REGULATIONS FOR ALTERNATIVE ONSITE SEWAGE SYSTEMS

12 VAC 5-613-10 et seq.

December 7, 2011

Part I

General

12VAC5-613-10. Definitions.

The following words and terms used in this chapter shall have the following meanings. Terms not defined in this chapter shall have the meanings prescribed in Chapter 6 (§ 32.1-163 et seq.) of Title 32.1 of the Code of Virginia or in 12VAC5-610 unless the plain reading of the language requires a different meaning.

"Alternative onsite sewage system," "AOSS," or "alternative onsite system" means a treatment works that is not a conventional onsite sewage system and does not result in a point source discharge.

"Best management practice" means a conservation or pollution control practice approved by the division, such as wastewater treatment units, shallow effluent dispersal fields, saturated or unsaturated soil zones, or vegetated buffers, that manages nutrient losses or other potential pollutant sources to minimize pollution of water resources.

"Biochemical oxygen demand, five-day" or "BOD_5" means the quantitative measure of the amount of oxygen consumed by bacteria while stabilizing, digesting, or treating biodegradable organic matter under aerobic conditions over a five-day incubation period; BOD_5 is expressed in milligrams per liter (mg/l).

"Board" means the State Board of Health.

"Chesapeake Bay Watershed" means the following Virginia river basins: Potomac River Basin (see 9VAC25-260-390 and 9VAC25-260-400), James River Basin (see 9VAC25-260-410, 9VAC25-260-415, 9VAC25-260-420, and 9VAC25-260-430), Rappahannock River Basin (see 9VAC25-260-440), Chesapeake Bay and small coastal basins (see 9VAC25-260-520, Section 2 through Section 3g), and the York River Basin (see 9VAC25-260-530).

"Conventional onsite sewage system" means a treatment works consisting of one or more septic tanks with gravity, pumped, or siphoned conveyance to a gravity distributed subsurface drainfield.

"Department" means the Virginia Department of Health.

"Direct dispersal of effluent to ground water" means less than six inches of vertical separation between the point of effluent application or the bottom of a trench or other excavation and ground water.

"Disinfection" means a process used to destroy or inactivate pathogenic microorganisms in wastewater to render them non-infectious.

"Dissolved oxygen" or "DO" means the concentration of oxygen dissolved in effluent, expressed in mg/l or as percent saturation, where saturation is the maximum amount of oxygen that can theoretically be dissolved in water at a given altitude and temperature.

"Division" means the Division of Onsite Sewage and Water Services, Environmental Engineering, and Marina Programs within the department

"Effluent" means sewage that has undergone treatment.

"General approval" means that a treatment unit has been evaluated in accordance with the requirements of this chapter and 12VAC5-610 and approved for TL-2 or TL-3 in accordance with this chapter.

"GPD/sf" means gallons per day per square foot.

"Ground water" means any water, except capillary moisture, beneath the land surface in the zone of saturation or beneath the bed of any stream, lake, reservoir, or other body of surface water wholly or partially within the boundaries of this Commonwealth, whatever the subsurface geologic structure in which such water stands, flows, percolates, or otherwise occurs. Ground water includes a seasonal or perched water table.

"High-level disinfection" means a disinfection method that results in a fecal coliform concentration less than or equal to 2.2 colonies/100 ml. Chlorine disinfection requires a minimum total residual chlorine (TRC) concentration at the end of a 30 minute contact time of 1.5 mg/l. Ultraviolet disinfection requires a minimum dose of 50,000 μW-sec/cm^2. Influent turbidity to the disinfection unit shall be less than or equal to 2 Nephelometric turbidity units (NTU) on average.

"Ksat" means saturated hydraulic conductivity.

"Large AOSS" means an AOSS that serves more than three attached or detached single-family residences with a combined average daily sewage flow greater than 1,000 GPD or a structure with an average daily sewage flow in excess of 1,000 GPD.

"Limiting feature" means a feature of the soil that limits or intercepts the vertical movement of water, including seasonal, perched or permanent water table, pans, soil restrictions, and pervious or impervious bedrock.

"Local health department" means the local health department having jurisdiction over the AOSS.

"Maintenance" means performing adjustments to equipment and controls and in-kind replacement of normal wear and tear parts such as light bulbs, fuses, filters, pumps, motors, or other like components. Maintenance includes pumping the tanks or cleaning the building sewer on a periodic basis. Maintenance shall not include replacement of tanks, drainfield piping, and distribution boxes or work requiring a construction permit and an installer.

"MGD" means million gallons per day.

"MPI" means minutes per inch.

"Operate" means the act of making a decision on one's own volition to (i) place into or take out of service a unit

process or unit processes or (ii) make or cause adjustments in the operation of a unit process at a treatment works.

"Operation" means the biological, chemical, and mechanical processes of transforming sewage or wastewater to compounds or elements and water that no longer possess an adverse environmental or health impact.

"Operator" means any individual employed or contracted by any owner who is licensed or certified under Chapter 23 (§ 54.1-2300 et seq.) of Title 54.1 of the Code of Virginia as being qualified to operate, monitor and maintain an alternative onsite sewage system.

"Organic loading rate" means the biodegradable fraction of chemical oxygen demand (BOD, biodegradable fats, oils, and grease and volatile solids) delivered to a treatment component in a specified time interval expressed as mass per time or area; examples include pounds per day, pounds per cubic foot per day (pretreatment), or pounds per square foot per day (infiltrative surface or pretreatment). For a typical residential system, these regulations assume that biochemical loading (BOD_5) equals organic loading.

"Owner" means the Commonwealth or any of its political subdivisions, including sanitary districts, sanitation district commissions and authorities, or any individual, any group of individuals acting individually or as a group, or any public or private institution, corporation, company, partnership, firm, or association that owns or proposes to own a sewerage system or treatment works.

"pH" means the measure of the acid or base quality of water that is the negative log of the hydrogen ion concentration.

