

Technical Specification Guide

TurfPaver™ II

08/20/09 REV

Page 1 of 9

tp.0003

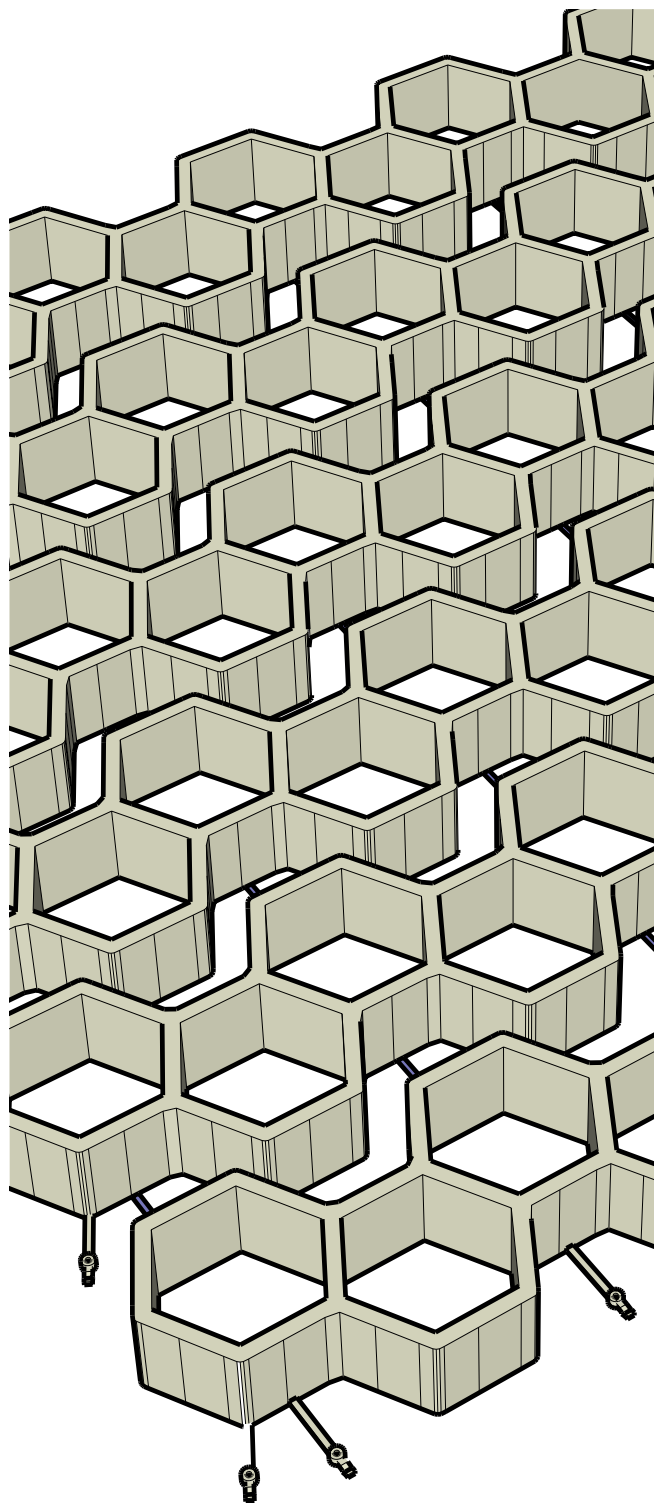


TABLE OF CONTENTS

Recommended and Non-Recommended Uses	3
Maintenance Tips and Warnings	3
Installation Guidelines	4
Architectural and Engineering “Base” Determination	
Site Preparation	
Paver Assembly & Installation (overview)	
Planting – Sod, Seed, or Hydroseeding	
Installation Tips & Techniques	5-6
Product Specifications	7
Paver Design	8
Paver Mat Movement & Separation	
Nesting Integrity	
Impact & Compressive Strength	
Product Features	9
Planting Profile/Soil Levels	10
Top Profile Planting	
Recessed Planting	
Planting Profile/Soil Levels (illustrations)	
Material Composition	11
EZ Roll™ Grass Pavers	
Molding Technique	
Testing Methods	
Compression Tests	
Permeability	11-12
Runoff % - 24 Hour Rainfall (Table 1)	
Frequent Traffic & Parking Considerations	
Root Penetration	
General Statement of Fact	
Product Installation Options — Section Drawings	13
Against Hardscape Installation	
Swale	
Swale with a french drain	
Around a drain basin	
Soil Definitions	14
Product Testing Documentation	15



