



Institute for Catastrophic  
Loss Reduction

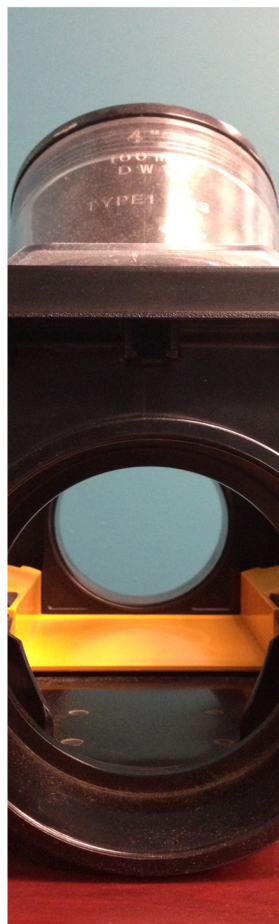
Building resilient communities

Designed for safer living®

Focus on

# Backwater valves

Designed for safer living® is a program endorsed  
by Canada's insurers to promote disaster-resilient homes



## About the Institute for Catastrophic Loss Reduction

The Institute for Catastrophic Loss Reduction (ICLR), established in 1997, is a world-class centre for multidisciplinary disaster prevention research and communication. ICLR is an independent, not-for-profit research institute founded by the insurance industry and affiliated with Western University, London, Ontario.

The Institute's mission is to reduce the loss of life and property caused by severe weather and earthquakes through the identification and support of sustained actions that improve society's capacity to adapt to, anticipate, mitigate, withstand and recover from natural disasters.

ICLR's mandate is to confront the alarming increase in disaster losses caused by natural disasters and to work to reduce disaster deaths, injuries and property damage. Disaster damage has been doubling every five to seven years since the 1960s, an alarming trend. The greatest tragedy is that many disaster losses are preventable. ICLR is committed to the development and communication of disaster prevention knowledge. For the individual homeowner, this translates into the identification of natural hazards that threaten them and their home. The Institute further informs individual homeowners about steps that can be taken to better protect their family and their homes.

### Waiver

The tips and information contained in this booklet are only general guidelines and are to be used as information only. This booklet is not designed or intended to replace advice from licenced plumbing professionals or supersede recommendations from product manufacturers and installers. Since each situation is different, contact a professional if you have questions about specific issues. Contact your municipal government for any questions or concerns you have about basement flooding, storm water management etc. and to determine what is and isn't allowed in your jurisdiction. ICLR recommends that measures taken to address the concerns outlined in this booklet be handled by professionally licensed experts and that building permit and inspection requirements be followed.

ICLR accepts no responsibility of liability for:

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- Any personal injury or bodily injury, including death, and any loss or damage caused by water to insured or uninsured structures and /or property as a result of actions outlined in this document

## **Focus on Backwater valves**

Increasingly, municipal governments, homeowner insurers and homeowners are turning to backwater valves as reliable devices that can be used in tandem with other measures to reduce the likelihood of sewage and/or storm water backing up into basements of homes.

While backwater valves themselves tend not to be particularly complex devices, the manner in which they need to be installed can be complicated depending on how a home's plumbing and drainage systems are set up. What's more, simply having a backwater valve isn't enough to significantly reduce (we never say eliminate) the risk of basement flooding.

First, backwater valves represent just one of several measures that should be taken to reduce the risk, with other efforts including such actions as severing downspouts from the foundation drain (aka weeping tiles, weepers, footing or perimeter drains) and redirecting the flow onto the surface of the lot, disconnecting foundation drains from sanitary sewer connections, re-grading the soil immediately around the home to improve runoff, and installing window wells and window well covers, to name but a few.

Second, certain mechanical backwater valves need to be inspected and maintained on a regular basis to keep them in working order; as things like debris and coagulated cooking fat can impede the raising and lowering of the gate that prevents sewage or storm water surcharge into a basement.

Backwater valves, and their distant cousins gate valves and inline check valves, aren't particularly new. However, as the instances of basement flooding and sewer backup occur more regularly, talk of the devices has become more common. Unfortunately, so, too, have myths and misinformation about backwater valves.

