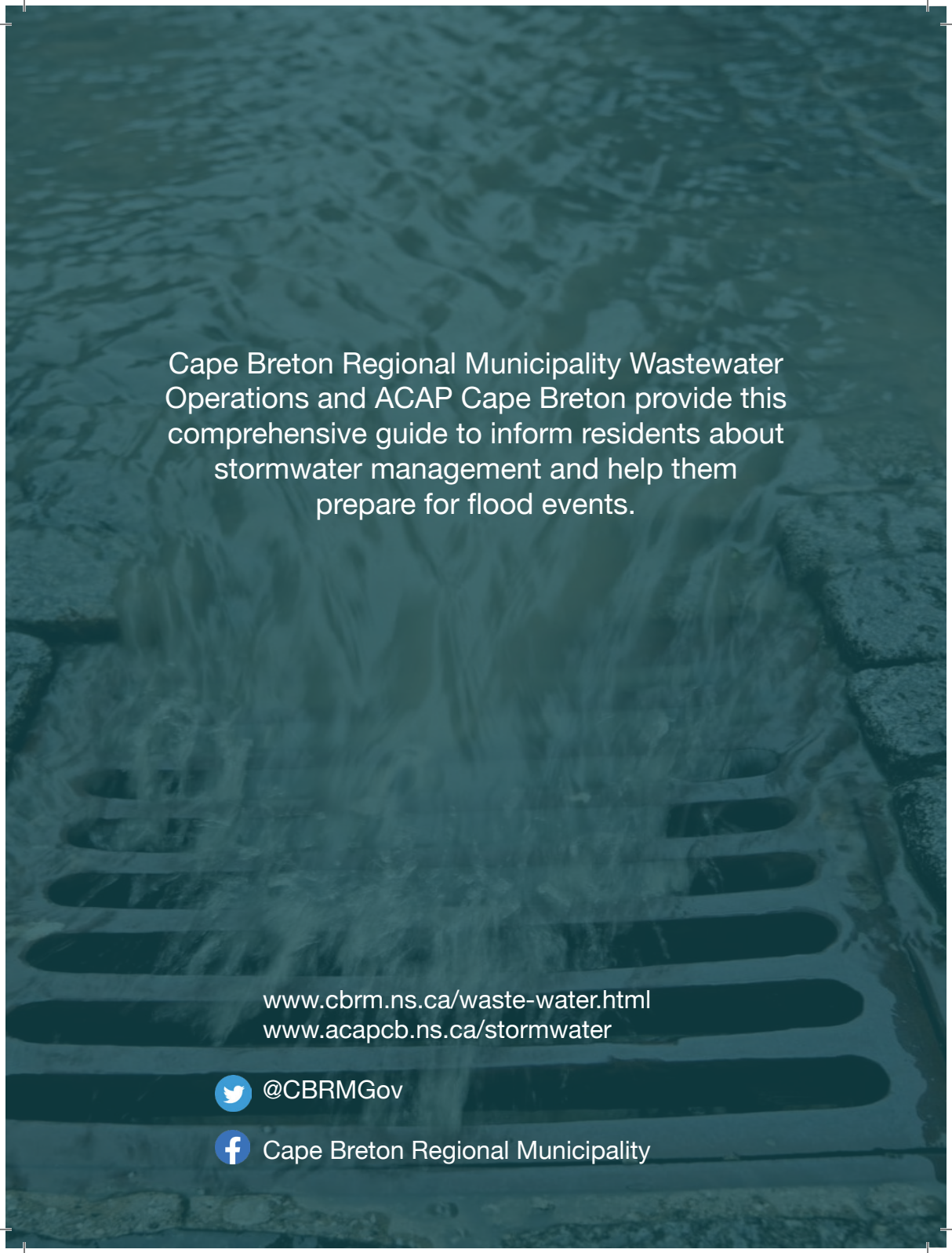
Homeowner's Guide to Flood Prevention and Recovery



Cape Breton Regional Municipality Wastewater Operations and ACAP Cape Breton provide this comprehensive guide to inform residents about stormwater management and help them prepare for flood events.

www.cbrm.ns.ca/waste-water.html
www.acapcb.ns.ca/stormwater

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Cape Breton Regional Municipality

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Flood Facts

In Canada, floods are one of the most common hazards.

Floods occur when heavy rainfalls introduce more water than drainage systems can handle.

All natural water courses, like brooks and streams, flood their banks at one time or another. Flash floods can happen with no warning. Homes and business that are built in low lying areas or close to natural water courses are more susceptible to flood damages.

Both average rainfalls and temperatures have increased in Canada over the last 60 years. As our climate continues to change we can expect, and prepare to meet, inevitable challenges.

The water cycle. In natural landscapes, water slowly infiltrates into the earth, and runs off into rivers and streams (left). In urban landscapes, it quickly runs off impermeable surfaces (right).

Your Urban Water Cycle

What is sanitary sewer?

Sanitary sewer is used water from households, industrial, commercial, and institutional sources. It is the water that flows from toilets, sinks, showers, and washing machines. Sanitary sewer often contains substances that may pose risks to human and environmental health and is directed from homes and other buildings to nearby wastewater treatment facilities to be treated, or to raw water outfalls where wastewater treatment facilities will be constructed in the future.

What is stormwater?

Stormwater is rain and melted snow that can soak into the ground, pool on the surface or flow across land to low lying areas or storm drains. Stormwater infrastructure like storm drains are designed to direct water to natural drainage systems such as brooks, rivers and streams.

In some instances, stormwater can enter the sanitary sewer system through improper connections such as weeping tile systems and roof drains.

Flood in Sydney, N.S., October 2016
Photo by Mark Voutier

Types of Flooding

If you have experienced flooding, the first step to protecting and preparing your home for future events is identifying the cause(s) of the flooding to prevent it from happening again.

The common types of basement or home flooding are:

Stormwater flooding

Stormwater flooding is often referred to as overland flooding, and is caused by heavy rainfall or snowmelt. This type of floodwater is usually clear and odour free.

Sanitary sewer backup

This type of flooding is often greyish in color and has an odour. Sanitary sewer backups will enter the home through cleanouts or plumbing fixtures such as toilets or tubs and often occurs because of a blockage in the sewer lateral that connects a home to the city sewer system under the street.

Both sanitary sewer and stormwater can enter a home during a sanitary sewer backup. This type of flooding occurs most often in neighbourhoods where homes were built more than 30 years ago when it was common practice to connect weeping tile, sump pumps, and downspouts directly to sewer laterals.

This old method of managing stormwater on private property causes the municipal sewer system to become overwhelmed with rainwater or melting snow leading to sewer backups and elevated groundwater levels around homes.

Who is responsible?

The Cape Breton Regional Municipality is responsible for maintaining the sewer system comprised of sanitary sewer and stormwater infrastructure.

Homeowners are responsible for the sanitary sewer lateral that runs from their home or building to the sanitary sewer main in the street, and for maintaining proper water drainage around their home and other buildings.

