Guidelines for the Installation and Inspection of On-site Sewage Disposal Systems

CALVERT COUNTY
HEALTH
DEPARTMENT
Division of Environmental Health

Guidelines established 2019

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Contents

Preface

This document was prepared for the purpose of providing a uniform and consistent set of guidelines for the installation of on-site sewage disposal systems (OSDS) in Calvert County Maryland. These criteria have been established through a culmination of research, regulatory guidance, guidance from the Maryland Department of the Environment, recognized common professional practice and years of field experience.

The Calvert County Health Department Division of Environmental Health (EH) is committed to providing fair implementation of regulations and guidance to ensure that public health and the environment are very well protected in a consistent manner. Our Licensed Environmental Health Specialists (LEHS) seek to provide the most efficient, fair, and consistent implementation of current regulations and statutes as well as these guidelines. The consistency that these guidelines provide will allow for fair bidding and business practices to take place as well. Prior to finalization of this document, the contents were shared with representative stakeholders and an open comment period was provided. Feedback from stakeholders was taken into consideration and incorporated into the document where appropriate.

Many thanks are offered to Brooke Hebb, James Whitney, Abigail Lingenfelter, Matt Cumers and Don Hammerlund for their work on this document.

1. Licensing of installers

General license for septic installers in Calvert County

The following information is adopted in these guidelines directly from the Calvert County Code of Ordinances Chapter 110 Article II which addresses licensing of septic installers in Calvert County.

Septic contractor/installer's license

1. Sewage Disposal Installers.

a. No person shall construct, remodel, or repair any individual sewage disposal system except under the supervision of a sewage disposal installer in possession of a valid license issued by the Health Officer for that purpose.
b. All applicants shall be required to pass a written and/or oral examination to demonstrate the applicant's knowledge of this article, the Code of Maryland Annotated Regulations (COMAR) 26.04.02 as well as applicable state laws and regulations.

2. License application and fees.

a. Any person desiring to obtain a license shall apply to the Health Officer on forms provided for that purpose by the Health Officer. No application shall be approved to a person whose license previously issued is under suspension or revocation, or who is not 21 years of age or who has not passed an examination.
b. Examinations shall be offered four times per year. The Board of Health shall adopt such procedures as may be necessary for the administration of said examinations.
c. A license fee shall be payable upon issuance of a license. Please see the Environmental Health Fee Schedule for payment amount.
d. Any person engaging in the business of installation of individual sewage disposal systems shall post a performance bond for the amount of $10,000.00 with the Calvert County Board of Health.

3. License term; renewal fee.

a. Licenses shall be issued for a period not in excess of one year and shall expire on December 31 of each year, beginning December 31, 1990.
b. Licenses may be renewed without further examination upon payment of a fee of $100.00 within 30 days before the expiration date.
c. Bonds must be reposted for the amount of $10,000.00 within 30 days before the expiration date of said license.
d. Copies of all certifications (mound, BAT, etc.) must be provided at time of renewal.
e. The Health Officer or his designee may require reexamination prior to license renewal if it is determined that any or all prospective licensees need to demonstrate proficiency with current regulations and ordinances, is in the case of regulation changes and/or improved methodologies and technologies.

License Suspension or Revocation

Any license issued pursuant to this article may be revoked or suspended by the Health Officer for violation of any provision of this article or failure to comply with the provisions of COMAR 26.04.02 after sending a notice by certified mail to the address of the licensee listed on the application.

1. Appeals; procedure.

    a. Any person whose license has been suspended or revoked, or who has been denied a license shall have a right to appeal the decision to the Board of Health. The decision to deny, revoke, or suspend a license shall remain in effect until rescinded or modified by the Board of Health.
    b. A hearing on the appeal shall be called by the Board of Health within 15 working days from the date of receipt of the appeal. The decision of the Board shall be stated in writing and sent to the address of the licensee by certified mail within 15 working days after the date of the hearing.
    c. The Board decision to deny, suspend, or revoke license may be appealed in the Circuit Court. Any appeals from the Board of Health shall be taken to the Circuit Court within 30 calendar days of the sending of the notice of decision by the Board.
    d. The Board of Health shall adopt written procedures covering conduct on hearing of appeals. Copies of these procedures shall be provided to the licensee with notice of any revocation or suspension.

Violations and penalties

Any person convicted of violating any provision of this article shall be guilty of a misdemeanor and shall be fined not less than $100.00, no more than $200.00 for the first conviction, and for the second or subsequent conviction, such person shall be fined not less than $200.00, no more than $500.00.

MDE Certifications

1. Sand mound/ At-grade mound systems.

    a. Per COMAR, sand mound systems shall only be installed by an Maryland Department of the Environment (MDE) certified Sand Mound installer and that installer must be onsite while the Sand Mound system is being installed.
    b. MDE does not certify companies.
    c. Certification shall be given to individuals who have successfully complete a course of study and examination in the practice of construction of mound systems.
    d. Sand Mound installer certification shall be valid for a period of 3 years and may be renewed by MDE, provided that the installer has complied with all of the appropriate laws and regulations.
    e. The Sand Mound certification may be revoked at any time for violation of these regulations. For those sand mound systems that also require a BAT unit, the installer must also be an MDE certified BAT installer and be certified as an installer through the authorized BAT distributor- in addition to the sewage disposal installers license.

2. BAT (Best Available Technology for the removal of nitrogen) systems.

    a. Per COMAR, BAT systems shall only be installed by a Maryland Department of the Environment (MDE) certified installer and that installer must be onsite while the BAT unit is being installed.
    b. MDE does not certify companies.
    c. Certification shall be given to individuals who successfully complete a course of study and examination in the practice of installation of BAT units.
    d. Installers certified by MDE must also be certified to install by the authorized BAT unit distributor for their specific technology.
    e. Copies of certifications from MDE and the authorized BAT unit distributor must be provided to Calvert County Health Department- Division of Environmental Health.

3. Registration with MDE as an individual providing onsite wastewater services is required for all Calvert County licensed installers. MDE is actively looking to create a board of onsite wastewater professionals. This registration may eventually become a statewide licensure requirement, at such time a Calvert County Septic Installers License will still be required.

2. Applicable Regulations and Statutes

The regulations that apply to the installation of OSDS can be found in COMAR 26.04.02.
http://www.dsd.state.md.us/comar/SubtitleSearch.aspx?search=26.04.02.*

These regulations have been created by the Maryland Department of the Environment (MDE), are maintained by MDE, are subject to legislative or regulatory change, and are enforced by EH through delegated authority by MDE. Various regulation citations will be observed throughout this document where relevant.

Below is a chart of separation distances from OSDS as described in COMAR 26.04.02.04J with amendments added by EH (Approving Authority) based on local experience and added for clarity.

