

**SANTA CRUZ COUNTY HEALTH SERVICES AGENCY
ENVIRONMENTAL HEALTH DIVISION**

ENHANCED TREATMENT SYSTEM REGULATIONS

I. INTRODUCTION

Many sites in Santa Cruz County are cannot meet the criteria for the installation of a standard Onsite Wastewater Treatment System (OWTS). These sites may have limitations such as reduced setback from a stream, shallow depth to groundwater, soil permeability rates that are too rapid to provide adequate treatment or too slow to provide adequate absorption or have limited space and the system would be undersized. Santa Cruz County code prohibits the installation of standard OWTS where such conditions occur, due to potential for water quality impacts or drainfield failure. Sections 7.38.182 through 186 of the County code allow for the use of alternative technology and/or enhanced treatment (ET) systems to overcome such site constraints. In addition, section 7.38.152, requires the use of enhanced treatment systems to reduce the discharge of nitrogen from large onsite disposal systems and onsite disposal systems located in sandy soils. The State OWTS policy and the County's Local Area Management Plan (LAMP) also provide for use of enhanced treatment where onsite sewage disposal may impact impaired surface water bodies, or groundwater quality.

The objective of the regulations outlined in this document is to permit the use of approved technologies that will treat sewage to a level sufficient to prevent surface and groundwater contamination and reduce biomat buildup that causes drainfield failure. The ultimate goal would be to treat sewage in manner that reliably reduces the Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) to less than 10 mg/L and remove at least 75% of the total Nitrogen (N) to less than 10 mg-N/L. The minimum requirement is to reduce nitrogen by 50% to 30 mg-N/L and BOD and TSS to 30 mg-/L. These regulations also provide for the use of alternative dispersal methods such as mounded beds, at-grade systems, or drip dispersal systems that provide a higher level of treatment in the soil and can mitigate high groundwater conditions.

II. DETERMINATION OF REQUIREMENTS FOR ENHANCED TREATMENT OR ALTERNATIVE TECHNOLOGY

The following are conditions and locations where enhanced treatment systems are required.

A. LIMITED SITE CONDITIONS

For parcels where site conditions do not meet standards for conventional septic systems due to an inability to meet the required vertical setback to groundwater or impermeable layer, slow percolation soils, or inadequate disposal area, the Health Officer may accept sewage disposal permit applications utilizing ET system designs for the upgrade of existing systems to allow building additions or remodels, and for the construction of new systems. Homeowners with single family dwellings on small lots may want to install ET systems in order to cut leachfield size requirements by 50% and to allow future additions to their homes.

1. **INSUFFICIENT LEACHING AREA** - Whenever a parcel cannot accommodate the size of leachfield required by the soils found on the parcel, a sand filter enhanced treatment may be

used to increase the soil application rate for wastewater loading. The standard leachfield requirements listed in section IV.B.2 may be reduced by 50% when a sand filter enhanced treatment is used. Similarly, the application rates for commercial or institutional properties may be reduced by 50% by the treatment of septic tank effluent with a sand filter (grease traps may also be required for commercial/institutional parcels - see section I.A.1). Soil application rates that further differ from the County Code may be used for the dispersal of septic tank effluent that has been treated by an enhanced treatment unit, where they are supported by previous findings under similar site conditions. The County Health Officer may approve guidelines for dispersal system accelerated application rates for treated septic tank effluent

2. **SOIL PERCOLATION RATES SLOWER THAN 60 MPI** - For soils percolating 60-120 MPI, the use of a sand filter or approved enhanced treatment system may permit the use of leachfields sized according to the requirements for 31-60 MPI soils. Additionally, leachfields may be installed deeper than 5 feet effective depth to a maximum of 10 feet effective depth provided that all setbacks are observed and the leachfields are installed as shallow as possible.
3. **SETBACK TO GROUNDWATER UNSUITABLE FOR LEACHFIELDS** - Use of a sand filter or approved enhanced treatment system may also allow building additions with reduced groundwater separation. For repairs and upgrades using enhanced treatment, the groundwater separation may be reduced to two feet at distances greater than 100 feet from a waterway, 3 feet at distances between 100 and 50 feet from a waterway, and 5 feet at distances between 25 and 50 feet from a waterway. Parcels that have gentle slopes and high groundwater problems that prevent the use of conventional leachfields may be suitable for mound or at-grade systems described above. A proposal for a mound system that meets requirements for the design loading rate may enable bedroom and other building additions provided that an area is available for replacement of the mound.