This booklet will explain what backwater valves are, what they do, how they can fail, and how they should be inspected and maintained. The booklet will also provide advice on what to consider when having a backwater valve installed and will go through the different types of backwater valves.

## What are backwater valves and what do they do?

For several decades, gate valves and inline check valves have been used to prevent sewage and storm water from backing up into basements of Canadian homes, and the National Plumbing Code of Canada and most provincial plumbing codes still allow for installation of these devices (though gate valves are no longer widely used to prevent sewer backflow in Canadian homes).

Gate valves involve the manual installation or manual turning to the off position of a barrier that blocks sewage from surcharging into a basement via the sewer lateral, storm water from entering via the storm lateral, or both from entering via a combined sewer lateral.

**ICLR recommends the removal of reference to manual sewer backflow prevention devices, including gate valves, in the National Plumbing Code of Canada. The Institute also recommends the removal of reference to manual floor drain screw caps in the NPCC. Both of these types of devices require that someone be home to operate or install them in order to prevent sewer backup/basement flooding, which is not always possible or practical.**

Inline check valves are one-way devices that allow sewage and/or storm water to exit – usually a branch line of a home's sewer drain - but not regain entry into that line. Inline check valves are still widely used across the country.

Both gate valves and inline check valves have their pitfalls.

Gate valves require the user be home in order to manually install the gate or turn the valve to the off position. This may not always be possible or practical.

Inline check valves are always closed (i.e. 'normally closed') and therefore are not suitable for installation on main sanitary sewer lines. Plumbing codes in Canada require that sewage backflow devices on main sanitary sewer lines be normally open in order to allow for the free exchange of air and the venting of sewer gases.

Another downfall of inline check valves is the difficulty in accessing these valves should maintenance be necessary. First, when a basement is finished, these valves (there would need to be one for every branch line in a basement, see Figure 3) often end up being located under or near interior walls, furnaces, hot water tanks or other obstacles. Second, drain snakes commonly get caught in these valves, causing damage which often leaves the unit non-functional.

In recent years, many municipal governments, homeowner insurers and homeowners have been turning to the normally open backwater valve to prevent backup of wastewater into basements.

A backwater valve is a device that is installed on a respective main lateral (sanitary and/or storm or combined) in the floor at the foot of the basement wall closest to where the lateral exits the house to connect with the municipal sewer system. The relatively simple device contains a gate that, when down (i.e. normally open, to permit venting), allows waste water to easily exit the house. However, when forced up as the municipal sewer system backs up, the gate prevents waste water from entering the home and coming up through the floor drain and/or basement plumbing fixtures such as sinks, toilets and showers.

After a thorough plumbing inspection by a qualified professional has been completed (a very important and highly recommended first step) and the homeowner has contacted their municipal government to find out about the rules, regulations and requirements regarding the installation of sewage backflow prevention devices, the homeowner may consider installing a backwater valve.

**Did you know?**

**Several cities across Canada have enacted bylaws requiring backwater valves on the sanitary lateral in new construction, but the City of Ottawa is unique in requiring valves on both the sanitary and the storm lateral.**

Since the first introduction of these devices close to 20 years ago, almost 500,000 have been sold in Canada. Until recently, numerous Canadian municipalities recognized only mainline backwater valves as the sewage backflow prevention device of choice, issuing plumbing permits and offering incentives only for this type of valve. Many Canadian homeowner insurers, in turn, only offered premium reductions for sewer backup coverage for installation of a mainline backwater valve and, in some cases, may require a mainline backwater valve as a condition of insurability.

In recent years, another player has entered the field with a product that uses an electro-pneumatic valve. This system employs an inflatable bladder, triggered by sensors designed to detect sanitary and/or storm water surcharge. It signals an on-board compressor to automatically inflate a bladder to seal off the sanitary sewer and/or storm water pipes. The system is designed to delay bladder deflation for 30 minutes for the sewers to stabilize. Based on the sensors detecting no existing sewer backup for 30 minutes, the bladder is automatically deflated and returned to the standby