Inflow and Infiltration

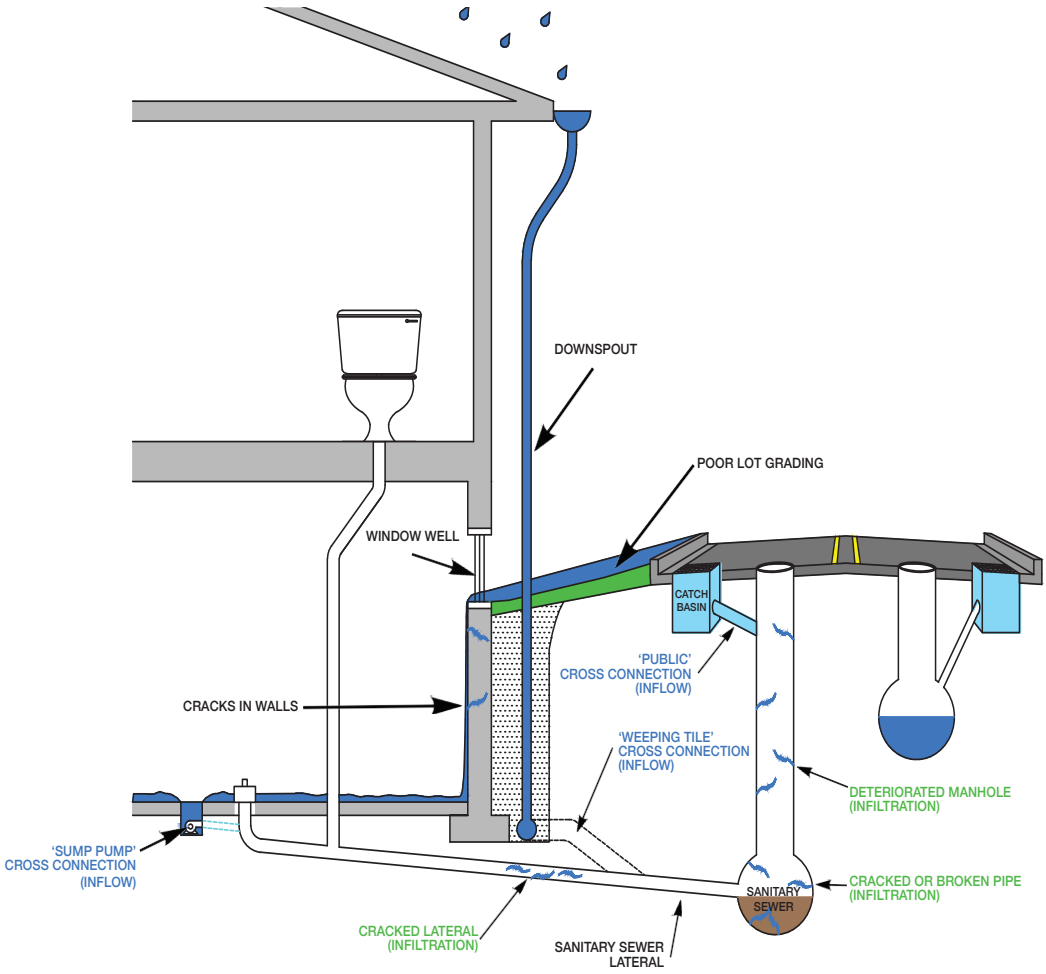
Municipalities from across Canada have a common problem: dealing with inflow and infiltration. These terms are commonly used to describe how unwanted water such as rain, melting snow, and groundwater enters the municipal sanitary sewer system.

Through improper connections, stormwater is able to flow directly into the sanitary sewer system, hence the term *inflow*. Common sources of inflow connections are eavestrough downspouts, sump pump discharges, weeping tile systems, and catch basins in the street.

Water can also trickle into the sanitary sewer system through cracks in manholes and buried pipes such as the sewer main under the street and residential sewer laterals under your yard between your home and the street. This trickling effect is called *infiltration*, and refers to how groundwater enters the sanitary sewer system. Depending on the condition of buried pipes, infiltration can also lead to large volumes of water entering the sanitary sewer system.

Why should you and the municipality be concerned?

The municipal sanitary sewer system, which consists of kilometers of pipe and a treatment plant, is designed to take used water from your bathroom, kitchen and laundry room and place it back into the environment. If the sanitary sewer system is full of stormwater from your downspouts and weeping tile, and groundwater from cracks in pipes, then where does your bathroom, kitchen and laundry room water go? This water can end up in your basement, or in the streets, brooks and streams. This is known as sanitary sewer overflows. The problem can be compounded if additional water is directed to sump pumps and weeping tiles through poor lot grading, cracks in your basement wall and leaky basement windows.



Common sources of inflow (labeled in blue) and infiltration (green) in the sanitary sewer system.

Prevention Measures

Did you know that the roof of a typical family home can create a significant amount of stormwater runoff? A single home can produce over 2,650 litres of runoff during a single 15 mm storm.

With Sydney's average annual rainfall of 1,212 mm, that means a single home can produce 214,120 litres of runoff each year!

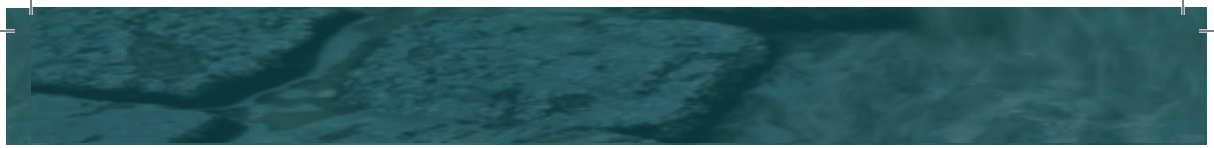
Now consider a neighbourhood of homes with their roof drains and weeping tile systems connected to sanitary sewer laterals and we can easily understand how the municipal sewer system quickly becomes overwhelmed with stormwater.

Capturing even a small percentage of that runoff can help protect our homes, our infrastructure, and our environment.

There are many ways that water can enter homes and basements:

- A crack or leak in your home's foundation, basement walls, or basement windows or door can allow groundwater, rain, and snowmelt to enter.
- Poor lot grading or drainage causes water to run overland toward your home.
- Failure of foundation drains, also called weeping tile.
- Failure of a sump pump used to pump weeping tile water away from your home.
- Overflowing eavestroughs that deposit water around the perimeter of your home near your basement wall.
- Leaking or plugged downspouts.
- A sewer back up caused by a blocked or overwhelmed sewer pipe. Blockages are typically caused by items that should not be flushed or poured down the drain. Tree roots and broken or cracked sewer pipes can also cause blockages.
- If sanitary sewers fill beyond capacity, the sewer and stormwater mixture will travel backwards in the sewer pipe and into the home if a backwater valve is not installed.

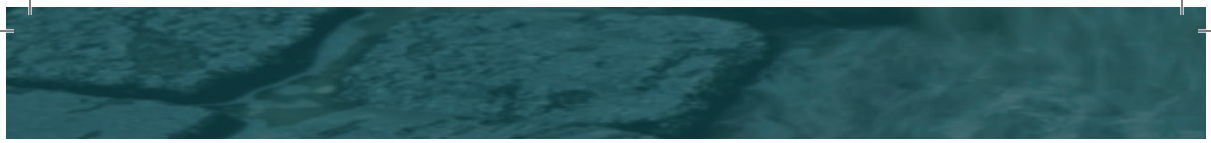
To help prevent sewer overflows and flooding, it is important to redirect stormwater into and overtop of the ground, away from your basement. This can be accomplished by disconnecting downspouts, sump pumps and weeping tile from the municipal sanitary sewer system, and by creating places for water to go to soak into the ground.



As the frequency and intensity of severe weather events continues to increase in CBRM, there are steps that homeowners can take to help protect their home from basement flooding.

Keeping Water Out

- Seal cracks or leaks in walls, floors, windows and foundations, and seal all window wells.
- Clear eavestroughs and downspouts of leaves and other debris that prevent drainage.
- Direct downspout drainage at least two metres away from your foundation's walls.
- Ensure the grading around your home slopes away from the foundation wall to help drain water away from your home (without negatively affecting neighbouring properties).
- Repair or replace damaged weeping tile systems.
- Ensure drainage swales (shallow ditches) between properties are maintained and clear of obstructions.



Disconnect and Redirect

In CBRM, weeping tile and downspouts connected to the sewers add large volumes of water to the system that contributes to overloading which can cause:

- Sewer back-ups into homes when the wastewater collection system cannot take on more water.
- Sewage overflows into the urban and natural environment.
- High wastewater treatment costs associated with pumping and treating stormwater that would not otherwise be treated.
- Flood damage costs.
- Reduction in the efficiency of the wastewater treatment processes when treating excess stormwater.

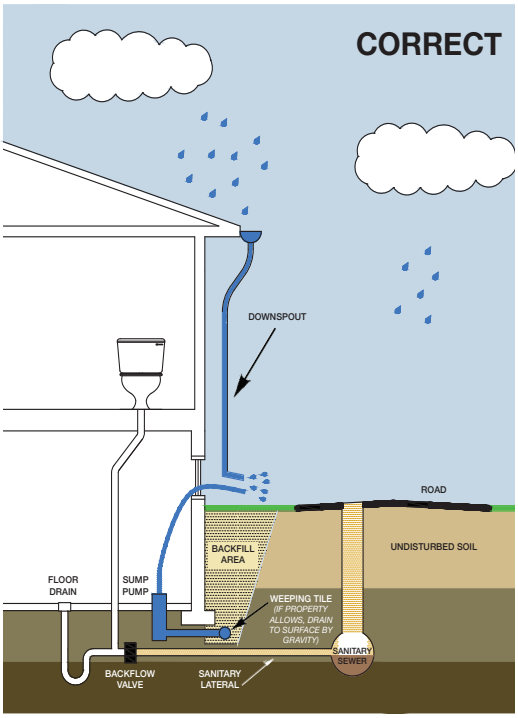
The best way to manage stormwater is to direct it away from the home and allow it to soak back into the ground.

