

WEST HANTS STORMWATER RESILIENCY TOOLKIT

Understanding Stormwater, Reducing Risks,
and Building Community Resilience



INTRODUCTION TO THE TOOLKIT

Stormwater affects everyone in West Hants Regional Municipality. Every time it rains or snow melts, water moves across rooftops, roads, parking lots, lawns, fields, forests, and other landscapes before eventually making its way into ditches, streams, wetlands, rivers, and municipal drainage infrastructure.

As weather patterns change and communities continue to grow, understanding how stormwater behaves and how flooding can occur is becoming increasingly important. While large-scale flooding can be influenced by factors such as weather events, aging infrastructure, land development, and climate change, there are also actions residents can take to improve resilience on their own properties and within their communities.

No single action can completely prevent flooding. Flooding is influenced by many factors, including rainfall intensity, river levels, drainage infrastructure, local topography, soil conditions, and climate trends.

The goal of this toolkit is not to eliminate flood risk, but to help residents better understand stormwater and identify practical actions that can improve preparedness and resilience.

WHAT IS STORMWATER RESILIENCE?

Stormwater resilience is the ability of individuals, properties, infrastructure, and communities to prepare for, adapt to, and recover from rainfall, flooding, and other water-related impacts.

Building resilience can involve actions such as:

- Understanding how water moves across your property
- Maintaining drainage features
- Preparing for severe weather events
- Reducing runoff where possible
- Protecting homes, property, and important infrastructure
- Supporting healthy waterways and natural drainage systems

Even small actions can help reduce risk and contribute to a more resilient community.

While flooding cannot always be prevented, understanding stormwater and taking practical resilience measures can help reduce impacts, improve preparedness, and support healthier communities and waterways.

WHAT YOU WILL FIND IN THIS TOOLKIT

	Understanding Stormwater	Pg. 4
	• What stormwater is • Groundwater and runoff • Stormwater vs. wastewater	
	Stormwater Management	Pg.6
	• What is stormwater management • Why stormwater management matters	
	Background of West Hants Regional Municipality	Pg. 7
	• The Avon River Watershed • Windsor, Falmouth, Hantsport, and Three Mile Plains • Rural West Hants	
	WHRM Stormwater Infrastructure	Pg. 12
	• Municipal infrastructure • Stormwater management ponds • Combined and separated sewer systems	
	Roles and Responsibilities	Pg. 18
	• Homeowners • West Hants Regional Municipality • Provincial and federal agencies	
	Nature-Based Solutions	Pg. 22
	• Rain gardens • Rain barrels • Rain chains • Bioswales • Naturalized yards	
	What Homeowners Can Do	Pg. 31
	• Improve drainage • Reduce flooding risks • Protect local waterways	
	Flood Preparedness	Pg. 36
	• Emergency planning • Flood safety • Recovery resources	
	Glossary	Pg. 40
	• Key terms and definitions	

WHAT IS STORMWATER?

Stormwater is water that originates from rain, melting snow, or ice. When precipitation falls to the ground, some of it soaks into the soil, some evaporates, and some flows across the surface of the land.

This water flowing across the ground is known as **stormwater runoff**.

Stormwater runoff is a natural part of the water cycle. However, as communities develop and more surfaces become covered by buildings, roads, driveways, and parking lots, less water can soak into the ground. This often results in greater volumes of runoff moving through drainage systems and waterways.

WHEN RAIN FALLS, WATER CAN FOLLOW SEVERAL DIFFERENT PATHWAYS

Some water:

- Soaks into the ground
- Is absorbed by plants
- Evaporates back into the atmosphere

The remaining water may flow across the land as runoff and enter:

- Ditches
- Catch basins
- Storm drains
- Culverts
- Wetlands
- Streams and rivers

Eventually, much of this water reaches larger waterways and continues through the natural watershed.

STORMWATER VS. WASTEWATER

Stormwater

- Comes from rain and snowmelt
- Flows across the landscape
- Enters ditches, streams, wetlands, and storm drainage systems

Wastewater

- Comes from sinks, toilets, showers, washing machines, etc. from households and businesses
- Is collected through sanitary sewer systems or septic systems
- Requires treatment before being released back into the environment

GROUNDWATER

Groundwater is water that has soaked into the ground and is stored within the spaces between soil, sand, gravel, and bedrock.

Groundwater is an important part of the natural water cycle. It can supply wells, feed streams and wetlands, and help maintain water levels during dry periods.

When large amounts of rain fall over a short period of time, groundwater levels can rise. In some cases, flooding may occur even when there is little surface water present because groundwater is pushing upward from below the ground surface.

Groundwater flooding can contribute to:

- Wet basements
- Saturated lawns
- Ponding in low-lying areas
- Increased flow to streams and drainage systems

STORMWATER MANAGEMENT

Stormwater management is the practice of planning, designing, and maintaining systems that help manage rainwater and snowmelt as it moves across the landscape.

Stormwater management strives to reduce overland flows of water from rainfall and snowmelt. It may also include runoff from activities like watering lawns, washing cars, and draining pools.

The goals of stormwater management are to lessen the strain on municipal infrastructure, decrease erosion, mitigate flooding, and improve the quality of water bodies.

WHY IS STORMWATER MANAGEMENT IMPORTANT?

As communities develop, natural landscapes are often replaced by buildings, roads, sidewalks, and parking lots. These impervious surfaces prevent water from soaking into the ground and increase the amount of runoff generated during rain events.

Stormwater management helps balance the needs of growing communities with the protection of natural waterways and ecosystems.

Without effective stormwater management, excess runoff can contribute to:

- Localized flooding
- Erosion of streambanks and ditches
- Damage to roads and infrastructure
- Poor water quality
- Impacts on aquatic and terrestrial wildlife habitats
- Property damage

Stormwater management is becoming increasingly important as communities adapt to changing weather patterns.

Climate change is already increasing the frequency and intensity of extreme rainfall events in many regions, including Nova Scotia, and these trends are expected to continue. When large amounts of rain fall over a short period of time, more stormwater runoff is generated, placing additional pressure on stormwater management infrastructure.

BACKGROUND OF WEST HANTS REGIONAL MUNICIPALITY

West Hants Regional Municipality is shaped by its unique geography, waterways, and natural drainage patterns. The way water moves across the landscape has influenced the region for thousands of years and continues to affect how stormwater is managed today.

The municipality includes a mix of rivers, streams, wetlands, agricultural lands, urban areas, and low-lying coastal environments. These natural features play an important role in how water is stored, conveyed, and drained throughout the municipality.

