

TITLE 18. ENVIRONMENTAL QUALITY
CHAPTER 9. WATER POLLUTION CONTROL
ARTICLE 3. AQUIFER PROTECTION PERMITS - GENERAL PERMITS
PART A. GENERAL PROVISIONS

R18-9-A309. General Provisions for On-site Wastewater Treatment Facilities

- A.** General requirements and prohibitions.
6. The Department shall prohibit installation of an on-site wastewater treatment facility if the installation will create an unsanitary condition or environmental nuisance or cause or contribute to a violation of an Aquifer Water Quality Standard.
- B.** Notice of Intent to Discharge under a Type 4 General Permit. In addition to the Notice of Intent to Discharge requirements specified in R18-9-A301(B), an applicant shall submit the following information in a format approved by the Department:
1. A site investigation report that summarizes the results of the site investigation conducted under R18-9-A310(B), including:
 - a. Results from any soil evaluation, percolation test, or seepage pit performance test;
 - b. Any surface limiting condition identified in R18-9-A310(C)(2); and
 - c. Any subsurface limiting condition identified in R18-9-A310(D)(2);
 2. A site plan that includes:
 - a. The parcel and lot number, if applicable, the property address or other appropriate legal description, the property size in acres, and the boundaries of the property;
 - b. A plan of the site drawn to scale, dimensioned, and with a north arrow that shows:
 - i. Proposed and existing on-site wastewater treatment facilities; dwellings and other buildings; driveways, swimming pools, tennis courts, wells, ponds, and any other paved, concrete, or water feature; down slopes and cut banks with a slope greater than 15 percent; retaining walls; and any other constructed feature that affects proper location, design, construction, or operation of the facility;
 - ii. Any feature less than 200 feet from the on-site wastewater treatment facility excavation and reserve area that constrains the location of the on-site wastewater treatment facility because of setback limitations specified in R18-9-A312(C);
 - iii. Topography, delineated with an appropriate contour interval, showing original and post-installation grades;
 - iv. Location and identification of the treatment and disposal works and wastewater pipelines, the reserve disposal area, and location and identification of all sites of percolation testing and soil evaluation performed under R18-9-A310; and
 - v. Location of any public sewer if 400 feet or less from the property line;

R18-9-A310. Site Investigation for Type 4 Onsite Wastewater Treatment Facilities

- A.** Definition. For purposes of this Section, "clean water" means water free of colloidal material or additives that could affect chemical or physical properties if the water is used for percolation or seepage pit performance testing.
- B.** Site investigation. An applicant shall ensure that an investigator qualified under subsection (H) conducts a site investigation consisting of a surface characterization under subsection (C) and a subsurface characterization under subsection (D). The applicant shall submit the results in a format prescribed by the Department. The site investigation shall provide sufficient data to:
1. Select appropriate primary and reserve disposal areas for an on-site wastewater treatment facility considering all surface and subsurface limiting conditions in subsections (C)(2) and (D)(2); and
 2. Effectively design and install the selected facility to serve the anticipated development at the site, whether or not limiting conditions exist.
- C.** Surface characterization.
1. Surface characterization method. The investigator shall characterize the surface of the site where an on-site wastewater treatment facility is proposed for installation using one of the following methods:
 - a. The "Standard Practice for Surface Site Characterization for On-site Septic Systems, D5879-95 (2003)," published by the American Society for Testing and Materials. This material is incorporated by reference and does not include any later amendments or editions of the incorporated material. Copies of the incorporated material are available for inspection at the Arizona Department of Environmental Quality, 1110 W. Washington, Phoenix, AZ 85007 or may be obtained from the American Society for Testing and Materials International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959; or
 - b. Another method of surface characterization that can, with accuracy and reliability, identify and delineate the surface limiting conditions specified in subsection (C)(2).
 2. Surface limiting conditions. The investigator shall determine whether, and if so, where any of the following surface limiting conditions exist:
 - a. The surface slope is greater than 15 percent at the intended location of the on-site wastewater treatment facility;
 - b. Minimum setback distances are not within the limits specified in R18-9-A312(C);
 - c. Surface drainage characteristics at the intended location of the on-site wastewater treatment facility will adversely affect the ability of the facility to function properly;
 - d. A 100-year flood hazard zone, as indicated on the applicable flood insurance rate map, is located within the property on which the on-site wastewater treatment facility will be installed;
 - e. An outcropping of rock that cannot be excavated exists in the intended location of the on-site wastewater treatment facility or will impair the function of soil receiving the discharge; and
 - f. Fill material deposits exist in the intended location of the on-site wastewater treatment facility.

