Wastewater Installers
Definitions and Permit Specifications

The following definitions and permit specifications are outlined for the Onsite Wastewater Installers Workshop and come directly from the Public Health – Sanitary Code LAC Title 51 Part XIII. This document is meant to be a study guide for installers to become familiar with the terminology outlined by the office of public health.

Community sewerage systems – This refers to sewerage systems with multiple connections that also have collection, pumping and transport systems to a treatment facility. **These systems must be provided for all new subdivisions and developments.** The developer/owner shall be responsible for the provision of adequate sewage treatment.

Commercial treatment facility – Facility dedicated for use when individual systems are unfeasible or not authorized.

Exceptions to community sewerage systems:

- Subdivisions comprised of less than 125 lots with comprehensive draining plan
- Total anticipated design flow to the sewerage system does not exceed 1,500 gallons per day (GPD) and there no food service is involved
- Lots with 1 acre or more have a minimum frontage of 125 feet
- System is located on a lot with a minimum area of 22,500 square feet and a minimum frontage of 125 feet; frontage minimum can be waived if less than 15% of lots in development are not less than 60 feet and at least 125 feet wide
- Parishes with formal sewage permitting systems
- Lots formed before July 28, 1967
- When upgrading an existing system
- State health officer doesn't see a hazard to the public health

Conventional septic system – Septic tank system which consists of a septic tank(s) followed by a subsurface absorption field.

Discharges – A person shall not directly or indirectly discharge the contents or effluent from any septic tank into any road, street, gutter, ditch, watercourse, body of water or onto the surface of the ground.

Electrical connections – The Office of Public Health does not have the authority to inspect or approve electrical connections and is not qualified in the area of such electrical connections and will not assume responsibility for such electrical safety considerations. Plans must include proper specifications for electrical connections like air pumps or mechanical units.

Facility/facilities – Any or all of the apparatus and appurtenances associated with sanitary sewerage treatment (systems, elements or processes).

Gravelless pipes – Propriety device that can be used for absorption trenches with approval from the state health officer.

Individual mechanical plant – Uses mechanical action to sustain aerobic bacteria that provide primary and secondary treatment.

Individual sewerage systems – Any component (except building drain) that connects to the treatment of sewage where it originates. Individual sewerage systems shall be kept in service and in a serviceable condition sufficient to ensure compliance with this code and in order to avoid creating or contributing to a nuisance or a public health hazard.

Installation – No sewerage system component will be installed wherever contamination of a groundwater supply may occur. The location of any sewerage facility shall not conflict with the placement requirements for a water well (50 feet).

Installer certification – The certification by the installer shall be submitted to the state health officer within 15 days after completion of the installation of a septic system. Via certification, installers become agents and have a duty to the public.

Limited use sewerage system – Structure/dwelling that is occupied less than four days in a week (i.e. three days or less), and the use of which generates less than 100 gallons per day (GPD) of sanitary sewage.

Manufacturer – People responsible for the construction and evaluating compliance of mechanical systems.

Onsite inspection – This will be conducted by a representative of the state health officer and/or in the form of a completed "Certification by Installer" form submitted to the state health officer by the licensed installer.

Permits – A person shall not install, cause to be installed, alter or operate an individual sewerage system of any kind without first having obtained a permit from the state health officer. A temporary permit will be issued once the proposed plans are approved and the final permit approving installation will be after the verifying the system is up to code.

Permits (community systems) – A person shall not construct, operate or make a modification (changes in capacity, effluent quality, point of discharge, hydraulic or contaminant loadings) to existing community sewerage systems, without having first obtained a permit from the state health officer.

Permits (individual systems) – These will be issued where community systems are not feasible and it's not likely to cause a public health hazard or nuisance.

Person – Anybody that represents a public or private organization.

Plat/property survey – Must be filed and approved for use of individual sewerage systems by the Office of Public Health.

Plumbing facilities – All facilities should have proper fixtures and be connected to appropriate systems when feasible.

Premise – Any structure or dwelling in which a person may live, work or congregate.

Previous permits – Any issued or approved before the 1998 revision shall remain in effect.

Responsible for permits – A person installing or providing maintenance of an individual sewerage system and the person who is the owner of the premises shall be responsible for compliance with sections 701 and 703.

Responsible parties – A person who controls any premise shall provide for sewage disposal in a manner which is in compliance with this code.

Sanitary sewerage – Any and all human waste and/or domestic waste (day-to-day residential waste) that requires a sewerage system.

Secondary treatment standards – The analyses are to be performed for compliance in accordance with the 18th edition of the "Standard Methods for the Examination of Water and Wastewater."

- A maximum 30-day average concentration of biochemical oxygen demand (BOD) of 30 milligrams per liter (mg/l)
- A maximum daily concentration of biochemical oxygen demand of 45 mg/l.

Septic tank system – Individual system that has primary treatment followed by processes to treat septic tank's effluent.

Sewerage system – Any component (except building drain and building sewer) that collects, transports, pumps, treats and/or disposes of sanitary sewage.

Subdivision – The division of land into two or more lots, tracts, parcels or plots, any one of which has an area of less than 3 acres. For the purpose of these regulations, the requirements for wetlands might be more stringent in some parishes.

Sub-manufacturer – Anybody licensed by a manufacturer to construct or assemble their units.

Trailer coach – Any form of structure that has wheels, whether moving under its own power or not, and where a person or persons may live, work or congregate.

Trailer park – Anywhere that more than one trailer coach is located and spaces are rented/leased.

Exception to the resubdivision of land divided into lots, tracts, sites or parcels:

- Subdivision legally established and recorded prior to July 28, 1967.
- A small parcel of land sold to or exchanged between adjoining property owners does not create additional lots.

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
- https://ldh.la.gov/page/wastewater

Authors

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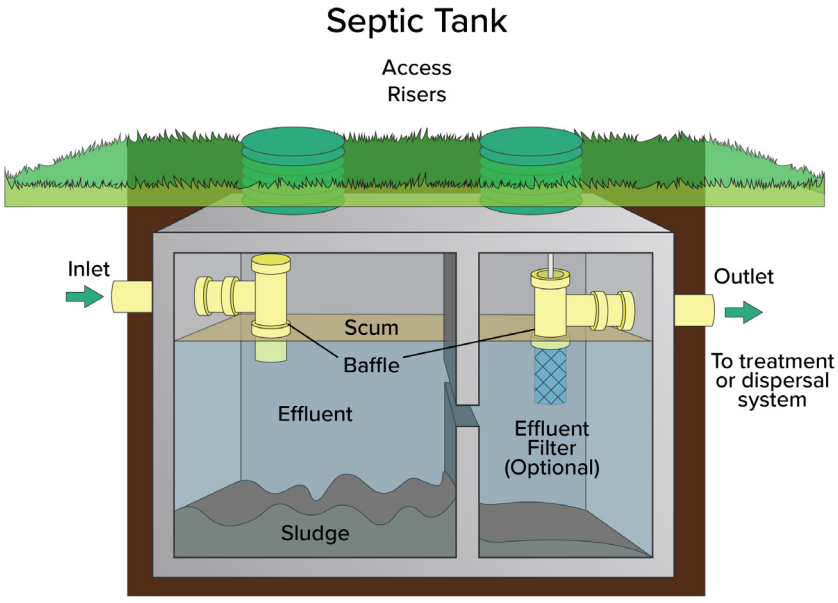
P3985-A (online) 11/25

Wastewater Installers
Conventional Septic System

A septic tank is a watertight tank made of steel concrete, or other approved materials in which the settleable solids settle and are largely changed into liquids or gases by bacterial decomposition. The remaining residue in the tank is a heavy, black semiliquid sludge that must be removed from the tank periodically by a commercial contractor. When the sludge is removed, it will contain undigested material, therefore, it must be properly disposed of to reduce the impact on public health. The effluent produced by a septic tank can be dangerous and foul. The septic tank cannot be depended upon to remove disease germs. The discharge of the effluent from septic tanks into street gutters, surface ditches or streams is prohibited. This is only a primary treatment method and must be coupled with additional treatment from an absorption field, oxidation ponds or alternative effluent reduction method as secondary treatment.

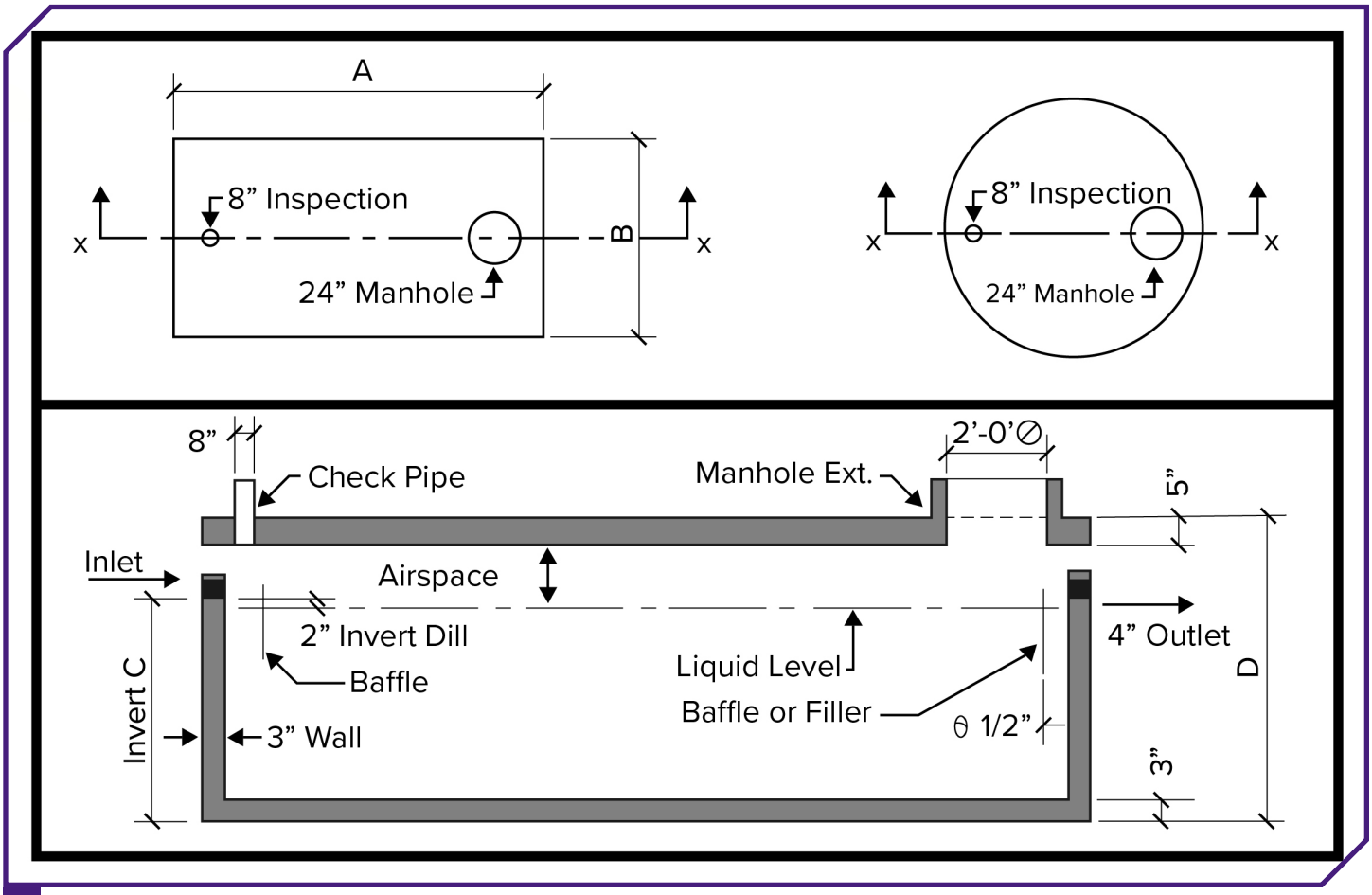
Design



Please note: The number of compartments in a septic tank vary by state and region.

