Green Infrastructure Guide

Village of Bayside

September, 2023

Introduction

In 2022, the Village of Bayside passed the updated version of the Comprehensive Plan. This plan encompasses the many tools that can help guide Bayside's future planning. The Comprehensive Plan included a Green Plan, which is a pivotal piece in guiding the Village towards continuous efforts of environmental sustainability.

The Village also has five strategic values, with one of them being Sustainable Resilience. The Village seeks to provide environmental stewardship and promote future resilience within the community.

This green infrastructure (GI) guide provides information regarding the design, implementation, and ongoing operations and maintenance of GI throughout the Village. This guide is a "living document" and will be periodically updated to reflect new information, findings, and experience. This guide is intended to aid the residents, contractors, local businesses, and others with information to expand their understanding of green infrastructure and its importance.

Bayside's Green Infrastructure Initiative

In an ongoing effort to sustain our pledge to sustainable resilience, Bayside is committed to promoting the use of green infrastructure initiatives for public and private entities.

What is Green Infrastructure?

GI is a resilient approach to managing wet weather through vegetative infrastructure systems which enhance the natural environment. GI incorporates both the natural environment and engineered systems to protect, restore, and mimic the natural water cycle.

Benefits of Green Infrastructure

Green infrastructure measures are primarily designed to provide stormwater sustainability benefits from buildings, sites, streets, and parking lots and are designed with a landscape and/or paving system that captures, slows, filters, and potentially recharges groundwater supplies from stormwater. These features reduce stormwater runoff and improve water quality before discharging to local creeks and other water bodies.

Stormwater Management Goals

Green infrastructure design should achieve three primary stormwater management goals: water quality improvement, flow reduction, and volume reduction.

Improve Water Quality

Green infrastructure facilities can filter and remove excess sediments and other pollutants from runoff. By allowing water to interact with plants and soil, water quality improvements are achieved through a variety of natural, physical, and chemical processes. Even if soils are not conducive to infiltration water quality is still enhanced through GI via pollutant settling, absorption into the soil, and uptake by plants.

Reduce Water Flow

Green infrastructure facilities can slow the velocity of runoff by detaining stormwater in the landscape. Flow rate reduction can often be achieved by integrating design strategies such as pervious paving, bioretention planters, rain gardens, green roofs, and other green infrastructure measures that provide stormwater detention.

Reduce Water Volume

Whenever possible, green infrastructure facilities should collect and absorb stormwater to reduce the overall volume of runoff. Retention facilities offer long-term stormwater collection and storage for reuse or groundwater charge. Plants contribute to retention capacity by intercepting rainfall, taking up water from the soil, and assisting infiltration by maintaining soil porosity.

Green Infrastructure for Residents

Build a Rain Garden

Rain gardens are shallow depressions that are planted with native flowering plants and grasses which, not only look great, but help soak up rainwater and melted snow. The runoff soaks into the ground rather than causing erosion or carrying pollution to the nearest creek or lake.

Resources

- **How to guide**
- **Plant guide**
- **Care tips**
- **Design guide**
- **Additional how to manual**

Want to see a rain garden in action? Check out the rain garden installed at Ellsworth Park near the playground.

Green Infrastructure for Residents

Install a Rain Barrel

A rain barrel collects rainfall running off a roof and stores it for future use, such as watering flowers and garden plants. Rainwater can be better for plants than water pumped from the ground or piped through a city water main. It's not chlorinated, fluoridated, or loaded with dissolved salts. Rainwater is mildly acidic, which helps plants take up important minerals from the soil. Properly maintained rain barrels will not become breeding sires for mosquitoes or other pests.

Where to purchase?

- Purchase a rain barrel from the Village!