Technical Specification Guide

TurfPaver™ II

08/20/09 REV

Page 2 of 9

tp.0003

TurfPaver™ is a load transfer paving system. TurfPaver are designed to be placed directly on a class II compacted gravel road base. The TurfPaver are designed to transfer the vehicle weight load to the road base and prevent soil compaction that will damage the root system of the grass. The honeycomb cell paver product allows light to heavy vehicular traffic. It prevents soil compaction, allowing healthy root growth for sustaining turf. TurfPaver can be used for erosion control and helps prevent surface water runoff. TurfPaver are sold in rolls with the lateral snap lock system connecting panels together. The rolls can then be rolled out over the road base, allowing for easy installation and a savings on labor costs.

Recommended Uses:

Light to moderate traffic loads, including:

- Golf Cart Paths
- Service Roads
- Jogging Tracks
- Bike Paths
- Roadway Shoulders
- Residential Driveways
- Parking Lots
- Overflow Parking Area
- RV and Boat Access and Parking
- Truck & cart wash-down areas

Heavy Traffic Loads, including:

- Fire lanes
- Emergency vehicle access roads
- Service vehicle utility roads
- Truck maintenance and equipment yards
- Construction entrance soil stabilization

Non-load applications:

Erosion control on slopes
Erosion control in swales

Non-Recommended Uses:

- Not recommended for traffic on slopes exceeding a 10% grade (staking may be required.).
- Not recommended for the playing surface of any sports field (e.g. baseball diamonds, football fields, etc.).
- Not recommended to support tread driven military vehicles.
- Not recommended for light or heavy-duty tread driven construction equipment or bobcats.

Maintenance Tips and Warnings:

- Do not use aeration equipment over turf areas containing grass pavers.
- Do not use scalping equipment over turf areas containing grass pavers.
- Do not use de-thatching equipment over turf areas containing grass pavers.
- Turf care and mowing practices that minimize the need for de-thatching, such as:
 - Planting turf varieties that are resistant to thatch build-up (like tall fescues) provided the selected variety is

appropriate for the site's growing conditions.

- Collecting grass clippings when mowing
- Using slow-release fertilizers
- Adopting deep watering irrigation techniques
- When snow clearing equipment is used, skid shoes must be used or the snow plow must be raised a minimum 2" above the paver surface. This will prevent the plow from digging into the sod area and breaking the paver mat.

Paver Installation Guidelines

Architectural and Engineering "Base" Determination

The first decision in project planning must address the correct base construction that will support the traffic load weight anticipated on the site. i.e. fire lane, overflow parking, light utility access road, R.V. access lane, etc. There are three base options to choose from:

1. Light load / High traffic – base shall be min. 4" of compacted coarse aggregate to architects' specification and local code.
2. Heavy load — base shall be a min. 6" class II road base of compacted coarse aggregate to architects' specification and local code.
3. Heavy load / Fire lane – base shall be a min. 6" class II road base of compacted coarse aggregate to architects' specification, local code, and fire authority's requirements.

Site Preparation

1. Remove all foreign top grade structures or objects and excavate existing site soil to accommodate the base specified for your traffic/load requirements.
2. Install the base per architectural and/or engineering drawings and written specifications describing depth, load rating, construction materials, and required compaction.

Paver Assembly & Installation (Overview)

1. Choose a starting point adjacent to a straight run if possible. Unroll product onto the prepared base being sure to provide a 1" clearance to any (pre-installed) fixed objects or surface



Technical Specification Guide

TurfPaver™ II

08/20/09 REV

Page 3 of 9

tp.0003

structures such as utility poles, valve boxes, sprinkler heads, drainage grates, curbs, etc.

2. Add next course of TurfPaver™ (either roll or individual pieces) as needed to completely cover specified coverage area. Be sure to connect to the lateral snap locks of the TurfPaver™ to the previous course for an integrated mat layer.
3. Upon completion of assembling the paver roll network, it is important to re-examine all paver fittings around surface utilities and bordering structures to assure proper 1" clearance. Make any adjustments prior to soil fill or planting.