The septic system can be multiple or single-chamber tanks in series. Though single-chamber tanks are acceptable, tanks with numerous compartments or in series provide more effective treatment than single-chamber tanks of the same total capacity and are thus encouraged during the installation process. The first tank shall have at least a 500-gallon liquid capacity and all subsequent tanks shall have at least 300-gallon liquid capacities. To maximize the solid and scum retention time, the velocity of effluent is an important part of the design. A vertical cylindrical tank must have 24 inches of horizontal separation from the inlet to the outlet and preclude all floating solids. The minimum total septic tank liquid capacity required is 2.5 times the estimated average daily design flow, unless for a one-bedroom residence that will utilize a 500-gallon tank. The minimum allowable total volume of a septic tank is 500 gallons

Dimension Requirements



Pipe schematic with invert.

The depth of a septic tank should be between 30-72 inches, which is measured from the invert of the outlet or the overflow level. The shallower tanks are encouraged due to increased treatment efficiency for effluent. A vertical cylindrical tank must have 24 inches of horizontal separation from the inlet to the outlet, but other shaped containers (i.e., rectangular or oval) must have a separation that exceeds the width of the tank. The minimum level of effluent in the tank must be greater than 15% of the depth capacity. Similarly, the minimum air space must also be greater than 15% of the depth capacity. A septic tank should be made up of no more than three components with a minimum compartment size of 250 gallons.

Tanks should be corrosion-resistant, permanent and watertight with a 4-inch-thick concrete cover that is reinforced with steel. The cover should have a dead load of no less than 150 pounds per square foot. The manhole covers should be 20 square inches or 24 inches in diameter. Additionally, the inlet and outlet must be accessible with an 8-inch inspection hole. Though concrete tanks are the most common for septic systems, an installed metal tank must be a minimum 14-gauge commercial grade steel with a hot-dipped asphalt coating of 0.025-inch thickness. Any untreated or uncoated metal septic tank shall not be used in an install.

Specification for Piping

The piping must be laid to not disturb the sludge lying in the tank. Inlet pipe from the house must be a minimum of 4 inches with a slope of 1/8 inch per foot. For the last 10 feet, the slope will not exceed 1/4 inch per foot. These pipes should be SDR 35 sewer and drainage pipes or equivalent. At the inlet of the septic tank, there should be a tee or baffle that extends upward at least 6 inches above the liquid level of the tank and have at least 2 inches of open space above for ventilation. The inlet tee will also extend downward at least 6 inches below the liquid level of the tank but not lower than the outlet. The outlet tee or baffle should also extend upward at least 6 inches above the liquid level of the tank, but the downward extended depth must be at least 40% of the liquid depth of a tank with vertical sides or 35% of the liquid volume of tanks with other shapes. To make sure the effluent flows out of the septic tank, the invert of the inlet shall be located at least 2 inches above the invert of the outlet. Inlet and outlet fittings must be of cast iron, schedule 40PVC/ABS plastic or other approved material. Septic tanks must comply with all minimum requirements for water wells and supply lines.

Key Maintenance

After installation, a septic tank should be inspected every six years and pumped at least every eight years by a licensed sewage hauler. There are many common indicators that the septic tank is not treating effluent properly including wet spots, standing water and/or odd growth patterns around the system. Septic tank odor is the easiest way to detect an issue with your system. It is best to make sure there are no additional sources of water that contribute to hydraulic overload of the system. This additional water can come from gutters, downspouts, paved surfaces draining toward the drain field or leaky fixtures inside the home. Additionally, garbage disposals can double the volume of solids in a septic tank and produce common issues such as slow drains or backups. If the tank is ever abandoned or becomes inactive, the tank should be pumped out, then removed/discarded or cover and fill the tank with soil to the natural grade. The contents of the abandoned tank shall not be placed into a newly installed individual sewerage system.

Additional Requirements

- The location of the septic tank shall comply with minimum distance requirements from water wells, water lines, etc., as contained in Part XII of the Public Health – Sanitary Code. This includes being a minimum of:
  - 50 feet from any private water wells
  - 10 feet from any property line
  - 100 feet from public water supply wells
  - 25 feet from potable water (pressure) lines
- The backfill around the tank must be in thin layers to not cause extra strain on the tank while allowing sufficient soil for grass growth. There should be no additional obstructions on the tank that would cause strain or prevent access.

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
- https://ldh.la.gov/page/wastewater

Authors

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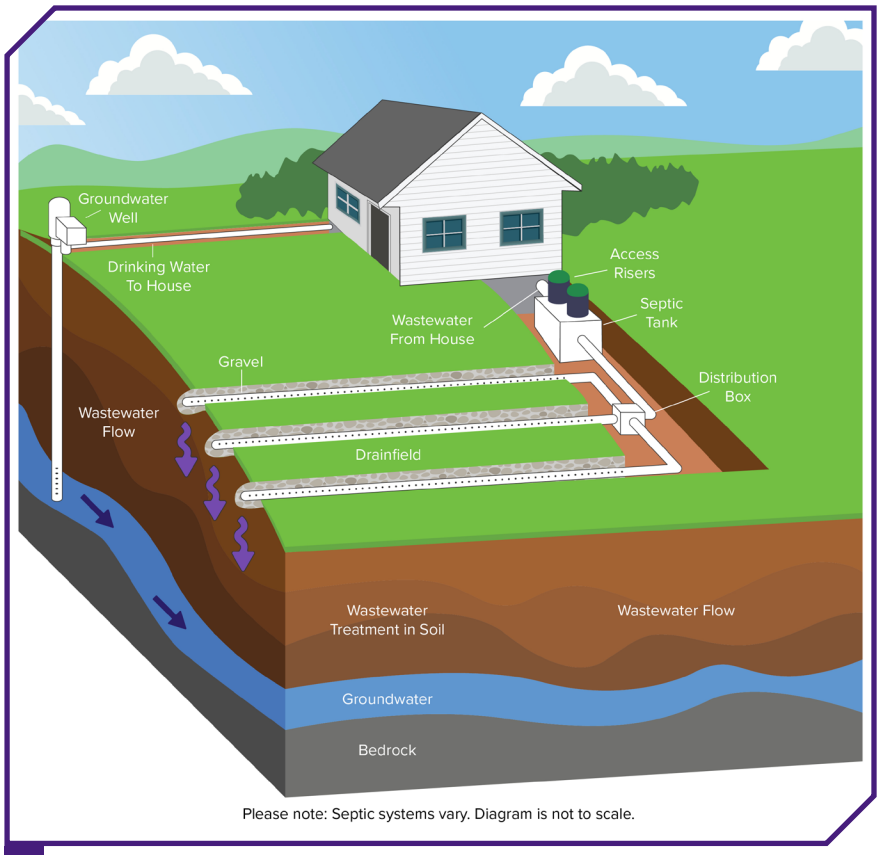
P3985-L (online) 11/25

Wastewater Installers
Absorption Trench

A conventional septic system is a primary treatment technique that uses an absorption trench for the secondary treatment of effluent. 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 effluent seeps through the aggregate-filled trenches and uses the microbial activity in the soil to convert organic matter from septic tanks into mineral components. In some parts of Louisiana, these systems aren't as common due to soil saturation and high water tables.



Conventional septic system

Feasibility

To use an absorption trench, one must take into consideration the soil porosity (permeability), groundwater table, available space and the rate at which septic tank effluent enters the soil (percolation rate). The conditions that must be satisfied to install the drain field include an acceptable soil percolation rate, a maximum elevation of groundwater that is at least 2 feet below the bottom of the trench, and that clay or other impervious strata are at least 4 feet below the bottom of the trench. If these criteria are not met, then the installation should include an alternate secondary treatment method. The percolation test will be conducted by a specialist and will determine the permeability which can be correlated to the hydraulic conductivity of the soil. This test is completed by digging three or more separate test holes spaced uniformly along the trench. The holes will be 4 inches wide and 12 inches deep with scratched bottom and sides to remove the smeared surface and mimic natural soils. Before testing, the hole should be prewet with clear water to mimic wet seasons. Once this condition is satisfied, water is added to a depth of at least 6 inches, but not more than 12 inches. This water is monitored over a 60-minute period. If the drop in liquid depth in the first 30 minutes is less than 1 inch, it is unnecessary to continue. The distance that water drops in 60 minutes at each of the three test holes is recorded to determine the percolation rate.

