WHAT IS GREEN INFRASTRUCTURE?

The Basics

There are many different definitions of green infrastructure, but at its most basic, the term describes stormwater management strategies that are designed to convey and filter rainwater runoff through plants and soils. This is important because stormwater runoff water carries a wide variety of pollutants, and once it enters a pipe, it is carried directly to the streams, rivers and lakes that supply drinking water and recreation opportunities for many Hoosiers. Green Infrastructure management strategies often use plants to treat this pollution, which is one reason it is called "green".

Native plants stabilize a detention pond shoreline, filter pollution, and deter geese.

Traditional or "gray" stormwater infrastructure consists primarily of the underground pipes and structures designed to provide proper drainage. Gray infrastructure alone is typically not considered a best management practice (BMP) for stormwater because it does not treat sources of pollution or help recharge ground water. Poor management of stormwater can also create downstream flooding.

Porous paving units allow stormwater to infiltrate, thus replenishing groundwater and reducing the amount of pollution to the nearby stream.

What do these practices look like?

The most common green infrastructure BMPs include: naturalized detention ponds, vegetated swales, rain gardens (bioretention), and pervious paving/pavers. These practices treat stormwater through natural processes such as infiltration (allowing the water to soak into the ground), plant uptake (use by the plants), filtration (trapping of pollution), and settling-out of pollutants. All of these processes help improve the quality of the water leaving a neighborhood or commercial area and also help prevent flooding by reducing the volume of stormwater running off the site.

Why Green Infrastructure?

Central Indiana has developed rapidly in recent years, and that has dramatically increased the amount of hard (impervious) surfaces in our communities including roads, parking lots, and roofs. These features dramatically decrease the amount of land that can soak up stormwater while increasing how much stormwater runoff is rushing into pipes

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This roadside swale infiltrates water but also has an overflow drain to capture water during larger storms.

and streams, carrying with it a variety of pollutants. Catching rain water closer to where it falls and allowing it to soak into the ground or be absorbed by plants can effectively remove pollution, limit flooding, and replenish critical groundwater supplies.

Stormwater runoff is the leading source of pollution of U.S. waterways which greatly increases the cost of treating drinking water and your utility bills! Many Indiana communities must now comply with permits based on the Clean Water Act which require the implementation of measures to reduce the amount of pollution that enters our water bodies from stormwater.

In response to these requirements many communities are adopting new standards for green infrastructure and other low impact development approaches for new development.

Your Responsibilities

Green infrastructure practices require periodic maintenance to ensure that they continue to function properly. As with any new approach, there is a learning curve for BMP owners, including Homeowners Associations (HOAs) and any contractors tasked with maintaining these practices.

It is important to understand the maintenance requirements, Operation and Maintenance (O&M) plans, costs, and inspection needs of these practices and then take corrective action as needed. This can include trash and debris removal, weeding, repairs and other routine maintenance activities. Keeping an inspection log is also a good idea. Are you unsure about what kind of maintenance might be required in your neighborhood or on your property? Review O&M Plans or talk with your city's stormwater staff. Often the O&M plan will be available at the county recorder's office associated with your property deed.

Part swale, part rain garden, this depression captures water from the road and the residential lot.

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WHAT IS GRAY INFRASTRUCTURE?

Storm Sewers

Gray infrastructure is the term commonly used to describe traditional stormwater drainage infrastructure. This primarily consists of pipes and structures, including manholes and storm drain inlets. This infrastructure is designed to convey water between different locations on a site in order to promote proper drainage and prevent flooding.

A detention pond and outlet control structure

Detention Ponds

Modern stormwater management systems are designed not only to convey water across or around a site, but also to temporarily detain water in order to help prevent downstream flooding that might occur from the site's runoff. Detention ponds are often considered part of the gray infrastructure system and function by storing stormwater during rain events and gradually releasing it over time to a nearby stream. This not only helps prevent downstream flooding but also erosion and other impacts to the stream. Detention ponds are also effective sediment traps. Incoming water often contains sediments and other particulates, much of which settles out before the water leaves the pond and heads to the nearby stream. Detention "ponds" or basins can be both wet or dry but still serve the same basic function, temporary storage of stormwater.

A mechanical water quality unit

Mechanical Water Quality Units

Modern stormwater management systems utilizing a traditional gray infrastructure approach (pipes and basins) often include mechanical water quality units as part of the system to help treat water before it leaves a site. These units sit below ground in line with the pipes and are produced by a variety of manufacturers resulting in many different sizes and types. Mechanical water quality units primarily act as sediment traps to capture settleable materials like sand, gravel, and trash. Some units even often capture greases and oils, through skimming baffles. These units need to be inspected and cleaned regularly to ensure proper function.

