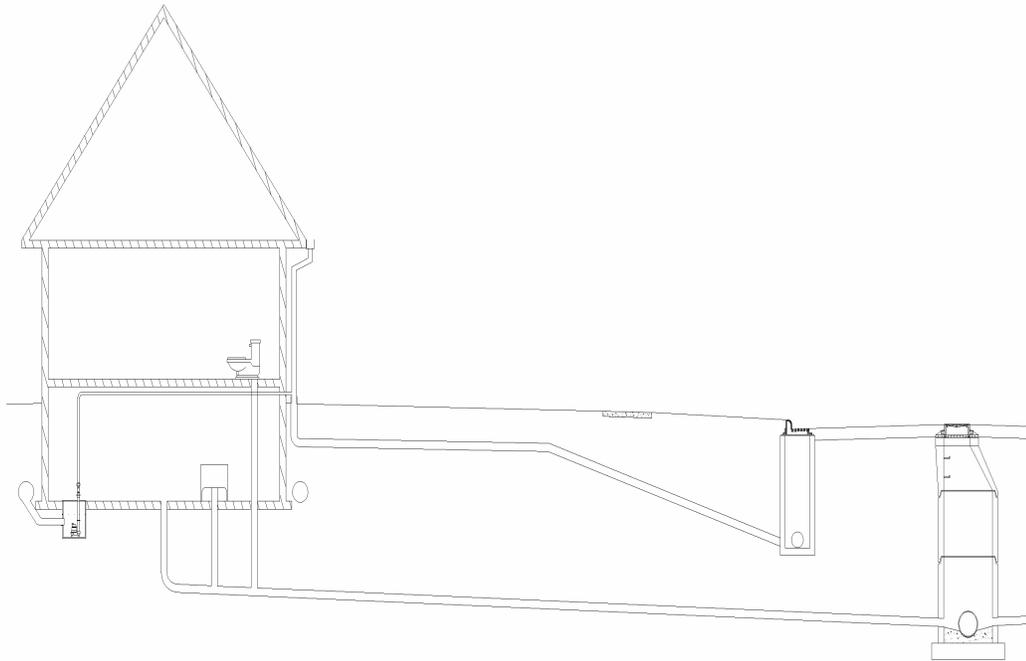


Wadsworth, Ohio Sanitary Sewer Backup Handbook



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I. Foreword

This handbook has been prepared by the City of Wadsworth Engineering Department to explain the causes of sewer backups that occur in the City during severe rainstorms and to describe steps that are available to homeowners to prevent backups and to protect the contents of their house.

Sanitary sewer backups have three main causes: a blockage located in the private sewer lateral (service line) from the house to the public sewer, a blockage in the public sewer main, or an overloading of the public sewer main during rainstorms.

While this handbook addresses backups which occur during rainstorms, the preventive measures and methods of correction will help to prevent backups caused by blockages of the service line and main sewer.

Even if you do not experience sewer backups, we hope that you will study the information since, quite unknowingly, you may be contributing to the problems. Your house may be contributing storm water runoff or ground water to the sanitary sewer system through plumbing connections that were made when the house was constructed. The storm or ground water may overload the sanitary sewer system and cause backups of sanitary sewage in some other resident's basement. You can help the situation by disconnecting these storm or ground water sources.

You should report a sanitary sewer backup as soon as it occurs and before you call a plumber. The City's telephone number, 330-334-1581, is manned at all times. City personnel will respond as discussed on page 16 of this handbook.

It is important to realize that backups may occur at any time due to blockages of your service line or the public sewer main, or during extreme rainstorm events. Therefore, you should consider improvements to your house to prevent future sewer backups. Since the improvements that will solve a problem in one situation may not be effective in other situations, the knowledge and skill of an engineer, a plumber and/or a sewer contractor may be needed to find the proper solution to the problem. Therefore, the only specific recommendation that can be made to all residents is: secure competent help and advice in determining the proper course of action to be taken.

The purposes of this handbook are to help you understand the real nature of your specific problem, to suggest methods that you may use to resolve the problem, and to explain when competent help is necessary to solve the problem.

II. The Nature of the Backup Problems

The City of Wadsworth owns and maintains a separate sanitary sewer system that is designed to collect only the sewage from the buildings in the City. If that were actually the case, many of the backup problems would not exist. Unfortunately, during rainstorms, storm water gets into the sanitary sewers which cause the basement backups.