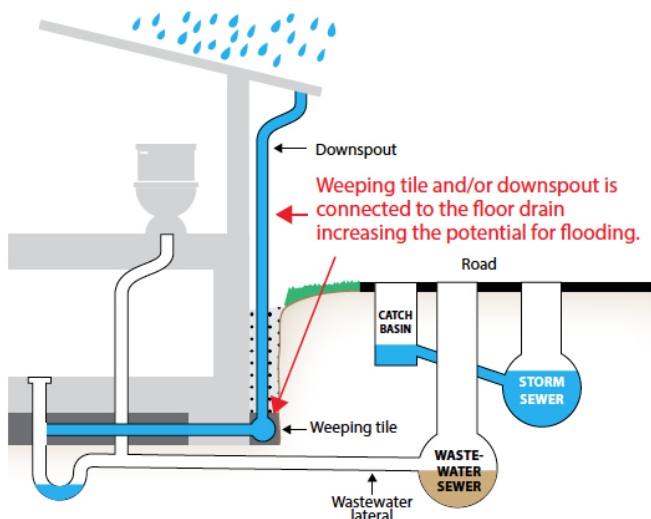
position (see Figure 4).

Unlike traditional mechanical valves, this product lessens the need for homeowner maintenance. The on-board computer conducts a weekly self-analysis which tests every individual component (including the week-long battery in event of a power outage) and warns the homeowner to call a plumber if the device isn't working properly. The homeowner is automatically notified both if the system is not working and when the bladder is deployed.

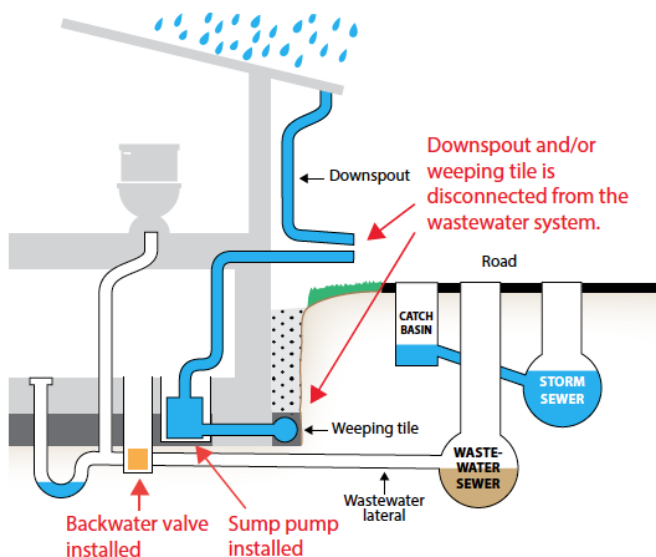
Backwater valves should be installed based on the manufacturer's instructions, which have specifications for both placement and grading. Proper placement and installation of the backwater valve is extremely important. If placed in the wrong location relative to other plumbing fixtures on the sewer lateral, the valve could be bypassed and provide no protection. If the valve is placed in the wrong location, sewer backup pressure could build and crack the basement floor and lead to flooding. Additionally, if the foundation drain is still connected to the sanitary sewer lateral (or to a combined lateral) downstream of the valve, sewage could be forced into the foundation drain and lead to structural damage, which may also lead to infiltration flooding and other problems (see Figures 1 and 2).

**Many municipalities offer subsidies to offset the cost of installing a backwater valve. Therefore, it is imperative that insurers recommend - and homeowners install - a valve that is recognized by their local government. In most cases, municipalities will require a normally open backwater valve. Some local governments offer incentive programs only to those homeowners who have experienced sewer backup in the past or only to those who live in high risk areas. Homeowners are encouraged to contact their local government to get all the necessary information they require before embarking on a backwater valve installation.**

