ONSITE SYSTEMS MANUAL

May 2014

County of Santa Clara
Department of Environmental Health

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www.EHinfo.org

Santa Clara County
Onsite Systems Manual

OVERVIEW

This *Onsite Systems Manual* (also "Onsite Manual" or "Manual") provides the policy, procedural and technical details for implementation of the provisions of the Santa Clara County Onsite Wastewater Systems Ordinance, codified in Sections B11-60 through B11-95 of the Santa Clara County Code. Section B11-73 provides further that:

- The *Onsite Systems Manual* shall be developed and maintained by the Department of Environmental Health, and shall provide a reasonable process for seeking input from the affected public and OWTS practitioners in connection with its development and when changes are made.
- The *Onsite Systems Manual* and any amendments shall be subject to approval by the director and by the San Francisco Bay and Central Coast Regional Water Quality Control Boards in accordance with applicable State requirements and policies for onsite wastewater treatment.

This Manual replaces the former "Bulletin A", and incorporates new and updated information regarding design details and guidelines related to both conventional and alternative systems, operation and monitoring requirements and related procedural matters. It is intended to provide technical guidance for homeowners, designers, and installers of onsite wastewater treatment and dispersal systems.

It is expected that the Onsite Manual will be reviewed and updated from time-to-time, typically annually, to keep pace with new issues, policies, procedures, and technologies affecting the use and management of onsite systems.

The Onsite Manual is divided into five main sections as follows:

Section 1: Policies and Administrative Procedures

Section 2: Site Evaluation Methods and Investigation Requirements

Section 3: General and Conventional OWTS Requirements

Section 4: Guidelines for Alternative Systems

Section 5: Operation, Monitoring, and Maintenance

SANTA CLARA COUNTY ONSITE SYSTEMS MANUAL

PART 1

POLICIES AND ADMINISTRATIVE PROCEDURES

PART 1
POLICIES AND ADMINISTRATIVE PROCEDURES

CONTENTS

A. INTRODUCTION

Part 1 of the Onsite Systems Manual provides an overview and clarification of various onsite wastewater treatment systems (OWTS) policies and administrative procedures pertaining to:

- OWTS installation permits;
- Development and OWTS requirements for site approval for building projects, subdivisions, lot line adjustments, use permits, remodeling projects, and secondary dwelling;
- Requirements for unincorporated properties located near sanitary sewer systems;
- Provisions and permitting requirements for alternative treatment and dispersal systems;
- Amendments to this Onsite Systems Manual; and
- Fees, forms and supplementary information.

B. INSTALLATION PERMIT REQUIREMENTS

A permit must be obtained from the Department of Environmental Health (DEH) to construct, reconstruct, or repair an onsite wastewater treatment and dispersal system. Permits will only be issued in those areas of the County where a sanitary sewer is not available within 300 feet of the property line (or within 200 feet of the building in some cities). OWTS cannot be used if soil conditions, topography, high groundwater or other factors indicate this method of sewage disposal is unsuitable.

To obtain a permit, four (4) sets of the site plan showing the proposed OWTS, and any required supporting documents, must be submitted to DEH for review and approval. Details regarding the site plan and other required submittal information are provided in this Manual as follows:

- **Part 2 – Site Evaluation Methods and Investigation Requirements**
- **Part 3 – General and Conventional OWTS Requirements**
- **Part 4 – Guidelines for Alternative Systems**

C. DEVELOPMENT REQUIREMENTS

Land use and building permit applications are evaluated for adequate sewage disposal and domestic water supply. Other conditions such as hazardous materials storage or use, illegal dumping or illegal uses on the property may also be evaluated during field inspections.

Evaluation/testing of any existing OWTS may also be required to determine condition and adequacy.

1. Site Approval – Individual Parcels, Subdivisions, Lot Line Adjustments and Use Permits

To determine feasibility and size of an OWTS, a site assessment, soil profile, and percolation test are required for sites for which OWTS are proposed.

For subdivisions, each parcel in the subdivision must be evaluated separately to verify OWTS suitability for each undeveloped parcel. Each developed parcel will be evaluated to determine if the existing OWTS meets the required setbacks, and verify that the system is functioning adequately. If so, the existing OWTS may continue to be used without modification, regardless of whether or not the OWTS meets current code requirements, provided that there is sufficient suitable area for expansion in case of failure or house remodel in the future.

An approved potable water supply is required as a condition of approval for building sites, subdivisions, lot line adjustments and most use permits. Proof of adequate potable domestic water for subdivisions may be required prior to deeming the application complete if water availability is unknown or poor. Otherwise, proof of an adequate domestic water supply is required prior to map recordation. Individual wells or water systems with up to 14 connections are regulated by DEH. The California Department of Public Health, Drinking Water Division, regulates all other water systems.

2. Building Additions and Accessory Structures

a. **Major Expansion and/or Major Intensification of Use.**

Where construction associated with an existing structure will result in a major expansion of the structure resulting in greater than five hundred cumulative square feet of all additions since March 2, 1982 or where the construction will result in a major intensification of the use of the property, (such as any increase in number of bedrooms for a residence or any increase in occupancy or wastewater flow for a commercial building), the OWTS must meet the minimum prevailing wastewater treatment and dispersal requirements of this Code.

b. **Minor building additions (up to 500 square feet) and Accessory Structures (barns, detached garages, swimming pools, cabanas, etc)**

Where construction associated with an existing structure will result in a minor expansion of the structure resulting in five hundred cumulative square feet or less of all additions, the following are required:

1. Conduct an on-site inspection to determine adequacy and safe functioning of the existing OWTS in accordance with guidelines prescribed by the director in the *Onsite Systems Manual* (Part 5).

2. Expose and pump the existing septic tank except where the applicant can document that the tank has been pumped within the last three years; a receipt for service from a licensed septic tank pumping firm may be considered sufficient documentation.

3. Determine the location of existing dispersal trenches and identify area where future dispersal system expansion may occur; the septic tank file will then be updated.

4. Improvement and/or expansion of the existing OWTS will be required where the director finds the system to be inadequate to accept current and/or projected waste flows. This determination may take into consideration the size and functioning of the current system, coupled with slope, soil, hydrological, and related factors. If the existing OWTS is found to be failing or can be expected to fail, replacement or improvement of the sewage disposal system pursuant to section B11-65 of the OWTS Ordinance will be required. If a repair or replacement is not possible, the application will be disallowed.

c. **Remodeling or Repair.**

Where the existing OWTS does not meet requirements of the OWTS Ordinance, but is functioning safely and cannot be improved, construction will be limited to the remodeling or repair (as defined in the Uniform Building Code) of the existing structure provided:

1. The construction will not constitute any expansion or intensification of the use of the property or structure.

2. Construction will not result in conversion of uninhabitable area(s), such as a garage, deck, porch, patio, or similar area(s), to habitable area(s).

d. **Terminology.** For purposes of implementing the requirements above:

1. **"Intensification of use"** means a change that may place an additional demand on the OWTS of a property. The magnitude of the intensification (major or minor) will be determined by the director.

2. "**Remodeling" and "Repair"** are as defined in the California Building Code (Chapter 15.05), which is adopted by reference into the County's building ordinance.

e. **Secondary Dwellings**

Each secondary dwelling shall be served by an OWTS, which conforms to current code. This may be a separate OWTS serving only the second dwelling, or the second dwelling may be connected to the main house system, provided there is sufficient treatment and dispersal capacity.

Attached secondary dwellings must have a shared wall, but not necessarily a direct access between the main house and secondary dwelling. For attached secondary dwellings, the septic tank will be sized based on the total square footage of the house (plus secondary dwelling) and the dispersal field will be sized based on the number of bedrooms for both the main house and secondary dwelling.

f. **Definition of a Bedroom for purposes of conditioning an OWTS**

Rooms that are designated as craft rooms, bonus rooms, offices, etc. on house floor plans, must be evaluated for their potential use as a bedroom. Such rooms that have direct or convenient access to a full bathroom are deemed a bedroom for purposes of sizing the OWTS. For example, if there is a full bedroom in a hallway beside or a few doors down from an "office", that office would be considered as a potential bedroom. The presence or absence of a closet is not the defining feature of what constitutes a bedroom/potential bedroom. Some rooms, which take their access directly from a living room or entryway, and do not have a bathroom, may be exempt.

D. UNINCORPORATED PROPERTIES NEAR A SANITARY SEWER SYSTEM

The following requirements regarding the permitting of an OWTS apply to unincorporated property, outside of an urban service area, but whose property line is within 300 feet of a sanitary sewer system.

1. **For Failing OWTS**. Where there is a failure of an OWTS, the following are required:

    a. An application for sewer connection must be filed with the city/district sewer provider and the Local Agency Formation Commission (LAFCO).

    b. There must be written verification that the city or district and LAFCO has deemed the application complete.

c. Upon receipt of verification, a sewage system permit for a temporary emergency repair may be issued (if necessary) prior to a decision on the sanitary sewer connection.

d. If the sanitary sewer connection is denied, a "long-term" sewage system repair permit will be allowed.

2. **For Remodeling Projects.** Where there is a proposed remodeling which results in an increase in square footage of the structure, an intensification of use, or alteration in a manner as to change uninhabitable space into habitable space:

   a. An application for sewer connection must be filed with the city, district, and LAFCO.

   b. There must be written verification that the city or district and LAFCO has deemed the application complete.

   c. A sewage system permit for an OWTS repair/replacement will only be issued if the sewer connection is denied by the city, district and/or LAFCO an there is sufficient area to allow the repair. The OWTS meets the minimum prevailing sewage disposal requirements of the County of Santa Clara Ordinance Code.

E. ALTERNATIVE SYSTEMS

To provide a broader range of OWTS treatment and dispersal options for new construction and repair/replacement situations, alternatives to conventional OWTS may be used in accordance with certain general provisions and specific requirements as follows:

1. **General provisions.**

   a. Alternative systems may be permitted by the Director of Environmental Health for the repair or upgrading of any existing OWTS and for new construction on any legally-created parcel where: (a) it is determined that sewage cannot be disposed of in a sanitary manner by a conventional OWTS; or (b) the Director determines that an alternative system would provide equal or greater protection to public health and the environment than a conventional OWTS.

   b. Alternative systems are not to be used as the basis approval of creation of new lots (subdivisions).

   c. Types of alternative systems permitted are limited to those for which siting and design standards have been adopted and incorporated in the Ordinance and this Manual.

d. All alternative systems must be installed by a contractor duly licensed by the Contractors State License Board of the State of California to install OWTS.

2. **Specific Requirements**

a. **Design and Installation Permit.** Alternative OWTS require design by a licensed professional and completion of site evaluation and installation permitting as required for conventional OWTS. Additional engineering and design requirements applicable to different types of alternative OWTS are contained in Part 4 of this Manual.

b. **Operating Permits.** A County-issued operating permit is required for all alternative systems. Operating permits are intended to serve as the basis for verifying the adequacy of alternative system performance and ensuring on-going maintenance, including requirements for system inspection, monitoring and reporting of results to the DEH, along with the requirement for permit renewal, typically on an annual basis.

c. **Performance Monitoring and Reporting.** Performance monitoring and reporting is required for all alternative OWTS in accordance with conditions established by the DEH at part of the operating permit. Performance monitoring requirements are covered in Parts 4 and Part 5 of this Manual.

d. **Design and Construction Guidelines.** Design and construction guidelines for approved alternative treatment and dispersal technologies are provided in Part 4 of this Manual.

F. AMENDMENTS TO THIS MANUAL

The DEH will periodically review and make amendments to the various procedures and technical information contained in this Onsite Systems Manual, typically on an annual or biannual basis. The amendments may be include recommended changes originating from DEH staff, RWQCB staff, other departments or agencies, contactors and consultants working in the OWTS industry, or other affected groups or individuals. Any substantive changes in requirements, such as changes in design criteria or addition of alternative design options, are expected to involve review and approval by the RWQCB.

The general format for considering changes to this Manual are as follows:

1. DEH will announce its intent to entertain and review proposed changes, including a due date for submission of proposals. DEH may establish, with Board of Supervisors approval, a fee to be charged for proposals that relate to proprietary equipment, systems or materials.

2. Proposals received shall include a description of the proposed change(s) along with supporting rationale, technical information, and specific language/text additions or changes.

3. DEH will conduct a preliminary internal review to determine the completeness and general merit of the proposal, and request additional information, as applicable.

4. DEH will circulate the proposal(s) for review by local consultants, contractors and maintenance providers, and others as deemed appropriate. DEH will convene a workshop-meeting with interested parties to review and discuss the proposal.

5. Based on the DEH review and workshop findings, proposals acceptable to the Director and warranting further consideration will be forwarded to the RWQCB for review and approval; changes will be incorporated following RWQCB approval.

G. FEES, FORMS AND SUPPLEMETARY INFORMATION

Fees, as prescribed by Resolution of the Board of Supervisors of the County of Santa Clara, are payable separately to the Department of Environmental Health for services described throughout this Manual. See DEH website for listing of applicable fees.

Forms and supplementary information:

- Land Use Service Application Form
- Septic System Permit Application
- Owner-Builder Information
- California Health and Safety Code Sections 19389-19832

County of Santa Clara

DEPARTMENT OF ENVIRONMENTAL HEALTH
CONSUMER PROTECTION DIVISION
1555 Berger Dr. Ste 300, • San José CA 95112
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www.ehinfo.org

Land Use Service Application Form

PLEASE NOTE: Submit an initial site plan (scale 1"=20') showing existing and proposed improvements.
All information is required to properly process application.

Project: Check only one

- ☐ **Single Family Residence (LU71)**
- ☐ **Accessory Structure/Pool/Solar/Etc. (LU72)**
- ☐ **Building Addition (LU73)**
- ☐ **Secondary Dwelling (LU74)**
- ☐ **Commercial (LU75)**
- ☐ **Emergency Repair-Actual System Failure (LU76)**
- ☐ **Other (LU79):** _____

Property Owner: _____

Address: _____ **Phone #:** _____

City: _____ **State:** _____ **Zip:** _____ **Fax#:** _____

E-mail Address: _____

Site Information

APN: _____

Address: _____

Cross Street: _____

City: _____ **Zip:** _____ **Lot Size (acres):** _____

Domestic Water Supply: ☐ **Proposed Well** ☐ **Existing Well(s) – Qty?** _____ **Water Source:** _____

Access Restrictions: ☐ **Locked Gates** ☐ **Dogs** ☐ **None** ☐ **Other:** _____

Contact Person (Designer/Architect/Contractor): _____ ☐ **Same as Property Owner**

Business Name (if any): _____

E-mail Address: _____

Address: _____ **Phone #:** _____

City: _____ **State** _____ **Zip** _____ **Fax #:** _____

By signing this application, authorization is granted to agents of the Department of Environmental Health to enter the property during normal business hours to conduct any necessary investigations related to this application.

Owner/Authorized Agent Signature	Print Name	Date

**** Office Use Only ****

Comments: _____

Owner ID: OW0_____ Facility ID: FA0 _____ Old ON0 #: _____ **Account ID#: AR**_____

Name Date **Invoice #: IN**_____

Received By: _____ ____/____/____ **Amount Paid:** _____

Assigned To: _____ ____/____/____ **Check Number:** _____

Plan submitted by: ☐ Owner ☐ Architect ☐ Contractor ☐ Designer ☐ Other_____

Project ID#: SR0_____ **Program Element(s):** _____

County of Santa Clara

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(408) 918-3400 ● FAX (408) 258-5891 ● www.EHinfo.org

SEPTIC SYSTEM PERMIT APPLICATION

PLEASE NOTE: Attach 3 site plans showing the proposed work. Permit is valid for 1 year from date of issuance.

Owner / Property Information

Owner:	APN: - -
Mailing Address:	Site Address:
City/Zip:	City/Zip:
Phone:	Cross Street:

Proposed Work

Square Footage of Residence:	Total Number of Bedrooms:
☐ New system ☐ Repair/modify existing system	Existing Drainfield to be used: ☐ Yes ☐ No
New Tank: ☐ Yes ☐ No	New Drainfield: Linear Feet
Tank Size/Manufacturer:	Rock depth below pipe: Inches
New Diversion Valve: ☐ Yes ☐ No	Chamber system: ☐ Yes ☐ No

Septic System Installation

☐ Owner will provide the labor and materials for construction of the proposed septic system.
Initial here ( ) to confirm that the owner has read the Owner-Builder information (see reverse side of this form) and will abide by the requirements.

☐ Owner has contracted with the following person/company to provide the construction:

Name: _____ Phone number: _____

Address: _____ Contractor's License: _____

Note: Notify the DEH district specialist a minimum of 1 working day prior to the start of septic system installation.

I agree that all work is to be completed per stamped, approved plans unless modified during construction by the Department of Environmental Health. As owner or authorized agent, I represent that the information herein submitted is correct to the best of my knowledge.

Owner/Authorized Agent Signature	Print Name	Date

Office Use Only

Date Approved:	Approved by:
Existing Septic Permit #:	Service Request #:
Comments:	

OWNER-BUILDER INFORMATION

An application for a septic permit has been submitted in your name listing yourself as the builder of the property improvements specified. For your protection, you should be aware that as an 'owner-builder' you are the responsible party of record on the permit.

Contractors are required by law to be licensed and bonded by the State of California and to have a business license from the city or county. Those whose scope of practice includes septic system construction and repair are also required by law to be registered on the Department of Environmental Health's approved Septic System Contractor's List.

If you plan to do your own work, with the exception of various trades that you plan to subcontract, you should be aware of the following information for your benefit and protection:

- If you employ or otherwise engage any persons other than your immediate family, and the work (including materials and other costs) is $500 or more for the entire project, and the persons are not licensed as contractors or subcontractors, then you may be an employer.
- If you are an employer, you must register with the state and federal government as an employer and you are subject to several obligations including state and federal income tax withholding, federal social security taxes, workers' compensation insurance, disability insurance costs, and unemployment compensation contributions.

There may be financial risks for you if you do not carry out these obligations, and these risks are especially serious with respect to workers' compensation insurance.

For more specific information about your obligations under federal law, contact the Internal Revenue Service (and, if you wish, the U.S. Small Business Administration). For more specific information about your obligations under state law, contact the Department of Benefit Payments and the Division of Industrial Accidents.

If the structure is intended for sale, property owners who are not licensed contractors are allowed to perform their work personally or through their own employees, without a licensed contractor or subcontractor, only under limited conditions.

The property owner may construct or repair an on-site sewage disposal system on his/her own property, which system serves or will serve the building on the property and is neither being offered for sale nor intended to be so offered, provided: 1) persons hired by the owner to do the subject work must comply with a general engineering contractor's license Class A, or a Class C-42 sanitation system contractor's license or Class C-36 plumbing contractor's license from the Contractor's State License Board of the State of California or 2) persons hired by the owner must be hired as employees of the owner and the owner must provide proof of workman's compensation insurance, as required by law and 3) a septic system permit is obtained.

CALIFORNIA HEALTH AND SAFETY CODE
SECTIONS 19830-19832

19830. Every city or county, whether general law or chartered, which requires the issuance of a permit as a condition precedent to the construction, alteration, improvement, demolition, or repair of any building or structure, shall, in addition to any other requirements, prepare and give notice to the owner of the building or structure whenever an application for a building permit is submitted in the owner's name as builder of the improvements. The notice shall be given by mail; or the notice may be given to the applicant at the time the application for the permit is made, provided that the applicant presents identification sufficient to identify himself or herself as the owner.

19831. A city or county, which is required to give notice pursuant to Section 19830, shall attach to such notice, and, as a condition precedent to issuing a septic permit, require the completion and require the return of, owner-builder verification.

19832. A city or county, whether general law or chartered, shall transmit the notice required pursuant to Section 19830 and the owner-builder verification required pursuant to Section 19831 by mail to the property owner applying for the owner-builder septic permit or may provide the notice or the verification in person to the person applying for the septic permit only if that applicant presents identification sufficient to identify himself or herself as the property owner. The return of the owner-builder verification shall be a condition precedent to issuance of the septic permit.

However, no city or county or its employees shall be responsible for determining the truth or accuracy of the declarations in the owner-builder verification, and no monetary liability on the part of, and no cause of action for damages against them, shall arise from their failure to verify the truth or accuracy of the declarations.

SANTA CLARA COUNTY ONSITE SYSTEMS MANUAL

PART 2

SITE EVALUATION METHODS AND INVESTIGATION REQUIREMENTS

PART 2
SITE EVALUATION METHODS AND INVESTIGATION REQUIREMENTS

CONTENTS

ATTACHMENTS

A. GENERAL

Prior to approving the use of an OWTS, a site evaluation is required in all instances to allow proper system design and to determine compliance with the site suitability criteria identified in the Ordinance and this *Onsite Systems Manual*.

For new divisions of land, soil profiles, percolation tests and groundwater determinations will be required on every parcel unless the director determines, on a case-by-case basis, that such testing is not necessary due to the availability of sufficient information to demonstrate conformance with applicable siting criteria for all proposed OWTS locations.

Site evaluations shall be conducted by a qualified professional, and evaluations shall be made in accordance with the following requirements and referenced attachments.

For sites where a conventional OWTS is appropriate, the site assessment and soil profile evaluation may be conducted entirely by DEH staff. For more difficult sites (e.g., steeper terrain) and for any site requiring the use of an alternative OWTS, the site evaluation and system design will require the involvement of an OWTS consultant (civil engineer, professional geologist, or registered environmental health specialist), who is retained by the owner. All percolation testing shall be conducted by or under the direct supervision of a qualified OWTS consultant. Where the work is conducted by a consultant, the DEH shall be notified prior to the site evaluation to coordinate with and allow for verification by department staff. To be able to provide optimum service to our land use customers the Department will develop a scheduling structure to provide the best service in the appropriate amount of time based on staffing and workload. Please go to www.EHinfo.org for more information.

B. SITE ASSESSMENT

The first step in the site evaluation process is a preliminary review of the physical features of the site by DEH staff, including the slope of the land, proximity to cuts, steep slopes, watercourses and drainage swales, wells, and other features that may limit the available dispersal area.

Prior to conducting the site assessment, a Land Use Service Application form must be completed, along with a preliminary site plan. This form must be signed by the owner of the property, or their authorized agent, in order to gain access to the parcel.

Site features determined by the field inspection and review of available maps and file information include:

(1) Land area available for treatment components and for primary and secondary/reserve dispersal fields.

(2) Ground slope in the primary and secondary/reserve dispersal area(s).

(3) Location of cut banks, fills, or evidence of past grading activities, natural bluffs, sharp changes in slope, soil landscape formations, and unstable land forms within 100 feet of the primary and secondary/reserve dispersal area(s).

(4) Location of wells, watercourses, drainage swales and other bodies of water within 150 feet of the primary and secondary/reserve dispersal area(s).

(5) To the extent possible, the location of existing OWTS within 100 feet of the primary and secondary/reserve dispersal area(s).

Following the site assessment, a written report will be provided by DEH. The report will briefly describe any limitation to development of the site using an OWTS.

C. SOIL PROFILES

After the initial site assessment, soil conditions in the area(s) identified for the dispersal field require evaluation through soil profile observations. A soil profile typically consists of a backhoe excavation or soil boring to a depth extending below the anticipated dispersal trench bottom. For conventional OWTS, the backhoe excavation should extend a minimum of 5 feet below trench bottom; for alternative OWTS this depth may be reduced to 3 feet below trench bottom.

The purpose of the soil profile is to:

(1) Determine the suitability of the soils for absorption of wastewater in the dispersal trench zone; and

(2) Verify that there will be adequate vertical separation between the bottom of the dispersal trench and bedrock, groundwater, or impermeable soil strata.

A minimum of one excavation in the primary dispersal field and one in the secondary/reserve area shall be required for this purpose. Additional soil profiles may be required if the initial two profiles show conditions which are dissimilar to the extent that they do not provide sufficient information for design and/or determination of code compliance.

Auger test holes may be an acceptable alternative to backhoe or hand-dug test pits where the DEH determines either that:

(1) the use of a backhoe or similar excavating machinery is impractical because of access or because of the fragile nature of the soils; or

(2) it is necessary only to verify conditions expected on the basis of prior soils investigations;

(3) soil profiles are required to be no greater than 3-feet deep (e.g., for mounds or drip dispersal); or

(4) it is done in connection with geologic investigations.

Also, where groundwater separation of more than 5 feet is required (e.g., for conventional OWTS in areas of rapid percolation rates), additional (deeper) subsurface exploration may be required for groundwater determination; and this can be done with an auger boring rather than backhoe excavation.

The following factors should be observed and reported from ground surface to the bottom of soil profile:

- Thickness and coloring of soil layers, soil structure, and texture according to United States Department of Agriculture (USDA) classification.
- Depth to a limiting condition such as hardpan, rock strata, impermeable soil layer, or saturated soil conditions.
- Depth to observed groundwater.
- Depth to and description of soil mottling (redoximorphic features).
- Other prominent soil features which may affect site suitability, such as coarse fragments, consistence, roots and pores, and moisture content.

Soil profile inspections should follow guidance provided in manuals such as:

(1) USDA, Natural Resources Conservation Service. "Field Book for Describing and Sampling Soils". September 2002.

(2) USEPA "Design Manual – Onsite Wastewater Treatment and Disposal Systems". 1980. (pages 28-38).

Various aids for soil profile observations and logging are provided in **Attachment A**.

D. DEPTH TO GROUNDWATER DETERMINATION

The anticipated highest level of groundwater in the primary and secondary/reserve area shall be estimated either:

(a) As the highest extent of soil mottling observed in the examination of soil profiles;

Or

(b) By direct observation of groundwater levels during the time of year when the highest groundwater conditions are expected or known to occur, i.e., wet weather testing period as defined by the DEH.

Where there is a discrepancy between soil profile indicators (mottling) and direct observations, the direct observations shall govern.

If there are site characteristics or historical documentation indicating that a shallow water table is likely to occur during the rainy season, a wet weather groundwater investigation will be required. This investigation must be conducted during normal wet weather ground water conditions in accordance with DEH policy and procedures (see **Attachment B**). DEH staff should be contacted early in the site evaluation process to determine if wet weather groundwater observations are likely to be required for a particular site and to coordinate the work.

E. PERCOLATION TESTING

Percolation testing is conducted to confirm the groundwater separation requirement for the proposed site and to determine the size of the dispersal field for the project. The applicant must hire a consultant to conduct the percolation tests. DEH will determine the level of oversight to be provided during the testing. Percolation testing shall be completed in accordance with procedures detailed in **Attachment C**.

With respect to percolation testing, the applicant is responsible for:

(1) Contracting with an OWTS contractor or other qualified individual to excavate and set-up the percolation test holes in locations designated by the DEH and/or the applicant's OWTS consultant;
(2) Contracting with an OWTS design consultant to run the percolation tests;
(3) Making necessary arrangements to assure that adequate water is available for the required 24-hour pre-soaking and for refilling during testing.

Percolation testing will normally be conducted at the time of or shortly following the soil profile investigation. However, if the soil profile observations indicate the presence of expansive soils with high shrink-swell characteristics, percolation testing during the normal wet weather season will be required. This is because expansive, high shrink-swell soils may exhibit suitable soil percolation rates during the dry season due to shrinkage cracks in the soil; but, when they become wet, the same soils may swell to the point of providing little or no percolation. Field judgment of the need for wet weather percolation testing will be made based on: (a) visual evidence of soil shrinkage cracks; and/or (b) soils exhibiting high clay content (e.g., exceeding

40 percent) in combination with massive, columnar or angular blocky soil structure.

F. GEOTECHNICAL REPORT/SLOPE STABILITY ANALYSIS

For any site where the ground slope in the proposed dispersal field area exceeds 20%, and for recommended reduction in horizontal setbacks from cuts, embankments, steep slopes or an unstable land mass, additional geotechnical evaluation of slope stability, drainage, and other factors shall be required to verify that the proposed dispersal system will not degrade water quality, create a nuisance, affect soil stability or present a threat to the public health or safety. See **Attachment D** for details pertaining to this additional geotechnical evaluation requirement.

G. CUMULATIVE IMPACT ASSESSMENT

For certain projects, typically non-residential and large flow OWTS, the completion of additional technical studies, termed "cumulative impact assessment", may be required. This is to address the cumulative impact issues (mainly groundwater mounding and nitrogen loading) from OWTS that can result from such factors as the constituent levels in the wastewater (e.g., nitrogen content), the volume of wastewater flow, the density of OWTS discharges in a given area, and/or the sensitivity and beneficial uses of water resources in a particular location (e.g., proximity to vernal pools). These issues are not necessarily addressed by conformance with standard OWTS siting and design criteria.

Cumulative impact assessment is mandatory for any OWTS with wastewater flows of 2,500 gpd or more.

Cumulative impact assessment is not required for normal residential OWTS, regardless of the type of system (conventional or alternative), except as may otherwise be designated by the director for certain situations of geographical areas of the county.

The requirements and guidelines pertaining cumulative impact assessments are detailed in detailed in **Attachment E**.

H. REPORTING

All site evaluation information shall be submitted to the DEH with the OWTS permit application, including, as applicable:

(1) soil profile and percolation test results, with map and written document attesting to the validity that the tests were set up and conducted in accordance with county standards for primary and secondary/reserve dispersal areas (per **Attachments A** and **C**);

(2) Floor plans of proposed structures. If structure is existing, provide existing and proposed floor plans.

(3) wet weather groundwater observations per **Attachment B** (if required);

(4) geotechnical report per **Attachment D** (if required);

(5) cumulative impact assessment per **Attachment E** (if required); and

(6) other project-specific information required by the director.

ATTACHMENT A

Site Evaluation

Field Forms and Soil Guides

County of Santa Clara

DEPARTMENT OF ENVIRONMENTAL HEALT
CONSUMER PROTECTION DIVISIO
1555 Berger Dr. Bldg., Suite 300, San Jose, CA 95112-271
(408) 918-3400 • FAX (408)258-5891 • www.EHinfo.or

SITE ASSESSMENT REPORT

Site Address:	Assessment Date:
City/Zip Code:	SR#:
APN:	☐ Existing Septic Permit (SP#:)

Items marked below represent constraints to designing a septic system or information that is required to determine the feasibility for designing a septic system on this property. This report represents a preliminary review based on a visual inspection of the property. It should be used only as a guide for more in-depth evaluation of the property for development.

☐ 1.	Before proceeding with soils investigations, it must be demonstrated on a site plan that a minimum duel dispersal field (primary + secondary) could be installed for a 1 bedroom house if very good percolation test results are obtained. **Percolation studies may dictate a larger system**, which may preclude development.
☐ 2.	It appears that the slope on a portion of the property exceeds 50%. Dispersal fields may not be installed on slopes that exceed 50%. Submit a topographical map and survey showing 2-foot contours.
☐ 3.	It appears that the slope in the proposed dispersal fields will exceed 20%. Approval for the use of a septic system will be contingent upon submittal of an engineered plan and a geotechnical report that demonstrates that the specific septic system design will not result in soil instability, surfacing effluent, contamination of water or creation of a nuisance.
☐ 4.	Existing or proposed easements or rights-of-way (driveway, roadway, etc.) may limit the available dispersal fields.
☐ 5.	Soils test pits and percolation tests must be conducted under the oversight of this Department. The results of these investigations will determine the suitability of the soil for a septic system and will determine the required dispersal fields.
☐ 6.	Cuts and steep banks (for driveway, house, retaining walls, roads, etc) downslope from the proposed dispersal area (either on the subject or adjacent property) may limit the available dispersal area.
☐ 7.	Wells located on the subject or adjacent property may limit the available dispersal area.
☐ 8.	The watercourse/drainage swale on the subject or adjacent property may limit the dispersal area.
☐ 9.	Large trees on the property may limit the available dispersal area. Maintain a setback of at least 15 feet between dispersal field and trees over 12 inches diameter (when measured at a height of 4.5 feet above the ground). See County or City for Tree Protection Requirements.
☐ 10.	The proposed dispersal area may be subject to seasonal high groundwater. A wet weather groundwater test may be required. Contact the DEH Land Use Senior at 408-299-5748 to be placed on the wet weather groundwater testing window notification list.
☐ 11.	There appears to be considerable surface drainage onto the proposed dispersal area.
☐ 12.	There is fill in the proposed dispersal area. A maximum of 1 foot of fill is allowed over a dispersal area.
☐ 13.	There may be unpermitted or illegal structures on the subject property.
☐ 14.	Other:

For more information regarding the septic system approval process and design requirements, see Santa Clara County Ordinance Division B-11 and the OWTS Technical Manual, available on our website.

Specialist Name _____ Signature _____ Date _____

Sent to _____ ☐Mail / ☐Fax / ☐E-mail

County of Santa Clara

ENVIRONMENTAL RESOURCES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
CONSUMER PROTECTION DIVISION
1555 Berger Dr. • Suite 300 • San Jose, CA 95112 • (408) 918 - 3400
Fax: (408) 258-5891 • Website: www.ehinfo.org

REPORT OF OBSERVATIONS

DBA / NAME					DATE
ADDRESS LOCATION					RECHECK DATE
OWNER / OPERATOR					
MAILING ADDRESS					
EMPLOYEE #	SERVICE	PROGRAM / ELEMENT	LOCATION CODE	TIME	WORK AREA

	RECEIVED BY
	SPECIALIST
	PAGE OF

SOIL PROFILE RESULTS
ALTERNATIVE/SHALLOW SYSTEMS

SR #:_____ **DATE OF INSPECTION:**_____

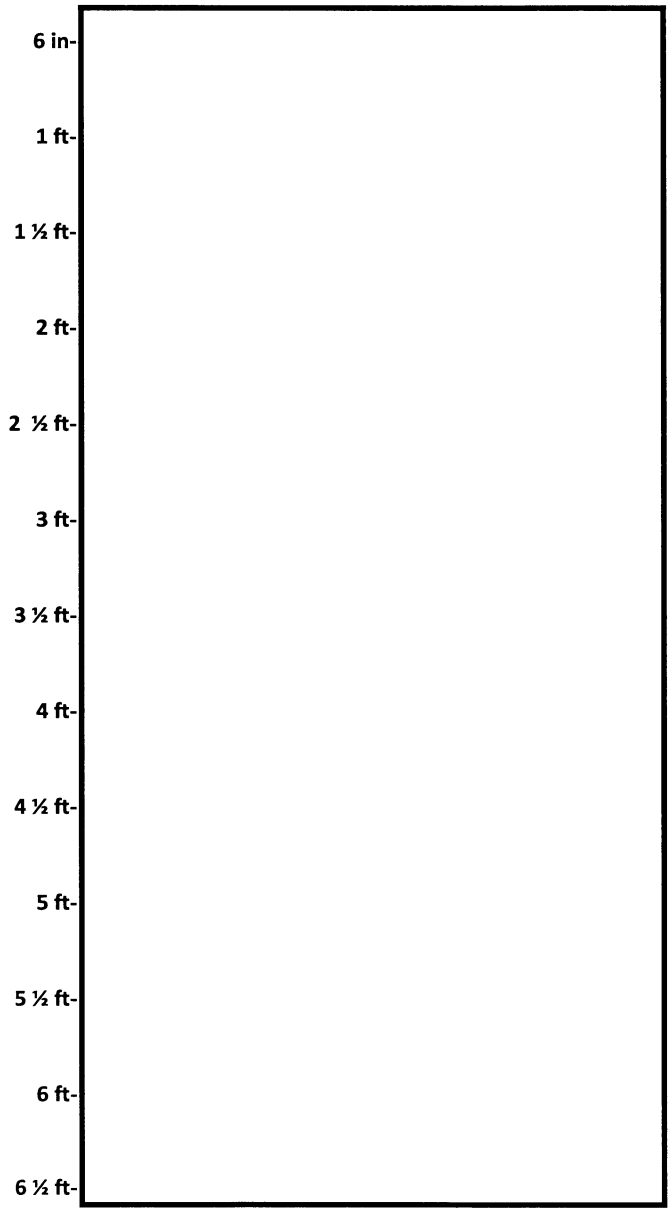
APN #: _____ **OWNER:** _____

APPLICANT: _____

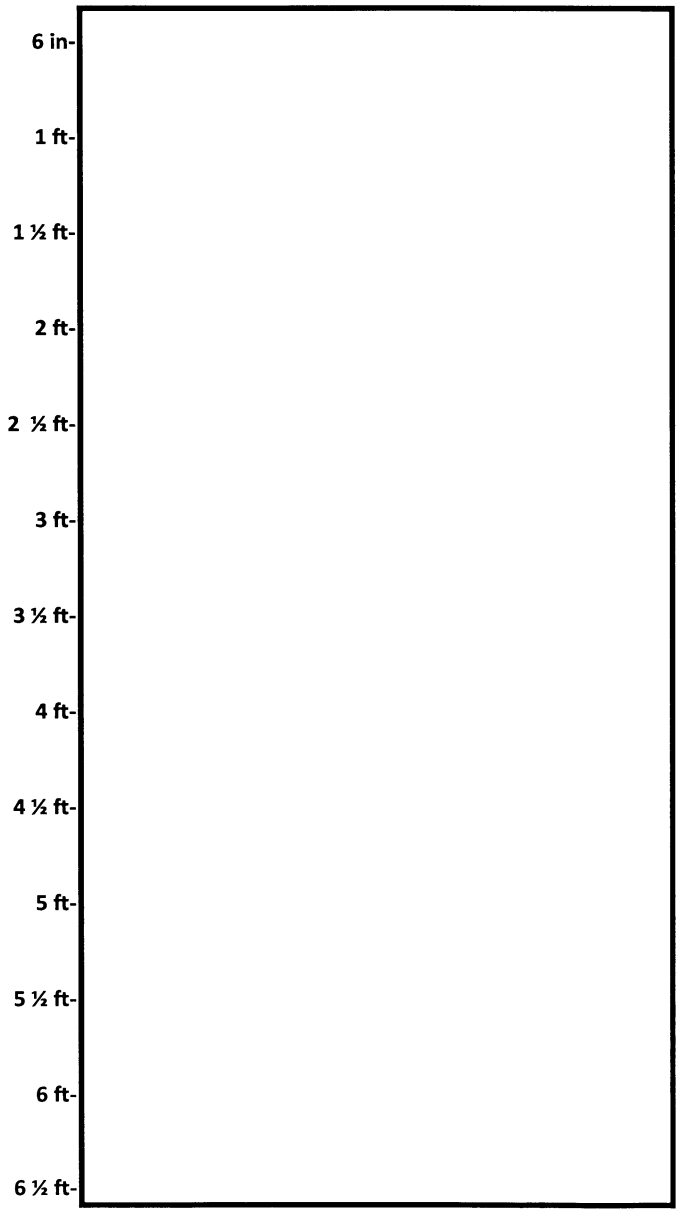
SITE ADDRESS: _____

CONDUCTED BY:_____ **CHECKED BY:** _____

HOLE #: _____



HOLE #: _____



COMMENTS:

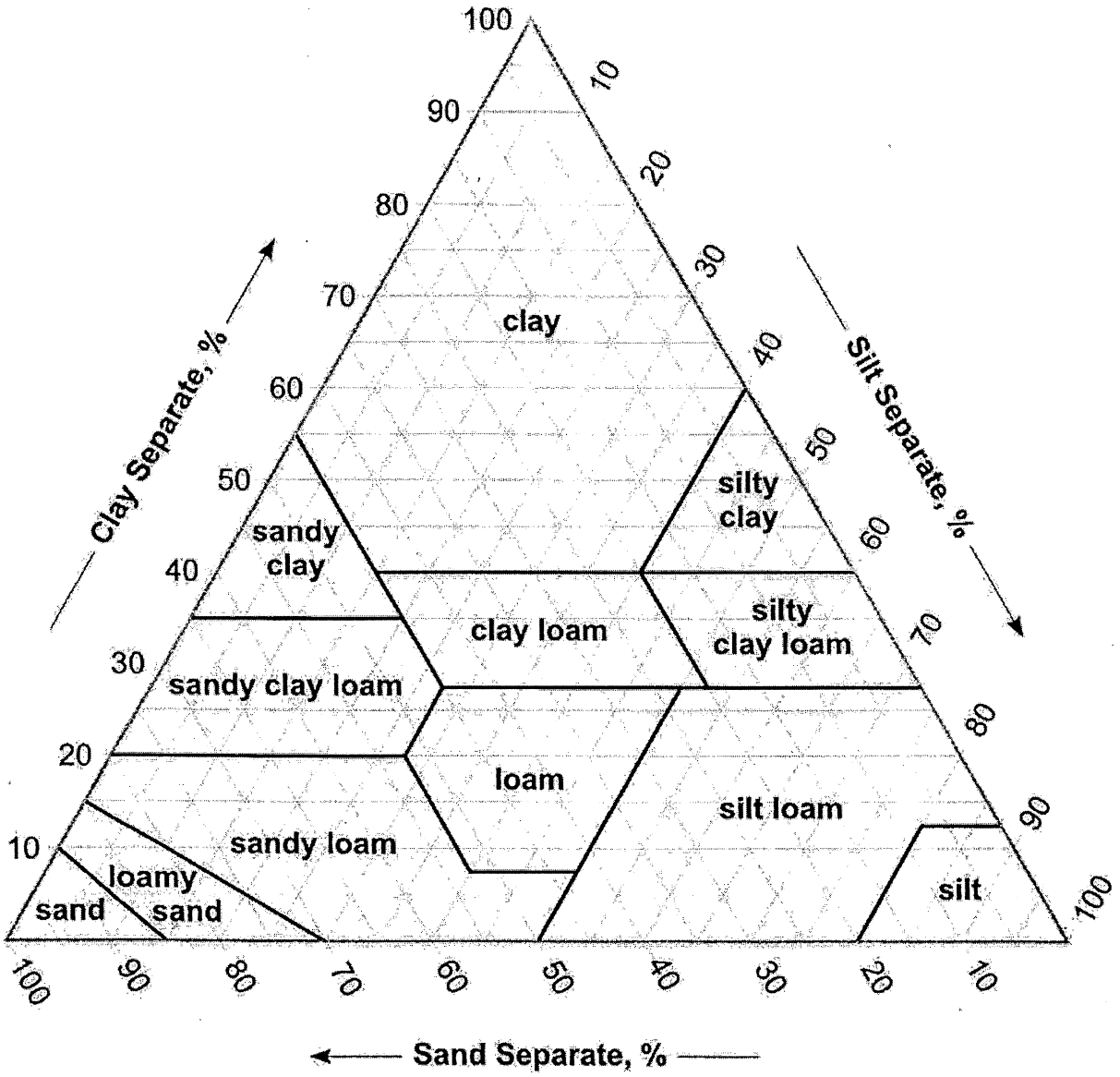
TABLE 3-4

TEXTURAL PROPERTIES OF MINERAL SOILS

Soil Class	Feeling and Appearance	
	Dry Soil	Moist Soil
Sand	Loose, single grains which feel gritty. Squeezed in the hand, the soil mass falls apart when the pressure is released.	Squeezed in the hand, it forms a cast which crumbles when touched. Does not form a ribbon between thumb and forefinger.
Sandy Loam	Aggregates easily crushed; very faint velvety feeling initially but with continued rubbing the gritty feeling of sand soon dominates.	Forms a cast which bears careful handling without breaking. Does not form a ribbon between thumb and forefinger.
Loam	Aggregates are crushed under moderate pressure; clods can be quite firm. When pulverized, loam has velvety feel that becomes gritty with continued rubbing. Casts bear careful handling.	Cast can be handled quite freely without breaking. Very slight tendency to ribbon between thumb and forefinger. Rubbed surface is rough.
Silt Loam	Aggregates are firm but may be crushed under moderate pressure. Clods are firm to hard. Smooth, flour-like feel dominates when soil is pulverized.	Cast can be freely handled without breaking. Slight tendency to ribbon between thumb and forefinger. Rubbed surface has a broken or rippled appearance.
Clay Loam	Very firm aggregates and hard clods that strongly resist crushing by hand. When pulverized, the soil takes on a somewhat gritty feeling due to the harshness of the very small aggregates which persist.	Cast can bear much handling without breaking. Pinched between the thumb and forefinger, it forms a ribbon whose surface tends to feel slightly gritty when dampened and rubbed. Soil is plastic, sticky and puddles easily.
Clay	Aggregates are hard; clods are extremely hard and strongly resist crushing by hand. When pulverized, it has a grit-like texture due to the harshness of numerous very small aggregates which persist.	Casts can bear considerable handling without breaking. Forms a flexible ribbon between thumb and forefinger and retains its plasticity when elongated. Rubbed surface has a very smooth, satin feeling. Sticky when wet and easily puddled.

Source: USEPA, Design Manual, 1980

Soil Textural Triangle



ATTACHMENT B

Santa Clara County

Wet Weather Groundwater Investigation

Department of Environmental Health
Consumer Protection Division
1555 Berger Drive, Suite 300
San Jose, CA 95112
408-918-3400

SANTA CLARA COUNTY
WET WEATHER GROUNDWATER INVESTIGATION

Background

The Santa Clara County Sewage Disposal Ordinance requires that soil investigations be conducted on each building site to be served by an onsite sewage disposal (septic) system. One function of these soil investigations is to determine if there will be adequate separation between the bottom of the dispersal field and seasonal high groundwater. For conventional systems, the ordinance requires groundwater to be at least 5 feet below the dispersal field in soils that exhibit slow to moderate percolation rates (31 to 120 mpi), 8 feet for faster rates (5 to 30 mpi), and 20 feet in highly permeable soils (<5 mpi). For alternative OWTS a 2 to 5-foot separation to groundwater is required.

