

SEPTIC SYSTEM MANUAL

How to maintain and protect your on-site sewage system.

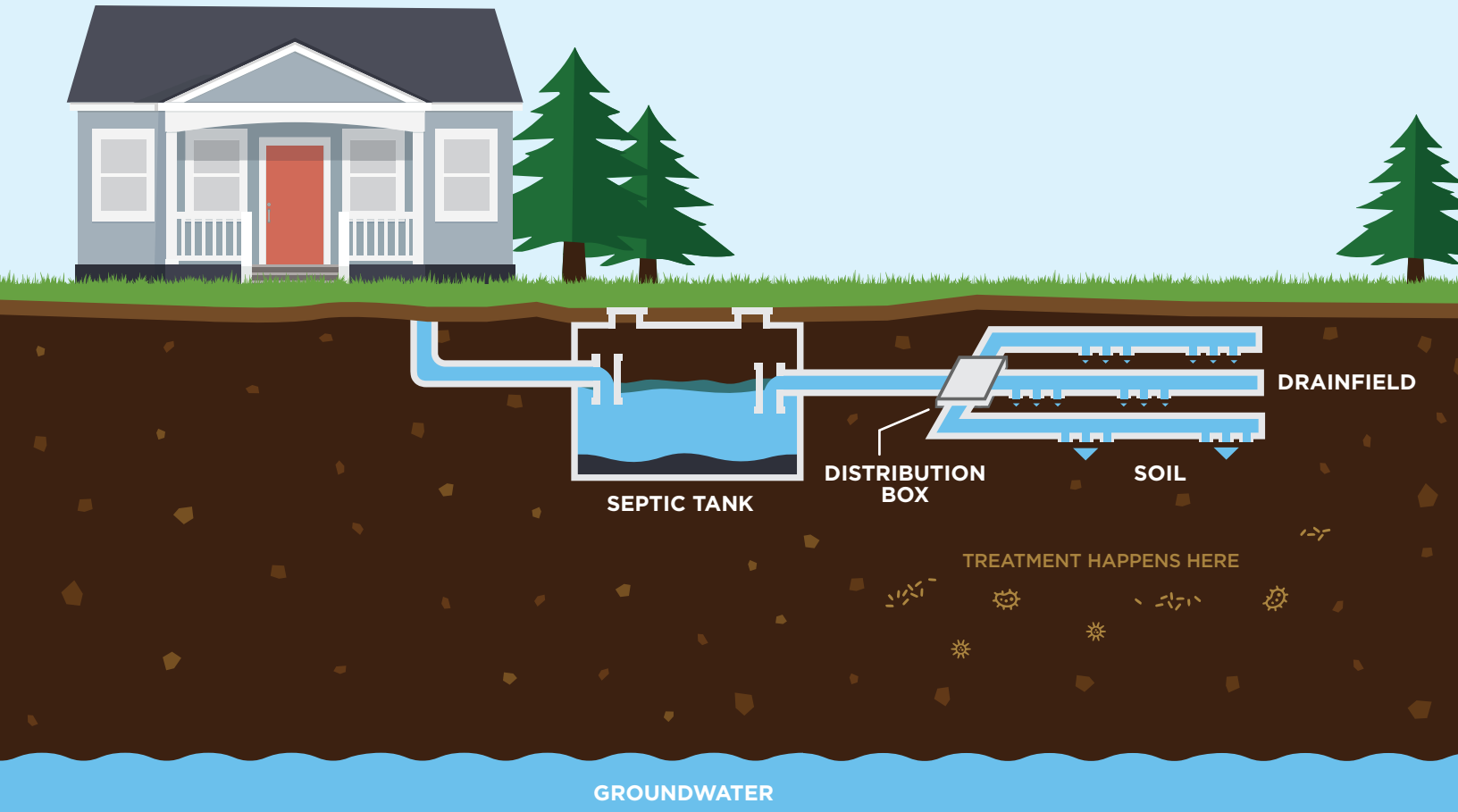


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Types of Septic Systems: Understand the Science

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Pressure Distribution System
Sand Filter System
Mound System
Subsurface Drip System
Aerobic Treatment Unit System
Disinfection Unit

HOW A SEPTIC SYSTEM WORKS

Just like a wastewater treatment plant, your septic system collects the wastewater (sewage) coming out of the house, treats it, then spreads the clean water back into the environment. The conversion from wastewater to clean water is done mainly by microorganisms (i.e. bacteria) present in your septic system. They come from the soil of the drainfield and from your sewage, and they are present in all components of your septic system. They use the waste as nutrients, cleaning the water as it passes through the system. By consuming the waste, the microorganisms in the system reduce the organic matter and harmful microorganisms going into the ground.

There are two steps to on-site wastewater treatment: waste separation and percolation through soil. In the first step, sewage moves through the septic tank where lighter particles (scum) and heavier particles (sludge) separate, leaving behind a clear layer of sewage. In the second step, sewage moves into a dispersal system (the drainfield), where microorganisms use oxygen to eat up the organic matter and treat the wastewater as it moves through the soil. Treating wastewater with septic systems prevents the contamination of groundwater and freshwater sources and protects the public from health hazards.

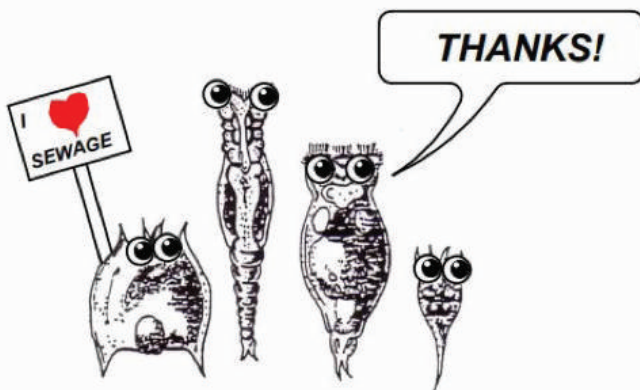


Photo credit: Mason County Public Health

TIPS

It is important to protect the microorganisms in your system to make sure that the septic system will function as long as possible. To do that, we recommend to:

- Keep household water flow low. Spread out water usage as much as possible, especially laundry (avoid running multiple loads at once).
- Redirect water from your roofdrains or yard away from your septic system, especially the drainfield.
- Throw food scraps and excessive soaps, oils and greases into the trash to keep them out of the drain.
- Keep strong chemicals, cleaners, and additives out of the septic system.
- Cover your drainfield with grass or other appropriate plants. If the drainfield is covered with concrete (like a driveway or sportcourt) or a structure, the microorganisms will not have the oxygen that they need to survive long enough to treat the wastewater.

WHY MAINTAIN & PROTECT YOUR SEPTIC SYSTEM

You are the caretaker of your house and property. Your septic system is part of the property you care for, so establishing good maintenance habits from the beginning will prolong the time you can enjoy it in the condition you received it. This manual explains good maintenance habits to focus on accessibility to the system, inspections, pumping and landscaping.