Resources

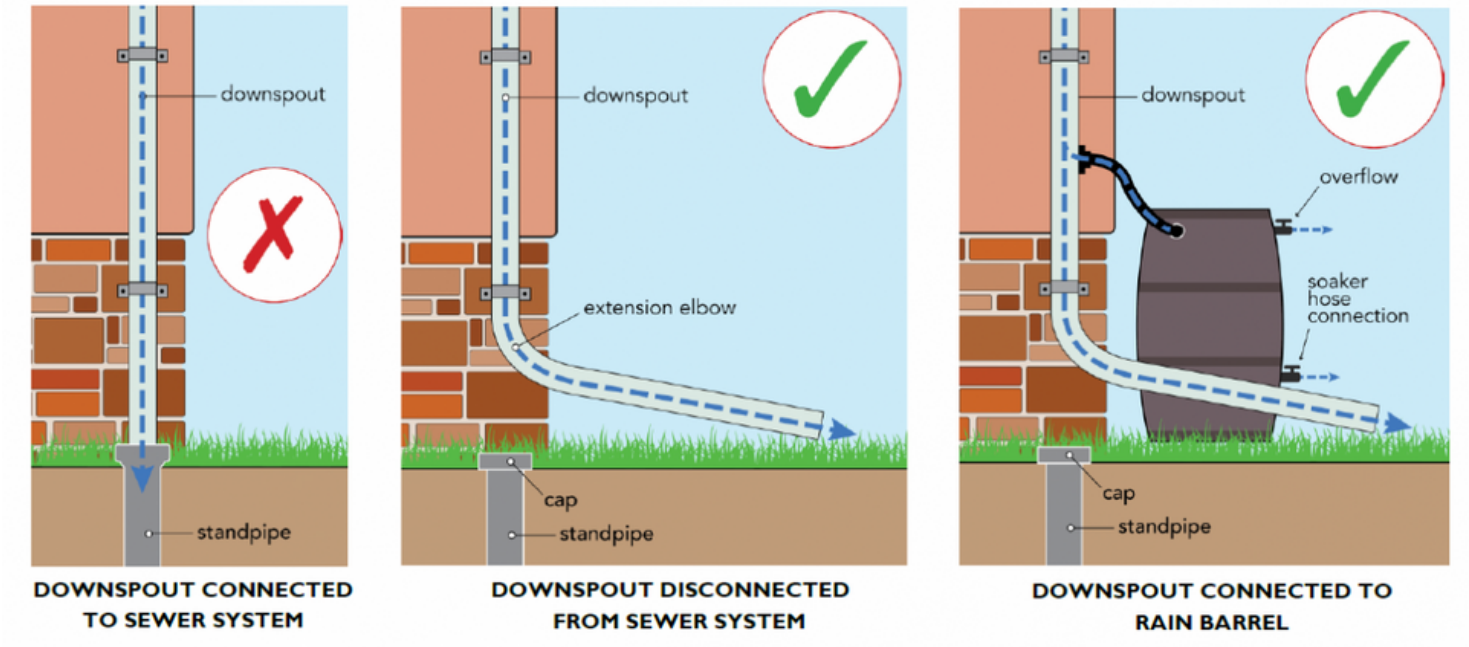
- **Installation guide**
- **FAQ**

Did You Know?:
Rain barrels save on average 1,300 gallons of water per year!

Green Infrastructure for Residents

Disconnect your Downspout

Downspout disconnection is one of the simplest ways that a homeowner can help with stormwater management. Disconnecting the downspouts and directing water runoff away from driveways to front, back, or side landscape areas slows and filters rainwater and lets it absorb into soils. Downspout disconnection can be easily integrated with rain barrels and rain gardens.



Resources

- **Helpful guide**

Green Infrastructure for Residents

Consider a Green Roof

Green roofs have proven to be for more than just living space extensions. Green roofs are now also thought to provide benefits such as saving energy, adding vegetation in an urban setting, and conserving and filtering water services.

Green roofs have been shown to demonstrate insulating capabilities that result in savings in heating and cooling costs. This principle can be demonstrated by temperature records taken from Chicago's City Hall green roof. When measured, the black tar portion of the roof had a temperature of 169 degrees on a summer day while the half acre sized planted green roof portion recorded temperatures between 90 and 120 degrees.

Recent studies and applications of green roof projects have demonstrated that in the summer, green roofs can retain 70 to 90 percent of the precipitation that falls on them. In winter months, the green roofs can retain 25 to 40 percent of the precipitation that falls on them. This demonstrates a potential to reduce high volume water or polluted water.

Small-scale green roofs can be placed on a variety of roof contexts including single family homes and garages, roof awnings, and shade structures.