Some areas within West Hants are naturally low-lying and collect water more easily than higher elevations. During periods of heavy rainfall, rapid snowmelt, or high river levels, these areas may experience:

- Ponding of water
- Reduced drainage capacity
- Overland flooding
- Elevated groundwater levels

Because water naturally flows downhill and seeks the lowest point, low-lying areas are often more susceptible to flooding regardless of nearby stormwater management infrastructure.

THE AVON RIVER WATERSHED

The Avon River is one of the most important water features in West Hants. Originating in the South Mountain region, the river flows northward through the municipality before entering the Minas Basin. Many communities throughout West Hants, including Windsor, Falmouth, Three Mile Plains, Newport, Brooklyn, Martock, and Avondale, are located within the Avon River watershed.

WINDSOR

Windsor is located within the lower Avon River watershed and is heavily influenced by its proximity to the river, surrounding marshlands, and low-lying terrain. The community is developed on land that naturally stores and conveys water, including floodplains, wetlands, and tidal marsh environments that have historically played an important role in regional drainage.

Stormwater within Windsor is managed through a combination of underground storm sewers, combined sewer systems, ditches, culverts, stormwater management ponds, natural drainage channels, and marshland drainage infrastructure.

Windsor contains a mix of residential, commercial, institutional, industrial, agricultural, recreational, and open space land uses.

THREE PRIMARY STORMWATER SHEDS HAVE BEEN IDENTIFIED WITHIN WINDSOR:

DOWNTOWN WINDSOR

The Downtown Windsor area contains a mix of combined and separated sewer and storm infrastructure. Much of the drainage system ultimately conveys flows toward the Avon River.

A significant feature of the downtown area is the Cunnabel Creek floodplain, which serves as a natural collection area for stormwater. The area surrounding Cunnabel Creek is relatively flat and sits at a lower elevation than many surrounding streets. Because water naturally flows toward these lower elevations, the area can act as a collection point for runoff from surrounding neighbourhoods.

TREGOTHIC MARSH

The Tregothic Marsh watershed includes the Tregothic Creek and Wentworth Creek systems. This watershed drains portions of:

- Wentworth Road
- Payzant Drive
- Underwood Drive
- Nesbitt Street
- Tremain Crescent
- Surrounding agricultural lands

Stormwater within this area is conveyed through a combination of natural watercourses, ditches, and limited storm pipe infrastructure before ultimately discharging to the Avon River.

MARTOCK MARSH

The Martock Marsh watershed is primarily rural and agricultural in character.

Drainage within this area relies largely on open ditches and drainage channels that convey water toward the Avon River. Compared to downtown Windsor, there is less underground storm sewer infrastructure and a greater reliance on natural and agricultural drainage systems.

FALMOUTH

The community of Falmouth lies entirely within the Avon River watershed. All stormwater and surface runoff ultimately drain towards to river.

Falmouth contains a mix of residential, commercial, agricultural, and rural land uses. The landscape is characterized by relatively flat low-lying areas near the Avon River and its associated floodplain, as well as gently sloping upland areas that direct runoff toward local watercourses. These topographic conditions play a significant role in how stormwater moves throughout the community and contribute to some of the area's flooding challenges.

Unlike some urban areas where drainage is primarily managed through underground storm sewers, much of Falmouth relies on a network of natural drainage features, roadside ditches, watercourses, culverts, and overland drainage pathways.

One of the most significant drainage features in the community is Elderkin Creek, which conveys runoff from portions of Falmouth toward the Avon River. The creek crosses both Highway 1 and Highway 101 and serves as an important drainage corridor for surrounding lands. Flooding along Elderkin Creek is influenced by a combination of rainfall, Avon River water levels, tidal conditions, and the capacity of the drainage infrastructure along the watercourse.

HANTSPORT

The Community of Hantsport is located along the western shore of mainland Nova Scotia near the estuary of the Avon River and the Minas Basin. Its location adjacent to tidal waters and the lower reaches of the Avon River means that both inland drainage processes and coastal influences affect how stormwater moves through the community.

Several watercourses influence drainage within Hantsport, most notably Willow Brook and the Halfway River. These watercourses receive runoff from developed and undeveloped areas throughout the community before ultimately discharging to the Avon River and Minas Basin.

The community contains a mix of residential, commercial, industrial, and open space areas, with varying elevations across the landscape. While some portions of Hantsport are situated on higher ground, several localized low-lying areas naturally collect stormwater runoff during rainfall events. These topographic conditions contribute to recurring drainage challenges in some parts of the community.

Hantsport contains a mix of combined and separated sewer and storm infrastructure. Much of the area was not originally developed using a modern major/minor drainage system. As a result, portions of the community depend on both underground infrastructure and overland flow routes to manage runoff during heavy rainfall events.

THREE MILE PLAINS

Three Mile Plains is a predominantly rural community characterized by a mix of residential neighbourhoods, agricultural land, forested areas, wetlands, and rural roadways. Unlike more urbanized areas of West Hants, Three Mile Plains does not have a formal piped conveyance storm system and relies heavily on natural drainage processes and roadside infrastructure. Most roads in the community have a typical rural cross section consisting of a crowned paved road surface and roadside drainage ditches designed to collect and convey runoff.

The community lies within the Lebreau Creek Brook watershed, one of the primary drainage systems in the area. Lebreau Creek Brook originates near Newport Station and flows westward through the community before discharging to the Avon River near Martock. Most stormwater generated within Three Mile Plains eventually drains to Lebreau Creek Brook and its tributaries.

RURAL WEST HANTS

The rural areas of West Hants encompass a large and diverse landscape extending from the Minas Basin shoreline and Avon River estuary to the upland forests, lakes, wetlands, and agricultural lands of the South Mountain region. Unlike the more urbanized communities of Windsor, Falmouth, and Hantsport, rural West Hants is characterized by dispersed development, extensive natural drainage systems, and relatively limited engineered stormwater infrastructure.

The region contains a mix of agricultural lands, forests, wetlands, lakes, rivers, coastal environments, rural residential areas, and transportation corridors. Topography varies considerably across the municipality, ranging from low-lying coastal marshes and river valleys to rolling uplands and rugged forested terrain in the South Mountain region.

Several distinct drainage systems and subwatersheds exist throughout rural West Hants, including the St. Croix River watershed, Kennetcook River watershed, Cogmagun River watershed, Herbert River watershed, Lebreau Creek watershed, and numerous smaller coastal watersheds that discharge directly to the Minas Basin. These watersheds drain a variety of land

uses including agricultural fields, managed forests, rural residential developments, and protected natural areas.

