

6.8 Turf Block and Permeable Joint Pavers



Best Uses

- Parking areas
- Common areas
- Lawn/landscape buffers
- Pathways

Advantages

- Flow attenuation
- Removes fine particulates
- Reduces need for treatment

Limitations

- May clog without periodic cleaning
- Weeds
- Lightly-trafficked areas only
- Higher installation costs

Figure 6-32: Turf Block and Pave Mat (Source: Georgia Stormwater Handbook)

Turf block and permeable joint pavers are used for areas with light vehicle loading, such as driveways, low-volume streets, street shoulders, and parking stalls (Table 6-3). The terms turf block and permeable joint pavers describe systems comprised of a load-bearing, durable surface together with a pervious soil that temporarily stores water, with overflow conveyed to an outlet. The turf block surface is constructed of impermeable blocks separated by spaces and joints, filled with soil and planted with turf, through which the water can drain. Alternately, the spaces and joints of turf block may be filled with gravel. Permeable joint pavers may be impermeable bricks, cobbles, natural stone, or modular unit concrete pavers with permeable joints to allow runoff to percolate to subsurface layers. Some pavers are designed with notched corners (Figure 6-37) to facilitate infiltration.

Where soil permeability is low, an underdrain system connected to the storm drain system may be needed. Areas of turf block may be considered “self-treating areas,” and may drain directly to the storm drain system if they do not receive runoff from impervious areas, as allowed by the municipality. If an area of permeable joint pavers is underlain with pervious soil or pervious storage material, such as a gravel layer sufficient to hold at least the Municipal Stormwater Regional Permit Provision C.3.d volume of rainfall runoff, it is not considered an impervious surface and can function as a self-treating area, as described in Section 4. 2. Please note that projects that the CalGREEN Building Code does not define pervious paving in the same way as the MRP. Projects that include permeable joint pavers per CalGREEN requirements must also verify that the pavers meet the MRP definition of pervious pavement.

Table 6-3: Permeable Joint Paver Types and Possible Applications		
Type	Description	Possible Applications
Brick	Solid unit paver laid on a permeable base with sand joints.	Driveways, walkways, patios, public sidewalks, plazas, low volume streets

<p align="center">Table 6-3: Permeable Joint Paver Types and Possible Applications</p>		
Type	Description	Possible Applications
Natural Stone	Laid on pervious surface area in random pattern with wide sand, gravel, or soil joints (from 1/2 to 4 inches).	Driveways, walkways, patios, sidewalks, plazas, low-use parking stalls
Turf Blocks	Open celled unit paver filled with soil and planted with turf. Sometimes the cells are filled with crushed rock only.	Areas of low flow traffic and infrequent parking, residential driveways and overflow parking areas, emergency access roads, utility roads, street shoulders, and outer edges of commercial and retail parking lots where low-use spaces are located.
Unit Pavers	Discrete units set in a pattern on a prepared base. Typically made of precast concrete in shapes that form interlocking patterns, some unit paver shapes form patterns that include an open cell to increase permeability. Solid unit pavers are made of impermeable materials, but can be spaced to expose a permeable joint set on a permeable base.	Parking stalls, private driveways, walkways, patios, low volume streets, and travel lanes, and bikeways.
<p>Source: Design Guidelines for Permeable Pavements, Redwood City</p>		

Design and Sizing Guidelines

The design of each layer of the pavement must be determined by the likely traffic loadings and their required operational life. To provide satisfactory performance, the following criteria shall be considered:

- The subgrade shall be able to sustain traffic loading without excessive deformation.
- The turf block or permeable joint pavers shall give sufficient load-bearing to provide an adequate support for loading.
- The paver materials should not crack or suffer excessive breakage under the influence of traffic.
- Both turf block and pavers require a single size, grading base to provide open voids. The choice of materials is thus a compromise between stiffness, permeability and storage capacity.
- The uniformly graded single size material cannot be compacted and is liable to move when construction traffic passes over it. This effect can be reduced by the use of angular crushed rock material with a high surface friction.
- The base shall be sized for strength and durability of the aggregate particles when saturated and subjected to wetting and drying. To allow for subsurface water storage, the base must be open graded, crushed stone (not pea gravel), meaning that the particles are of a limited size range, with no fines, so that small particles do not choke the voids between large particles. If subsurface water storage is not an objective, uncompacted soil with a sand bed to support the turf block or paver may be considered. The base should be reviewed by manufacturer of turf blocks or pavers. Check with the local jurisdiction regarding any local requirements for the base layer.
- If the base layer is sized to hold at least the Municipal Stormwater Regional Permit Provision C.3.d volume of rainfall runoff, the area of pervious paving is not considered an impervious surface and can function as a self-treating area (see Section 4. 2).

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- If the base layer has sufficient capacity in the void space to store the C.3.d amount of runoff for both the area of pervious paving and the area that drains to it, it is not considered an impervious surface and can function as a self-retaining area, described in Section 4.3.
- If an underdrain is used, allow a minimum of 2 inches between underdrain and bottom of base course. To be considered a self-treating area or self-retaining area, the underdrain shall be positioned above the portion of the base layer that is sized to meet the C.3.d sizing criteria.

