4
DESCRIPTION OF ONSITE SYSTEMS

This chapter includes descriptions and design guidelines for the various types of onsite wastewater disposal systems allowed in the Onsite Wastewater Management Zone. There are two classifications of onsite systems in the Town: standard systems and alternative systems. Onsite systems not described in this Chapter shall only be permitted under the provisions of Chapter 7. Specifications for various system components such as septic tanks, piping, and pumps, are provided in Chapter 5.

4.1 STANDARD SYSTEM

A standard absorption system is an onsite wastewater disposal system for a single family dwelling consisting of a septic tank, a flow distribution unit and a gravity-fed absorption field constructed in accordance with the guidelines outlined in this manual.

Method of septic tank effluent distribution will depend on the system. Variables such as slope of the site and type of final treatment facility will determine the necessary method of distribution. A distribution box is used for systems requiring distribution of effluent in equal portions to absorption trenches. Drop boxes are used for systems on sloping ground requiring serial distribution.

A. General conditions for approval

To be approved for a standard system each site must meet all the following conditions:

- Soil depth: See Figure 4.1

- Water table levels: Water table levels shall be predicted using conditions associated with saturation (Appendix A) or monitoring wells (Appendix B). If conditions associated with saturation do not occur in soil with rapid or very rapid permeability, predictions of the highest level of the water table shall be based on past recorded observations. If such observations have not been made, or are inconclusive, the application shall be denied until observations can be made. Groundwater level determinations shall be made during the period of the year in which high groundwater normally occurs. A permanent water table shall be forty-eight inches or more from the bottom of the absorption facility. A temporary water table shall be twenty-four inches or more below the bottom of the absorption trench.

- Slopes shall not exceed thirty percent.

- The site must not have been altered in a way that would affect proper functioning of the system.

- The site of the initial and replacement absorption facility will not be subjected to excessive saturation due to, but not limited to, artificial drainage of ground surfaces, driveways, roads, and roof drains.

- The required setbacks must be observed (See Table 3.1).

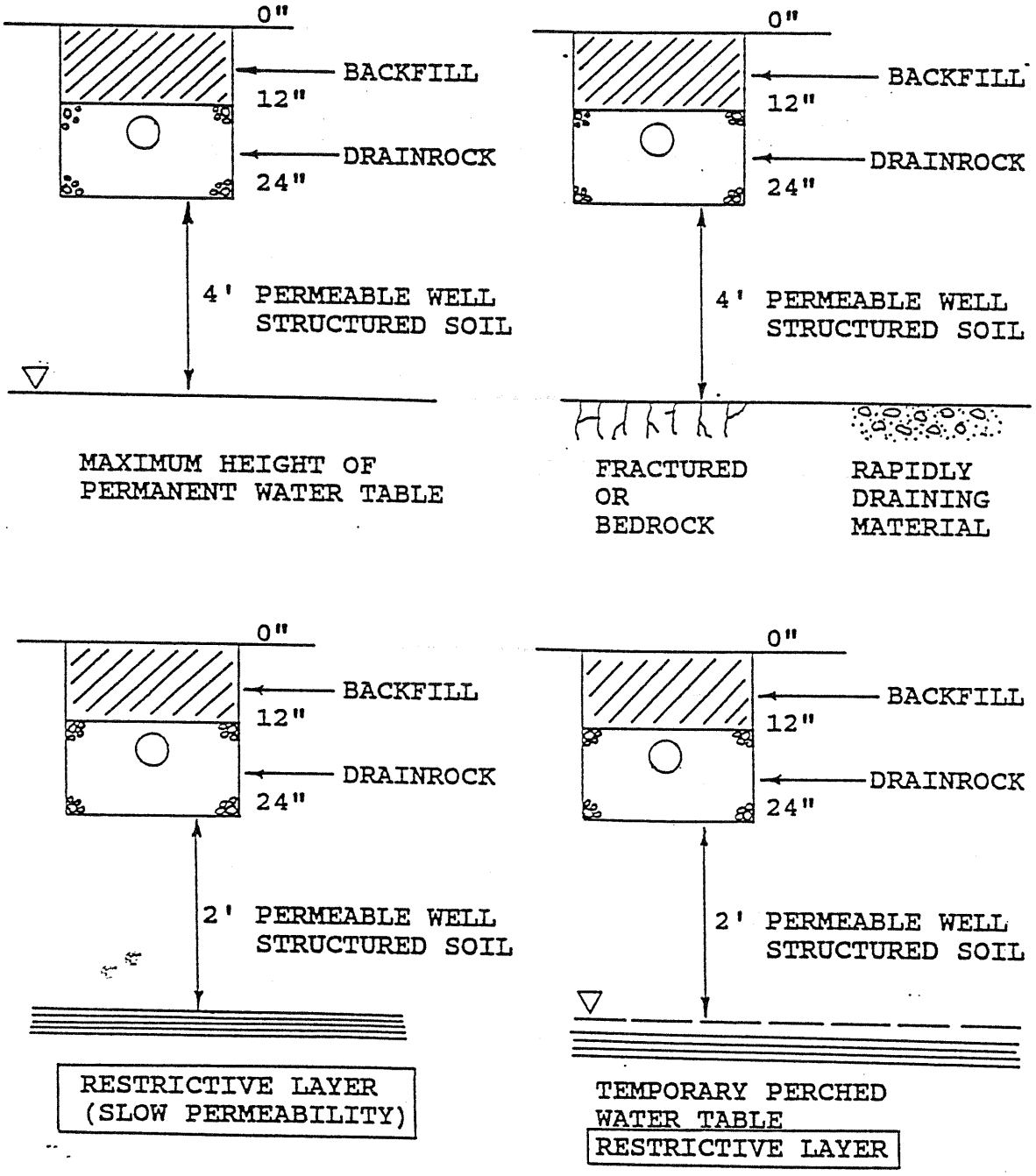


FIGURE 4.1

MINIMUM SEPARATION DISTANCES BETWEEN DISPOSAL TRENCH BOTTOM AND SENSITIVE LAYERS

B. Septic tanks

A diagram of a typical septic tank is shown in Figure 4.2. Volume and installation requirements are listed below. Other specifications are included in Chapter 5.

- Size of septic tank: Septic tanks to serve new single family dwellings shall be sized on the number of bedrooms in the dwelling, as follows:

Bedrooms	Minimum Tank Size (gallon)
1 - 3	1,500
4	1,500
5 - 6	1,500

- Existing septic tanks that are structurally sound and not identified as being in failure shall comply with the minimum septic tank sizes established by Appendix I, Table I-2 of the Uniform Plumbing Code, California Plumbing Code Edition.

- Septic tank installation requirements:

  a. Septic tanks shall be installed on a level, stable base that will not settle. A minimum eight (8) inch base layer of pea gravel shall be required. For fiberglass or PVC tanks, pea gravel or sand shall be used as backfill to the midseam of the tank as a minimum.

  b. Septic tanks located in high groundwater areas shall be weighted or provided with an antibuoyancy device to prevent flotation.

  c. A watertight access riser extending from the top of the septic tank to the ground surface or above is recommended for standard systems, but are not required. Watertight access risers extending to finished grade which are capable of supporting vehicle loads shall be installed on septic tanks located beneath vehicle traffic areas, sidewalks, and concrete pads. Watertight access risers are required on all alternative systems. The riser shall have a minimum inside dimension equal to or greater than that of the tank access port opening. A cover shall be provided and securely fastened or weighted to prevent easy removal and shall have a gasket to prevent odors from escaping.

  d. Septic tanks shall be installed in a location that provides access for servicing and pumping.

e. Septic tank construction shall comply with minimum standards set forth in this manual (see Chapter 5), unless otherwise authorized in writing by the Onsite Sanitary Official. A double compartment septic tank shall be used for standard systems.

- Effluent sewer: The effluent sewer shall extend at least one foot beyond the septic tank before connecting to the distribution unit. It shall be installed with a minimum fall of four inches per 100 feet, but in no instance shall there be less than two inches of fall from one end of the pipe to the other. Effluent sewers which are placed on a steep slope and running a long distance need clay dams in the trench containing the effluent sewer. The purpose of the dams is to prevent water running along the pipe and in the trench from concentrating at the terminal end of the trench and either entering the absorption field or causing a wet area.

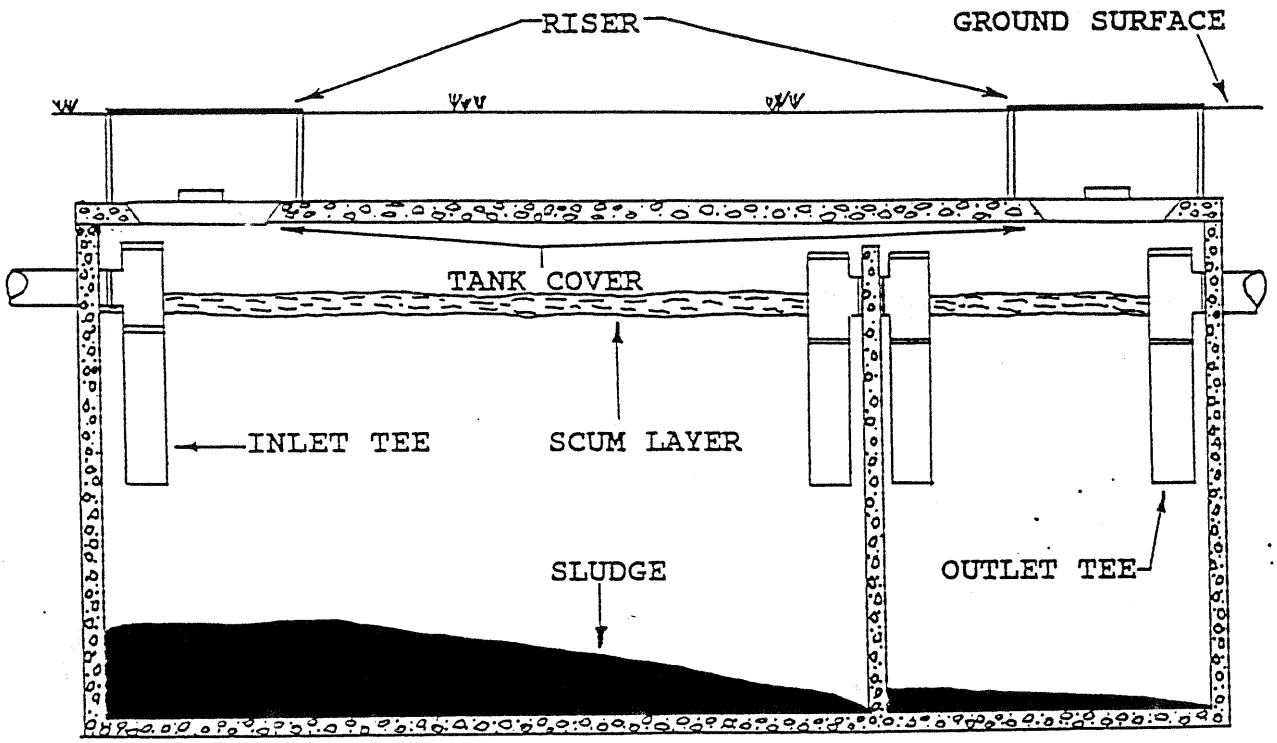


FIGURE 4.2
TYPICAL SEPTIC TANK CROSS SECTION

C. Distribution boxes

Distribution boxes are mandatory for parallel (equal) distribution to absorption trenches. The distribution box must be on a stable, level native soil or compacted soil base if it is to function properly. A typical parallel (equal) distribution system is illustrated in Figure 4.3. A typical distribution box installation is shown in Figure 4.4. Distribution box specifications are presented in Chapter 5. Other requirements are listed below:

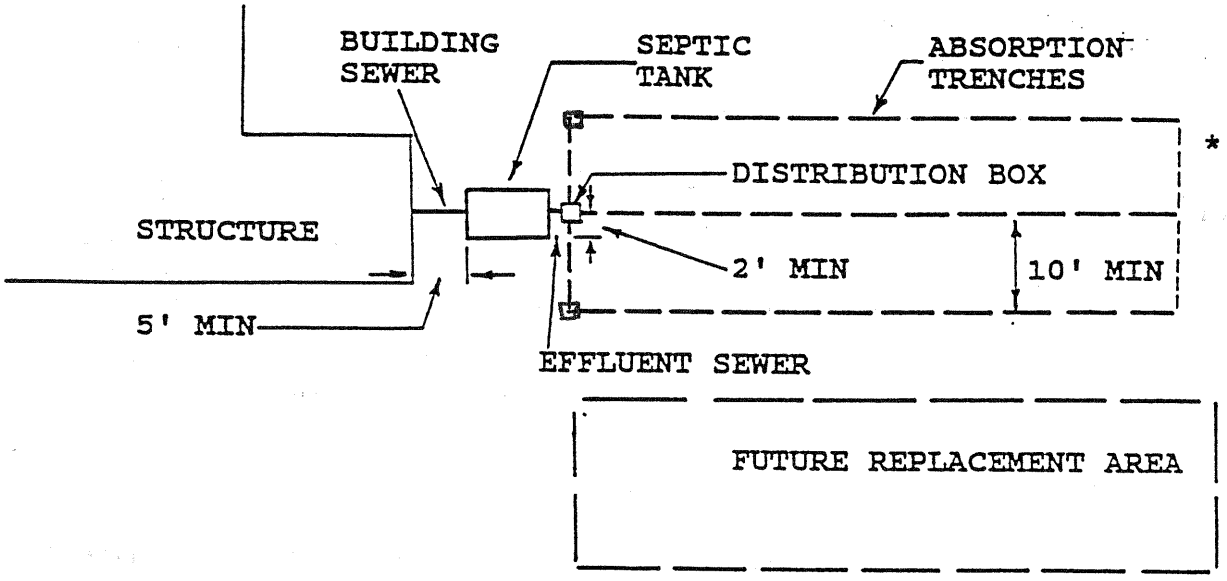
- The distribution box shall be placed on a stable, level native or compacted soil base.

- Outlets: A separate outlet shall be provided for each distribution pipe. The inverts of all outlets shall be set at the same level that shall be a minimum of two inches above the bottom of the distribution box. When installation is complete the distribution box shall be filled with water at which time the installation shall be checked to make sure that it is level. Adjustments shall be made as necessary so that all outlets are fixed permanently and securely at exactly the same elevation prior to back-filling.

- Inlets: The invert of the inlet shall be at least one inch above the invert of the outlets. Where dosing is used, or where the connecting pipe from the septic tank has a steep slope, measures shall be taken to prevent direct flow of septic tank effluent across the distribution box resulting in unequal distribution of septic tank effluent among the distribution outlets.