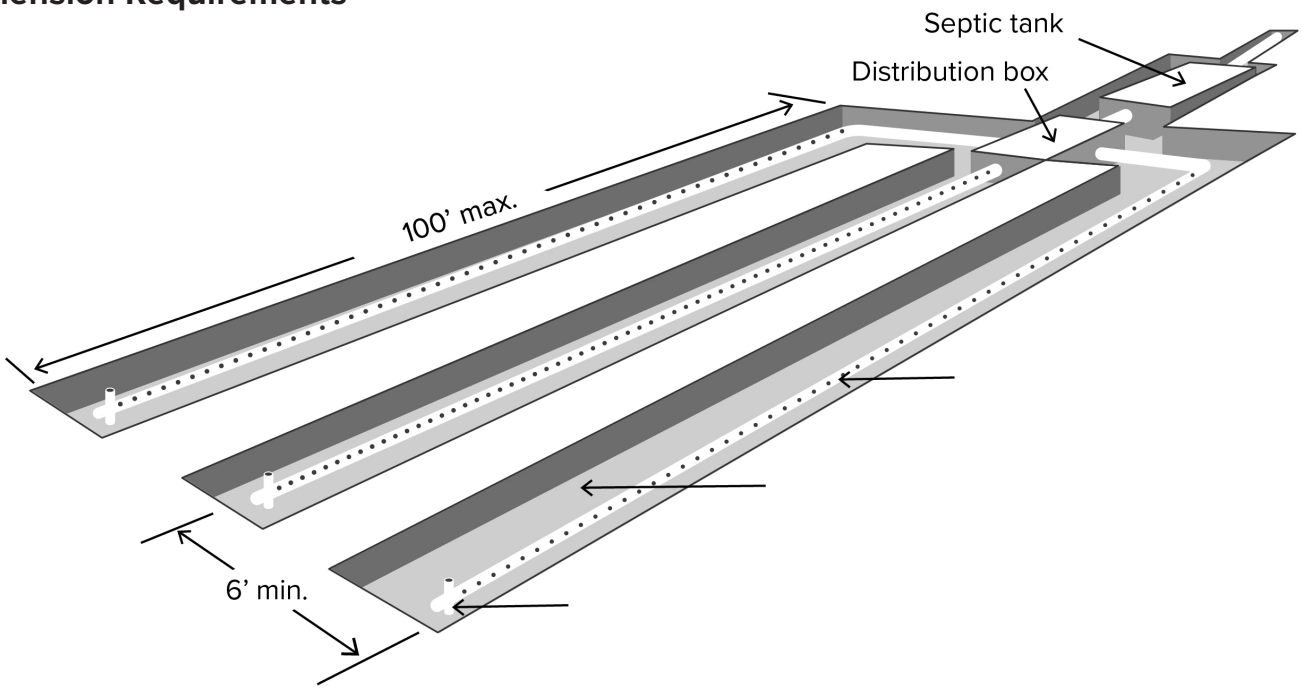
Design

The absorption trench design depends on many different factors such as the size, shape and topography of the area while also being designed for the capacity of the septic system. There is a minimum requirement of two trenches for the drain field with a minimum total distance of 160 feet. The absorption trench length requirements for residential houses are listed in the table below. Additionally, the trenches must have level bottoms and a distribution box for equal effluent distribution across all trenches.

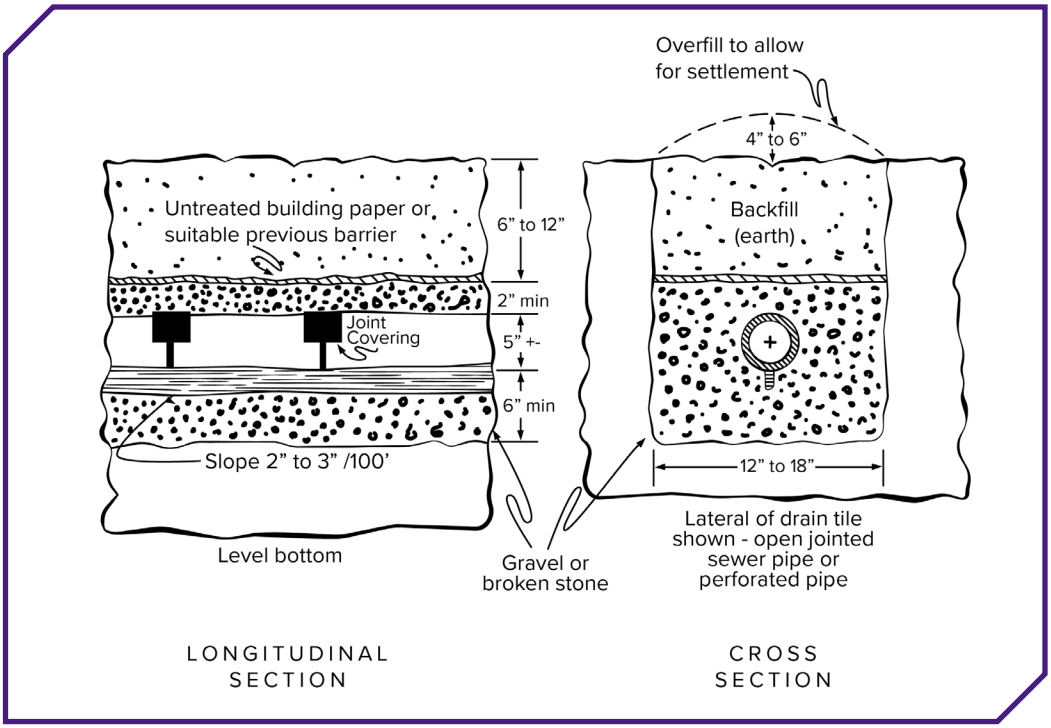
Average Water Level Drop From Percolation Test in 60 Minutes (in inches)	Length of Absorption Trenches Required Per Bedroom* (in feet)
More than 12 minutes	72
12	83
11	87
10	91
9	96
8	100
7	104
6	110
5	117
4	127
3	142
Less than 3	Not acceptable for absorption field

*A minimum of two trenches at a total length of 160 feet will be required for absorption trenches.

Dimension Requirements



The trenches should have a depth of 18 inches, but must not exceed 24 inches. An individual trench will have a maximum length of 100 feet. The centerlines between trenches should be at least 6 feet apart to ensure adequate water dispersion. Absorption trenches must comply with all minimum requirements for water wells and supply lines including a minimum distance of 10 feet from the property line or dwelling. Conventional field lines are laid on a slope of 2-3 inches per 100 feet, but the use of gravelless pipe or other distribution chambers must be laid as close as possible to a slope of 1 inch per 100 feet. Conventional field lines are 4 inches in diameter (perforated nonmetallic pipe) from 1) PVC sewer piping and fittings (thin wall), ASTM D2729-93; 2) smooth wall polyethylene (PE) pipe, ASTM F810-93 (for use in waste disposal absorption fields); or 3) SRP pipe and fittings, ASTM D2852-93.



Specification for Backfill

Care must be taken to protect the soil and prevent sealing of the trench. The excavation process should not take place when soil is wet enough to smear or compact. All disturbed surfaces have to be raked to a depth of 1 inch and loose material removed before the backfill is placed in the trench. Conventional field pipe must be surrounded by clean-graded gravel or rock, brick or similar material. The bedding material size will range from 0.5-2.5 inches in diameter and fill 2 inches above the top of the pipe and at least 6 inches below the pipe. By using previous paper material or landscape fabric, the gravel will remain in place and prevent clogging of the perforated pipe. Gravelless pipe and distribution boxes must be filled with porous soil or sand with 4-12 inches of pervious soil, hand-tamped, and then overfilled with about 4-6 inches of earth. Absorption trenches should not be located beneath driveways, parking, buildings or other paved structures to prevent compaction. Additionally, areas subject to passage or parking of heavy equipment or vehicles should not be suitable for absorption trenches. To maintain adequate secondary treatment, septic tanks should be inspected every six years after installation and pumped every eight years or as necessary, to prevent solid overflow to the soil absorption trench which could lead to clogging and failure.

Additional Requirements

- The location of the absorption field shall comply with minimum distance requirements from water wells, water lines, etc., as contained in Part XII of the Public Health – Sanitary Code. This includes being a minimum of:
  - 50 feet from any private water wells
  - 10 feet from any property line
  - 100 feet from public water supply wells
  - 25 feet from potable water (pressure) lines

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
- https://ldh.la.gov/page/wastewater
- https://ldh.la.gov/assets/oph/Center-EH/sanitarian/onsitewastewater/8145.pdf

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P3985-M (online) 11/25

Wastewater Installers
Oxidation Ponds

An oxidation pond is a shallow pond designed to treat sewage by the influence of air and sunlight. This pond will serve as a secondary treatment technique and must be proceeded with a septic tank for primary treatment. The septic tank feeds partially treated effluent to the oxidation pond which uses prolonged retention time for biological interactions of microbial bacteria, air and sunlight to complete the digestion of harmful substances in the effluent.

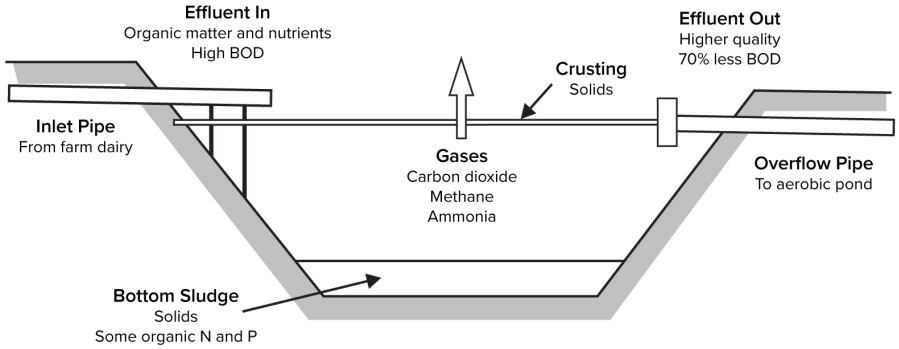
Residential oxidation pond for wastewater effluent.
Photo by Richard Grabert

Design

Oxidation ponds may be used when field lines cannot be utilized due to groundwater depth or insufficient soil drainage which is indicated by the soil percolation test. Ponds should be constructed with vertical side walls made of cypress, treated timbers or concrete blocks. These will be constructed to provide a permanent structure. Although not encouraged, a pond may be constructed with sloping sides and earthen levees. The slope of the natural earth side walls must not be shallower than one-to-one (45-degree angle). For the earthen levee design, more space is needed and routine maintenance including mowing levees is required.

Dimension Requirements

Oxidation ponds should be a minimum of 400 square feet (ft^2) with an average depth of 4-5 feet. With an area of 400 ft^2, the pond would be sufficient for 400 gallons per day (GPD). If the wastewater effluent is higher in biological oxygen demand (BOD), the square footage of the pond should be increased to properly treat the system. At a depth of 4 feet, the pond should provide a 30-day retention time for effluent to be processed. This process replaces the conventional field lines and must be used in conjunction with a septic tank as the primary treatment method.



