CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

RESOLUTION R5-2017-0068

APPROVING THE LOCAL AGENCY MANAGEMENT PROGRAM
FOR
KERN COUNTY ENVIRONMENTAL HEALTH DIVISION

WHEREAS, on 19 June 2012, the State Water Resources Control Board (hereafter State Board) adopted Resolution No. 2012-0032, which in part approves the *Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems* (hereafter the OWTS Policy); and

WHEREAS, the OWTS Policy allows Local Agencies to propose Local Agency Management Programs (hereafter LAMPs) for California Regional Water Quality Control Board, Central Valley Region (hereafter Central Valley Water Board) approval, as conditional waivers of Waste Discharge Requirements; and

WHEREAS, the OWTS Policy requires Central Valley Water Board staff (hereafter staff) to solicit comments from the State Water Resources Control Board Division of Drinking Water (hereafter DDW) regarding a LAMP's proposed setbacks and notifications to water purveyors; and

WHEREAS, for counties that span multiple jurisdictions, the OWTS Policy designates one Regional Water Quality Control Board to regulate, but requires its staff to solicit comments from non-jurisdictional Regions; and

WHEREAS, on 13 May 2016 the Kern County Public Health Services, Environmental Health Division (hereafter Kern County EHD) submitted a formal draft LAMP, along with a preliminary completeness checklist (hereafter checklist) per staff's request; and

WHEREAS, on 26 May 2016, Central Valley Water Board staff sought DDW's comments on the formal draft LAMP; on 15 September 2016 DDW concurred with the proposed setbacks and notifications contingent upon an appropriate workshop by 13 May 2018 to define public agency responsibilities and procedures for OWTS Policy implementation; and

WHEREAS, on 19 July 2016 staff met with Kern County EHD to discuss the formal draft LAMP and solicited comments from the Central Coast Regional Water Quality Control Board (hereafter Region 3), the Los Angeles Regional Water Quality Control Board (hereafter Region 4), and the Lahontan Regional Water Quality Control Board (hereafter Region 6); given its limited area, within Kern County, Region 4 declined to comment; and

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WHEREAS, on 20 December 2016 Kern County EHD submitted a revised LAMP to address comments from Regions 3 and 6; on 5 January 2017 Regions 3 and 6 concurred with the Revised LAMP; and

WHEREAS, on 16 March 2017, the Central Valley Water Board notified Kern County EHD and interested parties of its intent to approve the LAMP, and provided them with an opportunity for public hearing, and an opportunity to submit comments and recommendations, both on the LAMP and checklist; and

WHEREAS, on 9 June 2017, the Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to this action:

Therefore, be it RESOLVED, that the Central Valley Water Board hereby approves the Local Agency Management Program submitted by Kern County Environmental Health Division.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a Resolution adopted by the Central Valley Water Board, on 9 June 2017.

Original signed by

_____

PAMELA C. CREEDON, Executive Officer

ORDINANCE NO. G-8682

AN ORDINANCE OF THE BOARD OF SUPERVISORS OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ADDING CHAPTER 8.62 TO TITLE 8, OF THE KERN COUNTY ORDINANCE CODE CONCERNING ONSITE WASTEWATER TREATMENT SYSTEMS

The following ordinance, consisting of two sections, was duly and regularly passed and adopted by the Board of Supervisors of the County of Kern, State of California, at a regular meeting of the Board of Supervisors held on the 14th day of February, 2017, by the following vote:

AYES: Gleason, Scrivner, Maggard, Couch, Perez

NOES: None

ABSENT: None

Chairman of the Board of Supervisors of the County of Kern, State of California

(SEAL)

ATTEST:

KATHLEEN KRAUSE
Clerk of the Board of Supervisors

By _____, Deputy Clerk

THE BOARD OF SUPERVISORS OF THE COUNTY OF KERN ORDAINS AS FOLLOWS:

Section 1. This ordinance shall be published in accordance with Government Code Section 25124 and it shall take effect and be in full force on and after the 17th day of March 2017.

Section 2. Chapter 8.62 is added to Title 8 of the Kern County Ordinance Code to read as follows:

Chapter 8.62

ONSITE WASTEWATER TREATMENT SYSTEMS

Sections:

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8.62.010 Purpose.

The purpose of this Chapter is to establish standards for the approval, installation, and operation of onsite wastewater treatment systems (OWTS) within Kern County, consistent with plans, policies, and standards of the California State Water Resources Control Board (CRWQCB) and applicable Regional Water Quality Control Boards. The standards are adopted to prevent the creation of health hazards and nuisance conditions and to protect surface and groundwater quality.

8.62.020 Definitions.

a. The following terms used in this Chapter have the same definition as in the SWRCB OWTS Policy, which is available on the Kern County Environmental Health Services Department website: Basin Plan, Beneficial Uses, Cesspool, Domestic Wastewater, Groundwater, Major Repair, Onsite Wastewater Treatment System (OWTS), Regional Water Quality Control Board, Replacement OWTS, Seepage Pit, Septic Tank, Site Evaluation, Soil, Supplemental Treatment, and Waste Discharge Requirement (WDR).

b. The following terms used in this Chapter are defined as follows:

1. "Alternative OWTS" means any OWTS that does not meet the criteria of a conventional OWTS, but is allowed under conditions prescribed in this Chapter and approved by the director.

2. "Community system" means an OWTS that provides for the collection, treatment and dispersal of wastewater from multiple discharges under separate ownership. Community systems are subject to review and approval of the applicable CRWQCB.

3. "Conventional OWTS" is a type of OWTS consisting of a septic tank for primary treatment of sewage followed by a system of dispersal trenches or seepage pit 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.

4. "Cumulative impacts" means the persistent and/or increasing effect of OWTS resulting from the density of such discharges in relation to the assimilative capacity of the local environment. Examples include, but are not limited to: (a) nitrate or salt additions to ground water or surface water; and (b) rise in groundwater levels ("mounding of the water table") that interferes with the performance of an OWTS, causes drainage problems or results in other adverse hydrological or soil conditions affecting public health, water quality or public safety.

5. "Director" means the Director of the Environmental Health Services Division or his/her designated representative.

6. "Dispersal system" means a series of trenches, beds, subsurface drip lines, seepage pit, or other approved method for subsurface infiltration and absorption of wastewater effluent, including all component parts, such as piping, valves, filter material, chambers, dosing pumps, siphons and other appurtenances.

7. "Failure" means the ineffective treatment and dispersal of waste resulting in the surfacing of raw or inadequately treated sewage effluent and/or the degradation of surface or groundwater quality.

8. "Holding tank" means a watertight receptacle used to collect and store wastewater prior to it being removed from a property by means of vacuum pumping and hauling, or other approved method. The use of holding tanks in Kern County is authorized for limited circumstances, including, but not limited to, for the abatement of health hazards or for certain public use facilities.

9. "Installation permit" means a document issued by the EHD that conveys approval of and sets forth applicable conditions for the installation of an OWTS, or component thereof.

10. "Mountain and groundwater impact area" means areas of definite boundaries delineated by the EHD, after consultation with the appropriate Regional Water Quality Control Board, where additional or modified requirements for OWTS are deemed necessary for protection of public health and water quality due to environmental factors or/or land use conditions.

11. "Onsite wastewater maintenance provider" means a person capable of operating, monitoring and maintaining an OWTS in accordance with the requirements of this Chapter, and possessing minimum experience and qualifications as established by the EHD in the Onsite Systems Manual.

12. "Onsite Systems Manual" means the document developed, maintained, and amended by the Kern County Environmental Health Services Department containing policy, procedural and technical details for implementation of this Chapter, as prescribed by the director and approved by the appropriate CRWQCB, as applicable.

13. "Onsite wastewater treatment system" or "OWTS" means a system of pipes, tanks, trenches and other components used for the collection, treatment and subsurface dispersal of domestic wastewater at or near the building or buildings being served. The short form of the term may be singular or plural. For the purposes of this Ordinance, OWTS do not include "graywater" systems pursuant to Health and Safety Code Section 17922.12. Wastewater systems that discharge effluent above ground (e.g., via surface irrigation, percolation/evaporation pond) are not covered within the definition of an OWTS and are not authorized under this Chapter.

14. "Operating permit" means the administrative document issued by the EHD authorizing the initial and/or continued use of an alternative OWTS in conformance with the provisions of this Chapter, intended to aid in verification of the adequacy of alternative OWTS performance, and that may contain both general and specific conditions of use. An operating permit may also be issued for circumstances other than alternative OWTS, such as in connection with holding tank exemptions or where, in the opinion of the EHD, the type, size, location, or other aspects of a particular OWTS installation warrant the additional level of oversight provided by an operating permit.

15. "Registered Septic Tank Pumper" means a person with an active liquid waste pumper permit issued by EHD in accordance with California Health and Safety Code, division 104, part 13, sections 117400 – 117450, as qualified to pump and haul septic tank sludge ("septage").

16. "Sanitary sewer" means a system for collecting residential or municipal wastewater and directing the collected wastewater to a treatment works prior to dispersal.

17. "Site evaluation" means an assessment of the characteristics of the site sufficient to determine its suitability for an OWTS to meet the requirements of this Chapter. Site evaluations shall be in accordance with procedures and criteria established by the EHD and contained in the Onsite Systems Manual.

18. "Sewage" or "sewage effluent" means waste as defined in Section 5410(a), California Health and Safety Code.

19. "SWRCB OWTS Policy" means the Water Quality Control Plan for Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems adopted by the State Water Resources Control Board on June 19, 2012, which became effective May 13, 2013.

8.62.030 Applicability.

This Chapter is applicable to all existing and new OWTS in the unincorporated area of Kern County having a wastewater design flow of ten thousand (10,000) gallons per day (gpd) or less. If the amount of wastewater produced is more than ten thousand (10,000) gpd, or where a community system serving multiple discharges under separate ownership is proposed, the method of treatment and dispersal must be approved by the appropriate CRWQCB. Any proposed OWTS with a projected daily wastewater flow of more than ten thousand gallons per day (10,000 gpd) will be referred to the appropriate CRWQCB for review.

Where a governmental entity has entered into an agreement with the Board of Supervisors to assume responsibility for regulating or issuing permits to construct, alter, modify or replace OWTS, then the provisions of this Chapter shall not apply within the jurisdictional limits of that entity for the scope of responsibility assumed by the entity.

8.62.040 Administration and Enforcement.

The Director of Environmental Health Services Division, on behalf of the health officer, shall administer and enforce all provisions of this Chapter relative to installation, maintenance and operation of OWTS, including but not limited to septic tanks, cesspools, holding tanks, supplemental wastewater treatment systems, subsurface dispersal systems or other matters regulated or provided in this Chapter not expressly delegated to some other department or agency.

8.62.050 County Not Responsible for Damage.

The County, its officers, agents and employees are not liable or responsible for damage resulting from the defective construction of any OWTS as herein provided, nor will the County or any official or employee thereof be liable or responsible by reason of any inspection authorized hereunder.

8.62.060 Standards, Guidelines, and Onsite Systems Manual.

a. The director is authorized to issue standards and guidelines, including policies, procedures and technical details, to carry out the purposes of this Chapter, which shall be contained in a document titled the Onsite Systems Manual.

b. The Onsite Systems Manual shall be developed and maintained by the director, 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.

c. The Onsite Systems Manual and any amendments shall be subject to approval by the Central Valley and Lahontan Regional Water Quality Control Boards in accordance with applicable State requirements and policies for onsite wastewater treatment systems.

d. The type and manner of design and construction of OWTS shall conform to the standards as required by this Chapter and the Onsite Systems Manual.

e. The director shall maintain records pertaining to the permitting, installation, inspection, repairs and variances issued in regard to OWTS and prepare and submit applicable reports and information to the Regional Water Board in accordance with provisions of the State OWTS Policy.

8.62.070 Connection to Sanitary Sewer.

Every property where there is proposed a residence, place of business, or other building or place which people occupy, or where persons congregate, reside or are employed, and which proposed structures requiring sewage disposal are within two hundred (200) feet of an approved available sanitary sewer, must be connected to the sanitary sewer in the most direct manner possible, provided a right-of-way and any necessary approval from the appropriate sewer authority and the Kern County Local Agency Formation Commission (LAFCO) is first obtained.

On property where an OWTS exists, and which structures served by an OWTS are within two hundred (200) feet of an approved available sanitary sewer, connection to the available sanitary sewer will be required at the time of system failure or when major repair as defined in State OWTS, septic tank replacement, or addition to the OWTS is required or proposed, provided any necessary approval from the appropriate sewer authority and the Kern County LAFCO is first obtained.

8.62.080 Prohibited acts.

It is unlawful for any person to do any of the following:

a. Construct, alter, repair or replace an OWTS or a component element thereof, which system is subject to the provisions of this Chapter, without first obtaining a permit from the EHD in accordance with the provisions of this Chapter and standards established hereunder;

b. Construct, rebuild, use, occupy or maintain any residence, place of business or other structure where persons reside, congregate or are employed, which is not provided with a means of disposal of sewage by connection to a public sewer system or an individual sewage disposal system, without first obtaining approval and/or a permit from the EHD;

c. Construct, use, or maintain any privy, cesspool, septic tank, sewage treatment works, chemical toilet, composting toilet, sewer pipes or conduits, or system(s) components in a manner where sewage, impure water or any other matter or substance will discharge upon the surface of the ground, become injurious or dangerous to health or will empty, flow, seep, or drain into or affect any river, stream, creek, spring, lake, pond, reservoir, marsh, water supply, water system, groundwater, culvert, or drainage within the County of Kern.

d. Install or place a chemical toilet in or upon any property for any purpose other than temporary use in connection with the construction of a building or other structure during the period of such construction, or a special event on the list established and updated periodically by the EHD, without first obtaining a permit.

Any OWTS constructed, operated or maintained in violation of this Chapter is hereby declared to be a public nuisance and may be abated according to provisions of the law.

8.62.090 Building Permit Approval.

No building permit, as required by this Code shall be issued for any building which is not to be connected to an approved sanitary sewer or an OWTS, without the approval of the director.

8.62.100 OWTS Installation Permits Required.

No person may construct, build, rebuild or remodel any residence, place of business, or other building or place where persons reside, congregate or are employed which is not to be connected to an approved sanitary sewer without first submitting plans of the OWTS to the EHD for approval and either: (1) obtaining approval of the proposed construction, building, rebuilding or remodeling to be served by an existing OWTS; or (2) obtaining an OWTS installation permit pursuant to this Chapter. Failure to obtain an approval or permit from the EHD is a violation of this Chapter.

8.62.110 Permit Duration and Extension.

Permits that authorize construction of OWTS shall remain valid for a period of one (1) year from the date initially issued. Renewal procedures shall be as set forth in the Onsite Systems Manual if additional time is required to complete construction.

8.62.120 Permits Nontransferable.

No permit or approval issued pursuant to this Chapter shall be transferred from one person, contractor, or site to another person, contractor, or site. A new application must be submitted with all relevant new information and the appropriate fee paid.