Failure to provide the required separation to seasonal high groundwater may potentially result in groundwater contamination from the septic system or failure of the septic system itself. A septic system failure could manifest itself, among others things, by effluent surfacing on the ground and/or sewage backing up into the house fixtures. Installing a septic system on a site that appears to have adequate separation to groundwater in the dry season but experiences shallow groundwater during the rainy season may result in a septic system which functions properly only part of the year.

The Department of Environmental Health (DEH) has developed a policy that describes the wet weather groundwater investigation process. This process is used to identify sites with elevated seasonal groundwater tables which may preclude development using onsite sewage disposal systems.

A seasonal groundwater table may be suspected where 1) previous soil investigations have indicated evidence of high groundwater (soil mottling); 2) the site is at the base of a hill, near a creek or otherwise located where water is likely to accumulate; 3) riparian type plant life is present indicating prolonged soil moisture; 4) the Santa Clara Valley Water District (SCVWD) records indicate high groundwater conditions in the area; and/or 5) the presence of any other condition that may indicate a seasonal high groundwater table.

Wet Weather Investigation Process

A typical wet weather investigation will consist of a test pit, or with the approval of DEH, a test boring witnessed by DEH. The test must be conducted when sufficient rainfall has occurred in the area to establish the normal seasonal groundwater table. Prior to conducting the wet weather groundwater investigation, the percolation rate of the soil should be determined by DEH in order to assure that the wet weather investigation is conducted at the proper depth. DEH uses data from four SCVWD rainfall-monitoring stations to determine when sufficient rainfall has occurred. The testing window will open for a 30-day period when at least 60% of historical seasonal average rainfall has occurred, and 14% of that average has occurred in the last 30 days. The window will be extended for two-week periods provided that at the end of each testing period at least 14% of historical seasonal average rainfall has occurred in the previous 30 days.

In lieu of test pits or borings, the applicant may choose to construct at least two test wells in locations specified by DEH. The wells must be constructed to the same depth as would be required for the test pit. The wells must be constructed by an individual or company knowledgeable in the proper construction of these wells, and approved by DEH. The casing must be perforated from four feet below the surface to the depth of the well and the annular space at the surface must be sealed to prevent the introduction of surface water into the well. DEH will monitor the well during the wet weather investigation window.

The District Environmental Health Specialist should be consulted to determine whether a wet weather groundwater investigation would be required on a specific site. Appropriate fees must be paid to DEH prior to conducting the wet weather investigation.

Wet Weather Test Alternative

As an alternative to conducting the wet weather test, the applicant may elect to retain a hydrogeologist to investigate the site for evidence of seasonal high groundwater and submit a written report to the Department of Environmental Health. The investigation must include a field examination of test borings or excavations in the drainfield area and must address the topography and drainage of the area, including surface and subsurface drainage. Borings and excavations must be extended from 2 to 20 feet below the bottom of the proposed drainfield (based on the percolation rate of the soil and the type of OWTS proposed). The report must be submitted to the Land Use Senior who will request that the County Geologist review the report and comment. The County Geologist charges a fee for this review. Contact the County Geologist at 408-299-5774 for the fee schedule. These requirements should be discussed with the Land Use Senior at 408-299-5748 prior to conducting the investigation. A fee is also required by DEH for review of the hydrogeologist’s report.

ATTACHMENT C

Santa Clara County

Percolation Test Procedures

Consultant Conducted Tests

ATTACHMENT C

County of Santa Clara

ENVIRONMENTAL RESOURCES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
CONSUMER PROTECTION DIVISION
1555 Berger Dr. Bldg., Suite 300 • San Jose CA 95112-2716
408 918-3400 • FAX 408 258-5891 • www.EHinfo.org

SANTA CLARA COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH

PERCOLATION TEST PROCEDURES
CONSULTANT CONDUCTED TESTS

The person verifying the validity of the percolation tests must attest, in writing, that the test was set up and conducted in accordance with county standards, including the presoak procedure that he/she personally observed the site and at least a portion of the tests.

Test results shall be submitted on forms provided by or equivalent to those provided by the Department of Environmental Health.

ATTACHMENT C

General Information

Percolation tests must be conducted by or under the supervision of a California state registered environmental health specialist, a California state registered civil engineer, or a California state professional geologist.

The Department of Environmental Health will review and approve the number of percolation holes, their depths, and locations. Department of Environmental Health staff may elect to witness the installation of the percolation holes, verify presoaking, and be present during all or part of the testing. Upon satisfactory review of the data, department staff will determine the appropriate leachfield length.

Contact this department or visit our website at www.ehinfo.org for our current fee schedule. Extended service will be charged at an hourly rate.

The consultant shall notify the appropriate Department of Environmental Health office at least 24 hours prior to installing the percolation holes and 48 hours prior to conducting the percolation tests. Percolation tests may be conducted Tuesday through Friday.

Test readings, along with a site plan and letter of certification, are to be submitted on forms approved by the Department of Environmental Health.

Hole construction (see the attached diagram)

Diameter –12-inches	**Pipe Size** – 4-inches
Depth – as determined by the Department of Environmental Health.	**Gravel Size** – ½ to ¾ inch clean washed drain rock.
Number & Distribution – the minimum number of percolation holes shall be 6 per site, distributed to provide a reasonable representation of conditions throughout the proposed dispersal field area. Additional holes will be charged at the same rate as the initial 6 holes. Only those holes agreed upon prior to the test will be used to determine the leaching system requirement. Check with your local Department of Environmental Health office for more details.	

for a 4-hr period, refilling approximately once per hour. Alternatively, presoaking can be divided into 2-hr morning, 2-hr afternoon period or other schedule to achieve 4-hr total presoak period.

Pre-soak

Percolation test hole locations must be reviewed and approved by Department of Environmental Health staff prior to starting the work. A site map, showing the location of all percolation holes must be provided by the consultant. At the completion a site map, letter of certification and percolation reading will be submitted to DEH for review.

All percolation holes must be pre-soaked before the test begins. Pre-soaking is to consist of filling each percolation hole to at least 12 inches above the gravel bottom, for a 4-hr period, refilling approximately once per hour. Alternatively, presoaking can be divided into 2-hr morning, 2-hr afternoon period or other schedule to achieve 4-hr total presoak period.

Filling each percolation hole is best accomplished by adding water through the pipe rather than into the gravel.

ATTACHMENT C

Materials

Adjacent to each percolation hole there should be a hose connected to a plumbed water source or a water-filled container of 5 gallons or larger. Fifty (50) gallon drums or garbage cans are often preferred for faster percolating soils.

A water truck or other water source is to be available for refilling containers as needed during the course of the percolation test.

During the percolation test, holes may best be filled and re-filled to 6 inches above the gravel bottom, ideally using a small, easily managed bucket of ½ to 1-gallon capacity.

Test Procedures (for use with attached percolation test form)

1. On the day of the test, if more that 6 inches of water above the gravel bottom remains in any test hole. This constitutes a failure; and no further testing of the hole is warranted. If less than 6 inches of water remains in the test hole, proceed with steps 2 through 7.
2. Carefully fill the holes to 6 inches of water above the gravel bottom.
3. Measure the distance from the top of the pipe to the water surface with a 1/8-inch accuracy. This is water surface measurement A ("Start"). Record the measured distance. Record the time.
4. Allow 30 minutes to pass.
5. Measure the distance from the top of the pipe to the water surface with a 1/8-inch accuracy. This is water surface measurement B ("Finish"). Record the measured distance. Record the time.
6. Determine water level drop. The water level drop is the difference in inches between water surface measurements A and B ("Δ INCH"). Determine the amount of time between Start and Finish readings ("Δ MIN"). Calculate the rate in minutes per inch (MPI) as the product of "Δ MIN" divided by "Δ INCH".
7. Refill each hole to 6 inches of water above the gravel bottom and repeat the procedures of steps 3 through 6 above.
8. Continue these water refill and water level drop measurement procedures for a period of at least two (2) hours and until the water level drop (step 6) stabilizes and three (3) consecutive water level drop determinations are within 10% or 1/8 inch of each other. ***Note: The water level must be readjusted to 6 inches above the gravel bottom after each reading***.
9. If after one hour the water level is dropping so rapidly to make 30-minute readings infeasible, switch to 10-minute readings. Refill the hole to 6 inches above the gravel bottom and repeat the water level drop measurement procedures (steps 3 through 6) using a 10 minute interval instead of 30 minutes. Continue these 10-minute tests for at least one hour and until the water level drop stabilizes and three (3) consecutive water level drop determinations are within 10% or 1/8-inch of each other.
10. If, during the course of step 9, the water drains so rapidly that 10-minute readings are infeasible: (a) reduce the interval further (e.g., to 5 minutes); or (b) measure the time it takes for the water to drop exactly one inch, and report that time as the resultant rate (i.e., minutes

per inch). As above, repeat the measurements a sufficient number of times to achieve a stabilized rate over three consecutive readings.

11. All readings are to be reported in minutes per inch.
12. Complete calculations at the bottom of the percolation test form by: (a) entering the final stabilized rate for each test hole; (b) multiplying the stabilized rate by 1.4 to adjust for the displacement of water by the gravel-pack; and (c) calculating the average adjusted stabilized rate as the sum of the individual results divided by the total number of tests completed.
13. The average percolation rate determined per step 11 is used as the basis for dispersal system design and for determination of applicable groundwater separation requirements. See Additional Notes for dealing with individual outlier percolation values, including excessively fast, excessively slow or out-right failures.
14. Data for ***all*** percolation holes must be submitted to the Department of Environmental Health for evaluation. This data is to be included with a copy of the site map showing the location of the numbered percolation holes and a letter of certification.

Additional Notes on Percolation Testing

Number/Depth of Test Holes:

- Minimum of 6 tests in dispersal field area (spread over primary and secondary/reserve) for system design; 6 tests total for each parcel in new subdivisions.
- Minimum of 3 tests at proposed trench bottom; others within sidewall infiltration zone

Presoak Procedure:

- Required on the day prior to testing, except during wet weather period when the presoak may occur on the same day as testing.
- Fill test hole to 12 inches above gravel bottom and maintain for 4-hr period, refilling approximately once per hour. Alternatively, presoaking can be divided into 2-hr morning, 2-hr afternoon period or other schedule to achieve 4-hr total presoak period.
- Date and note level on perc pipe for verification at presoak inspection.

Use and Interpretation of Results

- Apply 1.4 gravel adjustment factor to determine final rate for each test hole.
- Calculate average mpi of all test holes
- If there are one or two failing test results, three options are available:
    1) Include the failing result(s) in the calculated average and design the system accordingly;
    2) Exclude the area represented by the failing test hole(s), and design the system according to the average of the other test holes. Split the

difference between the failing and nearby passing test holes to determine the area to be excluded.

3) Conduct additional testing in an alternate area or to refine the exclusion area represented by the failed test result(s).

- If there are more than two failing test results, additional testing will be required to define the limits of acceptable soil areas for the dispersal system.

:conslper5/00

County of Santa Clara– Department of Environmental Health
SOIL PERCOLATION TEST RECORDED MEASUREMENTS

OWNER / APPLICANT:	**SR #:**	**PLN FILE #:**
LOCATION:	**REHS:**	
CONTACT PERSON:	**PHONE:**	**DATE:**

HOLE # 1		DEPTH					HOLE # 2		DEPTH				
TIME		WATER LEVEL					TIME		WATER LEVEL				
START	FINISH	START	FINISH	Δ MIN	Δ INCH	MPI	START	FINISH	START	FINISH	Δ MIN	Δ INCH	MPI

HOLE # 3		DEPTH					HOLE # 4		DEPTH				
TIME		WATER LEVEL					TIME		WATER LEVEL				
START	FINISH	START	FINISH	Δ MIN	Δ INCH	MPI	START	FINISH	START	FINISH	Δ MIN	Δ INCH	MPI

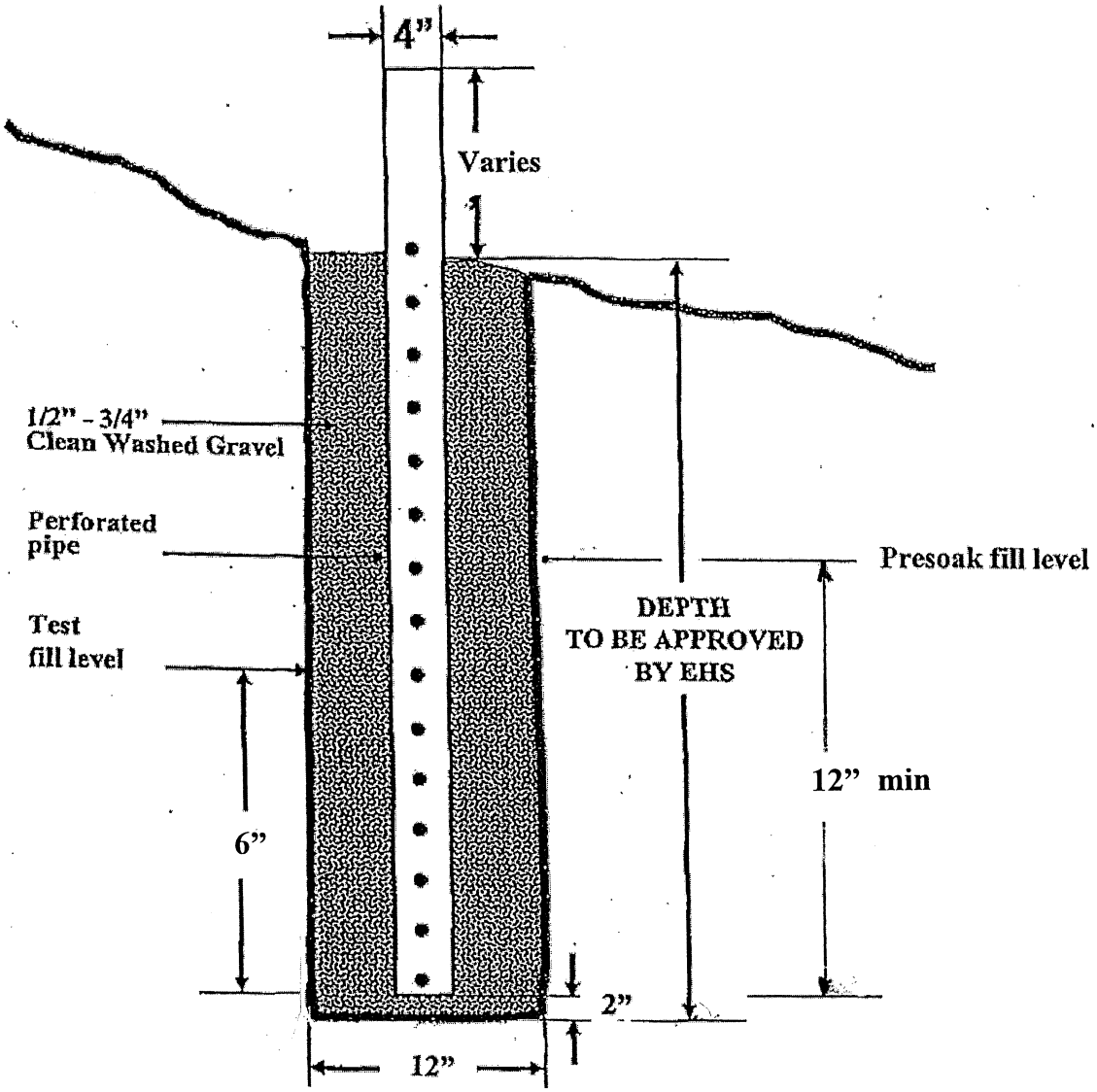
HOLE # 5		DEPTH					HOLE # 6		DEPTH				
TIME		WATER LEVEL					TIME		WATER LEVEL				
START	FINISH	START	FINISH	Δ MIN	Δ INCH	MPI	START	FINISH	START	FINISH	Δ MIN	Δ INCH	MPI

HOLE		1	2	3	4	5	6
Stabilized MPI	R						
Adjusted Stabilized MPI	R_1=R x 1.4						
Average Adjusted Stabilized MPI	R_2=(Σ R_1)/ # Holes						
# Bedrooms:	FOR OFFICE USE ONLY	Tank Size (Gal)			Leach line (Ft)		

SANTA CLARA COUNTY
DEPARTMENT OF ENVIRONMENTAL HEALTH

METHOD OF CONSTRUCTION

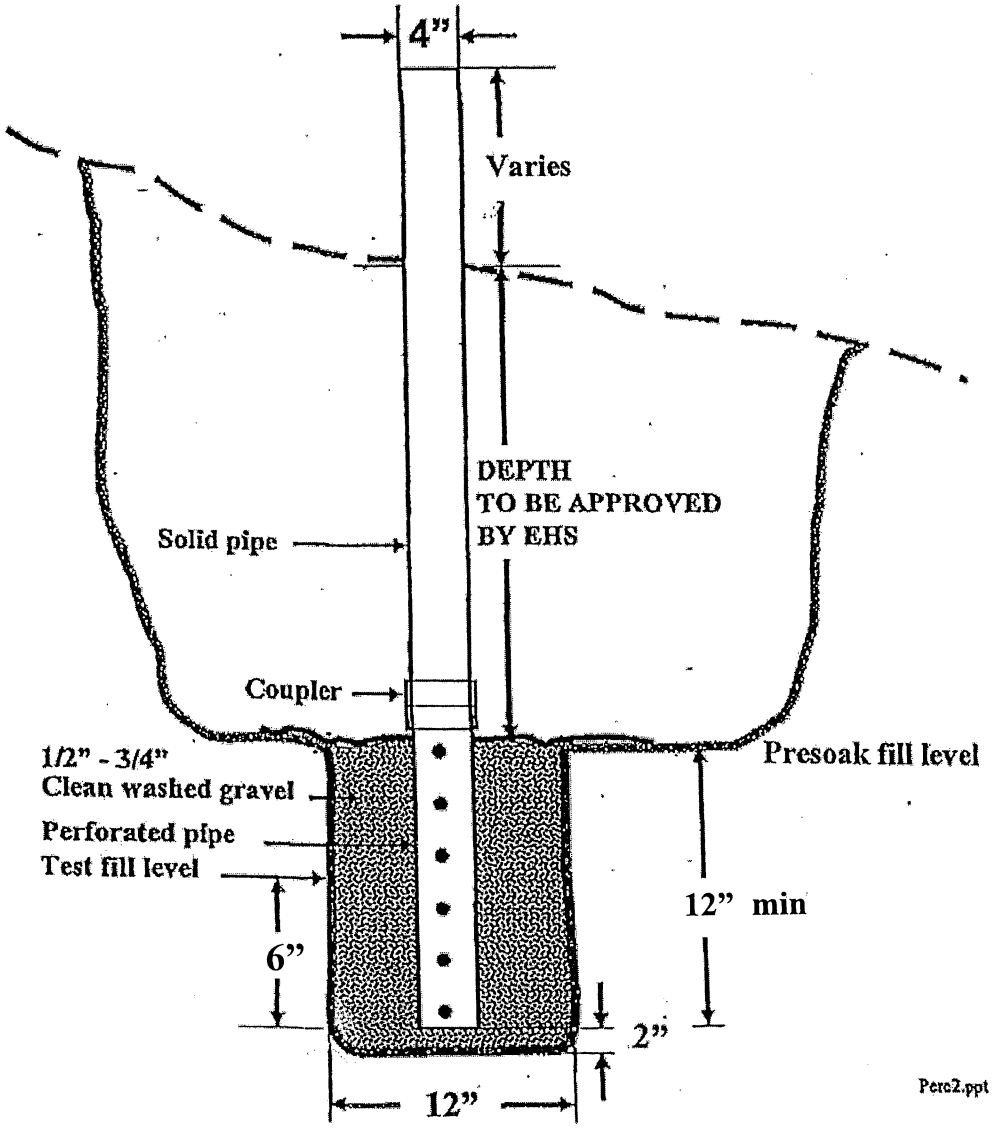
1. Hand auger or machine auger a 12-inch hole.
2. Scarify the glazed sidewall, if any.
3. Insert the perforated pipe in the center of the 12-inch hole.
4. Gravel-pack the hole around the pipe with ½-inch to ¾-inch clean washed gravel to the ground surface.



SANTA CLARA COUNTY
DEPARTMENT OF ENVIRONMENTAL HEALTH

ALTERNATIVE METHOD OF CONSTRUCTION

1. An additional fee will be charged for this method of construction.
2. Backhoe excavation with the bottom of the excavation no greater than 5½ feet in depth.
3. Hand auger or machine auger a 12-inch hole.
4. Scarify the glazed sidewall, if any.
5. Insert the perforated pipe in the center of the 12-inch hole.
6. Gravel pack the hole around the pipe with ½-inch to ¾-inch clean washed gravel.
7. The excavation shall be back filled prior to conducting the percolation test.



ATTACHMENT D

Geotechnical Report and

Engineering Installation Plan

Requirements

ATTACHMENT D

Geotechnical Report & Engineering Installation Plan Requirements for:
➢ Slopes Exceeding 20%
➢ Reduction of Horizontal Setbacks

When it is proposed to install an OWTS on slopes over 20% the County OWTS Ordinance, Code Section B11-83, requires that it be demonstrated "through a geotechnical report and complete engineering installation plan … that use of the subsurface dispersal system will not permit sewage effluent to surface, degrade water quality, create a nuisance, affect soil stability, or present a threat to the public health or safety. The geotechnical report shall include, but not be limited to, soil percolation rates, contours, soil depth, seasonal groundwater elevation(s), location of all existing or proposed ground cuts, rock formations, soil stability, drainage, and other data as determined by the director and the County geologist."

Also, under Section B11-67(i)(6) regarding horizontal setback distances between the dispersal field and cut banks, embankments, steep slopes and unstable land masses, the Code allows for reduction of the required setback distance "…in accordance with recommendations provided in a geotechnical report by a registered civil engineer or professional geologist…".

The following are the minimum requirements for the preparation of the geotechnical report and engineering installation plan pertaining to the above provisions of the Code.

1. The geotechnical report must be prepared by a state registered civil engineer or a professional geologist certified as an engineering geologist or having similar geotechnical expertise as determined by the County geologist. The engineering installation plan must be prepared by a state registered civil engineer, professional geologist, or registered environmental health specialist. The report and plan may be prepared by different authorized professionals.

2. Engineering Installation Plan Requirements:

    a) The plan must be wet-stamped by the designer and initialed or signed.

    b) The plan must include cross section(s) through the dispersal field that show dispersal line depths and details, and any benching that will be necessary to install the system.

    c) Any OWTS proposed for installation on slopes between 30% and 40% shall require the use of pressure distribution methods, designed in accordance with applicable guidelines in Part 4 of the Onsite Systems Manual.

    d) Any OWTS proposed for installation on slopes between 40% and 50% shall require the use of subsurface drip dispersal methods, designed in accordance with applicable guidelines in Part 4 of the Onsite Systems Manual.

    e) The plan must include an erosion control plan, incorporating measures consistent with guidelines and requirements contained in Division C12, Chapter III of the Santa Clara County Code (County Grading Ordinance).

f) The plan shall incorporate applicable recommendations contained in the geotechnical report regarding the avoidance or mitigation of slope stability concerns, including, as applicable, recommended horizontal setback distance(s) from cut banks, embankments, steep slopes, or any identified unstable land mass within 100 feet the dispersal field.

3. Geotechnical Report Requirements:

a) The report must specifically reference the engineering installation plan. If, at some future date, the dispersal field is appreciably modified an amended report must be submitted that references the modified plan.

b) The geotechnical report must discuss the geology, slope stability and seismic hazards, soils, groundwater, drainage, percolation rate, topography, cuts, vegetation and other pertinent site features.

c) The report shall include any recommendations deemed appropriate or necessary to mitigate potential slope stability, drainage or seepage concerns associated with either the installation or on-going operation of the proposed OWTS, including, as applicable, recommended horizontal setback(s) from any cut banks, embankments, steep slopes or any identified unstable land mass.

d) The report must state specifically in the conclusion that the proposed OWTS will not (or other wording such as not likely to, risk is very low, etc.):

1) Permit sewage effluent to surface

2) Degrade water quality

3) Affect soil stability

4) Present a threat to the public health or safety

5) Create a public nuisance

e) The geotechnical report shall be wet-stamped and signed by the responsible licensed professional.

ATTACHMENT E

Guidelines for

Cumulative Impact Assessment

ATTACHMENT E

GUIDELINES FOR CUMULATIVE IMPACT ASSESSMENT

A. General Provisions. Code section B11-74 authorizes the director to require the completion of additional technical studies ("cumulative impact assessment") for OWTS proposals in situations where cumulative impacts on groundwater and/or watershed conditions are of potential concern. Cumulative impacts from OWTS may occur due to such factors as the constituent levels in the wastewater (e.g., nitrogen content), the volume of wastewater flow, the density of OWTS discharges in a given area, and/or the sensitivity and beneficial uses of water resources (e.g., proximity to vernal pool). Cumulative impact assessments to address potential concerns shall be conducted in accordance with the requirements outlined in these guidelines. The results of the assessment shall be submitted for review by the Director and may be the basis for denial, modification or imposition of specific conditions for the OWTS proposal, in addition to other siting and design criteria.

B. Cumulative Impact Issues. The primary issues to be addressed in cumulative impact assessments will normally include the following:

1. Groundwater Mounding. A rise in the water table, referred to as "groundwater mounding", may occur beneath or down-gradient of OWTS as a result of the concentrated or high volume of hydraulic loading from one or more systems in a limited area.

2. Groundwater Nitrate Loading. Discharges from OWTS contain high concentrations of nitrogen that may contribute to rises in the nitrate level of local and regional aquifers.

For individual cases, the Director may identify and require analysis of cumulative impact issues other than those listed above which, in his/her judgment, could pose potential water quality, public health, or safety risks.

C. Qualifications. Cumulative impact assessments required for alternative system proposals shall be performed by or under the supervision of one of the following licensed professionals:

1. Registered Civil Engineer
2. Registered Environmental Health Specialist
3. Registered Geologist

Additionally, the licensed professional assuming responsibility for the cumulative impact assessment should have training and experience in the fields of water quality and hydrology.

D. Cases Requiring Cumulative Impact Assessment. Cases where cumulative impact assessments shall be required are listed in **Table 1.** Additionally, the Director reserves the right to require the completion of a cumulative impact assessment in any case where, in his/her opinion, special circumstances related to the size, type, or location of the OWTS warrant such analysis.

Table 1
Projects Requiring Cumulative Impact Assessment*

Type of Project	Geographic Location	Lot Size (acres)	Design Wastewater Flow (gpd)	Groundwater Mounding Analysis	Nitrate Loading Analysis
Individual Residence	Countywide	-	-	No	No
Residence with Second Unit	Countywide	-	-	No	No
	San Martin Area	< 5	-	No	Yes
Multiunit and Non-residential	Countywide	< 1	-	No	Yes
		-	1,500+	Yes	No
		-	2,500+	Yes	Yes
	San Martin Area	< 5	-	Per Countywide requirements above	Yes
		5+	1,000+		Yes
Subdivisions	Countywide	2.5+	-	No	No
		<2.5	-	No	Yes
Any OWTS <200 feet from a vernal pool	Countywide	-	-	Yes**	Yes**

*Note: Director may also require cumulative impact assessment based on project or site specific conditions.
** The hydrological and water quality analysis requirements may be modified depending on site specific conditions and the extent to which the OWTS discharge contributes flow to catchment area supporting the vernal pool.

E. Methods

1. Groundwater Mounding Analysis

a. Analysis of groundwater mounding effects shall be conducted using accepted principles of groundwater hydraulics. The specific methodology shall be

described and supported with accompanying literature references, as appropriate.

b. Assumptions and data used for the groundwater mounding analysis shall be stated along with supporting information. A map of the project site showing the location and dimensions of the proposed system(s) and the location of other nearby OWTS, wells and relevant hydrogeologic features (e.g., site topography, streams, drainage channels, subsurface drains, etc.) shall be provided.

c. The wastewater flow used for groundwater mounding analyses shall be the design sewage flow, unless supported adequately by other documentation or rationale.

d. Groundwater mounding analyses shall be used to predict the highest rise of the water table and shall account for background groundwater conditions during the wet weather season.

e. All relevant calculations necessary for reviewing the groundwater mounding analysis shall accompany the submittal.

f. Any measures proposed to mitigate or reduce the groundwater mounding effects shall be presented and described as to their documented effectiveness elsewhere, special maintenance or monitoring requirements or other relevant factors.

g. For OWST located <200 feet from and within the catchment area of a vernal pool, an annual water balance analysis will also ordinarily be required to assess the extent of potential OWTS impacts on vernal pool hydrology.

2. Nitrate Loading

a. Analysis of nitrate loading effects shall, at a minimum, be based upon construction of an annual chemical-water mass balance. The specific methodology shall be described and supported with accompanied literature references as appropriate.

b. Assumptions and data for the mass balance analysis shall be stated, along with supporting information. Such supporting information should include, at a minimum:

(1) climatic data (e.g., precipitation, evapotranspiration rates);
(2) groundwater occurrence, depth and flow direction(s);
(3) background groundwater quality data, if available;

(4) soils conditions and runoff factors;
(5) wastewater characteristics (i.e., flow and nitrogen content); and,
(6) other significant nitrogen sources in the impact area (e.g., livestock, other waste discharges, etc.)

c. A map of the project siting showing the location and dimensions of the proposed system(s) and the location of other nearby OWTS, wells and relevant hydrogeologic features (e.g., site topography, streams, drainage channels, subsurface drains, etc.) shall be provided.

d. The wastewater flow (average) used for nitrate loading analyses shall be as follows, unless adequately supported by other documentation or rationale:

(1) For individual residential systems: 75 gpd/bedroom;
(2) For multi-family residential systems and other non-residential systems: average monthly wastewater flow for the proposed OWTS;

e. Minimum values used for the total nitrogen concentration of septic tank effluent shall be as follows, unless supported adequately by other documentation or rationale:

(1) Residential wastewater: 50 mg/l
(2) Non-residential wastewater: as determined from sampling of comparable system(s) or from literature values.

The Director may require the use of more conservative values than cited above if, in his/her opinion, the values are not likely to be representative of the proposed system(s).

f. All relevant calculations necessary for reviewing the nitrate loading analysis shall accompany the submittal.

g. Any measures proposed to mitigate or reduce the nitrate loading effects shall be presented and described as to their documented effectiveness elsewhere, special maintenance or monitoring requirements or other relevant factors.

F. Evaluation Criteria

1. **Groundwater Mounding.** The maximum acceptable rise of the water table for short periods of time (e.g., one to two weeks) during the wet weather season, as estimated from groundwater mounding analyses, shall be as follows:

a. General Requirement for all OWTS. Groundwater mounding shall not result in more than a 50-percent reduction in the required minimum depth to seasonally high groundwater per section B11-67 or B11-95, as applicable, for the type of OWTS and site conditions. For example, where a 3-foot vertical separation to the native groundwater level is required, a short-term "mounding" rise of the water table to within 1.5 feet of trench bottom would be acceptable during peak wet weather conditions.

b. Requirement for Large Systems. Notwithstanding (a) above, for all OWTS of 2,500 gpd or more (i.e., "large systems"), the groundwater mounding analysis shall demonstrate that the minimum required groundwater separation, per B11-67 or B11-95 as applicable, will be maintained beneath the system during peak wet weather conditions.

The Director reserves the right to require, in any individual case, up to 24 inches of groundwater clearance ("mounded" conditions) where deemed necessary for protection of public health, or based upon specific requirements or recommendations of the applicable California Regional Water Quality Control Board.

Criteria for assessing hydrological impacts to vernal pools will be considered on a case-by-case basis. The director may rely upon rely upon Regional Water Quality Control Board staff or a third-party consultant to assist in the review. Costs for retaining a third-party consultant would be the responsibility of the project applicant.

2. Nitrate Loading. Minimum criteria for evaluating the cumulative nitrate loading from proposed OWTS shall be as follows:

a. For Areas Served By Individual Water Wells.

(1) Existing Lots of Record: New OWTS on existing lots of record shall not cause the groundwater nitrate-nitrogen concentration to exceed 7.5 mg-N/L at the nearest existing or potential point of groundwater withdrawal (e.g., water well location);
and
(2) New Subdivisions: The total loading of nitrate from new subdivisions shall not result in an average groundwater nitrate-nitrogen concentration over the geographical extent of the subdivision that exceeds 7.5 mg-N/L.

b. For Areas Not Served by Individual Water Wells.

(1) Existing Lots of Record: OWTS installed on existing lots of record shall not cause the groundwater nitrate-nitrogen concentration to exceed 10

mg-N/L at the nearest existing or potential point of groundwater withdrawal (e.g., water well location).
and

(2) New Subdivisions. The total loading of nitrate from new subdivisions shall not result in an average groundwater nitrate-nitrogen concentration over the geographical extent of the subdivision that exceeds 10 mg-N/L.

The Director reserves the right to require, in any individual case, more stringent nitrate-nitrogen compliance criteria where deemed necessary for protection of public health, or based upon specific requirements or recommendations of the applicable California Regional Water Quality Control Board.

Criteria for assessing nitrate or other water quality impacts to vernal pools will be considered on a case-by-case basis. The director may rely upon Regional Water Quality Control Board staff or a third-party consultant to assist in the review. Costs for retaining a third-party consultant would be the responsibility of the project applicant.

Santa Clara County Onsite Systems Manual

PART 3

GENERAL
AND
CONVENTIONAL OWTS REQUIREMENTS

PART 3
GENERAL AND CONVENTIONAL OWTS REQUIREMENTS

CONTENTS

1. GENERAL REQUIREMENTS

A. OWTS SITE PLANS

Site plans must include the following information and details:

1. Show all proposed and any existing OWTS drawn accurately to a scale of at least 1 inch = 20 feet. Large parcels must also show the entire site in a larger scale.

2. If the slope of the lot is less than 10%, indicate direction and percent of slope with an arrow. If the slope exceeds 10%, show elevation contour lines at 2-foot intervals. Note: If a "grid" dispersal system is proposed, one-foot contours are required to ensure the dispersal area does not exceed 5% slope.

3. Note the assessor's parcel number (APN), site address, County File Number (if applicable), and any subdivision, tract or lot numbers.

4. Show the North arrow and scale.

5. Show the location of all wells, springs, watercourses, drainage swales, cuts, steep slopes, and unstable land masses and other relevant landscape or water features on the property or within 100 feet of the property lines.

6. Show all existing and proposed structures, driveways, culverts, patios, decks, paved areas, swimming pools, large trees, water lines, etc.

7. Show all existing and proposed cuts, slopes or embankments over 50% gradient, slides and flood plain boundaries.

8. Include the name, address, and telephone number of the legal owner and/or applicant.

9. Show the name of adjoining property owners.

10. Show the property boundaries and their recorded lengths.

11. Show all recorded easements and right-of-ways and their purpose.

12. Indicate the name of the water company or the domestic water source (individual well, shared -well, mutual water system, etc).

13. Show all existing or proposed OWTS within 100 feet of an existing or proposed well.

14. Show location of soil profile and percolation test holes.

15. If proposing a grid design, see detailed requirements for "Grid Design Option" provided in Section 2.E.3.f., Part 3 of this Manual.

16. Show the location of all components of the OWTS (septic tank, diversion valve, dispersal trenches, etc).

17. Show the location of all OWTS components on the grading and drainage plan for the project.

B. PROCESSING OF PLANS, CHANGES AND FIELD MODIFICATIONS

1. **General.** Processing and issuance of an OWTS permit will not occur until four (4) complete sets of plans and supporting documentation are received (one copy of geotechnical report is sufficient). It is expected that the OWTS will be installed as designed. If significant changes in design are requested at the time of system installation, it will be necessary to stop work pending submission and approval of revised plans.
2. **Permit Processing**.
    a. If the plan submittal package is incomplete, the applicant will be informed in writing as to what additional information or modifications are required in order to process the OWTS permit.
    b. Plan changes or clarifications must be made by the designer. If changes are not extensive they can be made in pen and initialed by the designer at the time the OWTS permit is issued.
    c. The approving DEH staff member may make <u>minor</u> changes and clarifications to the plans in red pen.
3. **Field Modifications.**
    a. Decisions to accept minor modifications to the design will be the responsibility of field staff. Modifications may include, for example, small unplanned fluctuations in trench depth of a few inches and deviations from dispersal trench locations and lengths of a few feet.

b. Modifications that are not minor may require that the installation be delayed until the designer can modify the design/plans and they are reviewed and approved by DEH.

c. Modifications shall be documented in "As-Built" drawings provided to the DEH and system owner, following system installation.

C. OWTS INSTALLATION REQUIREMENTS

1. The approved, permitted OWTS site plan (wet-stamped by the Department of Environmental Health) must be available at the job site.

2. Per County Ordinance, the contractor must hold the appropriate contractor's license and be registered with the Department of Environmental Health.

3. The appropriate Environmental Health Office or Specialist must be notified at least 48-hours prior to starting construction.

   a. Main Office (1555 Berger Drive, Suite 300, San Jose) 408-918-3400

   b. South County Office (80 Highland Ave, San Martin) 408-918-3400 (office hours between 8:00 am and 9:00 am)

4. Trenches must not be excavated when the soil is wet so that the soil compaction and/or smearing of the trench walls occur. Compaction and smearing are problematic in clay soils and can cause reduced dispersal field efficiency.

5. No part of the septic tank or dispersal field may be covered without approval from the Department of Environmental Health.

6. At completion of construction and prior to receiving final acceptance by the director, the contractor and/or system designer shall provide to the DEH and system owner, a set of "As-Built" drawings of the completed OWTS installation.

D. WASTEWATER FLOWS FOR OWTS DESIGN

1. **Single Family Residences and Second Units.** Wastewater flows used for design of OWTS for single family residences and second units shall be based on a factor of 150 gal/day per bedroom for the first three (3) bedrooms, plus 75 gal/day for each additional bedroom, as indicated in **Table 3-1.** The design flows for a primary residence and secondary dwelling unit shall be determined independently, regardless of whether the flows are treated separately or combined in a single OWTS.

Table 3-1.
Wastewater Design Flows for
Single Family Residences and Second Units

No. of Bedrooms	Design Flow (gal/day)
1	150
2	300
3	450
4	525
5	600
6	675
>6	+ 75 per bedroom

2. **Multiunit Residences and Non-residential Facilities**. Wastewater flows used for the design of OWTS for multiunit residences and non-residential projects shall be developed based on full consideration of projected activities, occupancy, and facilities. **Table 3-2** provides guidelines for use in estimating design wastewater flows. For facilities not listed in **Table 3-2** the wastewater design flow shall be estimated based on either: (a) appropriate literature references (e.g., US EPA) for the type of facility proposed; or (b) documented wastewater flow monitoring data for a comparable facility. Additionally, the director may consider adjustment to the criteria listed in **Table 3-2** for specific facilities based upon documented wastewater flow monitoring data. In all cases, the design proposal shall include sufficient technical information to support the proposed design flow estimate. Notwithstanding the above, minimum design flow for any OWTS shall not be less than 150 gpd.

Table 3-2.
Wastewater Design Flow Guidelines
Multiunit and Non-residential Facilities

Type of Business or Facility	Design Flow (gallons per day)
Assisted living/ residential care home	
- per resident bed space, ambulatory residents	100
- per resident bed space, non-ambulatory residents	125
- live-in caregiver	75
- per employee (day use)	15
Camps (per person)	
- day use	10
- overnight use, with flush toilets, no showers	25
- overnight use, with flush toilet and showers	35
Churches and assembly halls (per seat)	
- without kitchen	5
- with kitchen	15
Country clubs	
- per resident member or caretaker	75
- per guest	25
- per employee	15
Day care (per patron, employee)	15
Detention center	
- per resident bed space	100
- per employee	15
Factories and industrial buildings (toilet wastes only)	
- without showers (per employee)	15
- with showers (per employee)	35
Hotels or motels	
- per guest	50
- per employee	15
- additional for restaurant, spa or other facilities	case-by-case
Laundromat, with self-service washing machines	
- per machine	500
or	
- per customer	50
Mobile home parks (per space)	250
Multiunit residential housing	
- apartments, per bedroom	150
- boarding house and farm labor housing, per bed	50
Offices and stores (per employee)	15

Type of Business or Facility	Design Flow (gallons per day)
Parks with picnic areas (per person)	
- with flush toilets	5
- with flush toilets and showers	10
Recreational vehicle parks	
- without individual sewer hook-ups (per space)	50
- with individual sewer hook-ups (per space)	100
Restaurants and Food Service	
- toilet and kitchen wastes (per patron)	10
- kitchen wastes only (per meal served)	5
- additional for bars (per patron)	2
- per employee	15
Service Station	
- per vehicle served	10
- per employee	15
Schools, boarding	
- student and live-in staff (per person)	75
- daily staff (per person)	15
Schools, day	
- without cafeteria or showers (per student)	15
- with cafeteria (per student)	20
- with cafeteria and showers (per student)	25
- staff (per person)	15
Swimming pools	
- per patron	10
- per employee	15
Theaters	
- per seat	5
- per employee	15
Wineries (sanitary waste only)	
- tasting room, per visitor	2.5
- per employee	15
- special events	case-by-case

3. **Flow Equalization.** Flow equalization may be used for non-residential and mixed use facilities that experience significant, regular and predictable fluctuations in wastewater flows. Examples of applicable facilities include, but are not limited to:

   - Churches
   - Schools
   - Special event venues

Flow equalization is the process of controlling the rate of wastewater flow through an OWTS by providing surge capacity storage and timed-dosing of the incoming flow. Installed following the septic tank, it allows peak surges in wastewater flow (e.g., from a weekend event) to be temporarily stored and metered into the treatment system and/or dispersal field at a relatively even ("average") rate over an extended number of days (e.g., during the subsequent week). This generally aids OWTS performance.

Where flow equalization is proposed to be incorporated in an OWTS the following apply:

a. the septic tank capacity shall be sized based on the peak daily flow for the facility;

b. the design flow used for sizing supplemental treatment unit(s) and/or the dispersal field may be based on the equalized ("average") flow rate rather than the peak daily flow rate for the facility;

c. engineering calculations and specifications must be submitted substantiating the proposed design and operation of the flow equalization system; and

d. an operating permit (per OWTS Ordinance section B11-92) will be required.

E. MATERIALS AND EQUIPMENT

Materials and equipment used in the construction of OWTS will be reviewed and evaluated by the DEH. A list of approved materials and equipment will be posted on the DEH website, and will be updated from time-to-time. New materials and equipment proposed for use will require evaluation and approval by the DEH before they can be added to the posted list.

2. CONVENTIONAL OWTS REQUIREMENTS

A. DESCRIPTION

Per Santa Clara County OWTS Ordinance, a "Conventional OWTS" means a type of OWTS consisting of a septic tank for primary treatment of sewage followed by a system of drainfield trenches for subsurface dispersal of effluent into the soil. A conventional OWTS may utilize gravity flow or a pump system to convey effluent from the septic tank to the drainfield.

B. SITING CRITERIA

The following minimum siting criteria must be met for approval of any conventional OWTS:

1. **Soil Depth.** Minimum depth of permeable soil beneath the bottom of the proposed dispersal field shall be 5 feet. Permeable soil is defined as having a percolation rate of 120 minutes per inch or faster or having a clay content of less than 60 percent, and shall not include rock formations that contain continuous channels, cracks or fractures.

2. **Soil Fill.** Maximum depth of soil fill covering any portion of the area proposed for installation of a dispersal system shall not exceed twelve inches in depth.

3. **Vertical Groundwater Separation.** Minimum required vertical separation distance between trench bottom and groundwater shall be determined according to the soil percolation rate as follows:

Percolation Rate* (Minutes/Inch)	Vertical Distance (feet)
Less than 1	Not Permitted
1-5	20
6-30	8
31-120	5
More than 120	Not Permitted

*average

4. **Areas of Flooding**. OWTS shall not be located in areas subject to flooding as defined by the limits of the 10-yr floodplain, determined or estimated from published floodplain maps or on the basis of historical evidence acceptable to the director. New OWTS that are to be

located in areas of special flood hazard, as identified in division C12 of the County Code, must comply with all relevant provisions of division C12.

5. **Ground Slope.** Maximum ground slope in the dispersal field area shall not exceed thirty percent. Additionally, for any site where the ground slope exceeds twenty percent, approval shall be dependent upon completion of a geotechnical report as provided in Ordinance section B11-83. See **Part 2** of this Manual for geotechnical report requirements.