Resources

- **Information Site**
- **Additional information**

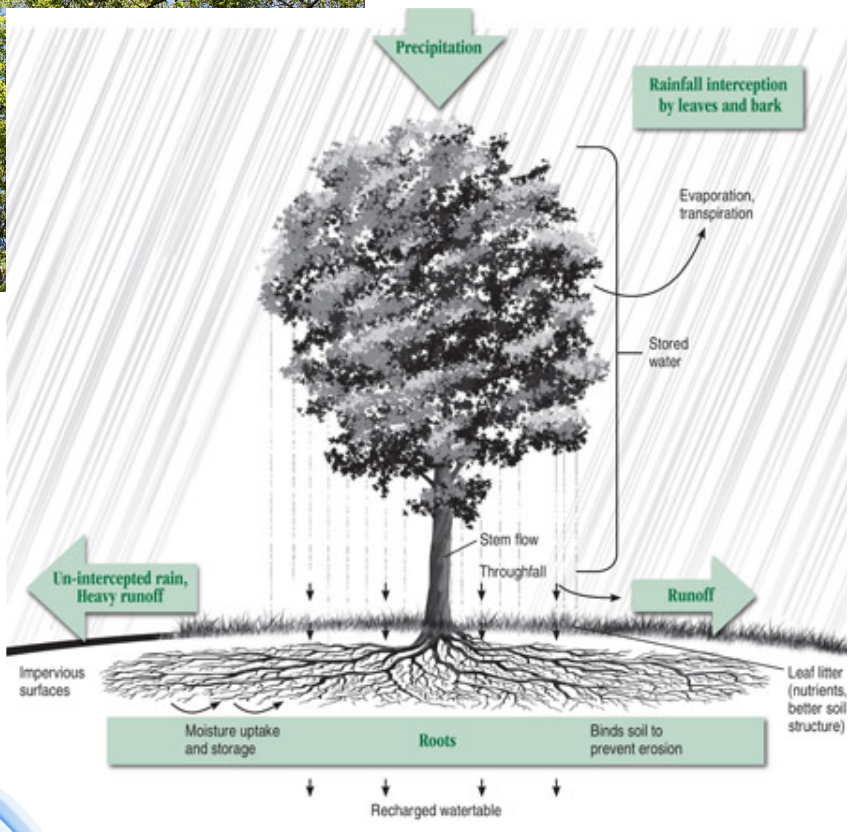
Green Infrastructure for Residents

Maintain & Grow the Tree Canopy

Tree canopies intercept rainfall, reducing the volume of runoff. Additionally, trees' root systems help to absorb and store water, reducing stormwater runoff. Roots, tree litter, and vegetative groundcover beneath the trees can slow runoff travel, allowing for more water to infiltrate the ground.

Resources

- **Adopt-A-Tree program**
- **Tree Canopy Fact Sheet**



Green Infrastructure for Residents

Over Excavated Ditching

Over excavated ditching usually refers to a construction technique where a ditch is dug deeper than required and then backfilled with suitable materials. The Village of Bayside offers two backfill options, an exposed stone finish and a top-dressed finish.

Over excavation ditches offer numerous benefits like improved drainage and increased stability of the ditch.

Resources

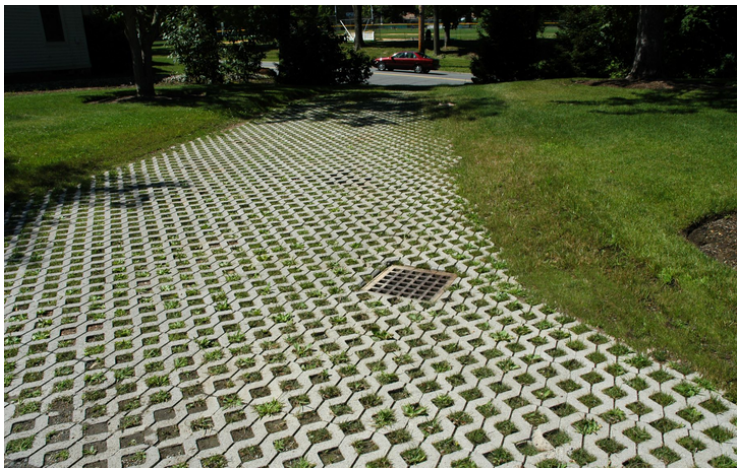
- **Bayside Fee Schedule**

Pervious Pavement Systems

Allow rainwater to either pass through the pavement system itself or through joint openings between the pavers into an underlying grass or gravel bed designed to store and infiltrate rainwater. Perviousness helps to reduce the total amount of runoff to roadways.

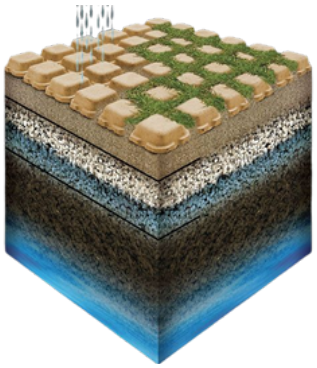
Pervious pavement systems refer to various methods designed to decrease the water-impermeable nature of conventional pavements. This is generally achieved through two primary ways:

1. The increased porousness of traditional paving materials like concrete and asphalt means that the properties of the pavement are modified to let more water through instead of shedding it as runoff.
2. The insertion of pervious pavement systems involves incorporating sections of permeable material within the conventional pavement. This serves to decrease the overall surface area of paved surfaces, thereby encouraging water runoff to infiltrate the soil beneath the pavement.