Piping schematic for an oxidation pond.

Specification for Piping

Pipes used for an oxidation pond must have a minimum diameter of 4 inches and a slope of 2 inches per 100 feet. The inlet to the pond should extend 4-6 feet horizontally into the pond in a downward direction. The outlet from the pond should extend 4-6 feet horizontally into the pond and have a tee with the invert set at the operating water level. One leg of the tee must be open and extended above the water level, while the down leg must extend 1.5-2 feet below the water level. The inlet and outlet must be as far apart as possible to limit short circulating and promote longer detection time. Regarding slope, the invert of the pond outlet must be below the invert of the pond inlet to ensure water will not back up in the septic system. Additionally, the invert of the pond inlet must be at least 2 inches lower than the invert of the septic tank outlet. This provides a gravity flow away from the residential home.

Additional Requirements and Procedures

- The ponds must be enclosed by a suitable non-climbable fence 5 feet in height to keep out children, pets and wildlife. A locked gate must also be used for added security. The fence must be well maintained and monitored for structural damage.
- Vegetation, especially trees, must be well maintained from around oxidation ponds. Mowing levees may increase the maintenance cost and upkeep of using a pond for secondary treatment. Note: The addition of any pesticides or chemical treatment for vegetation may inhibit the pond from adequately treating the wastewater effluent.
- Ponds that are abandoned or no longer in use must be dewatered and allowed to dry.

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
- https://ldh.la.gov/page/wastewater
- https://ldh.la.gov/assets/oph/Center-EH/sanitarian/onsitewastewater/7608.pdf

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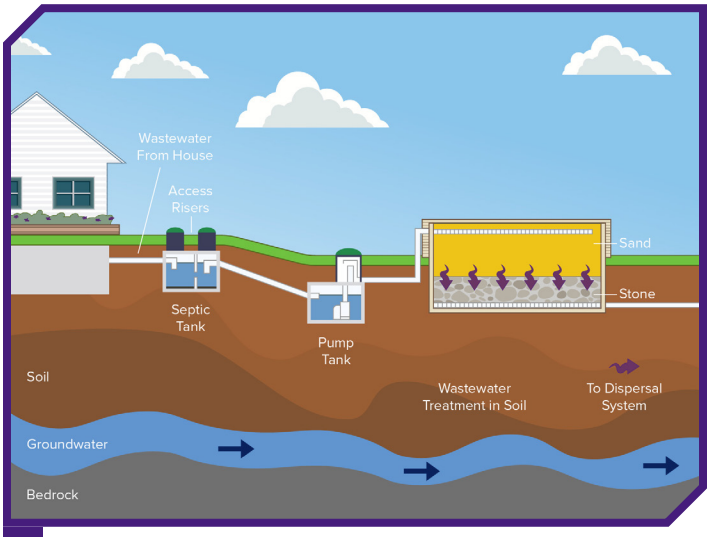
P3985-B (online) 11/25

Wastewater Installers
Sand Filter Beds

A deep-type sand filter bed is another alternative for the secondary treatment of septic tank effluent. **The sand filter bed should remain aerobic throughout the treatment process**. For aesthetic purposes, the cover of clean, washed, coarse gravel, not to exceed 6 inches in depth over the bed, is permitted. This form of secondary treatment can provide a high level of reduction for effluent nutrients. They are good alternatives for sites with high water tables or that are close to water bodies.

Design

A perforated pipe is placed across the top of the sand filter bed and receives water from the septic tank. The septic tank provides the primary treatment, while the sand filter bed acts as the secondary treatment in lieu of field lines. 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. The underdrain line is a perforated pipe near the bottom of a rectangular area in a layer of gravel covered by a layer of coarse sand 24 inches deep. To prevent sand infiltration into the underdrain, a layer of graded gravel must be placed over the underdrain line and the entire bottom of the filter bed.



Sand Filter Septic System

Dimension Requirements

The sand filter bed must have a minimum width of 12 feet and length of 25 feet. This minimum size filter bed is adequately sized for design flows of up to 400 gallons per day (GPD). By increasing the length of the bed by 8 feet, an additional capacity of 150 GPD can be added to the system. The bed must be built to drain completely to treat the effluent. This may require the bed to be raised above ground in saturated conditions.

Specification for Piping

Underdrain pipe materials are the same as those for the distribution pipe. The typical materials are perforated nonmetallic pipe, but 20-inch-long farm (or drain) tile and 2-3-foot lengths of vitrified clay bell-and-spigot sewer pipe laid with open joints are also approved materials. The underdrain slope must be no less than 4 inches per 100 feet. At least two distribution lines that are sloped 2-3 inches per 100 feet must be provided. The distribution lines must be 4 inches in diameter and be half closed on the ends.

Additional Requirements

- The filter bed must be appropriately protected from surface runoff water. This is an added benefit of the raised sand filter bed. Make sure all gutter, downspouts or paved surfaces drain away from the sand filter bed to avoid saturation.
- The location of the filter bed shall comply with minimum distance requirements from water wells, water lines, etc., as contained in Part XII of the Public Health – Sanitary Code. This includes being located no less than 10 feet from the property line.

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
- https://ldh.la.gov/page/wastewater
- https://ldh.la.gov/assets/oph/Center-EH/sanitarian/onsitewastewater/454.pdf

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P3985-C (online) 11/25

Wastewater Installers
Pit Privy Systems

Non-waterborne systems are allowed where a dwelling is not served with water under pressure, thus not allowing for a standard septic system. In these cases, non-waterborne systems are required for excreting disposal but are highly regulated due to the potential risk to public health.

Photo by M.P. Hayes

Examples of Systems Under the Non-waterborne System Classification: Pit toilet (or privy), Vault, Pail, Chemical toilet, Incinerator toilet, Composting toilet

Pit Privy Requirement and Location

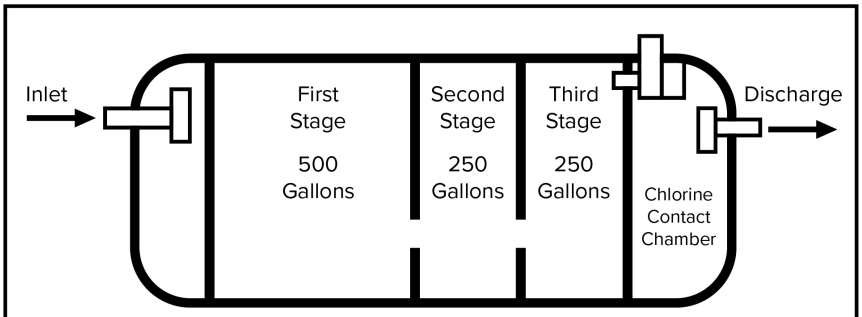
These non-waterborne systems should be in compliance with all minimum distance requirement from water sources including: 50 feet from any private water wells, 100 feet from public water supply wells and 25 feet from potable water (pressure) lines. These systems should be located on the downgrade from water wells, supply lines and water courses. The system must be housed in a separate unit away from other permanent structures. It is also required to be 4 feet from any fence and 10 feet from the property line. Any installation must be done in soil types, topography or geological formations where sources of water supplies will not be polluted.

Pit Privy Safety Precautions and Maintenance

There are many signs of defect in need of maintenance for pit privy systems. For true pit privy or outhouse systems, there should be no evidence of caving around the pit. Stand-alone units should only allow light to enter the pit, vault or pail when the seat is raised, and seat covers should always remain in place. All broken, perforated or unscreened vent pipes must be fixed to ensure proper ventilation of pit privy systems. Additionally, signs of overflow and general uncleanliness in toilet building should be addressed to prevent public health hazard.

Limited-Use Systems

The systems are seen on houseboats or fish camps where water is not served under pressure and is occupied less than four days in a week. This system should be fiberglass tanks that are adequately coated to prevent deterioration from ultraviolet light and must be watertight. Metal tanks are prohibited from limited-use systems. These septic systems will be comprised of three cells with the first having a liquid capacity of 500 gallons and the second and third with a capacity of 250 gallons. One access opening of a 6-inch minimum diameter is needed per cell for multiple-compartment, single-tank systems. The three-chamber septic system will flow into the chlorine contact chamber. The chlorination system shall be provided with a minimum capacity of 100 gallons and shall be equipped with an automatic cutoff to prevent flow from the third septic tank/chamber if the chlorine supply is exhausted. Septic tank systems shall be set below the normal high-water level and anchored/secured to prevent any movement. If a vessel is permanently moored, it should be connected to an approved sewerage system.



Typical multi-compartment "camp" waste treatment system

Approved Vendors by Louisiana Department of Health

Prior to the existence of a formal approval process for limited-use systems, sewage treatment systems that met dimensional requirements in the Public Health – Sanitary Code could be used. Manufacturers of these three-cell "old' camp units are listed below and at https://ldh.la.gov/assets/oph/Center-EH/sanitarian/onsitewastewater/LimitedUseSystemsList09-15-2015Final.pdf.

- Advanced Fiberglass Products, P.O. Box 969, Gray, LA 70359, 985-447-1624
- Delta Environmental Products, 8263 Florida Blvd., Denham Springs, LA 70726, 225-665-6162
- Lacey's Digging and Fiberglass Works, 2400 Highway 471, Brandon, MS, 39042, 601-939-6511 or 601-829-2886
- Mo-Dad Companies LLC, 9000 Cook Road, Denham Springs, LA 70726, 225-665-2949
- Murphy Cormier General Contractor Inc., 2885 Highway 14 East, Lake Charles, LA 70607, 337-474-2804
- Rogers Ready Mix LLC, 45232 Rogers Road, Hammond, LA 70401, 985-345-4096
- Southern Manufacturing Company, P.O. Box 790, Groves, TX 77619, 409-962-4501
- Wastewater Treatment of Louisiana, 17188 Airline Highway, Suite M-157, Prairieville, LA 70769, 225-673-3156

