



Pave Drain FAQ

1) What is the current total cost (including labor, etc.) per square foot? What is the current cost of the material only per square foot?

ANSWER: Depending on your location in the country and the size of your project a conservative installed cost of PaveDrain will be approximately \$10-12/square foot. This will include an installed 4-6" layer of clean, angular stone (AASHTO #57 stone). The installation of the PaveDrain will be approximately \$2.00/Sft. The purchase price of the material will be \$6.00-\$8.50/Sft. Delivery will add between \$0.50-\$1.00/Sft depending on the distance. (Colored blocks may add ± \$1/square foot).

2) What is the maintenance of PaveDrain?

ANSWER: Maintenance will vary greatly from site to site depending on the amount of silts, sedimentations and storm events that occur. The internal storage chamber and larger diameter aggregate bedding layer allow for a significant amount of silts and sedimentation to occur. The PaveDrain System is designed as an open joint concept between the blocks. Many existing installations have required little, if any maintenance. If the joints become filled or obstructed, maintenance is accomplished by using a vacuum truck or a combination sewer vacuum truck and the PaveDrain Vac Head. If a significant amount of sediment accumulates in the aggregate bedding stone, part or all of the PaveDrain system can be removed allowing the subgrade to be cleaned and then the same product re-installed. Repair of individual PaveDrain blocks can be accomplished without removing the (mat) cables. For more detailed information on these topics go to www.pavedrain.com and select Installation & MAINTENANCE, and then click on REPAIR.

3) What is the infiltration rate of the PaveDrain system?

ANSWER: The PaveDrain System® was tested in accordance with ASTM C1701/C1701M-09 by an independent third party engineering firm. The test were conducted on different **PaveDrain** installations *that had not been maintained* on an average of more than 2 years and still infiltrated in excess of 1,500 inches/hour per one foot diameter.

Inside Dia. of Infiltration Ring (in)	12.19	12.19
Elapsed Time of Test (sec)	20.3	21.95
Infiltration Rate (in/hr) (I=KM/(D ² *t))	1,630	1,560
Ave. Infiltration Rate (in/hr)	1,595	

4) What is the loading rate of the PaveDrain system?

ANSWER: The PaveDrain system has been rated to AASHTO HS-25 Load Rating. <http://www.pavedrain.com/pdf/specifications/PaveDrain-HS-25-AASHTO-Loading-Analysis-Letter.pdf>

5) How does the product perform in the freeze/thaw cycle?

ANSWER: PaveDrain is based off of articulating concrete block technology that has been utilized in the U.S. for over 50 years. The system of interlocking blocks gives PaveDrain a tremendous advantage in freeze-thaw conditions over traditional systems because the system is flexible and very little freeze-thaw forces are placed on the block itself. The mix design of the block itself is derived from *local block manufacturers'* knowledge and experience. It has been subjected to dozens of freeze-thaw tests (i.e. ASTM C 1262) from other products which measures a coupon cut from the block. The *mix design* is one critical aspect, but the articulating design of PaveDrain compliments the mix design. Unlike traditional impervious surfaces, the permeable world has rarely if ever experienced freeze/thaw issue, even though water is allowed to get into the base. The open graded aggregate, which ranges from 30% to 43% depending on the aggregate size allows the water *ROOM* to *EXPAND* when it *FREEZES*. Rather than put all of the pressure on the surrounding aggregates and fines, which shift and move and then adversely affect the surface (i.e. traditional asphalt and concrete), we give the aggregate some room.

6) What is the percent open area of PaveDrain?

ANSWER: The arch comprises a 20% open area of a standard 11.9” x 11.9” x 6.00” PaveDrain unit. The surface open area is 7%.

7) What is the projected amount of water that can be “held” in the arch?

ANSWER: The following is from Emmons & Olivier Resources, Inc. Oakdale, MN www.eorinc.com

One acre impervious surface generates the following volumes:

- 2.5” event: 0.189 acre feet
- 5-year storm: 0.272 acre feet
- 10-year storm: 0.330 acre feet
- 100-year storm: 0.472 acre feet

For a one acre parking area PaveDrain would achieve a volume within the storage chamber of 0.090 acre feet. Adding 1.0 foot of rock storage below the entire parking lot adds 0.401 acre feet of storage for a grand total of .491 acre feet of storage. This is more than sufficient to accommodate the runoff volume for a 2.5” event and large enough to hold the 100-year storm if built as if it was a swimming pool. This calculation does NOT include any additional infiltration PaveDrain would achieve through porous subgrade.

8) Can PaveDrain come in different colors?

ANSWER: Yes. Similar to the retaining wall industry PaveDrain is available in multiple colors. The most popular are earth tone colors such as tans, browns, reds and charcoal. This will typically ADD \$1 to the square foot price and there may also be minimum production requirements (Typically around 5,000 Sft). Local manufacturing will determine which colors are available. Special colors such as blends, yellows, blue and green will be subject to increased pricing above the typical \$1 per square foot color price increase.

9) How is a broken block replaced?