8.62.130 Application and Fees.

All applications for OWTS permits shall be submitted in writing to the Kern County of Environmental Health Services Division, on a form supplied by the EHD. The application shall be accompanied by fees as specified in the current resolution approved by the Board of Supervisors establishing fees for environmental health services.

8.62.140 Denial, Suspension, or Revocation of OWTS Permit.

EHD may deny, suspend or revoke a permit or approval issued hereunder in the case of any false statement, or misrepresentation of fact in the application or on the plans on which the permit approval was based, or if he or she determines that in any other way the permittee is acting in violation of State law, the provisions of this Chapter, or the conditions of the permit.

8.62.150 Appeals.

Any applicant may appeal the decision of the EHD in denying, suspending or revoking the permit for an OWTS or in relation to an abatement order. The appeal shall be made to the Board of Supervisors by submitting to the EHD a completed application for appeal and the appropriate fees as specified in the current resolution, approved by the Board of Supervisors establishing fees for Environmental Health Services. The appeal application must be submitted within ten (10) calendar days from the date of the EHD's decision to deny, suspend, or revoke the permit. The Board of Supervisors may reject, affirm, or modify EHD's decision.

8.62.160 Siting Criteria.

Siting criteria defining the location and environmental conditions under which OWTS may be permitted shall be developed by the director and included in the Onsite Systems Manual. Such siting criteria shall be consistent with applicable State and Regional Water Board OWTS policies and requirements, and shall be subject to review and approval by the Regional Water Quality Control Board. At a minimum, siting criteria shall cover following:

a. Soil depth and percolation characteristics.
b. Vertical separation to groundwater.
c. Ground slope.
d. Horizontal setback distances.

8.62.170 Site Evaluation.

a. For all locations where an OWTS is proposed to be installed, a site evaluation shall be conducted prior to permit approval to verify conformance with applicable soils, groundwater, ground slope, and horizontal setback requirements as prescribed in the Onsite Systems Manual.

b. Site evaluation methods shall include soil profiles, percolation tests and other exploratory tests, as necessary, to verify adequate depth and permeability of soil, and vertical separation between dispersal field and groundwater for both primary and reserve dispersal areas.

c. Testing shall be conducted in accordance with standards and guidelines provided in the Onsite Systems Manual.

d. Where the EHD has been provided adequate evidence to demonstrate suitable soil conditions and groundwater separation, testing requirements may be waived.

e. For new divisions of land, soil profiles, percolation tests and groundwater determinations will be required on every parcel unless the EHD 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.

8.62.180 Plans.

No person may construct, add to, repair or alter any existing OWTS without first submitting plans to the EHD for approval and obtaining a permit pursuant to the requirements of this Chapter. Plans shall include the site evaluation results, other relevant site and project information, scaled drawing(s) of proposed OWTS, supporting basis of design, and other information as specified in the Onsite Systems Manual.

8.62.190 Operation and Maintenance.

Every OWTS shall at all times be maintained and operated in a sanitary condition and state of good repair. Operation and maintenance guidelines for each OWTS installation shall be provided by the designer and/or the installer, with a copy provided to the EHD as well as to the system owner. Final approval of system installation shall be contingent upon confirmation by the EHD that required operation and maintenance guidelines have been provided.

8.62.200 Cumulative Impacts.

Where OWTS may have cumulative impacts on groundwater and/or watershed conditions due to such factors as the constituent levels (e.g., nitrogen content) in the wastewater, 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 the discharge area, the EHD may require additional technical studies (also termed "cumulative impact studies") or other information demonstrating to the satisfaction of the EHD, that use of the proposed OWTS will not create adverse cumulative effects on water quality or public health. Cumulative impact studies shall be mandatory for any OWTS with wastewater flows of 2,500 gpd or more and any OWTS proposed within the Lahontan Regional Water Quality Control Boards jurisdiction. In all cases, such cumulative impact studies will be conducted in accordance with guidelines provided in the Onsite Systems Manual.

8.62.210 Director Review and Approval.

If, after review, the EHD determines that the proposed OWTS is in accordance with the terms of this Chapter and applicable requirements in the Onsite Systems Manual, and will not be injurious to the public health and water quality, he or she shall approve or conditionally approve the application. Such approval may be made subject to such conditions as the EHD deems necessary to insure compliance with this Chapter. Any change in the OWTS plans after the issuance of a permit must first be approved by the EHD. Failure to obtain approval from the EHD will invalidate the permit.

8.62.220 Installation.

a. No person may install, construct, alter, enlarge, reconstruct, replace, improve, recondition or repair an OWTS pursuant to this Chapter unless: the person possesses a general engineering contractor's license (class A) as defined in section 7056 of the Business and Professions Code, or a Class C-42 sanitation system contractor's license or Class C-36 plumbing contractor's license from the Contractors State License Board of the State of California.

b. In the case of a conventional OWTS, the property owner may construct or repair an OWTS on his/her own property, provided: (1) persons hired by the owner to do the subject work must comply with (a) above; or (2) persons hired by the owner must be hired as employees of the owner and the owner must provide workman's compensation insurance, as required by law; and (3) an OWTS permit is obtained.

8.62.230 Installation Inspection and Approval.

a. OWTS must be installed in accordance with the plans approved by the EHD. Any changes in the installation plans must be reviewed and approved by the EHD prior to installation.

b. Inspection(s) of each OWTS installation shall be made by the EHD to ensure compliance with all applicable requirements of this Code and the Onsite Systems Manual. In the event the EHD determines there has been an improper installation, a stop-work order may be posted on the jobsite. Before any further work is done on a posted system, clearance from the EHD must be obtained.

c. An as-built drawing shall be completed by the OWTS designer or contractor upon completion of the OWTS installation, a copy of which shall be supplied to the EHD and the system owner.

8.62.240 Conventional OWTS.

a. A conventional OWTS shall, at a minimum, consist of a septic tank and subsurface dispersal system for absorption and leaching of the effluent into the soil. The septic tank and subsurface effluent dispersal system must be so constructed as to meet the requirements prescribed by this Chapter and the standards and guidelines contained in the Onsite Systems Manual.

b. The conventional dispersal method approved for use in Kern County shall be either a gravel-filled trench system or a seepage pit, sized, designed and installed in accordance with standards prescribed in the Onsite Systems Manual. A dispersal trench system is the preferred option, and a seepage pit shall only be considered if a trench system is deemed infeasible.

c. Trench system designs utilizing chambers or other filter material in place of gravel may be approved by the EHD and addressed with specific criteria in the Onsite Systems Manual as a conventional dispersal system design option.

d. At a minimum, all dispersal systems shall include a primary (installed) field, and a reserve area with suitable conditions and sufficient area for 100-percent replacement of the primary field.

8.62.250 Cesspools Prohibited.

Cesspools are declared to be a public nuisance and are not authorized for use in Kern County. Upon discovery, cesspools shall be abated in accordance with the provisions of this Chapter and in a manner approved by the EHD.

8.62.260 Holding Tanks.

a. All holding tanks are hereby declared a public nuisance and are prohibited, except for the following instances as may be approved by the EHD:

1. If it is necessary to use a holding tank to abate a nuisance or health hazard caused by a failing OWTS; or

2. For a publicly-owned nonresidential facility necessary for the public health, safety or welfare, where installation of an OWTS is not feasible and a holding tank is determined by the EHD to provide the safest and most acceptable method of sewage disposal.

b. Where exceptions are granted and holding tank(s) approved, an operating permit issued by the EHD (as provided for in this Chapter) will be required, which will provide for approval of the tank pumper, maintenance schedule, tank/sewage level monitoring, and reporting requirements.

8.62.270 Alternative OWTS.

The use of alternative OWTS in Kern County will be permitted in accordance with the following:

a. Uses. Alternative OWTS may be permitted by the EHD 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; (b) the EHD determines that an alternative OWTS would provide equal or greater protection to public health and the environment than a conventional OWTS; or (c) necessary to comply with requirements adopted for Mountain and Groundwater Impact Areas.

b. Types of alternative OWTS. Types of alternative OWTS permitted are limited to those identified in the Onsite Systems Manual, and which have been approved by the EHD and the appropriate CRWQCB.

c. Designer and installer qualifications. All alternative OWTS must be designed by a qualified professional (California Registered Civil Engineer, Registered Environmental Health Specialist, or Professional Geologist), and must installed by a contractor duly licensed by the Contractors State License Board of the State of California to install OWTS (A, C-42 or C-36).

d. Operating permit. All alternative OWTS require the issuance of a renewable operating permit, which is in addition to the permit issued for system installation. Operating permits are intended to serve as the basis for ensuring proper maintenance and system performance; associated work is required to be performed by a qualified professional or onsite service provider.

e. Monitoring and reporting. Monitoring and reporting requirements to verify adequate performance of alternative OWTS shall be included as conditions of the operating permit. Monitoring requirements will vary depending upon the specific type of alternative OWTS in accordance with guidelines in the Onsite Systems Manual.

8.62.280 Operating Permits.

In addition to an installation permit, an operating permit is required for: (a) all alternative OWTS; (b) any OWTS with a design flow of 2,500 gpd or more; (c) holding tank exemptions; and (d) where, in the opinion of the EHD, the type, size, location or other aspects of a particular OWTS installation warrant the additional level of oversight provided by an operating permit. Requirements pertaining to operating permits are as follows:

a. The operating permit will be issued by the EHD following: (a) completion of construction of the alternative OWTS; (b) satisfactory compliance with the installation permit requirements; and (c) payment of applicable fees. Operating permits are non-transferable.

b. After initial issuance, the operating permit is required to be renewed periodically, the standard renewal period being one year. EHD may establish conditions allowing the time period between renewals to be extended for certain types of OWTS based on a record of favorable performance or other factors warranting a reduction in system oversight by Environmental Health Services Department. Operating permits must also be renewed at the time of change in property ownership.

c. Operating permits are intended to serve as the basis for verifying the adequacy of OWTS performance and ensuring on-going maintenance. Permit conditions shall include monitoring and inspection requirements, permit duration, and other provisions as prescribed by the EHD in the Onsite Systems Manual or as deemed appropriate by the director on a case-by-case basis.

d. Renewal of an operating permit requires: (a) payment of the applicable fees, upon receipt of notice from the EHD; and (b) submission of the results of required system inspection and monitoring.

e. Failure to pay the required fee or submit the specified monitoring and inspection information, or failure to undertake any required corrective work specified by the EHD may be cause for issuance of a citation, penalty fees, non-renewal and/or revocation of the operating permit by the EHD. EHD may place a lien on the property for recovery of any associated abatement costs and unpaid fees.

f. A certified copy of the following shall be recorded against the property in the office of the County Recorder of Kern County: (a) initial operating permit issued for the system; (b) reissuance of operating permit to new owners; and (c) notices of withdrawal of any operating permit.

8.62.290 Abandoned Onsite Wastewater Treatment Systems.

Every OWTS that has been abandoned or has been discontinued from further use or to which no waste or waste discharge pipe from a plumbing fixture is connected must:

a. Have the sewage removed from, and disposed of, in an approved manner.

b. Have the tank top and bottom crushed, backfilled and compacted with material approved by the EHD or be removed and disposed of in an approved manner.

Completion of the above-described work shall require that the property owner obtain a septic tank abandonment permit from the EHD as provided in the Onsite Systems Manual.

8.62.300 Variances.

Variance from the terms of this Chapter and requirements as prescribed the Onsite Systems Manual may be granted by the EHD under the following conditions:

a. The variance will not harm the public health, safety and welfare of the people of Kern County;

b. Due to special conditions or exceptional characteristics of the property, its location or surroundings, a literal enforcement of this Chapter and the Onsite Systems Manual would result in unnecessary hardship;

c. The hardship was not caused with the intent to avoid the requirements of this Chapter or the Onsite Systems Manual;

d. The variance will not have any adverse environmental effect on the use of the adjoining property.

8.62.310 Abatement.

Any existing OWTS in a state of failure or which, based on inspection or evaluation by the EHD, is considered a hazard to safety or health by reason of inadequate maintenance, dilapidation, or obsolescence is hereby declared to be a public nuisance and shall be abated by repair or rehabilitation per order and adequate notice from the EHD.

Failing OWTS must be brought into substantial compliance with this Code to the greatest extent practicable. If not corrected within a time designated by the EHD, the director may order or cause corrections to be made and bill the property owner for the costs and may place a lien on the property for the abatement costs. EHD may also order the premises to be vacated if no safe manner of abatement is possible.

8.62.320 Violations.

No person, firm or corporation that is purchasing or that owns, controls, leases, lets, hires or occupies any lands, premises or habitations in the unincorporated area of Kern County shall construct, reconstruct, place or suffer or permit to exist thereon any installation referred to in this Chapter in violation of any of the provisions hereof or to perform any act or suffer or permit any act to be performed in violation of any of the provisions hereof.

8.62.330 Penalty.

Any person, firm or corporation who does any act declared unlawful in this Chapter or who violates or contributes in any way to the violation of any of the provisions of this Chapter shall be deemed guilty of an infraction. Every violation of any of the provisions of this Chapter shall be construed as a separate offense for each day during which such violation continues.

COPIES FURNISHED:
Public Health;
CAO; Co. Counsel
2/17/2017 TD

Local Agency Management Program

For

Onsite Wastewater Treatment Systems

Kern County, California

(DRAFT)

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Section 1:
Introduction and Background

Introduction

This document presents the proposed Local Agency Management Program (LAMP) pertaining to the oversight of onsite wastewater treatment systems (OWTS) within the County of Kern, California. This LAMP has been prepared in accordance with the requirements of the State Water Resources Control Board's (SWRCB) *Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems*, dated June 19, 2012, also referred to as the "OWTS Policy".

The State OWTS Policy provides a multi-tiered strategy for management of OWTS in California. This LAMP has been prepared by Kern County to obtain approval for OWTS management under Tier 2 of the OWTS Policy. As such, it is intended to allow the County to continue providing local oversight of OWTS by implementing practices that: (a) are suited to the conditions in Kern County; (b) meet or exceed the environmental protections of the "default" siting and design requirements for OWTS identified in Tier 1 of the SWRCB Policy; and (c) ensure the best opportunity for coordinated and comprehensive management of OWTS, public health, and water quality in Kern County.

This LAMP is intended to apply to all OWTS within Kern County having wastewater design flows of up to 10,000 gpd, with the exception of those located on State and Federally-owned lands. Any OWTS with a design flow exceeding 10,000 gpd would be regulated by the respective California Regional Water Quality Control Board. The position of Director of the Environmental Health Division (EHD), of and within the administrative control of the director of public health services is responsible for administration of this policy. Cities within the county that have designated the County Health Officer as their jurisdiction's health officer by resolution or ordinance, with approval of the board of supervisors, for the purpose of enforcing state and local environmental health laws, shall adhere to this policy. All environmental health division personnel who engage in enforcement of orders, and other regulatory enforcement actions as prescribed by the state shall be qualified as required by state law.