The sanitary sewers are designed to collect the wastewater from the bathrooms, kitchens, etc. and transport it to the City's Wastewater Treatment Plant for purification and discharge to the River Styx. The system includes the City's sanitary sewer mains beneath the streets and the individual building services that extend from each house or building to the main sewer. The sanitary sewers are not designed to collect or transport the large amounts of storm water runoff that results from a rainstorm. Whenever significant amounts of storm water get into the sanitary sewers, the system's capacity is exceeded and surcharging (overloading) of the system and basement backups occur. Normally, the sanitary sewage enters the basement through the floor drain which is the lowest access point. If the surcharge elevation is much higher than the floor drain or if the drain is plugged, the sewage can enter the basement through a shower drain, toilet, or laundry tub.

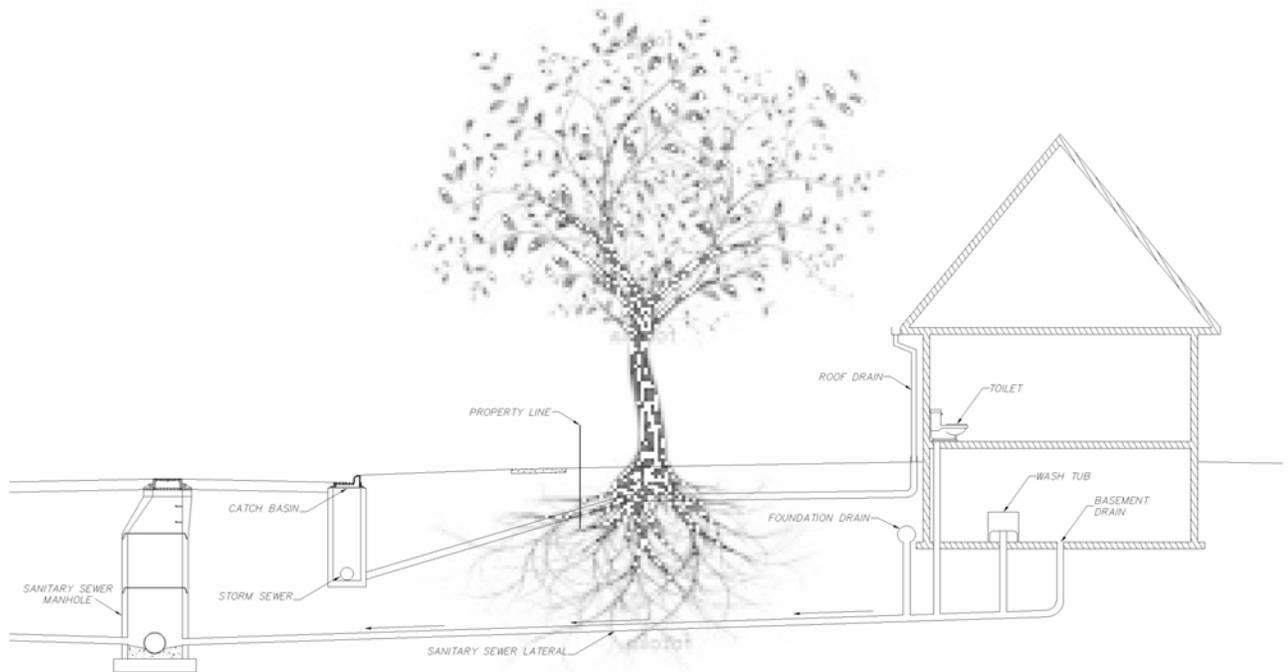
The storm water drainage system includes the storm water inlets in the streets, the storm sewer network, and individual services. The storm water drainage system is designed to collect and carry away the storm water runoff from the streets, driveways, roofs, and yards.

If you experience a sanitary backup during a rainstorm, it is probably caused by (A) a faulty private service pipe; or (B) an overloaded local sanitary sewer main in the street.

III. Types of Backups and Their Problems

A. Faulty Private Service Pipe

The service line between your house and the City sanitary sewer may be broken or partially plugged with roots. During dry weather, the service has enough capacity for your wastewater so a problem does not arise, but during a heavy rainstorm, some storm water may be getting into your service and the extra water may exceed its restricted capacity which would cause the water to back up into your basement. If you experienced a backup but your neighbors with a similar basement and plumbing did not, this situation may be causing your problems.