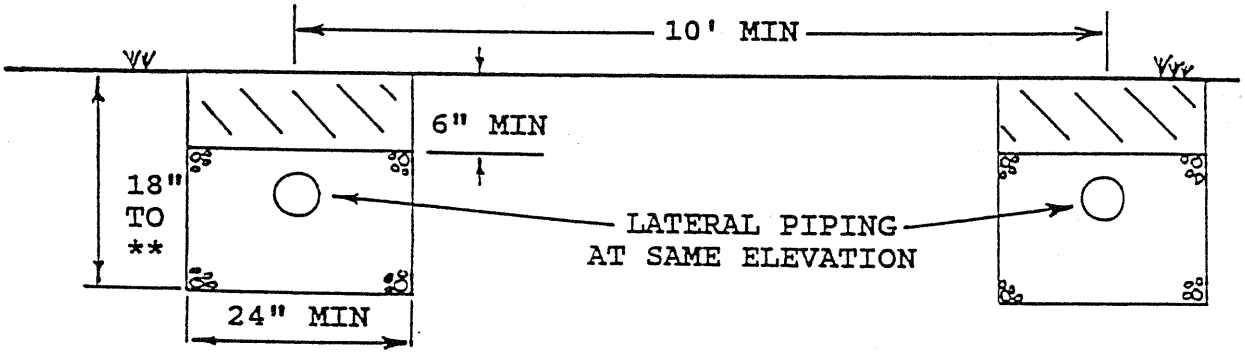
- Access: Distribution boxes shall be provided with a means of access which may be a removable lid for smaller boxes or an access port for larger boxes. Access openings must be large enough for easy removal of accumulated solids and inspection of the inlet and all outlets. Openings must be watertight and also extend to within twelve-eighteen inches of the finished grade.

- All distribution box locations shall be permanently marked with a steel post, concrete marker, or other durable material. Traffic should not be allowed on the distribution box.



* NOTE: IF SLOPES ARE FLAT THE ENDS OF ABSORPTION TRENCHES CAN BE CONNECTED

PLAN VIEW



TYPICAL SECTION

** MAXIMUM TRENCH DEPTH SHALL BE FORTY EIGHT INCHES. DEPTHS EXCEEDING FORTY EIGHT INCHES ARE ALLOWED IF MINIMUM SEPARATION DISTANCES FROM RESTRICTIVE LAYERS AND GROUNDWATER CAN BE MAINTAINED. ABSORPTION TRENCHES WITH GREATER THAN FIVE FEET OF DRAINROCK BELOW THE PIPE SHALL REQUIRE A VARIANCE.

FIGURE 4.3

TYPICAL EQUAL DISTRIBUTION SYSTEM WITH A DISTRIBUTION BOX

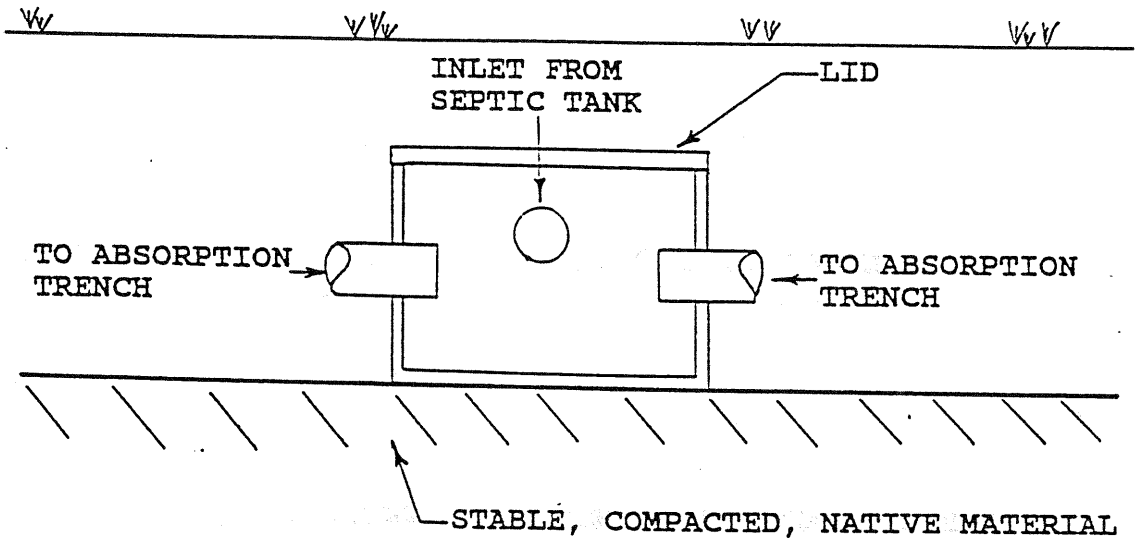


FIGURE 4.4
TYPICAL DISTRIBUTION BOX SECTION

D. Drop boxes

Drop boxes are sometimes used for serial distribution to absorption trenches. A typical serial distribution system is shown in Figure 4.5. Construction, installation, inlets, and access requirements are the same as for distribution boxes with the addition of overflow piping. Specific information about drop boxes is included in Chapter 5.

The overflow pipe to the next absorption trench shall be set so that the upper absorption trench is full of septic tank effluent before flow spills over to the next absorption trench being served from the box. The overflow pipe between drop boxes shall be watertight. It shall be placed in a trench dug only deep enough to allow connection to the next lower drop box. The soil back-filled around the overflow pipe shall be carefully compacted below and around it to prevent seepage along the pipe between absorption trenches. The drop box shall set on a firm base and carefully back-filled so as to prevent settlement or other movements.

E. Gravity-fed absorption field

A "standard" system will use a gravity-fed absorption field, as described below.

- The absorption area of the trench is calculated by using sidewall only. The entire surface area of sidewall that is in contact with the gravel is considered.

- Sizing: Absorption trenches shall be designed and sized based on the guidelines in this manual (Table 4.1). A single family dwelling with one to three bedrooms will normally need 300 lineal feet of absorption trench. A typical absorption trench design is shown in Figure 4.6.

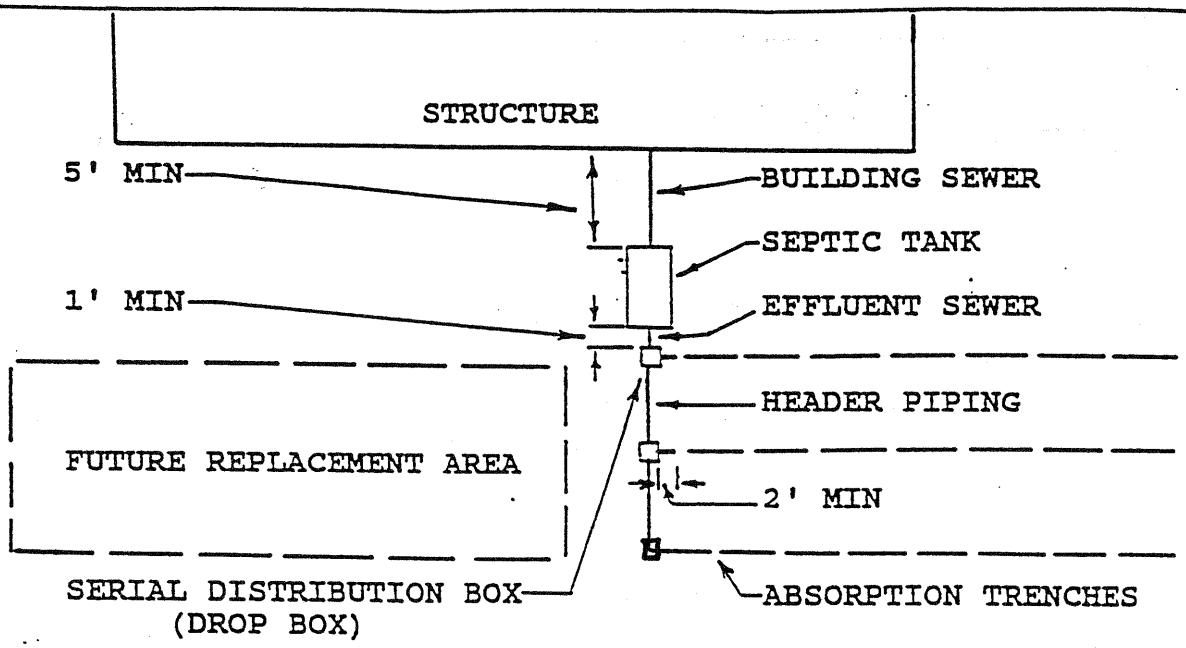
- Absorption trenches shall be constructed in accordance with the standards contained in Table 4.2, unless otherwise allowed by the Onsite Sanitary Official.

- Construction shall not be allowed by the Town when the soil has a moisture content that will cause permanent damage to the soil. Soil smearing can effectively seal trench walls. When the sidewall within the absorption trench has been smeared or compacted, sidewalls shall be raked to insure permeability. All smeared material shall be removed from the absorption trench.

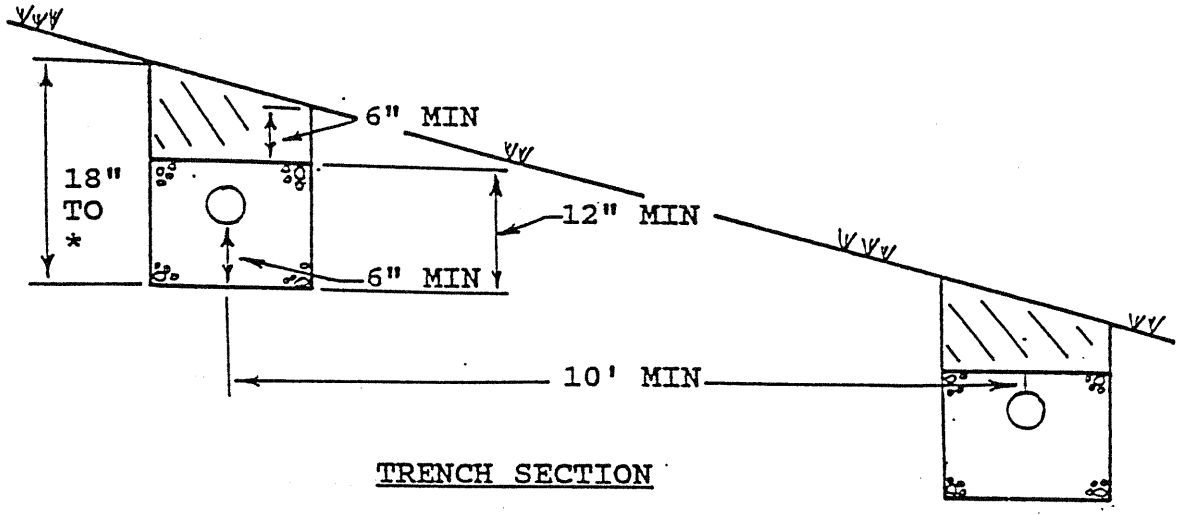
- The bottom of the absorption trench shall be level within a tolerance of plus or minus two inches.

- Absorption trenches shall not be constructed in a manner that would allow septic tank effluent to flow backwards from the distribution pipe to undermine the distribution box, the septic tank, or any portion of the distribution unit.

- A minimum of twenty-four inches of drainrock shall extend across the full width of the absorption trench. There shall be six inches minimum of drainrock under the pipe, four inches of drainrock around the pipe and two inches minimum of drainrock above the pipe.



PLAN VIEW



TRENCH SECTION

* MAXIMUM TRENCH DEPTH SHALL BE FORTY EIGHT INCHES. DEPTHS EXCEEDING FORTY EIGHT INCHES ARE ALLOWED IF MINIMUM SEPARATION DISTANCES FROM RESTRICTIVE LAYERS AND GROUNDWATER CAN BE MAINTAINED. ABSORPTION TRENCHES WITH GREATER THAN FIVE FEET OF DRAINROCK BELOW THE PIPE SHALL REQUIRE A VARIANCE.

FIGURE 4.5
TYPICAL SERIAL DISTRIBUTION SYSTEM WITH DROP BOXES

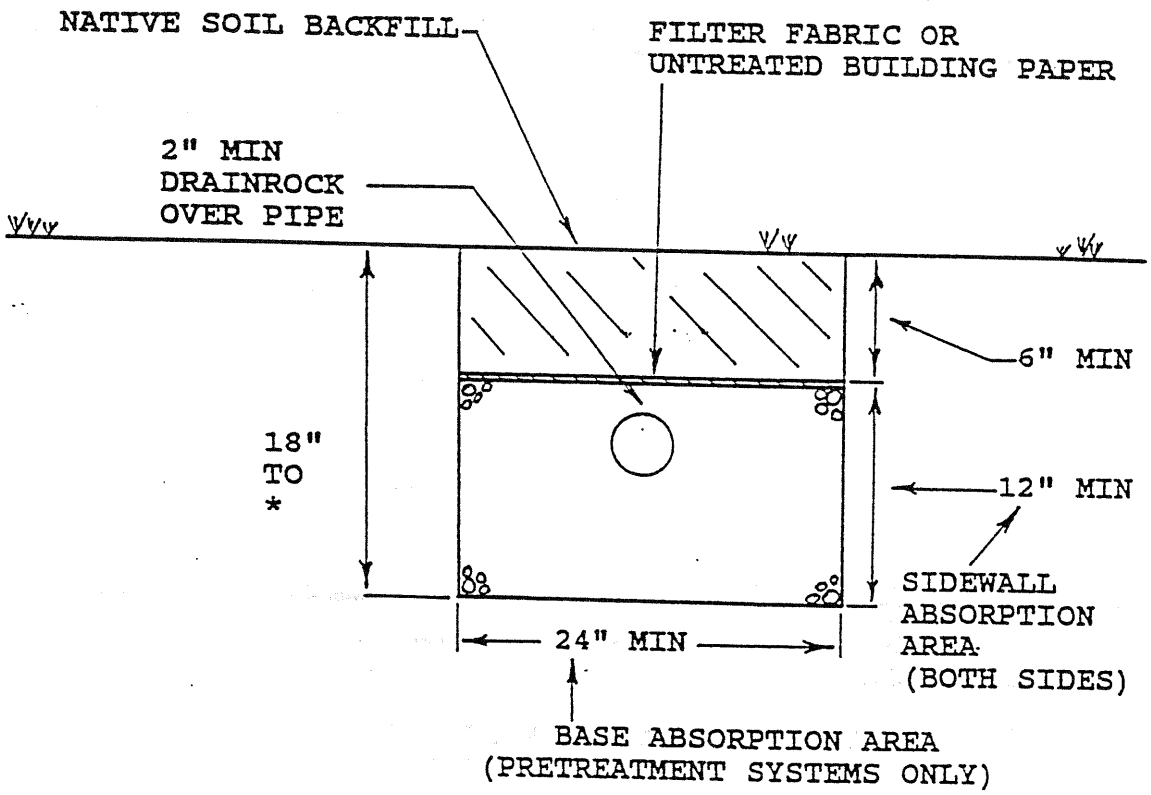


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FIGURE 4.6
GRAVITY-FED ABSORPTION TRENCH CROSS SECTION

TABLE 4.1
REQUIRED LINEAL FEET OF ABSORPTION TRENCH THAT HAS TWELVE INCHES OF DRAINROCK RECEIVING EFFLUENT BY TRICKLE FLOW[a]

