

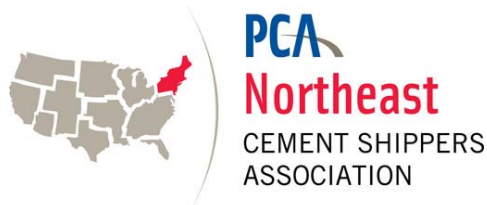
US EPA ARCHIVE DOCUMENT

Pervious Pavement Alternatives

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Basic Types of Pervious Pavements

- Pervious Concrete

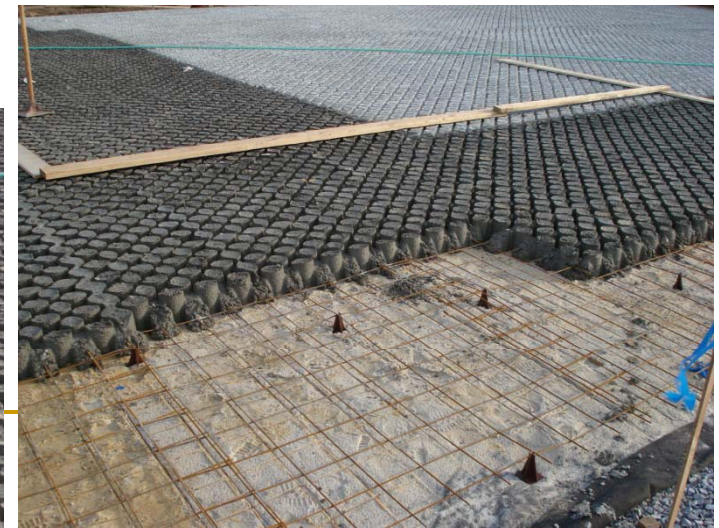


- Porous Asphalt



Basic Types of Pervious Pavements

- Permeable Pavers
 - Precast concrete product
- Grass-crete
 - Cast-in-place concrete



What is Pervious Concrete?



- 15-25% Void Space
- Also Called No-fines Concrete

What is Pervious Concrete?



- up to 1,800 in/hr porosity

Texture Comparison



What is Porous Asphalt?



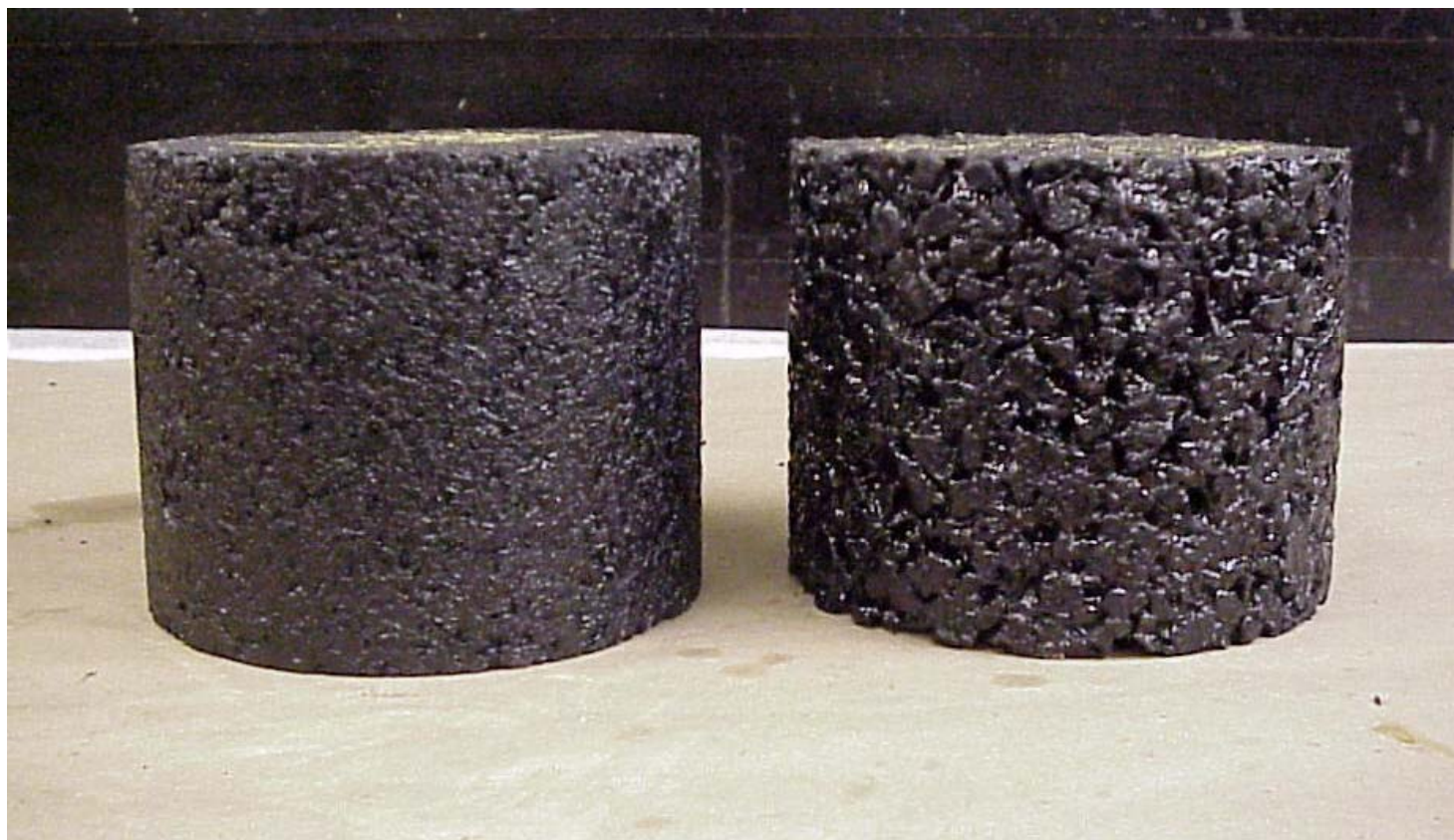
- 15-25% Void Space
- Also Called No-fines Asphalt