## Connection of foundation drains to sanitary vs sump pump system



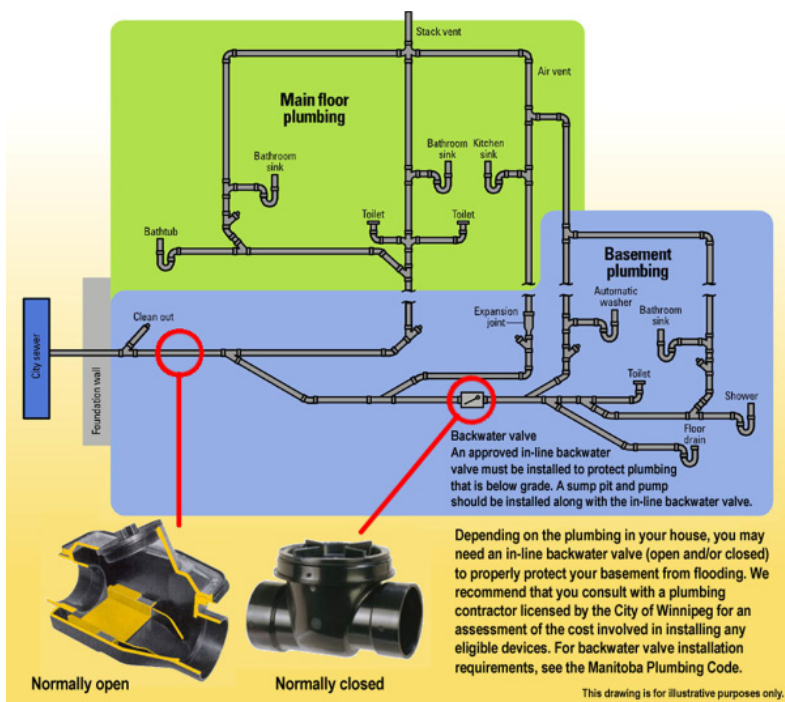
**Figure 1:** In the vast majority of cases, foundation drainage to sanitary systems should be avoided. (Reproduced and/or adapted with the permission of the Regional Municipality of Halton)



**Figure 2:** Proper use of a sump system to pump foundation drainage to the surface of the lot. (Reproduced and/or adapted with the permission of the Regional Municipality of Halton)



## Typical household backwater valve installations



**Figure 3** Typical household backwater valve installations  
(Source: City of Winnipeg)

## Existing homes vs new homes

Cost and ease of installing a backwater valve depends on several factors, the main one being whether the valve is going into an existing home as a retrofit, or whether it is going into a new home.

In an existing home, installation of a backwater valve requires breaking up portions of the concrete basement floor and cutting a section out of the sanitary or combined sewer lateral. Until recently, the amount or length of basement floor that had to be lifted depended on how much slope was required on the respective sewer lateral being worked on. In order to get the proper downward slope of a minimum two percent (to allow waste water to properly exit the house and drain into the municipal system and to allow the backwater valve to work properly), it was sometimes necessary to break up a fair length of cement floor - often four to five feet, and sometimes more. This wasn't as much an issue if a basement was unfinished, but got costly and disruptive when it was.



Recently, however, a new backwater valve was developed especially for retrofitting into existing houses. The 'Fullport retro (ML-FR4)' has a minimum 'fall' through the body, so it requires that the installer need only dig a hole in the basement floor that is big enough for the valve to be dropped in (see Figure 5).

An alternative for retrofits involves use of a product called the 'Adapt-A-Valve'. While this device can go into the basements of homes, it can also be installed on the sewer lateral outside of a house, by-passing the need to break up the basement floor (see Figure 7).

Another option would be the sensor/bladder product noted earlier. The product is designed for relatively simple, unobtrusive installation in the y shaped cleanout in a home's basement. If a home has a t shaped cleanout, installation would be more involved, as the cleanout would first have to be converted. A unique element of the device is that it tests itself weekly to ensure operability when it is really needed.

When it comes to new construction, installation of a backwater valve is usually considerably easier and less expensive, as the valve would be installed prior to the pouring of the concrete floor. Such an installation would likely cost little more than the price of the valve itself.

Regardless of the type of sewer backflow prevention device chosen, the homeowner will need the assistance of a licensed plumber to conduct the initial plumbing investigation (which will, in part, determine whether the

**Backwater valves and backflow preventers are not at all the same thing**

**It is very common to hear a backwater valve being called a backflow valve, backflow preventer or backflow prevention device and vice versa, but they are very different from one another.**

**Where a backwater valve is used to describe a device designed to prevent sewer backup, a backflow preventer or backflow prevention device is designed to prevent contamination of a municipality's potable water supply.**

**Other terms often used incorrectly in lieu of backwater valve include 'gate valve' and 'check valve'. And while each is a legitimate term describing a particular device, none should be confused with a backwater valve.**

**As such, if using the term 'backflow prevention device' in reference to basement flood risk reduction, it is imperative to qualify the term with the word 'sewer' – as in 'sewer backflow prevention device'.**