Geographical Area

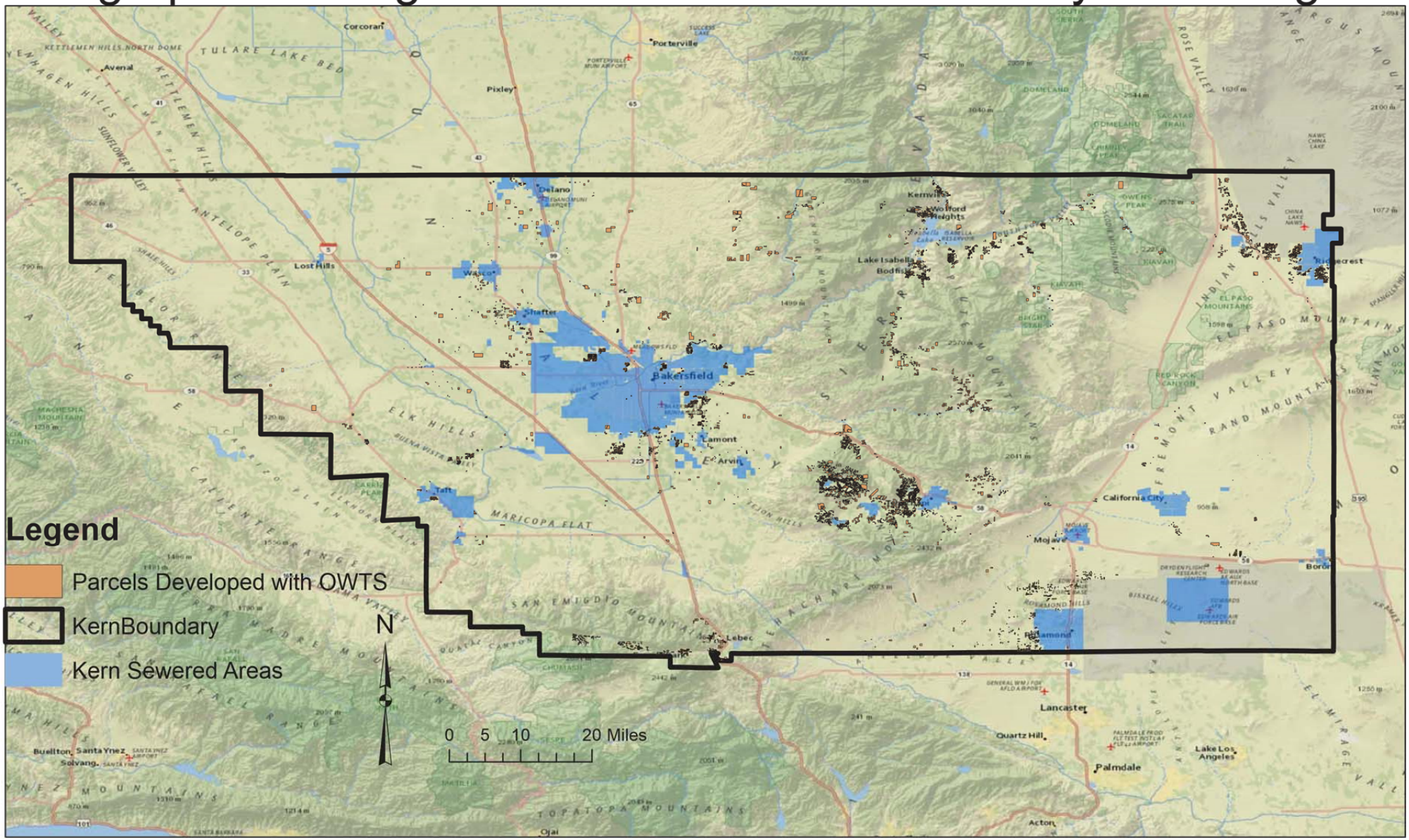
Kern County is located at the southern end of the Central Valley of California and shares boundaries with Kings and Tulare Counties to the north, Inyo County to the northeast, San Luis Obispo County to the west, Ventura and Los Angeles Counties to the south, and San Bernardino County to the east (see **Figure 1-1**). The county encompasses over 8,171 square miles of territory, or approximately 5,229,440 acres. The county seat and largest city is Bakersfield.

A major physical feature of the county is the San Joaquin Valley, encompassing 2,374 square miles at the southern terminus of California's Central Valley. The flat basin of the San Joaquin Valley is bordered on the west by the Temblor Range (part of the Coast Range

Mountains), on the south by the Transverse and Tehachapi Ranges, and on the east by the southern slope

Geographic Setting

Kern County LAMP Fig.1-1



of the Sierra Nevada Mountains. Almost one-third of the county's land area, the San Joaquin Valley includes the cities of Bakersfield, Wasco, Shafter, McFarland, and Delano agricultural lands and also is the location of some of the largest oil reserves in the United States.

The western border of Kern County is situated within the Temblor Range, trending northwest to southeast, west of the San Joaquin Valley foothills, and parallel to the San Andreas Fault, located immediately west in neighboring San Luis Obispo County. Most of the land of the Temblor Range is composed of grasslands and brush, with a significant portion of the western foothills of the San Joaquin Valley occupied with oil drilling and production.

At the southwestern corner of Kern County is the convergence of the Temblor and Transverse
Mountain Ranges, the Transverse Ranges running roughly east-west, combining with the Tehachapi Range, to form the southern border of San Joaquin Valley. The Tehachapi Range continues northeastward to converge with the southern terminus of the north–south trending Sierra Nevada Mountains. These densely-wooded mountain regions contain some concentrated populations in the mountain valleys. Large portions of the mountain areas are park and open space.

Southeast of the Tehachapi Range and east of the southern Sierra Nevada Mountains, is another major physical feature, the Mojave Desert. At 1,032 square miles, the Mojave Desert completes the southeast and eastern portion of Kern County and extends eastward into neighboring San Bernardino County. Except for the communities of Mojave, Ridgecrest, and Rosamond, the Mojave Desert portion of the County is sparsely populated and is occupied with mining operations, such as borax mining, and is also the site of Edwards Air Force Base.

Development in the County is mostly in the San Joaquin Valley along Interstate Highway 5 and the 99 Freeway. Radiating out from Bakersfield are also Freeways 14, 46, 58, and 178 that influence development density in the sparsely populated areas outside of the basin.

Regulation of Onsite Wastewater Treatment Systems

The Kern County Public Health Services Department, Environmental Health Division, is responsible for regulating OWTS throughout the unincorporated areas of the county. The EHD also administers OWTS regulations in the various cities in the county. OWTS are used almost exclusively for properties located outside of municipal sewer service boundaries, which includes a large number of unincorporated parcels in the Bakersfield Metropolitan area, as well as small communities and subdivisions in the mountain regions around Lake Isabella, Tehachapi Valley, and the Grapevine area. Countywide there are currently estimated to be approximately 16,500 OWTS.

The County has historically operated its onsite wastewater systems program under the authority granted to it by two California Regional Water Quality Control Boards: (1) the Central Valley Region, for those areas that drain to the west side of the County, in Tulare Lake Basin; and (2) the Lahontan Region, for those areas that drain to the east side of the County toward the Mojave Desert. **Figure 1-1** is a map of Kern County, showing major geographical features, city and sanitary district boundaries, and the location and distribution of OWTS in the unincorporated areas.

Historically, the County has relied on the California Plumbing Code (CPC) for most technical and procedural matters pertaining to OWTS. In response to the State OWTS Policy, beginning in 2013 the County started taking measures to modify and update the County's onsite system management program to meet provisions of the Policy. This effort included some initial changes in administrative policies and procedures, followed by a more comprehensive review, update, and revisions to establish a local OWTS Ordinance with an accompanying set of technical standards to replace the CPC. The new OWTS Ordinance combined with an "Onsite Systems Manual" containing various standards, policies, procedures, and technical information for implementation of the Ordinance, now contain all pertinent OWTS requirements for Kern County and form the basis of this LAMP.

Kern County OWTS Requirements

Onsite Wastewater Ordinance

The County Onsite Wastewater Ordinance establishes standards for the approval, installation, and operation of OWTS within Kern County consistent with the County's overall responsibility to prevent the creation of health hazards and nuisance conditions and the protection of surface and groundwater quality. A copy of the Ordinance accompanies and is an integral part of this LAMP. Any change to the Ordinance requires approval by the Kern County Board of Supervisors. **Table 1-1** presents a brief synopsis of various sections of the Ordinance.

Table 1-1. Kern County Onsite Wastewater Ordinance Summary

CHAPTER __. ONSITE WASTEWATER TREATMENT SYSTEMS	
ARTICLE 1. DEFINITIONS AND GENERAL PROVISIONS	
Section	**Purpose** - States purpose to establish standards for compliance with applicable laws and protection of public health and water quality.
Section	**Applicability** – applies to all OWTS up to max 10,000 gpd flow limitation, no community systems
Section	**Administration and enforcement** – by director of Environmental Health Services on behalf of Health Officer.
Section	**County not responsible for damage -**
Section	**Standards, guidelines and onsite systems manual** – establishes Onsite Systems Manual for implementation policies, procedures, and technical details
Section	**Definitions**
ARTICLE 2. GENERAL REQUIREMENTS AND PROHIBITIONS	
Section	**Connection to sanitary sewer** - requires connection to sanitary sewer if within 200 feet of parcel
Section	**Prohibited acts** – describes unlawful acts to include construction without permit and habitation without approved sanitation system.
Section	**Building permit approval** - requires OWTS clearance prior to bldg. construction and repair/remodel
Section	**OWTS installation permit required** – OWTS permits for new construction and repairs/remodels
Section	**Permit duration and extension** – two-year permit duration with provision for extension
Section	**Permits nontransferable –** permits not transferable to another person or site
Section	**Application and fees** - application and payment of fees; to be set by Board of Supervisors
Section	**Denial, suspension or revocation of OWTS permit** – allowances for director to deny, suspend, or revoke permit
Section	**Appeals -** process for appealing any decision of the director pursuant to this code chapter
ARTICLE 3. OWTS SITING., CONSTRUCTION AND OPERATIONAL REQUIREMENTS	
Section	**Siting criteria** - specifies criteria for OWTS States building requirements for inclusion of flush toilet and use of an OWTS
Section	**Site evaluation** – required for all OWTS installations to verify conformance with siting criteria
Section	**Plans** - Requires submission of plot plan with OWTS permit application
Section	**Operation and maintenance** - Requires operation and maintenance guidelines for OWTS, provided by designer or installer
Section	**Cumulative impacts** – additional reqts for cumulative impact assessment for certain OWTS
Section	**Director review and approval** – requires director review and approval of OWTS plans
Section	**Installation** – specifies contractor license for installation; with owner-builder exception
Section	**Installation inspection and approval** - specifies OWTS construction inspection requirements
Section	**Conventional OWTS** – septic tank, subsurface dispersal system, and 100% reserve area min reqts
Section	**Cesspools prohibited** - prohibition of cesspool and requires abatement upon discovery
Section	**Holding tanks** - restrictions on use of holding tanks and portable toilets
Section	**Alternative systems** – uses, types, design, operating, and monitoring requirements
Section	**Operating permits** - required for all alternative OWTS and some other cases
Section	**Abandoned OWTS** - specifies requirements for destruction of abandoned OWTS
ARTICLE 4. Variances, abatement and enforcement	
Section	**Variances** - conditions under which variances may be granted
Section	**Abatement -** abatement of OWTS failures, including property lien or order to vacate, if necessary
Section	**Violations -** notice, enforcement process, and cost recovery for OWTS failures/code violations
Section	**Penalty** – violations or unlawful acts constitute infraction, separate offense each day

Onsite Systems Manual

The Onsite Systems Manual provides the procedural and technical details for implementation of the Ordinance. It contains siting, evaluation, design, construction, and operating requirements for OWTS for residential and non-residential occupancies, covering conventional and alternative OWTS. The Onsite Systems Manual will be reviewed and updated from time-to-time, typically every few years, to keep pace with new issues, policies, procedures, and technologies affecting the use and management of onsite wastewater systems in Kern County. The Onsite Manual will be maintained by the EHD. The initial document submitted with this LAMP, as well as any substantive changes in the future, will require approval by the director and by the Regional Water Quality Control Board.

The Onsite Systems Manual is divided into seven main sections as follows:

Part 1: Siting, Design, and Construction Requirements for OWTS. This part of the Manual provides technical standards and guidelines for the design and construction of various onsite wastewater treatment and disposal technologies and components

Part 2: Design Guidelines, Policies, and Procedures. This part contains a compilation of EHD information sheets, guidelines, diagrams, charts, forms, and other information for use by designers and contractors working with OWTS projects.

Part 3: Requirements for Alternative OWTS. This part provides technical guidance and requirements for the application, design, construction, and management of various alternative onsite wastewater treatment and dispersal technologies, including design standards.

Part 4: Operation, Monitoring, and Performance Guidelines. This provides guidelines and criteria for operation, monitoring, and maintenance of conventional and alternative OWTS, including: (a) performance requirements for different components and types of OWTS; (b) monitoring requirements; and (c) guidelines for evaluating the functioning status and performance of OWTS.

Part 5: Standards, Rules, and Regulations for Land Development. This part contains County standards for sewage disposal, water supply, and preservation of environmental health protection applicable to land development projects.

Part 6: OWTS User Information. This contains various guides and information pamphlets about the use and care of OWTS for the benefit of owners and the public.

Part 7: Requirements for Sewage Pumping, Grease Traps, & Toilet Rental Business. This part sets forth the terms and conditions related to liquid waste hauling and portable toilet operations in the County.

Organization of this LAMP

This LAMP is organized to present a comprehensive explanation of the various requirements, policies, procedures, and measures used to regulate and oversee the use of OWTS in Kern County. It is also structured as much as possible to address the items listed in the State OWTS Policy pertaining to Local Agency Requirements and Responsibilities (Section 3.0 of the OWTS Policy) and Local Agency Management Program for Minimum OWTS Standards (Section 9.0 of the OWTS Policy). Reference is made throughout this LAMP to the County's OWTS Ordinance and Onsite Systems Manual, which are attached as part of this LAMP. A matrix-checklist developed by the Central Valley RWQCB is included in **Appendix C**, indicating the specific sections of this LAMP, County code, and Onsite Systems Manual references corresponding to each item required by the State OWTS Policy. The following briefly summarize the contents of this document.

- ***Section 1 - Introduction and Background:*** This introductory section describes the overall purpose, scope, geographical coverage, and overview of the key elements of the LAMP.

- ***Section 2 - Environmental Conditions, OWTS Usage and Water Quality Management in Kern County: T***his section provides background information on environmental conditions pertinent to the use and suitability for OWTS, extent of OWTS usage in the County, and summary of OWTS management approaches and requirements adopted for protection of water quality in Kern County, addressing items in State OWTS Policy Section 9.1.