"Pollution" means such alteration of the physical, chemical, or biological properties of any state waters as will or is likely to create a nuisance or render such waters (i) harmful or detrimental or injurious to the public health, safety, or welfare or to the health of animals, fish, or aquatic life; (ii) unsuitable with reasonable treatment for use as present or possible future sources of public water supply; or (iii) unsuitable for recreational, commercial, industrial, agricultural, or other reasonable uses. Pollution shall include any discharge of untreated sewage into state waters.

"Point source discharge" means any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water run-off.

"Project area" means one or more recorded lots or a portion of a recorded lot owned by the owner of an AOSS or controlled by easement upon which an AOSS is located or that is contiguous to a soil treatment area and that is designated as such for purposes of compliance with the performance requirements of this chapter. In the case of an AOSS serving multiple dwellings, the project area may include multiple recorded lots as in a subdivision.

"Project area boundary" or "project boundary" means the physical limits of the three-dimensional length, width, and depth of the project area, whereby each dimension is identified as follows: (i) the horizontal component is the

length and width of the project area; (ii) the upper vertical limit is the ground surface in and around the AOSS; and (iii) the lower vertical limit is the limiting feature.

"Renewable operating permit" means an operation permit that expires and must be revalidated at a predetermined frequency or schedule in accordance with this chapter.

"Reportable incident" means one or more of the following: an alarm event lasting more than 24 hours; an alarm event that reoccurs; any failure to achieve one or more performance requirements; removal of solids; replacement of media; or replacement of any major component of the system including electric and electronic components, pumps, blowers, and valves. The routine cleaning of effluent filters is not a reportable incident.

"Saturated hydraulic conductivity" means a quantitative measure of a saturated soil's capacity to transmit water when subjected to a hydraulic gradient.

"Settleable solids" means a measure of the volume of suspended solids that will settle out of suspension within a specified time, expressed in milliliters per liter (ml/l).

"Sewage Handling and Disposal Regulations" means 12VAC5-610 or its successor.

"Small AOSS" means an AOSS that serves no more than three attached or detached single-family residences with a combined average flow of less than or equal to 1,000 GPD, or a structure with an average daily sewage flow of less than or equal to 1,000 GPD.

"Soil treatment area" means the physical location in the naturally occurring soil medium where final treatment and dispersal of effluent occurs.

"Standard disinfection" means a disinfection process that results in a fecal coliform concentration of less than or equal to 200 colonies/100 ml. Chlorine disinfection requires a minimum TRC concentration at the end of a 30 minute contact time of 1.0 mg/l. Influent TSS to the disinfection unit shall average 30 mg/l or less.

"Standard engineering practice" means the care, diligence, competence, and judgment that a reasonably prudent and experienced professional engineer licensed in the Commonwealth of Virginia would exercise given the circumstances, including site and soil conditions, of a particular AOSS design.

"State waters" means all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands.

"Subsurface drainfield" means a system installed within the soil and designed to accommodate treated sewage from a treatment works.

"Surface waters" means: (i) all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (ii) all interstate waters, including interstate wetlands; (iii) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural

ponds and the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (a) that are or could be used by interstate or foreign travelers for recreational or other purposes; (b) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (c) that are used or could be used for industrial purposes by industries in interstate commerce; (iv) all impoundments of waters otherwise defined as surface waters under this definition; (v) tributaries of waters identified in clauses (i) through (iv) of this definition; (vi) the territorial sea; and (vii) wetlands adjacent to waters (other than water that are themselves wetlands) identified in clauses (i) through (vi) of this definition.

"Total nitrogen" or "TN" means the measure of the complete nitrogen content of wastewater including all organic, inorganic, and oxidized forms expressed in mg/l as nitrogen.

"Total residual chlorine" or "TRC" means a measurement of the combined available chlorine and the free available chlorine available in a sample after a specified contact time.

"Total suspended solids" or "TSS" means a measure of the mass of all suspended solids in a sample typically measured in milligrams per liter (mg/l).

"Treatment level 2 effluent" or "TL-2 effluent" means secondary effluent as defined in 12VAC5-610-120 that has been treated to produce BOD_5 and TSS concentrations equal to or less than 30 mg/l each.

"Treatment level 3 effluent" or "TL-3 effluent" means effluent that has been treated to produce BOD_5 and TSS concentrations equal to or less than 10 mg/l each.

"Treatment unit" or "treatment system" means a method, technique, equipment, or process other than a septic tank or septic tanks used to treat sewage to produce effluent of a specified quality before the effluent is dispersed to a soil treatment area.

"Turbidity" means a measurement of the relative clarity of effluent as a result of the presence of varying amounts of suspended organic and inorganic materials or color.

"Vertical separation" means the vertical distance between the point of effluent application to the soil or the bottom of a trench or other excavation and a limiting feature of the soil treatment area such as seasonal high ground water, bedrock, or other restriction.

"Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas .

12VAC5-613-20. Purpose and authority.

A. Pursuant to the requirements of §§ 32.1-12 , 32.1-163.6, and 32.1-164 of the Code of Virginia, the board has promulgated this chapter to:

1. Establish a program for regulating the operation and maintenance of alternative onsite sewage systems;

2. Establish performance requirements for alternative onsite sewage systems;

3. Establish horizontal setbacks for alternative onsite sewage systems that are necessary to protect public health and the environment;

4. Discharge the board's responsibility to supervise and control the safe and sanitary collection, conveyance, transportation, treatment, and disposal of sewage by onsite sewage systems and treatment works as they affect the public health and welfare;

5. Protect the quality of surface water and ground water;

6. Guide the commissioner in determining whether a permit or other authorization for an alternative onsite sewage system shall be issued or denied; and

7. Inform owners, applicants, onsite soil evaluators, system designers, and other persons of the requirements for obtaining a permit or other authorization for an AOSS.