Feature	*Separation Distance*
(1) All steep slopes (>25 percent)	*25 feet*
(2) Springs	*100 feet*
(3) Drainage ways and gullies	*25 feet*
(4) Flood plain soils	*25 feet*
(5) Rock outcrops	*25 feet*
(6) Elevation of spillway crest water level in a water supply reservoir	*300 feet*
(7) Stream bank 3,000 feet or less upstream from a water intake on a water supply reservoir or intake on a stream used as a potable water supply	*200 feet*
(8) Stream bank greater than 3,000 feet upstream from a water intake on a water supply reservoir or intake on a stream used as a potable water supply	*100 feet*
(9) Water bodies not serving as potable water supplies including intermittent and perennial streams	*100 feet*
(10) Water well system in unconfined aquifers	*100 feet*
(11) Water well system in confined aquifers	*50 feet*
(12) Sink holes underlain by karst topography	*100 feet*
(13) Building foundations (slab and crawlspace)	*10 feet*
Building foundations (basement)	*20 feet*
(14) In-ground pool	*25 feet*
(15) Above ground pool	*10 feet*
(16) Shed	*10 feet*
(17) Garage	*10 feet*
(18) Deck (piers or footers of deck to septic tank or drainfields)	*2 feet*

The Environment Article of the Code of Maryland §9-217.1 indicates that *every person engaged in the business of inspecting an on-site sewage disposal system for a transfer of property must be registered with the Department of the Environment after having completed a course of instruction, approved by the Department, in the proper inspection of on-site sewage disposal systems.*

3. System Installation Inspection requirements

A. COMAR 26.04.02.02N indicates *No part of an on-site sewage disposal system may be covered or used until it has been inspected and approved by the Approving Authority or a third party approved by the Approving Authority.*

B. All work must be completed and left uncovered prior to inspection by a LEHS.

C. Inspections must be emailed to EH clerical staff no later than **9:30am on the day that the inspection is being requested** (earlier is always better). Inspection requests should be emailed to ca.septicfinals@maryland.gov. With questions regarding this process, please contact EH Clerical at 410-535-3922, Monday-Friday 7:30am-4:30am (except for state holidays). Do not contact an LEHS directly for an inspection.

D. A plumbing inspector with the Calvert County Office of Inspections and Permits must inspect the sewer line within 5 feet of the dwelling prior to covering.

E. A bucket of water must be provided to check gravity-system distribution boxes.

F. Pressurized and pump systems require operational check of the effluent pump, floats, control panel and distribution box (if applicable) commonly referred to as a "pump test". The distribution box (if applicable) must be uncovered and available for inspection at the time of the pump test. Pump chambers must be filled with clean water to a level just below the high-water alarm float activation level prior to calling for a pump test. Tools must be on hand that allow for activation of the floats if necessary.

G. BAT systems require an operational check of the treatment system components commonly referred to as a "BAT test". Exactly what a BAT test entails varies based on the technology installed. The BAT should be filled with clean water prior to calling for a BAT test and tools shall be present on-site to allow for inspection of BAT components.

H. A BAT test performed for/by a LEHS employed by EH is in no way a substitute for a "Start-up" by the manufacturer's representative. All BAT systems must have a Start-up by the manufacturer's representative before being put into service.

I. Re-inspection fees will be charged to installers where system installation deficiencies are observed and require remedy and re-inspection. This includes covering of system components prior to inspection.

J. Trench depth verification is required by one of the three options below:

- *a.* Visual inspection by an LEHS while trench is being excavated.
- *b.* Photographs taken by the installer during the trench excavation that show a tape measure and proper depth obtained.
- *c.* Installation of observation ports at the ends of all trenches. Perforated or slotted 4" PVC must be used and installed vertically to the bottom of the trench with the top of the pipe extending 3 inches above the final grade. Screw-on caps will be required.

4. Site Evaluations and Percolation tests

COMAR 26.04.02.04 outlines how site evaluations are to be conducted. The following points are an attempt to summarize relevant information from the regulations and provide information specific to the EH process.

Applications, Permits and Site Preparation

A. Site evaluations are performed by a LEHS employed by EH and include percolation testing as well as other site assessments.

B. All site evaluations begin with completion and submittal a Site Evaluation Application form to the EH office with the appropriate payment.

C. A site evaluation application is **not a permit**. A "Site Evaluation Results" letter, when issued, is **not a permit**. A Sanitary Construction Permit must be issued prior to installation of any OSDS.

D. Site evaluations for new construction OSDS may be conducted at different times of the year depending upon the soil conditions, history of failures in the area, drainage patterns, and local knowledge of levels of soil saturation. Sites with moderate to severe soil limitations shall be tested only in the wet season (highest water levels) while other sites with more favorable soil conditions may be tested at other times of the year. The determination of when to evaluate a site will be made by a LEHS employed by EH. Percolation tests for subdivision of land shall only be conducted in wet season pursuant to COMAR 26.04.03.02A&C.

E. Stake-out of all property corners or proposed test locations by a licensed land surveyor is necessary for site evaluations of all undeveloped property for new construction and for replacement OSDS when necessary. Further, a concept plan must be submitted with the application for a new construction site evaluation that clearly indicates the requested areas for testing and/or proposed structure locations. All utilities must be marked by **Miss Utility** and a clear ticket must be received.

F. All "Tank Only" installations must have an **ISSUED PERMIT** prior to commencement of installation. Further, any existing drainfields or other disposal components connected to a tank in need of replacement **MUST** be properly evaluated by excavation and a hydraulic loading test must be conducted. A written certification of the existing drainfields will be required prior to consideration of issuance of the "Tank Only" permit. If adequate site/soil information does not exist, LEHS will request a "Site Evaluation Application" and fee to be submitted for percolation testing. This process applies when requesting to relevel an existing tank, replace a septic tank lid or the tank in its entirety. Please refer to the "Step by Step Tank Only Replacement" document for further detail. If you have any questions about the necessity of a permit, please contact EH staff for clarity before proceeding with any work!

G. Site evaluations for replacement OSDS will be conducted on an as-needed basis and may be conducted at any time of the year to ensure protection of public health and the environment from the effects of failing septic systems. A LEHS must be present during all site evaluations or percolation tests. Evaluation of the existing failing OSDS must have been conducted by a licensed septic installer or licensed septic inspector to confirm failure and diagnose any problems prior to arranging for a site evaluation with a LEHS.

H. If an inspection report from a licensed septic inspector (real estate transfers) fails to provide enough information to accurately assess that the system is failing and why, a more thorough inspection by a licensed septic installer must be conducted prior to arranging for a site evaluation for a replacement OSDS with a LEHS.

I. Contractors must contact **Miss Utility** to have all utilities marked and a clear ticket must be received prior to conducting a site evaluation for a replacement OSDS.