B. SANDY SOILS WITH RAPID PERCOLATION

For fast percolating sandy soils in areas where nitrogen reduction is required, the County Health Officer maintains a list of approved treatment units that can be used to reduce total nitrogen levels in effluent by 50-75% (30 mg-N/L, but with an ultimate target is 10 mg-N/L). For the purposes of this document, “sandy soils” are coarse-grained sands that have demonstrated average percolation rates faster than six minutes per inch. The regions currently designated by the Health Officer as requiring ETS due to present or potential nitrate contamination from septic effluent discharges in sandy soils include:

- The entire San Lorenzo Watershed including Branciforte and Carbonera Creeks,
 - Designated Santa Cruz County water supply watersheds of San Vicente/Mill Creek, East Branch Liddell Creek, Laguna Creek, Majors Creek.
 - Systems with the potential to impact a public drinking water source
 - Systems located in proximity to Karst features
1. If new development is proposed to be located in an area without a sewer connection that is underlain by Zayante or Baywood soils series as defined and mapped by the Soil Conservation Service, enhanced treatment will be required, unless it can be demonstrated by a qualified professional that actual soil textures differ dramatically from the description of these

soil series (as demonstrated by detailed profiling and sample analysis by a certified soils laboratory) The County Geographic Information System (GIS) provides the Soil Survey Mapping using the following numeric codes: Zayante Soils: 182, 183, 184; Baywood Soils: 104, 105, 106, 107

2. Enhanced treatment systems will also be required to serve new development or development upgrades proposed in an area which is not mapped as underlain by Zayante or Baywood soils, but where septic effluent is proposed to be discharged into material which percolates an average of 0-5 minutes per inch within the designated water supply watersheds.
3. ETS requirements for parcels with sandy, rapid percolation soils may be waived for small system repairs or proposed building upgrades (additions) with up to 500 square feet of habitable space and no bedroom additions, This waiver may only be granted if the total drainfield trench depth from the surface is 4 feet or less. ETS will be required whenever the homeowner proposes to add bedrooms or add more than 500 square feet of habitable space.

C. LARGE SYSTEMS

For large or commercial onsite sewage disposal systems in all areas of Santa Cruz County, enhanced treatment systems are required at the time of new system installation, upgrades or repairs. Large systems are those onsite disposal systems which serve more than five (5) dwelling units, or serve other uses that generate 2,500 gallons or more per day of sewage effluent (typically commercial or institutional development). The County of Santa Cruz Environmental Health Division (EH) will generally assume full jurisdiction over all onsite wastewater discharges between 2,500 and 10,000 gpd (gallons per day) of flow. Where County authority and requirements may not be adequate to prevent significant degradation of water quality, or where total sewage flow exceeds 10,000 gpd, the discharge shall be referred to the Regional Water Quality Control Board staff for review and appropriate action.

III. TYPE OF ALTERNATIVE AND ENHANCED TREATMENT SYSTEMS PERMITTED

The following types of systems may be approved where requirements can be satisfied:

- A. INTERMITTENT AND RECIRCULATING SAND FILTERS** - Although sand filters may not fully meet the objective for nitrogen removal, they are a proven technology that provides substantial nitrogen reduction and meets the objectives for BOD reduction.