What is Porous Asphalt?



- up to 400 in/hr porosity

Texture Comparison



What are Permeable Pavers?



- Voids are a factor of paver type and/or joint distance
- Paver block itself is not pervious

What are Permeable Pavers?



- Joints/voids filled with pea gravel or grass
- Up to 800 in/hr porosity

Parking Lots



Driveways



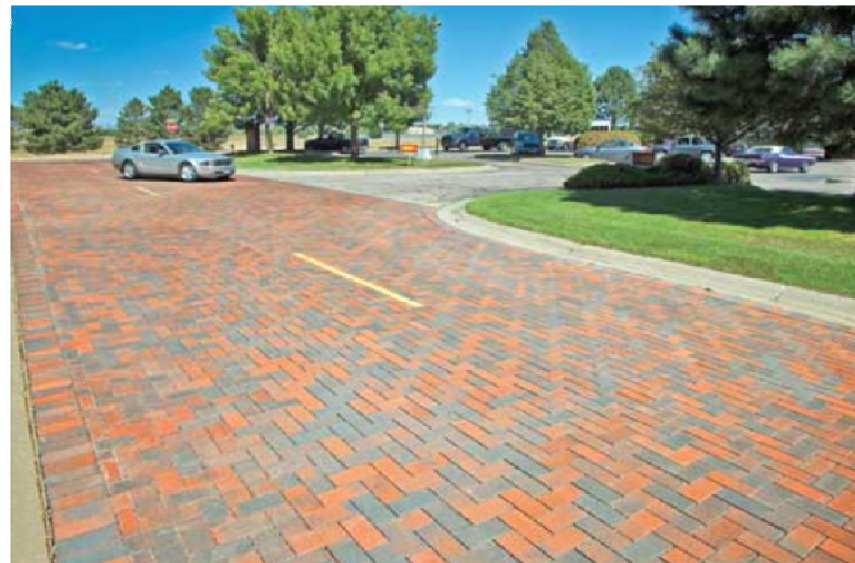
Sidewalks



Nature Paths/Parks



Streets, Alleys, Cul-de-sac's



Heavy-Duty Applications

Loading Dock, Forsgate Industrial Park, NJ



4,500 psi mix

Emergency Access Roads or Overflow Parking Areas



Stormwater is Polluted

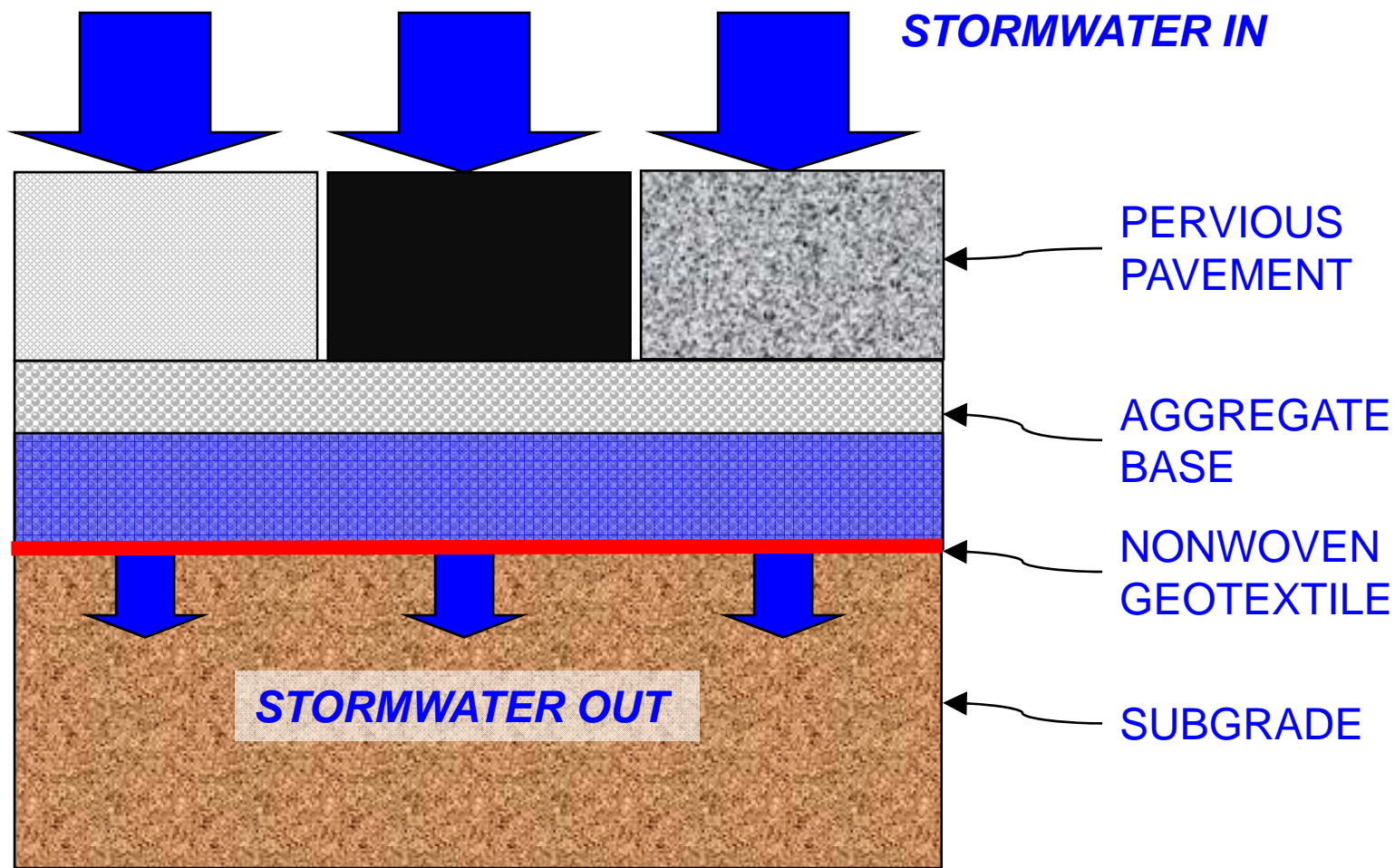
- Oils and Greases
- Metals
- Sediments
- Fertilizers



Elimination or reduction of expensive detention / retention ponds or underground storage systems, making more land available for development



