EFFLUENT REDUCTION GUIDELINES:
ALTERNATIVE TREATMENT AND DISPERSION TECHNIQUES

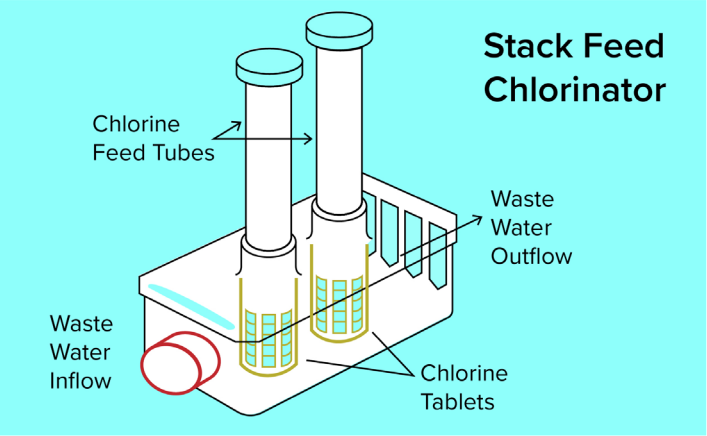
The design of a conventional septic system is a primary treatment technique that uses an absorption trench for the secondary treatment of effluent. The aggregate-filled trenches use the microbial activity in the soil to convert organic matter from septic tank effluent into mineral components. These trenches can be used where soil conditions are satisfactory, sufficient land space is owned, and it will not cause an issue to public health. The conditions that must be satisfied to install the trenches include acceptable soil percolation rate (based on permeability), maximum elevation of groundwater is at least 2 feet below the bottom of the trench and clay or other impervious strata are at least 4 feet below the bottom of the trench. In Louisiana's diverse landscape, these systems aren't as common due to soil saturation and high water tables. When conventional absorption fields cannot be used, there are alternative methods for secondary treatment and distribution of effluent that can be utilized. The methods may vary based on parish but will mostly be due to local topography, available space, soil profile and water table elevation. Specific guidelines for alternative treatment and dispersion techniques regulations can be found in the Public Health – Sanitary Code LAC Title 51 Part XIII or in the study materials for LSU AgCenter and Louisiana Department host Onsite Wastewater Installers Course linked in each section. Even though secondary treatment may vary, the homeowner will still need to have the septic tank inspected every six years and pumped at least every eight years by a licensed sewage hauler to promote efficient processing of effluent

Common Additional Components

In some systems, there may also be a need for additional components such as a pumping station or chlorine contact chamber. Pumping stations consist of a holding tank, pump, piping and electrical controls that store and move effluent between the primary treatment method and the secondary or dispersion method. These are typically required when gravity flow is not sufficient to move effluent from one location to another. They can also be used when water is needed to move through a piping network at a certain rate to provide adequate contact with a secondary treatment method. Three water level controls will automatically operate the pump system and provide the homeowner with warnings at high water levels when maintenance is required. The chlorine contact chamber is located after the primary treatment and can be used to disinfect the wastewater before discharge. These systems help mitigate contamination to environmental systems and for evaporation distribution methods like

Pumping station installation for septic system. Photo by Richard Grabert

spray irrigation. Homeowners should actively monitor chlorine residuals with color indicators to ensure sufficient concentrations are being maintained. For preventative maintenance, it's best to clean the unit internally every 6-12 months by flushing or pumping out and scraping residual chlorine from the tubing. In the diagrams, these may be pictured with alternative secondary treatment systems to promote water movement and disinfected dispersion.