Planting – Sod, Seed, or Hydro-seeding

The primary methods of planting are:

1. Sod
 - a) Top dressing with sod: (Most popular) Sod is laid on top of the paver grid after it has been filled with soil or sandy loam, back raked to top of cell walls and watered moderately. (Note: after watering, some of the soil or sandy loam fill may settle below the top of the paver cells. This should be back filled with additional soil or sandy loam to provide an even surface for the sod.) The surface is now ready for sod to be laid in a staggered pattern on top of the planting surface. Water the sod and set a watering schedule.
 - b) Recessed sod planting: (Typical for high traffic areas) using 3/4" or 1" sod, (do not add soil to paver grid) lay sod in staggered pattern over the paver grid. Water the sod (saturate) in preparation for compression into the paver cells. Use a hand or power driven water roller to compress the sod and root system into the cell structure of the paver mat. Set a watering schedule. When using a roller, always be sure to follow all manufacture's operating, maintenance, and safety instructions.
2. Seeding or hydro-seeding: Fill the paver grid with soil or sandy loam, back raked to top of cell walls and water generously. (Note: after watering, some of the soil or sandy loam fill may settle below the top of the paver cells. This should be back filled with additional soil or sandy loam to provide an even planting surface.) The surface is now ready for seed and fertilizer to be broadcast or hydro-seeded over the paver grid work. Water the new planting and set a watering schedule.

Installation Tips And Techniques

Pre-Installation

1. Order approximately 5% additional product to the total required to offset for curves or possible installation mistakes.
2. Check with local fire authority as to any requirements for during installation inspections before the installation of the base course for any area that may provide emergency vehicle access.
3. Back filled and reclaimed areas may require compaction and testing before the installation of the base course.
4. Define the boundary of the proposed grid work using a string line, header board, concrete curb or other hardscape border as specified by the landscape architect or engineer.
5. The installation of TurfPaver™ should occur after the completion of any nearby curbs, sidewalks, asphalt, sprinkler systems, or other hardscape.

Site Selection

1. Install with no more than a 6% grade for emergency access lanes or for heavy vehicle access.
2. Install with no more than 10% grade when used for light vehicular traffic. Retention spikes must be installed in this application in a manner specified by a qualified architect or soils engineer.
3. Installations over 10% grades are for erosion resistance only. The installation of TurfPaver™ on any type of slope should be pinned or fastened to the soil in a manner specified by a qualified architect or soils engineer.

Installation

1. The installation of TurfPaver™ is generally done at the same time as other grass installation on the site, and after the completion of major area construction.
2. Ensure that the paver is installed right-side-up with the open cells facing up. Warranties are voided for pavers installed face-down.
3. Roll out the first section of TurfPaver™ either where there

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Technical Specification Guide

TurfPaver™ II

08/20/09 REV

Page 4 of 9

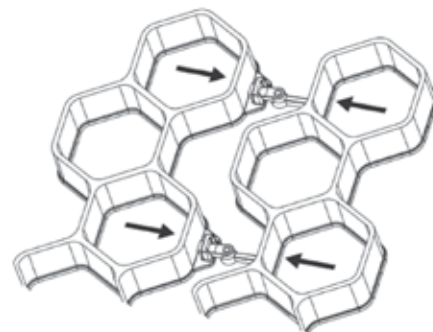
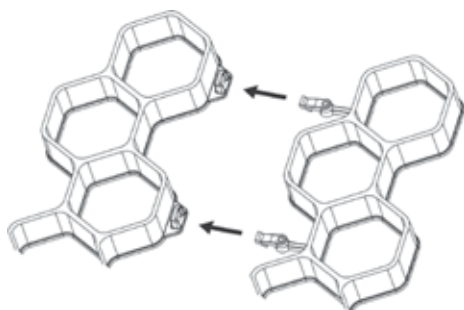
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is an available straight border, or where there is the longest available single run.