6. **Horizontal Setbacks.** Minimum horizontal setback distances from various site features to OWTS components shall be as listed in **Table 3-3**:

Table 3-3. Minimum Horizontal Setback Distances

Site Feature	Minimum Setback Distance (feet)	
	To Dispersal Field	To Septic Tank
All wells and springs	100	100
Public water supply wells	150	150
Watercourses • General (from top of bank) • Between 1,200 to 2,500 feet from a public water system intake[1] • Within 1,200 feet from a public water system intake[1]	 100 200 400	 100 100 100
Reservoirs (from highwater mark) • General • Within 1,200 feet from a public water supply intake[1]	 200 400	 200 400
Cuts or steep embankments (from top of cut)	4 X h[2,3]	10 feet
Steep slopes (from break of slope)[4]	4 X h[2,3]	10 feet
Unstable land mass	100[3]	100[3]
Drainageway/drainage swale (from edge of flow path)	50	50
Foundation	10	5
Property line	10	10

Site Feature	Minimum Setback Distance (feet)	
	To Dispersal Field	To Septic Tank
Septic tanks	6	N/A
Swimming pool	25	25
Road easement, pavement, or driveway	5	5

[1] For areas tributary to and upstream of water supply intake; setback distance measured from high water mark. Exceptions allowed per SWRCB OWTS Policy, as follows: (a) for replacement OWTS, comply to the maximum extent practicable and incorporate supplemental treatment unless director finds no impact or significant threat to water source; (b) for new OWTS on pre-existing lot of record (pre-May 2013), comply to maximum extent practicable and incorporate supplemental treatment for pathogens per sections 10.8 and 10.10 of SWRCB OWTS Policy as detailed in the *Onsite Systems Manual*.

[2] h equals the height of cut or embankment, in feet. The required setback distance shall not be less than twenty five feet nor more than one hundred feet.

[3] Setback distance may be reduced in accordance with recommendations provided in a geotechnical report prepared by a civil engineer or professional geologist consistent with section B11-83 and guidelines contained in the *Onsite Systems Manual.*

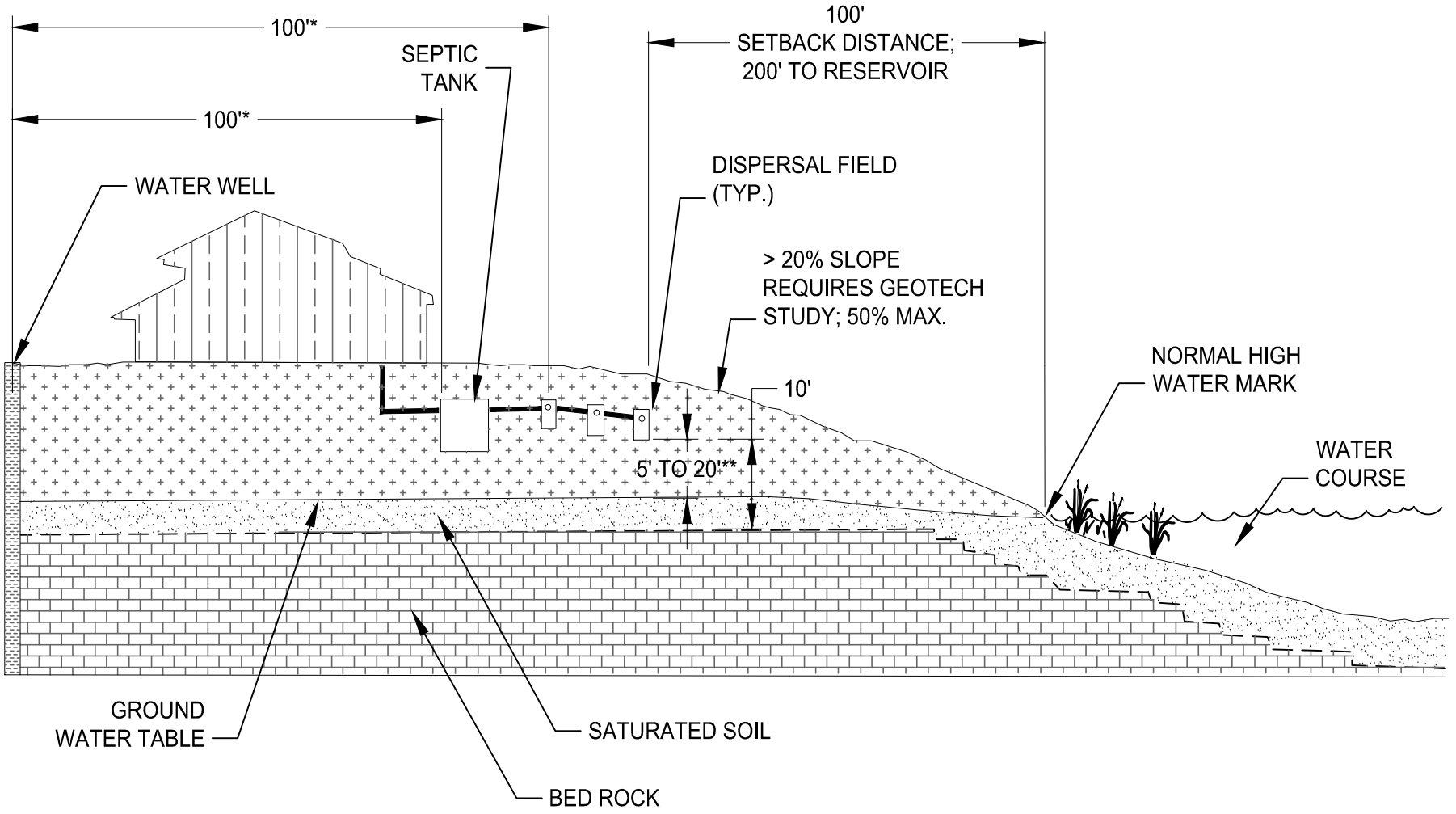
[4] Steep slope is considered to be land with a slope of >50% and distinctly steeper (at least 20% steeper) than the slope of the adjacent tank or dispersal field area.

7. **Additional Setback Considerations**

a. Site Grading and Drainage. Grading and drainage system drawings will be reviewed by DEH along with OWTS plans to ensure that the drainage system can be installed on the property without adversely affecting any existing or proposed OWTS. In addition to the requirements in **Table 3-3**, the following setback requirements from septic tanks and dispersal trenches will apply to site drainage features:

- Closed drain pipe or culvert - 10 feet
- Lined (e.g., concrete, asphalt or equal) drainage ditch – 15 feet
- Unlined earthen channel or V-ditch, for site drainage only – 25 feet
- Energy dissipaters – 10 feet downslope and 20 feet to the side

b. Trees. Refer to the Santa Clara County Ordinance C-16 Tree Preservation and Revision.



*150' TO PUBLIC SUPPLY WELL
**BASED ON PERCOLATION RATE

TYPICAL SITING CONSIDERATION FOR ONSITE WASTEWATER TREATMENT SYSTEMS
SANTA CLARA COUNTY

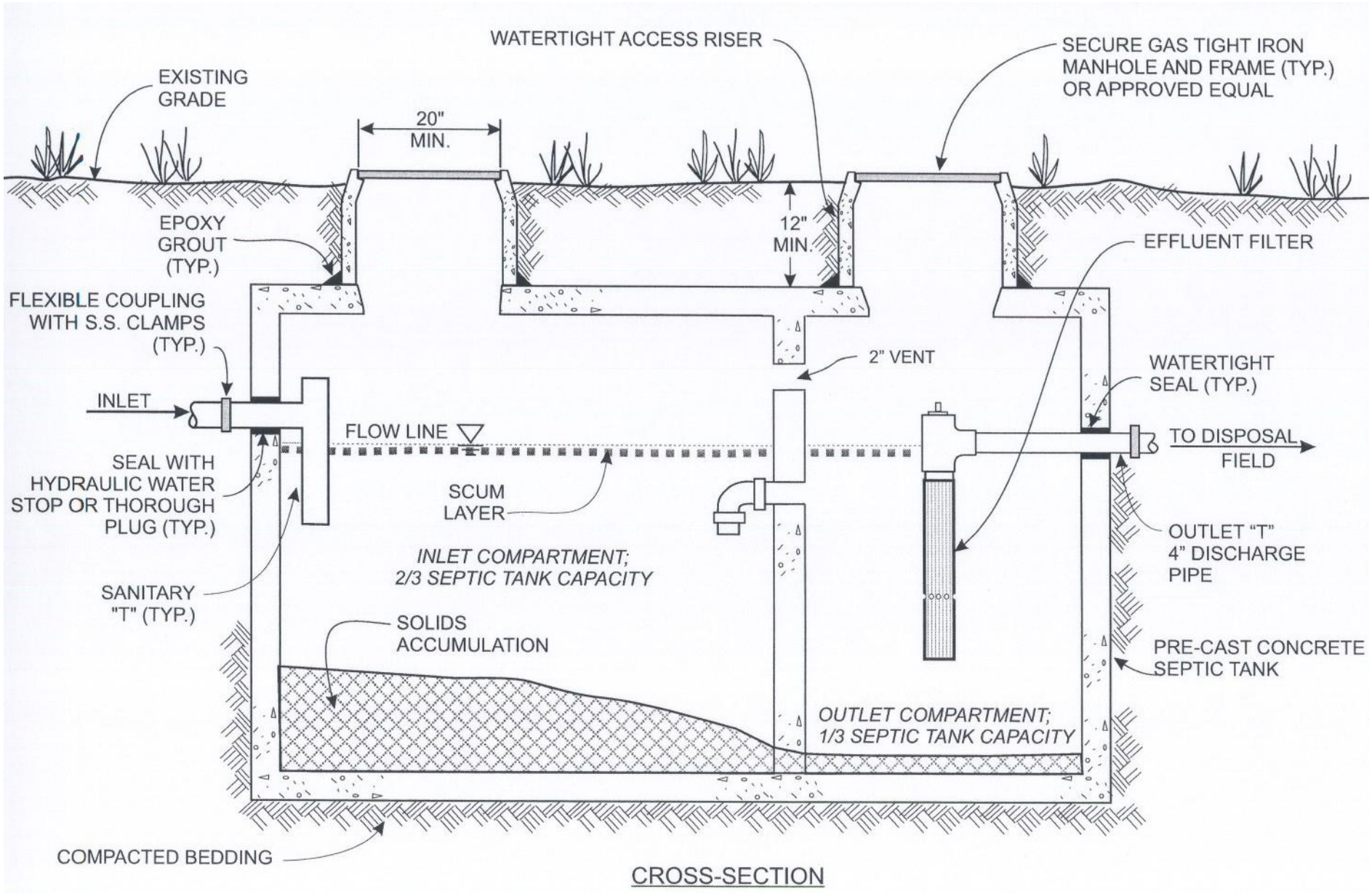
FIGURE
1

8. **Soil Percolation Rate.** The average soil percolation rate in the proposed dispersal field area shall not be faster than one minute per inch (1 mpi) nor slower than one hundred twenty minutes per inch (120 mpi), determined in accordance with procedures prescribed by the director in **Part 2** of this Manual.

9. **Location and Accessibility.** OWTS shall be situated on the same property as the building(s) being served and shall be located to be easily accessible for maintenance and repairs.

C. SEPTIC TANK REQUIREMENTS

1. **Minimum Capacity.** Septic tanks must have a minimum capacity of fifteen hundred (1,500) gallons or twice the peak daily wastewater flow for the facility served, whichever is greater. Minimum septic tank capacity for assisted care facilities shall be equal to three times the peak daily wastewater flow.
2. **Two Compartments.** Septic tanks must be of two-compartment construction, with the first compartment equal to two-thirds the total tank volume. The compartments must be separated by a baffle or equivalent arrangement.
3. **Materials.** Septic tanks must be watertight, properly vented and constructed of reinforced concrete, heavyweight reinforced concrete blocks, fiberglass or other durable, non-corrodible materials as approved by the director. Septic tanks shall be designed to withstand any anticipated weight placed above it. All septic tanks shall be listed and approved by IAPMO or an ANSI accredited testing organization: exception to this requirement may be granted where structural design calculations for the septic tank are provided by a California registered civil engineer.
4. **Access Openings.** Access to each septic tank compartment must be provided by a manhole opening at least twenty inches in diameter.
5. **Access Risers.** A riser must extend from each manhole opening to or above the surface of the ground. The riser must be of a size larger than the manhole opening, be both gas- and water-tight, be constructed of durable material and equipped with a secure cover.
6. **Effluent Filter.** The outlet of the septic tank shall be fitted with an effluent filter capable of screening solids in excess three-sixteenths (3/16) of an inch in diameter and conforming to NSF/ANSI Standard 46 or as otherwise approved by the director.
7. **Tank Connections.** All connections from building to septic tank must conform to construction standards as required by the County building official.



CROSS-SECTION

TYPICAL SEPTIC TANK

FIGURE 2

8. **Water-tightness Testing.** All new septic tank installations and modifications to existing septic tanks shall undergo water-tightness testing as follows:

   a. **New Tanks.** For new tank installations, the testing shall be done with the risers in place and the inlet and outlet pipes plugged. The tank shall be filled with water to a level extending a minimum of two (2) inches into the risers, and monitored for a 1-hour period, with no measurable drop in the water level.

   b. **Existing Tanks.** For existing tanks, the tank shall be filled with water to a level even with the invert of the outlet pipe, and monitored for a 1-hour period, with no measurable drop in water level. However, in cases where there the groundwater level is known or estimated to rise above the level of the outlet pipe during any time of the year, the water-tightness test shall be conducted following the procedure for new tank installations; i.e., by filling the tank with water into the risers.

D. PIPE REQUIREMENTS

1. **Solid pipe, joints and connections.** Solid (non-perforated) pipe for OWTS must conform to the standards of the most recent edition of the Uniform Plumbing Code, which is adopted by reference into the county's building ordinances. Pipe diameter must be four inches. All solid pipe joints and connections must be glued, cemented or made with an elastomeric seal so as to be watertight.

2. **Tightlines under Residential Driveway.** Tightlines in residential traffic areas must be installed with schedule 40 PVC. An alternative is to sleeve (i.e., double pipe) the thin wall tightline pipe within an outer pipe consisting of schedule 40 PVC, ABS or suitable alternative and rated by the Uniform Plumbing Code.

3. **Distribution pipe.** Perforated pipe for conventional OWTS dispersal systems must conform to the most recent edition of the Uniform Plumbing Code, which is adopted by reference into the county's building ordinances. The pipe diameter must be four inches.

DISPERSAL SYSTEM REQUIREMENTS

1. **Trench Specifications.** A conventional subsurface dispersal system must consist of a series of trenches meeting the specifications in **Table 3-4**.

Table 3-4. Conventional OWTS Dispersal Trench Design

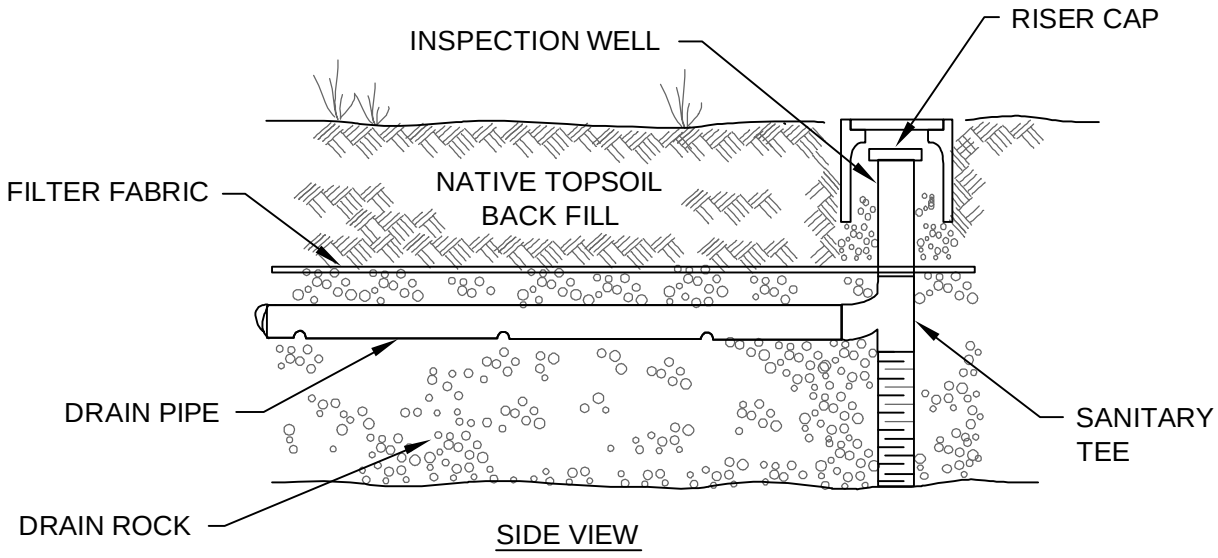
Parameter	Requirement
Trench length	Determined based on design flow and percolation rate; see below Recommended maximum of 100' per trench
Trench width	18 inches minimum; 36 inches maximum
Trench Depth	2.5 feet minimum; 8 feet maximum
Minimum cover over rock, in inches*	12 inches
Depth of rock under pipe (minimum) *	12 inches
Depth of rock over pipe (minimum)*	2 inches
Size of rock *	¾ to 2½ inches
Spacing of trenches, center to center, in feet, minimum	2 times the depth of rock below pipe; 6 feet minimum, plus 1-foot additional spacing for every 5% increase in dispersal area ground slope above 20%

* Other materials may be substituted for drainrock in the dispersal trenches if it is determined by the director that the material will serve the same function as drainrock as follows: 1) support the trench sidewalls and maintain the integrity of the infiltrative surface: and 2) provide adequate storage for septic tank effluent surges. The maximum depth and spacing between trenches may not be modified. Materials approved as drainrock substitutes must provide equivalent effective infiltrative surface consistent with trench sizing requirements per paragraph E3 below. Reduction in trench sizing requirements, up to 30%, may be approved by the director for IAPMO-certified dispersal systems.

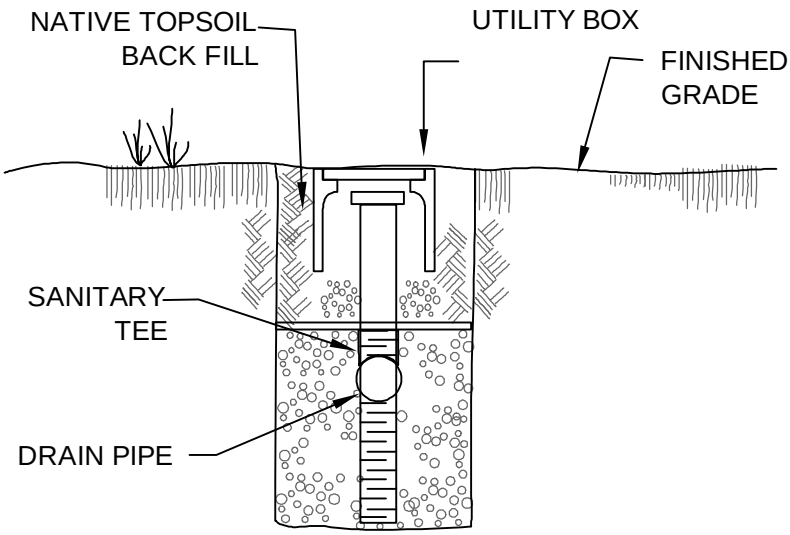
2. **Trench Construction.**

   a. Trenches must be placed in undisturbed earth, in an accessible area, and shall not be covered by paving or other impermeable or compacted surface. Natural topography shall not be graded to modify slope.

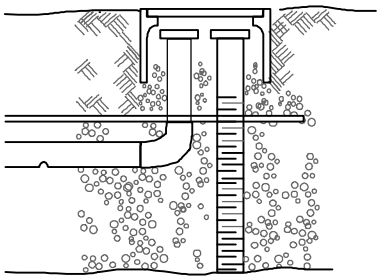
   b. The bottom of a trench must be level, with a variation of no more than 2 inches per 100 lineal feet of trench; trenches shall be aligned parallel to the ground surface contours to the greatest extent practicable.



SIDE VIEW



END VIEW



ALTERNATE END DETAIL

TYPICAL DISPERSALTRENCH

FIGURE
3

c. Adjacent trenches on slopes must be connected with a watertight overflow line ("relief line") in a manner that allows each trench to be filled with sewage effluent to the depth of the rock before the sewage flows to the next lower trench. Alternatively, a distribution box (D-box) may be used to equally divide the flow amongst the trenches, provided the proposed D-box is of a design approved and listed by the DEH per Part 3.1.E (Materials and Equipment) of this Manual. For systems located on sites having slopes of less than 5%, a "grid" design may be used in accordance with guidelines provided under at the end of this section (E.3.f).

d. Trenches must not be excavated when the soil is so wet that smearing or compaction occurs.

e. In clay soils when glazing occurs, the trench surfaces must be scarified to the depth of the glazing and the loose material removed.

f. Rock material in the trench must be washed and free of fines, and must be covered with an approved filter fabric silt barrier (geotextile) prior to backfilling with natural earth.

g. A capped inspection riser shall be installed within each trench to provide a means of observing the effluent level in the trench.

h. Erosion control measures shall be implemented following installation per requirements of Section B11-83(c) for any conventional dispersal system where: (1) ground slope exceeds 20%; (2) above-grade cover fill is added; (3) design flow exceeds 1,000 gpd; or (4) a grading and/or drainage permit is required for project site development per Division C12, Chapter III of the County Code. The plan submittal for the OWTS shall include an erosion control plan in accordance with requirements of Ordinance section B11-83(c).

3. Trench Sizing.

a. **Design Flow.** Design wastewater flow used for determining the required square footage and length of dispersal trench shall be determined in accordance with the criteria in Part 3-1C of this Manual.

b. **Wastewater Application Rates.** The wastewater application rate(s) used for d**etermining the** required infiltrative surface area and overall trench length shall be based upon representative percolation test results for the soil zone corresponding with trench bottom depth, and the criteria in **Table 3-5**.

Table 3-5
Wastewater Application Rates for Conventional Dispersal Trench Sizing[1]

Percolation Rate (MPI)	Wastewater Application Rate (gpd/ft^2)
1-5	1.2
10	0.80
24	0.60
30	0.56
45	0.45
60	0.35
90	0.20
91-120	0.20

[1] Interpolate between reference values for other percolation rates; see attached table for expanded listing of interpolated values.

c. **Effective Infiltrative Area.**

1) **Standard Requirement.** For trench sizing, the "effective infiltrative area" shall be limited to four (4) square feet per lineal foot of trench length, which may include any combination of trench bottom area and trench sidewall area below the invert of the perforated distribution pipe. For example, this may be comprised of: (a) 1.5-ft wide bottom area plus two sidewalls of 1.25 feet each; (b) 2-ft wide bottom area plus two sidewalls of 1 foot each; and so on.

2) **Deep Trench Exception.** Under certain (favorable) soil and site conditions where deeper dispersal trench (e.g., up to 8-feet deep) construction is acceptable, the effective infiltrative surface may be increased up to a maximum of eight (8) square feet per lineal foot. This exception is applicable to individual residential OWTS, where the dispersal site meets all conventional OWTS siting criteria, and further limited to sites where: (a) ground slope is <20%; and (b) soil percolation rate is in the range of 5 to 60 mpi.

d. **Trench Length Calculation.** Required trench length for 100% capacity dispersal field shall be calculated as follows:

Trench Length, $L = Q / (R*A)$

Where:

Q = Design wastewater flow, gpd
R = Wastewater application rate, in gpd/ft^2
A = Total infiltrative area per lineal foot of trench, in ft^2 (4 feet standard)

e. **Dual System Requirement.** Total dispersal trench capacity shall be provided for (2) 100% fields (primary and secondary) each sized per (d) above. Both primary and secondary fields shall be installed, and shall be equipped with an approved (manual) diversion device to allow alternating use of the two fields, typically switching between fields every 6 to 12 months.

f. **Grid Design Option.** For dispersal areas where the slope is near level (defined as less than 5%), the dispersal trenches may be designed and installed as a grid system, in accordance with the procedures:

1) For grid designs, the site plan must include the following:

- Contour lines at 2-foot intervals to verify that the slope is less than 5%.
- A cross-section of the entire disposal field area must be shown to verify trench depths. Trench depths must comply with requirements for conventional dispersal trenches as listed in **Table 3-3**, between a minimum of 2.5-feet deep and a maximum of 8-feet deep.
- Drainfield trench bottoms must be installed level, with a tolerance of 0 to 2 inches maximum per 100 lineal feet.

2) For each crossover connection (at the ends of the grid and in the middle of drainlines longer than 100 lineal feet), four (4) lineal feet will be counted towards the required lineal footage of drainlines due to the loss of absorption area in the corners of the grids. For example, with a 10-foot separation between drain lines, only six (6) lineal feet would be counted.

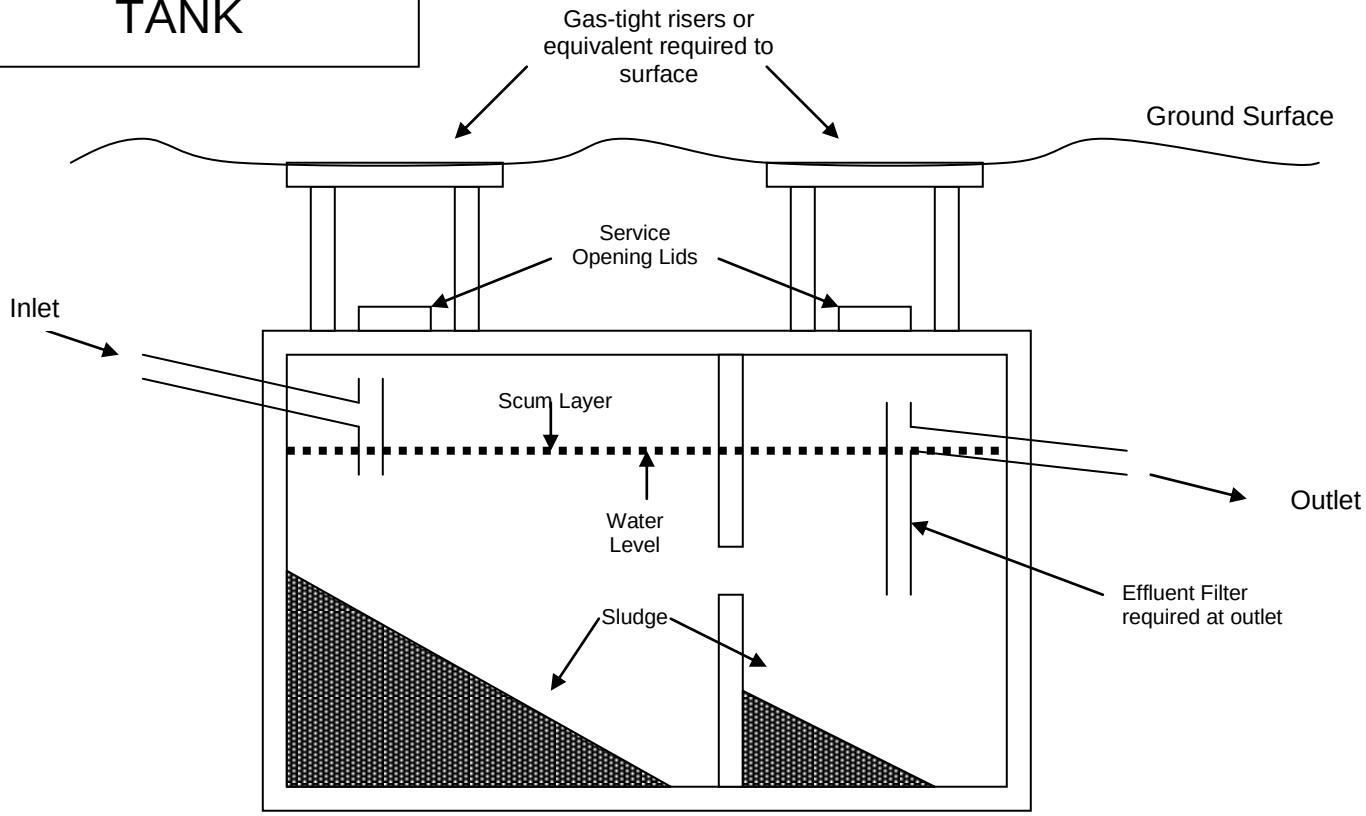
3) Any drainfield proposed in areas where the slope is 5% or more shall utilize relief lines ("popovers") or an approved D-box. This may result in a drainfield design that utilizes both grid and popover (or D-Box) systems on the same side of the diversion valve.

4) All percolation tests must be conducted at the level of the deepest trench depth proposed in the drainfield design. An alternative method would be to allow the percolation test holes to be at a depth midway between the shallowest trench depth proposed and the maximum trench depth proposed, providing the soil is of a consistent type throughout the trench depth range.

5) The area proposed for a grid system may not be graded to achieve a slope of less than 5%. Slope calculations will be based on the original, natural slope.

Table 1. Standard Wastewater Application Rates - Septic Tank Effluent				
Percolation Rate (MPI)	**Application Rate (gpd/ft^2)**		**Percolation Rate (MPI)**	**Application Rate (gpd/ft^2)**
1 to 5	1.20		51	0.41
6	1.12		52	0.40
7	1.04		53	0.40
8	0.96		54	0.39
9	0.88		55	0.38
10	0.80		56	0.38
11	0.78		57	0.37
12	0.77		58	0.36
13	0.75		59	0.36
14	0.74		60	0.35
15	0.72		61	0.35
16	0.70		62	0.34
17	0.68		63	0.34
18	0.67		64	0.34
19	0.65		65	0.33
20	0.64		66	0.33
21	0.63		67	0.33
22	0.62		68	0.32
23	0.61		69	0.32
24	0.60		70	0.32
25	0.59		71	0.31
26	0.59		72	0.31
27	0.58		73	0.31
28	0.57		74	0.30
29	0.57		75	0.30
30	0.56		76	0.30
31	0.55		77	0.29
4	0.55		78	0.29
33	0.54		79	0.29
34	0.53		80	0.28
35	0.52		81	0.28
36	0.52		82	0.28
37	0.51		83	0.27
38	0.50		84	0.27
39	0.49		85	0.27
40	0.49		86	0.26
41	0.48		87	0.26
42	0.47		88	0.26
43	0.46		89	0.25
44	0.46		90	0.25
45	0.45		91-120	0.20
46	0.44			
47	0.44			
48	0.43			
49	0.43			
50	0.42			

TYPICAL SEPTIC TANK



Cement/concrete tanks must be used whenever possible.
Alternative materials are approved on a site-specific basis.
The Department of Environmental Health maintains a list of approved septic tanks.

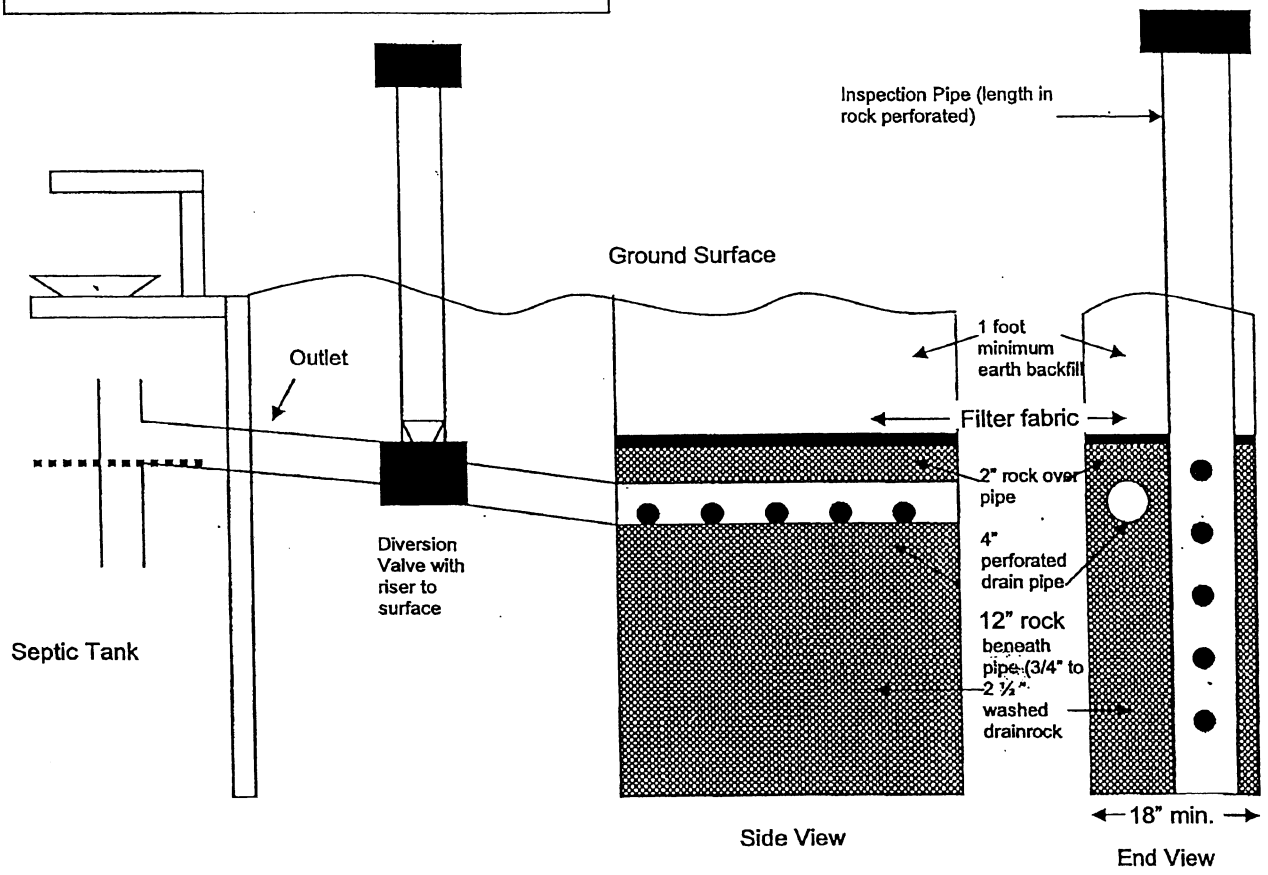
Septic tanks must be a minimum 1,500 gallons with two compartments.
The first compartment must be two-thirds the total tank volume. The compartments must be separated by a baffle or equivalent arrangement.

Septic tanks must be watertight and constructed of reinforced concrete, heavyweight reinforced concrete blocks, or other materials approved by DEH.

Access to each septic tank compartment must be provided by a manhole at least 20 inches in diameter and having a durable handle to facilitate removal.

A riser must extend from each manhole cover to or above the surface of the ground. The riser must be of a size larger than the manhole cover, be both gas- and water-tight, and be constructed of durable material.

DRAINLINE DETAIL



Two drainfields, each 100% of the total size required, shall be installed and interconnected with an approved diversion valve. The valve must be capable of directing the septic tank effluent to one drainfield at a time.

Drainline pipes shall be of approved, perforated pipe, at least 4 inches in diameter.

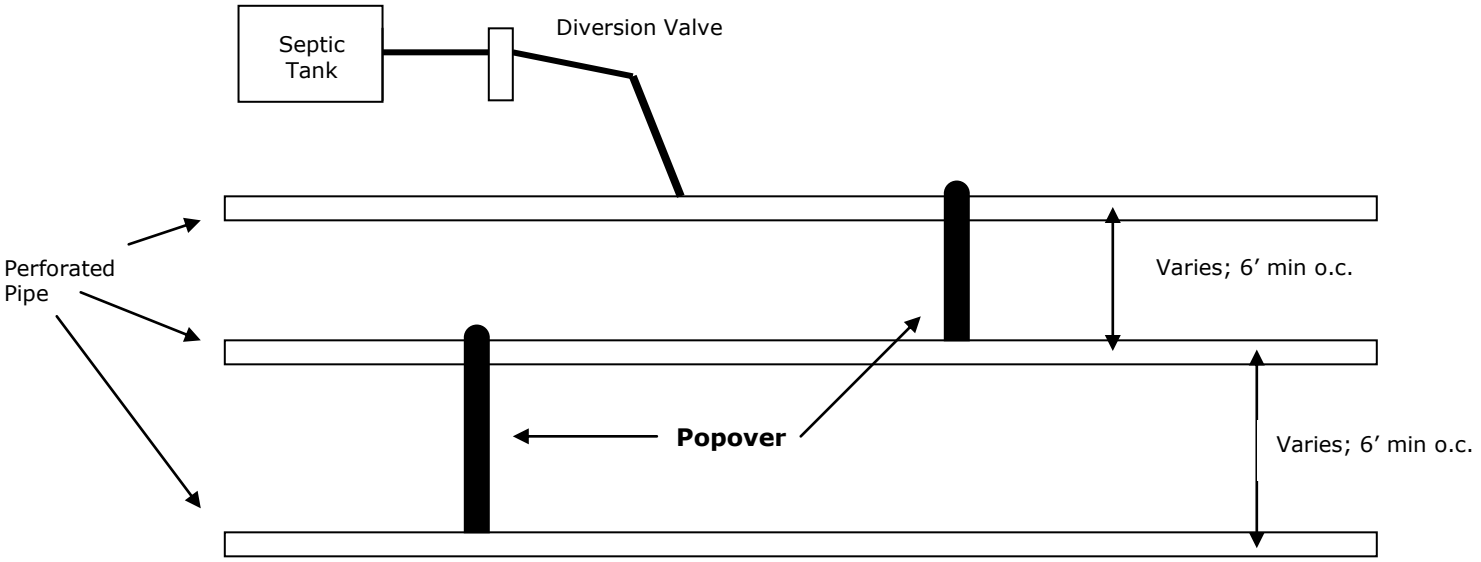
The tightline from the septic tank to the diversion valve must be ABS or schedule 40 PVC joined with glue, cement, or elastometric seal to be watertight.

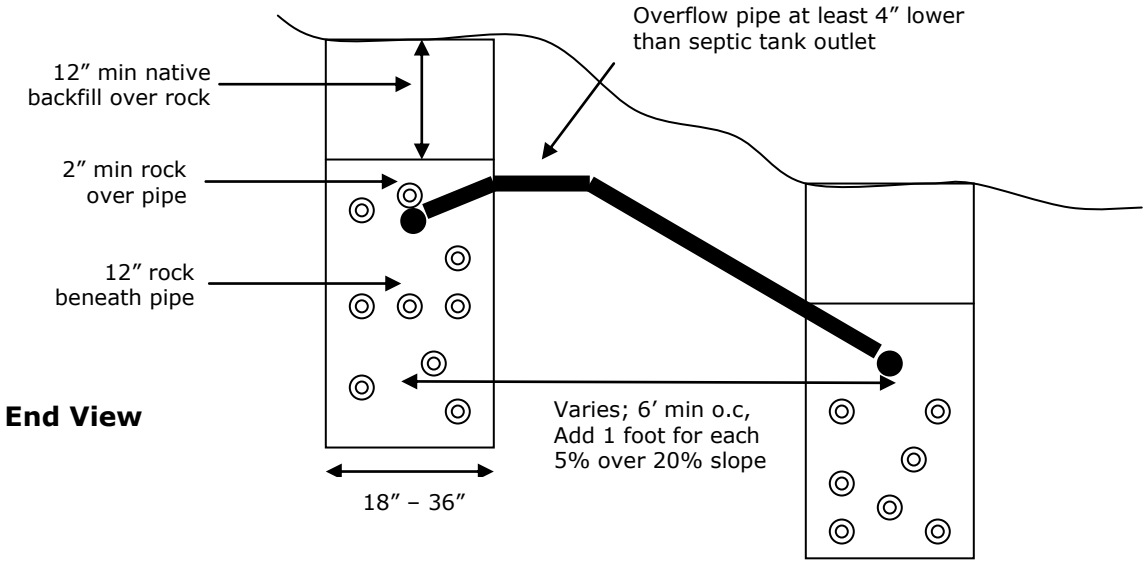
The drainline trench bottom must be level. The trenches must be at least 18 inches wide and 2.5 to 8 feet deep

At least 12 inches of clean, washed drainrock must be placed beneath the drainpipe and filled around and over the pipe at least 2 inches.

The drainrock must be covered with filter fabric to prevent clogging the rock with earth prior to backfilling.

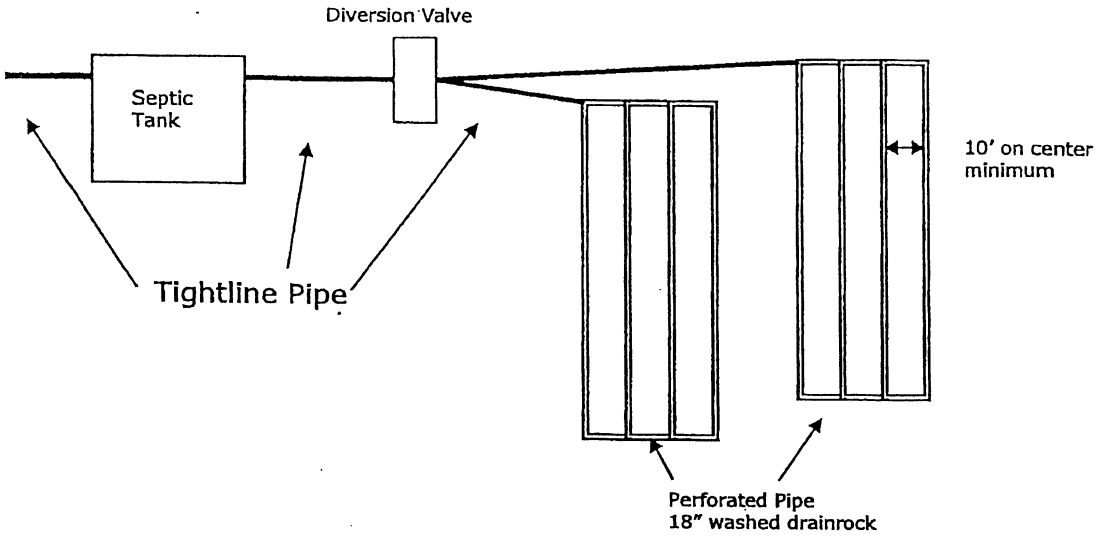
Drainfield System on Hillside or Sloping Land





End View

DRAINFIELD SYSTEM ON LEVEL LAND (LESS THAN 5% SLOPE)



"Grid" System for Leachfields

Distance between each leachline: 10-foot on center minimum

Perforated pipe throughout the "grid" - 6-foot credit for ends of leachlines

Natural terrain must be 5% or less

To ensure even distribution throughout the "grid," the bottom of all trenches must be level

Drainlines must be 50-feet in length minimum, 100' in length maximum

3. SITE AND DESIGN MODIFICATIONS

A. COVER FILL SYSTEMS

1. DESCRIPTION

The term "cover fill" refers to a dispersal trench system where the trenches are excavated entirely below grade, but up to 12 inches of soil fill is placed on top of native grade to provide the required backfill cover over the pipe and drain rock. The wastewater is dispersed into the native soils, not into the fill soil. The purpose is to allow for shallower trench depths where necessary or desirable to meet soil depth and groundwater separation requirements. It provides for improved use of the absorption capacity of the near surface soils, which tend to be most permeable and most effective for absorption and treatment of wastewater effluent. This is a design modification for use with a conventional dispersal trench system. Cover fill also be used in conjunction with certain alternative dispersal systems (shallow pressure distribution, pressure-dosed sand trench, and drip dispersal) presented in Part 4 of this Manual.

