

**REGULATIONS GOVERNING CONSTRUCTION,
INSTALLATION, AND OPERATION OF SUBSURFACE
SEWAGE DISPOSAL SYSTEMS.**

Part 1

1-100. ADMINISTRATION AND BASIS REQUIREMENTS.

1-101. GENERAL REQUIREMENTS.

In order to minimize the possibility of endangering the health and welfare of the public and/or the development of esthetically offensive conditions, subsurface sewage disposal systems shall be so located, constructed and maintained that wastes discharged to or from such systems:

- (1) Do not contaminate any drinking water supply;
- (2) Are not accessible to rodents, insects or other potential carriers of disease;
- (3) Do not pollute or contaminate surface or ground water;
- (4) Are not a health hazard by being accessible to the general public;
- (5) Do not cause a nuisance due to odor or unsightly appearance; and
- (6) Will not violate any other laws or regulations governing water pollution or sewage disposal.

1-102. DEFINITIONS.

For the purposes of this part; part 2 and subsequent regulations and standards, the following words and phrases have the following meanings:

- (1) "Alternative method of disposal" means a subsurface sewage disposal system, the construction, installation and operation of which varies from that of conventional subsurface sewage disposal systems;
- (2) "Board" means Memphis and Shelby County Groundwater Protection Board;
- (3) "Commissioner" means the Commissioner of the Department of Environment and Conservation, the Commissioner's duly authorized representative, and in the event of the Commissioner's absence or a vacancy in the office of Commissioner, the deputy Commissioner;
- (4) "Department" means the Memphis and Shelby County Health Department.
- (5) "Director" means the Director of the Memphis and Shelby County Health Department and the Director's duly authorized representatives.
- (6) "Lot" means a part of a subdivision or a parcel of land intended for the building of a single house, building or other development;
- (7) "OCCE" means Shelby County Office of Construction Code Enforcement;
- (8) "Permit" means a written authorization issued by the Director licensing one (1) of the following: the construction, alteration, extension or repair of a subsurface sewage disposal system, or the removal and disposal of accumulated wastes from subsurface sewage disposal systems, and including those engaged in such businesses;
- (9) "Person" means any and all persons, including individuals, firms, partnerships, associations, public or private institutions, municipalities, or political subdivisions or officers thereof, departments, agencies, or instrumentalities, or public or private corporations or officers thereof, organized or existing under the laws of this or any other state or country;
- (10) "Public sewerage system" means the conduits, sewers and all devices and appurtenances by means of which sewage is collected, pumped, treated and disposed of; all of which are owned and operated by a municipality, utility district or other legally constituted agencies of government;
- (11) "Sewage" means human excreta, all water carried wastes, and household wastes from residences, buildings, or commercial and industrial establishments;
- (12) "Subdivision" means any tract or parcel of land divided into two (2) or more lots, sites or other division for the purpose of immediate or future building of houses, buildings or other development where subsurface sewage disposal systems are to be used. "Subdivision" does not

include a division of any tract or parcel of land into two (2) or more tracts or parcels when such parts are four (4) acres or larger in size; and

(13) "TDEC" means the Tennessee Department of Environment and Conservation.

(14) "Subsurface sewage disposal system" means a system, other than a public or community system, which receives sewage. Included within the scope of this definition are septic tank absorption systems, privies, chemical toilets, and other similar systems. However, "subsurface sewage disposal system" does not include a sewerage system regulated under Title 69, Chapter 221, Part 1 and Title 69, Chapter 3.

1-103. DUTIES OF DIRECTOR AND DEPARTMENT - PERMIT APPROVAL - SUBSURFACE SEWAGE DISPOSAL REQUIREMENTS.

(a) It is the duty of the Director to:

(1) Exercise general supervision over the planning, location, construction, operation and maintenance of subsurface sewage disposal systems;

(2) Enforce the provisions of these rules and regulations and make such inspections and investigations as are necessary to determine compliance with the same;

(3) Review and approve the plans and plats of proposed subdivisions;

(4) Issue permits for the installation of subsurface sewage disposal systems;

(5) Issue permits to persons engaging in the business of the construction, alteration, extension or repair of subsurface sewage disposal systems and to persons engaging in the business of removing accumulated waste from such systems;

(6) Suspend or revoke permits issued to persons engaging in the business of construction, alteration, extension or repair of subsurface sewage disposal systems and to persons engaging in the business of removing accumulated waste from such systems, when it is determined that the person has violated provisions of these regulations;

(7) Require the submission of information in addition to that otherwise required by rules or regulations deemed necessary by the Director to determine the suitability of individual lots for subsurface sewage disposal systems; and

(8) Initiate an updating of standards and other regulations as appropriate to carry out the purposes of Section 1-101 or for any legal and appropriate purpose and as necessary so that they are as stringent as those of state law and regulations and recommend a system and amount of fees for services and permits to the County Commission for adoption. The Board of Commissioners of Shelby County shall enact ordinances for the purpose of updating standards, regulations, and fees, taking into consideration the recommendations of the Director and the requirements of State law.

(b) An applicant for a subsurface sewage disposal permit for a parcel of property may submit to the department the results of a high intensity soils evaluation by a soil scientist certified by TDEC or the results of percolation tests performed on the property. A permit must be issued to such an applicant for all lots within the parcel which comply with the regulations authorized herein and meet the following requirements:

(1) The results of the percolation test or high intensity soils evaluation must clearly establish that the lot has a percolation rate of:

(A) Not more than one hundred five (105) minutes per inch. The percolation holes used to determine this rate must be located at the intersection of lines in a grid pattern with maximum perpendicular distances of fifty feet (50') between the lines of the grid. Each hole shall be considered reasonably representative of a square area of two thousand five hundred square feet (2,500 sq. ft.) which includes that hole in the approximate center of the square; or

(B) Not less than one hundred six (106) minutes per inch and not more than one hundred twenty (120) minutes per inch; provided, that an alternative method of subsurface sewage disposal is used. The percolation holes used to determine this rate must be located at the intersection of lines in a grid pattern with maximum perpendicular distances of twenty-five feet (25') between the lines of the grid. Each hole shall be considered reasonably representative of a square area of six hundred twenty-five square feet (625 sq. ft.) which includes that hole in the appropriate center of the square;

(2) All percolation tests shall be performed by a soil scientist, engineer, registered professional environmentalist, professional geologist, registered environmental health specialist/registered sanitarian with more than five (5) years experience in a subsurface sewage regulatory program and who has received credentials from the National Environmental Health Association, or surveyor licensed in this state and must be carried out in accordance with Section 2-102(b) and Section 2-104 of these regulations.

(3) The grid pattern referred to in subdivision (c)(1) shall be located within the area to be utilized for the disposal field and reserve area in such a manner as to provide reliable information regarding the percolation rate of the entire area to be utilized for the disposal field and reserve area;

(4) If a percolation test hole within the test grid is unacceptable because the depth to rock is too little, that fact shall not necessarily mean that the remainder of the area within the test grid is unacceptable, only that the area represented by that particular hole is unacceptable;

(5) The department shall report the actual average percolation rate, as determined by the percolation test, on the subsurface sewage disposal system permit. The actual average percolation rate shall be determined by averaging only the test results from the area actually to be covered by the permit;

(6) The disposal field shall contain a minimum of three hundred seventy square feet (370 sq. ft.) of trench bottom area per bedroom; and

(7) When a permit applicant intends to rely upon the results of percolation tests, the applicant shall not be required to perform a high intensity soils evaluation of the area proposed for the subsurface sewage disposal system. However, for proposed subdivisions, the applicant shall submit a plat showing the results of a soils evaluation performed by a soil scientist certified by TDEC, the sole purpose of which is to determine which portions, if any, of the area proposed for the disposal field and reserve area are unsuitable for percolation tests because of depth to rock, slope or water problems. For individual lots which are not part of a subdivision, the general soils evaluation described in the preceding sentence is not required, but an evaluation of the lot may be performed by an employee of the department without preparing a plat. The percolation tests used to determine the actual average percolation rate of the area to be used for the disposal field and reserve area shall be run after the submission of the general soils evaluation, and the department shall be notified at least three (3) days prior to the day that these tests will be run. If the general soils evaluation concludes that a particular area is unsuitable for percolation tests, the applicant may then perform a high-intensity soils evaluation of that area to gather additional information, which may show that the area is suitable for percolation tests. When a proposed area is determined to be unsuitable for percolation tests, that area may be further evaluated to determine its suitability for an alternative subsurface sewage disposal system, and where found appropriate, shall be approved by the department for an alternative system.

(c) Permits for the construction of subsurface sewage disposal systems shall be issued for single-family residence lots in subdivisions, which were approved by the department prior to April 15, 1986, in accordance with the following requirements:

(1) Permits for lots within subdivisions approved prior to July 10, 1974, shall be based upon soils or percolation data, where such data are available for the recorded plat of the subdivision, and systems shall be constructed in accordance with the requirements authorized herein except for those provisions dealing with duplicate area and slope;

(2) Permits for lots with subdivisions approved July 10, 1974, or after, shall be based upon soils or percolation data, where such data are available for the recorded plat of the subdivision, and systems shall be constructed in accordance with the requirements authorized herein;

(3) In the absence of any data on file or on the recorded plat, permits shall be issued and systems constructed in accordance with the requirements authorized herein, except those provisions dealing with duplicate area and slope. The disposal field for these systems shall contain at least three hundred seventy square feet (370 sq. ft.) of trench bottom area per bedroom; or, if the lot does not have sufficient area to install this amount, the maximum square footage that can be installed; provided, that an absolute minimum of two hundred square feet (200 sq. ft.) per bedroom must be installed. The permit shall note that the system is for an approved subdivision without adequate available soils or percolation data; and

(4) The eighteen-inch (18") requirement of subsection (f) does not apply to systems approved under this subsection, or to subdivisions approved by the Commissioner prior to July 1, 1990.

(d) It is permissible to use blasting to remove unwanted rock in order to install a septic tank or a solid line leading to the tank or from the tank to the disposal field. Where blasting is used in the construction of the disposal field, no section of pipe designed to let, or capable of letting, water escape through perforations, joints, or any other opening shall be located within ten feet (10') horizontally of rock which has been blasted, and an anti-seep collar shall be installed at the junction of the perforated pipe and a solid pipe passing through the zone of blasted rock in such a manner as to prevent sewage discharged from perforations in the perforated pipe from moving laterally from the perforated pipe toward the blasted rock. In addition to the other requirements contained in the regulations, in no case shall any section of pipe designed to let, or capable of letting, water escape through perforations, joints, or any other opening be located within eighteen inches (18") (at least twelve inches (12") shall be undisturbed soil) vertically of rock in the area

of karst geology (however the department may specify a lesser distance in a non-karst area) or within three feet (3') horizontally of rock which has not been blasted. The provisions of this subsection are applicable to all subsurface sewage disposal system permits issued by the Director.

(e)(1) Where the undisturbed soil layer above rock is between eighteen inches (18") and twenty-four inches (24") deep, a low pressure pipe system may be installed; provided, that no portion of any seepage trench (i.e., aggregate-encased-perforated pipe) is within three feet (3') horizontally of rock which has not been blasted and ten feet (10') horizontally of rock which has been blasted. The elevation of each perforated distribution pipe in the low-pressure pipe system shall be the same as the elevation of the natural soil in the vicinity of each pipe. Each perforated pipe shall be installed on a bed of aggregate located in a trench excavated six inches (6") wide and six inches (6") deep into undisturbed natural soil. Each perforated pipe shall be covered by two inches (2") of aggregate. Each seepage trench shall be separated five feet (5') horizontally and covered with at least twelve inches (12") of compatible soil; provided, that all vegetation is removed from the original soil surface and it is plowed to a depth of three inches (3") with a chisel plow prior to the placement of the added soil. The covering soil shall extend, at a minimum depth of twelve inches (12"), for a distance of five feet (5') beyond the perimeter of the area containing the seepage trenches and then taper to natural soil level with a maximum side slope for the covering soil of three (3) to one (1) (i.e., three feet (3') horizontal to one foot (1') vertical). At least five (5) observation tubes shall be provided by installing fourteen-inch (14") long sections of one and one half inch (1.5") diameter pipe that will extend from the natural soil surface to above the surface of the covering soil. The location of the observation tubes will be specified for each system by a soil scientist certified by TDEC.

(2) Before any system may be approved under this subsection, a soils evaluation must be made by a soil scientist certified by TDEC, and the department must find that the soil is sufficiently permeable to allow proper absorption of the sewage into the soil. To the extent they are not inconsistent with the provisions of this subsection, the general regulations governing low-pressure pipe systems are applicable to systems installed pursuant to this subsection.

(f) When the undisturbed soil layer above rock is between twenty-four inches (24") and thirty-six inches (36") deep, a conventional disposal system may be installed, if the following requirements are met:

(1) The depth of gravel in the trench shall be either eight inches (8"), ten inches (10") or twelve inches (12") with a minimum depth underneath the pipe of three inches (3") and with a minimum depth above the pipe of one inch (1"). As the depth of gravel is reduced to ten inches (10") or eight inches (8"), the length of the trenches will increase proportionately such that the total cubic footage and the infiltrative surface on the sidewall of the trenches will remain constant;

(2) The original soil surface shall be at least seven inches (7") above the top of the gravel in the trench;

(3) There shall be at least nine inches (9") of undisturbed soil between the trench bottom and rock;

(4) The disposal field area shall have at least ten inches (10") of backfill above the elevation of the gravel in the trench. A maximum of three inches (3") of the backfill may be compatible soil fill; provided, that all vegetation is removed from the original soil surface and it is plowed to a depth of three inches (3") with a plow prior to the placement of the added soil. The covering soil shall extend, at the required depth, for a distance of five feet (5') beyond the perimeter of the area containing the seepage trenches and then taper to natural soil level with a slope for the covering soil of three feet (3') horizontal to one foot (1') vertical or flatter; and

(5) The eighteen-inch (18") requirement of subsection (f) does not apply to systems approved under the provisions of this subsection. To the extent they are not inconsistent with the provisions of this subsection, the general regulations governing conventional disposal systems are applicable to systems installed pursuant to this subsection.

(g) Permits shall be issued for the repair of any system in existence prior to July 1, 1990, pursuant to the applicable provisions of the Tennessee Code Annotated and the rules and regulations adopted pursuant thereto which were in effect on June 30, 1990.

1-104. ACCESS TO PROPERTY.

It is the duty of the owner or occupant of the property to give the Director free access to the property at reasonable times for the purpose of making such inspections or investigations as are necessary to determine compliance with the requirements of this ordinance and the rules and regulations herein.

1-105. UNLAWFUL ACTS.

(a) It is unlawful for any person to:

- (1) Begin construction or construct any house or establishment, mobile or permanent, to be served by a subsurface sewage disposal system prior to approval of plans for the proposed location of the house or establishment and location of disposal system on the lot and approval of the specific lot as to its suitability for construction of the subsurface sewage disposal system by the Director;
- (2) Begin construction or construct any house or establishment, mobile or permanent, in a subdivision until the subdivision plans have been approved by the Director;
- (3) Construct, alter, extend or repair subsurface sewage disposal systems prior to securing a permit from the Director;
- (4) Construct, alter, extend or repair subsurface sewage disposal systems in violation of the provisions of the permit;
- (5) Engage in the business of removing accumulated wastes from subsurface sewage disposal systems unless a permit has been secured from the Director;
- (6) Engage in the business of removing wastes from subsurface sewage disposal systems and dispose of such wastes in any place and manner that do not meet the approval of the Director;
- (7) Dispose of sewage or effluent from a subsurface sewage disposal system into any existing or abandoned well or well dug or drilled for that purpose, caves, sinkholes, ditches, streams or surface of the ground; or
- (8) Engage in the business of constructing, altering, extending or repairing subsurface sewage disposal systems prior to securing a permit for such business from the Director.

(b) Notwithstanding any provision of this part to the contrary, if the department is unable to inspect a subsurface sewage disposal system which requires repair within four (4) business days of notification to the department that a repair is necessary, then the person notifying the department may proceed with such repair as though the department had made its inspection and approved the repair. The department shall give priority in inspection of subsurface sewage disposal systems to repair of such systems over issuance of permits for new construction for installation of such systems.

1-106. APPROVAL OF SUBDIVISION PLAN.

No proposed subdivision shall be approved by a local planning commission or other agency authorized to approve subdivisions until the plans for such subdivisions have been approved by the Director.

1-107. PERMITS REQUIRED.

Any person proposing to construct, alter, extend or repair subsurface sewage disposal systems and/or engage in the business of removing accumulated wastes from such systems shall secure a permit from the Director in accordance with the provisions of this ordinance and the rules and regulations herein.

1-108. VARIANCES - HEARINGS - FINATY OF DECISION.

(1) Any person whose application for a subsurface sewage disposal system permit has been denied solely under the provisions of this ordinance prohibiting siting of a septic system within a 100-year flood plain may request in writing that a variance be granted by the Shelby County Groundwater Quality Control Board. Any person whose subdivision plan has been disapproved under any other provision of this ordinance or whose application for a subsurface sewage disposal system permit has been denied under any other provision of this ordinance may request in writing that a variance be granted by the Commissioner of the Tennessee Department of Environment and Conservation in accordance with T.C.A. Section 68-221-410.

(2) The Shelby County Groundwater Quality Control Board shall have the power to hear and deny matters concerning a request for variance related to the 100-year flood plain restriction. Such request shall be delivered to the Director within 30 days after receipt of written denial to grant a subsurface sewage disposal system permit.

(3) The Shelby County Groundwater Quality Control Board shall conduct the hearing on a request for variance related to the 100-year flood plain restriction in accordance with Code of Shelby County Section 29-107(9). The hearing may be continued to a new date at the discretion

of the Board. And render a decision to deny the variance request or a decision not to deny the variance request not later than the twenty-ninth day after the permit denial.

(4) The denial of a permit application by the department based on the 100-year flood plain restriction stands, unless the majority of a quorum of the Board votes not to deny a request for such variance the denial after the hearing. After the Shelby County Groundwater Quality Control Board votes not to deny such a variance request, or if the Board fails to deliver a decision to the appellant by the twenty-ninth day after the permit denial, then the permit applicant may appeal the in accordance with Paragraph (7) here below.

(5) No variance decision related to the 100-year flood plain restriction shall be denied pursuant to this ordinance until the Board has considered the relative interests of the applicant, other owners of property likely to be affected by the variance, and others who may be affected by a variance.