**When speaking of basement flood prevention, it is important to get the terminology correct. Words matter.**

## Different types of backwater valves



Figure 4 (above): Aqua-Protec device  
(Source: Inflatolix)

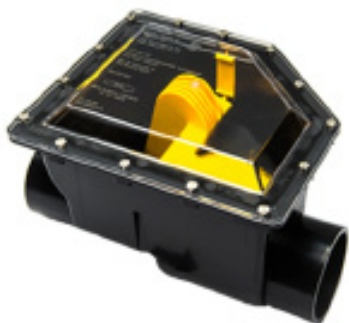


Figure 5 (above): Fullport retro (ML-FR4)  
(Source: ICLR)



Figure 6 (above): Mainline backwater valve  
(Source: ICLR)

Figure 7 (below): Mainline Adapt-A-Valve  
(Source: Mainline)



home's foundation drain is connected to the storm or sanitary system or whether it is connected to a combined system) and to install the sewer backflow prevention device. A proper plumbing permit should be taken out and required municipal inspections conducted. This is imperative if the homeowner wishes to tap into a municipal subsidy program to pay for some or all of the work. Homeowners may consider talking to their municipal government to see if they have a list of pre-approved plumbers who can install backwater valves.

## How do backwater valves most often fail?

Backwater valves are increasingly being recognized for their effectiveness in reducing the risk of damage from sanitary and storm sewer backup, but they are not panaceas or silver bullets. A backwater valve is not a guarantee that the risk of loss and damage from sanitary and/or storm surcharge will be totally eliminated, or that sanitary and/or storm backup won't be experienced from a failure of the valve itself.

Some homes experience damage from sanitary and/or storm sewer backup even though they have a backwater valve in place. In particular, if a backwater valve is not properly maintained, sanitary waste and/or storm water can back up into a home during an extreme rainfall event. Therefore, homeowners need to be educated about proper inspection and maintenance of the valves if the devices are to be effective.

**According to the manager of a municipal backwater valve subsidy program in one large Canadian city, the staffer was called to the home of a woman who reported that although she had a backwater valve in place, her basement still experienced sewer backup during a heavy rainfall event. Upon inspection of the valve, the gate was found to be stuck in the open position as the result of years of pouring cooking fat down the kitchen sink. The coagulated grease built up in the valve, preventing the gate from properly opening and closing. The story illustrates the importance of conducting regular inspections and maintenance of backwater valves - and of not disposing fats, oil and grease – or FOGs – down drains.**

In 2011, the City of Ottawa released a study of the effectiveness of backwater valves, both of the normally open (usually on the sanitary lateral) and normally closed (usually on the storm lateral) variety. The report serves as one of the only official third-party sources of information on the subject of backwater valve efficacy and failure. Other stories of backwater valve failures circulate from time-to-time but, aside from the Ottawa review, have largely proven to be anecdotal and not formally documented or supported

with evidence. It is important to note that while sanitary or storm water backup into a basement where a backwater valve is installed may be due to valve failure, it may also be from some other source (eg. clean water may enter a basement through cracks in walls or via windows or below grade doors). Often, determining the source of basement flooding requires an engineering or plumbing investigation.

The Ottawa report came as the result of a July 2009 extreme rainfall event that resulted in approximately 1,500 basement flooding incidents in the west end of the city. Out of these known incidents, almost eight percent happened in homes where a backwater valve was present on the storm sewer lateral. A comprehensive review was undertaken by Ottawa to understand what caused water to enter homes protected by backwater valves, to investigate city standards with regard to current industry technology and practices, and to see what other municipalities were doing to prevent sewer backups.

Through its investigation, the city determined that the main cause of failure of the (mostly 'normally closed') backwater valves in question centred around the valve cover; as one third of the backwater valve covers inspected were not screwed down tightly or were cross-threaded, resulting in failure of the valve. Ottawa determined that many homeowners were not aware of the appropriate maintenance and care required to get the greatest protection from their backwater valve.

One of the most common reasons for basement flooding that occurs after installation of a backwater valve actually has nothing to do with a failure of the valve itself but, instead, is the result of the failure to disconnect foundation drains that are connected to the sanitary or combined sewer system (see Figures 1 and 2).