Conducting Percolation Tests

Percolation testing is an essential part of the site evaluation process when exploring the potential for installation of OSDS on a property in Maryland. A percolation test involves excavating in specified areas to allow for description and classification of the soils and geology on the site. During this process, excavations are dug on the property by a Calvert County licensed septic installer using a backhoe or excavator and a soil evaluation is documented by a Licensed Environmental Health Specialist (LEHS). Water is introduced into the soil at a specified depth in a manner that allows for quantification of permeability of the soils, usually expressed in “minutes per inch”. It is important to note that percolation tests by themselves do not necessarily indicate a site’s ability to comply with current regulation and provide for an adequate OSDS or sewage disposal area. Several other factors, including but not limited to: surface and subsurface drainage patterns, landscape position, topography, characteristics of the receiving soils, hydraulic conductivity of the receiving aquifer, length and size of the sewage disposal area, effects of surrounding sewage disposal areas, and possible effects on drinking water wells and formations are all important components of a site evaluation that are not addressed by percolation testing. The location and number of percolation tests is usually dependent on the proposal submitted by a licensed surveyor/professional engineer and/or by the LEHS supervising the testing. Test locations are subject to change when on-site and in the field.

Conventional Tests

A conventional percolation test is used to determine permeability of soils or geological material at a specified depth for the installation of subsurface standard trenches, deep trenches, or seepage pits/absorption beds. The depth at which the percolation test is conducted is generally the same depth that the disposal trench or seepage pit will be installed. A modified falling head percolation test method is used in Calvert County. A conventional percolation test involves description and characterization of the entire soil profile reachable with the equipment provided (to ensure an adequate soil treatment

zone and groundwater separation) as well as a secondary excavation (often referred to as a "Shelf") that is excavated to a specified depth. A small shovel or auger hole is dug or bored into the soils (ranging from 6" to 12" in diameter) at the shelf elevation. A perc stick (with nails or bolts at 7",6" and 5" above the bottom of the stick) is inserted into the small hole and clear water is introduced. Measurements of the time required for one inch of water drop from 7" to 6" is recorded (prewet), as well as the time for water to drop from 6" to 5". The small hole may be refilled to 6" and timed again to determine a stabilized and representative percolation rate. Percolation rates must be converted based on the diameter of the small hole used. Percolation rates in regulation are based on 12" diameter test holes. See MDE's Site Evaluation Training manual for On-site sewage treatment and disposal systems for more information.

Mound tests

Percolation testing for sand mounds and at-grades shall be done using the cylinder infiltrometer test method. This is not the same testing that is done for conventional trench systems, so it is important that the application indicates what type of testing is requested. Cylinder infiltrometer testing is labor intensive and requires a lot of time and water. Single ring infiltrometer testing is used to evaluate the permeability of the uppermost soils present on a given site. This testing method must also be accompanied by deeper excavations and subsequent soil description and classification to ensure that an adequate soil treatment zone is present. Pursuant to COMAR 26.04.02.05U(3): *The criteria and conditions for performing site evaluation and testing for a sand mound system area: (a) Tests are performed in the least permeable soil horizon which is located in the upper 24 inches of soil; and (b) Tests are conducted with an apparatus which minimizes horizontal movement of water.*

The procedure for preparation of a test using a single ring infiltrometer begins by excavating down to the most restrictive horizon in the upper 24 inches. This can be done with a shovel, backhoe or excavator. The test hole should be leveled and cleared of loose soil prior to driving a cylinder. The cylinder should be driven at least 5 inches into the soil but 7 inches is preferred. Rocking of the cylinder should be avoided. When the cylinder is driven to the proper depth, the cylinder should be leveled out and the gaps between the soil and cylinder must be sealed by pressing the soil against the wall of the cylinder in a manner that will prevent water from migrating down and around the cylinder. A hook gauge should be installed on the cylinder for measurement of the water level drop. A diffuser (or other object that will diffuse the stream of water) should be placed in the cylinder to prevent scouring of the soil and stirring of fines while adding the water. Water should be added to the cylinder until 7 inches of water is present in the cylinder.

Measurement of the water level and time should be made as soon as the cylinder reaches 7 inches. Measurements should be made a regular intervals selected by making sure that not more than one inch of water drop is observed. Once the level of water drops to 5 inches, the level should be adjusted back to 6 inches and measurements of time and level resumed. This should be repeated through at least 3 drop and fill intervals but more are suggested. The goal is to have a stabilized rate of percolation with rates within 10% of each other.

Backfilling and Location of Percolation Tests

It is imperative for the protection of public safety, preservation of the integrity of the site, and avoidance of liability that all excavations conducted for the purposes of percolation testing or any other site/soil evaluation processes are backfilled as soon as possible after completion of testing. It is not acceptable to leave a site prior to backfilling test pits. All percolation test sites must be accurately located and labeled by a licensed surveyor following completion so that the locations are preserved for future use.

5. Permits and Sewage Disposal Area Preservation

Permits

A. A permit issued by EH must be obtained by a Calvert County licensed septic installer for *all* installations of on-site sewage disposal systems in Calvert County.

B. Permits are not required for minor repairs of existing systems but must be conducted by a licensed septic installer. This includes adding risers to existing tanks, replacement of blocked or crushed sections of pipe (totaling 10 feet or less), distribution box replacement, sealing of existing tank risers, etc.

C. A permit to install an on-site sewage disposal system (OSDS) for new construction must be accompanied by the currently approved surveyor site plan for the project and installation of the system must be in accordance with both the permit and the approved site plan. Deviations from the permit or site plan may result in disapproval of the installation by EH following inspection. All costs to correct unapproved deviations from an approved permit or site plan will be the responsibility of the licensed installer.

D. To obtain a permit to install a replacement OSDS, a "Site Evaluation" application and fee for a site/soil evaluation (percolation test) must first be submitted to this office. Following the site evaluation, if satisfactory, this office will provide a "Site Evaluation Results" document which will provide specifications for the plans that need to be submitted along with a "Sanitary Construction Permit" application and separate fee.

E. A qualified professional may create the design plan based on the specifications provided. For replacement system design, this professional may be a licensed septic installer, consultant, licensed surveyor, professional engineer, or other qualified professional approved by this office.

F. **Unless you have a signed/approved sanitary construction permit from the LEHS in your hand, you are not to proceed with an installation**.

G. If issues are encountered during the layout or installation process, **STOP!!!!** Call EH; if necessary an LEHS will visit the site. Changes to site plan layouts may not be approvable. These include but are not limited to: changing the location of the septic tank, installing 2 trenches instead of 3 (as specified on the permit and plan), utilizing a gravity feed to the drainfields instead of utilizing a pump system, digging deeper than permitted, and using a secondary or tertiary disposal area as opposed to the primary. Solve problems BEFORE you do any work.