TYPICAL RESIDENCE WITH SANITARY SEWER SERVICE PARTIALLY CLOGGED BY TREE ROOTS AND FOUNDATION DRAIN CONNECTED TO SANITARY SEWER SERVICE

FIGURE 1

Tree roots can become entangled in sewer lines, thus clogging pipes and causing sewer backup.

As the maintenance and repair of an individual building service is the responsibility of the building owner, the correction of a backup problem caused by roots or defective service piped will be your responsibility. If your problem is caused by root blockage, it can be relatively easy and inexpensive to correct depending on which alternative action you choose. First, the sewer must be cleaned with an electric rodding machine using a root cutter that will thoroughly remove the roots that have grown into the pipe. Following that, the homeowner may elect to do the following:

1. Periodic rodding – Having the sewer rodded on a regular schedule to cut out all root growth will often be sufficient to keep them under control and reduce the likelihood of sewer backup. No rules can be given on how often this must be done because It depends on how active the roots are and how thorough a job the contractor is able to do. Some homeowners have found it necessary to have the sewer rodded as often as every six months, and others have found that once every few years is enough..
2. Use of root remover products – A number of root remover products are available commercially. Be sure to follow all of the manufacturer’s instructions. Although these products may not completely eliminate the growth, they may increase the interval between needed rodding.
3. Sewer pipe replacement – The surest method of permanently correcting the problem is to have the sewer pipe dug up and replaced at the location where the roots are getting in. The new pipe used for replacement has a new type of joint that is tightly sealed to completely eliminate future entrance of roots. This is not, however, an inexpensive solution.
4. Any ground water or storm water which enters the sanitary sewer, such as foundation drains, roof downspouts, or sump pumps must be removed from the sanitary sewer. These types of connections are in violation of City ordinances and contribute significantly to the overloading of the sanitary sewer system.

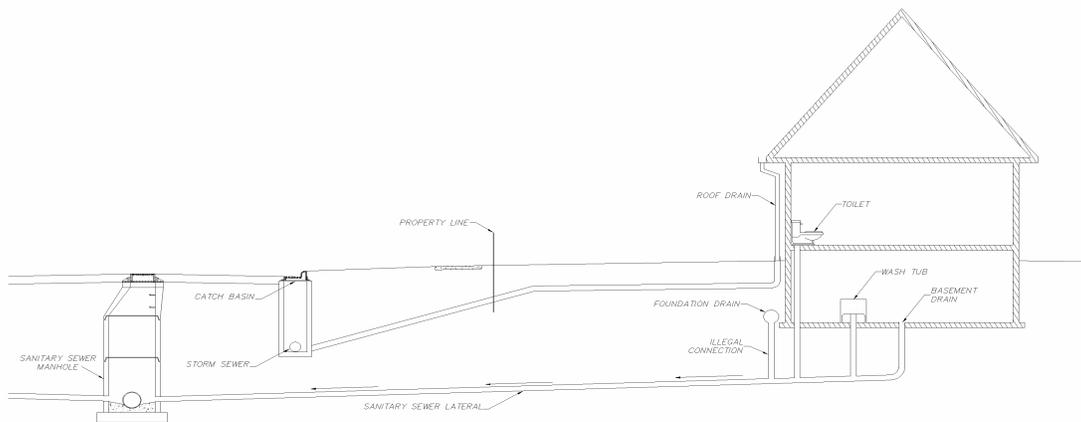
Blockage of house sewers is also occasionally caused by broken or separated pipe. This is usually the result of soil settlement under the pipe or poor installation of the pipe. In these cases, there is little alternative than to dig up the pipe at the damaged location and make repairs.

A professional firm specializing in sewer repair can best advise on the type of blockage in a sewer, the location and the probability that it will recur. Before making any decision

on how to proceed, we would strongly advise the homeowner to get more than one opinion (and cost estimate) on work needed to be done.