- ***Section 3 - OWTS Siting, Design, and Construction Requirements:*** This section summarizes key requirements of the County Ordinance and Onsite Systems Manual pertaining to siting, design and construction of OWTS, per the requirements of section 9.2 and covering applicable items listed under Tier 1 (Sections 7.0 and 8.0) of the State OWTS Policy.

- **Section 4 – Special Management Issues:** This section describes the provisions contained in the Kern County LAMP corresponding with special OWTS management issues listed in Sections 9.2.1 through 9.2.12 of the State OWTS Policy.

- ***Section 5 – Prohibitions*:** This section describes the provisions contained in the Kern County LAMP corresponding with the required prohibitions set forth in Section 9.4 of the State OWTS Policy.

- ***Section 6 – Program Administration:*** This section presents the County's plan for addressing the administrative aspects of the LAMP, including record keeping, ongoing assessment of water quality issues related to OWTS, and reporting to the RWQCB, as required under Sections 3.3 and 9.3, of the State OWTS Policy.

- ***Appendix A – Supporting Rationale:*** This presents discussion of the supporting rationale (including literature sources) for the various siting and design requirements, focusing on vertical separation requirements for conventional and alternative OWTS, comparison with Tier 1 standards of the OWTS Policy, and highlighting the requirements and management practices that are more protective than the provisions of the OWTS Policy.

- ***Appendix B – Nitrate Loading:*** This presents estimates that have been made of wastewater discharge volumes, and nitrate loading contributions to groundwater from the approximately 16,500 existing OWTS in different geographical areas of Kern County. This will be part of the County's ongoing assessment of water quality impacts from

  OWTS.

Section 2:
Environmental Conditions, OWTS Usage, and Water Quality Management in Kern County

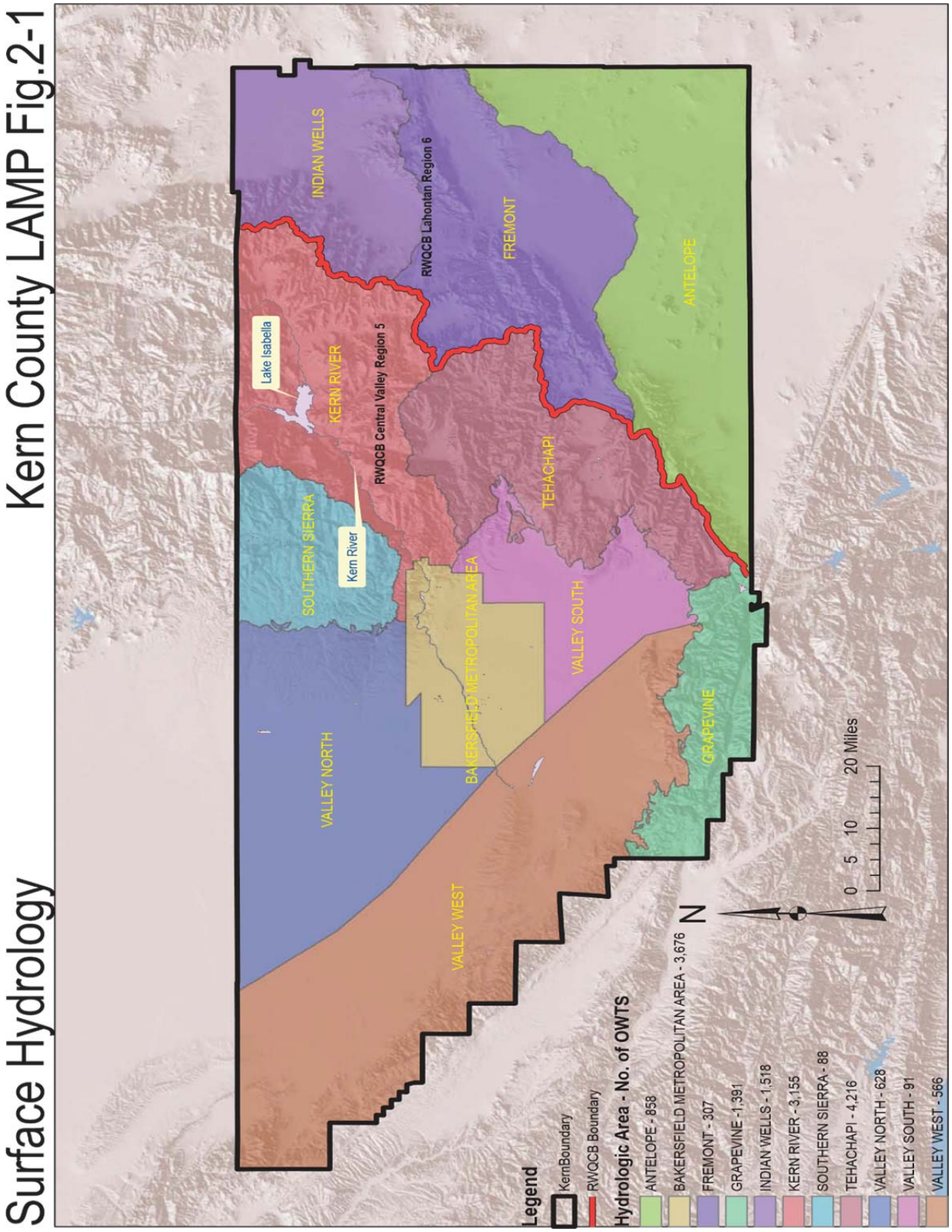
This section provides background information on environmental conditions, OWTS usage, and management approaches adopted for protection of water quality in Kern County.

Surface Water Hydrology

Kern County includes two primary hydrologic regions, the Tulare Lake Hydrologic Region and the South Lahontan Hydrologic Region. These hydrologic regions are managed under two Water Quality Control Board Regions: Central Valley Region 5 (Tulare Lake Hydrologic Region on the west side of the county) and Lahontan Region 6 (the South Lahontan Hydrologic Region on the east side of the county). Very small areas in the remote west edges of the county fall within the Central Coast Region. Utilizing watershed boundaries established by the California Department of Water Resources (DWR), eleven (11) hydrologic areas were delineated and labeled as shown in **Figure 2-1**. Eight of the hydrologic areas are in the Central Valley Region and three within the Lahontan Region. The boundaries match DWR delineations, except that the expansive San Joaquin Valley area was further divided geographically into four sub-areas: labeled Valley North, Valley West, Valley South, and Bakersfield Metropolitan Area. Respective watershed areas and estimated number of OWTS in each Hydrologic Area are listed in Table 2-1.

Table 2-1
Kern County Hydrologic Areas

Hydrologic Area	Total Watershed Area (acres)	Estimated Number of Developed Parcels w/OWTS
Central Valley Region		
Bakersfield Metro Area	2,043,106	3,676
Valley North	2,626,729	628
Valley West	2,444,693	566
Valley South	1,276,966	91
Grapevine	373,658	1,391
Tehachapi	454,041	4,216
Kern River	747,589	3,155
Southern Sierra	264,235	88
TOTAL	**10,231,017**	**13,811**
Hydrologic Area	**Total Watershed Area (acres)**	**Estimated Number of Developed**
Lahontan Region		
Antelope	2,146,292	858
Fremont	908,922	307
Indian Wells	535,095	1,518
TOTAL	**3,590,309**	**2,683**



Major Kern County Rivers, Creeks, and Dry Lakes

Kern River

The Kern River originates in groups of glacial lakes in the vicinity Mount Whitney and drains an approximate area of 2,420 square miles in the southern Sierra Nevada Range. Water runoff from the Sierra Nevada flows from northeast to southwest and enters the San Joaquin Valley through the Kern River Canyon. Kern River has two primary tributaries that meet at Lake Isabella, which was dammed by the Isabella Dam and Reservoir in 1954, for the purposes of flood control. There is generally no flow in the Kern River past the City of Bakersfield due to water diversion into seven canals that flow through the City. In very wet years, water flows in the river southwest to the Buena Vista Lake bed and north to Tulare Lake or into the California Aqueduct near Tupman (KCGP RPEIR, Volume 1, 2004).

Poso Creek

Poso Creek is the primary drainage course for surface water from the Greenhorn Range of Kern County, located in the east side of the County to the north of the Kern River. The creek flows to the southwest out of Kern County, then turns to the northwest before it outlets onto the plains north of Bakersfield and ultimately into the Tulare Lake Bed.

Caliente Creek

The Caliente Creek is located to the south of the Kern River on the east side of the County. The Caliente Stream Group includes various creeks including Caliente Creek, Sycamore Creek, Walker Basin Creek, Tehachapi Creek, Little Sycamore Creek, Comanche Creek, and Tejon Creek. Most of the surface water flow from Caliente Creek seeps into the ground, with only infrequent high intensity flows that reach the Great Valley. Water from high flow ultimately reaches the Kern Lake area.

Sandy Creek

Sandy Creek drains an area within Kern and San Luis Obispo Counties in the southwestern portion of the San Joaquin Valley. The creek originates on the eastern slopes of the Temblor Range. The channel is poorly defined east of Taft-Ford City area and becomes more defined near the Buena Vista Lake Bed. Runoff in Sandy Creek is sporadic, but can become a flood hazard in urban areas during heavy rainfall years.

Cuddy Creek

Cuddy Creek originates in the San Emigdio Mountains and flows eastward through the communities of Lake of the Woods and Frazier Park and ultimately under Interstate 5 to the Tejon (Castaic) Lake bed. The creek is intermittent, with peak flows occurring in winter and spring following periods of peak precipitation.

Major Dry Lakes

Four major dry lake beds occur in eastern Kern County. These include the Rosamond Lake, Rogers Lake, Koehn Lake, and China Lake. Rosamond and Rogers Dry Lakes are located in the southeastern portion of the county on Edwards Air Force Base. The lakebeds receive drainage from Kern and Los Angeles Counties. Koehn Lake is a playa located about 20 miles northeast of Mojave in the Cantil Valley. The lakebed receives runoff from the El Paso Mountains to the northwest and the Rand Mountains to the southeast. China Lake, located northeast of Ridgecrest is located within the China Lake Naval Weapons Center. Drainage from the El Paso Mountains located south of the lake, flows northeast through and around Ridgecrest to China Lake.

Groundwater

Utilizing boundaries established by the California Department of Water Resources (DWR), sixteen (16) alluvial groundwater basins were delineated and labeled as shown in **Figure 2-2**. Eleven (11) basins are located in the Tulare Lake Hydrologic Region, and five (5) basins are located in the South Lahontan Hydrologic Region. There are also small fractional portions of groundwater basins that lie predominantly in neighboring counties (San Bernardino and Los Angeles) which area shown in **Figure 2-2.** These were omitted from further analysis due to the small percentage of each basin falling within Kern County, as well as the absence of any overlying parcel development in these remote areas of the County.

For the 16 groundwater basins, **Table 2-2** summarizes the basin characteristics, including surface area, storage and annual recharge as reported by DWR in Bulletin 118 (DWR, 2003). Also included in **Table 2-2** is groundwater monitoring data, including depth to groundwater and water quality monitoring data available through DWR. The depths to groundwater presented reflect the range of measurements from the most recent well monitoring data available in the DWR Groundwater Library. Where available, data are included from the edges as well as the center of each basin.

Soils and OWTS Suitability Mapping

General Soils Map. Figure 2-3 presents a General Soils Map of Kern County compiled from information contained in several soil surveys and mapping published by the U.S. Department of Agriculture, which include: (1) Soil Survey of Kern County, California, Northwestern Area, 1988; (2) Soil Survey Kern County, California, Southeastern Part, 1981; (3) Soil Survey of Kern County, California, Southwestern Part, 2008; and (4) Online soils data base maintained by the Natural Resources Conservation Service (NRCS). The General Soils Map contained in the 1988 Soil Survey of Northwestern Kern County, provided the baseline groupings of general soil associations, which were extended to cover other portions of the County, as shown in **Figure 2-3**.