Solution to Stormwater Management



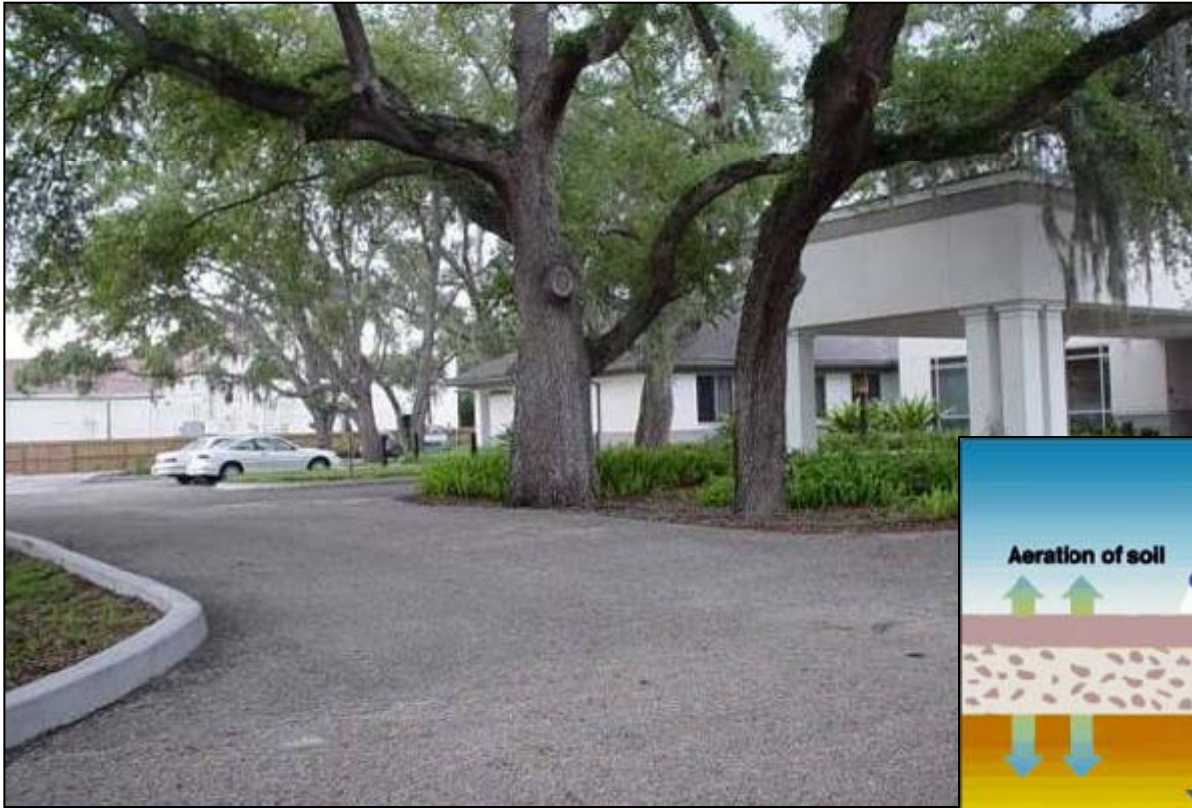
Turns your pavement into a DRY DETENTION POND!

Sustainability

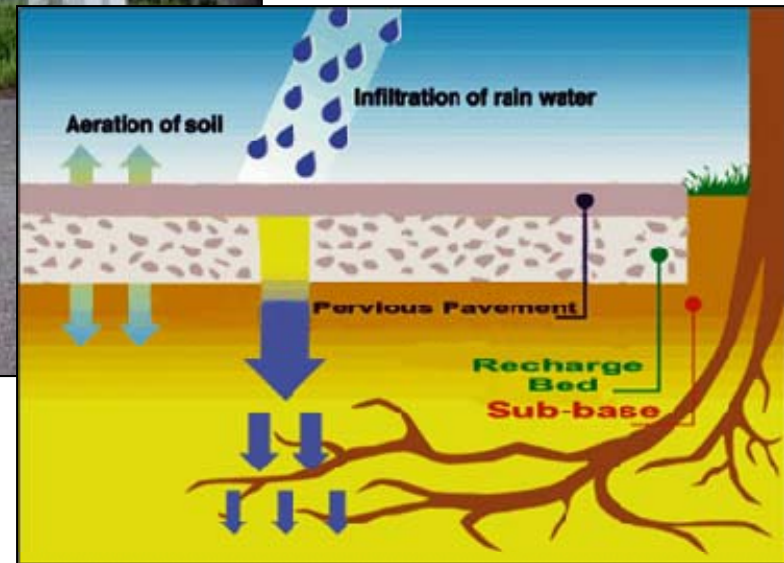
- Low-Impact Development
- Pollution Treatment
- Recharging Groundwater
- Tree Protection
- LEED Requirements
- Cool Communities



Protects Trees



Can pave within the drip line
Water and air filters to roots



Meets LEED Requirements

- Reduce stormwater runoff
- Improve stormwater Quality
- Reduce urban heat islands
- Recycled Materials
- Regional Materials



Basic Ingredients

- Cement
 - Portland Cement
 - Liquid Asphalt
- Coarse Aggregate
- Water
- Admixtures

- *Little or No Sand / Fines*



Aggregate

- Texture and Porosity Affected by
 - Aggregate Size
 - Aggregate Grading
 - Aggregate Angularity
 - Paving Equipment



