

Soil Evaluation, Testing, and Reporting

Imperial County Ordinance authorizes the Division of Environmental Health to be the local administering authority for the permitting of On-Site Wastewater Treatment System (OWTS) installations. Moreover, the State of California has established minimum standards for the proper siting and design of these systems, including the need for a qualified professional to properly evaluate the soil and site conditions to ensure that a proposed OWTS will function correctly without risk of water quality degradation or public health impacts. This policy summarizes the standards and requirements that are applicable to evaluating a site for the installation of a new or replacement OWTS (i.e. septic system).

- 1.0 Site Evaluation** – As part of all applications for an OWTS, the applicant shall provide a site-specific evaluation and soil percolation report. The report shall be prepared by a qualified professional and contain the minimum information as specified in Chapter 8.80.110 of Imperial County Ordinance. A qualified professional may be a registered environmental health specialist or a licensed professional engineer or geologist in the State of California. The results of the soil evaluation report shall be valid for a period of five (5) years from the date of the report, provided that no grading or disturbance of the soil has modified site conditions.
 - 1.1 Soil Boring** – The site evaluation report shall identify the soil by type(s) using a standard Soil Conservation Service soil textural classification, to a depth of at least eight (8) feet in the area of the proposed dispersal system. The description must also include the location and depth of restrictive layers to determine both the suitability of the soil as well as to assess the maximum hydraulic loading rates of the receiving soils within twenty-four (24) inches beneath the bottom of the proposed leach lines.
 - 1.2 Groundwater Depth** – The site evaluation report shall include the depth of the static groundwater elevation, the date of observation, and the probable maximum height. If groundwater or saturated soils are not encountered within eight (8) feet of the ground surface, the report must then indicate the probable depth based on regional groundwater hydrology. In the Ocotillo/No Mirage community area, the minimum depth to groundwater for a conventional gravity system is twenty (20) feet.
 - 1.3 Percolation Testing** – Percolation testing shall be required on each lot where any OWTS is to be installed. The testing shall be done at a frequency and manner consistent with Section 2.0 of this Policy within the area of the disposal field installation and the designated replacement area. It shall be the responsibility of the property owner and project engineer to locate the most suitable area for the OWTS based on soil and site conditions.
 - 1.4 Site Map** – The qualified professional conducting the site evaluation is responsible for submitting as part of the site evaluation a scaled site map that identifies the specific location of the soil testing conducted at the site, including the locations of the soil and groundwater boring and percolation test holes. The site map and report must also describe the general topography and drainage characteristics of the site that may affect OWTS siting and construction. If the proposed area in which the septic tank and disposal field will be installed has a slope in excess of two (2%) percent, topographic contours must be shown on the map at a minimum contour interval of one (1) foot in elevation.

2.0 Percolation Testing – Imperial County has adopted a falling head test method published by the US Public Health Service Manual of Septic Tank Practice (see *Robert A. Taft Method of Soil Percolation Testing*) as the accepted standard for percolation testing. Any deviation from these standard hole preparation, soil saturation and rate measurement procedures must be pre-approved by the Division prior to conducting the soil percolation test.

2.1 Number and Location of Tests – The number of test holes shall be sufficient for the project engineer to certify the results as representative of percolation rates through the area of the disposal field and replacement area. A minimum of three (3) test holes shall be considered per installation, with at least one (1) percolation test conducted in the replacement area.

2.2 Depth of Test – The depth of soil percolation test holes shall be at a representative depth of the proposed disposal field installation, and within (2) feet of the bottom of the proposed leach lines. The depth of each test hole shall be indicated in the soil percolation report. If the project engineer determines that the soil characteristics at the site vary considerably with depth, an additional test is necessary to determine the percolation rate of the receiving soils at no more than five (5) feet below grade.

2.3 Test Hole Diameter – The standard percolation method is based on an excavated round or square hole of one (1) square foot cross section with vertical sides. If the percolation test is conducted with a smaller diameter test hole, a conversion calculation must be applied to determine the long-term acceptance rate applicable to a twelve (12") inch excavation area based on the ratio of wetted surface area to the non-standard diameter test hole. No percolation test holes may be smaller than six (6") inches in diameter.

$$\text{Conversion Factor} = (W.S.A._{12''}/W.S.A._{th})/(V_{12''}/V_{th})$$

Where $W.S.A._{12''}$ = the wetted surface area for a 12" diameter test hole (in cubic inches); $W.S.A._{th}$ = the wetted surface area for the non-standard diameter test hole (in cubic inches); $V_{12''}$ = the volume of the 12" diameter test hole, and V_{th} = the volume of the non-standard diameter test hole. These calculations assume a height of 6" in all of the holes.

2.4 Pre-Soaking – As the hydraulic conductivity of soil can vary considerably based on soil moisture conditions, presoaking is required in order to get valid percolation results. A minimum depth of twelve (12) inches of water over the gravel must be maintained in the test hole for at least four (4) hours. In clayey soils with a high potential for swelling (Soil Type 6), an overnight pre-soak is required. Alternatively, in sandy soils with little or no clay (Soil Types 1-2), pre-soaking is not necessary. If, after filling the hold twice with 12 inches of water, the water seeps completely away in less than ten minutes, the percolation test can proceed immediately. The presoak period must be noted on the percolation data sheet.