(6) An appeal from the Groundwater Quality Control Board's decision shall be to a court of competent jurisdiction in the County.

1-109. PROOF OF ACCESS TO SEWAGE SYSTEM PRIOR TO CONSTRUCTION RULES AND REGULATIONS.

(a) Any person who intends to construct or locate a house or establishment, mobile or permanent, shall furnish evidence to the Memphis and Shelby County Office of Construction Code Enforcement, that:

(1) The house or establishment is served by a public sewerage system; or

(2) The person has applied for a permit for a subsurface sewage disposal system; provided, that this subsection shall not apply to farm buildings or other buildings which are not required to be connected to a public sewerage system or a subsurface sewage disposal system.

(b) No public electric system shall supply electrical service for the construction or location of a house or establishment, mobile or permanent, until notified by any OCCE electrical inspector that the provisions of subsection (a) have been complied with. Such notification shall be furnished to the public electric system by the inspector along with the electrical inspection approval for the house or establishment.

(c) Under no circumstances shall any of the following persons be held liable for a violation of subsection (b) unless the violation is knowing and intentional:

(1) A public electric system or any of its employees; and

(2) The department of commerce and insurance or any of the electrical inspectors employed by or under contract with that department.

(d) The sole responsibility for enforcement of the subsurface sewage law shall lie with the Memphis and Shelby County Health Department.

Part 2

2-100. METHODS, STANDARDS, AND PROCEDURES.

2-101. DEFINITIONS.

1. "Accessible Community Sewer" means a public sewer system not limited for use because of physical or other features as determined by the Commissioner.

2. "Alternative/Experimental Methods of Disposal" means a subsurface sewage disposal system, the construction, installation and operation of which varies from that of a conventional subsurface sewage disposal system.

3. "Blockout" means a potential access hole which is a thin section of concrete preformed in a septic tank which can be removed to allow insertion of a four (4) to six (6) inch diameter pipe.

4. "Boundary Outline" means a map or chart with lines delineating the boundaries of the proposed area or parcel of land.

5. “Buffer Zone” means the distance between subsurface sewage disposal systems or subsystems required to alleviate the impact of hydraulic overloading from the adjacent system(s).
6. “Conventional Sand Filter” means a filter with two (2) feet or more of medium sand designed to chemically and biologically process septic tank or other treatment unit effluent from a pressure distribution system operated on an intermittent basis.
7. “Conventional Subsurface Sewage Disposal System” means a system that pretreats sewage by use of a septic tank and applies effluent to the soil as described in Rule 1200-1-6-.06.
8. “Disposal Field” means the part of a subsurface sewage disposal system that utilizes the soil for absorption and treatment of septic tank effluent.
9. “Domestic Septage” means either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receive only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from a grease trap at a restaurant.
10. “Dosing Chamber” means a watertight receptacle which houses a sewage effluent pump and stores sewage effluent from a septic tank until it is pumped to a disposal field.
11. “Effluent Filter” means an effluent treatment device installed on the outlet of a septic tank or dosing tank which is designed to prevent the passage of large suspended matter.
12. “Filled Land” means areas to which more than two (2) feet of soil and/or debris have been added.
13. “Graded Land” means areas from which soil has been removed and the remaining soil cannot be classified in any soil series.
14. “Grease” means animal fats or vegetable oils (resulting from food preparation) which are discharged to a sewage disposal system or accumulated in collection devices or traps that are associated with sewage disposal systems, conduits, sewers, plumbing fixtures and attachments. However, this definition shall exclude petroleum products, lubricants, silicones and greases of mineral or synthetic origin.
15. “Grease Trap” means a device designed to intercept and retain grease present in sewage or other wastewater.
16. “Gullied Land” means areas where gullies occupy nearly all of the surface area. Areas in which gullies occur within special intervals of less than one hundred (100) feet shall be classified as a soil gullied land complex. Gullies of more than one hundred (100) feet spatial intervals shall be located on the soil maps with the designated symbols.
17. “Gully” means a miniature valley (more than one foot in depth) cut by running water and through which water generally runs during and shortly after rainfall. Gullies are intermittent stream channels.
18. “Installer of Subsurface Sewage Disposal Systems” means a person who contracts or otherwise installs, constructs, alters or extends a subsurface sewage disposal system.
19. “Miscellaneous Land Types” means areas on the earth’s surface that are non-soil (rocks, water, etc) and soils that are difficult or impossible to classify in soil series (filled land, graded land, gullied land, paved areas, etc.)

20. “Percolation Rate” means the rate at which water moves into the soil as determined by a percolation test.
21. “Percolation Test” means a method of determining the usability of an area for subsurface sewage disposal by testing for the rate at which the undisturbed soil in a series of test holes of standard size will absorb water per unit of surface area..
22. “Plans” means any documents required by the Director in the process of carrying out these Regulations. Plans may include, but not be limited to: applications, boundary outlines, plats, soil maps and topographic maps.
23. “Plat” means a map or other graphic representation drawn to scale, of a piece of land subdivided into lots, showing streets, waterlines, lot lines, etc.
24. “Positive Drainage Plan” means a plan by which all free water, both surface and subsurface, is removed from an area (lot, subdivision, etc.) by gravity, (even acquiring off-site easements where necessary).
25. “Privy” means a structure and/or excavation for the disposal of human excreta by non-water carriage methods.
26. “Recirculating Gravel Filter (RGF)” means a type of gravel filter wastewater treatment system, which utilizes an effluent, recycle system where a portion of the filtered effluent is mixed with septic tank effluent in a recirculation/dilution tank and redistributed to the filter.
27. “Relief Line” means a closed pipe laid on an undisturbed section of ground that conveys septic tank effluent from one trench to a subsequent trench on a lower elevation.
28. “Restriction” means a limitation on the use of properties where subsurface sewage disposal systems are proposed.
29. “Restrictive Covenant” means that document which restricts the use of property by its owner and specifies the obligations and responsibility of the owner regarding the property.
30. “Rill” means a small shallow (one foot or less in depth) ephemeral channel that carries water only during and for a few minutes after rainfall. Rills can be obliterated with conventional farm tillage implements.
31. “Septage” means a combination of organic sludge, liquid and scum, which accumulates in septic tanks.
32. “Septic Tank” means a watertight receptacle, which receives the discharge of sewage and is designed and so constructed so as to permit settling of solids from the liquid, digestion of organic matter by detention, retention of the floating solids, and discharge of the liquid portion.
33. “Septic Tank Effluent” means partially treated sewage, which is discharged from a septic tank.
34. “Septic Tank Pumping Contractor” means any person engaged in the business of removing or disposing of the sludge and liquid contents of septic tanks or holding tanks.
35. “Sink” means a closed depression in an area of karst topography, that is formed either by the solution of the surficial limestone or by the collapse of underlying caves. Its form varies from basin-like to funnel shaped and its size varies from only a few feet across to several hundred feet across. The bottom of a sink most commonly consists of soil formed of materials, which rolled or washed from the surrounding area and has slopes, which are generally, nearly level to undulating.

36. “Slope or Grade” means the rate of fall or rise of a pipeline or of the ground surface in reference to the horizontal plane.
37. “Soil Absorption Rate” means the rate, in minutes per inch, that clean water is absorbed by or drains through a soil during least favorable climatic conditions when soils are at or near field capacity. Estimated absorption rates are established in Appendix 1 for soil series and phases of soil series that have been recognized in Tennessee. For soil series and phases that have been recognized but not listed in Appendix 1 the Department shall establish the rate. Estimated soil absorption rates for variants of soil series and miscellaneous land types may be established by an approved soil consultant; however, those rates may be established by the Department.
38. “Soil Evaluation” means the systematic examination of soils in the field and/or in laboratories, their description and classification, the mapping of kinds of soils or miscellaneous areas showing the distribution of soils in relation to the physical, cultural and special features of the earth’s surface and the interpretation of the soils and site characteristics for their suitability for subsurface sewage disposal or to determine if the areas are eligible for percolation tests. The mapping is either general, high intensity or extra high intensity.
39. “Soil Incorporation” means the disking or plowing of the soil at a domestic septage disposal site, within six (6) hours of land application of domestic septage, so that no domestic septage is present on the surface of the soil.
40. “Soil Injection” means the injection of domestic septage below the surface of the soil.
41. “Soil Map” means a map showing the size, shape and distribution of the various kinds of soil in relation to other physical and cultural features on the earth’s surface.
(a) There are three (3) kinds of soil maps. They are general, high intensity and extra high intensity. They are defined as follows:

(b) General - A general is a second order survey as defined in the Soil Survey Manual, United States Department of Agriculture, October 1993. These surveys are made for intensive land use that require detailed information. Map units shall be named at a categorical level above the soil series. Miscellaneous land types or interpretative groupings of soils such as those in which percolation tests are allowed for subsurface sewage disposal site evaluation shall be delineated. Map scale shall be one (1) inch equals one hundred (100) feet. Minimum size map unit delineations shall be twenty-five hundred (2500) square feet. The mapping legend shall be provided by the Department.

(c) High Intensity - A first order survey as defined in the Soil Survey Manual, United States Department of Agriculture, October 1993. These surveys are made for very intensive land use that require very detailed soils information that require very precise knowledge of soils and their variability such as individual building sites. Field procedures require observation of soil boundaries throughout their length. Map units are mostly soil series, phases of soil series with some complexes and miscellaneous land areas. Some map units named at categorical level above the series are allowed. Map scale shall be one (1) inch equals one hundred (100) feet. Minimum size delineation shall be six hundred twenty-five (625) square feet.

(d) Extra High Intensity - A map that is the same as a high intensity soil map except the scale may be one (1) inch equals one hundred (100) feet or one (1) inch equals fifty (50) feet. The minimum size delineation shall be one hundred (100) square feet. These maps have more cartographic detail than high intensity maps.
42. “Soil Map Unit” means an abstract model of a soil taxonomic unit or miscellaneous land type that has a set of distinguishing soil characteristics that set it apart from all other soil map units.

43. “Soil Map Unit Delineation” means an area on a soil map that represents a kind of soil or miscellaneous land type that occupies an area on the earth’s surface. There may be several map unit delineations of one soil map unit.
44. “Soil Series” means a group of very similar soils that have one or more soil characteristics that distinguishes that soil from all other soil series. As used in these Regulations, a soil series is one that has been recognized by the Natural Resource Conservation Service in Tennessee.
45. “Soil Taxadjunct” means soil that has one or more distinguishing soil characteristics that prevents that soil from being classified in any soil series that has been recognized in Tennessee by the National Cooperative Soil Survey. A taxadjunct to a soil series does not differ enough to require different use and management or to expect different behavior from the named soil to which it is adjunct.
46. “Soil Variant” means a soil that has one or more distinguishing soil characteristics and soil properties that prevent that soil from being classified in any soil series that has been recognized by the National Cooperative Soil Survey in Tennessee. A soil variant requires use and management significantly different from the soil from which the variant is named. Also, behavior different from the soil series for which the variant is named can be expected.
47. “Spring” means a point where water naturally issues from the ground surface.
48. “Storage Facility” means a receptacle, which is designed to receive and retain septage prior to disposal, when the disposal site is not accessible.
49. “Subsurface Sewage Disposal Systems” means a system, other than a public or community system, which receives sewage. Including within the scope of this definition or septic tank absorption systems privies, chemical toilets, and other similar systems. However, “subsurface sewage disposal systems” does not include a sewerage system regulated under Title 69, Chapter 221, Part 1 and Title 69, Chapter 3.
50. “Subdivision” means the division of real property into two or more lots pursuant to the requirements the Shelby County Subdivision Regulations as set out in Appendix B of the Code of Shelby County, Tennessee.
51. “Swelling” means a condition caused by the intrusion of water into the individual clay particles.
52. “Topographic Map” means a map showing existing physical features, with contour lines at sufficient intervals to permit determination of proposed grades and drainage.
53. “Vicinity Map” means a map, which indicates the region near or about a place and the proximity to prominent and established landmarks.
54. “Water Table” means that level below which the soil or rock is saturated with water.

2-102. SUBDIVISIONS.

- (1) Approval by Other Agencies - No proposed subdivision shall be approved by the Land Use Control Board, Board of County Commissioners or other agency authorized to approve subdivisions until the plans for such subdivision have been approved by the Director.
- (2) Lot Size - Lots shall be large enough to construct the original subsurface sewage disposal system and to provide an area for duplication of that system. The area(s) for both original and duplicate systems shall meet the provisions of these Rules and of the Code of Shelby County, Appendix B, which sets forth requirements for subdivisions.
- (3) Evaluation and Lot Design - Either a High-Intensity or a General Soil Evaluation shall be conducted as described below.

(a) Soils Evaluation

1. Mapping Procedures

(i) A high-intensity soil evaluation shall be made of the entire subdivision and each soil delineation shall be drawn and plotted using a scale of 1 inch to 100 feet. The soil mapping shall be done by a soil consultant approved by TDEC. Two (2) copies of such map shall be submitted to the Director.

(ii) A general soil evaluation map shall be made of the entire subdivision using a standard mapping legend provided by TDEC and each soil delineation shall be drawn and plotted using a scale of one (1) inch to one hundred (100) feet. The soil mapping shall be done by a soil consultant approved by TDEC. Two (2) copies of such map shall be submitted to the Director. Soil delineations based on slopes, soil depth to rock and water problems shall be identified on the map. Each delineation appearing on the plat map through soil evaluation shall be interpreted by the soil consultants in terms of eligibility for percolation tests.

2. When the services of a soil consultant are provided by the department, three (3) copies of a plat of the site drawn to a scale of one (1) inch equals one hundred (100) feet shall be submitted to the Director. The site shall be either grid staked or lots staked as follows:

(i) A one hundred (100) feet master-grid system with surveyed control stakes numbered at not more than five hundred (500) feet intervals and the location of the same on the plat. The ratio of precision of the unadjusted survey shall be a minimum of 1:1000. The plat shall show the seal and signature of the surveyor and show a bar scale. Intermediate grid stakes with numbers at not more than one hundred (100) feet intervals shall be numbered and shown on the plat. The intermediate stakes may be set by rough chaining or other methods to a lesser degree of accuracy; however, said intermediate stakes shall be within two (2) feet of the distance shown. The Director may require the removal of vegetative growth such as weeds, vines and briars to permit access to all parts of the property. In wooded areas, cut/flagged lines shall be maintained until the property is evaluated.

(ii) Staked lots must have a numbered surveyed stake at each corner. The ratio of precision of the unadjusted survey shall be a minimum of 1:1000. The plat shall show the seal and signature of the surveyor and show a bar scale. Intermediate ground control stakes shall be numbered and set in areas where lot corners are not visible from any point on the lot. The intermediate stakes must be set no more than two hundred (200) feet apart, and said intermediate stakes may be set by rough chaining or other methods to a lesser degree of accuracy; however, said stakes shall be within two (2) feet of the distance shown on the plat. The Director may require the removal of vegetative growth such as weeds, vines, and briars to permit access to all parts of the property. In wooded areas, cut/flagged lines shall be maintained until property is mapped.

3. When the service of a private soil consultant is utilized, then the requirements in 2-102(3)(a), (i) or (ii) shall apply.

(b) Percolation Test

1. Under authority of T.C.A. Section 68-221-403(c), after a general or high intensity soil evaluation has been conducted by an approved soil consultant and the soils are found to have the following characteristics, then a percolation test may be conducted pursuant to Rule 2-104.

(i) There shall be a minimum depth of twenty-four (24) inches of undisturbed soil.

- (ii) Slopes of more than thirty (30) percent do not qualify for percolation tests unless provisions of Rule 2-103(4)(d) are met.
- (iii) No water problem shall exist. A water problem shall be considered to exist if any of the conditions are present as listed in the Natural Resource Conservation Service Soils Handbook on file at the Department.

2. Where a percolation test is required to determine the percolation rate for a conventional system, the percolation holes used to determine this rate must be located at the intersection of lines in a grid pattern with maximum perpendicular distances of fifty (50) feet between the lines of the grid. Each hole shall be considered reasonably representative of a square area of two thousand five hundred (2,500) square feet which includes that hole in the approximate center of the square; or

Where a percolation test is required to determine the percolation rate for an alternative system, the percolation holes used to determine this rate must be located at the intersection of lines in a grid pattern with maximum perpendicular distances of twenty-five (25) feet between the lines of the grid. Each hole shall be considered reasonably representative of a square area of six hundred twenty-five (625) square feet, which includes that hole in the approximate center of the square. Where percolation tests are used to determine the rate at which water moves through the soil, the minimum lot size shall be twenty thousand (20,000) square feet where a public water supply is used or a minimum of twenty-five thousand (25,000) square feet where a private water supply is used. The department shall be notified at least three (3) days prior to the day that the percolation test will be conducted. Percolation test procedures may be monitored when deemed necessary.

- (i) Two (2) copies of the subdivision plat at a scale of one (1) inch equals one hundred (100) feet shall be submitted to the Director. Such plat shall show percolation test holes identified by number and plotted to scale, subdivision boundaries and other pertinent topographic features. All lot and grid lines shall be drawn with appropriate numbers shown on the plat corresponding with survey stakes on the ground.
- (ii) Tabulated results of percolation test holes shall be reported on a form provided by the department.
- (iii) The actual average percolation rate shall be determined by averaging only the test results from the area actually to be covered by the permit, which includes both initial and duplicate area. Areas in which percolation test results were unfavorable shall be excluded. The average percolation rate shall be calculated on a weighted basis.
- (iv) Percolation test results shall not be conclusive evidence as to the suitability of an area. Such tests shall be considered and analyzed as one of the many criteria in determining site suitability.

