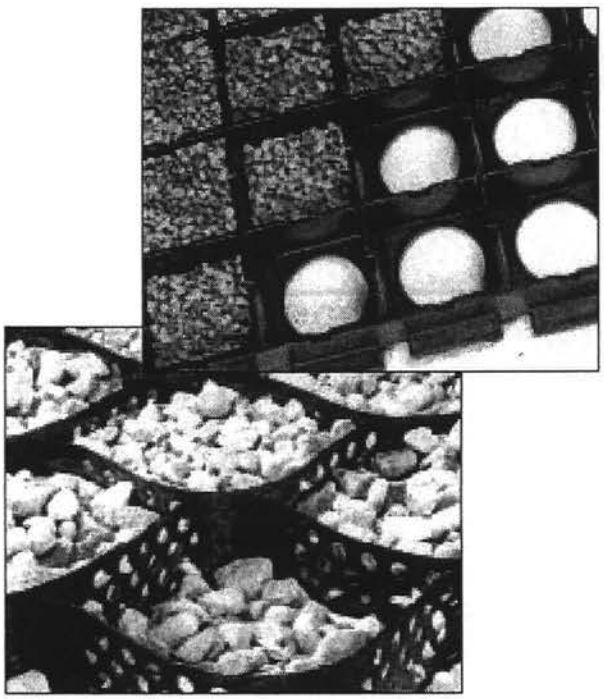
Today, with successful installations worldwide, Presto's porous pavement systems are globally recognized as fully engineered cost-effective solutions.



Load Support & Turf Protection

In areas where aesthetics are vital, the Presto porous pavement systems provide dependable protection of turf grass and load support. Other benefits:

- Access for all types of emergency vehicles.
- Maintenance and small vehicle support around properties, such as utility vehicles or golf carts.
- Support of small vehicles for auxiliary parking areas, driveways and medians.
- Pedestrian foot traffic support in trails, walkways, approaches and other high use areas.
- Handicap access in parks and other recreational areas.



Load Support & Stormwater Storage

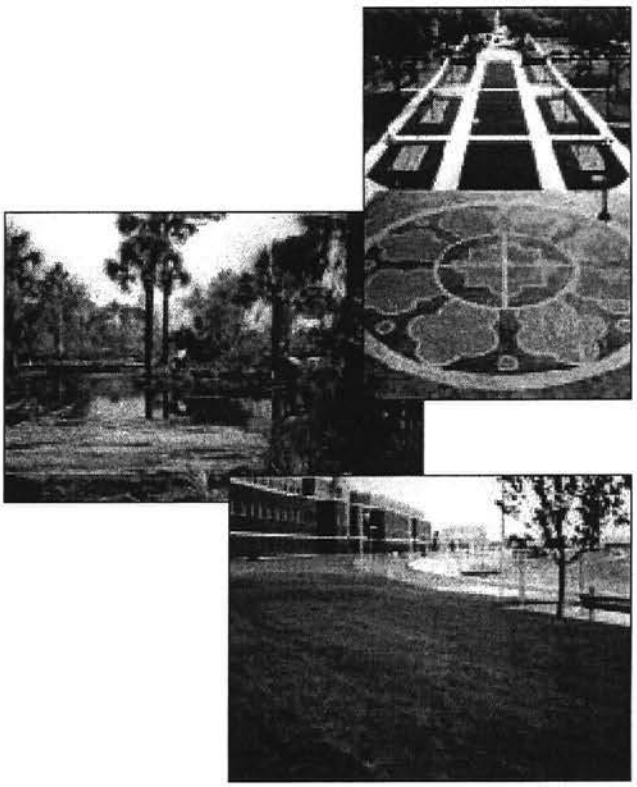
Presto's porous pavement systems provide advantages for stormwater storage and load support.

- Clear aggregate infill offers permeability, stormwater storage and load support for parking, access areas and other load support applications.
- Aggregate with 35-45% void space creates a storm-water storage area that allows stormwater to slowly permeate into the existing ground while supporting loads.

