



COMMONWEALTH of VIRGINIA

Department of Health

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March 18, 2016

TO: District Health Directors, Managers, and other staff

THROUGH: Marissa J. Levine, MD, MPH, FAAFP
State Health Commissioner

THROUGH: Robert Hicks
Deputy Commissioner
Community Health Services

FROM: Dwayne Roadcap, Division Director
Office of Environmental Health Services

SUBJECT: GUIDANCE MEMORANDUM AND POLICY 2016-01

PURPOSE: This policy interprets and implements the trench design and construction requirements of the Sewage Handling and Disposal Regulations (12VAC5-610-20 et seq.; the Regulations) as they pertain to the use of gravelless material.

SCOPE: This policy applies to any conventional onsite sewage system with flows less than 1,000 gallons per day that use gravelless material not designed pursuant to Va. Code § 32.1-163.6. Alternative onsite sewage systems that use gravelless material are addressed by the Regulations for Alternative Onsite Sewage Systems (12VAC5-613 et seq.). Conventional and alternative system designs greater than 1,000 gallons per day require the practice of engineering and must follow applicable regulations.

BACKGROUND:

Gravelless materials are proprietary products specifically manufactured to disperse effluent within the absorption trench of an onsite sewage system, without the use of gravel. Gravelless material may include chamber, bundled expanded polystyrene, and multi-pipe systems.

The Regulations prescribe clean gravel and pipe or crushed stone and pipe as the means for distributing septic tank effluent within onsite sewage system absorption trenches. Section 12VAC5-610-448 of the Regulations states that site selection design and construction criteria shall be developed when the Commissioner is satisfied that a sewage treatment and disposal system, method, process or equipment has demonstrated operational competency and satisfactory performance equal to or better than that of a gravity flow septic tank drainfield absorption area. Section 12VAC5-610-448 of the Regulations further states that initially these criteria shall be implemented by policy and shall grant the status of general approval to the system or process.

The Commissioner is satisfied gravelless materials have demonstrated operational competency and satisfactory performance equal to or better than that of a gravity flow septic tank drainfield absorption system. Therefore, gravelless material is generally approved pursuant to 12VAC5-610-448 of the Regulations. The Division of Onsite Sewage and Water Services, Environmental Engineers, and Marina Programs (the Division) will maintain a list of approved products. Except as noted herein, gravelless materials utilized pursuant to this policy shall be designed, installed, and operated in accordance with the Regulations in all respects.

Va. Code § 32.1-164.9 mandates the Board of Health to promulgate regulations for chamber and bundled expanded polystyrene systems, and other technologies. Following the Board of Health's promulgation of emergency regulations (as required by an enactment clause), Governor McAuliffe approved a six month extension of the emergency regulations in August, 2015; hence, the emergency regulations expired on March 14, 2016.

The Board of Health will consider final regulations on March 17, 2016. If the Board of Health approves final amendments, then executive branch review will follow, and after approval by the Governor, then the Virginia Registrar will publish the regulations for a 30 day final adoption period, after which the regulation would take effect. This policy, to the extent possible, has the same requirements for gravelless material as the final regulations. Drip dispersal technology can still be used without a policy allowance because engineers can use Va. Code § 32.-163.6 and 12VAC5-613 to design drip dispersal.

Physical Properties:

Gravelless material shall have the following minimum characteristics:

1. The minimum exterior width shall be at least 90% of the total width of the absorption trench. The exterior width of a chamber system shall be measured at the edge or outer limit of the product's contact with the trench bottom unless the Division determines a different measurement is required based on the gravelless material's design. The exterior width of bundled expanded polystyrene and multi-

- pipe systems shall be measured using the outside diameter of the bundled gravelless material unless the Division determines a different measurement is required based on the gravelless material's design. The Division shall establish the exterior width of any gravelless material that is not considered a chamber, bundled expanded polystyrene, or multi-pipe system.
2. Gravelless material shall have a minimum height of eight inches to provide a continuous exchange of air through a permeable interface.
 3. Gravelless material shall have a permeable interface which shall be located along the trench bottom and trench sidewalls within the absorption trench.
 4. Gravelless material shall provide a minimum storage capacity of 1.3 gallons per square foot of trench bottom area.
 5. Gravelless material shall pose no greater risk to surface water and groundwater quality than gravel in absorption trenches. Gravelless material shall be constructed to maintain structural integrity such that it does not decay or corrode when exposed to sewage.
 6. Gravelless material shall have a minimum load rating of H-10 or H-20 from the American Association of State Highway and Transportation Officials or equivalent when installed in accordance with the manufacturer's minimum specified depth of compacted cover in non-traffic or traffic areas, respectively.¹
 7. For designs using gravelless material, the absorption trenches shall receive an equal volume of effluent per square foot of trench. Trench bottom area shall be equal to or greater than the minimum area requirements contained in Table 1. Trench sidewall shall not be included when determining minimum area requirements. When open-bottom gravelless material is utilized, it shall provide a splash plate at the inlet of the trench or other suitable method approved by the manufacturer to reduce effluent velocity.
 8. Installation of gravelless material shall comply with this policy unless the department grants a deviation pursuant to 12VAC5-610-660 of the Regulations or the Division has granted a deviation identified in the installation manual.
 9. Gravelless material shall contain a pressure percolation line along the entire length of the trench when low pressure distribution is utilized pursuant to this policy.