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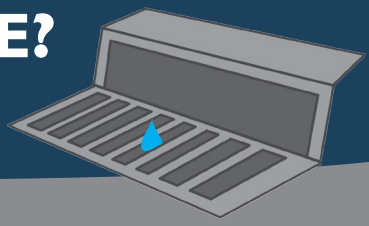
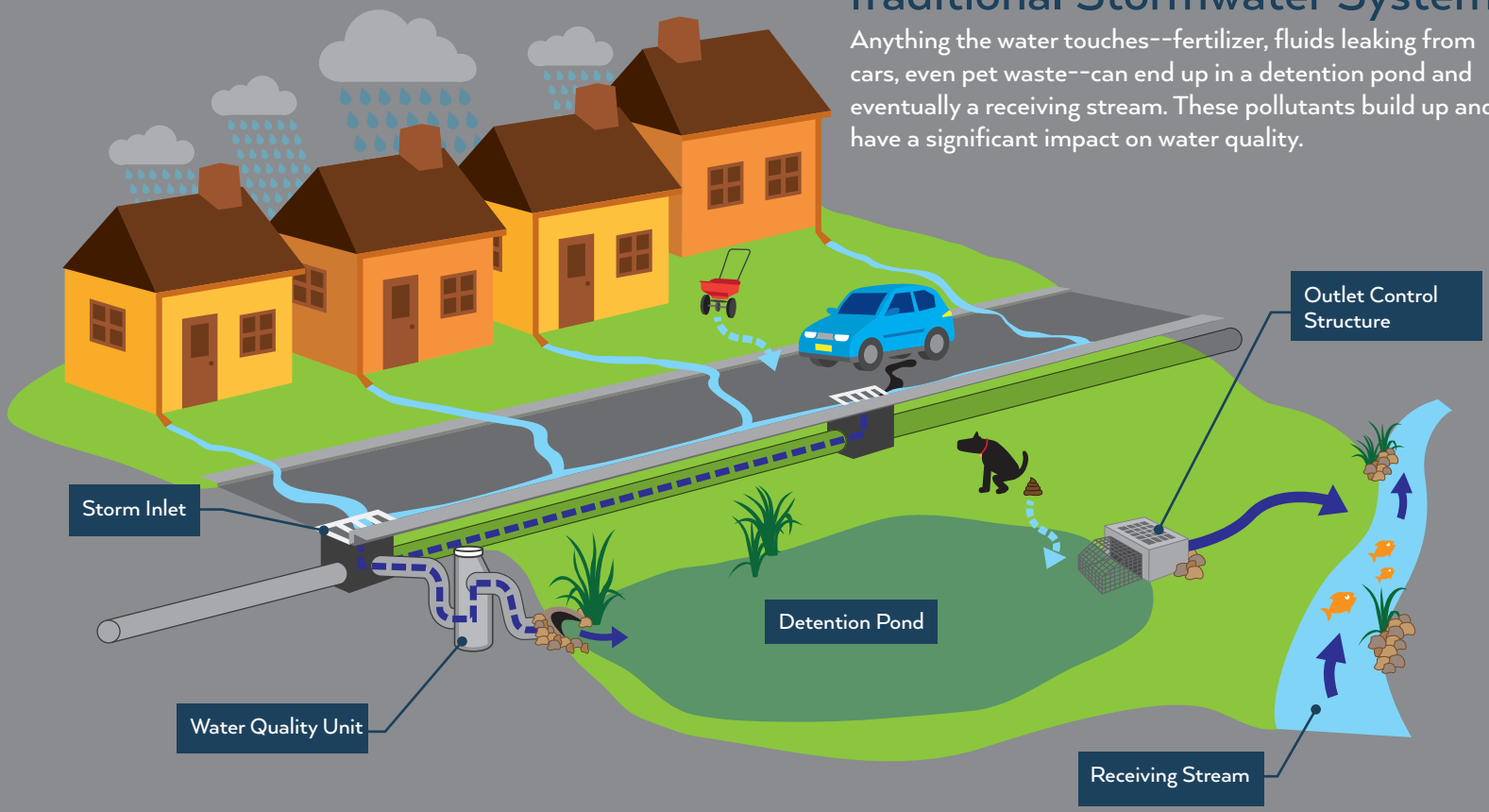


Ownership & Maintenance

In most communities the storm sewers - including pipes, inlets, and manholes - that are installed in new residential subdivisions and in the public right-of-way are owned and maintained by the local government. However, the water quality BMPs, including both detention ponds and mechanical water quality units, are typically privately owned and therefore are the responsibility of the Homeowners Association (HOA) or the owner of the property on which the practice is located. Ownership of the infrastructure and BMPs can vary by local jurisdiction, so it's a good idea to check with the local stormwater department to confirm who has what responsibility. In commercial developments typically all storm sewer infrastructure and BMPs are privately owned and maintained, although this too may vary by jurisdiction. For newer developments, there is often a BMP Operation and Maintenance (O&M) Plan that is developed during the project approval process that stipulates how and when practices are to be maintained. The O&M Plan is required to be recorded with the property deed and should have been provided to the HOA or property owner after the subdivision or project was completed. It is important to read and review this regularly as HOA leadership changes over time, and City and town ordinances often require routine inspections and maintenance.

Traditional Stormwater System

Anything the water touches--fertilizer, fluids leaking from cars, even pet waste--can end up in a detention pond and eventually a receiving stream. These pollutants build up and have a significant impact on water quality.



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