3. All percolation test locations shall adhere to the requirements of Rule 2-110(1).

(4) Construction Design

- (a) Each lot shall be accurately surveyed and lot boundaries designated by survey stakes with lot numbers shown on said stakes.
- (b) Three (3) copies of a subdivision plat at a scale of one (1) inch equals one hundred (100) feet shall be submitted to the Director, which shall indicate:
 - 1. Lot dimensions with all lots numbered;

2. Easements for any purpose;
 3. Surface and underground drainage designed so as not to interfere with subsurface sewage disposal systems;
 4. Positive drainage plan, where needed. A positive drainage outlet must be available for each lot before the final plat is signed. If construction of a positive outlet is necessary, all construction shall be done before final plat approval is given. Off property easements may be necessary;
 5. Seal and signature of registered surveyor. (In order to survey and plat subdivisions an engineer, by law, must be a registered surveyor);
 6. Precision of the unadjusted survey. A minimum ratio of precision of the unadjusted survey of 1:7,500 is required;
 7. Vicinity map;
 8. North arrow indicating magnetic north or otherwise and indicate the scale of the plat; and
 9. All final plats shall have distances on all lines and shall indicate the identity of all corners such as steel post, concrete or iron pin.
 10. Site maps or plot plans submitted by the subsurface sewage disposal system installer for each lot in the subdivision shall be to a scale of 1 inch equals 100 feet in order to correspond with the high intensity soils map that is done for each lot.
- (c) The submittals required under Rules 2-102(3) and 2-102(4) may be combined into one (1) submittal to the Director.
- (d) After review of the site and information submitted, the Director shall:
1. Approve in writing the subdivision as proposed, or
 2. Recommend in writing the corrections needed to receive approval.
 3. Indicate in writing that the proposed subdivision or areas therein are not suitable with reasons therefore.
- (e) Where revisions are made to the construction design, revised plats shall be submitted to the Director.
- (5) Additional Data

Whenever the data required in these rules are insufficient to determine suitability of an individual lot or subdivision, additional data may be required by the Director.

- (6) Final Approval
- (a) Two (2) copies of the final plat shall be submitted to the Director with permanent lot lines drawn and the information required in Rule 2-102(3)(a) or 2-102(3)(b) and Rule 2-102(4). Additional plats for recording purposes without soil delineation, contour lines and percolation test hole locations may be submitted for approval.
 - (b) The maximum wastewater flow or maximum number of bedrooms for each lot shall be shown on the plat.
 - (c) Any subdivision plat may be subject to restrictions as determined by the Director and such restrictions shall be recorded on or appended to the plat.

This may include designation of primary and duplicate areas or soil area to be reserved for subsurface sewage disposal systems.

- (d) The Director may approve a plat by attaching an appropriate signature after all provisions of these Rules are met.
 - (e) Before any changes or restrictions can be made or removed, a revised plat must be submitted to the Director prior to approval. If the approved plat has been recorded at the county register of deeds office, any modifications will require rescission of the existing approved plat.
- (7) Individually owned lots in unapproved legal subdivisions shall meet the requirements of this rule with the exception that only one copy of each plat shall be submitted to the Director, with the plat representing only the individual lot. Where a plat of the unapproved legal subdivision has been recorded, this rule shall only apply to those subdivisions recorded after June 30, 1995.

2-103. ADDITIONAL SITE REQUIREMENTS AND LIMITATIONS FOR SUBDIVISION APPROVAL AND INDIVIDUAL LOTS AND ISSUANCE OF CONSTRUCTION PERMIT.

- (1) Suitability of Site - Prior to the design of subsurface sewage disposal systems, the suitability of the site must be demonstrated through acceptable soil absorption rates, acceptable soil conditions, freedom from groundwater interference or slowly permeable strata below the level of the disposal field, and other topographic characteristics. For lots, which are not part of a subdivision as defined herein, the Director may determine site suitability, acceptable soil absorptions rates, acceptable soil conditions, freedom from groundwater interference or impervious strata below the level of the disposal field, and other topographic characteristics. For lots which are not part of a subdivision as defined herein, where the services of a soil consultant are utilized, then the requirements established in Rule 2-102(3)(a) of these Regulations may apply as deemed necessary by the department either on an area basis or site specific basis.
- (2) Water table - The water table shall be at least four (4) feet below the bottom of the disposal field, except that a lesser depth may be permitted where soil conditions provide adequate protection for groundwater.
 - (a) Borings for determination of perched groundwater and the water table may be required by the Director. In such cases, borings shall be made to a minimum depth of six (6) feet or as site conditions so warrant. Sufficient time shall be provided for stabilization of groundwater before water table elevations are recorded. In sandy soil, this may require as little as thirty (30) minutes, while clay soil may require several hours or overnight. Borings shall be located by number on the plat map. Borings shall be conducted during the wettest part of the year and at a time approved by the Director.
- (3) Rock - At sites where surface rock or subsurface rock formations exist to such degree as to affect operational effectiveness of subsurface sewage disposal systems, a sufficient number of borings to a minimum depth of six (6) feet may be required by the Director to determine whether subsurface sewage disposal systems can be expected to give satisfactory service. Such borings shall be located by number on the plat and the results recorded.
 - (a) Rock formations shall be at a depth greater than four (4) feet below the bottom of the disposal field trenches, provided a lesser depth may be permitted where soil conditions so warrant.
 - (b) Rock may be removed in the septic tank excavation if a smooth, firm, level bedding is provided.

(4) Other Site Considerations:

- (a) Areas consisting of fill shall be excluded from the area considered for installation of the disposal fields unless soil conditions provide for adequate filtration and will prevent outcropping of sewage effluent.
- (b) Gullies, ravines, dry stream beds, natural drainage ways, sinkholes, wells, springs, cisterns, streams, areas subject to flooding which have no surface drainage outlet, areas within the 100-year floodplain, and caves shall be excluded from consideration as usable areas for disposal systems.
- (c) Sinks shall be considered unsuitable for subsurface sewage disposal unless the following requirements are met:
 - 1. Depth to rock formations must be a minimum of four (4) feet from the surface of the ground, and trench depth shall not exceed thirty (30) inches;
 - 2. Slopes must be thirty (30) percent or less;
 - 3. The area must not be subject to flooding; and
 - 4. All other site suitability criteria must be met.
- (d) Maximum slope permitted for the area to be used for the disposal field shall be determined by the consideration of lateral flow of effluent to the surface of the slope. Slopes of more than thirty (30) percent shall be considered unsuitable unless soil conditions will prevent lateral movement of sewage effluent to the ground surface. Slopes exceeding fifty (50) percent shall be considered unsuitable.
- (e) Lot Grading - The area to be used for the disposal field shall not be disturbed when grading the lot. However, where this is unavoidable, a re-evaluation shall be made after grading has been completed. After the suitability of any area to be used for subsurface sewage disposal has been evaluated and approved for construction, no change shall be made to this area unless the Director is notified and a re-evaluation of the area's suitability is made prior to the initiation of construction.
- (f) When soils evaluations indicate the soil absorption rate to be less than ten (10) minutes per inch, a conventional subsurface sewage disposal system shall not be used.

(5) Soil Improvements

(a) Site Requirements

- 1. Sites where soil improvement is necessary to change soil absorption rates to the acceptable range shall be considered unsuitable for subsurface sewage disposal until the improvement is adequately noted on the recorded final plat and in addition, noted on the permit at the time of issuance.
- 2. Sites where soil protection practices are necessary to maintain soil absorption rates within the acceptable range shall be considered unsuitable for subsurface sewage disposal until the protection practice is adequately noted on the recorded final plat and in addition, noted on the permit at the time of issuance.

(b) Design

The improvement and/or protection practices shall be of such location, configuration and construction to adequately collect, remove and discharge by gravity all interfering surface and subsurface water and not to collect sewage or any effluent from a subsurface sewage disposal system.

(c) Material Specifications

1. The gravel in the improvement and/or protection practices must be of sufficient amount, size and quality to allow storage and free movement of the collected water;
2. If an impermeable barrier is necessary for proper performance of the improvement and/or protection practice, the barrier must be of sufficient strength and durability to withstand the conditions under which it must perform; and
3. The collection pipe must have a minimum diameter of four (4) inches, or equivalent, and must be designed to collect groundwater. It must be constructed to withstand the conditions and weights under which it must perform.

2-104. PERCOLATION TEST PROCEDURES.

- (1) Type of Test Holes - The holes shall be dug or bored, with horizontal dimensions from six (6) to twelve (12) inches and vertical sides to the depth as appropriate for the type of system to be installed and the house that is to be constructed.
- (2) Preparation of Test Holes - Carefully scratch the bottom and sides of the holes with a knife blade or sharp pointed instrument in order to remove any smeared soil surfaces, and to provide a natural soil interface into which water may percolate. Remove all loose material from the holes. Add two (2) inches of coarse sand or fine gravel to protect the bottom from scouring and sediment.
- (3) Conducting the Test - Carefully fill the holes with clear water to a minimum depth of twelve (12) inches over the gravel. No additives shall be used at any time during the percolation test procedures. In most soils, it is necessary to refill the holes by supplying a surplus reservoir of water, possibly by means of an automatic siphon, to keep water in the holes at least four (4) hours and preferably overnight. The measurement period of the test shall begin twenty-four (24) to thirty (30) hours after initial filling.
- (4) Percolation Rate Measurement - Percolation rate measurement shall be made on the day following the procedure described under item (3) and calculations of area required for disposal fields shall be based on Appendix II.
- (5) If greater than six (6) inches of water remains in the test holes after the overnight presoaking period, adjust the depth to approximately six (6) inches over the gravel. From a fixed reference point, measure the drop in water level over a thirty (30) minute period. This drop is used to calculate the percolation rate.
- (6) If six (6) inches, or less, of water remains in the holes after the overnight presoaking period, add clear water to bring the depth of water in the holes to approximately six (6) inches over the gravel. From a fixed reference point measure the drop in the water level at approximately thirty (30) minute intervals for four (4) hours, refilling to approximately six (6) inches over the gravel after each reading. The drop that occurs during the final thirty (30) minute period is used to calculate the percolation rate. The drop that occurs during prior periods provides information for possible modification of the procedure to suit local circumstances.

- (7) Tests shall be conducted by an engineer or surveyor licensed in the State of Tennessee. An approved soil consultant or a registered professional environmentalist registered in the State of Tennessee may conduct percolation tests if he or she is not employed by: a State, Regional, District Department of Environment and Conservation or by the Department, Shelby County, any included municipality subject to this ordinance or by any contractor or subcontractor of any of the entities named above.

2-105. CONSTRUCTION PERMIT.

- (1) No property owner or installer of a subsurface sewage disposal system shall construct, alter, extend, or repair subsurface sewage disposal systems within Shelby County unless he holds a valid construction permit issued by the Director.
- (2) The Director shall refuse to grant a permit for the construction of a subsurface sewage disposal system where there is an accessible public sewerage system. The recipient of a permit for construction of a subsurface sewage disposal system shall be the responsible person(s) for adhering to the construction requirements of these Regulations.
- (3) These rules also apply in correcting existing failures; however, the Director may allow repairs if the site does not meet the soil suitability; disposal field length and reserve area requirements.
- (4) The construction permit shall have an expiration date effective three (3) years from the date of issuance.
- (5) Electrical Inspector Notification
 - (a) Any person who intends to construct or locate a house or establishment, mobile or permanent, after October 1, 2003, shall furnish evidence to the OCCE that:
 1. An application for a subsurface sewage disposal system construction permit has been made to the department; or
 2. The house or establishment is served by a public sewerage system.
 - (b) Provided however, this shall not apply to farm buildings or other buildings, which are not, required to be connected to a public sewerage system or a subsurface sewage disposal system.
 - (c) Where an existing subsurface sewage disposal system is to be utilized, a statement shall be provided by the legal department (upon request of the landowner) that will serve as evidence that the requirements of these regulations or Tennessee Code Annotated, Section 68-221-414(a) have been met.
 - (d) Where power is being restored, the provisions of Rule 2-106(5) shall not apply.

2-106. DESIGN OF THE CONVENTIONAL DISPOSAL FIELD.

- (1) The size of the conventional subsurface sewage disposal system shall be determined by the following:
 - (a) The suitability of the site shall be determined by a high or extra high intensity soil map completed by a soil consultant approved by TDEC and other criteria established by these Regulations. The soil absorption rates that range from ten (10) through seventy-five (75) minutes per inch are acceptable. Soil absorption rates for soil series and phases of soil series that are established in Appendix I shall apply. The absorption rates for soil series and phases that

have been recognized by the Natural Resource Conservation Service in Tennessee but not listed in Appendix I shall be established by TDEC. Rates for soil variants and miscellaneous land types may be established by an approved soil consultant but may require approval by TDEC.

- (b) Where percolation tests are conducted, the size of the subsurface sewage disposal system shall be determined by the rate found in Appendix II. The minimum linear footage per bedroom shall be one hundred fifty (150) feet if a reduction is not specified.
 - (c) On individual lots where the Director determines site suitability, an estimated soil absorption rate up to and including seventy-five (75) minutes per inch may be established. The size of the conventional subsurface sewage disposal system shall be determined by the rate found in Appendix II.
 - (d) Soils with absorption rates greater than seventy-five (75) minutes per inch as determined by a soil evaluation shall be considered unsuitable for conventional subsurface sewage disposal. Soils with percolation rates less than one hundred and six (106) minutes per inch may be used for conventional systems under authority of T.C.A. §68-221-403(c)(1).
- (2) Where conventional subsurface sewage disposal systems are installed, sufficient additional area must be available for the expansion of the disposal field in an amount large enough to install the secondary disposal field as required by these Regulations.
- (3) Design of the disposal field shall be of the recirculating (level lot) or serial distribution type or a modification of either, depending on the characteristics of the site.
- (a) Recirculating Design - Where the elevation difference in the area utilized for the absorption field does not exceed twelve (12) inches, a recirculating system is preferred. A recirculating design provides equal distribution of the effluent throughout the entire system by connecting successive trenches on both ends and by maintaining the grade in the bottom of these trenches from level to no more than four (4) inches. In this manner, the entire absorption area within the sewage system is utilized concurrently.
 - (b) Serial Distribution - This design is preferred where the elevation difference of the ground surface over the absorption field area exceeds twelve (12) inches. In serial distribution, each adjacent trench is connected to the next by a closed pipe laid on an undisturbed section of ground. The arrangement is such that all effluent is discharged to the first trench until it is filled. Excess liquid is then carried by means of a closed line (relief line) to the next trench. In this manner, each portion of the subsurface system is used in succession.
 - (c) Large Conventional Systems - Those exceeding two thousand two hundred and fifty (2,250) square feet of disposal field.
 - 1. When the disposal field exceeds two thousand two hundred and fifty (2,250) square feet of trench bottom in a single system, a properly designed dosing system shall be used for discharging septic tank effluent into the disposal field. The Director shall require design plans by a licensed engineer. The Director may also require:
 - (i) Prior to design approval, a licensed engineer must agree, in writing, to monitor the installation and construction of the system and upon completion, provide a final set of as built plans encompassing all components of the system and certification that the installation is in accordance with the design specifications.
 - (ii) Prior to design approval, it shall be the responsibility of the department to review the aforementioned design and notify the

engineer, in writing, of approval of the plans, denial of the plans or needed modifications to the plans.

2. When the design daily flow from a single source exceeds three thousand (3,000) gallons per day, siphons or pumps shall be used which shall discharge to separate disposal fields. Each system shall not exceed a design capacity of three thousand (3,000) gallons per day.
3. Discharges from dosing systems shall be designed to maximize the distribution of the effluent throughout the system.
4. Buffer zones shall be required at a frequency and size as determined by a detailed soil/site evaluation.
5. The daily wastewater flow from residences or other similar establishments shall be based upon one hundred and fifty (150) gallons per bedroom per day.

(4) Construction Procedure for Disposal Field

- (a) The pipe size from the septic tank to the disposal field or pump chamber shall not be less than three (3) inches in diameter (inside measurement) and shall be of equivalent strength of Schedule 40 PVC except where Rule 2-114. applies. The pipe from the septic tank to the disposal field shall be of sufficient length to rest on undisturbed earth.
- (b) Materials and equipment used in subsurface sewage disposal systems shall be those which have specifications outlined in these Regulations.
- (c) The disposal field trenches shall follow the ground surface contours so that variations in trench depth will be minimized.
- (d) A minimum of six (6) feet of undisturbed earth between adjacent trench walls shall be required.
- (e) Adjacent trenches in a serial distribution system shall be connected with a relief line in such a manner that each trench is completely filled with septic tank effluent to the full depth of the media before effluent flows to a succeeding trench.
- (f) In constructing relief lines, care must be exercised to insure that an undisturbed block of earth remains between trenches. The trench for the relief pipe, where it connects with the preceding absorption trench, shall be dug no deeper than the top of the media. The relief line shall rest on undisturbed earth and backfill must be carefully tamped. This section pertains primarily to a serial distribution system. Pipe for relief lines shall have no perforations and shall have a minimum inside diameter of four (4) inches and conform to or exceed the standards of ASTM (American Society for Testing and Materials) F-405-82A; however, Schedule 40 pipe, or its equivalent, with a minimum inside diameter of three (3) inches may be used. The lengths of pipe used for relief lines shall not be considered part of the required absorption area.
- (g) The influent and effluent relief lines in each individual trench shall be as far from each other as practical in order to prevent short-circuiting.
- (h) Invert of the overflow pipe in the first relief line shall be at least four (4) inches lower than the invert of the septic tank outlet.
- (i) Trenches shall not be excavated when the soil is wet enough to smear or compact easily.
- (j) Media for the disposal fields shall consist of crushed rock, gravel or other suitable material as approved by the department, and shall be size number 2, 3, 4, or 24 coarse aggregate, as defined by ASTM D-448-86. The material

shall be free from dust, sand, clay or excessive fines. At least ninety (90) percent of the material must pass a two and one-half (2 1/2) inch screen and not more than five (5) percent may pass a one-half (1/2) inch screen.