D. Subsurface characterization.

1. Subsurface characterization method. The investigator shall characterize the subsurface of the site where an on-site wastewater treatment facility is proposed for installation using one or more of the following methods:
 - a. The following ASTM standard practices, which are incorporated by reference and do not include any later amendments or editions of the incorporated material. Copies of the incorporated material are available for inspection at the Arizona Department of Environmental Quality, 1110 W. Washington, Phoenix, AZ 85007 or may be obtained from the American Society for Testing and Materials International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959:
 - i. "Standard Practice for Subsurface Site Characterization of Test Pits for On-site Septic Systems, D5921-96(2003)e1 (2003)," published by the American Society for Testing and Materials; and
 - ii. "Standard Practice for Soil Investigation and Sampling by Auger Borings, D1452-80 (2000)," published by the American Society for Testing and Materials;
 - b. Percolation testing as specified in subsection (F);
 - c. Seepage pit performance testing as specified in subsection (G); or
 - d. Another method of subsurface characterization, approved by the Department, that ensures compliance with water quality standards through proper system location, selection, design, installation, and operation.
2. Subsurface limiting conditions. The investigator shall determine whether any of the following limiting conditions exist in the primary and reserve areas of the on-site wastewater treatment facility within a minimum of 12 feet of the land surface or to an impervious soil or rock layer if encountered at a shallower depth:
 - a. The soil absorption rate determined under R18-9-A312(D)(2) is:
 - i. More than 1.20 gallons per day per square foot, or
 - ii. Less than 0.20 gallons per day per square foot;
 - b. The vertical separation distance from the bottom of the lowest point of the disposal works to the seasonal high water table is less than the minimum vertical separation specified in R18-9-A312(E)(1);
 - c. Seasonal saturation occurs within surface soils that could affect the performance of the on-site wastewater treatment facility;
 - d. One of the following subsurface conditions that may cause or contribute to the surfacing of wastewater:
 - i. An impervious soil or rock layer,
 - ii. A zone of saturation that substantially limits downward percolation from the disposal works,
 - iii. Soil with more than 50 percent rock fragments;
 - e. One of the following subsurface conditions that promotes accelerated downward movement of insufficiently treated wastewater:
 - i. Fractures or joints in rock that are open, continuous, or interconnected;
 - ii. Karst voids or channels; or
 - iii. Highly permeable materials such as deposits of cobbles or boulders; or
 - f. A subsurface condition that may convey wastewater to a water of the state and cause or contribute to an exceedance of a water quality standard established in 18 A.A.C. 11, Articles 1 and 4.
3. Applicability of subsurface characterization methods. The investigator shall:
 - a. For a seepage pit constructed under R18-9-E302, test seepage pit performance using the procedure specified in subsection (G);
 - b. For an on-site wastewater treatment facility other than a seepage pit, characterize soil by using one or more of the ASTM methods specified in subsection (D)(1)(a) if any of the following site conditions exists:
 - i. The natural surface slope at the intended location of the on-site wastewater treatment facility is greater than 15 percent;
 - ii. Bedrock or similar consolidated rock formation that cannot be excavated with a shovel outcrops on the property or occurs less than 12 feet below the land surface;
 - iii. The native soil at the surface or encountered in a boring, trench, or hole consists of more than 35 percent rock fragments;
 - iv. The seasonal high water table occurs within 12 feet of the natural land surface as encountered in trenches or borings, or evidenced by well records or hydrologic reports;
 - v. Seasonal saturation at the natural land surface occurs as indicated by soil mottling, vegetation adapted to near-surface saturated soils, or springs, seeps, or surface water near enough to the intended location of the on-site wastewater treatment facility to have a connection with potential seasonal saturation at the land surface; or
 - vi. A percolation test yields results outside the limits specified in subsection (D)(2)(a) and (b).
 - c. Percolation testing. The investigator may perform percolation testing as specified in subsection (F):
 - i. To augment another method of subsurface characterization if useful to locate or design an on-site wastewater treatment facility, or
 - ii. As the sole method of subsurface characterization if a subsurface characterization by an ASTM method is not required under subsection (D)(3)(b).

