

Preventing Back-flow

Using Valves, Plugs, Caps and Seepage Barriers in Flood Protection

When there is more water outside than inside a floodwall, levee or building, water continually tries to get inside.

Obvious paths of intrusion are sewer drains for the bathtub and toilet and drainage tubes in floodwalls and levees. Floor drains in some areas of buildings also could provide such a path.

Any drain with its inside opening below flood level must be blocked. The drains may not be obvious – such as air-conditioning condensate drains – so look carefully.

Valves

A single valve installed in the main drain line can prevent back-flow through several interior drains.

There are advantages and disadvantages to each of the three valve styles:

Flap valves are the least expensive but the most prone to

failure. A bit of trash stuck on the valve gasket can prevent a flap valve from closing completely. The advantage of a flap valve, aside from its lower cost, is that it reduces back-flow without your intervention. A 4-inch PVC flap valve costs about \$40.

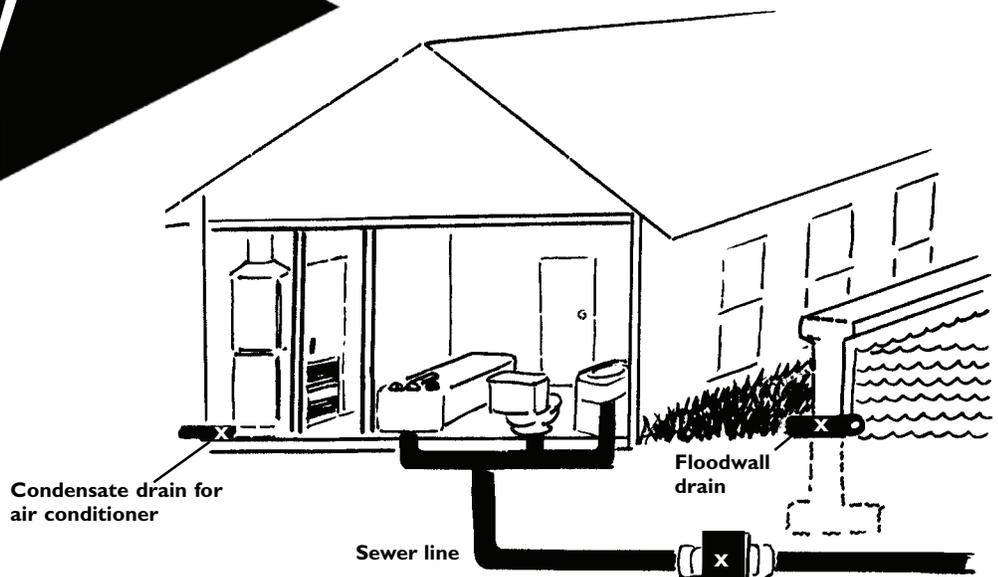
Gate valves and **ball valves** normally must be closed by mechanical action but can be automated.

Ball valves close by turning the valve handle a quarter turn; this rotates a ball within a drain tube to block flow. A 4-inch PVC ball valve costs about \$85. This valve provides a more positive closure than a flap and it will seal even in the presence of some debris.

Gate valves close by turning the handle several complete rotations to slide the gate across the drain tube. Gates provide the tightest closure possible with valves; the metal valve can overcome the resistance of small debris. A manual 4-inch brass gate valve costs around \$110. A hydraulically activated gate valve costs about \$850.

Installing any of these valves in an existing sewer line is equally difficult, since it requires digging up the sewer line. However, the benefits far outweigh the trouble and cost of preventing unhealthy sewage back-flow, even if you don't keep surface flood water out of the building.

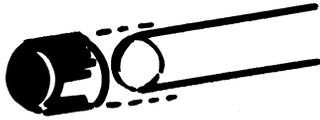
It may be beneficial to combine a flap valve (for automatic closure) with a ball or gate valve that requires manual closure but provides a more positive seal.



Flap valve	Ball valve	Gate valve
<p>Open</p>	<p>Quarter turn</p>	<p>Several turns</p>
<p>Action required</p> <p>None</p>	<p>Quarter turn</p>	<p>Several turns</p>
<p>Closed</p>		
<p>← Normal drain flow Back-flow →</p>		

Caps and Plugs for Open-ended Drain Lines

When the outlet of a drain is exposed, as it is with drain tubes through a floodwall or levee, one simple solution to back-flow is to block the line with a threaded or unthreaded cap.



Slip-on cap for bare pipe



Screw cap for threaded pipe

Install caps so water pressure tightens the seal

In a closed sewer system, a valve in the outside sewer line should prevent back-flow through tubs, toilets and other plumbed drains inside the building.

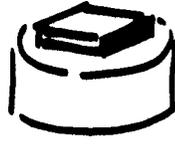
If you don't have a valve, or the valve fails, you may be able to block the drain openings inside the building.

To do that, you'll need to access the openings. For a tub or floor drain, that may mean removing the strainer. For a toilet, it means removing the toilet. (Don't forget to turn off the water to the toilet first and disconnect the water inlet to the tank.)

A product sold for plugging drain pipe is a gripper plug. Tightening the screw causes the plug to expand and "grip" the inner wall of the pipe. A 4-inch plug sells for about \$4.



Two styles of gripper plugs for bare pipe



Seepage

The solution to seepage problems, if you have seepage, is to block underground flow with a barrier that increases the distance water must travel through the ground to get past your barrier.

Most Louisiana soils have more than 30 percent clay content, so seepage is not a significant problem for floods shorter than two days.

However, if the soil was imported for construction of the building, the rate of seepage should be determined. This is done using the percolation test commonly used to determine whether a septic system will drain properly.

Additional flood protection and recovery information is available from parish offices of the Louisiana Cooperative Extension Service or from our website at www.louisianafloods.org

Extension's flood mitigation work is supported by the Federal Emergency Management Agency through its Hazard Mitigation Grant Program. The HMGP is administered in Louisiana by the Louisiana Office of Emergency Preparedness.

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Tips

- Prevent sewage back-flow with a valve installed in the main sewer line.
- For back-flow protection without human intervention, use a flap valve. Back it up with a positively sealing ball valve, gate valve or plug. More elaborate valve systems are available.
- Caps or plugs may be used instead of valves on exposed storm drains to prevent back-flow. Flow is blocked in both directions.
- On open-ended drain tubes, keep valve gaskets, cap seats and threads clean so they will function properly. Know where removable caps are kept.
- In an emergency, prevent sewer back-flow by stuffing a plastic bag full of rags into the sewer pipe at the clean-out.
- Never use pumps and barriers to create a water-level difference of more than 3 feet without proper design by a competent professional.

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Pub 2770

10/99

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Issued in furtherance of Cooperative Extension work, Acts of Congress of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. The Louisiana Cooperative Extension Service provides equal opportunities in programs and employment.