4. Roll out additional rolls of TurfPaver™ as needed to cover larger areas and securely connect the lateral snap locks to create an integral paver mat.
5. Smaller areas can be filled in by attaching single sections of TurfPaver™ to the already laid out paver mat. (These can be carefully detached from another roll).
6. Be sure to leave the recommended 1" clearance between the paver mat and any (pre-installed) fixed objects or surface structures such as utility poles, valve boxes, sprinkler heads, drainage grates, curbs, walls, poured concrete, etc.
7. The paver can be trimmed /cut to fit any fixed objects or surface structure using garden shears, a hand saw, PVC pipe cutter, utility cutter, or appropriate power saw may also be used if desired. Be sure to follow all manufacturer's operating and safety instructions when using such tools.
8. Insert lateral snap lock tabs of one panel into the slots of the adjacent panel.
9. Insert your fingers into the cells of the EZ Roll™ paver panels and squeeze the panels together.
10. When you hear the lateral snap locks tab "click", the panels are now locked together.

Planting

1. All TurfPaver™ should be filled with soil and planted within 30 days of being installed.
2. A sandy loam or loam soil should be used to fill the empty grass paver cells. The selection of sandy loam or loam soil should be made based upon the soil requirements of the turf selected for the project. Sand alone is not a suitable fill material TurfPaver™.



3. Select a turf variety well suited to the anticipated traffic frequency and local growing conditions.
 - a) For example, faster growing varieties are preferred for light traffic applications (quickly regenerates blades bent by traffic). Seasonal rye grass and tall fescues may be preferred over slower growing blue grass turf varieties.
 - b) Resistance to thatch build-up, drought and disease resistance should be considered too.
4. Seeded or Sodded areas should be protected from non-emergency traffic for 4 to 6 weeks or until the grass is sufficiently established to handle traffic.
5. Planting type for load applications:
 - a) Seeded grass pavers should be filled to the top of the cell wall. Seeding is recommended for light to moderate traffic applications.
 - b) Sodded grass pavers should be filled with soil to the top of the cell walls (for top planting method). Sodding is recommended for emergency traffic applications.
6. Grass paved areas must have irrigation systems sufficient to maintain year-round healthy turf.
7. When planting trees nearby a grass paver surface, it is advisable to install a root barrier product around the root ball to prevent shallow roots from interfering with surface integrity or the road base. Shawtown™ root barrier products are recommended.
8. When TurfPaver™ are installed bisecting a large lawn or grass field to provide a service road, it is recommended to plant shrubs or trees to mark the ends and edges of the grass paved strip. This guides service vehicle drivers to stay on the grass paved strip whenever they have to traverse the large lawn or grass field.



Technical Specification Guide

TurfPaver™ II

08/20/09 REV

Page 5 of 9

tp.0003

Product Specifications

Material	TurfPaver™ are molded from up to 100% recycled Polyolefin.
Recyclability	TurfPaver™ are 100% recyclable. Please recycle whenever possible.
Paver Size	Rolls (comprised of 24" x 24" panels). Part number EZ4X24 has dimensions of 4' x 24' per roll, and part number EZ4X150 has dimensions of 4' x 150' per roll.
Paver Details	Each paver panel shall contain 72, 2 1/4 inch hexagonal cells in a nested honeycomb form with integrated cross links that allow easy rollout installation.
Paver Top Surface	The top surface of the hexagonal cell walls of the TurfPaver™ is smooth and devoid of notches or groves.
Assembly Mechanism	12 lateral snap locks per panel.
Paver Bottom Open Area	The EZ Roll™ Grass Pavers structure has over 80% open area on the bottom surface, an area equal to 478 square inches per paver section.
Paver Color	Black with ultraviolet inhibitors.
Compressive Strength	The compressive strength of the TurfPaver™ is 52,600 lbs. (psf.) which is equal to 365 lbs. (psi.), bare product (empty cells); independent laboratory tests conducted at CRT Laboratories Inc. This load capability is in excess of H2O loading requirements.
Chemical Resistance	TurfPaver™ have superior chemical resistance and are totally inert.
Weight Per Unit	2.31 pounds per 24" x 24" section.
Unique Product Features	The TurfPaver™ system combines the load carrying durability of a nested honeycomb system with connecting integrated cross links to allow easy roll out installations.

Paver Design

TurfPaver™ — referred to as EZ Roll™. The product is configured in a nested honeycomb form with integrated cross links that allow

easy rollout installation. EZ Roll™ is the only grass paver on the market that combines the strength and stability benefits of a nested cell design with the ease of a roll out installation. Each paver panel contains 72, 2 1/4 inch hexagonal cells and forms a 4 square foot flat block structure measuring 24" by 24" by 1" depth, (approximate dimensions.) EZ Roll™ grass paver is designed to be placed directly on a class II compacted gravel road base. The TurfPaver™ structure has over 80% open area on the bottom surface to help promote and maintain healthy turf growth.