More information about operating and maintaining your septic system is available at www.kingcounty.gov/oss.

BENEFITS OF GOOD MAINTENANCE HABITS:

- Avoid costly repairs.
- Extend the longevity of your system.
- Keep harmful pathogens away and keep yourself and your family from getting sick.
- Protect groundwater and surface water - shellfish, swimming, fishing, etc.
- Follow the law, and avoid being out of compliance with state and local codes.

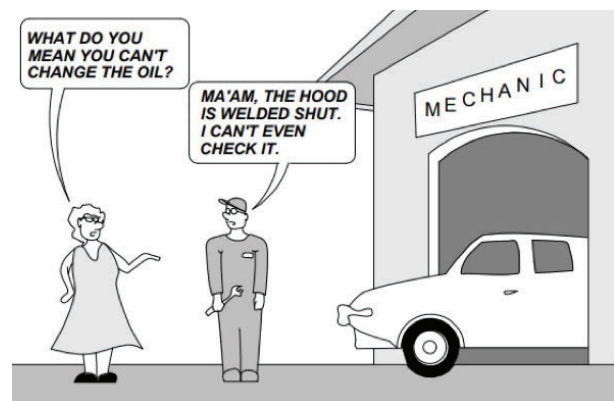
ACCESSIBILITY TO YOUR SEPTIC SYSTEM

The first step to protecting your septic system (and your property) is to make sure that the septic system is accessible for inspections:

- If you do not have risers, add them to your septic tank, as this will reduce the cost of future inspections.
- Make sure tank access lids are not buried under ground, decks, or future additions because they would need to be dug through for inspections and pumping.
- Keep valve boxes, observation ports, and cleanouts above ground. They offer access for system adjustments and easy system checks.

Make sure tank access lids are not cracked or deteriorated to prevent a safety hazard from happening.

Photo credit: Mason County Public Health



Just like you take your car for regular oil checks, your septic system also needs to be regularly inspected. If the mechanic cannot open the hood, they cannot check the oil levels, so you would not know when (or how) to change your oil. When systems are not accessible, you cannot regularly check them to make sure that there are not any problems, so you risk only finding a problem when it is larger and much harder to fix.

INSPECTING YOUR SEPTIC SYSTEM

You will also need to have an on-site sewage system inspection done routinely to maintain your systems operation.

During an inspection you will need to assess the general conditions of the septic system. In the first part of the inspection you will determine whether the component of the septic system are accessible and secure for maintenance, whether there is any leakage from the system, whether the system needs alteration and whether the system is functioning properly.

In the second part of the inspection, the inspector should carefully examine the tanks(s) and its lids and baffles, the distribution component, the dispersal box and any additional treatment and disinfection present in the septic system



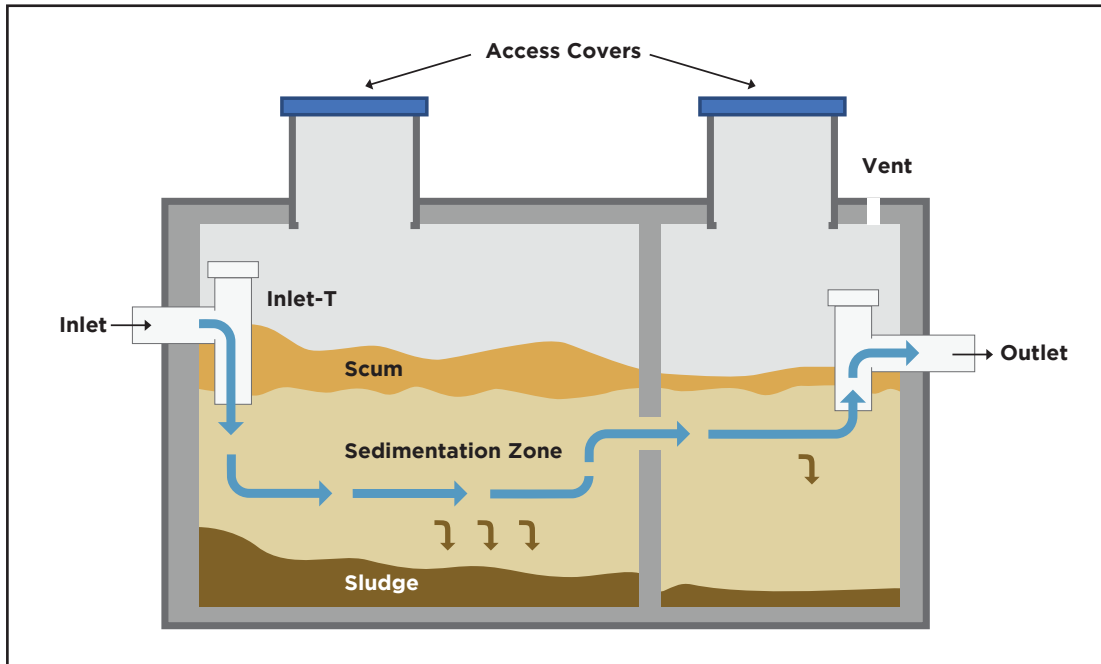
See the information sheet pertinent to your septic system in the second part of the manual for more information. The frequency of inspections depends on the type of septic system you have on your property.

****Iowa requires that all septic systems are inspected by a certified time of transfer inspector before properties with septic systems can be sold. This is a separate inspection from annual maintenance inspections. ****

SYSTEM	Suggested Frequency
Gravity System	Every 4-6 years
Pressure Distribution System	Every year
Sand-Filter System	Every year
Mound System	Every year
Subsurface Drip System	Every 6 months
Aerobic Treatment Unit System	Every 6 months

PUMPING YOUR TANK

Solids that are not decomposed remain in the septic tank. It is important to remove solids from the tanks periodically by pumping them out. If they are not removed, they will continue to accumulate until they overflow into the drainfield. This eventually leads to drainfield plugging and failure. The first signs may be slow draining fixtures, however the system may fail by discharging sewage effluent to the ground or backing up into the house.



The speed at which solids accumulate in the septic tank is impacted by the number of people using the septic system, the type of water use, and many other household characteristics. The only way to really know when your septic tank needs to be pumped is to measure how many solids are in the tank. A maintainer will do this as part of their routine inspection.

The tank should be pumped when:

- There are less than 4 inches between the bottom of the floating solids (scum) and the bottom of the outlet baffle.
- There are less than 16 inches between the top of the settled solids (sludge) and the bottom of the outlet baffle.

When you pump the tank, make sure you pump the second compartment and the pump tank (if your system includes one) as well. For a list of certified pumpers, visit www.kingcounty.gov.

NOTE FOR HOUSES WITH A GARBAGE DISPOSAL:

- Garbage disposals use very large volumes of water and send a lot of solids into the septic tank. Garbage disposals very commonly overload septic systems.
- If you use the disposal, you will need to have the septic tank pumped much more frequently. Regardless of the frequency of septic tank pumping, garbage disposals will increase the waste concentration, which can overload the drainfield. We highly recommend that you do not use your garbage disposal. If you do use it, do so sparingly.