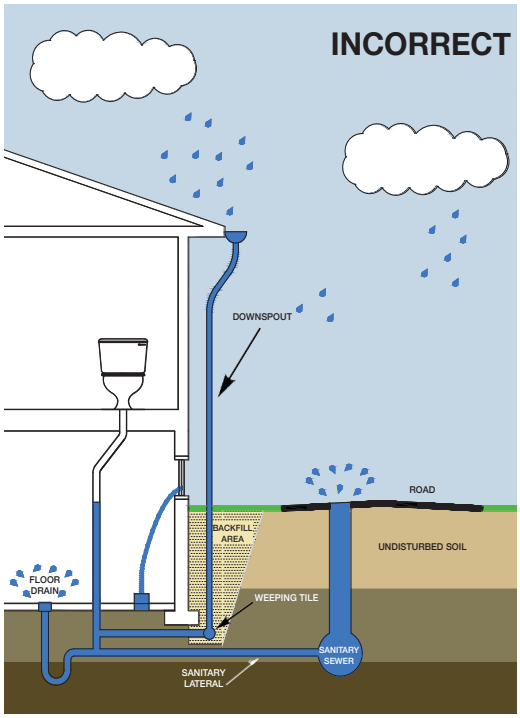
Let's examine what happens during extreme rain events when your roof drains or weeping tile are connected to the sewer system:

- As soon as the rain begins to fall roof drains collect rain and direct this water through the downspout into the sanitary sewer system.
- The sewers fill up with more water than they were designed to collect and eventually cannot take on any more water.
- Rainwater seeps into the soil and is collected by the weeping tile within minutes after the rain starts.
- The sewer system becomes overloaded and stormwater mixed with sewage can back up into homes.
- Your basement may not flood but having your roof drains or weeping tile connected to the sewer system may be causing your neighbours to have a flooded basement. Likewise, your neighbours could be contributing to flooding in your home.
- To manage stormwater correctly weeping tile can discharge overland by gravity flow if slope permits or it can be connected to a sump pit equipped with a sump pump.
- When the sump pit fills with water and the sump pump turns on, water is pumped out of your home overland and away from your foundation wall to the ground surface.

Disconnecting weeping tile from the municipal collection system should be assessed on a case-by-case basis with the advice of a professional.

Roof drain connected to municipal sanitary sewer vs. directed into the ground and away from the house. A neighbourhood of rooftop runoff adds up quickly causing surcharging. This is how back-ups are caused.





Downspouts discharge to a lawn or another permeable surface. Weeping tile is disconnected and water is pumped away from the foundation by the sump pump. A backwater valve stops sewer from backing up into the home.

Connection of downspouts and weeping tile to the sanitary sewer system increases the likelihood for basement and street level flooding.

Disconnecting Your Downspout

Disconnecting Your Downspout

Before You Disconnect: Ensure water will flow away from the building's foundation!

Extend your downspout at least 2 metres (6 feet) away from foundation walls.

Ensure flow of water will not cause damage to your neighbours' property, or flow onto a driveway or sidewalk. Directing flow into a rain barrel or water garden makes a resource out of a nuisance.

Use a splash pad to help direct the flow of water and protect against erosion.

Avoid creating a tripping hazard; do not add extensions across a walkway or in front of a gate or doorway.

Water flow may freeze in the winter; do not create dangerous conditions.

Consider extending downspouts under a deck, patio or to a grassed or garden area.

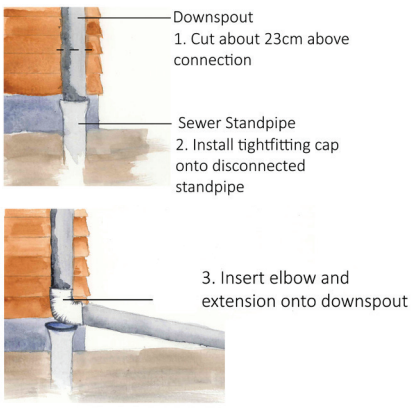
How to Disconnect your Downspout

Once you are ready to disconnect, you can do it yourself or hire a contractor.

1. Assemble the tools and supplies you will need: hacksaw, tape measure, rubber or PVC standpipe cap, hose clamp (optional), hammer, screwdriver, drill, pliers, metal file, sheet metal screws, downspout elbow, downspout pipe extension, downspout brackets, and personal protective equipment such as gloves and safety glasses.To disconnect your downspout, measure your downspout from the top of the sewer standpipe and mark it about 23 cm (or 9 inches) above the standpipe. Depending on the length of your extension, you may need to cut it higher.

   Cut the downspout with a fine blade hacksaw at the mark and discard the piece. Use a metal file to remove the rough edge of the downspout.

2. Be sure to cap the sewer standpipe. This prevents water from going in and animals from getting trapped. You can use a simple rubber or PVC cap secured by a hose clamp or a wingnut test plug.
   Insert downspout into the elbow.



3. Measure and cut your downspout extension to the desired length. Connect the extension by slipping it over the end of the elbow. The extension should be at least 2 metres long.

   Secure the elbow and extension with sheet metal screws at each point where the downspout, elbow, and extension connect (pre-drilling the holes will help). If desired, use a splash block at the end of the extension to prevent soil erosion. Avoid draining water onto impermeable plastic weed block or cloth.

The extension can be cut higher and connected to rain barrel or directed into a rain garden.

Managing Your Sewer Lateral

- Homeowners are responsible for maintaining plumbing inside their home all the way to the sewer main connection in the street.
- Clogs in wastewater lateral pipes are a common cause of wastewater backup.
- Do not flush dental floss, Q-tips, condoms or tampons.
- Please note “flushable wipes” are not flushable and should be put in the garbage.
- Never pour fats, oils and grease (FOG) down the drain. Dispose of small amounts of grease in your green bin. Large volumes of grease should be hauled away by a contractor.
- Learn about what common household items and chemicals are “No Drainers” and where they belong.

Please don’t put these things down the drain:

CATEGORY	EXAMPLE	HOW TO DISPOSE
Fat, Oil, & Grease	- Household Cooking Oil, Fat & Grease - Food Scraps	Green Cart
Combustibles & Flammables	- Petroleum Products - Gasoline - Used Motor Oil	Service Station or Garage
	- Kerosene - Solvents - Turpentine - BBQ Starter Fluid - Lighter Fluid	CAMDON Recycling Household Special Waste Depot 345 Gulf Crescent Sydport 902-564-8104
Corrosives	- Degreaser - Oven Cleaners - Photo Chemicals - Rust Removers	
Poison	- Pesticides - Moth Balls - Antifreeze - Pool Supplies	
	- Unused & Expired Medication	Any Pharmacy
Unflushables	- Cigarette Butts - Dental Floss - Sanitary Napkins & Tampon Applicators - Baby Wipes - Paper Towel - Bandages - Diapers - Kitty Litter - Cotton Swabs	Regular Garbage

Some examples of household waste that cannot be disposed of down drainpipes and where to safely dispose.

If only one fixture (sink, toilet) is not draining, this indicates a private plumbing issue. A plumber should be called. The most common cause of slow draining plumbing fixtures are blockages due to gradual buildup of debris such as hair or putting the wrong things down the drain such as bacon grease, sanitary napkins and “flushable wipes” (which should not be flushed and do not break down in the environment).

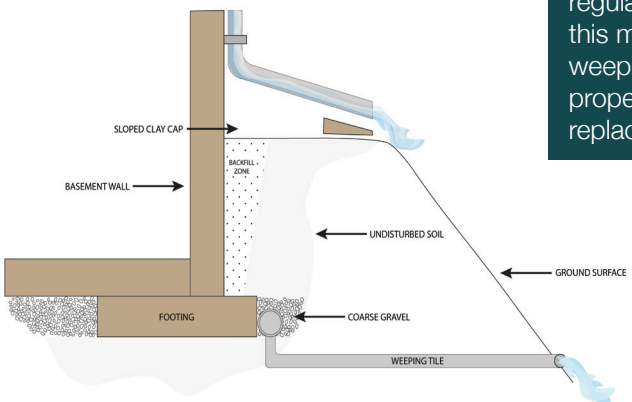
If a sanitary sewer service lateral is blocked and no fixtures are draining, residents should call CBRM Public Works to investigate the cause *(see Emergency Contacts on the last page).*

Weeping Tile

Weeping tile, also called foundation drains or perimeter drains, are perforated pipes that capture ground and surface water and direct it away from basement walls to prevent basement flooding.