Along the northern edge of the municipality, the Minas Basin forms a coastal environment influenced by the Bay of Fundy, home to some of the highest tides in the world. Extensive mudflats, salt marshes, tidal rivers, and dyked agricultural lands characterize this coastal zone. Communities such as Cheverie, Walton, and Burlington are closely tied to this tidal landscape.

In the southern portion of West Hants, elevation increases into the South Mountain uplands. This area is characterized by rugged terrain, shallow soils, exposed bedrock, extensive forests, wetlands, and numerous lakes, including Falls Lake and Armstrong Lake.

WHRM'S STORM SYSTEM

Stormwater is managed throughout West Hants Regional Municipality using a combination of natural drainage features and engineered infrastructure. These systems work together to collect, convey, store, and release stormwater generated by rainfall and snowmelt.

West Hants Regional Municipality designs and maintains stormwater infrastructure in accordance with municipal engineering standards.

Under the Municipal Services Specification Manual:

- Storm sewer systems are generally designed for a 1-in-5-year storm event.
- Commercial and industrial developments typically require storm sewer systems designed for a 1-in-10-year storm event.
- Major drainage systems, including roadways, road cross culverts, and watercourse crossings, are generally designed to convey flows associated with a 1-in-100-year storm event.

ROAD GRADING & CURBS

Roads are designed with slight slopes that direct water away from the travel surface and toward drainage infrastructure.

Without proper grading, water can collect on roadways, creating safety hazards and increasing the risk of flooding.

Purpose

- ✓ Direct stormwater away from roads and developed areas
- ✓ Convey runoff to catch basins, ditches, or drainage channels

DITCHES

A ditch is an open channel dug into the ground. Its primary purpose is to manage the flow of water. Ditches can temporarily store water and slow runoff during rainfall events.

Ditches along roads often have vegetation in them. This plant life slows down the water, allowing a portion of it to soak into the soil. Fine sediments often associated with pollutants

filters out as subsurface water moves through a mesh of plant roots. Those plants roots take up water, helping to reduce the volume of run off after a storm. Vegetation should only be removed if it is obstructing flow that may lead to property or roadway damage.

Purpose

- ✓ Collect and convey stormwater
- ✓ Provide temporary storage during rainfall events
- ✓ Reduce pressure on underground infrastructure

SWALES

Swales are wide, shallow, and flat-bottomed with gentle, gradual slopes. They are covered with vegetation, mulch, or grass. A swale acts as a sponge to catch, hold, filter, and sink rainwater into the soil to recharge groundwater and feed plant roots.

Swales can be found alongside roads, within subdivisions, or as part of landscaped stormwater management features.

Purpose

- ✓ Convey stormwater
- ✓ Slow runoff
- ✓ Promote infiltration
- ✓ Reduce erosion

CATCH BASINS

Catch basins, also referred to as storm drains, are grate-covered openings that collect runoff and channel it into the underground pipe network. Catch basins also include a sump below the grate that helps trap sediment and debris before it enters storm pipes.

If you have a catch basin on or near your property ensure that grass, leaves or any other obstructions are cleaned away.

Purpose

- ✓ Collect runoff from roads and paved areas
- ✓ Remove some sediment and debris
- ✓ Direct water into the storm sewer system

STORM PIPES & MANHOLES

Storm pipes are underground pipes that carry stormwater runoff collected from catch basins. These pipes transport water through the municipal stormwater network and eventually discharge it to ditches, streams, wetlands, rivers, retention ponds, or other receiving water bodies.

Purpose

- ✓ Convey stormwater underground
- ✓ Move runoff away from roads and developed areas
- ✓ Connect different components of the stormwater system

STORM MANHOLES

Manholes are access structures located throughout the underground storm sewer system. They allow municipal staff to inspect, clean, maintain, and repair storm pipes. Manholes are typically located where pipes change direction, elevation, or size.

CULVERTS

Culverts are structures that allow water to flow beneath roads, driveways, railways, and other crossings. They help maintain natural drainage paths while allowing transportation infrastructure to safely cross streams, ditches, and drainage channels.

DRIVEWAY CULVERT

A driveway culvert is a pipe underneath a driveway entrance that allows water to continue flowing through the roadside ditch without flooding the road or washing away driveway access.

ROADWAY CULVERT

Road cross culverts convey safely channel surface water, streams, or runoff from one side of the roadway to the other, preventing flooding, erosion, and structural damage to the road. Roadway culverts often discharge into ditches or swales.

Purpose

- ✓ Convey water beneath driveways or roadways
- ✓ Reduce overland flooding
- ✓ Protect transportation infrastructure

STORMWATER MANAGEMENT PONDS

Stormwater management ponds are designed to store stormwater and release it at a controlled rate. These ponds help reduce peak flows, manage runoff from development, and reduce the risk of downstream flooding. They are also designed to limit post-development runoff rates to levels equal to or lesser than pre-development conditions.

DETENTION PONDS

Detention ponds are designed to temporarily store stormwater during and after rainfall events. They are typically dry between storms or contain only a small amount of water. Detention ponds release stormwater gradually to reduce peak flows and reduce pressure on infrastructure.

RETENTION PONDS

Retention ponds are designed to permanently hold water. These ponds have inlet and outlet pipes that help stormwater move the drainage systems into the pond. The inlets let large amounts of water enter the pond, and the outlets let out small quantities of water as needed to maintain the correct water level.

Purpose

- ✓ Store water
- ✓ Reduce downstream runoff impacts
- ✓ Provide flood storage during storm events

COMBINED VS SEPARATED SEWER SYSTEMS

West Hants Regional Municipality operates both combined sewer systems and separated sewer systems. The type of system present depends largely on when and where the infrastructure was constructed.

As infrastructure is renewed and upgraded, opportunities may arise to separate older combined systems and improve overall stormwater management capacity.

SEPARATED SEWER SYSTEMS

A separated sewer system consists of two independent pipe networks:

SANITARY SEWER

A sanitary sewer collects wastewater from homes, businesses, and institutions, including:

- Toilets
- Sinks
- Showers and bathtubs
- Washing machines
- Dishwashers

From the Municipal Sewer Bylaw:

Sanitary Sewer means a sewer that collects and carries liquid and water-carried wastes, such as toilet waste and household wastewater, and is not designed to take in stormwater, surface water, or groundwater.

Sanitary sewage is conveyed to a wastewater treatment facility before being released back into the environment.

STORM SEWER

A storm sewer is a separate system that collects and conveys runoff from rainfall and snowmelt.