B. Overloaded Sanitary Sewer Main

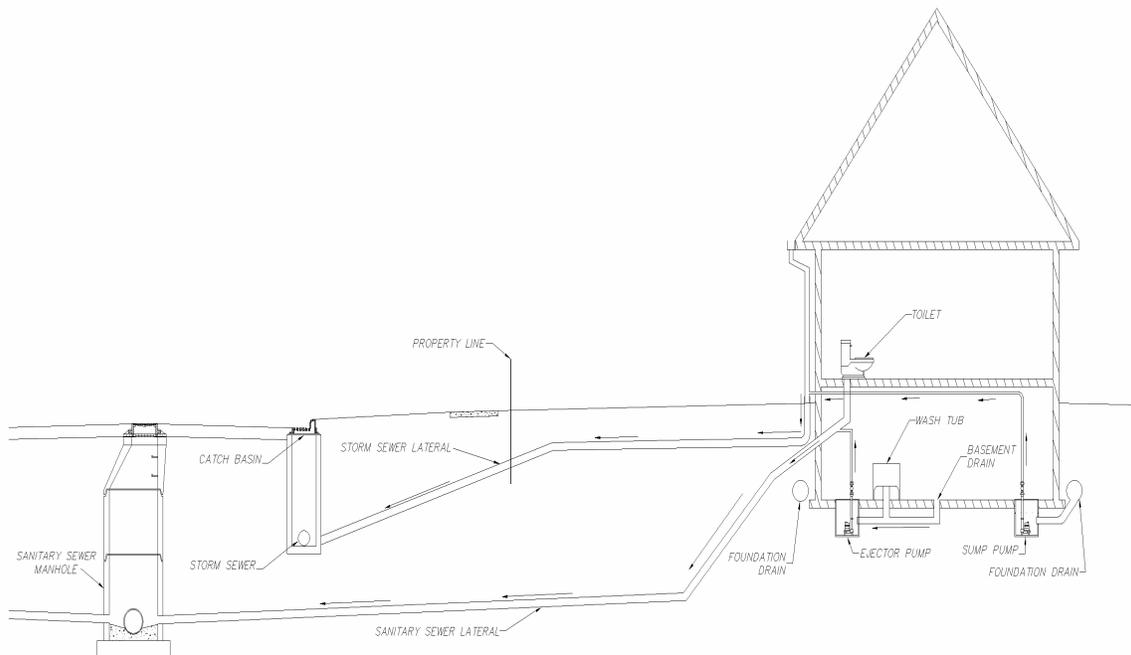
The sanitary sewer main in the street may be overloaded during wet weather periods because the sewer system cannot handle the extra storm water that gets into the system through plumbing connections that were made when the houses were first constructed, particularly the houses that were built prior to 1960. Prior to that time, it was common practice to connect the foundation drain to the sanitary sewer service. If your house has a basement but no sump pump or other direct outlet for the foundation drain, it is likely that your drains are directly connected to the sanitary sewers. Some houses have direct connections between the sanitary sewer service and the roof downspouts and/or an area drain. Each of these connections will contribute large amounts of storm water to the sanitary sewer system. **These connections are violations of City ordinances and must be disconnected.**



**TYPICAL RESIDENCE WITH FOUNDATION DRAIN CONNECTED TO
SANITARY SEWER SERVICE (THIS IS AN ILLEGAL CONNECTION)
FIGURE 2**

When the valve is tightly closed, the sewage backup into the house is cut off, but the sewage flow from the house to the sewer is also cut off. Thus, the household plumbing cannot be used unless a pumped bypass is provided. Also, all storm water sources such as the foundation drain and roof downspout must be disconnected from the sanitary service, otherwise the storm water will back up into the basement through the floor drain. In addition, this connection is a violation of City ordinances.

Valves installed in sewer lines sometimes become ‘jammed’ with debris and fail to close completely. In this case, the valve may slow down the backflow of sewage, but not stop it completely. For this reason, a valve installed on a sewer line should not be depended on for 100 percent protection, and an access box should always be provided for service and repair work