E. If an ASTM method is used for subsurface characterization, the investigator shall conduct subsurface characterization tests at the site to provide adequate, credible, and representative information to ensure proper location, selection, design, and installation of the on-site wastewater treatment facility. The investigator shall:

1. Select at least two test locations in the primary area and one test location in the reserve area to conduct the tests;
2. Perform the characterization at each test location at appropriate depths to:
 - a. Establish the wastewater absorption capacity of the soil under R18-9-A312(D), and
 - b. Aid in determining that a sufficient zone of unsaturated flow is provided below the disposal works to achieve necessary wastewater treatment; and

3. Submit with the site investigation report:
 - a. A log of soil formations for each test location with information on soil type, texture, and classification; percentage of rock; structure; consistence; and mottles;
 - b. A determination of depth to groundwater below the land surface by test trenches or borings, published groundwater data, subdivision reports, or relevant well data; and
 - c. A determination of the water absorption characteristics of the soil, under R18-9-A312(D)(2)(b), sufficient to allow location and design of the on-site wastewater treatment facility.
- F. Percolation testing method for subsurface characterization.**
1. Planning and preparation. The investigator shall:
 - a. Select at least two locations in the primary area and at least one location in the reserve area for percolation testing, to provide adequate and credible information to ensure proper location, selection, design, and installation of a properly working on-site wastewater treatment facility;
 - b. Perform percolation testing at each location at intervals in the soil profile sufficient to:
 - i. Establish the wastewater absorption capability of the soil under R18-9-A312(D), and
 - ii. Aid in determining that a sufficient zone of unsaturated flow is provided below the disposal works to achieve necessary wastewater treatment. The investigator shall perform percolation tests at multiple depths if there is an indication of an obvious change in soil characteristics that affect the location, selection, design, installation, or disposal performance of the on-site wastewater treatment facility;
 - c. Excavate percolation test holes in undisturbed soil at least 12 inches deep with dimensions of 12 inches by 12 inches, if square, or a diameter of 15 inches, if round. The investigator shall not alter the structure of the soil during the excavation;
 - d. Place percolation test holes away from site or soil features that yield unrepresentative or misleading data pertaining to the location, selection, design, installation, or performance of the on-site wastewater treatment facility;
 - e. Scarify smeared soil surfaces within the percolation test holes and remove any loosened materials from the bottom of the hole; and
 - f. Use buckets with holes in the sides to support the sidewalls of the percolation test hole, if necessary. The investigator shall fill any voids between the walls of the hole and the bucket with pea gravel to reduce the impact of the enlarged hole.
 2. Presoaking procedure. The investigator shall:
 - a. Fill the percolation test hole with clean water to a depth of 12 inches above the bottom of the hole;
 - b. Observe the decline of the water level in the hole and record time in minutes for the water to completely drain away;
 - c. Repeat the steps specified in subsection (F)(2)(a) and (b) if the water drains away in less than 60 minutes.
 - i. If the water drains away the second time in less than 60 minutes, the investigator shall repeat the steps specified in subsections (F)(2)(a) and (b).
 - ii. If the water drains away a third time in less than 60 minutes, the investigator shall perform the percolation test by following subsection (F)(3); and
 - d. Add clean water to the hole after 60 minutes and maintain the water at a minimum depth of 9 inches for at least four more hours if it takes 60 minutes or longer for the water to drain away. The investigator shall protect the hole from precipitation and runoff, and perform the percolation test specified in subsection (F)(3) between 16 and 24 hours after presoaking.
 3. Conducting the test. The investigator shall:
 - a. Conduct the percolation test before soil hydraulic conditions established by the presoaking procedure substantially change. The investigator shall remove loose materials in the percolation test hole to ensure that the specified dimensions of the hole are maintained and the infiltration surfaces are undisturbed native soil;
 - b. Fill the test hole to a depth of six inches above the bottom with clean water;
 - c. Observe the decline of the water level in the test hole and record the time in minutes for the water level to fall exactly 1 inch from a fixed reference point. The investigator shall:
 - i. Immediately refill the hole with clean water to a depth of 6 inches above the bottom, and determine and record the time in minutes for the water level to fall exactly 1 inch,
 - ii. Refill the hole again with clean water to a depth of 6 inches above the bottom and determine and record the time in minutes for the water to fall exactly 1 inch, and
 - iii. Ensure that the method for measuring water level depth is accurate and does not significantly affect the percolation rate of the test hole;
 - d. If the percolation rate stabilizes for three consecutive measurements by varying no more than 10 percent, use the highest percolation rate value of the three measurements. If three consecutive measurements indicate that the percolation rate results are not stabilizing or the percolation rate is between 60 and 120 minutes per inch, the investigator shall use an alternate method based on a graphical solution of the test data to approximate the stabilized percolation rate;
 - e. Record the percolation rate results in minutes per inch; and
 - f. Submit the following information with the site investigation report:
 - i. A log of the soil formations encountered for all percolation tests including information on texture, structure, consistence, percentage of rock fragments, and mottles, if present;
 - ii. Whether and which test hole was reinforced with a bucket;
 - iii. The locations, depths, and bottom elevations of the percolation test holes on the site investigation map;
 - iv. A determination of depth to groundwater below the land surface by test trenches or borings, published groundwater data, subdivision reports, or relevant well data; and
 - v. A determination of the water absorption characteristics of the soil, under R18-9-A312(D)(2)(a), sufficient to allow location and design of the on-site wastewater treatment facility.