Number of bedrooms	Design flows (gal/d)[b,e]	All non-sandy soils with <50% fragments smaller than 3 in.[c]	Gravity loam or clay loam or clay >50% coarse fragments larger than 3 in.[d]
1-3[f]	300	300	400
4	375	350	450
5	450	400	500
6	525	450	550
7	600	500	600

a Absorption trench sizing for low pressure distribution is the same as for gravity flow.

b Loading rates are based on the long term acceptance rates for loam, clay loam, and well structured clays. Design flows provide a safety factor to cover those individual homes which produce high flow rates. Actual average flow for a single family dwelling with three people is usually 150 - 180 gallons per day

c Design long term acceptance rates 0.45 to 0.60 gallons per square feet·day for sidewall area only.

d Design long term acceptance rates 0.38 to 0.45 gallons per square feet·day for sidewall area only.

e Soils containing excessive amounts of clay must have absorption trenches lengths increased based upon soil percolation rate. Absorption trenches installed in excessive clay content soils shall be pressurized.

f System design flows shall be 150 gallons for a one-bedroom residence. with each additional bedroom adding seventy-five gallons of effluent flow per bedroom

TABLE 4.2
ABSORPTION TRENCH SPECIFICATIONS

Item	Value
Maximum length of trench	125 feet
Minimum bottom width of trench	24 inches
Minimum depth of trench, using:	
Equal or loop distribution	18 inches
Serial distribution	24 inches
Minimum distance of undisturbed earth between trenches:	
For 24 inch wide trenches	8 feet
For 12 6 inch wide trenches	6 feet
Maximum depth of trenches below natural soil surface	48 inches[1]
Minimum depth of filter material	12 inches
Minimum depth below pipe	6 inches
Minimum depth above pipe	2 inches
Minimum native soil backfill	6 inches

[1] Trench depths in excess of forty-eight inches may be allowed if soil profile descriptions show that the required separation distance can be maintained between the base of the absorption trenches and any groundwater or restrictive soil horizons. Absorption trenches with greater than five feet of drain rock below pipe shall require a variance.

- Prior to backfilling the absorption trench, the filter material shall be covered with filter fabric or other material approved by the Onsite Sanitary Official to prevent fines from filling the gravel.

- The installation of a piezometer in each trench is highly recommended, but not required, for standard systems (see Appendix B).

- Absorption trench backfill:

  a. Backfill shall be placed carefully to prevent damage to the system. Extra backfill is required over the absorption trenches to allow for settling. The backfill shall not be compacted. The absorption trenches should not become depressions. Wheeled tractors must be operated with care over constructed absorption trenches to avoid damaging the absorption trenches.

b. Backfill shall be free of large stones, clumps of soil, masonry, stumps, or waste construction materials or other materials that could damage the system.

- All surface water shall be directed away from the disposal field.

- Header pipe shall be watertight, have a minimum diameter of four inches, and be bedded on undisturbed native soil or compacted soil. Where distribution boxes or drop boxes are used, header pipe shall be at least two feet in length. See Chapter 5.

- Distribution pipe:

  a. Distribution pipes shall have a minimum diameter of four inches.

  b. Each absorption trench shall have distribution piping that is centered in the trench and laid level within a tolerance of plus or minus one inch.

  c. Distribution piping shall comply with the standards listed in Chapter 5.

  d. All perforated pipe shall be installed with centerline markings up.

- All absorption trenches shall be marked permanently with a steel post, concrete marker or other durable material. A marker shall be set at each end of the absorption trench. Piezometers, if installed, can be used to satisfy this requirement.

All other systems described hereafter shall comply with the conditions set forth for the standard system except as indicated by the additions and substitutions required by an alternative system.

4.2 PRETREATMENT SYSTEMS

It may be necessary to pretreat septic tank effluent with a sand or fine gravel filter in areas of shallow soil, where restrictive layers are present, in area of high groundwater, on sites with excessively permeable soil, or where disposal area is limited. Pretreatment systems are considered to be "alternative systems" by the Town of Paradise.

A. General conditions for approval

Pretreatment systems shall not be permitted on a site if a standard system would be acceptable. Sand or fine gravel filters may be permitted on any site meeting all the following minimum site conditions:

- General conditions for sand or fine gravel filter placement:

  a. Slope is forty-five percent or less. Refer to Section 4.7 for steep slope (thirty to forty-five percent) conditions.

b. Setbacks shown in Table 3.1 can be met

c. Soil beneath a sand filter absorption area shall be at least four feet deep and the percolation rate must be no less than five minutes per inch and no greater than sixty minutes per inch.

- Temporary water table levels:

  a. The highest level attained by temporary water would be twenty-four inches below the bottom of the trench.

- Permanent water table levels: Permanent water table levels shall be determined in accordance with methods specified in this manual. A four foot separation from trench bottom to permanent water shall be maintained.

Types of pretreatment: There are two basic types of pretreatment: Single pass (intermittent dosing: contained and bottomless) and multiple pass (recirculating gravel) filters. The selection of the filter will be based on an evaluation of the site.

The partially treated wastewater is collected at the bottom of the filter and discharged, either by gravity or by pressure, to a suitable, approved final treatment, usually an absorption field.

B. Intermittent sand filters - General

An intermittent dosing sand filter system consists of a septic tank, a dosing system with effluent pump and controls or a dosing siphon, bed of sand, and an absorption facility (for contained sand filters). A two foot bed of medium sand serves as an aerobic site for microorganisms, which live on the surface of the sand grains. All or portions of the sand bed will require replacement at some point in time depending on operation practices and inert, non-biodegradable material contained in the waste.

C. Intermittent dosing sand filter - contained

A contained intermittent dosing sand filter consists of an impermeable container filled with a minimum of two feet of medium sand designed to filter and biologically treat septic tank or other treatment unit effluent from a pressure distribution system at an application rate not to exceed 1.23 gallons per square feet·day of sand surface area, applied at a dose not to exceed twenty percent of the projected daily sewage flow. A typical intermittent contained sand filter is shown in Figure 4.7.

Construction:

- Use guidelines for the distribution as outlined in pressure distribution systems.

- Filters can be placed above or below grade.

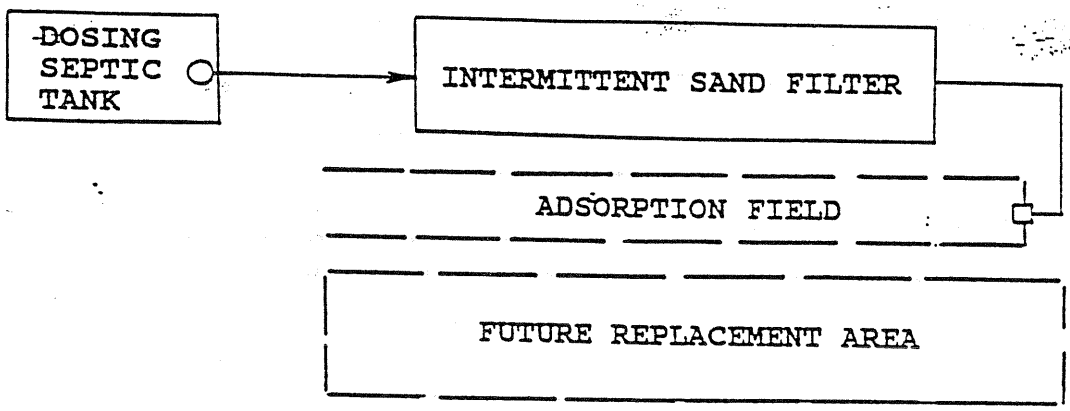
- Media specifications: effective size 0.30 - 0.50 millimeters, uniformity coefficient of four or less. The media shall conform to the gradation shown below. The sand must be washed as to be free of fines and approved by the system designer prior to delivery to the site.

Sieve Size	Percent Passing
3/8 inch	100
No. 4	40 - 100
No. 10	62 - 100
No. 16	45 - 82
No. 30	25 - 55
No. 50	5 - 20
No. 60	0 - 10
No. 100	0 - 4

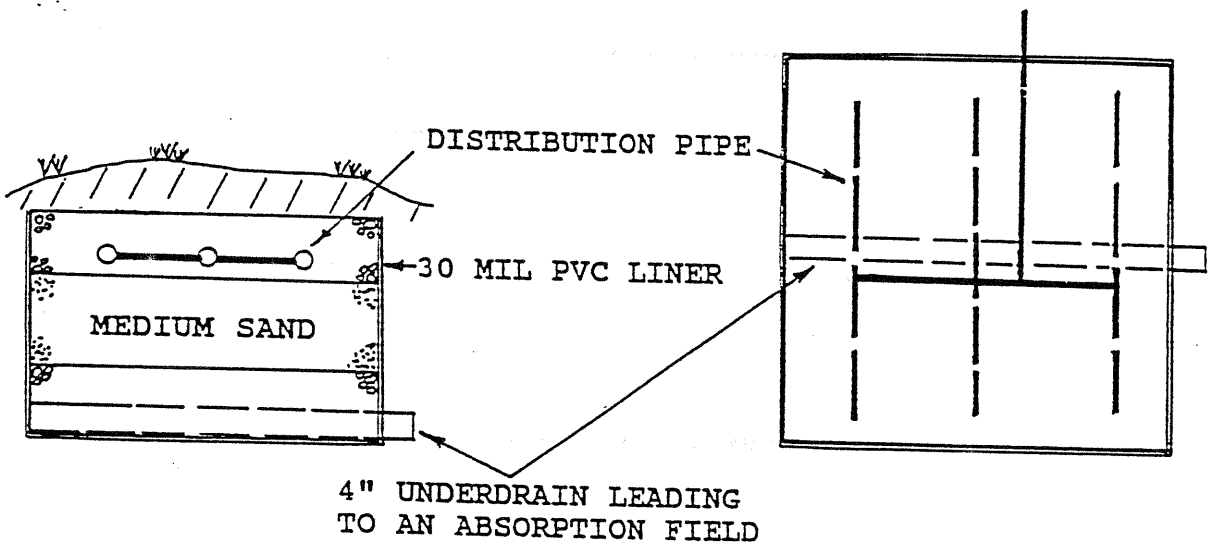
D. Intermittent dosing sand filter - bottomless

A bottomless intermittent dosing sand filter consists of two feet of medium, washed sand which is pressure dosed and effluent is allowed to drain through the sand directly into the soil beneath. A typical bottomless sand filter is illustrated in Figure 4.8. A bottomless sand filter can typically be used in soils with rapid permeability provided that the required groundwater separation distances are provided.

Maximum loading rates for bottomless sand filters are the same as for contained sand filters. The underlying material must accept the treated effluent at a rate greater than 5 gallons per square feet·day. Soil hydraulic testing procedures are outlined in Appendix C. A bed or trench design may be used.



SYSTEM SCHEMATIC



TYPICAL CROSS SECTION

PLAN VIEW

FIGURE 4.7
TYPICAL CONTAINED INTERMITTENT DOSING SAND FILTER

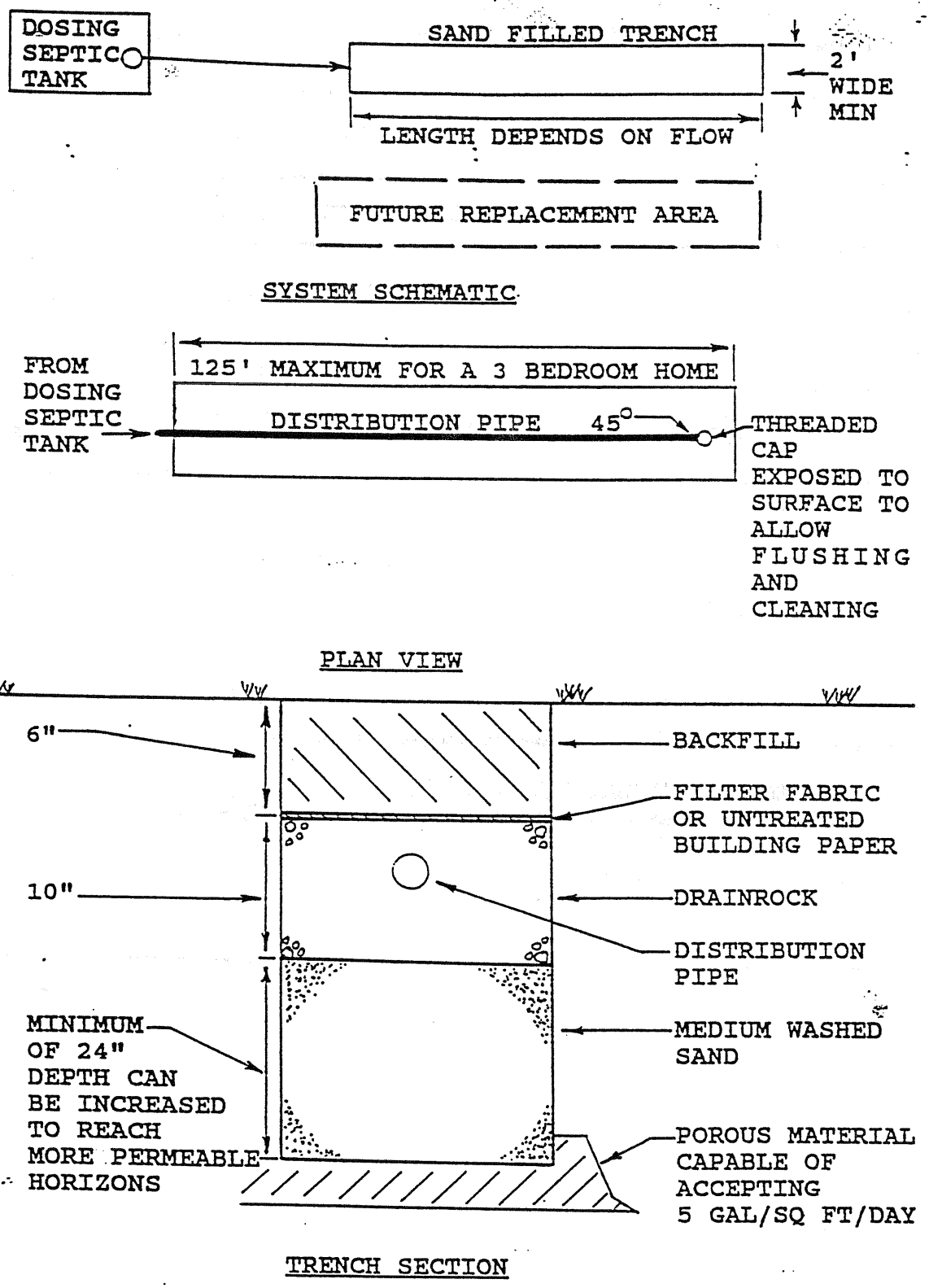


FIGURE 4.8
BOTTOMLESS INTERMITTENT DOSING SAND FILTER

Construction:

- Use guidelines for the distribution as outlined in pressure distribution systems.
- Filters can be placed above or below grade.
- In-trench bottomless sand filters shall have a minimum width of two feet.
- Media specifications: effective size 0.30 - 0.50 millimeters, uniformity coefficient of four or less. The media shall conform to the gradation shown below. The sand must be washed so as to be free of fines and approved by the system designer prior to delivery to the site.