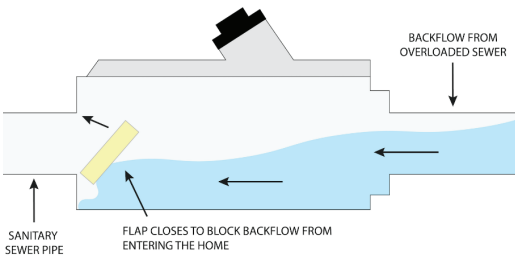
Weeping Tile Maintenance

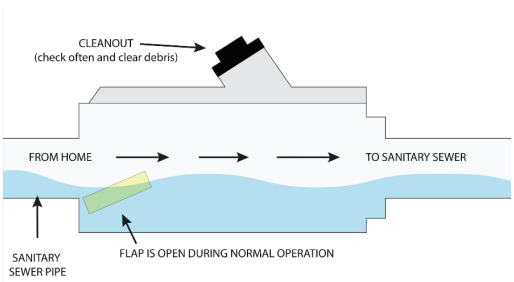
Check the corners of your basement regularly. If the floor is damp or wet, this may be an indication that your weeping tile may not be functioning properly and needs to be repaired or replaced.



Backwater Valves

Backwater valves close the sanitary sewer line during periods of surcharging sewers to prevent wastewater from entering your home. When the valve is closed, you should not use any plumbing fixtures (i.e. toilets, sinks, dishwasher, washing machine) because water will not drain and will back up into your home. Backwater valves should be installed by a licensed plumber. They also need to be regularly inspected and cleaned out according to product specifications.





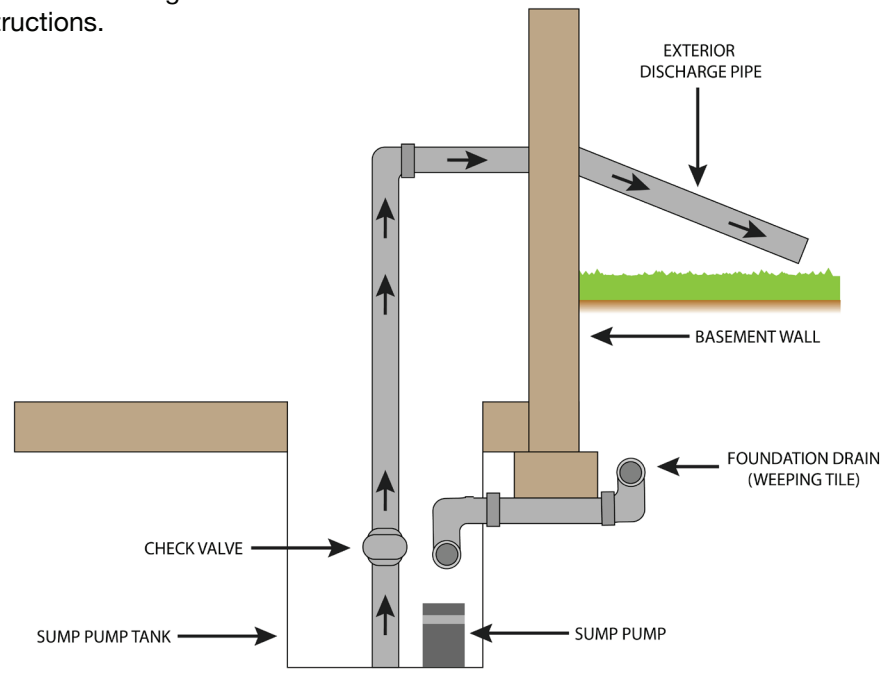
Sump Pumps

When a weeping tile system cannot drain by gravity, the proper stormwater management technique is to connect your weeping tile system to a sump pump that discharges stormwater outside overland away from your home.

Make sure to install a properly sized sump pump for your home. The discharge pipe should extend at least 2 metres from the foundation wall and be directed onto a surface that will allow the water to seep back into the ground.

Consult with a professional before installing your sump pump.

There is a risk of power outages during severe storms, so consider a battery backup or generator. Sump pumps need to be inspected and maintained on schedule following manufacturer's instructions.



Redirecting Roof Water

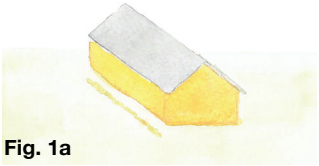


Fig. 1a

Fig. 1a - If your roof does not have an eavestrough then you might find a drip line where the water flows off the roof eroding the soil beneath it.

Fig. 1b

Fig. 1b - Make use of roof water by placing cobbles beneath the roofline and directing that water into a garden. Use the natural slope of your land, or grade it to direct water where you want. In figure 1b the cobbled dripline drains immediately into a garden bed. If you choose shrubs, you can create a bird garden with berry yielding species like black cherry, highbush cranberry, elderberry, and serviceberry.

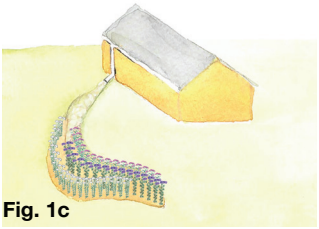


Fig. 1c

Adding an eavestrough and downspout allows you to collect roof water and direct it in a more controlled way.

Fig. 1c - If you want the flow to drain into a rain garden, bioswale, water garden, etc., you can direct the downspout directly into it or into a swale of cobbles to slow the water as it pours.

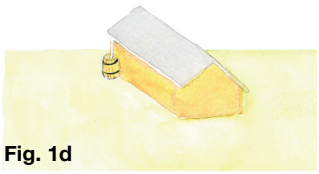


Fig. 1d

Fig. 1d - Collect roof water for storage and later use by directing it into a rain barrel or cistern.

Proper Lot Grading

Proper lot grading is essential to minimize the risk of basement flooding. Lots that are flat or slope towards the foundation can result in water pooling and basement flooding. Land that is graded too steep may have increased runoff and does not allow time for water to seep into the ground. The best solution is to hire a professional to grade the yard away from the foundation on the proper, gentle slope to allow water to flow away from your home. Maximize this flow by planting a bioswale or rain garden to collect the runoff.

Rainscaping

Landscaping techniques that combine garden esthetics with functional design to manage stormwater are referred to as low impact developments (LIDs) or rainscaping.

Ecological landscaping refers to how water naturally flows over your land. We can better manage stormwater on our properties by considering what nature does with the water on our site.

Is the land low? Soak water in by restoring wetland or planting water gardens.

Does it slope? Use your slope by installing a bioswale to direct the flow of water. You can install a rain garden at the end of the swale to absorb the water and soak it in.

In nature, water soaks into the ground where it replenishes groundwater and streams and adds moisture to the soil, allowing ecosystems to thrive. Trading lawns for vegetation, especially native plants, will increase the infiltration on your property substantially.

The plant species suggested in this book are native to Cape Breton. If you are ecologically landscaping elsewhere, don't forget to check the plant's range and find species that belong there. Always avoid introducing invasive species.

Rain Barrels

Rain barrels collect water from rooftops and store it for later use. Rain barrels can hold 150-280 litres of water. The rain barrel will usually have a spigot that can be attached to a garden hose and the non-potable water (you cannot drink it) can be reused in many ways:

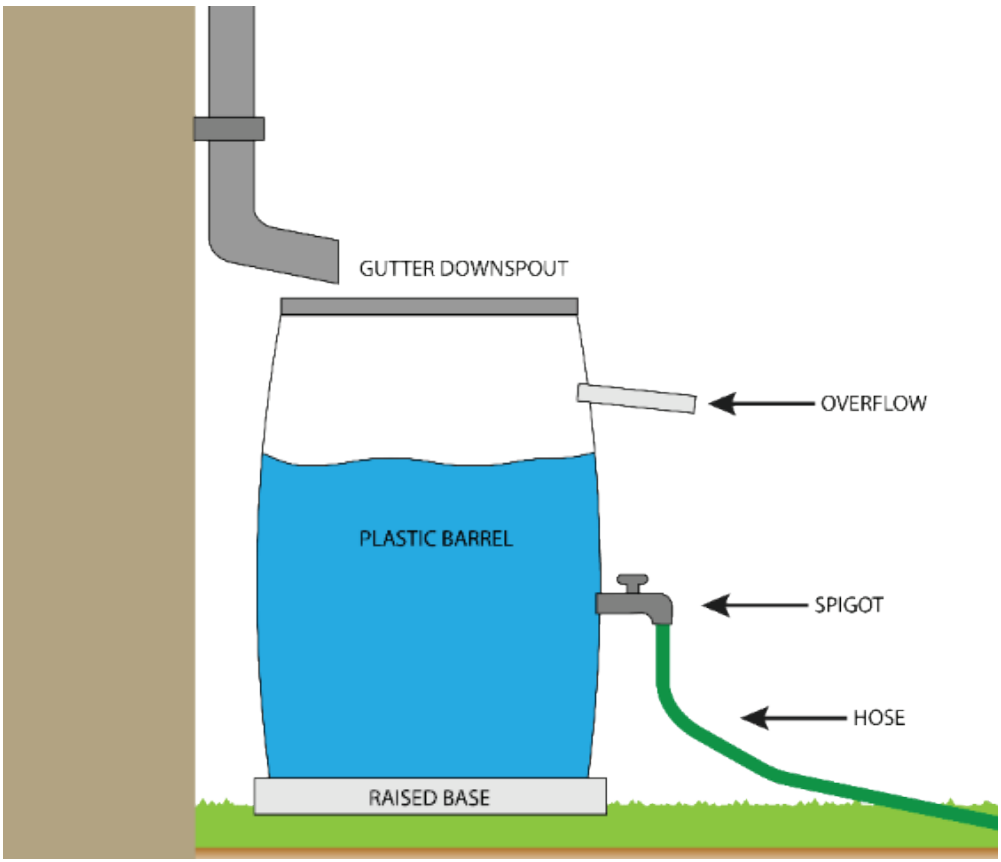
- irrigate your flower garden
- water your indoor/outdoor plants
- fill outdoor fountains
- wash your vehicle
- clean windows and siding

Rain Barrel Tips

Water flow depends on water pressure and gravity, so water will flow better when the barrel is full and elevated.

