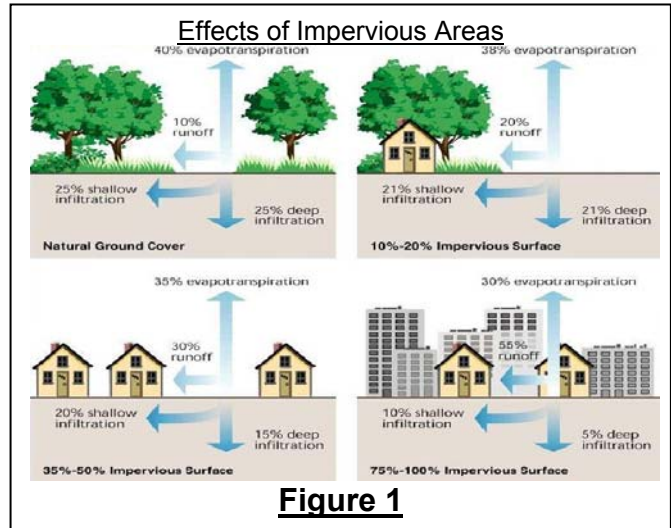


## **Ohio Turnpike Commission Storm Water Management Program** **Flooding: What is being done to address the problem?**

It is no secret that highway lanes, parking lots and building roofs (collectively referred to as impervious surfaces) allow minimal absorption of storm water into the underlying groundwater table. A less well known fact is that even hard, heavily compacted earth also allows only minimal absorption. While increasing the amounts of these surfaces is not the only source of higher amounts storm water in rivers, streams and creeks, they do further compound the flooding problem.

Due to the increasing amount of impervious surfaces, less rain water from storm events is absorbed into the groundwater. As indicated in Figure 1, the amount of rainwater that will run off a surface is directly related to the amount of impervious surfaces with which it becomes exposed (i.e., as impervious surfaces increase, so will the amount of runoff). Although storm sewers collect and drain rain water from impervious areas, they do so at a rate and volume much higher than the receiving stream can accept, therefore causing storm water to back up and flood the surrounding area. An additional side effect of the higher flow rates of storm water is erosion of stream banks.



Currently, the EPA has placed regulations on all future site development projects and redevelopment projects, to ensure that the current problems do not continue to grow. According to the established EPA regulations, a developer must determine a site's required runoff treatment volume. Once this quantity is calculated, the designer must develop a storm sewer plan that will be able to store this quantity of runoff onsite and discharge it slowly over a period of 24 – 48 hours. For sites that are already developed but will be modified to meet a new purpose, the developer must either lower the amount of impervious surface or treat a portion of the existing site's required storm water run-off volume over a period of 24 – 48 hours. Currently, designers are complying with these regulations by incorporating detention ponds, wetlands, treatment structures, green roofs and porous pavements, among others into their plans. The designs of most of these items are detailed in separate design manuals created by the Ohio Departments of Transportation and Natural Resources, both of which have been adopted by the Ohio Turnpike Commission. By recommending the use of these manuals during the design phase, the Ohio Turnpike Commission hopes to encourage design consultants to recommend more efficient means of storm water management.

The need for additional water management measures were partially driven by the housing market boom from 1999 to 2007. According to a 2007 Housing Inventory, it is estimated that there are currently over 128 million housing units in the United States and the median housing unit size was 1,769 square feet (U.S. Census Bureau, Table 1A-3). Based on this information, with a storm that results in  $\frac{3}{4}$  inch of rainfall per hour, nearly 1.5 billion gallons of storm water runoff will be generated per minute from just the estimated number of residential rooftops in

the United States. Furthermore, if you assume that the median housing unit size did not significantly change, approximately 70 thousand gallons per minute of that total was added between 1999 and 2007 due to the nearly 14 million housing units built during that time period (U.S. Census Bureau, Table 1A-1).

**Reference:**

U.S. Census Bureau, Current Housing Reports, Series H150/07, *American Housing Survey for the United States: 2007* U.S. Government Printing Office, Washington, DC, 20401  
Printed in 2008.