GEO PRODUCTS, LLC

INSTALLATION GUIDE:
Retaining Walls

ENVIROGRID® GEOCELL

MANUFACTURING

ENVIROGRID® GEOCELL

SINCE 1990

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APPLICATION & DESIGN

Retaining walls are typically used in areas with rough terrain and/or steep slopes that were once considered unsuitable for development. Unlike cantilever retaining walls which are made of steel-reinforced concrete and expensive to build, gravity retaining walls are constructed of EnviroGrid® and soil. Gravity walls are able to be built in nearly every weather condition and have a degree of flexibility which allows adjustment to small amounts of differential settlement without suffering structural damage.

A gravity wall must be able to hold together as a unit in order to function. It must be stable in respect to both external forces that would cause it to fall as well as internal forces that could cause deformity or loss of shape.

External Stability

Retaining walls must be designed to be stable with respect to four potential external failure modes:

GLOBAL STABILITY
OVERTURNING
BASE SLIDING
BEARING CAPACITY

Internal Stability

refers to the ability of the individual parts of the wall to act as a single unit.

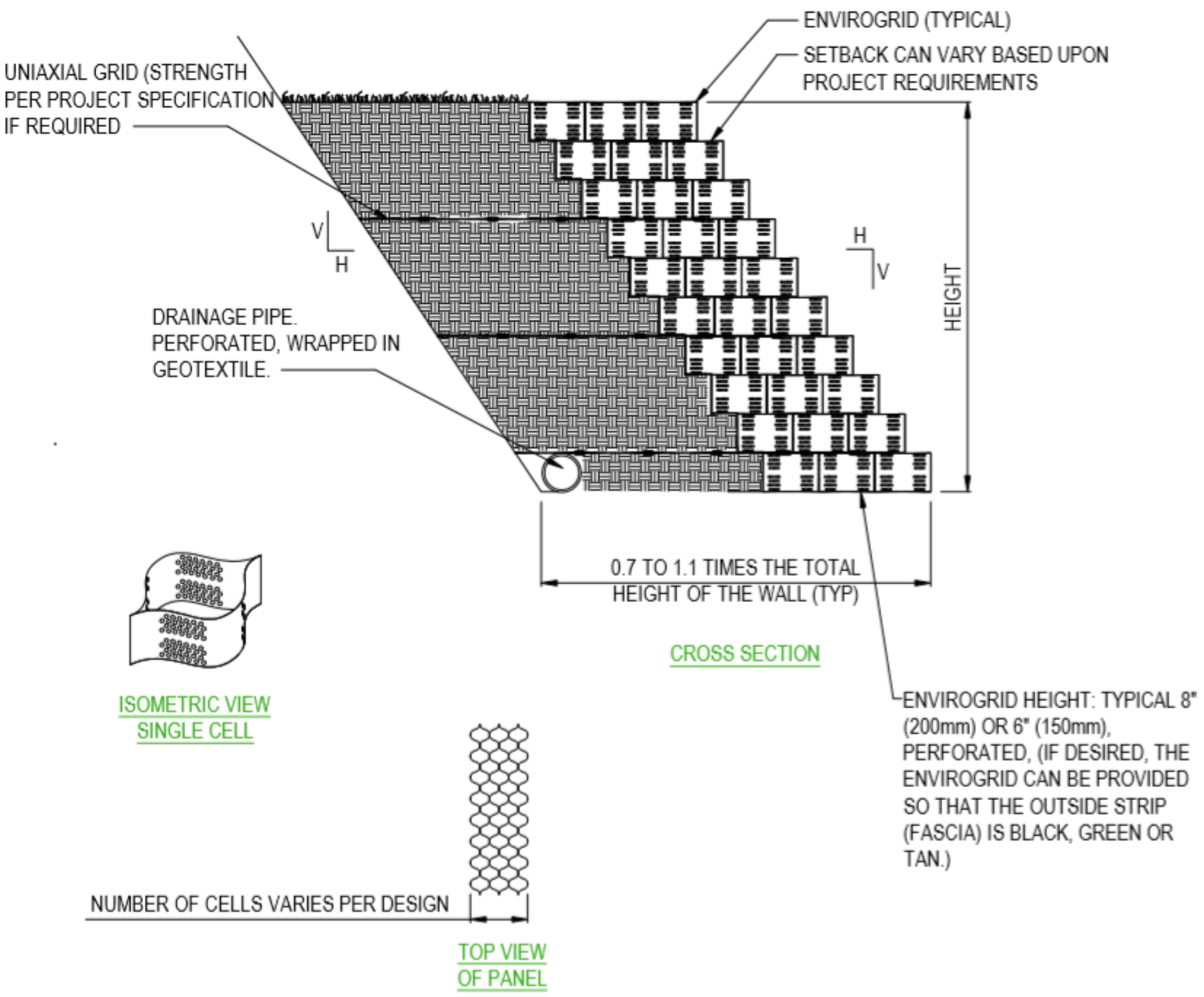
Safety Factors

Global Stability	**FS_{gl} = 1.3**
Base Sliding	**FS_{sl} = 1.5**
Overturning	**FS_{ot} = 2.0**
Bearing Capacity	**FS_{bc} = 2.0**