References

https://www.doa.la.gov/media/j3hnpfdy/51.pdf

https://ldh.la.gov/page/wastewater

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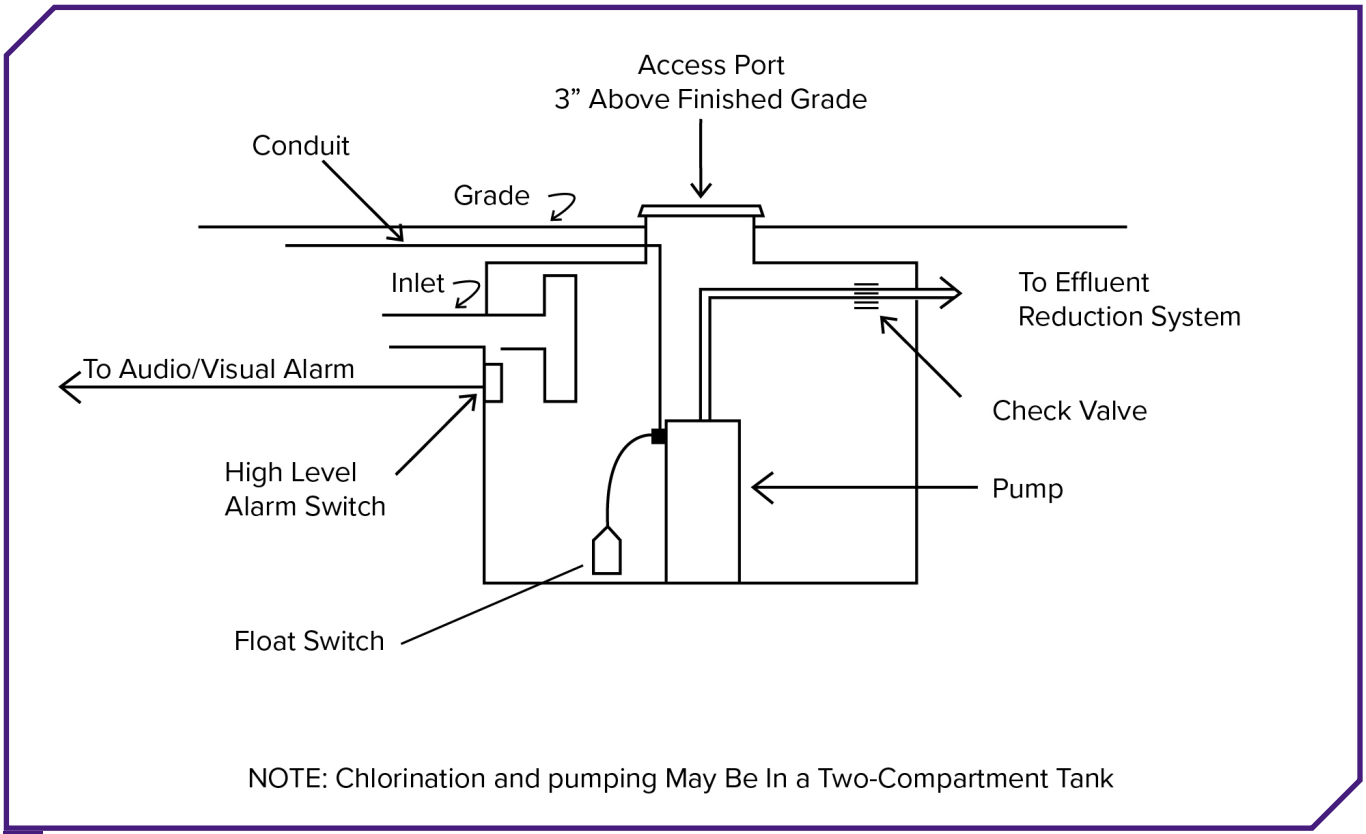
Wastewater Installers
Pumping Station

The use of a pumping station is required when the topography or elevation of the site prevents gravity flow of liquid from one location to another. The pumping station can be a part of any orientation septic unit series including conventional septic/absorption field systems, aerobic treatment units and other configurations using effluent reduction or distribution methods.

Design

The pumping station consists of a holding tank, pump, piping and electrical controls that are used to store and move liquid between treatment methods. The pumps (impellers and castings) must be constructed of corrosive-resistant materials that can handle peak flow rates for the corresponding septic systems. The plans for a pumping station should take into consideration the gallons per day of the unit to account for the volume of wastewater effluent to store and transport. The holding tank will also be constructed of the same materials as a standard septic tank. These materials must be resistant to hydrogen sulfide (H2S) corrosion. The holding tanks will have a minimum diameter of 24 inches to store effluent from the treatment process. The station should be built on a stable, long-term foundation to prevent the floating of the tank due to the high water table. All holding tanks, gaskets, grooves and covers must be watertight, including wall seams, tank floor and openings between pipes and wires. Additionally, all covers and access openings will be greater than 3 inches above ground, to prevent the entrance of surface runoff water. The cover should be greater than 12 inches in diameter for accessibility to perform maintenance. The preferred method of maintenance minimizes contact with the wastewater, so the installation of a pumping system should allow personnel quick, convenient disconnection from discharge piping and electrical wiring. The foundation and location should be open and suitable for lifting the pump from the holding chamber for maintenance with minimal exposure to the effluent in the tank.

Pumping station installation for septic system.
Photo by Richard Grabert.



Schematic from Louisiana Department of Health Code.

Pump and Electrical Controls

Pumps should be cycled in a manner not to disturb downstream systems. If there is too much flow from the pump, the downstream treatment processes could be less efficient and thus ineffective. There will be three water level controls that will automatically operate the pump system:

- **Pump off:** This level shall be set at the minimum liquid depth as recommended by the specific pump’s manufacturer.
- **Pump on:** This level shall be set to provide a minimum working volume of 10% of the average daily design flow.
- **High water alarm:** This level shall be set to provide for a net storage volume between the “pump on” level and the “high water alarm” level of 10% of the average daily design flow.

An installer can also consider a reserve volume between the high water level and the invert of the inlet pipe to the holding tank. Raw sewage pumps and piping must accommodate the passage of 2-inch solids. Piping should not be less than 1.25 inches in diameter and be capable of withstanding a pressure of 75 psi.

For the electrical controls, there will be an audible and visible high water alarm to alert the owner when there is an issue with the system. This alarm will have a conveniently located reset button for the audible signal for accessibility. The pump must be wired for automatic level control with a manual override located at the control panel. All conduits must be accounted for in the electrical work and connection to the main house must be up to code. In addition, a ground fault interrupt (GFI) required for mechanical plants should also be used for pump stations.

Additional Requirements

The Office of Public Health does **not** have the authority to inspect or approve electrical connections, is not qualified in the area of such electrical connections and will not assume responsibility for such electrical safety considerations. Plans must include proper specifications for electrical connections like air pumps or mechanical units.

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
- https://ldh.la.gov/page/wastewater

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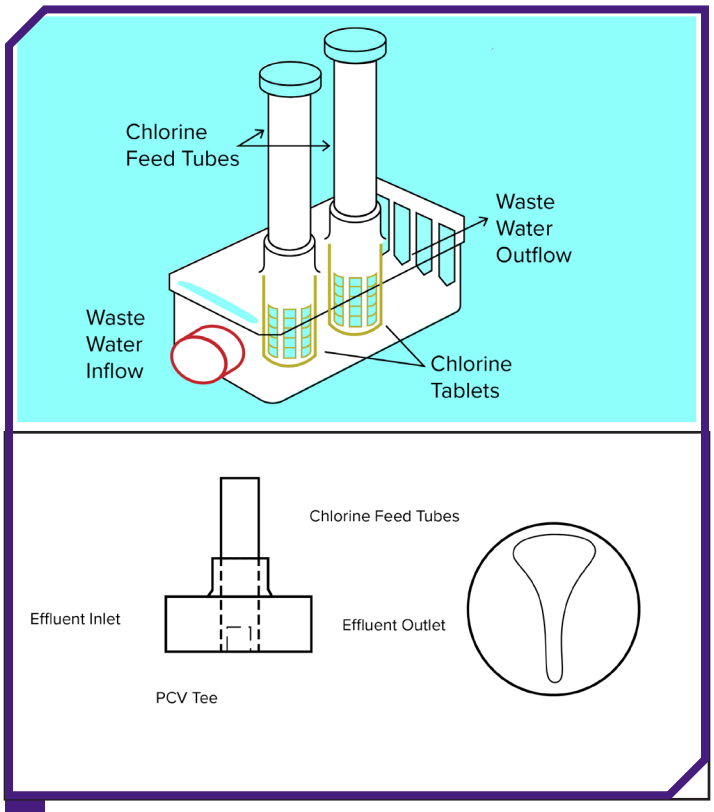
Wastewater Installers
Chlorinators

Where effluent discharges are required to be chlorinated, a chlorine contact chamber should be used to disinfect the wastewater before distribution. Calcium hypochlorite, labeled for wastewater disinfection, shall be added in sufficient concentrations to maintain a minimum residual of 0.5 ppm total chlorine in the effluent. To achieve the required contact time for chlorine, a baffled chlorine contact chamber shall be used with recommended gallons per day (GPD) capacities.

Treatment Capacity of Sewerage System	Contact Chamber Liquid Capacity
500 GPD or less	30 gallons
501-750 GPD	45 gallons
751-1,000 GPD	60 gallons
1,001-1,500 GPD	90 gallons

Design

The chlorine contact chamber is located after the primary treatment and before the effluent is dispersed through a distribution system like spray irrigation. Standard 4-inch PVC pipes will be used for the connections. In the chamber, a 4-inch minimum PVC tee with a restrictive insert will be used to control the effluent flow. The insert is cemented onto the PVC tee with the restriction pointing down. This allows for the effluent to have more contact time with the chlorine to ensure sufficient treatment. Owners should monitor chlorine residual with a color indicator and record every six months for single homes, monthly for clusters or as required by law for other units. There may be opportunities to adjust residuals by varying the number of tubes to be stocked. Restock chlorine feed tubes as necessary to ensure sufficient concentrations are being maintained. This is roughly an average of every six months for a single home and every month for clusters. For preventative maintenance, it's best to clean the unit internally every six to 12 months by flushing or pumping out and scraping residual chlorine from the tubing.