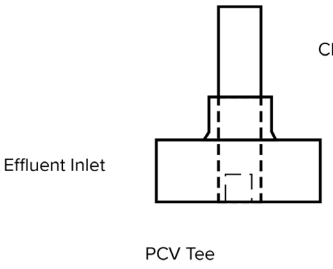


Figure 12

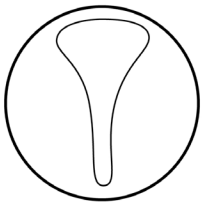


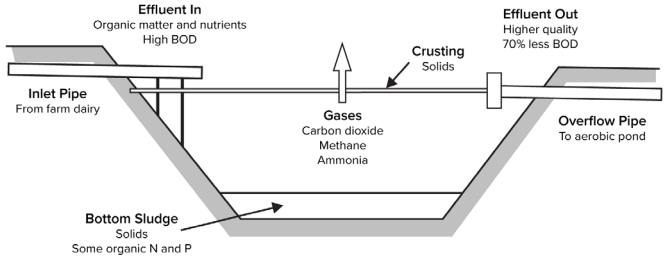
Figure 13

Stack Feed Chlorinator

Oxidation Ponds

When adequate space is available, an oxidation pond can be used to treat effluent by the influence of air and sunlight. These shallow ponds, with an average depth of 4-5 feet, use prolonged retention time for biological interactions of microbial bacteria, air and sunlight to complete the digestion of residual organic matter and harmful substances in the effluent. General maintenance requirements include vegetation control, mowing and the occasional pump out if sedimentation is high. The addition of any pesticides, chemical treatment for vegetation or fertilizer from surrounding runoff may inhibit the pond from adequately treating the wastewater effluent. These ponds must also be enclosed by a chain-link fence with a locked gate to keep out children, pets and wildlife.

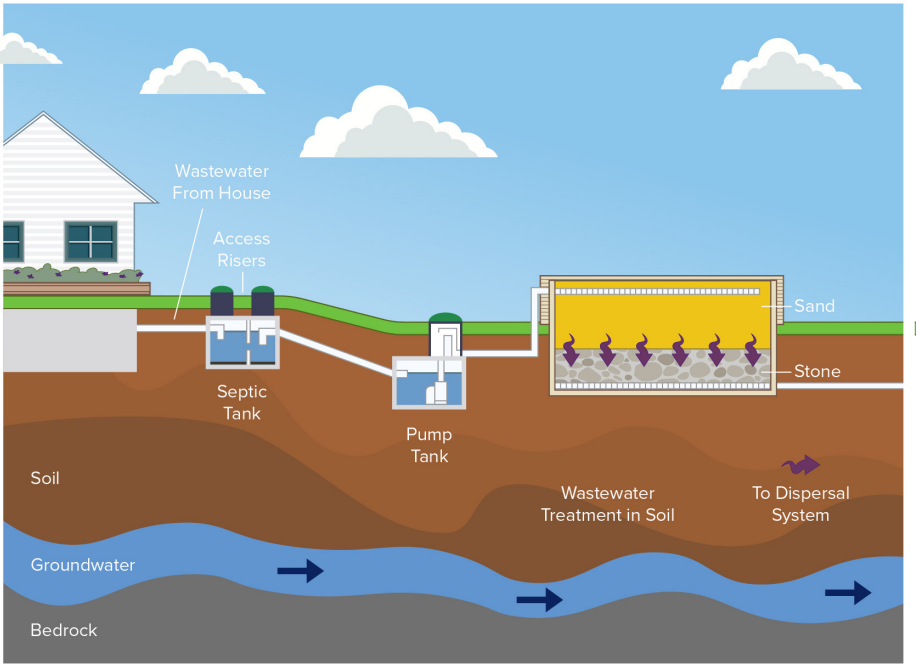
Oxidation ponds are used to treat sewage. Google maps photo



Piping schematic for an oxidation pond.