Resources

- **Fact Sheet**



Stormwater Filtering Systems

Increase the quality of the runoff discharged into local waterways. Filtering removes particulater pollutants like sediment from the runoff either through biological processes or mechanical means. Since other pollutants are transported by attaching themselves onto sediment particles, sediment removal also reduces chemicals washed off of roadways and lawns.

Stormwater filtration systems are selected because of their applicability to smaller drainage areas and their reliable pollutant removal rates, provided that appropriate maintenance is performed.

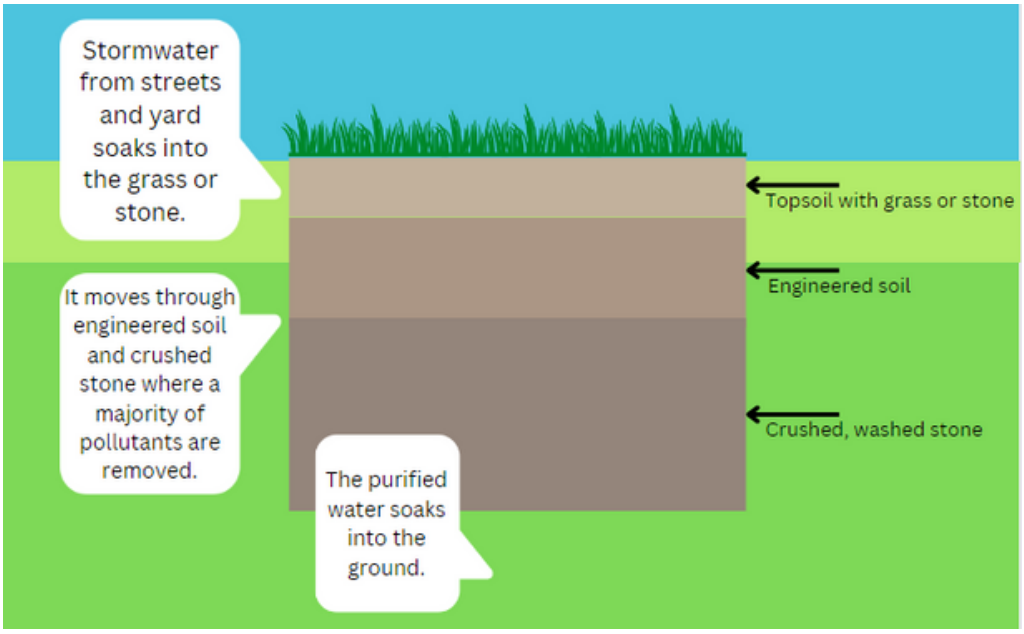
Stormwater filter systems proposed for consideration are:

1. Bio- filters
2. Sand filters
3. Infiltration trenches
4. Bioswales

Bio- Filters

Biofiltration uses a combination of stone and engineered soil to absorb stormwater in shallow, low points where there is little to no sloping. Bioretention helps reduce flooding and removes contaminants, sediment, and toxins from stormwater.

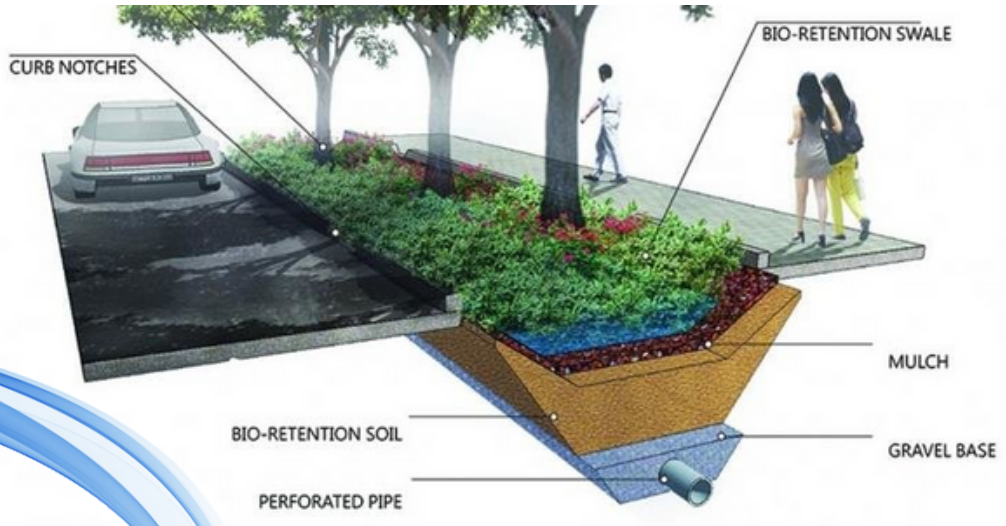
Biofiltration is ideally suited for placement along the curb. An example of a biofiltration in Bayside can be seen along Tennyson Dr.