Minimization of Stormwater Runoff

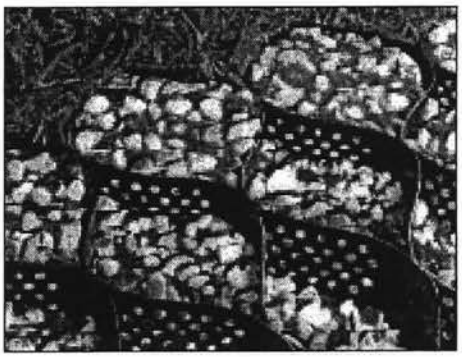
With 87-98% open surface area, Presto porous pavement systems provide benefits over traditional hard surfaces, including:

- Lower development and construction costs by minimizing use of valuable land for stormwater holding systems.
- Lower cost of stormwater collection and discharge systems as the reduction in stormwater runoff allows the use of smaller, less expensive discharge pipes.
- Reduced ground maintenance costs as potential turf damage caused by loading is minimized.
- Direct replenishment of groundwater as stormwater percolates into the ground through the open design.

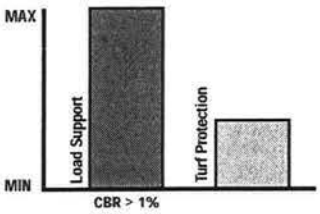


Presto's Permeable Solutions

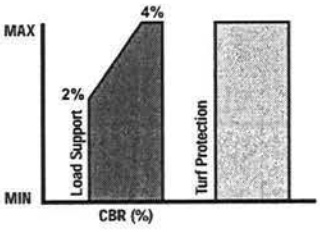
Relative performance of porous pavement solutions with Presto's three systems:

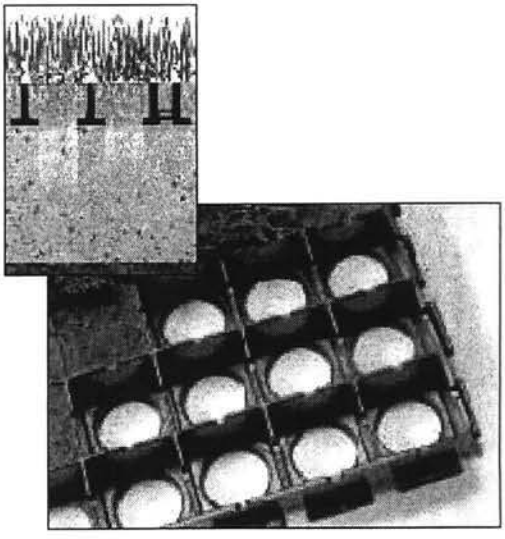


1 ***The Geoweb system*** provides maximum load support with the tire load supported by an aggregate stabilized turf.

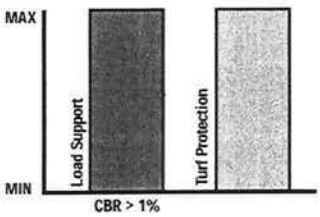


2 ***The Geoblock system*** delivers maximum protection to the turf while supporting the tire load through the Geoblock System's wall structure.





3 ***The Geoblock/Geoweb system*** offers the greatest load support of heavy vehicles over softer soils while providing maximum turf protection.



The Geoweb® Porous Pavement System

- When an economical load support system is needed.
- When maximum load support is required and turf protection is secondary.
- When direct tire contact with the turf area and minimal surface rutting are acceptable.
- When maximum load support is required and aggregate infill is desired or acceptable.
- For non-turf applications where maximum confinement of free-draining granular materials support narrow-wheeled vehicle access, such as bicycles or wheelchairs.
- For non-turf applications that provide stormwater storage in addition to load support and stormwater replenishment.

