

SHASTA COUNTY SEWAGE DISPOSAL STANDARDS\*

In addition to the provisions of the Shasta County Ordinance Code regulating sewage disposal, the following regulations and standards apply to all individual sewage disposal, sewage disposal systems, and sewage disposal operations over which the Shasta County Director of Environmental Health has jurisdiction. References below to the Director of Environmental Health include his designees.

A. LAND DIVISIONS NOT SERVED BY COMMUNITY SEWERAGE

1. Disposal Area.

- a. Each parcel shall contain one or more disposal areas, each consisting of minimum 1/2 acre of usable disposal material in locations which could reasonably be utilized by a structure built at a desirable and feasible site.
- b. Disposal area shall not include:
  - (1) Land subject to flooding. In case of disputes concerning flooding potential, the flooded area shall be determined by calculating the expected 10-year frequency flood.
  - (2) Land closer than 200 feet to a lake or reservoir, measured from the high water line or 100 feet if down slope from the lake or reservoir.
  - (3) Land closer than 200 feet to any spring, or 100 feet if downhill from the spring.
  - (4) Land within 100 feet of any existing or proposed well site for the parcel or any adjoining parcels.
  - (5) Land closer than 100 feet to an intermittent, seasonal, or perennial waterway measured from the top of the bank or other physically evident high water line. An intermittent stream is one which may continue to flow for five or more days after the passage of a storm.
  - (6) Land closer than 50 feet to an ephemeral stream, measured from the edge of the channel. An ephemeral

stream is one which flows for less than five days after the passage of a storm.

\*As amended through November 20, 2001. This section supplements provisions of the Shasta County Ordinance Code.

It contains no water from a spring, snow, or other long-continuing surface source and does not discharge to a perennial aquifer.

- (7) Land closer than 50 feet downhill from an irrigation ditch or canal.
- (8) Land closer than 50 feet uphill from an existing or proposed cut.
- (9) Land with a grade steeper than 30 percent.
- (10) Filled land, unless the fill is engineered for sewage disposal and approved by the Shasta County Director of Environmental Health.
- (11) Dredger tailings.
- (12) Gravel bars of very pervious materials adjoining a stream or body of water.
- (13) Land used for road or utility easements. Overhead utility easements may be included if the utility, entity or agency holding the easement gives a permanent and unconditional release, easement or license for sewage disposal within the easement.

2. Disposal Material Characteristics.

Usable disposal material has both of the following characteristics:

- a. Percolation rates greater than 5 and less than 60 minutes per inch when tests are conducted by the method specified in the Manual of Septic Tank Practice, U.S. Department of Health and Human Services.

- b. Depth to a seasonal high water table, as determined by the procedures in A3c, shall be at least four feet for lots of one or more acres and at least eight feet for lots of less than one acre or community disposal field.<sup>1</sup>

<sup>1</sup> "Community disposal fields" are fields that serve more than two (2) individual dwelling units.

3. Percolation Test, Test Pits and Groundwater Monitoring.

a. Percolation Tests.

Three percolation tests representative of the disposal area shall be conducted on each proposed disposal area at a depth of three feet by the method in the Manual of Septic Tank Practice. As a substitute for one-half of the percolation tests for the entire subdivision, the procedures in the document referred to in A5b(2) may be used.

b. Test Pits.

At least one test pit shall be excavated on each lot. It shall be at least two (2) feet wide and five (5) feet deep for an acre or greater and nine (9) feet deep for lots less than one (1) acre or community disposal fields. It shall slope towards one end at a rate no greater than 3:1. The soil profile shall be logged by a person qualified to perform percolation tests<sup>1</sup> and backfilled. At the request of the Shasta County Director of Environmental Health, pits will be provided for examination by the Department.

c. Groundwater Monitoring.

- (1) The height of the seasonal high groundwater shall be determined by wet weather testing when any of the following is present:

- (a) Vegetation tolerant of, or indicative of, a high water table present on or in the vicinity of the parcel.
- (b) High groundwater has previously been found in the vicinity.
- (c) The test pits show cracked or creviced formations but no clear delineation of the top of the water table.
- (d) Other conditions or historical data preclude accurate determination of the groundwater levels by dry weather observations.

<sup>1</sup> See paragraph A3d below

- (e) The test pits indicate less than five feet of disposal material over an impervious stratum or eight (8) feet for lots less than an acre or community disposal fields.
  - (f) Free water from seepage is observed in the test pit.
- (2) The height of seasonal high groundwater shall be determined by actual measurements of observation wells during periods of maximum soil moisture content, or by mathematical modeling after sufficient precipitation has occurred to meet or exceed field capacity of the soil, and produce a response in observation wells acceptable to the Shasta County Director of Environmental Health.

- (a) Direct Observation:

The design for constructing an observation well is shown in Figure 1.

Measurements shall be taken at the times and intervals specified by the Shasta County Director of Environmental

Health in response to local conditions. Except as the Shasta County Director of Environmental Health may otherwise direct, measurements (excluding land within the A.C.I.D.) shall be taken at approximately monthly intervals from January 1 to April 30. Land requiring groundwater monitoring caused by A.C.I.D. irrigation water and within the A.C.I.D. shall have monthly measurements beginning May 1 and ending August 31.

At least one observation well shall be included within each proposed disposal area suspected of having groundwater less than four feet, or eight feet for lots of less than one acre, below the ground surface, except where a nearby monitoring well shows groundwater contours representative of the proposed disposal area.

For a site to be acceptable for a conventional disposal system (without mathematical modeling), the groundwater during the monitoring period shall not be less than four feet below the ground surface, or eight feet for lots of less than one acre or community disposal fields. If these limits are exceeded on any observation, weekly observations shall be recorded throughout the remainder of the wet weather season to assure that the standards are not exceeded for longer than any two-week period. The depth to groundwater shall never be less than two feet (four feet for lots less than one acre or community disposal fields) on any observation. If seasonal rainfall up to the April 30 cutoff date has not exceeded 80 percent of the normal rainfall, as determined by the nearest rainfall reporting station approved by the Shasta County Director of Environmental Health, during the period from December 1 to April 30, testing shall be continued the next year or the site may be evaluated by mathematical modeling or "Conditions Associated with Saturation."

(b) Mathematical Modeling.

This approval is to be based on the results of calculations that demonstrate that the site meets the conditions required in the preceding paragraph. Calculations shall be provided by a qualified professional knowledgeable in groundwater hydrology and be based on using a 10-year rainfall return interval for

the most critical situations.

1. Monitoring Wells for Mathematical Modeling

Monitoring wells necessary to complete mathematical modeling require special design and observation. A copy of Shasta County Bulletin #1 "Guidelines for Monitoring Well Construction and Observation for Mathematical Modeling" should be consulted prior to proceeding.

- d. All of the above testing shall be done by, or under the supervision of, a qualified registered civil engineer, registered geologist, registered environmental health specialist, certified engineering geologist, or soil scientist certified by the American Registry of Certified Professionals in Agronomy, Crops and Soils, or by a qualified testing laboratory approved by the Office of the State Architect.

The results of all percolation tests and groundwater monitoring shall be reported and the logs of all excavations shall be submitted to the Shasta County Director of Environmental Health and shall be accompanied by a plot plan to scale showing the test, well and pit locations. The map shall include the topography in the 1/2 acre disposal area at five (5) foot contour intervals. The Shasta County Director of Environmental Health may disregard any test or log that, in his opinion, does not represent the soil conditions of the parcel.

4. Soil Analysis\*

"Conditions Associated With Saturation".

As an alternative to direct observation or mathematical modeling, an application may be made to the Director of Environmental Health for individual evaluations utilizing "Conditions Associated With Saturation".

(a) Conditions Associated With Saturation include:

- 1) Reddish brown or brown soil horizons with gray (chromas of three or less) and/or red or yellowish red mottles; or

- 2) Gray soil horizons, or gray soil horizons with red, yellowish red, or brown mottles; or
  - 3) Dark-colored highly organic soil horizons; or
  - 4) Soil profiles with concentrations of soluble salts at or near the ground surface.
- (b) If conditions associated with saturation do no occur in "soil with rapid or very rapid permeability", saprolite or fractured bedrock, soils predictions of the highest level of the water table shall be based on direct observations or mathematical modeling as defined in A3C(2)(a) & (b).
- (c) "Soil with Rapid or Very Rapid Permeability" means"
- 1) Soil which contains thirty-five (35) percent or more of coarse fragments two (2) millimeters in diameter or larger by volume with interstitial soil of sandy loam texture or coarser, as defined in Appendix A and Soil Textural Classification Chart, Table One; or
  - 2) Coarse textured soil (loamy sand or sand as defined in Appendix A and as classified in Soil Textural Classification Chart, Table One); or
  - 3) Stone, cobbles, gravel and rock fragments with too little soil material to fill interstices larger than one (1) millimeter in diameter.
- (d) Saprolite means weathered material underlying the soil that grades from soft thoroughly decomposed rock to rock that has been weathered sufficiently so that it can be broken in the hands or cut with a knife. It does not include hard bedrock or hard fractured rock. It has rock structure instead of soil structure.

\* Site evaluation procedures for determination of groundwater using "Conditions Associated with Saturation."

Applications for site evaluation shall be made to the Director of Environmental Health on forms approved by the Department. Each application must be completed in full, signed by the

owner or his legally authorized representative, and be accompanied by all required exhibits and appropriate fee. Applicants shall provide at least two (2) test pits with dimensions of at least two (2) feet wide and which slope toward one end at a rate no greater than 3:1 and be five (5) feet deep and located approximately seventy-five (75) feet apart and within the 1/2 acre disposal area on each individual parcel or proposed parcel. A new application and fee shall be submitted for each additional set of two test pits per parcel.

For a site to be acceptable under this method for a conventional disposal system, groundwater shall not be less than four feet below ground surface.

Lots less than one (1) acre in size or community disposal fields shall be evaluated using either direct observation as defined in A3c(2)(a) or mathematical modeling as defined in A3c(2)(b).