Stack Feed Chlorinator

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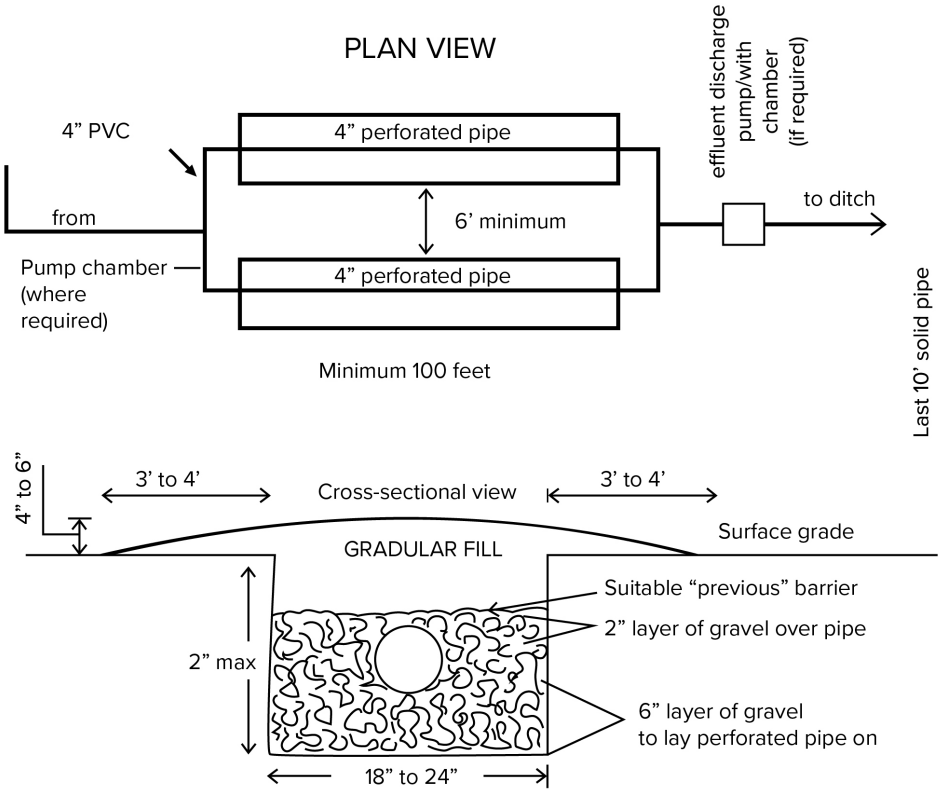
Wastewater Installers
Effluent Reduction Field

An effluent reduction field is designed as a soil absorption field that will both treat and reduce the amount of effluent that drains from a septic system to the surrounding water courses. Individual sewage systems, with a capacity up to and including 1,500 gallons per day (GPD), that produce a treated off-site effluent shall include an effluent reducer as part of the overall system. All effluent reduction systems shall be installed by a licensed installer. Existing field lines cannot be used for the newly installed effluent reduction system. The size of the effluent reduction system installed has to correspond with the recommended size of the sewerage system. This size corresponds to the "Application for Permit for Installation of On-Site Wastewater Disposal System" (LHS-47) for a particular plant. Additionally, in accordance with the appropriate edition and section of National Sanitation Foundation (NSF) Standard 40 and the applicable provisions of the Louisiana Department of Health Code, a sample port for a sewerage system must be installed immediately downstream of the system.

Design and Dimension Requirements



The effluent reduction field will have similar features to a standard absorption trench. A pumping station can be used if there is not sufficient grade for gravity flow to the discharge point. To help alleviate the force of the pumped effluent, a distribution box, a tee or similar appurtenance can be used to reduce the flow. The bottom of the effluent reduction field must be graded and leveled to promote equal distribution of effect. Each field trench shall be at least 18 inches wide and between 16-24 inches in depth. Porous soils or sands should be used as fill material to allow water to pass in all directions. This fill should be at least 4-6 inches above grade and spread at least 3-4 feet on either side of the trench. Perforated pipe may be used but will require a

6-inch layer of porous material below the pipe, as well. The media should be clean, graded gravel from 0.5-2.5 inches in diameter, but clam or oyster shells may be substituted for gravel in the effluent reduction fields. The distance between individual trenches must be at least 6 feet with one discharge pipe provided. The end of the discharge line must have a 1/2 diameter PVC endcap over the lower half of the end pipe, causing longer retention of the effluent. The minimum total length for the effluent reduction field is based on the treatment capacity of the primary systems in gallons per day (GPD).

The maximum length of a single trench is 100 feet. The pipe from the end of the effluent reduction field to the discharge point must be solid. **If the end of the discharge line is more than 2 inches lower than the absorption line, other provisions must be made to cause the effluent to be retained in the reduction field.** A backwater valve must be provided at the end of the effluent reduction field whenever the discharge line is less than 12 inches above the ditch flow line. The effluent reduction field must comply with all minimum requirements for water wells and supply lines. Additionally, they should be a minimum of 10 feet from the property line.

Treatment Capacity of Sewerage System	Minimum Total Trench Length
500 GPD or less	100 feet
501-750 GPD	150 feet
751-1,000 GPD	200 feet
1,001-1,500 GPD	300 feet

Additional Requirements

The effluent reduction field and its drainage must be a minimum of:

- 50 feet from any private water wells
- 10 feet from any property line
- 100 feet from public water supply wells
- 25 feet from potable water (pressure) lines

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
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- https://ldh.la.gov/assets/oph/Center-EH/sanitarian/onsitewastewater/7056.pdf

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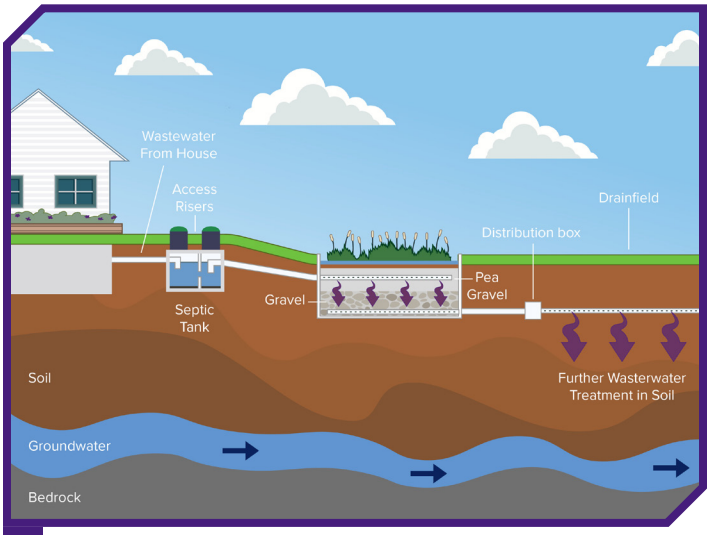
Wastewater Installers
Rock-Plant Filter Bed

A rock-plant filter bed is a type of effluent reduction system that can follow a mechanical plant of high effluent volume. The size of the effluent reduction system installed has to correspond with the recommended size of the sewerage system. These systems use plants and microbes to improve water quality and reduce the volume of water from domestic wastewater treatment.



Constructed Wetland Septic System

Design

Plans to build this alternative effluent reduction bed must be submitted to the regional director for approval before building. Pumping stations can be used if there is not sufficient grade for gravity flow to the discharge point, but all electrical must be accounted for in the plans by licensed individuals. A polyethylene liner in multiple layers is required when the groundwater level is within 24 inches of the bottom of the trench. The liner must achieve 16 mm in width to satisfy the code. Landscape fabric is highly recommended to prevent weed intrusion when liners aren't required. The bottom of the bed must be level and depth less than 14 inches with 10-12 inches providing the best results. The gravel must be 2-3 inches in diameter and laid to a depth of 12 inches. An 8-inch water level must be maintained in the rock-bed filter during the treatment processes. To prevent erosion, the gravel layer can be filled higher to protect the filter bed.

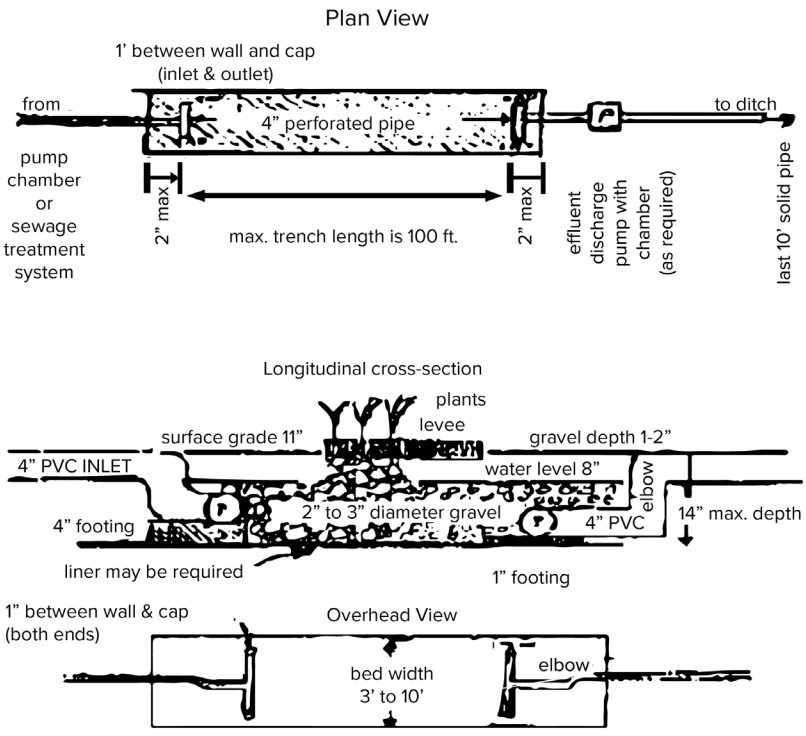
Dimension Requirements

All rock-plant filters must be a minimum of 5 feet wide to a maximum of 10 feet wide. Only a standard-shape bed may be installed with a minimum width of 5 feet and of such length as to provide the required square footage. The table below shows the required square footage for the estimated gallons per day (GPD) of effluent.

Treatment Capacity of Sewerage System	Rock-Plant Filter Bed Size
500 GPD or less	150 square feet
501-750 GPD	225 square feet
751-1,000 GPD	300 square feet
1,001-1,500 GPD	450 square feet

Specification for Piping

A noncorrosive material (concrete or treated timber) should support the minimum 4-inch perforated pipe inlet to the rock-plant filter bed. The inlet should extend no more than 2 feet into the bed and be no



Piping schematic for a rock-plant filter.

closer than 4 inches from the bottom. At the end of the inlet, a tee with end caps should extend the width of the bed within 1 foot of each sidewall to promote equal distribution of the effluent. The outlet pipe should be built to the same specifications as the inlet piping. Do not allow plants to grow within 3 feet of the inlet and outlet piping. Plant growth in these areas could cause roots to damage the pipes and clog perforated holes. A backwater valve must be provided at the end of the field lines whenever the discharge pipe is less than 12 inches above the ditch flow line.

Additional Requirements

- The location of the filter bed shall comply with minimum distance requirements from water wells, water lines, etc., as contained in Part XII of the Public Health – Sanitary Code. This includes being located no less than 10 feet from the property line.
- The filter bed must be appropriately protected from surface runoff water. A surrounding levee support system should be built to exclude additional runoff or flood waters. Make sure all gutter, downspouts or paved surfaces drain away from the rock-plant filter bed to avoid saturation.