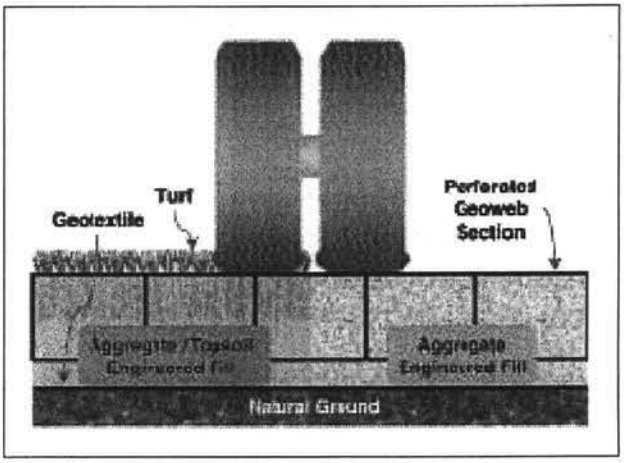
Recommended Engineered Fill Characteristics:

Turf

Geoweb system infill soil shall consist of a mixture of angular clear-stone or crushed rock blended with topsoil. This mixture will promote vegetative growth and provide required structural support. The aggregate portion should be angular with a particle range from 5 mm - 15 mm (3/16 in - 5/8 in) and have a known percentage void-space when compacted. Pulverized topsoil, equal to the void space in the aggregate, should be added and blended prior to placement. If the topsoil is not present within the engineered base, grass growth may be significantly impaired.

Non-turf

Geoweb system infill soil shall consist of angular clear-stone or crushed rock. The aggregate should be angular with a particle range from 5 mm - 15 mm (3/16 in - 5/8 in) and have a known percentage void-space when compacted. With a known percentage void-space in the aggregate and a known percolation rate of the underlying soil, storm water retention and dispersion can be determined.



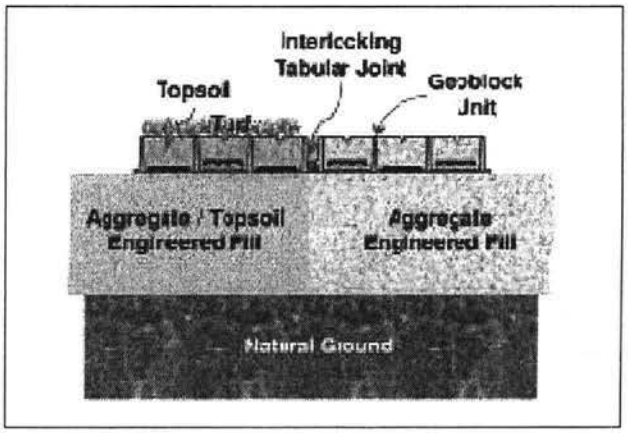
The Geoweb® System Components

Components	*Turf*	*Non-turf*
The perforated Geoweb section	x	x
Aggregate fill	x	x
Topsoil portion to fill	x	
Selected vegetation	x	
Topsoil additives to enhance vegetative growth (optional)	x	
Geosynthetic separation layer (required under some conditions)	x	x

Both the Geoweb section and the aggregate portion of the engineered fill work together to support the imposed loading. The topsoil portion of the engineered fill contributes to the vegetation support.

The Geoblock® Porous Pavement System

- When maximum load support and turf protection are required.
- When protecting top soil from compaction and rutting, and protecting the turf from root damage are important.
- For non-turf applications where maximum confinement of aggregate or other free-draining granular materials are used to support automotive and truck access.
- For non-turf applications that provide stormwater storage in addition to load support and stormwater replenishment.



Recommended Engineered Fill Characteristics:

Turf

Topsoil within the Geoblock cells should contain sufficient organic materials to support vegetative growth. Topsoil such as sandy loam is recommended. Topsoil shall be pulverized prior to application. Clay and clay loam materials are considered not acceptable.

