

City of Watertown

245 Washington Street Watertown, NY 13601

SEWER BACKFLOW PREVENTION

Typical causes of a sewer backflow:

- Blockage in the sewer service (pipe connecting the building to the sewer main in the street), due to tree roots, grease, other debris
- Major precipitation events that inundate sanitary & storm sewer mains

How sewer backflow enters your building:

- The sanitary/storm mains surcharge, which can allow sewer to backflow into the sewer service and enter the lowest fixture or pipes inside your building (washer, toilet, sink, etc)
- Floor drains (typically in the basement floor) that are tied into the municipal sewer system

Types of backflow prevention devices:

- Check Valve
- Gate Valve
- Ball Valve

Important questions to ask when considering a backflow prevention device:

- Did my basement flood from ground water or did sanitary/storm sewer backup into my building?
- *How did water/sewer enter my building and would a check valve, gate valve, shear gate, ball valve, etc, help protect me from another backup?*
- Have I performed a detailed inspection of my plumbing system? Have I verified how roof leaders and sump pumps are connected?
- Who are the licensed Master Plumbers I can contact to assist with the inspection and modifications to my plumbing system?

A few key thoughts to keep in mind when installing a backflow prevention device:

- <u>Installation:</u> The owner of the property is allowed to install their own device as long as they obtain a permit at City Hall. <u>If you are</u> planning to hire a contractor, please note, only licensed plumbers on the City's "Master
- Plumbers List" are authorized to perform work within the City. A sewer cleanout must also be installed if one does not currently exist. It is critical that these devices are maintained on a routine basis to ensure proper operation.
- <u>Cost:</u> The property owner is responsible for the costs associated with the installation according to Section §253 of the City Code.
- <u>Situation:</u> Not every building's plumbing system is alike. That is why it is important to have an experienced professional take a look at your current plumbing situation to see what course of action is necessary to protect your building.

Contact List:

For flooded basements & backup emergencies:

- 9-1-1 (primary contact)
- Fire Department (315) 785-7800
- Department of Public Works (315) 785-7842

For information or to report a sewer backup event:

Department of Engineering – (315) 785-7740

Fo obtain the necessary permit:

- Bureau of Code Enforcement (315) 785-7735 (internal to building)
- Department of Engineering (315) 785-7740 (external to building)

SEE REFERENCES BELOW FOR MORE INFORMATION ON BACKFLOW PREVENTION.

Reference 1: https://www.fema.gov/media-library/assets/documents/3729 Reference 2: http://www.rectorseal.com/clean-check-backwater-valves/ Reference 3: https://www.health.ny.gov/environmental/water/drinking/cross/guide.htm Reference 4: https://www.watertown-ny.gov/DocumentView.asp?DID=374

CITY OF WATERTOWN, NEW YORK



245 Washington Street Watertown, New York 13601

Sewer Backup Prevention

Rain events with extraordinary amounts of precipitation are rarth, but when combined with an already wet Fall season, the resulting stormwater runoff and ground water may contribute to flooded basements and, in some cases, sewer backups into buildings.

A sewer backup may occur when the storm or sanitary sewer main surcharges (flows at full capacity under pressure) and backflows into the building through the sewer service (a pipe connecting the sewer main to the building). The backflow typically enters the building through the lowest fixture in the house, such as a floor drain (if connected to the sewer service), or washing machine drain line in the basement, or toilet, etc. The pressure from the backflow can, in some cases, also cause plumbing pipe joints to fail, thus allowing sewer to enter the building. A sewer backup may also occur when a property owner's sewer service becomes clogged withtree roots and/or debris or grease, preventing wastewater from flowing to the sewer main and causing a backup into the building. While clogged or broken sewer services and ground water flooding into basements are issues property owners must resolve, the City is actively taking steps to improve the sewer infrastructure to reduce the frequency and severity of sewer surcharge events which may contribute to sewer backups.