Sieve Size	Percent Passing
3/8 inch	100
No. 4	40 - 100
No. 10	62 - 100
No. 16	45 - 82
No. 30	25 - 55
No. 50	5 - 20
No. 60	0 - 10
No. 100	0 - 4

E. Recirculating gravel filter

Effluent from the septic tank flows by gravity to a recirculation tank (see Figures 4.9 and 4.10). Here it mixes with treated effluent returning from a bed of fine gravel. A timer controls a pump used to pressure dose a twenty-four inch layer of fine gravel, usually two-three times per hour. A valve in the recirculation tank allows effluent returning from the filter to either enter the tank or be discharged, depending on the liquid level in the tank.

- The filter loading rates are based on five gallons per square foot·day based on the wastewater flow rate.
- Wastewater recirculation ratios will vary from 3:1 to 6:1 (recirculation flow to wastewater flow).

Construction:

- Media specifications: effective size three millimeters, uniformity coefficient of two or less. The gravel shall have less than two percent passing through the No. 10 sieve and shall have

one hundred percent passing the No. 4 sieve. The media must be washed as to be free of fines and must be approved by the designer prior to delivery to the site.

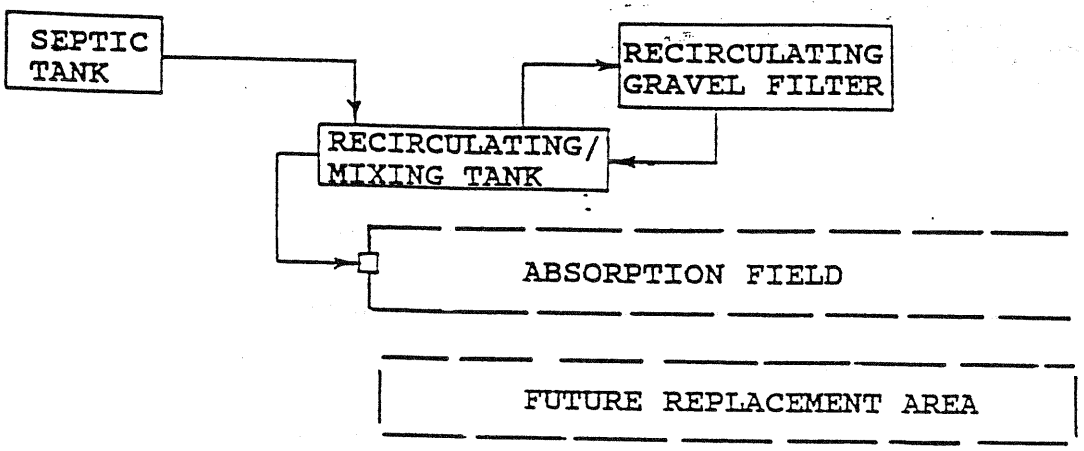
- Containers can be concrete or flexible membrane. Use the same guidelines for containers as for contained sand filters.

F. Other types of pretreatment systems

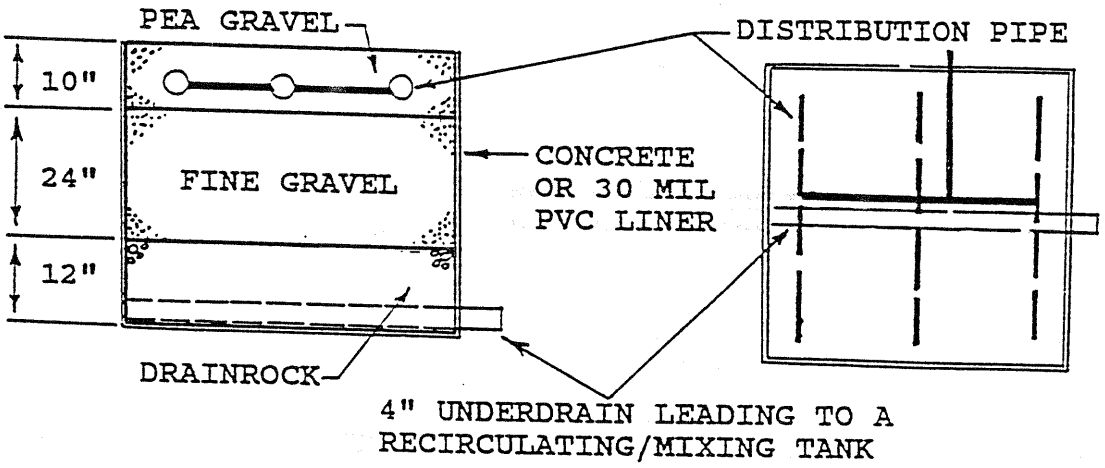
Other pretreatment systems which vary in design from the filters mentioned in this manual may be authorized by the Town if it is demonstrated that the systems produce comparable effluent quality. Refer to Chapter 7 for approval procedures.

G. Pretreatment system disposal fields

The minimum total lengths of standard initial absorption trenches for sand filter absorption facilities serving single family homes are indicated in Table 4.3. For other applications the application rate shall not exceed 1.20 gallons per day·square feet of combined sidewall and absorption trench bottom area, based on the design flow rate, as discussed in Chapter 6. Repair area absorption trenches for single family residences shall be maintained which utilize onsite wastewater disposal system installations other than pretreatment disposal trenches and redundant disposal trenches. Repair area absorption trench lengths shall yield sufficient absorption trench surface area equal to the absorption capacity of standard absorption trenches required for a one to three bedroom single family residence.



SYSTEM SCHEMATIC



TYPICAL CROSS SECTION

PLAN VIEW

FIGURE 4.9
TYPICAL RECIRCULATING GRAVEL FILTER

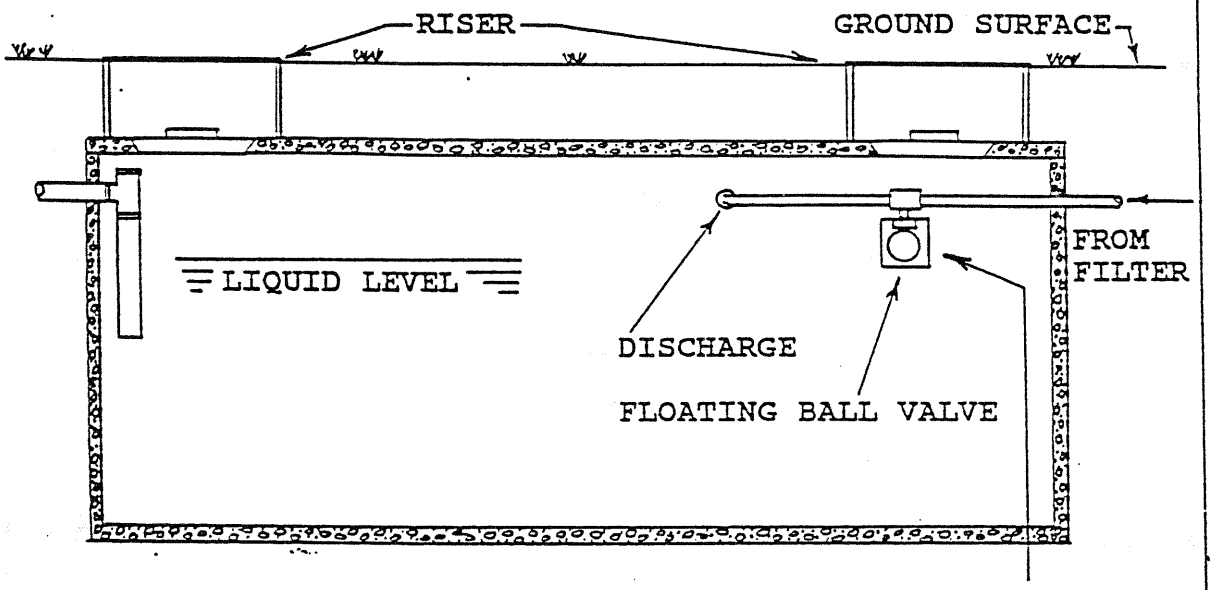


FIGURE 4.10
TYPICAL CROSS SECTION OF RECIRCULATING/MIXING TANK

TABLE 4.3
ABSORPTION FIELD SIZING FOR TRENCHES WITH 12 IN. OF DRAINROCK OVER PERMEABLE SOILS RECEIVING PRETREATED EFFLUENT BY TRICKLE OR PRESSURE DOSED FLOW*

Number of bedrooms	Design flows (gal/d)	Lineal feet
1-3	300	100
4	375	125
5	450	150
6	525	175
7	600	200

* For slowly permeable soils and fractured bedrock, infiltration tests shall be performed in accordance with Appendix C.

The allowable soil hydraulic loading rates are higher where pretreatment systems are provided because of the following:

- Pretreatment reduces soil clogging which allows higher loading rates.
- Bottom area of absorption trenches are important absorption surfaces for pretreated effluent, because the absorption trench bottoms continue to absorb pretreated effluent unlike absorption trenches receiving untreated effluent from a septic tank. Each lineal foot of pretreated absorption trench has more usable surface area than absorption trenches loaded with untreated septic tank effluent.

H. General requirements for pretreatment systems

- All materials used in filter system construction shall be structurally sound, durable and capable of withstanding normal installation and operation stresses. Component parts subject to malfunction or excessive wear shall be readily accessible for repair and replacement.
- All filter containers shall be placed over a stable level base.
- Piping and fittings for the filter distribution system shall be as required under pressure distribution systems.
- A method for sampling filter effluent shall be provided.
- The specific requirements for septic tanks, dosing tanks, etc. in Chapter 5 shall be met.

- A piezometer shall be installed adjacent to each absorption trench (see Appendix B).

- The applicable components of the pretreatment system shall meet minimum specifications indicated in Chapter 5 unless otherwise authorized in writing by the Onsite Sanitary Official.

- Container design and construction: Container may be constructed of concrete or other materials where equivalent function, workmanship, water-tightness and at least a thirty-year service life can be documented. A flexible membrane liner (FML) is permitted provided that it is made of material with the following properties:

  a. Materials are at least equivalent to thirty milliliter unreinforced polyvinyl chloride (PVC) described in Chapter 5.

  b. Have field repair instructions and materials which are provided to the purchaser with the liner; and

  c. Have factory fabricated "boots" suitable for field bonding onto the liner to facilitate the passage of piping through the liner in a waterproof manner. Where accepted for use, flexible sheet membrane liners shall be placed against relatively smooth, regular surfaces. Surfaces shall be free of sharp edges, corners, roots, nails, wire, splinters and other projections which might puncture, tear, or cut the liner. Where a smooth, uniform surface cannot be assured in the field, filter system plans must include specification for liner protection. A four-inch bed of clean sand or a non-degradable filter fabric acceptable to the Town, shall be used to provide liner protection.

- The designer of a pretreatment system shall supply both the owner and the Onsite Sanitary Official with system operations and maintenance instructions.

I. Operation and maintenance

Operation, Maintenance, Monitoring and reporting shall be as outlined in Chapter 1.4.A. Alternative and Innovative Pre-Treatment Systems, of this Manual.

The owner/purchaser of a filter system must recognize that he/she assumes the continuous responsibility to preserve the installation as near as practical in its "as built" state. This responsibility includes erosion control, fencing out of livestock and the control of burrowing animals.

J. Operations and maintenance instructions

As a minimum, the operations and maintenance instructions shall include the following information.

- A statement notifying the homeowner of his/her responsibility for maintaining the system in proper working condition.
- A complete description of the system and components. Include process description for the homeowner and design criteria.
- Instructions on how to properly set pump control equipment.
- How the Town can sample filter effluent.
- How and when to inspect and flush distribution laterals.
- What to do if the alarm on the pump panel activates.
- A system troubleshooting table listing potential problems and their solutions for the septic tank, filter, and absorption field.
- When to get the septic tank or recirculation tank pumped.
- Safety precautions to be observed.

4.3 PRESSURE DISTRIBUTION

A pressure distribution system is any system designed to intermittently distribute septic tank or other treatment unit effluent uniformly under pressure in an absorption facility or sand filter. Pressure distribution is used to prolong the life of an absorption surface, prevent surfacing of effluent, and allow the use of narrow absorption trenches which can be built closer together on sites with limited absorption trench area. Any system using pressure distribution will be considered "alternative" by the Town of Paradise.

A. General conditions for approval

A pressure dosed absorption field will not be permitted on a site if a standard system would be acceptable. Pressurized distribution systems may otherwise be permitted where this method of effluent distribution is desired.

B. Requirements

A typical dosing tank is shown in Figure 4.11. A single compartment septic tank may be used if the pump or siphon is located in a screened vault.

All materials used in pressurized systems shall be structurally sound, durable, and capable of withstanding normal stresses incidental to installation and operation. Nothing in these rules shall be construed to set aside applicable building, electrical, or other codes.

Pressurized distribution piping: Piping, valves and fittings for pressurized systems shall meet the following minimum requirements, as well as the applicable requirements presented in Chapter 5.

- All pressure transport, manifold, lateral piping, and fittings shall meet or exceed the requirements for Class 200 PVC 1120 pressure pipe as identified in ASTM Specification D2241.

- Pressure transport piping shall be uniformly supported along the trench bottom, and at the discretion of the Town, it shall be bedded in sand or other material approved by the Onsite Sanitary Official. A fourteen gauge tracer wire shall be placed above piping if it crosses property lines or enters public property or right of way.

- Orifices shall be located on top of the pipe.

- The ends of lateral piping shall be provided with threaded plugs or caps and extend to the surface for cleaning purposes.

- All joints in the manifold, lateral piping, and fittings shall be solvent welded, using the appropriate joint compound for the pipe material. Pressure transport piping may be solvent welded or rubber ring jointed.