PROTECTING YOUR SEPTIC SYSTEM: REMODELING AND LANDSCAPING

Septic systems have a false reputation that they ruin the landscape of the property. In reality, they are flexible with landscape changes, as long as the landscaper follows a few tips:

- Do not build houses, sheds, patios, or other structures on top of your septic system. This can damage the components and cause the septic system to fail.
- Keep vehicles or livestock off of your septic system. They can damage the system, and they disrupt the soil structure and oxygen availability for the microorganisms in the soil.
- Cover your drainfield with grass or other low-maintenance, low-water, shallow-rooted plants, as shown in the picture. When you are planting, make sure that you avoid deep digging. The septic system may be only 6 inches deep, and can be damaged by rototilling or digging.
- Keep trees and large shrubs at least 30 feet away from your drainfield. Their roots will seek out the water in the drainfield and can severely block the system.



Septic systems usually last 30-40 years before they fail and need to be replaced with a new one. While you develop the landscape of your property, make sure you plan and maintain a reserve area for your next septic system. The reserve area may be located between the current drainfield lines or in a completely different area, as shown on your record drawing.



PROBLEM ALERT: WHAT TO DO?!

There are times when, despite rigorous maintenance and inspections, problems still arise. Keep an eye out for early signs of septic system malfunctions and act promptly so that you can prevent your property from becoming a risk to your household, your neighborhood, and your wallet.

The most common problematic situations are listed on page 12, alongside recommended steps to remedy the situation. For up-to-date lists of certified installers, maintainers, and pumpers, as well as list of questions to ask septic professionals prior to hiring them to solve the **Problem Call us at 641-747-3972**



A failure can be confirmed with a fluorescent dye test.

PROBLEM ALERT: WHAT TO DO?! CONT...

▶ ALARM GOING OFF:

- 1 Call a professional.
 - 2 You can usually silence the alarm by pushing a button on the front or side of the panel. The red light will continue to shine, showing the problem has not been fixed yet.
 - 3 Do not change the settings in your control panel. Systems are set up a certain way to make them function as well as possible. By changing the system settings, you could worsen your problem.
 - 4 Make sure that none of your toilets, appliances, or water fixtures are leaking.
-

▶ SLOW-DRAINING FIXTURES:

- 1 Use as little water as possible.
- 2 Call a certified maintainer to diagnose the problem.

Possible explanation for the issue:

- Tank needs pumping.
- A pump is not working.
- Drainfield is clogged and cannot absorb as much water as designed.

ALWAYS CHECK YOUR EFFLUENT FILTER AS PLUGGED FILTERS CAN CAUSE SLOWING DRAINAGE!

▶ CRACKS/ HOLES IN THE TANK LIDS:

- 1 Contact a certified maintainer to replace the lids. This is a safety hazard and it must be addressed as quickly as possible.
 - 2 Make sure that other people do not come near the tanks until the lids are replaced.
-

▶ SEWAGE SURFACING ON THE GROUND:

- 1 Contact a professional to diagnose the problem. A designer might need to design a repair or replacement for your septic system.

If, the septic system is going to be replaced, make sure the old tanks are properly abandoned by following the instructions in the tank abandonment report available on our website.

- 2 Contact the public health department. We can help you figure out what your next steps are and make sure that other people do not come in contact with the sewage.
-

▶ SYSTEM IN NEED OF VERY FREQUENT PUMPING:

- 1 Make sure that the waste going into the septic system does not have too many solids, greases, or chemicals.
- 2 Make sure that none of your toilets, appliances or water fixtures are leaking.
- 3 Call a professional to diagnose the problem because your septic system might need to be repaired soon.

PROBLEM ALERT: WHAT TO DO?! CONT...

► EMERGENCY SITUATION:

1 Power outage (for systems that have pumps):

- a** Take short showers.
- b** Do not wash laundry.
- c** Do not let water run while brushing your teeth, shaving, or rinsing dishes.
- d** Do not flush the toilet each time it is used for liquid waste.
- e** If your system has a timer:
 - If the power has been out for a long time, the timer will be behind when your power is restored. You should continue to conserve water for an additional day or more.
 - If the high water alarm sounds when the power is restored, the effluent has backed up into the reserve storage area of the pump tank. In this case, follow the steps listed for a system without a timer. (See section 1.f).

f If your system does not have a timer:

- Turn the circuit to the pump 'off' while the power is out.
- When the power is restored, turn the pump 'on' for 2 minutes and 'off' for 4-6 hours to "dose" the right amount of effluent into the drainfield. If there was little water use during the power outage, the pump may automatically turn off during the first manual dosing.
- Conserve water and continue the 2-minute pumping every 4-6 hours until the pump turns itself off.

2 Earthquakes and wildfires:

a Before the event:

- Maintain your septic system and take pictures/ keep documents of the location of septic system components.
- Turn off electricity to the system at the circuit breaker.

b During the event:

- Follow emergency and evacuation procedures.
- Eliminate all non-essential water use.
- Try to find other toilets if your septic system is damaged.

c After the event:

- Contact a certified maintainer for an inspection.
- If sewage is surfacing, contact the public health department.
- Isolate your septic system to keep people away from possible collapsing components.
- Check for changes in how the septic system is working.

3 Flooding:

a During the flood:

- Reduce water use.
- Turn off electricity to the system at the circuit breaker.

b After the flood:

- Isolate your septic system to keep people away from possible collapsing components.
- If sewage is surfacing, contact the public health department and a certified maintainer.
- If the septic system is above the flood water, have the tank pumped by a certified pumper. Do not have the septic tank pumped if it is under the flood water.
- Avoid using the system and do not dig while the soil is flooded.

For more information about what to do with your septic system in emergency situations, visit: <https://www.neha.org/eh-topic/preparedness-response-septic-systems>.

TYPES OF SEPTIC SYSTEMS: UNDERSTAND THE SCIENCE

GRAVITY SYSTEM

A gravity system consists of a septic tank, a distribution box, a drainfield (a network of underground pipes), and a reserve area (area reserved for a replacement drainfield). Sewage flows through the network following gravity. A distribution box is used to spread the sewage flow evenly between multiple drainfield lines. The sewage moves down to the bottom of the trench and into the original soil.

MAINTENANCE:

- Have gravity systems inspected every 3 years.
- Check observation ports for ponding water.
- Clear drainfield of large vegetation and ensure ports are accessible.
- Check drainfield area for soggy spots or breakouts.
- Pump out the septic tank as needed.