A sand filter treatment system consists of a septic tank, dosing tank and pump, a sand filter bed, and a drainfield. The septic tank allows for anaerobic biological treatment of effluent. Following the septic tank, the filter bed of engineered medium-grained sand physically filters and promotes biological treatment of effluent prior to disposal in the drainfield. The filtering and biological effect of the sand bed results in the discharge of substantially higher quality effluent than effluent discharged directly from a septic tank to a drainfield. Recirculating sand filters generally provide superior nitrogen removal over Intermittent sand filters.

- B. MOUNDS** –The Wisconsin mound wastewater treatment system was developed in the 1970s to overcome site limitations such as high groundwater. The mounded bed system discharges effluent to a sand bed in a constructed mound, that provides an additional vertical

distance for percolation and treatment prior to effluent reaching underlying groundwater. Mound systems for repairs and upgrades shall be designed to the greatest extent possible according to all provisions of the "Wisconsin Mound Soil Absorption System: Siting, Design and Construction Manual." Converse, J.C., and E.J.Tyler, 2000. Any deviation to the above standards, for repairs only, shall be as described in "On-Site Wastewater Treatment Using Wisconsin Mounds on Difficult Sites" Pursuant to those guidelines, mounds for repairs or upgrades may be approved on sites with: groundwater as little as 1 foot below the surface; on soils with low permeability; over fill with adequate permeability; on slopes up to 21%; and over old failing leachfields.

- C. AT-GRADE SYSTEMS** - At-Grade systems shall be designed according to the provisions of the 1990 "Wisconsin At-Grade Soil Absorption System - Siting, Design, and Construction Manual." The groundwater setback requirements for use of the At-Grade system for repairs shall be the values for conventional leaching devices as described in Section 7.38.095.B.1 of the Santa Cruz County Code: 2 foot separation over 250 feet from a waterway, 3 foot separation 100-250 feet from a waterway, 5 foot separation between 50 and 100 feet from a waterway.
- D. PROPRIETARY TECHNOLOGIES** - Proprietary packaged treatment systems are devices held under patent, trademark, or copyright. Before the Health Officer issues a permit for a proprietary product, the manufacturer or representative must demonstrate and certify to EH that the device, product, or method meets the requirements of the specific EH criteria, and is an appropriate application of the technology. The proprietary system must be reviewed by EH Staff. The manufacturer will submit review fees, conduct a presentation and may install up to three (3) experimental systems on existing developed parcels as a repair or upgrade permit. The system will be monitored for 2 years after installation. The manufacturer is responsible for taking samples quarterly and submitting the lab results to EH. After the 2 year review period, the manufacturer will be informed if the system is approved. All proprietary systems must be installed by a licensed contractor certified by the product dealer. . The following types of proprietary systems have been approved for use in Santa Cruz County:
- OSI Advantex system for enhanced treatment with nitrogen reduction.
 - Multiflo Aerobic Treatment Unit (ATU) for enhanced treatment with nitrogen reduction.
 - Microseptech for enhanced treatment with nitrogen reduction
 - Hoot Aerobic Treatment System without nitrogen reduction
 - OSI half round pressure distribution for very shallow dispersal of treated effluent.
 - Geoflow drip system for very shallow dispersal of treated effluent.
- E. PRESSURE DISTRIBUTION** – Although not a treatment technology, pressurized distribution (generally using a 1" to 2" diameter pressure lateral pipe with 1/8" orifices) is an efficient method of providing uniform and dosed distribution of effluent in a drainfield, with alternating saturated and unsaturated aerobic conditions. This technology provides superior conditions for the soil to treat the effluent, especially when used in shallow trenches in conjunction with timed dosing. When used in conjunction with an ETS, pressurized Shallow Gravelless Drainfields installed in the upper 12" of the soil column have proven to be an extremely effective means of dispersal and can mitigate high groundwater, shallow depths to impermeable layers and limitations in area available for conventional drainfield trenches