The Shasta County Director of Environmental Health shall be the sole determiner of groundwater levels based on "Conditions Associated with Saturation." This shall not preclude the applicant from conducting direct observations or mathematical modeling as defined in A3C(2)(a) & (b).

5. Limitations.

- a. No lot shall be created for which a seepage pit is the only feasible method of sewage disposal.
- b. In subdivisions where no adequate impervious stratum lies beneath the one which may receive effluent and above the usable water aquifer, no lots shall be approved where the depth of usable material beneath any leach line will be less than five feet. An adequate impervious stratum exists if the stratum:
  - (1) Confines under pressure the usable aquifer so that wells drilled in it have a higher static water level than the level at which the driller first encounters the water, or
  - (2) Consists of layers of material five feet thick with particle size distribution classified as "Zone 4" in the "Soil Percolation Suitability Chart" of the North Cost Regional Water Quality Control Board document, Soil



Evaluation for On-Site Disposal, (prepared by William T. Neikirk, Jr., dated May, 1979) and with bulk density of 1.9 or other materials demonstrated to be equivalent thereto, or

- (3) Consists of material with a percolation rate slower than 120 minutes per inch when tested by the Method prescribed in the Manual of Septic Tank Practice, or
- (4) Supports a perched water table.

c. When a potential is noted for inadequate treatment in the underlying or disposal material prior to effluent reaching a usable aquifer or the surface, additional tests to prove that travel time is sufficient shall be done, or the project will be recommended for disapproval and sewage disposal permits will not be granted.

6. Waivers.

a. Certified Design Systems.

The Shasta County Director of Environmental Health and the Central Valley Regional Water Quality Control Board may certify the design of special systems for use in mitigating the adverse effects of specific soil or water table deficiencies. These certified systems may be permitted on lots with the specific deficiencies without being designed by a person qualified to conduct percolation tests, and the property shall be committed to participate in the inspection and maintenance program for non-conventional wastewater disposal systems established in the Shasta County Ordinance Code, as amended.

b. Special Non-Conventional Systems.

In specific locations, and under special circumstances, the Shasta County Director of Environmental Health may waive soil, percolation or groundwater criteria set by these Standards and permit the use of a specially designed non-conventional system if technical data demonstrate that the system is unlikely to create a health hazard or impair water quality and on the condition that the property is committed to participate in the inspection and maintenance program. Written notice of the proposed use of such a system shall be mailed by the Shasta County Director of Environmental Health to the Regional Water Quality Control Board. Any such waiver requires the

concurrence of that Board, which shall be assumed to concur unless it notifies the Shasta County Director of Environmental Health to the contrary within three weeks after notice is given. The data shall be submitted by and the system shall be designed by and constructed by or under the supervision of a person qualified to conduct percolation tests under paragraph A3d, above.

c. Lots Created for Uses which will not Generate Liquid Wastes.

- (1) Lots proposed and suitable for agricultural, commercial, industrial, or recreational uses that will not generate liquid wastes and do not require the regular presence of workers or employees are not subject to the disposal area or testing requirements of the above portions of this subsection.
- (2) Each of these parcels shall be identified on the recorded map with this statement: "This parcel is not approved for any use that will generate liquid wastes. No permit to dispose of sewage or other liquid waste generated by the use of this property will be issued until applicable provisions of state and local law and the Shasta County Sewage Disposal Standards, as amended, have been complied with."

d. Limitation on Waivers.

The requirement of 1/2 acre of disposal area may not be waived for new land divisions.

7. Subdivisions with 100 or More Lots.

All lots in subdivisions with 100 or more lots shall be committed to participate in the county sewage disposal system inspection and maintenance program or be subject to an equivalent program conducted by another acceptable public entity, unless a specific waiver is granted by the Regional Water Quality Control Board.

8. Maps.

a. Tentative.

All tentative maps shall show for each parcel the location,

boundaries and calculated acreage of the disposal area(s) as determined by the procedures of A3. The test results shall be submitted concurrently with the tentative land division application. If individual wells are proposed, the map shall show all existing and proposed well sites. The map shall be to scale and show topography in the 1/2 acre disposal area at five (5) feet contour intervals and location of the test pits, percolation tests, and piezometers.

b. Final and Parcel Maps.

For each parcel, the area(s) qualifying as disposal area shall be clearly delineated and labeled on the final or parcel map. If recordation of a parcel map is waived and developable parcels are proposed, a plot plan showing equivalent information shall be attached as an exhibit to, and recorded with, the notice of approval of waiver of parcel map. The face of each map or plot plan shall be annotated: "An onsite sewage disposal system shall be located only within the disposal area indicated for each parcel unless an alternative site is specifically approved by the Shasta County Director of Environmental Health." If individual wells are proposed, the map shall show all existing and proposed well sites.

B. EXISTING UNITS

1. Developed Lots

a. Repairs/Replacement

If an onsite sewage disposal system has been installed on a lot pursuant to a valid sewage disposal permit, the requirements of Subsection A shall not apply to the lot so long as the leach field or expansion area functions properly. If neither the leach field nor expansion area functions properly, paragraph 2 below applies.

b. Division of lots with existing sewage disposal systems

Lots with septic systems installed pursuant to a valid sewage disposal system permit issued prior to November 20, 2001, may be divided without demonstrating compliance with Subsection A. Lots with septic systems installed pursuant to a valid sewage disposal system permit issued on or after November 20, 2001,

must demonstrate compliance with the requirements of Subsection A.

2. Undeveloped Lots

- a. For all existing undeveloped lots which were not created under Subsection A of these Standards, Subsection C applies.
- b. For lots which could not have been created under subsection A, but which meet the 1976 or the 1980<sup>(3)</sup> Standards for usable area, as determined by Table 2 or 3, a septic tank and conventional leach field may be approved by the Shasta County Director of Environmental Health for installation in the soil most suitable for sewage disposal.
- c. For all undeveloped lots, including those with less than one-half acre of disposal area, a waiver for a special non-conventional or certified design system may be approved under paragraph A6 above. Concurrence of the Regional Water Quality Control Board is not required.

<sup>(3)</sup> The 1976 Sewage Disposal Standards were adopted by Resolutions No. 76-42 and No. 76-176 and the 1980 Standards were adopted by Resolution No. 80-298.

C. SOILS TESTING.

1. Test Pits, Percolation Tests, and Groundwater Monitoring.

- a. All lots shall be tested and approved for onsite sewage disposal systems. Three percolation tests representative of the disposal area shall be conducted at a depth not to exceed three (3) feet by the Manual of Septic Tank Practice, or equivalent method as determined by the Shasta County Director of Environmental Health. At least one test pit shall be excavated in the disposal area. It shall be at least two feet wide and five feet deep for an acre or greater and nine feet deep for lots less than one acre or community disposal fields. It shall slope toward one end at a rate no greater than 3:1. The soil profile shall be logged by a person qualified to perform percolation tests and then backfilled. At the request of the Shasta County Director of Environmental Health, pits will be provided for examination by the Department. If groundwater monitoring is required by the Shasta County Department of Environmental Health, the monitoring shall be done as required under A3c above.

D. Construction and Installation

The following requirements apply to all lots, regardless of when or how created:

1. Onsite Sewage Disposal (General).

a. Where permitted by Section 1101 of the UPC, a building or mobile home sewer may be connected to a sewage disposal system complying with the provisions of these Standards if a sewage disposal permit is first obtained. The type of systems shall be determined on the basis of location, soil porosity and the groundwater level and shall be designed to receive all sanitary sewage from the property. Unless another design or method is approved by the Shasta County Director of Environmental Health, the system shall consist of a septic tank with effluent discharging into a subsurface disposal field. One or more seepage pits or a combination of subsurface disposal field and seepage pits may be approved only under the standards of paragraphs 6, 7, and 8 below.

b. The method of sewage treatment and disposal shall be approved by the Shasta County Director of Environmental Health

prior to issuance of a permit in the following cases: where conditions are such that the above system cannot be expected to function satisfactorily; for commercial, agricultural, and industrial plumbing systems; for installations where appreciable amounts of industrial or indigestible waste are produced; for occupancies not listed in Table I-3 of the UPC; for occupancies producing abnormal quantities of sewage or liquid waste; when grease interceptors are required by the UPC; or for minor, limited or temporary uses.

c. Disposal systems shall be designed to utilize the most porous or absorbent portions of the soil formation. Where the groundwater level extends to within 12 feet or less of the ground surface or where the upper soil is porous and the underlying stratum is rock or impervious soil, a septic tank and disposal field system may be installed but no seepage pit will be permitted in any event.

d. All onsite sewage disposal systems shall be designed so that additional subsurface disposal fields, equivalent to at least 100 percent of the required area of the original system, may be installed if the original system cannot absorb all the sewage. No parcel shall be divided and no structure shall be erected or constructed if to do so would impair the usefulness of the 100 percent expansion area for its intended purpose.

e. No property shall be improved or used in excess of its capacity to properly absorb sewage effluent in the quantities and by the means provided in these Standards.

f. When the Shasta County Director of Environmental Health finds insufficient lot area or improper soil conditions for adequate sewage disposal for the use proposed, no sewage disposal, building or mobile home installation permit shall be issued and no onsite sewage disposal shall be permitted. Where space or soil conditions are critical, no permit shall be issued until engineering data and test reports have been submitted to and approved by the Shasta County Director of Environmental Health. The Shasta County Director of Environmental Health may approve a variance as to the location of any disposal field shown on a map or plot plan approved under subsection A above if he finds that new information and public health and safety require the variance.

## 2. Area of Disposal Fields and Seepage Pits.

The minimum effective absorption area in disposal fields in square feet of trench bottom, and in seepage pits in square feet of side wall, shall be predicated on anticipated daily sewage flow in gallons, the type of soil found in the excavation made pursuant to B2 and shall be as follows:

a. For disposal fields, a minimum of 150 square feet of trench bottom shall be provided for each system, exclusive of all hardpan, rock, clay and other impervious formations. For large, specially-designed and approved systems, side wall area in excess of the required 12 inches and not to exceed 36 inches below the leach line may be added to the square feet trench bottom area when computing absorption areas.

b. For seepage pits, the required wall area of the pit or pits shall be determined from the results of percolation tests made and interpreted as directed by the Shasta County Director of Environmental Health.