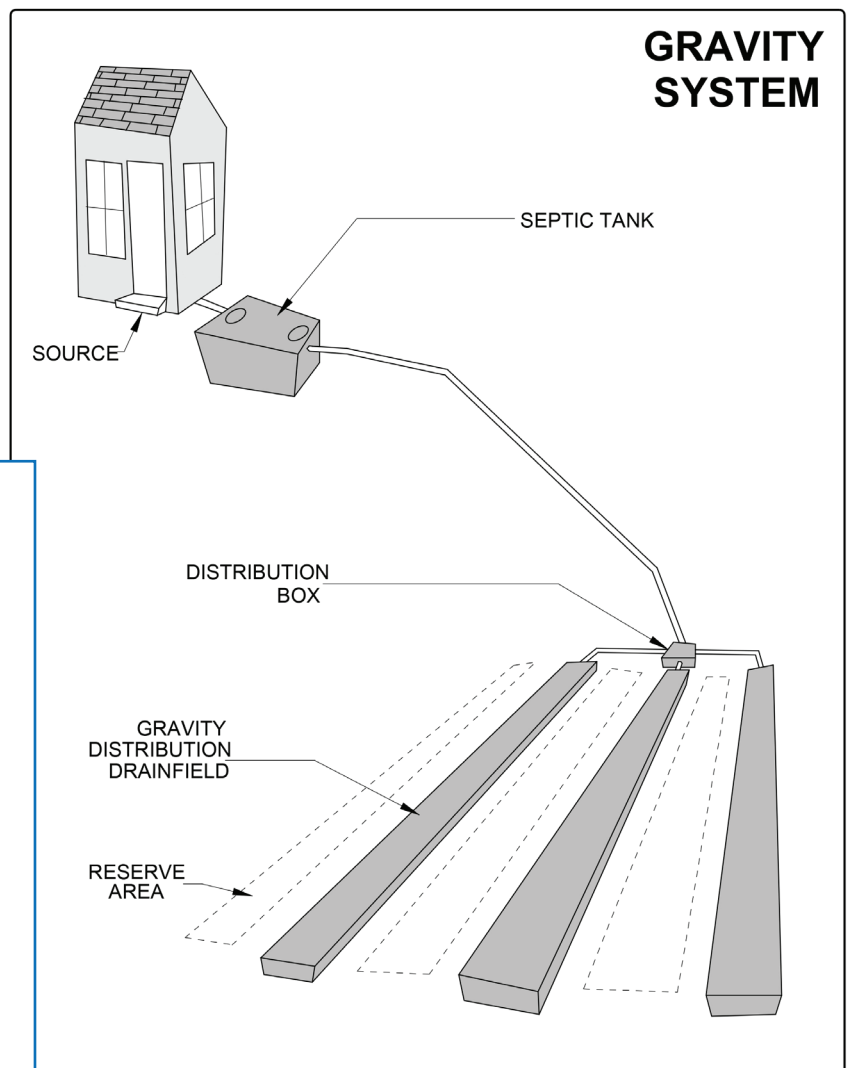
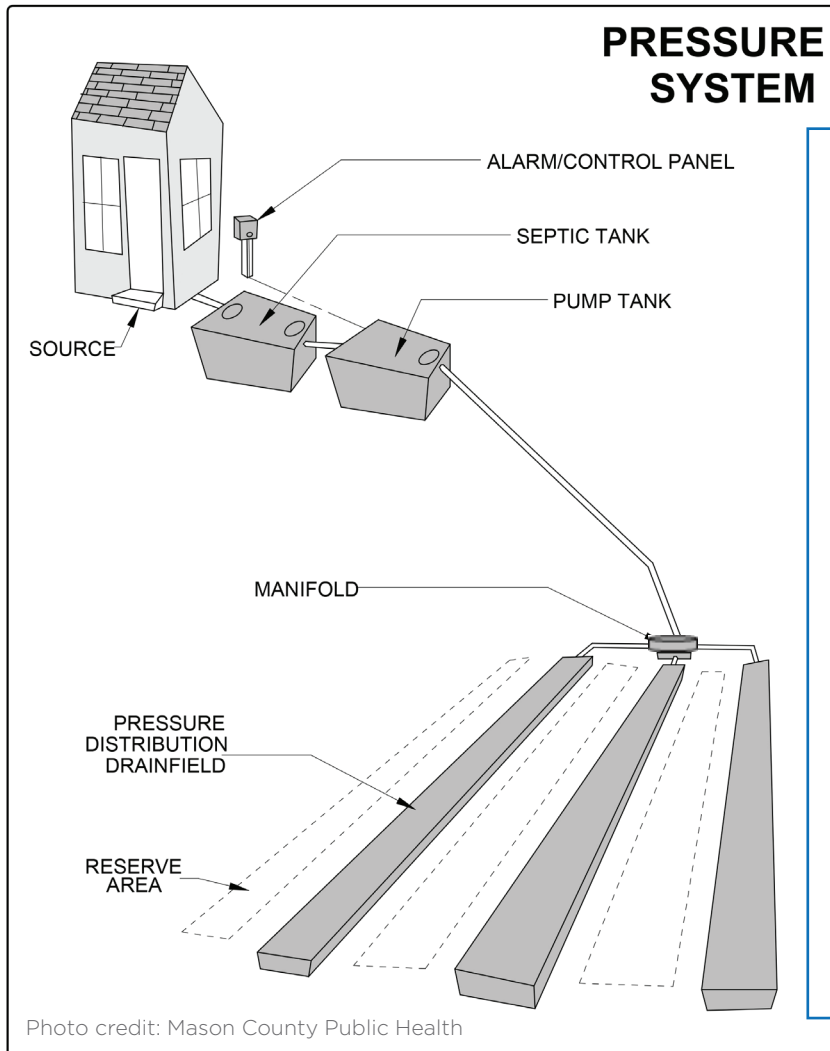


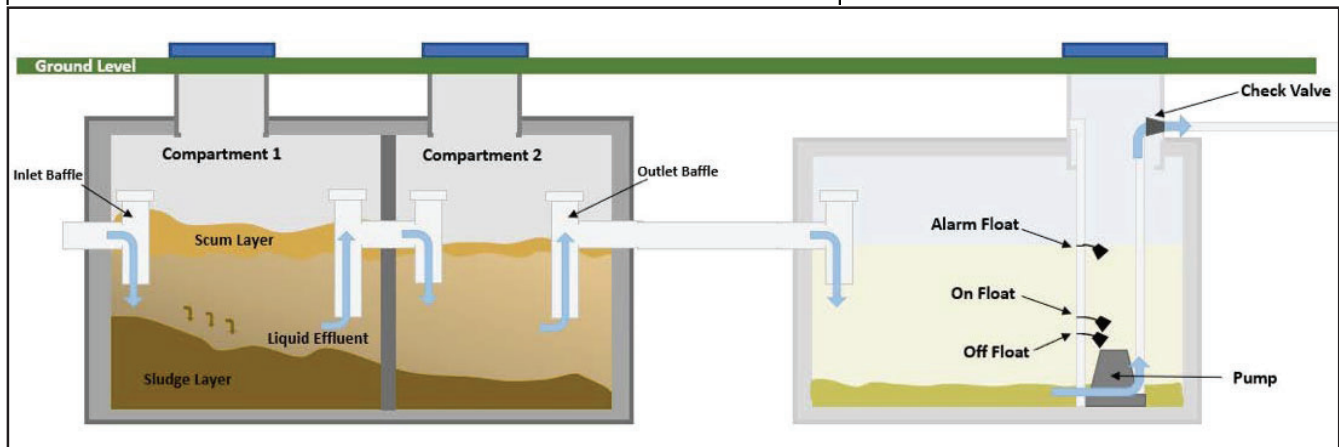
Photo credit: Mason County Public Health

PRESSURE DISTRIBUTION SYSTEM

A pressure distribution system is composed of an alarm/control panel, a septic tank, a pump tank, a manifold, a pressure distribution drainfield and a reserve area. Sewage is pumped to the underground pipes in the drainfield under pressure. Usually, a timer is used so that sewage is discharged to the drainfield evenly throughout the day. A manifold is used to equally disperse the flow between multiple lines. Then, the sewage is sprayed into the trenches, where it moves down into the original soil.