Stormwater enters this system through:

- Catch basins
- Ditches
- Swales
- Culverts

From the Municipal Sewer Bylaw:

Storm Sewer means a sewer and its related structures designed solely to collect and carry uncontaminated water, stormwater, surface drainage, or water flowing from land or watercourses, including ditches and culverts under Municipal jurisdiction.

Stormwater is typically discharged to streams, rivers, wetlands, ponds, or other natural drainage systems. Unlike wastewater, stormwater generally does not receive treatment before being released.

COMBINED SEWER SYSTEMS

Some areas of West Hants contain combined sewer systems.

From the Municipal Sewer Bylaw:

Combined Sewer means a sewer intended to function simultaneously as a storm sewer and sanitary sewer.

In a combined system, a single pipe carries both:

- Sanitary wastewater from homes and buildings
- Stormwater runoff from roads and catch basins

During dry weather, the system primarily carries wastewater. During rainstorms, stormwater runoff also enters the same pipe network. Because both types of water share the same infrastructure, heavy rainfall can significantly increase the amount of water moving through the system. All water moving through a combined system is conveyed to a wastewater treatment plant before being discharged.

COMBINED SEWER OVERFLOWS

Some of WHRM's infrastructure, like many older North American municipalities, was designed as a combined sewer system where sewage and stormwater flow through the same pipes. The climate was more predictable when the combined sewer systems were designed to carry all contents (rain, melted snow, and sewage) to a wastewater treatment plant for full treatment, and most of the time, they still function effectively. Rarely, during prolonged periods of intense rainfall or power outage, the volume of stormwater entering these combined sewers exceeds the system's capacity and can trigger diluted overflows at emergency fallout locations. It is a long-term endeavour to reduce excess stormwater by methods like diverting, adding capacity, adding storage, identifying extraneous flows, and gradually separating stormwater and sewer systems.

ROLES & RESPONSIBILITIES

WEST HANTS REGIONAL MUNICIPALITY

West Hants Regional Municipality is responsible for the maintenance and upkeep of transportation systems that are owned by the Municipality, while the remaining roads and sidewalks are managed by the province (Nova Scotia Public Works). If you have any questions or concerns about Provincial-owned transportation systems, please contact NS Public Works at dpw-cc@novascotia.ca or call 1-844-696-7737.

Responsibility for roads varies across West Hants.

WINDSOR

West Hants Regional Municipality owns and maintains all roads and sidewalks within Windsor.

HANTSPORT

West Hants Regional Municipality owns and maintains all roads and sidewalks within Hantsport.

Note: Tannery Road, Bog Road, and Bishopville Road are shared between West Hants Regional Municipality and Nova Scotia Public Works.

FALMOUTH

Road ownership is split between West Hants Regional Municipality and Nova Scotia Public Works.

West Hants Regional Municipality owns:

- Linden Court
- Mountain View Drive
- Southview Court
- Julie Court
- Jocelyn Lee Court
- Halewood Drive
- Clover Lane
- Thistle Street
- Goldenrod Court

- Short Drive
- Shetland Road
- Fundy Court
- Station Lane

THREE MILE PLAINS

Road ownership is split between West Hants Regional Municipality and Nova Scotia Public Works.

West Hants Regional Municipality owns:

- The Crossing
- Bailey Drive
- Jared Court
- A portion of Underwood Road
- Kingston Court
- Alexander Drive
- Swinamer Drive
- Katie Court

Remaining roads are managed by Nova Scotia Public Works.

RURAL AREAS

Outside of these communities, roads within West Hants Regional Municipality are owned and maintained by Nova Scotia Public Works, or private contracting.

*A map of municipally owned roads is available on the West Hants Regional Municipality website under the Public Works department.

HOMEOWNERS AND PROPERTY OWNERS

Property owners play an important role in managing stormwater on private property.

Homeowner responsibilities may include:

- Maintaining roof drainage systems
- Maintaining gutter and downspouts
- Private drainage features
- Managing runoff on their property
- Maintaining private swales
- Keeping drainage pathways clear

Catch Basins Near Your Property

Residents can help reduce localized flooding by ensuring debris such as leaves, grass clippings, and litter do not block nearby catch basins.

Damaged or blocked infrastructure should be reported to the Municipality.

Driveway Culverts

Property owners are generally responsible for maintaining driveway culverts associated with their property.

This includes:

- Keeping culverts free of debris and obstructions
- Maintaining rip rap or erosion protection at culvert ends
- Maintaining side slopes around the culvert
- Ensuring grading does not direct water onto the roadway

Proper maintenance helps ensure water can continue flowing through roadside drainage systems and reduces the risk of flooding or road damage.

PROVINCE/FEDERAL AGENCIES

Several provincial agencies have responsibilities related to stormwater management and environmental protection.

These responsibilities may include:

- Protection of wetlands and watercourses
- Environmental regulations and permitting
- Watershed management
- Flood mapping and planning
- Emergency management support
- Climate adaptation initiatives

Examples include:

- Nova Scotia Environment and Climate Change
- Nova Scotia Emergency Management Office
- Nova Scotia Public Works

If you have questions or concerns regarding provincially owned roads, drainage systems, or roadside infrastructure, please contact:

Nova Scotia Public Works

 dpw-cc@novascotia.ca

 1-844-696-7737

The federal government is responsible for certain aspects of environmental protection, natural resources, and emergency management that extend beyond municipal or provincial boundaries.

Responsibilities may include:

- Fisheries and fish habitat protection
- Flood and weather monitoring
- Environmental protection
- Climate science and forecasting
- Emergency management support

Examples include:

- Environment and Climate Change Canada
- Fisheries and Oceans Canada
- Public Safety Canada

NATURE-BASED SOLUTIONS

Nature-based solutions are approaches that use natural processes to help manage stormwater. Rather than relying entirely on pipes and engineered infrastructure, these practices help slow, store, filter, and absorb water where it falls.

On private properties, nature-based solutions can help:

- Reduce stormwater runoff
- Improve drainage
- Increase groundwater recharge
- Reduce erosion
- Improve water quality
- Increase resilience to heavy rainfall events

RAIN GARDEN

A rain garden is a shallow, depressed garden that uses mulch, soil, and deep-rooted plants to capture, absorb, and infiltrate stormwater runoff.

Rain gardens are designed to temporarily collect water from surfaces such as roofs, driveways, patios, and walkways and allow it to slowly soak into the ground. They can be incorporated into both small residential properties and larger landscapes.

