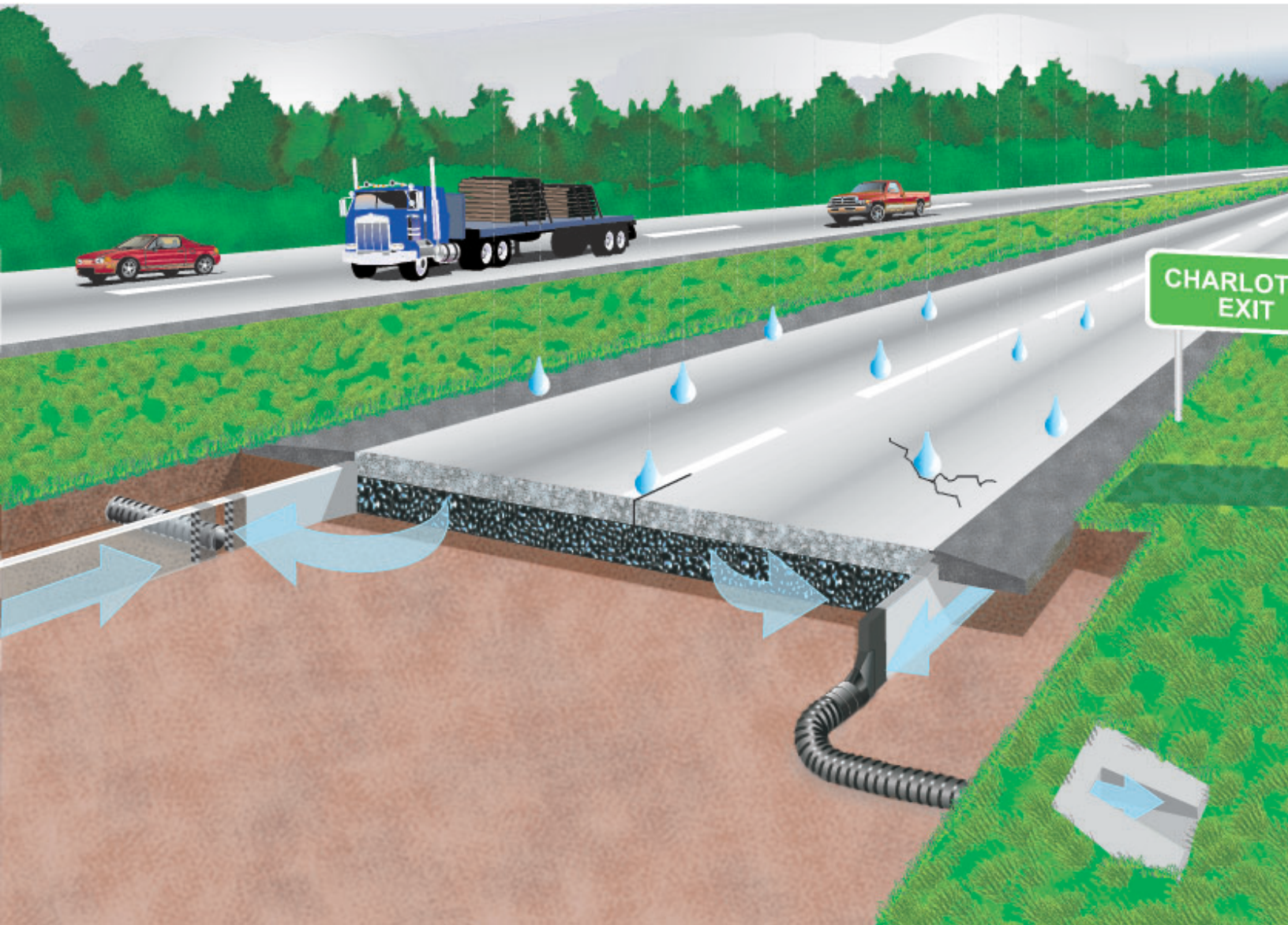


AKWADRAIN™

Highway Edge Drain

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AMERICAN WICK DRAIN
CORPORATION

AKWADRAIN HIGHWAY EDGE DRAIN

America continues to invest billions of dollars annually in its major highway system. Engineers are constantly searching for ways to improve highway design and achieve savings that amount to billions of dollars over the life of the project. Extensive studies have shown that excessive water can cause accelerated deterioration of both flexible and rigid pavement systems. American Wick Drain has worked with state and government agencies to develop the most efficient and strongest highway edge drain product currently on the market.