IF THE MINIMUM FRONT-TO-BACK DIMENSION OF A WALL THAT USES ENVIROGRID® IS **AT LEAST 0.6 TIMES** THE WALL HEIGHT, THE ABOVE SAFETY FACTORS WILL BE ACHIEVED IN ALMOST ANY DESIGN.

ENVIROGRID® OVERVIEW: DESIGN DRAWING

FOR DETAILED DESIGN GUIDELINES FOR RETAINING WALLS USING ENVIROGRID®, PLEASE CONTACT YOUR LOCAL ENVIROGRID® DISTRIBUTOR OR GEO PRODUCTS, LLC. THE FINAL DESIGN OF ANY RETAINING WALL MUST BE DEVELOPED BY AN ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED.



LEED® GREEN BUILDING CREDITS

The EnviroGrid® Geocell is designed and implemented with environmental merit as a top priority, and contributes heavily to a higher LEED® rating for your green building project. Please refer to the US Green Building Council webiste for further details on the LLED® certification system at WWW.USGBC.COM.

ACCESSORIES

Adjacent sections of EnviroGrid® must be joined to keep them from moving when the infill material is placed. Depending on various factors of the job, there are two avenues of connecting panels that can be taken.

EnviroLock

The EnviroLock is a one-piece, high strength nylong mechanical device that can join up to 6" of the joints. One EnviroLock is used per cell joint. They do not require any additional equipment to install.

STAPLES

The use of pneumatic stapler and staples is another method, primarily used for larger jobs. The staples are attached through each set of adjoining cells. This requires a small compressor (100psi) and generator. The number of recommended staples per various cell heights are listed below.

Number of staples required

cell height	# Staples/joint
3" (75mm)	3
4" (100mm)	4
6" (150mm)	5
8" (200mm)	5

INSTALLATION:
STEP BY STEP

1. PREPARE SUBGRADE & SITE

- Remove debris and vegetative cover from the installation area.
- Complete initial earthworks, excavation, or fills according to plan.
- Remove in-situ soils that are unacceptable for EnviroGrid® and replace with suitable materials.
- Prepare foundation soils as specified.

2. FOOTING INSTALLATION

Expand specified EnviroGrid® footing section. Hold the expanded footing section open using:

- Straight Stakes
- Rebar
- J-Pins

Overfill the footing section with specified infill material and level to approximately 2 inches (50mm) above the cell wall.

Place infill material around the footing section and ensure that placement does not conflict with the placement of the drainage system.

Compact fill and infill material to 95% of SPDD* using conventional equipment and material.

*Standard Proctor Dry Density

INSTALLATION:
STEP BY STEP

3. Drainage System Installation

- Install specified sub-drain pipe at location and elevation per drawings, ensuring that a minimum gradient of 2% is maintained to all free outlets.
- Ensure all pipe connections are property made and sub-drain pipe is connected to outlet pipes or an existing and functional subsurface drainage system.
- Encapsulate the sub-drain pipe with a geotextile wrapped bedding material.
- Wrap all outlet pipes passing through the wall face with a suitable geotextile to prevent loss of cell infill material.
- Ensure discharge of outlet end will not cause localized erosion that may affect stability of EnviroGrid® wall.

4. Excavation Protection & Drainage

Place a suitable geotextile over the base on the cut slope behind EnviroGrid® wall, where specified.

Install appropriate drainage composite materials and ensure that the system is functional and connected to a suitable outlet or sub-drain system.

INSTALLATION:
STEP BY STEP

5. Install EnviroGrid® Sections

- Expand EnviroGrid® wall section into position and hold open using straight stakes or J-Pins.

- Make sure each section is fully expanded.

- Correctly align and inter-leaf edges of adjoining wall section to ensure that the upper surface of adjoining sections is flush.
- Fasten wall sections together with staples or specifed means on drawings.

- Overfill wall section with specified infill material and level to approximately 2 inches (50mm) above the cell wall.
- Compact infill material to 95% SPDD using conventional compaction equipment and methods.

- Place specified backfill material behind wall sections and compact to 95% SPDD>
- In cut areas, extend backfill materials back to the cut slope.
- In fill areas, place backfill material as specified in drawings.