- (k) Media for the disposal fields shall extend from at least two (2) inches above the top of the perforated field line pipe to at least six (6) inches below the bottom of the perforated field line pipe [a minimum of twelve (12) inches total].
 - (l) The top of the disposal field media shall be below the invert of the tank outlet.
 - (m) The media for the disposal fields shall be covered with untreated building paper, a layer of straw at least two (2) inches thick or other material determined to be equivalent by the Director.
 - (n) Soil material excavated from trenches should be used in backfilling and should be left mounded over the trenches until initial settling has taken place.
 - (o) There shall be a minimum of twelve (12) inches of ground cover over the disposal field media and the maximum shall be thirty-six (36) inches of fill, except for systems designed pursuant to T.C.A. §68-221-403(i).
 - (p) The bottom of the trenches and the distribution lines shall have a grade from level to no greater than four (4) inches.
 - (q) All pipes (tight lines) under paved areas or under driveways shall be Schedule 40 PVC or equivalent and have a minimum inside diameter of three (3) inches. The lengths of pipe used for relief lines and tight lines shall not be considered part of the required absorption area.
 - (r) The pipe used in the disposal field trenches shall have a minimum diameter of four (4) inches, be perforated with one-half (1/2) inch holes and conform to or exceed the standards of ASTM F-405-82A.
 - (s) The area of the disposal field shall not be used for vehicular traffic or vehicular parking. Dozers, trucks, and other heavy vehicles shall not be allowed to run over the septic tank, field lines or other parts of the system.
 - (t) The maximum length of a single line should not exceed one hundred (100) feet unless conditions require a longer line.
 - (u) The maximum depth of a trench shall be forty-eight (48) inches. The minimum depth shall be twenty-four (24) inches, except for systems designed pursuant to T.C.A. §68-221-403(i).
 - (v) The area of the disposal field shall not be used for any underground utilities.
 - (w) A septic tank must not be bypassed by direct line (laundry, grease, etc.) to field line.
 - (x) Down-spouts shall not be connected to the subsurface sewage disposal system. Downspouts or other surface water shall be diverted away from the subsurface sewage disposal system.
 - (y) Water lines shall not cross, pass through, or go under the subsurface sewage disposal field. Water lines may cross, but not be located in the same trench with, a tight line leading from a septic tank or dosing tank to a disposal field provided the water line is sleeved in a continuous twenty (20) feet section of Schedule 40 PVC pipe or equivalent [a minimum of ten (10) feet on either side of the tight line] and the water line is a minimum of one (1) foot vertically above the tight line.
- (5) No system shall be covered without the inspection and authorization of the Director.

2-107. SEPTIC TANK CAPACITY.

- (1) For residences, the liquid capacity of the septic tank shall be based on the following:

Number of Bedrooms	Capacity in Gallons
2 or less	750
3	900
4	1000

For each additional bedroom, add two hundred and fifty (250) gallons.

- (2) For facilities other than residences, the net volume or effective liquid capacity below the flow line of a septic tank for flows up to five hundred (500) gallons per day shall be at least seven hundred fifty (750) gallons. For flows between five hundred (500) and fifteen hundred (1500) gallons per day, the capacity of the tank shall be equal to at least one and one-half (1 1/2) days' liquid sewage flow. With flows greater than fifteen hundred (1500) gallons per day, the minimum effective tank liquid capacity shall equal one thousand one hundred and twenty-five (1125) gallons plus seventy-five (75) percent of the daily sewage flow; or $V=1125+0.75Q$ where V is the volume of the tank in gallons and Q is the daily sewage flow in gallons. Additional tank volume may be necessary where unusual wastewater characteristics are expected from a facility. Expected normal sewage flows may be determined from a list as provided by the department or actual known water usage data for any facility to be served may be used if available.

2-108. DESIGN OF SEPTIC TANKS.

- (1) A septic tank shall be watertight, structurally sound, and not subject to excessive corrosion or decay. Septic tanks installed after October 1, 2003 shall be of two-(2) compartment design. The inlet compartment of a two (2) compartment tank shall be between two-thirds (2/3) and three-fourths (3/4) of the total tank capacity.
- (2) Minimum standards of design and construction of precast reinforced concrete septic tanks:
- (a) The liquid depth may range from thirty (30) to sixty (60) inches for septic tanks of less than three thousand (3000) gallons capacity and may not exceed seventy-eight (78) inches for septic tanks with a capacity of three thousand (3000) gallons or greater.
- (b) All tanks shall be manufactured with a partition so that the tank contains two (2) compartments. The partition shall be located at a point not less than two-thirds (2/3) nor more than three-fourths (3/4) the length of the tank from the inlet end. The tank wall thickness must remain not less than two and one half (2 1/2) inches thick throughout the tank except for blockouts or the groove for a slide-in partition. The groove for the slide-in partition shall leave a concrete thickness of not less than two and one-fourth (2 1/4) inches in the tank walls. The partition shall be structurally sound and not subject to excessive corrosion or decay.
- (c) There shall be three (3) blockouts in the inlet compartment, one (1) on the tank end and one (1) on each sidewall, and a blockout in the partition and the outlet end of the tank. The blockouts for these openings shall leave a concrete thickness of not less than one (1) inch in the tank wall. The blockouts shall be made for a minimum of four (4) inch pipe or a maximum of six (6) inch pipe. In lieu of the partition wall blockout, a four (4) to six (6) inch slot extending at least half way across the width of the tank may be used. The top of the slot shall be located no closer than twelve (12) inches to the liquid level and the bottom of the slot shall be no lower than four (4) inches below the midpoint of

the liquid depth. A four (4) inch diameter, or equivalent, air passage opening in the partition shall be provided above the liquid level of the tank.

- (d) The tees or baffles shall be a minimum diameter of either three (3) inch cast iron soil pipe T branch, three (3) inch cast iron sanitary T branch, three (3) inch cast-in-place baffle, or three (3) inch PVC T branch, or equivalent in durability and performance as determined by the Central Office of the Division of Ground Water Protection of TDEC.
- (e) The inlet invert shall enter the tank at least one (1) inch, preferably three (3) inches, above the liquid level of the tank.
- (f) An inlet tee or baffle shall be provided to divert the incoming sewage downward and extend at least twelve (12) inches below the liquid level.
- (g) The partition tees or baffles and outlet tee or baffle shall extend eighteen (18) inches or one-third (1/3) the liquid depth, whichever is the lesser, below the liquid level of the tank. A tee or baffle shall be provided on the first compartment side of the partition at the same elevation as the outlet tee or baffle, unless an intercompartmental connecting slot is utilized as described in (2)(c) of this rule.
- (h) Air space equal to at least twenty (20) percent of the liquid depth shall be provided between the top of the tank and the liquid level.
- (i) Adequate access openings above each tee or baffle must be provided in the tank top. Access shall be provided for cleaning or rodding out of the inlet pipe, and the interconnecting tees or baffles in the partition, for inserting the suction hose for tank pumping, and for entrance of a person if internal repairs are needed after pumping. If the knockouts on the inlet compartment sides of the tank are to be used, access to these tees or baffles shall also be provided for cleaning and rodding of the inlet pipe. To accomplish this, it may be necessary to extend the tee so they will be located under an access port or a cleanout must be provided on the inlet line immediately outside the septic tank. A manhole opening shall be provided to each compartment with each having a minimum opening of eighteen (18) inches by eighteen (18) inches as the opening cuts the plane of the bottom side of the top of the tank. All circular shaped manholes shall have a minimum diameter of twenty (20) inches as the opening cuts the plane of the bottom side of the top of the tank. The manhole covers shall be beveled on all sides in such manner as to accommodate a uniform load of one hundred fifty (150) pounds per square foot without damage to the cover or the top of the tank. If the top of the tank is to be multislabs construction, the slabs over the inlet of the tank, partition, and outlet of the tank must not weigh in excess of one hundred fifty (150) pounds each. Multislabs construction must allow for a minimum access hole size of six (6) inches by six (6) inches to each compartment. Manhole covers, opening covers, or slabs shall have a handle of steel or other corrosion resistant material equivalent in strength to a No. 3 reinforcing rod (rebar).
- (j) The tank shall be properly vibrated and rodded prior to curing to eliminate honeycomb.
- (k) The top, bottom, ends, and sides of the tank must have a minimum thickness of two and one-half (2 1/2) inches except for blockouts or the slide in partition groove.
- (l) After curing, tanks manufactured in two (2) sections shall be joined and sealed at the joint by the manufacturer by using a mastic sealant and/or pliable sealant that is both waterproof and corrosion resistant.
- (m) Tank Labeling - Precast septic tanks shall be provided with a suitable legend, cast or etched in the wall at the outlet end and within six (6) inches of the top of the tank, identifying the manufacturer by name and address or registered trademark and indicating the liquid capacity of the tank in gallons.

- (3) Plans for prefabricated tanks, other than those for precast reinforced concrete tanks, shall be approved by the department, on an individual basis as determined by the information furnished by the designer which indicates the tank will provide equivalent effectiveness as those designed in accordance with the provisions of Section 2 -108(2) herein.
- (4) Septic tanks other than approved prefabricated tanks shall be constructed consistent with the provisions of paragraph (2) of this rule except as follows:
 - (a) Cast-in-place concrete septic tanks shall have a minimum wall thickness of six (6) inches.
 - (b) Cast-in-place septic tanks of one thousand (1000) gallons or smaller shall have a minimum top and bottom thickness of four (4) inches.
 - (c) Cast-in-place concrete septic tanks with a capacity of greater than one thousand (1000) gallons shall have a minimum top and bottom thickness of six (6) inches.

2-109. EFFLUENT TREATMENT DEVICES/SYSTEMS.

- (1) Septic Tank and/or Dosing Tank Filters, Conventional Sand Filters, and Recirculating Gravel Filters may be used to improve the quality of septic tank effluent in an approved subsurface sewage disposal system.

2-110. LOCATION OF SEPTIC TANKS, DOSING CHAMBERS AND ABSORPTION FIELDS.

- (1) The location of septic tank, dosing chamber, and disposal field shall be selected in accordance with the following minimum distances in feet, bearing in mind that local conditions may require increased distances of separation.

	<u>Septic tank And/or Dosing Chamber</u>	<u>Disposal Field</u>
Water Supply/Wells	100	100
Dwellings	5	10
Property Lines	10	10
*Gullies, Ravines, Dry Stream Beds, Natural Drainageways, Sinkholes, Streams, and Cut Banks		
	15	25
Water Lines	10	10
House to Tank Connections	--	10
Septic Tank	--	5

*These distances may increase or decrease as soil conditions so warrant as determined by the Director after a special investigation by an approved soil consultant.

2-111. DESIGN OF DOSING SYSTEMS.

(1) Dosing Chamber

- (a) The dosing chamber, access riser and riser cover shall be watertight, structurally sound and not subject to excessive corrosion or decay. The dosing chamber shall be of one (1) compartment design. They shall be of such construction and size as specified in Rule 2-108, Sections 2, 3 and 4, excluding those requirements strictly relating to two (2) compartments.

1. The access riser shall have a minimum diameter of twenty-four (24) inches and extend to the finished grade or above. Rectangular or square risers may be allowed provided the size of the opening provides the equivalent access as a circular riser. An access riser with a minimum diameter of sixteen (16) inches may be used provided the threaded union on the pump outlet pipe is located within two (2) feet of the top of the access riser. The access riser shall be located near the outlet end of the tank, directly above the pump or siphon, supply line, switches and other fixtures.

- (b) The dosing chamber volume shall be a minimum of two (2) times daily wastewater flow except when an alternate pump equipped with an in-tank supply line and switch assembly is on-site and ready for use. If the alternate pump, in-tank supply line and switch assembly is on-site and ready for use, the minimum dosing chamber volume shall be a total of the volume of water below the static level plus the designed dosing volume plus one-half (1/2) the daily flow.

(2) Design of Pumps, Pipes, and Controls

- (a) The gallons per minute (gpm) flow in a dosing system shall be determined by the distribution network it doses. If the distribution network is of such design that the gpm flow is not confined to specific amounts, the minimum flow shall be ten (10) gpm.

- (b) Total dynamic head (TDH) shall be determined by adding the following:

1. Elevation head is the difference in elevation between the bottom of the pump and the highest ground elevation at the disposal field. The minimum assigned elevation head shall be five (5) feet.
2. Friction head shall be determined from Appendix III plus fittings loss.
3. Pressure head is the amount of pressure desired at the distribution network and shall be a minimum of one (1) foot.

- (c) When pumping uphill, a check valve must be utilized if the volume of effluent which will flow back into the tank exceeds one-fourth (1/4) daily flow.
- (d) The dosing volume shall be between one-fourth (1/4) and one-half (1/2) daily flow, except in those situations where the minimum dose exceeds one-half (1/2) daily flow, then the calculated minimum dose shall be the dosing volume.
- (e) Pipe and Fittings
 - 1. All pipe materials shall be a minimum of Schedule 40 PVC.
 - 2. All fittings shall be pressure fittings.
 - 3. All connections shall be adequately cleaned with cleaning solvent and glued with PVC solvent cement.
 - 4. If used, the gate or globe valve(s) and check valve shall be either bronze or PVC.
 - 5. The supply line shall be designed and installed to drain after each use unless system design requires a check valve.
- (f) Pump, Float Controls, and Alarm System
 - 1. The pump shall be a good quality, effluent pump and be of sufficient size to meet or exceed the gallons flow requirement and the total dynamic head requirement set forth by the system.
 - 2. The pump float controls must be adjustable.
 - (i) The controls must be sealed against entry of effluent or gases.
 - 3. The alarm system.
 - (i) The high water alarm shall be required and consist of an audible and visible alarm located in a visible place and clearly marked "wastewater system alarm."
 - (ii) The alarm and alarm switches shall be placed on a separate electrical circuit from the pump power line.
 - (iii) The alarm float control shall be placed so as to be activated when the pump chamber water level rises above the "pump on" float control.
- (g) Pump and Controls
 - 1. The pump must be placed so that the intake is a minimum of eight (8) inches above the bottom of the pump chamber.
 - 2. As a means to remove the pump from the pump chamber, a material of sufficient strength and durability must be secured to the pump and access riser.
 - 3. The pump control must be positioned so the "pump off" switch is slightly above the top of the pump and the "pump on" switch is at the desired dosing depth. The "pump off" switch for pumps specifically designed to operate with the pump motor casing exposed to air, may be located at a lower elevation provided an adequate depth of wastewater is maintained above the pump intake to insure that the pump intake will not draw in air.
 - 4. The pump outlet pipe must be connected to the supply manifold with a threaded union or similar device.

5. When a disposal system requires a specific pressure head, a PVC or bronze, gate or globe valve shall be placed in the supply line.
 6. If the effluent is pumped downhill, a five-thirty seconds (5/32) inch siphon breaker hole must be drilled in the bottom of the supply line inside the pump tank, above the liquid level.
 7. All electrical installations shall be installed to meet the applicable wiring methods of the current edition of the National Electric Code (NEC) adopted by the State Fire Marshall's office or the current edition of the Shelby County Electric Code.
- (3) Where elevation permits and a dosing siphon are used, it shall be designed in accordance with the minimum dose requirements in this rule and capable of meeting those requirements. It shall be durable, structurally sound and not subject to excessive corrosion or decay.

2-112. MAINTENANCE OF THE SUBSURFACE SEWAGE DISPOSAL SYSTEM.

- (1) It is the property owner's responsibility to maintain the system in a safe and sanitary manner.
- (2) Should the system malfunction, the Director shall issue, in writing, a maximum thirty (30) day notice to the owner requiring repair, replacement or improvement of the system.

2-113. GREASE TRAPS.

- (1) Grease Traps in Commercial Buildings - Kitchen drain lines from institutions, hotels, restaurants, schools, lunchrooms, and other establishments from which flow a relatively high volume of grease may be discharged to a grease trap. Grease trap effluent shall also be treated in the septic tank before being discharged into the disposal field.
- (2) Grease traps shall be constructed to insure that both the inlet and outlet are properly submerged to trap grease, and that the distance between inlet and outlet is sufficient to allow separation of the grease so that grease solids will not escape through the outlet.
- (3) Grease traps shall be vented so they will not become airborne. A cover shall be provided and located so as to be conveniently accessible for servicing and cleaning. The cover shall be designed to prevent odor and exclude insects and vermin.
- (4) Garbage Grinder Waste - Waste from garbage grinders shall not pass through any grease trap before being discharged to a septic tank.
- (5) Sizing the Grease Trap - Proper sizing of the grease trap should be based on efficiency ratings and flow capacities, which are determined by the number and kinds of sinks or fixtures discharging into the trap.

2-114. ALTERNATIVE METHODS OF SUBSURFACE SEWAGE DISPOSAL.

- (1) Regarding alternative methods of subsurface sewage disposal, if a conflict occurs between this rule and other rules of these Regulations, the items of this rule shall apply. However, the Director may allow repairs if the site does not meet soil suitability and reserve area requirements. The wastewater flow for residences or other similar establishments served by alternative methods of subsurface sewage disposal shall be based upon one hundred fifty (150) gallons per bedroom per day.
- (2) Large Alternative Subsurface Methods of Sewage Disposal - Any alternative subsurface sewage disposal system that has a wastewater flow greater than six hundred (600) gallons per day, other than a large diameter gravelless pipe system, shall be considered a large alternative subsurface sewage disposal system. A large diameter gravelless pipe system that exceeds seven hundred fifty (750) linear feet of ten (10) inch pipe or eleven hundred twenty-five (1125) linear feet of eight (8) inch diameter pipe shall meet the minimum requirements established in Rule 2-106(3)(c).

- (a) A site-specific design for each large alternative subsurface sewage disposal system shall be submitted to the department for review.
 - (b) The design shall be stamped with the seal of a licensed engineer.
 - (c) Prior to design approval, a licensed engineer must agree, in writing, to monitor the installation and construction of the system and upon completion, provide a final set of as built plans encompassing all components of the system and certification that the installation is in accordance with the design specifications.
 - (d) It shall be the responsibility of the department to review the aforementioned design and notify the engineer, in writing, of approval of the plans, denial of the plans or needed modifications to the plans.
- (3) A Low Pressure Pipe (LPP) system is a subsurface sewage disposal system, which has three basic design principles different from conventional subsurface sewage disposal systems. They are: 1) uniform distribution of effluent, 2) dosing and resting cycles, and 3) shallow placement of trenches. The department shall determine the necessity, location and design of buffer zones for all lots using an LPP system for subsurface sewage disposal. LPP systems shall not be used to dispose of wastewater wherein the average concentration of grease exceeds one hundred fifty (150) milligrams per liter (mg/L) because of the clogging potential of the distribution network. LPP systems designed to accommodate wastewater flows in excess of six hundred (600) gallons per day must be designed by a licensed engineer. The design shall be reviewed by the department applying Rule 2-114(2).