Rain gardens are one of the most effective property-level stormwater management practices because they help restore some of the natural infiltration that is lost when land is developed.

Benefits:

- ✓ Capture runoff close to where it falls
- ✓ Reduce the volume of stormwater entering drainage systems
- ✓ Promote infiltration into the ground
- ✓ Filter sediment and pollutants from runoff
- ✓ Provides wildlife habitat
- ✓ Generally low maintenance
- ✓ Adds beauty

DID YOU KNOW?

COMPARED TO A PATCH OF LAWN, A RAIN GARDEN ALLOWS APPROXIMATELY 30% MORE WATER TO SOAK INTO THE GROUND.

WHY CHOOSE NATIVE PLANTS?

Native plants are strongly recommended for rain gardens.

Rain garden plants must be able to tolerate both wet conditions after storms and dry conditions between rainfall events.

Consider using a mix of:

- Native grasses
- Wildflowers
- Perennials
- Shrubs

A diverse plant selection will promote healthy growth and improve habitat value.

LOCATIONS TO AVOID:

- ✗ Within 3 metres of a home or garage foundation
- ✗ Within 4 metres of a septic bed
- ✗ Within 15 metres of a steep slope
- ✗ In areas with consistently poor drainage

Selecting an appropriate location is important to ensure the garden functions properly and does not create drainage issues elsewhere on the property.

MAINTENANCE

Rain gardens require the most attention during their first two years as plants become established.

During establishment:

- Water during dry periods
- Remove unwanted weeds as needed
- Monitor plant health and growth

Once established:

- Occasional weeding
- Removing dead vegetation if desired
- Thinning plants when they become overcrowded

Watering Tips

- ✓ Water deeply but infrequently
- ✓ Water in the morning or evening
- ✓ Allow plants to develop deep root systems
- ✗ Avoid overwatering
- ✗ Do not apply fertilizer

Rain gardens are designed to function naturally and generally do not require fertilizer to thrive.

RAIN BARREL

Rain barrels are an efficient way to collect rainwater for reuse around your property.

During the summer months, a significant portion of household water use occurs outdoors for activities such as watering lawns, gardens, flower beds, hanging baskets, and potted plants. Collecting rainwater can help reduce the demand on treated drinking water while making use of a free natural resource.

Installing a rain barrel at the bottom of a downspout is the most common form of rainwater harvesting. As rain falls on your roof, water is directed through gutters and downspouts into the barrel, where it is stored until needed.

Benefits:

- ✓ Reduces stormwater runoff from rooftops
- ✓ Conserves treated drinking water
- ✓ Provides a water source during dry periods
- ✓ Low-cost and easy to install
- ✓ Helps reduce pressure on municipal drainage systems
- ✓ Can lower outdoor water use during the growing season

INSTALLATION TIPS

- Install the rain barrel beneath a downspout
- Place the barrel on a stable, level surface
- Direct overflow away from building foundations
- Consider using multiple barrels if you have several downspouts
- Install a screen to help keep out leaves, debris, and insects
- Position barrels close to gardens or landscaped areas whenever possible

THINGS TO KEEP IN MIND

- Rain barrels are intended for outdoor, non-potable uses only
- Stored rainwater should not be used for drinking, cooking, or food preparation unless it has been properly treated
- A full rain barrel can become heavy, so ensure it is placed on a secure surface
- During large storms, a rain barrel may fill quickly, so an overflow outlet is important

Rain barrels are one of the simplest stormwater resilience measures homeowners can adopt. By capturing rainwater from rooftops, they help reduce runoff, conserve water, and provide a convenient source of water for gardens and landscaping throughout the growing season.



RAIN CHAIN

Rain chains are a decorative and functional alternative to traditional downspouts that help control the flow of water from your eavestrough to the ground.

Typically installed in place of, or in addition to, a traditional downspout, rain chains consist of a series of links, cups, or decorative elements that guide water downward. As rainwater collects in the gutter, it flows onto the rain chain and follows the chain to the ground, using gravity and surface tension to create a controlled flow.

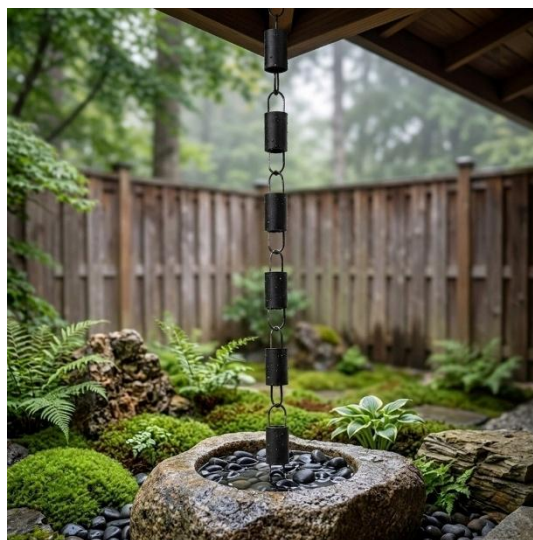
Rain chains work especially well when combined with other nature-based stormwater solutions, such as:

- Rain gardens
- Rain barrels
- Infiltration areas
- Naturalized landscaping

These features help ensure water is safely absorbed, stored, or conveyed after leaving the rain chain.

Benefits:

- ✓ Attractive and visually appealing
- ✓ Easy to install
- ✓ Relatively inexpensive
- ✓ Less prone to clogging than enclosed downspouts
- ✓ Creates calming waterfall-like sounds during rain events
- ✓ Can direct runoff to landscaped areas
- ✓ Helps connect roof runoff to other stormwater management features



BIOSWALE

A bioswale, also known as a vegetated swale, is a shallow channel designed to collect, slow, and convey stormwater while allowing water to soak into the ground.

Unlike a conventional drainage ditch that primarily moves water away as quickly as possible, a bioswale uses vegetation, soil, and gentle slopes to slow runoff, promote infiltration, and filter pollutants before water enters nearby drainage systems or waterways.

Benefits:

- ✓ Slows stormwater flow
- ✓ Improves infiltration
- ✓ Reduces erosion
- ✓ Improves water quality
- ✓ Provides aesthetic and environmental benefits
- ✓ Reduces runoff volume

HOW BIOSWALES WORK

When rain falls, stormwater enters the bioswale and is temporarily stored within the shallow channel.

As the water moves through the swale:

- Vegetation slows the flow of water
- Sediment and debris settle out
- Some pollutants are filtered by the plants and soil
- Water is absorbed into the ground through infiltration
- Excess water is safely conveyed downstream

By slowing water and allowing infiltration, bioswales help mimic the way water naturally moves through undeveloped landscapes.