Geoblock system support soil shall consist of a mixture of coarse sand, clear-stone or crushed rock blended with topsoil. This mixture will promote vegetative growth and provide required structural support. The aggregate portion should be free from fines and have a known percentage void-space when compacted. Pulverized topsoil, equal to the void space in the aggregate, should be added and blended prior to placement. If the topsoil is not present within the engineered base, grass growth may be significantly impaired.

Non-turf

Geoblock system infill and support soil shall consist of angular clear-stone or crushed rock. The aggregate should be angular with a particle range from 5 mm - 15 mm (3/16 in - 5/8 in) and have a known percentage void-space when compacted. With a known percentage void-space in the aggregate and a known percolation rate of the underlying soil, storm water retention and dispersion can be determined.

The Geoblock® System Components

Components	*Turf*	*Non-turf*
The Geoblock unit	x	x
Selected topsoil fill for the Geoblock cells	x	
Selected aggregate fill for the Geoblock cells		x
Selected vegetation	x	
Aggregate support fill	x	x
Topsoil portion of support fill	x	
Geosynthetic separation layer (required under some conditions)	x	x
Topsoil additives to enhance vegetative growth (optional)	x	

Both the Geoblock unit and the engineered fill work together to support the imposed loading. Both the Geoblock unit and the topsoil contribute to the vegetation support.

The Geoweb®/Geoblock® Porous Pavement System

- When both maximum protection of the turf area against direct tire contact is important and maximum load support over poor soils is required.

Recommended Engineered Fill Characteristics:

Turf

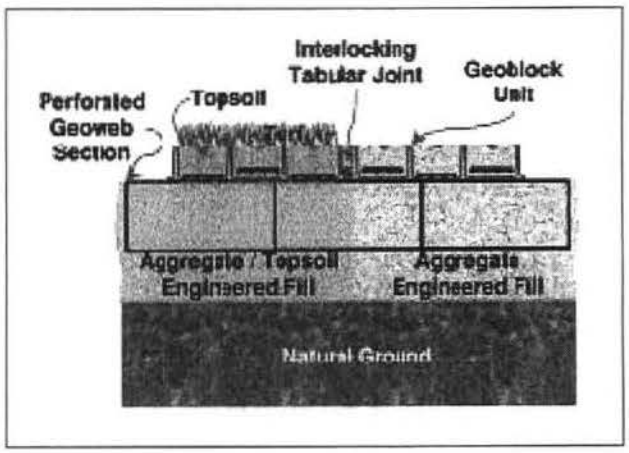
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Geoblock system support soil shall consist of a mixture of coarse sand, clear-stone or crushed rock blended with topsoil. This mixture will promote vegetative growth and provide required structural support. The aggregate portion should be free from fines and have a known percentage void-space when compacted. Pulverized topsoil, equal to the void space in the aggregate, should be added and blended prior to placement. If the topsoil is not present within the engineered base, grass growth may be significantly impaired.

Geoweb system infill soil shall consist of a mixture of angular clear-stone or crushed rock blended with topsoil. This mixture will promote vegetative growth and provide required structural support. The aggregate portion should be angular with a particle range from 5 mm - 15 mm (3/16 in - 5/8 in) and have a known percentage void-space when compacted. Pulverized topsoil, equal to the void space in the aggregate, should be added and blended prior to placement. If the topsoil is not present within the engineered base, grass growth may be significantly impaired.

Non-turf

Geoblock and Geoweb system infill and support soil shall consist of angular clear-stone or crushed rock. The aggregate should be angular with a particle range from 5 mm - 15 mm (3/16 in - 5/8 in) and have a known percentage void-space when compacted. With a known percentage void-space in the aggregate and a known percolation rate of the underlying soil, storm water retention and dispersion can be determined.