2. SITING CRITERIA

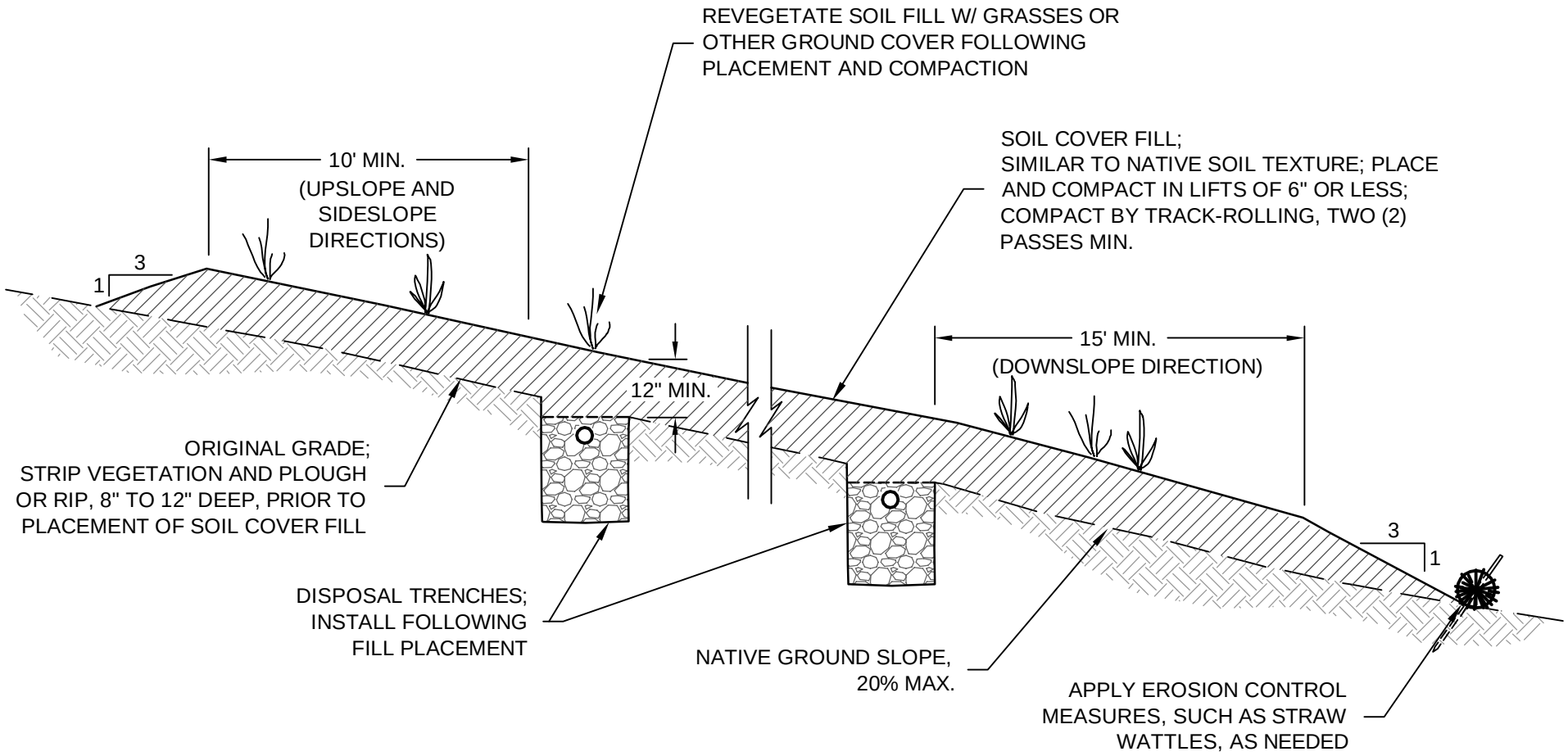
a. **Setbacks.** All horizontal setback siting criteria applicable to conventional OWTS as specified in Ordinance section B11-67 and Part 3-2B of this Manual shall apply to OWTS where cover fill is used. Required setback distances for dispersal trenches shall be measured from the edge of trench, not from the edge of the installed cover fill.

b. **Soil Depth, Groundwater Separation and Percolation.** Soil depth, groundwater separation and percolation shall conform to the requirements applicable to the type and design of the dispersal system proposed.

c. **Ground Slope**. Maximum allowable ground slope for cover fill systems shall be 20%.

3. DESIGN AND CONSTRUCTION REQUIREMENTS

a. **Dispersal Trenches**. The drain rock and perforated pipe sections shall be installed entirely within native soil, and all other aspects of the dispersal trench design shall be in conformance with requirements for conventional dispersal fields, as specified in Part 3-2 of this Manual or, in the case of an alternative dispersal system, in accordance with requirements for the particular type of system (e.g., shallow pressure distribution trench, drip dispersal, etc) and detailed in Part 4 of this Manual.



COVER FILL SYSTEM
CROSS-SECTION

FIGURE 4

P:\2010\1000064_SANTA_CLARA_ONSITE\CAD\1000064_SCHEMATIC DIAGRAMS_MARCH_2014.DWG

b. **Site Preparation.** Prior to placement of fill material, all vegetation shall be removed and the ground surface ripped or ploughed to a depth approximately 6 to 10 inches to permit good mixing of native soil and fill material.

c. **Fill Material.** The soil used for fill shall be similar in texture to the native surface soil in the dispersal field area. Sand, gravel or rock do not qualify as acceptable material for cover fill. Particle size analysis (hydrometer method) of the dispersal site soils and fill soil shall be required for DEH review and acceptance of the proposed fill soil, except in cases where the fill is obtained from similar soils at the project site.

d. **Sequencing.** The fill shall be placed prior to dispersal trench excavation and installation of dispersal piping and appurtenances.

e. **Areal Coverage.** The fill shall be continuous and constructed to provide a uniform soil cover of at least 12 inches over the dispersal trenches. The fill shall extend a minimum distance of 15 feet from the edge of trench in the down-slope direction and 10 feet in the upslope and side-slope directions. On a level site, the fill shall extend a minimum of 10 feet in all directions. The toe of the fill shall be tapered at no less than a 3:1 grade, beginning at the above required 15-foot or 10-foot distance, as applicable. Where the primary and secondary dispersal fields are adjacent to one another, the cover fill should be continuous over both fields.

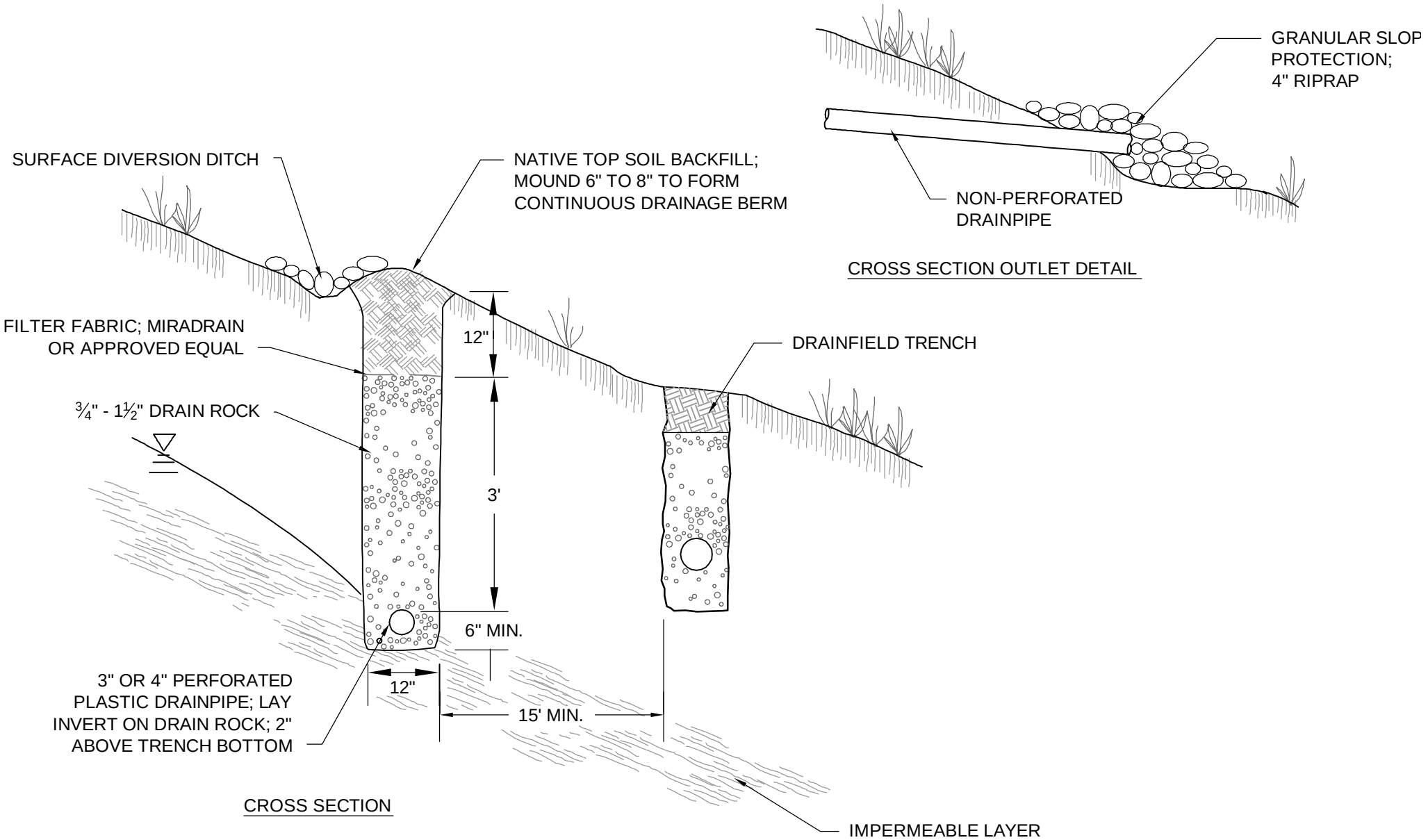
f. **Fill Compaction.** Fill shall be placed in layers ("lifts") of not more than six (6) inches, and compacted to approximately the same dry density as the native soil. Normal compaction procedures to achieve this requirement shall consist of track-rolling each lift, two passes minimum. Alternative compaction procedures may be allowed by DEH in accordance with recommendations and supporting technical data supplied by a registered civil engineer.

g. **Revegetation and Erosion Control.** Following system installation, measures shall be taken to revegetate the soil fill and adjacent disturbed areas, and to apply other erosion control measures, as needed, such as straw mulch, silt fencing, straw wattles, and hay bales. The plan submittal for the OWTS shall include an erosion control plan in accordance with requirements of Ordinance section B11-83(c).

B. CURTAIN DRAINS

1. BACKGROUND

Controlling surface water and shallow perched groundwater may be an essential part of protecting the integrity and performance of OWTS dispersal fields in certain situations. A



5 CURTAIN DRAIN SCHEMATIC DETAIL

particular situation of concern is in areas where rainfall readily percolates through very permeable surface soils and perches along the contact with the less permeable substrata. Dispersal trenches can act as a collection area for this transient subsurface water flow, and in the worst case may be flooded during heavy rain events or throughout the rainy season. This reduces the dispersal capacity during the wet season; and it can also contribute to a long-term decline in the dispersal system effectiveness and potential surface failures. One of the most effective drainage measures is a "curtain drain" (also called "subdrain" or "french drain"), which consists of a gravel-filled trench installed uphill of a drainfield system, designed to intercept shallow perched groundwater flow and divert it away from or around the dispersal field. The installation of curtain drains may be considered for new system installations as well as to rehabilitate a failing system affected by higher than anticipated groundwater.

2. SITING CRITERIA AND INVESTIGATION REQUIREMENTS

a. **Ground Slope.** Curtain drains are only to be used on sites with a slope of greater than 5%. The use of curtain drains to de-water a flat site will not be allowed.

b. **Setbacks.** Curtain drains may be positioned upslope or to the side of a dispersal field to intercept and drain subsurface water away from dispersal trenches. Curtain drains are not to be used as underdrains located downslope from the dispersal field in an attempt to lower the groundwater table. The following horizontal setbacks shall apply to curtain drains. The downslope setback requirement is intended to apply to a curtain drain that may be located on an adjacent (downhill) property.

Horizontal Setbacks Requirements for Curtain Drains

Reference Location	Horizontal Setback Distance* (ft)
Uphill of the dispersal field	15
Lateral of the dispersal field (along slope contour)	25
Downhill of the dispersal field (e.g., adjacent property)	50
Outfall, distance from dispersal field	25**

* measured from edge of dispersal trench to edge of curtain drain trench (perforated pipe section), except as noted.

** measured from edge of nearest dispersal trench to the daylight end of outlet pipe.

c. **Site Investigation and Engineering Plan.** Prior to approval of a curtain drain, a site investigation shall be conducted and an engineering plan for the installation shall be developed by a California Registered Civil Engineer, Professional Geologist, or Registered Environmental Health Specialist. The site investigation shall be conducted to:

(1) prepare a suitable map of the site, including slope contours, drainage and other pertinent site features;

(2) document soil, geologic and groundwater conditions on the site;

(3) assess the subsurface conditions to determine the feasibility and means of controlling groundwater levels with a curtain drain; evaluate whether or not the groundwater of concern is a perched condition above a clearly definable restrictive/impermeable soil layer;

(4) determine the appropriate depth and location for the proposed curtain drain and outlet point, based on soil, groundwater, and other site conditions.

The engineering plan for the curtain drain shall include drawings, supporting data and calculations, as applicable, and a plan for groundwater monitoring, as applicable.

d. **Approval Process.** The process for approval of the curtain drain will depend on the site conditions and the supporting information supplied with the engineering plan, as follows:

(1) **No Field Demonstration Required.** For cases where the site investigation shows the groundwater condition to be mitigated is perched water above a clearly definable restrictive/impermeable layer (e.g., stiff, plastic, clayey subsoil), the curtain drain plan may be approved without the need for field demonstration of its effectiveness.

(2) **Pilot Demonstration Required.** For cases where the site investigation shows the groundwater condition to be mitigated is most probably perched water but there is some level of uncertainty about the extent or degree of impermeability of the identified restrictive layer, then the DEH may require a pilot test of a portion of the proposed curtain drain prior to approval. The pilot test, conducted by the applicant, would involve the installation of a section of curtain in accordance with the proposed design, along with installation of monitoring wells in appropriate locations (upslope and downslope of the drain) as needed to provide evidence of the effectiveness in lowering the water table during the wet season. The system designer/consultant would be responsible for presenting the details of the pilot

demonstration, overseeing the installation, monitoring the performance, and reporting the results to the DEH.

(3) **Full-scale Demonstration Required.** For cases where the site investigation shows limited or questionable evidence that the groundwater condition to be mitigated is perched water above a defined restrictive/impermeable layer, then the DEH may require a full-scale installation and monitoring of the proposed curtain drain prior to approval. The full-scale test, conducted by the applicant, would involve the installation of the entire curtain in accordance with the proposed design, along with installation of monitoring wells in appropriate locations (upslope and downslope of the drain) as needed to provide evidence of the effectiveness in lowering the water table during an entire wet weather season. The system designer/consultant would be responsible for presenting the details of the monitoring plan, overseeing the installation, monitoring the performance, and reporting the results to the DEH.

3. DESIGN AND CONSTRUCTION REQUIREMENTS

A curtain drain shall consist of a gravel-filled trench constructed as shown in the attached schematic diagram and designed in accordance with the following specifications:

a. **Trench Width**: 12 inches minimum.

b. **Trench Depth**: Shall extend to a depth of at least 6 inches into the underlying impermeable layer.

c. **Filter/Backfill Material**: Filter material shall be clean, durable 3/4 to 1½-inch drain rock, extending from trench bottom to within 6 to 12 inches of grade; backfill to grade with native soil.

d. **Filter Fabric**: A geotextile "filter fabric" envelope shall surround the drain rock.

e. **Perforated Collection Pipe**: Collection pipe shall consist of 4-inch diameter perforated drain pipe, oriented with holes down and installed on top of the drain rock, approximately 2 to 4 inches above trench bottom.

f. **Outlet Pipe**: The outlet pipe shall consist of minimum 4-inch diameter solid (non-perforated) drain pipe.

g. **Cleanouts.** Provide cleanouts to grade: (a) at the upslope end of the drain; (b) at bends of 45^{o} or greater; and (c) at least every 400 feet along the length of the drain.

h. **Slope:** The trench and pipe shall be sloped for gravity flow at a minimum 1% gradient throughout the trench and extending to the outlet point. The curtain drain must drain by gravity only.

i. **Outlet.** The outlet must be on the property being developed, and located so the flow does not adversely affect the drainage or any existing or proposed OWTS on the subject parcel or neighboring parcels. Protect downslope outlet against blockage or damage through the use of screening, rock cover, junction box or other suitable means.

j. **Erosion Control.** Provide erosion protection at drain outlet point.

C. PUMP SYSTEMS

The pump systems used in the connection with either conventional or alternative OWTS shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and constructed in accordance with attached pump system design requirements.

ATTACHMENT A

Effluent Pumping System

Design Guidelines

EFFLUENT PUMPING SYSTEMS
DESIGN GUIDELINES

General Requirements

Effluent pump systems may be considered when they offer a better alternative for the protection of public health and safety or the only safe opportunity for parcel development. Due to the problems inherent in mechanical devices, pump systems are to be considered only after gravity feed options have been explored and shown to be infeasible.

Design Requirements

___ Drainlines must meet all requirements as set forth in the sewage ordinance.
___ Both primary and secondary fields must be fed by the pump.
___ The system must be designed by a qualified state Registered Civil Engineer or Registered Environmental Health Specialist.
___ Upon installation the designer must inspect and test the pump system in the presences of the Department's Environmental Health Specialist.
___ Upon completion the designer must submit a written statement to the Department of Environmental Health certifying that the system has been installed and operates according to the design criteria.
___ The Department's Environmental Health Specialist will sign the final occupancy section of the building permit only upon satisfactory final inspection of the pump system and receipt of the designer's statement of final inspection.
___ Float switches must be used and installed such that the float switches or wires do not become entangled. Clamps must be of non-corrosive material.
___ A Check valve is required at the pump.

Required Materials and Details

___ Provide specification sheets for the pump tank, tank risers, and pump, including the pump performance curve.
___ State the elevation of the pump and drainfield pipe at the highest elevation.
___ Show the calculations for total dynamic head through the effluent piping and valve on the Pump System Work Sheet provided by this department.
___ Provide specification sheets and show the placement of float switches indicating the 1½ days storage capacity, audio/visual alarms and any other materials proposed for use.

Sizing Criteria

Septic Tank

Septic tank must be sized as required for the projected wastewater load. A pump system does not require the use of different sizing methodologies.

Pump Tank

The pump tank must have sufficient capacity to hold the following:

- the dosing volume
- 1½ days storage capacity above the "on" switch
- pump displacement volume
- sufficient distance from the tank bottom to pump inlet to allow space for any solids to settle without interfering with the pump operation

As a general rule, the pump tank volume will be the same as the septic tank volume.

See Diagrams 1 and 2

Pump Sizing

The proposed pump must be able to provide the required gpm at the designed head. See Pump System Work Sheet and friction loss tables provided by this Department.

DEFINITIONS

Dose Volume: Pump on to pump off. The amount of wastewater pumped in one cycle.

High Water Alarm: Float set 2 inches above pump on – alerts user of pump failure, both audio and visual alarms.

Pump On: Float set to turn pump on.

Pump Off: Float set to turn pump off. Lowest water level in pump tank.

Pump Tank: A septic tank without a mid-tank baffle. Use this figure to calculate the appropriate setting for pump switches and alarms.

Storage Capacity: Volume of the pump tank from high water alarm to tank outlet invert.

Total Dynamic Head: A combination of:

1. the difference in elevation from pump "off" to pipe invert at the beginning of the highest drainfield.

2. and the friction loss of delivery pipe and fittings.

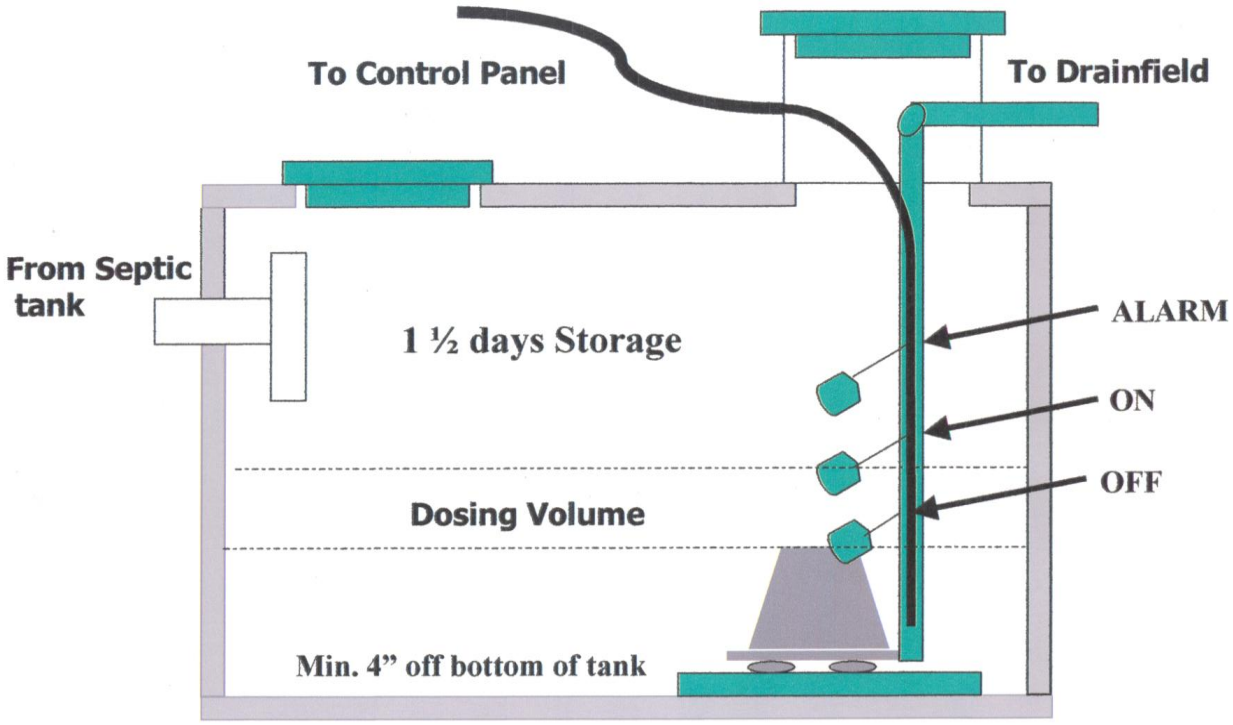


Diagram 1

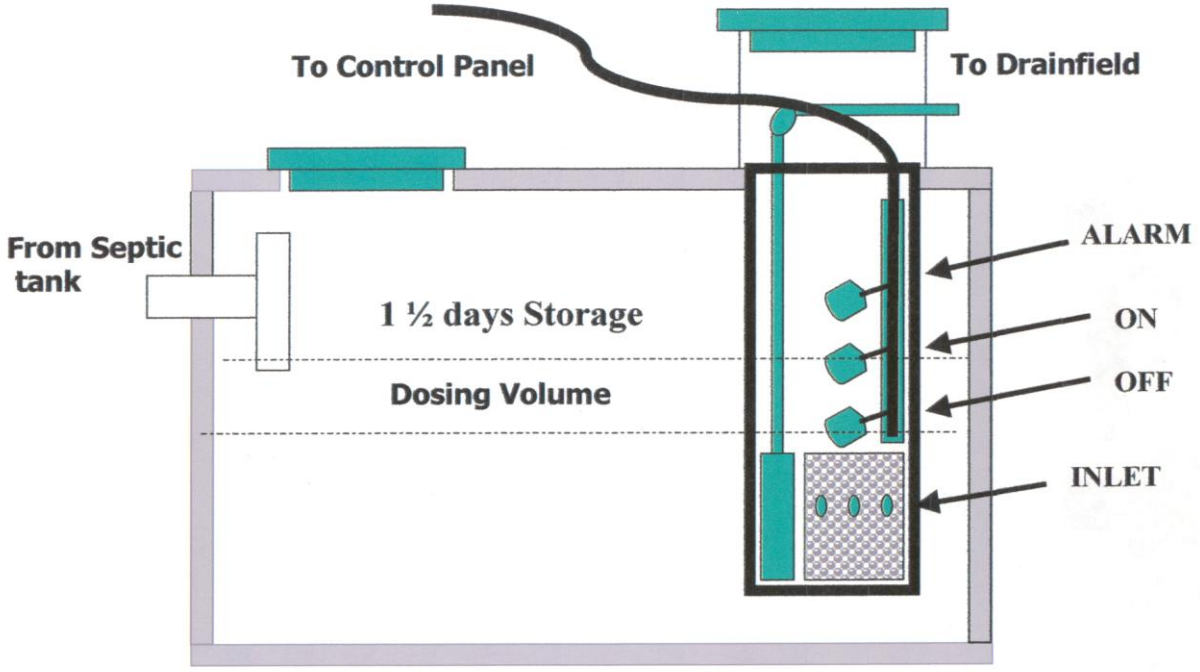
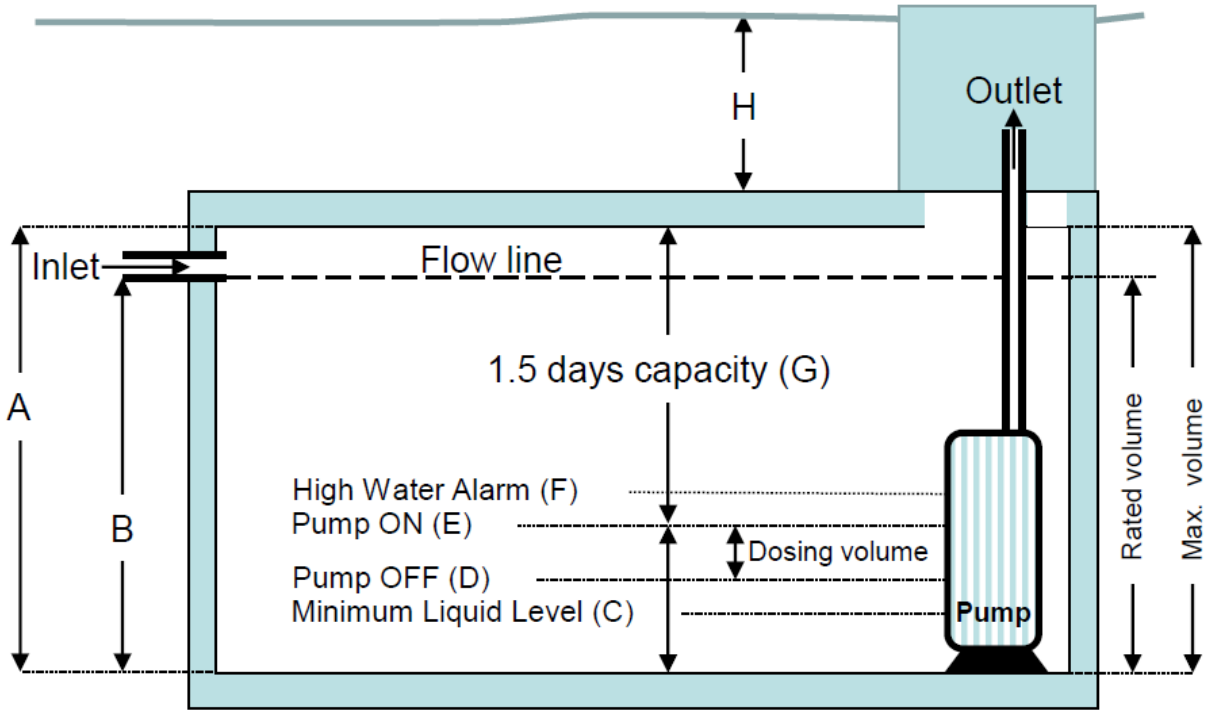


Diagram 2

Pump Tank Diagram

to be included on the design plan



Pump Tank Manufacturer/Model:

_____

A	B	C	D	E	F	G	H

PUMP SYSTEM WORKSHEET

Applicant_____ Date_____
Owner_____ File No._____
Site Address_____ City_____ APN_____
Designer (REHS or RCE) _____
Number of bedrooms_____ Total square footage of living space_____
Septic tank size_____ Installed drainfield_____ Expansion drainfield_____

Elevation of highest drainfield (ft) _____
Elevation of pump off (ft) - _____
Total lift (Ft Head) = _____ (A)

TIGHT LINE
Diameter of tight line (inches) _____
Length of tight line from pump to upper drainfield (ft) _____ (B)

FITTINGS

No. of Fittings		Pipe Length Equivalent (ft) See chart	Total Pipe Equivalent (ft)
___90° standard elbow	X	_____	=_____
___45° standard elbow	X	_____	=_____
___90° long radius elbow	X	_____	=_____
___other fittings	X	_____	=_____
___gate valve (fully open)	X	_____	=_____
___check valve (conventional swing)	x	_____	=_____

TOTAL=_____ (C)

Total Length of Pipe = B + C = _____ (D)

CALCULATIONS:

Friction Loss in Pipes and Fittings:
(D/100 ft) x _____ (friction loss per chart) = _____ (E) Head in Feet

Required Pump Size:
_____ (A) + _____ (E) = _____ (F) Total Pumping Head in Feet

Pump Size:
(F) versus GPM = Pump Size (refer to pump curve)

Pump Model: (Attach Pump Curve)
_____GPM at _____ (G) (ft of head: from pump curve) Manufacturer/Model_____

Required Capacity in Gallons
Dosing Volume _____
Storage Capacity (1 ½ days) _____
Pump Displacement _____
Volume from tank bottle to pump base _____
Total tank capacity _____

Pump Tank Information
Manufacturer_____ Size_____ Gallons per inch_____

Friction Loss per 100 feet of Plastic Pipe
In feet of head

GPM	Pipe Diameter									
	1/2 in.	3/4 in.	1 in.	1 1/4 in.	1 1/2 in.	2 in.	2 1/2 in.	3 in.	4 in.	5 in.
1	2.08	0.51								
2	4.16	1.02	0.55	0.14	0.07					
5	23.44	5.73	1.72	0.44	0.22	0.066	0.038	0.015		
7	43.06	10.52	3.17	0.81	0.38	0.11	0.051	0.021		
10	82.02	20.04	6.02	1.55	0.72	0.21	0.09	0.03		
15		42.46	12.77	3.28	1.53	0.45	0.19	0.07		
20		72.34	21.75	5.59	2.61	0.76	0.32	0.11	0.03	
25			32.88	8.45	3.95	1.15	0.49	0.17	0.04	
30			46.08	11.85	5.53	1.62	0.68	0.23	0.06	0.02
35				15.76	7.36	2.15	0.91	0.31	0.08	0.03
40				20.18	9.43	2.75	1.16	0.40	0.11	0.03
45				25.10	11.73	3.43	1.44	0.50	0.13	0.04
50				30.51	14.25	4.16	1.75	0.60	0.16	0.05
60					19.98	5.84	2.46	0.85	0.22	0.07
70						7.76	3.27	1.13	0.30	0.10
75						8.82	3.71	1.28	0.34	0.11
80						9.94	4.19	1.44	0.38	0.13
90						12.37	5.21	1.80	0.47	0.16
100						15.03	6.33	2.18	0.58	0.19
125							9.58	3.31	0.88	0.29
150							13.41	4.63	1.22	0.40
175								6.16	1.63	0.54
200								7.88	2.08	0.69
250								11.93	3.15	1.05
300									4.41	1.46

Friction Loss in PVC Fittings

The follow table lists friction loss in PVC pipe fittings as a measure of the amount of friction in an equivalent length (ft) of straight pipe.

PVC Part	Normal Pipe Size (in)								
	1/2"	**3/4"**	**1"**	**1 1/4"**	**1 1/2"**	**2"**	**2 1/2"**	**3"**	**4"**
90° elbow, standard	1.5	2.0	2.25	4.0	4.0	6.0	8.0	8.0	12.0
45° elbow, standard	0.75	1.0	1.4	1.75	2.0	2.5	3.0	4.0	5.0
Insert Coupling	0.5	0.75	1.0	1.25	1.5	2.0	3.0	3.0	4.0
Gate Value	0.3	0.4	0.6	0.8	1.0	1.5	1.6	2.0	3.0
Male-Female Adapter	1.0	1.5	2.0	2.75	3.5	4.5	-	6.5	9.0
Tee-Flow through Run	1.0	1.4	1.7	2.3	2.7	4.3	5.1	6.3	8.3
Tee-Flow through Branch	4.0	5.0	6.0	7.0	8.0	12.0	15.0	16.0	22.0

Santa Clara County Onsite Systems Manual

PART 4

GUIDELINES FOR ALTERNATIVE SYSTEMS

PART 4
GUIDELINES FOR ALTERNATIVE SYSTEMS

CONTENTS

INTRODUCTION

"Alternative System" means a type of OWTS that utilizes either a method of wastewater treatment other than a conventional septic tank and/or a method of wastewater dispersal other than a conventional drainfield trench for the purpose of producing a higher quality wastewater effluent and improved performance of and siting options for effluent dispersal.

This part of the Onsite Systems Manual provides guidelines for the design and application of various alternative onsite wastewater treatment and disposal technologies suited to the conditions and constraints in Santa Clara County.

These guidelines provide the technical criteria and standards for the use of alternative OWTS as provided by Santa Clara County Code Section B11-90 through B11-95, and are intended to be followed for both new development and repair situations. Santa Clara County Code does not provide for the use of alternative OWTS as the basis for new lot creation (subdivisions). Schematic and cross-section diagrams are included to illustrate the key design features of each type of system.

ALTERNATIVE TREATMENT SYSTEMS

Guidelines are provided for the following alternative treatment systems:

- Intermittent and Recirculating Sand Filters
- Proprietary Treatment Units, and
- Other alternative treatment systems approved by the director and the appropriate California Regional Water Quality Control Board(s).

ALTERNATIVE DISPERSAL SYSTEMS

Guidelines are provided for the following types of alternative dispersal systems.

- Shallow Pressure Distribution
- Mound
- At-Grade
- Pressure-Dosed Sand Trench
- Raised Sand Filter Bed
- Drip Dispersal, and
- Other alternative dispersal systems approved by the director and appropriate California Regional Water Quality Control Board(s).

SITING CRITERIA

All requirements specified in section B11-67 of Santa Clara County Code for conventional OWTS also apply to alternative OWTS, with the following clarifications and exceptions.

- **Horizontal Setbacks.** Horizontal setback requirements for alternative treatment systems are the same as those specified in section B11-67 for septic tanks. Horizontal

setback requirements for alternative dispersal systems are the same as those specified in section B11-67 for conventional dispersal systems.

- **Areas of Flooding.** Alternative OWTS shall not be located in areas subject to flooding as defined by the limits of the 10-yr floodplain, determined or estimated from published floodplain maps or on the basis of historical evidence acceptable to the director. Alternative OWTS shall be located and designed to avoid contamination of or damage from inundation by floodwaters during a 100-year flood event. As appropriate, such measures shall include: 1) protecting OWTS supplemental treatment, pressure distribution and/or drip dispersal components from flood damage using structural tie-downs and/or elevating critical components above the 100-year flood level; 2) preventing discharge of wastewater into flooded dispersal areas from pump systems (e.g., using flood-activated float switches to override/disable pump operation during high water conditions); and 3) providing additional emergency storage capacity for flood periods.

- **Ground Slope.** Maximum ground slope for different types of alternative wastewater dispersal systems are as follows:

Maximum Ground Slope for Alternative Wastewater Dispersal Systems[1]

Type of Disposal System	20%	30%	40%	50%
• Mound, • At-Grade	X			
• Raised Sand Filter Bed		X		
• Shallow Pressure Distribution • Pressure-dosed Sand Trench			X	
• Subsurface Drip Dispersal				X

[1]Related Requirements: Any disposal system located on a slope greater than 20 percent shall require the completion and approval of a geotechnical report per Code section B11-83.

- **Vertical Separation to Groundwater.** Where alternative OWTS are used, minimum vertical separation distance to groundwater, measured from the bottom of the dispersal system to the seasonal high water table, may be reduced from the requirements that apply to conventional OWTS (per section B11-67 of the County Code), as specified in the table below. See specific requirements for the type of alternative OWTS for additional restrictions on groundwater separation distances that may apply based on system size (i.e., volume of wastewater flow) or for particular site conditions or geographic areas.

Minimum Vertical Separation Distance to Ground Water for Alternative OWTS (feet)[1]

Type of OWTS	Percolation Rate (MPI)	Vertical Separation to Groundwater (feet)[1]			
		2'	3'	5'	8'
• Conventional Trench w/ Supplemental Treatment	1-5 6-30 31-120		 X	X	X
• Shallow Pressure Distribution (PD) • At-Grade	1-5 6-120		 X	X	
• Shallow PD w/Supplemental Treatment • At-Grade w/Supplemental Treatment • Mound • Pressure-dosed Sand Trench (PDST) • Raised Sand Filter Bed • Subsurface Drip Dispersal w/Supplemental Treatment	1-5 6-120	X	X		
• Raised Sand Filter Bed, w/Supplemental Treatment & Drip Dispersal	1-5 6-120	X X			

[1] Measured from the bottom of the dispersal system to the seasonal high water table.

- **Soil Depth.** Minimum depth of permeable soil beneath the bottom of the dispersal field shall be as specified in the table below for different types of alternative OWTS. Permeable soil is defined as having a percolation rate of 120 minutes per inch or faster or having a clay content of less than 60 percent, and shall not include solid rock formations or those that contain continuous channels, cracks or fractures. Design requirements for alternative OWTS prescribed in the Onsite Systems Manual may impose additional soil depth requirements based on system size (i.e., volume of wastewater flow) or for particular site conditions or geographic locations.

Minimum Soil Depth Beneath Alternative OWTS (feet)[1]

Type of OWTS	Minimum Soil Depth (feet)[1]	
	2'	3'
• Conventional Trench w/ Supplemental Treatment • Shallow Pressure Distribution Trench (PD) • At-Grade		X
• Shallow PD w/Supplemental Treatment • At-Grade w/Supplemental Treatment • Mound • Raised Sand Filter Bed (Open Bottom Sand Filter) • Subsurface Drip Disposal w/Supplemental Treatment • Raised Sand Filter Bed, w/Supplemental Treatment & Drip Dispersal	X	

[1] Measured from the bottom of the dispersal trench, bed or piping (drip dispersal only).

SITE EVALUATION, DESIGN AND CONSTRUCTION REQUIREMENTS

Site evaluation, engineering plans, operation and maintenance guidelines, and other permitting requirements for alternative systems shall conform to all requirements for conventional OWTS as well as any additional requirements specified in this Manual for the type of alternative system proposed. Design and construction of alternative OWTS shall be in conformance with requirements in this Manual.

GUIDELINES FOR
INTERMITTENT AND RECIRCULATING SAND FILTER SYSTEMS

A. DESCRIPTION

Intermittent sand filters (ISF) and recirculating sand filters (RSF) are used to provide supplemental treatment of septic tank effluent prior to discharge to the dispersal system. They are used to improve or restore the capacity of the dispersal field, reduce pathogenic bacteria and can provide additional nitrogen removal.

Sand filtration is well established in sanitary engineering practice for more than 100 years as a passive, reliable "biofilm" treatment process. An ISF consists of a packed-bed filter of medium-grained sand, designed for single pass-through treatment of septic tank effluent; it is sometimes referred to as a "single pass filter".

An RSF utilizes coarse-grained sand and a recirculation system, usually controlled by a timer that causes the effluent to pass through the sand media several times prior to final dispersal. RSFs have the ability to produce effluent quality similar to ISFs, except that they are less effective in bacteria removal. However, RSFs typically provide greater nitrogen removal than ISFs, on the order of 50-percent reduction as compared with conventional septic tank effluent.

Effluent from sand filters may be discharged to conventional leachfields and to any type of alternative dispersal system identified in this Onsite Systems Manual. Effluent from an ISF or RSF designed and operated in accordance with these guidelines will be considered to meet the criteria for "supplemental treatment".

B. CONSTRAINTS ADDRESSED

Used in combination with the appropriate type of dispersal system, sand filters can be applied to address the following onsite wastewater constraints:

1. High groundwater;
2. Shallow soil over fractured rock or coarse alluvium;
3. Shallow soil over impermeable soil or bedrock;
4. Slow percolation at standard dispersal trench depths;
5. Steep slopes;
6. Limited dispersal area; and

7. Nitrogen limitations (RSFs)

C. SITING CRITERIA

1. **Sand Filter Treatment Unit**. All siting criteria for septic tanks, as specified in Santa Clara County Code Chapter B11-67, shall also apply to intermittent and recirculating sand filters and associated tanks and pumping units.

2. **Dispersal Systems Receiving Sand Filter Effluent**. Dispersal systems receiving sand filter effluent are subject to all siting criteria for conventional septic tank-dispersal trench systems, except as modified in accordance with adopted requirements for the specific type of alternative dispersal system proposed, including any allowances for the incorporation of supplemental treatment. Allowances for supplemental treatment may include reduced vertical separation distances or increased wastewater application rates. Refer to the adopted guidelines for the specific type of dispersal system for applicable requirements and supplemental treatment allowances.

D. DESIGN CRITERIA

1. **Septic Tank Pretreatment**. Sand filter treatment units shall be preceded by a septic tank, sized for the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 3 of this Manual.

2. **Pressure Dosing**. Septic tank effluent shall be applied to the sand filter treatment unit by pressure dosing, utilizing either an automatic dosing siphon (intermittent filter only) or pump. The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:

    (a) Uniform dosing of effluent over the surface application area of the sand filter distribution bed;

    (b) Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;

    (c) Suitable access provisions for inspection, testing and adjustment of the pressure distribution system;

    (d) Dosing volume as follows:
        (1) Intermittent Sand Filters: Dosing volume to achieve a minimum of 3 to 5 doses per day at design flow conditions; and,

(2) Recirculating Sand Filters: Timed dosing to achieve a recirculation rate of approximately 5:1 at design flow conditions.

(e) At least one distribution lateral for every 36 inches of bed width.

Additional requirements for the design and construction of pressure distribution systems contained in "Guidelines for Shallow Pressure Distribution Systems" shall also apply.

Also, where a sand filter is used in conjunction with a gravity-fed dispersal system, the dosing pump system for the sand filter shall provide emergency storage capacity equal to at least 1.5 times the daily wastewater flow, consistent with requirements for pump systems provided in Part 3 of this Manual.

3. **Wastewater Application Rate**. The wastewater application rate used for sizing the surface area of the sand filter shall be as follows:

   (a) Intermittent Sand Filters:

   (1) 1.2 gpd/ft^2 for individual residential OWTS

   (2) 1.0 gpd/ft^2 for all commercial, industrial, institutional, and multi-residential OWTS

   (b) Recirculating Sand Filters:

   (1) Maximum of 5.0 gpd/ft^2 for individual residential OWTS

   (2) Maximum of 4.0 gpd/ft^2 for all commercial, industrial, institutional, and multi-residential OWTS

   Reduction in the above wastewater loading rates or other provisions to insure the long-term integrity and performance of the sand filter may be required for high strength waste flows, such as those from restaurants.

4. **Containment Liner**. The sand filter shall be provided with an impermeable containment liner to prevent leakage out of or into the filter. The liner shall consist of either: (a) 30 mil plastic; (b) reinforced poured-in-placed concrete; or (c) an equivalent impermeable structure or barrier.

5. **Finished Grade**. The finished grade of the sand filter shall be at or above the surrounding ground elevation. Above-ground installation shall be structurally supported with retaining wall(s), as required.

6. **Shape**. The sand filter shall not be restricted as to its shape in plan view.

7. **Multiple Units**. The sand filter may be divided into compartments or multiple units.

8. **Sand Filter Media**

   (a) **Sand Specification**. The sand media shall be a medium to coarse sand that meets the gradation specifications in **Table SF-1**:

   (b) **Sand Depth**. The minimum sand depth below the gravel distribution bed shall be 24 inches.

Table SF-1. Sand Specifications

Sieve Size	Percent Passing	
	Intermittent Sand Filter	Recirculating Sand Filter*
3/8	100	100
#4	90-100	70-100
#10	62-100	5-78
#16	45-62	0-4
#30	25-55	0-2
#50	5-20	0-1
#60	0-10	0-1
#100	0-4	0-1
#200	0-2	0-1

*Additional sand specifications for RSF:

- Effective size of sand/gravel, D_{10}: 1.5 to 2.0 mm
- Uniformity coefficient, U_c: <2.5

Documentation of laboratory sieve analysis results for the proposed sand fill material shall be supplied to DEH to verify conformance with the above specifications, as applicable.

9. **Gravel Distribution Bed**

   (a) **Material**. The distribution bed shall consist of 3/8-inch double-washed pea gravel, substantially free of fines.

   (b) **Depth**. Pea gravel shall extend a minimum of 6 inches below the invert and 2 inches above the top of the distribution piping. If the distribution piping is installed with chambers, the pea gravel depth below the distribution pipe may be reduced from 6 inches to 4 inches, and the 2-inch pea gravel cover may be eliminated.

10. **Silt Barrier**. For an intermittent sand filter, the gravel distribution bed shall be covered in its entirety with a geotextile ("filter fabric") silt barrier. Filter fabric shall be either polyester, nylon or polypropylene, or any combination thereof, and shall be suitable for underdrain applications. Filter fabric shall be non-woven, shall not act as a wicking agent and shall be permeable.

Recirculating sand filters do not require a silt barrier.

11. **Cover**

    (a) **Intermittent Sand Filters:**
        (1) **Material**. A soil cover shall be placed over the distribution bed, consisting of a medium, loamy-textured soil.
        (2) **Depth**. Soil cover depth shall be a minimum of 12 inches and a maximum of 18 inches over the top of the distribution bed. Soil cover shall be crowned or sloped to promote rainfall runoff.

    (b) **Recirculating Sand Filters:**
        (1) **Material**. A granular media cover shall be placed over the distribution bed, consisting of clean gravel that may range in size from 3/8-inch pea gravel to 2 ½ –inch rounded rock.
        (2) **Depth**. Cover depth shall be a minimum of 12 inches and a maximum of 18 inches over the top of the distribution bed.

12. **Underdrain**

    (a) **Material**. The underdrain beneath the sand media shall consist of 3/8" washed pea gravel with 4-inch diameter perforated drain pipe, installed with perforations oriented down.

    (b) **Depth**. The pea gravel underdrain shall have a minimum depth of 9 inches.

    (c) **Grade**. The underdrain shall be constructed and the drain pipe set with a minimum grade of 1% toward the outlet point.

    (d) **Watertight Outlet "Boot"**. The sand filter underdrain shall be equipped with a watertight outlet "boot" for connection of piping to the dosing tank. An exception to this is for intermittent sand filters that are equipped with an internal pump system for direct dosing to the disposal field (see paragraph #15 below).

