

Preventing Sewer Backups

To safeguard your home against flooding from sewer backups, you should understand your home's basic plumbing and the preventative techniques discussed in this brochure. Basement flooding can result in serious property damage. Be mindful of your health and safety when cleaning up your flooded basement. Floodwater may carry waterborne diseases, corrosive agents, irritants and sharp objects. Electrical accidents are possible because of contact between appliances and water. Dress appropriately by wearing protective eyewear, gloves, boots and a mask. Open windows and stay away from electrical equipment and electric outlets that are under water, or shut off the electrical power.

HOUSE PLUMBING

In Washington, DC, many areas of the city have a combined sewer system. This means that both sanitary water from normal water use (for example, showering, laundry, toilet flushing, etc.) and rainwater or snow melt are carried away in the same sewer system to the Blue Plains Advanced Wastewater Treatment Plant. Your home or building may have the following plumbing connections to the combined sewer system:

1. **Foundation drain** – Perforated pipe along the foundation designed to keep water out of the basement.
2. **Sump Pump** – The foundation drain is connected to the sump pump, usually installed in a pit in the basement floor, which lifts the water to discharge it outside and away from the house or to the sewer system.
3. **Downspout Leader** – A shallow pipe that runs around the exterior of the house, to which all the downspouts are connected as well as the sump pump.
4. **Downspout Connection** – The pipe that collects the storm flow from the downspout leader and miscellaneous yard drains and then connects to the sewer lateral.
5. **Sinks**
6. **Washing Machines**
7. **Showers**
8. **Toilets**
9. **Floor drains in basement or garage**
10. **Yard or stairwell drains**

Frequently Asked Questions:

- 1. Can I use my plumbing while the backwater valve is engaged during a storm or when there is a lot of snow melt?**

Under normal conditions, so long as there is not a major rainfall or snow melt, you won't notice that you have a backwater valve. You will be able to use your plumbing normally. If your sewer lateral starts to back up, the backwater valve will be activated to block off the lateral from the basement so that you don't experience flooding. When activated, the valve won't allow any water you use to be carried off to the sewer in the street. If you use your plumbing when the backwater valve is activated, you will cause flooding from your basement plumbing fixtures.

- 2. Will I need to be home during a rain event to activate the device?**

You will not have to be home to activate the backwater valve.

- 3. How much time will it take to install a backwater valve? Do I need to be home for installation?**

This depends on your plumber and whether the device will be installed inside or outside. Installation time will depend on whether the plumber can readily locate your buried sewer lateral. If the basement floor has to be jack-hammered for installation, a separate appointment may be required for repairing the concrete.

- 4. I live in the basement of a 2-unit building. If a backwater valve is installed for the building, what effect will this have on the upper floor occupants?**

If your building has only one sewer lateral connecting to the public sewer in the street, you will have to install a backwater valve on the lateral. This means that when the backwater valve is activated, no one in the building will be able to use the plumbing. If the plumbing in the building is used, it will cause flooding to your basement apartment. If each unit has its own sewer lateral, this would not be a problem.

- 5. Are there backwater valves with alarms to let you know when valve is activated so you are reminded not to use your plumbing?**

Yes, there are some electrical and battery powered alarms that indicate when water has backed up into the backwater valve.

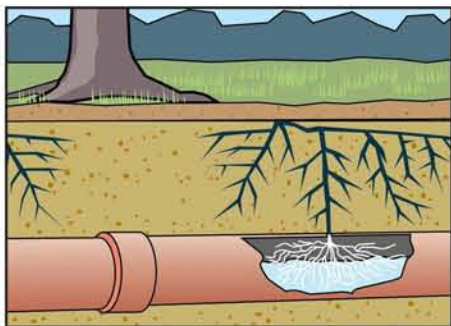
- 6. In a building with multiple units, can each unit have an alarm for the backwater valve so that everyone knows that the plumbing is off limits until the sewer lateral backup clears?**

No, the alarm is going to be located near the backwater valve.

Sewer Lateral Blockage or Collapse

If your sewer lateral is blocked for any reason, your household waste has nowhere else to go and backs up into your building. Two common causes of blockage are disposal of cooking fats, oils and grease (FOG) down your drain and clogging from tree roots. Discarding cooking fat, oil or grease down the sewer can cause clogs as these wastes may solidify in the piping.

Trees planted above sewer laterals can cause problems if the tree roots enter the pipe creating a blockage. Once roots find this source of moisture, they continue to grow and the blockage becomes more severe.