Design Theory

TurfPaver™ are designed to transfer vehicle load to the paver base while preventing soil compaction within paver cells.

1. Paver Mat Movement & Separation

Major forces that are applied during traffic include lateral pressure from turning, braking, and acceleration. These torsional forces must be addressed in two key areas. They are paver mat movement and paver separation. The TurfPaver™ design incorporates two unique features that address these issues. The first is the lateral snap locks latching system to securely connect the EZ Roll™ panels together and create an integral paver mat. The lateral snap locks latching system provides a greater assurance against paver separation. The second is the 30 integrated cross links per panel. The cross links provide stability of the cell row structure, allowing the paver to withstand both horizontal and lateral forces.

2. Nesting Integrity

Lateral snap lock integrity is critical, unlike a simple overlapping connection, or post and eye connection, the heavy duty lateral snap locks latching system does not allow the paver units to be pulled apart (on the flat plane). The lateral snap locks securely fasten the entire mat into one continuous section. This becomes extremely important in two types of situations. The first is traffic load movement. The second, not so obvious condition can occur as the project ages. Subtle changes in ground conditions could easily result in paver displacement or separation (mat failure), as would be the case with inferior locking mechanisms found in other paver products.

3. Impact & Compressive Strength

The EZ Roll™ has been tested for compressive strength at 52,600 pounds per square foot (bare product). In working terms that means EZ Roll™ is not relying on the fill material for load carrying capability. This load carrying capability



Technical Specification Guide

TurfPaver™ II

08/20/09 REV

Page 6 of 9

tp.0003

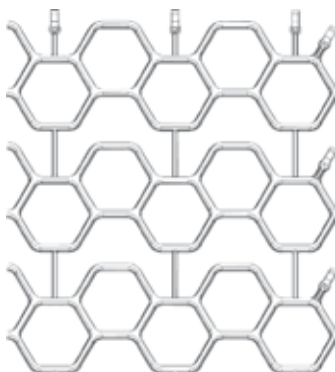
is over double that of an H2O loading specification and will support any municipal fire truck with ease.

Product Features:

The TurfPaver™ from SSPCo is the latest and most advanced product of its type on the market. SSPCo has used its years of experience in the landscaping industry to create a product with all of the most desirable features wrapped up into a single product. The TurfPaver™ has combined a series of 72 nested hexagonal cells per paver section connected with 30 integrated cross links and lateral snap locks. This unique combination makes a product with the superior strength and durability of nested cells (like our popular Tufftrack™ TT-24 paver) but thanks to the addition of the integrated cross links, it can be shipped in rolls. This means that the EZ Roll™ can be installed by simply rolling the product out in the in the desired area, saving time and money on installation.

The design of the EZ Roll™ nested cells work together to support the load which makes for a much more stable paver mat than products using individual stand alone cells. The nested cell design is able to withstand not only direct load but also lateral forces from braking, acceleration, and turning. The design of the TurfPaver™ is able to support these forces due to its unique design.

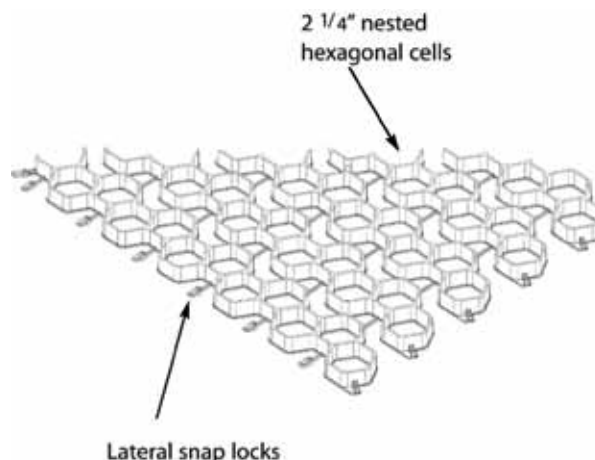
Top View of Cells



Planting Profile / Soil Levels

When using plastic grass pavers in a professional landscape applications involving fire lanes, utility roads, and overflow parking there are several textures of grasses and planting methods that can be achieved, however there are only two planting profiles that address the soil elevation adjustment to final grade and ultimately determine the finished surface you can achieve: Top Profile Plantings which can include laying sod, seeding, or hydro seeding, and Recessed Plantings which also include laying sod, seeding or hydro-seeding.