Pervious Concrete vs. Paver Mix



Truck Mixed

- Truck Mixed
- A load of pervious concrete should be mixed for at least 70 to 100 revolutions of the mixer drum in a truck mixer
- Mix on jobsite prior to placement



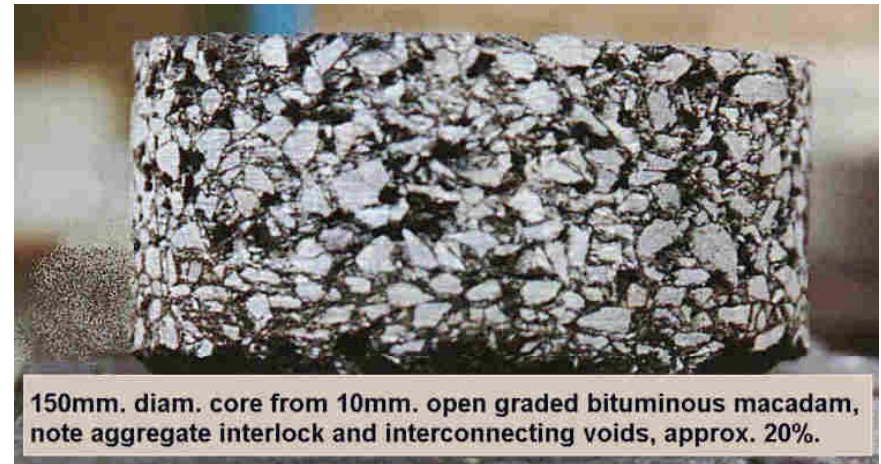
Permeable Pavers

- Precast in a manufacturing plant
- Specified by:
 - Type
 - Size
 - Shape
 - Color
- Up to 4" thick, typically 2- $\frac{1}{4}$ " thick



Porous Asphalt

- Minor changes to mix design
- An added advantage to porous asphalt is that it does not necessitate proprietary ingredients
- Does not require the contractor to have special paving equipment or skills