Groundwater Basins

Kern County LAMP Fig.2-2

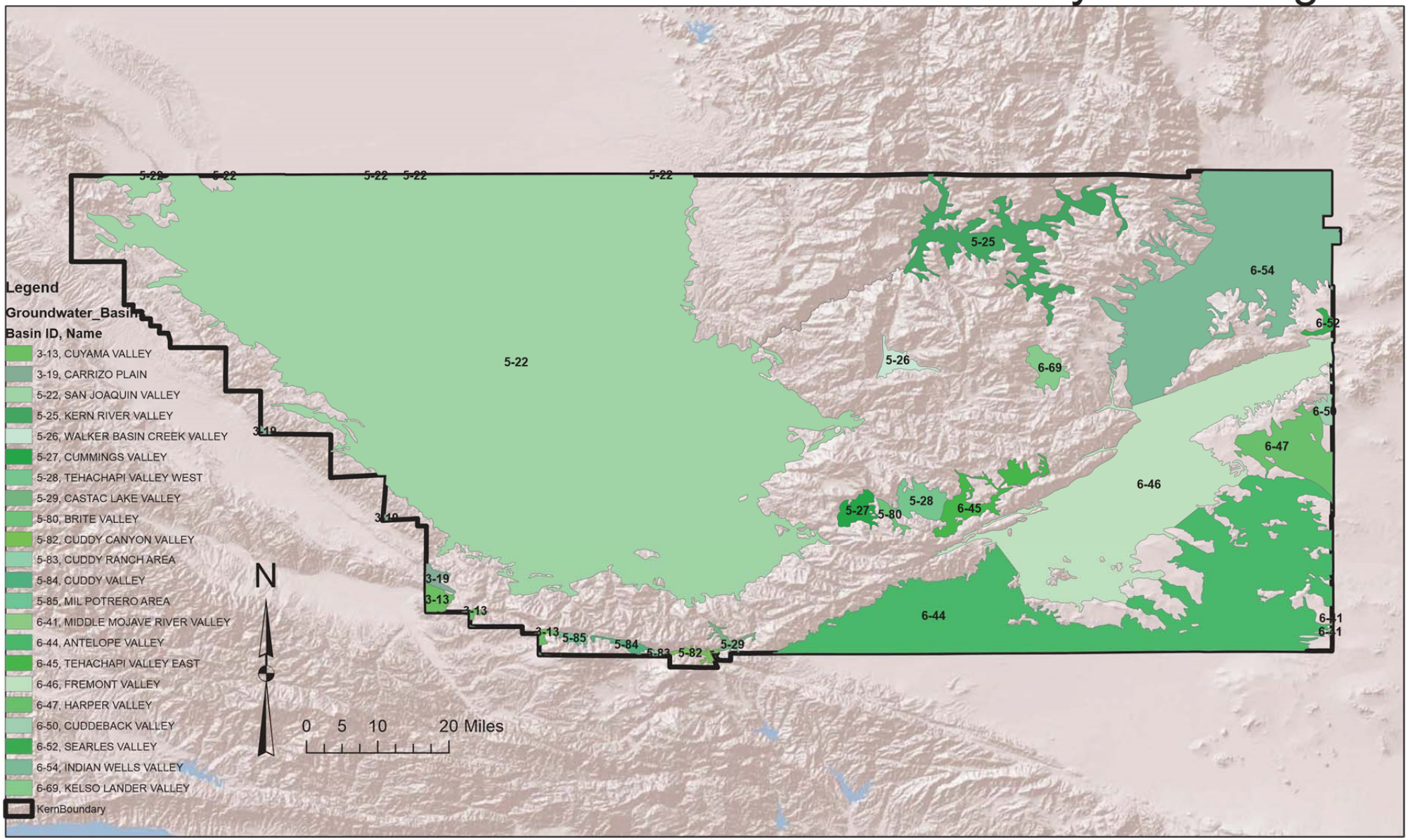


Table 2-2. Kern County Groundwater Basin Characteristics

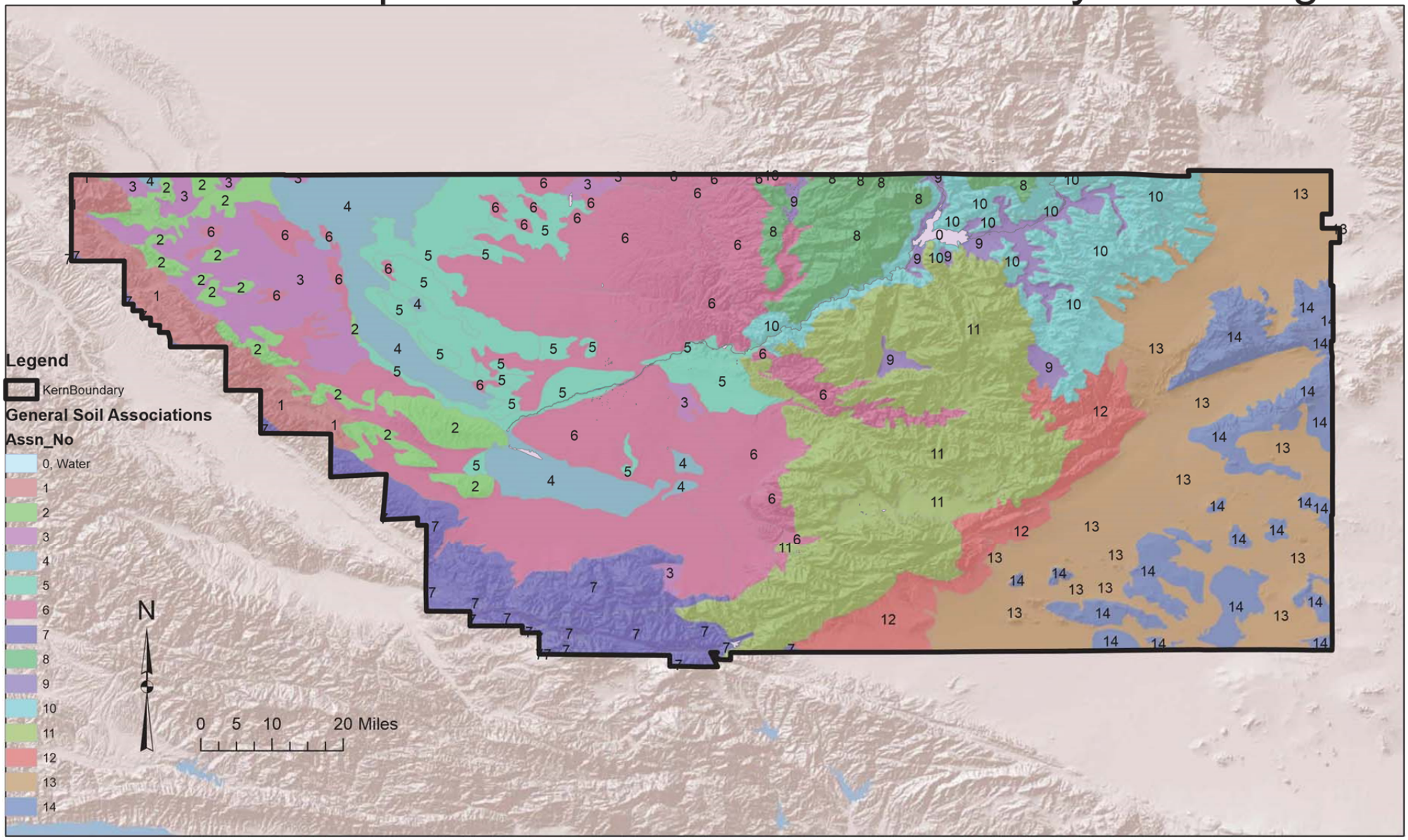
GW Basin Name	Basin No.	Hydrologic Area	Surface Area (AC)	Storage Volume (AC-FT)	Annual Recharge Volume (AC-FT/YR)	Depth to Groundwater (ft., bgs)	Water Quality			
							TDS (mg/L)		Nitrate	
							Range	Ave.	# Wells Monitored	# Wells Exceeding MCL
San Joaquin Valley	5-22.14	Tulare Lake Valley [1]	1,945,000	40,000,000	1,534,000	5 to 20 (perched); 50 to 300+ (regional)	150 - 5,000	400 - 450	475	38
Kern River Valley	5-25	Kern River	74,000	N/A		9 to 63	253 - 480	378	76	5
Walker Basin Creek Valley	5-26	Tehachapi	7,670	-	-	22 to 102	-	-	-	-
Cummings Valley	5-27	Tehachapi	10,000	98,000	4,500	0 to 110	-	344	15	0
Tehachapi Valley West	5-28	Tehachapi	14,800	225,000	4,000	1 to 57	280 - 365	315	30	2
Castaic Lake Valley	5-29	Grapevine	3,600	-	-	37 to 52	570 - 605	583	8	0
Brite Valley	5-80	Tehachapi	3,170	26,000	3,000	51	-	-	-	-
Cuddy Canyon	5-82	Grapevine	3,300	-	-	67 to 130	690 - 695	690	5	0
Cuddy Ranch Area	5-83	Grapevine	4,203	-	-	33 to 42	480 - 645	550	6	0
Cuddy Valley	5-84	Grapevine	3,500	77,000	510	no data	325-645	407	10	0
Mil Potrero	5-85	Grapevine	2,300	-	3,100 [2]	artesian to 50	372 - 657	460	7	0
Antelope Valley	6-44	Antelope	1,010,000 [3]	68,000,000	48,000	20 to 280	200 - 800	300	243	8
Tehachapi Valley East	6-45	Fremont	24,000	150,000	3,000	284	298 - 405	361	10	0
Fremont Valley	6-46	Fremont	335,000	4,800,000	-	110 to 212	398 - 1,400	596	15	0
Indian Wells Valley	6-54	Indian Wells	382,000 [4]	2,050,000	15,100	13 to 212	192 - 950	390	58	1
Kelso Lander	6-69	Fremont	11,200	-	-	no data	360 - 1300	-	-	-

* Primary data source: DWR Bulletin 118, California's Groundwater

1. *Extends over sub-areas designated Valley North Valley West, Valley South and Bakersfield Metropolitan*
2. *Includes estimate of 400 AC-FT/YR from 1,900 OWTS in 8,800 watershed area (CM Engineering, 1970)*
3. *Groundwater basin extends over portions of Kern, Los Angeles, and San Bernardino Counties*
4. *Groundwater basin extends over portions of Kern, Inyo, and San Bernardino Counties*

General Soils Map

Kern County LAMP Fig.2-3



Soils in the County can be grouped into general landform classifications as follows:

1. **Alluvial Plains, Fans, and Stream Benches (3, 5, 6, 11):** Soils found in the flat portions of the San Joaquin Valley and Mojave Desert are deep, well drained soils derived from sedimentary parent material and formed in alluvial plains, fans, stream benches, flood plains, and basin rims. The deep, well drained fine sandy loam and clay loam soils in these areas are well suited for conventional OWTS.

2. **Basins (4):** Soils found in the basin areas of San Joaquin Valley are deep, well drained to somewhat poorly drained clays and silt loams. Restricted permeability and locally shallow perched groundwater conditions can pose a moderate constraint for OWTS.

3. **Foothills (2, 12):** The foothill soils of San Joaquin Valley and the Eastern footslopes of the Southern Sierra Nevada and Tehachapi Mountains are generally shallower, located on old fans and terraces that lie between the more recent alluvial soils on the valley floor and the soils of the uplands. Soils range from sandy loams to stratified coarse gravelly sand. Limited soil depth over bedrock, steep slopes, and somewhat excessive permeability pose moderate to locally severe constraints for OWTS in the foothill regions.

4. **Uplands (1, 7, 8, 9, 10, 11, 14):** The mountain soils of the Temblor and Diablo Ranges to the west of San Joaquin Valley are shallow to deep and well drained loams situated on gently rolling to steep slopes. The Coast and Transverse Ranges to the south have moderately deep to very deep, well drained to excessively well drained, and fine sandy to gravelly loams.

   East of the San Joaquin Valley, mountainous areas include the Tehachapi and Greenhorn Ranges, continuing into the southern terminus of the Sierra Nevada Mountains. Soil are generally suitable for OWTS in the upland areas, limited by locally steep slopes and shallow soil depth and in some areas by shallow seasonal groundwater conditions.

Soil-OWTS Suitability: The general mapping of soil conditions takes into account location and landform conditions, depth to bedrock, slope, subsurface texture, and drainage conditions of the soils, which are all key factors that can affect the suitability of the soils for onsite wastewater treatment. **Table 2-3** was developed from the published soil survey information, summarizing the soil characteristics of the general soil associations mapped in **Figure 2-3.**

The second to last right-hand column in **Table 2-3** highlights the key constraints and overall suitability designation for OWTS for each general soil association. The designations were developed and assigned based on the USDA soils information and Questa's best professional judgment (preliminary). This is provided as a general assessment tool and is not a substitute for site-specific investigation of and planning for onsite wastewater treatment systems. It provides a general indication of the management and design issues likely to be encountered in each area. It does not take into account local constraints such as steep slopes, setback, or other anomalous conditions that may be found on particular sites. The last column gives the estimated number of residential OWTS within each general soil area, determined by merging the GIS parcel data with the soil mapping boundaries.

Table 2-3: Kern County General Soil Associations

General Soil Association Number	Description	Soil Depth	Slope	Drainage	Soil Texture	Suitability and Constraints for OWTS	Estimated Number of OWTS
1	**Soils on the Hills and Mountains of the Temblor and Diablo Ranges**	shallow to deep	mainly gently rolling to very steep 9-75%, some undulating	well drained	clay to sandy loam, some very shelly loam	Generally suitable conditions for conventional OWTS with locally steep slope limitations; potentially requiring shallow dispersal designs	5
2	**Soils on the Foothills of the Temblor and Diablo Ranges**	shallow to deep	Rolling to steep; some very steep	well drained to somewhat excessively drained	mainly sandy loam, some fine sandy loam to stratified coarse gravelly sand	Generally suitable conditions for conventional OWTS with locally steep slope limitations, potentially requiring shallow dispersal designs	30
3	**Soils Mainly on Alluvial Fans, Alluvial Plains, and Terraces in the Western Part of the San Joaquin Valley**	deep	nearly level to moderately sloping	well drained	clay loam to sandy loam	Suitable conditions for conventional OWTS	936
4	**Soils Mainly in Basins of the San Joaquin Valley**	deep	nearly level to gently sloping, 0-5%	well drained to somewhat poorly drained	loam, fine sandy loam, and clay	Suitable conditions for conventional OWTS; some inclusions of low permeability and perched groundwater favoring shallow dispersal designs	132
5	**Soils Mainly on Alluvial Fans, Alluvial Plains, Basin Rims, and Flood Plains in the Eastern Part of the San Joaquin Valley**	deep	nearly level to gently sloping, 0-5%	well drained to somewhat excessively drained	silt and clay loam to sandy loam	Suitable conditions for conventional OWTS; may be limited locally by cumulative groundwater loading effects from high density of OWTS	9,612
6	**Soils on Flood Plains, Alluvial Fans, Stream Terrace, and Fan Remnants of Southern and Southeastern Joaquin Valley**	moderately deep to very deep	nearly level to moderately sloping	well drained to somewhat excessively well drained	mainly clay loam to sandy loam, some gravelly loam, and loamy sand	Suitable conditions for conventional OWTS; may be limited locally by cumulative groundwater loading effects from high density of OWTS	12,169

General Soil Association Number	Description	Soil Depth	Slope	Drainage	Soil Texture	Suitability and Constraints for OWTS	Estimated Number of OWTS
7	**Soils on the Coast and Transverse Range**	moderately deep to very deep	mainly gently sloping to steep, some nearly level	well drained	silty clay loam to very gravelly sandy loam	Generally suitable conditions for conventional OWTS; some local inclusions of steep slope; potentially requiring alternative treatment and/or shallow dispersal designs	1,380
8	**Soils and Rock outcrop on Hillslopes, Mountain Slopes, Flood Plains, Stream Terraces, Alluvial Fans, and Fan Remnants on the Western and Central Slopes of the Southern Sierra Nevada and Greenhorn Ranges**	mainly shallow to moderately deep, some very deep	mainly moderate-ly steep to very steep; some nearly level	well drained to somewhat excessively drained	gravelly sandy loam to stony, boulder coarse sandy loam	Moderately constrained by steep slopes and shallow soils; potentially requiring alternative treatment and/or shallow dispersal designs	149
9	**Soils in Mountain Valleys, on Flood Plains, in Depressions, and on Stream Terraces, Inset Fans, Fan Aprons, Alluvial Fans, Fan Piedmonts, and Fan remnants of the Southern Sierra Nevada Range; Primarily Near Lake Isabella in South Fork Valley**	very deep	nearly level to moderately steep	well drained or somewhat poor-ly drained	fine sandy loam	Generally suitable conditions for conventional OWTS, with areas of shallow groundwater and low permeability constraints; potentially requiring alternative treatment and/or shallow dispersal designs	2,230
				well drained or excessively drained	gravelly loamy coarse sand		
10	**Soils on the Hillslopes and Mountain Slopes on the Eastern Slopes of the Southern Sierra Nevada Range**	very shallow to moderately deep	moderately sloping to very steep	well drained to somewhat excessively drained	mainly gravelly loamy coarse sand, some boulder loamy coarse sand or fine sandy loam	Moderately to severely con-strained by steep slopes and shallow soils; potentially requiring alternative treatment and/or shallow dispersal designs	866

General Soil Association Number	Description	Soil Depth	Slope	Drainage	Soil Texture	Suitability and Constraints for OWTS	Estimated Number of OWTS
11	**Soils on Uplands and in Valleys of the Sierra Nevada and Tehachapi Mountains**	moderately deep to very deep	Nearly level to hilly, 0-30%	well drained	sandy loam to clay loam	Generally suitable conditions for conventional OWTS, with areas of shallow groundwater, steep slopes, and high OWTS densities; potentially requiring alternative treatment and/or	4,875
12	**Soils on the Eastern Foot Slopes of the Sierra Nevada and Tehachapi Mountains**	rock outcrop and shallow	nearly level to steep	well drained to somewhat excessively drained	gravelly sandy loam and loamy coarse sand	Moderately to severely constrained by steep slopes and shallow coarse-textured soils, potentially suitable for supplemental treatment and/or shallow dispersal designs	36
13	**Soils of the Mojave Desert**	mainly deep to very deep, some shallow	nearly level to strongly sloping	well drained to excessively drained	sandy clay loam to very gravelly loamy sand	Generally suitable conditions for conventional OWTS; some local inclusions of steep slope limitations favoring shallow dispersal designs	5,215
14	**Soils of the Mojave Uplands**	shallow to deep	gently sloping to strongly sloping	well drained	sandy loam and silica lime cemented hardpan	Moderately to severely con-strained for conventional OWTS by steep slopes and shallow soils; potentially requiring shallow dispersal designs	73
		shallow and very shallow	very steep		coarse sandy loam to clay loam		

OWTS Usage Estimates

Parcel Development Status

Since a comprehensive inventory of existing OWTS usage in Kern County does not exist, estimates were made by Questa Engineering in connection with studies supporting the development of this LAMP. This included a systematic GIS-based inventory to determine the development status (i.e., developed or vacant) of all parcels in non-sewered areas of the County, which was taken as the best estimate of the current number of OWTS in the county. Description of the methodology, assumptions, and results is provided in **Appendix B**.