ANSWER: Even if the PaveDrain system is installed as a mat with a cable, individual PaveDrain blocks can still be removed via conventional concrete removal tools, (i.e. sledge hammer, concrete saw etc.) Individual blocks can then be replaced without removing the cable. Because the cables are loose a new block can be installed over the top of the existing cables. For more information go to: <http://www.pavedrain.com/installation-maintenance/>

10) Can PaveDrain be hit with a snow plow?

ANSWER: Yes. PaveDrain can be plowed with both steel and rubber tipped blades. All corners of the PaveDrain are chamfered so that not corners or edges are created. It is IMPOSSIBLE for a complete PaveDrain block to be removed from the matrix from being hit by a snow plow. The blocks are too thick. PaveDrain blocks that have been hit by a steel bladed snow plow have been chipped or scrape. SEE BELOW.



11) What is the life expectancy of the PaveDrain system?

ANSWER: The PaveDrain system is based off of articulating concrete block technology that has been utilized in the U.S. for over 50 years. Cleaning of the PaveDrain with a vacuum truck such as an Elgin Whirlwind® or Megawind® or a combination sewer vacuum truck and the PaveDrain Vac Head is a project specific condition. Individual blocks *MAY* occasionally break over time. This does NOT constitute a system failure. Individual PaveDrain blocks can be replaced over time lengthening the lifespan of the PaveDrain system. A life expectancy of 50 years can be expected in most installations.

12) Is sealing the PaveDrain system recommended?

ANSWER: Yes. Especially in northern climates. Salt is hard on everything. One of the big benefits of PaveDrain over other permeable surfaces is that our joints are *not* filled with stone. This means that once the PaveDrain system is installed a boom sprayer can be utilized to seal the PaveDrain against the ravages of salt. Conversely if a permeable paver system was installed and then the swept with small rock between the joints and then sprayed (i.e. sealed) it would seal the *ENTIRE* surface.

13) Does the PaveDrain system conform to ADA requirements?

ANSWER: Yes. ADA Design Guidelines require that surfaces be firm, stable and slip resistant. Gaps between PaveDrain blocks do not exceed 1/2". The PaveDrain system easily exceeds all of these requirements by incorporating a 1/4" gap between individual PaveDrain blocks.

14) Should different striping paint be utilized?

ANSWER: No. A conventional striping paint utilized on conventional asphalt or concrete can be utilized on the PaveDrain system. Installations have shown that the paint sticks exceptionally well to the PaveDrain system.



15) What are the estimated LEED points that PaveDrain can qualify for?

ANSWER: Depending on your site PaveDrain can achieve several LEED points. It is up to the architect and engineer of record to determine which LEED points apply to their respective sites. The following LEED points are most commonly applicable to PaveDrain projects.

SUSTAINABLE SITES

- Credit 6.1 **Stormwater Design, Rate and Quality Control** **1 Point**
 - Limit distribution of natural water flows by managing stormwater runoff
- Credit 6.2 **Stormwater Design, Treatment** **1 Point**
 - Implement a stormwater management plan that reduces impervious cover, promotes on-site filtration and eliminates contaminants.
- Credit 7.1 **Heat Island Effect, Non-Roof** **1 Point**
 - Reduce heat islands.

MATERIALS & RESOURCES

- Credit 4.1 **Recycled Content** **1 Point**
 - 10% (Post-Consumer +1/2 Pre-Consumer) *(The use of recycled glass within the block is a DEFINITE possibility in the near future. We will also be utilizing recycled stone beneath the PaveDrain system as a base course).*
- Credit 4.2 **Recycled Content** **1 Point**
 - 20% (Post-Consumer +1/2 Pre-Consumer) *(The use of recycled glass within the block is a DEFINITE possibility in the near future. We will also be utilizing recycled stone beneath the PaveDrain system as a base course).*
- Credit 5.1 **Regional Materials** **1 Point**
 - 10% Extracted, processed, and Manufactured Regionally. *(Most materials (sand, rock, cement) for the manufacture of block is produced within 100 miles of the manufacturing facility).*
- Credit 5.2 **Regional Materials** **1 Point**
 - 20% Extracted, processed, and Manufactured Regionally. *(Most materials (sand, rock, cement) for the manufacture of block is produced within 100 miles of the manufacturing facility).*

INNOVATION & DESIGN PROCESS

- Credit 1.2 **Innovation in Design: Life-Cycle Benefits** **1 Point**
 - PaveDrain can easily be vacuumed and cleaned. Unlike traditional asphalt when it is sealed, re-painting of the pavement striping is not needed.

16) If matted will a cable wear out?

ANSWER: It is highly unlikely that the cables will ever wear out. The cables will be made with polyester cable wrapped with a nylon sheath. Polyester cables have been utilized in salt water environments on articulating concrete block mats in erosion control applications for over 30 years. These cable sits loose within a one-inch diameter hole in the block. The cable diameter is typically $\frac{1}{4}$ " (20mm). That leaves $\frac{3}{4}$ " for movement.