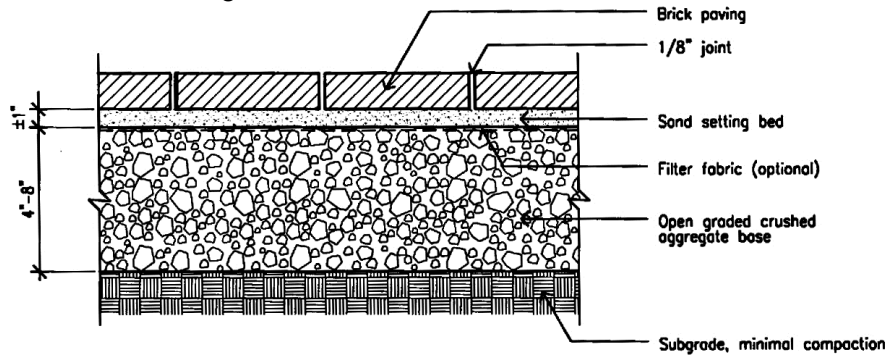


Figure 6-33: Profile of Brick Paver Installation (BASMAA, 1999)

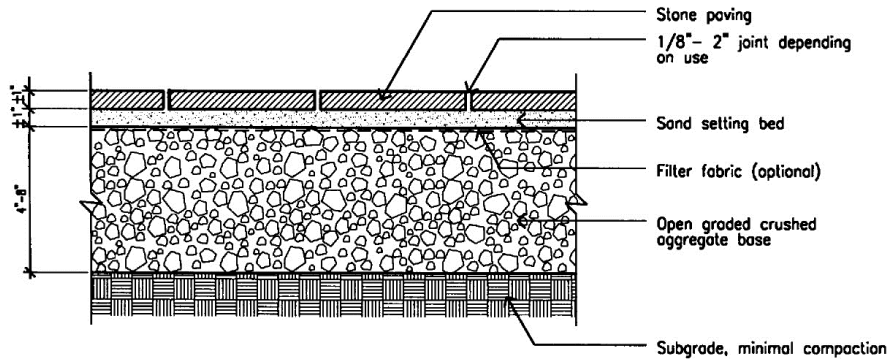


Figure 6-34: Profile of Natural Stone Paver Installation (BASMAA, 1999)

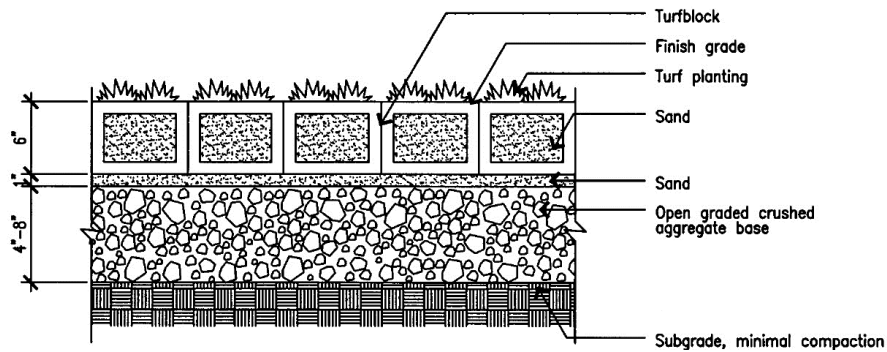


Figure 6-35: Profile of Turf Block Installation (BASMAA, 1999)

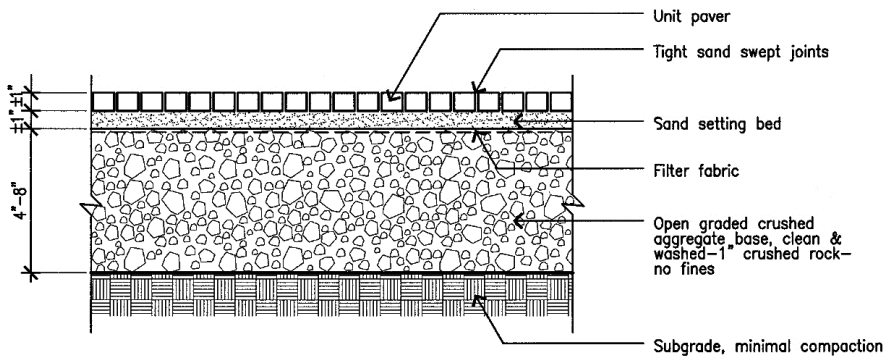


Figure 6-36: Profile of Unit Paver Installation (BASMAA, 1999)

MAINTENANCE

A maintenance plan shall be provided.

Standards for Ongoing Maintenance and Upkeep :

- Keep landscaped areas well maintained
- The surface of the unplanted turf block and permeable joint pavers shall be vacuum cleaned using commercially available sweeping machines at the following times:
 - End of winter (April)
 - Mid-summer (July / August)
 - After autumn leaf-fall (November)
- Planted turf block can be mowed, as needed.
- Inspect outlets yearly, preferably before the wet season. Remove trash and debris.
- When vacuum cleaning is conducted, inspect turf block and pavers for any signs of hydraulic failure.



Figure 6-37: Unit Pavers, Redwood City

As needed maintenance:

- If routine cleaning does not restore infiltration rates, reconstruct the part of pervious surface that is not infiltrating.
- The surface area affected by hydraulic failure should be lifted, if possible, for inspection of the internal materials to identify the location and extent of the blockage.
- Surface materials should be lifted and replaced if damaged by brush (or abrasive) cleaning.
- Deposits may need to be disposed of as controlled waste.
- Replace permeable joint materials as necessary.



Figure 6-38: Notched pavers (Source: Unigroup-usa.org). Photo for example purposes only; it is not an endorsement of any proprietary product.