(a) Site and Soil Requirements

1. Prior to the design of the LPP system, the suitability of the site must be demonstrated through acceptable soil absorption rates, acceptable soil conditions and other topographic characteristics. The acceptable soil absorption rate range shall be from ten (10) minutes per inch through seventy-five (75) minutes per inch as determined by an extra high intensity soil map prepared by an approved soil consultant. If the soil absorption rate is determined to be greater than seventy-five (75) minutes per inch based upon the extra high intensity soil map, then percolation tests may be conducted. However, soils with absorption rates in excess of seventy-five (75) minutes per inch due to wetness that cannot be corrected by drainage shall not be eligible for percolation tests. Percolation rates from seventy-six (76) minutes per inch through one hundred twenty (120) minutes per inch are acceptable if no water problems exist.
2. A minimum soil depth of thirty (30) inches over any underlying restrictive horizon is required. However, a modified LPP system may utilize a maximum of six (6) inches of compatible fill, as determined by an approved soil consultant, to obtain the thirty (30) inch depth.
3. Slopes of more than thirty (30) percent shall be considered unsuitable.
4. An area of suitable soil must be available to install the initial system and maintain a suitable area of adequate size for 100% duplication.
5. The size of the LPP system shall be determined by the following:
 - (i) An extra high intensity soil map, provided by a soil consultant approved by the department, shall establish the soil absorption rate.
 - (ii) If the extra high intensity soil map determines that a percolation test is necessary to establish a rate, the percolation holes shall be located in a grid pattern with maximum perpendicular distances between holes of twenty-five (25) feet and the gridded portion shall encompass the entire area to be

utilized for the system and duplicate area. Greater distances may be allowed as determined by the Director. The percolation test procedure in Rule 2-104 of these Regulations shall apply.

- (iii) The daily wastewater flow divided by the loading rate (Table I) shall determine the amount of square footage (area) required for the initial system.
- (iv) Hydraulic overloading of the disposal field may occur when excessive amounts of effluent are distributed over a continuous common slope. Therefore, buffer zones are required if there is more than six (6) feet of elevation difference between the upper and lower laterals or if the distance between the upper and lower laterals exceeds fifty (50) feet. The buffer zone size and the use of soil improvement or soil protection practices are site specific and shall be determined by the Director based on the recommendation of a soil consultant approved by TDEC. The buffer zone shall not be included as part of the reserve area.

TABLE I. MAXIMUM LOADING RATE

<u>Established Rate (mpi)</u>	<u>Loading Rate (gpd/ft2)</u>
10	.40
20	.40
30	.35
40	.30
45	.275
50	.25
60	.20
75	.15
90	.10
120	.05

(b) Layout of the LPP System

1. The required linear footage is determined by dividing the amount of required square footage of suitable soil area by five (5).
2. The location of the septic tank, dosing chamber, and the disposal field shall be in accordance with Rule 2-110 of these Regulations.
3. The lateral lines shall be placed on contour and lengths shall not exceed those specified in Figure 1.7b
4. The trench bottom of each lateral shall be at the same elevation throughout that lateral.

Figure 1. Maximum Length of Different Sized Laterals for Low Pressure Pipe Systems with Varying Orifice Sizes and Spacing (1 ft. = .305 m)

5. The distance between laterals (center to center) shall not be less than five (5) feet.
6. Trench width shall be a minimum of six (6) inches.
7. Trench depth shall range between eighteen (18) and twenty-two (22) inches.
8. A minimum of twelve (12) inches of soil material shall be present between the bottom of the trenches and the restrictive layer.

(c) Dosing and Distribution System Design

1. The dosing rate per linear foot of disposal trench shall be uniform over the entire system. This may be accomplished by varying the hole spacing, hole sizing, or placement of valves in the manifold or laterals to compensate for changes in ground elevation. Table II shall be used to calculate dosing rates.

TABLE II. PRESSURE HEAD VS GPM FLOW PER HOLE

Pressure Head		Hole diameter (in.)		
<u>ft</u>	<u>psi</u>	<u>5/32</u>	<u>3/16</u>	<u>7/32</u>
1	.43	.29	.42	.56
2	.87	.41	.59	.80
3	1.30	.50	.72	.98
4	1.73	.58	.83	1.13
5	2.16	.64	.94	1.26

2. The first and last holes in a lateral shall be thirty (30) inches from the ends of the lateral. Hole spacing shall not exceed seven and one-half (7.5) feet
3. Hole sizes shall be within the range of five thirty-second (5/32) inches through seven thirty-second (7/32) inches.
4. Calculation of gallons per minute (gpm) flow and total dynamic head.
 - (i) The gallons per minute flow amount, which the num

must provide, shall be determined by adding the gallons per minute flows per hole over the system dosed by that pump.

- (ii) The total dynamic head (TDH) shall be determined by adding the following:

- (I) Elevation head is the difference in elevation between the bottom of the pump and the highest ground elevation at the disposal field. The minimum assigned elevation head shall be five (5) feet.
 - (II) Friction head shall be determined from Appendix III plus fittings loss. (III) A pressure head average of three (3) feet shall be used for TDH calculations. The range shall be one (1) through five (5) feet.
5. When pumping uphill, a check valve must be utilized if the volume of the supply line, manifold, and the volume of the laterals that drain back into the pump tank exceeds one-fourth (1/4) daily flow.
 6. The minimum dosing volume shall be determined by adding the volume of the supply line, manifold and five (5) times the volume of the laterals. If a check valve is utilized, the minimum dosing volume shall be determined by adding the volume of the manifold and five (5) times the volume of the laterals.
 7. The dosing volume shall be between one-fourth (1/4) and one-half (1/2) daily flow, except in those situations where the minimum dose exceeds one-half (1/2) daily flow, then the calculated minimum dose shall be the dosing volume.

(d) Equipment and Material Specifications

1. Septic Tank and Dosing Tank
 - (i) The septic tank shall conform to all design, construction and installation criteria set forth in Rules 2-107 and 2-108.
 - (ii) The dosing chamber shall conform to all design construction and installation criteria set forth in Rule 2-111.
2. Pipe and Fittings
 - (i) All pipe materials shall be PVC and have a minimum equivalent strength of Schedule 40.
 - (ii) All fittings shall be pressure fittings.
 - (iii) All connections shall be adequately cleaned with cleaning solvent and glued with PVC solvent cement.
 - (iv) The gate or globe valve(s) and check valve shall be either bronze or PVC.
 - (v) The lateral pipe diameter shall be a minimum of one (1) inch.

- (vi) The distal end of each lateral shall be equipped with a capped turnip that provides aboveground access.

3.. Pump, Float Controls, and Alarm System

- (i) The pump shall be an effluent pump of sufficient quality and size to meet or exceed the flow requirement and the total dynamic head requirement of the system.
- (ii) The pump float controls must be adjustable and must be sealed against entry of effluent or gases.
- (iii) Alarm System
 - (I) A high water alarm shall be required and consist of an audible and visible alarm located in a visible place and clearly marked "wastewater system alarm."
 - (II) The alarm and switches shall be placed on a separate electrical circuit from the pump power line.
 - (III) The alarm float control shall be placed so as to be activated when the pump chamber water level rises above the "pump on" float control.

4. Disposal Field Media

The disposal field media size shall be within the range of one-half (1/2) to one (1) inch. It must be washed and free of fines.

(e) Installation Procedures

1. Site Preparation and Imported Fill

- (i) The soil area reserved for the initial and duplicate system must not be cut, filled, compacted or disturbed in any manner prior to or after system installation.
- (ii) No site preparation shall occur if the soil is wet. The designated person responsible for monitoring system installation shall determine when the soil is adequately dry.
- (iii) If imported fill is used during installation, it must be of compatible material which shall be determined by the soil consultant approved by TDEC. The area to be filled must be plowed prior to adding fill. The fill material must be applied with a minimum amount of wheeled traffic and must be incorporated to ensure even mixing.

2. Supply Line and Manifold

- (i) The manifold and laterals shall be designed and installed to drain after each use.
- (ii) The supply line shall be designed and installed to drain after each use unless system design requires a check valve.
- (iii) A tee to tee connection between the manifold and laterals shall be used except in situations where the topographic, soil and other site conditions allow the manifold and laterals to be at right angles. If the manifold and laterals are at right angles then crosses or tee to tee connections may be utilized.

3. Distribution Laterals

- (i) The distribution laterals shall be constructed with a minimum disposal field media depth of nine (9) inches, with three (3) inches above the lateral pipe invert.
- (ii) The disposal field media must be covered with untreated building paper, straw or other acceptable material which will allow movement of water and restrict soil movement.

4. Pump and Controls

- (i) The pump must be placed so that the intake is a minimum of eight (8) inches above the bottom of the pump chamber.
- (ii) As a means to remove the pump from the pump chamber, a material of sufficient strength and durability must be secured to the pump and access riser.
- (iii) The pump control must be positioned so the "pump off" switch is slightly above the top of the pump and the "pump on" switch is at the desired dosing depth.
- (iv) The pump outlet pipe must be connected to the supply manifold with a threaded union or similar device.
- (v) A PVC or bronze, gate or globe valve shall be placed in the supply line to adjust the specific pressure head.
- (vi) If the effluent is pumped downhill, a five thirty second (5/32) inch siphon breaker hole must be drilled in the bottom of the supply line above the water level inside the pump tank.
- (vii) All electrical installations shall be installed to meet the applicable wiring methods of the current edition of the National Electric Code (NEC) adopted by the State Fire Marshall's office or the current edition of the Shelby County Electric Code.

5. The completed landscape must be shaped to prevent water from ponding or flowing over the system.
- (4) A Mound System is a soil absorption system that is located above the natural soil surface and constructed with suitable fill material. The system differs from the conventional subsurface sewage disposal system in three (3) ways: (1) uniform distribution of effluent, (2) dosing and resting cycles, and (3) above ground construction. The department shall determine the necessity, location and design of buffer zones for all mound systems. Mound systems shall not be used to dispose of wastewater wherein the average concentration of grease exceeds one hundred and fifty (150) milligrams per liter (mg/L) because of the clogging potential of the distribution network.

Mound systems designed to accommodate wastewater flows in excess of six hundred (600) gallons per day must be designed by a licensed engineer in accordance with T.C.A. §62-2-101 et seq. The design shall be reviewed by the department applying Rule 2-114(2).

(a) Site and Soil Requirements

1. Prior to the design of the mound system, the suitability of the site must be demonstrated through acceptable soil absorption rates, acceptable soil conditions and other topographic characteristics.
2. The size of the mound system shall be determined by the following:
 - (i) An extra high intensity soil map, provided by a soil consultant approved by TDEC, shall establish the soil absorption rate.
 - (ii) If the extra high intensity soil map, determines that a percolation test is necessary to establish a rate, the percolation holes shall be located in a grid pattern with the maximum perpendicular distances between the holes being twenty-five (25) feet and the gridded portion shall encompass the entire area to be utilized for the system and duplicate area. Greater distances may be allowed as determined by the Director. The percolation test procedure in Rule 2-104 and 2-102(b) of these Regulations shall apply.
 - (iii) The daily wastewater flow divided by the infiltrative capacity of medium sand (1.2 gal/ft² /day) shall determine the amount of square footage (area) required for the distribution bed.
3. The requirements relating to rock, groundwater and other site conditions established in Rule 2-103(2), (3) and (4) shall apply. A minimum soil depth of twenty-four (24) inches over any underlying restrictive horizon is required. However, a modified mound system may utilize up to four (4) inches of additional sand backfill reducing the minimum depth of soil to any underlying restrictive horizon to twenty (20) inches.
4. The acceptable soil absorption rate range for the mound system shall be from ten (10) minutes per inch through seventy-five (75) minutes per inch as determined by an extra high intensity soil map conducted

by an approved soil consultant. If the soil absorption rate is determined to be greater than seventy-five (75) minutes per inch based upon a soils map prepared by an approved soil consultant, percolation tests may be conducted. However, soils with absorption rates in excess of seventy-five (75) minutes per inch due to wetness that cannot be corrected by drainage shall not be eligible for percolation tests. Percolation rates from seventy-six (76) minutes per inch through one hundred twenty (120) minutes per inch are acceptable if no water problems exist.

5. An area of suitable soil must be available to install the initial system and maintain a suitable area of adequate size for 100% duplication.
6. If tree stumps or boulders are present within the areas designated for the initial and duplicate systems, adequate area must be available to compensate for the area occupied by the boulders and tree stumps.
7. The basal area available for a mound must be equal to or greater than the basal area required for a given soil absorption rate.
 - (i) On sloping sites, the basal area available is that area directly below and downslope of the distribution bed. On level sites, the basal area available is that area below and on both sides of the distribution bed. That area below the end slopes shall not be included as available basal area.
 - (ii) The basal area required is determined by dividing the daily flow by infiltrative capacity of the soil. The infiltrative capacity of the following soils shall have the following absorption rates:

<u>Absorption Rate</u>	<u>Infiltrative Capacity (Gal./ft.2/day)</u>
10-29	1.2
30-60	0.74
61-120	0.24

8. Slopes steeper than twelve (12) percent shall not be utilized. Sites with soil absorption rates of sixty-one (61) through one hundred twenty (120) minutes per inch shall not exceed a slope of six (6) percent.
9. When cluster mounds are used, buffer zones are required at a frequency and size as determined by an extra high intensity soil/site evaluation.
 - (b) Layout of the Mound System
 1. The mound shall be located so as to insure that the distribution bed is situated parallel to slope contour.

2. The location of the septic tank, dosing tank and disposal mound shall be in accordance with Rule 2-110 of these Regulations.
3. The distribution bed shall be constructed level and its thickness shall be constant. A layer of uncompacted straw six (6) inches thick, untreated building paper or acceptable synthetic fabric shall be placed between the distribution bed and the clay cap.
4. Configuration
 - (i) The end slope gradient of the mound shall not be steeper than three (3) horizontal to one (1) vertical. The distance from the gravel bed to the toe of the end slope is calculated by multiplying the average mound height by the horizontal slope figure.
 - (ii) The upslope and downslope gradient of the mound shall not be steeper than three (3) horizontal to one (1) vertical. The distance from the gravel bed to the toe of either the upslope or the downslope side is calculated by multiplying the mound height at the appropriate edge of the gravel bed by the horizontal slope figure and then by the slope correction factor found in Table III.
 - (iii) The distribution bed thickness shall be a minimum of three-fourths (3/4) feet with a minimum of one-half (1/2) feet of aggregate below the distribution network.
 - (iv) The bed width shall not exceed ten (10) feet.
 - (v) The sand fill thickness beneath the gravel bed shall be a minimum of one (1) foot.

TABLE III. DOWNSLOPE AND UPSLOPE WIDTH CORRECTIONS FOR MOUNDS ON SLOPING SITES

Slope Percent	Downslope Correction Factor	Upslope Correction Factor
0	1.00	1.00
2	1.06	.94
4	1.14	.89
6	1.22	.86
8	1.32	.80
10	1.44	.77
12	1.57	.73

- (vi) The cap above the distribution bed shall consist of one (1) foot of clayey subsoil at its center tapering to one-half (1/2) foot at its edges.
- (vii) The entire finished mound shall be covered with one-half (1/2) foot of soil material suitable for plant growth.

(c) Dosing and Distribution System Design

1. The dosing rate per linear foot of lateral shall be uniform throughout the entire distribution network.
2. Hole spacing and location shall provide uniform distribution of effluent over the entire distribution bed. If the last hole is equal to or greater than one-half (1/2) of the hole spacing distance from the distal end of the lateral, a hole shall be placed in the end cap or adjacent to it.
3. Hole sizing, hole spacing, lateral length and lateral diameter shall be derived from Table IV. The hole diameter shall range from five thirty-second (5/32) through one-fourth (1/4) inch.
4. The system must be designed and placed so that the laterals and manifold drain after each dosing.
5. Calculation of gallons per minute (gpm) flow and total dynamic head (TDH).
 - (i) The gallons per minute flow, which the pump must provide, shall be determined by adding the combined gallons per minute flows of each hole.
 - (ii) The total dynamic head shall be determined by adding the following:
 - (I) Elevation head is the difference in elevation between the bottom of the pump and the laterals in the distribution bed. The minimum assigned elevation head shall be five (5) feet.
 - (II) Friction head shall be determined from Appendix III plus fittings loss.

TABLE IV. ALLOWABLE LATERAL LENGTHS (IN FEET) FOR THREE (3) PIPE DIAMETERS, THREE (3) PERFORATION SIZES, AND TWO (2) PERFORATION SPACINGS.

<u>Perforation Spacing</u> (in.)	<u>Perforation Diameter</u> (in.)	<u>Pipe Diameter</u>		
		(1 in.) feet	(1-1/4 in.) feet	(1-1/2 in.) feet
30	5/32	42	68	85
	3/16	34	52	70
	7/32	30	45	57
	1/4	25	38	50
36	5/32	45	70	90
	3/16	36	60	75
	7/32	33	51	63
	1/4	27	42	54

(III) A pressure head average of three (3) feet shall be used for TDH calculations. The range shall be one (1) through five (5) feet.

6. The minimum dosing volume shall be determined by adding the volume of the supply line, manifold and five (5) times the volume of the laterals.
7. The dosing volume shall be between one-fourth (1/4) and one-half (1/2) daily flow, except in those situations where the minimum dose exceeds one-half (1/2) daily flow, then the calculated minimum dose shall be the dosing volume.
8. When pumping uphill, a check valve must be utilized if the volume of the supply line, manifold and the volume of the laterals that drain back into the pump tank exceeds one-fourth (1/4) of the daily flow. If a check valve is utilized, the minimum dosing volume shall be determined by adding the volume of the manifold and five (5) times the volume of the laterals.

(d) Equipment and Material Specifications

1. Septic Tank and Dosing Tank

The septic tank shall conform to all design, construction and installation criteria set forth in Rules 2-107 and 2-108.

- (ii) The dosing chamber shall conform to all design, construction and installation criteria set forth in Rule 2-111.

2. Pipe and Fittings

- (i) All pipe materials shall be PVC and have a minimum equivalent-strength of Schedule 40.
- (ii) All fittings shall be pressure fittings.
- (iii) All connections shall be adequately cleaned with cleaning solvent and glued with PVC solvent cement.
- (iv) The gate or globe valve(s) and check valve shall be either bronze or PVC.
- (v) The lateral pipe diameter shall be a minimum of one (1)inch.
- (vi) The distal end of at least one (1) lateral shall be equipped with a capped turnup.

3. Pump, Float Controls and Alarm System

- (i) The pump shall be an effluent pump of sufficient quality and size to meet or exceed the gallons flow requirement and the total dynamic head requirement of the system.
- (ii) The pump float controls must be adjustable and must be sealed against entry of effluent or gases.
- (iii) Alarm System
 - (1) A high water alarm shall be required and consist of an audible and visible alarm located in a visible place and clearly marked "wastewater system alarm."
 - (II) The alarm and switches shall be placed on a separate electrical circuit from the pump power line.
 - (III) The alarm float control shall be placed so as to be activated when the pump chamber water level rises above the "pump on" float control.

4. Disposal Field Media

The media size shall be within the range of one-half (1/2) to one (1) inch. It must be washed and free of fines.