¹ American Association of State Highway and Transportation Officials. (2011) *The Manual for Bridge Evaluation* (2). Section 6: Load Rating.

10. When pumping effluent to overcome gravity, any open-bottom gravelless material shall provide a high-flow splash plate at the inlet of the trench or other suitable method approved by the manufacturer to reduce effluent velocity.
11. When enhanced flow distribution is required by the Regulations, open-bottom gravelless material shall contain a percolation pipe that extends a minimum of 10 feet from the trench's intersection with the header line. The percolation pipe shall be installed in accordance with the manufacturer's approved installation manual. The dosing volume shall be a minimum 39 gallons per 100 linear feet of absorption trench.
12. Gravelless material with general approval may be used for low pressure distribution in accordance with the manufacturer's approved installation manual, Table 1 and the applicable requirements of the Regulations.
13. See Table 1 for minimum area sizing when gravelless material is utilized. When gravelless material is utilized, the width of the trench excavation shall be used to calculate minimum area requirements for absorption trenches.

**Table 1:
 Required minimum Area for Gravelless Material**

Percolation Rate (Minutes/Inch)	(Ft ² /100 Gallons)	(Ft ² /Bedroom)
5	83	124
10	90	135
15	99	149
20	110	164
25	119	178
30	131	195
35	143	215
40	157	236
45	172	258
50	188	282
55	206	309
60	227	339
65	248	372
70	272	408
75	299	447
80	328	492
85	359	539
90	394	590
95	489	733
100	536	804
105	588	882
110	645	967
115	707	1061
120	775	1163

Procedures:

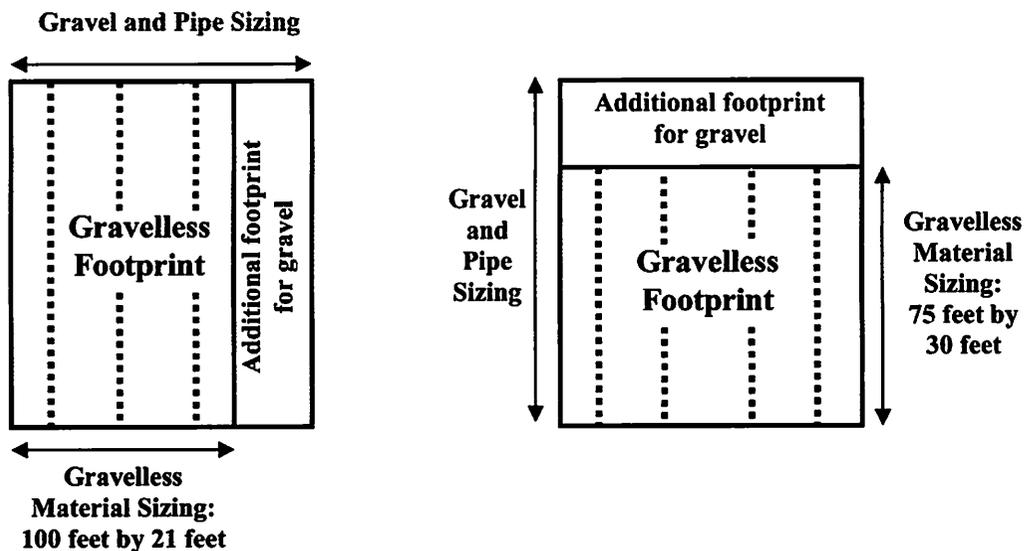
Gravelless material may be substituted for gravel in accordance with this policy, provided the certifying licensed professional engineer (PE) or onsite soil evaluator (OSE) approves the substitution. The certifying PE or OSE shall identify the substitution on the inspection report in accordance with 12VAC5-610-330 of the Regulations. A new construction permit pursuant to 12VAC5-610-310 of the Regulations is not required for the substitution. VDH shall have the following statement on every permit issued from an application without supporting private sector work (also called a “bare application”):

“Gravelless material may be used, in lieu of gravel and pipe, within the approved absorption area in accordance with Table 1 of GMP 2016-01. If gravelless material is used, then the distribution box location remains the same. Install the amount shown for gravel, or, at a minimum, ___ trenches, ___ feet long, ___ depth, ___ foot center-to-center spacing. Contact [local] Health Department at [local health department number] to address installation questions.”