    (e) **Clean-out Riser**. For clean-out and inspection purposes the upslope end of the perforated drain pipe in the underdrain shall be equipped with a vertical riser constructed of non-perforated pipe of equal diameter. The riser shall extend to finished grade of the sand filter.

13. **Air Manifold.** An air manifold shall be installed within the pea gravel underdrain for the purpose of introducing forced air to into the sand filter media, as needed, for maintenance or drainage rehabilitation. The air manifold shall consist of small diameter PVC piping, with drilled perforations (pointed down), and positioned above the perforated underdrain pipe. The manifold shall be connected to a vertical leader pipe

that extends to the surface of the sand filter, fitted with a threaded pipe cap or plug at the top where a portable air line can be connected.

14. **Inspection Wells**. An inspection well shall be installed in the gravel distribution bed of each sand filter compartment. The inspection well shall extend from finished grade to the pea gravel-sand interface of the distribution bed and shall be perforated in the pea gravel zone only. Inspection wells shall be 2-inch to 4-inch diameter plastic pipe and fitted with a wrench-tight cap or pipe plug. Perforations shall consist of hacksaw slots at nominal 1" spacing; alternatively, commercially slotted pipe may be used. For intermittent sand filters, inspection wells shall be sealed against surface infiltration with a bentonite or concrete annular seal through the soil backfill zone.

15. **Internal Pump System (ISF only)**. In lieu of gravity flow from the sand filter to the dispersal field (or dispersal field dosing system), an internal pump system may be installed within the intermittent sand filter for dosing directly to the dispersal field. In such applications:

    (a) pump chamber shall be seated at or below the bottom of the underdrain;

    (b) pump operating depth shall be entirely within the depth of the underdrain; and,

    (c) storage volume equal to at least 50 percent of the disposal field dose volume shall be provided in the network of perforated drain pipe within the underdrain.

E. ENGINEERING PLANS AND CONSTRUCTION

1. Reference Guidelines. In addition to the requirements set forth herein, design and construction of sand filter systems shall utilize applicable guidelines contained in the following references:

a. "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002 and as amended.

b. “Design Manual – Onsite Wastewater Treatment and Disposal Systems”, U.S. Environmental Protection Agency, October 1980.

2. Engineering Plans. Engineering plans for sand filter systems shall include:

a. All relevant elevation data and hydraulic calculations;

b. Specific step-by-step construction guidelines and notes for use by the installer;

c. Recommended make and model of all components;

d. Recommended pump system components, with cut-sheet depicting float settings;

e. Control panel programming; and

f. An inspection schedule listing critical control points.

4. **Construction Inspection.** At a minimum, inspection of the sand filter system installation should include the items listed below. Joint inspection by the designer, contractor, and DEH may be required.

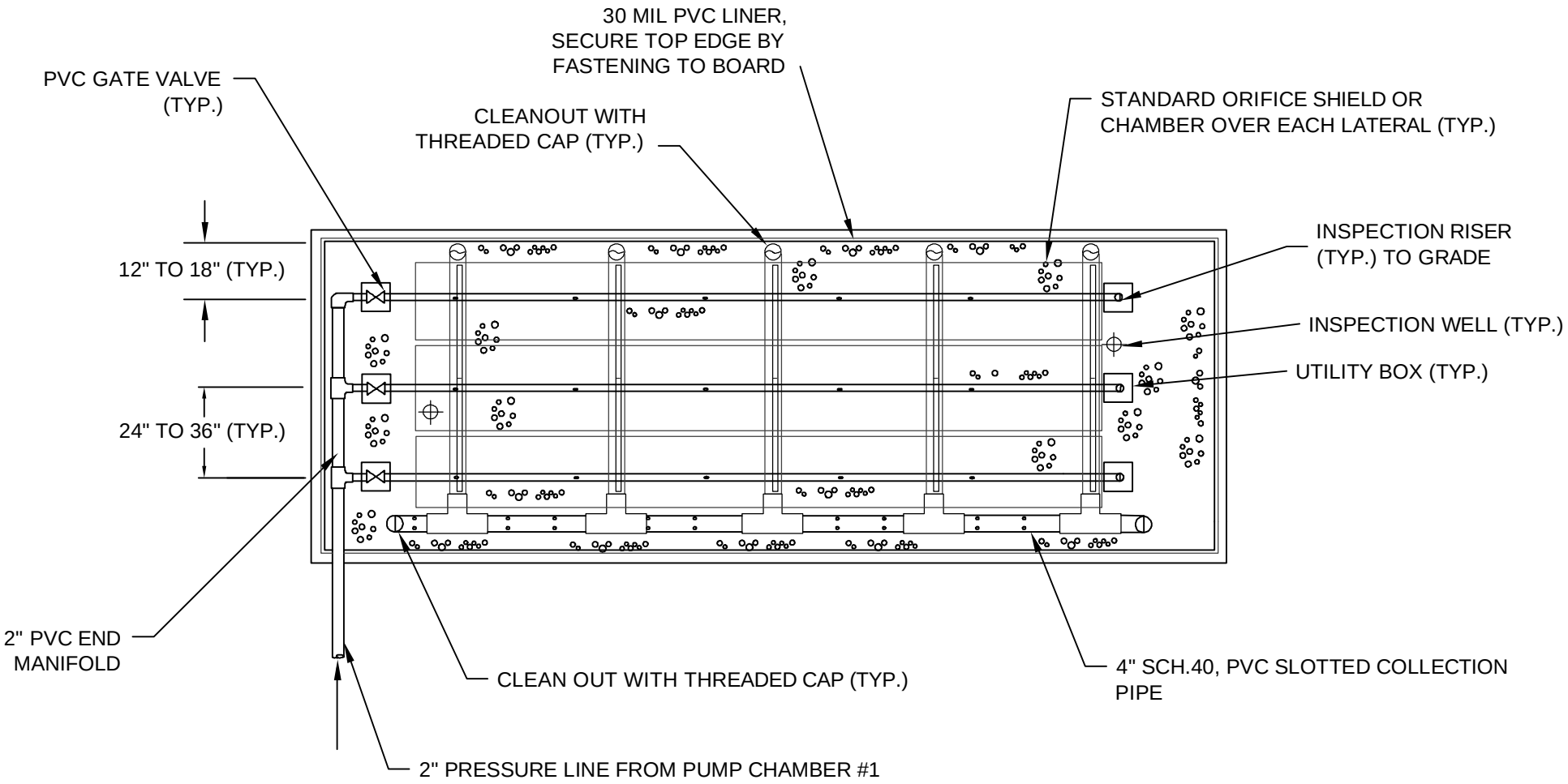
- Pre-construction inspection where the construction staking or marking of the sand filter is provided and construction procedures discussed;
- Water tightness of septic tank and dosing (pump) tank;
- Sand filter dimensions, structure and liner;
- Underdrain piping and filter rock;
- Sand quality and placement;
- Piping installation and hydraulic ("squirt") test of the distribution system;
- Functioning and setting of all control devices; and
- Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed; and erosion control has been completed.

F. MANAGEMENT REQUIREMENTS.

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for intermittent and recirculating sand filter systems are outlined in **Table SF-2.**

Table SF-2. Intermittent and Recirculating Sand Filter System Management Requirements

	Work	Frequency
Inspection	• Observe surface conditions on and around filter for effluent leakage, drainage/infiltration, erosion or other problems. • Check/measure water level in inspection wells in filter bed. • Perform all inspection work as recommended by designer or equipment manufacturer. • Perform inspection protocol for pump systems (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual). • Record observations.	• According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Maintenance	• Purge laterals. • Perform squirt and balance laterals. • Exercise valves to ensure functionality. • Perform all maintenance work as recommended by designer or equipment manufacturer. • Record work done.	• According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history. • Responsive maintenance as necessary.
Water Monitoring & Sampling	• Report observation findings and maintenance actions, including notation of problems and corrective actions. • Record dose counter and elapsed time meter readings from control panel.	• According to permit conditions, if applicable.
Reporting	• Report findings to DEH per permit requirements. • Standard report to describe findings, analyze performance, and detail actions taken. • Report emergency or failure conditions to DEH immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.



PLAN VIEW

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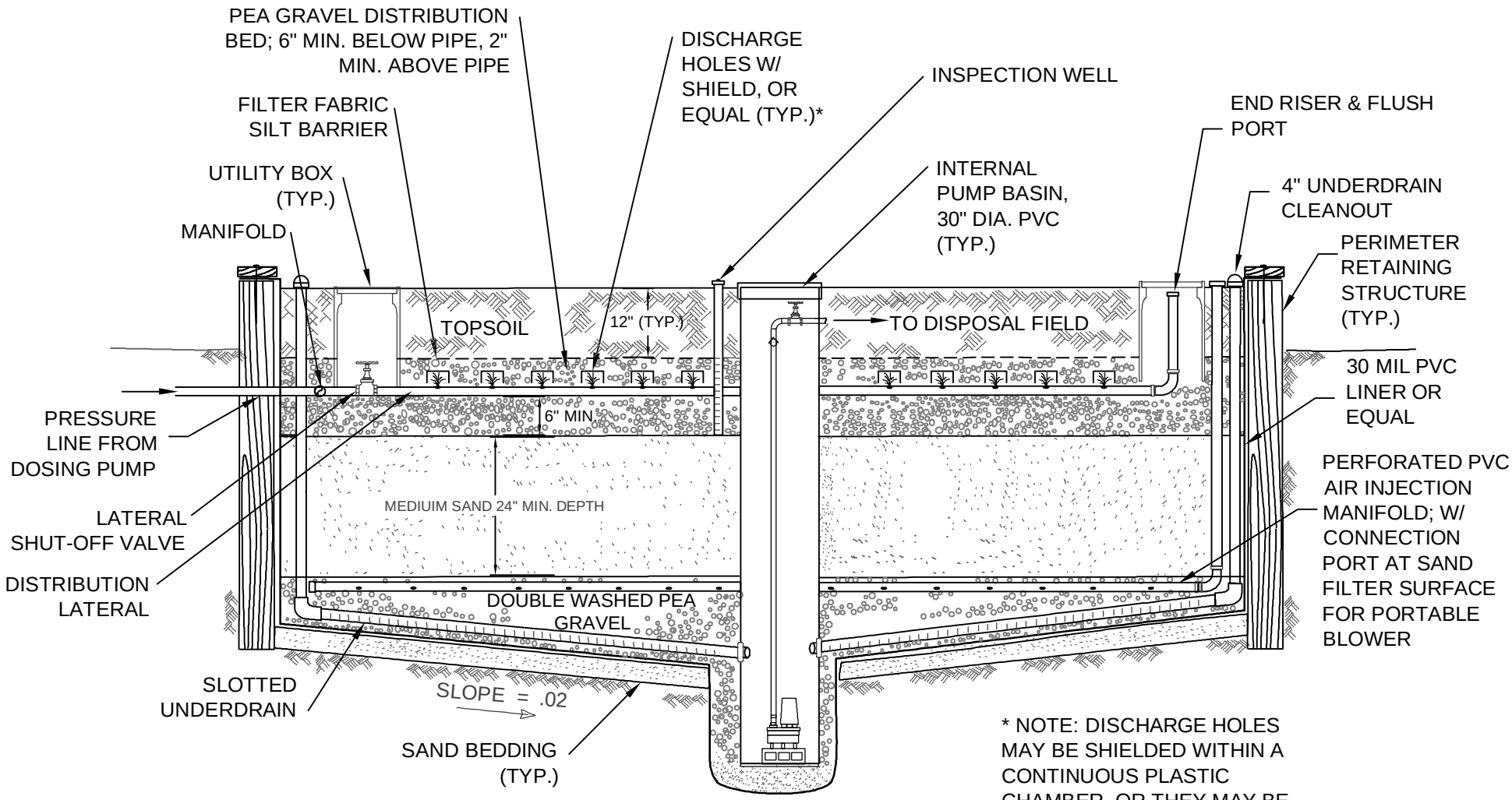
INTERMITTENT SAND FILTER
PLAN VIEW



* NOTE: DISCHARGE HOLES MAY BE SHIELDED WITHIN A CONTINUOUS PLASTIC CHAMBER, OR THEY MAY BE ORIENTED DOWN WITHOUT THE NEED FOR ANY SHIELD.

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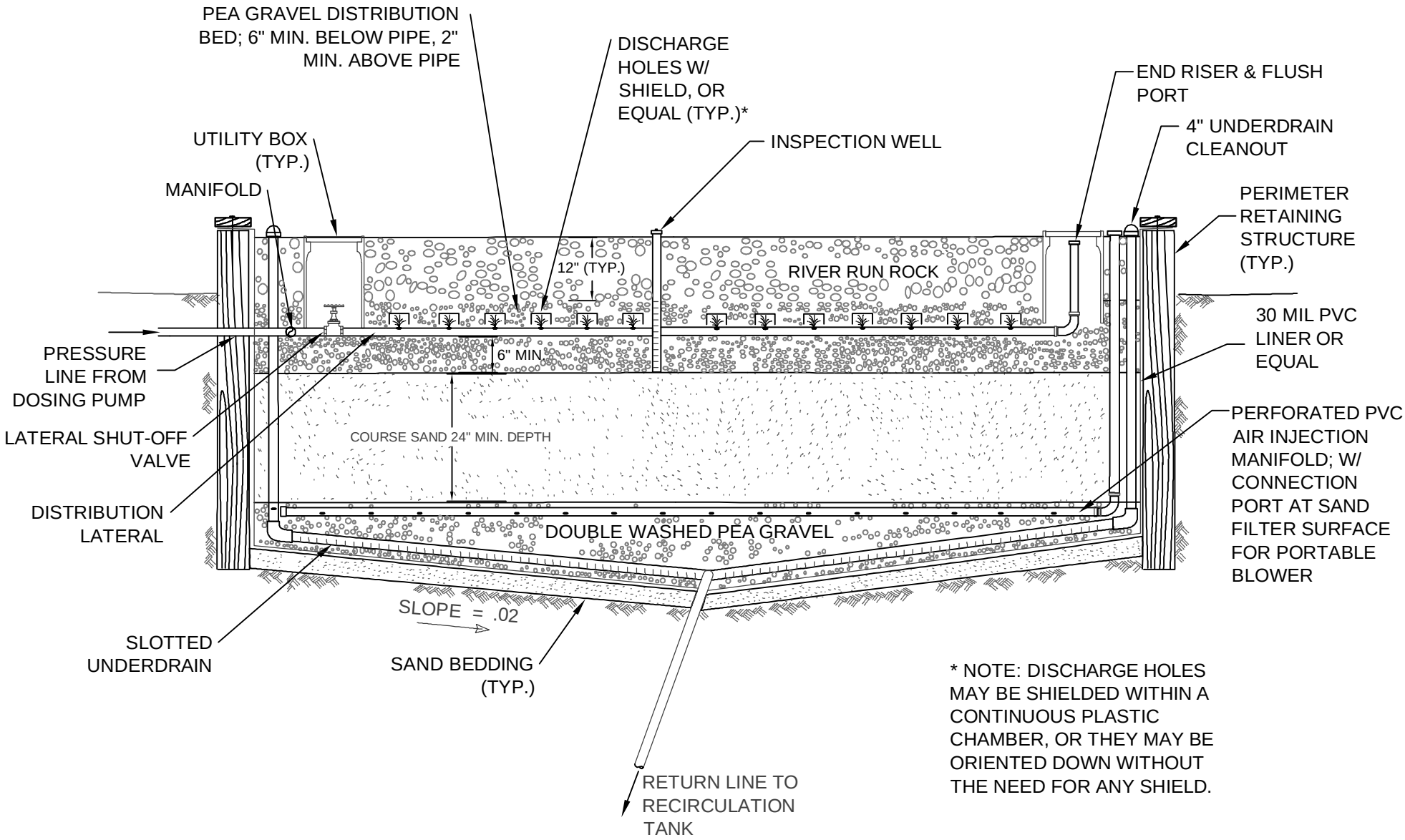
INTERMITTENT SAND FILTER
WITH INTERNAL PUMP BASIN



* NOTE: DISCHARGE HOLES MAY BE SHIELDED WITHIN A CONTINUOUS PLASTIC CHAMBER, OR THEY MAY BE ORIENTED DOWN WITHOUT THE NEED FOR ANY SHIELD.

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RECIRCULATING SAND FILTER

GUIDELINES FOR
PROPRIETARY TREATMENT UNITS

A. DESCRIPTION

Propriety treatment units cover a category of manufactured or "package" systems specifically developed for residential and other small-scale sewage treatment applications. Most proprietary designs currently available fall into two general categories: (1) aerobic treatment units (ATUs); and (2) media filters.

1. **Aerobic Treatment Units (ATUs).** ATUs utilize forced air to oxidize the wastewater, promoting aerobic decomposition of the wastewater solids. These systems provide supplemental treatment of wastewater for improvement in dispersal field performance; they also provide varying degrees of nitrogen removal. In general, ATUs can be relied on to produce secondary quality effluent, better than 30 mg/L BOD and TSS. ATUs are generally not as effective in reducing pathogen levels as are systems that incorporate media filtration. However, some ATUs provide reduction in nitrogen levels equal to or greater than that provided by sand filters and other media filters.

2. **Media Filters.** This includes proprietary designs that function similar to sand filters. In these systems the sand is replaced with an alternate media; peat, gravel or textile are a few examples. Textile and other media filters have been found to produce effluent quality reasonably similar to recirculating sand filters, and provide similar capabilities in overcoming various soil and site constraints.

Effluent from proprietary treatment units may be discharged to conventional dispersal trenches and to any type of alternative dispersal system identified in this Onsite Systems Manual. Effluent from proprietary treatment units designed and operated in accordance with these guidelines will be considered to meet the criteria for "supplemental treatment".

B. CONSTRAINTS ADDRESSED

Used in combination with the appropriate type of dispersal system, proprietary treatment units can be applied to address the following onsite wastewater constraints:

1. High groundwater;

2. Shallow soil over fractured rock or coarse alluvium;

3. Shallow soil over impermeable soil or bedrock;

4. Slow percolation at standard dispersal trench depths;
5. Steep slopes;
6. Limited dispersal area; and
7. Nitrogen limitations.

C. SITING CRITERIA

1. **Treatment Unit**. All siting criteria for septic tanks, as specified in Santa Clara County Code Chapter B11-67, shall also apply to proprietary treatment units and associated tanks and pumping units.
2. **Dispersal Systems Receiving Proprietary Treatment Effluent**. Dispersal systems receiving effluent from a proprietary treatment unit are subject to all siting criteria for conventional septic tank-dispersal trench systems, except as modified in accordance with adopted requirements for the specific type of alternative dispersal system proposed, including any allowances for the incorporation of supplemental treatment. Allowances for supplemental treatment may include reduced vertical separation distances, increased wastewater application rates or modified slope restrictions. Refer to the adopted guidelines for the specific type of dispersal system for applicable requirements and supplemental treatment allowances.

D. DESIGN AND CONSTRUCTION REQUIREMENTS

1. **NSF Standard 40.** The proprietary treatment unit shall be listed by the National Sanitation Foundation (NSF) as meeting the NSF Standard 40, Class 1 performance evaluation, or have certification by a third-party listing agency as complying with NSF Standard 40 performance requirements. The treatment unit shall be manufactured and installed in accordance with the design specifications used to determine compliance to NSF Standard 40. This specification is applicable to treatment units for wastewater flows of up to 1,500 gpd and is based on compliance with US EPA standards for secondary treatment of municipal wastewater, including 30-day average effluent limits of 25 mg/L for $CBOD_5$ and 30 mg/L for TSS. Treatment units for flows in excess of 1,500 gpd will require certification by a third-party listing agency of equivalent performance.
2. **Design Sewage Flow**. Sizing and design of proprietary treatment units shall be based on the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 3 of this Manual.

3. **Tanks.** All tanks housing a proprietary treatment unit shall be structurally sound, water-tight and capable of withstanding 1,000 pounds of weight.

4. **Controls.** Control panels shall be designed and configured in such a manner that, in the event of a treatment unit malfunction, an alarm system will be triggered and discharge from the treatment system to the dispersal field will be interrupted until the treatment unit malfunction is rectified. At a minimum, the alarm system shall include an audible and visual alarm located within the building served by the system.

5. **Emergency Storage Provisions.** Where a proprietary treatment unit is used in conjunction with a gravity-fed dispersal system, the system shall provide emergency storage capacity equal to at least 1.5 times the daily wastewater flow, consistent with requirements for pump systems provided in Part 3 of this Manual.

6. **Compliance with Manufacturer Requirements.** The designer and installer shall follow the proprietary manufacturer's design, installation, construction, and operations procedures.

7. **Engineering Plans.** Engineering plan submittals for proprietary treatment units shall provide documentation of compliance with manufacturer requirements and sufficient design analysis to verify the appropriateness of the treatment unit for the proposed application. Engineering plans shall contain specific step-by-step construction guidelines and notes for use by the installer, including any manufacturer instructions.

8. **Installer Requirements.** Anyone installing a proprietary treatment unit shall be trained and certified by the system manufacturer. Documentation verifying conformance to this requirement shall be provided to DEH prior to system installation.

9. **Maintenance Contract**. The applicant must demonstrate that a written maintenance agreement with a qualified service provider has been obtained for the proposed proprietary treatment unit to ensure satisfactory post-construction operation and maintenance. A maintenance agreement must be maintained valid for the life of the treatment unit.

10. **Construction Inspection.** The following minimum inspections prior to commencing construction or covering any elements of the system shall be required. Joint inspection by the designer, installer, and Santa Clara County DEH may be required.

    a. Pre-construction inspection where the construction staking or marking of the treatment unit is to be placed and installation procedures are discussed;

b. Testing of the treatment unit:

   i. Function and setting of all control devices and alarms.

   ii. Water-tightness of septic tank, treatment tank(s), and dosing tank, as applicable.

c. Final Inspection:

   i. A letter from the designer that the treatment unit has been installed and is operating in conformance with design specifications shall be provided.

   ii. A valid, signed maintenance agreement between the applicant/property owner and service provider shall be provided.

E. MANAGEMENT REQUIREMENTS

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for proprietary treatment systems are outlined in **Table P-1** below.

Table P-1. Proprietary Treatment System Management Requirements

	Work	Frequency
Inspection	• Inspection to be in accordance with manufacturer specifications.	• According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Maintenance	• Perform all maintenance as required and in accordance with equipment manufacturer specifications.	• According to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Water Monitoring & Sampling	• Monitoring to be in accordance with manufacturer specifications.	• If required, according to permit conditions, typically every 6 to 12 months, depending on system size, usage, and history.
Reporting	• Report findings to DEH per permit requirements. • Standard report to describe findings, analyze performance, and detail actions taken. • Report crisis or failure conditions to DEH immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.

GUIDELINES FOR
SHALLOW PRESSURE DISTRIBUTION SYSTEMS

A. DESCRIPTION

Shallow pressure distribution (PD) systems are a variation of a conventional gravity drainfield system that use a pump and small-diameter pressure piping to achieve broad, uniform distribution of wastewater in the shallow soil zones for improved soil absorption and better treatment of percolating effluent. This type of design, especially in conjunction with supplemental treatment, is well suited for steeper terrain and shallow soil conditions.

B. CONSTRAINTS ADDRESSED

1. High groundwater;
2. Shallow soil over impermeable soil or bedrock;
3. Shallow soil over fractured rock or coarse alluvium;
4. Slow percolation at standard dispersal trench depths; and
5. Steep terrain.

C. SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for shallow PD systems shall be those applicable to conventional dispersal fields, as specified in Santa Clara County Code section B11-67.
2. **Vertical Separation Requirements.**
    a. **Depth to Groundwater.** Minimum depth to seasonal high groundwater for shallow PD systems, as measured from trench bottom, shall vary according to soil percolation rate as shown in **Table PD-1**.
    b. **Soil Depth**. Minimum depth of soil, as measured from trench bottom to impermeable soil or rock, for shallow PD systems shall vary according to soil percolation rate and the level of treatment provided as shown in **Table PD-1**.
3. **Percolation Rate**. Average percolation rate for shallow PD systems shall be within the range of 1 to 120 minutes per inch (MPI), as determined in accordance with standard percolation requirements for conventional dispersal trenches.

Table PD-1
Minimum Vertical Separation Requirements for Shallow PD System
(feet, below trench bottom)

Percolation Rate (MPI)	Depth to Groundwater		Soil Depth	
	Primary Treatment*	Supplemental Treatment*	Primary Treatment**	Supplemental Treatment**
1-5	5	3	3	2
6 – 120	3	2	3	2

* Provided by a septic tank sized and constructed in accordance with requirements in Part 3 of this Manual.

** Provided by an approved alternative treatment system identified in this Manual

4. **Ground Slope**.

   a. Maximum ground slope in areas used for shallow PD systems shall be 40 percent.

   b. Any shallow PD system located on slopes greater than 20 percent shall require the completion of a geotechnical report and slope stability analysis as specified in Santa Clara County Code section B11-83.

5. **Dual System**. Per Santa Clara County Code section B11-67(d), two shallow PD dispersal fields, each one hundred percent of the total size required for the design sewage flow, shall be installed and interconnected with an approved flow diversion device (pressure-rated), intended to allow alternate use of the two fields.

D. DESIGN CRITERIA

1. **Treatment**. The following treatment requirements shall apply in connection with the use of shallow PD systems:

   a. Primary (septic tank) treatment shall be the minimum level of treatment, and shall be acceptable where applicable vertical separation distances are met per **Table PD-1**.

   b. Supplemental treatment, using an approved alternative treatment system identified in this Manual, may be used to allow compliance with reduced vertical separation distances as provided in **Table PD-1**.

2. **Design Sewage Flow.** Shallow PD systems shall be designed on the basis of the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 3 of this Manual.

3. **Pressure Dosing**. Septic tank effluent shall be applied to the shallow PD system by pressure dosing, utilizing either an automatic dosing siphon or pump system. The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:

    a. Uniform dosing of septic tank effluent throughout the system of shallow PD trenches;

    b. Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;

    c. Suitable access provisions for inspection, testing and adjustment of the pressure distribution system; and

    d. Dosing volume to achieve minimum of 3 to 5 doses per day at design flow conditions.

4. **Dispersal Trenches.** Shallow PD trenches shall conform to the same design and construction requirements as conventional trenches, per Part 3 of this Manual, with the exception that the piping system shall consist of pressure piping rather than gravity piping.

5. **Pressure Distribution Piping**.

    a. **Pressure-Rated Pipe Material**. All pipe, fittings and valves shall be pressure-rated PVC pipe, minimum 150 psi.

    b. **Solvent Welded.** All joints in the pressure piping system shall be solvent welded.

    c. **Pipe Sizing**. All pressure distribution pipes and fittings, including transport lines, manifolds, laterals and valves, must be adequately sized for the design flow, and shall be designed to minimize frictional losses to the maximum extent practicable.

    d. **Thrust Blocks.** Concrete thrust blocks, or equivalent restraint, shall be provided at sharp changes in piping directions.

    e. **Shut-off Valves.** The distribution lateral for each trench shall be fitted with a shut-off valve to adjust or terminate the flow to individual trenches. This valve may be either a ball or gate valve, and shall be located in a utility/valve box.

    f. **Lateral End Riser.** The end of each lateral shall be fitted with a 90^{o} long sweep to facilitate line cleaning and hydraulic testing. The end riser pipe shall also be fitted with a ball valve and/or threaded end cap or plug, housed in a valve box.

6. **Pump System.** The pump system shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and

constructed in accordance with pump system requirements provided in Part 3 of this Manual.

7. **Wastewater Application Rates.** The wastewater application rates used for sizing the infiltrative surface (trench bottom and/or sidewall area), shall be based upon representative percolation test results for the soil zone corresponding with trench bottom depth, and the loading rate criteria in **Table PD-2**.

Table PD-2. Wastewater Application Rates for Shallow PD System[1]

Percolation Rate (MPI)	Septic Tank Treatment	Supplemental Treatment		
	Standard Rate (gpd/ft^2)	Standard Rate[2] (gpd/ft^2)	Enhanced Rate[3] (gpd/ft^2)	Treatment Multiplier[4]
1-5	1.2	1.2	1.2	0
10	0.80	0.80	1.2	1.5
24	0.60	0.60	1.2	2.0
30	0.56	0.56	1.12	2.0
45	0.45	0.45	0.68	1.5
60	0.35	0.35	0.53	1.5
90	0.20	0.20	0.25	1.25
91-120	0.20	0.20	0.25	1.25

[1] Interpolate between reference values for other percolation rates; see end of Part 4 for expanded table listing interpolated values.
[2] Applies where supplemental treatment is used in connection with reduced depth to groundwater and/or reduced soil depth.
[3] Applies where standard vertical separation distances are met.
[4] For information only.

Reduction in the above wastewater loading rates or other provisions to insure the long-term integrity and performance of the shallow PD trenches may be required for high strength waste flows, such as from restaurants.

8. **Trench Sizing**. The required square footage of trench infiltrative surface shall be calculated based on the design flow and the applicable wastewater application rate per **Table PD-2**. The required length of trench shall be calculated based on the combined bottom area and trench sidewalls, up to a maximum of four (4) square feet of effective infiltrative surface per lineal foot of trench. For example, this may be comprised of: (a) 1.5-ft wide bottom area plus two sidewalls of 1.25 feet each; (b) 2-ft wide bottom area plus two sidewalls of 1 foot each; and so on.

9. **Inspection Wells**. A minimum of three (3) inspection wells shall be installed within and around shallow PD systems for the purpose of checking groundwater levels, and may also be used for water quality sampling, as needed. Inspection wells shall extend to a depth of

3 feet below the bottom of the PD trenches or to contact with impermeable materials, whichever is less. The inspection wells shall be located and constructed as follows:

a. One shall be located upslope of the dispersal field, typically 10- to 15-feet away, to serve as a background or control well;

b. One shall be located within the dispersal field, typically between trenches near the center of the field;

c. One shall be located down-slope of the dispersal field, typically 10 to 25 feet horizontally from the lowest trench(es), and positioned to provide a representative point for monitoring the area estimated to be in the probable flow path of percolating wastewater;

d. Inspection wells shall be constructed of 2" to 4" diameter pipe, equipped with a wrench-tight cap or pipe plug, and a bottom cap. All wells shall be perforated beginning at a depth of 18 inches below grade and extending to the bottom of the pipe. Perforations shall consist of hacksaw slots at nominal 1" spacing, or equivalent commercially-slotted pipe. To prevent surface water infiltration, inspection wells shall be sealed with a bentonite or concrete annular seal (or equivalent) to a depth of 12 inches, minimum.

E. ENGINEERING PLANS AND CONSTRUCTION

1**. Reference Guidelines**. In addition to the requirements set forth herein, design and construction of shallow PD systems shall utilize applicable guidelines contained in the following references:

a. "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002 and as amended.

b. “Design Manual – Onsite Wastewater Treatment and Disposal Systems”, U.S. Environmental Protection Agency, October 1980.

2**. Engineering Plans.** Engineering plans for shallow PD systems shall include:

a. All relevant elevation data and hydraulic calculations;

b. Specific step-by-step construction guidelines and notes for use by the installer;

c. Erosion control plan for any site over 20% slpoe, utilizing cover fill or with design flow >1,000 gpd;

d. Recommended make and model of all components;

e. Recommended pump system components, with cut-sheet depicting float settings;

f. Control panel programming; and

g. An inspection schedule listing critical control points.

3. **Construction Inspection.** At a minimum, inspection of the shallow PD system installation should include the items listed below. This is in addition to inspection work required for a supplemental treatment system, if used. This is in addition to inspection work required for a supplemental treatment system, if used. Joint inspection by the designer, contractor, and DEH may be required.

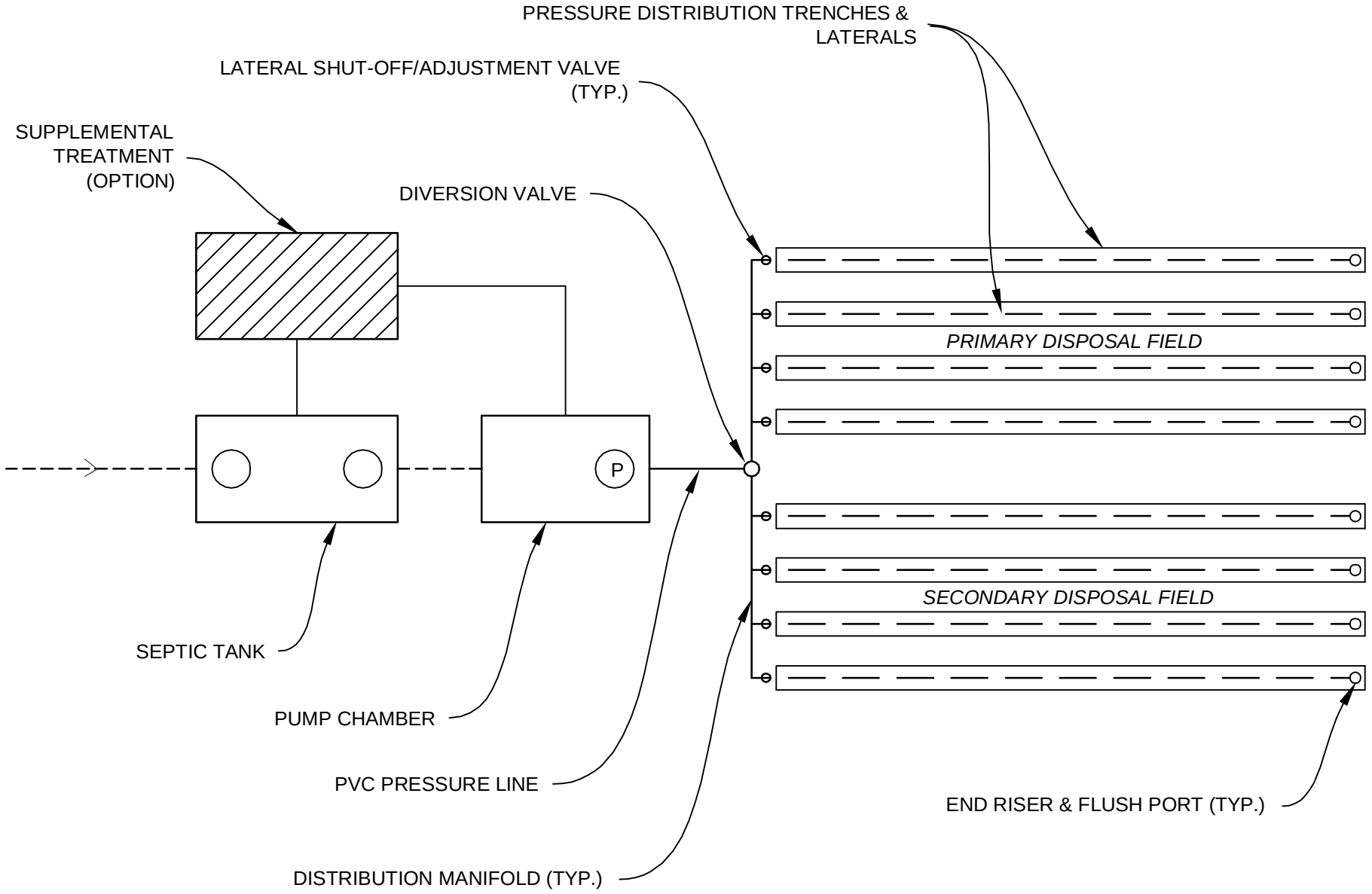
   - Pre-construction inspection where the construction staking or marking of the various system components is provided and construction procedures discussed;
   - Water tightness of septic tank and dosing (pump) tank;
   - Layout and excavation of dispersal trenches and piping;
   - Drain rock material and placement;
   - Piping installation and hydraulic ("squirt") test of the distribution system;
   - Functioning and setting of all control devices; and
   - Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all performance wells are installed; and erosion control has been completed.

F. MANAGEMENT REQUIREMENTS

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for shallow pressure distribution systems are outlined in **Table PD-3.**

Table PD-3. Shallow Pressure Distribution System Management Requirements

	Work	Frequency
Inspection	• Conduct routine visual observations of disposal field and downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, or other problems. • Perform all inspections of pump and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual).	• Every 6 to 12 months.
Maintenance	• Purge laterals, squirt and balance. • Exercise valves to ensure functionality. • Perform all maintenance work as recommended by equipment manufacturer for any special valves or other components. • Investigate and repair erosion, drainage or other disposal field problems, as needed. • Investigate and perform distribution system corrective work, as required. • Record work done.	• Distribution system maintenance annually. • Other maintenance as required.
Water Monitoring & Sampling	• Measure and record water levels in trench observation wells. • Measure and record water levels in dispersal field monitoring wells, as applicable, per permit requirements. • Obtain and analyze water samples from monitoring wells, as applicable, per permit requirements.	• Measure trench water levels annually. • Other monitoring according to permit conditions, as applicable.
Reporting	• Report findings to DEH per permit requirements. • Standard report to include dates, observation well and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to DEH immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.



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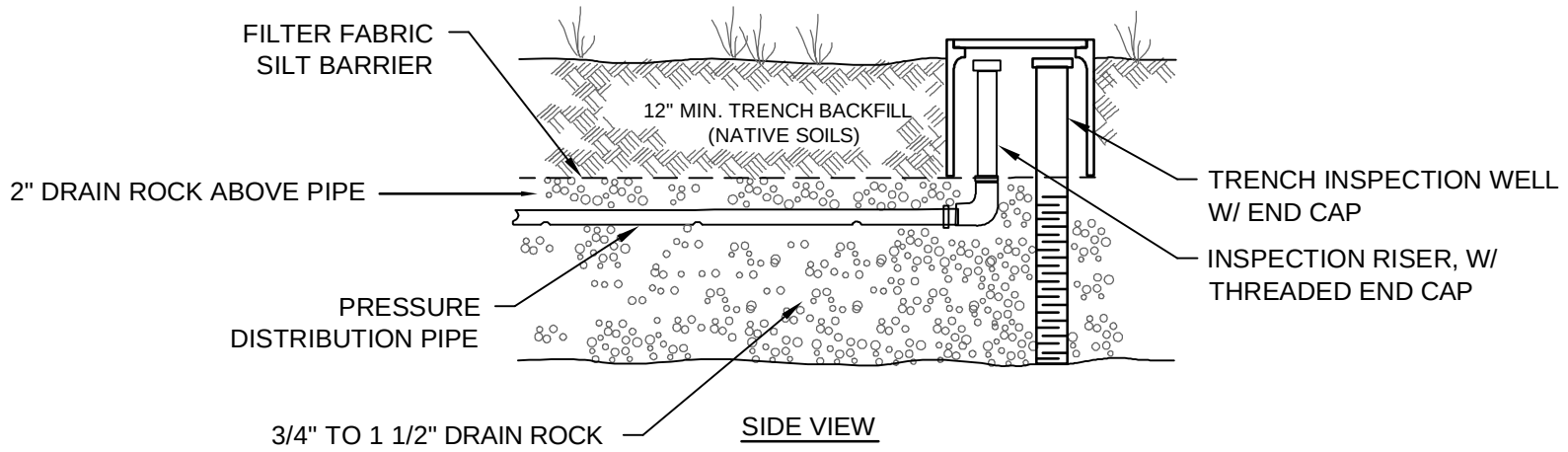
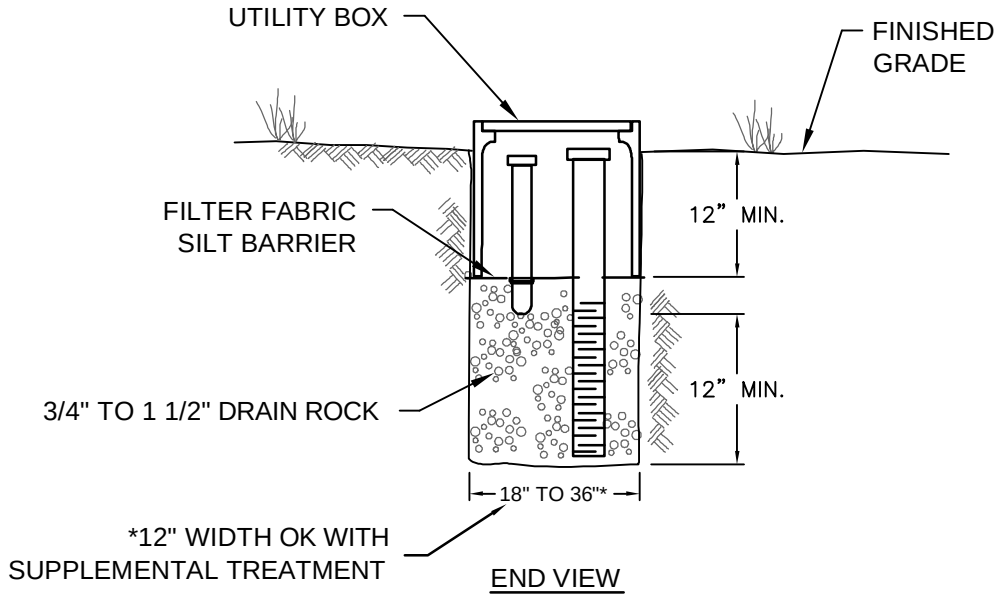
SHALLOW PRESSURE DISTRIBUTION SYSTEM SCHEMATIC





SHALLOW PRESSURE-DISTRIBUTION SYSTEM

GUIDELINES FOR
MOUND SYSTEMS

A. DESCRIPTION

A mound system consists of an elevated sand bed with a gravel distribution bed covered by soil fill. Mound systems are intended to raise the soil absorption system above grade and provide further treatment (sand filtration) of effluent before it reaches native soils. It utilizes the shallow surface soils for broad distribution of effluent, and is used to mitigate high water table and shallow soil conditions on flat or gently sloping terrain. Mound systems can be used where there are at least two feet of permeable surface soils (above the water table or restrictive soils) on slopes up to 20 percent, depending upon percolation characteristics.

B. CONSTRAINTS ADDRESSED

1. High groundwater;
2. Shallow soil over fractured rock or coarse alluvium;
3. Shallow soil over impermeable soil or bedrock;
4. Slow percolation at standard dispersal trench depths; and
5. Limited disposal area.

C. SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for mound systems shall be those applicable to conventional disposal fields, as specified in Santa Clara County Code section B11-67.

2. **Vertical Separation Requirements.**

a. **Depth to Groundwater.** Minimum depth to seasonal high groundwater, as measured from ground surface, shall vary according to soil percolation rate as follows:

Percolation Rate, MPI	Depth to Groundwater
1-5	3 feet
6-120	2 feet

b. **Soil Depth**. Minimum depth of soil, as measured from ground surface to impermeable soil or rock, for mound systems shall be 2 feet. This soil depth

requirement shall apply within the mound fill area and in the adjacent area extending a distance of 25 feet down-slope of the mound system.

3. **Percolation Rate**. Average percolation rate for mound systems shall be within the range of 1 to 120 minutes per inch (MPI), as determined from testing at depths of 1 to 2 feet below ground surface. These percolation requirements shall apply within the mound fill area and in the adjacent area extending a distance of 25 feet down-slope of the mound system.

4. **Ground Slope**. Maximum ground slope for mound systems shall be 20% where the percolation rate is in the range of 1 to 60 MPI. For soils with a percolation rate greater than 60 MPI, maximum ground slope for mound systems shall be 15%.

5. **Reserve Area/Dual System.** A reserve area having suitable site conditions and sufficient area for full, 100% replacement of the primary mound shall be provided or a complete dual primary and secondary mound system shall be installed initially. See D.9 for circumstances requiring the installation of a dual system (and applicable requirements). In determining the necessary space for the primary and secondary mound, the required basal area (per D.8) of the primary and secondary mound shall not overlap. The surplus sand run-out and soil fill may also not overlap unless the primary and secondary mounds are installed together as a dual system.

D. DESIGN CRITERIA

1. **Treatment**. The mound system shall be preceded by a septic tank sized for the design sewage flow and constructed in accordance with requirements contained in Part 3 of this Manual.

2. **Design Sewage Flow**. The mound system shall be designed on the basis of the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 3 of this Manual.

3. **Pressure Dosing**. Septic tank effluent shall be applied to the mound system by pressure dosing, utilizing a pump system. The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:

    a. Uniform dosing of septic tank effluent over the surface application area of the mound distribution bed;

    b. Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;

    c. Suitable access provisions for inspection, testing and adjustment of the pressure distribution system;

d. Dosing volume to achieve a minimum of 3 to 5 doses per day at design flow conditions; and

e. At least one distribution lateral for every 36 inches of bed width.

Additional requirements for design and construction of pressure distribution piping systems contained in "Guidelines for Shallow Pressure Distribution Systems" shall also apply.

4. **Pump System.** The pump system shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and constructed in accordance with pump system requirements provided in Part 3 of this Manual.