- It is important to place rain barrels on a firm surface, like cinder blocks, pavement, or bricks because they can sink into the ground when full.
- When the barrel is full, an overflow device can be used to direct extra water away from the foundation.
- A closed lid or screen is a good idea to prevent debris from entering and to prevent mosquitoes from breeding inside.
- Use the water in your rain barrel frequently so that storage is available for the next rainstorm.
- Before winter, drain the barrel, clean it with a non-toxic cleaning solution, and check all of the connections for repairs.
- Store the empty barrel upside down to keep it from freezing until you are ready to use it again in the spring.
- Clean eavestroughs and downspout regularly to reduce clogging.
- Rain barrels can be purchased from hardware or gardening stores, or online. An average rain barrel costs between $55 and $120, but you can create your own on a budget.

Find installation tips and instructions on how to make a homemade rain barrel at acapcb.ns.ca/stormwater.



A properly maintained rain barrel can last 20 years – a great investment!

Rain Gardens

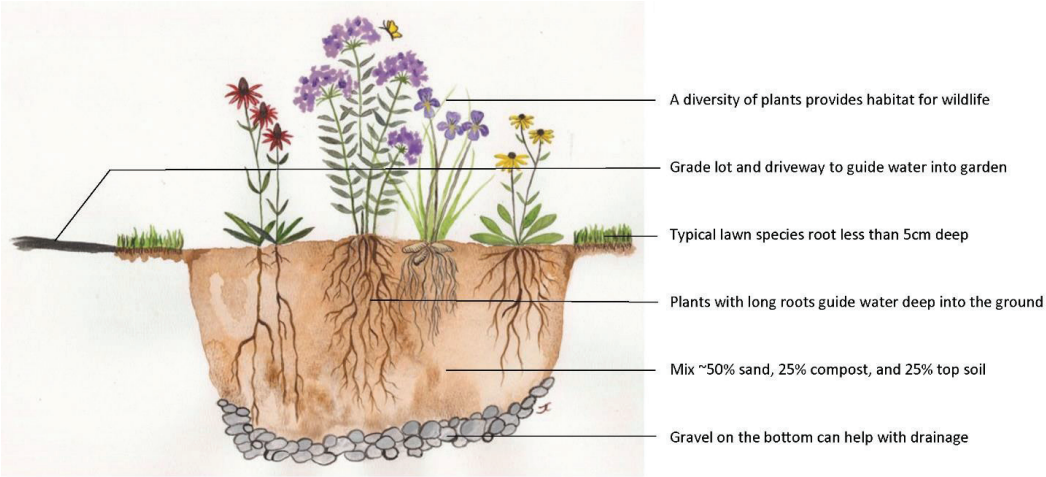
The purpose of a rain garden is to capture stormwater and allow it to filter into the ground. Rain gardens remove pollutants as the water slowly infiltrates. They help to recharge local groundwater, protect water quality in local waterways, and reduce the amount of water entering the sewer system.

Rain Garden Installation

- Call local utilities before you dig to ensure that you will not affect buried infrastructure.
- Make sure to locate a rain garden away from underground piping such as water and sanitary sewer lines.
- You can test the permeability of your soil by performing a ribbon test (see page 20 ribbon test).
- Ensure the location of the garden is at least 3 meters away from any building foundation.
- Excavate the garden and fill it with a soil mix of ~50% sand, 25% compost, and 25% top soil.
- Commonly, rain gardens have a “river” of gravel or stones through the garden.
- Select native plants that are both drought and flood resistant, and avoid invasive species. Native plants typically root quite deeply which will draw the water deeper into the ground.
- Call to get rain garden advice from ACAP Cape Breton or to inquire whether they currently have any rain garden programming or plant material.

Lawns have the lowest vegetation absorption rate! Is it time to reconsider?

We use our most valuable resources: water, oil, and time to maintain them.
We cut them before they can go to seed eliminating potential as a food source for wildlife or for the plant to complete its lifecycle. Ironically, they make excellent dandelion habitat.
Creating a monospecific (one species) landscape eliminates the quality of the land. The more biodiversity an ecosystem has, the healthier it is.



Plants with deep roots are ideal for rain gardens because they guide water downward, soaking it into the ground. (From left: Echinacea, swamp milkweed, blue flag iris and brown-eyed Susans.)

Soil Replacement of Clay Soils

Slow draining clay soil must be removed when installing a rain garden. Remove the top 25-30 cm of soil and replace with a composition of roughly 40% sand, 20% topsoil, 20% compost, and 20% clay. This soil mix will support plant growth and improve infiltration. Leaving a small percentage of clay in the mix will prevent a "layering effect." In other words, if no clay is mixed into the replacement mix, plant roots may behave as if they were in a clay bottomed pot and stay in the top layer of soil, and water will not move through the soil as is your intention.

Ribbon Test - how much clay do you have?

1. Dig a 30 cm deep hole and take a handful of soil to create a ball. Ensure the soil is damp.

2. Press the ball of soil together with your thumb and index finger upward to create ribbon.

3. Keep pressing the soil to continue lengthening the ribbon until it breaks. Measure the length of the ribbon.

Soil Type	Length of ribbon
Sand	Does not form ribbon
Silt	Weak ribbon < 3.5 cm
Clay	Strong ribbon > 3.5 cm

Bioswales

Bioswales slow down and direct runoff while removing debris and pollution. They are often shaped like streams, as they are a drainage course. Their slopes are gentle (less than 6%) but are effective in directing flow.

Bioswale design

By altering the slope and soil composition in your bioswale you can control how it works.

If the slope is near level with small particles, like a loamy soil, it's ideal for holding slow-moving water and wetland plants. Some good wetland species for gardens are blue flag iris, swamp milkweed, and Joe-Pye weed. That is also a great mix for attracting butterflies.

If your slope is higher and you fill it with larger particles, like sand or river stones, your bioswale moves water quickly from one place to another. This is a good habitat for plants that like good drainage, like a pollinator mix with purple coneflower and black-eyed Susans as it's only wet during rain events.

Fill your swale with cobbles, or plant vegetation in it to produce a soft river garden look. You can create pollinator habitat by filling your bioswale with swamp milkweed, Joe-Pye weed, and boneset as illustrated here.

Trees and Stormwater Management

A report from TD economics calculated the benefits of Toronto's trees at more than $81 million! Sixty-six percent of this value came from the role of trees in managing stormwater.

As trees are stationary, their architecture naturally develops in a way that aims to maximize capture and absorption of precipitation. Trees help manage stormwater by intercepting rain and snowmelt, slowing runoff, holding water, and increasing absorption of water into soils. Trees also reduce soil erosion and are able to sequester, or take up and store, certain toxins like fuels and metals.

Trees in urban areas can directly reduce the amount of stormwater runoff that enters wastewater collection systems and decrease the risk of flooding. In the case of stormwater management, the more trees the better.

Mini Forest Restoration

You can hold water and slow it down even if your land sits quite high and you don't have pooling. Think of it as a forest restoration and you're simulating a forest ecosystem. Lay dead logs and brush into your planned bed. Cover it with compost and soil, and then plant right into the mound you have created. The dead wood will absorb water as it decomposes and slowly releases nutrients. Hardwood logs can break down for more than 20 years releasing nutrients and providing habitat for the vegetation you plant there as well as for a diversity of beneficial fungi and insects.