For bare applications, VDH OSEs must always specify primary absorption areas with a total area (or “footprint”) based on the largest gross available absorption area required. Gravity gravel and pipe requires the largest gross absorption area. If sufficient area for use of a gravity gravelless system exists, but there is insufficient area for a gravity gravel and pipe trench system, then the VDH OSE shall specify a primary absorption area based on minimum sizing for gravelless material. VDH OSEs shall also specify reserve areas based on the largest gross available absorption area sizing required under Table 5.4, at 12VAC5-610-950, of the Regulations and Table 1 of this policy. The flowcharts outlined in Appendix A describe the evaluation process for a VDH OSE to specify a gravity gravelless system for the primary and reserve areas.

For permits based on bare applications, and issued prior to the effective date of this policy, gravelless material may be used in lieu of gravel and pipe when installed in accordance with Table 1 of this policy. If gravelless material is used, then VDH shall document on its inspection statement and as-built drawing all modifications made.

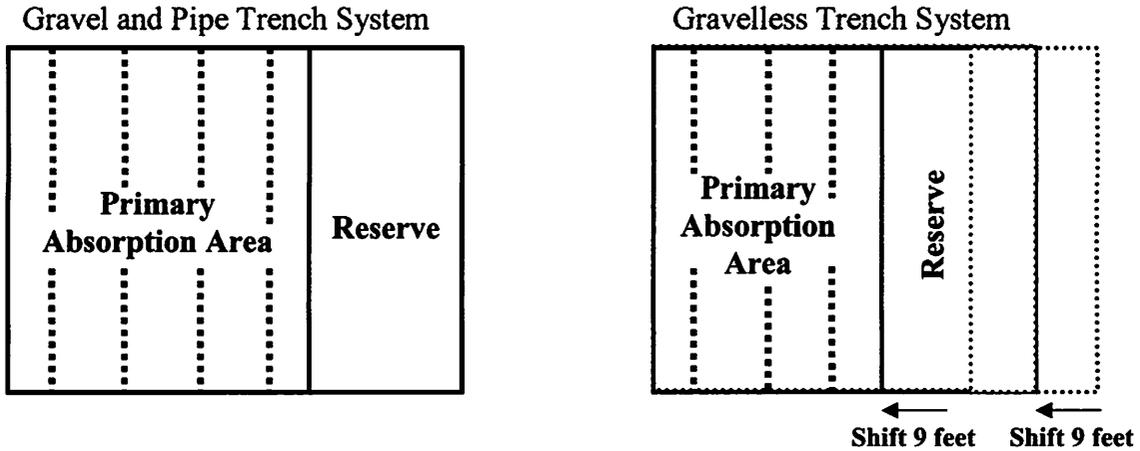
When gravelless material is used, the total area (“footprint”) for the primary and reserve area (if applicable) must comply with the minimum requirements of this policy and the manufacturer’s instructions. The following are two examples using a hypothetical gravel and pipe primary absorption area of 100 feet by 30 feet and how that footprint may be changed using gravelless material. The examples are not to scale.



The following requirements apply to all gravelless material systems approved for use by the certifying PE or OSE:

- i. The use of gravelless material must comply with all applicable sections of the Regulations, this policy, and the manufacturer's recommendations and instructions;
- ii. Except for resizing the absorption area in accordance with Table 1 of this policy, the location of the drainfield remains the same. No other change is authorized (e.g., trench location, depth, or contour orientation). Center-to-center spacing must comply with 12VAC5-610-950.F of the Regulations; and
- iii. The certifying PE or OSE documents on the inspection statement and as-built drawing all modifications, including the make and model of the gravelless material used, the number of gravelless material units installed, the number of trenches, the length of trenches, and the location of trenches.