If the foundation drain of a home is still connected to the sanitary or combined sewer lateral downstream of the valve, sewage could be forced back into the weeping tiles and lead to structural damage to the foundation. This could also lead to infiltration flooding.

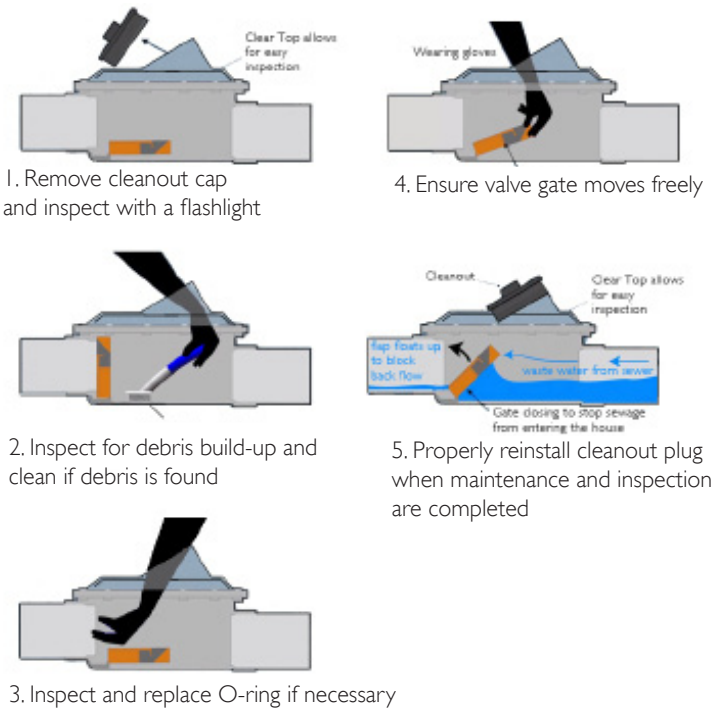
In cases where a home's foundation drain is connected to the municipal sanitary or combined sewer system, and where there are plans to install a backwater valve, it is imperative that the home's foundation drains be disconnected from the sanitary or combined system and redirected to a sump pit. If this is not done, the basement may flood as the backwater valve closes, because the valve has trapped what may be a rapidly growing

amount of water coming from the home's foundation drain and other sources. This is known as 'self-flooding', and is common where a proper plumbing inspection was not conducted prior to installation of a backwater valve.

Other failures associated with backwater valves could be connected to issues discussed in this next section.

## How should backwater valves be inspected and maintained?

Like many things in a home, backwater valves require periodic maintenance to ensure proper performance over time. An improperly maintained valve may fail during a flood event. Many backwater valves come with a see-through top so the valve can easily be inspected to determine if it is clogged with debris or otherwise not functioning properly. It should be noted that homeowners may require the assistance of a qualified plumber to carry out maintenance or repairs of a valve.



**Figure 8: Backwater valve maintenance**  
(Source: ICLR)

For Mainline Backwater Valves, the manufacturer provides the following maintenance instructions, which it states should be performed at least twice a year:

- Remove cleanout plug on top of the valve and inspect visually;
- Inspect inside the valve with a flashlight;
- Inspect for debris build-up in the valve body, on or beneath the gate;
- Flush clean if debris is found;
- Inspect and replace O-ring if necessary;
- Ensure valve gate moves freely, and;
- Properly reinstall cleanout plug when maintenance and inspection are complete

(Source: Mainline Backwater Valves, 2012).

The City of Edmonton has also provided backwater valve maintenance recommendations that it suggests be completed at least annually (preferably in the early spring before snow-melt), including ensuring the valve is accessible, removing debris from the valve, lubricating valve hinges and ensuring the cleanout cap is properly installed.

ICLR has produced a video on backwater valve maintenance, which can be found at <https://www.youtube.com/watch?v=vJN9YKvnIYk>



Figure 9: Backwater valve maintenance video  
(Source: ICLR)

## Knowing when your device is in use

Where a backwater valve has been installed and the home is being subjected to a heavy rainfall event, it is imperative that the homeowner be aware when the flap or gate in the valve is in the closed position. As discussed, this is because a closed backwater valve will trap water from the foundation drain and other sources in behind it. If this water exceeds the capacity of the pipes that are holding it (a very real possibility if the rainfall is very heavy, the storm is prolonged and/or homeowners use water during the storm), it will work its way up through the floor drain and other exit routes, including sinks, toilets and showers. In extreme circumstances, the water may also create enough hydrostatic pressure to damage foundation drains and possibly even crack the concrete slab floor.

