CONNECTICUT CONSTRUCTION INDUSTRIES ASSOCIATION, INC.

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Senate Bill 388, An Act Concerning Connecticut's Economic and Environmental Future
Environment Committee
March 12, 2010

The Connecticut Construction Industries Association, Inc. is the most diverse commercial construction industry trade association in Connecticut. Formed over 40 years ago, CCIA is an organization of associations, where all sectors of the commercial construction industry work together to advance and promote their shared interests. CCIA members have a long history of providing quality work for the public benefit.

CCIA is comprised of nine divisions, including the Associated General Contractors of Connecticut, Inc.; The Connecticut Road Builders Association, Inc.; Utility Contractors Association of Connecticut, Inc. (UCAC); The Connecticut Ready Mixed Concrete Association, Inc. (CRMCA); and Connecticut Asphalt and Aggregate Producers Association. CCIA has more than 350 members statewide, including contractors, subcontractors, suppliers, and professional organizations that service the construction industry.

UCAC represents the utility contractors and excavators who specialize in water, drainage, sewer and underground public utility construction work. The division also includes material and specialty equipment suppliers, utility companies, municipalities and professionals allied with the utility construction industry.

CRMCA promotes the use of ready mixed concrete and innovative construction products and technologies. CRMCA's Concrete Promotion Council (CCPC) is the most active committee in the division, hosting monthly meetings and a variety of educational and concrete promotional programs and events throughout the year.

UCAC supports additional Clean Water Fund bond authorizations, which are used for municipal stormwater and sewage treatment projects. UCAC is an active member of the Clean Water Fund Investment Coalition, which is comprised of municipalities, labor organizations, engineers and environmental organizations and supports continued funding for the Clean Water Fund. Senate Bill 388 increases revenue bond authorizations in the next fiscal year to up to $150 million and $90 million in general obligation bond funds for the Clean Water Fund. These funds would help create jobs, which is critical in this economic recession to help restore the economy. State investment in infrastructure improvements not only puts people to work, grows jobs and spurs economic development; it helps improve Connecticut's environment. If investments are made now, they are less expensive than waiting until they fall further into disrepair.

Section 10 of Senate Bill 388 authorizes stormwater authorities, which manage programs for construction and post-construction site stormwater runoff control, including control

detention and prevention of stormwater runoff from development sites, to develop a fee schedule for property owners and, in doing so, may consider certain criteria, such as the area of the property that contains impervious surfaces from which stormwater runoff is generated. Stormwater authorities may also provide credits for property owners and operators who demonstrate reduced stormwater impacts in accordance with Leadership in Energy and Environmental Design (LEED) approved construction and rehabilitation standards or green infrastructure techniques, including pervious pavers.

CCPC supports the use of green infrastructure techniques as a means of controlling stormwater runoff. Pervious concrete pavement has high surface infiltration and can immediately infiltrate and store rainfall and stormwater runoff from the heaviest of rainstorms—up to 350 inches of rainfall per hour! In many case, runoff is completely eliminated, which helps protect the environment. Research has demonstrated the ability of all permeable pavements to substantially reduce urban runoff. Additionally, the use of concrete in certain projects garners points to help projects obtain LEED certification from the U.S. Green Building Council. Further, the U.S. Environmental Protection Agency's Stormwater Management Best Practices includes permeable concrete pavement and pavers among its practices to design, implement and evaluate stormwater management efforts.

As the attached excerpt from the publication, "Permeable Interlocking Concrete Pavement: A Comparison Guide to Porous Asphalt and Pervious Concrete" (Interlocking Concrete Pavement Institute, February 2008) describes, pavers are comprised of a material that is not in and of itself pervious; rainwater runs off pavers and seeps into the ground in the gap between the devices. Pervious concrete is comprised of a porous material through which stormwater passes. Stormwater management systems that include pervious concrete are effective and have been used successfully on private and public projects in Connecticut, including most recently in the parking lot adjacent to the Hugh Greer Field House at UConn at Storrs.

CCPC believes, therefore, that it would be more accurate if the bill stated pervious *concrete*. The term "paver" is a specific device and not a generic material like concrete. Thus, as indicated in the attached proposed amendment, Senate Bill 388 should be amended in line 445 by deleting "pavers" and substituting "concrete" in lieu thereof.

Please contact Matthew Hallisey, Director of Government Relations and Legislative Counsel for CCIA, at 860-529-6855, if you have any questions or if you need additional information.