B. The division may, as it deems necessary, develop best management practices for the purposes of recognizing acceptable methods to reduce pollution from AOSSs.

12VAC5-613-30. Applicability and scope.

A. As provided in this section, this chapter governs the design, construction, and operation of AOSSs.

B. Part II of this chapter, Performance Requirements, applies only to AOSSs with applications filed on or after December 7, 2011.

C. Any AOSS with an application filed prior to December 7, 2011, is subject to the performance requirements contained in the regulations in effect at the time the system was permitted or the performance requirements contained in the operation permit.

D. Small AOSSs designed, constructed, permitted, and operated in accordance with this chapter; the prescriptive design, location, and construction criteria of 12VAC5-610-20; and the policies and procedures of the department are presumed to comply with the ground water quality requirements of 12VAC5-613-90 A.

E. Part III of this chapter, Operation and Maintenance Requirements, shall apply to all AOSSs, including those with applications filed prior to December 7, 2011.

F. Requirements for renewable operation permits contained in this chapter shall apply only to AOSSs with applications filed on or after December 7, 2011.

G. The laboratory sampling requirements of this chapter apply only to AOSSs with applications filed on or after December 7, 2011.

H. Any AOSS with an application filed prior to December 7, 2011, is subject to the laboratory sampling requirements contained in the regulations in effect at the time the system was permitted or the sampling requirements

contained in the operation permit.

I. AOSSs designed pursuant to § 32.1-163.6 of the Code of Virginia are subject to the following requirements:

1. Performance requirements of this chapter unless waived pursuant to 12VAC5-613-210;

2. Horizontal setback requirements of this chapter;

3. Operation, maintenance, inspection, and sampling requirements of this chapter; and

4. Standard engineering practice.

J. Dispersal of treated or untreated sewage to a wetland that is subject to permitting by the Virginia Department of Environmental Quality pursuant to the requirements of Title 62.1 of the Code of Virginia is specifically excluded from this chapter.

K. Spray irrigation systems are subject to permitting by the Virginia Department of Environmental Quality and are specifically excluded from this chapter.

L. Treatment units for small AOSSs that are recognized by the department as generally approved for TL-2 or TL-3 as of December 7, 2011, shall retain such status for a period of five years from December 7, 2011, after which the units shall be evaluated pursuant to the requirements of this chapter.

M. After December 7, 2011, new applications for general approval for TL-2 or TL-3 shall be subject to the requirements of this chapter. The department may continue to evaluate any treatment unit for small AOSSs that is undergoing evaluation as of December 7, 2011, using the protocol in place on the date of application for general approval.

N. The additional nutrient requirements for AOSSs in the Chesapeake Bay watershed contained in 12VAC5-613-90 D shall take effect on December 7, 2013.

12VAC5-613-40. Relationship to other regulations.

A. This chapter is supplemental to 12VAC5-610 (Sewage Handling and Disposal Regulations).

B. All procedures pertaining to enforcement, minimum requirements for filing applications, and processing of applications, including appeals and case decisions contained in the Sewage Handling and Disposal Regulations shall apply to the permitting of AOSSs under this chapter.

C. In any case where there is a conflict between this chapter and the Sewage Handling and Disposal Regulations, this chapter shall control.

D. This chapter supersedes Table 5.4 of the Sewage Handling and Disposal Regulations for all AOSSs designed to disperse TL-2 or TL-3 effluent. Table 5.4 of the Sewage Handling and Disposal Regulations (12VAC5-610-950) shall govern the design of any AOSS designed to disperse septic tank effluent to the soil treatment area unless waived pursuant to 12VAC5-613-210.

E. All plans and specifications for AOSSs shall be properly sealed by a professional engineer licensed in the Commonwealth pursuant to Title 54.1 of the Code of Virginia unless such plans are prepared pursuant to an exemption from the licensing requirements of Title 54.1 of the Code of Virginia. All AOSS designs prepared by a professional engineer shall be reviewed by the department pursuant to § 32.1-163.6 of the Code of Virginia unless otherwise designated in writing by the professional engineer.

F. When AOSS designs are prepared pursuant to an exemption from the licensing requirements of Title 54.1 of the Code of Virginia, the designer shall provide a certification statement in a form approved by the division identifying the specific exemption under which the plans and specifications were prepared and certifying that the designer is authorized to prepare such plans pursuant to the exemption.

G. Each application under § 32.1-163.6 of the Code of Virginia shall include a site and soil characterization report using the Field Book for Describing and Sampling Soils, Version 2.0, National Soil Survey Center, Natural Resources Conservation Service, U.S. Department of Agriculture, September 2002. The report may contain such information that the designer deems appropriate; however, it must describe the following minimum attributes of the site of the proposed soil treatment area:

1. Depth to limiting features, seasonal or perched water tables, pans, restrictions, or pervious or impervious bedrock;

2. Slope of the project area;

3. Ksat or percolation rate at the proposed installation depth and at depths below the soil treatment area to demonstrate compliance with this chapter. Ksat or percolation rate may be estimated for small AOSSs. The Ksat or percolation rate must be measured using an appropriate device for large AOSSs;

4. Landscape or landform; and

5. Project area along with those physical features in the vicinity of the proposed AOSS normally associated with plans for onsite sewage systems; such physical features include streams, bodies of water, roads, utilities, wells and other drinking water sources, existing and proposed structures, and property boundaries.

12VAC5-613-50. Violations and enforcement.

A. Subject to the limitations of 12VAC5-613-30.B, failure by any owner of an AOSS to achieve one or more performance requirements prescribed by this chapter or specified for the AOSS shall be a violation of this chapter.

B. Failure by any owner to comply with the conditions of an operation permit shall be a violation of this chapter.

C. Failure by any owner to accomplish any mandated visit, operation, maintenance, repair, monitoring, sampling, reporting, or inspection requirement prescribed by this chapter shall be a violation of this chapter.