5. **Sand Fill**.

a. **Sand Specifications**. The sand media shall be a medium to coarse sand which meets the following gradation specifications:

Sieve Size	Percent Passing
3/8	100
#4	90 – 100
#10	62 – 100
#16	45 – 82
#30	25 – 55
#50	5 – 20
#60	0 – 10
#100	0 – 4
#200	0 – 2

Documentation of laboratory sieve analysis results for the proposed sand fill material shall be supplied to DEH to verify conformance with the above specifications.

b. **Sand Depth**. The minimum depth of sand fill, below the gravel distribution bed, shall be 12 inches. The minimum depth of sand fill shall be increased to 24 inches for sites where the average percolation rate is between 1 and 5 MPI; such sites also require greater separation to groundwater below ground surface (3 feet rather than 2 feet).

c. **Lateral Dimensions**. The sand shall be placed as a continuous fill extending in lateral dimensions as necessary to meet the following minimum requirements:

(1) Top of the sand fill shall extend horizontally beyond the gravel distribution bed:

- 1 foot in the upslope direction

- 2 feet in the down-slope direction
- 2 feet in the longitudinal (side) direction

(2) Maximum slope of the top of the sand surface shall be 3 horizontal to 1 vertical.

(3) Bottom of the sand fill shall be large enough to meet minimum mound sizing requirements based on basal area and linear loading rate criteria per D.8 below.

6. **Gravel Distribution Bed**

   a. **Material.** The distribution bed shall consist of 3/8-inch double-washed pea gravel, substantially free of fines.

   b. **Depth.** Pea gravel shall extend a minimum of 6 inches below the invert and 2 inches above the top of the distribution piping.

   c. **Width.** Maximum width of the distribution bed shall be 10 feet.

   d. **Level.** The bottom of the distribution bed shall be level; and the down-slope side shall be parallel to the slope contour.

7. **Silt Barrier**. The gravel distribution bed shall be covered in its entirety with a geotextile ("filter fabric") silt barrier. Filter fabric shall either be polyester, nylon or polypropylene, or any combination thereof, and shall be suitable for underdrain applications. Filter fabric shall be non-woven, shall not act as a wicking agent and shall be permeable.

8. **Soil Cover**

   a. **Material**. A continuous soil cover shall be placed over the entire distribution bed and sand fill. The soil cover shall consist of a medium, loamy-textured soil.

   b. **Depth**. Soil cover depth shall be a minimum of 12 inches and a maximum of 18 inches over the top of the distribution bed, and 12 inches minimum over the sand fill portion of the mound. Soil cover over the distribution bed shall be crowned to promote rainfall runoff, and compacted by track-rolling, minimum two passes.

   c. **Lateral Extension**. The soil cover shall extend a minimum of 4 feet beyond the perimeter edge of the sand fill in all directions.

9. **Wastewater Application Rate**. The wastewater application rates used for sizing the surface area of the distribution bed and the basal area of the sand fill shall be as follows:

   a. **Distribution Bed**.

      (1) 1.2 gpd/ft^2 for individual residential OWTS; and

(2) 1.0 gpd/ft^2 for commercial, industrial, institutional and multi-residential OWTS.

Reduction in the above wastewater loading rates or other provisions to insure the long-term integrity and performance of the mound distribution bed may be required for high strength waste flows, such as from restaurants.

b. **Sand Basal Area**. The basal area of the sand fill shall be sized to meet maximum basal wastewater application rates and linear loading requirements as follows:

(1) **Basal Wastewater Application Rates**.

- **Effective Application Area.**
  - For level sites (0 - 2% slope) the effective basal wastewater application area includes the entire sand fill basal area.
  - For sloping sites (>2% slope) the effective basal wastewater application area includes the sand basal area immediately below and directly down-slope (at right angles to the natural slope contours) of the distribution bed.
- **Wastewater Flow.** The wastewater flow used for sizing the basal area shall be the design sewage flow for the system.
- **Application Rates.** The maximum basal application rate shall be based on the demonstrated percolation rate of the upper 12 to 24 inches of soil depth as shown in **Table M-1.**

Table M-1. Basal Wastewater Application Rates[1]

Percolation Rate (MPI)	Wastewater Application Rate (gpd/ft^2)
1-5	1.2
10	1.2
24	1.2
30	1.12
45	0.68
60	0.53
90	0.25
91-120	0.2

[1] Interpolate between reference values for other percolation rates; see end of Part 4 for expanded table listing interpolated values.

(2) **Linear Loading Requirements**

- **Linear Loading Rate Definition.** Linear loading rate is defined as the volume of wastewater flow (in gpd) divided by the effective length of the disposal system measured along the slope contour.

- **Effective Length**. The effective length (L) of the mound system for determining the linear loading rate shall be the length of the gravel distribution bed along the down-slope edge. Separate linear loading rate calculations shall be made for the primary and secondary (reserve) systems. The effective length of each mound may overlap for purposes of determining compliance with linear loading rate criteria, since only one system would be in operation at a given time.

- **Wastewater Flow**. The wastewater flow used for determining the linear loading rate shall be as follows:

    - 100 gpd/bedroom for residential systems;

    - Design sewage flow rate for commercial, institutional, industrial and multi-residential systems.

- **Loading Rate Criteria**. Maximum linear loading rates for mound systems vary according to ground slope and percolation rate as indicated in **Table M-2.** If a variance from these criteria is proposed, it must be supported by detailed groundwater mounding analysis carried out in accordance with accepted methodology and/or scientific references dealing with water movement in soils and utilizing site specific hydraulic conductivity (permeability) data.

Table M-2. Maximum Linear Loading Rates (gpd/lineal foot)

Soil Depth (ft)	Ground Slope (%)	Percolation Rate (MPI)		
		1-30	31-60	61-120
2 to 2.5	0-10	5	4	3
	11-20	6	5	4
2.5 to 3.0	0-10	7	6	5
	11-20	8	7	6
3.0 to 4.0	0-10	9	8	7
	11-20	10	9	8
> 4.0	0-10	11	10	9
	11-20	12	11	10

9. **Dual Mound Systems**.

    a. **Dual System Requirement**. Dual mound systems shall be required for any system where, due to space constraints, the sand fill run-out of the primary mound overlaps the sand fill run-out area of the secondary mound.

    b. **Distribution Bed Placement**. Dual mound systems shall have at least two distinctly separate distribution beds. The beds may be placed within one continuous mound or in separate mounds. The distribution beds may be placed end-to-end or upslope/down-slope of one another subject to meeting minimum sizing requirements for basal and linear loading rates per D.8.b above.

    c. **Distribution Bed Separation**. The minimum lateral (i.e., end-to-end) separation between distribution beds in a dual mound system shall be six feet.

    d. **Effective Basal Area**. For dual mound systems the effective basal area for sizing the two systems shall not overlap.

    e. **Alternate Dosing**. The distribution beds for dual mound systems shall be designed and operated to provide alternate dosing and resting of the beds.

10. **Inspection Wells**. A minimum of six inspection wells shall be installed within and around mound systems as follows:

    a. One shall be located near the center of the mound, extending from the mound surface to the bottom of the gravel distribution bed.

    b. One shall be located within the effective basal area (outside of the distribution bed), extending from the mound surface to 6 inches into the native soil.

    c. Four shall be located, respectively, midway along each of the four sides of the mound, near the toe of the slope, extending from ground surface to a depth of 5 feet or to the depth of impermeable materials, whichever is less.

    d. Inspection wells shall be constructed of 2" to 4" diameter pipe, equipped with a wrench-tight cap or pipe plug and a bottom cap. All wells shall be perforated beginning at a depth of 18 inches below grade and extending to the bottom of the pipe. Perforations shall consist of hacksaw slots at nominal 1" spacing, or equivalent commercially-slotted pipe. To prevent surface water infiltration, inspection wells shall be sealed with a bentonite or concrete annular seal (or equivalent) to a depth of 12 inches, minimum.

E. ENGINEERING PLANS AND CONSTRUCTION

1. Reference Guidelines. Construction of mound systems shall be in accordance with guidelines contained in the following references:

a. "Design and Construction Manual for Wisconsin Mounds", Small Scale Waste Management Project, University of Wisconsin, Madison, January 2000, including any amendments.

b. "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002.

2. **Engineering Plans**. Engineering plans for mound systems shall include:

   a. All relevant elevation data and hydraulic calculations;

   b. Specific step-by-step construction guidelines and notes for use by the installer;

   c. Erosion control plan;

   d. Recommended make and model of all components;

   e. Recommended pump system components, with cut-sheet depicting float settings;

   f. Control panel programming; and

   g. An inspection schedule listing critical control points.

3. **Construction Inspection.** At a minimum, inspection of the mound system installation should include the following. Joint inspection by the designer, contractor, and DEH may be required.

   - Pre-construction inspection where the construction staking or marking of the mound system is provided and construction procedures discussed;
   - Water tightness of septic tank and dosing (pump) tank;
   - Clearing and ripping/plowing of the mound basal area soils;
   - Sand material and placement;
   - Pea gravel distribution bed and piping installation;
   - Hydraulic (“squirt”) test of the distribution system;
   - Functioning and setting of all control devices;
   - Placement of filter fabric silt barrier and soil cover;
   - Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed; and erosion control has been completed.

F. MANAGEMENT REQUIREMENTS.

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for mound systems are outlined in Table M-3 below.

Table M-3. Mound System Management Requirements

	Work	Frequency
Inspection	• Conduct routine visual observations of mound and downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, gophers or other problems. • Perform all inspections of pump and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual). • Record observations.	• Every 6 to 12 months.
Maintenance	• Purge laterals, squirt and balance. • Exercise valves to ensure functionality. • Perform all maintenance work as recommended by equipment manufacturer for any special valves or other components. • Maintain mound area landscape vegetation, as req'd • Investigate and repair erosion, drainage or other disposal field problems, as needed. • Investigate and perform distribution system corrective work, as req'd • Record work done.	• Distribution system maintenance annually. • Other maintenance as required.
Water Monitoring & Sampling	• Measure and record water levels in observation wells in distribution bed, sand fill and around mound perimeter. • Obtain and analyze water samples from monitoring wells, as applicable, per permit requirements.	• Measure mound system water levels annually. • Other monitoring according to permit conditions, as applicable.
Reporting	• Report findings to DEH per permit requirements. • Standard report to include dates, observation well and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to DEH immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.

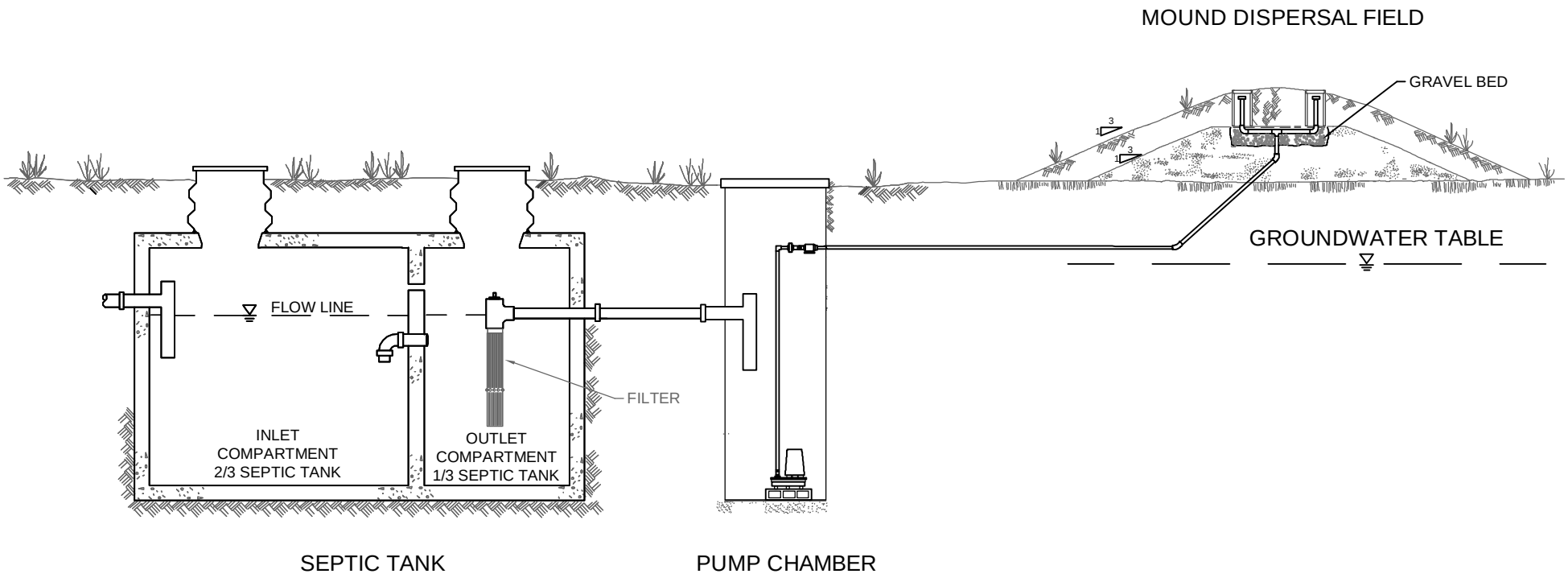


DIAGRAM OF A MOUND SYSTEM

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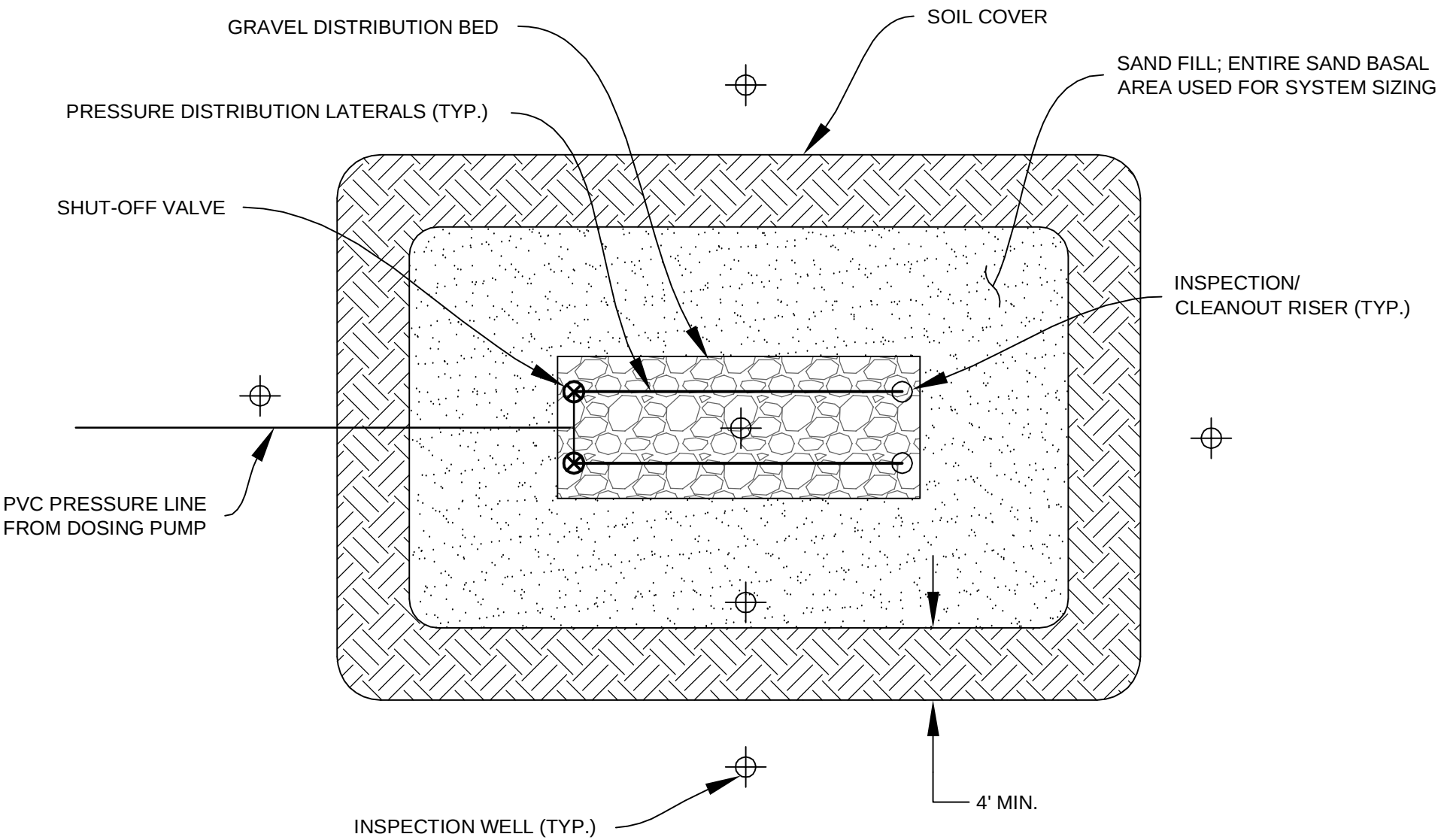

MOUND SYSTEM SCHEMATIC
~ LEVEL SITE ~

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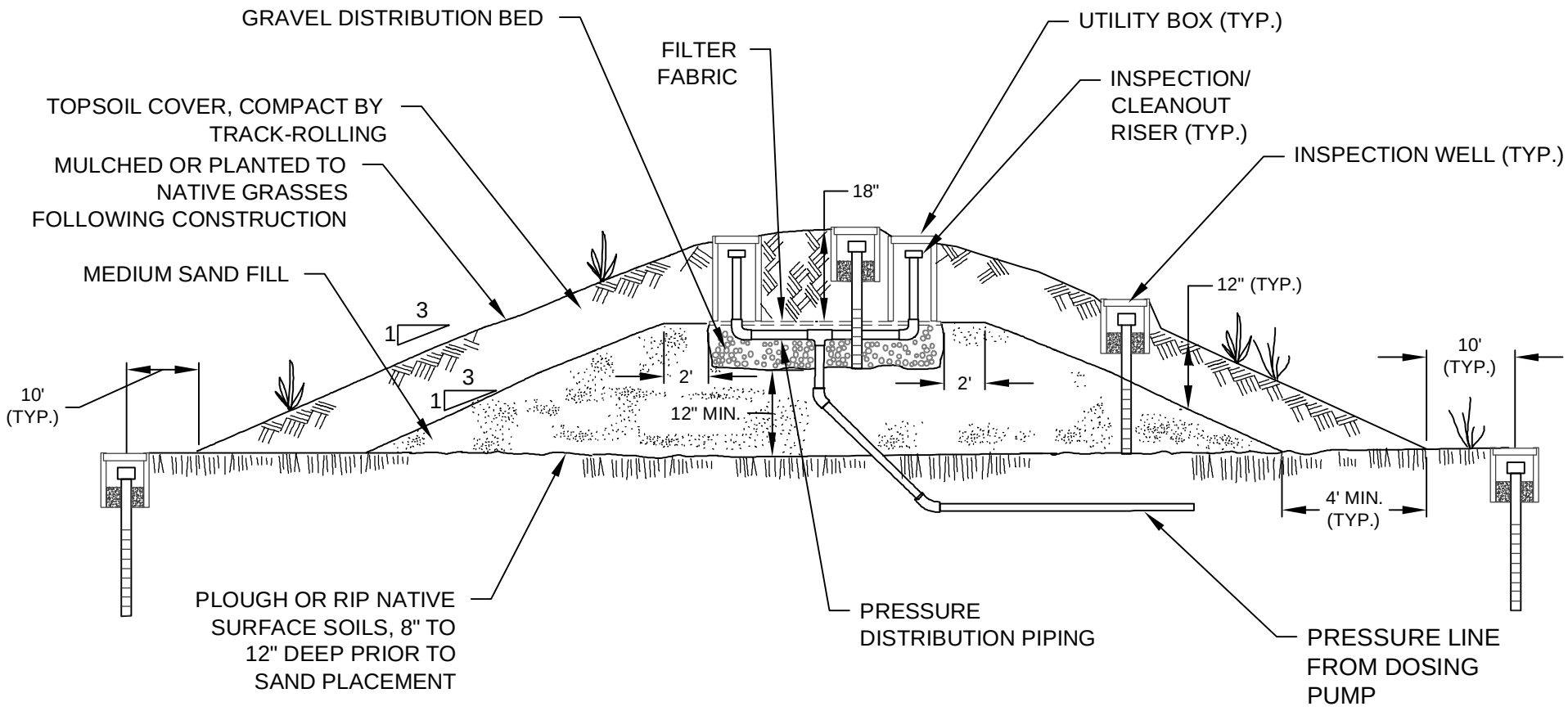

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MOUND SYSTEM CROSS-SECTION
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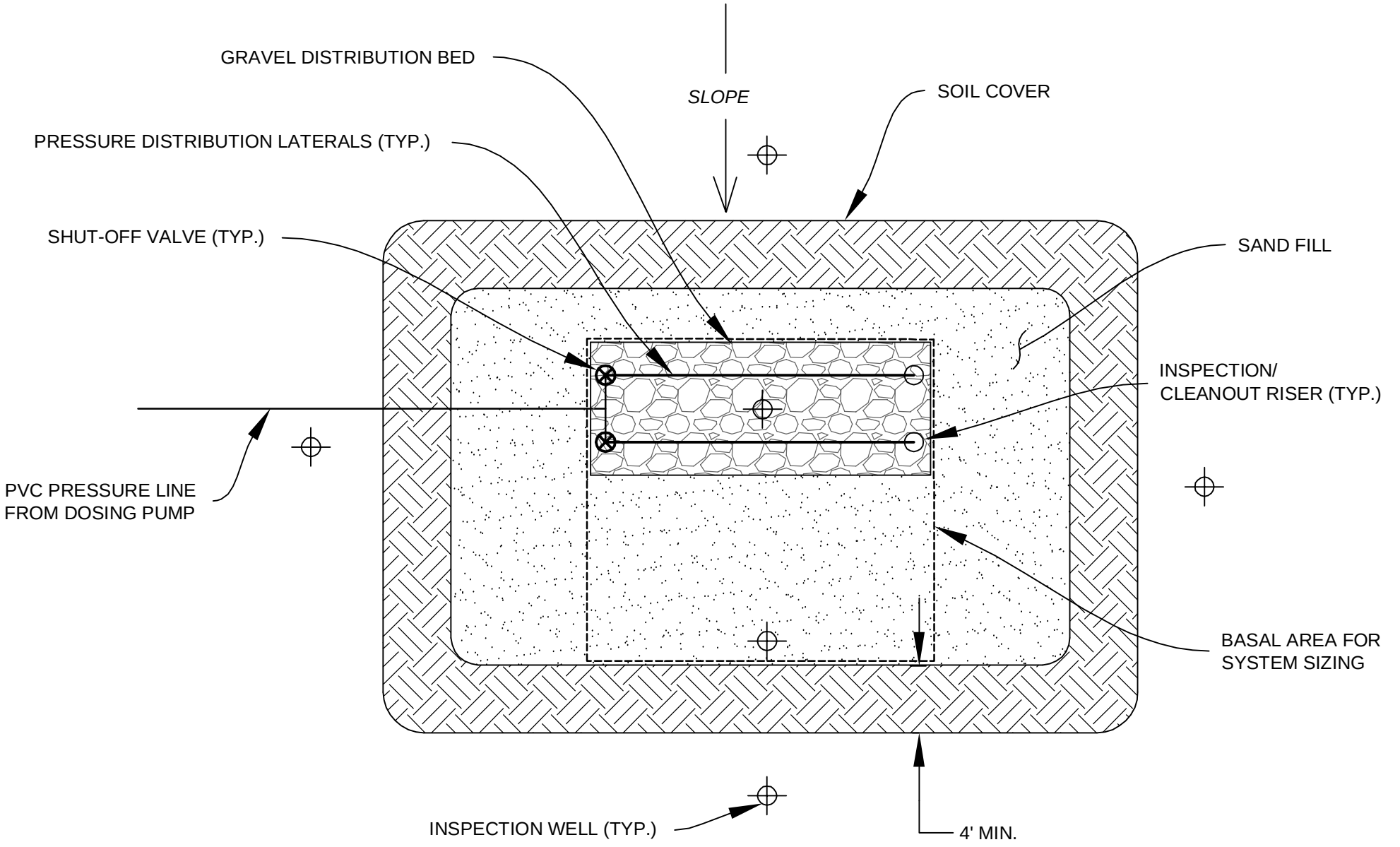

MOUND SYSTEM SCHEMATIC
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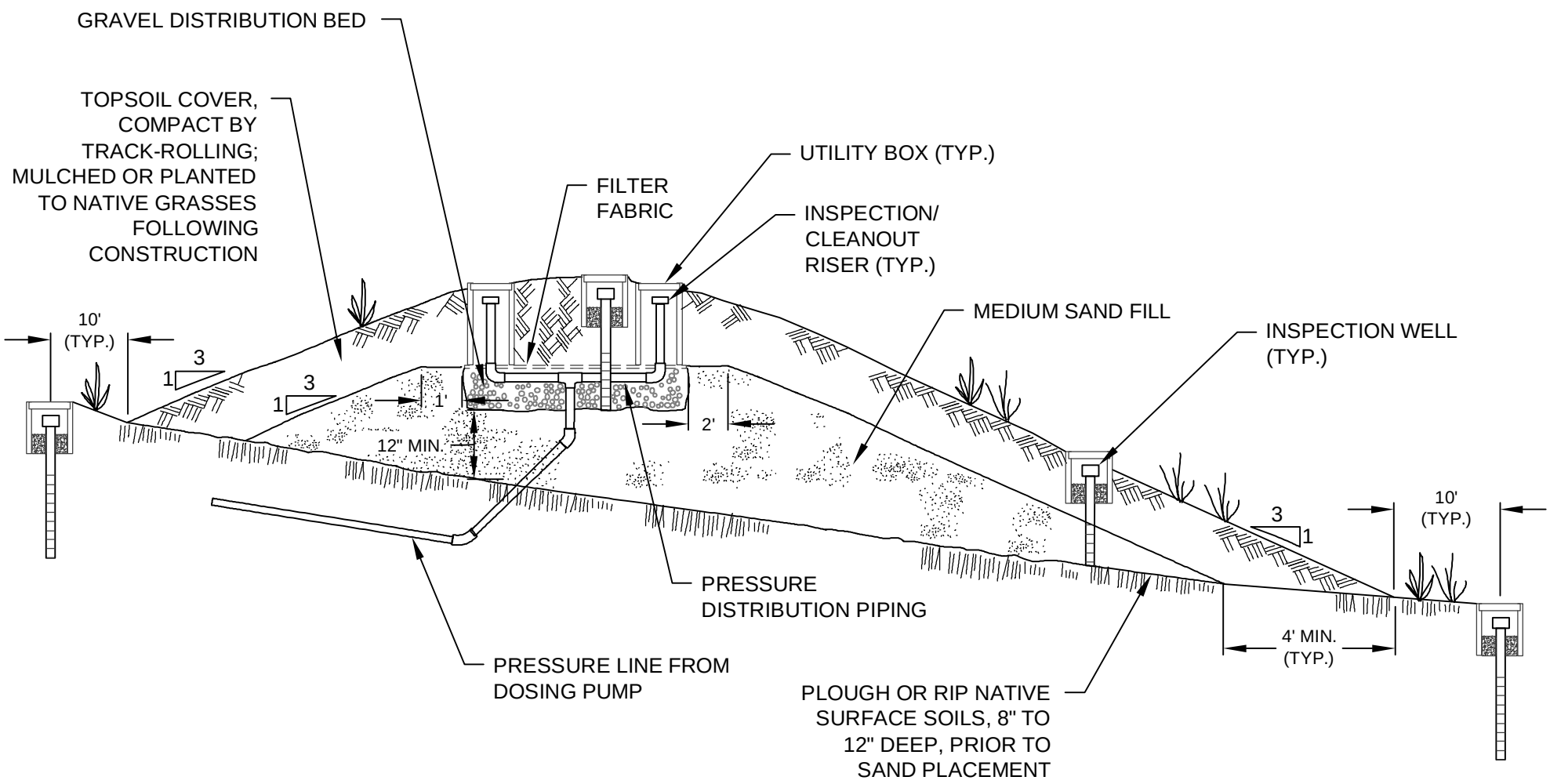

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GUIDELINES FOR
AT-GRADE SYSTEMS

A. DESCRIPTION

At-grade systems are similar to mound systems, except that they do not include the sand bed; the gravel distribution bed is placed directly on the scarified (i.e., plowed) soil surface. They are often used in conjunction with a supplemental treatment system. They can be used in the same types of situations as mound systems to overcome shallow soil depths and high groundwater.

B. CONSTRAINTS ADDRESSED

1. High groundwater;
2. Shallow soil over impermeable soil or bedrock;
3. Shallow soil over fractured rock or coarse alluvium; and
4. Limited dispersal area.

C. SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for At-grade systems shall be those applicable to conventional dispersal fields, as specified in Santa Clara County Code section B11-67.
2. **Vertical Separation Requirements.**
    a. **Depth to Groundwater.** Minimum depth to seasonal high groundwater for At-grade systems, as measured from ground surface, shall vary according to soil percolation rate and the level of treatment provided as shown in **Table AG-1**.
    b. **Soil Depth**. Minimum depth of soil, as measured from ground surface to impermeable soil or rock, for At-grade systems shall vary according to soil percolation rate and the level of treatment provided as shown in **Table AG-1**. These soil depth requirements shall apply within the dispersal field and in the adjacent area extending a distance of 25 feet down-slope of the At-grade system on sloping sites, and a distance of 15 feet on all sides on level sites.

Table AG-1

Minimum Vertical Separation Requirements for At-grade System
(feet, below ground surface)

Percolation Rate (MPI)	Depth to Groundwater		Soil Depth	
	Primary Treatment*	Supplemental Treatment**	Primary Treatment*	Supplemental Treatment**
1-5	5	3	3	2
6 – 60	3	2	3	2
61- 120	NA***	2	NA***	2

*Provided by a septic tank sized and constructed in accordance with requirements in Part 3 of this Manual.
** Provided by an approved alternative treatment system identified in this Manual
***Supplemental treatment required where percolation rate is slower than 60 MPI.

3. **Percolation Rate**. Average percolation rate for At-grade systems shall be within the range of 1 to 120 minutes per inch (MPI), as determined from testing at 2 to 3 feet depth below ground surface. Where the percolation rate is in the range of 60 to 120 MPI supplemental treatment shall be required. These percolation requirements shall apply within the dispersal field and in the adjacent area extending a distance of 25 feet down-slope of the At-grade system on sloping sites, and a distance of 15 feet on all sides on level sites.

4. **Ground Slope**. Maximum ground slope for At-grade systems shall be 20%.

5. **Reserve Area/Dual System**. A reserve area having suitable site conditions and sufficient area for full, 100% replacement of the primary At-grade system shall be provided or a complete dual primary and secondary At-grade system shall be installed initially. See D.7 for circumstances requiring the installation of a dual system (and applicable requirements). In determining the necessary space for the primary and secondary (reserve) field, the required gravel distribution bed area (per D.4) of the primary and secondary At-grade shall not overlap. The surplus soil fill run-out may also not overlap unless the primary and secondary At-grades are both installed (i.e., as a dual system).

D. DESIGN CRITERIA

1. **Treatment**. The following treatment requirements shall apply in connection with the use of At-grade systems:

    a. Primary (septic tank) treatment shall be the minimum level of treatment, and shall be acceptable where the average percolation rate is in the range of 1 to 60 MPI and the applicable vertical separation distances are met per **Table AG-1**.

    b. Supplemental treatment, using an approved alternative treatment system identified in this Manual, shall be required where the average percolation rate is between 61 to 120 MPI, and/or to allow compliance with reduced vertical separation distances as provided in **Table AG-1**.

2. **Design Sewage Flow**. At-grade systems shall be designed on the basis of the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 3 of this Manual.

3. **Pressure Dosing**. Wastewater effluent, from the septic tank or supplemental treatment system, shall be applied to the At-grade system by pressure dosing, utilizing a pump system. The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:

    a. Uniform dosing of effluent over the surface application area of the At-grade distribution bed;

    b. Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;

    c. Suitable access provisions for inspection, testing and adjustment of the pressure distribution system;

    d. Dosing volume to achieve a minimum of 3 to 5 doses per day at design flow conditions; and

    e. At least one distribution lateral for every 36 inches of distribution bed width.

    Additional requirements for design and construction of pressure distribution piping systems contained in "Guidelines for Shallow Pressure Distribution Systems" shall also apply.

4. **Pump System.** The pump system shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and constructed in accordance with pump system requirements provided in Part 3 of this Manual.

5. **Gravel Distribution Bed**
    a. **Material.** The distribution bed shall consist of 3/8-inch double-washed pea gravel, substantially free of fines.
    b. **Depth.** Pea gravel shall extend a minimum of 6 inches below the invert and 2 inches above the top of the distribution piping.
    c. **Width.** Maximum width of the distribution bed shall be 10 feet. Long, narrow distribution bed configurations are preferred.
    d. **Wastewater Application Rate**. The wastewater application rate used for sizing the basal surface area of the distribution bed (i.e., soil infiltrative surface) shall vary

according to the soil percolation rate of the native soil and the level of wastewater treatment provided as indicated in **Table AG-2**.

Table AG-2.

Wastewater Application Rates for At-grade System[1]

Percolation Rate (MPI)	Septic Tank Treatment	Supplemental Treatment		
	Standard Rate (gpd/ft^2)	Standard Rate[2] (gpd/ft^2)	Enhanced Rate[3] (gpd/ft^2)	Treatment Multiplier[4]
1-5	1.2	1.2	1.2	0
10	0.8	0.8	1.2	1.5
24	0.60	0.60	1.2	2.0
30	0.56	0.56	1.12	2.0
45	0.45	0.45	0.68	1.5
60	0.35	0.35	0.53	1.5
90	NA	0.20	NA	NA
91-120	NA	0.20	NA	NA

[1] Interpolate between reference values for other percolation rates; see end of Part 4 an expanded table listing interpolated values.
[2] Applies where supplemental treatment is used in connection with reduced depth to groundwater, reduced soil depth, or for mitigation of other site constraints.
[3] Applies where standard vertical separation distances are met.
[4] For reference only.

Reduction in the above wastewater loading rates or other provisions to insure the long-term integrity and performance of the At-grade distribution bed may be required for high strength waste flows, such as from restaurants.

e. Minimum Basal Area Sizing. At a minimum, sizing of the distribution bed basal area shall be determined by dividing the design wastewater flow (in gpd) by the applicable wastewater application rate per **Table AG-2**.

f. Linear Loading Rate Requirements. The length of the distribution bed shall be sized to meet maximum linear loading rate criteria as follows:

(1) **Linear Loading Rate Definition.** Linear loading rate is defined as the volume of wastewater flow (in gpd) divided by the effective length of the dispersal system measured along the slope contour.

(2) **Effective Length**. The effective length (L) of the At-grade system for determining the linear loading rate shall be the length of the gravel distribution bed measured along the down-slope edge. Separate linear loading rate calculations shall be made for the primary and secondary (reserve) systems; however, the effective length of each field may overlap for purposes of determining compliance with linear loading rate criteria.

(3) **Wastewater Flow**. The wastewater flow used for determining the linear loading rate shall be as follows:

- 100 gpd/bedroom for residential systems;
- Design sewage flow rate for commercial, institutional, industrial and multi-residential systems.

(4) **Loading Rate Criteria**. Maximum linear loading rates for At-grade systems vary according to ground slope and percolation rate as indicated in **Table AG-3.** If a variance from these criteria is proposed, it must be supported by detailed groundwater mounding analysis carried out in accordance with accepted methodology and/or scientific references dealing with water movement in soils and utilizing site specific hydraulic conductivity data.

Table AG-3. Maximum Linear Loading Rates* gpd/lineal foot)

Soil Depth (ft)	Ground Slope (%)	Percolation Rate (MPI)		
		1-30	31-60	61-120
2.0 to 3.0	0-10	5	4	3
	11-20	6	5	4
3.0 to 4.0	0-10	7	6	5
	11-20	8	7	6
4.0 to 5.0	0-10	9	8	7
	11-20	10	9	8
>5.0	0-10	11	10	9
	11-20	12	11	10

6. **Silt Barrier**. The gravel distribution bed shall be covered in its entirety with a geotextile ("filter fabric") silt barrier. Filter fabric shall either be polyester, nylon or polypropylene, or any combination thereof, and shall be suitable for underdrain applications. Filter fabric shall be non-woven, shall not act as a wicking agent and shall be permeable.
7. **Soil Cover**
   a. **Material**. A continuous soil cover shall be placed over the entire distribution bed. The soil cover shall consist of a medium, loamy-textured soil.
   b. **Depth**. Soil cover depth shall be a minimum of 12 inches and a maximum of 18 inches over the top of the distribution bed. Soil cover over the distribution bed shall be crowned to promote rainfall runoff, and compacted by track-rolling, minimum two passes.
   c. **Lateral Extension**. The soil cover shall extend a minimum of 4 feet beyond the perimeter edge of the gravel bed in the upslope and sideslope directions. In the

down-slope direction, the soil cover extension beyond the down-slope edge of the gravel bed shall vary according to slope as follows:

Ground Slope (%)	Soil Fill Extension (ft)
0-2	4
3-4	6
5-6	8
7-8	10
9-10	12
11-12	14
13-14	16
15-16	18
17-20	20

8. **Dual At-Grade Systems**

   a. **Dual System Requirement**. Dual At-grade systems shall be required for any system where, due to space constraints, the soil cover run-out of the primary At-grade overlaps the soil cover run-out area of the secondary At-grade.

   b. **Distribution Bed Placement**. Dual At-grade systems shall have at least two distinctly separate distribution beds. The beds may be placed with one continuous soil cover fill or with independent soil cover fill. The distribution beds may be placed end-to-end or upslope/down-slope of one another, subject to meeting minimum sizing requirements determined from basal area and linear loading criteria per D.5(f) above.

   c. **Distribution Bed Separation**. The minimum lateral (i.e., end-to-end) separation between distribution beds for dual At-grade systems shall be six feet.

   d. **Alternate Dosing**. The distribution beds for At-grade systems shall be designed and operated to provide alternate dosing and resting of the beds.

9. **Inspection Wells**. A minimum of three (3) inspection wells shall be installed within and around At-grade systems as follows:

   a. One shall be located near the center of the At-grade system, extending from the fill surface to the bottom of the gravel distribution bed.

   b. One shall be located 5 to 10 feet upslope of the At-grade system, midway along the length of the At-grade, extending from the ground surface to a depth of 5 feet or to contact with an impermeable substratum, whichever is less.

   c. One shall be located midway along the down-slope length of the At-grade, within 5 to 10 feet from the toe of the fill slope, extending from ground surface to a depth of 5 feet or to contact with an impermeable substratum, whichever is less.

   d. Inspection wells shall be constructed of 2" to 4" diameter pipe, equipped with a wrench-tight cap or pipe plug and a bottom cap. All wells shall be perforated

beginning at a depth of 18 inches below grade and extending to the bottom of the pipe. Perforations shall consist of hacksaw slots at nominal 1" spacing, or equivalent commercially-slotted pipe. To prevent surface water infiltration, inspection wells shall be sealed with a bentonite or concrete annular seal (or equivalent), extending from the ground surface to depth of 12 inches, minimum.

E. ENGINEERING PLANS AND CONSTRUCTION

1. **Reference Guidelines**. Construction of At-grade systems shall be in accordance with guidelines contained in the following references:

   a. "Wisconsin At-grade Soil Absorption System Siting, Design and Construction Manual", Small Scale Waste Management Project, University of Wisconsin-Madison, 1990.

   b. "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002.

   c. "At-grade Component Using Pressure Distribution Manual for Private Onsite Wastewater Treatment Systems", State of Wisconsin, Department of Commerce, 1999.

2. **Engineering Plans.** Engineering plans for At-grade systems shall include:

   a. All relevant elevation data and hydraulic calculations;

   b. Specific step-by-step construction guidelines and notes for use by the installer;

   c. Erosion control plan;

   d. Recommended make and model of all components;

   e. Recommended pump system components, with cut-sheet depicting float settings;

   f. Control panel programming; and

   g. An inspection schedule listing critical control points.

3. Construction Inspection. At a minimum, inspection of the At-grade system installation should include the following. This is in addition to inspection work required for a supplemental treatment system, if used. Joint inspection by the designer, contractor, and DEH may be required.

- Pre-construction inspection where the construction staking or marking of the At-grade system is provided and construction procedures discussed;
- Water tightness of septic tank and dosing (pump) tank;
- Clearing and ripping/plowing of the At-grade basal area soils;
- Pea gravel distribution bed and piping installation;

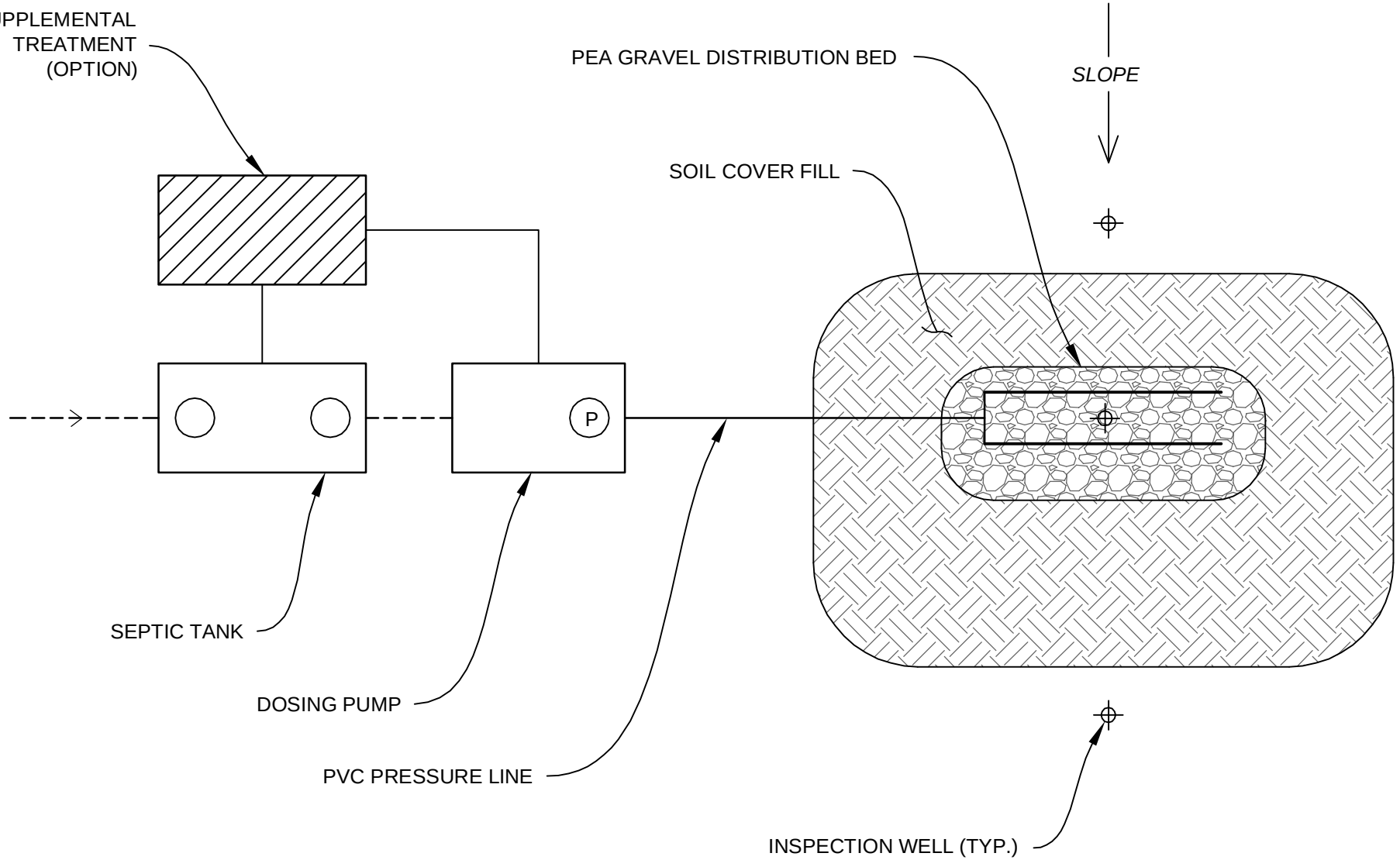
- Hydraulic ("squirt") test of the distribution system;
- Functioning and setting of all control devices;
- Placement of filter fabric silt barrier and soil cover;
- Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed; and erosion control has been completed.

F. MANAGEMENT REQUIREMENTS

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for At-grade systems are outlined in **Table AG-4**.

Table AG-4. At-grade System Management Requirements

	Work	Frequency
Inspection	• Conduct routine visual observations of At-Grade fill and downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, gophers or other problems. • Perform all inspections of pump and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual). • Record observations.	• Every 6 to 12 months.
Maintenance	• Purge laterals, squirt and balance • Exercise valves to ensure functionality. • Perform all maintenance work as recommended by equipment manufacturer for any special valves or other components. • Maintain fill area landscape vegetation, as applicable and as needed. • Investigate and repair erosion, drainage or other disposal field problems, as needed. • Investigate and perform distribution system corrective work, as needed. • Record work done.	• Distribution system maintenance annually. • Other maintenance as required.
Water Monitoring & Sampling	• Measure and record water levels in observation wells in distribution bed and around system perimeter. • Obtain and analyze water samples from monitoring wells, as applicable, per permit requirements.	• Measure dispersal system water levels annually. • Other monitoring according to permit conditions, as applicable.
Reporting	• Report findings to DEH per permit requirements. • Standard report to include dates, observation and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to DEH immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.