Depending on the paving unit design and pattern, PICP joints can vary between 1/8 and 1/2 in. (3 and 13 mm). Small-sized aggregate in the joints that allow water to pass through it can be somewhat deceptive. While PICP has less visible permeable surface area than porous asphalt or pervious concrete, PICP openings still provide high surface infiltration rates. These rates are well above practically all rainfall intensities, making their hydrological performance equal to or better than other permeable surfaces. The small aggregate in the joints and bedding also facilitates interlock and load transfer to neighboring pavers. Unlike standard interlocking concrete pavement, no sand is used in PICP joints or bedding since it has very low permeability.

Materials and Construction

Porous asphalt and pervious concrete are supplied in a 'plastic' state and formed on the job site. This makes them subject to weather. PICP can be installed in freezing weather, however, porous asphalt and pervious concrete cannot. In above-freezing temperatures, plastic asphalt and concrete mixes must be regularly checked by the contractor for consistency and conformance to specifications. These materials impose time limits within which the contractor must work before asphalt cools and concrete cures and stiffens. These time and temperature-constrained materials rely on a high degree of site control in order to achieve a successful installation.

In contrast, PICP units are manufactured in a factory and delivered to the site. They are not subject to time and temperature limitations in installation. PICP paving units should comply with national product standards (ASTM C 936 or CSA A231.2). These product standards require manufacture of high compressive strength concrete averaging 8,000 psi (55 MPa). Pervious concrete has a typical compressive strength of about 2,500 to 4,000 psi (17 to 28 MPa). Unlike pervious concrete and porous asphalt, concrete pavers have freeze-thaw durability test methods and requirements within their product standards to help assure adequate field performance in winter conditions. Freeze-thaw durability and higher strength PICP offers a more durable surface under wheel loads, snow plow abrasion and deicing materials.