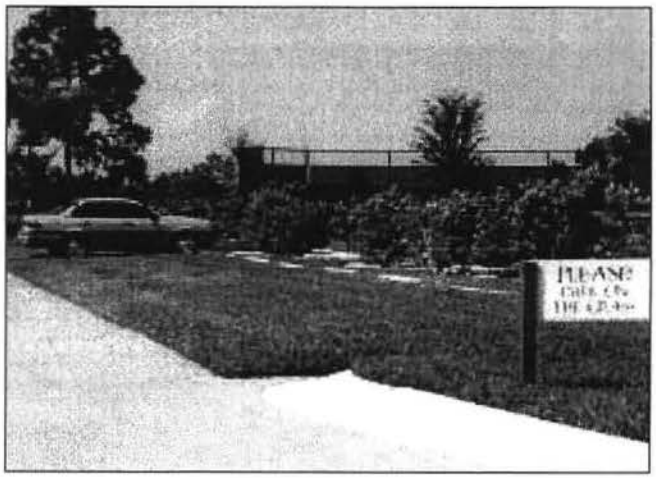
The Geoweb®/Geoblock® System Components

Components	*Turf*	*Non-turf*
The Geoblock unit	x	x
The perforated Geoweb section	x	x
Selected topsoil fill for the Geoblock cells	x	
Selected aggregate fill for the Geoblock cells		x
Selected vegetation	x	
Aggregate fill	x	x
Topsoil portion to fill	x	
Geosynthetic separation layer (required under some conditions)	x	x
Topsoil additives to enhance vegetative growth (optional)	x	

Both the Geoblock unit and the Geoweb section infilled with the engineered fill work together to support the imposed loading. Both the Geoblock unit and the topsoil contribute to the vegetation support.

Load Support

Use the following guideline to determine the appropriate porous pavement system based on load requirements and subgrade conditions.



	Load Description	System Components		
		Subgrade CBR 1% - 2%	Subgrade CBR 2% - 4%	Subgrade CBR > 4%
1. GEOWEB® SYSTEM	Fire Truck Access (H20 & H15 Loading) Axle Loads: 110 kN - 145 kN (24 kips - 32 kips)	- 150 mm (6 in) Geoweb section with topsoil/aggregate infill - 200 mm (8 in) base - Geotextile underlayer	- 150 mm (6 in) Geoweb section with topsoil/aggregate infill - Geotextile underlayer	- 100 mm (4 in) Geoweb section with topsoil/aggregate infill
	Maintenance Truck Access (H10 Loading) Axle Loads: 75 kN (16 kips)	- 100 mm (4 in) Geoweb section with topsoil/aggregate infill - 150 mm (6 in) base - Geotextile underlayer	- 100 mm (4 in) Geoweb section with topsoil/aggregate infill - Geotextile underlayer	- 100 mm (4 in) Geoweb section with topsoil/aggregate infill
	Car & Pick-Up Truck Access Axle Loads: 18 kN (4 kips)	- 100 mm (4 in) Geoweb section with topsoil/aggregate infill - Geotextile underlayer	- 100 mm (4 in) Geoweb section with topsoil/aggregate infill - Geotextile underlayer	- 75 mm (3 in) Geoweb section with topsoil/aggregate infill
2. GEOBLOCK® SYSTEM	Fire Truck Access (H20 & H15 Loading) Axle Loads: 110 kN - 145 kN (24 kips - 32 kips)	Refer to the Geoblock/Geoweb solutions shown below	- Geoblock units - 150 mm (6 in) topsoil/ aggregate base - Geotextile underlayer	- Geoblock units - 100 mm (4 in) topsoil/ aggregate base
	Maintenance Truck Access (H10 Loading) Axle Loads: 75 kN (16 kips)	Refer to the Geoblock/Geoweb solutions shown below	- Geoblock units - 50 mm (2 in) topsoil/ aggregate base - Geotextile underlayer	- Geoblock units with topsoil infill
	Car & Pick-Up Truck Access Axle Loads: 18 kN (4 kips)	Refer to the Geoblock/Geoweb solutions shown below	- Geoblock units with topsoil infill - Geotextile underlayer	- Geoblock units with topsoil infill
3. GEOBLOCK®/GEOWEB® SYSTEM	Fire Truck Access (H20 & H15 Loading) Axle Loads: 110 kN - 145 kN (24 kips - 32 kips)	- Geoblock units - 150 mm (6 in) Geoweb with topsoil/aggregate infill - Geotextile underlayer	Refer to the Geoblock solutions shown above	Refer to the Geoblock solutions shown above
	Maintenance Truck Access (H10 Loading) Axle Loads: 75 kN (16 kips)	- Geoblock units - 100 mm (4 in) Geoweb with topsoil/aggregate infill - Geotextile underlayer	Refer to the Geoblock solutions shown above	Refer to the Geoblock solutions shown above
	Car & Pick-Up Truck Access Axle Loads: 18 kN (4 kips)	- Geoblock units - 75 mm (3 in) Geoweb with topsoil/aggregate infill - Geotextile underlayer	Refer to the Geoblock solutions shown above	Refer to the Geoblock solutions shown above