AKWADRAIN

AKWADRAIN highway edge drain is the solution for excessive water buildup in the pavement system. It provides a positive and rapid drainage system for water that enters the pavement structure. AKWADRAIN is a two-part prefabricated drainage system consisting of a formed polymeric core covered on both sides with a non-woven, needle-punched polypropylene filter fabric. The fabric passes water or other liquids freely while restricting soil particles which might clog the core. Water collected in the core flows freely to the nearest outlet.

AKWADRAIN highway edge drain offers numerous benefits over a typical pipe and aggregate drainage system.

Flow Capacity

The longitudinal flow capacity of 21 gallons per minute (for 12" drain) provides rapid removal of water from the subbase even in high inflow conditions. The structure of the core provides multiple unobstructed flow channels for both vertical and horizontal water flow.

Inflow Capacity

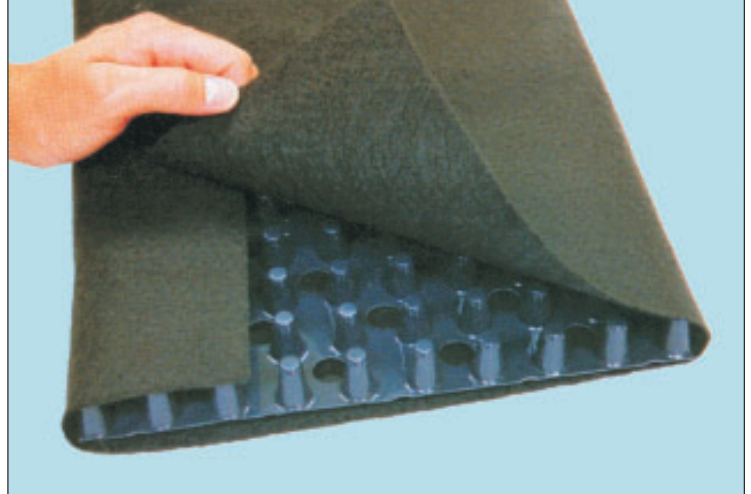
The filter fabric permits high volumes of water to enter the core while restraining soil particles. Inflow capacity of AKWADRAIN highway edge drain is over 100 gallons per minute per foot (for 12" drain). Over 85% of the total draw area is open to receive water.

Compressive Strength

The compressive strength of the AKWADRAIN highway edge drain core is over 6000-9500 pounds per square foot (42-66 psi) under normal load, and has virtually no loss of strength under shear loading. The core material remains durable over the life of the drain with minimal loss of strength due to creep.

Chemically Resistant

Both the fabric and core have excellent resistance to petroleum-based chemicals as well as naturally occurring substances typically found in soils



Easy to Install

AKWADRAIN highway edge drain is lightweight (6.5 oz/sq ft) and easy to handle. It comes in various widths, 12, 18, 24 and 36," to suit specifications for any project. It can be placed with standard equipment and no skilled labor is required. Installation requires only a 4"-6" wide trench. Several miles per day can be installed with minimal traffic disruption. AKWADRAIN highway edge drain is also inexpensive to store and transport compared to the expenses associated with an aggregate drain.

Resists Clogging

The fabric used for AKWADRAIN highway edge drain is specially designed for edge drain applications to resist clogging from subbase materials. Other fabrics are available for unusual subbase or soil conditions.

Puncture and Tear Resistant

The fabric has a high resistance to puncture or tearing. This strength prevents damage during installation and ensures a long service life.



AKWADRAIN HIGHWAY EDGE DRAIN

One of the advantages of prefabricated edge drains is their ability to collect large amounts of water without the addition of aggregates. Calculation of collection capacity for perforated pipe without aggregate, perforated flattened pipe, and AKWADRAIN drain are as follows:

For perforated pipe, collection capacity per foot is equal to the cross sectional area of the perforations times the number of perforations per linear foot. For a standard 4" perforated pipe, there are usually eight holes 0.5" in diameter (See Figure 1) which provide 1.6 in² of open area per linear foot of pipe. 1.1% of the total area is open for drainage. Typically for a perforated pipe to function, a large surrounding volume of aggregate must be added to increase collection capacity.