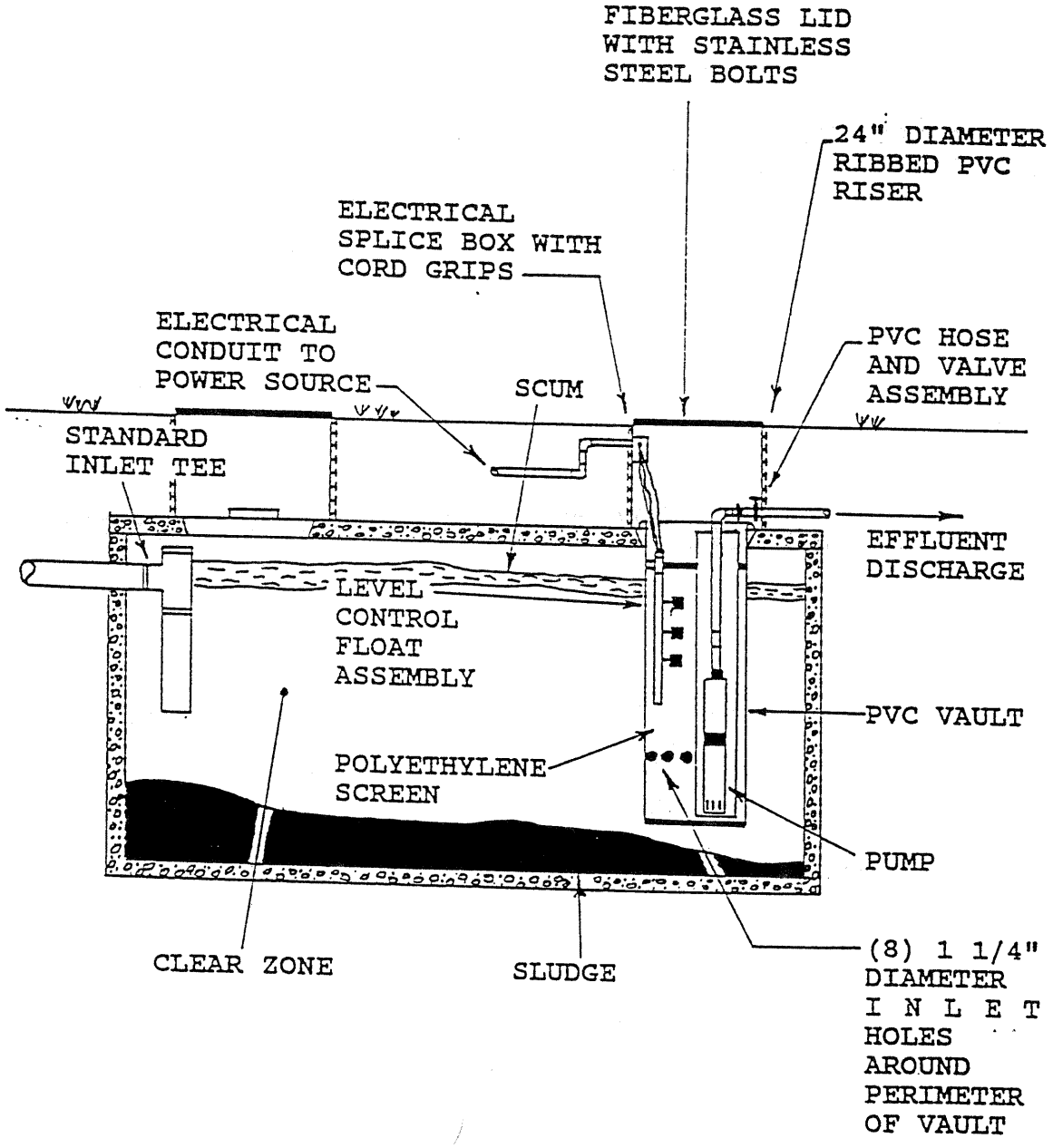


FIGURE 4.11
TYPICAL CROSS SECTION OF A DOSING SEPTIC TANK

- A ball valve shall be placed on the pressure transport pipe, in or near the dosing tank, when appropriate.

- A check valve shall be placed between the pump and the ball valve.

- Antisiphon valves shall be placed between the pump and ball valve when pumping down slope.

Absorption trench sizing and construction: A pressurized system using absorption trenches shall be designed and sized in accordance with the requirements for a standard system (see Figure 4.1). Absorption trenches can be narrow or standard width. A typical pressure dosed absorption trench is shown in Figure 4.12. Absorption trenches shall be constructed based on the following guidelines.

- Pressure lateral piping shall have not less that six inches of filter material below, nor less than four inches of filter material above the piping.

- The top of the filter material shall be covered with filter fabric, or other nonbiodegradable material permeable to fluids that will not allow passage of soil particles coarser than very fine sand.

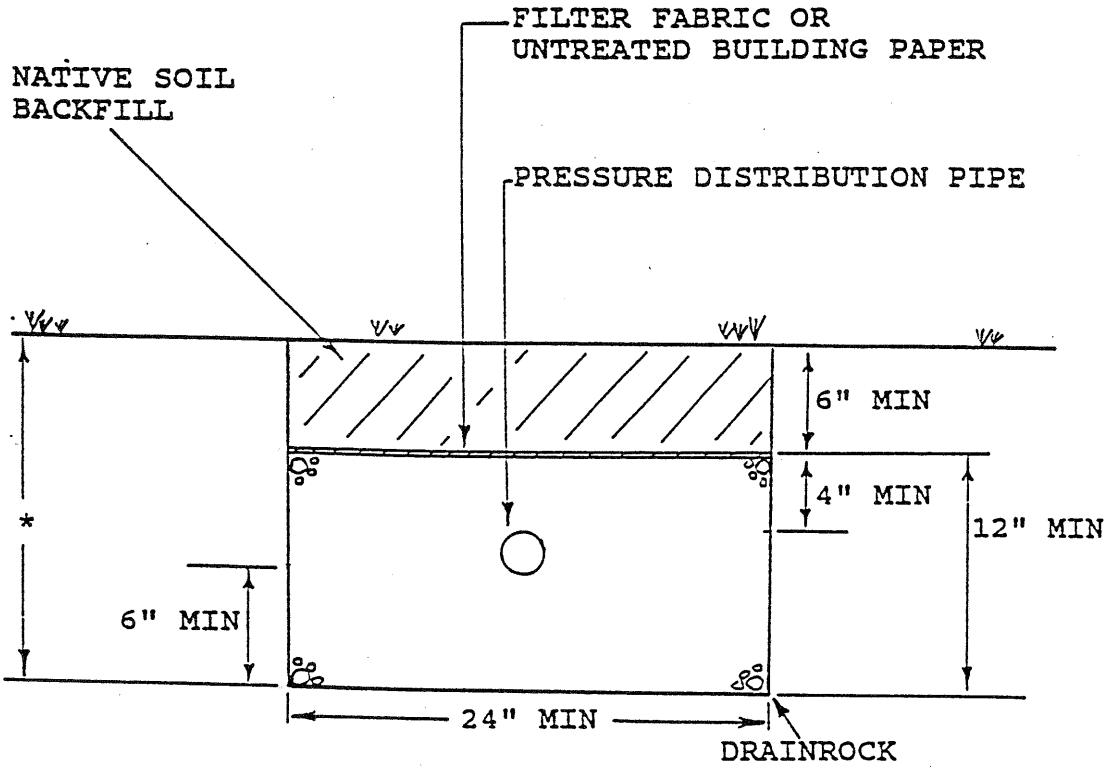
- A piezometer shall be installed adjacent to each absorption trench (see Appendix B).

- Hydraulic design criteria: Pressurized distribution systems shall be designed for appropriate head and capacity. Head calculations shall include maximum static lift, pipe friction, and orifice head requirements.

    a. Where pumps are used, static lift shall be measured from the minimum dosing tank level to the highest pipe elevation.

    b. Pipe friction shall be based upon a Hazen Williams coefficient of smoothness of 150. The head loss across a lateral with multiple evenly spaced orifices may be considered equal to one-third of the head loss that would result if the entrance flow were to pass through an equivalent of similar unperforated pipe length.

    c. There shall be a minimum head of five feet (up to ten feet is desirable) at the most remote orifice and no more than a ten percent head variation between nearest and most remote orifice in an individual lateral.



* MAXIMUM TRENCH DEPTH SHALL BE FORTY EIGHT INCHES. DEPTHS EXCEEDING FORTY EIGHT INCHES ARE ALLOWED IF MINIMUM SEPARATION DISTANCES FROM RESTRICTIVE LAYERS AND GROUNDWATER CAN BE MAINTAINED. ABSORPTION TRENCHES WITH GREATER THAN FIVE FEET OF DRAINROCK BELOW THE PIPE SHALL REQUIRE A VARIANCE.

FIGURE 4.12
PRESSURE DOSED ABSORPTION TRENCH CROSS SECTION

- The capacity of a pressurized distribution system refers to the rate of flow given in gallons per minute.

  a. Lateral piping shall have one-eighth inch maximum discharge orifices spaced evenly.

  b. The system shall be dosed at a rate not to exceed twenty percent of the design daily wastewater flow.

  c. The effect of back drainage of the total volume of effluent within the pressure distribution system shall be evaluated for its impact upon the dosing tank and pump operation.

- Orifice spacing: The objective of pressure dosing is to produce unsaturated flow in a trench with no clogging mat. In coarse textured soils with rapid permeability, a spacing of two feet between orifices is adequate. In well structured, medium textured soils the spacing is not as critical. Spacing of four to six feet is adequate for these soils. Greater spacings can cause very high loading rates near the orifice which will create a clogging mat. There is no real advantage to using pressure dosing for soils with an acceptance rate slower than 0.3 gallons per square foot·day. A clogging mat will form with or without pressure dosing.

C. Operation and maintenance

System operation and maintenance tasks and requirements shall be as specified on the operating permit and the designer's operations and maintenance instructions. The system owner shall be responsible for the continuous operation and maintenance of the system. Each system will be inspected by the Town on a regular basis.

The owner/purchaser of a pressure distribution system must recognize that he/she assumes the continuous responsibility to preserve the installation as near as practical in its "as built" state. This responsibility includes erosion control, fencing out of livestock and the control of burrowing animals.

D. Operations and maintenance instructions

As a minimum, the operations and maintenance instructions shall include the following information.

- A statement notifying the homeowner of his responsibility for maintaining the system in proper working condition.

- A complete description of the system and components, including a process description for the homeowner and design criteria.

- Instructions on how to properly set pump control equipment.
- How and when to inspect and test dosing tank components.
- How and when to inspect and flush distribution laterals.
- What to do if the alarm on the pump panel activates.
- A system troubleshooting table listing potential problems and their solutions.
- When to get tank(s) pumped.
- Safety precautions to be observed.

4.4 NARROW ABSORPTION TRENCHES

Narrow absorption trenches are used to allow closer spacing of trenches in difficult-to-construct locations. A diagram of a narrow absorption trench system is shown in Figure 4.13. Narrow absorption trench systems shall be considered "alternative" by the Town of Paradise.

A. General conditions for approval

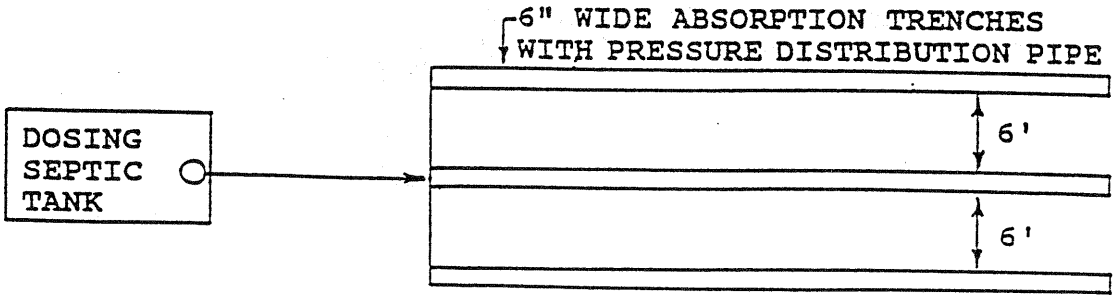
Narrow absorption trenches will not be permitted on a site if a standard system would be acceptable. Construction permits may be issued by the Town for narrow absorption trenches for sites that meet the following criteria.

- Any site that meets soil requirements for a standard or pretreated system or
- Those sites where area is limited for an absorption field.

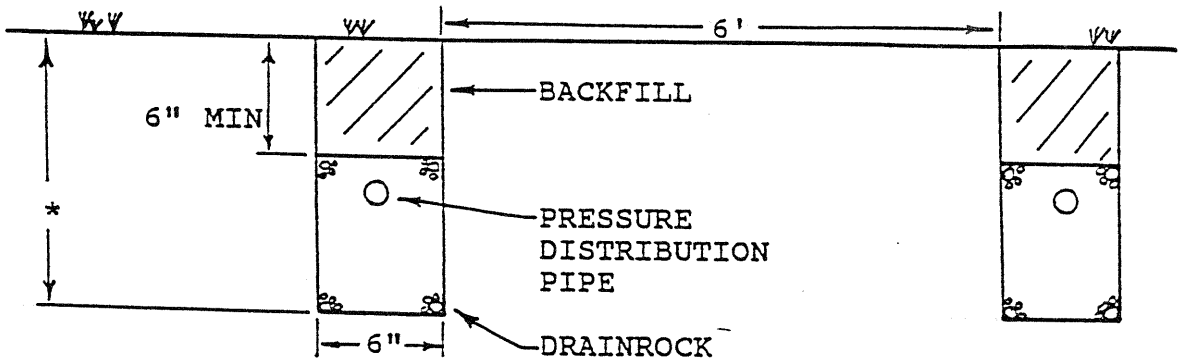
B. Requirements

- All applicable requirements of Section 4.1 apply.
- Minimum absorption trench width shall be six inches.
- Minimum distances between absorption trenches shall be six feet.
- Maximum depth shall be dependent on the depth to restrictive soil horizons and groundwater levels. Absorption trenches with greater than five feet of drainrock below the pipe shall require a variance.
- Pressure distribution shall be used as outlined in Section 4.3.
- A piezometer shall be constructed adjacent to each absorption trench (see Appendix B).

- Narrow absorption fields can be installed in engineered fills. They can have a capping fill (twelve inches) if the soil depth is within twelve inches of the minimum effective soil depth requirements.



PLAN VIEW



TRENCH CROSS SECTION

* MAXIMUM TRENCH DEPTH SHALL BE FORTY EIGHT INCHES. DEPTHS EXCEEDING FORTY EIGHT INCHES ARE ALLOWED IF MINIMUM SEPARATION DISTANCES FROM RESTRICTIVE LAYERS AND GROUNDWATER CAN BE MAINTAINED. ABSORPTION TRENCHES WITH GREATER THAN FIVE FEET OF DRAINROCK BELOW THE PIPE SHALL REQUIRE A VARIANCE.