The City of Watertown owns and maintains a vast sewer network consisting of many miles of pipe and hundreds of structures, constructed over many decades since the late 1800's, much of which is a combined sewer system. There is a committed and ongoing effort to make improvements to the sanitary and storm sewer networks throughout the City, such as separating combined sewer systems which accept storm and sanitary sewer flows, improving the health of the Black River by reducing overflow events, increasing the capacity of the sewer network, and prioritizing improvements to target the most vulnerable areas impacted by heavy rain events. The recently completed Factory Street Reconstruction Project invested almost \$3 million dollars in capital projects are budgeted to continue improving the sewer networks across the City. It is evident the recent storm events in October 2017 impacted many properties across the City of Watertown, and affected many people's lives. The emergency calls, flooded basements, sewer backups, and flood observations are all being analyzed to identify the most vulnerable infrastructure and neighborhoods, and to help prioritize future improvements.

If you experienced a sewer backup into your building during these events, or in a previous event, we encourage you to contact the City of Watertown's Department of Engineering as you consider options to protect your property from future sewer backups. Modifications to the sewer service and/or to the building's internal plumbing system can help reduce the risk of another sewer backup when done properly.

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CITY OF WATERTOWN, NEW YORK

245 Washington Street Watertown, New York 13601

Sewer Backup Prevention

It is important to note that property owners are responsible for costs and expenses incident to the installation, connection, disconnection, repair or renewal of building sewers per Section § 253 of the City Code. Property owners are also responsible for making every effort to ensure their sewer service and plumbing system is functioning and also protected from backups. The City of Watertown maintains a list of licensed Master Plumbers, who are familiar with the City's sewer system, and are authorized to perform work on plumbing systems associated with sewer and plumbing permits, should you decide to modify your system.

Some options to consider include installation of sewer back flow prevention devices such as a back flow valve, sewer gate valve, and floor drain valve. The plumbing of every building is different, as is the best solution, so careful consideration should be taken to determine what type of device(s) is (are) most appropriate, in consultation with a licensed professional. While backflow prevention devices can reduce the risk of sewer backups, they do require continued maintenance, and should only be installed when necessary.

Property owners who experience a sewer backup or flooding emergency should contact 911 for immediate assistance, especially during a storm event. The City of Watertown Fire Department and Department of Public Works can also be contacted during non-storm events, and will do their best to assist property owners experiencing flooding and sewer backups. For more information on sewer backup prevention, to report a prior sewer backup event, and to obtain a sewer and/or plumbing permit prior to making modifications to their building's plumbing system, please contact the City of Watertown Department of Engineering.

Contact List

Flooded Basement and Sewer Backup Emergencies:

Primary Contact	911
Fire Department	(315) 785-7800
Department of Public Works	(315) 785-7842

Report a Sewer Backup Event or to get information on Sewer Backup Prevention: Department of Engineering (315) 785-7740

Obtain Sewer and/or Plumbing Permits:

Bureau of Code Enforcement	(315) 785-7735
Department of Engineering	(315) 785-7740

Plumbing Permit - Internal to building Sewer Permit - External to building

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CITY OF WATERTOWN, NEW YORK

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Sewer Backup Prevention

Supplemental Information:

Enclosed is reference material about basement flooding and sewer backflow prevention for informational purposes. The City's Standard detail for a sewer backflow valve, and sewer cleanout, to be located on the property side, just behind the sidewalk, is enclosed for your reference. Please note, a decision to install backflow prevention devices should be made only after careful inspection and evaluation of your building's plumbing system by those with appropriate experience and knowledge.

Often, a sewer backup is only storm water (and is clear in appearance) because the building has a dedicated storm sewer service tied into a dedicated storm sewer main. In many cases, the backup is sanitary sewer because the sanitary sewer main in the street also receives storm water, either directly from catch basins (known as a inflow into a combined sewer) or indirectly by ground water though pipe and manhole joints (known as infiltration), which can surcharge the sewer main during extreme rain events (as well as thawing events during winter) and contribute to back flow into the building through the sewer service.