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
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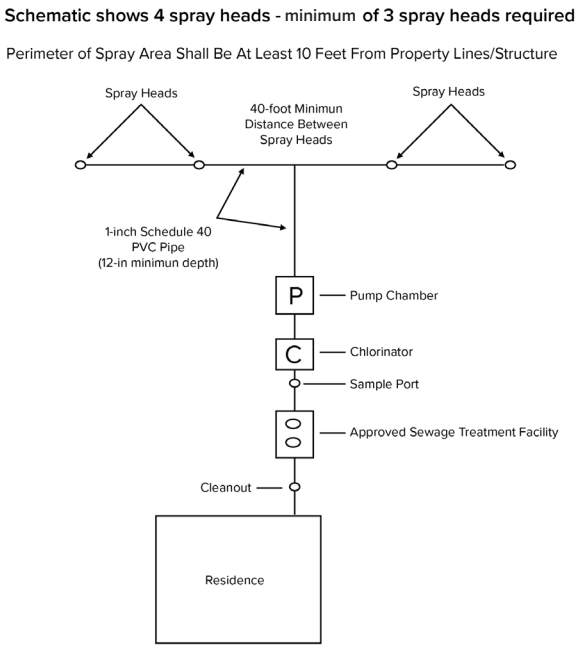
Wastewater Installers
Spray Irrigation

Spray irrigation heads for wastewater effluent.
Photo by Richard Grabert

A spray irrigation system is a type of dispersion system that promotes evaporation and soil infiltration of the effluent. It is highly recommended that effluent from a mechanical septic system be chlorinated in a chlorine contact chamber prior to spray irrigation. This system uses an electric pump where a float switch activates the pump to force the effluent through piping to pop-up or elevated rotating-type sprinkler heads to distribute to the yard.

Design Specifications

To properly install a spray irrigation system, the pumps must comply and be sized according to the provision in the Public Health – Sanitary Code. The minimum pump for the system should be a one-half horsepower motor that provides a minimum flow of 12 gallons per minute at 25 pounds per square inch at all sprinkler heads. A minimum of three 4-inch sprinkler heads, coded for wastewater effluent, should be spaced 40 feet apart as part of the requirement. Pumping chambers will be activated by a high/low water switch through an automatic on/off switch. The pump must be deactivated through a low-volume cut-off switch to prevent operating issues. For these pumps, time cycling devices may be used to program sprinklers for early morning or evening irrigation, but pumping chambers should have adequate capacity to maintain water levels while sprinklers are off. For all areas that host spray irrigation, the land should be sloped to facilitate drainage away from water wells or water courses to prevent public health hazards.



Minimum Standard Layout for Spray Irrigation Process Utilizing Four Spray Heads

Drawing not to Scale

Additional Requirements

- The spray irrigation sprinklers shall comply with American Society of Agricultural Engineers Standard S398.1 – Procedure for Sprinkler Testing and Performance Reporting.
- The edge of the spray and its drainage must be a minimum of:
  - 50 feet from any private water wells
  - 10 feet from any property line
  - 100 feet from public water supply wells
  - 25 feet from potable water (pressure) lines
- Any exceptions due to lot size, topography or other constraints may be authorized by the sanitarian parish manager with written notification and must be approved prior to installation.

References

- https://www.doa.la.gov/media/j3hnpfdy/51.pdf
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Wastewater Installers
Alternative Methods of Effluent Reduction

There are additional methodologies of effluent reduction and dispersion that are not prevalent in the state due to lot size, topography or other constraints, but are listed as available options for homeowners and installers. All designs or questions about alternative methods of effluent reduction should submitted to the sanitarian parish manager with approval needed prior to installation.

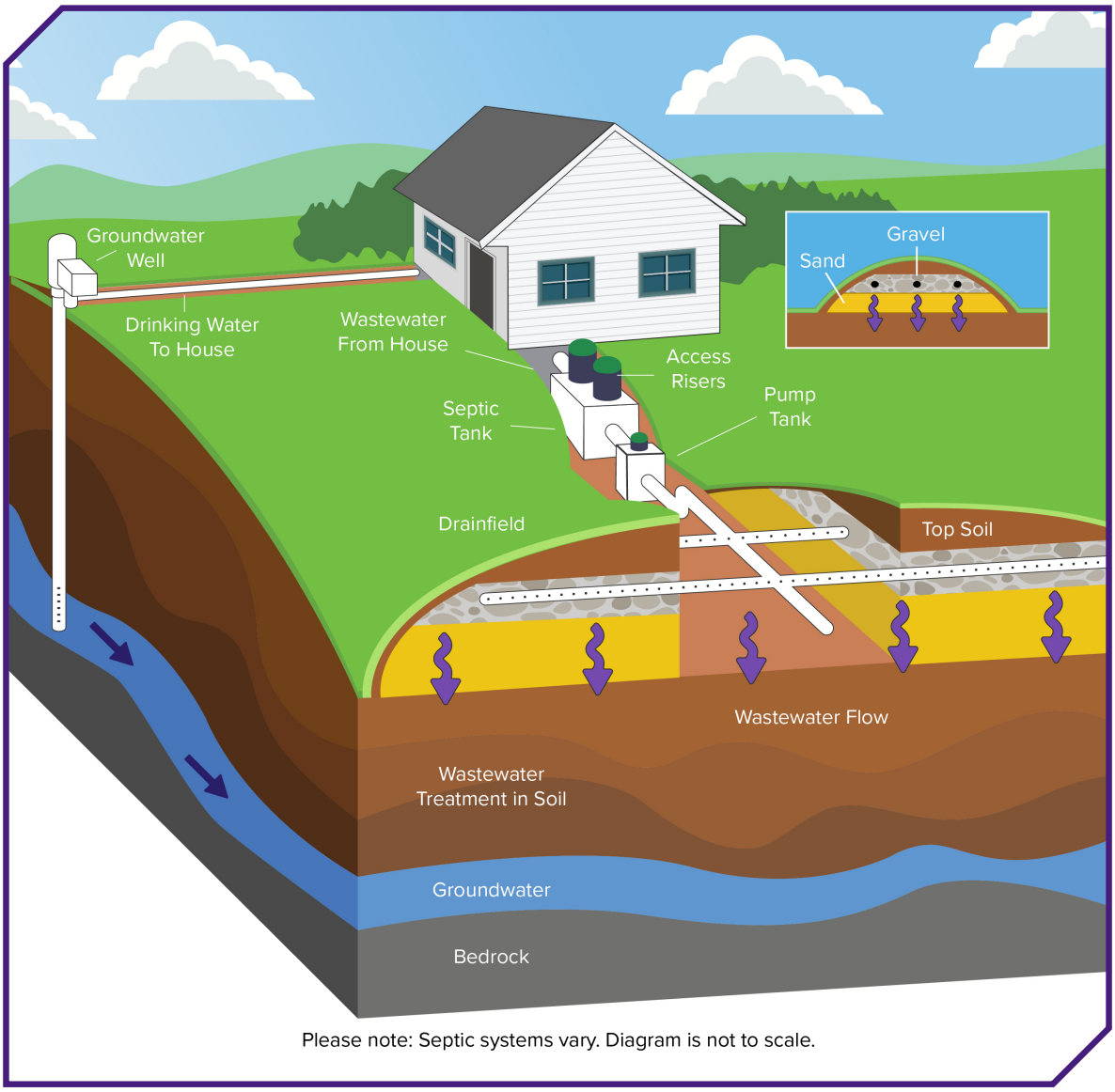
Example image of piping for overland flow. Photo by Richard Grabert

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 mechanical sewage system 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 discharge point and field of flow 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.

Mound System

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 next to container-perforated drainfield lines for effluent dispersion. Mound systems are approved for aerobic treatment unit (ATU) effluent reduction, not septic tanks. The effluent from the ATU 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.

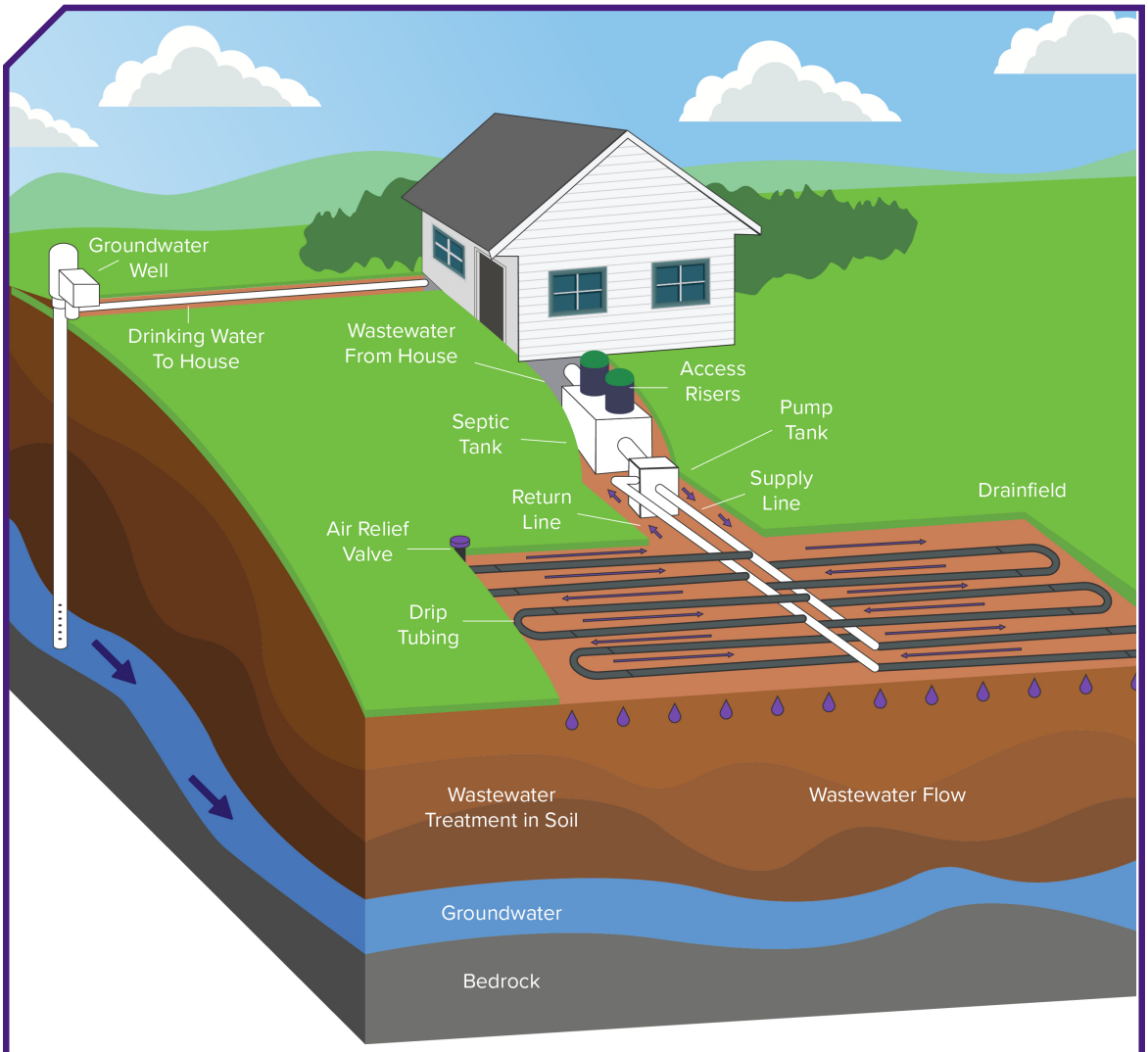


Please note: Septic systems vary. Diagram is not to scale.