Sand Filters

Sand-filtered systems can be constructed either above or below ground with direct flow or recirculating systems. This treatment technique is good for reducing nutrients, and if built above ground, is an adequate method for sites with high water tables or that are close to water bodies. The sand filter bed should remain aerobic throughout the process for bacteria to efficiently treat the effluent. Effluent is distributed through the top perforated pipe and seeps slowly down to the bottom layer of gravel to be carried away in the underdrain line. In some systems, effluent can be pumped under low pressure to help with distribution and recirculation through the box system. An advantage of above aboveground system is the reduced risk from surface runoff



Sand FIlter Septic System

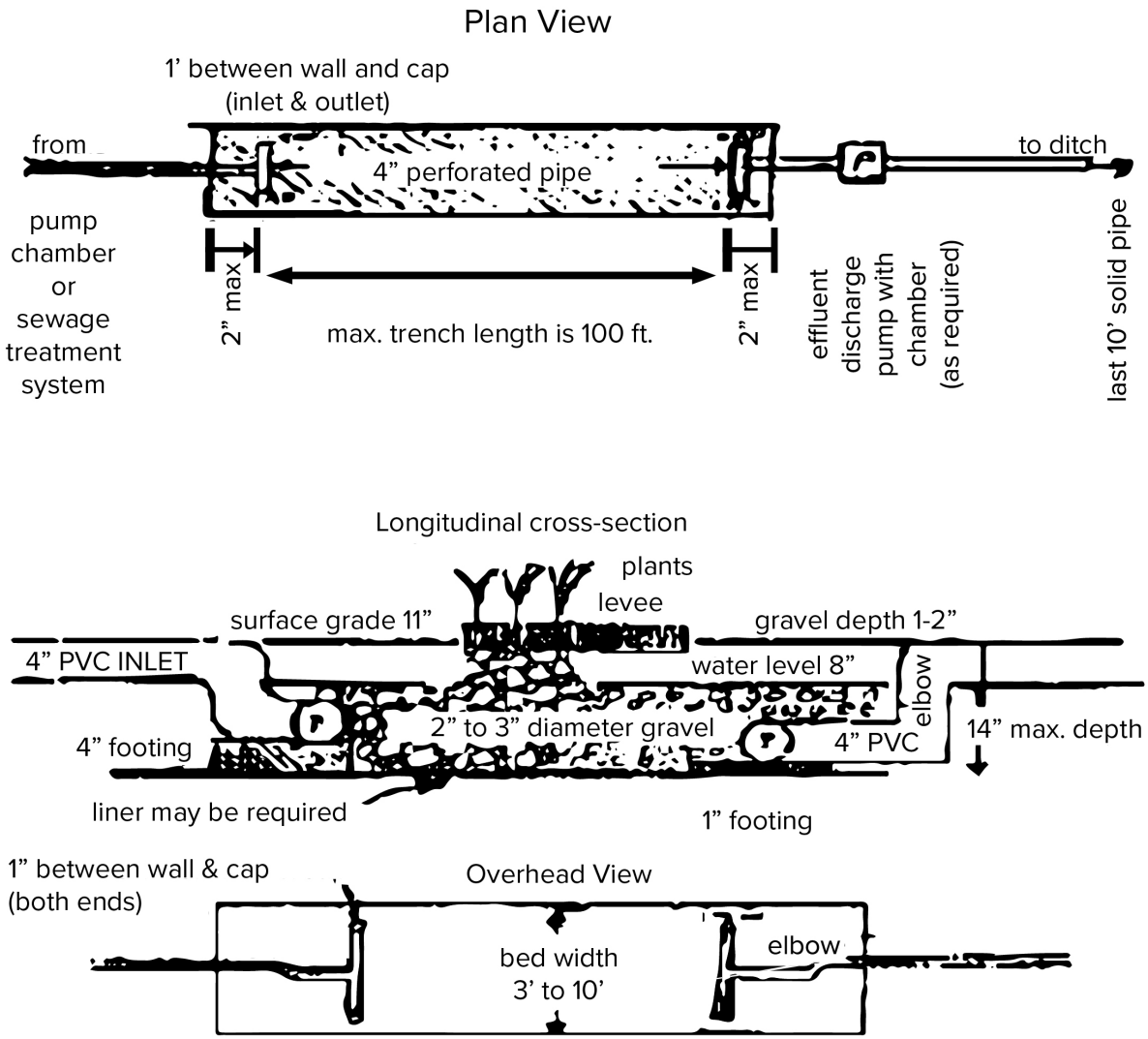
water. Make sure all gutter, downspouts or paved surfaces drain away from the sand filter bed to avoid saturation. Due to the materials needed, these systems are more expensive than a conventional septic system or other alternative methods.