TYPICAL RESIDENCE WITH BACKWATER VALVE

FIGURE 3

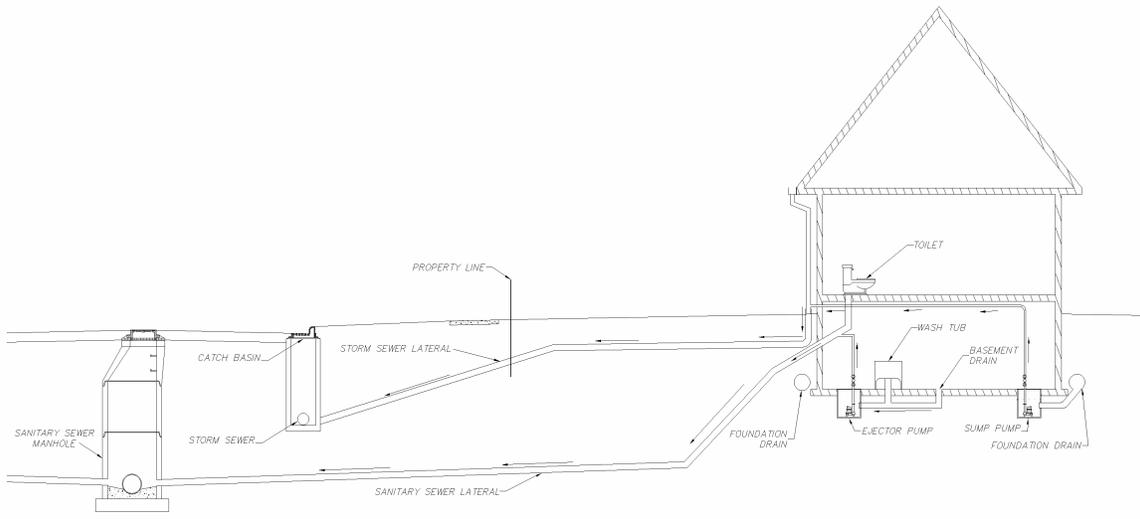
If an overloaded sanitary sewer main is the cause of your sewer backup, you neighbors probably experienced similar problems. If so you can either protect the contents of your basement and let the sewer continue to backup or you can prevent the backups. If you want to simply protect the contents of your basement from damage, please refer to the tasks, warnings, advantages and disadvantages discussed in a subsequent section of this report. If you want to prevent the backups, several alternative procedures are available.

- 1. Plugs or standpipes:** Since the basement floor drain is the lowest opening to the sewer in your house, it is the first place of entry for the backup. The floor drain can be closed with a rubber plug or with a standpipe during heavy rainstorms. Some drains are specifically threaded for a screw-in plug or a standpipe. This is

the simplest and least expensive way to stop backups through the drain, but it is effective only until the sewage level rises up to the level of the next opening, probably a shower, toilet, or sink. At that level, the sewage will overflow into your basement. If you use a plug or a standpipe, you must consider and protect against the possible uplift pressure on your basement floor. To be effective, a plug or standpipe confines the sewage to the pipes under the basement. If these pipes are watertight, the sewage won't leak out so no uplift pressure will develop. If the pipes are not watertight, the sewage will leak out of the pipes and saturate the ground beneath the floor. The sewage will then push up on your floor and if the pressure is large enough, your floor may buckle which would cause more damage than a basement backup. Since it is difficult to determine the condition of the pipes beneath your basement floor, plugs or tall standpipes should be used with caution. A "rule of thumb" which may be used as a guide is that a water level six inches higher than the basement floor level will not exert significant uplift pressure on the floor so, under normal conditions, a six-inch standpipe may reduce minor flooding without damage to the floor.

2. Valve: Since the sewer backup comes through the service line, an obvious solution is to install a valve in that line and to close that valve when flooding is imminent. The valve is normally installed in an access box that is located inside the house. Some valves are manual and others operate automatically such as a "check valve." The manual valves are not effective unless someone is available to close them. The automatic valves sometimes fail to close completely because sewage solids get jammed in the valve. In those cases, the valves may not prevent the backup.

3. Overhead Sewer: The term "overhead sewer" means that there are no direct openings to the sanitary sewer in the basement. All of the wastewater that is collected in the basement is discharged into a separate sump pit and pumped into the sanitary service line so the basement drainage is dependent on a pump and a continuous electric power supply. Generally, the plumbing from the fixtures on the main floor is installed must below the basement ceiling (hence, the term "overhead"), and is routed to the outside service line through an opening high up on the basement wall. Converting your plumbing to an overhead sewer is one of the most expensive ways to prevent basement backups. Nevertheless, it is generally considered to be the best method available.