D. Failure by any owner to follow the approved operation and maintenance manual (O&M manual) shall be deemed a violation of this chapter when such failure results in the failure to achieve one or more performance

requirements prescribed by this chapter.

E. Failure by any operator to perform any mandated activity in accordance with 12VAC5-613-110, 12VAC5-613-120, 12VAC5-613-180, or 12VAC5-613-190 shall be a violation of this chapter.

F. Nothing in this chapter shall be construed to limit the authority of the board, the commissioner, or the department to enforce this chapter or to enforce the requirements of 12VAC5-610.

G. In accordance with the Sewage Handling and Disposal Regulations and § 32.1-25 of the Code of Virginia, the commissioner may take such samples and conduct such monitoring, including ground water samples and monitoring, that he deems necessary to enforce this chapter.

H. The board, commissioner, and department may use any lawful means to enforce this chapter including voiding a construction or operation permit, imposition of civil penalties, or criminal prosecution pursuant to § 32.1-27 of the Code of Virginia.

I. Except when there is additional evidence that an AOSS has failed to achieve one or more of the performance requirements of this chapter or when a licensed operator has filed a report indicating that an AOSS cannot be returned to normal function via routine maintenance, the department shall not rely solely on the results of an individual grab sample to establish the factual basis for a violation of this chapter.

12VAC5-613-60. Operation permits and land records.

A. The department shall not issue an operation permit for an AOSS until the property owner has recorded an instrument that complies with § 15.2-2157 E of the Code of Virginia in the land records of the circuit court having jurisdiction over the site of the AOSS. The local health department shall receive legal documentation indicating that the instrument has been duly recorded before issuance of the operation permit.

B. When all or part of the project area is to be used in the management of nitrogen from a large AOSS, the property owner or the owner of the AOSS shall record legal documentation in the land records of the circuit court having jurisdiction over the site of the AOSS. Such documentation shall contain assurances that the land area will be protected and preserved in accordance with the management methods established by the designer. The local health department shall receive legal documentation indicating that the instrument has been duly recorded before issuance of the operation permit.

C. All large AOSSs and any AOSS permitted pursuant to 12VAC5-613-90 C shall be subject a renewable operating permit. Such permits shall be issued for a period of five years. The owner of the AOSS shall apply for a new permit at least 180 days prior to the expiration date.

12VAC5-613-70. General approval testing and evaluation.

The division shall develop a protocol to verify the expected performance of treatment units of small AOSSs that meet TL-2 or TL-3 effluent quality. The protocol to evaluate and test field performance of TL-3 treatment units shall

include the following minimum requirements:

1. The manufacturer shall evaluate at least 20 treatment units installed in the Commonwealth of Virginia for single family residences occupied full-time, year-round throughout the testing and evaluation period;

2. The manufacturer shall provide the division with quarterly results of influent and effluent samples measuring, at a minimum, BOD and TSS for each installed treatment unit;

3. Operation and maintenance shall be performed on each treatment unit during the evaluation period in accordance with the provisions of this chapter; and

4. An independent third party with no stake in the outcome of the approval process shall oversee and administer the testing and evaluation protocol. Examples of an independent third party include faculty members in an appropriate program of an accredited college or university, a licensed professional engineer experienced in the field of environmental engineering, or a testing firm that is acceptable to the division.

Part II

Performance Requirements

12VAC5-613-80. Performance requirements; general.

All AOSS designed, constructed, and operated pursuant to this chapter shall comply with the following performance requirements unless waived pursuant to 12VAC5-613-210:

1. The presence of raw or partially treated sewage on the ground's surface or in adjacent ditches or waterways is prohibited;

2. The exposure of insects, animals, or humans to raw or partially treated sewage is prohibited;

3. The backup of sewage into plumbing fixtures is prohibited;

4. The direct dispersal of effluent into ground water shall comply with 12VAC5-613-90 C;

5. All treatment units and treatment systems shall be designed for the anticipated receiving wastewater characteristics and peak flow;

6. Dosing of the treatment unit or treatment system shall accommodate the design peak flow within the treatment unit's rated capacity;

7. The AOSS shall be designed so that all components are of sufficient structural integrity to minimize the potential of physical harm to humans and animals;

8. The conveyance system for any AOSS shall be designed and installed with sufficient structural integrity to resist inflow and infiltration and to maintain forward flow;

9. The AOSS shall be designed to minimize noise, odor, or other nuisances at the property boundary;

10. Maximum trench bottom hydraulic loading rates for pressure-dosed systems using TL-2 and TL-3 effluent are found in Table 1 and are to be used as follows:

a. The designer is responsible for reducing loading rates according to the features and properties of the soils in the soil treatment area as well as for reducing loading rates for other types of dispersal;

b. Adherence to the maximum trench bottom hydraulic loading rate criteria herein does not assure or guarantee that other performance requirements of this chapter, including effluent dispersal or ground water quality, will be met. It is the designer's responsibility to ensure that the proposed design is adequate to achieve all performance requirements of this chapter;

c. Trench bottom hydraulic loading rates for pressure-dosed systems shall not exceed the values in Table 1;

d. Hydraulic loading rates shall be incrementally reduced from the TL-2 values in Table 1 when a treatment unit or system is not designed to achieve TL-2 or TL-3. In such cases, the designer shall, for

monitoring purposes, specify the effluent quality of the treatment unit. If the specified BOD_5 exceeds 60 mg/l, the designer shall use loading rates for septic tank effluent;

e. Trench bottom hydraulic loading rates for gravity dosed systems shall be reduced from the values in Table 1; and

f. Area hydraulic loading rates for systems such as drip dispersal, pads, and mounds shall be reduced from the values in Table 1 and shall reflect standard engineering practice.