The primary difference in the two planting profiles is the planting soil elevation or finished grade in relationship to the top surface of the grass paving grid work.



Top Profile Planting

Sod or grass is grown on top of the grass paver grid work after assembly of the product is completed and the grid work has been filled, watered, and re-filled with the prescribed planting soil mix. This is by far the most common application used in the construction of fire lanes integrated within building structures. In this application the surface of the grass has all the appearance of a natural landscape green environment within the surrounding landscape. The actual access to the fire lane, as well as turns and perimeters of the fire lane must be marked with shrubs, borders, gates, or other fire warning devices or signage, as prescribed by the governing fire authority or municipal code. The Top Profile Planting method, using sod laid on top of the paver, has an advantage over seeding or hydro-seeding because the sod completely covers the surface of the paver grid immediately and thus reduces pedestrian tripping and potential liability. Additionally, the paver grid work is protected from the damaging ultra violet rays of the sun. This is the most economical and easiest planting application to install. See detail below.



Technical Specification Guide

TurfPaver™ II

08/20/09 REV

Page 7 of 9

tp.0003

Recessed Planting

This planting method is used in both fire lanes and most other application where vehicular traffic, vehicular storage and other temporary parking/traffic are anticipated. The concept here is to achieve an ultimate grass/soil level recessed about 1/4 inch down inside the grass paver cell. When the grass/soil level is recessed within the cells it is possible to drive vehicles over the surface (on the top of the cell walls) without inflicting serious damage to the grass blades or compacting the soil within the individual cells. The radius of the tire, traveling across the surface does not extend down inside the hexagonal cell walls of the grass paver to a depth that would compact the soil or damage the grass. See detail below. Whether you are going to use the Top Profile Planting or the Recessed Planting method you must consider appropriate horticultural practices associated with the planting soils, mixes, amendments, and treatments within the soil planting zones illustrated below. In adverse soil conditions consult a horticulturist or soils specialist.

Material Composition

TurfPaver™

EZ Roll™ must be made from up to 100% reprocessed recycled Polyolefin plastic. The nature of Polyolefin plastic is rugged, flexible, and ideally suited for outside exposure and longevity. Plastic polymers can show a decline in mechanical properties during service lifetime when they are exposed to sunlight. SSPCo uses UV inhibitors within the plastic in order to prevent a breakdown in the strength of the pavers over time due to environmental effects. TurfPaver™ is manufactured in the color black to utilize carbon black polymers to their fullest extent in providing the highest quality of ultra violet protection for the paver product. As good corporate custodians of our environment, SSPCo uses quality reprocessed recycled materials in the manufacture of TurfPaver™. EZ Roll™ should qualify for all projects requiring recycled construction materials.

Molding Technique

TurfPaver are proudly manufactured in the U.S.A. in Lindsay, California. The pavers are injection molded to exacting specifications. The pavers are molded to an exact temperature range that will not damage the molecular chain of the polymer. The use of a high quality reprocessed recycled resins and UV inhibitors coupled with computerized manufacturing technologies guarantees the TurfPaver™ will preserve its strength over time.

Testing Methods

TurfPaver™ undergo a battery of tests with each production run, as

is the process with all of the products manufactured by SSPCo. All of the manufacturing tests are conducted within the manufacturing cycle to assure a quality-finished product.

Compression Tests

Compression tests are used to determine the yield and ultimate load strength of a given paver. CRT Laboratories, Inc. in Orange CA. performed the stress load testing on the TurfPaver™ using the following procedure: Each sample paver was individually placed flat on the fixed 18x18 plate of a load testing machine. A load was then applied to the top surface of the paver, through a 12-inch by 12-inch steel plate until failure. The ultimate compressive strength of the EZ Roll™ paver product was 52,600 pounds per square foot (bare product). This is over double that of an H20 loading specification. See testing and documentation data at the end of this document.

Permeability

In comparing concrete or asphalt paving with the use of TurfPaver™, there are several factors to consider. In general EZ Roll™ provides a lower runoff coefficient, a prolonged time of concentration, a much higher rate of percolation, and a cleaner runoff of storm water than concrete or asphalt.