2.5 Calculation of the Infiltration Rate – All soil percolation test results shall be reported in minutes per inch of drop. If the last two determinations vary by more than a 10% deviation in rate of drop, additional ground soaking and a repeat of the testing series of measurements must be done. The stabilized rate of drop and/or soil classification of the receiving soils will be used to determine the long-term infiltration rate for disposal field sizing in *Table III, Maximum Hydraulic Loading Rate* in Section 8.80.170 of Imperial County Ordinance. The slowest percolation rate in the proposed disposal field area will be the basis for determining the OWTS loading rate.

2.6 Reporting – Copies of all field notes, name of persons performing the tests, and all actual test results for each hole shall be supplied with the site evaluation report. Any deviation from the Standard Method or use of a test hole conversion factor shall be reported, and justified in writing as equivalent results. The Division may request report corrections and/or additional testing to be performed by the qualified professional based on the submitted percolation and soil boring data prior to the issuance of an OWTS permit.

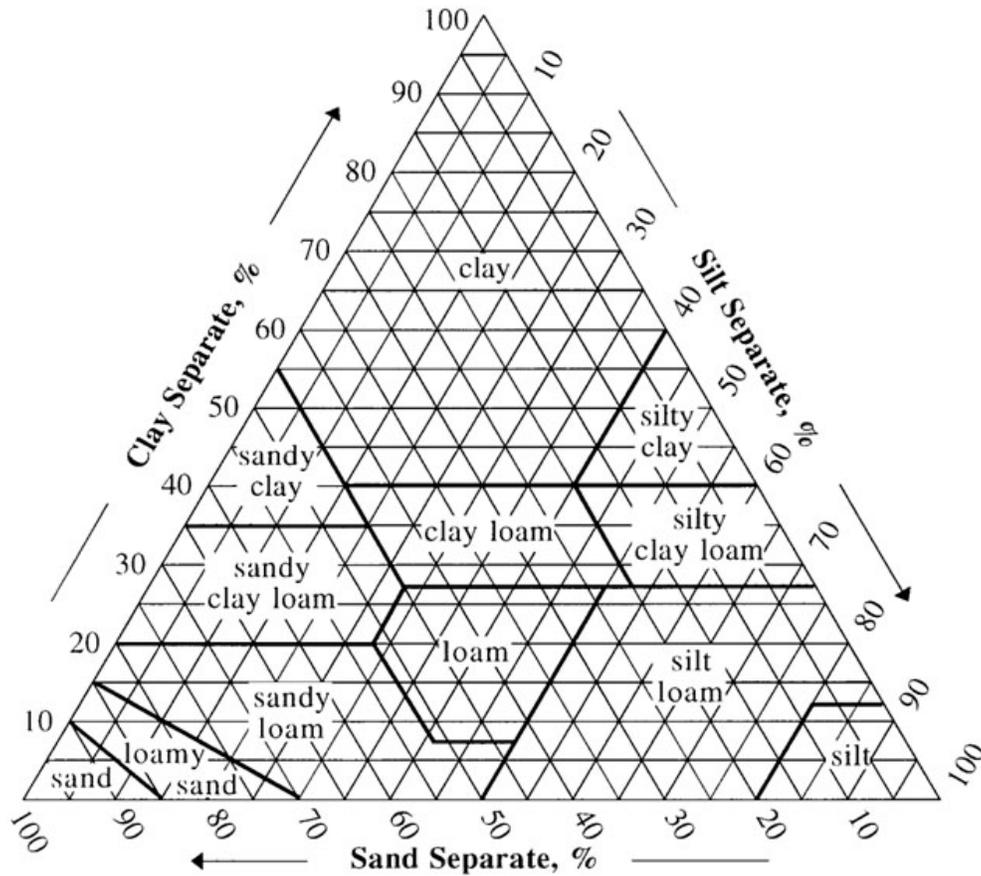
3.0 Extended Soil Evaluation – If soil percolation data indicate the presence of soils with a percolation rate slower than sixty minutes per inch (>60 mpi) or exceeding five minutes per inch (<5 mpi), additional soil testing data must be submitted in support of the engineered OWTS design, which may include soil excavations and/or hydrometer testing as follows.

3.1 Soil Profile Excavation – A minimum of two (2) excavations are required in soils with a percolation rate slower than sixty minutes per inch (>60 mpi), logged by a qualified professional. Soil profiles shall be described in sufficient detail to determine their properties for the movement of wastewater through the soil, including, but not limited to: soil texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, limiting layers, saturation, and the relative content of sand, silt, and clays consistent with USDA soil texture classifications (See Soil Texture Triangle).

As a standard engineering reference, the visual and manual classification of soils encountered in the test borings may be described consistent with *ASTM D 2488 – Standard Practice for Description and Identification of Soils*. However, the extended soil evaluation report must also specify the equivalent USDA soil textural classification from the Unified Soil Classification as the basis for OWTS sizing.

3.2 Particle Size Analysis – A particle size analysis of a representative sample from the receiving soil within 24 inches of the trench bottom must be completed for all rapidly draining soils exceeding five minutes per inch (<5 mpi), or on the receiving clayey soils when the percolation rate is determined to be slower than sixty minutes per inch (>60 mpi). For gravelly soils, the sieve analysis report shall also include the percent gravel passing the 3-inch (76 mm) screen and retained on the No. 4 (4.75 mm) sieve. At least one sample must be analyzed from the representative soil in each of the primary and replacement OWTS areas.

The test method that may be referenced for meeting this requirement is *ASTM D 422 - Standard Test Method for Particle-Size Analysis of Soils*.



COMPARISON OF PARTICLE SIZE SCALES