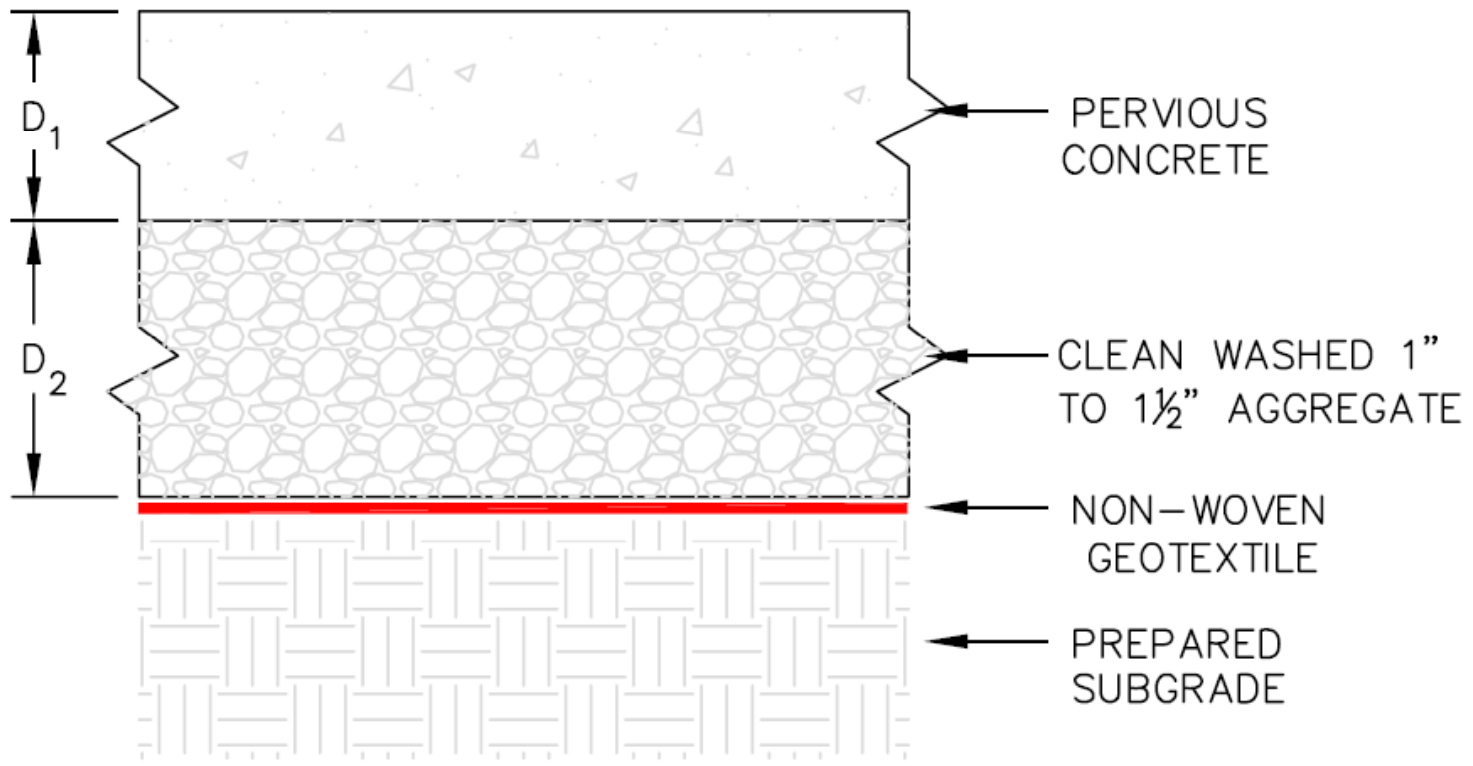


Porous Asphalt

- With the proper information, most asphalt plants can easily prepare the mix and general paving contractors can install it
- Acceptance testing similar as regular asphalt paving