Subsurface Drip System

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 build-up 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.

The Louisiana Department of Health Office of Public Health (LDH-OPH) can approve either mound or subsurface drip systems on a case-by-case basis. Design plans and specifications must be submitted to LDH-OPH engineering services in consultation with the sanitarian regional director for review and approval prior to construction. The Public Health – Sanitary Code LAC Title 51 Part XIII has examples for each style system for construction designs.



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

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- https://ldh.la.gov/assets/oph/Center-EH/sanitarian/onsitewastewater/3020.pdf
- https://ldh.la.gov/assets/oph/Center-EH/sanitarian/onsitewastewater/7748.pdf

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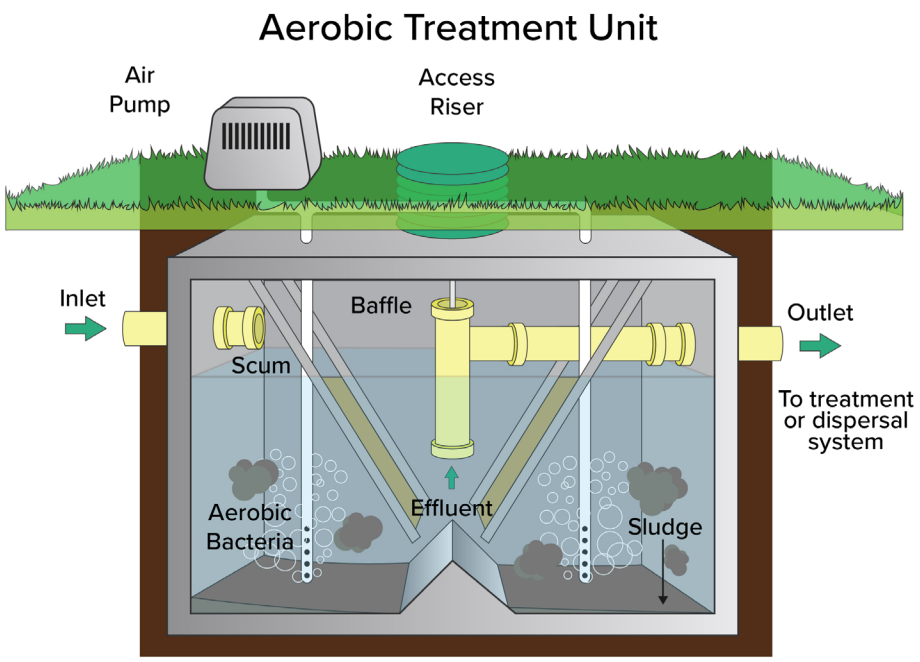
AEROBIC TREATMENT UNITS (ATU)

In Louisiana, many conventional septic systems are unsuitable due to environmental conditions such as high water table, soil saturation, contamination potential for surrounding waterways or topography. In these instances, aerobic treatment units are utilized to process wastewater effluent by creating oxygen to break down the organic matter in sewage and promote aerobic bacterial activity. These mechanical systems require regular maintenance to treat effluent efficiently. The major differences between conventional septic systems and aerobic treatment units are listed below :



Schematic of Aerobic Treatment Unit

Conventional Septic System	Aerobic Treatment Unit
Anaerobic bacteria	Aerobic bacteria
Primary treatment	Primary and secondary treatment
No discharge allowed	Discharge is possible
Must meet LAC Title 51 XIII[1]	Must meet NSF/ANSI 40[2]
Manufacturer's approval by LDH[3]	Manufacturer's approval by ANSI[4]

[1]This is the Public Health – Sanitary Code LAC Title 51 Part XIII

[2]NSF/ANSI – National Sewerage Foundation (NSF)/American National Standards Institute (ANSI)

[3]LDH – Louisiana Department of Health

[4]Louisiana Department of Health has a Memorandum of Understanding (MOU) with NSF and Gulf Coast Testing LLC (GCT) for manufacturer approved systems.

The NSF/ANSI 40 lists the following guidelines for systems with 400-1,500 gallons per day (GPD):

- •Biological oxygen demand (BOD) must be adequate to treat waste in a five-day period. The required demand is 25 mg/L for the bacteria to process the waste effectively.
- Total suspended solids (TSS) will remain after treatment but should be less than 30 mg/L at discharge. Residual TSS can be further filtered using additional processes.
- The potential of hydrogen (pH) should be in the range of 6.0-9.0 which includes slightly acidic and alkaline conditions.
- All aerobic treatment units and corresponding parts, including blowers, must be approved by an ANSI accredited testing facility. Any alternate equipment (aerators) must be tested/approved by the testing facility.

The Louisiana Department of Health currently has 21 certified manufacturers located both in the state and across the country. Some companies have a single model/series of systems while others have multiple models/series of systems.

Approved Vendors by Louisiana Department of Health

The list of licensed manufacturers of mechanical treatment plants as of July 2024 can be found below and also at https://ldh.la.gov/assets/oph/Center-EH/sanitarian/onsitewastewater/LicensedManufacturersofMechanicalTreatmentPlants.pdf .

- Acquired Wastewater Technology, LLC, 9000 Cook Road, Denham Springs, LA 70726, 800-999-0615, www.modad.com
  - Models: Alliance, Econo HP Dual Air, CajunAire, Mo-Dad, TexAire
- Aerobic Systems Design Inc., 59 Joe Rosier Road, Deville, LA 71328, 318-466-9295
  - Models: Omni Green (G Series)
- AeroGreen Technologies, LLC, 3535 Calder Ave., Suite 310, Beaumont, TX 77706, 409-499-2040
  - Models: AeroGreen (AG series)
- American Wastewater Systems Inc., 1307 South Fieldspan, Duson, LA 70529, 800-960-3997 or 337-873-3128, www.best1systems.com
  - Models: B.E.S.T. 1 AWS
- AquaKlear, Inc., 876 North Bierdeman Road, Pearl, MS 39208, 877-936-7711 or 601-936-7711, www.aquaklear.net
  - Models: AquaKlear (AK, AKA series)
- Bio-Microbics Inc., 16002 W. 110th St., Lenexa, Kansas 66219, 800-753-3278, https://biomicrobics.com/
  - Models: Bio-Barrier (MBR), MicroFast
- Clearstream Wastewater Systems Inc., P.O. Box 7568, Beaumont, TX 77726-7568, 409-755-1500, www.clearstreamsystems.com
  - Models: Clearstream
- Ecological Tanks Inc., 2247 Highway 151 North, Downsville, LA 71234,800-277-8179 or 318-644-0397, www.etiaquasafe.com
  - Models: Aqua Aire (AA series), Aqua Safe (AS and ASO series)
- Enviro-Flo Inc., 235 Flowood Drive, Flowood, MS 39232, 877-836-8476, www.enviro-flo.net
  - Models: Aqua-Flo (AF series), NuWater, BioRobix, Maxx Air, Enviro-Flo (E series)
- Fuji Clean USA LLC, 41-2 Greenwood Road, Brunswick, ME 04011, 207-406-2927, www.fujicleanusa.com
  - Models: Fuji Clean (CE and CEN series)

- Henry McGrew LLC, 3822 East Texas, Bossier City, LA 71111, 318-746-2380
    - Models: JetSpray
- Hoot Aerobic Systems Inc., 2885 Highway 14 East, Lake Charles, LA 70607, 888-878-4668 or 337-474-2804, www.hootsystems.com
    - Models: Hoot (H and LA series)
- Hydro-Action Inc., 2055 Pidco Drive, Plymouth, IN 46563, 800-370-3749 or 574-936-2542, www.hydro-action.com
    - Models: Hydro Action (AN, AP, and CLP series)
- Infiltrator Water Technologies LLC, 9125 Comar Drive, Walker, LA 70785, 225-665-6162, www.infiltratorwater.com/delta-treatment-systems
    - Models: Ecopod (E series), Enviro-Aire (EA series), Whitewater (DF and UC series)
- Jet Inc., 750 Alpha Drive, Cleveland, OH 44143, 440-461-2000, www.jetincorp.com
    - Models: Jet, Nano-Jet
- Montgomery Tanks of LA Inc., 2611 Highway 71, South Montgomery, LA 71454, 318-646-2212
    - Models: Montgomery Tanks (MT series)
- National Wastewater Systems Inc., 137 Reserve Drive, Lake Charles, LA 70611, 337-439-0680, www.solarair.biz
    - Models: Solar Air, Solar Aerobics (SA series)
- Norweco Inc., Firelands Industrial Park, 220 Republic St., Norwalk, OH 44857, 419-668-4471, www.norweco.com
    - Models: Singulair, Hydro-Kinetic
- Orenco Systems Inc., 814 Airway Ave., Sutherlin, OR 97479, 800-348-9843 or 541-459-4449, www.orenco.com
    - Models: AdvanTex (AX series)
- SludgeHammer, 4772 US-131 South Building D., Petoskey, MI 49770, 231-348-5866, https://sludgehammer.net/
    - Models: SludgeHammer
- Toshco Sewer Systems Inc., 2460 Comeaux Road, Jennings, LA 70546, 337-855-2282, www.microair-atu.com
    - Models: Micro Air

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