Rock-Plant or Constructed Wetland Filters

Mimicking a natural plant system using local fauna and rocks can create an aesthetically pleasing secondary treatment method called a rock-plant filter bed or constructed wetland. These systems use plants and microbes to improve water quality and reduce the volume of water from domestic wastewater treatment. The effluent is allowed to pass through the media to help remove pathogens and nutrients just like in natural environmental systems. An impermeable liner helps to keep the gravel, sand and soils in place as they stay saturated year-round. The plants selected for this system must also be able to survive in water-inundated settings. After

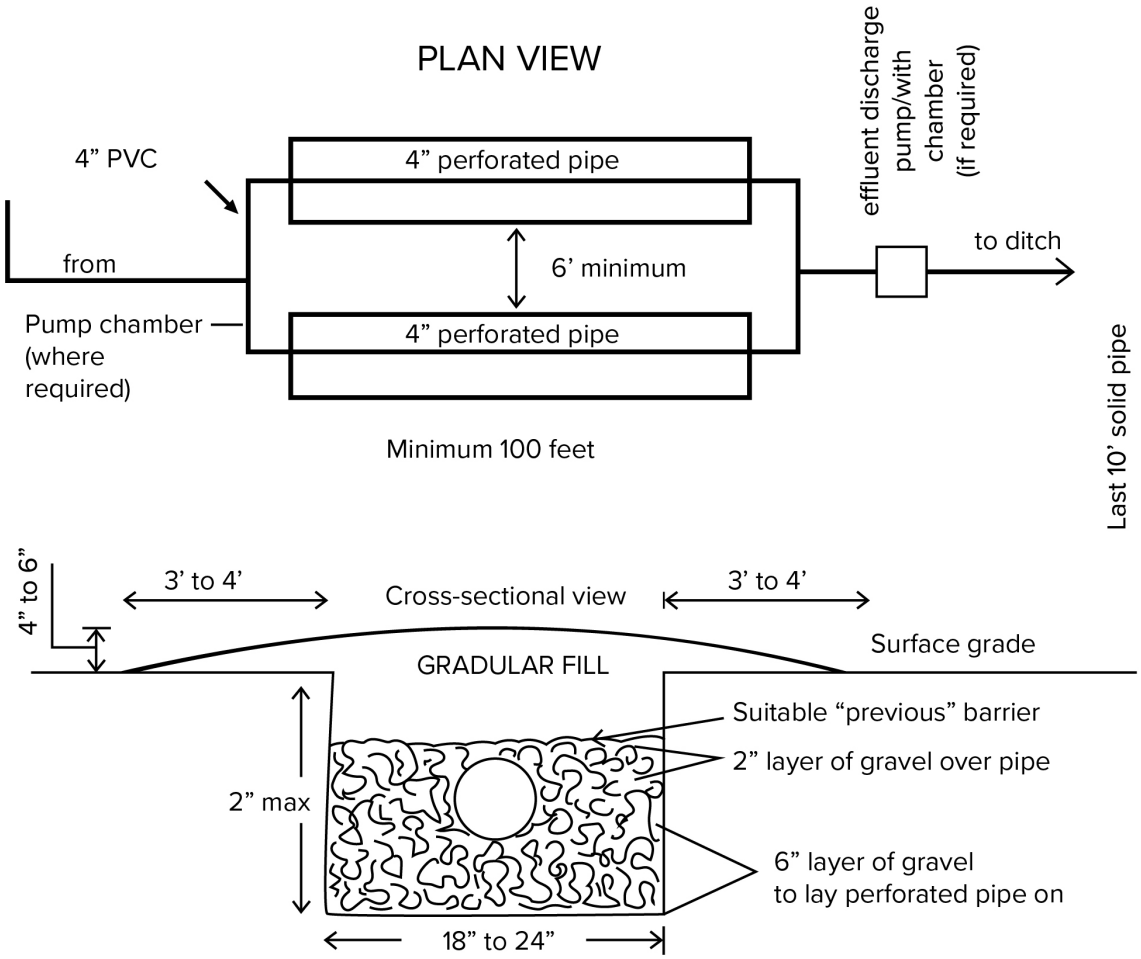
Continued on next page.

the effluent passes through the wetland it goes through an underdrain line to the discharge point. Though these systems should maintain saturation, they must be protected from surface runoff water. A surrounding levee support system should be built to exclude additional runoff from gutters, downspouts or paved surfaces.