The geographic area covered in the analysis included the unincorporated area of Kern County, plus those portions of California City which do not have municipal sewer service and instead rely on the use of OWTS. All incorporated property within the remaining cities and sanitary districts was excluded, under the assumption that municipal sewer systems either serve or are available to these parcels. Some "islands" of unincorporated parcels were found to exist in the urban areas; and in most cases found these areas to be connected to a sewage treatment facility. There may be some additional isolated cases within sanitary district boundaries were individual lots or small pockets of development are not connected to the municipal sewer system; and these findings should be added to the inventory in the future as the information becomes available.

OWTS Distribution by Watershed Areas

To assist with present and future management of OWTS and water quality assessments, the GIS parcel status data were merged with watershed boundaries, providing useful information on the distribution of OWTS according to geographical and watershed areas in the county. The results are presented in **Tables 2-4** and **2-5** for the Central Valley and Lahontan regions of the county, respectively. Shown in the tables for each watershed is the total land acreage comprising each basin, the lot area developed with OWTS, the estimated number of OWTS, and the average lot size for the developed parcels. As indicated, about 84% of the OWTS are located in the Central Valley Region and 16% in the Lahontan Region.

Table 2-4.
OWTS Usage and Distribution Hydrologic Area, Kern County - Central Valley Region 5

Hydrologic Area	Total Water-shed Area (acres)	Developed Lot Area (acres)	Number of Developed Parcels	Average Developed Lot Size (acres)
Bakersfield Metro Area	2,043,106	4,662	3,676	1.27
Valley North	2,626,729	6,080	628	9.68
Valley West	2,444,693	1,704	566	3.01
Valley South	1,276,966	761	91	8.37
Grapevine	373,658	1,625	1,391	1.17
Tehachapi	454,041	15,692	4,216	3.72
Kern River	747,589	5,271	3,155	1.67
Southern Sierra	264,235	3,337	88	37.92
TOTAL	**10,231,017**	**39,132**	**13,811**	**2.83**

Table 2-5.
OWTS Usage and Distribution by Hydrologic Area, Kern County - Lahontan Region 6

Hydrologic Area	Total Water-shed Area (acres)	Developed Lot Area (acres)	Number of Developed Parcels	Average Developed Lot Size (acres)
Antelope	2,146,292	2,855	858	3.32
Fremont	908,922	1,647	307	5.36
Indian Wells	535,095	4,893	1,518	3.22
TOTAL	**3,590,309**	**9,395**	**2,683**	**3.50**

Water Quality Management Measures

The following summarizes how key site suitability, land use, and development factors have been addressed in the OWTS requirements of Kern County's LAMP for protection of water quality. This summary is organized to correspond with the elements listed under Section 9.1 of the SWRCB OWTS Policy.

Groundwater Quality Protection

1. **Soil Conditions:** Soil suitability is the single most critical aspect of onsite wastewater treatment and dispersal. The soil provides the medium for the absorption and treatment of wastewater discharged through sub-surface dispersal systems. This is accomplished mainly through a combination of physical filtering, biological and chemical processes, and dilution. Protection of underlying groundwater relies on provision of an adequate depth of permeable soil below the dispersal field (zone of aeration) for absorption and treatment to occur. The Kern County Onsite Wastewater Ordinance and Onsite Systems Manual requires detailed site evaluation to document suitable soil characteristics and depth for each OWTS installation consistent with industry practices and appropriate for the conditions and requirements in Kern County (see **Section 3**). The observed depth and percolation characteristics of the soil are used to select the appropriate location, sizing, and design of the OWTS, to achieve proper effluent dispersal and groundwater protection.

2. **Geologic Factors:** Geology is important to the suitability and performance of OWTS due to its influence on topography and landforms, the type and characteristics of soils that develop at the surface, the occurrence and movement of sub-surface water, and slope stability. A large percentage of OWTS usage in Kern County occurs in flat valley desert regions, characterized by deep alluvial soils where the geology does not pose any unusual of difficult constraints. However, there are also large numbers of OWTS in the mountainous regions, where the rock formations may influence the suitability for and effects of OWTS. Geologic factors are addressed for new OWTS based on: (a) information from basic site evaluations for all installations; and (b) for systems located on slopes, steep slopes, or near areas of unstable land masses, the completion of a geotechnical study, including assessment of hydrogeologic conditions, water movement, and slope stability.

3. **Groundwater Conditions:** Groundwater conditions are of importance for OWTS usage in Kern County due to the great dependence on groundwater resources for public and private water supplies. While most of the county is served by public water systems, there are mountainous and rural desert areas of the county that rely on local aquifers for both public and private water supplies, in areas where OWTS discharges may be within the contributing watershed/recharge area. Site evaluation practices include requirements for documenting groundwater conditions, which include procedures for wet weather observations (Onsite Systems Manual Parts 1 and 2). Documentation of groundwater levels, in combination with soil permeability (percolation rate), provide the basis for selection of the appropriate OWTS design and maintenance of an appropriate vertical separation distance between the point of effluent dispersal and the water table for protection against pathogen impacts. Siting and design criteria addressing groundwater separation requirements have been developed to provide the following:

    - Vertical separation distance of 7 feet for conventional OWTS and 12 feet for seepage pits;

- Reduced vertical separation distance of 2 to 3 feet, based on inclusion of supplemental treatment and/or alternative dispersal designs (e.g., pressure distribution, drip dispersal) found to provide more effective use of the shallow unsaturated soil zones for improved absorption and biodegradation of wastewater constituents, including pathogens.

- Reduced vertical separation distance of 10 feet for seepage pits where supplemental treatment is provided.

- No provision for vertical separation distance of less than 2 feet for trenches and 10 feet for seepage pits.

Appendix A provides further discussion of the supporting rationale, including literature sources, for the OWTS groundwater separation requirements adopted by Kern County.

4. **Areas with High Usage of Domestic Wells:** Most development in Kern County is served by public water systems. Domestic wells are used to a moderate extent in the more rural areas of the county. Measures to assure protection of existing and new domestic water supply wells from the effects of OWTS include the following:

    - Minimum horizontal setback distances between OWTS and water wells consistent with requirements of the State OWTS Policy;

    - Water well testing, review, and approval by EHD for any new development;

    - Provision in County Ordinance (Article 3) for EHD to require completion of cumulative impact studies for new OWTS proposals in areas of water quality concern (see additional discussion below). This may include areas of high domestic well usage.

    - Availability of alternative treatment and dispersal technologies to mitigate documented or potential impacts to groundwater in areas of high domestic well usage.

    - The EHD will be giving special attention to ongoing review of OWTS and water quality data in areas of high domestic well usage as part the Water Quality Assessment Program under this LAMP (see **Section 6**).

5. **Domestic Water Well Data:** For nearly 30 years, the EHD has been collecting groundwater quality data for new domestic water well installations in the County. In connection with the development of this LAMP the data for nitrate concentrations were compiled and merged with GIS parcel information and then sorted by hydrologic area. **Table 2-6** summarizes the results, organized by 11 different general hydrologic areas defined for the County. The nitrate results were grouped to into four different ranges of values (<15, 15-30, 30-45, and >45 mg/L) as indicated and include the results for 2,571 wells. Additional data exist for a large number of other wells, but

could not be linked to an APN, and therefore are not included in this initial analysis. These and additional data like them will be reviewed in further detail through the implementation of the County's LAMP and will be an important point of reference for the required Water Quality Assessment addressed in Section 6 of this LAMP document.

For graphical illustration, **Figure 2-4** shows the location of all 2,571 wells represented by the data below; **Figure 2-5** shows the location of only those wells with reported NO_3 concentration in the ranges of 30 to 45 mg/L and >45 mg/L.

Table 2-6.
Summary of Domestic Well Nitrate Data by Hydrologic Area, 1990-present (number of wells in NO_3 concentration range)

Hydrologic Area	<15 mg/L	15-30 mg/L	30-45 mg/L	>45 mg/L	Total Records
Antelope	268	14	1	4	287
Bakersfield Metro Area	260	26	5	17	308
Fremont	87	17	4	3	111
Grapevine	46	9	4	3	62
Indian Wells	153	17	0	4	174
Kern River	215	44	20	10	289
Southern Sierra	39	12	6	13	70
Tehachapi	478	102	19	13	612
Valley North	234	47	25	47	353
Valley South	82	12	9	11	114
Valley West	173	6	6	6	191
Total	**2,035**	**306**	**99**	**131**	**2,571**
Percent of Total	**79%**	**12%**	**4%**	**5%**	

Surface Water Quality Protection

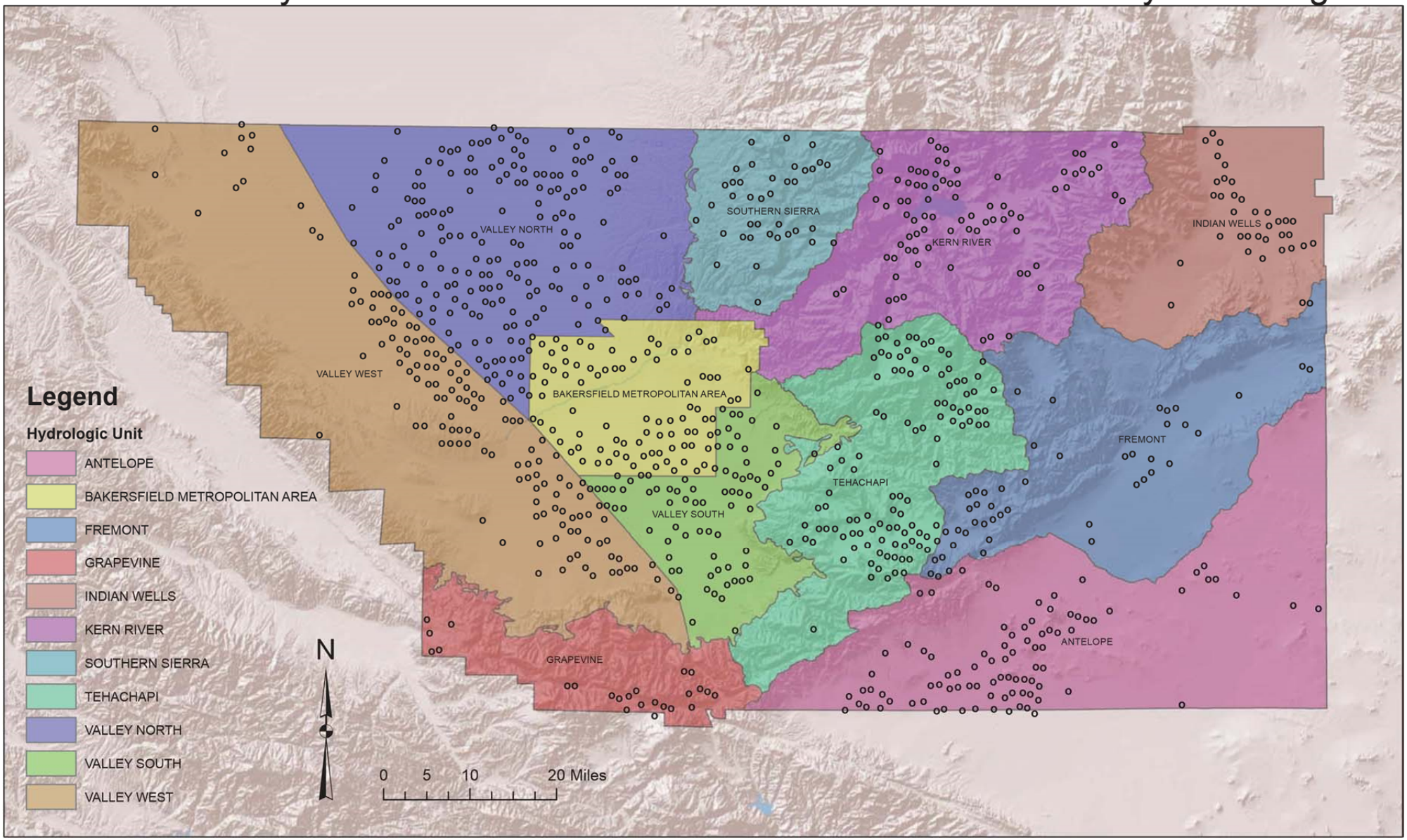
1. **Minimum watercourse/water body setback requirements:** The primary measure for protection of surface water quality is the establishment of safe horizontal setback buffers between OWTS components (treatment tanks and dispersal fields) and various water and landscape features. The requirements contained in the Kern County Onsite Systems Manual are consistent with current and historical policies and guidelines of the Central Valley and Lahontan Regional Water Quality Control Boards. They address setbacks to springs, drainage ditches/swales, watercourses, and reservoirs.

2. **Alternative treatment and dispersal technologies:** The County's updated Ordinance and Manual includes alternative treatment and dispersal technologies that provide greater flexibility and options for system repairs than have historically been available in Kern County. This will have two positive effects for surface water quality protection: (1) the use of alternative treatment technologies, producing higher quality effluent, can compensate for reduced amount of soil absorption area where the repair system on an older non-conforming development site encroaches within

the normal setback buffer; and (2) alternative dispersal methods and sizing criteria can reduce the amount of encroachment into the setback area, by making more portions of the property (e.g., shallow soil areas) potentially feasible for wastewater dispersal.