Tree Root Migrating into Pipe

If the sewer lateral is broken or collapsed, your sanitary waste and drainage cannot be effectively carried to the public sewer in the street. In this case, a plumber will have to dig up the sewer lateral and replace the broken portion.

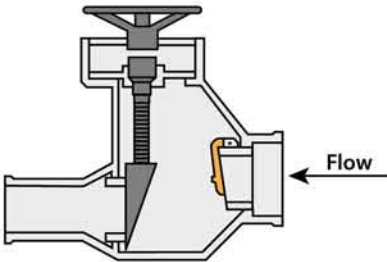
One way to determine if your sewer lateral is clogged or collapsed is to hire a plumber to do a TV inspection of the line using a small, remotely operated camera.

How to avoid sewer lateral problems:

- Do not pour fats, oils and grease down your drain. Instead, put this cooking waste in a melt-proof container, such as a tin can ready for recycling. Once the fats cool and solidify, dispose of the can with your household trash.
- Plant trees several feet away from sewer laterals.
- Keep your sewer lateral clear of roots by occasionally flushing a small quantity of copper sulfate crystals in a toilet. The copper sulfate reduces the root growth without harming the trees. The treatment may not eliminate the tree root problem but it should make problems less frequent.
- Have a licensed plumber clean your sewer lateral at regular intervals.
- Be careful when doing any type of digging or construction in your yard that you don't damage the lateral. Installing flag poles, fence posts, lighting, play equipment, and other features can easily break or dislodge a sewer lateral.

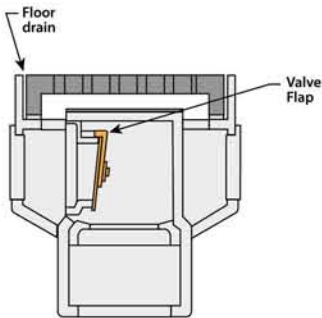
Other facts on backwater devices:

- Some devices are equipped with a manual valve in addition to the automatic valve. If the automatic valve does not engage and you see evidence of sewage back up, you would manually turn the backwater valve to a closed position. This device provides some redundant protection assuming you are on the premises when the backup occurs.



Backwater Valve with Manual Gate Valve

- Combination floor drain and backwater valves can be very helpful if you do not have plumbing fixtures in your basement and the only source of sewer backup is the floor drain.



One Type of Floor Drain Backwater Valve

Floor drain plugs are also an option that you can discuss with your plumber.

- Regardless of type, backwater valves should be cleaned every six months.

Indoor Installation of Backwater Valve

Advantages: Easy accessibility. Weather and elements are not a factor. If there is any spillage or malfunction, it is easy to notice.

Disadvantages: Cleaning is very messy. Debris and waste will be in your home. Installing in an existing house requires jack-hammering the basement floor above the sewer lateral. It is often difficult to locate the sewer lateral making it hard to know where to jack-hammer.

Outdoor Installation of Backwater Valve

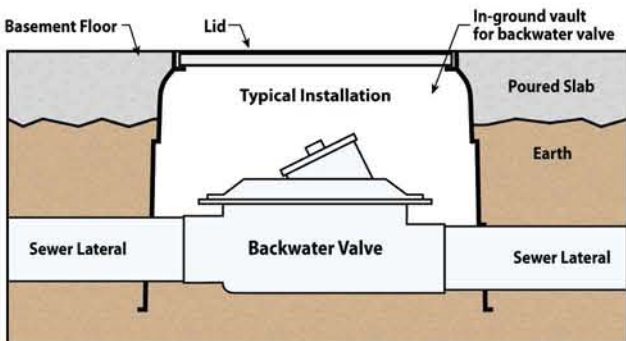
Advantages: Easy to clean, no concerns about debris in the home.

Disadvantages: The weather and elements, especially cold weather, make cleaning and accessing under inclement conditions challenging. Outdoor backwater valves must be buried underground and require a long brush to clean and are hard to access. Also, there may be the tendency to forget about its maintenance (out of sight; out of mind).

How is a backwater valve installed?

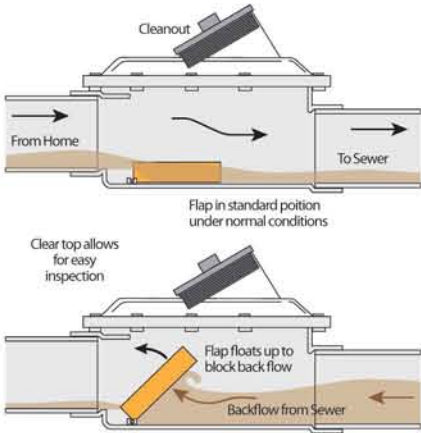
A retrofit (installation on existing home) will require uncovering the building sewer lateral.