Table 1

Maximum Pressure-Dosed Trench Bottom Hydraulic Loading Rates

Percolation Rate (MPI)	Saturated hydraulic conductivity (cm/day)	TL-2 Effluent (gpd/sf)	TL-3 Effluent (gpd/sf)
≤15	> 17	1.8	3.0
15 to 25	15 to 17	1.4	2.0
>25 to 45	10 to < 15	1.2	1.5
>45 to 90	4 to < 10	0.8	1.0
>90	< 4	0.4	0.5

11. Septic tank effluent may only be discharged to a soil treatment area when the vertical separation to a limiting feature consists of at least 18 inches of naturally-occurring, in-situ soil. AOSSs designed to disperse septic tank effluent require at least 12 inches of soil cover over the soil treatment area;

12. Whenever the depth to a permeability limiting feature on the naturally occurring site is less than 18 inches as measured from the ground surface, whenever the treatment works does not provide at least 18 inches of vertical separation to a permeability limiting feature, or whenever the design is for a large AOSS, then the following shall apply:

a. The designer shall demonstrate that (i) the site is not flooded during the wet season, (ii) there is a hydraulic gradient sufficient to move the applied effluent off the site, and (iii) water mounding will not adversely affect the functioning of the soil treatment area or create ponding on the surface;

b. For large AOSSs, the department may require the owner to monitor the degree of saturation beneath the soil treatment area to verify that water mounding is not affecting the vertical separation; and

c. For any system in which artificial drainage is proposed as a method to meet the requirements of this chapter, the designer shall provide calculations or other documentation sufficient to demonstrate the effectiveness of the proposed drainage.

13. The following minimum effluent quality shall be met for the described vertical separation to limiting feature as measured from the point of effluent application or the bottom of the trench or other excavation:

Table 2

Minimum Effluent Requirements for Vertical Separation to Limiting Features

Vertical Separation	Minimum Effluent Quality
≥18" (requires naturally occurring, undisturbed soils)	Septic
<18" to 12" (requires minimum 6" of naturally occurring, undisturbed soils)	TL-2
0" to <12"	TL-3 and standard disinfection*

*Note: Where direct dispersal of effluent to ground water occurs, effluent quality shall be governed by 12VAC5-613-90 C.

14. The designer shall specify methods and materials that will achieve the performance requirements of this chapter whenever sand, soil, or soil-like material is used to increase the vertical separation.

15. All treatment units or treatment systems shall prevent the bulking of solids to the treatment area.

12VAC5-613-90. Performance requirements; ground water protection.

A. The AOSS shall not pose a greater risk of ground water pollution than systems otherwise permitted pursuant to 12VAC5-610. After wastewater has passed through a treatment unit or septic tank and through the soil in the soil treatment area, the concentration of fecal coliform organisms shall not exceed 2.2 cfu/100 ml at the lower vertical limit of the project area boundary.

B. Each large AOSS shall comply with TN limit of 5 mg/l at the project area boundary. Prior to the issuance of a construction permit, the designer shall demonstrate compliance with this requirement through modeling or other calculations. Such demonstration may incorporate multiple nitrogen removal methods such as pretreatment, vegetative uptake (only for AOSSs with shallow soil treatment areas), denitrification, and other viable nitrogen management methods. Ground water and other monitoring may be required at the department's discretion.

C. AOSSs with direct dispersal of effluent to ground water are subject to the following requirements:

1. If the concentration of any constituent in ground water is less than the limits set forth at 9VAC25-280, the natural quality for the constituent shall be maintained; natural quality shall also be maintained for all constituents not set forth in 9VAC25-280. If the concentration of any constituent in ground water exceeds the limit in the standard for that constituent, no addition of that constituent to the naturally occurring concentration shall be made. The commissioner shall consult with the Department of Environmental Quality prior to granting

any variance from this subsection.

2. Ground water and laboratory sampling in accordance with 12VAC5-613-100 G.

3. The treatment unit or system shall comply with the following at a minimum:

a. The effluent quality from the treatment unit or system shall be measured prior to the point of effluent application to the soil treatment area and shall be as follows: BOD_5 and TSS concentrations each equal to or less than 5 mg/l; fecal coliform concentrations less than or equal to 2.2 col/100 ml as a geometric mean with no sample exceeding 14 col/100 ml; and TN concentration of less than 5 mg/l;

b. High level disinfection is required; and

c. Treatment systems shall incorporate filtration capable of demonstrating compliance with an average turbidity of less than or equal to 2 NTU prior to disinfection.

4. Gravity dispersal to the soil treatment area is prohibited.

5. Loading rates to the soil treatment area shall not exceed the loading rates in Table 1 of this section.

6. A renewable operating permit shall be obtained and maintained in accordance with 12VAC5-613-60 C.

7. The designer shall provide sufficient hydrogeologic analysis to demonstrate that a proposed AOSS will function as designed for the life of the structure served without degradation of the soil treatment area. This shall include a determination of ground water flow direction and rate.

D. The following additional nutrient requirements apply to all AOSSs in the Chesapeake Bay Watershed:

1. All small AOSSs shall provide a 50% reduction of TN as compared to a conventional gravity drainfield system; compliance with this subdivision may be demonstrated through the following:

a. Compliance with one or more best management practices recognized by the division such as the use of a NSF 245 certified treatment; or

b. Relevant and necessary calculations provided to show one or both of the following:

(1) Effluent TN concentration of 20 mg/l measured prior to application to the soil dispersal field; or

(2) A mass loading of 4.5 lbs N or less per person per year at the project boundary provided that no reduction for N is allotted for uptake or denitrification for the dispersal of effluent below the root zone (>18 inches below the soil surface).