### 3. Septic Tanks

a. Plans for all septic tanks shall be submitted to the Shasta County Director of Environmental Health for approval and shall show all dimensions, reinforcing, structural calculations and such other pertinent data as may be required. Independent laboratory tests and calibrations shall be provided on prefabricated septic tanks as required by the Shasta County Director of Environmental Health.

b. Septic tanks shall be water-tight and constructed of sound and durable materials that are not subject to excessive corrosion or decay. Wooden septic tanks are prohibited. Each tank shall be structurally designed to withstand all anticipated earth or other loads and shall be installed level and on a solid bed.

c. The walls and floor of each poured-in-place concrete septic tank shall be monolithic. The length of any section of unreinforced concrete wall shall not exceed six feet. No cross section of any unreinforced concrete wall or floor shall be less than five inches in thickness. The minimum compressive strength of any concrete wall, top, cover or floor shall be 2,500 pounds per square inch.

d. Concrete covers shall be reinforced with steel reinforcing bars and poured-in-place covers shall be reinforced with 1/2-inch

steel bars on not more than 20-inch centers. All covers shall be capable of supporting an earth load of not less than 300 pounds per square foot when the maximum coverage does not exceed three feet.

e. The minimum wall thickness of any steel septic tank shall be No. 12 U.S. gauge (.109 in.) and each steel tank shall be protected from corrosion both externally and internally by an approved bituminous coating or by other means acceptable to the Shasta County Director of Environmental Health.

f. Septic tank design shall be such as to produce a clarified effluent and shall provide adequate space for sludge and scum accumulations consistent with the proposed use.

g. Septic tanks shall have a minimum of two compartments. The inlet compartment of any septic tank shall be two-thirds of the total capacity of the tank nor less than 500 gallons liquid capacity, and shall be at least three feet in width and five feet in length. Liquid depth shall be not less than two feet and six inches. The secondary compartment of any septic tank shall have a capacity of one-third of the total capacity of the tank.

h. Access to each septic tank shall be provided by at least two manholes 20 inches in minimum dimension or by an equivalent removable cover slab. One manhole shall be located over the inlet and one over the outlet. Whenever a first compartment exceeds 12 feet in length, an additional manhole shall be provided over the baffle wall. Septic tanks installed under concrete paving or blacktop shall have the required manholes accessible by either extending the manhole openings to grade in a manner acceptable to the Shasta County Director of Environmental Health, or by providing a removable concrete or other approved section, not less than 20 inches in the least dimension, in the concrete paving or blacktop and located directly over the required manholes.

i. The inlet and outlet pipe or baffle shall extend four inches above and at least 12 inches below the water surface. The invert of the inlet pipe shall be at a level not less than two inches above the invert of the outlet pipe.

j. Inlet and outlet pipe fittings or baffles and compartment partitions shall have a free vent area equal to the required cross-sectional area of the house sewer or private sewer discharging into the tank to provide free ventilation above the water surface from the disposal field or seepage pit through the septic tank, house



sewer and stack to the outer air.

k. The total depth shall exceed the liquid depth by at least nine inches. The cover of the septic tank shall be at least two inches above the vent openings.

l. Partitions or baffles between compartments shall be of sound and durable material and shall extend at least four inches above the liquid level. An inverted fitting equivalent in size to the tank inlet, but in no case less than four inches in size, shall be installed in the inlet compartment side of the baffle with the bottom of the fitting placed midway in the depth of the liquid. Wooden baffles are prohibited.

m. Septic tanks serving dwellings or groups of dwellings shall be designed to contain at least a five-year accumulation of sludge and scum computed on the basis of a 95 percent confidence limit plus the expected daily liquid loading computed by the Director of Environmental Health on the basis of a 95 percent confidence limit. Septic tanks serving structures with other occupancies shall be designed to contain at least three times the expected daily liquid loading. Septic tanks shall be at least twice as long as their width or liquid depth. The horizontal flow-through distance shall be at least eight feet for 750 gallon septic tanks and nine feet for all larger tanks.

#### 4. Disposal Fields.

a. Distribution lines shall be constructed of materials approved by the Shasta County Director of Environmental Health provided that sufficient openings are available for distribution of the effluent into the trench area.

b. Before drain lines are laid, crushed stone, gravel, slag, or similar filter materials clean in appearance and varying in size from three-quarter inch to two and one-half inches and otherwise acceptable to the Shasta County Director of Environmental Health shall be placed in the trench to the depth and grade required by this paragraph: The filter material in the leaching field shall conform to the following standards: Effective size 3/4 inch, uniformity coefficient 3.0, voids 40 percent by volume. The filter material shall have a cleanness value of at least 70 using test

method No. Calif. 227-E method of test for evaluating cleanness of course aggregate. The gravel shall be placed in the trenches in a manner which will leave the sides and bottom free from deposits of rock dust or cement dust. "Effective size" for the purpose of these Standards is that size of grain which is larger than 10 percent of the material by weight. The uniformity coefficient for the purpose of these Standards is that sieve that passes 60 percent of the material divided by sieve size that passes 10 percent of the material. Drain lines shall be completely encased by filter material to prevent closure of voids with earth backfill.

c. When seepage pits are used in combination with disposal fields, the filter material in the trenches shall terminate at least five feet from the pit excavation and the line extending from such points to the seepage pit shall have watertight joints and be made of pipe approved by the Shasta County Director of Environmental Health.

d. Where two or more drain lines are installed, an approved distribution box of sufficient size to receive lateral lines shall be constructed at the head of each disposal field. The inverts of the inlet shall be at least one inch above the outlets. Suitable baffles shall be provided to insure equal flow. Distribution boxes shall be installed in natural or compacted soil.

e. All laterals from distribution box to the disposal field where the grade exceeds six inches per 100 feet shall have watertight joints and be made of pipe approved by the Shasta County Director of Environmental Health. Multiple disposal field laterals, wherever practicable, shall be of uniform length and, if possible, interconnected at their downstream ends.

f. Connections between a septic tank and a distribution box, or between a distribution box and a seepage pit or drainfield, or between seepage pits shall be laid with approved watertight joints on natural ground or compacted fill.

g. Automatic siphon or dosing tanks shall be installed when required or as permitted by the Director of Environmental Health.

h. Disposal fields shall be constructed as follows:

Maximum length of each line . . . . .	100 feet
Minimum bottom width of trench . . . . .	18 inches
Minimum spacing of lines (edge to edge) . . . . .	8 feet

Maximum depth of earth cover over lines. . .	36 inches
Maximum grade of lines . . . . .	4 in/100'
Minimum grade of trench. . . . .	Level
Maximum grade of trench. . . . .	4 in/100'
Minimum usable material below trench bottom.	12 inches
Minimum filter material under drain lines. .	12 inches
Minimum filter material over drain lines . .	2 inches
Maximum distance drain pipe to edge of trench	18 inches

i. A disposal field shall not be installed in filled ground.

j. The site of the initial and replacement disposal fields shall not be covered by asphalt or concrete or subject to vehicular traffic or other activity which would adversely affect the soil.

k. Straw, newspaper, untreated building paper or similar materials shall be placed over filter materials in leach lines or seepage pits prior to backfilling.

5. Seepage Pits.

No seepage pit may be located in areas where individual wells are the customary source of water supply. Seepage pits are to be used only as a last resort when no other method of disposal is likely to function properly. No seepage pit may be constructed, maintained or used for sewage disposal unless the Shasta County Director of Environmental Health finds in each case that the use of the pit or pits will not cause a health hazard directly or indirectly. No system of seepage pits shall expose less than 600 square feet of surface below flowline for the absorption of sewage. Seepage pits shall be constructed to the following standards:

a. Each seepage pit above any stratum containing water which is used or is usable as a source of domestic supply shall be separated from that stratum by an impervious stratum, as defined under subsection A5b above.

b. As soon as the pit is completed, a perforated pipe at least four inches in diameter shall be extended from the bottom to the level of the forthcoming concrete seal. The pit shall then be filled with filter material conforming to the specifications in paragraph 4 above.

c. Percolation tests shall be conducted to demonstrate the absorptive capacity of each pit to the satisfaction of the Shasta

County Director of Environmental Health.

d. A stratum of earth less pervious than any of the soil above it shall be located at least four feet beneath the surface. At the level of this stratum a slab of concrete shall be poured that is at least four inches thick and is keyed into the stratum for at least six inches.

e. All piping upstream from the concrete slab shall be of approved material and have watertight joints. The construction and capacity of the septic tank shall comply with paragraphs 3 and 4 above.

f. A cleanout for access to the perforated pipe below the concrete slab shall be located directly over the top of each pit.

6. Shasta County Director of Environmental Health Authority.

In individual cases, the Shasta County Director of Environmental Health may set more stringent requirements than these Standards where such higher requirements are essential to maintain a safe and sanitary condition.

7. The system shall not be backfilled or put into use until it has been inspected and approved by the Department. Before the final inspection, it shall be complete and all portions shall be accessible for inspection.

