

## **Rainwater Runoff – What's the Problem?**

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On an undeveloped site, the natural processes of infiltration into the ground, evaporation from surfaces, and transpiration from vegetation moderates storm events. On many natural sites, very little rainwater leaves the site in the form of runoff.



When a site is developed, these processes are diminished by an increase in impervious surfaces from roads, buildings, and parking areas, leading to significant changes in the ability of the site to handle rainwater. More water runs off the site – as much as 20 to 30 percent - and far less water infiltrates, evaporates or transpires.

In addition to the increased volume of runoff, the rate at which the discharge occurs can cause dramatic changes in hydrological function and water quality of a watershed. Rapid surface runoff discharges into streams and rivers, where the excessive quantity of water can erode soils, change stream patterns, and cause flooding. It can also pick up pollutants along the way. Sediments, toxic metal particles, pesticides and fertilizers, oil and grease, pathogens, excess nutrients, and trash are common stormwater pollutants.

In urbanized areas, rainwater is frequently diverted to combined sewer systems. This means rainwater is combined and treated to same degree (and at the same cost) as raw sewage. Heavy rains can cause untreated sewage to be discharged into lakes, rivers, and streams when the system's capacity is exceeded. Even in separated sewage systems, the increased volume of rainwater during heavy rains can result in high levels of pollutants ending up in waterways.

Since the primary cause of runoff is increased impervious surface, sustainable site design seeks to minimize this as a first step. Then, designers engineer the site infrastructure to minimize runoff for 95 percent of the rain events that typically occur in that area. The ultimate goal is to achieve run-off rates that mimic the pre-development hydrology with an integrated approach of natural and engineered options.

This generally requires reducing the discharge rate and quantity by providing natural and engineered solutions for filtration, absorption, and evaporation

## **How Does Concrete Help?**

Concrete has played a significant role in conventional surface water management by providing conveyance and treatment infrastructure that is durable and permeable. Within green design, concrete continues to provide reliable solutions for flow control and water quality treatment on site, known as Low Impact Development (LID).