It is always recommended that homeowners reduce water use during heavy rainfall events, including refraining from flushing toilets, running dishwashers, washing machines and taps, and not taking a bath or shower. While this is equally true both for those with and without a backwater valve (it is good practice to reduce the amount of water entering a municipal sewer system during heavy rainfall events, regardless of whether one has a valve or not); it is particularly important to reduce water use if one has a backwater valve. If home plumbing is used when the backwater valve is closed, waste water will have no way to exit the home until the valve has reopened, risking self-flooding.

If homeowners aren't sure if the valve is closed, they can check it – as many backwater valves are made with a clear plastic top to allow for easy inspection.

The manufacturer of the sensor/bladder type of sewage backflow prevention device mentioned earlier also produces a separate device that is capable of detecting and stopping water leaks by shutting off a home's main water supply. The device can be paired with the sewage backflow prevention device to ensure that the homeowner doesn't use water when the bladder has been deployed.



## Backwater valve comparison



Features	Mainline Fullport	Fullport Retro (ML-FR4)	Adapt-A-Valve	Aqua-Protec
Operating principle	Mechanical	Mechanical	Mechanical	Sensor controlled, electric pneumatic
Device CSA or CSC approved <sup>1</sup>	Yes	Yes	Yes	Yes
Recognized by municipal incentive programs	Location dependent - Inquire	Location dependent - Inquire	Location dependent - Inquire	Location dependent - Inquire
Recognized by insurers for premium discounts	Company dependent - Inquire	Company dependent - Inquire	Company dependent - Inquire	Company dependent - Inquire
Can be installed inside or outside the home	Inside	Inside	Inside/Outside	Inside
Requires excavation to install	Yes	Yes	Yes	No <sup>2</sup>
Contains an integrated alarm	No	No	No	Yes
Can be connected to a home alarm system	No	No	No	Yes
Requires that downspouts and foundation drains be disconnected from sanitary sewer connection <sup>5</sup>	Yes	Yes	Yes	Yes

1. Canadian Standards Association and Canadian Standards Council. Current status as of January 4, 2016
2. No additional work is required for a y-shaped cleanout. For a t-shaped cleanout, conversion to a y-shape with some excavation is necessary. If foundation drainage is connected to sanitary sewer lateral, an excavation will be required to disconnect foundation drainage and install a sump pit/pump system
3. Relevant if the home's foundation drains are connected to the municipal sanitary – as opposed to the storm – sewer system.

## Glossary of key terms

**Backflow preventer:** A device which stops the undesired reversal of water flow against normal direction, preventing contamination of potable water supplies. Not to be confused with a Sewage backflow prevention device or Sewage backflow preventer.

**Backwater valve:** (sometimes referred to as a backflow valve): A device that is placed in the sewer lateral that helps to prevent water from backing up from the municipal sewer into a basement.

**Branch line:** Describes any part of a drain system other than the main, riser or stack. Also known as a lateral line.

**Cleanout:** Cleanouts allow for access to the home's sewer laterals for cleaning and maintenance purposes. Cleanout ports may be located either in the basement, close to where the sanitary sewer lateral enters the basement, or outside of the home, usually somewhere close to the foundation or between the home and the public sewer system.

**Combined lateral:** A pipe designed to convey both sanitary sewage/waste water and storm water from a private property to a public sewer system. Usually sewer laterals are owned by and are the responsibility of the owner of the private property.

**Downspout:** A vertical pipe that conveys roofwater from eavestroughs to either weeping tiles if the downspout remains 'connected', or to the lot surface if it has been 'disconnected'.

**Downstream:** In plumbing, refers to the direction in which flow is going. Regarding a backwater valve, that which is deemed to be 'downstream' or below the valve would include any plumbing connections inside the home, including branch lines to sinks, toilets, bathtubs and showers.

**Floor drain:** A plumbing fixture found in the lowest floor of a structure, mainly designed to remove any standing water near it.