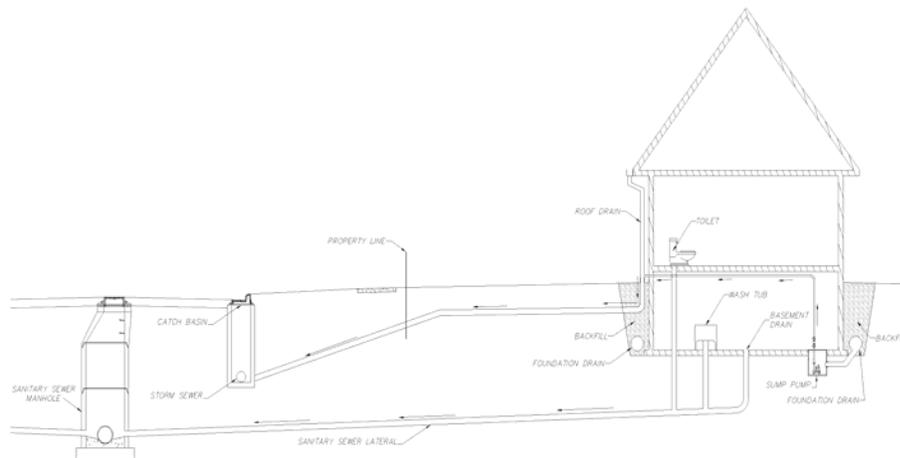


**TYPICAL RESIDENCE WITH OVERHEAD SEWER
FIGURE 4**

IV. Storm Water Flooding/Seepage

Apparent basement backups can be caused by ground water that enters the basement through cracks in the walls or through the basement sump or by storm water runoff flowing overland that enters the house through windows, doorways, or other openings.

Ground water is always present but the depth of the ground water is dependent on the soil type, ground surface elevation, surrounding topography and previous rainfall amounts. During rainstorms, some of the rainfall percolates into the ground which raises the ground water level. Since a basement is essentially a concrete bowl in the ground, the basement may become surrounded by ground water. If there are cracks in the basement walls or leaks between the walls, floor or foundation, the ground water will enter the basement. Minor leaks can be corrected by the careful application of special hydraulic cements, which must be applied in strict accordance with the manufacturer's recommendations to be effective. At the base of most houses, there is a pipe that is laid all around the outside of the foundation. The pipe may be perforated or may have open joints so that the ground water can easily enter it. This foundation drain protects the house by draining the ground water away from the basement.



TYPICAL RESIDENCE
FIGURE 5

In many cases, the foundation drain is directly connected to the sump pump and all of the drainage must be pumped out of the basement.

Any flooding through the basement sump is either caused by: (1) a pump that does not work properly; or (2) by water entering the sump at a rate that exceeds the capacity of the pump. If you rely on a sump pump to keep water out of your basement, you may want to start a routine maintenance program to be sure that the pump will operate when needed. Such a program should follow the pump manufacturer's instructions. It could consist of:

1. Every month, pour some water into the pump to make sure that the pump operates and that it quickly empties the sump.
2. Every six months, check and clean the strainer on the suction side of the pump.

If the pump is working properly, the flooding could be caused by water entering the sump at a rate that exceeds the pump's capacity. The excess water floods the basement floor. The large amounts of water may be coming from the foundation drain, the roof downspouts, or both.

Grading: After construction of a house, the space around the basement is filled with backfill. In some cases, this backfill will settle, creating a low area adjacent to the basement walls. Any storm water runoff that gets into the low area will rapidly percolate down along the basement walls and will enter the foundation drain. This situation can be corrected by filling the low area with soil to create a slope away from the basement walls that will divert storm water runoff away from the basement and foundation drain.

Roof Downspouts: The roof downspouts can have a substantial impact on the flow from a foundation drain. In some cases, as shown on the right side of Figure 5, the roof downspouts are directly connected to the foundation drains. During an intense rainstorm, this type of downspout can discharge thousands of gallons of rainwater to the sump pit which can exceed the pump's capacity and cause basement flooding. To eliminate this problem, the downspout should be cut off above the ground surface and the drain pipe into the ground should be carefully sealed. An elbow and an extension should be installed on each downspout to direct the rainwater away from the basement. The extension should reach well beyond the old excavation, and connect to the public storm sewer in the public right of way. If the existing downspout is not fitted with an extension as shown in the left side of Figure 5, the rainwater may collect near the basement wall and percolate directly to the foundation drain. To correct this situation, an extension should be installed on the elbow to direct the rainwater away from the basement walls.

If the house does not have roof gutters and downspouts, the rainwater falls directly off the roof and percolates along the basement wall. To correct this situation, gutters and downspouts with extensions will prove beneficial.