Bioswale

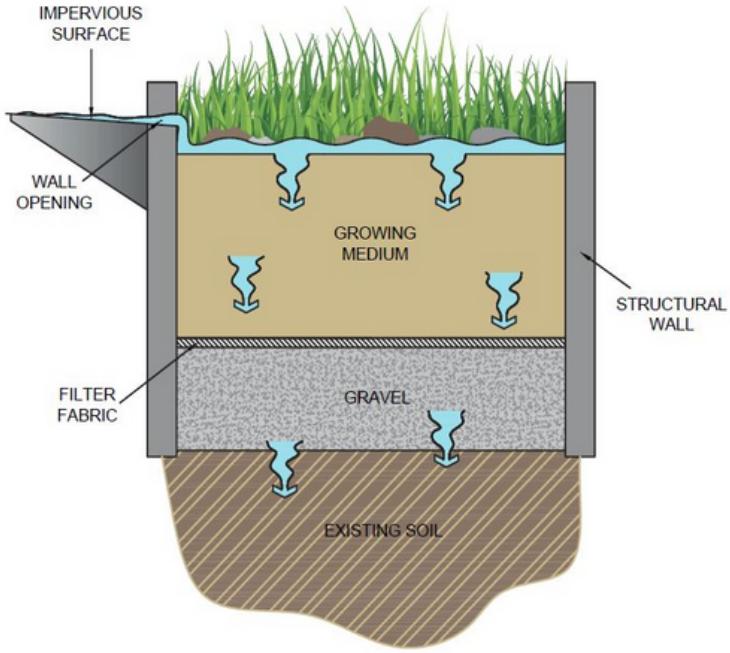
Bioswales are landscape features that can capture and soak up stormwater. Bioswales use a combination of vegetation, stone, engineered soil and an underground pipe to help slow down and soak up stormwater that might otherwise contribute to flooding before entering a stormwater outlet.

An example of a bioswale in Bayside can be found along King Road.



Sand Filters

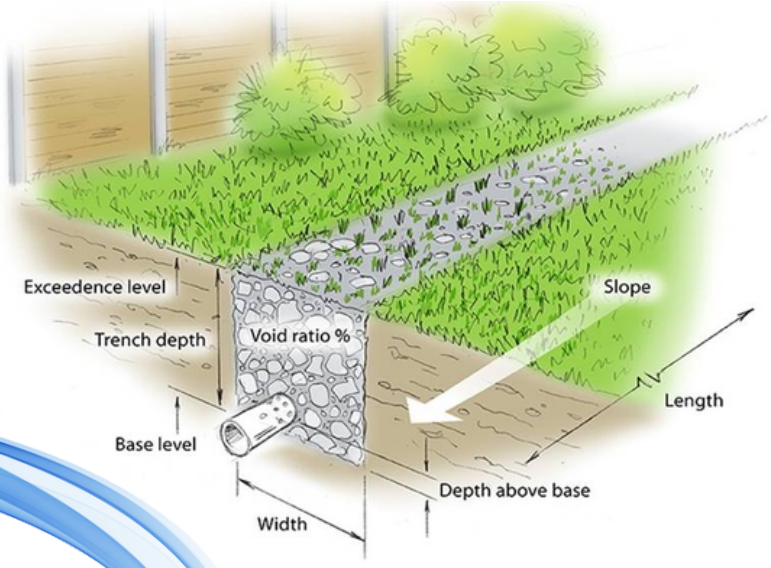
Sand filters are a surface device that percolates stormwater down through a sand media where pollutants are filtered out. Sand filters are capable of removing a wide variety of pollutants in stormwater via settling, filtering, and absorption processes.



Infiltration Trenches

An infiltration trench is an excavated trench filled with stone aggregate used to capture and allow infiltration of stormwater runoff into the surrounding soils from the bottom and sides of the trench.

This is similar to the sand filter, except that the infiltration trench relies on runoff loss through infiltration into the surrounding native soils.



How to Connect

Looking for more information? Contact:

Shane Albers
Department of Public Works
Operations Superintendent
414-206-3921
salbers@baysidewi.gov

Emma Baumgartner
Department of Public Works
Operations Coordinator
414-206-3919
ebaumgartner@baysidewi.gov

Or take a look at our Stormwater Page on our website!

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