- ### MAINTENANCE
- Have pressure systems inspected annually.
 - Check observation ports for ponding water.
 - If the alarm goes off, find the problem as soon as possible.
 - During an inspection, make sure floats swing freely and that cords are not tangled up.
 - Clear drainfield of large vegetation and ensure ports are accessible.
 - Check drainfield area for soggy spots or breakouts.
 - Pump out the septic and pump tanks as needed.



This diagram shows the contents of a pressure distribution septic tank and pump tank.

SAND FILTER SYSTEM

Sand-based septic systems contain an alarm/control panel, a septic tank, a pump tank, a sand filter, a drainfield (or sand-lined trenches), and a reserve area. The systems use pressure distribution technology through special sand to treat the sewage efficiently before it is distributed to the drainfield.

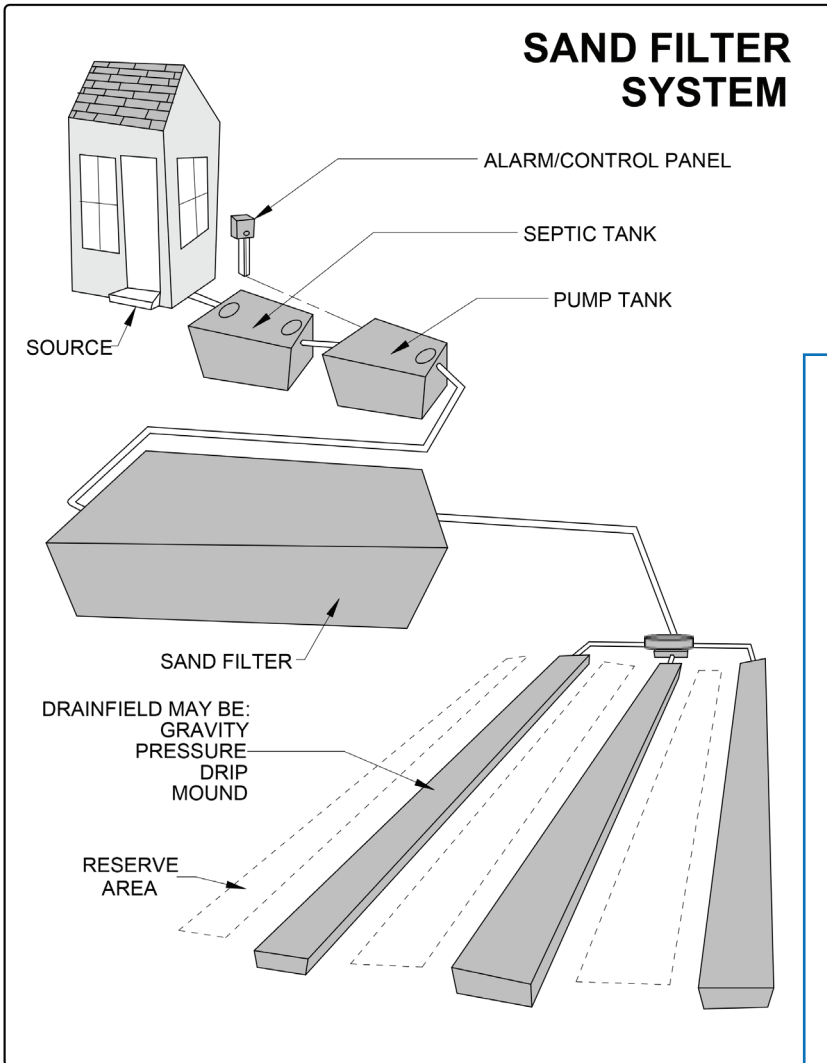


Photo credit: Mason County Public Health

MAINTENANCE

- Have sand filter systems inspected annually.
- During an inspection, make sure floats swing freely and that cords are not tangled up.
- Check observation ports for ponding water.
- Clear drainfield of large vegetation and ensure ports are accessible.
- Check drainfield area for soggy spots or breakouts.
- Pump out the septic and pump tanks as needed.

MOUND SYSTEM

A mound septic system contains all the components of a pressure distribution system (including a sand filter, occasionally). The mound is an elevated pressure drainfield bed installed in a large sand berm that contains a network of small perforated pipes. The sewage is dispersed evenly between the lines in the mound by a manifold. The sewage is treated as it travels down through the mound.