AT-GRADE SYSTEM
SCHEMATIC

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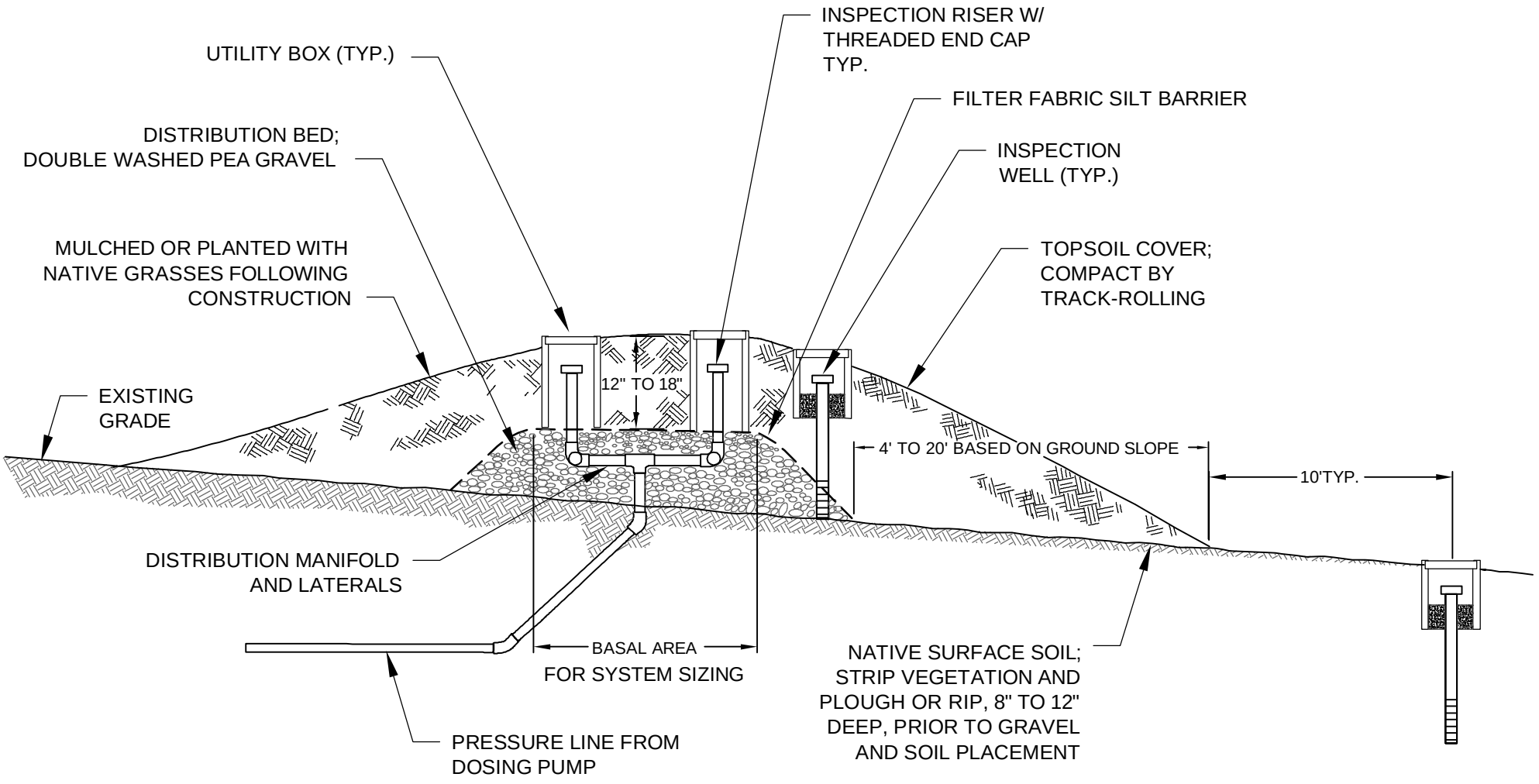

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AT-GRADE SYSTEM
CROSS-SECTION

GUIDELINES FOR
PRESSURE-DOSED SAND TRENCH SYSTEMS

A. DESCRIPTION

Pressure-dosed sand trench (PDST) systems are a variation of a shallow pressure distribution system that utilizes a medium-grade sand in place of a portion of the gravel backfill in the dispersal trench, to improve treatment of effluent and normalize the flow of effluent before it reaches the trench bottom. Treatment occurring in the sand fill can enhance the acceptance rate of native soils beneath the trench. This type of design can also be used with supplemental treatment, and is well suited for conditions where underlying soils are highly permeable and/or groundwater beneath a system is especially vulnerable to wastewater contaminants.

B. CONSTRAINTS ADDRESSED

1. High groundwater; and
2. Rapid percolation.

C. SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for PDST systems shall be those applicable to conventional dispersal fields, as specified in Santa Clara County Code section B11-67.
2. **Vertical Separation Requirements.**
    a. **Depth to Groundwater.** Minimum depth to seasonal high groundwater for PDST systems, as measured from trench bottom, shall vary according to soil percolation rate, level of treatment provided, and sand fill thickness as shown in **Table PDST-1**.
    b. **Soil Depth**. Minimum depth of soil, as measured from ground surface to impermeable soil or rock, for PDST systems shall be 2 feet.

Table PDST-1
Minimum Groundwater Separation Requirements for Shallow PD System
(feet, below sand-soil interface)

Percolation Rate (MPI)	Depth to Groundwater	
	Primary Treatment	Supplemental Treatment
1-5	3[1]	2[2]
6 - 120	2[2]	2[3]

[1] 24-inch sand thickness
[2] 12-inch sand thickness
[3] 6-inch sand thickness

3. **Percolation Rate**. Average percolation rate for PDST systems shall be within the range of 1 to 120 minutes per inch (MPI), as determined in accordance with standard percolation requirements for conventional dispersal trenches.

4. **Ground Slope**.

    a) Maximum ground slope in areas used for shallow PDST systems shall be 40 percent.

    b) Any PDST system located on slopes greater than 20 percent shall require the completion of a geotechnical report and slope stability analysis as specified in Santa Clara County Code section B11-83.

5. **Dual System**. Per Santa Clara County Code section B11-67(d), two PDST dispersal fields, each one hundred percent of the total size required for the design sewage flow, shall be installed and interconnected with an approved flow diversion device (pressure-rated), intended to allow alternate use of the two fields.

D. DESIGN CRITERIA

1. **Treatment**. The following treatment requirements shall apply in connection with the use of PDST systems:

    a. Primary (septic tank) treatment shall be the minimum level of treatment, and shall be acceptable where the applicable vertical separation distances are met per **Table PDST-1**.

    b. Supplemental treatment, using an approved alternative treatment system identified in this Manual, may be used to allow compliance with reduced vertical separation distances as provided in **Table PDST-1**.

2. **Design Sewage Flow**: PDST systems shall be designed on the basis of the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 3 of this Manual.

3. **Pressure Dosing**. Septic tank effluent shall be applied to the PDST system by pressure dosing, utilizing either an automatic dosing siphon or pump system. The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:

    a. Uniform dosing of septic tank effluent throughout the system of PDST trenches;

b. Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;

c. Suitable access provisions for inspection, testing and adjustment of the pressure distribution system; and

d. Dosing volume to achieve minimum of 3 to 5 doses per day at design flow conditions.

Additional requirements for design and construction of pressure distribution piping systems contained in "Guidelines for Shallow Pressure Distribution Systems" shall also apply.

4. **Pump System.** The pump system shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and constructed in accordance with pump system requirements provided in Part 3 of this Manual.

5. **Drainfield Trenches.** PDST drainfield trenches shall conform to the same design and construction requirements as shallow PD trenches, per this Manual, with the exception that the trench filter material (below the distribution pipe) shall consist of a minimum of 6 inches of double-washed pea gravel underlain by 6 to 24 inches of medium sand fill, per **Table PDST-1** and paragraph D.7.b.

6. **Trench Width.** Trench widths for PDST systems be as follows:

a. For septic tank effluent: 18 to 36 inches

b. With supplemental treatment: 12 to 36 inches

7. **Sand Fill**.

a. **Sand Specifications**. The sand media shall be a medium to coarse sand that meets the following gradation specifications:

Sieve Size	Percent Passing
3/8	100
#4	90 – 100
#10	62 – 100
#16	45 – 82
#30	25 – 55
#50	5 – 20
#60	0 – 10
#100	0 – 4
#200	0 – 2

Documentation of laboratory sieve analysis results for the proposed sand fill material shall be supplied to DEH to verify conformance with the above specifications.

b. **Depth of Sand**. The minimum depth of sand below the drain rock shall be as follows:

i. For septic tank effluent:
- 1-5 MPI percolation: 24”
- 6-120 MPI percolation: 12”

ii. With supplemental treatment:
- 1-5 MPI percolation: 12”
- 6-120 MPI percolation: 6”

8. **Wastewater Application Rates.** Wastewater application rates used for system sizing shall include consideration of both the: (a) pea gravel –sand interface; and (b) sand-soil interface, bottom area only. The more restrictive criterion shall govern system sizing.

a. **Pea Gravel – Sand Interface.** The wastewater application rate used for sizing the pea gravel-sand interface shall be:

i. 1.2 gpd/ft^2 for individual residential OWTS.

ii. 1.0 gpd/ft^2 for commercial, industrial, institutional and multi-residential OWTS.

b. **Sand – Soil Interface.** The wastewater application rate for sizing the sand-soil interface (considering bottom area only) shall be based upon representative percolation test results for the soil zone corresponding with trench bottom depth as shown in **Table PDST-2**.

Table PDST-2. Wastewater Application Rates[1]

Percolation Rate (MPI)	Wastewater Loading Rate (gpd/ft^2)
1-5	1.2
10	1.2
24	1.2
30	1.12
45	0.68
60	0.53
90	0.25
91-120	0.2

[1] Interpolate between reference values for other percolation rates; see end of Part 4 an expanded table listing interpolated values.

Reduction in the above wastewater loading rates or other provisions to insure the long-term integrity and performance of the PDST trenches may be required for high

strength waste flows, such as from restaurants.

9. **Trench Sizing**. The required square footage of trench infiltrative surface shall be calculated based on the design flow and the applicable wastewater application rates per paragraphs 8a and 8b. The required length of trench shall be calculated based on the bottom area only, up to a maximum of 3 square feet of effective infiltrative surface per lineal foot of trench.

10. **Inspection Wells**. A minimum of three (3) inspection wells shall be installed within and around PDST systems for the purpose of checking groundwater levels periodically, and may also be used for water quality sampling, as needed. Inspection wells shall extend to a depth of 3 feet below the bottom of the PDST trenches or to contact with impermeable materials, whichever is less. The inspection wells shall be located and constructed as follows:

    a. One shall be located upslope of the dispersal field, typically 10 to 15 away, to serve as a background or control well;

    b. One shall be located within the dispersal field, typically between trenches near the center of the field;

    c. One shall be located down-slope of the dispersal field, typically 10 to 25 feet horizontally from the lowest trench(es), and positioned to provide a representative point for monitoring the area estimated to be in the probable flow path of percolating wastewater;

    d. Inspection wells shall be constructed of 2" to 4" diameter pipe, equipped with a wrench-tight cap or pipe plug and a bottom cap. All wells shall be perforated beginning at a depth of 18 inches below grade and extending to the bottom of the pipe. Perforations shall consist of hacksaw slots at nominal 1" spacing, or equivalent commercially-slotted pipe. To prevent surface water infiltration, inspection wells shall be sealed with a bentonite or concrete annular seal (or equivalent) to a depth of 12 inches, minimum.

11. **Trench Inspection Wells**. A minimum of two (2) inspection wells shall be installed within each trench for the purpose of checking ponded water levels periodically. One well shall extend to the trench bottom, and a second well shall extend to pea gravel-sand fill interface. The trench inspection wells shall preferably be located at the end of each trench.

E. ENGINEERING PLANS AND CONSTRUCTION

1. **Reference Guidelines**. In addition to the requirements set forth herein, design and construction of PDST systems shall generally follow guidelines contained in the following references:

a. "Onsite Wastewater Treatment Systems Manual", U.S. Environmental Protection Agency, February 2002 and as amended.

b. "Design Manual – Onsite Wastewater Treatment and Disposal Systems", U.S. Environmental Protection Agency, October 1980.

2. **Engineering Plans.** Engineering plans for PDST systems shall include:

   a. All relevant elevation data and hydraulic calculations.

   b. Specific step-by-step construction guidelines and notes for use by the installer.

   c. Erosion control plan for any site over 20% slope, utilizing cover fill or with design flow >1,000 gpd;

   d. Recommended make and model of all components;

   e. Recommended pump system components with cut-sheet depicting float settings;

   f. Control panel programming;

   g. An inspection schedule listing critical control points.

3. **Construction Inspection.** At a minimum, inspection of the PDST system installation should include the following. This is in addition to inspection work required for a supplemental treatment system, if used. Joint inspection by the designer, contractor, and DEH may be required.

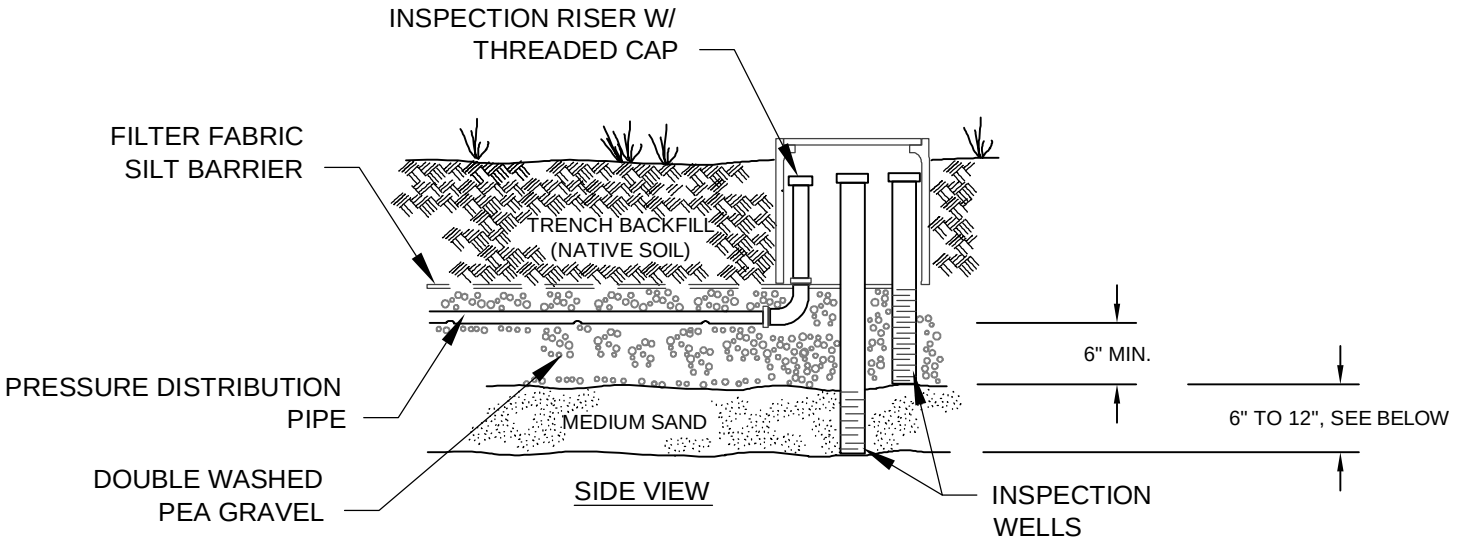
   - Pre-construction inspection where the construction staking or marking of the various system components is provided and construction procedures discussed;
   - Water tightness of septic tank and dosing (pump) tank;
   - Layout and excavation of dispersal trenches and piping;
   - Sand and drain rock materials and placement;
   - Piping installation and hydraulic ("squirt") test of the distribution system;
   - Functioning and setting of all control devices; and
   - Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all performance wells are installed; and erosion control has been completed.

F. MANAGEMENT REQUIREMENTS.

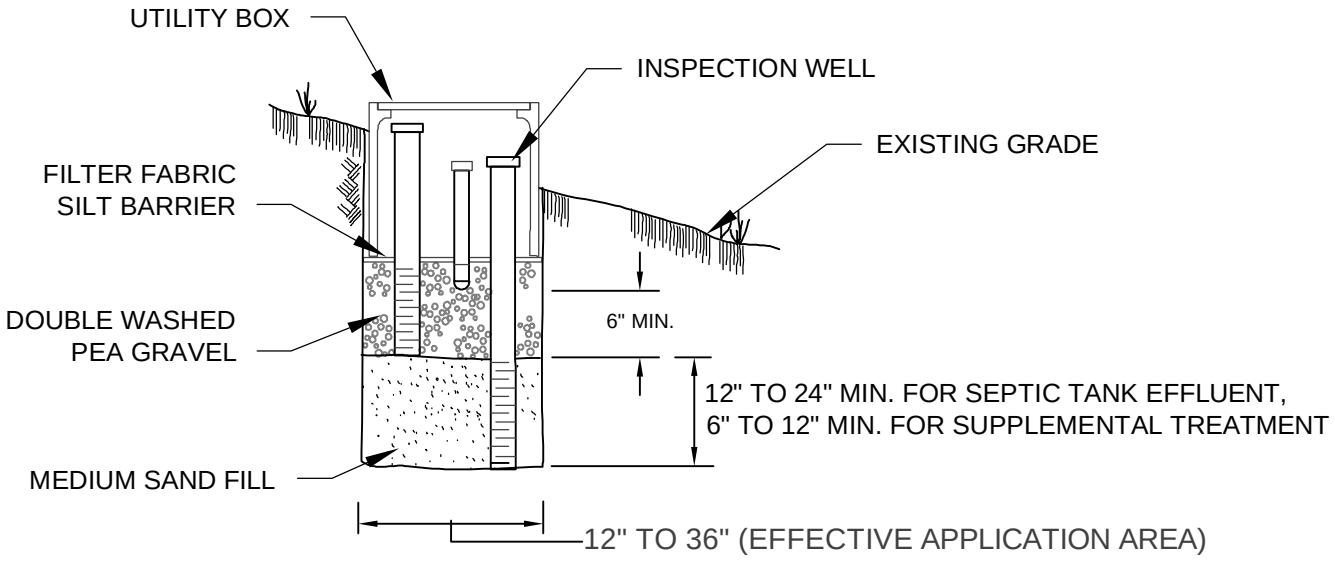
Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for pressure-dosed sand trench systems are outlined in **Table PDST-3.**

Table PDST-3. Pressure-dosed Sand Trench Management Requirements

	Work	Frequency
Inspection	• Conduct routine visual observations of disposal field and downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, or other problems. • Perform all inspections of pump and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual).	• Every 6 to 12 months.
Maintenance	• Purge laterals, squirt and balance. • Exercise valves to ensure functionality. • Perform all maintenance work as recommended by equipment manufacturer for any special valves or other components. • Investigate and repair erosion, drainage or other disposal field problems, as needed. • Investigate and perform distribution system corrective work, as required. • Record work done.	• Distribution system maintenance annually. • Other maintenance as required.
Water Monitoring & Sampling	• Measure and record water levels in (2) types of trench observation wells: 1) extending to the pea gravel-sand interface; and 2) extending to sand-soil interface. • Measure and record water levels in dispersal field monitoring wells, as applicable, per permit requirements. • Obtain and analyze water samples from monitoring wells, as applicable, per permit requirements.	• Report findings to County per permit requirements. • Report any continuous ponding at sand interface that may indicate the formation of restrictive biomat. • Standard report to include dates, observation well and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to County immediately.
Reporting	• Report findings to DEH per permit requirements. • Standard report to include dates, observation well and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to DEH immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.



SIDE VIEW



END VIEW

PRESSURE DOSED SAND TRENCH

GUIDELINES FOR
RAISED SAND FILTER BED

A. DESCRIPTION

A raised sand filter bed, sometimes referred to as a bottomless sand filter, combines features of an intermittent sand filter and a mound system. It consists of a raised or terraced sand bed, commonly supported by a low retaining wall or bulkhead, where the bottom surface is even with or slightly below ground surface and forms the absorption surface. This alternative is intended to be used only for repair or replacement OWTS, not to serve new construction. The system may be designed for use with or without supplemental treatment ahead of the raised sand bed. The raised sand filter bed provides additional polishing treatment and final dispersal of water into the ground.

B. CONSTRAINTS ADDRESSED

1. High groundwater;
2. Shallow soil over fractured rock or coarse alluvium
3. Shallow soil over impermeable soil or bedrock;
4. Slow percolation at standard dispersal trench depths;
5. Moderately steep slopes; and
6. Limited dispersal area.

C. SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for raised sand filter beds shall be those applicable to conventional disposal fields, as specified in Santa Clara County Code section B11-67.
2. **Vertical Separation Requirements.**
    a. **Depth to Groundwater.** Minimum depth to seasonal high groundwater shall be 2 feet below ground surface. For percolation rates faster than 5 mpi, depth to groundwater shall be 3 feet.
    b. **Soil Depth**. Minimum depth of soil, as measured from ground surface to impermeable soil or bedrock, shall be 2 feet. This soil depth requirement shall

apply within the disposal field and in the adjacent area extending a distance of 25-feet downslope of the raised sand filter bed.

c. **Depth to Fractured Rock**. Minimum depth of soil, as measured from ground surface to fractured, permeable rock or coarse alluvium, shall be 2 feet. This soil depth requirement shall apply within the disposal field and in the adjacent area extending a distance of 25-feet downslope of the raised sand filter bed.

3. **Percolation Rate**. Average percolation rate for raised sand filter bed systems shall be within the range of 1 to 60 minutes per inch (MPI), as determined from testing at 2 to 3 feet depth. These percolation requirements shall apply within the disposal field and in the adjacent area extending a distance of 25 feet downslope of the raised sand filter bed.

4. **Ground Slope**.

   a. Maximum ground slope for raised sand filter beds shall be 30%.

   b. Any raised sand filter bed system located on slopes greater than 20 percent shall require the completion of a geotechnical report and slope stability analysis as specified in Santa Clara County Code section B11-83.

5. **Dual System**. Per Santa Clara County Code section B11-67(d), two raised sand filter beds, each one hundred percent of the total size required for the design sewage flow, shall be installed and interconnected with an approved flow diversion device, intended to allow alternate use of the two beds.

D. DESIGN CRITERIA

1. **Treatment**. The following treatment requirements shall apply in connection with the use of raised sand filter bed systems:

   a. Primary (septic tank) treatment shall be the minimum level of treatment, and shall be acceptable where the design includes sand fill depth of 24 inches.

   b. Supplemental treatment, using an approved alternative treatment system identified in this Manual, may be used to allow reduction of the sand fill depth to 12 inches.

2. **Design Sewage Flow**. Raised sand filter bed systems shall be designed on the basis of the projected sewage flow, determined in accordance with sewage flow estimation guidelines in Part 3 of this Manual.

3. **Pressure Dosing**. Wastewater effluent from the supplemental treatment system shall be applied to the raised sand filter bed system by pressure dosing, utilizing a pump system. The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:

    a. Uniform dosing of effluent over the surface application area of the raised sand filter bed;

    b. Adequate flow rate, screening of effluent and suitable piping network to preclude solids accumulation in the pipes or clogging of discharge orifices;

    c. Suitable access provisions for inspection, testing and adjustment of the pressure distribution system;

    d. Dosing volume to achieve a minimum of 3 to 5 doses per day at design flow conditions; and

    e. At least one distribution lateral for every 36 inches of distribution bed width.

    Additional requirements for design and construction of pressure distribution piping systems contained in "Guidelines for Shallow Pressure Distribution Systems" shall also apply.

4. **Pump System.** The pump system shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and constructed in accordance with pump system requirements provided in Part 3 of this Manual.

5. **Containment Liner.** The raised sand filter bed shall be provided with an impermeable containment liner along all sides of the filter bed to prevent lateral leakage out of or into the filter. The liner shall extend a minimum of 12 inches below native grade. The liner shall consist of either: (a) 30 mil plastic; (b) reinforced poured-in-placed concrete; or (c) an equivalent impermeable structure.

6. **Finished Grade**. The finished grade of the raised sand filter bed shall be above the surrounding ground elevation. Above-ground installation shall be structurally supported with retaining wall(s), as required.

7. **Bed Width**. Maximum width of the sand bed shall be 10 feet.

8. **Shape**. The raised sand filter bed shall not be restricted as to its shape in plan view.

9. **Multiple Units**. The raised sand filter bed may be divided into compartments or multiple units.

10. **Sand Filter Media.**

a. **Sand Specification**. The sand media shall be a medium to coarse sand that meets the following gradation specifications:

Sieve Size	Percent Passing
3/8	100
#4	90 – 100
#10	62 – 100
#16	45 – 82
#30	25 – 55
#50	5 – 20
#60	0 – 10
#100	0 – 4
#200	0 – 2

Documentation of laboratory sieve analysis results for the proposed sand fill material shall be supplied to DEH to verify conformance with the above specifications.

b. **Sand Depth**. The minimum depth of sand fill, below the gravel distribution bed, shall be 24 inches for septic tank effluent, and 12 inches for supplemental treatment.

11. **Wastewater Application Rate**. The wastewater application rate used for sizing the basal area of the sand filter bed (i.e., sand-soil interface) shall vary according to soil percolation rate of the native soil as follows:

Table RB-1

Basal Wastewater Application Rates for Raised Sand Filter Beds[1]

Percolation Rate (MPI)	Wastewater Application Rate (gpd/ft^2)
1-5	1.2
10	1.2
24	1.2
30	1.12
45	0.68
60	0.53
90	0.25
91-120	0.2

[1] Interpolate between reference values for other percolation rates; See end of Part 4 for an expanded table listing interpolated values.

Reduction in the above wastewater loading rates or other provisions to insure the long-term integrity and performance of the raised sand filter bed may be required for high strength waste flows, such as from restaurants.

12. **Minimum Basal Area Sizing.** Minimum size (ft^2) of the basal area of the raised sand filter bed shall be determined by dividing the design wastewater flow (in gpd) by the applicable wastewater loading rate per **Table RB-1**.

13. **Linear Loading Rate.** The length of the raised bed shall be sized to meet maximum linear loading rate criterion as follows:

    a. **Effective Length**. The effective length (L) of the raised bed for determining the linear loading rate shall be the total length of the raised bed along the downslope edge.

    b. **Wastewater Flow**. The wastewater flow used for determining the linear loading rate shall be as follows:

        - 100 gpd/bedroom for residential septic systems (note: 150 gpd/bedroom used for system design);
        - design sewage flow rate for commercial, institutional, industrial and multi-residential septic systems.

    c. **Loading Rate**. Maximum linear loading rates for raised sand filter bed systems sizing shall vary according to soil depth, ground slope, and percolation rate as indicated in **Table RB-2.** If a variance from these criteria is proposed, it must be supported by detailed groundwater mounding analysis carried out in accordance with accepted methodology and/or scientific references dealing with water movement in soils and utilizing site specific hydraulic conductivity data.

Table RB-2. Maximum Linear Loading Rates (gpd/lineal foot)

Soil Depth (ft)	Ground Slope (%)	Percolation Rate (MPI)		
		1-30	31-60	61-120
2 to 2.5	0-10	5	4	3
	11-20	6	5	4
2.5 to 3	0-10	7	6	5
	11-20	8	7	6
3 to 4	0-10	9	8	7
	11-20	10	9	8
> 4	0-10	11	10	9
	11-20	12	11	10

14. **Gravel Distribution Bed.**
    a. **Material**. The distribution bed shall consist of 3/8-inch double-washed pea gravel, substantially free of fines.

    b. **Depth**. Pea gravel shall extend a minimum of 6 inches below the invert and 2 inches above the top of the distribution piping. If the distribution piping is installed with chambers, the pea gravel depth below the distribution pipe may be reduced from 6 inches to 4 inches, and the 2-inch pea gravel cover may be eliminated.

15. **Silt Barrier**. The gravel distribution bed shall be either polyester, nylon or polypropylene, or any combination thereof, and shall be suitable for underdrain applications. Filter fabric shall be non-woven, shall not act as a wicking agent and shall be permeable.

16. **Soil Cover**.
    a. **Material**. A soil cover shall be placed over the distribution bed, consisting of a medium, loamy-textured soil.

    b. **Depth**. Soil cover depth shall be a minimum of 12 inches and a maximum of 18 inches over the top of the distribution bed. Soil cover shall be crowned or sloped to promote rainfall runoff.

17. **Inspection Wells**. A minimum of four (4) inspection wells shall be installed within and around raised sand filter bed as follows:

    a. One shall be located near the center of the raised bed, extending from the fill surface to the bottom of the gravel distribution bed.
    b. One shall be located near the center of the raised bed, extending from the fill surface to the sand-soil interface.
    c. One shall be located 5 to 10 feet upslope of the raised bed system, midway along the length of the at-grade, extending from the ground surface to a depth of 5 feet or to contact with impermeable materials, whichever is less.
    d. One shall be located midway along the downslope length of the raised bed, within 10 to 15 feet from the edge of the bed, extending from ground surface to a depth of 5 feet or to the depth of impermeable materials, whichever is less.
    e. Inspection wells shall be constructed of 2" to 4" diameter pipe (or equivalent), equipped with a wrench-tight cap or pipe plug and a bottom cap. All wells shall be perforated beginning at a depth of 18 inches below grade and extending to the bottom of the pipe. Perforations shall consist of hacksaw slots at nominal 1" spacing

or commercially-slotted pipe. Inspection wells shall be sealed with a bentonite or concrete annular seal (or equivalent) to prevent surface infiltration.

E. ENGINEERING PLANS AND CONSTRUCTION

1. **Engineering Plans.** Engineering plans for raised sand filter bed systems shall include:
   a. All relevant elevation data and hydraulic calculations;
   b. Design layout and details for sand filter bed construction;
   c. Specific step-by-step construction guidelines and notes for use by the installer;
   d. Erosion control plan;
   e. Recommended make and model of all components;
   f. Recommended pump system components with cut-sheet depicting float settings;
   g. Control panel programming; and
   h. An inspection schedule listing critical control points.

2. **Construction Inspection.** At a minimum, inspection of the raised sand filter bed system installation should include the following. This is in addition to inspection work required for a supplemental treatment system, if used. Joint inspection by the designer, contractor, and DEH may be required.

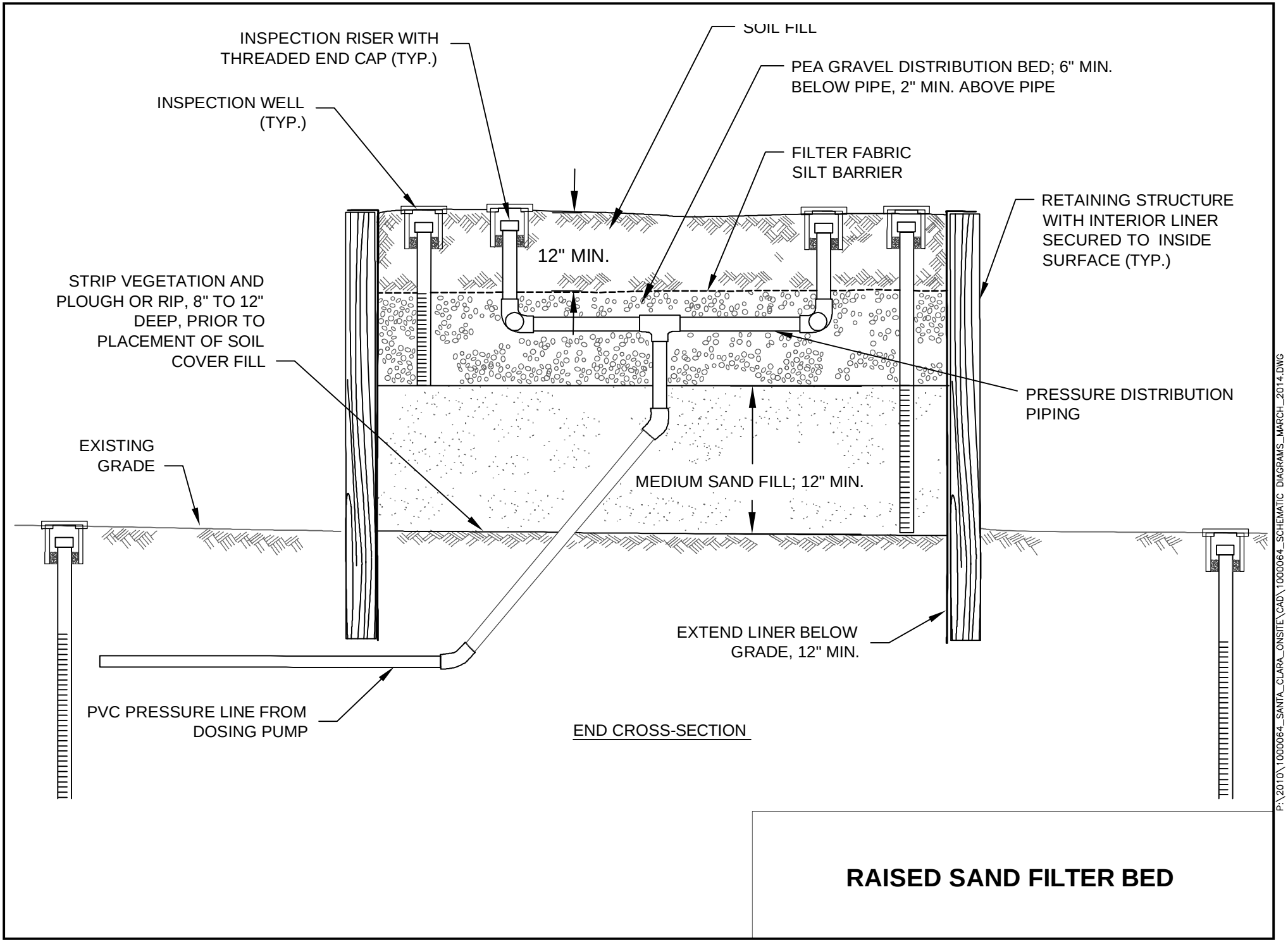
   - Pre-construction inspection where the construction staking or marking of the raised sand filter bed is provided and construction procedures discussed;
   - Water tightness of dosing (pump) tank;
   - Raised sand bed dimensions, structure and liner;
   - Sand material and placement;
   - Piping installation and hydraulic ("squirt") test of the distribution system;
   - Function and setting of all control devices.
   - Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed, and erosion control has been completed.

F. MANAGEMENT REQUIREMENTS

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for pressure-dosed sand trench systems are outlined in **Table RB-3.**

Table RB-3. Raised Sand Filter Bed System Management Requirements

	Work	Frequency
Inspection	• Conduct routine visual observations of sand filter bed system and perimeter area and surroundings for wet areas, pipe leaks or damage, structural condition of filter bed, soil erosion, drainage issues, abnormal vegetation, gophers or other absorption field problems. • Perform all inspections of pump and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual). • Record observations.	• Every 6 to 12 months.
Maintenance	• Purge laterals, squirt and balance. • Exercise valves to ensure functionality. • Perform all maintenance work as recommended by equipment manufacturer for any special valves or other components. • Maintain sand filter bed surface landscape vegetation, as req'd. • Investigate and repair erosion, drainage, structural problems or other problems, as needed. • Investigate and perform distribution system corrective work, as req'd • Record work done.	• Distribution system maintenance annually. • Other maintenance as required.
Water Monitoring & Sampling	• Measure and record water levels in observation wells in distribution bed, sand fill and around system perimeter. • Obtain and analyze water samples from monitoring wells, as applicable, per permit requirements.	• Measure system water levels annually. • Other monitoring according to permit conditions, as applicable.
Reporting	• Report findings to DEH per permit requirements. • Standard report to include dates, observation well and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to DEH immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.



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RAISED SAND FILTER BED

GUIDELINES FOR
SUBSURFACE DRIP DISPERSAL

A. DESCRIPTION

Subsurface drip dispersal is a method for disposal of treated wastewater that uses special drip tubing designed for use with wastewater. The dripline is placed normally 8 to 12 inches below ground surface and makes use of the most biologically active soil zone for distribution, nutrient uptake and evapotranspiration of the wastewater. A drip dispersal system is comprised of small-diameter (½" to 1") laterals ("driplines"), usually spaced about 24 inches apart, with small-diameter emitters (1/8") located at 12 to 24 inches on-center along the dripline. Effluent is conveyed under pressure to the laterals, normally with timed doses. Prior to dispersal the effluent requires supplemental treatment.

Drip dispersal has several advantages, including: (a) it can be effective in very shallow soil conditions since it distributes the wastewater very uniformly to substantially all of the available soil in the field; (b) it can be installed in multiple small discontinuous "zones", allowing the hydraulic load to be spread widely rather than concentrated in one main area; (c) installation on steeper slopes causes less soil disturbance and erosion or slope stability hazards; and (d) water movement away from the drip emitters is substantially by unsaturated/capillary flow, which maximizes contact with and treatment by the soil.

B. CONSTRAINTS ADDRESSED

1. High groundwater;
2. Shallow soil over impermeable soil or bedrock;
3. Shallow soil over fractured rock or coarse alluvium;
4. Slow percolation at standard dispersal trench depths;
5. Steep slopes;
6. Limited dispersal area; and
7. Large and/or dense tree cover.

C. SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for drip dispersal systems shall be those applicable to conventional disposal fields, as specified in Santa Clara County Code section B11-67.

2. **Vertical Separation Requirements.**

    a. **Depth to Groundwater.** Minimum depth to seasonal high groundwater, as measured from the bottom of the dripline, shall vary according to soil percolation rate as follows:

Percolation Rate, MPI	Depth to Groundwater
1-5	3 feet*
6-120	2 feet

*Note: Where drip dispersal field is combined with a raised sand filter bed, the depth to groundwater may be reduced to 2 feet, as measured from ground surface.

    b. **Soil Depth**. Minimum depth of soil, as measured from the bottom of the dripline to impermeable soil or rock, shall be 2 feet.

3. **Percolation Rate**. Percolation rates for subsurface drip dispersal systems shall be within the range of 1 to 120 minutes per inch (MPI), as determined by testing at depths of 12" to 24".

4. **Ground Slope**.

    a. Maximum ground slope in areas used for drip dispersal shall be 50 percent.

    b. Any drip dispersal system located on slopes greater than 20 percent shall require the completion of a geotechnical report and slope stability analysis as specified in Santa Clara County Code section B11-83.

5. **Dual System**. Per Santa Clara County Code section B11-67(d), two drip dispersal fields, each one hundred percent of the total size required for the design sewage flow, shall be installed and interconnected with an approved flow diversion device (pressure-rated), to allow alternate or combined use of the two fields.

D. DESIGN CRITERIA

1. **Treatment**: The following treatment requirements shall apply in connection with the use of subsurface drip dispersal systems:

    a. Wastewater effluent discharged to any drip dispersal system shall be treated to at least a secondary level through an approved supplemental treatment system, in accordance with applicable guidelines provided in this Manual.

    b. All drip dispersal systems shall include a filtering device capable of filtering particles larger than 100 microns; this device shall be located downstream of the supplemental treatment system.

2. **Design Sewage Flow**: Subsurface drip dispersal systems shall be designed on the basis of the projected sewage flow for the structure or facility being served, determined in accordance with sewage flow estimation guidelines in Part 3 of this Manual.

3. **Wastewater Application Rates:** Wastewater application rates used for sizing drip dispersal fields shall be based on soil percolation rate in accordance with the criteria in **Table DD-1.** In applying these criteria, the wastewater application area refers to the ground surface area encompassed by the drip dispersal field.

Table DD-1. Wastewater Application Rates for Subsurface Drip Dispersal Fields

Soil Type*	Soil Percolation Rate (MPI)	Wastewater Application Rate (gpd/ft^2)
Coarse Sand	1-4	1.4
Fine Sand	5-10	1.2
Sandy Loam	11-20	1.0
Loam	21-30	0.7
Clay Loam	31-45	0.6
Silt-Clay Loam	46-60	0.4
Clay, non-swell	61-90	0.2
Clay, swell	91-120	0.1

*Soil types listed for reference information only; design shall be based on site-specific percolation data.

4. **Dripfield Sizing.**

   a. Minimum sizing of the dripfield area shall be equal to the design wastewater flow divided by the applicable wastewater application rate from **Table DD-1.**

   b. For sizing purposes, effective ground surface area used for drip field sizing calculations shall be limited no more than 4.0 square feet per drip emitter. For example, 200 lineal feet of dripline with emitters at 2-foot spacing would provide a total of 100 emitters (200/2) and could be used for dispersal to an effective area of up to 400 ft^2 (100 emitters x 4 ft^2/emitter). Conversely, if wastewater flow and percolation design information indicate the need for an effective area of 1,000 ft^2, the dripline design and layout would have to be configured to provide a minimum of 250 emitters spaced over the required 1,000 ft^2 dispersal area.

   c. Dripfields may be divided into multiple zones which may be located in different areas of a site, as desired or needed to provide the required dripfield size. A single continuous dripfield area is not required. However, any areas proposed for drip dispersal shall be supported by field observations/measurements to verify conformance with soil suitability and other site requirements. Differences in soil conditions and percolation characteristics from one zone to another may require the use of correspondingly different wastewater application rates and dripfield sizing for each zone.

5. **Pressure Dosing.** Secondary-treated effluent shall be delivered to the dripfield by pressure, employing a pump system and timed dosing. The pressure distribution system shall be designed in accordance with accepted engineering practices and manufacturer recommendations for drip dispersal systems to achieve, at a minimum:

    a. Uniform dosing of treated effluent;

    b. An adequate dosing volume and pressure per manufacturer's guidelines;

    c. Adequate flow rate, final filtering of effluent and suitable piping network to preclude solids accumulation in the pipes and driplines or clogging of discharge emitters;

    d. A means of automatically flushing the filter and driplines at regular intervals; and

    e. Suitable access provisions for inspection, testing and adjustment of the dripfield and components.

    Additional requirements for design and construction of pressure distribution piping systems contained in "Guidelines for Shallow Pressure Distribution Systems" shall also apply.

6. **Pump System:** The pump system shall be: (a) appropriate for sewage applications; (b) of the size and type to meet the hydraulic design requirements; and (c) designed and constructed in accordance with pump system requirements provided in Part 3 of this Manual.

7. **Dripline Material:** Dripline shall be manufactured and intended for use with secondary quality wastewater, with minimum 45 mil tubing wall thickness, bacterial growth inhibitor(s), and means of protection against root intrusion.

8. **Dripfield Layout:** The bottom of each dripline row shall be level and parallel to the slope contour.

9. **Dripline Depth: The** dripline depth shall be installed at a depth between eight and twelve inches below native grade. Deeper placement of driplines may be considered by DEH on a case-by-case basis.

10. **Length of individual driplines**: The maximum dripline length shall be designed in accordance with accepted engineering practices and in accordance with the manufacturer's criteria and recommendations.

11. **Line and Emitter Spacing:** Line and emitter spacing shall be designed as appropriate for soil conditions, slope, and contour. Emitters shall be located at no less than 12" from the supply and return manifolds.

12. **Dual System Operation.** Unless exempted by the Director, all drip dispersal systems shall be installed as dual (200% capacity) drip fields, and shall normally be operated with both fields in use. Doses may be alternated among different zones in both the primary and

secondary fields, or all zones may be dosed simultaneously. Secondary drip fields should not be left dormant for long periods of time (e.g., more than a few weeks at a time).

13. **Inspection Wells**. A minimum of three (3) inspection wells, minimum 3 feet in depth, shall be installed for the purpose of monitoring groundwater levels or for water quality sampling within and around subsurface drip dispersal fields as follows:
    a. One well shall be located within the dripfield area.
    b. One well shall be located 10 to 15 feet up-gradient of the dripfield.
    c. One well shall be located 10 to 15 feet down-gradient of the dripfield.
    d. Inspection wells shall be constructed of 2" to 4" diameter pipe (or equivalent), equipped with a wrench-tight cap or pipe plug and a bottom cap. All wells shall be perforated beginning at a depth of 12 inches below grade and extending to the bottom of the pipe. Perforations shall consist of hacksaw slots at nominal 1" spacing, or equivalent commercially-slotted pipe. Inspection wells shall be sealed with a bentonite or concrete annular seal (or equivalent) to prevent surface infiltration.