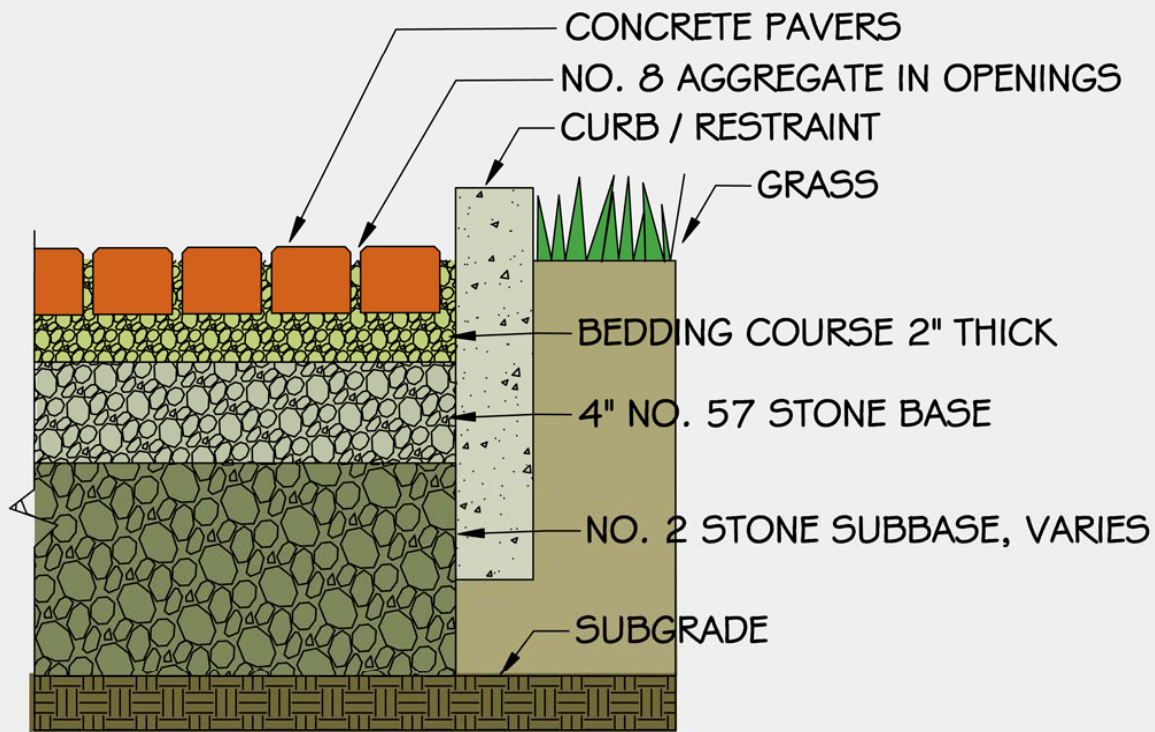
Pervious Concrete Profile



PERVIOUS TYPICAL SECTION

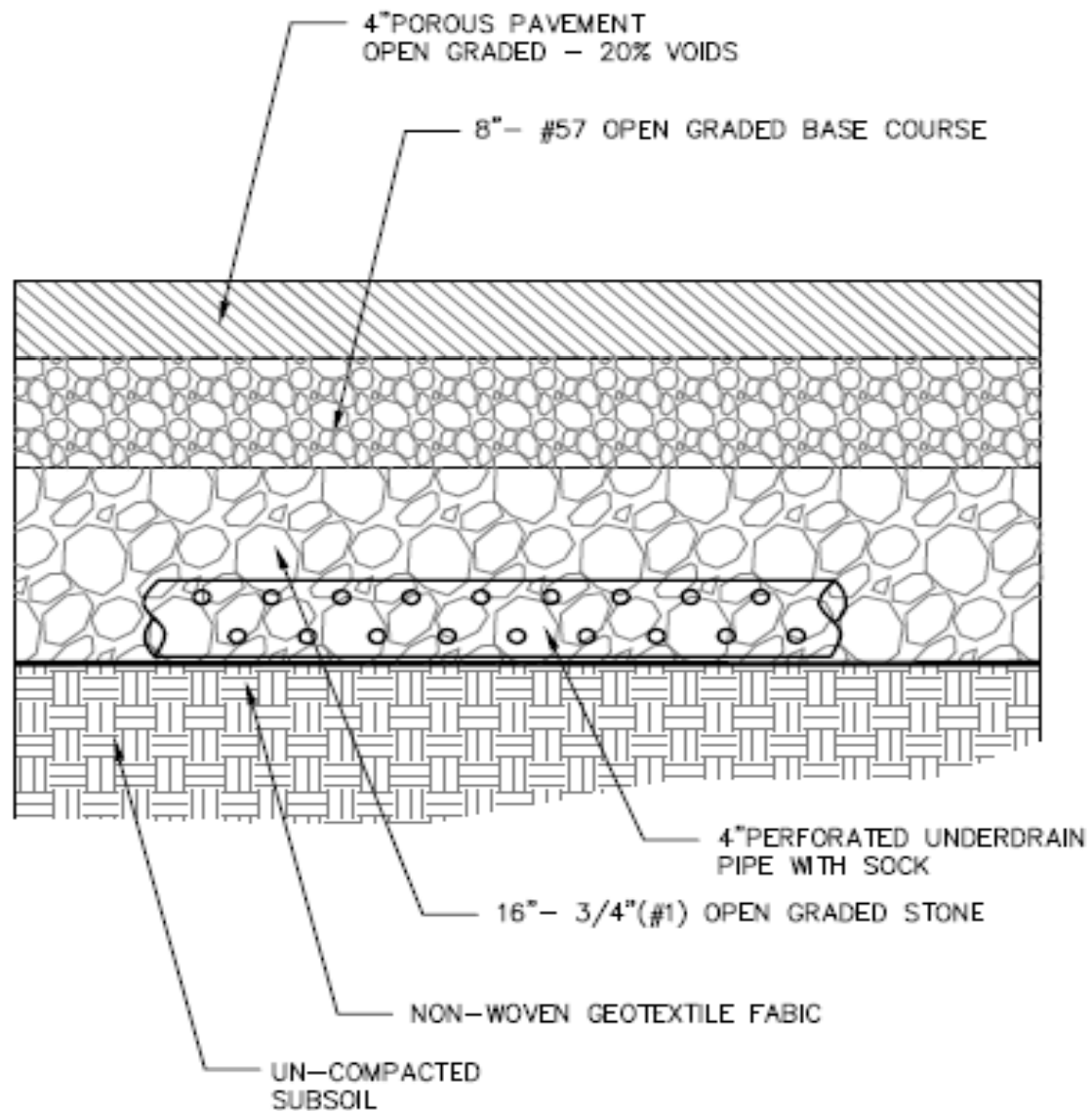
NOT TO SCALE

Permeable Paver Profile



CONCRETE PAVERS

Porous Asphalt Profile



Can Pervious Pavement Withstand Freeze-Thaw?

- **15-25%** void structure means little moisture trapped in matrix
 - Stormwater is stored below concrete in **aggregate base**
 - Expansion of moisture due to freezing does not exert undue pressures on matrix
-

Freeze Thaw Comparison



- Melting snow on impervious pavements can become “black ice”

Freeze Thaw Comparison

- Melting snow on a pervious pavement parking lot does not leave a “trail” of water that could become black ice
- Melting snow goes through the pavement



Pervious Concrete Pavement Thickness

- Minimums
 - ❑ 5" Sidewalks / Paths
 - ❑ 6" Parking lots
 - ❑ 6" Residential Driveways
 - ❑ 8" Streets
 - ❑ 8" Commercial Driveways
- Consider Conventional Concrete Pavement
 - ❑ Heavy truck traffic
 - ❑ High volume traffic



Add 1" of thickness over regular concrete to account for the 20% voids!