FIGURE 4.13
NARROW ABSORPTION TRENCH-NARROW SPACING SYSTEM

4.5 DEEP ABSORPTION TRENCH SYSTEM

A deep absorption trench system is defined as a system which uses trenches that are pressurized and use a greater vertical depth of drainrock than a standard absorption trench. By using this method, absorption trenches can be fit into a smaller area and superior soil permeability, if present at a greater depth in the profile, can be utilized. A typical deep absorption trench system is shown in Figure 4.14. Deep absorption trench systems shall be considered "alternative" by the Town of Paradise.

A. General conditions for approval

A deep absorption trench system will not be permitted on a site if a standard absorption trench system would be acceptable. Construction permits may be issued by the Town for deep absorption trench systems for sites that meet all the following conditions.

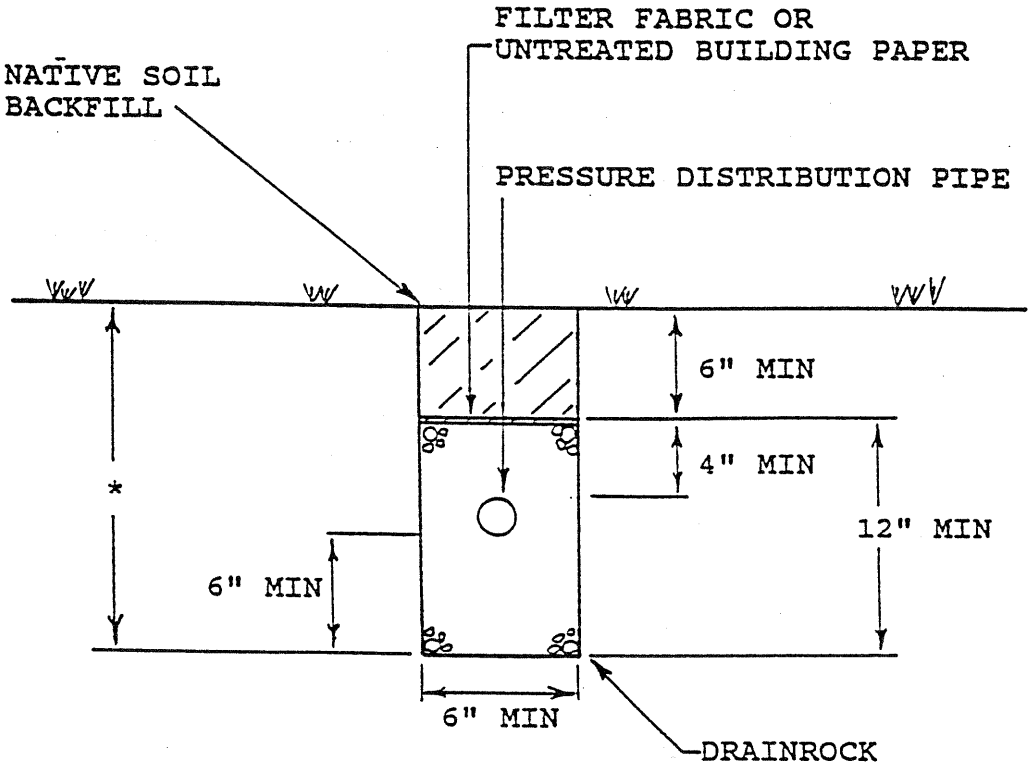
- The effective soil depths shown in Figure 4.1 can be maintained.
- Lot or parcel size is inadequate to accommodate standard system absorption trenches with a projected flow of 300 gallons per day.
- All other requirements for standard subsurface systems can be met.

B. Requirements

- The deep absorption trench system shall be sized on the sidewall loading rates presented in Section 4.1 or the combined sidewall/bottom area loading rates presented in Section 4.2, as appropriate.
- A piezometer shall be constructed adjacent to each absorption trench (see Appendix B).
- All applicable requirements outlined in Section 4.1 apply.

4.6 REDUNDANT SYSTEMS

A redundant absorption field system is one in which two complete absorption field systems are installed. The absorption trenches of each system alternate with each other and only one system operates at any given time. A typical redundant absorption field system is shown in Figure 4.15. This type of system may be required on small lots where it will be difficult to install a repair absorption field once the house is built.



* MAXIMUM TRENCH DEPTH SHALL BE FORTY EIGHT INCHES. DEPTHS EXCEEDING FORTY EIGHT INCHES ARE ALLOWED IF MINIMUM SEPARATION DISTANCES FROM RESTRICTIVE LAYERS AND GROUNDWATER CAN BE MAINTAINED. ABSORPTION TRENCHES WITH GREATER THAN FIVE FEET OF DRAINROCK BELOW THE PIPE SHALL REQUIRE A VARIANCE.

FIGURE 4.14
DEEP ABSORPTION TRENCH

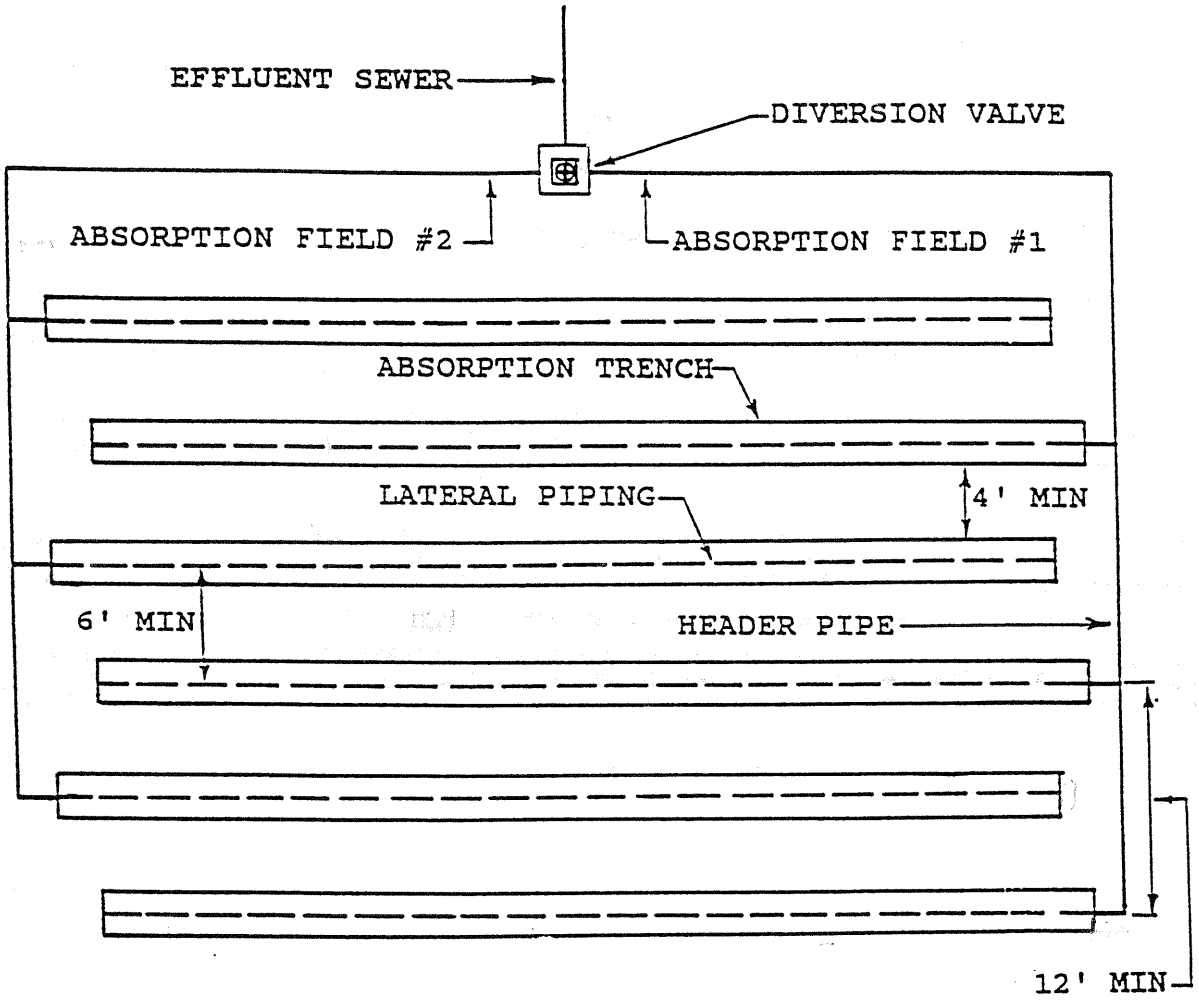


FIGURE 4.15
REDUNDANT SYSTEM

A. General conditions for approval

A redundant system will not be permitted on a site if a standard absorption trench system would be acceptable. Construction permits may be issued by the Town for redundant disposal field systems to serve single family dwellings on sites that meet all the conditions for a standard system. Redundant absorption systems shall not be used for large systems. Redundant systems shall be considered "alternative" by the Town of Paradise.

B. Requirements

- Each redundant absorption field system shall contain two complete absorption fields.
- Each absorption field shall be adequate in size to accommodate the projected daily wastewater flow from the structure.
- A minimum trench sidewall separation of ten feet (twelve feet on centers) shall be maintained between absorption trenches designed to operate simultaneously and a minimum trench sidewall separation of four feet (six feet on centers) shall be maintained between adjacent absorption trenches.
- A piezometer shall be installed adjacent to each absorption trench (see Appendix B).
- The diversion valve location shall be marked permanently with a steel post, concrete marker, or other durable material.

C. Operation and maintenance

System operation and maintenance tasks and requirements shall be as specified on the Operating Permit and the designer's operations and maintenance instructions. The system owner shall be responsible for the continuous operation and maintenance of the system. Each system will be inspected by the Town on a regular basis.

The owner/purchaser of the redundant system must recognize that he/she assumes the continuous responsibility to preserve the installation as near as practical in its "as built" state. This responsibility includes erosion control, fencing out of livestock and the control of burrowing animals.

D. Operation and maintenance instructions

As a minimum, the operations and maintenance instructions shall include the following information.

- A statement notifying the homeowner of his/her responsibility for maintaining the system in proper working condition.

- A complete description of the system and components, including a process description and design criteria.
- When and how to alternate absorption fields.
- When to get the septic tank pumped.

4.7 STEEP SLOPE SYSTEMS

Slope stability and surfacing of effluent are major concerns when onsite systems are constructed on slopes exceeding thirty percent. Where steep slopes are encountered, absorption trenches using greater vertical depths of drainrock than standard absorption trenches can be utilized. All steep slope systems shall be considered "alternative" by the Town of Paradise.

A. General conditions for approval

An onsite system construction permit may be issued by the Town for a steep slope system to serve a single-family dwelling on slopes in excess of thirty percent provided the site meets the following requirements.

- Slope does not exceed forty-five percent.
- The soil is well drained with no evidence of saturation to a depth of eight feet.
- The soil has a minimum effective depth of six feet.

B. Requirements

- Steep Slope absorption trenches shall be installed at a minimum depth of thirty inches and at a maximum depth that maintains the required separation from the trench base to a restrictive soil horizon or groundwater level. Minimum and maximum steep slope absorption trench depth measurements shall be made from the natural soil surface on the downhill side of the trench, and contain a minimum of eighteen inches of filter material and twelve inches of native soil backfill. Absorption trench width can be a minimum of six inches up to a maximum of thirty-six inches.
- The system shall be sized using the table for Standard Absorption Trench Systems.
- Steep slope absorption trenches can be excavated manually. All smeared and compacted surfaces in the absorption trench shall be removed before any filter material (drainrock) is placed in the absorption trench.
- A piezometer shall be installed adjacent to each absorption trench (see Appendix B).

- No large or community systems will be allowed on steep slopes. See Chapter 6.

4.8 CAPPING FILL

A capping fill is a system where the effective sidewall of the absorption trench is installed a minimum of twelve inches into natural soil and covered with a soil cap of specified depth and texture. A capping fill disposal system is used where the site is lacking in effective soil depth or depth to groundwater. A typical capping fill is shown in Figure 4.16. All capping fill systems shall be considered "alternative" by the Town of Paradise.

A. General conditions for approval

To be approved for a capping fill system, each site must meet all of the following conditions.

- Slope does not exceed twelve percent. (Special designs may allow installation on steeper slopes.)

- Any site which can meet all the rules for a standard system or a pretreatment system except where effective soil depth (soil depth, depth to seasonal or permanent water table, depth to rapidly draining material) is lacking by twelve inches or less.

- Soil permeability from the ground surface to the layer that limits effective soil depth is adequate to accept wastewater flow plus rainfall.

B. Requirements

The cap shall be constructed pursuant to permit requirements. Unless otherwise required by the Onsite Sanitary Official, construction sequence shall be as follows:

- The soil shall be examined and approved by the designer prior to placement. The texture of the soil used for the cap shall be of the same textural class, or one textural class coarser than the natural topsoil.

- Construction of capping fills shall occur between June 1 and October 1 unless otherwise allowed by the Onsite Sanitary Official. The upper eighteen inches of natural soil must not be saturated or at a moisture content which causes loss of soil structure and porosity when worked.

- The absorption trench area and the soil cap borrow site shall be scarified prior to construction to destroy the vegetative mat. Rototilling is the preferred method.

- The system shall be installed as specified in the construction permit. There shall be a minimum of ten feet of separation between the edge of the fill and the outside sidewalls of the absorption trenches.

- The first six inches of the fill shall be mixed thoroughly with the native soil. Fill material shall be evenly graded to a final depth of sixteen inches over the drainrock. Drainrock shall be covered by filter fabric prior to the placement of the soil cap. Both initial cap and repair cap may be constructed at the same time if the owner wishes.

- A piezometer shall be installed adjacent to each absorption trench (see Appendix B).

C. Required inspections

The following minimum inspections shall be performed for each capping fill installed:

- The absorption trench area and soil cap borrow material must be inspected for scarification, soil texture, and moisture content, prior to cap construction.

- Precover inspection of the installed absorption facility.

- After a cap is placed, determine adequate contact between fill material and native soil (no obvious contact zone visible), adequate depth of material, and uniform distribution of fill material.

- Final inspection is after landscaping. The operating permit will be issued after the final inspection.

D. Operation and maintenance

System operation and maintenance tasks and requirements shall be as specified on the operating permit and the designer's operations and maintenance instructions. The system owner shall be responsible for the continuous operation and maintenance of the system. Each system will be inspected by the Town on a regular basis.

The owner/purchaser of a capping fill system must recognize that he/she assumes the continuous responsibility to preserve the installation as near as practical in its "as built" state. This responsibility includes erosion control, fencing out of livestock and the control of burrowing animals.