One of the most common applications is installation of a backflow valve in the basement where the plumbing exits the building, or in the lawn area between the sewer main and the building. Should the sewer main in the street begin to surcharge (flow full and under pressure) during a storm event, and attempt to backup into your sewer service, the backflow valve will close, thus preventing water from flowing into your building. While these devices operate automatically, regular inspection and maintenance is critical to ensure proper function.

A sewer gate valve is another device which is installed on the sewer service, typically between the sewer main and the building, but is manually operated by the property owner to open or close the valve. In anticipation of a flood event, the home owner would manually close the valve to prevent the sewer main flow from backing up into the sewer service, until the storm event is over and sewer mains have stopped surcharging. While this type of device must be operated manually, it offers greater protection against a sewer backup than a backflow valve device does, and can be used in conjunction with a backflow valve. As with any application, regular inspection and maintenance of a backflow prevention device is critical to ensure proper function.

Floor drain valves are commonly used in the basements and may allow ground water or sewer backups to enter the building, depending on how the plumbing is installed. When the drain is subjected to backflow, the valve shuts and prevents further flow into the building. Floor drain valves are susceptible to failure, however, when subjected to more force than they are designed for, and/or used as the sole means of backflow prevention. The plumbing of each building is different and must be inspected to verify how it is connected and to determine what the best course of action is.



Protecting Building Utility Systems From Flood Damage

Principles and Practices for the Design and Construction of Flood Resistant Building Utility Systems

FEMA P-348, Edition 2 / February 2017



When plumbing components need to be placed below the required flood elevation, they should be (and, in newly constructed and Substantially Improved homes, must be) designed to resist flood forces and prevent floodwater entry and accumulation. They also must be designed and installed to resist flood loads.

In elevated homes constructed over open style foundations, vertical sections of domestic water and DWV piping can be exposed to moving floodwater, flood borne debris, and, in coastal areas, breaking waves. Installing this piping along vertical structural elements, preferably on the landward side in coastal areas or the downstream side in riverine areas, can help protect them from damage. Alternatively, piping can be placed in a vertical chase if the chase is designed to resist flood forces. In cold climates, chases are typically insulated to provide freeze protection. Well casings that extend above grade can also be exposed to damage from moving floodwater. Steel casings are less prone to damage than polyvinyl chloride (PVC) casing and should be used in areas exposed to moving floodwater.

Sewage can back up into a house in one or a combination of the following scenarios:

- Floodwater infiltrates the sewer system by entering through unsealed manholes, pipe connections, and line breaks, thus surcharging the sewer.
- Combined systems that collect both sewage and stormwater can be overloaded and surcharged following heavy or prolonged rains. Surcharged or overloaded lines can back up into houses connected to that combined system.
- Municipal sewage pump station failure can cause sewage to back up into a house.

The risk of floodwater entering a home through DWV piping can be reduced by installing backflow valves. These devices, referred to as backwater valves in the IPC and IRC, can help prevent wastewater backup in a house when the municipal sanitary sewer lines are surcharged or overwhelmed, or when floodwater flows into an onsite waste disposal system.

Backflow values should be installed in the sanitary sewer lateral. Preferably, the backflow values should be installed outside of the home before the lateral enters the basement or crawlspace. The backflow value may be installed inside the home if the outside location prevents access for testing and maintenance, or when installing the device outside is impractical.

There are several types of backflow prevention valves, including check valves, gate valves, and ball float valves. Some are suitable for use in DWV piping, while others are suitable for other plumbing systems like foundation and floor drain systems.

Check Valves: Check valves allow one-direction flow. Flow from the opposite direction automatically shuts the valve. A check valve in the sewer service connection pipe allows sewage to flow out of the collection system



ASCE 24, Section 7.3, Sanitary Plumbing Systems states:

- Any openings below the required elevation should be protected with automatic backwater valves or backflow devices.
- Redundant backflow devices requiring human intervention are permitted.
- Sanitary system vent openings should be elevated.