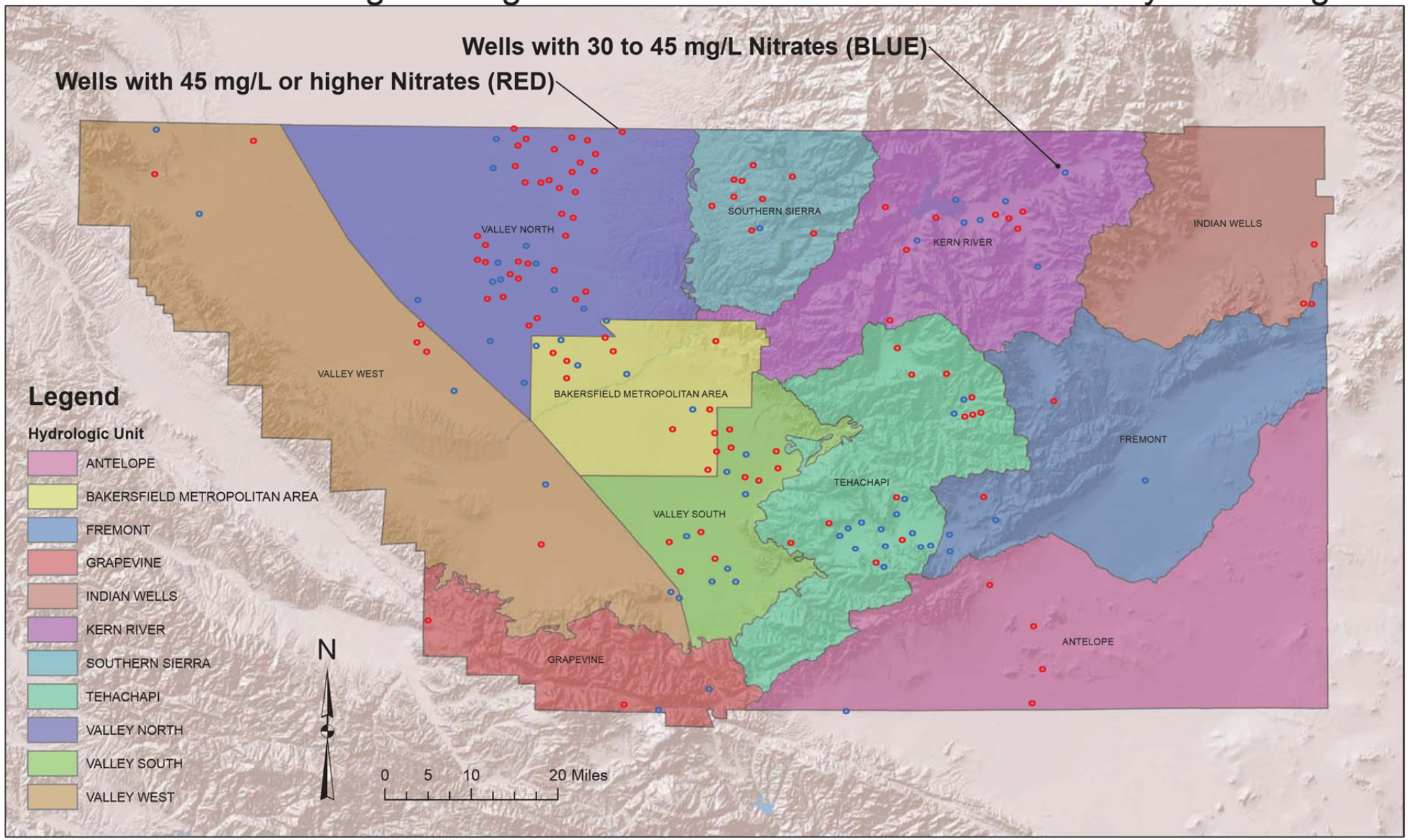
Water Wells Analyzed for Nitrates

Kern County LAMP Fig. 2-4



Water Wells with 30 mg/L or Higher Nitrates

Kern County LAMP Fig. 2-5



3. **Erosion control measures:** Depending upon site conditions and system design, construction of an OWTS may pose a threat of soil erosion and impacts on downstream receiving waters from excavations for tanks, trenching for pipelines and dispersal trenches, and associated clearing and grading activities. The County's Onsite Systems Manual requires that erosion control measures be implemented in connection with the installation of OWTS in mountain areas and that final approval of the OWTS installation is contingent upon confirmation that the specified erosion control measures have been implemented.

4. **Flood protection measures:** In addition to prohibiting the installation of OWTS in low-lying areas that experience annual flooding, the County's Onsite System Manual includes provisions for evaluation and incorporation of special design measures for systems located within areas subject to inundation by extreme flood events, such as the 100-year flood. Specifically, the measures require: (a) protection for OWTS supplemental treatment, pressure distribution and/or drip dispersal components from flood damage, such as structural tie-downs and/or elevating critical components above the 100-year flood level; (b) prevention of 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 (c) additional emergency storage capacity for flood periods.

5. **Enhanced Protection for Water Supply Watersheds:** Kern County does not have a great many surface water resources that serve as water supply sources. However, those that do exist warrant special concern and enhanced water quality protection. In accordance with the requirements of State OWTS Policy, Kern County has adopted increased setback standards for any OWTS located in an area tributary to and within 1,200 feet and within 2,500 feet of a public water supply surface water intake. The provisions for identifying and notifying public water system owners of pending OWTS applications are discussed in **Sections 4** and **5** of this LAMP, along with the applicable requirements for OWTS design when the dispersal system must be located within the prescribed setback buffer (e.g., for a replacement system or pre-existing lot of record).

Impaired surface waters (nitrogen or pathogens)

There are no water bodies in Kern County currently listed as impaired for nitrogen or pathogens.

High Density of OWTS, Parcel Size and Cumulative Impacts

Consideration of OWTS density, parcel size and potential cumulative OWTS impact issues (e.g., groundwater mounding, nitrate loading) are addressed in Kern County primarily through Ordinance requirements under Article 3, that call for the completion of cumulative impact assessments for certain types of projects or locations, including consideration of such factors as the constituent levels (e.g., nitrogen content) in the wastewater, 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 the discharge area. Guidelines for such studies

are contained in the Onsite Systems Manual (Part 1). The guidelines identify circumstances requiring cumulative impact studies, minimum qualifications of those conducting the work, typical data needs and assumptions, analytical methods, and evaluation criteria. The Ordinance also allows for the County to designate areas of special environmental concern for OWTS that may be identified from the results of cumulative impact studies. Any new subdivision utilizing OWTS with lot sizes smaller than 2.5 acres where domestic wells are used, normally require cumulative impact assessment to evaluate nitrogen loading.

Additionally, the new Ordinance provisions allowing the use of alternative treatment and dispersal technologies provide opportunities to mitigate nitrate loading (e.g., with supplemental treatment systems) and hydraulic mounding (e.g., with pressure distribution or drip dispersal designs).

Geographic areas with many older non-conforming OWTS installations and setbacks

Older, non-conforming OWTS are common in the rural mountain and agricultural areas of the County. OWTS issues commonly arise in areas where properties were originally developed for seasonal/recreational cabins and have converted over the years to year-round residences. Often the properties are very small, with OWTS constructed prior to the introduction of modern codes. Some systems consist of cesspools, and repairs/replacement systems tend to be very challenging. Non-conformance with adopted setback requirements (e.g., from structures, water features, etc.) are also common. Non-conforming OWTS located in areas of high groundwater conditions, such as some parts of the Lake Isabella area, are especially problematic.

Measures contained in the County's updated Ordinance that will aid significantly in addressing problems of older non-conforming OWTS, are the availability of alternative treatment and dispersal system designs to provide more effective upgrades and repairs for lots having limited area, soil limitations, or other constraints for conventional OWTS. Additionally, as discussed in Section 4, the County anticipates the eventual need to pursue community approaches to OWTS management in some of the mountain development areas that may include the implementation of Onsite Waste Disposal Zones (e.g., maintenance districts) and/or development of community facilities to replace individual OWTS.

Section 3:
OWTS Siting, Design, and Construction Requirements

Siting Criteria for OWTS

Approval of any conventional OWTS shall require compliance with the following minimum siting criteria.

1. **Soil Depth:** For conventional OWTS, minimum depth of soil beneath the bottom of the dispersal field, shall be 7 feet for leaching trenches or beds and 12 feet for seepage pits. For alternative OWTS, minimum soil depth may be reduced to 3 feet for trench systems and 10 feet for seepage pits.

2. **Vertical separation to ground water:** Minimum vertical separation distance between the bottom of the dispersal field and groundwater, including perched groundwater, shall be 7 feet for leaching trenches or beds, and 12 feet for seepage pits. For alternative OWTS utilizing supplemental treatment, minimum depth to groundwater may be reduced to 2 feet for trench systems and 10 feet for seepage pits. For alternative OWTS utilizing supplemental treatment and/or alternative dispersal methods, minimum separation distance to groundwater may be reduced to 3 feet or 2 feet, depending on the type of alternative OWTS design as provided in Table 3-1. Depth to groundwater may be reduced to 10 feet for seepage pits where used in combination with supplemental treatment.

Table 3-1.
Depth to Groundwater Requirements for Conventional and Alternative OWTS (feet, below trench bottom)

Type of OWTS	Percolation Rate (MPI)	Min. Depth to Groundwater (feet)[1]		
		2	3	7
Conventional Septic Tank & Dispersal Trench	1-60			X
Conventional Trench w/Supplemental Treatment Pressure Distribution (PD) Trench At-grade	1-120		X	
Pressure Distribution w/Supplemental Treatment Mound At-grade w/Supplemental Treatment Raised Sand Filter Bed Drip Dispersal w/Supplemental Treatment	1-120	X		

[1] Measured from the bottom of the dispersal system

3. **Soil Percolation Rate:** For conventional leaching, trenches, or beds, the average soil percolation rate in the proposed disposal field area shall not be faster than one minute per inch (1 mpi) nor slower than 60 mpi, determined in accordance with procedures prescribed in the Onsite Systems Manual. For seepage pits, percolation rates shall not be slower than 25 mpi. Soils having percolation rates between 60 and 120 mpi will require the use of an alternative OWTS, as provided per Article 3 of the Kern County Onsite Wastewater Ordinance Code and in accordance with methods and requirements detailed in Part 2 of the Onsite Systems Manual.

4. **Ground Slope:** Maximum ground slope in the disposal field area shall not exceed thirty (30) percent.

5. **Horizontal Setbacks:** Minimum horizontal setback distances from various site features to OWTS components, shall be as listed in Part 1, Table 1-1 of the Onsite Systems Manual.

6. **Areas of Flooding:** OWTS shall not be located in the primary floodplain or "floodway" as determined or estimated from published floodplain maps or on the basis of historical evidence acceptable to the Director. OWTS are not permitted in secondary floodplain areas unless: (1) they are protected by flood control devices approved by the Kern County Water Agency or Kern County Department of Public Works; (2) they are constructed with appropriate measures to minimize infiltration of floodwaters into the system and discharges from the system into the floodwater.

7. **OWTS Located on Property Served:** OWTS shall be located on the same property as the building(s) being served. An exception may be granted by the Director for existing lots of record, where the OWTS may be located on an adjoining property within a non-revocable easement.

Site Evaluations for OWTS

1. For all locations where an OWTS is proposed to be installed, a site evaluation shall be conducted prior to permit approval to verify conformance with applicable horizontal setbacks, ground slope, soils, and groundwater requirements as prescribed in this Manual.

2. Site evaluation methods shall include soil profiles, percolation tests, and other exploratory tests, as necessary, to verify adequate depth and permeability of soil and vertical separation between disposal field and groundwater, for both primary and reserve disposal areas.

3. Testing shall be conducted in accordance with standards and guidelines provided in the Onsite Systems Manual.

4. Where the director has been provided adequate evidence to demonstrate suitable soil conditions and groundwater separation exists, testing requirements may be waived.

5. For new divisions of land, soil profiles, percolation tests, and groundwater determina-

tions 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.

Wastewater Flows for OWTS Design

Wastewater flow requirements for OWTS design are covered in Part 1, Section 1.3 of the Onsite Systems Manual and include the following provisions:

1. **Peak daily flow:** All OWTS sized for peak daily flow;

2. **Residential OWTS:** Based on number of bedrooms in accordance with criteria in Table 1-2 in the Manual (consistent with CPC criteria). Design flows for a primary residence and secondary dwelling unit, shall be determined independently, regardless of whether the flows are treated separately or in a combined OWTS;

3. **Multiple Dwelling Units or Apartments:** Based on the number of dwelling units in accordance with criteria in Table 1-3 in the Manual (consistent with CPC criteria)**;**

4. **Non-residential OWTS:** Based on consideration of projected activities, occupancy, facilities, and estimating factors (unit flows) given in Table 1-4 of the Manual (consistent with CPC). Alternative flows may be based on other appropriate literature references (e.g., EPA Manuals) or documented wastewater flow for a comparable facility, as deemed acceptable by EHD;

5. **Flow Equalization:** Flow equalization may be used for non-residential and mixed use facilities that experience significant, regular and predictable fluctuations in wastewater flows, such as churches, schools, and 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. It allows peak surges (e.g., weekend usage) to be spread out over several subsequent days to aid in overall OWTS performance.

Conventional OWTS Requirements

Where an OWTS is required, it shall, at a minimum, consist of a septic tank and subsurface dispersal system for absorption and leaching of the effluent into the soil (Conventional OWTS). The septic tank and effluent dispersal system must be designed, permitted, and so constructed as to meet the requirements prescribed by the Onsite Systems Manual in Part 1, Sections 1.4 and 1.5; which have been developed to be substantially consistent with requirements contained in the California Plumbing Code, the guidelines that have historically been followed in the County. Key design and construction requirements detailed in the Manual include the following:

Septic Tank Requirements

Requirements for septic tanks in Section 1-4 of the Manual cover the following:

- Capacity
- Plans
- Structural design
- Prefabricated tanks
- Construction materials
- Compartments, partitions, and baffles
- Access manholes and sidewalls
- Pipe opening sizes, extension, and venting
- Effluent Filter
- Water-tightness Testing

Conventional Disposal Trenches and Beds

Requirements for septic tanks in Section 1-5 of the Manual cover the following:

- General – requires design to be based on soils analysis and/or percolation testing;
- Sizing – effective absorption area and absorption capacity for trenches, leaching beds, and chamber designs;
- Construction – addresses depth, length, width, spacing, cover, grade, pipe and filter material, distribution boxes and laterals, connections and joints, surface covering, and dosing siphons.

Construction Inspection and Testing

Minimum requirements for inspection and testing of OWTS installations are addressed in Section 1.7 of the Manual, covering: (a) pre-construction meeting; (b) open trench inspection; (c) drain rock, pipe materials, and placement; (d) diversion valves; (e) septic tank location, size, and water-tightness testing; and (f) final inspection, backfill, and as-built; as applicable.