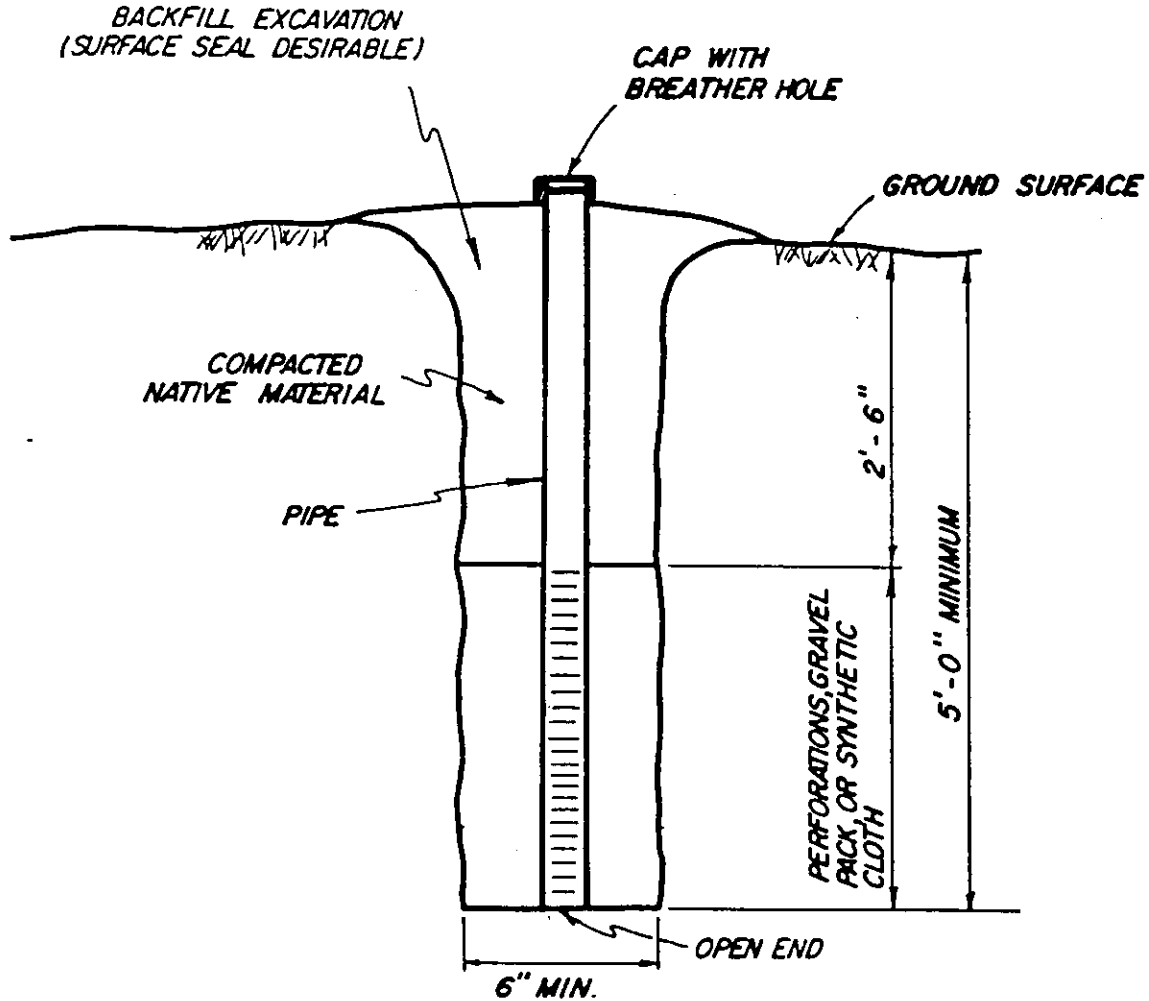
## Appendix A

The major textural classifications are defined as follows:

- (1) Sand: Individual grains can be seen and felt readily. Squeezed in the hand when dry, this soil will fall apart when the pressure is released. Squeezed when moist, it will form a cast that will hold its shape when the pressure is released, but will crumble when touched.
- (2) Sandy loam: Consists largely of sand, but has enough silt and clay present to give it a small amount of stability. Individual sand grains can be readily seen and felt. Squeezed in the hand when dry, this soil will readily fall apart when the pressure is released, but will withstand careful handling without breaking. The stability of the moist cast differentiates this soil from sand.
- (3) Loam: Consists of an even mixture of sand and of silt and a small amount of clay. It is easily crumbled when dry and has a slightly gritty yet fairly smooth feel. It is slightly plastic. Squeezed when moist, it forms a cast that will not only hold its shape when the pressure is released, but will withstand careful handling without breaking. The stability of the moist case differentiates this soil from sand.
- (4) Silt loam: Consists of a moderate amount of fine grades of sand, a small amount of clay, and a large quantity of silt particles. Lumps in a dry, undistributed state appear quite cloddy, but they can be pulverized readily; the soil then feels soft and floury. When wet, silt loam runs together in puddles. Either dry or moist, casts can be handled freely without breaking. When a ball of moist soil is pressed between thumb and finger, it will not press out into a smooth, unbroken ribbon, but will have a broken appearance.
- (5) Clay loam: Consists of an even mixture of sand, silt, and clay, which breaks into clods or lumps when dry. When a ball of moist soil is pressed between the thumb and finger, it will form a thin ribbon that will readily break, barely sustaining its own weight. The moist soil is plastic and will form a cast that will withstand considerable handling.
- (6) Silty clay loam: Consists of a moderate amount of clay, a large amount of silt, and a small amount of sand. It breaks into moderately hard clods or lumps when dry. When moist, a thin ribbon or one-eighth (1/8) inch wire can be formed between thumb and finger that will sustain its weight and will withstand gentle movement.
- (7) Silty clay: Consists of even amounts of silt and clay and very small amounts of sand. It breaks into hard clods or lumps when dry. When moist, a thin ribbon of one-eighth (1/8) inch or less sized wire formed between thumb and finger will withstand considerable movement and deformation.
- (8) Clay: Consists of large amounts of clay and moderate to small amounts of sand. It breaks into very hard clods or lumps when dry. When moist, a thin, long ribbon or one-sixteenth (1/16) inch wire can be molded with ease. Fingerprints will show on the soil, and a dull to bright polish is made on the soil by a shovel.

SHASTA COUNTY  
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FIGURE NO. 1



GROUND WATER MONITORING WELL

SHASTA COUNTY BULLETIN #1

GUIDELINES FOR MONITORING WELL CONSTRUCTION  
AND OBSERVATION FOR MATHEMATICAL MODELING

MONITORING WELLS

- A. Observation wells should be drilled to eight (8) feet. This will allow an extra two (2) feet of hole to monitor water levels. Having numerous measurements is critical to the modeling process.
- B. Use a drill to make the boring, do not use a backhoe. A backhoe results in a major disturbance to the soil around the bore to the extent the monitoring well is not measuring water levels reflective of the property's soil profile, but of a disturbed hole. Completion with a backhoe will generally result in water levels standing higher in the well than if completed by a drill.
- C. Complete the hole during the summer when the soil is dry. Waiting until saturation occurs before drilling the hole can result in smearing of the hole wall which reduces the ability of the hole to drain, causing higher water levels to be recorded than would normally be found.
- D. Complete the top three (3) feet of the hole with concrete rather than cuttings removed from the hole. Concrete will provide a seal that keeps surface water from entering the hole. Lack of a proper seal around the top of the hole is the primary source of erratic and unnaturally high water levels in the monitoring wells. The concrete (bagged type is the easiest to work with) can be installed either wet or dry. If installed dry, the concrete will pull moisture from the soil and set adequately; it also won't pass surface water if still in a dry state.

MEASUREMENT PERIOD AND FREQUENCY

- A. Measurements should start before the well becomes saturated. It is critical in the modeling process to know how much rainfall occurred prior to saturation.
- B. Experience has shown that saturation occurs after about 9-12 inches of cumulative rainfall, as measured from about October 1. Tracking the amount of rainfall occurring during the fall will give an idea of when measurements should begin. Once

total rainfall reaches nine (9) inches, the wells should be measured at least once every three (3) days until saturation occurs.

- C. Once saturation occurs, the well should be measured at least once weekly. This frequency should be adhered to regardless of where the water stands in the well (the Ordinance calls for weekly measurements if levels reach above four (4) feet). Measurements should continue on a weekly basis until the well goes dry. If any rainfall occurs after the well goes dry, monitoring should be resumed.

#### MONITORING PROTOCOLS

- A. Use a two-wire electrical sounder for making measurements. This device can be made from an inexpensive ohm meter and lamp cord. A commercially-produced sounder will provide the most accurate and more easily read measurements.
- B. Make all measurements from the top of the casing to the water level and record this value. Do not make corrections for reference-point height in the field.
- C. Record the height of the reference point above ground surface. Use this distance to make corrections to water-level readings at a later time.
- D. Record the depth-to-water to the nearest 1/16 inch; always record the readings observed, make no field corrections or additions. If the measuring tape is graduated in inches, record 42 inches, not 3 and 1/2 feet. If graduated in feet by inches, record 3 and 1/2 feet, not 42 inches.
- E. Always use the same sounder for making water-level readings, and be consistent in how the measurements are read from the sounder (most sounders have five (5) foot interval "tick marks"). The least error is introduced by always recording up from a tick mark; that is, measurements will always be additive. For example, a measurement from the R.P. to the water level might be recorded as 5'- 1'-2-1/2". It would automatically be known that this represents a five foot tick mark on the sounder plus 1-foot 2-1/2 inches read up from the tick mark to the point on the sounder wire at the R.P.
- F. Record if the weather is either dry or raining at the time of measurement.