5. Sand

- (i) The particle sizes shall be predominantly [fifty (50%) percent or greater] medium sand (0.50 to 0.25 mm.) with no more than twenty (20%) percent fine sand (0.25 to 0.10 mm.) and be free from silt and clay.
- (ii) The sand shall be composed of stable materials and not subject to chemical deterioration.

6. Clay Cap Above the Distribution Bed - The cap shall be clayey subsoil.

7. Final Cover - The final cover shall consist of non-clayey, friable, fertile soil capable of supporting plant growth.

(e) Installation Procedures

1. Site Preparation and Imported Fill

- (i) The soil area reserved for the initial and duplicate system must not be cut, filled, compacted or disturbed in any manner prior to or after system installation.
- (ii) No site preparation shall occur if the soil is wet. The designated person responsible for monitoring system installation shall determine when the soil is adequately dry.
- (iii) All trees within the area designated for the mound shall be cut to ground level and all excess vegetation shall be removed.
- (iv) The area designated for the mound shall be plowed to a minimum depth of eight (8) inches prior to addition of the sand fill. This area shall be plowed on contour.
- (v) After any area is plowed there shall be no large equipment or wheeled traffic on or over said area. If a small tracked vehicle is used for construction there shall be a minimum of six (6) inches of sand between the track and plowed layer.

2. Supply Line and Manifold

- (i) The manifold and laterals shall be designed and installed to drain after each use.

- (ii) The supply line shall be designed and installed to drain after each use unless the system design requires a check valve.
- (iii) The supply line shall be installed so as to prevent freezing and shall not enter from the downslope side.

3. Pump and Controls

- (i) The pump must be placed so that the intake is a minimum of eight (8) inches above the bottom of the pump chamber.
- (ii) As a means to remove the pump from the pump chamber, a material of sufficient strength and durability must be secured to the pump and access riser.
- (iii) The pump control must be positioned so the "pump off switch is at the desired dosing depth.
- (iv) The pump outlet pipe must be connected to the supply manifold with a threaded union or similar device.
- (v) Immediately after the union, a gate or globe valve shall be placed in the supply line. The valve may be either PVC or bronze and shall be used to adjust the pressure on the system to the desired head.
- (vi) If the effluent is pumped downhill, a five thirty-second (5/32) inch siphon breaker hole must be drilled in the bottom of supply line above the water level in the pump tank.
- (vii) All electrical installations shall be installed to meet the applicable wiring methods of the current edition of the National Electric Code (NEC) adopted by the State Fire Marshall's office or the current edition of the Shelby County Electric Code.

4. The completed system must be shaped to prevent water from ponding or flowing over the system.

(5) Where soil conditions preclude the use of other soil absorption systems, a Waste Stabilization Lagoon may provide satisfactory sewage treatment for residences where soils are not suited for absorption systems and flows are less than six hundred (600) gallons per day. Waste stabilization lagoons require a minimum acreage tract of five (5) acres.

(a) Site and Soil Requirements

1. Prior to the design of the oxidation lagoon, the suitability of the site must be demonstrated through acceptable soil absorption rates, acceptable soil conditions and other topographic characteristics.
2. The soil characteristics shall be determined by a site investigation which includes the following elements.
 - (i) A site plan to a scale of one (1) inch equals fifty (50) feet shall show the four corners of each cell and the four (4) corners of the floor (bottom) of each cell. The four corners of the floor of the proposed lagoon shall be identified with flags or wood stakes.
 - (ii) A minimum of four (4) borings shall be made to a minimum of five (5) feet. One (1) boring shall be made in the floor of the lagoon near each stake or flag.
 - (iii) Additional borings shall be made in the side slopes (walls) of the wetted area of the lagoon to determine that the site has acceptable soil conditions and that the site is free of rocks to a depth of one (1) foot or more below the bottom of the wetted area of the lagoon.
 - (iv) The soil notes shall state the soil color, including mottles; the texture, including coarse fragments and consistency for each layer in the soil.
 - (v) The absorption rate may be estimated by a soil consultant approved by TDEC but may require approval by the department where the estimated absorption rate has been determined to be less than one hundred twenty (120) minutes per inch by a percolation test. The percolation holes shall be located in a grid pattern with maximum perpendicular distances between holes being twenty-five (25) feet, and the gridded portion shall encompass the entire area to be utilized for the system and duplicate area. The percolation test holes shall be dug to a depth equivalent to the total depth of the anticipated oxidation lagoon. The water level shall be adjusted three (3) feet from the bottom of the hole. All other portions of the percolation test procedure in Rule 2-104 of these Regulations shall apply.
 - (vi) The depth of the seasonal high water table shall be noted if it is located within six (6) feet of the soil surface.

3. The soil percolation rate must be a minimum of one hundred twenty (120) minutes per inch.
 4. Adequate suitable soil must be available to install the initial system and reserve an area of equal size.
 5. The lagoon shall be located in soils where the vertical separation from the bottom of the lagoon and bedrock and rock formations are a minimum of one (1) foot.
 6. The minimum operating level of the lagoon shall be located above the seasonal high ground water level. The lagoon shall not be located in areas in the 100-year flood plan.
 7. Slopes greater than eight (8) percent shall be considered unsuitable.
 8. Selection of the site shall include a clear sweep of the surrounding area by prevailing winds. Heavy timber must be removed for a distance of one hundred (100) feet from the water's edge to enhance wind action and prevent shading.
 9. Areas consisting of fill shall be excluded from the area considered for installation of the oxidation lagoon and disposal field.
 10. Lot Grading - The area to be used for the oxidation lagoon and disposal field shall not be disturbed when grading the lot. However, where this is unavoidable, a re-evaluation shall be made by an approved soil consultant after grading has been completed. After the suitability of any area to be used for an oxidation lagoon has been evaluated and approved for construction, no change shall be made to this area unless the Director is notified and a re-evaluation of the area's suitability is made prior to the initiation of construction.
- (b) Location - A minimum acreage tract of five (5) acres is required and larger areas may be necessary.

1. Minimum Separation Distances

- (i) The lagoon shall be located a minimum of fifty (50) feet from property lines, as measured from the lagoon shoreline.
- (ii) The lagoon shall be located a minimum of two hundred (200) feet from the nearest residence, commercial or industrial establishments, any habitable building or public use area. With the

owner's permission the lagoon may be within a lesser distance of his home.

- (iii) The lagoon shall not be located closer than fifty (50) feet away from any spring or well. Greater horizontal separation distances may be required depending on engineering and hydro geological data and type of water supply.
- (iv) The lagoon shall not be closer than fifty (50) feet away from a stream, lake or impoundment.
- (v) The lagoon shall not be located closer than fifty (50) feet from gullies, ravines, dry stream beds, natural drainageways, sinks, caves and cut banks.

(c) Design of the Oxidation Lagoon

1. The capacity of a two (2) cell lagoon shall be equivalent to a sixty (60) day minimum retention time based upon the average daily sewage flow of one hundred and fifty (150) gallons per bedroom for residences. The minimum water surface area of both cells shall be one thousand two hundred and fifty (1,250) square feet.
2. A properly sized and constructed two (2) compartment septic tank shall precede the lagoon.
3. The inner embankment of the lagoon shall be lined with soil that has a clay content of thirty-five (35) percent or more. The liner shall have a minimum thickness of six (6) inches after compaction.
4. The shape of the lagoon shall be such that there are no narrow or elongated portions. Round, square, or rectangular cells are considered most desirable. Rectangular cells shall have a length not exceeding three (3) times the width. No islands, peninsulas, or coves shall be permitted. Embankments must be rounded at corners to minimize accumulations of floating materials.
5. The embankment top width shall be a minimum of two (2) feet.
6. The embankment slopes shall not be steeper than two (2) horizontal to one (1) vertical on the inner and outer sides.
7. Inner embankment slopes shall not be flatter than

three (3) horizontal to one (1) vertical. Outer embankment slopes shall be sufficient to prevent the entrance of surface water into the lagoon.

8. Freeboard (the distance from the top of the water to the top of the embankment) shall be at least two (2) feet after settling. Additional freeboard may be provided.
9. Embankments shall be seeded with a locally hardy grass from the outside toe to the water line, to minimize erosion and facilitate weed control. Alfalfa or similar long-rooted crops which may interfere with the water holding capacity of the embankment shall not be used. Riprap may be necessary under unusual conditions to provide protection of embankments from erosion.
10. On sloping areas, a diversion ditch or soil improvement practices shall be located immediately upslope from the embankment. The ditch or soil improvement practice shall be installed to intercept and remove all surface and subsurface water and shall be protected from erosion.
11. The gravity flow lagoon influent line shall be Schedule 40 PVC or equivalent and have a minimum diameter of three (3) inches with a minimum grade of one-fourth (1/4) inch per foot. When gravity flow is utilized, the outlet invert of the septic tank shall be a minimum of one (1) foot above the high water level in the lagoon. The water level of each cell shall be at an elevation lower than the original ground surface.
12. The influent line shall be center discharging at a point two (2) feet beneath the water level. A watertight cleanout shall be provided in the influent line near the lagoon embankment and shall extend upwards to finished grade.
13. The effluent line from each cell shall be designed to maintain the water level of that cell at a depth of four (4) feet and be located so as to minimize short-circuiting from the influent line.
14. The effluent from the second cell shall be disposed of by a subsurface sewage disposal system.
15. The subsurface sewage disposal system shall be constructed according to Rule 2-106(4) of these Regulations and shall require a minimum of one hundred and fifty (150) square feet of soil absorption trench bottom area.

16. The finished grade above the subsurface sewage disposal system shall be lower in elevation than the invert of the effluent discharge line from the last cell.

(d) Dosing of the System (applicable only when pumping is necessary).

1. If pumping to the lagoon is necessary, the total dynamic head (TDH) shall be determined by the elevation head, friction head and three (3) feet of pressure head.

2. The gallons per minute (gpm) flow amount that the pump must provide shall be a minimum of ten (10) gpm.

3. The dosing volume shall be less than one-half (1/2) daily flow.

4. A check valve must be utilized when pumping uphill.

(e) Equipment and Material Specifications

1. Septic tank and dosing tank

(i) The septic tank shall conform to all design, construction and installation criteria set forth in Rules 2-107 and 2-108.

(ii) The dosing chamber shall conform to all design, construction and installation criteria set forth in Rule 2-111.

2. Pipe Materials

(i) All pipe materials shall be PVC and have a minimum equivalent strength of Schedule 40 PVC.

(ii) If pumping is necessary, all fittings shall be pressure fittings.

(iii) All connections shall be adequately cleaned with cleaning solvent and glued with PVC solvent cement.

(f) Construction

1. The area designated for the lagoon liquid storage area and embankments shall be stripped of vegetation. The organic material removed during excavation of the lagoon shall not be used in embankment construction.

2. The area designated for the lagoon liquid storage area and embankments shall be stripped of soils that will not form an effective seal.
3. The liquid storage area of the lagoon must be sealed to prevent excessive exfiltration.
4. Embankments shall be constructed of impervious materials, and compacted sufficiently to form a stable structure.
5. The influent line shall be installed at sufficient depth to protect the line from freezing and be properly bedded to prevent structural damage to the pipe from wheeled vehicles that cross the area. Slope of the line shall be such that excessive flow velocities do not cause scouring at the discharge point, but shall be adequate to prevent deposition within the line.
6. Effluent from the last cell shall be withdrawn from six (6) inches below the water surface. This shall be accomplished by placing a tee, with the run in a vertical position, on the inlet end of the effluent pipe.
7. The lagoon area shall be enclosed with a minimum four (4) feet high woven or chain-link fence to preclude livestock and discourage trespassing. The fence shall be so located to permit mowing of the embankment top and slopes. A gate of sufficient width to accommodate mowing equipment shall be provided.
8. Appropriate warning signs shall be provided to designate the nature of the facility and discourage trespassing.

(g) Operation and Maintenance

1. It shall be necessary to fill the lagoon with water prior to using it for waste disposal.
2. Vegetation growing along the water's edge and in the water shall be mowed or otherwise removed at least annually.
3. It shall be necessary to maintain a consistent water depth of four (4) feet at all times of the year.

- (6) A Large Diameter Gravelless Pipe (LDGP) system is a subsurface sewage disposal-system which has one (1) basic design principle different from conventional subsurface sewage disposal systems, which is that an eight (8) or ten (10) inch inside diameter corrugated polyethylene perforated pipe is used for the storage and distribution of effluent in a trench in lieu of a four (4) inch diameter pipe and gravel. A filter, fabric wrapped around the pipe prevents soil infiltration into the pipe and prevents small, suspended solids from moving out of the pipe; the pipe volume provides storage

equal to or slightly greater than a conventional gravel trench. LDGP systems that exceed seven hundred fifty (750) linear feet often (10) inch diameter pipe or one thousand one hundred and twenty-five (1,125) linear feet of eight (8) inch diameter pipe shall meet the minimum requirements established in Rule 2-106(3)(c).

(a) Site and Soil Requirements

1. The site and soil requirements are the same as for a conventional subsurface sewage disposal system. Where the soil absorption rate exceeds sixty (60) minutes per inch, gravel backfill, leveled with the top of the LDGP, shall be required in accordance with Rule 2-106(4)(j) and (m) and a trench width of twenty-four (24) inches.
2. An area of suitable soil must be available equivalent in size to that necessary to install and duplicate a conventional subsurface sewage disposal system.
3. The size of the LDGP system shall be determined by the following:
 - (i) The soil series shall determine the soil absorption rate found in Appendix I except those series or variants thereof to which a different soil absorption rate has been assigned based on soil properties determined during soil evaluations by a soil consultant approved by TDEC. The rate found in Table V shall determine the size of the LDGP system. Should a rate not be established for a particular soil series, the rate for that series shall be established by the department.
 - (ii) On individual lots where the Director determines site suitability, an established soil absorption rate up to and including seventy-five (75) minutes per inch may be established. The size of the LDGP system shall be determined by the rate found in Table V.
 - (iii) Where percolation tests are required, the size of the LDGP shall be determined by the rate found in Table V.

TABLE V. SOIL ABSORPTION RATES AND CORRESPONDING TRENCH LENGTH REQUIREMENTS FOR LDGP SYSTEMS

ABSORPTION RATE IN MINUTES PER INCH	TRENCH LENGTH IN LINEAR FEET/GALLON		TRENCH LENGTH IN FEET PER BEDROOM	
	8" Pipe	10" Pipe	8" Pipe	10" Pipe
10	0.600	0.400	83	55
15	0.700	0.467	95	64
30	1.000	0.677	125	84
45	1.250	0.834	150	100
60	1.450	0.967	165	110
75	1.600	1.067	185	124
80	1.650	1.100	190	126
85	1.700	1.134	195	130
90	1.750	1.167	200	134
95	1.800	1.200	208	139
100	1.850	1.234	215	144
105	1.900	1.267	223	149

EXAMPLES:

1. The soil absorption rate is thirty (30) minutes per inch. A three (3) bedroom home is to be located on this site. If an eight (8) inch inside diameter pipe is used, then three (3) bedrooms x one hundred and twenty-five (125) feet/bedroom = three hundred and seventy-five (375) linear feet of trench needed.
2. The soil absorption rate is ninety-five (95) minutes per inch. A four (4) bedroom house is to be located on this site. If a ten (10) inch inside diameter pipe is used, then four (4) bedrooms x one hundred and thirty-nine (139) feet/bedroom = five hundred and fifty-six (556) linear feet of trench needed.
3. The soil absorption rate is forty-five (45) minutes per inch. A commercial building generating five hundred (500) gallons of wastewater per day is to be located on this site. If a ten (10) inch inside diameter pipe is used, then five hundred (500) gallons x eight hundred and thirty-four one thousandths (0.834) feet/gallon = four hundred and seventeen (417) linear feet of trench needed.
4. The soil absorption rate is eighty-five (85) minutes per inch. An industrial plant generating three hundred and seventy-five (375) gallons of wastewater per day is to be located on this site. If an eight (8) inch inside diameter pipe is used, then three hundred and seventy-five (375) gallons x one and seven tenths (1.700) = six hundred and thirty-eight (638) linear feet of trench needed.

(b) Layout of the LDGP System

1. The linear footage required is determined from Table V.
2. The location of the septic tank and the disposal field shall be in accordance with Rule 2-110 of these Regulations.
3. The lateral lines shall be placed on contour. The maximum length of a single line should not exceed one hundred (100) feet unless conditions require a longer line.
4. The trench bottom of each lateral shall have a grade from level to no greater than two (2) inches per one hundred (100) feet.
5. A minimum of six (6) feet of undisturbed earth between adjacent trench walls shall be required.
6. Trench width shall be a minimum of eighteen (18) inches and a maximum of twenty-four (24) inches .with the maximum trench width being required when the soil absorption rate exceeds sixty (60) minutes per inch.
7. Trench depth shall range between twenty-two (22) and forty-eight (48) inches for eight (8) inch pipe and twenty-four (24) and forty-eight (48) inches for ten (10) inch pipe.
8. The large diameter pipe shall be positioned in the trench so that the top location stripe is on top. Sections of pipe shall be securely joined and the filter wrap must cover all joints and the ends of each line. All couplings and/or connections must be accomplished with material/fittings manufactured specifically for large diameter gravelless pipe. Where a supply or tight line ties into the side of a large diameter gravelless pipe, the supply line or tight line shall not penetrate the pipe more than two (2) inches.
9. Soil material excavated from trenches should be used in backfilling and should be left mounded over the trenches until initial settling has taken place.
10. The invert of the overflow pipe in the first relief line shall be at least four (4) inches lower than the invert of the septic tank outlet. The trench for the relief pipe, where it connects with the proceedings large diameter gravelless pipe, shall be dug no deeper than the top of the large diameter gravelless pipe. In a recirculating design, the top of the pipe must be a minimum of one (1) inch below the invert of the septic tank outlet.

(c) Equipment and Material Specifications

1. Septic Tank (Rules 2-107 and 2-108 shall apply)
2. Pipe
 - (i) The eight (8) and ten (10) inch inside diameter tubing shall be corrugated polyethylene, meeting the requirements of ASTM F667, Standard Specification for Large Diameter Corrugated Polyethylene Tubing.

- (ii) Perforations shall be cleanly cut and uniformly spaced along the length of the tubing as follows: two (2) rows of three-eighths (3/8) to one-half (1/2) inch diameter holes located 115 degrees - 125 degrees apart along the bottom half of the tubing with each row of holes 57.5 degrees - 62.5 degrees up from the bottom centerline. These perforations should be staggered so that there is only one (1) hole in each corrugation. Perforations must be located in the minimum diameter portions of the pipe.
- (iii) The tubing shall be marked with an easily visible top location stripe.