2. All large AOSSs up to and including 10,000 gallons per day shall provide a 50% reduction of TN at the project boundary as compared to a conventional gravity drainfield system. Compliance with this subdivision may be demonstrated as follows:

a. A demonstrated effluent quality of less than or equal to 20 mg/l TN measured prior to application to the soil treatment area; or

b. In situ monitoring of the treatment works within 24 vertical inches of the point of effluent application to the soil treatment area to demonstrate the effluent leaving the treatment works has a TN concentration of less than or equal to 20 mg/l. The designer shall identify an intermediate compliance point within the treatment system and a corresponding TN concentration for use in the event that a representative in situ sample cannot be obtained. The intermediate compliance point and the corresponding TN concentration for use must be approved by the department and shall be conditions of the operation permit.

The AOSS operation permit shall be conditioned upon compliance with the constituent concentrations approved pursuant to this subdivision.

3. All large AOSSs over 10,000 gallons per day shall comply with the following TN requirements:

a. A demonstrated effluent quality of less than or equal to 8 mg/l TN measured prior to application to the soil treatment area; or

b. In situ monitoring of the treatment works within 24 vertical inches of the point of effluent application to the soil treatment area to demonstrate the effluent leaving the treatment works has a TN concentration of less than or equal to 5 mg/l. The designer shall identify an intermediate compliance point within the treatment system and a corresponding TN concentration for use in the event that a representative in situ sample cannot be obtained. The intermediate compliance point and the corresponding TN concentration for use must be approved by the department and shall be conditions of the operation permit.

The AOSS operation permit shall be conditioned upon compliance with the constituent concentrations approved pursuant to this subdivision.

4. For direct dispersal of effluent to groundwater in the Chesapeake Bay Watershed, TN concentration shall be less than or equal to 3 mg/l and total phosphorus concentration shall be less than or equal to 0.3 mg/l.

12VAC5-613-100. Performance requirements; laboratory sampling and monitoring.

A. Laboratory sampling is not required for any small AOSS with an installed soil treatment area that is sized for septic tank effluent and complies with the requirements of 12VAC5-610 for septic tank effluent.

B. All effluent samples must be taken at the end of all treatment, prior to the point where the effluent is discharged to the soil treatment area unless changed pursuant to 12VAC5-613-90 or 12VAC5-613-210. The designer shall identify the sampling points. When required, the sampling point for chlorine disinfection shall be at the end of the chlorine contact tank if TRC is to be used to measure compliance.

C. All sampling and monitoring shall be conducted according to procedures approved under 40 CFR Part 136 or alternative methods approved by the U.S. Environmental Protection Agency unless other procedures have been specified in this chapter.

D. The owner of each small AOSS must ensure that an initial grab sample of the effluent from the treatment unit

is collected within 180 days of system operation. The sample must be analyzed in accordance with 40 CFR Part 136 or alternative methods approved by the U.S. Environmental Protection Agency within the first 180 days of operation. Thereafter, if the treatment unit has received general approval, a grab sample is required once every five years. Samples shall be analyzed for BOD_5 and, if disinfection is required, fecal coliform. Treatment units utilizing chlorine disinfection may alternatively sample for TRC instead of fecal coliform. Sample results shall be submitted to the local health department by the 15th of the month following the month in which the sample was taken.

E. For small AOSSs that utilize a treatment unit that has not received general approval, in addition to the initial sample required by subsection D of this section, four additional grab samples of the effluent from the treatment unit shall be collected, analyzed, and submitted to the department within the first two years of operation and annually thereafter. The interval for collecting the samples shall not be less than quarterly or more than semiannually. Sample results shall be submitted to the local health department by the 15th of the month following the month in which the sample was taken. After two years of sampling in accordance with this subsection, the owner may submit a request to the department to reduce the sampling frequency to once every five years. The department shall grant such requests if the mean of five or more consecutive samples complies with the applicable performance requirements of this chapter.

F. Sampling and monitoring requirements for AOSS treatment systems with flows greater than 1,000 GPD are contained in Table 3:

Table 3

Sampling and Monitoring for Large AOSSs

PLANT SIZE	>2.0 MGD	>1.0 - to 2.0 MGD	> 100,000 GPD to 1.0 MGD	> 40,000 GPD to 100,000 GPD	>10,000 GPD to 40,000 GPD	>1,000 GPD to 10,000 GPD
Flow	Totalizing, Indicating, & Recording	Totalizing, Indicating, & Recording	Totalizing, Indicating, & Recording	Totalizing, Indicating, & Recording	Measured	Measured or Estimate
BOD_5, TSS	24-HC* 1/day	24-HC 5 days/wk	8-HC 3 days/wk	4-HC 1 day/wk	Grab quarterly	Grab 1/yr
Total Nitrogen	24-HC weekly	24-HC weekly	8-HC monthly	4-HC quarterly	Grab quarterly	Grab 1/yr
TRC, End of Contact Tank**	Grab daily	Grab daily	Grab weekly	Grab weekly	Grab weekly	Grab 1/yr
Fecal Coliform***	Grab weekly	Grab weekly	Grab monthly	Grab monthly	Grab quarterly	Grab 1/yr

*HC – hourly, flow weighted composite samples

**if disinfection required and chlorine used

***if disinfection required and a disinfectant other than chlorine used

G. Systems with direct dispersal to ground water as described in 12VAC5-613-90 C shall comply with the following:

1. Small AOSS treatment systems:

a. Shall incorporate a method to remotely monitor the operation of treatment units and processes, including the status of the disinfection unit, and automatically notify the operator and local health department if an alarm condition occurs;

b. Shall be sampled quarterly in accordance with 12VAC5-613-90 C and as defined in the renewable operating permit; and

c. No treatment units or systems shall be deemed generally approved.

2. Large AOSSs must be continuously monitored for the proper operation of all treatment units. If the wastewater treatment works is not manned 24 hours a day, telemetry shall be provided that monitors all critical systems, including turbidity into the disinfection unit and the functionality of the disinfection unit, and notifies the operator and local health department if an alarm condition occurs.

a. Treatment works with a design flow of less than 40,000 GPD shall be sampled at least monthly in accordance with 12VAC5-613-90 C and as defined in the renewable operating permit.

b. Treatment works with a design flow of 40,000 GPD or greater shall be sampled at the frequency specified in Table 3 of this section. Total phosphorus and other limited parameters not listed in Table 3 of this section shall be conducted at a frequency defined in the renewable operating permit. The treatment works must comply with the continuous operability requirements of a Reliability Class I rating as described in 9VAC25-790. Appropriate backup power sources, equipment redundancy, and failsafe modes must be in place.