E. ENGINEERING PLANS AND CONSTRUCTION

1. **Reference Guidelines.** Installation of subsurface drip dispersal systems shall be in accordance with applicable manufacturer guidelines and recommendations.
2. **Engineering Plans.** Engineering plans for subsurface drip dispersal systems shall include:
    a. All relevant elevation data and hydraulic calculations;
    b. Specific step-by-step construction guidelines and notes for use by the installer;
    c. Erosion control plan for any site over 20%, utilizing cover fill or with design flow >1,000 gpd;
    d. Recommended make and model of all components;
    e. Recommended pump system components, with cut-sheet depicting float settings;
    f. Control panel programming; and
    g. An inspection schedule listing critical control points.
3. **Construction Inspection.** At a minimum, inspection of the drip dispersal system installation should include the following. This is in addition to inspection work required for the treatment system. Joint inspection by the designer, contractor, and DEH may be required.
    - Pre-construction inspection where the construction staking or marking of the drip lines, supply and return piping, pump system and appurtenances is provided and construction procedures discussed;

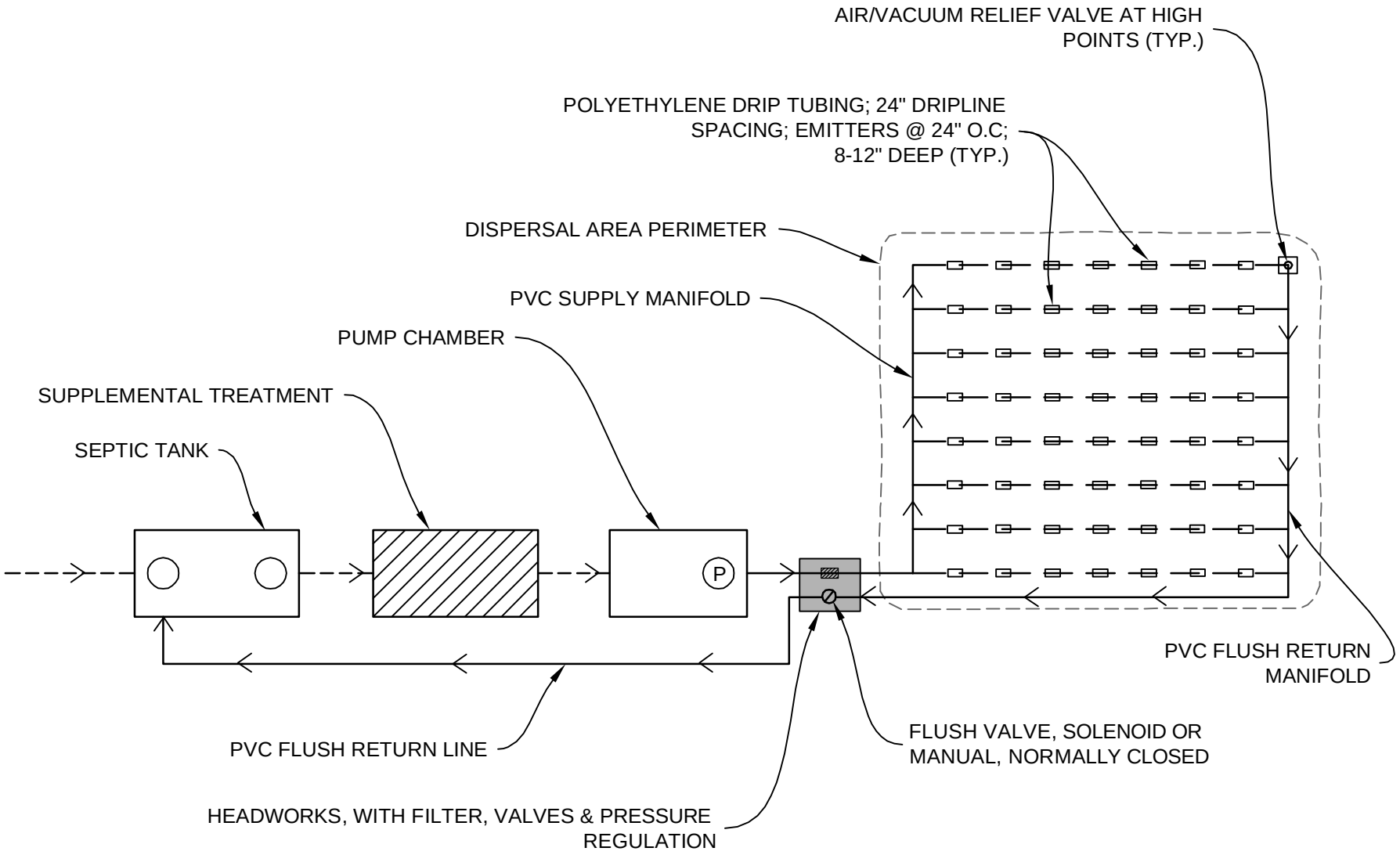
- Water tightness of effluent dosing (pump) tank;
- Drip field layout, piping materials and installation, and all associated valves and connections;
- Hydraulic testing of the drip system;
- Functioning and setting of all control devices; and
- Final Inspection to verify that all construction elements are in conformance with the approved plans, specifications, and manufacture recommendations; all inspection wells are installed; and erosion control has been completed.

F. MANAGEMENT REQUIREMENTS

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for subsurface drip dispersal systems are outlined in **Table DD-2.**

Table DD-2. Drip Dispersal System Management Requirements

	Work	Frequency
Inspection	• Conduct routine visual observations of drip field, downslope area and surroundings for wet areas, pipe leaks or damage, soil erosion, drainage issues, abnormal vegetation, gophers or other problems. • Conduct routine physical inspections of system components, including valves, filters, and headworks box(es). • Perform special inspections of drip field at time of any landscaping work or other digging in drip field area. • Perform inspections of dosing pump(s) and appurtenances (per O&M manual and Performance Evaluation Guidelines, Part 5 of this Manual). • Record observations.	• Every 6 to 12 months.
Maintenance	• Manually remove and clean filter. • Clean and check operation of pressure reducing valves. • Clean flush valves and vacuum release valves.	• Clean filter every 6 months. • Other maintenance annually.
Water Monitoring & Sampling	• Measure and record water levels in dispersal field monitoring wells, as applicable, per permit requirements. • Obtain and analyze water samples from dispersal field monitoring wells, as applicable, per permit requirements.	• According to permit conditions, if applicable.
Reporting	• Report findings to DEH per permit requirements. • Standard report to include dates, monitoring well and other data collected, work performed, corrective actions taken, and performance summary. • Report public health/water quality emergency to DEH immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.



DRIP DISPERSAL SYSTEM SCHEMATIC

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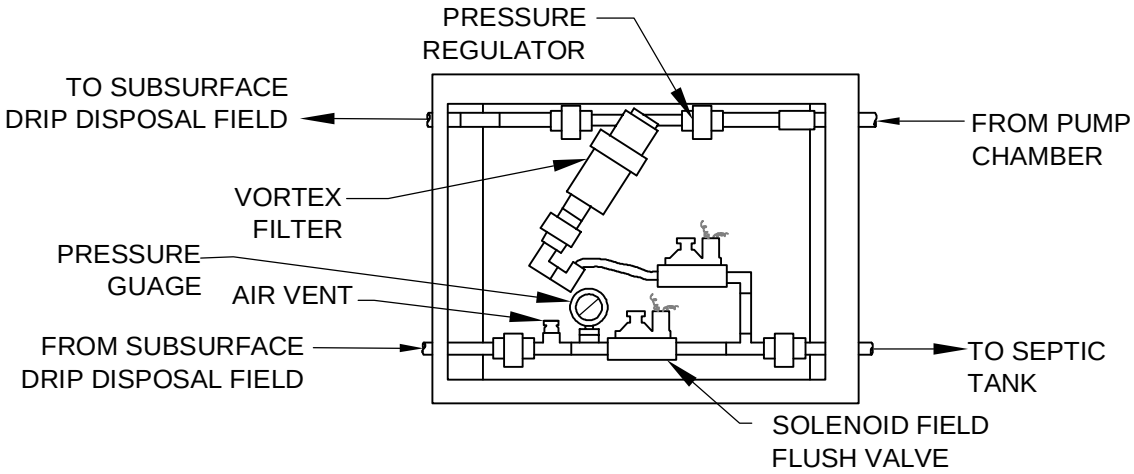
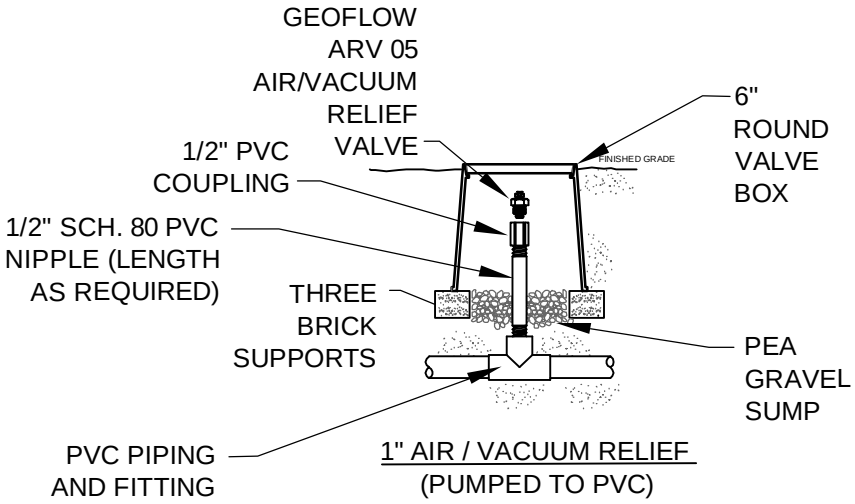
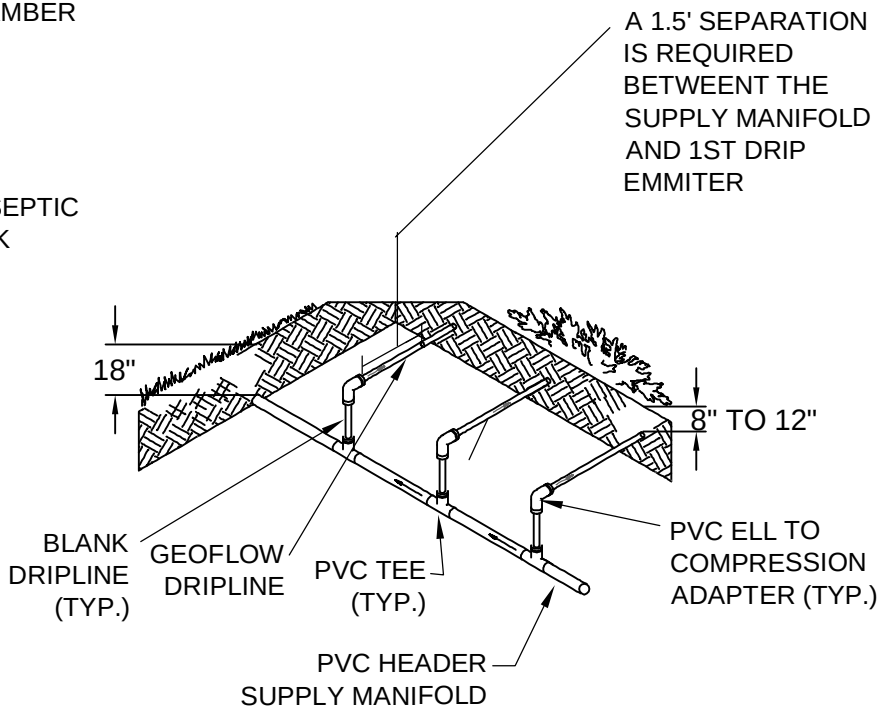


AUTOMATIC HEADWORKS



1" AIR / VACUUM RELIEF
(PUMPED TO PVC)



END FEED/ FLUSH MANIFOLD

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DRIP DISPERSAL DETAILS

ATTACHMENT A

Expanded

Wastewater Application Rate

Tables

Table 1. Standard Wastewater Application Rates - Septic Tank Effluent				
Percolation Rate (MPI)	**Application Rate (gpd/ft^2)**		**Percolation Rate (MPI)**	**Application Rate (gpd/ft^2)**
1 to 5	1.20		51	0.41
6	1.12		52	0.40
7	1.04		53	0.40
8	0.96		54	0.39
9	0.88		55	0.38
10	0.80		56	0.38
11	0.78		57	0.37
12	0.77		58	0.36
13	0.75		59	0.36
14	0.74		60	0.35
15	0.72		61	0.35
16	0.70		62	0.34
17	0.68		63	0.34
18	0.67		64	0.34
19	0.65		65	0.33
20	0.64		66	0.33
21	0.63		67	0.33
22	0.62		68	0.32
23	0.61		69	0.32
24	0.60		70	0.32
25	0.59		71	0.31
26	0.59		72	0.31
27	0.58		73	0.31
28	0.57		74	0.30
29	0.57		75	0.30
30	0.56		76	0.30
31	0.55		77	0.29
4	0.55		78	0.29
33	0.54		79	0.29
34	0.53		80	0.28
35	0.52		81	0.28
36	0.52		82	0.28
37	0.51		83	0.27
38	0.50		84	0.27
39	0.49		85	0.27
40	0.49		86	0.26
41	0.48		87	0.26
42	0.47		88	0.26
43	0.46		89	0.25
44	0.46		90	0.25
45	0.45		91-120	0.20
46	0.44			
47	0.44			
48	0.43			
49	0.43			
50	0.42			

Table 2. Enhanced Wastewater Application Rates - Supplemental Treatment

Percolation Rate (MPI)	Application Rate (gpd/ft^2)	Percolation Rate (MPI)	Application Rate (gpd/ft^2)
1-24	1.20	61	0.52
25	1.19	62	0.51
26	1.17	63	0.50
27	1.16	64	0.49
28	1.15	65	0.48
29	1.13	66	0.47
30	1.12	67	0.46
31	1.09	68	0.46
32	1.06	69	0.45
33	1.03	70	0.44
34	1.00	71	0.43
35	0.97	72	0.42
36	0.94	73	0.41
37	0.91	74	0.40
38	0.89	75	0.39
39	0.86	76	0.38
40	0.83	77	0.37
41	0.80	78	0.36
42	0.77	79	0.35
43	0.74	80	0.34
44	0.71	81	0.33
45	0.68	82	0.32
46	0.67	83	0.31
47	0.66	84	0.31
48	0.65	85	0.30
49	0.64	86	0.29
50	0.63	87	0.28
51	0.62	88	0.27
52	0.61	89	0.26
53	0.60	90	0.25
54	0.59	91-120	0.20
55	0.58		
56	0.57		
57	0.56		
58	0.55		
59	0.54		
60	0.53		

Table 3. Mound System Wastewater Application Rates (Basal Area)

Percolation Rate (MPI)	Application Rate (gpd/ft^2)	Percolation Rate (MPI)	Application Rate (gpd/ft^2)
1-24	1.20	61	0.52
25	1.19	62	0.51
26	1.17	63	0.50
27	1.16	64	0.49
28	1.15	65	0.48
29	1.13	66	0.47
30	1.12	67	0.46
31	1.09	68	0.46
32	1.06	69	0.45
33	1.03	70	0.44
34	1.00	71	0.43
35	0.97	72	0.42
36	0.94	73	0.41
37	0.91	74	0.40
38	0.89	75	0.39
39	0.86	76	0.38
40	0.83	77	0.37
41	0.80	78	0.36
42	0.77	79	0.35
43	0.74	80	0.34
44	0.71	81	0.33
45	0.68	82	0.32
46	0.67	83	0.31
47	0.66	84	0.31
48	0.65	85	0.30
49	0.64	86	0.29
50	0.63	87	0.28
51	0.62	88	0.27
52	0.61	89	0.26
53	0.60	90	0.25
54	0.59	91-120	0.20
55	0.58		
56	0.57		
57	0.56		
58	0.55		
59	0.54		
60	0.53		

Table 4. At Grade System - Wastewater Application Rates (Septic Tank Effluent)

Percolation Rate (MPI)	Application Rate (gpd/ft^2)	Percolation Rate (MPI)	Application Rate (gpd/ft^2)
1 to 5	1.20	51	0.41
6	1.12	52	0.40
7	1.04	53	0.40
8	0.96	54	0.39
9	0.88	55	0.38
10	0.80	56	0.38
11	0.78	57	0.37
12	0.77	58	0.36
13	0.75	59	0.36
14	0.74	60	0.35
15	0.72	61	0.35
16	0.70	62	0.34
17	0.68	63	0.34
18	0.67	64	0.34
19	0.65	65	0.33
20	0.64	66	0.33
21	0.63	67	0.33
22	0.62	68	0.32
23	0.61	69	0.32
24	0.60	70	0.32
25	0.59	71	0.31
26	0.59	72	0.31
27	0.58	73	0.31
28	0.57	74	0.30
29	0.57	75	0.30
30	0.56	76	0.30
31	0.55	77	0.29
4	0.55	78	0.29
33	0.54	79	0.29
34	0.53	80	0.28
35	0.52	81	0.28
36	0.52	82	0.28
37	0.51	83	0.27
38	0.50	84	0.27
39	0.49	85	0.27
40	0.49	86	0.26
41	0.48	87	0.26
42	0.47	88	0.26
43	0.46	89	0.25
44	0.46	90	0.25
45	0.45	91-120	0.20
46	0.44		
47	0.44		
48	0.43		
49	0.43		
50	0.42		

Note: Rates for 61-120 MPI only applicable where supplemental treatment provided.

Table 5. PDST Wastewater Application Rates

Percolation Rate (MPI)	Application Rate (gpd/ft^2)	Percolation Rate (MPI)	Application Rate (gpd/ft^2)
1-24	1.20	61	0.52
25	1.19	62	0.51
26	1.17	63	0.50
27	1.16	64	0.49
28	1.15	65	0.48
29	1.13	66	0.47
30	1.12	67	0.46
31	1.09	68	0.46
32	1.06	69	0.45
33	1.03	70	0.44
34	1.00	71	0.43
35	0.97	72	0.42
36	0.94	73	0.41
37	0.91	74	0.40
38	0.89	75	0.39
39	0.86	76	0.38
40	0.83	77	0.37
41	0.80	78	0.36
42	0.77	79	0.35
43	0.74	80	0.34
44	0.71	81	0.33
45	0.68	82	0.32
46	0.67	83	0.31
47	0.66	84	0.31
48	0.65	85	0.30
49	0.64	86	0.29
50	0.63	87	0.28
51	0.62	88	0.27
52	0.61	89	0.26
53	0.60	90	0.25
54	0.59	91-120	0.20
55	0.58		
56	0.57		
57	0.56		
58	0.55		
59	0.54		
60	0.53		

SANTA CLARA COUNTY ONSITE SYSTEMS MANUAL

PART 5

OPERATION, MONITORING AND MAINTENANCE

PART 5
OPERATION, MONITORING AND MAINTENANCE

CONTENTS

1. OWTS PERFORMANCE REQUIREMENTS

A. GENERAL PERFORMANCE CRITERIA

1. All onsite wastewater treatment systems (OWTS) shall function in such a manner as to:

   a) Be sanitary and not create a health hazard or nuisance;

   b) Prevent backup or release of wastewater or wastewater effluent into the structure(s) being served by the OWTS; and

   c) Not discharge wastewater or wastewater effluent onto the ground surface or into surface water, or in such a manner that groundwater may be adversely impacted.

2. All OWTS and the individual components shall meet the performance requirements for the specific site conditions and application for which they are approved.

3. All OWTS shall be operated in compliance with applicable performance requirements particular to the type of system, the facility served, and the site conditions.

B. CONVENTIONAL SYSTEMS

1. All septic tanks shall be structurally sound, watertight, provide clarified effluent, have adequate space available for sludge and scum storage, operate in such a manner as to not create odors or vector attraction, be properly vented, and have a functional baffle(s).

2. Dispersal systems shall: (a) have adequate dispersal capacity for the structures and/or uses served; (b) not result in seepage or saturated soil conditions within 12 inches of ground surface in or adjacent to the dispersal field; and (c) be free from soil erosion or instability.

3. Effluent shall not continuously pond at a level above the invert (bottom) of the perforated distribution pipe in the dispersal trench or serial distribution overflow line, as applicable.

4. All components of the OWTS shall be functional and in proper working order.

C. SUPPLEMENTAL TREATMENT

In addition to meeting criteria in A and B above, supplemental treatment systems shall comply with the following performance requirements.

1. **Effluent Quality**. Effluent produced by all supplemental treatment systems shall comply with the following minimum constituent limitations:

Constituent	(1) For Use with Trenches and At-grade Systems	(2) For Use with Drip Dispersal Systems	(3) Where Pathogen Removal Required*
Biochemical Oxygen Demand (BOD), mg/L	30	20	Per (1) or (2), as applicable
Total Suspended Solids (TSS), mg/L	30	20	Per (1) or (2), as applicable
Fecal Coliform, MPN/100 ml	N/A	N/A	200

*Due to proximity to public water supply well or surface water intake per SWRCB OWTS Policy and Section B11-67(i)(6), Santa Clara County Code; where applicable, additional requirements include: (a) minimum 3-ft separation to groundwater below dispersal field; and (b) minimum 12 inches of soil cover over dispersal piping.

2. **Sand Filters.** Sand filters shall:

    a. be operated to maintain uniform effluent distribution throughout the sand filter bed;

    b. not result in continuously ponded effluent on the distribution bed infiltrative surface;

    c. be operated and maintained to prevent channeling of flow, erosion of the sand media or other conditions that allow short-circuiting of effluent through the system;

    d. not result in leakage of effluent through the sand filter liner or supporting structure; and

    e. conform to applicable requirements for pressure distribution in D.1 below.

3. **Proprietary Treatment Units.** Proprietary treatment units shall comply with the following:

    a. The unit and its components shall be structurally sound, free from defects, be watertight, and not create odor or vector attraction nuisance.

    b. The unit shall be operated in accordance with the approved manufacturer and certification/listing organization standards.

D. ALTERNATIVE DISPERSAL SYSTEMS

In addition to the requirements in A and B above, alternative dispersal systems shall also comply with the following.

1. **Pressure Distribution Systems.**

    a) Pump tanks, risers and lids shall be structurally sound, watertight and store wastewater effluent in such a manner as to not create odors or vector attraction.

    b) Pumps, floats, alarms and associated controls shall be in good condition and operate in accordance with design specifications.

    c) Dispersal field and components shall:

        1) be operable and in good condition;

        2) maintain uniform distribution of effluent throughout the dispersal field;

        3) not result in continuously ponded effluent in the dispersal trench (or bed) to a level above the invert (bottom) of the distribution pipe; and

        4) in the case of pressure-dosed sand trenches, not result in continuously ponded effluent above the sand interface.

2. **Mound, At-Grade and Raised Sand Bed Systems**. Mound, at-grade and raised sand bed systems shall:

    a) not result in seepage or saturated soil conditions within 12 inches of ground surface anywhere along the perimeter toe or edge of the system;

b) be free from erosion, slumping or damage to the soil cover;

c) not result in continuously ponded effluent within the gravel distribution bed or in the sand fill (for mounds and raised sand bed systems); and

d) conform to applicable requirements for pressure distribution in D.1 above.

3. **Subsurface Drip Dispersal Systems**. Subsurface drip dispersal systems and components shall:

a) not result in seepage or saturated soil conditions above the depth of the dripline within or anywhere along the perimeter of the dripfield;

b) be free from erosion, slumping or other soil disturbance that threatens to expose or cause damage to drip dispersal tubing or appurtenances;

c) conform to applicable requirements for pressure distribution in D.1 above; and

d) be operated and maintained in accordance with manufacturer recommendations.

2. OWTS MONITORING REQUIREMENTS

A. GENERAL

A monitoring program will be established for each alternative OWTS as a condition of the operating permit at the time of permit issuance, and may be amended at the time of permit renewal. Said monitoring shall be performed to ensure that the alternative OWTS is functioning satisfactorily to protect water quality and public health and safety.

B. MONITORING ELEMENTS

The monitoring requirements will vary depending on the specific type of alternative system, typically including the following:

1. Recoding of wastewater flow based on water meter readings, pump event counter, elapsed time meter, in-line flow meter, or other approved methods;

2. Measurement and recording of water levels in inspection/monitoring wells in the dispersal field;

3. Inspection and observation of pump operation and other mechanical equipment;

4. Water quality of selected water samples taken from points in the treatment process, from groundwater monitoring wells, or from surface streams or drainages; typical water quality parameters include total and fecal coliform, nitrate, BOD, and suspended solids;

5. General review and inspection of treatment and dispersal area for evidence of seepage, effluent surfacing, erosion or other indicators of system malfunction; and

6. Other monitoring as recommended by the system designer or equipment manufacturer.

C. MONITORING FREQUENCY

The required frequency of monitoring for each installation will be established in the operation permit, generally in accordance with the following minimum schedule:

- Years 1 through 4 of operation: semi-annual monitoring
- Years 5 and beyond: annual monitoring

Monitoring frequency may be increased for larger flow OWTS (e.g., >2,500 gpd) or where warranted because of the complexity of the design or sensitive nature of the site. Monitoring frequency may be increased for any system if problems are experienced.

D. MONITORING RESPONSIBILITY

Monitoring of alternative OWTS shall be conducted by or under the supervision of one of the following:

1. Registered Civil Engineer;
2. Professional Geologist;
3. Registered Environmental Health Specialist; or
4. Other onsite wastewater maintenance provider registered with the Department of Environmental Health and meeting qualifications as established in this Manual. Registration shall entail: (a) documentation of required qualifications; (b) participation in annual training/review conducted by the director; and (c) payment of an annual fee established by the Board of Supervisors.

Additionally, the director may require third-party or County inspection and monitoring of any alternative OWTS where deemed necessary because of special circumstances, such as the complexity of the system or the sensitive nature of the site. The costs for such additional monitoring would be the responsibility of the owner.

E. REPORTING

Monitoring results shall be submitted to the director in accordance with reporting guidelines provided in this Manual and as specified in the operating permit. The monitoring report shall be signed by the party responsible for the monitoring. Notwithstanding formal monitoring reports, the director shall be notified immediately of any system problems observed during system inspection and monitoring that threaten public health or water quality.

F. POST-SEISMIC INSPECTIONS

In addition to regular inspection and monitoring activities, post-seismic inspection and evaluation of alternative OWTS located in high-risk seismic areas will be required in the event of an earthquake causing significant ground shaking in the region, as determined by the director in consultation with the County geologist. The director will be responsible for

issuing appropriate notices when such inspections are required; those conducting the inspections will be required to report the inspection results to the director. The purpose of such inspections will be to assess and document any damage to the OWTS and to implement corrective measures, as needed, in a timely manner. Post-seismic inspection shall be in accordance with the standard inspection requirements specified in the applicable operating permit for each OWTS, along with any additional requirements that may be prescribed by the director, in consultation with the County geologist, based on the intensity, location and other aspects of the particular seismic event.

G. DATA REVIEW

The director will, from time-to-time, compile and review monitoring and inspection results for alternative OWTS and will provide a summary of results to the San Francisco Bay and Central Coast Regional Water Quality Control Boards at least once every five (5) years. Based on this review, the director may require corrective action for specific properties or certain types of alternative OWTS, or general changes in monitoring and inspection requirements.

3. OWTS PERFORMANCE EVALUATION GUIDELINES

A. PURPOSE AND PERFORMANCE CRITERIA

Santa Clara County Code section B11-84 (Life extending construction) requires the completion of an OWTS inspection and performance evaluation in connection with certain types or level of changes or additions to an existing building served by an OWTS. The guidelines to be followed for such inspections are prescribed below. These guidelines may also be useful and employed for other circumstances, such as OWTS inspections in connection with property transfers, for lending institutions, etc.

The purpose of these inspections is to determine, on an individual basis, whether an existing OWTS is functional and meets minimum standards of performance established by the County of Santa Clara Department of Environmental Health (DEH). The following performance criteria are established as minimum requirements:

1. There is no surfacing effluent at any time.

2. The effluent is not discharged directly to groundwater; i.e., the dispersal trenches do not extend to or below the seasonal high groundwater level.

3. There is always positive flow to the dispersal field from the septic tank, with no backup to the tank or house plumbing during high groundwater conditions.

4. There is an adequately sized septic tank for the structure being served and it must be serviceable - e.g. access risers for maintenance. The septic tank must be water tight and constructed of approved materials.

5. There is no indication that the existing OWTS is adversely affecting any beneficial uses of surface water or groundwater.

The following sets forth procedures for conducting performance evaluations, to assure consistency and thoroughness in verifying the functioning status of existing OWTS.

B. INSPECTION RESPONSIBILITY

The inspections shall be carried out by any of the following:

1. Registered Civil Engineer

2. Professional Geologist (also meeting the requirements of 4a or 4b below)

3. Registered Environmental Health Specialist

4. Other onsite wastewater maintenance providers registered with DEH and having experience in the construction and/or operation of OWTS as evidenced by either of the following:

   (a) possession of a valid contractor's license (A, C-36 or C-42);

   (b) completion of an onsite wastewater certification training course by a third party entity, such as the California Onsite Wastewater Association (COWA), National Association of Waste Transporters (NAWT), National Sanitation Foundation (NSF), or other acceptable training program as determined by the director.

   Registration shall require completion of an application form, demonstrated minimum qualifications, participation in an annual review/ training session conducted by the director, and payment of an annual fee. Registration shall require annual renewal.

The individual conducting the field inspection work shall be qualified in the operation and maintenance of OWTS and trained specifically in the testing and inspection procedures outlined in this document.

C. BACKGROUND DATA

Prior to conducting the onsite performance inspection available background information pertaining to the property, structures and septic system should be compiled and reviewed. This should include permit information, site plan, "As Built" drawings of the OWTS, prior inspection results, etc.

The site plan should show the location of the septic tank and dispersal field, the locations of all buildings, decks, cutbanks, creeks, wells, reserve or failsafe area, direction and percentage of slope, or any other items which may affect the OWTS. The reserve dispersal field area(s) should be identified and evaluated for any conflicting encroachment by buildings or other site development.

D. INITIAL SITE RECONNAISSANCE

Initially, the inspector should walk the property to confirm the location of the septic tank, dispersal field, and other pertinent features of the system. In verifying the dispersal field location, the length of each line and the depth of the drainpipe (below ground surface) should

also be determined for comparison with observed groundwater conditions. This may require probing with a metal rod or actual excavation to locate the pipe.

Site reconnaissance should also include a check of setbacks between the existing dispersal field and expansion areas and any man-made structures, e.g., to confirm no building foundations recently added within or too close to the existing dispersal field or expansion areas.

The septic tank and dispersal field areas should be checked for any obvious signs of existing system problems such a surfacing effluent, odors, greywater bypasses, selective fertility (i.e., lush vegetation in the dispersal field area) or any other condition that may suggest an existing or impending problem. The inspector should determine if the system has dual dispersal fields and, if so, locate and check the diversion valve: (a) to see that it is functional; and (b) to determine which field is in service. All observations should be noted.

As part of the initial site reconnaissance a hand-augured boring (3-inch minimum) should also be made within or adjacent to the dispersal field for observation of soils and groundwater conditions. An initial reading (i.e., depth to groundwater from ground surface) should be taken when the boring is made. The boring should then be left open for the remainder of the performance inspection so that a final reading may be taken after the water level has been allowed to stabilize for about 1 hour. The boring should be backfilled before leaving the site. If a hand-auger boring is not feasible and the area is known or estimated to have high groundwater conditions, a motorized drill rig or excavator may be necessary.

E. SEPTIC TANK INSPECTION

After the initial site reconnaissance has been conducted, the detailed inspection of the system should commence.

1. **Access Risers**

   First, locate the septic tank and determine if permanent access risers have been installed on the septic tank. If the tank is equipped with risers, check their general condition. Ideally, the risers should be properly grouted or sealed to the top of the septic tank to prevent groundwater and/or surface water intrusion. The lids of the risers should also be properly sealed to prevent odors or the entry of insects, (e.g., flies, mosquitoes, etc.). Any observed defects in the access risers should be noted. If the tank lacks access risers, this information should be so noted; and the property owner should be provided information about access risers and advised to have them installed.

2. **Opening the Tank**

After inspecting the access risers the septic tank lids should be carefully removed. Care must be taken if gardens and shrubs are near to prevent damage and to disturb the yard area as little as possible. Concrete lids are heavy and may be "cemented" in place by silt. A steel bar or other suitable tool may be needed to assist in opening the lids. During the tank inspection process, personnel should wear protective boots and gloves (neoprene) to guard against infection from pathogenic organisms.

3. **Structural Condition**

Once the tank is open, the inspector should observe and probe the structural condition of the septic tank to check for any obvious signs of cracking or other structural defects in the tank.

A steel rod is used to probe the walls and bottom of the tank. Normally, the tank will not need to be pumped-out to perform this procedure. The inlet and outlet sanitary "tees" should also be inspected to assure that they are in satisfactory condition, properly positioned, and free of scum accumulation, rocks, root matter or other obstructions. Any problems should be noted and the inspector should assess whether or not additional tests or observations are necessary to verify the structural integrity of the septic tank.

4. **Liquid Level**

The liquid level in the tank should be measured with respect to the outlet pipe. In a properly functioning system, the level in the tank should be even with the invert (i.e., bottom) of the outlet pipe. If the liquid level is below the outlet pipe, the tank is probably leaking. If the liquid is above the pipe, the dispersal field is either flooded or the line to the field is obstructed or possibly set with an improper grade. The depth of water above or below the outlet pipe should be measured and noted.

5. **Tank Capacity**

The capacity of the septic tank (in gallons) should be determined from as-built plans or from measurements of the width, length and depth (below outlet pipe) of the tank. The capacity can then be compared with the established water use/wastewater flow rates for the property.

F. HYDRAULIC LOAD TEST

1. **General**

The inspector should then proceed with the hydraulic load test of the septic tank and dispersal field. The test, as described here, is conducted only for conventional gravity-fed dispersal trench systems, and does not apply if the system utilizes a pump. A separate test to be conducted for pump systems is described in the next section. The hydraulic load test is conducted by surcharging the septic tank with about 150 gallons of water over a 20 to 30-minute period, and then observing the rise of water in the tank and the subsequent draining process. Although not always conclusive, tracer dye, added to the tank, may be used to assist in investigating the possible contribution of effluent where surface wetness/seepage is suspected or observed. A garden hose discharging into the outlet side of the tank can be used to surcharge the tank. The hose outlet should remain at least 12 inches above the water level in the tank to prevent cross-contamination. Before starting the test, the flow rate from the hose should be determined (i.e., with 5-gallon bucket and stop watch) to properly gauge the amount of surcharge water added to the tank. Alternatively, a portable water meter can be installed between the house faucet and the hose to directly measure the water volume added.

2. **Test Procedures**

The step-by step procedures for the hydraulic load test are then as follows:

- Measure the location of the static water line in the septic tank (at the outlet side) as an initial reference point.

- Begin surcharging the tank with water to start the hydraulic load test.

- Observe any rise in the liquid level at the outlet pipe and measure the final level at the end of filling. Typically, the liquid level will rise from an inch or two, at which point the liquid level should stabilize for the reminder of filling, and then return to the initial level in a matter of minutes after filling is stopped.

- After the filling cycle is finished, the water level decline in the septic tank is observed until the initial level is reached; and the time to achieve this is recorded. If the initial level is not attained within 30 minutes, the test is terminated and the final water level is noted.

3. **System Rating**

   Based upon the water level readings during the test, a hydraulic performance rating is then assigned to the system in accordance with the guidelines provided in **Table 1**. It should be emphasized that these are guidelines only; and special circumstances may be cause for modifying the evaluation and rating of a particular system. A system receiving a "Failed" rating will likely require upgrading and/or additional investigation to determine the underlying cause(s).

G. FINAL LEACHFIELD INSPECTION

At the completion of the hydraulic load test, the dispersal field area and downslope areas should be checked again for indications of surfacing effluent, wetness, or odors. If any of these conditions exist as a result of the hydraulic load test, this would likely be considered evidence of system failure. If the field observations of wetness are not obviously the result of the hydraulic load test, further investigation may be necessary to determine if the dispersal field is failing and the cause of the failure. Additional investigative work may include water quality sampling (for total and fecal coliform, ammonia and nitrate) or dye testing. The cause of seepage could be related to gopher holes, site drainage or erosion problems, excessive water use or simply the age of the system.

TABLE 1
HYDRAULIC LOAD TEST RATING GUIDELINES

RATING	SEPTIC TANK RESPONSE TO HYDRAULIC LOADING
EXCELLENT	No noticeable rise in water level during filling.
SATISFACTORY	Maximum water level rise of about 2 inches, with decline to initial level within about 15 minutes after end of filling.
MARGINAL	Maximum water level rise of about 3 inches, with decline to initial level within about 30 minutes after end of filling.
POOR	Water level rise of more than 3 inches, with decline not reaching initial level within 30 minutes after end of filling.
FAILED	Water level rise of more than 3 inches, with no noticeable decline within 30 minutes after end of filling.

H. PUMP SYSTEMS

For systems equipped with an effluent pump, the following inspection procedures should be followed. This is in addition to inspection of the septic tank as described under “E. Septic Tank Inspection”.

1. **General**

   Remove the pump access cover and basin lid, taking care that no soil or other material enters the basin. Note any signs of scum or sludge buildup, indications of previous pump failure (such as scum line above the high water alarm switch), or evidence of soil or roots entering the basin. Look for any signs of groundwater infiltration or surface water inflow to the basin. Also, inspect the float controls to see that they have free movement, and check the electrical junction box (if located in the basin or access riser) for any obvious signs of corrosion. Measure the dimensions of the pump basin and determine the amount of emergency storage capacity for comparison with the system design and County guidelines (1.5 times the daily sewage flow volume). If the water level in the basin is normal (i.e., between the high and low water controls) proceed with testing of the pump system.

2. **Pump Test**

   The pump test is conducted by adding sufficient water to the basin to activate the pump "ON" control, and observing the performance of the system over at least one pumping cycle. The total amount of water added should be about 150 gallons, to approximate the same hydraulic loading of the dispersal field as for gravity systems. Using a garden hose, the water may be added to the outlet side of the septic tank, or directly to the pump basin. If filling the basin directly, care should be taken to minimize turbulence and disturbance of sediment or sludge that may have collected in the basin. This can be best accomplished by directing the stream of water against the interior side of the chamber, rather than directly toward the bottom of the pump chamber.

   Observe the filling of the basin, and note and measure the point at which the pump is activated. Immediately stop the filling operation and observe the pumping cycle until the pump shuts off. While the pump is discharging, examine the piping system (where exposed) for any leaks. Even small leaks could be a forewarning of possible breaks in the pressure line at some point in the future; and these should be corrected as soon as possible. Note and measure the depth at which the pump shuts off, and calculate the volume of water between the "ON" and “OFF” measurements. Compare this dose with the design dose volume specified for the system. If the dose is too high or too low, float controls should be

readjusted to correct the dose. Any adjustments to the pump system should be done by a licensed and properly qualified contractor (not by the inspector, unless so qualified).

The pumping cycle (from "ON" to "OFF') level should be timed and the results recorded on the inspection form. Typically, if the pump is sized and operating properly, pump operation lasts about 1 to 5 minutes per dose. Pump cycles lasting longer than this may indicate a flooded dispersal field and/or pump or piping deficiencies. If this is observed, it should be noted and further investigation of the pump and dispersal field should be conducted to determine the specific cause. Dividing the pump volume (in gallons) by the pump cycle time (in minutes) will give an approximate pump discharge rate (in gpm). The observed pump rate should be checked against the design requirement for the system, and any discrepancy noted.

If during filling of the pump basin, the pump does not activate when the water reaches the high liquid level control (i.e., "ON" float), discontinue the pump test. This indicates a pump failure, defective float switch or wiring problems and will require the repair service of a competent contractor familiar with these types of systems. The pump system failure should be noted, communicated immediately to the resident/owner, and followed up with prompt corrective action.

3. **Dispersal Field Inspection**

At the completion of the pump test, the dispersal field area should be checked for signs of seepage in the same manner as previously described for gravity-fed systems following hydraulic loading.

4. **Audio and Visual Alarm**

Test the pump system audio and visual alarm to confirm that it can be heard at the house if mounted at the pump tank.

I. CLEAN UP

At the completion of the OWTS inspection and testing, replace all access lids and clean all tools before leaving the site. All tools and equipment that come into contact with wastewater should be cleaned and disinfected with a 1:5 bleach solution, then rinsed with fresh water; and all contaminated rinse water should be disposed of in the septic tank.

AFTER THE FLOOD:
Septic Tank Failure

During a flood or heavy rainstorm, excessive water can accumulate in leach field, leach line, or seepage pit areas causing the septic system to become sluggish, to back up, or to stop functioning when toilets are flushed or when other plumbing fixtures are used. ***If the septic system was operating properly prior to flooding, household waste water should not overflow onto the surface of the ground.***

If a sewage backup occurs:

When a sewage backup occurs in your residence or business, or when sewage overflows onto the surface of the ground, ***the following must be done until the flooding or ground saturation dissipates:***

- if there is a backup or visible overflow of sewage onto the ground, ***immediately stop all water usage***. Once the flooding and groundwater saturation diminishes, the septic system should again operate normally.
- if the system is slow or sluggish, ***but still operating***, minimize the amount of liquids and solids put into the system.

If you operate a food facility and experience a septic system failure: immediately contact the Department of Environmental Health at 408 918-3400 for cleanup instructions.

If the septic tank is above the flood point:

✔ The tank can be ***pumped*** by a permitted liquid waste hauler/pumper *(see Yellow Pages under "Septic Tanks and Systems").*

✔ The septic system can be used as a ***holding tank*** and will continue to accept household waste water and not overflow into leach lines unless the tank is full — most septic tanks will hold up to 1,000 gallons or more *(the amount of waste water per person per day from showers, dishwashing, laundry, etc., averages 50-100 gallons every 24 hours–a family of four would, therefore, produce 200-400 gallons each day).*

What if sewage has overflowed in my house?

- Wash all contaminated areas with detergent and water, then rinse with a sanitizing solution made from ***one tablespoon household bleach*** *(5.25% sodium hypochlorite)* ***to each gallon of water***. ***(1 tablespoon = 3 teaspoons or ½ fluid ounce)***
- Be sure to clean and sanitize all contaminated areas — pay special attention to cooking utensils, work surfaces, children's toys, and surface areas such as floors and walls which family and pets may come in contact

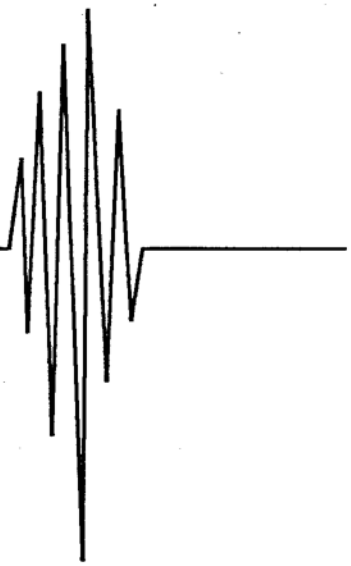
If the septic system is flooded or the ground is saturated so that waste water is not accepted:

✔ ***Pumping*** the tank ***will not be effective*** since the flooding/saturation will fill the tank as quickly as it is pumped.

✔ Use a ***portable chemical toilet*** — small units are available from camping, RV, and hardware stores. Larger chemical toilets, such as those used at construction sites and festivals may be rented; these units are recommended for apartments, condos, and office buildings *(see Yellow Pages under "Toilets-Portable").* The functioning toilet facilities of a motorhome, travel trailer, or a neighboring home can also be used.

✔ If portable chemical toilets are ***unavailable***, use large extra-strength trash bags *(double bagged)* as liners in toilets, or contain waste in water tight plastic or metal containers with tight fitting lids. Use household disinfectant *(such as bleach)* for odor control. Final disposal can be by sanitary sewer *(when notified by public officials)* or by burial once flood waters have receded.

SEWAGE DISPOSAL IN AN EMERGENCY



WHAT WILL HAPPEN?

In an emergency such as a large magnitude earthquake, sewer lines will probably be damaged and become inoperable. Sewage may back up and broken water lines may become contaminated by sewage.

WHAT SHOULD I DO?

If stoppage in sewer lines is suspected or obvious, discontinue discharge of wastewater in house or building sinks and drains, and stop flushing toilets. Avoid contact with any overflowing waste water or sewage.

IF I CAN'T FLUSH THE TOILET, WHAT CAN I USE?

- Large extra-strength trash bags (double bagged) may be placed in water tight plastic or metal containers, with tight fitting lids, or used as liners in toilets. Household disinfectant can be used for odor control. Final disposal can be by burying or by sanitary sewer when notified by public officials.
- A dug latrine or trench 2' to 3' deep can be used to bury human waste. Spread a thin layer of powdered lime or dry chlorine bleach and a layer of earth each time it is used.
- Portable camp toilets, RV toilets, porta-potties, etc. may also be used.
- High occupancy complexes such as apartments, condominiums, and office buildings should consider making arrangements to obtain commercial chemical toilets.

WHAT ABOUT A SEWAGE OVERFLOW IN MY HOUSE?

- Wash all contaminated areas with detergent and water, then rinse with a sanitizing solution of one tablespoon household bleach (5.25% sodium hypochlorite) to each gallon of water.
- Be sure to clean and sanitize all contaminated areas — pay special attention to cooking utensils, work surfaces, and other surface areas such as floors and walls with which your family and pets may come in contact.

County of Santa Clara
Department of Environmental Health
408-918-3400

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