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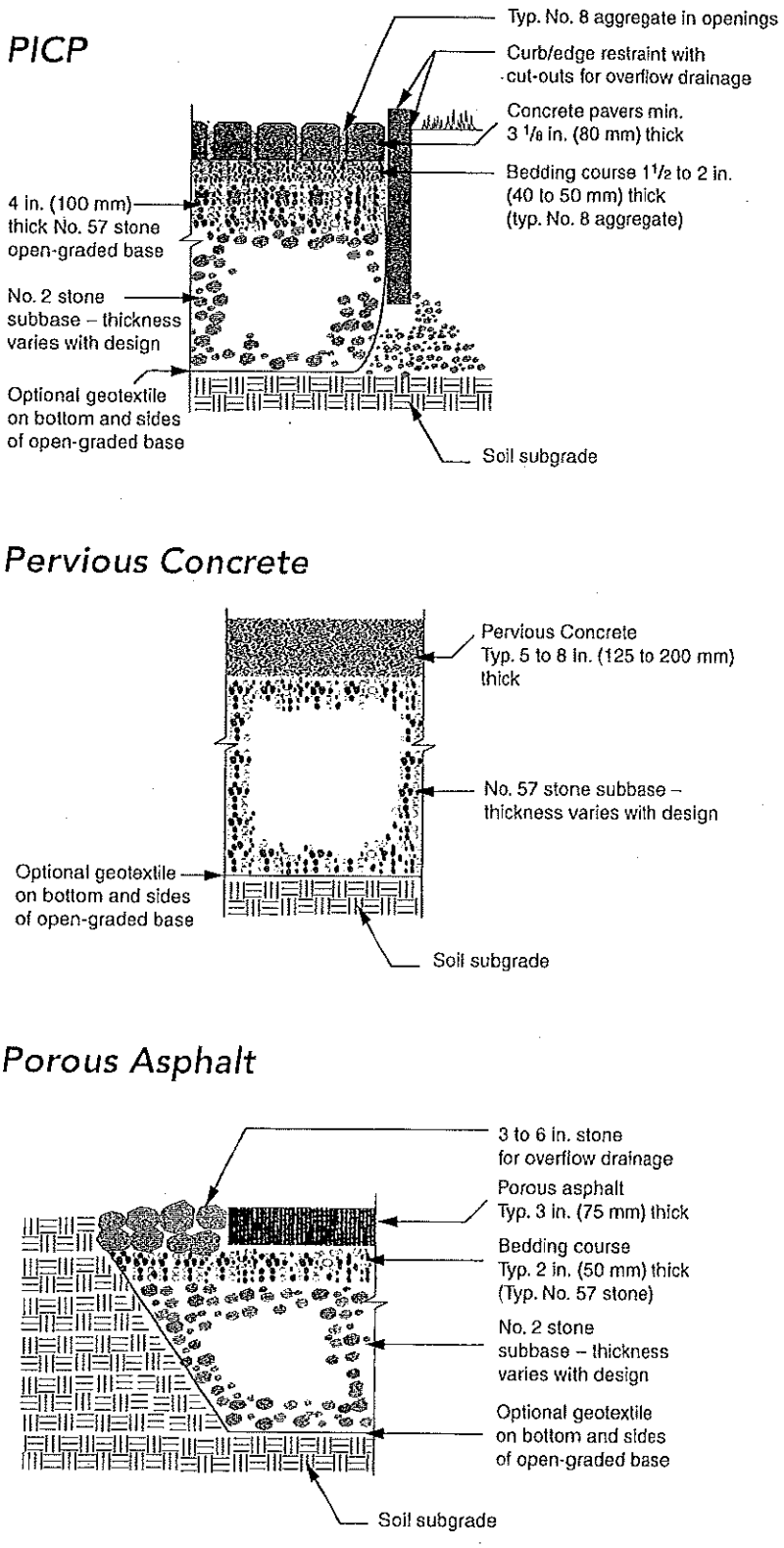
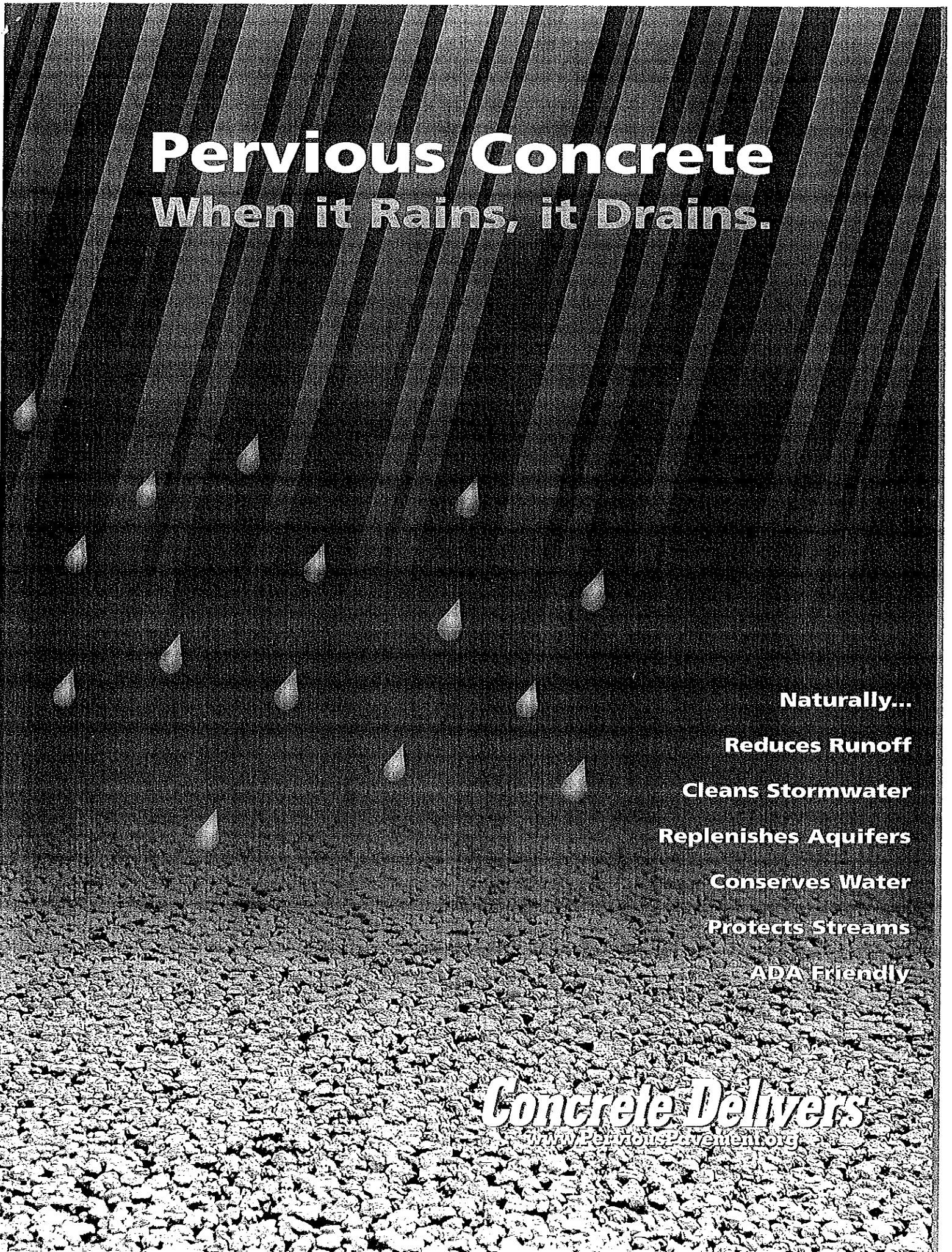