The I-Codes contain criteria on the installation of backwater valves that may dictate where they can be used.

and into the public sewer or onsite treatment system during non-flood conditions while preventing it from flowing back into the house during flood conditions. The valve generally has corrosion-resistant internal parts and a cast-iron body with a removable cover for access. Valves are available in sizes from 2 to 8 inches in diameter. A disadvantage of check valves is that they are susceptible to debris blockage. Periodic maintenance and testing is required to maintain functionality.

4 MITIGATION MEASURES FOR RESIDENTIAL BUILDINGS

- **Gate Valves:** Gate valves allow flow in both directions. Gate valves must be operated manually or electronically, and are less susceptible to debris and blockage than check valves. When open, a gate valve allows flow in either direction; when closed, a gate valve prevents flow in both directions.
- **Shear Gate:** Some manufacturers add a shear gate mechanism that is manually operated to close the drain line when backflow conditions are anticipated. The valve remains open during normal use.
- Ball Float Check Valve: A ball float check valve can be installed on the bottom of outlet floor drains to
 prevent water from flowing up through the drain. This type of valve is often built into floor drains or
 traps in new construction (see Figure 4-23).



Although manually operated valves are available, it is recommended that homeowners consider automatic valves. Backflow through sewage pipes may result from a backup some distance away from the house and occur with little or no notice, so manual valves may not be as convenient. Manual valves can be installed to augment automatic valves, but if they are used, manually operated backflow valves should be closed well before flooding is expected.

For the best protection against sewage backup, a combination of a check valve and a gate valve should be installed, as shown in Figure 4-24. The operation of a check valve can be impaired by the accumulation of debris at the valve opening, while a gate valve is less likely to be affected by debris. With these two valves in use, backed-up sewage would shut the check valve automatically. Then, closing the gate valve either manually or electrically can seal the pipe.



Figure 4-24. Combination gate and check valve.

4.3.2.1 Mitigation for Private Wells

The risk of private well water contamination can be reduced by sealing the portion of the well exposed to floodwater. For drilled wells sleeved with casings, pre-manufactured sanitary well caps can be used as shown in Figure 4-25.

For dug wells constructed with pre-cast concrete casings, gaskets may be available to help seal individual riser sections and to seal the concrete cap to the top riser. For existing wells, it is impractical to add seals for all casing sections. However, gaskets can usually be added to seal the cap to uppermost casing section (see Figure 4-26).

Sealing the portions of wells exposed to floodwater will help prevent floodwater from entering and contaminating drinking water wells. While they reduce the potential for contamination, however, gaskets will not fully eliminate contamination risk. After floodwater recedes, all lines from private wells should be flushed and the well water should be tested. If it is found to be contaminated with harmful bacteria, the well must be disinfected.

If wells are in areas that can experience moving floodwater, mitigation actions should be taken in conjunction with steps to prevent floodwater from contaminating well water. When new drilled wells are installed in areas that can be exposed to moving floodwater, steel casings should be used because they are less prone to damage from debris impact and hydrodynamic loads. For existing wells exposed to moving floodwater, other protective devices like floodand impact-resistant devices constructed around exposed portions of the well should be considered.



Figure 4-25. Sanitary well cap.





Install Sewer Backflow Valves



PROTECTING YOUR PROPERTY FROM FLOODING

In some floodprone areas, flooding can cause sewage from sanitary sewer lines to back up through drain pipes into buildings. These backups not only cause damage that is difficult to repair but also create health hazards.

A good way to protect buildings from sewage backups is to install backflow valves, which are designed to block drain pipes temporarily and prevent return flow. Backflow valves are available in a variety of designs that range from the simple to the complex. The figure shows a gate valve, one of the more complex designs. It provides a strong seal, but must be operated by hand. The effectiveness of a gate valve will depend on how much warning you have of impending flooding.

Among the simpler valves are flap or check valves, which open to allow flow out of the structure but close when the flow reverses. These check valves operate automatically but do not provide as strong a seal as a gate valve.