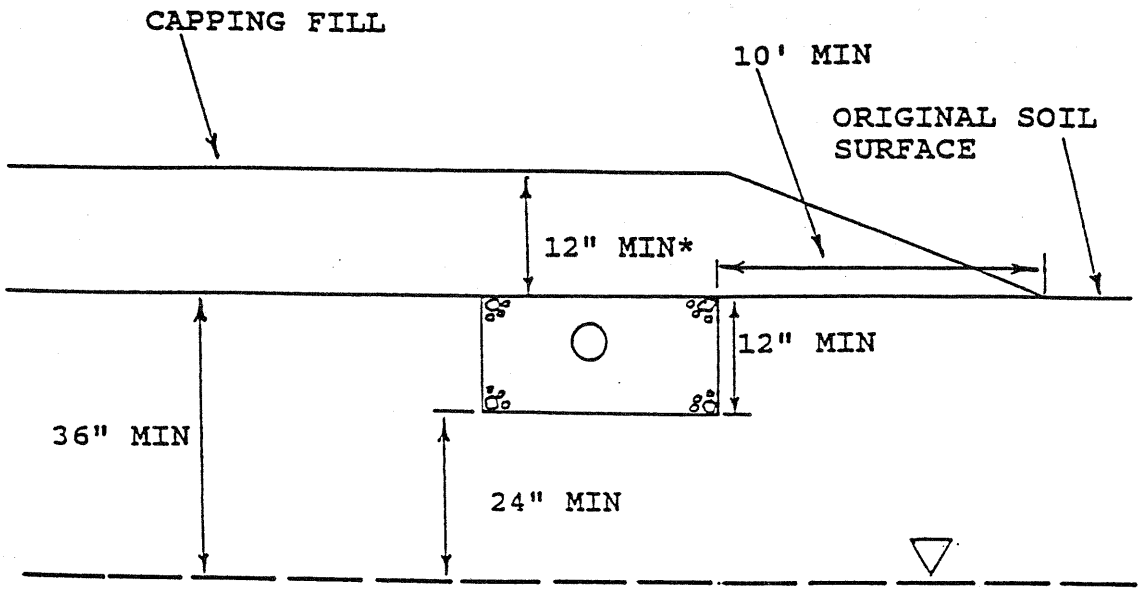
E. Operation and maintenance instructions

As a minimum, the operation and maintenance instructions shall include the following information.

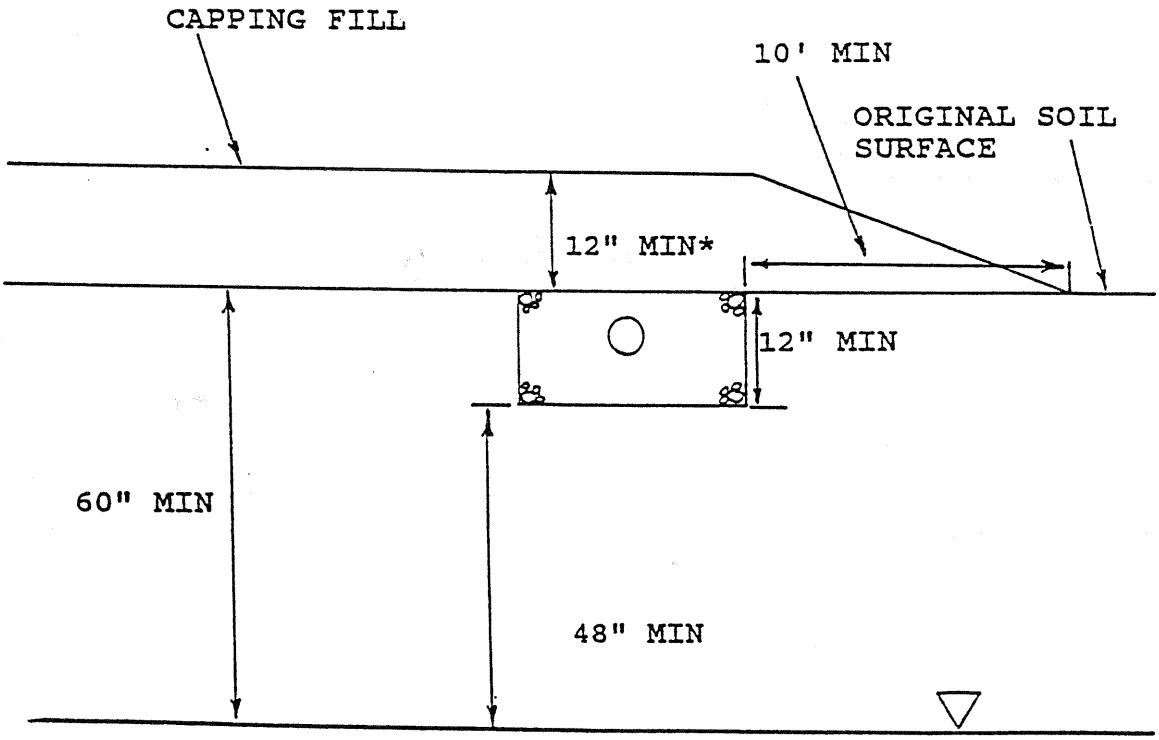
- A statement notifying the homeowner of his/her responsibility for maintaining the system in proper working condition.

- A complete description of the system and components.

- How to properly maintain the integrity of the fill.



TEMPORARY WATER TABLE



PERMANENT WATER TABLE

*16" DEPTH BEFORE SETTLING

FIGURE 4.16
CAPPING FILL

4.9 Perimeter Drain or Tile Dewatering System

A perimeter drain or tile dewatering system is used to lower the groundwater level on sites with slopes less than three percent. A trench is constructed around the entire absorption field area to collect and divert groundwater away from the absorption facility. A typical perimeter drain system is shown in Figure 4.17. All drain systems shall be considered "alternative" by the Town of Paradise.

A. General conditions for approval

Construction permits may be issued by the Town for a perimeter drain system provided the site can meet the following requirements.

- The site has a natural outlet that will allow a drainage pipe installed on a proper grade around the proposed absorption facility to daylight above annual high water.

- Soils must be drainable, with a minimum effective soil depth of at least forty-eight inches in soils with temporary groundwater, and at least seventy-two inches in soils with permanent groundwater.

- Slope does not exceed three percent.

- All other requirements for the system, except depth to groundwater, can be met. However, after the field collection drainage tile is installed, the groundwater levels shall remain below the specified depth.

B. Requirements

- Field collection drainage pipe shall be installed on a uniform grade of 0.2-0.4 feet of fall per 100 feet at:

  a. A minimum of forty-eight inches deep in soils with temporary groundwater, or

  b. A minimum of seventy-two inches deep in soils with permanent groundwater.

- Maximum drainage pipe spacing parallel to the absorption field shall be seventy feet on center.

- Minimum horizontal separation distance between the drainage pipe and absorption facility shall be twenty feet.

- Field collection drainage pipe shall be rigid, smooth wall perforated pipe with a minimum diameter of four inches.

- Field collection drainage pipe shall be enveloped in clean filter material (drainrock) to within thirty inches of the soil surface in soils with permanent groundwater or to within twelve inches of the soil surface in soils with temporary groundwater. Filter material (drainrock) shall be covered with filter fabric or other nondegradable material approved by the Onsite Sanitary Official.

- Outlet pipe shall be rigid, smooth wall solid PVC or ABS pipe with a minimum diameter of four inches. The outlet end shall be protected by a four-foot long section of Schedule 40 PVC or ABS or galvanized metal pipe, and a flap gate or grill to exclude rodents. The outlets shall be permanently marked with a steel post or other durable material so that they can be easily located if vegetation is dense.

- The discharge pipe and pipe drainage system are integral parts of the system, but do not need to meet setback requirements to property lines, streams, lakes, ponds or other surface water bodies. The discharge of drainage water shall not create nuisance conditions.

- The Onsite Sanitary Official will require demonstration that a proposed tile dewatering site can be drained over an entire wet season prior to issuing the construction permit for the absorption field. The installation of piezometers within the proposed site will be required (see Appendix B).

- The absorption facility shall use equal or pressurized distribution and can use narrow absorption trenches.

C. Operation and maintenance

System operation and maintenance tasks and requirements shall be a specified on the Operating Permit and the designer's operations and maintenance instructions. The system owner shall be responsible for the continuous operation and maintenance of the system. Each system will be inspected by the Town on a regular basis.

The owner/purchaser of a perimeter drain or tile dewatering system must recognize that he/she assumes the continuous responsibility to preserve the installation as near as practical in its "as built" state. This responsibility includes maintenance of drain outlets, erosion control, fencing out of livestock and the control of burrowing animals.

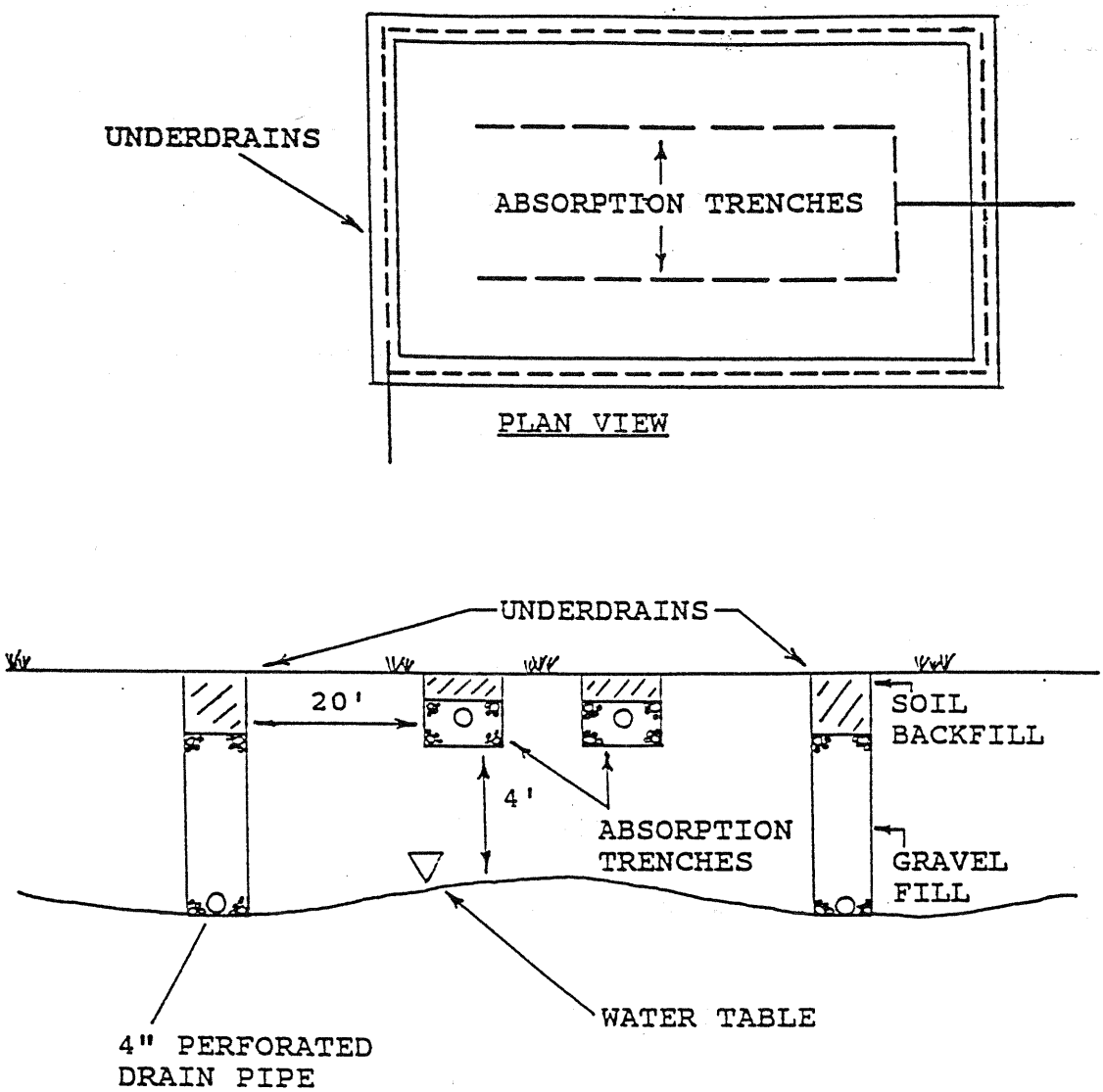


FIGURE 4.17
TYPICAL PERIMETER OR TILE DEWATERING DRAIN

D. Operation and maintenance instructions

As a minimum, the operations and maintenance instructions shall include the following information.

- A statement notifying the homeowner of his/her responsibility for maintaining the system in proper working condition.
- A complete description of the system and components.
- How and when to inspect the drain outlets for proper operation.
- When to get the septic tank pumped.

4.10 CURTAIN DRAIN

A curtain drain is used to lower an existing water table on sites with slopes greater than four percent. A trench is installed on the up-hill side of the absorption field which collects and diverts water away from the absorption field area. The curtain drain technique applies only to sites with a temporary water table. The effectiveness of most curtain drains extends thirty to fifty feet downslope of the trench. A typical curtain drain system is shown in Figure 4.18. All curtain drain systems shall be considered "alternative" by the Town of Paradise.

A. General conditions for approval

Construction permits may be issued by the Onsite Sanitary Official for a curtain drain system provided the site can meet the following requirements.

- Soils must be drainable, with a minimum effective soil depth of at least forty-eight inches in soils with temporary groundwater.
- Slope does not exceed forty-five percent.
- All other requirements for the system, except depth to groundwater, can be met.

B. Requirements

- Field collection drainage tile shall be installed on a uniform grade of 0.2-0.4 feet of fall per 100 foot, and a minimum of forty-eight inches deep in soils with temporary groundwater.
- Minimum horizontal separation distance between the drainage pipe and absorption facility shall be ten feet.

- Field collection drainage pipe shall be rigid smooth wall perforated pipe with a minimum diameter of four inches.

- Field collection drainage pipe shall be enveloped in clean filter material (drainrock) to within twelve inches of the soil surface. Filter material (drainrock) shall be covered with filter fabric, untreated building paper or other nondegradable material approved by the Town.

- Outlet pipe shall be rigid and smooth wall solid PVC pipe with a minimum diameter of four inches. The outlet end shall be protected by a four-foot long section of Schedule 40 PVC or ABS or galvanized metal pipe, and a flap gate or grill to exclude rodents. The outlets shall be permanently marked with a steel post or other durable material so that they can be easily located if vegetation is dense.

- The discharge pipe and pipe drainage system are integral parts of the system, but do not need to meet setback requirements to property lines, streams, lakes, ponds or other surface water bodies.

- The Onsite Sanitary Official will require demonstration that a proposed curtain drain site can be drained over an entire wet season prior to issuing a construction permit for the absorption field. The installation of piezometers within the proposed site will be required (see Appendix B).

- The absorption facility shall use equal, serial or pressurized distribution and narrow absorption trenches can be used.

- The curtain drain can only be used on sites with a well defined restrictive layer. The bottom of the drain shall be a minimum of 6 in. into the restrictive layer (see diagram).