This requires some concrete removal around the area of installation. Once installed, the backwater valve cover must be accessible for servicing. If installing the backwater valve outdoors, it must be installed within the boundaries of your property line. In DC, the property line is often at the front wall of the building. If this is the case, you will not be able to install the backwater valve in the front yard. Installation of these valves should only be performed by a licensed professional plumber.



How does a backwater valve work?

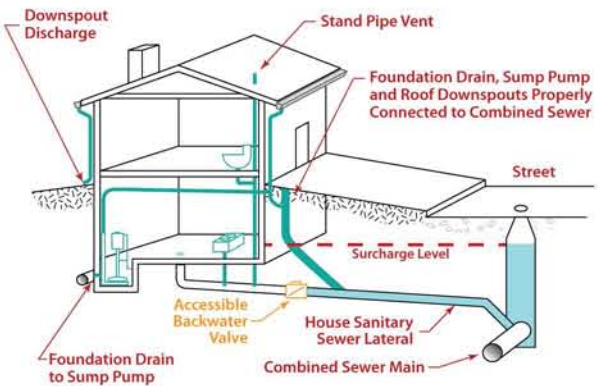
A backwater valve is typically installed on the sewer lateral that connects the building to the public sewer in the street. A properly operating backwater valve allows flow to only go in one direction (out), preventing wastewater from entering your building during regular maintenance of the public sewer system or backups caused by storms.



Backwater Valve Operation

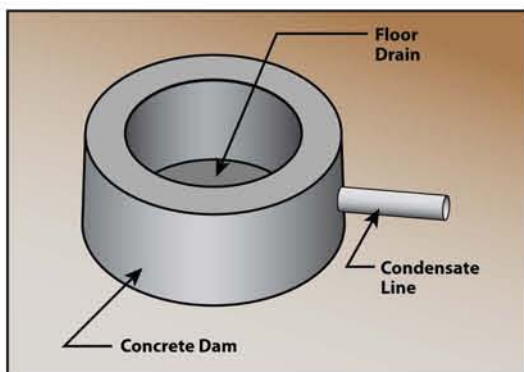
Where should a backwater valve be located?

Backwater valves are installed on the sewer lateral, typically in your basement or in your yard.



Backwater Valve in Home Sewer System

2. Concrete Dam – A concrete or masonry dam works like a standpipe. It is permanently constructed around the floor drain so that the water is contained in the small well area as it rises to seek the surcharge elevation. The dam is higher than any previous flooding depth and may be constructed around a condensate drain line.



Advantages: It does not require the threads that a standpipe does. Creates temporary relief from backups without flooding. Inexpensive alternative to backwater valve installation.

Disadvantages: Challenging to build, requiring knowledge of concrete. May cause a tripping hazard. Floor drain will no longer collect basement spills or seepage of outdoor flood water into the basement.

Technique 2: Blocking the Water

Block the path of water at the sanitary connection by installing a backwater valve. A professional plumber installs this device near where the sewer lateral leaves the building.

Backwater Valve – A backwater valve prevents sewage from backing up into the basement. A valve automatically prevents water from the public sewer from coming back into your home's plumbing system. If installed properly, a backwater valve will keep a sewage backup from coming out through plumbing fixtures or the floor drain in your basement. These valves require periodic inspection and maintenance to remove debris and reduce the risk of failure.

The UPC requires backwater valves to be located where they will be accessible for inspection and repair and, unless exposed, have to be enclosed in a pit fitted with an adequately sized removable cover.

PROTECTING A HOUSE FROM SEWER LATERAL BACK UP

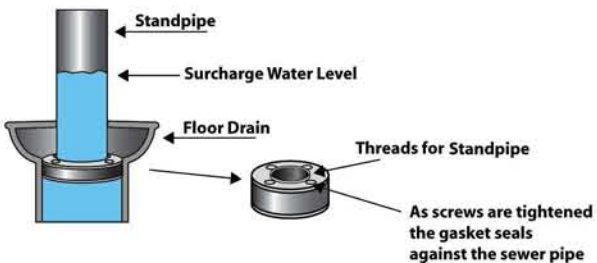
There are two techniques used to protect a home or building from a sewer lateral backup.