Figure 2. Typical PICP, pervious concrete and porous asphalt pavement sections. Surface and base thicknesses vary with traffic. Slower draining soils generally require thicker bases to store and infiltrate water. All can accommodate perforated drain pipes in the base for low infiltration soils.

containing impervious surfaces from which stormwater runoff is generated, (B) land use types that result in higher concentrations of stormwater pollution, and (C) the grand list valuation of such property. The stormwater authority may provide credits in such fee schedule for property owners and property operators who demonstrate, through monitoring, reduced stormwater impacts in accordance with Leadership in Energy and Environmental Design approved construction and rehabilitation standards or green infrastructure techniques including, but not limited to, the following: (i) Downspout disconnections, (ii) rain barrels, (iii) pervious ~~pavers~~ concrete, (iv) rain gardens, and (v) green roofs. The stormwater authority may reduce such fees or defer such fees for land classified as, or consisting of, farm, forest or open space land; and (2) collect fees from certain property operators or property owners of the municipality for the purposes described in subsection (b) of this section. [In establishing fees for any property in its district, the stormwater authority may consider criteria, including, but not limited to, the following: The area of the property containing impervious surfaces from which stormwater runoff is generated, land use types that result in higher concentrations of stormwater pollution and the grand list valuation of the property. The stormwater authority may reduce or defer such fees for land classified as, or consisting of, farm, forest or open space land.]

(d) A stormwater authority established pursuant to this section shall constitute a body politic and corporate with powers commeasured with the furtherance of its purposes including those set forth under subsection (b) of this section and the powers described in subsection (c) of this section. Any ordinance that establishes such an authority shall confer upon such authority each of the following powers: (1) To sue and be sued, including the right to seek liens or pretrial attachments in the course of collecting unpaid levies or fees; (2) to acquire, hold, convey, or mortgage, any estate, real or personal; (3) to contract; (4) to borrow money, including by the issuance of bonds; (5) to recommend to the legislative body of the municipality or municipalities in which such authority is located the imposition of a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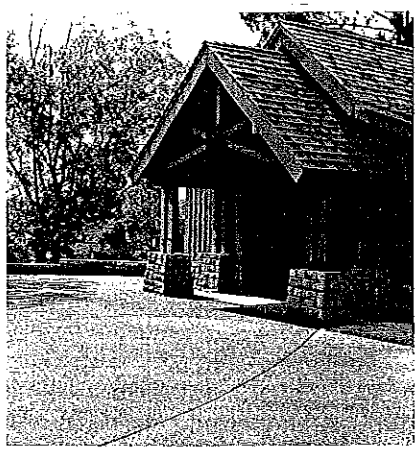


Pervious Concrete: The Natural Choice

It's tough to balance the demand for development with the need to preserve our natural resources. However, this balance becomes easy to achieve when you construct parking lots using pervious concrete.

Pervious concrete is a mix of coarse aggregate, cement, water, and little to no sand. Also known as "no-fines" or porous concrete, this mixture creates an open-cell structure, allowing rainwater to filter through to underlying soil. By modeling natural ground cover, pervious concrete is an excellent choice for stormwater management.

Pervious Concrete: The Environmentally Sound Choice

According to the United States Environmental Protection Agency (EPA), stormwater runoff can send as much as 90% of the pollutants—such as oil and other hydrocarbon liquids found on the surface of traditional parking lots—directly into our rivers and streams. The EPA now requires state and local governments to implement measures to reduce and improve the overall quality of stormwater runoff in an effort to address this important pollution problem. Pervious concrete has been recognized by the EPA as a best management practice (BMP) to address this most vital environmental concern. The open-cell structure of pervious concrete provides a medium for aerobic bacteria that break down many of the pollutants that seep from parked cars.