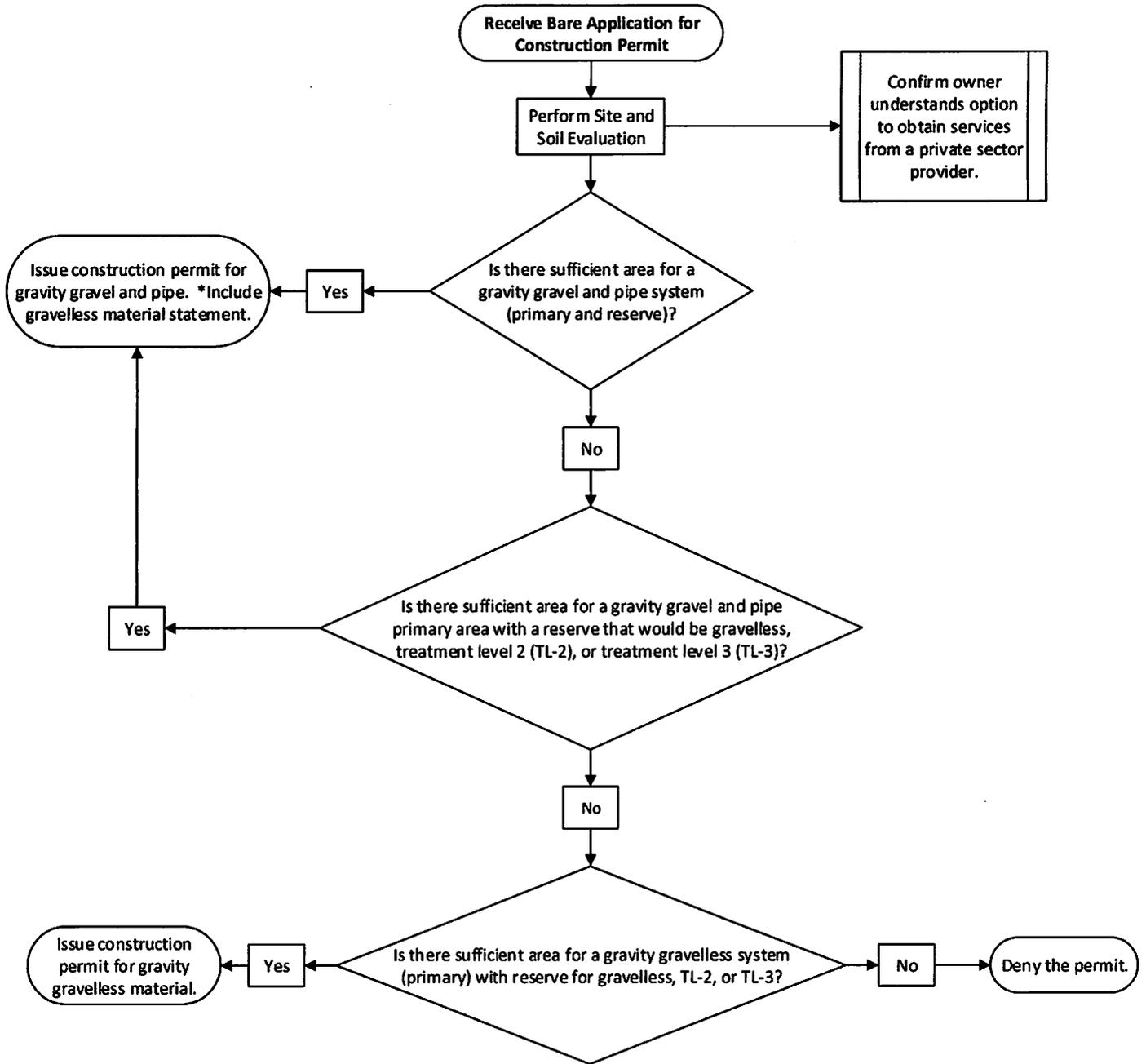
When gravelless material is used to modify a construction permit that specifies gravel and pipe, the reserve area may be shifted within the undisturbed portions of the originally designated absorption area. The certifying OSE or PE shall document any change in the reserve area's location on the inspection statement and as-built drawing. The following is an example of how a reserve area may shift (no scale). Please note that a reserve area need not be contiguous with the primary absorption area and may be located elsewhere on the parcel.



Va. Code Section 32.1-164.1 and 12VAC5-610-330 of the Regulations allow property owners to petition the local health department to inspect an installation and render a case decision if the certifying PE or OSE fails or refuses to inspect the installation in a timely manner, or declines to certify that the installation was completed substantially in accordance with the approved evaluation and design. Petitions regarding the use of gravelless material will be handled on a case-by-case basis.

Private sector OSEs and PEs may use gravelless material when designating primary absorption areas and reserves (if applicable) for certification letters and subdivision approvals. VDH OSEs shall always specify the largest gross available absorption area sizing required by the Regulations and this policy (see Appendix A).

Appendix A:
Absorption Area Trench Material Determination for Construction Permits²



² Assumes that soils are suitable for installation of a conventional onsite sewage system. If soils are not suitable for a conventional onsite sewage system, then the permit shall be denied.

Absorption Area Material Determination for Certification Letters and Reserve Areas