Technique 1: Containing the water

Allow the water to back up through the sewer lateral and contain the water as it attempts to rise above the basement floor. Use a standpipe or concrete dam for this task. **The important thing here is the height of the water, not the amount.** It is not necessary for the amount of water that is contained in the standpipe or concrete dam to be as much as the amount of the sewage backup. The stand pipe or dam must stand higher than any previous backup depth.

The following are cost-effective approaches that you may install inside the basement to contain the water:

1. Temporary Standpipe – Standpipes are lengths of pipe that are open at the top and are screwed into an expandable rubber gasketed protective shield within the floor drain. The standpipe should be taller than the deepest flooding height in the basement. It will hold the sanitary surcharge until it recedes. Standpipes are generally inexpensive, easy to install and help relieve pressure caused by backups. If you have a condensate line drain from an AC unit or a dehumidifier, you will need a special fitting to connect it to a standpipe.



Advantages: Standpipes are generally inexpensive, easy to install by homeowner, and help relieve pressure caused by backups.

Disadvantages: The protruding pipes may be a trip hazard. Basement floor drains cannot be used until standpipes are removed. The temporary standpipe has to be screwed into place just before the storm event. In that case, you must be on the premises and awake to do this. If the standpipe is left in place permanently, the standpipe disables the floor drain.

WHY IS THERE WATER BACKING UP IN MY BASEMENT?

There are two major sources of water in a basement.

1. Sewer Lateral Back-up
2. Sewer Lateral Blockage or Collapse

What Is A Sewer Lateral?

Your home or building is connected to the public sewer in the street by a pipe called a sewer lateral. When a sewer lateral backs up due to heavy rainfall, a blockage or pipe collapse, your basement is likely to experience a sewer backup.

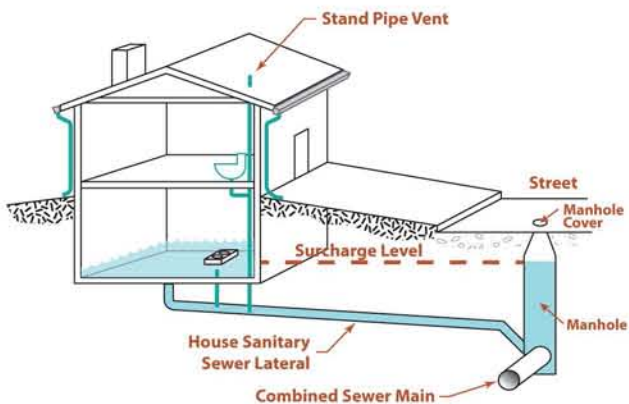
SEWER LATERAL BACK-UP

What Causes A Sewer Lateral Back-up?

Problems arise when a large amount of water from major storms enters the combined sewer system. This may cause the sewer to back up (surcharge) and overflow.

When this occurs, residences at lower elevations – especially those without proper backflow protection – are most at risk of having their sewer lateral back up, causing sewage to flow out of the basement floor or other low drain. Because water always seeks a level elevation, the water in the basement will be as deep as the height of the surcharge within the nearest combined sewer manhole usually out in the street.

The *Uniform Plumbing Code* includes the need for backflow protection if drains and plumbing fixtures are located below the next upstream manhole or below the main sewer level. Fixtures installed on a floor level that is below the next upstream manhole cover must have an approved type of backflow prevention (BFP), also called a backwater valve, installed.



Level of sewage in manhole rises higher than the basement floor elevation, causing flooding

- 7. Will a backwater valve prevent any future sewer backup?**
Yes, however, regular maintenance is required.
- 8. What is the appropriate maintenance for a backwater valve?**
Typically minimal as these are simple mechanical valves. Always check the valve manufacturer's maintenance requirements.
- 9. Do I have to activate the backwater valves during a storm or is this automatic?**
It is automatic and self-activating by reverse flow in the building sewer lateral.
- 10. Will the backwater valve be affected if I experience a power outage?**
No, the backwater valve has no electrical components. However, an electrical alarm will not work if there is a power failure unless the alarm has a charged backup battery.

This brochure was intended to provide a basic understanding of how basement flooding can occur and the possible solutions to prevent it. Since every home is different it would not be practical to discuss all the various types of scenarios in depth. A professional consultation is recommended prior to any major work associated with basement flooding.

**DC Water and Sewer Emergency Line
(202) 612-3400**

**DC Water Office of Risk Management
(202) 787-2052**



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