F. SUBSURFACE DRIP TUBING – Drip emitter tubing uses small diameter, flexible, low-pressure piping which should only be used for dispersal of treated effluent from an ETS. Subsurface drip systems allow for a uniform dispersal of effluent into the upper 6” – 10” of the soil profile where improved treatment and evaporation and transpiration through plant roots can also occur. Discharge of wastewater to such shallow soils has the significant benefit of additional treatment that occurs with the microbial populations that exist in the upper 18 inches of the soil column. As with shallow gravelless drainfields, subsurface drip systems can help mitigate high groundwater, shallow depths to impermeable soil and limitations in area available for conventional drainfield trenches. Emitter lines are typically spaced two (2) feet apart on center in sandy and loamy soils and may be spaced twelve (12) inches apart in soils with a higher clay content where greater dispersal area is required. A “cover crop” (preferably grass) must be planted over the lines to stabilize the soil and maximize the evapotranspiration potential.

G. EXPERIMENTAL ENHANCED TREATMENT SYSTEMS - ETS technologies that meet or surpass treatment effectiveness of approved technologies may be approved in Santa Cruz County on an experimental basis provided that the following criteria are met:

1. Experimental technologies will only be allowed for the upgrade or repair of an existing onsite sewage disposal system until satisfactory performance of the technology is demonstrated.
2. No more than three of one type of system may be installed County-wide during an initial three year evaluation period (or a period determined by Health Officer). Once satisfactory quarterly monitoring, sampling and maintenance results have been established by EHS, the experimental system may obtain approved status and additional systems can be allowed.
3. Prior to approval of an individual permit, the consultant proposing a system shall provide satisfactory evidence to Santa Cruz County EH that the experimental system or proprietary system is NSF approved and will reliably and consistently meet overall ET objectives for BOD and nitrogen removal. The designer shall provide adequate documentation to show that the proposal will meet Santa Cruz County EHS requirements including the following:
 - Detailed design specifications and calculations;
 - Monitoring results from cited references;
 - Costs of installation, operation, and maintenance, including electricity costs;
 - Information on parts availability
 - Availability of a qualified local service provider
 - Certified installer(s) (contractors) available
 - Jurisdictions where the proposed ET system has been installed including types of uses served, dates in operation, and the names and phone numbers of officials approving and overseeing such systems.

IV. PROCEDURES FOR PERMIT APPLICATION AND APPROVAL

Procedures for obtaining an approved permit for an alternative technology or ET system are subject to the requirements specified in County Code Sections 7.38.182 through 186. The owner or owner’s agent will submit an application and fees for a sewage disposal permit specifying the type of ETS. The design must be prepared by a qualified professional such as a California Registered Environmental Health Specialist (R.E.H.S), Professional or Civil Engineer (P.E. or C.E.), or

Professional Geologist (P.G.) . The design submission must include supporting documentation such as pump selection calculations/curves, friction/head loss calculations, design basis flow analysis and waste strength analysis.

Prior to approval of the permit, a signed contract between a qualified service provider and property owner must be submitted. A separate electrical permit from the Planning Department is required for systems with electrical components prior to approval/permitting of an alternative or ET system for septic system repair or building upgrades. In addition, the owner will be required to sign an Acknowledgment of Requirements for Use of An Onsite Sewage Disposal Nonstandard System with Special Operating Characteristics which includes the following information: description of system characteristics and limitations; operating, monitoring and maintenance requirements to ensure proper performance; restrictions on system use and property use; and notification that the property owner will be assessed a fee on the annual property tax bill to cover County costs of system oversight.

Construction inspections are required to be performed by the County and the design consultant. Upon completion, the design consultant is required to submit a final "letter of completion" stating that the system was installed according to the design specifications. Once the final letter has been submitted, the permit will be finalled (signed-off) and a Notice of Onsite Sewage Disposal System with Enhanced Treatment Technology and Special Operating Conditions, which reiterates the above information, will be recorded on the deed by EH.