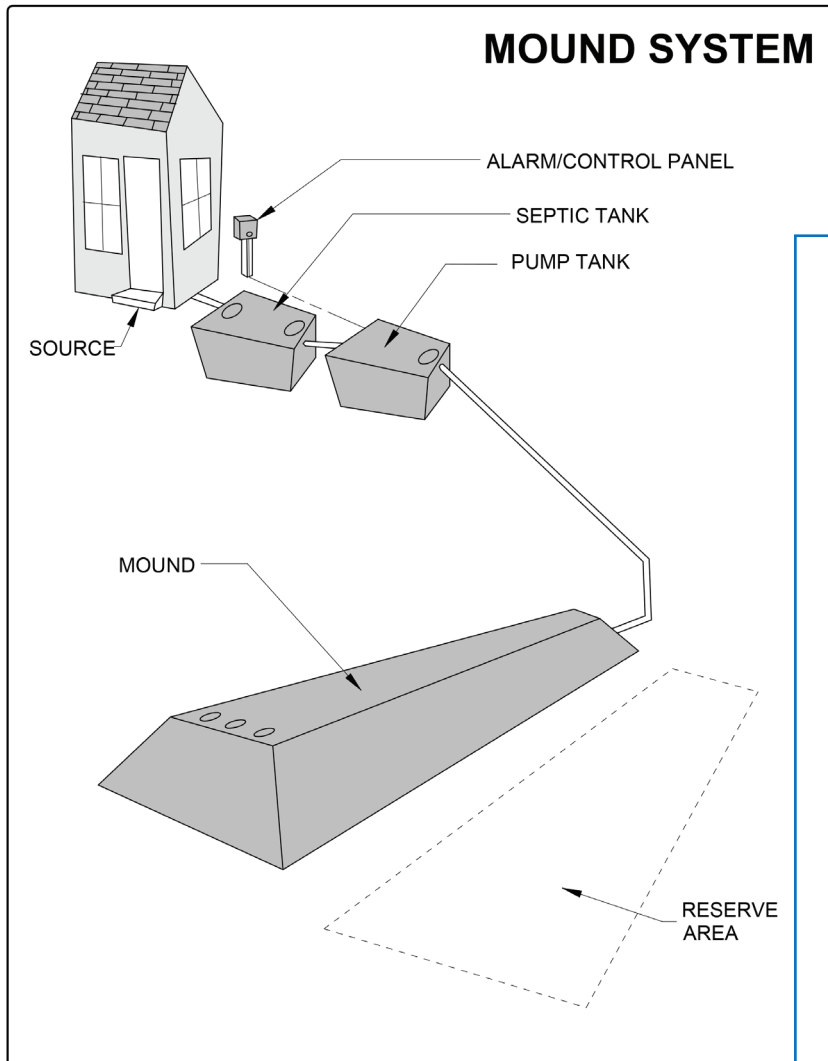


Photo credit: Mason County Public Health

MAINTENANCE

- Have mound systems inspected annually.
- Have laterals flushed as needed.
- Clear mound of large vegetation.
- Ensure that the mound's shape is maintained. Plant grass (or other plants with small grassy roots) to keep sand from sloughing. Do not fill around the mound to make it level.
- Check observation ports for ponding water.
- Clear drainfield of large vegetation and ensure ports are accessible.
- Check drainfield area for soggy spots or breakouts.
- Pump out the septic and pump tanks as needed.

GLENDON BIOFILTER® SYSTEM

A Glendon Biofilter® septic system contains all the components of a sand-based system. It resembles a mound system in the shape of the drainfield. The Glendon Biofilter® is made of a buried basin filled with sand and gravel. As it is pumped by the pump tank, the sewage moves into the bottom of the basin. Then it flows up through the layers of the media, moves over the rim of the basin, and flows down into the sand-covered area surrounding the unit where it absorbs into the original soil.

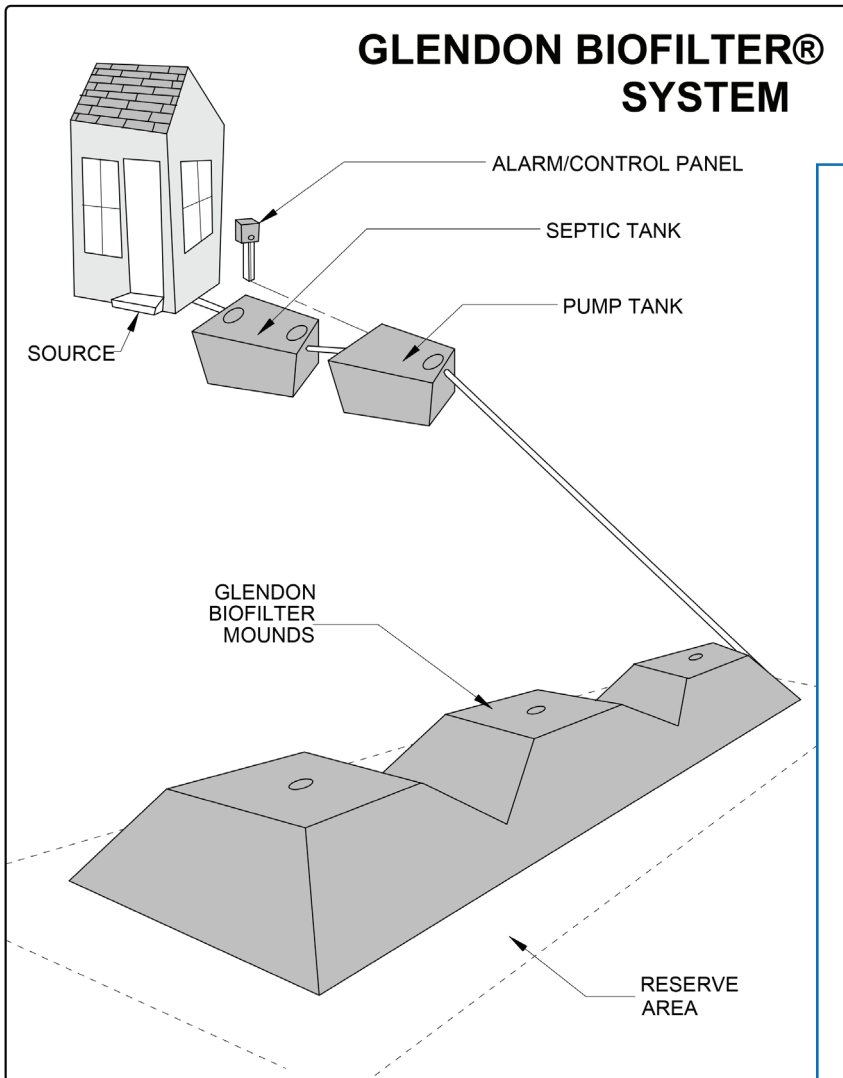


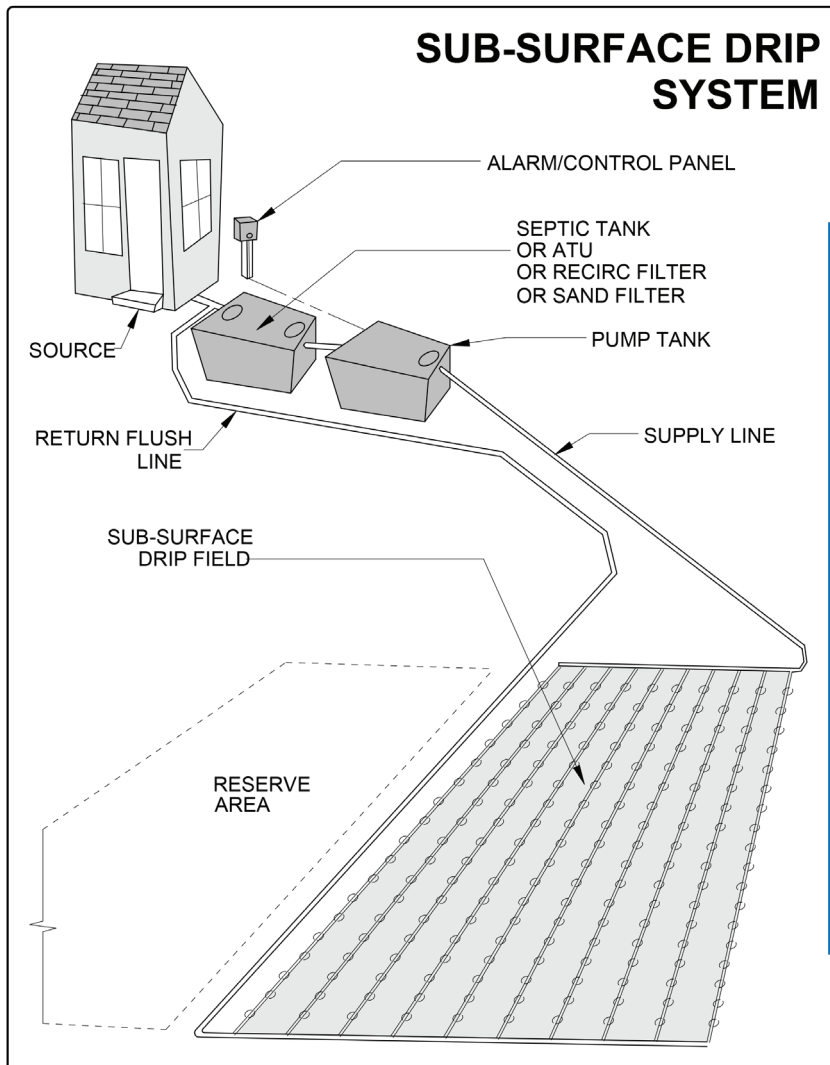
Photo credit: Mason County Public Health