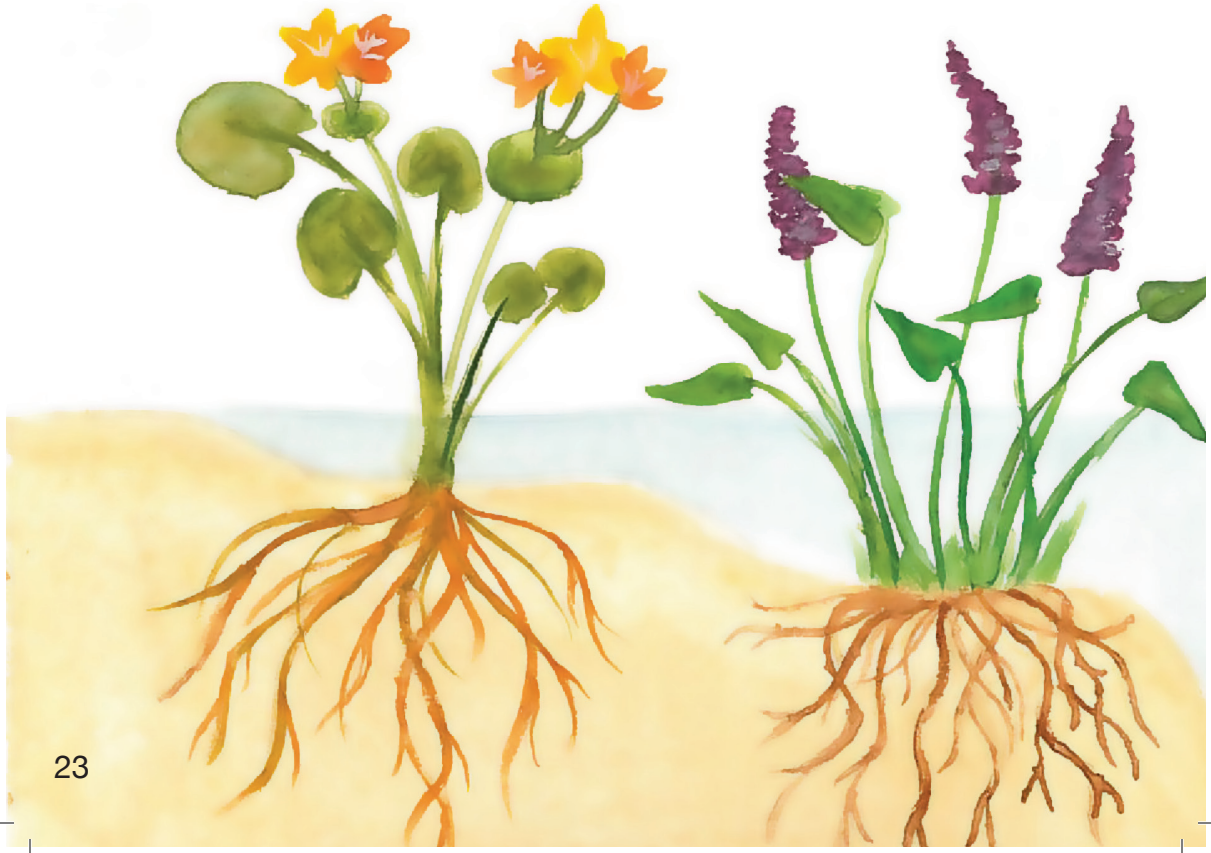
Cross section of a forest restoration garden.
Top down: red oak, highbush cranberry, wintergreen, gold thread.

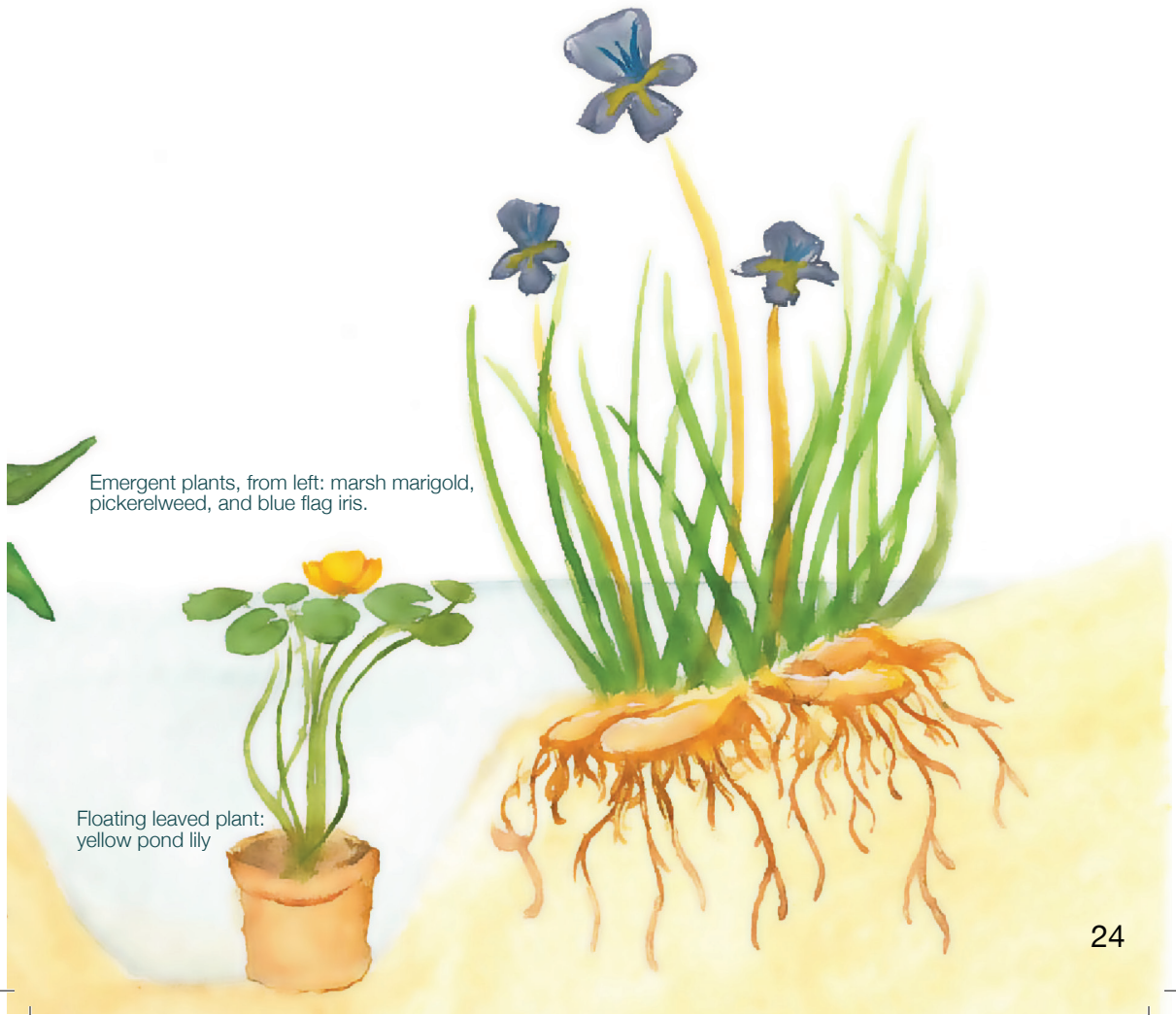
Wetland Gardens

If you have a particularly wet spot that does not drain and is always too wet to mow then embrace it. By lifting the sod and planting emergent vegetation you can create a wetland garden.

If you'd like to see open water in your wetland garden:

- Dig out the shape you want leaving different bottom levels depending upon your plant choice.
- Line it with clay and compact the base of the hollow so that clay particles are pressed together forming a bowl.
- Allow for a small pond or open water wetland to emerge by planting vegetation right into the earth or placing potted plants at the lower levels.
- Plant species such as the flowers illustrated below or insert sedges, cattails, and hardstem bulrush for a naturally soft look.
- Enjoy providing logs and rocks for the frogs and wildlife that will be interested in your new gardening style.





Emergent plants, from left: marsh marigold, pickerelweed, and blue flag iris.

Floating leaved plant: yellow pond lily

Stormwater and the Environment

Excess stormwater flows and overland flooding caused by overwhelmed wastewater collection systems can not only negatively impact homes and other buildings, it can have significant negative impacts on the local environment. Listed below are just a few of the ways stormwater and combined wastewater overflows can be detrimental to ecosystem health.

Litter

A good way to imagine how water carries pollutants is to visualize litter being carried down your street in a rainstorm. Water is predictable; it runs with gravity. Debris that enters storm drains leads to one of two destinations: a wastewater treatment facility or the nearest catchment body of water and ultimately on to the ocean. If the water does divert to wastewater treatment, litter can impair the treatment system by causing blockages.