Sewage Disposal Area Preservation

A. Pursuant to COMAR 26.04.02.04E- *Sewage disposal areas shall meet all physical and distance requirements outlined in regulations .03 and 04 of this chapter, exclusive of easements, rights-of-way, buildings, and any other permanent or physical objects, and may not be disturbed by earth moving, compaction, tree removal or grading after approval by the Approving Authority without prior authorization of the Approving Authority.*

B. It is especially important to preserve sewage disposal areas from compaction, tree removal and grading when mound systems, at-grade systems or alternative systems are being installed. The resulting destruction of the soils and soil structure may lead to invalidation of the permit and possibly loss of permitting for a building site. COMAR 26.04.02.05U(5)(f) reads- *A minimum 25 foot wide area downslope of the sand mound is designated on a plan as an area protected from compaction and grading and free of structures such as buildings and driveways.*

C. Grading or stock piling in a sewage disposal area may also lead to problems with trench systems as well. A licensed septic installer shall bring to the attention of EH any adverse disturbance of the sewage disposal area so that the damage may be evaluated. Grading of, or stockpiling on a sewage disposal area may lead to invalidation of the permit and possibly loss of permitting for a building site.

D. It is the responsibility of the licensed septic installer to ensure that the sewage disposal area is not damaged or destroyed before, during and after an installation.

6. Pumps, pumping equipment and pump chambers

Utilization of pump systems in the design of OSDS has become common practice. This section will provide clarity as to exactly what is required for their installation pursuant to COMAR 26.04.02.05.

A. **Single sewage effluent pumps are required for both new construction and replacement OSDS systems** (unless otherwise specified on the permit).

B. Use effluent-grade pumps only. The selected pump must be capable of delivering the necessary flow (gallons per minute) at the calculated design head (ft).

C. A minimum of 6 inches must be provided between the pump intake and the floor of the pumping chamber. Pump blocks are a good way to achieve this.

D. If floats are used for pump control it is recommended that they are securely attached to a float tree (with either stainless steel clamps or by drilling through a dummy pipe and knotting the float wire on each side of the pipe providing a fail-safe attachment) that is independent of the discharge pump line. Attaching floats to the pump discharge piping is not acceptable.

E. It is also recommended that the float tree be securely attached to either a pump block with a cast-in coupling or the pumping chamber in a manner that allows for easy access for replacement of faulty floats.

F. A high water alarm must be installed within the pumping chamber and wired on a circuit separate from that of the pump. The alarm float should be set 6 inches above the on float.

G. The force main must be installed to allow the wastewater to drain back to the pumping chamber from the distribution system to prevent freezing. Use of check valves is not recommended. Check valves may and shall be used when duplex alternating pumps are utilized to prevent pumping of effluent through the second pump. Check valves may be used when both the assigned LEHS and the licensed installer agree that, given the specific site conditions, use of check valves is appropriate.

H. A pump must be able to resist the corrosive effects of septic tank effluent.

I. The pump system must be constructed and located to prevent the entrance of surface water or ground water. Access to the pump, floats and pump chamber must be made available via tank risers that extend to a minimum of 6 inches above grade.

J. The dosing frequency should be approximately 6 times a day (unless otherwise specified).

K. A minimum storage capacity of 1 day's flow must be provided above the high water alarm.

L. The pumping chamber must provide adequate volume to store the sewage between doses.

M. The pump control sensor or floats must be located so that they are not affected by flow entering the pump chamber. A three float system is recommended, however a two float system (one on/off float to control the pump and one for a high water alarm) may be utilized in those instances where a pressure distribution system is not being utilized.

N. Pressure distribution systems, including sand mound and at-grade systems, must have a pump that provides adequate capacity for handling peak flow at the design head. The design head shall include static head, friction head, and *at least* an additional 2 feet of discharge head. A pressure distribution system with 5/16-inch perforations must have a minimum of two feet of distal end head. A system with 1/4-inch perforation must have a minimum of three feet of distal end head. All specifications for pumps, floats, force main, manifold and laterals provided on the approved plans must be adhered to.

O. Force main shall be a minimum of 2-inch diameter schedule 40 PVC to within 10 feet of the distribution box, at which point expansion coupling will be installed. The last 10 feet of force main shall be 4-inch diameter minimum Schedule 40 PVC and needs to be visible during time of inspection. All pipe and couplings must be pressure-rated Schedule 40 PVC or better. This applies only to situations where a pressurized distribution network is not utilized.

P. A siphon breaker hole of ¼ inch diameter shall be drilled in the force main inside of the pump chamber. Installation of a quick-disconnect union in the force main before the pump chamber outlet is required for ease of pump replacement.

7. Tanks, Holding tanks and Grease Interceptors

A. Pursuant to Calvert County Resolution 3-93, *Each new or replacement residential septic tank shall be top seam, chambered and fabricated of precast concrete, with a capacity of at least 1500 gallons for up to three bedrooms and an additional 500 gallon capacity for each individual bedroom over three. Both the inlet and outlet ends of the tank shall be equipped with risers that extend to the final grade. Each riser shall be fabricated of precast concrete and shall be either*

24" in diameter or 24" square. Refer to the policy "Conventional Residential On-site Sewage Disposal System Design Criteria" for additional tank sizing criteria.

B. Composite tanks made of fiberglass, high density polyethylene, PVC, a combination of these materials or any other material found to be suitable by EH may be accepted for use in those cases where a concrete tank installation is not possible due to site constraints. Approval of composite tanks must be granted by a LEHS **prior** to installation.

C. Pursuant to COMAR 26.04.02.05E- *Criteria of a Residential Septic Tank.*

(1) A residential septic tank shall have a minimum of two compartments or two tanks in series.

(2) A residential septic tank shall be made of materials and constructed in a manner acceptable to the Approving Authority.

(3) A residential septic tank shall be watertight. Manufacturers shall certify that septic tanks are watertight. The Approving Authority may require one of the following tests to determine watertightness.

(a) Vacuum Testing. Seal the empty tank and apply a vacuum to two inches of mercury. The tank is acceptable if 90 percent of the vacuum is held for 2 minutes.

(b) Water-Pressure Testing. Seal the tank with all the inlet and outlet pipes installed. Fill with water into the risers and let stand for 24 hours. Refill the tank. The tank is acceptable if the water as level measured in the tank remains the same for one hour.

D. All tanks used as a component of a permitted OSDS shall be watertight, installed level in all directions, installed as directed by the manufacturer's recommendations for installation, and must be inspected prior to covering.

E. All septic tanks shall be fitted with sanitary tees or factory installed baffles extending 18 inches below the outlet invert. Slotted center walls are also an acceptable means of creating a baffle.

F. The sewer line from the building to the tank (plumbing inspector must inspect the pipe up to 5 feet away from the dwelling) must be 4 inch diameter minimum Schedule 40 PVC or equivalent. The minimum grade is ¼ inch per foot or 2%.