Table 2					
Minimum Horizontal Distance (in feet) Required Between:	Building Sewer	Septic Tank	Disposal Field	Seepage Pit or Cesspool	Well
Building or Structures <sup>1</sup>	2	10	10	20	Clear
Property Lines	Clear	5	10	10	5
Wells	50 <sup>2</sup>	50	100	100	Clear
Domestic Water Line	5 <sup>3</sup>	5	5	5	Clear
Springs <sup>4</sup>	50	50	200	200	Above Flood Plain
Ephemeral Streams	50	50	50	50	Above Flood Plain
Intermittent and Perennial Streams <sup>5</sup>	50	50	100	100	Above Flood Plain
Lakes <sup>6</sup>	50	50	200	200	Above Flood Plain
Road Cuts or Excavations			50	50	Clear
Seepage Pits or Cesspools		5	5	16	100
Disposal Field		5	5	5	100
Distribution Box		5		5	100

FOOTNOTES:

1. Includes mobile homes, porches and steps, whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, carports, covered walks, covered driveways and other structures or appurtenances.
2. All non-metallic drainage piping shall clear domestic water supply wells at least 50 feet. This distance may be reduced to not less than 25 feet when approved piping is installed. Where special hazards are involved, the distance required shall be increased as the Director of Environmental Health may direct.
3. Water pipes and sewer pipes shall not be located in the same trench. When a water pipe serves a public water system, as defined in PL 93-523, the minimum separation shall be ten feet.
4. These distances apply to sewage disposal systems on the same level as or lower than any spring. Sewage disposal systems shall not be closer than 200 feet at any point in relationship to a spring located on the same hillside or in the same watershed or 100 feet if downhill from the spring.
5. Includes irrigation ditches and natural and artificial drainage ways with either intermittent or continuous flows. This distance is to be measured from the 10-year flood line or top of bank or other evident high-water line or the expected 10-year flood line.
6. Includes lakes, ponds, reservoirs, and other bodies of standing water, as measured from the high-water line or spillway elevation. **For lakes that are uphill from the disposal field, the setback may be reduced to 100 feet.**

# SHASTA COUNTY DEPT. OF RESOURCE MANAGEMENT ENVIRONMENTAL HEALTH DIVISION

Table 1  
Soil Textural Classification Chart

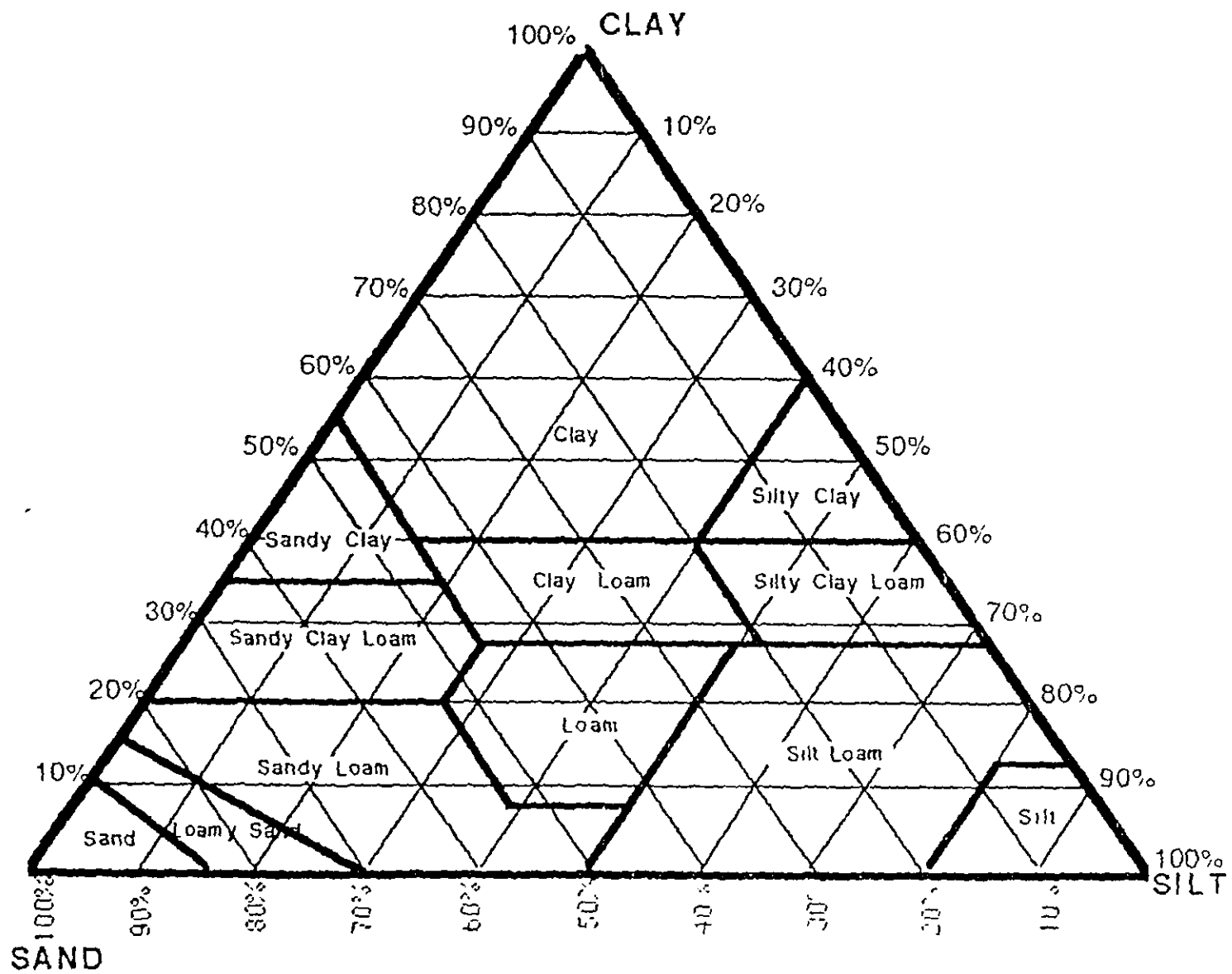
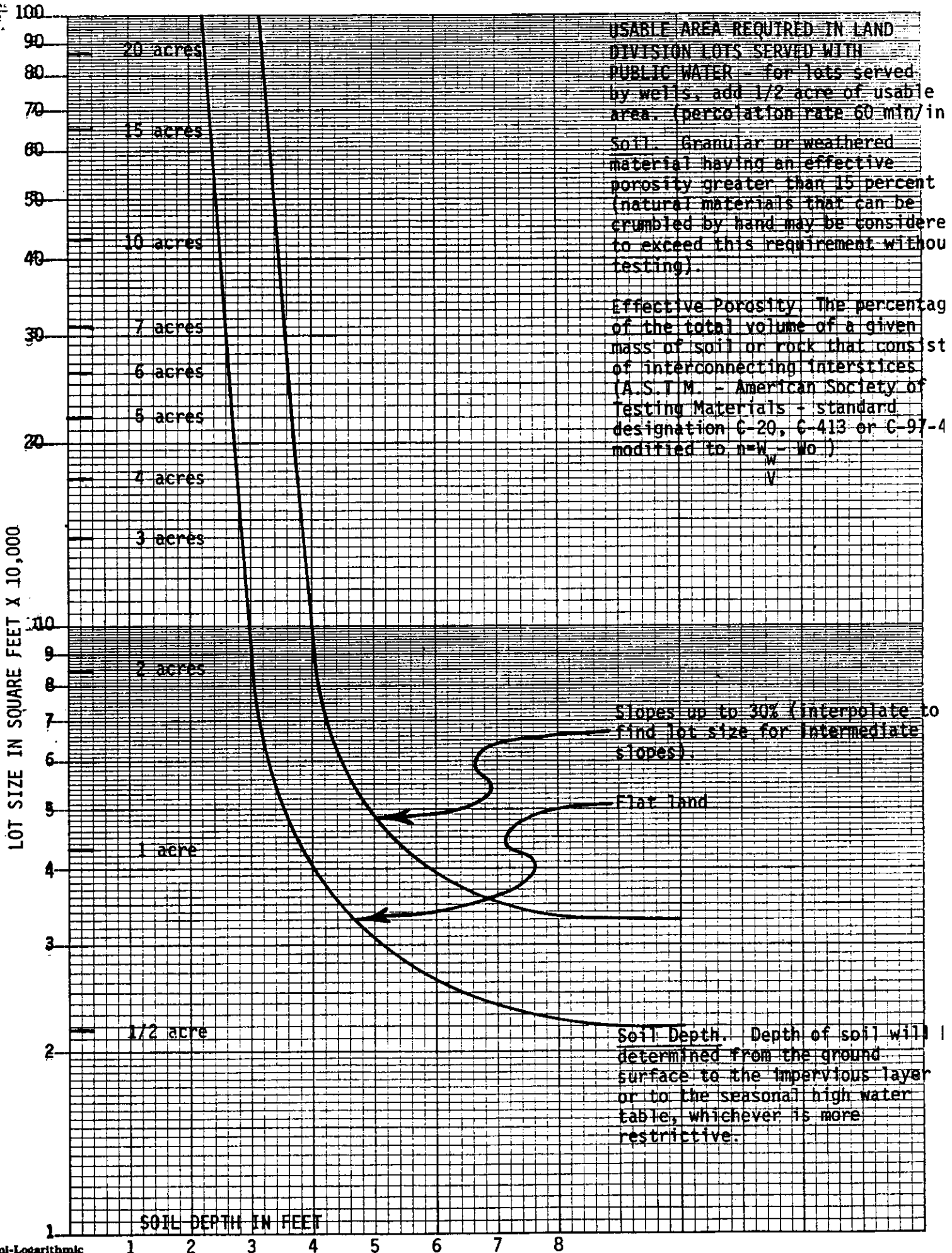
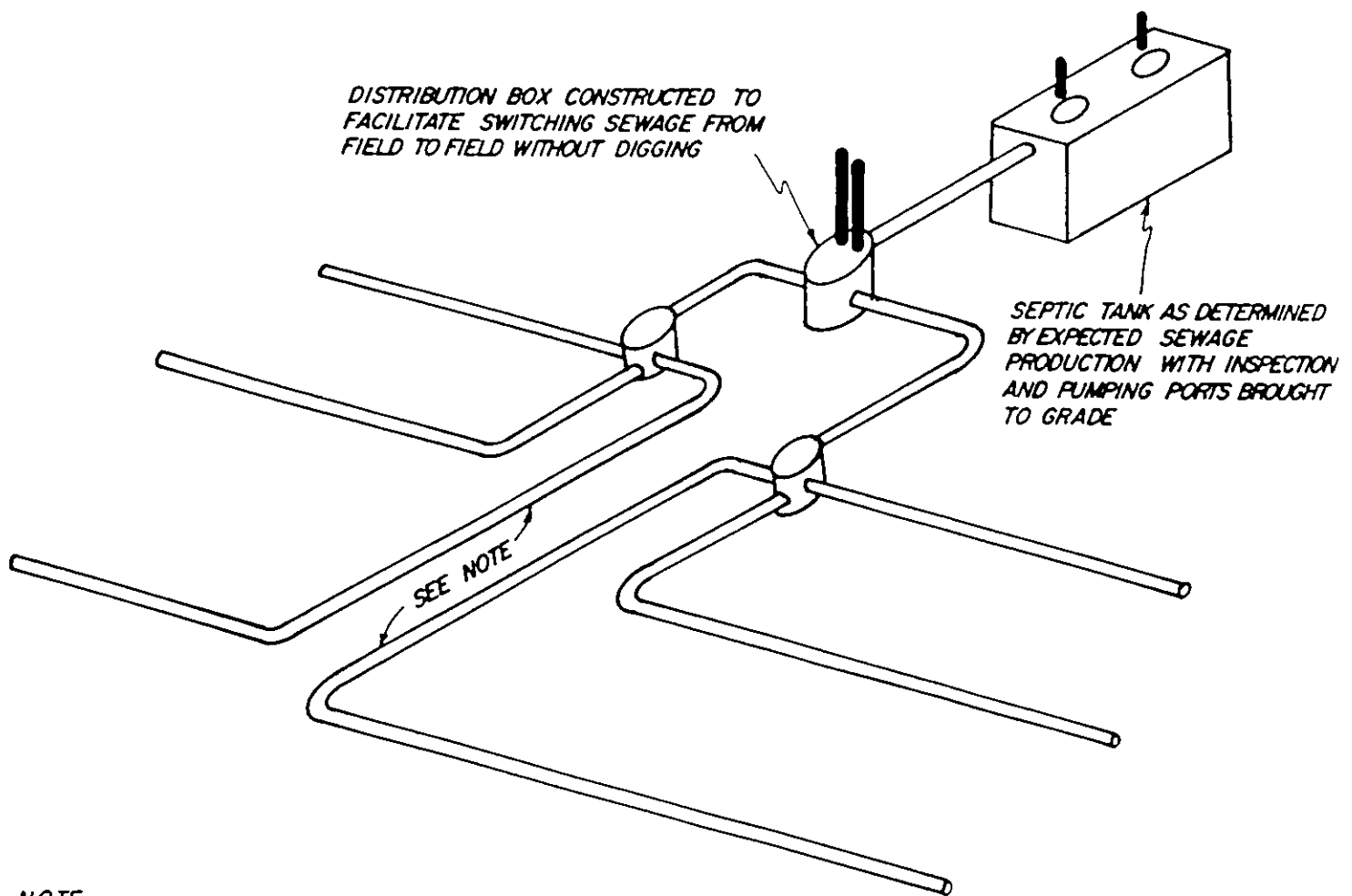