V. SYSTEM OPERATION, MAINTENANCE AND MONITORING REQUIREMENTS

Due to their more technical nature, alternative and ET systems generally require more intensive monitoring and maintenance to ensure that they function properly. In addition, particularly with experimental systems, monitoring is needed to ensure that the ET system is working properly and is not contaminating surface or ground water. Monitoring information is required for the overall ET system program to evaluate the effectiveness of various designs and allow broader approval of satisfactory systems.

The recorded Notice of Onsite Sewage Disposal System with Enhanced Treatment Technology and Special Operating Conditions will set forth the specific requirements for operation, maintenance and monitoring. An annual fee will be charged on the tax bill which reimburses the County costs of administering the monitoring and maintenance program. Property owners not complying with the requirements of submitting to EH both annual operation/maintenance service provider reports and annual septic system sample results of treated effluent will receive notice to correct. If non-compliance continues, a "Notice of Violation" will be recorded at the Office of the Santa Cruz County Recorder. Owners of proprietary systems are required to maintain a maintenance/service agreement with a qualified service provider. The following elements for maintenance and monitoring must be included in the system design, installation and ongoing maintenance program:

- 1) An Operations and Maintenance Manual must be provided to the owner, operator, and EH, specifying inspection and maintenance requirements for all system components essential for operating and trouble-shooting the alternative/ET system. The owner must comply with the provisions in the Manual.
- 2) Proprietary systems shall upon purchase include a two-year initial service policy with four site visits (every 6 months). After the two-year period, an extended service policy shall be made

available for a fee.

- 3) Samples of treated effluent from ETS are to be collected annually by the Service Provider and results submitted to EH along with the service report. The design and installation of the system shall include provisions for collecting samples of effluent. Acceptable sampling locations include a sampling port, the pump chamber and the return line. Analysis of effluent samples shall be performed by a certified laboratory and shall include: biological oxygen demand (BOD5), Total Suspended Solids (TSS) and, for systems that require nitrogen reduction, shall also include total nitrogen (nitrite, nitrate, ammonia, and Kjeldahl nitrogen). EH may waive the annual sampling requirement if prior sampling of a specific system indicates acceptable operation. If sample results do not meet requirements, the service provider must determine the cause, make necessary repairs or adjustments and submit a passing resample within 90 days
- 4) Pressure distribution laterals and drip emitter tubing in pressurized drainfields, if any, shall be checked for clogging of orifices and be flushed annually. Filters for subsurface drip systems may need to be cleaned every six months. As part of the annual servicing, the area of the disposal field must be visually inspected for signs of surface failure.
- 5) Telemetry is required and shall be able to diagnose the following: high and low liquid levels, excessive pump cycles/run times and other parameters specified by the manufacturer. This requires a telephone land line to be installed and maintained by the property owner.
- 6) EH may require additional monitoring and maintenance requirements as a condition of initial permit approval, or as part of the Notice of Nonstandard System.
- 7) Monitoring will be carried out under the terms of the Notice of Nonstandard System, which is recorded on the deed.
- 8) As specified in Chapter 7.38.184 (E) (4) and 7.38.295 of the Santa Cruz County Code, the property owner may be subject to a violation reinspection fee and/or a recordation of a Notice of Violation for deficiencies which include: failure to do annual servicing, failure to sample, sample results do not meet standards, failure to operate system properly. Environmental Health will serve adequate notice and allow a reasonable amount of time for the property owner to rectify system deficiencies.

VI. SERVICE PROVIDER REQUIREMENTS

EH maintains a list of approved qualified service providers. For proprietary systems, the service provider must be certified by the product dealer. Service providers must demonstrate specific proficiency in servicing and operating enhanced treatment units. The service provider submits service reports on an annual basis for residential system or quarterly for large systems. If a service provider fails to maintain acceptable servicing proficiency or does not provide samples and/or service reports in an acceptable timely manner, the service provider shall be removed from the approved list. The service provider may be subject to an annual fee charged by EH (reduced for service provider who services only one system, i.e.: a qualified and certified homeowner).