As a general rule, using EZ Roll™ over a rock and sand base with a sandy loam site soil (CN30) will promote a situation unlikely to generate surface runoff in an average rainstorm. We define an average storm as one delivering less than six inches of rain in a twenty-four hour period.

When EZ Roll™ is installed over clay soils (CN78), water absorption will vary slightly depending upon the depth of the base course because of internal water storage capacity of the soil. EZ Roll™ provides a permeable area of approximately 80% per square foot of surface area. As per Technical Release #55, US Dept of Agriculture, Soil and Conservation Service, the evaluation of storm water management objective is done by the following method. Calculate the existing (pre-construction) runoff volumes and time of concentration factors. Next calculate area and runoff volumes, which will be generated by new hard surface areas. Runoff reduction can be calculated and compared when using Table 1 which lists runoff percentages from various soils based on "meadow" type cover and a 24 hour rainfall.

Frequent Traffic & Parking Considerations

Commonly we are asked about using TurfPaver™ as an overflow parking or driveway situation. This is how we typically address the requirements for a satisfactory installation. The root systems of indigenous turf are protected within the cellular walls of the paver.



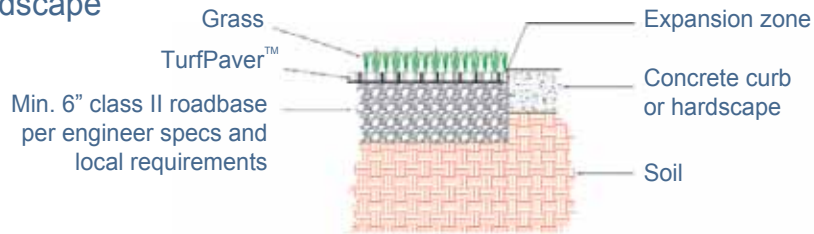
Technical Specification Guide

TurfPaver™ II

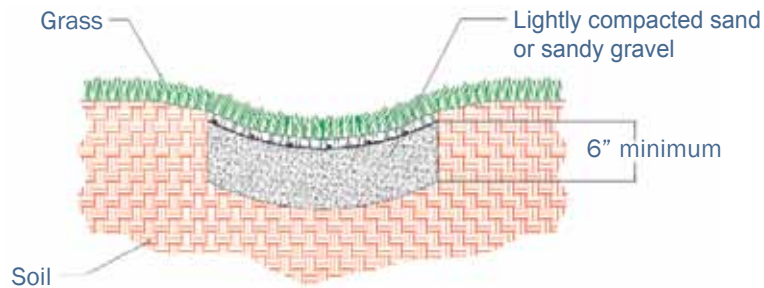
PRODUCT INSTALLATION OPTIONS

*Installation detail against concrete, asphalt or other hardscape
installation when using TurfPaver*