- G.** Seepage pit performance testing method for subsurface characterization. The investigator shall test seepage pits described in R18-9-E302 as follows:
1. Planning and Preparation. The investigator shall:
 - a. Identify the disposal areas at the site and drill a test hole at least 18 inches in diameter to the depth of the proposed seepage pit, at least 30 feet deep, and
 - b. Scarify soil surfaces within the test hole and remove loosened materials from the bottom of the hole.
 2. Presoaking procedure. The investigator shall:
 - a. Fill the bottom 6 inches of the test hole with gravel, if necessary, to prevent scouring;
 - b. Fill the test hole with clean water up to 3 feet below the land surface;
 - c. Observe the decline of the water level in the hole and determine the time in hours and minutes for the water to completely drain away;
 - d. Repeat the procedure if the water drains away in less than four hours; If the water drains away the second time in less than four hours, the investigator shall conduct the seepage pit performance test by following subsection (G)(3);
 - e. Add water to the hole and maintain the water at a depth that leaves at least the top 3 feet of hole exposed to air for at least four more hours if the water drains away in four or more hours; and
 - f. Not remove the water from the hole before the seepage pit performance test if there is standing water in the hole after at least 16 hours of presoaking.
 3. Conducting the test. The investigator shall:
 - a. Fill the test hole with clean water up to 3 feet below land surface;
 - b. Observe the decline of the water level in the hole and determine and record the vertical distance to the water level from a fixed reference point every 10 minutes. The investigator shall ensure that the method for measuring water level depth is accurate and does not significantly affect the rate of fall of the water level in the test hole;
 - c. Measure the decline of the water level continually until three consecutive 10-minute measurements indicate that the infiltration rates are within 10 percent. If measurements indicate that infiltration is not approaching a steady rate or if the rate is close to a numerical limit specified in R18-9-A312(E)(1), the investigator shall use, an alternate method based on a graphical solution of the test data to approximate the final stabilized infiltration rate;
 - d. Percolation test rate. Calculate the stabilized infiltration rate for a seepage pit determined by the test hole procedure specified in subsection (G)(1)(a) using the formula $P = (15 / DS) \times IS$ to determine an equivalent percolation test rate. Once "P" is determined, the investigator shall use R18-9-A312(D)(2)(a) to establish the design SAR for wastewater treated under R18-9-E302 and to calculate the required minimum sidewall area for the seepage pit using the equation specified in R18-9-E302(C)(5)(k).
 - i. "P" is the percolation test rate (minutes per inch) tabulated in the first column of the table in R18-9-A312(D)(2)(a),
 - ii. "DS" is the diameter of the seepage pit test hole in inches, and
 - iii. "IS" is the seepage pit stabilized infiltration rate (minutes per inch) determined by the procedure specified in R18-9-A310(F)(3)(c);
 - e. Submit the following information with the site investigation report:
 - i. The results of the seepage pit performance testing including data, calculations, and findings on a form provided by the Department;
 - ii. The log of the test hole indicating lithologic characteristics and points of change;
 - iii. The location of the test hole on the site investigation map;
 - iv. A determination of depth to groundwater below the land surface by borings, published groundwater data, subdivision reports, or relevant well data.
 - f. Fill the test hole so that groundwater quality and public safety are not compromised if the seepage pit is drilled elsewhere or if a seepage pit cannot be sited at the location because of unfavorable test results.
- H.** Qualifications. An investigator shall not perform a site investigation under this Section unless the investigator has knowledge and competence in the subject area and is licensed in good standing or otherwise qualified in one of the following categories:
1. Arizona-registered professional engineer,
 2. Arizona-registered geologist,
 3. Arizona-registered sanitarian,
 4. A certificate of training from a course recognized by the Department as sufficiently covering the information specified in this Section, or
 5. Qualifies under another category designated in writing by the Department.