MAINTENANCE

Bioswales are generally low maintenance once established.

Typical maintenance may include:

- Removal of accumulated sediment or debris
- Occasional weeding
- Pruning or thinning vegetation as needed
- Monitoring for erosion or standing water
- Replacing plants if necessary



NATURALIZED YARDS

Naturalized landscapes replace highly managed lawn areas with native plants, shrubs, trees, pollinator gardens, or meadow vegetation.

While traditional lawns can provide some infiltration, naturalized areas are often much more effective at absorbing rainfall due to their healthier soils and deeper root systems. These roots create pathways for water to move into the ground, helping to reduce runoff and improve soil health.

Naturalized yards can be adapted to properties of all sizes, whether it is a small pollinator garden, a naturalized property edge, or a larger meadow area.

Benefits:

- ✓ Increases infiltration
- ✓ Reduces runoff
- ✓ Supports pollinators
- ✓ Improves biodiversity
- ✓ Requires less watering and maintenance

EXAMPLES OF NATURALIZED LANDSCAPES

Naturalized areas can take many forms, including:

❖ **Pollinator Gardens**

Gardens planted with native flowering species that provide nectar and habitat for bees, butterflies, and other pollinators.

❖ **Native Plant Gardens**

Landscaped areas featuring plants that naturally occur in Nova Scotia and are well adapted to local conditions.

❖ **Meadow Gardens**

Areas planted with native grasses and wildflowers that create diverse habitat while reducing maintenance requirements.

❖ **Naturalized Property Edges**

Allowing the edges of a property to grow more naturally with native trees, shrubs, and groundcover can improve infiltration and provide wildlife habitat.

❖ **Tree and Shrub Plantings**

Trees and shrubs intercept rainfall and help absorb water through extensive root systems.

MAINTENANCE

One common misconception is that naturalized landscapes are completely maintenance-free. While they typically require less maintenance than traditional lawns, some management is still beneficial.

During Establishment

- Water during dry periods
- Remove invasive species
- Monitor plant growth

Long-Term Maintenance

- Occasional weeding
- Seasonal pruning if desired
- Removal of invasive plants
- Managing plant density where necessary

Over time, many naturalized landscapes become relatively self-sustaining and require less mowing, watering, and fertilizing than conventional turf grass.

Things to Avoid

- ✗ Applying excessive fertilizer
- ✗ Removing all natural leaf litter
- ✗ Planting invasive species
- ✗ Overwatering established native plants

NATIVE VEGETATION

Native vegetation is vegetation that naturally grows in the ecosystem on which it is planted.

Native vegetation is recommended for rain gardens, bioswales, and naturalized yards, as native plants are well adapted to local conditions and often have deeper root systems.

The deep root systems help:

- Absorb more stormwater than traditional turf grass
- Improve soil structure
- Increase infiltration
- Support pollinators and local wildlife

Examples include:

- Blue-joint Reedgrass
- Late Lowbush Blueberry
- Coastal Sweet Pepperbush
- Canada Cinquefoil
- Lupin
- Purple-stemmed Aster
- Canada Lily
- Fringed Yellow Loosestrife

For more information on what plants are native to West Hants, links to the New Brunswick and Nova Scotia Grow Me Instead Guide and the Natural Edge plant database are provided below:

https://nsinvasives.ca/wp-content/uploads/2023/07/CCIS-NSISC-Grow-Me-Instead-Guide_2023_EN_web.pdf

<https://naturaledge.watersheds.ca/plant-database/>

FURTHER ACTION FOR HOMEOWNERS

While municipalities maintain public stormwater infrastructure, there are many practical actions that homeowners can take to manage stormwater and create more flood-resilient properties. Residents also play an important role in helping to protect local waterways.

The following actions can help reduce runoff, improve drainage, protect your home, and support healthier streams, wetlands, and rivers.

IMPROVE PROPERTY GRADING

Property grading refers to the slope of the land around your home.

Ideally, the ground should slope away from the foundation so water drains away from the building rather than collecting around it.

Poor grading can contribute to:

- Basement flooding
- Water seepage
- Foundation damage
- Standing water around the home

Tips

- ✓ Ensure soil slopes away from foundations
- ✓ Monitor areas where water regularly collects
- ✓ Repair settled areas that trap water

REDIRECT YOUR DOWNSPOUT

Downspouts should direct roof runoff away from your home's foundation.

If downspouts are discharged too close to the house, water may collect around the foundation and increase the risk of water intrusion.

Tips

- ✓ Extend downspouts away from the house
- ✓ Direct runoff toward lawns, rain gardens, or other infiltration areas
- ✓ Avoid directing water onto neighbouring properties
- ✓ Ensure runoff does not create drainage issues for sidewalks or roadways

INSTALL A BACKWATER VALVE

A backwater valve is a device installed on a sanitary sewer service connection that helps prevent wastewater from flowing back into a home during sewer surcharging events.

Benefits

- ✓ Provides protection against sewer backups
- ✓ Can reduce flood damage risks
- ✓ Adds an extra layer of resilience for some homes

SUMP PUMP

A sump pump removes water that collects in a sump pit, typically located in a basement. When groundwater levels rise during wet periods, a sump pump can help reduce the risk of basement flooding.

Under section 5.3(e) of the Municipal Sewer Bylaw, sump pumps, rain gutters, and heat exchangers must not be connected to any municipal system.

Tips

- ✓ Test the pump regularly
- ✓ Check discharge lines for blockages
- ✓ Consider battery backup systems where appropriate
- ✓ Ensure discharge does not create drainage problems on neighbouring properties

INSTALL A FRENCH DRAIN

A French drain is a gravel-filled trench containing a perforated pipe that collects and redirects water away from problem areas.

French drains can help address:

- Wet yards
- Localized drainage problems
- Water accumulation near foundations

Benefits

- ✓ Improves drainage
- ✓ Reduces standing water
- ✓ Helps manage groundwater and runoff

CONSIDER PERMEABLE SURFACES

A permeable surface is a material that allows water to pass through it and soak into the ground, rather than running off across the surface.

Traditional hard surfaces such as asphalt, concrete, and tightly packed paving stones are considered impervious surfaces because they prevent water from infiltrating into the soil. When rainfall cannot soak into the ground, it becomes stormwater runoff that must be managed by ditches, catch basins, storm sewers, and waterways. By allowing water to infiltrate naturally, permeable surfaces help restore some of the natural water cycle and reduce the amount of runoff entering stormwater systems.