G. Sewer lines from a dwelling or other building for human occupation to a septic tank, grease interceptor, BAT, ATU or sewage holding tank shall not include any standard 90 degree elbows. Long sweep 90 degree elbows or multiple lesser degree elbows should be used for sharper turns.

H. If the sewer line from the dwelling to the tank is greater than 50 feet long, a clean-out will need to be installed (every 50 feet if longer)to allow for blockages in the line to be cleared.

I. If a sewer line is installed under a driveway or other access pathway, it must be sleeved in Schedule 40 PVC.

J. All lines connecting tanks, grease interceptors, BATs, ATUs or sewage holding tanks shall be 4" Schedule 40 PVC or better.

K. Risers are required for each compartment on all tanks and should extend to at least 6" above final grade to prevent infiltration and allow for easy access. All tank riser lids shall be solid and secure.

L. All Holding tanks must be vacuum or water-pressure tested prior to approval by EH. Testing must be conducted in the presence of a LEHS and documented in the inspection report.

M. All tanks installed must conform to the specifications outlined in the permit, attachment to the permit, specified on the approved site plan/sketch plan, or as specified in an attachment to an approved site plan.

N. Tanks installed in areas where high groundwater is expected on a regular or seasonal basis shall be seal-coated on the outside (interior seal-coating is also beneficial for longevity and watertightness), shall be installed with anti-buoyancy protection (as specified by the permit, manufacturer or designer), and shall be 50% filled with clean water before completion of installation (unless strictly prohibited by the manufacturer).

O. *..A restaurant or an establishment discharging grease shall install a grease interceptor on each separate kitchen waste drain.* This requirement is pursuant to COMAR 26.04.02.05C.

P. All new or replacement grease interceptors shall be three compartment and manufactured to WSSC specifications. Waste drains from kitchen floor sinks (includes warewashing), dish machines, handwashing sinks, prep sinks, mop sinks, and floor drains shall be plumbed to drain directly into a grease interceptor. All bathroom and sanitary waste drains shall be plumbed to drain directly into a septic tank, holding tank or aerobic treatment unit and shall not be directed into a grease interceptor.

Q. Grease interceptors shall be plumbed so that the effluent is directed to a sewer line leading to the inlet of the septic tank or aerobic treatment unit for the OSDS.

R. Food service establishments utilizing an OSDS with a design flow less than 2500 gallons/day shall utilize a 1600 gallon WSSC grease interceptor (unless specific conditions warrant a larger size).

S. Food service establishments utilizing an OSDS with a design flow equal to or greater than 2500 gallons/day shall utilize a 2000 gallon WSSC grease interceptor (unless specific conditions warrant multiple interceptors are necessary).

8. BAT and ATU systems

BAT (Best Available Technology for the removal of nitrogen)

A. Pursuant to COMAR 26.04.02.07A- *A person may not install, or have installed, an onsite sewage disposal system unless the onsite sewage disposal system utilizes BAT for any of the following: (1) New construction in the Chesapeake Bay and the Atlantic Coastal Bays Critical Areas; (2) A replacement system to serve a property in the Chesapeake Bay and the Atlantic Coastal Bays Critical Areas.*

B. BAT systems may also be required by EH for OSDS outside of the critical area or if it is deemed necessary to protect public health and the environment.

C. BAT systems may also be electively installed as a component of an OSDS regardless of the area or reason contingent upon the permit indicating the use of a BAT and the sizing (gallons per day, gpd).

D. BAT systems must be sized and designed for the application that they are being used and permitted for. For example, a residential BAT unit may not be appropriate for a 50 seat Restaurant.

E. All BAT systems to be utilized as a component of an OSDS with design flows at or above 1500 gpd must be individually engineered by a Professional Engineer with knowledge and training in the design of wastewater treatment systems. See Guidance Memorandum from MDE dated May 7, 2017.

F. BAT systems differ from Aerobic Treatment Units (ATU) in that BAT systems are designed for both aerobic treatment and nitrogen reduction of wastewater. ATU systems are designed with aerobic treatment of wastewater as the main focus and do not necessarily focus on nitrogen removal. Most BAT systems qualify as an ATU, but the opposite is not always true.

G. All BAT systems must be installed according to the permit specifications, in accordance with the approved site or sketch plan. These systems must be installed by a certified BAT installer with MDE accreditation, and who is approved by the manufacturer or manufacturer's representative to install the specific technology being utilized.

H. BAT or ATU systems must be installed in accordance with the manufacturers or manufacturer's representative's instruction, guidelines, and/or standards.

I. Control panels for BAT or ATU systems shall be mounted outside of the dwelling and in a location that is favorable to the owner, service provider and Manufacturer. The location shall take into consideration both aesthetic, functional, and auditory attributes of the control panel and the specific unit being used. The panel must be installed at least 30" above grade.

See Section 2 for applicable regulations governing installations and setbacks.

9. Trench Disposal Systems

Trench systems are the most commonly utilized disposal method for on-site sewage disposal systems in Calvert County. There are 3 major types of trench systems employed for OSDS: shallow (<3'deep with variable gravel depths and typically utilizing low pressure distribution), standard (4' deep with 12" of gravel below the distribution pipe) and deep (>4' deep with variable gravel depths below the distribution pipe).

Installation and Inspection Procedures- General

Installation of trench systems can vary in difficulty depending upon the site conditions, soil and geological conditions, access to the trench installation site, equipment utilized, slope of the site, required installation depth, and space available for stockpiling/moving material. The following procedures should be followed when installing a trench system in Calvert County:

A. A permit approved by EH must be obtained for all installations of on-site sewage disposal systems in Calvert County.

B. All trench systems, regardless of the depth, shall be installed on contour with the topography of the ground's surface. This means that the beginning of the trench should be at the same elevation as the end of the trench unless otherwise permitted or authorized by the permitting LEHS.

C. Once the trenches are installed or are in the process of being installed, an inspection should be requested, pursuant to Section 3.

D. When a LEHS employed by EH arrives to the site of a trench installation for inspection, he/she should be able to see all pipe connections between the tank and the house, tank and pump pit, tank/pump pit and the distribution box, the distribution box and all of its connections(as applicable) as well as the trenches themselves.

E. If a trench collapses during the installation prior to or after reaching the trench's final depth, the spoils that entered the trench as a result of the collapse must be removed and the trench excavated to its permitted depth prior to placement of gravel.

F. If a trench collapses during the installation after gravel has been placed, the spoils that entered the trench as a result of the collapse and any gravel affected by those spoils shall be removed until clean gravel or trench depth is reached.

Materials

All materials used in a trench system shall meet the requirements of COMAR 26.04.02, the permit specifications, the specifications outlined on the approved plan (if there are any), and the specifications outlined in this guidance document. The following are guidelines indicating what materials are acceptable:

A. All sewer lines from a dwelling or other building for human occupation to a septic tank, grease interceptor, BAT, ATU or sewage holding tank shall be 4" Schedule 40 PVC or better and shall have a minimum grade of ¼ inch per foot (2%). If a slope that is greater than 2% is necessary, the sewer line must incorporate "step-downs".