TABLE 3



# SHASTA COUNTY DEPT. OF RESOURCE MANAGEMENT ENVIRONMENTAL HEALTH DIVISION

**(CERTIFIED SPECIAL DESIGN SYSTEM NO.1)**  
DUAL LEACH FIELDS WITH SWITCHING BOX  
THIS DESIGN IS TO BE USED TO MITIGATE INADEQUATE SOIL  
PERMEABILITY-PERCOLATION RATE, 60 MINUTES PER INCH TO  
120 MINUTES PER INCH

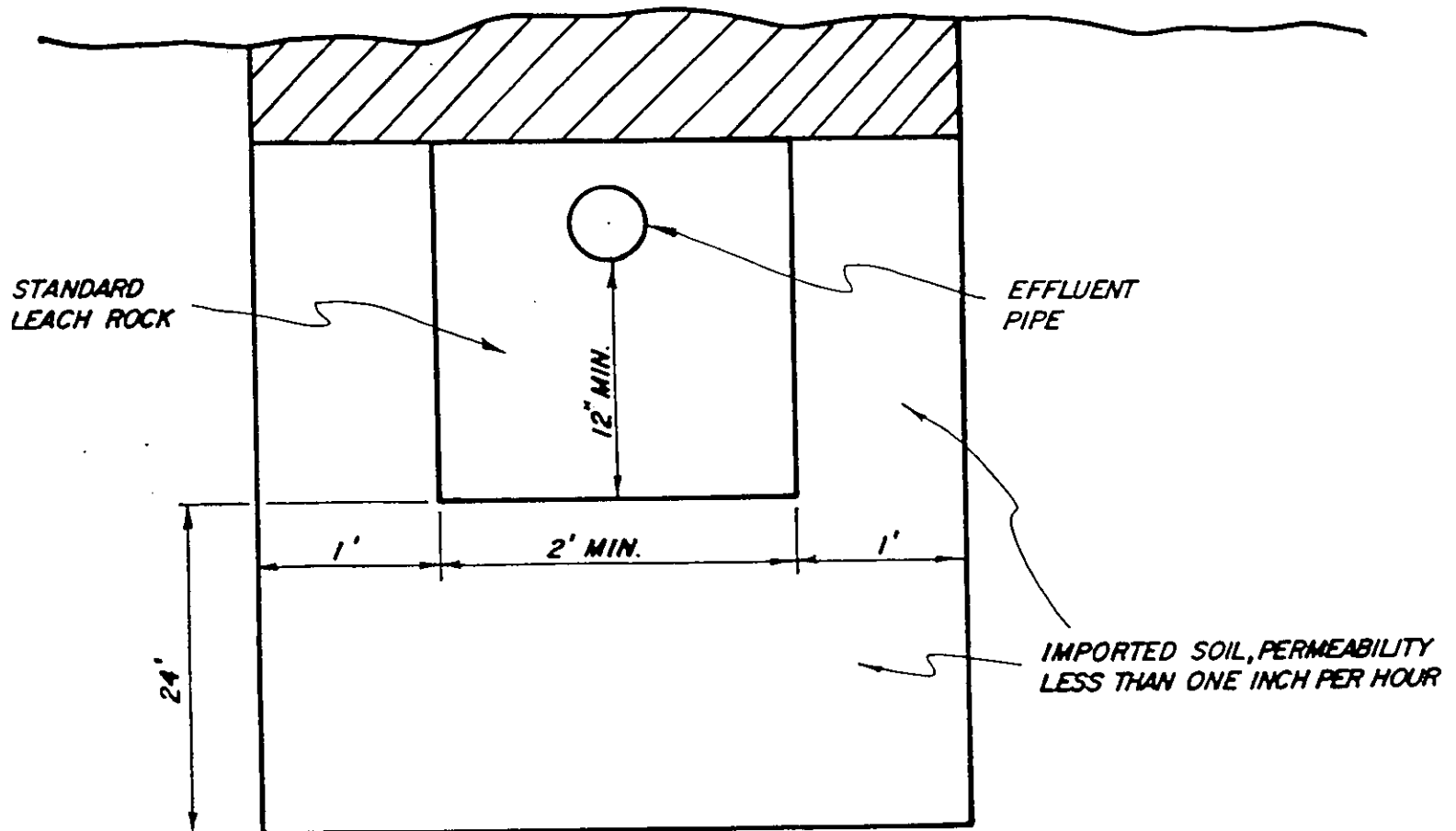


NOTE  
TWO LEACH FIELDS, EACH DESIGNED TO  
TAKE EXPECTED SEWAGE FLOW AT THE  
ESTIMATED PERCOLATION OF THE SOIL  
THE INSTALLATION OF THE SECOND LEACH  
LINE SATISFIES THE REQUIREMENTS FOR  
100% EXPANSION AREA

SHASTA COUNTY  
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**(CERTIFIED SPECIAL DESIGN SYSTEM NO. 2)**

LEACH LINES IN SOIL WITH EXCESSIVE PERMEABILITY  
WITH PERCOLATION RATES BETWEEN 1 AND 5 MINUTES PER INCH  
THIS SYSTEM IS USED IN SITUATIONS WHERE THE SOIL IS PERMEABLE  
BUT DOES NOT HAVE OPEN CRACKS OR CREVICES