Excess Nutrients

The state of excessive nutrients in the water, from our fertilizers picked up by stormwater, is called eutrophication, which leads to harmful algae blooms that can stress and/or eliminate aquatic species. These particular algae are toxic, and cause a state of hypoxia (lack of oxygen), preventing plants and fish from obtaining oxygen and sunlight.

Contamination

Bodies of water such as oceans, lakes, ponds, and streams can be greatly affected by stormwater runoff. The National Oceanic and Atmospheric Administration (NOAA) says that 80% of pollution in the ocean is the result of land runoff, and one of the biggest sources of contamination.

Habitat Loss

Pollution and contaminants in the water affect the quality of life for aquatic inhabitants. In a natural cycle, water is introduced to streams at a slow rate because it has infiltrated through vegetation but when runoff races down streets, pipes, parking lots, and rooftops it reaches streams in excess very soon after rainfall. These surplus water events end up blowing out streambeds, destroying fish and amphibian habitat.

Before a Flood

Planning for Emergencies – Know the risks, make a plan, prepare an emergency kit!

If there is an emergency in your community, it can take time for emergency workers to reach you. Making a plan is a quick and easy way to become better prepared to face a range of emergencies. You should be prepared to take care of yourself and your loved ones for at least 72 hours.

1. Know the risks

In the CBRM, we are vulnerable to different types of natural disasters and floods are the most common. There are steps that you can take to prepare your home for a flood such as storing important documents at a higher level, keeping floor drains clear of obstructions, and elevating the furnace, water heater, and electrical panels. Even if it seems unlikely that the area in which you live will flood, it is important that you and your family understand the risks in your community. It is never too late to come up with a plan and prepare an emergency kit.

2. Make a plan

Every family should have an emergency plan. Each member of your family should know what steps to take in order to protect themselves during an emergency such as a flood. Your family may not be together when an emergency happens, so have a plan in place before these events occur and talk about what you would do in different situations. If you live alone, make a plan that includes meeting up or contacting a friend, family member, or neighbour.

You can make a plan at home on paper or online using the Public Safety Canada template: https://www.getprepared.gc.ca/cnt/plns/mk-pln-en.aspx

3. Prepare an emergency kit

In case of an emergency, be prepared to take care of you and your family for at least 72 hours. Prepare a 72-hour emergency kit that you can take with you if you need to evacuate your home or community. Each family member should know where the emergency kit is stored and how to retrieve it. Always keep your cellphone charged and stored somewhere where it is easy to access if you must evacuate your home.

Prepare a 72-hour Emergency Kit

Prepare a 72-hour Emergency Kit

Are you prepared?

The Red Cross recommends these items as essential components of your 72-hour emergency kit:

- Water
- Non-perishable food items and manual can opener
- Special needs such as medications, baby needs, glasses, etc.
- Important family documents such as copies of birth and marriage certificates, licenses, passports, wills, land deeds, and insurance documents
- Crank or battery-operated flashlight
- Extra batteries
- Candles and matches/lighter
- Extra keys for your house and car
- First aid kit
- Extra cash in small bills
- Toilet paper and other personal hygiene items
- Pet food and medication
- Cellphone with extra charger
- A copy of your emergency plan

Additional items to consider include:

- Battery-operated or crank radio
- Extra clothing and footwear
- Blankets or sleeping bags
- Plastic sheeting
- Scissors and a pocket knife
- Hand sanitizer
- Garbage bags and twist ties
- Basic tools
- Duct tape
- Paper/pencils/pens
- Whistle (to attract attention, if needed)
- Map of your community (to locate shelters)
- Playing cards, toys, games, books

Red Cross provides an emergency kit checklist that you can access online at:

https://www.redcross.ca/crc/documents/What-We-Do/Emergencies-and-Disasters-CDN/Home-and-Family/DM_get_a_kit_EN.pdf

Insurance Considerations

When flooding occurs, damages caused by water can be wide-ranging and costly to repair. As we have learned, water can enter a home in many ways during extreme weather events. According to the Insurance Bureau of Canada (IBC), flooding is the most common and costly climate issue that affects Canadians. There are several steps that homeowners can take to be prepared for a flood event.

Maintain a detailed inventory of valuable household items. A video inventory is an easy way to keep track of valuables and can be used if you need to make an insurance claim. Review your insurance policy so you know what items to include.

Talk to your insurance representative to make sure you have the appropriate coverage – in general, overland flooding is not covered and water damage in a basement due to a sewer backup may only be covered if you purchase specific sewer backup coverage.

For more detailed information on water-related insurance considerations, visit the IBC website (http://www.ibc.ca/on/).

If flooding occurs in a home or basement and is a result of overland flooding during storms, a blocked or full sewer pipe, leaking foundation walls, or poor lot drainage on your property, homeowners are responsible for losses and repairs caused by flooding. Help prevent disaster before it strikes by following some of the indoor and outdoor preventative measures recommended in this booklet.

During a Flood

Reducing Property Damage

To help reduce property damage if flood conditions are forecast – heavy rains, periods of prolonged precipitation, or snowmelt – take the following precautions:

- Check all drains, gutters, and downspouts to clear any buildup of leaves and debris.
- Close all basement/low-sitting windows.
- Check to ensure that backwater valves and sump pumps are working properly. Consider a generator to keep your sump pump running in case of interruptions in electrical service.
- Move all valuable items – furniture, electronics, cherished items, etc. – out of basements and even ground level floors if necessary.
- If your home is a high risk for flooding it may be worth permanently moving furnaces, electrical panels, and hot water tanks to higher locations well above the water line.
- Roll up any rugs that can be moved, and ensure that important files and paperwork are also moved to higher levels in the home.

Flood Conditions and Possible Hazards

Flooding can affect you and your family's safety and health. When floods occur, hazardous conditions can quickly develop both in and out of the home. Here are some possible hazards to take note of:

- Floodwaters pose many hazards. Standing water can be electrically charged in the home, or by downed power lines outdoors. Do not enter water if there are potential electrical hazards.
- Floodwaters can contain hazardous substances like home heating oil, raw sewage, glass, and other dangerous chemicals and debris. Keep family members and pets out of standing water and floodwaters outdoors. Do not enter a space that is flooded unless you are wearing appropriate personal protective equipment.
- Floodwaters can move quickly, making driving or walking through a flooded area dangerous because of increased risk of drowning.
- Buildings, roadways, and other structures can quickly become unstable during a flood event. Leave your home if any structural damage is evident. Do not drive on flooded roads that could collapse if their structure is compromised by the floodwaters.

What to Do if Your Home or Basement is Flooded

- Your first priority is to protect yourself and others in the home. If water has risen above electrical outlets or the electrical panel, call Nova Scotia Power to have your power shut off to prevent shock or electrocution. Do not attempt turn off the power yourself if conditions around the main breaker or fuse box appear unsafe!
- Water could extinguish a pilot light on a gas appliance. If you detect gas, leave the house immediately and contact your oil company.

- Assume that everything floodwaters touch is contaminated, and keep your family and pets out of flooded locations.

- If any structural or foundation damage is suspected, leave your home until it can be inspected by a professional.

- If you suspect water is entering your home through the sanitary sewer lines, or if you have a backwater valve that is triggered by flood waters, do not use your sinks, toilets, showers, or washing machine because the water will not be able to drain and will back up into your house.

Oil Spills

Nova Scotia Environment defines domestic oil spills as releases of petroleum at a private residence or small apartment complex. The landlord, occupant, or company has the responsibility to contact the proper authorities (listed below) if a domestic oil spill occurs during a flood. Negligence could result in contamination of soil and groundwater, which would affect drinking water sources, adjacent properties, and private wells.

Here are some homeowner or occupant responsibilities for managing spills once they have occurred:

- For initial emergency response, the individual may hire a contractor to contain the release.

- If the spill is larger than 100 litres or has a smaller volume but is a threat to the environment (i.e. spilled into an ecosystem like a brook), you are required under the Nova Scotia Environment Act to report the spill to Nova Scotia Environment at 902-563-2100 (after hours: 1-800-565-1366).

- If the spill is less than 100 litres the person responsible or the person who has control, management, or charge of the spill is obligated to immediately notify the municipality. Spills to the CBRM sanitary sewer system must be reported to CBRM Wastewater Operations at (902) 563-5255. (A copy of the CBRM Discharge By-Law can be found at http://laserfiche.cbrm.ns.ca/WebLink8/1/ doc/6167/Page1.aspx).

- If you find an oil leak from a car, furnace, oil tank, etc., place a pan underneath to capture the spill if it is safe to do so.

- If it is spreading, use an absorbent material like kitty litter to stop the flow. Contact the appropriate professional maintenance personnel to fix the problem.

- Never flush a fuel or oil down the toilet or drain.