BENEFITS OF UTILIZING THIS MITIGATION STRATEGY

- Helps to prevent damage to a structure and avoids hazardous and costly cleanup.
- Helps to protect the health and safety of the structure's occupants

TIPS

Keep these points in mind if you have backflow valves installed:

- Changes to the plumbing in your property must be done by a licensed plumber or contractor, who will ensure that the work is done correctly and according to all applicable codes. This is important for your safety.
- ✓ Some valves incorporate the advantages of both flap and gate valves into a single design. Your plumber or contractor can advise you on the relative advantages and disadvantages of the various types of backflow valves.
- ✓ Valves should be installed on main waste drain pipes that leave the structure or that are connected to equipment that is below the potential flood level. Therefore, valves may be needed on washing machine drain lines, laundry sinks, fuel oil lines, rain downspouts, and sump pumps, as well as sewer/septic

connections.

✓ If you have a sump pump, it may be connected to underground drain lines, which may be difficult to seal off.

ESTIMATED COST

Having a plumber or contractor install one backflow valve will cost approximately \$1,400 for a combined gate/flap valve or about \$600 for a flap valve. These figures include the cost of excavation and backfilling.

OTHER SOURCES OF INFORMATION

FEMA 348, *Protecting Building Utilities from Flood Damage*, November 1999, <u>http://www.fema.gov/library/viewRecord.do?id=1750</u>.

FEMA P-499, *Home Builder's Guide to Coastal Construction*, "Protecting Utilities," Technical Fact Sheet No. 8.3, December 2010, <u>http://www.fema.gov/library/viewRecord.do?id=2138</u>.

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INSTALLATION INSTRUCTIONS

FINGER HOLE

4" > 2"

RectorSeal brand solvent cements are approved to meet manufacturer's recommendations.

Extendable Backwater Valve

ADAPTOR & PLUG (available on 3" & 4" models only)

THUMB SCREW

NOTCH

REFERENCE

NOTCH

See step 8

3

Pre-Installation

• Slide Upper Collar through Outer Riser Pipe. If collar does not slide freely through pipe, check to see if pipe is "out-of-round." If so, replace Outer Riser Pipe.

Backwater valves
require adequate drop
between the flood rim of the
lowest fixture and burial
depth of the valve in order
to function properly.
We recommend a minimum
slope of 1/4" per foot or as
ecommended by the UPC
and IPC codes.

• 6" Clean Check includes PVC bushings for use if needed. Discard if not used.

OUTER RISER PIPE 8" or 6" (depending on model - not included)

INNER RISER PIPE (depending on model - not included)

Parts not provided

• Outer Riser Pipe -Standard 8" or 6" ABS or PVC of required length.

• Inner Riser Pipe -Standard 4" or 2" ABS or PVC of required length.

• Adaptor & threaded cap -Standard 8" or 6" ABS or PVC (available on 3" & 4" Clean-Check models)



RECTORSEAL

Outer Riser Installation

At proper depth, install the Clean Check Valve Body between the building and the sewer lateral, with the "FLOW" arrow of the Valve Body pointing downstream away from the building.

Rotate the Valve Body until the opening is facing directly upward. A level may be used across the top of the Valve Body to verify horizontal positioning.

Cut the Outer Riser Pipe to the required length. Cement and insert while keeping the inside of the body clean of debris. **CAUTION:** Be certain that excess solvent cement has not impeded proper seating of the Flapper Assembly or the proper seating of the flapper sealing surface of the Valve Body.

Inner Riser Installation

Cut the Inner Riser Pipe to a length (3¹/2") shorter than the Outer Riser Pipe.

- Cement the Lower Collar with Flapper to one end of the Inner Riser Pipe.
- Cement the Upper Collar to the other end of the Inner Riser Pipe, while aligning the center of the Finger Hole with the center of the Flapper on the opposite end.
- When cement is dry, loosen the thumb screw in the Upper Collar and slide the Inner Riser Assembly – Flapper Assembly first – into the Outer Riser Assembly with the flat sealing side of the Flapper facing the inlet side of the Valve Body. Lower the Inner Riser Assembly into the seating area of the Valve Body, making certain that the Thumb Screw is inside the inside wall of

the Outer Riser Pipe and NOT on the resting on the top edge. Seat the Flapper Assembly by rotating as necessary until it locks in place. Visually inspect that the Flapper Assembly is installed correctly.