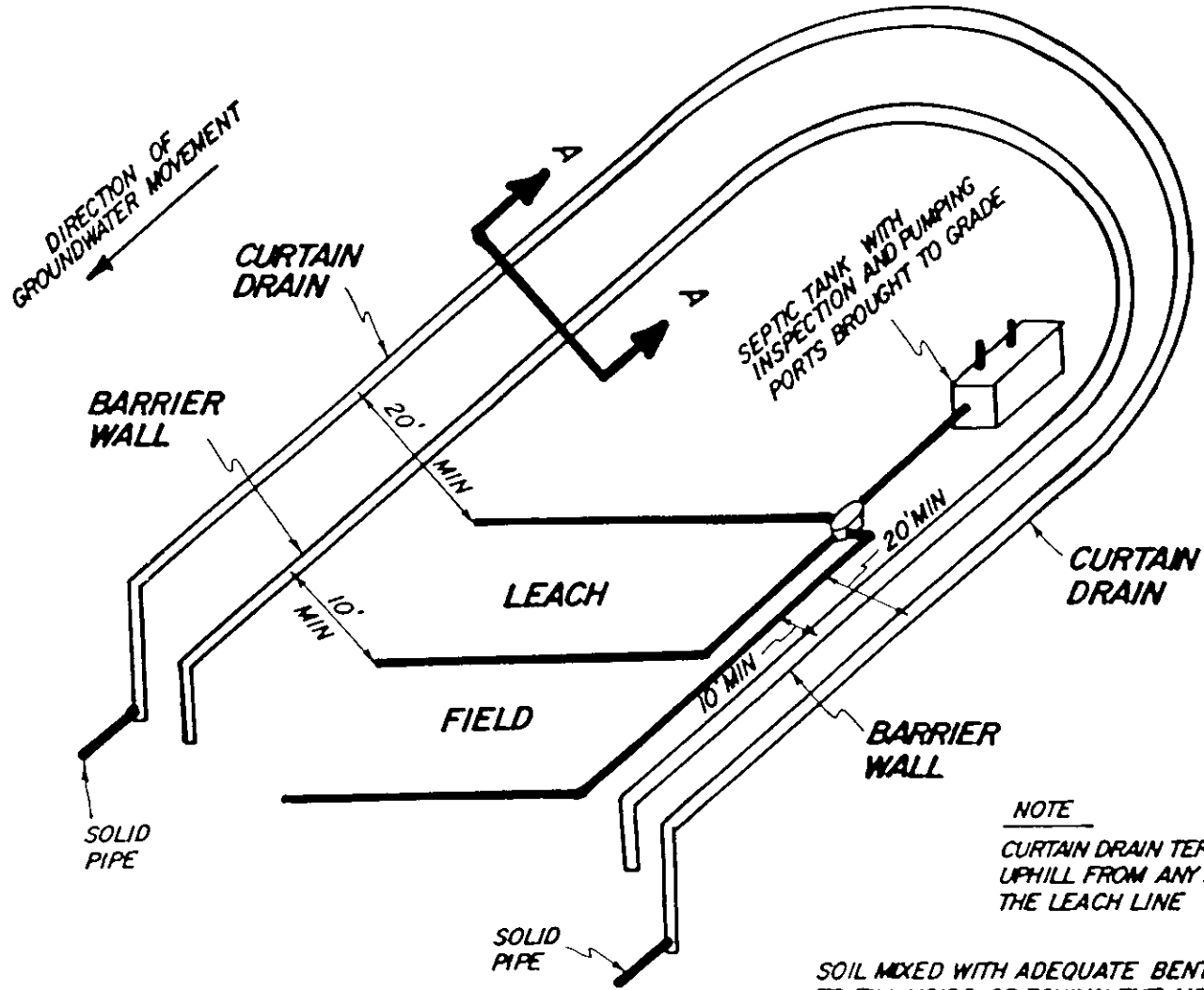


LEACH LINE SIZED TO TAKE SEWAGE  
AT LESS THAN 0.75 GALLONS PER DAY  
PER SQUARE FOOT AT BOTTOM AREA ONLY  
BASED ON PERCOLATION TESTS

# SHASTA COUNTY DEPT. OF RESOURCE MANAGEMENT ENVIRONMENTAL HEALTH DIVISION

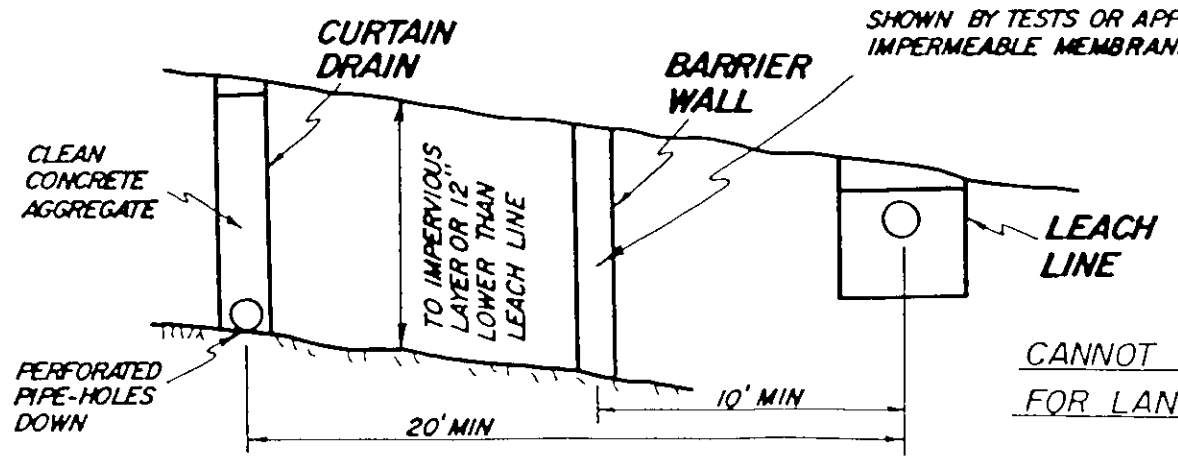
**(CERTIFIED SPECIAL DESIGN SYSTEM NO 3)**

LEACHLINE PROTECTED BY A CURTAIN DRAIN  
THIS DESIGN IS TO BE USED TO MITIGATE HIGH WATER  
TABLES FOR SLOPING GROUND GREATER THAN 0.05 FEET PER FOOT



**NOTE**  
CURTAIN DRAIN TERMINATES  
UPHILL FROM ANY PART OF  
THE LEACH LINE

SOIL MIXED WITH ADEQUATE BENTONITE  
TO FILL VOIDS OR EQUIVALENT MIXTURE AS  
SHOWN BY TESTS OR APPROVED  
IMPERMEABLE MEMBRANE