3. Filter Wrap - All large diameter pipe shall be encased with a spun bonded nylon, or other material of similar strength and durability. If the filter wrap is installed at the point of manufacture, then the corrugated pipe and filter wrap shall be shipped in a protective covering that will prevent damage to the filter wrap. This wrap shall meet or exceed the following general qualities:

Physical Properties	Minimum Values
Weight (oz./sq.yd.)	0.75
Thickness (mils.)	4.4
Grab Strength (lbs.)	
Machine Direction	19
Transverse Direction	11
Burst strength (psi)	26
Air Permeability (cfm/sq.ft.)	500
Water Flow Rate (gpm/sq.ft. at 3" head)	200

(7) A chamber system is a media replacement system consisting of a high density polyethylene arch shaped open bottomed chamber. Chamber systems that exceed seven hundred fifty (750) linear feet in a single system, or five hundred twenty-five (525) linear feet where the soil absorption rate is sixty (60) minutes per inch or less, shall meet the minimum requirements established in Rule 2-106(3)(c).

(a) Site and Soil Requirements

- 1. The site and soil requirements are the same as for a conventional subsurface sewage disposal system.
- 2. An area of suitable soil must be available equivalent in size to that necessary to install and duplicate a conventional subsurface sewage disposal system.

(b) Layout of the Chamber System

1. The size of a chamber system shall be equivalent to the total linear footage required for a three feet wide conventional subsurface sewage disposal system. However, where the soil absorption rate is from ten (10) to sixty (60) minutes per inch, the total linear footage may be reduced by thirty (30) percent. If a portion of a unit is left over after determining the total linear footage required, round up to the nearest whole unit.
2. The location of the septic tank and the disposal field shall be in accordance with Rule 2-110 of these Regulations.
3. The lateral lines shall be placed on contour. The maximum length of a single line should not exceed one hundred (100) feet unless conditions require a longer line.
4. The trench bottom of each lateral shall have a grade from level to no greater than two (2) inches per one hundred (100) feet.
5. A minimum of six (6) feet of undisturbed earth between adjacent trench walls shall be required.
6. Trench width shall be thirty-six (36) inches.
7. Trench depth shall range from twenty-four (24) to forty-eight (48) inches.
8. Soil material excavated from trenches should be used in backfilling and should be left mounded over the trenches until initial settling has taken place.
9. The top of the chambers shall be below the invert of the septic tank outlet.
10. The trench for the relief pipe, where it connects with the preceding absorption trench, shall be dug no deeper than the invert of the opening in the end plate.

(c) Equipment and Material Specifications

1. Septic Tank (Rules 2-107 and 2-108 shall apply)
2. Each chamber shall measure from thirty-two (32) to thirty-six (36) inches wide and ten (10) to twelve (12) inches high. Chambers of varying heights and widths may be approved on an individual basis by the Department of Environment and Conservation, Division of Groundwater Protection, Central Office.
3. Each chamber must be designed to interlock with adjacent chambers, inlet plate or end plate forming a complete disposal trench that consists of an inlet plate with a splash plate located below the inlet on the trench bottom and a solid end plate to be located at the distal end of each terminal trench.

4. The chamber sidewall must be designed to allow effluent to pass laterally into the soil.

2-115. EXPERIMENTAL METHODS OF TREATMENT AND DISPOSAL OTHER THAN THOSE PROVIDED IN THESE REGULATIONS.

- (1) Experimental methods of treatment and disposal of sewage in lieu of those provided herein shall not be utilized unless approval has been granted by TDEC, Division of Groundwater Protection.
- (2) Prior to issuance of an experimental sewage system permit, an application must be made to the department and a restrictive covenant noting that fact shall be completed, notarized and recorded at the Shelby County Register's Office. A copy of such shall be submitted to the department.

2-116. PRIVIES AND COMPOSTING TOILETS.

- (1) Pit privies shall be constructed to prevent a health hazard and prevent insect and rodent accessibility, and shall not be located less than fifty (50) feet from a water supply or less than ten (10) feet from any habitable building or property line.
- (2) Composting toilets must be certified by the National Sanitation Foundation (NSF) to be in compliance with NSF Standard 41, and must be published in their "Listing of Certified Wastewater Recycle/Reuse and Water Conservation Devices", before they may be used for disposal of human excreta by non-water carriage methods.
- (3) A pit privy or composting toilet shall not be permitted for a facility where the facility has running water available unless there is an acceptable means to dispose of wastewater.

2-117. APPROVED SOIL CONSULTANTS.

An approved soil consultant shall be one who has been approved by the Commissioner pursuant to applicable law and regulations.

2-118. INSTALLER OF SUBSURFACE SEWAGE DISPOSAL SYSTEMS.

- (1) No person shall engage in the business of constructing, installing, altering, or extending or repairing a subsurface sewage disposal system unless he has a valid annual permit issued by the Director. Nothing in this subsection shall act to remove the requirement that any person must secure a construction permit from OCCE and a subsurface sewage disposal system plan permit from the department as provided by law and these Regulations.
- (2) Any person who is, on the effective date of these Regulations, or who intends to become after the effective date of these Regulations, an installer, shall make application for the installer's permit in writing on a form furnished by TDEC.

2-119. SEPTIC TANK PUMPING CONTRACTOR.

- (1) Domestic Septage Removal Permit - Persons engaged in the business of removing and disposing of domestic septage from septic tanks, holding tanks, portable toilets, or other similar sewage treatment or disposal facilities covered within the provision of these Regulations shall obtain an annual permit from the Director. Septic tank pumping contractors are authorized under the domestic septage removal permit to pump the contents of grease traps that are a part of subsurface sewage disposal systems. This grease trap waste must be disposed of in a manner approved by the Director. Grease trap waste may not be disposed of on a domestic septage disposal site, as authorized under these Regulations.
- (2) No permit under this section shall be granted until:
 - (a) An application is filled out in its entirety, unless otherwise specified by the Commissioner; and
 - (b) The contractor shall demonstrate to the Director that he is capable of conducting the operation in accordance with the Regulations as set forth therein.
 - (c) A domestic septage removal permit may be denied where the applicant has had a previous permit denied, suspended or revoked due to unsatisfactory work, where such unsatisfactory work is material to the subject matter of the permit.
- (3) Application for permit shall contain the following:
 - (a) Business name, owner's name, address and telephone number.
 - (b) Signature of applicant and date of application.
 - (c) Written permission of the proper official when contents are to be disposed of by discharging into a public or community wastewater treatment plant.
 - (d) Written permission of the landowner, and disposal site operator, if different from the landowner, for each land application site used, including a copy of the domestic septage disposal site permit(s).
 - (e) Tank capacity, in gallons, license number and state of registration for each vehicle used to transport domestic septage.
 - (f) Counties in which the contractor intends to conduct most of his business.
- (4) Monitoring Logs - A monthly log, on a form provided by the Department, of all pumping and discharges shall be maintained. The log shall include, but not be limited to, the following:
 - (a) Date domestic septage is collected.
 - (b) Address of collection.

- (c) Indicate if collection point is residential or commercial.
- (d) Volume in gallons collected.
- (e) Type of waste handled.
- (f) The discharge location, by treatment plant name or land disposal site permit number.
- (g) . The date, time and total number of gallons of domestic septage applied to the approved disposal site (if applicable).
- (h) Method of pathogen reduction and vector attraction reduction for each load (if applicable).
- (i) The following statement of certification:

"I certify, under penalty of law that all domestic septage has been disposed of at an approved wastewater treatment facility, or that the site requirements in the Regulations To Govern Subsurface Sewage Disposal Systems, Section 1200-1-6.20(6) have been met."

- (5) Vehicle Identification - All vehicles engaged in domestic septage removal shall carry on both sides of the vehicle the name and address of the firm or operator conducting the business and the domestic septage removal permit number under which the business is being conducted. All lettering shall be at least two (2) inches high in bold print on a background of contrasting colors. All vehicles used for transporting domestic septage shall have an identifying sticker, provided by the department, attached to the vehicle in a location determined by the department.
- (6) Vehicle Maintenance - Every vehicle used for domestic septage removal purposes shall be equipped with a watertight tank and shall be maintained in a clean and sanitary condition. Liquid wastes shall not be transported in an open body vehicle unless contained within suitable portable receptacles. All pumps, valves and hose lines shall be maintained so as to prevent leakage. A splash plate or other approved method of dispersal shall be used for land application,
- (7) Portable Receptacles - All portable receptacles used for transporting liquid or solid wastes shall be watertight, equipped with tight-fitting lids, and cleaned daily.
- (8) Domestic Septage Removal Permit
 - (a) Permits shall not be transferable or assignable and shall automatically become invalid upon a change of ownership or upon suspension or revocation.
 - (b) Permits shall expire on the 31st day of December, following the date of issuance.
 - (c) When a permit has been denied, suspended, or revoked, a hearing may be requested before the Director making such request in writing within thirty (3) days of the date of the denial, suspension or revocation.

- (9) Septic tank pumping contractors are subject to and must comply with all applicable regulations of the Tennessee Department of Environment and Conservation and these Regulations.
- (10) All septic tank pumping contractors must obtain a permit, renewable annually, from the Department.

2-120. DOMESTIC SEPTAGE DISPOSAL.

- (1) When permission for use is obtainable, a public, or community, or private wastewater treatment facility shall be used to dispose of domestic septage. When permission to use wastewater treatment facilities cannot be obtained, then a permitted domestic septage disposal site may be used in accordance with this rule. A domestic septage disposal site permit shall be obtained from the Director.
- (2) Domestic Septage Disposal Site Permit - Any site used for the disposal of the domestic septage from septic tanks or other sewage treatment or disposal facilities covered within the provisions of these Regulations shall require an annual permit from the Director. The operator of the site shall obtain this permit prior to any use of the site and shall be responsible for the proper use and maintenance of the site.
- (3) No permit under this section shall be granted until:
 - (a) An application is filled out in its entirety, unless otherwise specified by the Director; and
 - (b) The operator has demonstrated to the Director that he is capable of operating the site in accordance with the Regulations as set forth herein; and
 - (c) The department has determined that the site meets the minimum requirements as set forth herein.
 - (d) A domestic septage disposal site permit may be denied, suspended, or revoked when the disposal site does not meet the minimum requirements as set forth herein or where it is determined that the operator is not operating the site in accordance with the Regulations as set forth herein.
- (4) Application for permit shall contain the following:
 - (a) Business name, address and telephone number of operator.
 - (b) Name, address and telephone number of applicant.
 - (c) Written permission of the landowner. The landowner must agree, in writing, to abide by the land use restrictions as provided in the Regulations.
 - (d) A high intensity soil map of the proposed disposal area prepared in accordance with Rules 2-102(3)(a)(1)(i) and 2-102(3)(a)(2)(i) of these Regulations. This map must note any areas where slope exceeds twelve (12)

percent or where there is less than twenty-four (24) inches of soil material before subsurface bedrock formations, fragipans, seasonal high water table, or water are encountered.

- (e) A plat, with seal and signature of a registered surveyor, of sufficient scale and accuracy to locate pertinent features. This plat shall include, but not be limited to, the property boundaries, disposal boundaries, buildings, underground utilities, roads, surface waters, water supplies, water courses, sinks, sinkholes, caves, etc.
 - (f) The crop to be grown on the disposal site for the coming year.
 - (g) Any additional information that the Director determines is necessary to properly evaluate the site.
- (5) Permits for Domestic Septage Disposal Site.
- (a) Permits shall not be transferable or assignable and shall automatically become invalid upon a change of land or business ownership or upon suspension or revocation.
 - (b) Permits shall expire on the 31st day of December, following the date of issuance.
 - (c) When a permit has been denied, suspended, or revoked, a hearing may be requested before the Board pursuant to Rule 1-108 of these Regulations.
- (6) Land application of domestic septage maybe approved as follows:
- (a) The pH of the domestic septage shall be raised to a minimum of twelve (12) or higher by the addition of an alkali such as hydrated lime or quicklime, and without adding more alkali, the domestic septage shall remain at a pH of twelve (12) or higher for at least thirty (30) minutes prior to being land applied; or
 - (b) Domestic septage shall be injected below the surface of the soil. When domestic septage is injected below the surface of the soil, no significant amount of domestic septage shall be present on the surface of the soil within one (1) hour after the domestic septage is injected; or
 - (c) Domestic septage shall be incorporated into the surface of the soil within six (6) hours of land application.
 - (d) The vehicle must be in motion during land application to evenly distribute the domestic septage over the site. A splash plate or other approved method of dispersal shall be used for land application.
 - (e) Grease and/or the contents of grease traps shall not be disposed of at any domestic septage disposal site approved under these rules.
 - (f) Commercial or industrial wastewater shall not be disposed of at any domestic

septage disposal site approved under these rules.

- (g) The contents of portable toilets, Type marine sanitation devices, or similar materials shall not be applied to domestic septage disposal sites unless the site is approved in conjunction with the department.

(7) Site Restrictions

- (a) Soil requirements:

1. Domestic septage disposal sites shall have a slope of twelve (12) percent or less.
2. The soil material in the domestic septage disposal site shall be at least twenty-four (24) inches deep before subsurface rock formations or seasonal ground water is encountered.
3. Domestic septage disposal sites shall have a well-established sod cover unless domestic septage is injected below the soil surface or incorporated into, the soil surface within six (6) hours of land application.
4. The minimum soil absorption rate shall be thirty (30) minutes per inch. There are no upper limits on soil absorption rates.

- (b) The annual application rate for domestic septage shall not exceed the annual application rate calculated using the equation:

$$AAR = N \frac{0.0026}{0.0026}$$

$$0.0026$$

Where:

AAR = Annual application rate in gallons per acre per 365 day period.

N = Amount of nitrogen in pounds per acre per 365 day period needed by the crop or vegetation grown on the land.

Once the annual application rate has been reached for an approved domestic septage disposal site, no additional domestic septage disposal will be allowed on that site during that calendar year.

- (c) The location of the disposal site shall be selected in accordance with the following minimum distances:

1. Five hundred (500) feet from any habitable building or public use area. With the owner's permission, the site may be within a lesser distance of his residence.

2. One hundred (100) feet from adjoining property, any highway or public road, sink, cave or bedrock outcrop.
 3. Three hundred (300) feet from surface waters or any point where it can pollute any water course or groundwater.
 4. Five hundred (500) feet from water supplies or bathing areas.
 5. No disposal in areas subject to flooding, as determined by the department.
- (d) Grazing restrictions - Animals shall not be allowed to graze on the land for thirty (30) days after application of domestic septage.
- (e) Public access to the domestic septage disposal site shall be restricted for one year after application of domestic septage. Examples of restricted access include remoteness, posting "no trespassing" signs, and/or simple fencing.
- (f) Crop restrictions:
1. Food crops with harvested parts that touch the domestic septage/soil mixture and are totally above ground shall not be harvested for fourteen (14) months after application of domestic septage.
 2. Food crops with harvested parts below the surface of the land shall not be harvested for thirty-eight (38) months after application of domestic septage.
 3. Animal feed, fiber, and those food crops that do not touch the soil surface shall not be harvested for thirty (30) days after application of domestic septage.

(8) Facility Standards

- (a) Storage facilities shall be identified and approved and must be used if pumping is continued when the site is not accessible or usable.
- (b) Mixing facilities for lime and domestic septage shall be identified, inspected, and approved by the Commissioner.
- (c) Mixing tanks must be watertight, structurally sound, and not subject to excessive corrosion or decay.

2-121. FEES FOR SERVICES.

- (1) Fees for services are assessed pursuant to the following:

<u>Specific Procedure Covered by Fee</u>	<u>Fee</u>
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- (a) Conventional, chamber and large diameter gravelless pipe subsurface sewage disposal systems permit application processing, making inspections and other regulatory activities relative to the construction of new conventional, chamber and large diameter gravelless pipe subsurface sewage disposal systems and expansion of system because of additions resulting in added wastewater flow but not for repair of malfunctioning systems. Permits shall be granted or denied within forty-five (45) days of receipt of all necessary information. One Hundred and Seventy-Five dollars (\$175.00) up to (1,000) gallons per day (g.p.d.) design flow plus one hundred (\$100.00) dollars for each additional (1,000) gallons per day flow, or portion thereof.
- (b) Alternative subsurface sewage application up to disposal systems permit processing (excluding chamber and large diameter gravelless pipe systems), making inspections and other enforcement activities relative to the construction of alternative subsurface sewage disposal systems and expansion of systems because of additions resulting in added wastewater flow but not for repair of malfunctioning systems. Permits shall be granted or denied within forty-five (45) days of receipt of all necessary information. Three hundred (\$300.00) dollars (1,000) g.p.d. design flow plus one hundred fifty (\$150.00) dollars for each additional (1,000) gallons per day flow, or portion thereof.
- (c) Inspections of existing sewage systems. One hundred (100.00) dollars per inspection.
- (d) Installer and Pumper Permits - Enforcement activities relative to sewage system installers and septic tank pumpers. Permits shall be granted or denied within forty-five (45) days of the date of application.. One hundred (\$100.00) dollars per permit for pumpers and installers of conventional, and large diameter gravelless pipe systems. An additional (\$100.00) dollars for each type of alternative system to be permitted.
- (e) Plans Review - Review of designs for large conventional or large alternative subsurface sewage disposal systems to the point of permit issuance. One hundred and seventy-five (\$175.00) dollars per proposed lot.
- (f) Subdivision Evaluations. Evaluations of lots within proposed subdivisions to determine and to specify limitations on their usability for subsurface sewage disposal systems. Forty (\$40.00) dollars per lot
- (g) Plat approval for individual lots Forty (\$40.00) dollars per lot

2-122. GENERAL PROVISIONS.