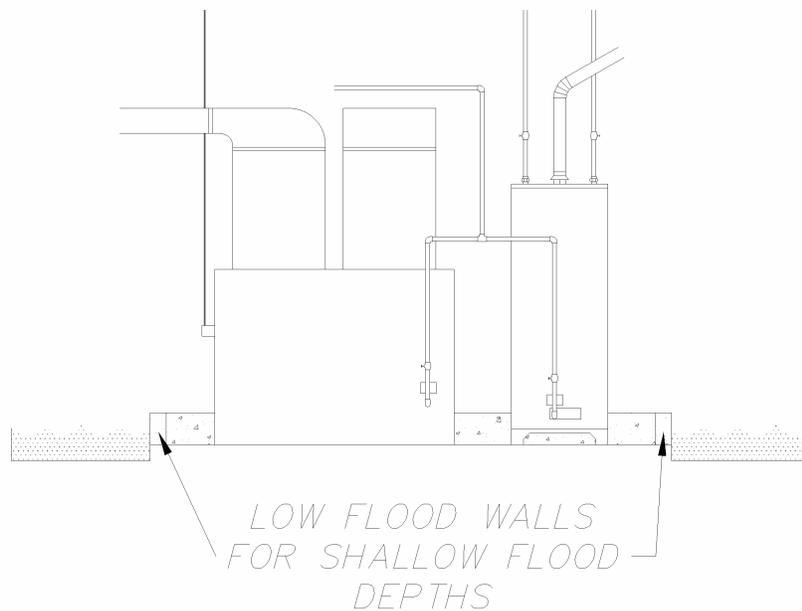
The importance of proper grading and proper discharge of the roof downspouts cannot be over-emphasized and the problems can be alleviated by simple measures performed by the homeowner.

Overland Flow: Storm water flooding can be caused by water runoff that exceeds the capacity of the drainage system. The excess runoff flows overland and enters houses through windows, doors, or other openings. Generally, this type of flooding is more difficult and expensive to prevent than the flooding by ground water that was discussed above. Basement flooding, caused by storm water runoff or seepage, is not a sanitary sewer backup.

V. How To Minimize Damage From Backups

If it is impossible or prohibitively expensive to prevent a backup in your house, the damages can be minimized by measures aimed at protecting the house and its contents.

There are five main tasks to protect your house to reduce sewer backup damage. (These tasks may also help protect your home from flooding caused by storm water runoff or seepage.)



1. Relocate expensive items that are subject to water damage. Freezers, washers, dryers, furniture, power tools, large appliances and similar items should be permanently moved to higher floors.

2. Protect what cannot be moved. A floodwall or protection closet could be built around valuable, immovable equipment. Such protection walls must withstand all the pressure caused by the flood waters.

Another alternative is to place the equipment on a pedestal above the flood height. Some equipment can be protected by a coating of grease or covering with plastic bags or plastic sheets.

3. Relocate or adjust your utilities. Either move all electric outlets above the flood level or install a control panel where the power can be shut off easily in time of flood. If your furnace, water heater, dryer, and other gas appliances are not all elevated, make sure there is an accessible gas shut off valve.
4. Seal off the sewer and water systems to prevent health hazards caused by interflows with flood waters. A water heater moved to an attic can act as an emergency storage tank for a gravity-fed potable water supply. Heating and air conditioning ducts should have removable plugs along the bottom to permit water to drain out when the flood recedes.
5. Store things that are very quick to remove or items that won't be damaged; garden tools, metal furniture or cabinets, spare tires, boats, or floatable items (if water is shallow), plastic curtains, etc.

If you rebuild or improve the floodable area, use the following types of materials:

Concrete, concrete block or glazed brick; clay, concrete or ceramic tile; mastic, silicone or polyurethane formed-in-place flooring; terrazzo, rubber, vinyl or vinyl-asbestos floor covering with waterproof adhesives; stone, slate or cast stone (with waterproof mortar); glass or glass block; metal doors and window frames; foam or closed cell type insulation; polyester-epoxy or other waterproof type paint; indoor-outdoor carpeting (be able to remove it so the debris can be hosed out of it).

Do not use the following types of materials because they dissolve and decompose when wet or they absorb and retain too much water:

Wood chipboard; gypsum products; cork; fabrics, carpeting, felt based floor Coverings; linoleum; fiberboard, paperboard, strawboard; batt, blanket, and other types of insulation; wallpaper.

Certain items should not be stored in the floodable area because they would become especially hazardous or create health or pollution problems during a flood:

*Hazardous chemicals: chlorine, fluorine, acids, sulfur products, magnesium, many industrial chemicals.