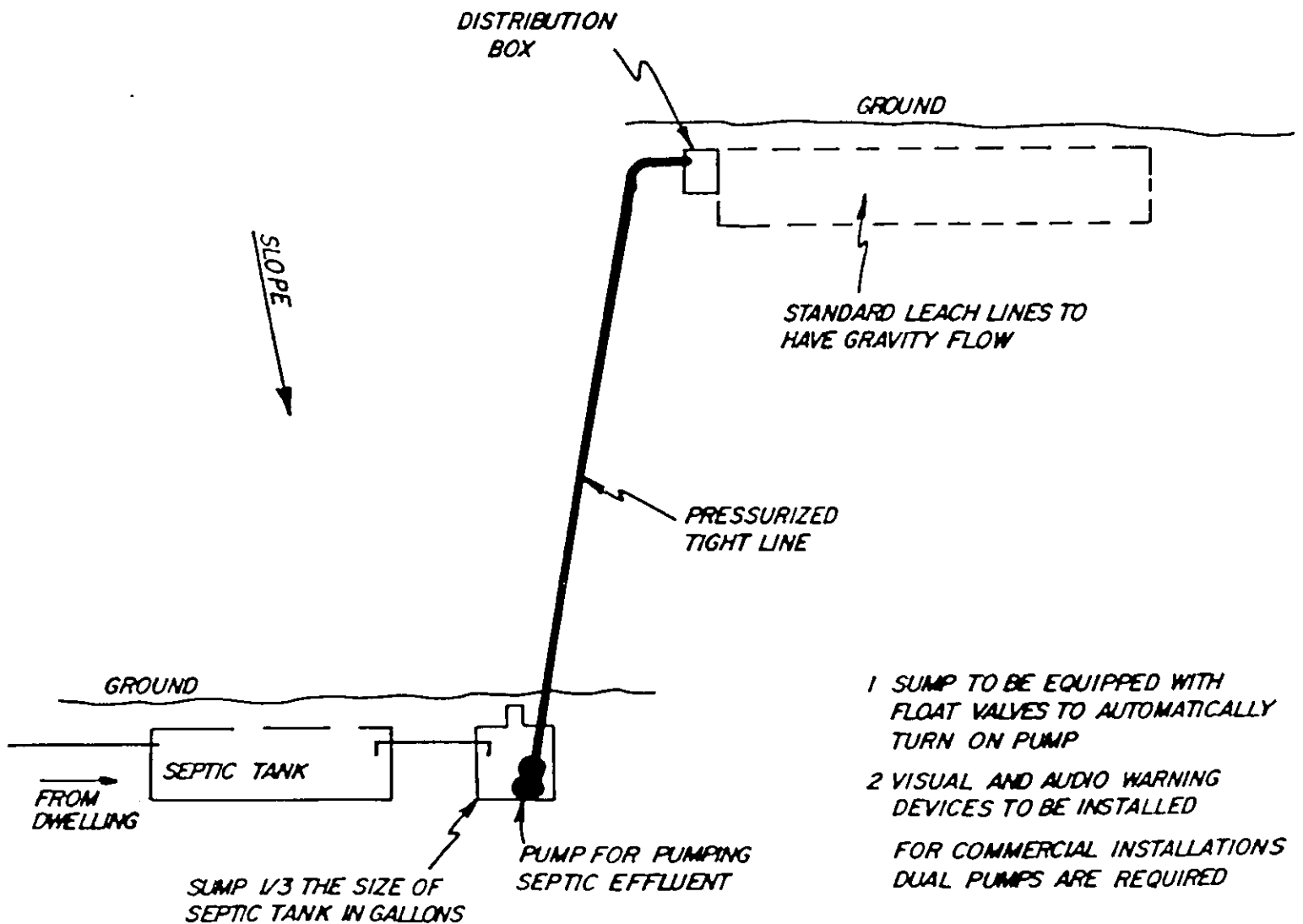
CANNOT BE USED  
FOR LAND DIVISIONS

**SECTION A-A**

# SHASTA COUNTY DEPT. OF RESOURCE MANAGEMENT ENVIRONMENTAL HEALTH DIVISION

## (CERTIFIED SPECIAL DESIGN SYSTEM NO. 4)

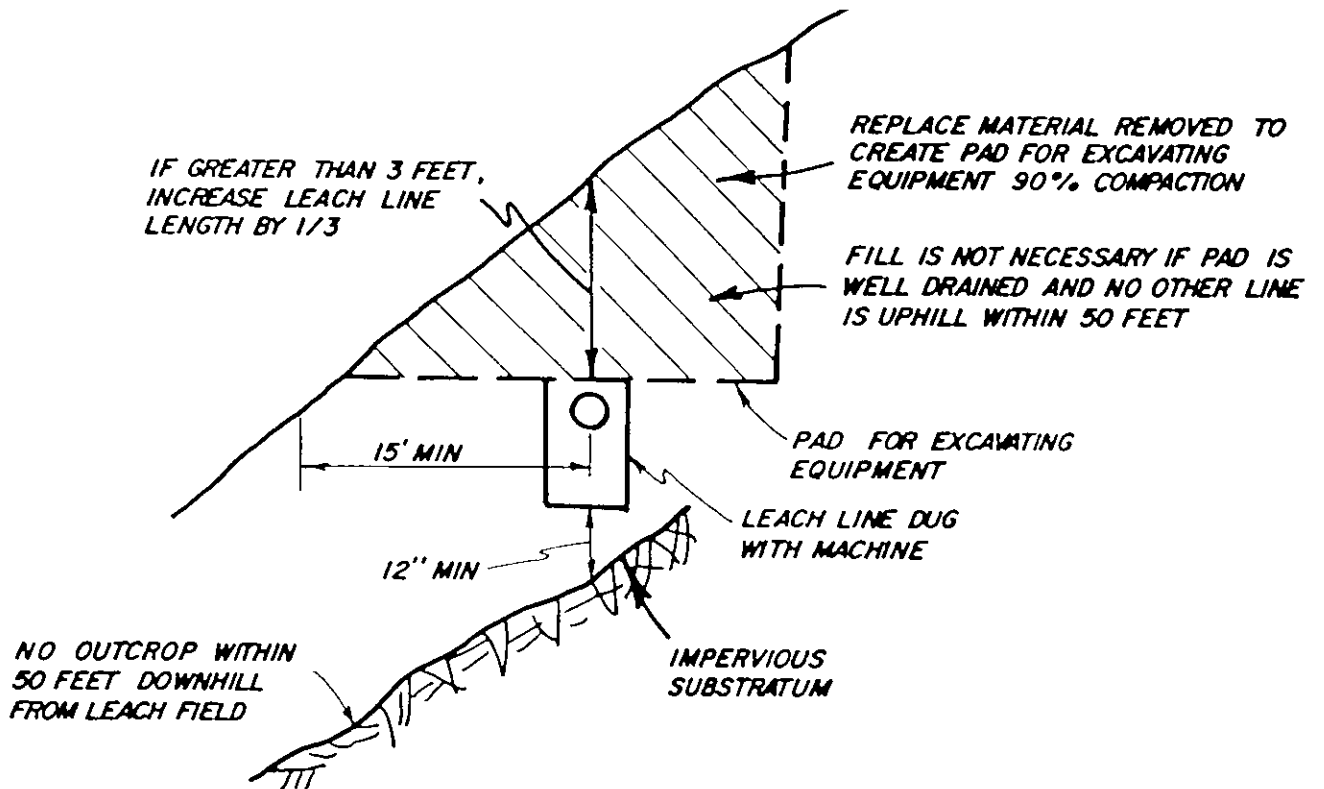
PRESSURIZED TIGHT LINE MOVING SEPTIC TANK EFFLUENT FROM SEPTIC TANK TO LEACH LINES WHERE TOPOGRAPHY WILL NOT ALLOW GRAVITY FLOW. (LEACH LINES TO BE INSTALLED FOR GRAVITY FLOWS)



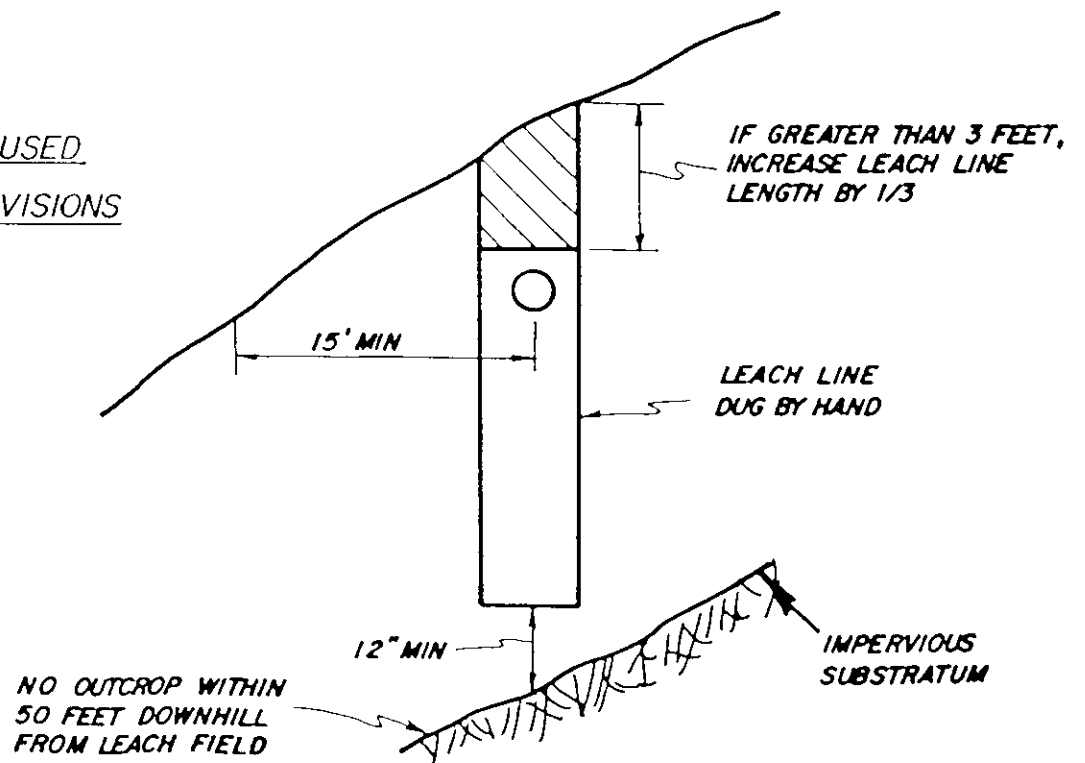
# SHASTA COUNTY DEPT. OF RESOURCE MANAGEMENT ENVIRONMENTAL HEALTH DIVISION

## (CERTIFIED SPECIAL DESIGN SYSTEM NO.5)

LEACH FIELD ON STEEPLY SLOPING GROUND, FOR SLOPE  
GREATER THAN 0.30 FEET PER FOOT



CANNOT BE USED  
FOR LAND DIVISIONS



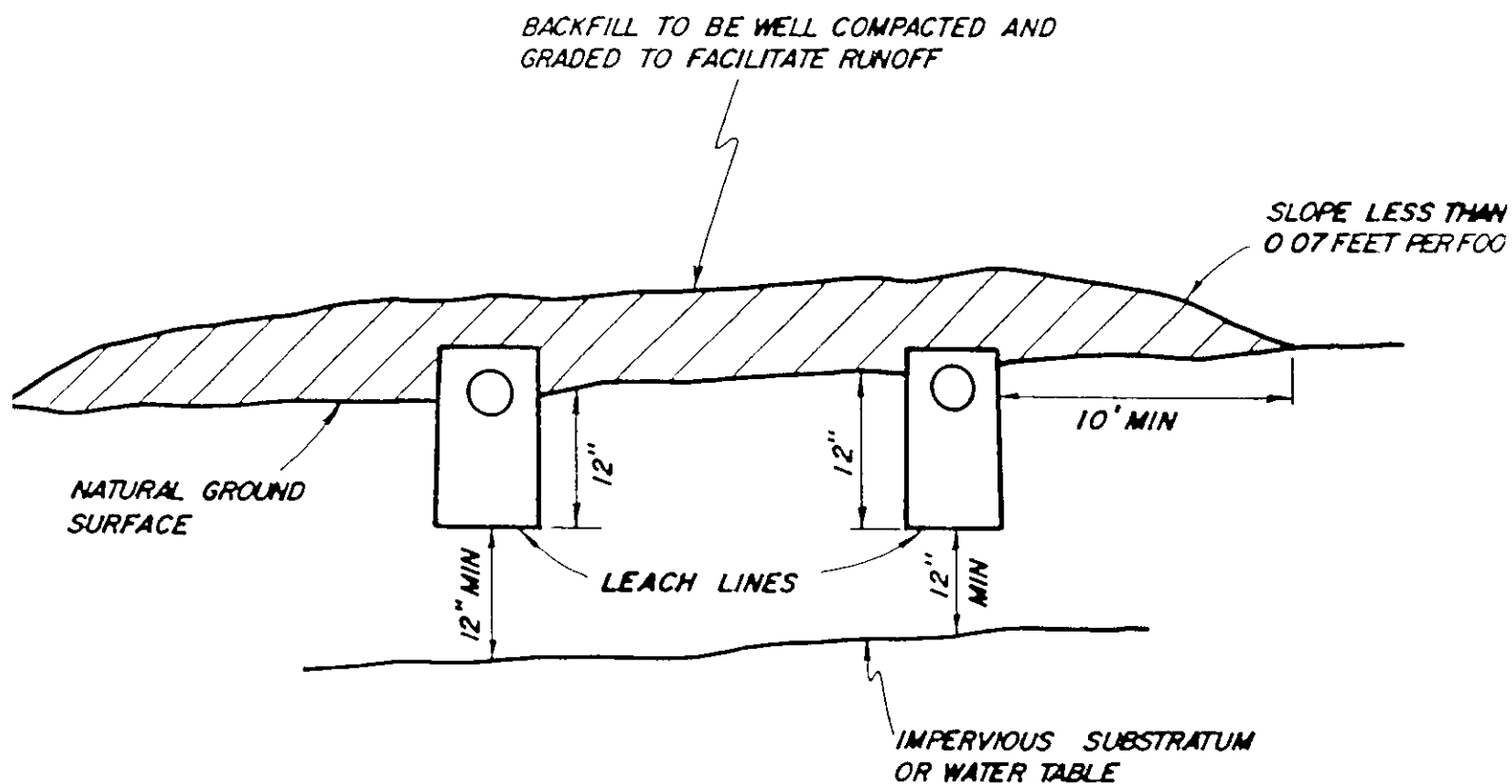


SHASTA COUNTY  
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*(CERTIFIED SPECIAL DESIGN SYSTEM NO.6)*

*SHALLOW LEACH FIELD*

*THIS SYSTEM IS TO MITIGATE SHALLOW WATER TABLES OR  
IMPERVIOUS SUBSTRATA ON LAND SLOPING LESS THAN 0.05 FEET PER FOOT*



CANNOT BE USED  
FOR LAND DIVISIONS