IMPORTANT: Prior to installation of the Threaded Adaptor & Plug (with the Inner Riser Assembly properly installed) cut a reference notch into the Outer Riser Pipe. This saw cut notch should be aligned with the molded Notch in the Upper Collar. For future removal, alignment of the notches will quickly indicate that the flapper is seated correctly.







IMPORTANT: Tighten the ¹/₄" Stainless Steel Thumb Screw in the Upper Riser until it seats snugly against the Outer Riser Pipe, fixing the Inner Riser Assembly in place.

Cement the Threaded Adapter to the Outer Riser Pipe riser and screw the Threaded Plug into the Threaded Adapter to complete installation.

Scan for more info



Your property is now protected from sewage backups by a Clean Check® extendable backwater valve.

With appropriate maintenance, this valve will protect your property from sewer backups due to system overloads, Clean Out Clean Check® block-ages and flooding. It is your responsibility to have this valve checked

periodically to insure that it is operating properly. Under normal installation and use, a three month inspection interval is recommended. It is also recommended that a licensed plumber perform these inspections.



CLEAN CHECK Flapper replacement instructions:



Remove flapper: 1. With a flathead screwdriver, push down through the lower collar mount to the bottom clip edge of the flapper insert. Pull old flapper straight back and out.

Replace flapper: 2. Snap in the replacement flapper by pushing it straight into the lower collar mount.

Replacement flappers are available from your local plumbing contractor or wholesale supplier. **Part No. 96980 (flapper)**



2601 Spenwick Drive - Houston, TX 77055 800-231-3345 www.rectorseal.com





Extendable Backwater Valve Maintenance Guide



Maintenance Procedure

NOTE: Harmful bacteria are present in sewer lines. We recommend that you contact your local health district for proper sanitary precautions.





The following steps will guide your plumber through a proper inspection of your Clean Check® Extendable Backwater Valve.

- Locate the Clean Check® cover. It has been placed outside your building, between the sewer lateral cleanout and the building.
- Remove the threaded cover plug by unscrewing it to expose the upper collar of the inner riser assembly.
- 3 Loosen, but do not remove, the stainless steel thumbscrew located inside the upper collar.
- 4 Note the locations of the thumbscrew and opposing notch. There are two notches: one in the upper collar and Finger Hole one in outer riser pipe

(See Fig 3). This will be necessary for correct repositioning of the inner riser pipe during re-installation.

Outer Riser Pipe

(Fig 1)

(5) Using the finger hole provided opposite the thumbscrew of the upper collar, extract the entire inner riser assembly from the outer riser pipe and place it on the ground.

Inner Riser

Assembly

Upper Collar

Inner Riser Pipe

Clean debris from the 6 flapper and inner riser assembly, as well as the in ground valve body.

Inspect the flapper for deterioration or damage caused by the harsh environment in which it operates. If deterioration is present, replace the flapper. (See back for replacement instructions and flapper part number)

For additional availability, contact: RectorSeal[®] Customer Service at 800-231-3345 for a local source.

Upper Collar

Notch

Thumbscrew



8 The Clean Check[®] Extendable Backwater Valve is designed for easy re-installation. To properly re-seat the valve, slowly lower the inner riser assembly back into the outer riser pipe and rotate it until you feel the unit drop into place. The notch in the upper collar should now be lined up with the notch in the outer riser pipe. **Important:** Correct alignment of the notch in the upper collar and the notch in the outer riser pipe is necessary for correct repositioning of the inner riser assembly.



After seating the inner riser assembly properly, hand tighten the thumbscrew until it re-seats against the inside wall of the outer riser pipe. Be certain the thumbscrew is NOT resting on the top of the larger outer riser pipe. The flat side of the flapper should be resting, in the closed position, on the building side of the valve body.



10 Replace the threaded cover plug.



City of Watertown Standard Detail Sewer Cleanout/Backwater Valve