Pervious concrete also contributes to enhanced air quality by lowering atmospheric heating through lighter color and lower density, decreasing the impact of heat island effects. The heat island effect occurs when tree-covered areas are replaced with dark pavement surfaces, and is characterized by up to a 12-degree average temperature increase between an urban area and its surrounding countryside. This heat island effect increases ground level ozone production by as much as 30%.

Concrete surfaces, both pervious and conventional, have a much higher albedo—a measure of reflectance—than competitive paving materials. Specifications requiring a minimum surface albedo are becoming increasingly popular. The inherently light color of concrete naturally reflects heat and light. *Studies have shown as much as a 30% savings in lighting costs over other pavement types due to concrete pavement's reflectivity.*

Pervious Concrete: The Smart Business Choice

Using pervious concrete pavement in your parking lot can reduce the need for large detention ponds because the pavement acts as a detention area. Parking lot owners will spend fewer dollars on labor, construction and maintenance of detention ponds, skimmers, pumps, drainage pipes, and other stormwater management systems. Expensive irrigation systems can also be downsized or eliminated.

A pervious concrete parking lot will help reduce demands upon sewer systems. Today, many government agencies are now implementing stormwater impact fees for all impervious areas. Pervious concrete can reduce these fees for the property owner.

Developers are using pervious concrete for parking lots to increase utilization of commercial properties. The land ordinarily devoted to costly stormwater management practices or compliance with maximum impervious area ordinances can now be developed or preserved, enhancing the bottom line.

Pervious concrete is a durable material—parking areas properly designed and constructed will last 20-40 years with little or no maintenance. Thus concrete, conventional or pervious, is widely recognized as the lowest life cycle cost option available for paving.

When it Rains, it Drains.

Stormwater runoff occurs when rain falls. This runoff causes increased pollution in rivers and streams, flash floods, and loss of rainwater that could otherwise replenish water tables and aquifers. Pervious concrete has a 15-25% void structure and allows 3–8 gallons of water per minute to pass through each square foot—accounting for far more than is generated during most rain events. **Pervious concrete puts rainwater back in the ground where it belongs.**

Pervious Concrete
Frequently Asked Questions

Q: What about drainage issues in soils with high clay content?

A: Typically if a soil type has sufficient percolation to support a septic tank system it will be allowable for pervious concrete. If a soil is truly impervious, the pervious concrete system will still be useful for detention pond requirements. Soil percolation rates are most important if you must meet stormwater quality requirements. A typical parking lot design may have 5"–8" of pervious pavement on top of a 6"–12" sub-base of #57 stone (40% voids) on a geotextile fabric. In sandy areas pervious is placed directly above the sand.

Q: What about freeze-thaw issues?

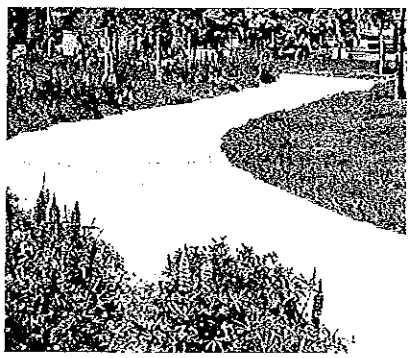
A: Pervious concrete has been placed in freeze-thaw climates for over 15 years. Successful applications of pervious concrete in freeze-thaw environments have two common design features—the cement paste is air-entrained, and the pervious concrete is placed on 6–12 inches of drainable aggregate base (3/4" or larger clean gravel). For more information on pervious pavement in freeze-thaw applications go to www.concreteparking.org and view documents on pervious concrete, including "Freeze-Thaw Resistance of Pervious Concrete" and "Concrete in Practice #38–Pervious Concrete."

Q: What about clogging?

A: Clogging problems are mainly an issue of design. If a natural area with grass or exposed soil is allowed to drain stormwater across a pervious concrete pavement, fine material can be introduced into the system causing localized clogging. Vegetative matter can collect on the surface of the pervious concrete causing some clogging, but routine sweeping or vacuuming will restore porosity. Studies have been conducted that indicate pressure washing will restore most of the porosity of clogged pervious concrete to nearly new conditions.

Q: What other uses are there for pervious concrete?

A: Pervious concrete has been successfully used for low volume streets, driveways, sidewalks, golf cart paths, retaining walls, slope protection, and French drains. Pervious concrete can be utilized in a variety of paving applications to provide hardscape without altering hydrology of the land.



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