MAINTENANCE

- Have Glendon Biofilter® Systems inspected every 6 months by a maintainer familiar with this technology.
- During an inspection, check basins for solids build up when other tanks are checked.
- Clear mound of large vegetation.
- Ensure that the mound's shape is maintained. Plant grass (or other plants with small grassy roots) to keep sand from sloughing. Do not fill around/between mounds to make it level.
- Check observation ports for ponding water.
- Clear drainfield of large vegetation and ensure ports are accessible.
- Check drainfield area for soggy spots or breakouts.
- Pump the basins and the other tanks as needed.

SUBSURFACE DRIP SYSTEM

The subsurface drip system is composed of an alarm/control panel, a septic tank, a pump tank, a manifold, a supply line, a return flush line, a sub-surface distribution drainfield, and a reserve area. Sewage is pumped under pressure to the network of tubes through the manifold that will disperse the effluent evenly between multiple lines. The effluent drips out of the tubing through small emitters (special holes in the pipe wall). Then it moves directly into the original soil.



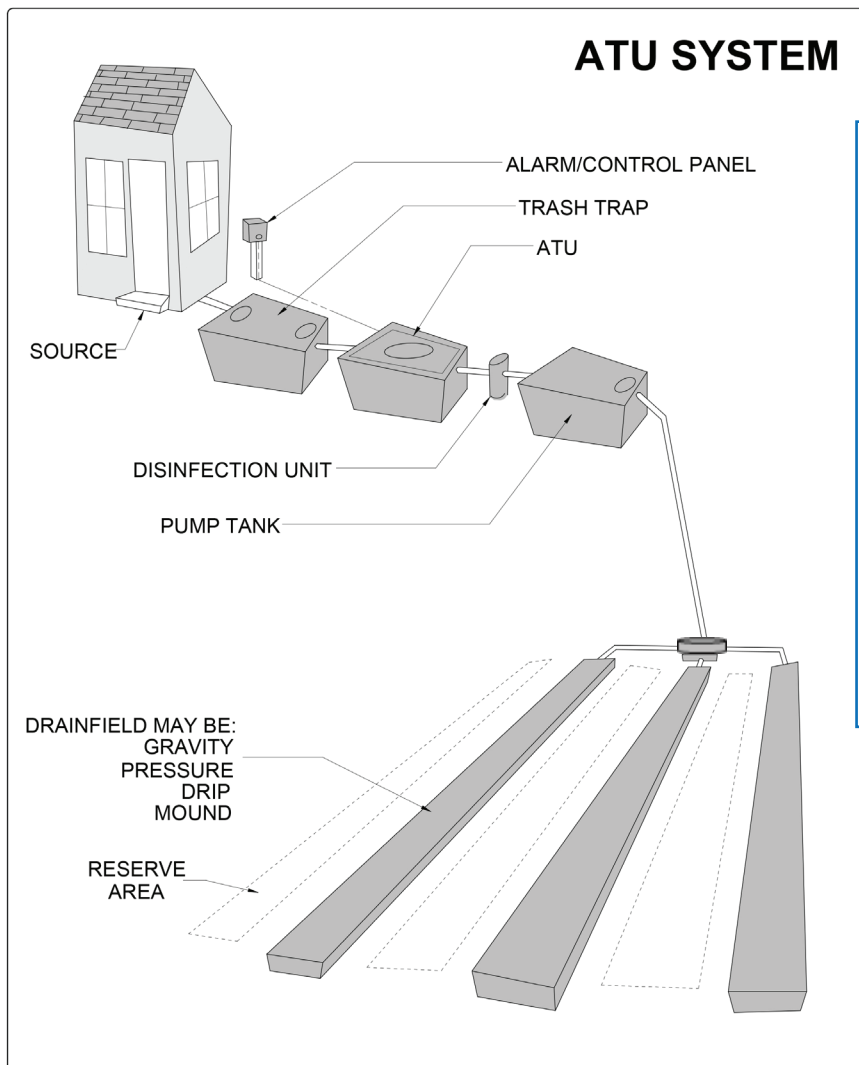
MAINTENANCE

- Have subsurface drip systems inspected every 6 months.
- Clear drainfield of large vegetation and ensure ports are accessible.
- Check drainfield area for soggy spots or breakouts.
- Pump out the septic and pump tanks as needed.
- The drainfield drip lines are very shallow. Make sure that they are not dug up when landscaping or by dogs.

Photo credit: Mason County Public Health

AEROBIC TREATMENT UNIT (ATU) SYSTEM

An aerobic treatment unit system contains an alarm/control panel, a trash tank/trap (if needed), an aerobic treatment unit (ATU), a pump tank, a drainfield, and a reserve area. The ATU is made up of a buried tank and an air-blower. When the sewage is in the ATU tank, the blower injects a large volume of air and mixes it with the sewage. This provides additional treatment when the soil conditions on your property cannot adequately treat the wastewater to protect groundwater and surface waters. Each ATU is a little bit different - make sure to read the manufacturers' guidance documents for your specific type of ATU.