B. Sewer lines from a dwelling or other building for human occupation to a septic tank, grease interceptor, BAT, ATU or sewage holding tank shall not include any standard 90 degree elbows. Long sweep 90 degree elbows or multiple lesser degree elbows should be used for sharper turns.

C. All lines connecting tanks, grease interceptors, BATs, ATUs or sewage holding tanks shall be 4" Schedule 40 PVC or better.

D. All lines from the outlet of a tank to a distribution box shall be 4" Schedule 40 PVC or better and shall have a minimum grade of 2 inches per 100 feet.

E. Perforated pipes in drain fields should be a minimum of 4-inch diameter ASTM F 810 PVC with 3 rows of ¾ inch perforations installed with perforations facing downward. Required grade is 2 to 4 inches per 100 feet.

F. Force main shall be a minimum of 2 inch diameter Schedule 40 PVC (no cellular core) to within 10 feet of the distribution box, at which point an expansion coupling shall be installed (unless otherwise specified). The last 10 feet of force main shall be 4 inch diameter Schedule 40 PVC. All pipe and couplings shall be pressure rated.

G. High Density polyethylene (HDPE) pipe may be used for force main when appropriate as long as the pipe is rated for pressure and the joints are adequately sealed.

H. Gravel used in a trench system shall be clean, free of fines and washed river or bank run gravel. Use of blue stone, recycled concrete or slag is not acceptable.

I. All gravel used in a trench system shall be of a size between ¾ and 2 inches.

J. All pipe used in disposal trenches shall have a minimum of 6 inches of gravel cover.

Distribution boxes

A. Standard distribution boxes for gravity systems shall be pre-cast concrete with a minimum of 5 outlets.

B. Larger 10-hole precast concrete distribution boxes are required for pump systems with high flow effluent pumps. A diversion wall is recommended to prevent flow from the inlet line from disproportionately entering the opposing outlet pipe.

C. Distribution boxes with water-tight inlet and outlet seals are recommended; cemented connections may be approved as well.

D. All precast concrete distribution box lids must be constructed with a 4" PVC coupling cast into the lid that allows for direct viewing of the distribution box. A 4" Schedule 40 PVC inspection pipe must be installed in the lid and extended to a minimum of 3" above grade with a 4" PVC cleanout adapter with a threaded plug.

E. Distribution boxes used under parking lots or roads shall be constructed in a manner as to be capable of withstanding heavy loads. Cast iron frames and covers shall be utilized for these types of boxes and installed in such a way that prevents surface water from entering the box.

F. EH will permit the use of the Tuf-Tite® HDPE 6-hole distribution box. The Tuf-Tite ® lid with an inspection port must be used with these boxes and the 4" PVC inspection pipe must be installed in the lid and extended to a minimum of 3" above grade with a 4" PVC cleanout adapter with a threaded plug. Great care should be taken when backfilling and grading around poly distribution boxes. Sandy backfill or small diameter washed gravel is recommended for backfilling material. Under no circumstances should these distribution boxes be installed in or near any driveway or area where vehicular traffic is likely. Per manufacturer's instructions, distribution boxes must <u>not</u> be installed on concrete slabs and appropriate fittings/pipe seals (Blue S-40 for Schedule 40, Yellow S-35 for thin wall, SDR 35 etc.) shall be used for each hole where pipes are inserted. Unused holes shall be fitted with a P-10 plug. NO MORE THAN 36" OF COVER CAN BE PLACED OVER THESE DISTRIBUTION BOXES. NO EXCEPTIONS WILL BE GRANTED TO THIS POLICY.

G. EH will permit the use of the Tuf-Tite® 7-hole distribution boxes as well. If this box is to be used, they must have risers installed that extend to a minimum of 3" above grade with screwed-on lids. Great care should be taken when backfilling and grading around poly distribution boxes.

Sandy backfill or small washed gravel is recommended for backfilling material. Under no circumstances should these distribution boxes be installed in or near any driveway or area where vehicular traffic is likely. Per manufacturer's instructions, distribution boxes must not be installed on concrete slabs and appropriate fittings/pipe seals (Blue S-40 for Schedule 40, Yellow S-35 for thin wall, SDR 35 etc.) shall be used for each hole where pipes are inserted. Unused outlets shall be fitted with a P-10 plug. NO MORE THAN 36" OF COVER CAN BE PLACED OVER THESE DISTRIBUTION BOXES. NO EXCEPTIONS WILL BE GRANTED TO THIS POLICY.

H. Other alternative distribution boxes may be approved following a written request from the supplier/manufacturer, a thorough review of the product specifications by EH as well as in-person inspection of the product by EH.

Low-pressure Distribution

A. All low-pressure distribution systems for trenches shall be designed either by a professional engineer, qualified soil consultant, or licensed septic contractor with knowledge and expertise in this area.

B. Low pressure distribution systems shall be installed as specified and inspected prior to covering.

C. All pipe used in a low pressure distribution system shall be as specified in the design and shall be pressure-rated schedule 40 PVC, equivalent or better.

D. Perforations/orifices drilled into pipe for use in a low pressure system shall be free of burrs or shavings.

E. Orifice shields are recommended and shall be used whenever specified.

F. Lateral turn-ups for low pressure distribution systems are required for every lateral, and shall be protected by installation of a 3 inch PVC sleeve with screw off cap over the pipe. See schematic.

G. A siphon breaker hole (of the specified diameter) shall be drilled into the elbow of the turn-up for each lateral in a manner that allows water to drain out of the face-down perforations. See schematic.

Barrier Material

A. Geotextile fabric shall be used to cover the gravel in a trench system prior to covering with backfill or topsoil.

B. The geotextile fabric shall be spun filter fabric (not woven) that is strong and capable of withstanding significant applied forces without tearing or being punctured.

C. Geotextile fabric shall be of equal or greater width than the trench to allow for complete covering of gravel.

D. Red Rosin or construction paper will **no longer** be accepted as a barrier material.

Backfilling

A. Trenches shall be covered with native backfill originating from the site of construction.

B. Care should be taken when backfilling trenches to prevent damage to the barrier material.

C. Trenches should be covered as soon as possible (after inspection) to prevent fines being washed into the trenches during rain events.