- The absorption trenches need to be within fifty feet of the curtain drain. If tighter spacing is required to stay within the effective area of the curtain drain, a narrow absorption trench system can be used.

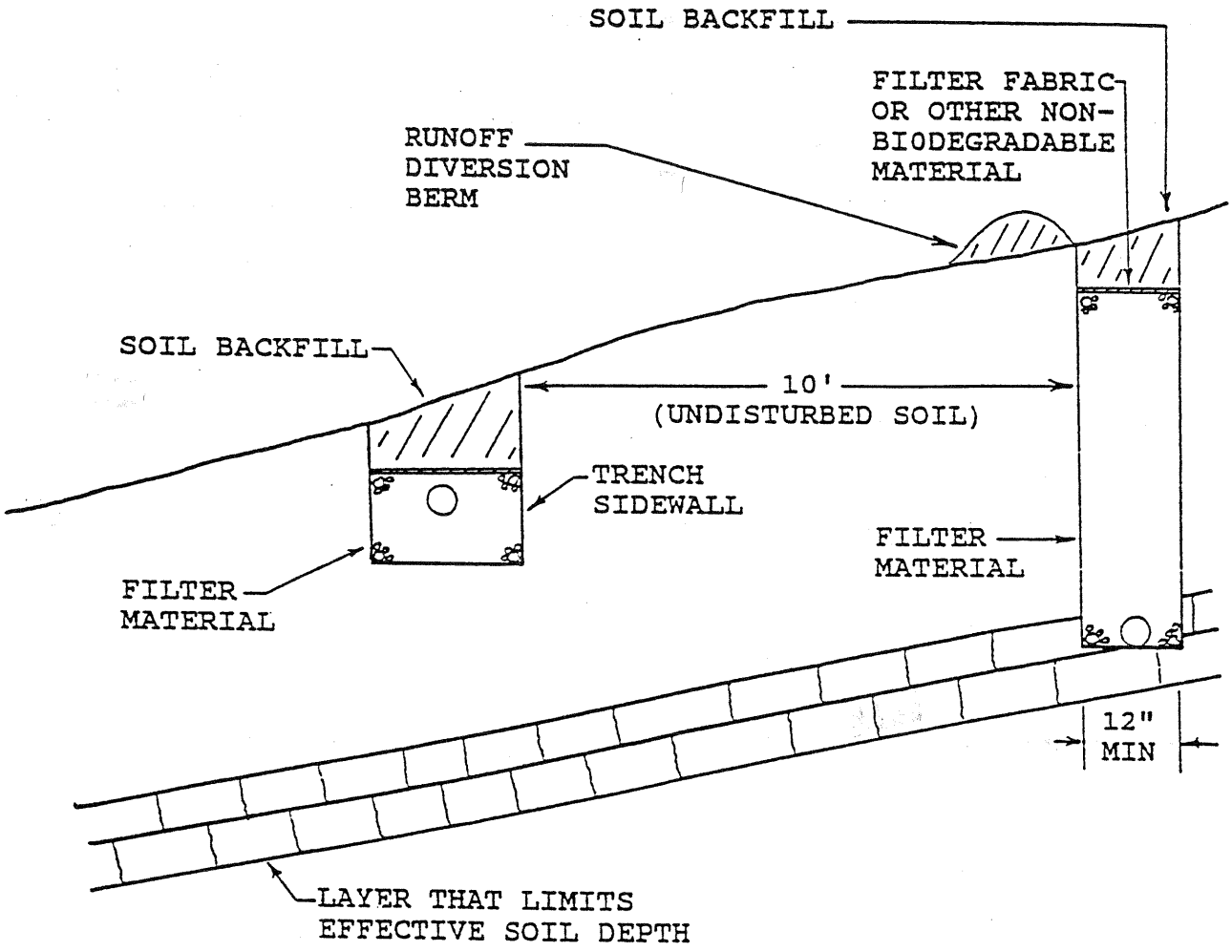


FIGURE 4.18
TYPICAL CURTAIN DRAIN

C. Operation and maintenance

System operation and maintenance tasks and requirements shall be a specified on the Operating Permit and the designer's operations and maintenance instructions. The system owner shall be responsible for the continuous operation and maintenance of the system. Each system will be inspected by the Town on a regular basis.

The owner/purchaser of a curtain drain system must recognize that he/she assumes the continuous responsibility to preserve the installation as near as practical in its "as built" state. This responsibility includes maintenance of drain outlets, erosion control, fencing out of livestock and the control of burrowing animals.

D. Operation and maintenance instructions

As a minimum, the operations and maintenance instructions shall include the following information.

- A statement notifying the homeowner of his/her responsibility for maintaining the system in proper working condition.
- A complete description of the system and components.
- How and when to inspect the drain outlets for proper operation.
- When to get the septic tank pumped.

4.11 ENGINEERED FILL

Any fill thicker than twelve inches and used for an absorption facility shall be considered engineered fill. Engineered fill is typically used to provide the minimum required effective soil depth in areas of high groundwater or over sensitive layers, as illustrated in Figure 4.1. Any engineered fill shall be considered "alternative" by the Town of Paradise.

A. General conditions for approval

To be approved for an engineered fill, each site must meet all the following conditions:

- Have suitable soils which will remain stable and permeable after the fill is in place.
- The finished system must provide the minimum required separation from sensitive layers as shown in Figure 4.1.

B. Requirements

The fill shall be constructed pursuant to permit requirements and be supervised by the designer. Unless otherwise required by the Onsite Sanitary Official, construction sequence shall be as follows:

- The fill soil shall be examined and approved by the Onsite Sanitary Official prior to placement. The texture of the soil used for the fill shall be of the same textural class, or of one textural class coarser than the natural topsoil.

- Construction of fills shall occur between June 1 and October 1 unless otherwise allowed by the Onsite Sanitary Official. The natural soil on the site and the fill material shall be at a moisture content that will prevent loss of porosity when worked.

- The absorption field area and the fill soil borrow site shall be scarified to destroy the vegetative mat. Rototilling is the preferred method.

- No wheeled vehicles shall be permitted on the fill site or the fill once scarifying has been completed.

- The fill shall be installed when the soil is dry. The fill shall also be dry to prevent compaction. The fill should be as dry as possible when worked and allowed to settle naturally under water, either rainfall or irrigation.

- The system shall be installed as specified in the construction permit. There shall be a minimum of ten feet of separation between the edge of the fill and the outside sidewalls of the absorption trenches.

- The first six inches of the fill shall be mixed thoroughly with the native soil. It shall be placed with a crawler tractor to minimize compaction. Both initial and repair absorption field areas may be constructed at the same time if the owner wishes.

C. Required inspections

The following minimum inspections shall be performed for each fill installed:

- The absorption field area and fill soil borrow material must be inspected for scarification, soil texture, and moisture content, prior to fill construction.

- After the first six inches are in place, determine adequate contact between fill material and native soil (no obvious contact zone visible), adequate depth of material, and uniform distribution of fill material.

- After entire fill is in place, dimensions and depth shall be checked. Hydraulic testing of the fill must be conducted in accordance with the appropriate procedures in Appendix C. The hydraulic testing will be witnessed by the Onsite Sanitary Official.

- Precover inspection of the installed absorption facility.

- Final inspection is after landscaping. The operating permit will be issued at this point.

D. Operation and maintenance

System operation and maintenance tasks and requirements shall be as specified on the Operating Permit and the designer's operations and maintenance instructions. The system owner shall be responsible for the continuous operation and maintenance of the system. Each system will be inspected by the Town on a regular basis.

The owner/purchaser of the engineered fill system must recognize that he/she assumes the continuous responsibility to preserve the installation as near as practical in its "as built" state. This responsibility includes erosion control, fencing out of livestock and the control of burrowing animals.

E. Operation and maintenance instructions

As a minimum, the operations and maintenance instructions shall include the following information.

- A statement notifying the homeowner of his/her responsibility for maintaining the system in proper working condition.
- A complete description of the system and components.
- How and when to inspect the drain outlets for proper operation.
- When to get the septic tank pumped.

4.12 PORTABLE TOILETS

A portable toilet is any self-contained chemical toilet facility that is housed within a portable toilet shelter and includes but is not limited to construction-type chemical toilets.

Portable toilets may be approved for temporary or limited use areas, such as construction sites, provided all liquid wastes can be handled in a manner to prevent a public health hazard and to protect public waters, and separation distances also can be met.

Portable toilet waste shall not be discharged into storm sewers, on the surface of the ground or into public waters.

Portable toilets shall be installed by a licensed wastewater disposal business.

No person shall cause or allow the installation or use of a portable toilet unless the pumping or cleaning of the portable toilet is covered by a valid and effective contract with a licensed business.

Each portable toilet shall display the business name of the sewage disposal service that is responsible for servicing it.

Portable toilets shall be constructed in accordance with requirements contained in this manual and be maintained to prevent health hazards and pollution of public waters. Required setbacks are listed in Table 3.2.

4.13 HOLDING TANKS

A holding tank is a watertight receptacle designed to receive and store wastewater to facilitate disposal at another location.

A. General conditions for approval

Installation permits may be issued by the Onsite Sanitary Official for holding tanks on sites that meet all the following conditions:

- For permanent use:

  a. The site can not be approved for the installation of any other type of onsite wastewater disposal system; and

  b. No public sewer system is available or expected to be available within five years; and

  c. The tank is intended to serve a facility with intermittent occupancy; and

  d. Unless otherwise allowed by the Onsite Sanitary Official, the projected daily wastewater flow is not more than 200 gallons; and

  e. Setbacks as required for septic tanks can be met.

- For temporary use:

  a. The Town has committed in writing to provide sewer service to the property within five years.

  b. Installation of an approved onsite system has been delayed by weather conditions; or

  c. The tank is to serve a temporary construction site.

B. Requirements

- No building may be served by more than one holding tank.
- A single lot may be served by no more than one holding tank.
- Plans and specifications for each holding tank proposed to be installed shall be submitted to the Onsite Sanitary Official for review and approval.
- Each tank must:

  a. Have a minimum liquid capacity of 1,500 gallon.

  b. Comply with standards for septic tanks contained in Chapter 5.

  c. Be located and designed to facilitate removal of contents by pumping. The holding tank shall be equipped with watertight risers extending to finished grade to facilitate the removal of contents by pumping.

  d. Be equipped with both an audible and visual alarm, placed in a location acceptable to the Onsite Sanitary Official, to indicate when the tank is seventy-five percent full. The audible alarm only may be user cancelable.

  e. Have no overflow vent at an elevation lower than the overflow level of the lowest fixture served.

  f. Be designed for antibuoyancy if test hole examination or other observations indicate seasonally high groundwater may float the tank when empty.

- The application for a construction permit shall contain:

  a. A copy of a contract with a licensed wastewater disposal service company which shows the tank will be pumped periodically, at regular intervals or as needed, and the contents disposed of in a manner and at a facility approved by the Onsite Sanitary Official.

  b. Evidence that the owner or operator of the proposed disposal facility will accept the pumping for treatment and disposal.

- A record of pumping dates and amounts pumped shall be maintained by both the treatment facility owner and the wastewater disposal service and upon request, made available to the Onsite Sanitary Official.
- Inspection requirements: Each holding tank shall be inspected regularly by the Onsite Sanitary Official.

4.14 WATER CONSERVATION FIXTURES

The use of low flush toilets or other water conservation fixtures is encouraged to aid in water conservation. **NO REDUCTION IN THE SIZE OF THE ABSORPTION FIELDS OR FILTERS WILL BE ALLOWED.** Reduction of water flow does not decrease the amount of biological matter which must be treated in the onsite system. The use of water conservation fixtures will prolong the life of an absorption field.

4.15 PACKAGE OR PLANT SYSTEMS

A package or plant system is defined as a proprietary self-contained wastewater treatment and disposal system. Proof of compliance with the California Environmental Quality Act, California Water Quality Control Board, EPA and NSF International ANSI/NSF 40 - 1990 Class I standards is required, or the performance of the selected Package Plant or Plant System incorporated in the overall facility plan shall be guaranteed for one (1) year upon start up by the Equipment Manufacture and Design Engineer. An alternative preliminary design selection shall be furnished at the time of final plan approval should the original selected plant process fail to meet the Town of Paradise requirements.

A typical package or plant system or equivalent shall provide acceptable wastewater treatment. The Onsite Sanitary Official shall determine the method and extent of remote monitoring required based on the complexity of the system or the system's location. Suitable auto-phone monitoring must be provided.

The minimum basic requirements to permit use of alternative systems shall be in all cases:

- An engineering study by qualified practitioners
- Proof of long-term performance and reliability
- Operation, Maintenance, Monitoring and Reporting shall be as outlined in Chapter 1.4.A., Alternative and Innovative Pre-Treatment Systems, of this manual.

4.16 GRAYWATER DISPOSAL SYSTEMS

A graywater waste disposal system is a wastewater treatment system capable of discharging and treating liquid waste from bathtubs, showers, bathroom wash basins, and water from clothes washing machines and laundry tubs. Graywater waste disposal systems shall not treat liquid waste discharged from kitchen sinks, dishwashers or laundry water from soiled diapers. Graywater waste disposal systems shall be considered "alternative" systems by the Town of Paradise.

A. General conditions for approval

Installation permits may be issued by the Onsite Sanitary Official for graywater waste systems on sites that meet all the following conditions:

- Sites must be approved for standard system installation.
- Minimum separation distances listed in Figure 4.1 can be met.
- Slope does not exceed forty-five percent.

B. REQUIREMENTS

- System design and installation standards shall comply with minimum standards for graywater waste systems mandated in Appendix J of the Uniform Plumbing Code, California Plumbing Code Edition (Title 24, Part 5, California Administrative Code).

  A one-third reduction in size of the black waste system shall be allowed when a graywater waste disposal system is installed.

C. Operation and maintenance

System operation and maintenance tasks and requirements shall be as specified on the Operating Permit and the designer's operations and maintenance instructions. The system owner shall be responsible for the continuous operation and maintenance of the system. Each system will be inspected by the Town on a regular basis.

The owner/purchaser of a graywater disposal system must recognize that he/she assumes the continuous responsibility to preserve the installation as near as practical in its "as built" state. This responsibility includes erosion control, fencing out of livestock and the control of burrowing animals.

D. Operations and maintenance instructions

As a minimum, the operations and maintenance instructions shall include the following information:

- A statement notifying the homeowner of his/her responsibility for maintaining the system in proper working condition.
- A complete description of the system and components. Include process description for the homeowner and design criteria.
- Instructions on how to properly set pump control equipment.
- How the Town can sample graywater system effluent.

- How and when to inspect and flush distribution laterals.
- What to do if the alarm on the pump panel activates.
- A system troubleshooting table listing potential problems and their solutions for the graywater system.
- When to get the graywater system tank pumped.
- Safety precautions to be observed.