3. Ground water monitoring is required for all large AOSSs with direct dispersal of effluent to the ground water and such monitoring shall be conducted in accordance with the renewable operating permit.

12VAC5-613-110. Performance requirements; field measurements, sampling, and observations.

A. For treatment units or treatment systems with flows greater than 1,000 GPD and less than or equal to 40,000 GPD, the following parameters shall be evaluated or tested when applicable: flow, pH, TRC, DO, odor, turbidity (visual), and settleable solids.

B. For treatment systems with flows greater than 40,000 GPD, the operator shall follow the operational and control testing requirements of the O&M manual.

Part III

Operation and Maintenance Requirements

12VAC5-613-120. Operator responsibilities.

A. Whenever an operator performs a visit that is required by this chapter or observes a reportable incident, he shall document the results of that visit in accordance with 12VAC5-613-190 or as otherwise specified in the operation permit.

B. Whenever an operator performs a visit that is required by this chapter, he shall do so in such a manner as to accomplish the various responsibilities and assessments required by this chapter through visual or other observations and through laboratory and field tests that are required by this chapter or that he deems appropriate.

C. Each operator shall keep an electronic or hard copy log for each AOSS for which he is responsible. The operator shall provide a copy of the log to the owner. In addition, the operator shall make the log available to the department upon request. At a minimum, the operator shall record the following items in the log:

1. Results of all testing and sampling;

2. Reportable incidents;

3. Maintenance, corrective actions, and repair activities that are performed other than for reportable incidents;

4. Recommendations for repair and replacement of system components;

5. Sludge or solids removal; and

6. The date reports were given to the owner.

D. When performing activities pursuant to a visit that is required by this chapter, the operator is responsible for the entire AOSS, including treatment components and soil treatment area components and the operator shall follow the approved O&M manual.

12VAC5-613-130. Sludge and solids removal.

Any person who pumps or otherwise removes sludge or solids from any septic tank or treatment unit of an AOSS shall file a report with the appropriate local health department on a form approved by the division.

12VAC5-613-140. Owner responsibilities.

It is the owner's responsibility to do the following:

1. Have the AOSS operated and maintained by an operator;

2. Have an operator visit the AOSS at the frequency required by this chapter;

3. Have an operator collect any samples required by this chapter;

4. Keep a copy of the log provided by the operator on the property where the AOSS is located in electronic or hard copy form, make the log available to the department upon request, and make a reasonable effort to

transfer the log to any future owner;

5. Follow the O&M manual and keep a copy of the O&M manual in electronic or hard copy form for the AOSS on the property where the AOSS is located, make the O&M manual available to the department upon request, and make a reasonable effort to transfer the O&M manual to any future owner; and

6. Comply with the onsite sewage system requirements contained in local ordinances adopted pursuant to the Chesapeake Bay Preservation Act (§ 10.1-2100 et seq. of the Code of Virginia) and the Chesapeake Bay Preservation Area Designation and Management Regulations (9VAC10-20) when an AOSS is located within a Chesapeake Bay Preservation Area.

12VAC5-613-150. Operator requirements for AOSS with flows up to 40,000 GPD, minimum frequency of visits.

The owner of each AOSS shall have that AOSS visited by an operator in accordance with Table 4.

Table 4

Minimum Operator Visit Frequency for AOSSs up to 40,000 GPD

Avg. Daily Flow	Initial Visit	Regular visits following initial visit
≤1,000 GPD	Within 180 calendar days of the issuance of the operation permit	Every 12 months
>1,000 GPD to 10,000 GPD	First week of actual operation	Quarterly
>10,000 GPD to 40,000 GPD	First week of actual operation	Monthly

12VAC5-613-160. Operator requirements for systems with flows greater than 40,000 GPD.

A. AOSSs with average daily flows greater than 40,000 GPD shall be attended by a licensed operator and manned in accordance with the recommendations specified in the Sewage Collection and Treatment Regulations for sewage treatment works (9VAC25-790).

B. When the operating staff cannot be physically present at the treatment works site during the designated manning hours, then the operating staff shall have a method in place for an operator to respond to the operation and maintenance needs of the treatment works within the timeframe provided by the O&M manual or as otherwise directed by the department.

C. Attendance by the operator pursuant to this section shall not be waived.

D. The department may reduce operator or staffing requirements when automatic monitoring, telemetry, or other electronic monitoring or process controls are employed. All reductions must be approved by the division director.

12VAC5-613-170. Operation and maintenance manual.

A. This chapter outlines the minimum requirements for operation, maintenance, sampling, and inspection of AOSSs. Operation, maintenance, sampling, and inspection schedules for some AOSSs may exceed these minimum requirements, in which case the designer is responsible for determining such additional requirements based upon the proposed use, design flow, project area, loading rates, nitrogen removal, treatment level, and other factors.

B. Prior to the issuance of an operation permit, the owner shall ensure that an O&M manual is submitted to the local health department for approval.

C. The O&M manual shall be easily understood by any potential owner and shall include the following minimum items:

1. Basic information on the AOSS design including treatment unit capacity, installation depth, pump operating conditions, a list of the components comprising the AOSS, a dimensioned site layout, sampling locations, and contact information for replacement parts for each unit process;

2. A list of any control functions and how to use them;

3. All operation, maintenance, sampling, and inspection schedules for the AOSS, including any requirements that exceed the minimum requirements of this chapter;

4. The performance (laboratory) data sampling and reporting schedule;

5. The limits of the AOSS design and how to operate the system within those design limits;

6. For systems with flows greater than 40,000 GPD, the O&M manual shall include operational and control testing recommendations that shall be based upon 9VAC25-790-970; and

7. Other information deemed necessary or appropriate by the designer.

12VAC5-613-180. Mandatory visits; inspection requirements.