For flattened perforated pipe, there are 144 slots (0.065"x0.75") per linear foot (See Figure 2) which provide 7 in² of open area per linear foot of drain. 2.5% of the total area is open for drainage.

For AKWADRAIN highway edge drain, the total open area (both sides) is 188 in² per linear foot. 60% of the total area is open for drainage.

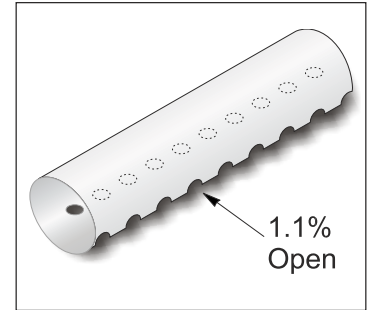


Fig.1 Perforated Pipe

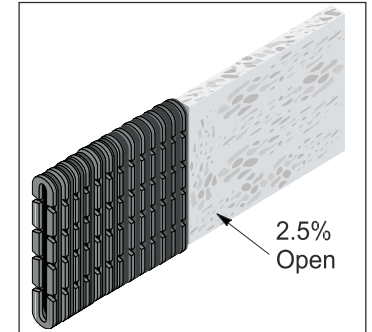


Fig.2 Flat Pipe



In addition to the collection capacity advantage, the compressive strength of our AKWADRAIN highway edge drain has demonstrated the ability to withstand not just normal stresses, but shear stresses as well. Shear loads are developed during back filling and by uneven settlements caused by heavy dynamic loading during the life of the roadway. Deformation from both normal and shear loading may greatly reduce the flow capacity of a collection system. In laboratory tests, AKWADRAIN highway edge drain has proven its ability to support significantly higher loads at much lower deformations than those seen in perforated pipe or flat pipe.

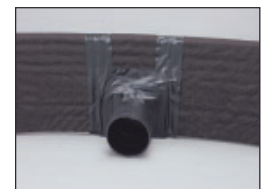
Fittings and Splices

There are two types of outlets available to allow water to exit the highway edge drain:

Universal Outlet - The universal outlet will allow water to drain to either a 4" Schedule 40 PVC pipe or a 4" corrugated polyethylene pipe. With its patented bell shape outlet, it is only necessary to have this one outlet to accommodate both types of outlet pipes.

Tee Outlet - The Tee Outlet will allow water to drain with either a 4" PVC or corrugated pipe perpendicular to the highway edge drain. This may be used in low areas along the roadway.

Splicing - To splice the AKWADRAIN highway edge drain, splicing is typically done by peeling back the fabric from the two ends and overlapping several rows of the core dimples, which can be secured with a rubber hammer. The fabric is then overlapped and secured with 3" polyethylene underground tape.



Left to Right: Universal Outlet and Tee Outlet



Splicing can be done by overlapping the cores and securing with a rubber hammer, overlapping the fabric and securing with underground tape.

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Typical Properties

Test Method

Drainage Properties

Compressive Strength, lbs/sqft	6,000-9,500	ASTM D1621 or D695
Shear Strength, lbs/sqft	6,000-9,500	ASTM D1621(Mod.)
Peel Strength, lbs/ft	38	ASTM D1876
Fungus Resistance (Core)	No Growth	ASTM G21
In-plane Flow, gpm/ft of width Hydraulic Gradient=0.1, Loading=10psi	21	ASTM D4716

Fabric Properties*

Material	Polypropylene	
Grab Tensile, lbs	110	ASTM D4632
Puncture Strength, lbs	65	ASTM D4833
Mullen Burst Strength, psi	215	ASTM D3786
Grab Elongation, %	60	ASTM D4632
AOS/ EOS (O95), seive	100	ASTM D4751
Flow Rate, gpm/ft ²	150	ASTM D4491

*Heavier fabrics available to meet ASSHTO M288 and special specifications.

Dimensions & Weights

Thickness, in	1
Standard Widths, in	12, 18, 24, & 36
Roll Length, ft	Range from 100 to 500
Roll Weight, lbs	Range from 40 to 400 based on roll length



American Wick Drain Corporation

1209 Airport Road, Monroe, NC, USA 28110
 Phones 800 242-WICK 704-238-9200
 Fax 704 296-0690
 Visit our Website: www.americanwick.com
 E-mail Address: info@americanwick.com