10. Seepage pits/absorption beds

A. Seepage pits or absorption beds are generally utilized on small lots where trench, mound, or at-grade systems are not viable.
B. Seepage pits generally lead to high amounts of wastewater being applied to a small amount of surface area in the receiving environment. This often leads to saturation of soils and clogging. For these reasons, seepage pits are not a preferred method of sewage disposal.
C. When seepage pits are utilized, EH recommends filling the pit with 2 inch washed gravel.
D. All seepage pits installed in Calvert County shall utilize a system of perforated laterals installed on top of the gravel in the pit. This may be in conjunction with a vertically installed center-feed 6" Schedule 40 PVC pipe connected to the inlet pipe (either directly or with a distribution box) or a 6" Schedule 40 PVC pipe installed vertically for observation only.
E. Seepage pits or absorption beds shall be installed in accordance with the permit specifications.
F. Seepage pits must be separated from each other by three times the diameter of the pit.

11. Mound and At-grade systems

Installation and Inspection Procedures-General

Both Mound and At-grade systems require that the installer be certified by the Maryland Department of the Environment prior to contemplating an installation. **Certifications of installers only last for 5 years and need to be updated to maintain certification**. Both of these certification courses are offered by the Maryland Department of the Environment on an annual basis. Please refer to COMAR 26.04.02.05U-V, the MDE Design and Construction Manual for Sand Mound systems and the MDE Design and construction manual for At-grade systems for more detailed information.

A certified and licensed installer should contact the EH office staff (main number) and subsequently the LEHS that permitted the project prior to commencement of work on a mound or at-grade system. If the LEHS that permitted the project is not available, office personnel will notify the supervisor and a LEHS will be assigned to fill in. Evaluation of the soil moisture content of the proposed mound or at-grade site must be conducted by an LEHS prior to beginning construction.

After the soil moisture test is complete, if satisfactory, inspections can be coordinated between the installer and the LEHS. Inspections should be arranged for the following stages of construction:

- Layout and soil preparation
- Sand placement (mounds) and bed construction
- Lateral construction and placement

- ❖ Barrier placement, cap placement and topsoil placement
- ❖ Pump test

Multiple stages of construction may be observed in one single inspection if agreeable to the LEHS.

Materials

Material specifications shall be verified by a LEHS prior to arrival at the site and a copy of the receipt and the material certification from the sand supplier showing that the material meets specifications shall be provided to EH. All materials used in the construction of a sand mound or at-grade system shall meet the specifications indicated on the permit or approved plans. Materials used in the construction of a sand mound or at-grade system shall also meet the specifications indicated in COMAR 26.04.02.05. Unless otherwise specified on the permit or approved plans, materials shall meet the following standards:

- Sand: Of an effective size between 0.25 and 0.5 mm and have a uniformity coefficient of 3.5 or less; **OR** Of an effective size between 0.15 and 0.3 mm and have a uniformity coefficient between 4 and 6 and contain less than 20 percent of material larger than 2.0 mm and less than 5 percent of material less than 0.053 mm
- Washed Gravel: The gravel is between 3/4 inch and 2 inches in size and free of fines (clean).
- Cap Material: Shall be soil relatively free of coarse fragments and preferably a loam, silt loam or finer texture. Clay texture should not be used for the cap.
- Topsoil: shall be of good quality, and free of debris such as rocks and trash. A silt loam or other medium textured soil is recommended.
- Pipe: All piping from the pump to the distribution laterals shall be Pressure-rated Schedule 40 PVC or better (unless otherwise specified). No foam core Schedule 40 PVC pipe will be allowed for these purposes.

Barrier Material

Geotextile fabric shall be used to cover the gravel bed prior to covering with either cap material or topsoil. The geotextile fabric shall be spun filter fabric (not woven) that is strong and capable of withstanding significant applied forces without tearing or being punctured.

Finishing, Stabilization, and Surface Water Diversion

Place a minimum of six inches of good quality topsoil over the entire mound surface including side slopes. **Final grading should divert surface water away from the mound or at-grade site**. Fertilize, lime, seed and mulch the entire surface of the mound. Grass mixtures adapted to the area should be used. Consult the county extension agent or Soil Conservation Service for recommendations. Irrigate the seeded mound sufficient to establish growth in a timely manner. Erosion control blankets (like short-term Curlex© or similar products) are recommended to prevent erosion of topsoil and to assist in vegetative growth.

12. Alternative systems

Types

Alternative systems could be an adaptation of a conventional system design or an entirely different way of distributing treated effluent to the soil. The Calvert County Health Department will not permit the installation of an alternative system if we believe that it presents a threat to public health or the environment. Some types of alternative systems that may be permitted by EH would be modified or marginal sand mound systems, alternative trench systems with low pressure distribution, absorption beds, bottomless sand filters and drip dispersal systems. Alternative systems must be designed by a third-party qualified soil consultant and a proposal submitted for co-review with MDE. If satisfactory, an "Innovative and Alternative Agreement" will need to be signed by the property owner, MDE, and EH Director then recorded with Land Records before a "Sanitary Construction Application" can be submitted by a licensed septic installer for permitting of the alternative system.

Installation and Inspection Procedures- General

Installation of alternative systems should not take place without first consulting and arranging for a pre-construction meeting between the installer, permitting LEHS, and designer. At the pre-construction meeting, an inspection schedule should be discussed between the installer and LEHS to determine at what points in the installation inspections should take place. Most alternative systems utilize effluent pumps in some way. Therefore, it will be necessary to arrange for a pump test to verify that the pump installed is providing the required head pressure and flow. Each and every alternative system will be unique and will have differing circumstances and limitations for installation. A licensed installer should not contract for the installation of an alternative system unless he/she is confident that they are familiar with the technology and design, and are comfortable performing the installation as specified. If at any point in the installation or planning of the installation clarification is needed, the installer shall contact the LEHS/designer and get the clarity needed to proceed.

Materials

Materials used in the construction of alternative systems shall strictly follow the specifications of the system design. If some components of the system are not specifically indicated on the design plans, the installer must obtain revised plans from the designer and EH approval of these components prior to installation.

Finishing, Stabilization and Surface Water Diversion

Final grading should divert surface water away from the disposal site. Fertilize, lime, seed and mulch the entire disturbed area around the alternative system. Grass mixtures adapted to the area should be used. Consult the county extension agent or Soil Conservation Service for recommendations. Irrigate the seeded area sufficient to establish growth in a timely manner. Erosion control blankets (like short-term Curlex© or similar products) are recommended to prevent erosion of topsoil and to assist in vegetative growth.