- *Hazardous household products: lye, pesticides, poisons, calcium hypochlorite (swimming pool chlorine), bleach, ammonia, lime detergents.
- *Charcoal, coal, coal dust, coke, and hay are subject to spontaneous combustion when wet or moist.
- *Gasoline, acetone, benzene.
- *Drugs, food (unless in tin cans).
- *Storage tanks and buoyant materials can float and cause damage to walls, ceilings, and other contents.

Finally, here is a list of products that are particularly subject to flood damage. They should be removed, if possible, from any flood-prone areas as an extra precaution:

Appliances, clocks and other electric motors; art works, musical instruments; books, magazines, papers; clothing, curtains; televisions, radios, electronic equipment; upholstered furniture, mattresses; cabinets, pool tables, and similar wood furniture that would become useless with only a little warping.

Never enter a flooded basement unless absolutely necessary, and then only with extreme caution. The possibility of electrocution is always present. Always wear rubber boots. When cleaning the basement after water has receded, use caution around electrical outlets and appliances, and disconnect power from electrical equipment as quickly as possible.

VI. Cleaning Up Following A Backup

Shovel out any mud and debris while it is still moist and hose down the walls to remove silt. To get rid of any odor that may accompany a backup, scrub all interior wetted surfaces. Use hot sudsy water followed by double-strength sanitizing solution or use a household disinfectant, following manufacturer's directions. Repeat scrubbing and rinsing if necessary. You may also try sprinkling liberally with baking soda. Odors in the basement may be harder to treat. If the above approaches don't work, sprinkle bleaching powder (chlorine or lime) over the floor. Let it dry then sweep it up. Remember, bleaching powder is caustic and poisonous. Follow all the precautions on the label.

Wooden floors dry very slowly. Assuming your furnace is operational, keep the house at 60-70 degrees F. to hasten drying but don't overheat the house as this could cause cracking or splitting. All loose plaster should be removed because plaster board and drywall can be ruined if immersed for a long time. Removal will also speed drying of the walls and will enable you to inspect the insulation in the exterior walls. Any waterlogged insulation must be replaced.

Mildew may appear if a warm spell follows a flood. Scrub mildewed floors or woodwork with a mild alkali solution such as washing soda or tri-sodium phosphate (four to six tablespoons to a gallon of water). Badly stained walls will need new paint.

All electric motors that have gotten wet should be disconnected and thoroughly cleaned to get rid of dirt and grit. After cleaning, the motors should be re-oiled and allowed to dry for two weeks. You can shorten the drying time by using a fan or hair dryer.

Washers should be sanitized by pouring a disinfectant such as chlorine, pine oil, or phenolic into the empty washing machine, and then complete a 15-minute cycle at the hot setting. The dryer can be cleaned by wiping the drum with a cloth dipped in a disinfectant solution, rinse with cloth dipped in clear water. Leave washer and dryer doors open, preferably overnight, until all parts are dry.

Clothing, sheets, etc., should be hosed or rinsed with cool water to get as much mud out as possible. Then wash with as much detergent as possible. Bleach or other disinfectant should be used to kill bacteria. After drying, rugs and carpets can be cleaned with a vacuum cleaner and then shampooed.

Gasoline engines need to be thoroughly inspected and cleaned. All electrical parts must be dry. Grit or silt must be removed from the oil, transmission or gas lines.

VII. Summary

Problems which cause the sanitary sewers to occasionally back up are many and they are often interrelated. Many residents of the City may be worried and inconvenienced by the occurrence of a sewer backup in their basement or crawl space. It is our hope that if you have such a problem, you have found some suggestions in this report which may be of help. If you have a question regarding the connections in your home, call our office at 330-335-2751 during our regular business hours, 8:00 A.M. to 4:30 P.M., Monday through Friday.

In conclusion, please remember that the City's telephone number, 330-334-1581, is manned 24 hours a day, seven days a week, in the event you must contact the City to report a sanitary sewer backup or other emergency. **Call this number as soon as the backup occurs and before you call a plumber.** District personnel will respond as promptly as possible. If the backup is caused by a blockage located in the public sewer main, the problem will be corrected. If, however, the backup is caused by an overloading of the public sewer main during a rainstorm the problem cannot be relieved and your backup will not recede until the rainstorm stops and overloading of the sewer main subsides, which may take several hours. If the backup is caused by a blockage in your private service lines, you must take appropriate measures to eliminate the problem.