CBR refers to California Bearing Ratio. As the CBR increases, the depth of the engineered base will decrease.

Installation

Presto's porous pavement systems are designed for easy installation, requiring less site preparation, less subgrade improvement, less excavation and less granular backfill than other porous pavement systems.

The Geoblock® System

The Geoblock system installs easily around obstructions and contours, and can be cut with ordinary hand or power tools. No forklifts, cranes or concrete saws are required.

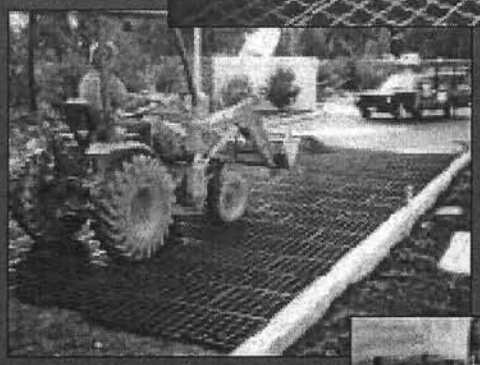
The tabular, interlocking design saves installation time and money by eliminating the need for special tools, staples, cleats and rings. Plus, the system's larger, easy-to-handle size minimizes the quantity of blocks required on any job, reducing installation costs and labor.

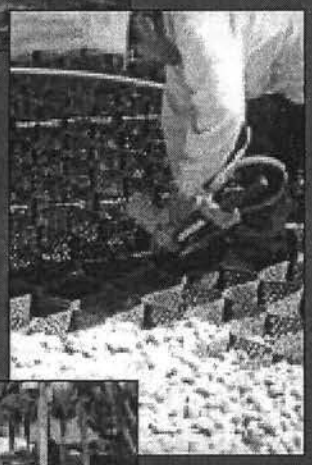
The Perforated *Geoweb*® System

Geoweb sections collapse into lightweight, compact bundles for easy shipment. During installation, sections remain flexible and easy to handle. Various methods are used for expanding the Geoweb sections.

For complete installation information, contact Presto or an authorized representative.









Our Commitment

At Presto, we're dedicated to helping you apply the best solutions to your porous pavement problems. Our commitment to quality begins with design assistance and continues through installation support. You get better results and greater peace of mind. Rely on the leaders in the industry for dependable, durable solutions with the Geoblock and Geoweb Porous Pavement systems. Rely on Presto.

ISO Certified Quality

Presto's quality management system for the Geoweb® System is certified to ISO 9002. All phases of manufacturing are monitored through statistical process control. Manufactured from polyethylene, *perforated* Geoweb sections meet certified quality standards before getting shipped to the job site. Each Geoweb section is specifically engineered in accordance with established geosynthetic industry guidelines, and is backed by warranty for materials and workmanship.

Presto®

Leaders In Advanced Geotechnology™

Presto Products Company • Geosystems® Products
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1-800-548-3424 or 1-920-738-1118 • FAX: 1-920-738-1222
e-mail: info@prestogeo.com • www.prestogeo.com

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