- Do not throw away material or soil that has been contaminated with fuel, as they are flammable and a hazard to the environment. Instead, it must be disposed of at an approved facility. Terrapure Environmental at 675 Keltic Drive in Sydney can safely dispose of items that are contaminated with fuel/oil.

- Contact your insurance company to discuss cleanup coverage, because part or all of the cost may be covered. If it is not covered, you are liable for the cost.

- If you believe your property is contaminated, contact an environmental services professional to carry out the remediation process.

After a Flood

Health and Safety

Flooded homes can be dangerous in many ways, even after floodwaters have receded. You can be exposed to waterborne diseases or to toxins left behind. Here are some things to consider following a flood event:

- Call your insurance company as soon as possible and report property damage caused by the flooding.
- Take photos of damage caused by the flooding and keep receipts from emergency repair or clean-up work.
- Children and pets should not go near damaged areas until cleanups and repairs are complete.
- Mould and waterborne diseases are hazards associated with flooded homes. Consider hiring a professional cleaning company to clean up your home or basement.
- If you must enter a building that has flood damage, for example to begin cleanup, protect yourself with long sleeves and pants, gloves, rubber boots, a mask, protective eyewear, etc.
- Use dehumidifiers and fans to help dry your home quickly and prevent further damage from mould growth.
- Thoroughly clean walls and floors using a solution of household bleach (mix 1 cup bleach with 19 litres of water).
- Any drywall or insulation that has been contaminated should be removed and properly disposed of.
- All surfaces should be sanitized with hot water and liquid soap. Rinse and ensure the area dries completely by giving it time and good ventilation.
- Avoid all electrical equipment. Hire a professional electrician to determine if there are hazards present.
- Any contaminated items that cannot be disinfected should be discarded (especially textiles).
- All clothing worn during your cleanup should be washed in hot soapy water.
- Any food items – packaged or not – that were in contact with floodwater should be disposed of.

Flood Prevention Checklist

With these tips you will be able to catch runoff and redirect flow effectively, while protecting your home and neighbourhood from flood risk to the best of your abilities.

Outdoors

- ☐ Inspect and repair cracks in your foundation, walls, floors, and windows.
- ☐ Disconnect downspouts, weeping tile, and sump pumps from the sanitary sewer system and redirect them to a prepared spot that soaks water in so as not to impact roadways and neighbouring properties.
- ☐ Install a rain garden or bioswale to soak up water. These techniques accumulate stormwater in a low area where it is absorbed, infiltrating slowly into the ground while simultaneously being filtered by soil, organic matter, and deep rooting plants.
- ☐ Collect the water coming off your roof by using a rain barrel or cistern, and reuse the water for the garden and other yard work.
- ☐ Make sure that redirected water is draining at least 2 metres away from your home.
- ☐ Direct the slope of your yard away from your house. Reducing the slope allows for more infiltration to occur.
- ☐ Reduce impermeable surfaces, like pavement.
- ☐ Clean out debris from eavestroughs and downspouts on your home so the water can flow where you direct it.
- ☐ Ensure weeping tile systems are working properly.
- ☐ Make sure any basement windows are covered so that water cannot enter.
- ☐ Increase vegetation to absorb more water.

Indoors

- ☐ Inspect and repair cracks in your foundation, walls, floors, and windows.
- ☐ Install a sump pump that is the appropriate size for your home.
- ☐ Hire a plumber to install a backwater valve.
- ☐ Disconnect your sump pump from municipal lines.
- ☐ Inspect your plumbing to ensure it is working smoothly and safely.
- ☐ Have a backup generator for your sump pump so it works properly despite power outages.
- ☐ Prepare an emergency response kit so that your family is equipped in the event of a flood.

Emergency Contact Information

Dial 911 only in case of emergency.

Cape Breton Regional Municipality

General Information	(902) 563-5005
Public Works Central Division	(902) 563-5255
Public Works East Division	(902) 842-1171
Public Works North Division	(902) 794-5692
Public Works *(after hours & emergency)*	(902) 563-5500

Police

Non-Emergency Line	(902) 563-5151

Utilities

Nova Scotia Power Outages	1-800-428-6004
Nova Scotia Power Utility Poles	1-800-428-6230

Community Support

Canadian Red Cross	(902) 564-4114
United Way Cape Breton	(902) 562-5226

Local Fire Departments

Central

Sydney (Station 1) Fire Dept.	(902) 539-1279
Sydney (Station 2) Fire Dept.	(902) 562-0442
Sydney River Vol. Fire Dept.	(902) 564-9989
Grand Lake Road Vol. Fire Dept.	(902) 562-3233
South Bar Vol. Fire Dept.	(902) 539-0163
Westmount Vol. Fire Dept.	(902) 539-9773
Hazardous Materials (HazMat) Team	(902) 539-8956

East

Dominion Vol. Fire Dept.	(902) 849-3870
Glace Bay Vol. Fire Dept.	(902) 849-9758
New Waterford Vol. Fire Dept.	(902) 862-7112
Reserve Mines Vol. Fire Dept.	(902) 849-4309
Scotchtown Vol. Fire Dept.	(902) 862-8362

North

North Sydney Vol. Fire Dept.	(902) 794-4700
Sydney Mines Vol. Fire Dept.	(902) 736-2298

Rural

Albert Bridge Vol. Fire Dept.	(902) 562-2422
Bateston Vol. Fire Dept.	(902) 733-3688
Big Pond Vol. Fire Dept.	(902) 828-3138
Birch Grove Vol. Fire Dept.	(902) 737-2233
Boisdale Vol. Fire Dept.	(902) 871-2482
Christmas Island Vol. Fire Dept.	(902) 622-2737
Coxheath Vol. Fire Dept.	(902) 564-5676
Donkin Vol. Fire Dept.	(902) 737-2079
East Bay Vol. Fire Dept.	(902) 828-2432
Florence Vol. Fire Dept.	(902) 736-3588
Frenchvale Road Vol. Fire Dept.	(902) 794-7332
Gabarus Vol. Fire Dept.	(902) 884-2090
Georges River Vol. Fire Dept.	(902) 794-2998
Howie Centre Vol. Fire Dept.	(902) 564-9299
Louisbourg Vol. Fire Dept.	(902) 733-2393
Marion Bridge Vol. Fire Dept.	(902) 727-2046
Mira Road Vol. Fire Dept.	(902) 539-3572
New Victoria Vol. Fire Dept.	(902) 862-7778
Northside East Bay Vol. Fire Dept.	(902) 828-2180
Port Morien Vol. Fire Dept.	(902) 737-2528
Southside Boularderie Vol. Fire Dept.	(902) 736-6742
Tower Road Vol. Fire Dept.	(902) 849-1555

Glossary

Catchment is the collection of water specifically over a natural drainage area or catchment basin.

Ecosystems are communities of living organisms interacting with each other and their physical environment.

Invasive plants are usually introduced to a given location. They are plants that have not evolved with the present ecosystem and they upset the natural balance with aggressive growth behaviours, uninhibited by natural predators or limitations in the area, outcompeting the present vegetation.

Low impact developments (LIDs) are structures and techniques that homeowners can do on a small scale to simulate what happens to rain and snowmelt in nature. These can include landscaping like rain gardens and bioswales or they can include techniques such as porous paving and redirecting downspouts. LIDs allow us to use stormwater as a resource.

Surcharged sewers are overwhelmed with extra flow.

Native plants are indigenous to a given location. They are plants that have evolved to thrive with the temperatures, precipitation, soil, etc. in a given habitat.

Naturalized plants are introduced to a given location. They are plants that are not native to the area but thrive in the present conditions and do not appear to upset the natural balance of that ecosystem.

Non-potable water is water that has not been treated, examined, or approved safe for drinking.

Pervious or **permeable** means that it allows water to move through, such as gravel as a pervious driveway. Contrary, examples of impervious or impermeable materials are paved driveways or rooftops that do not allow water pass through and so it must move over top as runoff.

Pollinators are animals that move pollen from the male parts of a plant to the female parts allowing seed production to occur. Insects, such as native bees and ants, birds, and mammals are examples of pollinators.

Runoff is precipitation that flows over surfaces because it was not able to be absorbed.

Sanitary Sewer is the system of municipal infrastructure that carries wastewater from homes and businesses, including drainage from sinks and toilets.

Wastewater is any water that has been affected by humans including sanitary sewer and stormwater.

This guide outlines important information about flood risks and how properties can be prepared to reduce flood impacts. This guide also includes information on what you should do during a flood, and how to clean up after a flood event while protecting your health.

A helpful flood prevention checklist is included at the end of the guide to highlight ways you can protect your home and family during and after a flood event.

CBRM Wastewater Operations

ACAP Cape Breton
Environmental Action & Education