- (1) Applicability
 - (a) Rule 2-102 applies to subdivisions as defined in Rule 2-101. All subdivisions shall comply with applicable provisions of Rule 2-102.
 - (b) Rule 2-103 applies to subdivisions and individual lots. All subdivisions and individual lots shall comply with all applicable provisions of Rule 2-103.
 - (c) Rule 2-104 applies to percolation tests. Percolation tests may only be conducted as authorized in T.C.A. §68-13-403(c). A percolation test is defined in Rule 2-101 and is not to be confused with soil analyses conducted by a soil consultant. All percolation tests shall comply with all provisions of Rule 2-104.
 - (d) Rule 2-105 applies to all construction permits whether an individual lot or a lot within a subdivision. All persons installing or having installed a subsurface sewage disposal system must comply with all provisions of Rule 2-105.
 - (e) Rule 2-106 applies to installation of conventional subsurface sewage disposal systems. All conventional disposal field installations shall comply with all provisions of Rule 2-106.
 - (f) Rule 2-107 applies to installation of all subsurface sewage disposal systems. All septic tanks shall comply with all provisions of Rule 2-107.
 - (g) Rule 2-108 applies to installation of all subsurface sewage disposal systems. All septic tanks shall comply with all provisions of Rule 2-108.
 - (h) Rule 2-109 applies to subsurface sewage disposal effluent treatment devices/systems. All effluent treatment devices/systems shall comply with applicable provisions of Rule 2-109.
 - (i) Rule 2-110 applies to subsurface sewage disposal systems. All septic tanks, dosing chambers and absorption fields shall be located in accordance with Rule 2-110.
 - (j) Rule 2-111 applies to subsurface sewage disposal systems requiring dosing. All dosing systems shall be designed and installed in accordance with Rule 2-111.
 - (k) Rule 2-112 applies to subsurface sewage disposal systems. It shall be the responsibility of the property owner and the Commissioner to adhere to Rule 2-112.

- (l) Rule 2-113 applies to those subsurface sewage disposal systems that utilize grease traps. All grease traps shall be designed, constructed, operated and maintained in accordance with Rule 2-113.
- (m) Rule 2-114 applies to all alternative methods of subsurface sewage disposal. All alternative subsurface sewage disposal systems shall comply with the applicable provisions of Rule 2-114.
- (n) Rule 2-115 applies to experimental methods of subsurface sewage disposal. All experimental methods of subsurface sewage disposal shall comply with Rule 2-115.
- (o) Rule 2-116 applies to privies. All privies shall comply with applicable provisions of Rule 2-116.
- (p) Rule 2-117 applies to all persons who apply for or who are approved soil consultants. Any person applying for or maintaining this approval shall comply with all applicable provisions of Rule 2-117.
- (q) Rule 2-118 applies to all persons who apply for or who have a valid installer of subsurface sewage disposal systems permit. Any person applying for or maintaining this permit shall comply with all applicable provisions of Rule 2-118 at all times.
- (r) Rule 2-119 applies to all persons who apply for or who have a valid septage removal permit. Any person applying for or maintaining this permit shall comply with all applicable provisions of Rule 2-119 at all times.
- (s) Rule 2-120 applies to any person (as defined in Rule 2-101) who disposes of septage and any site, which is used for septage disposal. Any person requesting approval to dispose of septage shall comply with all applicable provisions of Rule 2-120. Any site used for disposal of septage shall comply with all applicable provisions of Rule 2-120 at all times.
- (t) Rule 2-121 applies to all services provided by the Division of Ground Water Protection. All applicants requesting a soil map, subsurface sewage disposal system permit, subdivision evaluation, inspection of an existing system, installer or pumper permit, sewage survey, water sample or plan review shall comply with all provisions of Rule 2-122.
- (u) Rules 2-101 through 2-121 apply only to subsurface sewage disposal. They do not include surface discharge systems or holding tanks.

2-123. INJUNCTIONS.

- (a) The Director may cause to be instituted a civil action in any court of competent jurisdiction for injunctive relief to prevent violation of any provision of this ordinance.
- (b) The County Attorney shall represent the Director in bringing such civil action.

2-224. VIOLATIONS — PENALTY.

- (a) Any person violating any of the provisions of this ordinance shall be subject to a fine of fifty dollars (\$50.00) for each offense.
- (b) Each day that an offense continues shall constitute a separate and distinct offense or a term of imprisonment not greater than thirty (30) days, or both.
- (c) Any alleged violation of this Ordinance shall be prosecuted in Division XIV of the Shelby County General Sessions Court.

APPENDIX I

Soil Series or Soil Phase	Soil Absorption Rate Min./In. (Average)	Footnote
Abernathy	30	1
Adaton	>75	2
Adler	30	1
Alcoa	45	
Allegheny	30	
Allen	45	
Alligator	>75	4
Almaville	>75	4
Almo	>75	
Allicrest	30	5
Altavista	30	2
Alva	15	1
Am agon	75	1
Apison	45	5
Arkabutla	45	4
Armour	30	
Armuchee	>75	5
Arrington	30	1
Ashe	15	3
Askew	45	1
Ashwood	>75	3
Atkins	30	4
Augusta	>75	2
Balfour	30	
Barbourville	15	1
Barfield	>75	3
Baxter (Cherty)	60	
Beason	>75	2
Bedford		
more than 24 inches to fragipan	75	
less than 24 inches to fragipan	>75	
Beechy	30	4
Bewleyville	45	
Bibb	15	4
Birds	30	4
Bland	>75	3
Bodine (Cherty)	30	
Bolton	45	
Bonair	30	4
Bonn	>75	2
Bosket	30	1

Boswell	>75	
Bouldin	10	
Bowdre	30	
Bradyville		
more than 20 inches to clay		
less than 20 inches to clay		
Brandon Brasstown Braxton		
more than 24 inches to clay	75	
less than 24 inches to clay	>75	
Brevard	30	
Briensburg	30	1
Britton	>75	
Brookshire	15	
Bruno	<10	1
Bryson		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Buncombe	<10	1
Burgin	>75	2
Burton	30	3
Byler		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Calhoun	>75	2
Galloway	>75	2
Calvin	>75	3
Camp	30	1
Cannon	15	1
Capshaw	>75	2
Captina		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Carbo	>75	3
Cataska	>75	
Caylor	60	
Center	75	2
Chagrin	30	1
Chenneby	45	2
Chewacla	30	4
Chickasaw	>75	
Christian	>75	
Citico	45	
Claiborne	45	
Glarksville (Cherty)	30	

Clarkrange		
more than 24 inches to fragipan	75	
less than 24 inches to fragipan	>75	
Clifton	45	
Cloudland		
more than 24 inches to fragipan	75	
less than 24 inches to fragipan	>75	
Colbert	>75	
Collegedale	>75	
Collins	30	1
Commerce	60	4
Conasauga	>75	
Conagree	15	2
Convent.	45	
Cookeville	60	1
Cotaco	30	4
Crevassee		
Crider	30	
Crossville	30	
Culleoka	30	
Cumberland	45	
Curtistown	30	
Cuthbert	>75	
Cynthiana	>75	
Dand ridge	>75	
Deanburg	30	
Decatur	45	
DetCalb	15	
Dekoven	>75	
Delanco	30	5
Dellrose (Cherty)	30	
Dewey	60	4
Dexter	30	
Dickson		2
more than 24 inches to fragipan	75	
less than 24 inches to fragipan	>75	
Dillon	75	
Ditney	30	
Donerail	>75	2
Dowelltown	>75	2
Dubbs	45	2
Dulac		5
more than 24 inches to fragipan	75	
less than 24 inches to fragipan		2
Dundee	60	1
Dunmore		

more than 24 inches to clay	60	
less than 24 inches to clay	75	
Dunning	>75	2
Dyer	45	4
Eagleville	>75	3
Ealy	15	1
Egam	>75	1
Elk	45	
Elkins	45	4
Elliber	30	
Emory	30	1
Enders	>75	
Ennis	30	1
Enville	45	4
Etowah	30	
Eustis	<10	
Eupora	30	4
Fail-mount	>75	3
Falaya	45	4
Falkner	>75	
Fannin	30	5
Farragut		
more than 36 inches to shale material	75	
less than 36 inches to shale material	>75	
Fletcher	45	
Forestdale	>75	4
Fountain	>75	2
Frankstown (Cherty)	45	
Freeland		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Fiillerton (Cherty)	45	
Fullerton	60	
Gilpin	>75	3
Gladeville	>75	3
Godwin	>75	4
Greendale (Cherty)	30	1
Grenada		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Groseclose	>75	
Guin	15	
Guthrie	>75	4
Hagerstown	60	
Hamblen	30	1
Hampshire	>75	

Hanceville	45	
Harpeth	30	
Hailsells	30	5
Hatchie	>75	2
Hayesville	45	
Hayter	45	
Hector	>75	3
Henry	>75	2
Hermitage	30	
Hicks	45	
Hi 11 wood	45	
Hiwassee	45	
Hollywood	>75	2
Holston	45	
Humphreys	30	
Huntington	30	1
Hymon	30	1
Iberia	>75	4
Ina	45	4
Inman	>75	3
luka	30	1
Jeffrey	30	3
Jefferson	30	
Jefferson		
Stoney	15	
Cobbly	15	
Gravell	15	
Johiisburg	>75	2
Junaluska	45	5
Landisburg	>75	2
Lanton	>75	1
Lawrence	>75	2
Lax		
more than 24 inches to fragipan	75	
less than 24 inches to fragipan	>75	
Leadvale	>75	2
Lee	30	4
Leesburg	30	
Lehew	30	5
Lewistown	>75	
Lexington	30	
Lickdale	60	4
Lily	30	5
Lindell	30	1
Lindsay	30	1
Linker	30	5

Litz	>75		3
Lintonia	45		
Lobdell	30		1
Lobelville	30		1
Lomond	45		
Lonewood	60		
Lonon	45		
Loring			
more than 24 inches to fragipan	75		
less than 24 inches to +fragipan	>75		
Luveme	>75		
Lynnville	45		4
Magnolia	>75		
Manse	30		
Mantachie	45		4
Masada	30		
Matney	30		3
Maury	45		
Maymead	30		
Melvin	45		4
Memphis	45		
Mercer			
more than 24 inches to fragipan	75		2
less than 24 inches to fragipan	>75		2
Mhoon	60		4
Mimosa		>75	
Minvale		45	
Minvale (Cherty)		30	
Morganfield	30		1
Monongahela			
more than 24 inches to fragipan	75		2
less than 24 inches to fragipan	>75		2
Montevallo	>75		3
Mountview		45	
Muskingum	60		3
Mullins	>75		4
Muse		>75	
Natchez		60	
Needmore	>75		5
Nella		15	
Nesbitt		75	
Neubert	15		1
Newark	30		4
Nixa			
more than 24 inches to fragipan	75		
less than 24 inches to fragipan	>75		

Nolichucky	30	
Nolin	30	1
Northcove	30	
Nugent	<10	1
Oaklimeter	30	1
Ocana	15	1
Ochlochkonee	30	1
Oktibbeha	>75	
Oliver	>75	4
Ooltewah	30	1
Openlake	>75	1
Orrville	30	4
Pace	75	2
Paden		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Paraloma		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Pembroke	45	
Perkinsville	45	
Petros	>75	3
Philo	30	1
Pickaway		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Pickwick	60	
Pope	30	1
Porters	30	5
Prader	45	4
Providence		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Prentiss		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Pottsville	>75	3
Purdy	>75	4
Ramsey	>75	3
Ranger	45	5
Reelfoot	60	4
Richland		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Roane	>75	4
Roanoke	>75	2

Robertsville	>75	4
Robinsonville	15	1
Roellen	>75	2
Rosebloom	45	4
Routon	>75	2
Russellville		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Ruston	30	
Saffell	30	
Safford	>75	
Sandhill	15	3
San go		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Savannah		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Sees	>75	
Sensabaugh	30	1
Sequatchie	30	1
Sequoia	>75	
Sewanee	30	1
Shannon	30	1
Shelocta	45	
Sharkey	>75	4
Shouns	60	
Shubuta	75	
Silerton		
more than 24 inches to clay	75	
less than 24 inches to clay	>75	
Smithdale	30	
Soco	45	5
Solway	>75	3
Spivey		15
Staser	30	1
State	30	1
Statler	30	1
Steekee	>75	3
Steens	75	2
Stemley		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Stiversville		30
Sulphura	>75	3
Sullivan	30	1

Sumter	>75	
Susquehanna	>75	
Swafford		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Swaim	>75	
Sweatman	>75	
Sylco	>75	5
Taft	>75	2
Talbott	>75	3
Talladega	>75	3
Tallant	60	3
Tarklin		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Tasso		
more than 24 inches to fragipan	75	
less than 24 inches to fragipan	>75	
Tate		30
Teas	>75	3
Tellico	45	
Tickfaw	>75	4
Tigrett	30	1
Tilsit		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Tioga	10	1
Tippah		
more than 24 inches to clay	75	
less than 24 inches to clay	>75	
Tiptonville	45	1
Transylvania	15	1
Tunica	>75	4
Tupelo	>75	2
Tuscumbia	>75	4
Tusquitee	30	
Tyler	>75	2
Una	>75	4
Unaka	30	5
Unicoi	>75	3
Upshur	>75	
Urbo	>75	
Vaiden	>75	2
Vicksburg	30	1
Wakeland	45	4

Wallen	45	5
Watauga	30	5
Waverly	45	4
Waynesboro		60
Waynesboro		
Gravelly		30
Weaver	30	1
Wehadkee	45	4
Welchland	15	1
Wellston	75	
Weon	>75	
Whitesburg	45	1
Whitwell	45	2
Wilcox	>75	
Woodmont	>75	2
Wolftever	>75	2
Woolper	>75	
Worthen	30	
Wynnvilke		
more than 24 inches to fragipan	75	2
less than 24 inches to fragipan	>75	2
Zenith	45	5

FOOTNOTES

1. Flooding or standing water during brief periods of high rainfall make many areas of these soils unsuitable even though the absorption rate is favorable. Areas protected from flooding or otherwise not subject to flooding may be suitable. These are dominantly well drained and moderately well drained soils along rivers and streams.
2. A seasonally high water table due to position in landscape and/or soil properties make most areas of these soils unsuitable.
3. Depth to bedrock is generally not sufficient to accommodate a septic tank system. There are some spots of these soils with adequate depths.
4. Flooding and/or a seasonally high water table make these soils unsuitable sites for subsurface sewage disposal systems. Areas protected from flooding and/or artificially drained may be suitable.
5. Depth to bedrock is generally sufficient to accommodate a filter field system. There are some spots of these soils with inadequate depths.

APPENDIX II

SOIL ABSORPTION/PERCOLATION RATES AND CORRESPONDING
 ABSORPTION AREA REQUIREMENTS

ABSORPTION/PERCOLATION RATES

ABSORPTION AREA (AS
 TRENCH BOTTOM RATES AREA)

<u>IN MINUTES PER INCH</u>	<u>SO. FT./GAL.</u>	<u>SO. FT./BEDROOM</u>
10	1.2	165
15	1.4	190
30	2.0	250
45	2.5	300
60	2.9	330
75	3.2	370
80	3.3	380
85	3.4	390
90	3.5	400
95	3.6	415
100	3.7	430
105	3.8	445

NOTE: Round percolation rates to next highest increment of five (5).

NOTE: Trenches of two (2) to three (3) feet in width are preferred. For trenches greater than three (3) feet in width, increase absorption area by the following factors:

Trench Width	Factor
4	1.33
6	1.50
	1.60

EXAMPLES:

The soil absorption rate is fifteen (15) minutes per inch. A factory with a daily flow of three thousand (3,000) gallons is to be located on this site. Three thousand (3,000) gal. x one point four (1.4) sq. ft./gal. = four thousand two hundred (4,200) sq. ft. If a two (2) ft. width trench is used, four thousand two hundred (4,200) sq. ft. 4- two (2) = two thousand one hundred (2,100) linear feet needed.

The soil absorption rate is thirty (30) minutes per inch. A four (4) bedroom house is to be constructed. Two hundred and fifty (250) sq. ft./bedroom x four (4) bedrooms = one thousand (1,000) sq. ft. If a three (3) ft. width trench is used, one thousand (1,000) square ft. 4- three (3) = three hundred and thirty-three point three (333.3) linear ft. needed.

NOTE: Flow rates for non-residential establishments will be based on the memo from Kent D.

Taylor to the Division of Ground Water Protection Field Office Managers dated July 8, 1993, regarding expected sewage flow from non-residential establishments.

APPENDIX III

FRICITION LOSS, IN FEET, THROUGH 100 FEET OF SCHEDULE 40 PVC PIPE

----- Pipe Diameter (in.)-----

Flow (GPM)	1"	1/4"	1 1/2"	2"	3"	4"	6"
2	.32	-.09	.3				
..68	.18		.08				
4	1.17	.31	-.14				
5	1.76	.46	.22	.06			
6	2.47	.65	.31	.09			
7	3.28	.86	.41	.12			
8	4.20	1.10	.52	.15			
9	5.22	1.37	.65	.19			
10	6.35	1.67	.79	.23			
11	7.57	1.99	.94	.28			
12		2.34	1.10	.33			
• 13		2.71	1.28	.38			
14		3.11	1.47	.43	.06		
15		3.54	1.67	.49	.07		
16	,		3.98	1.88	.56	.08	
17			4.46	2.10	.62	.09	
18			4.95	2.34	.69	.10	
19			5.47	2.58	.77	.11	
20			6.02	2.84	.84	.12	
25				4.29	1.27	.19	
30				6.02	1.78	.25	.07
35					2.37	.35	.09
40				3.03	.44	.12	
45				3.77	.55	.15	
50				4.58	.67	.18	
60				6.42	.94	.25	
70				1.25	.33		
80				1.60	.43	.06	
90				1.99	* .53	.07	
100				2.41	.67	.09	

APPENDIX III (continued)

FRICITION LOSS, IN FEET, THROUGH 100 FEET OF SCHEDULE 40 PVC PIPE

-----Pipe Diameter (in.)-----

Flow (GPM)	1/4"	1 1/2"	2"	3"	4"	
100						
125			2.41	.64	.09	
150			3.65	.97	.13	
175				6.11	1.36	.19
200				6.80	1.81	.25
225					2.32	.32
250					2.88	.39
275					3.50	.48
300					4.18	.57
325					4.91	.67
350					5.69	.77
375					6.53	.89
400					7.41	1.01
425						1.14
450						1.27
475						1.41
500						1.56
550						1.72
600						2.05
650						2.40
700						2.79
750						3.20
800						3.63
850						4.09
900						4.58
950						5.09
						5.63

Notes: 160 PSI pipe assumed to be SDR 26.
Computed by the Hazen Williams Formula, assuming C - 140:

$hf = 0.001$

$D^{4.87}$

$hf =$ head loss (feet)

$L =$ pipe length

$Q =$ flow (GPM)

$D =$ pipe inside diameter (inches)