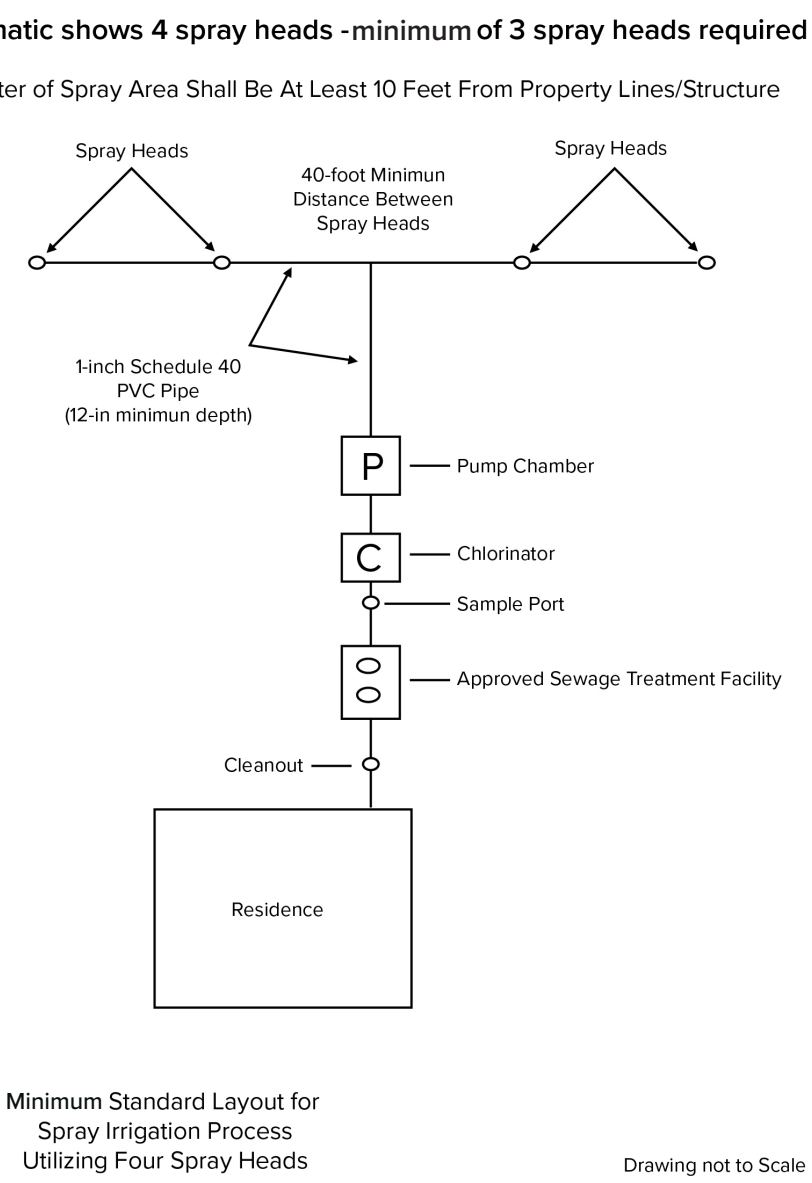
Rock-Plant filter bed

Effluent Reduction Fields



Plan View Effluent Reduction Field

An effluent reduction field is a similar design to soil absorption fields but used for individual sewage systems, with a capacity of up to and including 1,500 gallons per day (GPD). These field lines both treat and reduce the amount of effluent that is discharged from a septic system. A pumping station can be used if there is not sufficient grade for gravity flow to the discharge point. Distribution boxes are used to reduce the flow and promote equal distribution of the effluent through the soil profile. The microbes in the fill material will convert organic matter and residual compounds to minerals similar to absorption field lines. Porous soils or sands should be used as fill material to allow water to pass in all directions while a clean, graded gravel, clam, or oyster shell material may be used for effluent to pass through. Maintaining these systems requires great care to prevent clogs in the septic unit or drain field lines from nonbiodegradable materials, sedimentation, or particulates for septic tank overload, or increased water volume leading to hydraulic overload. For strategies to help conserve water and protect downstream septic systems, check out What **Types of Wastewater Do You Generate fact sheet.**



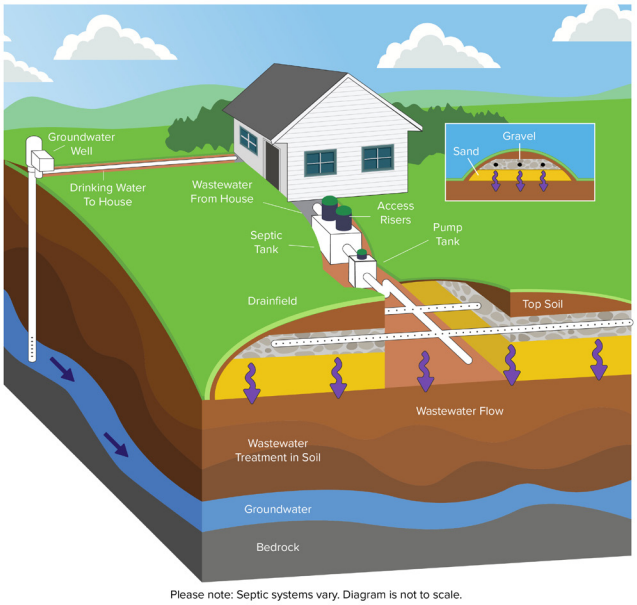
Minimum Standard Layout for Spray Irrigation.