When an operator is required to make a visit to an AOSS the operator shall, at a minimum, accomplish the following:

1. Inspect all components of the AOSS and conduct field measurements, sampling, and other observations required by this chapter, the O&M manual, or deemed necessary by the operator to assess the performance of the AOSS and its components.

2. Review and evaluate the operation of the AOSS, perform routine maintenance, make adjustments, and replace worn or dysfunctional components with functionally equivalent parts such that the system can reasonably be expected to return to normal operation.

3. If the AOSS is not functioning as designed or in accordance with the performance requirements of this chapter and, in the operator's professional judgment, cannot be reasonably expected to return to normal

operation through routine operation and maintenance report immediately to the owner the remediation efforts necessary to return the AOSS to normal operation.

12VAC5-613-190. Reports.

When required to file a report, the operator shall complete the report in a form approved by the division. In accordance with § 32.1-164 H of the Code of Virginia, the operator shall file each report using a web-based system and pay the required fee. The operator may, solely at his own discretion, file reports in addition to those required by this chapter. Each report shall be filed by the 15th of the month following the month in which the visit occurred and shall include the following minimum elements:

1. The name and license number of the operator;

2. The date and time of the report;

3. The purpose of the visit, such as required visit, follow-up, or reportable incident;

4. A summary statement stating whether:

   a. The AOSS is functioning as designed and in accordance with the performance requirements of this chapter;

   b. After providing routine operation and maintenance, the operator believes the AOSS will return to normal operation; or

   c. The system is not functioning as designed or in accordance with the performance requirements of this chapter and additional actions are required by the owner to return the AOSS to normal operation;

5. All maintenance performed or adjustments made, including parts replaced;

6. The results of field measurements, sampling, and observations;

7. The name of the laboratory that analyzed samples, if appropriate; and

8. A statement certifying the date the operator provided a copy of the report in electronic or hard copy form to the owner.

Part IV

Horizontal Setback Requirements

12VAC5-613-200. Horizontal setback requirements.

AOSSs designed pursuant to § 32.1-163.6 of the Code of Virginia are subject to the following horizontal setbacks that are necessary to protect public health and the environment:

1. The horizontal setback distances as found in 12VAC5-610 that apply to public and private drinking water sources of all types, including wells, springs, reservoirs, and other surface water sources, except that in cases where an existing sewage system is closer to a private drinking water source, the AOSS shall be no closer to the drinking water source than the existing sewage system;

2. The horizontal setback distances that apply to shellfish waters as found in 12VAC5-610;

3. The horizontal setback distances that apply to sink holes as found in 12VAC5-610;

4. A five foot horizontal separation to a wetland that is subject to permitting by the Virginia Department of Environmental Quality pursuant to the requirements of Title 62.1 of the Code of Virginia; and

5. Unless the AOSS complies with the ground water protection requirements of 12VAC5-613-90.C, a horizontal separation between the soil treatment area and any drainage trench or excavation that comes within six inches vertically of ground water shall be as follows:

a. AOSSs utilizing septic tank effluent shall be subject to a horizontal separation contained in 12VAC5-610;

b. AOSSs utilizing TL-2 or TL-3 (without disinfection) shall be subject to a horizontal separation of 20 feet; and

c. AOSSs utilizing TL-3 with disinfection shall be subject to a horizontal separation of 10 feet.

Part V

Waivers from Certain Performance Requirements

12VAC5-613-210. Waivers from certain performance requirements.

A. A professional engineer designing a treatment works pursuant to § 32.1-163.6 of the Code of Virginia may deviate from the design criteria in subdivisions 10, 11, and 13 of 12VAC5-613-80 and from the laboratory sampling location specified in 12VAC5-613-100 B through F in accordance with this part.

B. Designs pursuant to this part shall at a minimum be substantiated by:

1. Documentation from applicable engineering standards, texts, or other publications;

2. Relevant peer-reviewed research; or

3. Regulations or technical guidance from other states or the U.S. Environmental Protection Agency.

C. The soil treatment area shall be adequately sized to accommodate the hydraulic and organic capacity of the underlying soil to be used;

D. Sampling and monitoring pursuant to 12VAC5-613-100 B through F may be accomplished either in situ, immediately beneath the soil treatment area and within 24 inches of the point of effluent application, or within the treatment system at a point identified by the design engineer.

1. The professional engineer shall provide a sampling and monitoring plan to demonstrate that the design complies with the water quality standards in 12VAC5-613-90.

2. For in situ monitoring, the design engineer shall specify locations within the soil treatment area's zone of influence (i.e., mounding) where samples representative of the effluent quality being achieved by the treatment works can be collected. Monitoring wells or lysimeters shall be located at least six inches above any seasonal or permanent water table. Monitoring may be conducted using sampling wells, lysimeters, or other methods approved by the department. Suction lysimeters may not be used for fecal coliform monitoring.

3. The design engineer shall identify an intermediate compliance point (or points) within the treatment system along with corresponding constituent concentrations (e.g., BOD_5, fecal coliforms) for use if in situ monitoring is not desired or if an in situ sample cannot be obtained for any reason. The intermediate compliance point and the corresponding constituent concentrations shall be approved by the department. The AOSS operation permit shall be conditioned upon compliance with the constituent concentrations approved pursuant to this subdivision.

E. The following additional performance requirements shall apply to in situ monitoring:

1. BOD_5 less than or equal to 5 mg/l.

2. Fecal coliforms less than or equal to 2.2 col/100 ml.

F. The frequency of sampling shall be in accordance with 12VAC5-613-100.