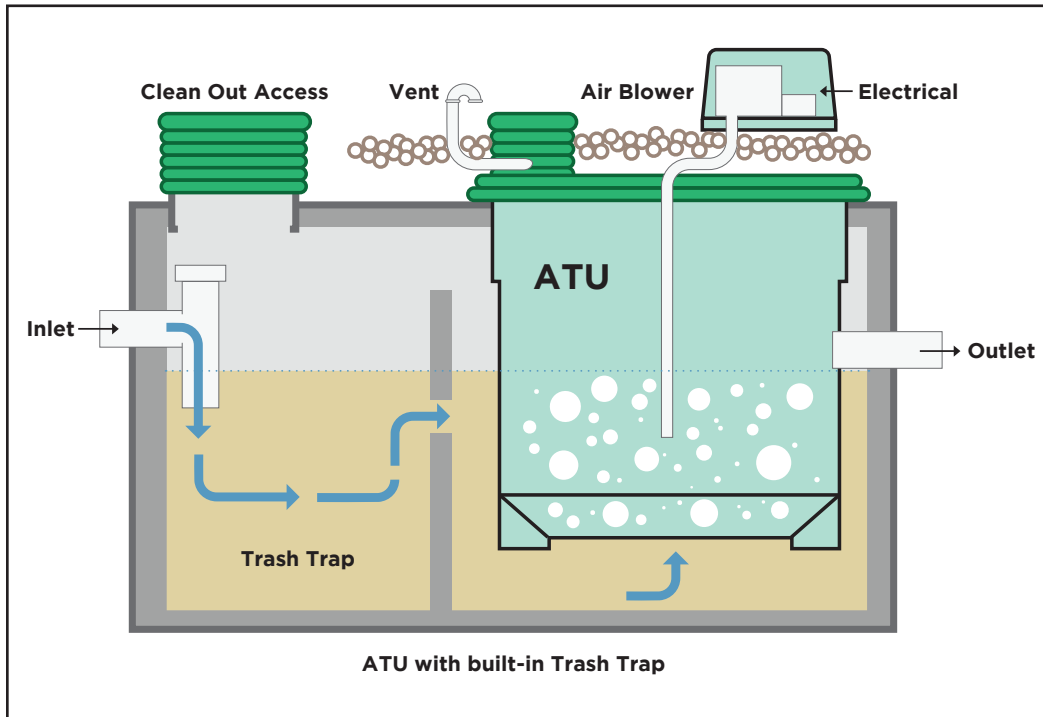
MAINTENANCE

- Have ATUs inspected every 6 months by a maintainer familiar with this technology.
- Pump out the tanks when necessary. When pumping, make sure to hire a certified professional that is familiar with your type of ATU.
- Visually inspect the tank for damage, leaks, etc. when pumping.

MAINTENANCE CONTRACTS ARE REQUIRED FOR THESE SYSTEMS IN IOWA!
FOR A LIST OF CONTRACTORS CONTACT OUR OFFICE
641-747-3972!

Photo credit: Mason County Public Health

THE AEROBIC TREATMENT UNIT (ATU) SYSTEM, CONT...



Similar units to ATUs that have similar maintenance requirements:

- Sequencing batch reactors (SBRs)
- Rotating Biological contractors (RBCs)

THE DISINFECTION UNIT

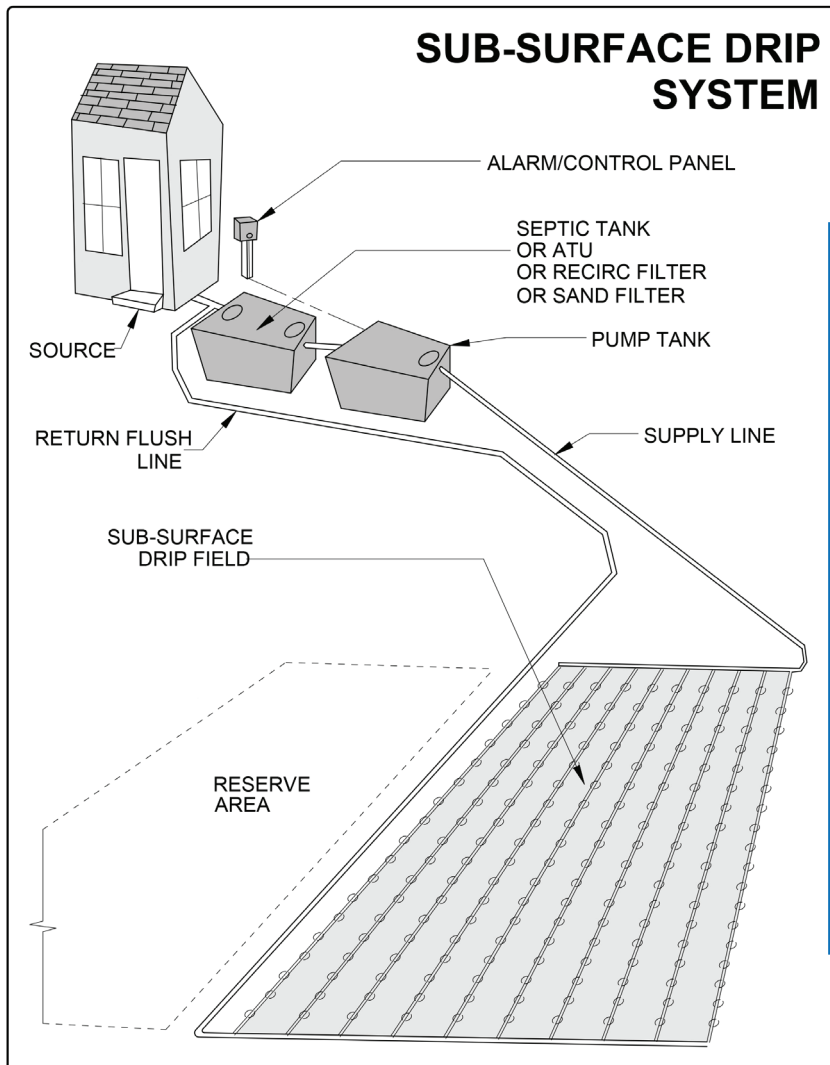
A disinfection unit is a small device designed to kill bacteria in sewage as it passes through it. They are included when additional treatment is needed. The most common type is an ultraviolet light.

MAINTENANCE

- Have disinfection units inspected by a certified maintainer at least every 6 months. During the inspection, the maintainer should clean the bulb's container.
- The ultraviolet bulb needs to be replaced every 2 years.
- Make sure that the power to the disinfection unit remains on at all times.
- Make sure that the disinfection unit and the ATU blower are on separate circuits. If they are on the same circuit, they become a fire hazard.

SUBSURFACE DRIP SYSTEM

The subsurface drip system is composed of an alarm/control panel, a septic tank, a pump tank, a manifold, a supply line, a return flush line, a sub-surface distribution drainfield, and a reserve area. Sewage is pumped under pressure to the network of tubes through the manifold that will disperse the effluent evenly between multiple lines. The effluent drips out of the tubing through small emitters (special holes in the pipe wall). Then it moves directly into the original soil.



MAINTENANCE

- Have subsurface drip systems inspected every 6 months.
- Clear drainfield of large vegetation and ensure ports are accessible.
- Check drainfield area for soggy spots or breakouts.
- Pump out the septic and pump tanks as needed.
- The drainfield drip lines are very shallow. Make sure that they are not dug up when landscaping or by dogs.

Photo credit: Mason County Public Health



COUNTY HEALTH SERVICES

ENVIRONMENTAL HEALTH

2002 State Street

Guthrie Center IA 50115

641-747 -3972

This Manual was adapted from the King County Septic System Manual