A spray irrigation system is a type of dispersion system that promotes evaporation and soil infiltration of the effluent after treatment. These systems are typically preceded by a chlorine contact chamber to further disinfect effluent before yard dispersion. Pumping chambers will be activated by a high/low water switch and can be placed on time cycling devices for early morning or evening irrigation. A minimum of three 4-inch sprinkler heads coded for wastewater effluent will be used for these systems. The electric pump will force the effluent through piping to pop-up or elevated rotating-type sprinkler heads and distribute it to the yard. Care should be taken to ensure the land is sloped to facilitate drainage away from water wells or water courses to prevent public health hazards.

Overland Flow

Overland flow is a type of dispersion system that promotes wide-applied soil infiltration of the effluent. The pumping chamber will distribute effluent from the primary treatment septic unit to large acre properties. This system is permitted when the property is 3 acres or more and will be used as permanent vegetation cover. The discharge through a 4-inch perforated pipe must be distributed in such a manner as to confine the effluent on the property owned by the generator. A header should be used at the end of the discharge line to help disperse the effluent and to discourage channelization. The point of discharge must be such that there is at least a 200-foot flow of effluent over the property of the generator. The slope of the land and its drainage must be a minimum of: a) 50 feet from any private water wells, b) 20 feet from any property line, c) 100 feet from public water supply wells, and d) 25 feet from potable water (pressure) lines.

Plan View Effluent Reduction Field



Please note: Septic systems vary. Diagram is not to scale.