R18-9-A311. Facility Selection for Type 4 Onsite Wastewater Treatment Facilities

- B.** A person may install a septic tank and disposal works system described in R18-9-E302 as the sole method of wastewater treatment and disposal at a site if the site investigation conducted under R18-9-A310 indicates that no limiting condition identified under R18-9-A310(C) or R18-9-A310(D) exists at the site.
1. A person may install a seepage pit only in valley-fill sediments in a basin-and-range alluvial basin and only if the seepage pit performance test results meet the criteria specified in R18-9-A312(E).
 2. The person shall specify in the Notice of Intent to Discharge that no limiting conditions described in R18-9-A310(C) and (D) were identified at the site.
- C.** If any surface or subsurface limiting condition is identified in the site investigation report, an applicant may propose installation of a septic tank and disposal works system described in R18-9-E302 only if:
1. The applicant submits information under R18-9-A312(G) that describes:

- a. How the design of the septic tank and disposal works system specified in R18-9-E302 was modified to overcome limiting conditions;
 - b. How the modified design meets the criteria of R18-9-A312(G)(3); and
 - c. A site-specific SAR under R18-9-A312(D)(2)(a) or (b), as applicable; and
2. None of the following surface or subsurface limiting conditions are identified at the site:
- a. An outcropping of rock that cannot be excavated or will impair the function of soil receiving the discharge exists in the intended location of the on-site wastewater treatment facility, as described in R18-9-A310(C)(2)(e);
 - b. The vertical separation distance from the bottom of the lowest point of the disposal works to the seasonal high water table is less than the minimum vertical separation distance, as described in R18-9-A310(D)(2)(c); or
 - c. A subsurface condition that promotes accelerated downward movement of insufficiently treated wastewater as described in R18-9-A310(D)(2)(e).