Permeable surfaces can be incorporated into many areas around the home, including driveways, walkways, patios, and garden paths. Common materials include gravel, permeable pavers, porous asphalt, open-joint stone, and permeable concrete.

Benefits

- ✓ Reduces runoff
- ✓ Improves infiltration
- ✓ Reduces ponding
- ✓ Mimics natural drainage patterns

KEEP GUTTERS AND EAVESTROUGHS CLEAR

Leaves, sticks, and other debris can block gutters and downspouts.

Blocked gutters can cause water to overflow and may direct water toward foundations rather than away from the home.

Tips

- ✓ Inspect gutters regularly
- ✓ Remove leaves and debris
- ✓ Check downspouts after storms
- ✓ Repair damaged sections as needed

HELP PROTECT LOCAL WATERWAYS

Stormwater flows directly into ditches, streams, wetlands, rivers, and other natural waterways. Simple everyday actions can help reduce pollution and improve water quality.

PICK UP AFTER PETS

Pet waste contains bacteria and nutrients that can be washed into storm drains, streams, and rivers during rainfall events.

Benefits

- ✓ Protects water quality
- ✓ Reduces bacteria entering waterways
- ✓ Helps keep parks and public spaces clean

PROPERLY DISPOSE OF LITTER

Litter can block catch basins, reduce drainage capacity, and contribute to pollution in local waterways. Wind and stormwater runoff can carry litter long distances through the drainage system.

Tips

- ✓ Secure garbage and recycling materials
- ✓ Pick up litter when possible
- ✓ Never dispose of waste in ditches, streams, wetlands, or catch basins

WASH YOUR VEHICLE RESPONSIBLY

When vehicles are washed on driveways, roads, or other impermeable surfaces, runoff can flow into nearby catch basins and storm drains. Soap, dirt, oil, and other contaminants can then be carried into local waterways.

Washing your vehicle on a lawn or other permeable surface allows water to soak into the ground, reducing runoff and helping the soil filter some pollutants.

Tips

- ✓ Wash vehicles on grass or other permeable surfaces when possible
- ✓ Use biodegradable, phosphate-free, and chlorine-free soaps
- ✓ Use a commercial car wash when possible
- ✓ Use a water-saving hose nozzle
- ✓ Use a bucket instead of continuously running water
- ✓ Use rain barrel water or other appropriate non-potable water sources where possible
- ✓ Minimize water use whenever possible

ONLY RAIN DOWN THE DRAIN

Storm drains are designed to carry rainwater and snowmelt. Anything placed on roads, driveways, or into catch basins may eventually reach local streams, rivers, wetlands, and the Minas Basin.

Help protect waterways by properly disposing of waste, picking up pet waste, minimizing fertilizer use, and preventing chemicals or litter from entering storm drains.

FLOODING AND EMERGENCY RESOURCES

The information in this section is intended to help residents prepare for, respond to, and recover from flood emergencies safely and effectively. While every emergency is different, taking steps to prepare in advance can help reduce risks to people, property, and pets.

The preparedness, flood safety, and recovery guidance presented in this section has been adapted from resources developed by the Government of Canada, including Get Prepared Canada and Public Safety Canada emergency preparedness materials. Residents are encouraged to consult these resources regularly for the most current information and guidance.

BEFORE A FLOOD: PLANNING AHEAD

Flood preparedness is an important part of adapting to climate change in Canada. Understanding your flood risk and preparing in advance can help keep you and your family safe during a flood event.

PREPARE AN EMERGENCY KIT

Have enough supplies to support everyone in your household for at least 72 hours. Your emergency kit should include:

- Food and water
- Medical and first aid supplies
- Necessary medications
- Identification and important documents for each family member
- Flashlight with spare batteries
- Battery-powered radio
- Spare clothing
- Blankets

CREATE A FAMILY EMERGENCY PLAN

Your family may not be together when an emergency occurs. Plan how you will contact one another and decide where you will meet if you become separated. Discuss what to do in different emergency situations.

Consider the needs of all household members, including older adults, children, pets, and individuals with medical or accessibility needs. Keep your emergency plan in an easy-to-find location.

PREPARE YOUR HOME

- If you have a basement, seal windows and doors and install a sump pump if possible. Ensure the sump pump is **not connected to the municipal sewer system**.
- Move important documents, valuables, electrical appliances, and other belongings to higher levels.
- Document and photograph your property and belongings for insurance purposes.
- Clear rain gutters, downspouts, and storm drains.
- Ensure nearby drains are free of debris.
- If flooding is imminent and it is safe to do so, shut off power to your home.
- Remove hazardous materials such as pesticides and insecticides from areas that may be affected by flooding to help prevent contamination.

DURING A FLOOD

- Be prepared to evacuate.
- Monitor weather updates, news reports, and instructions from local authorities.
- Do not attempt to shut off electricity if water is present.
- Do not operate generators in flooded areas.

IF YOU NEED TO EVACUATE

- Leave your home when advised by emergency officials.
- If time permits, leave a note indicating when you left and where you are going.
- Follow designated evacuation routes and avoid shortcuts.
- Do not return home until authorities have declared it safe.
- Remember to bring your emergency kit.

STAY AWAY FROM FLOODWATERS

Floodwaters can be dangerous and unpredictable. Even shallow-looking water can be deadly.

- Avoid crossing flooded areas.
- If you are on foot, fast-moving water can sweep you away, even at shallow depths.
- Never drive through floodwaters or flooded underpasses. Water may be deeper than it appears, and vehicles can be swept away.
- Avoid crossing bridges when water is close to or touching the underside of the bridge and moving quickly.

AFTER A FLOOD

Do not return home until local authorities have advised that it is safe to do so.

Use extreme caution when re-entering your property. Flood-damaged buildings may have structural damage and other hidden hazards.

BEFORE MOVING BACK IN ENSURE:

- Your water supply has been inspected and declared safe for use.
- All affected rooms have been cleaned, disinfected, and thoroughly dried.
- All dishes, utensils, and glassware have been washed and disinfected.
- Adequate toilet facilities are available.

BE CAUTIOUS OF

- Using electrical systems and appliances before they have been inspected by a qualified professional.
- Hazards inside and outside your home.
- Food, medications, cosmetics, and toiletries that may have come into contact with floodwater.

Dispose of any perishable food, medications, cosmetics, or toiletries exposed to floodwater.