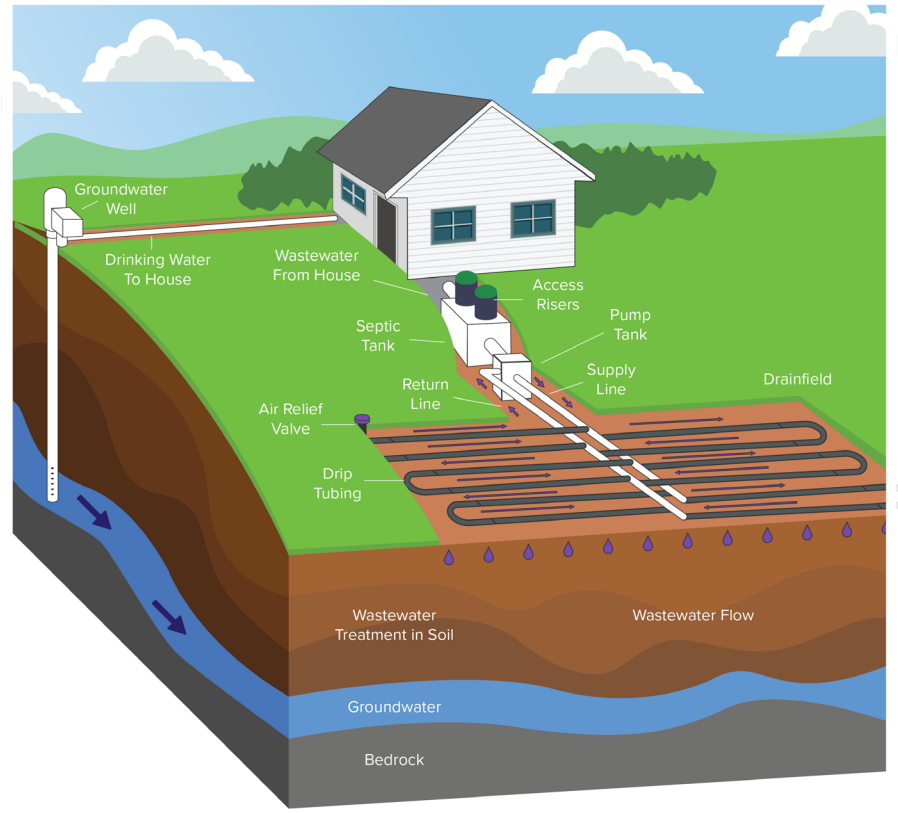
Mound Septic System

Mound Drip

Mound systems are formed land spaces that provide additional areas for treatment where land topography does not permit standard field lines or treatment options. This is most common in areas of shallow soil depth, shallow bedrock or high groundwater table. This type of construction often requires substantial spaces and periodic maintenance to ensure proper treatment of effluent. A sand mound is constructed to container perforated drain field lines for effluent dispersion. This is considered a secondary treatment method and requires primary treatment from a septic tank. The effluent from the septic tank is pumped to the field lines and the discharge is treated by filtering through sand and distributed into native soil profile for further microbial processing.

Subsurface Drip

A subsurface drip system is a type of field line that promotes time-dosed delivery for effluent dispersion. Similar in concept to a standard drain field, the subsurface drip system can be placed in shallower soil types (most commonly 6-12 inches in depth) and does not require mound buildup or trenches. These drip systems require large pumping chambers to provide adequate volume for the slow-timed dose delivery method which is required for the shallower absorption areas. Additionally, pumping components can be used to circulate wastewater effluent through the drip system, but will increase cost, electricity usage and maintenance.



Please note: Septic systems vary. Diagram is not to scale.

Drip Distribution Septic System

One of the most common methods for alternative treatment is aerobic or mechanical treatment units. These will not be covered in this fact sheet but can be found at **Aerobic Treatment Units Explained**. The Louisiana Department of Health certifies installers for various treatment designs and has adaptable plans for every property type. When selecting a method, it's best to consult the regional health officer for the most common treatment practices and feasibility for your area.

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- https://www.epa.gov/septic/types-septic-systems#septictank
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Authors

M.P. Hayes, Assistant Professor in the School of Plant, Environmental and Soil Science and Louisiana Sea Grant

Richard Grabert, Sanitarian Program Specialist for the Louisiana Department of Health

Paula Guient, Assistant Program Administrator, Onsite Wastewater and Compliance for the Louisiana Department of Health

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