**Footing drain:** (See Weeping tiles)

**Foundation drain:** (See Weeping tiles)

**Gate valve:** A device that opens or closes by lifting or lowering a round or rectangular gate/wedge out of or into the path of a fluid.

**Hydrostatic pressure:** Generally, refers to the pressure that any fluid in a confined space exerts. In relation to basement flooding, water collecting around a home's foundation or being forced through laterals, floor drains or weeping tiles, can cause basement floor slabs to heave and/or walls to leak and even collapse.

**Inline check valve:** A valve that normally allows fluid (for the purposes of this publication, sewage) to flow through it in one direction only. 'Inline' indicates the location of the valve, in this case, on branch lines leading from specific plumbing fixtures, and not on the main line, or lateral. Inline check valves are usually of the 'normally closed' variety.

**Main line:** Describes the main sanitary, storm or combined lateral line, other than branch lines, the riser or stack.

**National Plumbing Code of Canada:** The national model plumbing code that sets out technical provisions for the design and installation of new plumbing systems, the provisions of which apply to the extension, alteration, renewal and repair of existing plumbing systems.

**Normally closed backwater valve:** A sewage backflow prevention device, usually located directly on the storm lateral or on a branch line, that allows sewage/waste water and/or storm water to exit through it in one direction only and which remains closed at all times. (See Inline check valve).

**Normally open backwater valve:** A sewage backflow prevention device, usually located directly on the main sewer and/or storm lateral, which remains open when not in use (i.e. when there is no surcharge) in order to facilitate the free exchange of air and venting of sewer gases as prescribed by the National Plumbing Code of Canada.

**Plumbing fixture:** A device for the distribution and use of water in a building. Examples include sinks, toilets, showers and bathtubs.

**Perimeter drains:** (See Weeping tiles)

**Roof leader:** (See Downspout)

**Sanitary lateral:** A pipe designed to convey sanitary sewage/waste water

from a private property to a public sewer system. Usually sanitary laterals are owned by and are the responsibility of the owner of the private property.

**Sanitary/Sewage backflow:** Sewage that is forced back through storm and sanitary sewer laterals from sanitary, storm or combined sewers. Sewage typically enters lower levels of a home through plumbing fixtures, including floor drains, sewer cleanouts and basement toilets, sinks and showers. Failure of sewer laterals due to clogs by tree roots, coagulated cooking fat or other obstructions may also lead to sanitary sewage backflow.

**Sanitary surcharge:** (See Sanitary/Sewage backflow)

**Self-flooding:** Occurs when water builds up and becomes trapped behind (or downstream of) a closed backwater valve and eventually escapes into a basement via floor drains or other fixtures. This water may come from weeping tiles (if a home's foundation drains are connected to the sanitary sewer system) or downspouts that are connected to foundation drains, baths, showers, dishwashers, washing machines, etc. Residents with backwater valves are advised to disconnect foundation drains from the sanitary system and direct the water to a sump system. All homeowners are advised not to use large amounts of water during heavy rainfall events, particularly if a backwater valve is in place.

**Sewage backflow prevention device:** Any device, including a mainline or inline backwater valve, gate valve, check valve or electro-pneumatic system, that is installed either directly on a sanitary, storm or combined sewer lateral or branch line that allows sewage/waste water and/or storm water to exit a home but not re-enter should surcharge occur.

**Storm lateral:** A pipe designed to convey storm water from a private property to a public sewer system. Usually storm laterals are owned by and are the responsibility of the owner of the private property.

**Sump pump:** A device, whether a pedestal pump or a submersible pump, that is placed into the sump pit to pump weeping tile discharge out of a structure's basement.

**Upstream:** In plumbing, refers to the source of flow or the direction from which flow is coming. Regarding a backwater valve, that which is deemed to be 'upstream' or above the valve would include any connections, inlets, manholes etc located outside of the house and beyond, including the public

sewer system, manhole covers etc.

**Valve:** A device that regulates, directs or controls the flow of fluids or gases by opening, closing, or partially obstructing a single or multiple passageways.

**Weeping tiles or weepers:** A series of tiles or a perforated pipe located along the bottom of a building's foundation that is used to collect and drain groundwater away from the building.











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