13. Works Cited and Schematics

Works Cited

Calvert County Code of Ordinances, Chapter 110

Calvert County Resolution 3-93

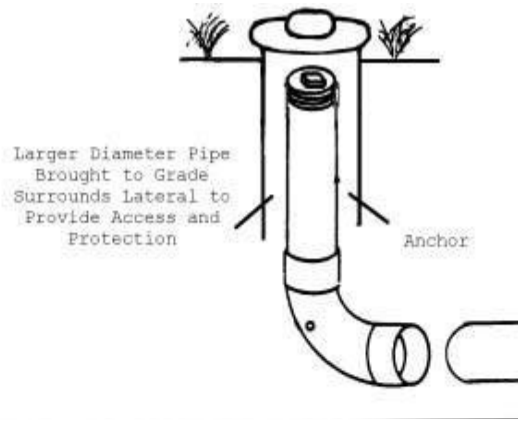
Code of Maryland Annotated Regulations

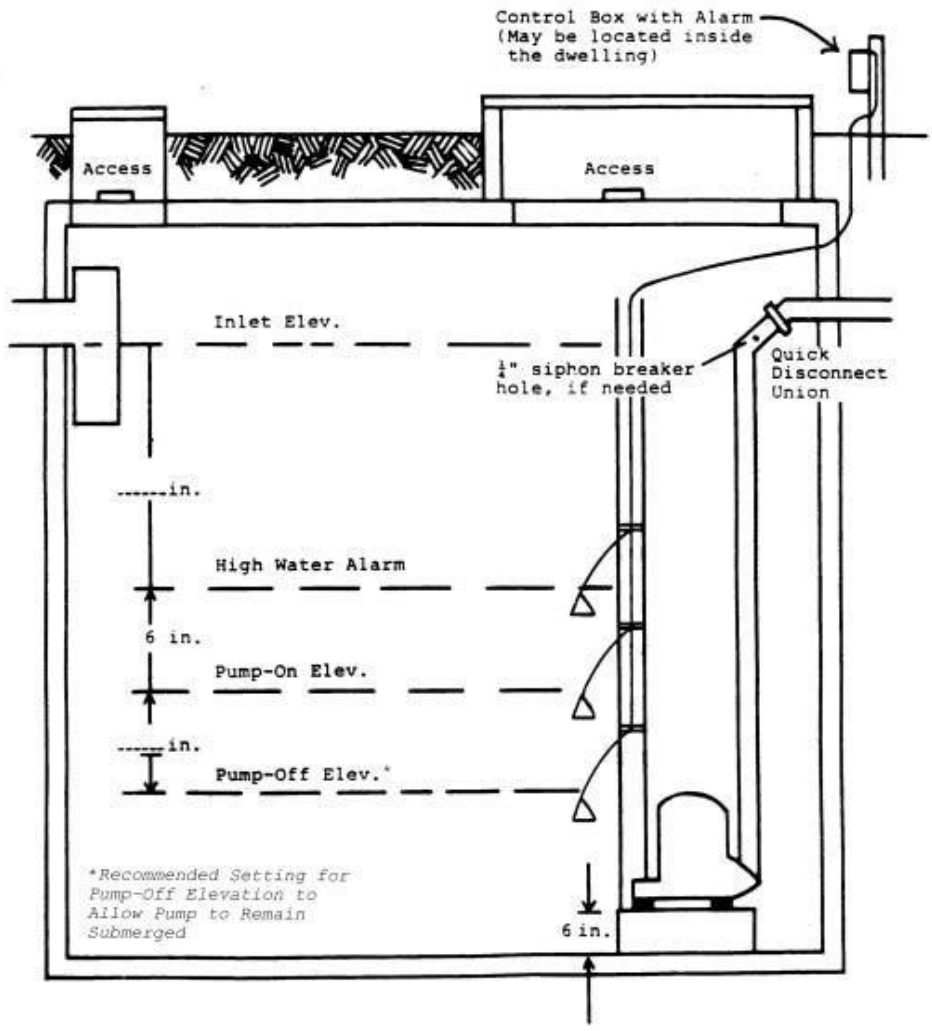
Design and Construction Manual for Sand Mound systems, February 2016 (5th edition), Maryland Department of the Environment.

Design and Construction Manual for Maryland At-grade mound systems, January 2015 (1st edition), Maryland Department of the Environment.

Schematics

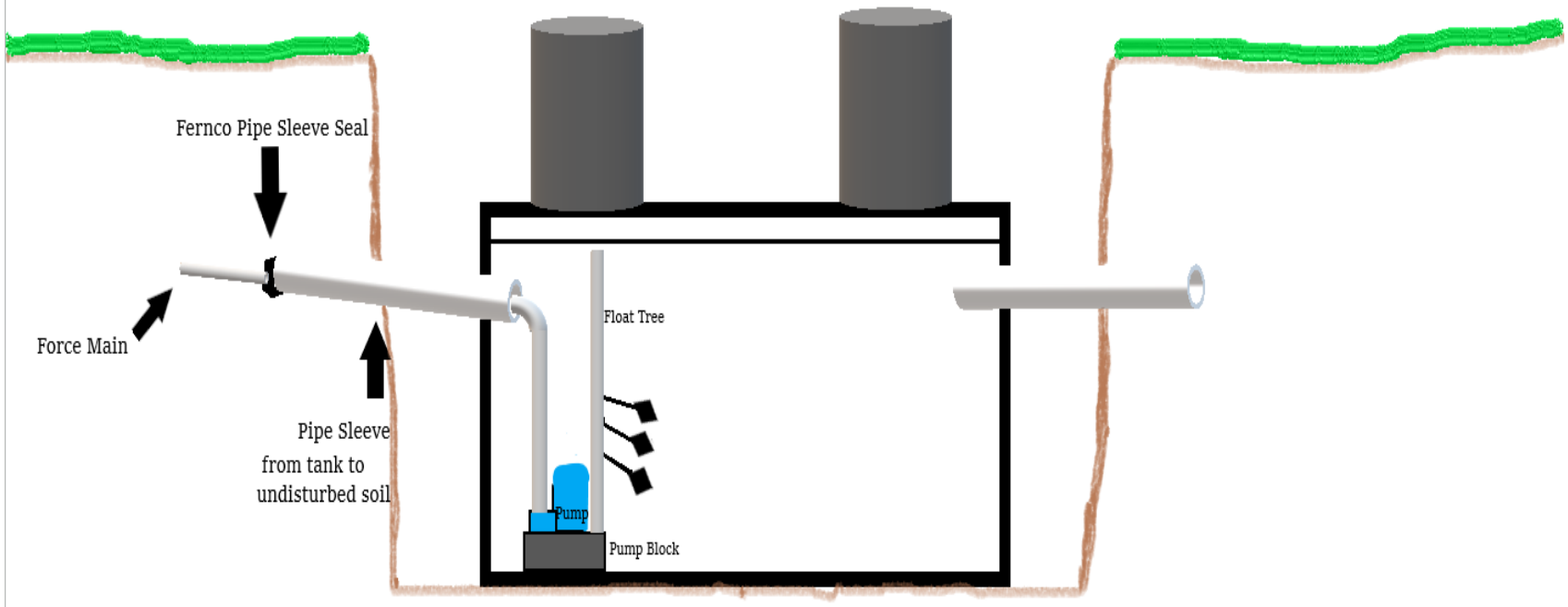
Lateral turn-up protection





Typical Pump Chamber

Pump Chamber Sleeve Detail



*See typical pump chamber schematic for more details