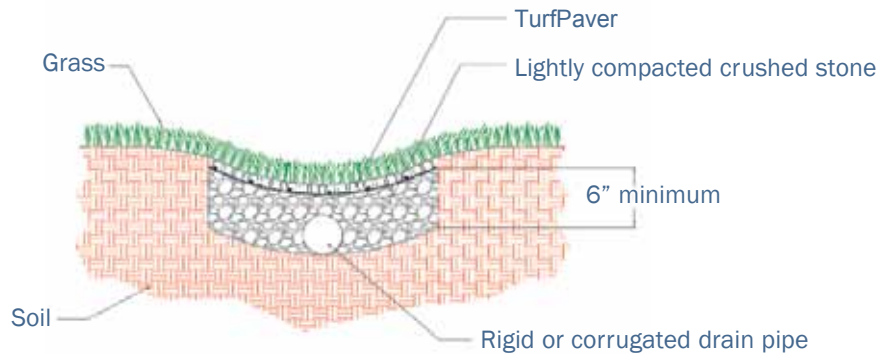
Against hardscape



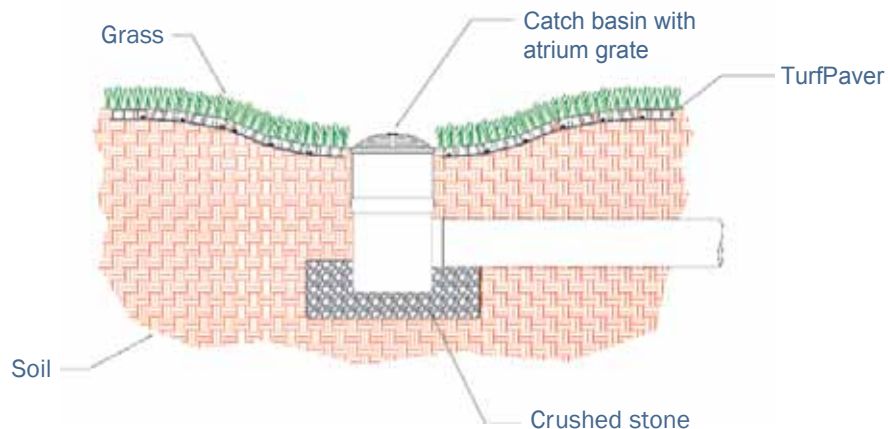
Swale



Swale with a french drain



Around a drain basin



Technical Specification Guide

TurfPaver™ II

08/20/09 REV

Page 9 of 9

tp.0003

Frequent vehicular traffic does not harm the grass root structure because of the cellular wall protection; however blades of grass will be cut off if driven on daily. If someone parks over the same spot everyday, the grass simply cannot survive. Turf requires light, and that requirement cannot be met unless parking areas are used less than daily or are rotated. We cannot specify the rotation you will require. This is determined by climate, turf, and other factors. Most likely it is something that will require a certain amount of testing and client feedback.

Root Penetration

The primary source of water and nutrients will be below the road base and not be above it. As an example, the roots of fescue can penetrate to a depth of over 20 feet (6m). The entire base and paver structure is not designed to retain water – in fact its primary purpose is to allow water to percolate into the soil quickly, while retaining strength. While the soil in the paver structure is important and is a source for nutrients and moisture, is it not the primary source.

As a general reference on base preparation, the main purpose of the base is to obtain 95% compaction while still allowing the water to percolate through the entire paved area. The type of stone used for the base will usually have no bearing on growth, except in one instance. Gravel which is heavy in lime (limestone based) can slow root growth. Generally speaking, clean 3/4" (1.9cm) gravel which is free from any agents which would slow turf growth should be used.

A General Statement about Grass Pavers

A grass paving structure such as the TurfPaver™ or any other grass paving structure, whether it is constructed of plastic or concrete, is only as good as the base foundation upon which it is installed. This is the primary factor that must be considered beyond design.

SOIL DEFINITIONS

Sandy loam

Soil material that contains either 20% or less clay, with a percentage of silt plus twice the percentage of clay that exceeds 30, and 52% or more sand; or less than 7% clay, less than 50% silt, and between 43% and 52% sand.

Coarse sandy loam

25% or more very coarse and coarse sand and less than 50% any other one grade of sand.

Sandy loam

30% or more very coarse, coarse, and medium sand, but

less than 25% very coarse sand, and less than 30% very fine or fine sand.

Fine sandy loam

30% or more fine sand and less than 30% very fine sand or between 15 and 30% very coarse, coarse, and medium sand.

Loamy Sand

Soil material that contains at the upper limit 85% sand, and the percentage of silt plus 1.5 times the percentage of clay is not less than 15, at the lower limit it contains not less than 70 to 85% sand, and the percentage of silt plus twice the percentage of clay does not exceed 30.

Loamy coarse sand

25% or more very coarse and coarse sand and less than 50% any other one grade of sand.

Loamy sand

25% or more very coarse, coarse, and medium sand and less than 50% fine or very fine sand.

Loamy fine sand

50% or more fine sand or less than 25% very coarse, coarse, and medium sand and less than 50% very fine sand.

Sand

Soil material that contains 85% or more sand; the percentage of silt plus 1.5 times the percentage of clay does not exceed 15. Coarse sand (sable grossier) 25% or more very coarse and coarse sand and less than 50% any other one grade of sand.

Sand

25% or more very coarse, coarse, and medium sand and less than 50% fine or very fine sand.

Fine sand

50% or more fine sand or less than 25% very coarse, coarse, and medium sand and less than 50% very fine sand.

Very fine sand

50% or more very fine sand.

Loam

Soil material that contains 7 to 27% clay, 28 to 50% silt, and less than 52% sand.