Permeable Paver Thickness

- Pavers typically come in standard sizes

WHITACRE GREER

4x8x2-1/4
PERMEABLE PAVERS

STORM WATER MANAGEMENT WITH PERMEABLE CLAY BRICK PAVERS

Whitacre Greer 4 x 8 x 2-1/4 Permeable Brick Pavers feature the clean crisp lines of our classic dry-pressed 4 x 8. The pavers' dimensions allow them to be installed interchangeably. This ADA-compliant product is available in the full palette of colors, including custom blends of standard colors.

Dayton, OH

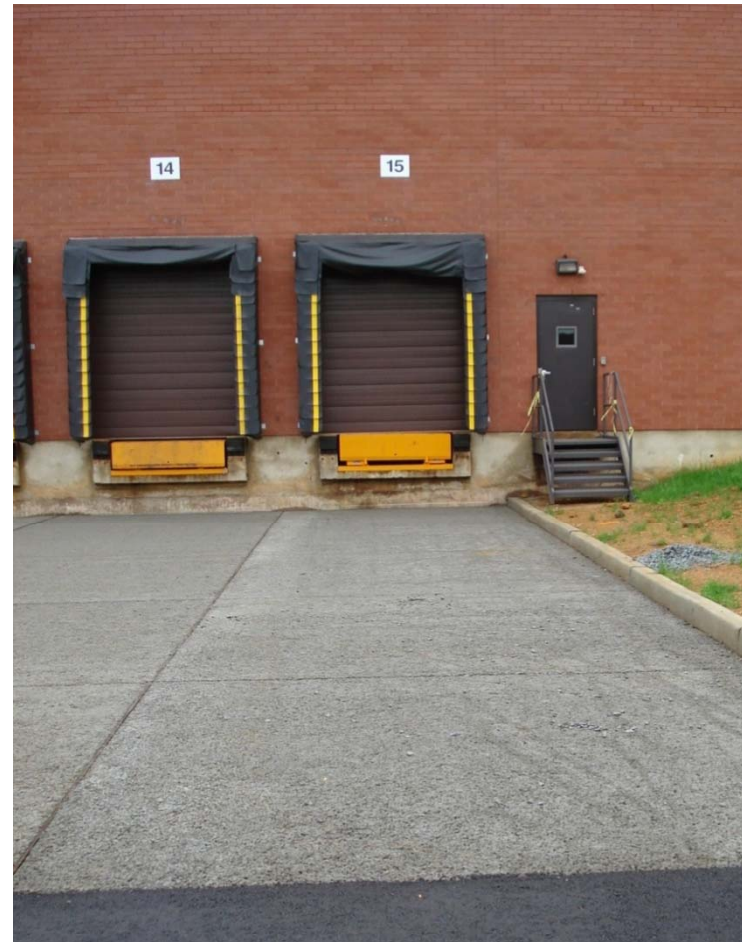
Porous Asphalt Pavement Thickness

- Minimums
 - 2" Sidewalks / Paths
 - 2" to 4" Parking lots and Residential Driveways
 - 4" Streets
 - 4" to 6" Commercial Driveways



Pervious Concrete Strength

- Add sand into mix
 - 5% up to 25%
 - Adds up to 1,000 psi
 - Sacrifice porosity for strength
- Synthetic Fibers
- Larger Aggregate Size
 - For areas where high heels, wheelchairs are not a concern
- Thicker sections



Cost of laying pervious pavement exceeds that of traditional pavement, historically:

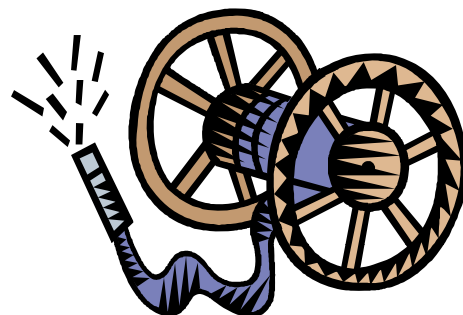
- Pervious pavement is approximately 4%-15% higher than regular pavement,

BUT . . .

- Higher installation costs can be off-set by elimination of the need for curbs, gutters, storm drains and large retention ponds.



Broom and/or garden hose



Leaf Blower



Power Washing



Vacuumping



Street Sweeper – Vacuum Sweeper



Thank You