CLEANUP TIPS

- If possible, begin cleanup within 48 hours to reduce the risk of mould growth.
- Add approximately two litres of chlorine bleach to standing water, where appropriate and safe to do so.
- Gather supplies such as gloves, masks, pails, mops, chlorine bleach, and dish detergent.
- Discard flood-damaged insulation, mattresses, box springs, stuffed toys, pillows, and furniture coverings.

Looking After Your Well-Being

It is normal to experience a range of difficult or conflicting emotions after a stressful event. Take time to check in with yourself and your loved ones. Reach out to trusted friends, family members, community supports, or mental health professionals if you need support.

HELPFUL RESOURCES

Emergency Info Nova Scotia
Nova Scotia Department of Emergency Management
NS Alert App
Environment Canada Weather Alerts
511 Nova Scotia
Insurance Bureau of Canada (IBC) Flood Resources

Government of Canada – Get Prepared

<https://www.getprepared.gc.ca/cnt/kts/bsc-kt-en.aspx>

Government of Canada – Flood Risk Info

<https://www.canada.ca/en/campaign/flood-ready.html>

Province of Nova Scotia - Flooding Safety Tips

<https://novascotia.ca/emergency-education/docs/floods-en.pdf>

Province of Nova Scotia – Preparing for an Emergency

<https://emergencyinfo.novascotia.ca/preparing-for-an-emergency>

Floodsmart Canada

<https://floodsmartcanada.ca/>

Intact Centre on Climate Adaptation » Climate-Ready Guides

<https://www.intactcentreclimateadaptation.ca/climate-ready-infographics/>

Red Cross Flood Recovery Guide

[https://cdn.redcross.ca/prodmedia/crc/documents/What-We-Do/Emergencies-and-Disasters-CDN/Flood Recovery Guide 2018 SCREEN.pdf?_gl=1*6tm57h*_gcl_au*OTM2ODYyMiI5LjE3NTEzMTAzNzg.*_ga*MTM2MDI5Mjg4NC4xNzUxMzEwMzc5*_ga_376D8LHM0R*cze3NTEzMTAzNzgkbzEkZzAkdDE3NTEzMTAzNzgkajYwJGwwJGgyOTg5NjgwMzU.*_fplc*NDILZERSdyUyQkEIMkZNdEJNVHpQNfNndiUyRnhxeHVxMHkzNzdaMExRNDkIMkZtejQ1eEJpQmFmb1Fqb1pPaW5uaEd6VzhES2pyU245VfJUm04ekRrWDkzUzRoZVBaczFqbU1ycUhFNIVLYVlIMjByUURHZTdXTG9HVTEIMkZJT2Q3SVJpUSUzRCUzRA..](https://cdn.redcross.ca/prodmedia/crc/documents/What-We-Do/Emergencies-and-Disasters-CDN/Flood_Recovery_Guide_2018_SCREEN.pdf?_gl=1*6tm57h*_gcl_au*OTM2ODYyMiI5LjE3NTEzMTAzNzg.*_ga*MTM2MDI5Mjg4NC4xNzUxMzEwMzc5*_ga_376D8LHM0R*cze3NTEzMTAzNzgkbzEkZzAkdDE3NTEzMTAzNzgkajYwJGwwJGgyOTg5NjgwMzU.*_fplc*NDILZERSdyUyQkEIMkZNdEJNVHpQNfNndiUyRnhxeHVxMHkzNzdaMExRNDkIMkZtejQ1eEJpQmFmb1Fqb1pPaW5uaEd6VzhES2pyU245VfJUm04ekRrWDkzUzRoZVBaczFqbU1ycUhFNIVLYVlIMjByUURHZTdXTG9HVTEIMkZJT2Q3SVJpUSUzRCUzRA..)

****CALL 911 IMMEDIATELY FOR POLICE, FIRE, OR MEDICAL EMERGENCIES REQUIRING URGENT ASSISTANCE***

GLOSSARY: HELPFUL STORMWATER-RELATED DEFINITIONS

Term	Definition
Detention Pond	Detention ponds are designed to temporarily store stormwater during and after rainfall events.
Erosion	Erosion is the geological process in which earthen materials are worn away and transported by natural forces such as wind or water.
Flash Flood	A flood caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours.
Floodplain	An area of flat land near a stream or river that is often flooded when the river becomes too full.
Flood	An overflow of water onto normally dry land. Flooding is a longer term event than flash flooding: it may last days or weeks.
Groundwater	Groundwater is water that has soaked into the ground and is stored within the spaces between soil, sand, gravel, and bedrock.
Impervious	An impervious surface is any solid area—such as roads, parking lots, roofs, and sidewalks—that prevents precipitation and stormwater from soaking into the ground. Instead of infiltrating the soil, water runs off these surfaces.
Infiltration	Infiltration is the process of rainwater or surface water soaking down into the soil and filtering through rock layers.
Marshland	A marsh or marshland is a type of wetland. Marshland is low-lying, wet land covered by soft, muddy soil and grassy plants.
Resilience	Resilience refers to the ability to survive and recover from disruptions and function well again. *Resilience in terms of stormwater is the ability to prepare for, withstand, and recover from flooding or severe weather events
Retention Pond	Retention ponds are designed to permanently hold water. These ponds have inlet and outlet pipes that help stormwater move the drainage systems into the pond. The inlets let large amounts of water enter the pond, and the outlets let out small quantities of water as needed to maintain the correct water level.
Rip Rap	Rip rap is a layer of rocks or stones placed over soil to help slow water and prevent erosion. Rip rap is often found in ditches as well as along shores and coastlines.
Runoff	Water flowing across the ground surface.

Stormwater	Stormwater is any water that originates from rain, melting snow, or ice.
Stormwater Management	Stormwater management is the practice of planning, designing, and maintaining systems that help manage rainwater and snowmelt as it moves across the landscape.
Stormwater Management Pond	Stormwater management ponds are designed to store stormwater and release it at a controlled rate.
Wastewater	Municipal wastewater refers to used water from homes, businesses, industries, and institutions that drain into sewers. It contains sanitary sewage and is sometimes combined with stormwater from rain or melting snow draining off rooftops, lawns, parking lots and roads. Municipal wastewater can contain human and other organic waste, nutrients, pathogens, microorganisms, suspended solids and household and industrial chemicals.
Watercourse	A watercourse is a natural or man-made channel through which water flows. It includes flowing surface water features like rivers, streams, brooks, and creeks, as well as artificial channels, ditches, and underground drainage culverts.
Watershed	A watershed is an area of land where all the rain and melting snow drain downhill into the same place, like a stream, river, lake, or ocean.
Wetlands	Wetlands are areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year.