Seepage Pit Requirements

Requirements for seepage pits are prescribed in the Onsite Systems Manual in Part 1, Section 1.6. These requirements have been developed to be substantially consistent with requirements contained in the most recent adopted version of the Kern County Plumbing Code; the guidelines that have historically been followed in the County. Design and construction requirements detailed in the Manual include the following:

- Sizing – effective absorption area and capacity
- Multiple Installations – level and sloping sites
- Construction
- Spacing
- Lining
- Sidewall
- Cover

- Inlet Fitting

Alternative OWTS

General

An alternative OWTS is a type of OWTS that utilizes either a method of wastewater treatment other than a conventional septic tank, for the purpose of producing a higher quality wastewater effluent and/or a method of wastewater dispersal, other than a gravity fed drain field trench for effluent dispersal. Kern County Ordinance and Onsite Systems Manual allow for, and in some cases require, the use of an alternative OWTS. Alternative OWTS may be permitted by EHD 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; (b) it is determined that an alternative OWTS would provide equal or greater protection to public health and the environment than a conventional OWTS; or (c) necessary to comply with requirements adopted for Mountain and Groundwater Impact Areas. Alternative OWTS normally include pressure distribution for effluent dispersal and often include supplemental treatment.

General requirements guiding the use of alternative OWTS include the following:

- Types of alternative OWTS permitted are limited to those identified in the Manual for which siting and design standards have been adopted and approved by the EHD and the Regional Water Board as part of the County's LAMP.

- All alternative OWTS must be designed by a Registered Professional (RCE, REHS, PG) as allowed by their registration and installed by a contractor duly licensed by the Contractors State License Board of the State of California to install OWTS (A, C-42 or C-36).

- All alternative OWTS require the issuance of a renewable annual operating permit which is in addition to the construction permit issued for system installation. Operating permits are intended to serve as the basis for ensuring on-going maintenance and require that such work be performed by a registered professional or qualified onsite wastewater maintenance provider.

- Monitoring and reporting requirements to verify adequate performance of alternative OWTS, are implemented as conditions of the operating permit and vary according to the type of system.

Types of Alternative OWTS

The types of alternative OWTS approved for use in Kern County include the following:

1. **Supplemental Treatment Systems:**

    a. Intermittent sand filters;

    b. Proprietary Systems;

c. Others as may be approved.

2. **Alternative Dispersal Systems:**

   a. Pressure distribution systems;
   b. Mound systems;
   c. Subsurface drip dispersal systems;
   d. Others as may be approved.

Siting, Design, and Construction Requirements

Siting, design, and construction requirements are provided in Part 3 of the Manual for each respective type of Alternative OWTS.

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 Environmental Health, along with the requirement for permit renewal; typically on an annual or biennial (every two years) basis. An OWTS operating permit gives Environmental Health right of inspection. In addition, failure to comply with requirements of an OWTS operating permit may subject the system owner or user to administrative enforcement and fines.

Performance monitoring and reporting requirements

Performance monitoring requirements and frequencies for Alternative OWTS are provided in Part 3 and Part 4 of the Manual and are dependent on the type and complexity of the system, treatment components, and dispersal system. 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. Monitoring shall be performed to ensure that the alternative OWTS is functioning satisfactorily to protect water quality and public health and safety. The monitoring program will be in accordance with guidelines prescribed in the Onsite Systems Manual.

EHD will compile and review monitoring and inspection results for alternative OWTS and periodically provide a summary of results to the Central Valley and Lahontan Regional Water Boards. Based on this review, EHD may require corrective action for specific properties or certain types of alternative OWTS, or general changes in monitoring and inspection requirements.

Section 4:
Special OWTS Management Issues

The following describes the provisions contained in the Kern County LAMP corresponding with special OWTS management issues listed in sections 9.2.1 through 9.2.12 of the State OWTS Policy.

OWTS Inspection, Monitoring, Maintenance, and Repair

Kern County Ordinance requirements pertaining to operational inspections, monitoring, maintenance, and repair of OWTS are summarized in **Table 4-1** below.

Table 4-1.
Summary of Kern County Provisions for OWTS Inspection, Monitoring, Maintenance, and Repairs

Activity	Code, Manual Section	Inspections	Monitoring	Maintenance & Repairs*
Building Additions & Remodels		OWTS performance inspection required at time of application for building addition or remodel; procedures specified in Onsite Manual, Part 4.	May involve water sampling, dye testing, or other monitoring.	Maintenance and/or repair work may be required as a result of inspection findings.
Operating Permits		Regular inspections of OWTS according to terms of operating permit for (a) alternative systems; (b) large flow OWTS, >2,500 gpd; (c) holding tanks; and (d) other OWTS at Director's discretion.	Monitoring of OWTS under terms of operating permit, including flows, water levels, pump-out volumes, and water quality sampling as applicable.	Maintenance and/or repair work may be required from time-to-time based on observations during routine inspections or as part of normal system servicing.
Complaint Investigations (Abatement)		Inspections of OWTS by EHD staff in response to complaints or observed violation(s).	May involve water sampling, dye testing, or other monitoring.	Maintenance and/or repair work may be required as a result of inspection findings.

*Code Article 2 stipulates that it is unlawful to "Construct, alter, repair, or replace an OWTS or a component element thereof, which system is subject to the provisions of this chapter, without first obtaining a permit from the director in accordance with the provisions of this chapter and standards established hereunder".

OWTS Near Impaired Water Bodies

No water bodies in Kern County are listed as impaired pursuant to Section 303(d) of the Clean Water Act. Therefore, no special provisions related to impaired water bodies have been adopted for OWTS in Kern County.

Variances and Exceptions

Ordinance Code

As provided in Kern County OWTS Ordinance, Article 4, variances from the terms of the Ordinance and requirements as prescribed in the Onsite Systems Manual may be granted by the Director of the Environmental Health Division under the following conditions:

1. The variance will not harm the public health, safety, and welfare of the people of Kern County;

2. Due to special conditions or exceptional characteristics of the property, its location or surroundings, a literal enforcement of the Ordinance, and the Onsite Systems Manual would result in unnecessary hardship;

3. The hardship was not caused with the intent to avoid the requirements of this Chapter or the Onsite Systems Manual;

4. The variance will not have any adverse environmental effect on the use of the adjoining property.

Exceptions

1. Dispersal systems may be located on slopes over 30% with a variance, if supported by a geotechnical assessment and report;

2. Dispersal systems may be located closer than 100 feet from an unstable land mass with a variance, if supported by a geotechnical assessment and report;

3. Holding tanks are prohibited by code, but they may be permitted as an exception for a publicly-owned/non–residential facility, under certain conditions as specified in Article 3.

OWTS Repairs and Corrective Actions

OWTS that require corrective action to address a current or threatened failure condition, shall be repaired in a manner approved by the EHD that brings the OWTS into substantial conformance with County Ordinance and Manual to the greatest extent practicable. For systems that can be repaired, the work shall be implemented as soon as is reasonably possible and in accordance with any time limits issued by the EHD.

The overall goal with all OWTS repairs is to obtain a practical, timely, and effective long-term correction to the failure condition. In determining the level of corrective work required, the EHD will take into consideration a variety of factors, generally according to the following priorities:

1. Soil characteristics and groundwater separation;
2. Setbacks from wells and streams;
3. Ground slope and setback from unstable landforms;
4. OWTS sizing standards;
5. Other setback criteria (e.g., foundations, pipelines, and trees).

Interim measures, such as installation of a holding tank and pumping/hauling of septage, may be required for failed systems that require replacement and submittal of system design plans. Submittal requirements for OWTS repairs may vary case-by-case, and will depend on the nature of the failure condition, the property location, type of occupancy, and the type of corrective work needed.

Prohibitions

No variances or exceptions are permitted to prohibitions 1 through 9 listed in **Section 5** of this LAMP.

Prohibition 10 in **Section 5,** relating to OWTS in proximity to public water wells and/or water supply intakes, contains specific exception clauses applicable to OWTS repairs and new or replacement OWTS on existing legal lots of record.

Appeals

The Onsite Wastewater Ordinance allows an applicant to appeal the decision of the Director to the Board of Supervisors, in accordance with procedures set forth in Article 2. This may include issues related to variances or exceptions to Ordinance requirements.

Professional, Contractor, and Maintenance Provider Qualifications

Kern County Ordinance requirements pertaining to qualifications for OWTS professionals, contractors, and maintenance providers are summarized in **Table 4-2**.

The qualification notations and terminology in **Table 4-2** have the following meanings:

- RCE: Registered Civil Engineer
- REHS: Registered Environmental Health Specialist
- PG: Professional Geologist
- CEG: Certified Engineering Geologist
- SS: Soil Scientist as certified by the Soil Science Society of America
- Registered Septic Tank Pumper: Registered with Kern County in accordance with California Health and Safety Code 117400 et. seq.
- Maintenance Provider: An individual registered having experience in the construction and/or operation of OWTS as evidenced by the either of the following:

- Possession of a valid contractor's license (A, C-36 or C-42).
- Completion of an onsite wastewater certification training coarse 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.

Table 4-2.
Qualifications for OWTS Practitioners

OWTS Activity	Required Work	Code or Manual Section	Minimum Qualifications
Site Evaluation	Conduct field studies and evaluation of geology, soils, percolation, groundwater, slopes, and other factors for design and use of OWTS		RCE, REHS, PG, SS
System Design	Prepare plans and supporting design analysis required for permitting and installation of OWTS.		RCE, REHS, PG
System Installation	Install OWTS in accordance with approved plans and permit conditions issued by EHD.		General Engineering Contractor License: • Class A • Class C-42 • Class -36 Exception: Homeowner may install conventional OWTS on their own property.
Cumulative Impact Assessment	Assess nitrate loading, groundwater mounding, or other cumulative impacts of OWTS for flows >2,500 gpd or as otherwise required by EHD.		RCE/ REHS/PG/SS
Geotechnical Assessment	Assess slope stability, drainage, and other geotechnical issues for OWTS located on slopes over 30%.		RCE or PG with CEG certificate or equivalent experience
Performance Evaluation	Conduct performance evaluation of OWTS for building addition/remodel project, failure investigation, or as otherwise required by EHD.		RCE/ REHS/PG OWTS Maintenance Provider
Septic Tank Pumping & Report	Pump and haul septage.		Registered Septic Tank Pumper
Alternative System Inspection and Monitoring	Perform inspection, monitoring, and reporting of alternative OWTS in accordance with conditions of operating permit issued by EHD.		RCE/ REHS/PG or Maintenance Provider

Education and Outreach

Kern County's LAMP includes the following provisions for education and outreach regarding OWTS:

1. **Website - Informational Material:** EHD maintains a website including up-to-date information on various OWTS matters, such as: (a) regulatory issues; (b) permitting requirements, procedures, fees, forms, etc.; (c) meetings and other announcements; and (d) OWTS user information, guidelines, and references, including a list of local service/maintenance providers and after hours contact information. This includes access to the Onsite Systems Manual which contains a section (Part 6) devoted to compilation of practical information and guides for OWTS users;

2. **OWTS Operation and Maintenance Guidelines:** Kern County Onsite Wastewater Ordinance (Article 3) requires operation and maintenance guidelines to be provided to the OWTS owner (and EHD) for each new or replacement OWTS by either the system designer or installer. This applies to both conventional and alternative OWTS. Final approval of system installation is contingent upon confirmation that the required operation and maintenance guidelines have been provided;

3. **Alternative Systems Operating Permits:** Owners of alternative OWTS will be issued an ongoing operating permit that specifies ongoing inspection, monitoring, and reporting requirements for the system. Although, the work will be conducted substantially by qualified maintenance providers, the system owner is ultimately responsible for compliance under the operating permit, which will indirectly promote an improved level of education and understanding of the OWTS operational requirements.

Septage Management

Septage Receiving Facilities

Septage disposal for OWTS in Kern County occurs almost entirely at the following publicly owned treatment plants (POTWs):

1. **Central Valley Region (West County):** City of Bakersfield Plants #2 and #3

2. **Lahontan Region (East County):** Rosamond Community Services District Plant

Estimated Septage Pumping Volumes

Based on an average pumping frequency of once every five (5) years and a pump-out volume of 1,000 gallons per tank, estimates of annual volumes of septage generated by OWTS in Kern County were developed for the West and East County regions and summarized in **Table 4-3.**

Table 4-3.
Estimated Annual Septage Generation in Kern County

	West County	East County	Total
Estimated Number of OWTS	13,811	2,683	16,494
Estimated Annual Septage Volume (M gal.)	2.76*	0.54	3.30

* City of Bakersfield reported 3.8 million gallons of septage received and treated at their #2 and #3 wastewater treatment plants in 2015.

The available capacities at septage receiving facilities in Kern County are considered adequate for the estimated annual septage generation rates for both the West and East County areas.

Septic Tank Pumper Registration

There are a large number of septic tank pumping businesses operating in Kern County. EHD has the enforcement authority to register, issue the environmental health permit, and regulate the activities of all sewage pumping, grease trap pumping, and portable toilet rental businesses in the County. Part 7 of the Onsite Systems Manual contains the requirements ("Terms and Conditions") applicable to these operations in the County.

Onsite Maintenance Districts

Presently there are no onsite wastewater maintenance districts in Kern County. Some of the key functions of an onsite wastewater management district are already covered on a countywide basis, by requirements and activities under the newly (proposed/adopted) On-site Wastewater Ordinance and within the provisions of this LAMP, including: (a) operating permits for alternative OWTS and certain other OWTS based on system size or other factors; and (b) requirements for water quality assessment and reporting to the RWQCB.

However, over the years there has been discussion and interest in the concept of an OWTS maintenance district approach for some of the mountain area communities. In particular, Golden Hills Community Services District (CSD) has historically been active and involved in review and oversight of OWTS serving properties within their jurisdiction. The CSD was originally identified in the 1980's as a potential candidate for establishment of an Onsite Wastewater Disposal Zone (OSWDZ) per (State Health and Safety Code), to provide additional on-going monitoring and assessment of OWTS. Although it was not pursued further at the time, the need for locally-based OWTS maintenance/monitoring programs continues to exist in certain challenging areas of the County supporting high OWTS densities. Through this LAMP the EHD intends to support the implementation of an OSWDZ for Golden Hills and other areas to supplement EHD oversight and assessment of OWTS where warranted.

Regional Salt and Nutrient Management Plans

Estimates have been made of wastewater discharge volumes, and nitrate loading contributions to groundwater from the approximately 16,500 existing OWTS in Kern County and are provided in **Appendix B**. OWTS inventories and waste loading estimates have been organized and tabulated according to major hydrologic areas and for areas directly overlying groundwater basins. OWTS represent a very small fraction of the nitrate and salt loading to groundwater in comparison to other agricultural sources. However, these estimates of wastewater volumes and nitrate loading will be available and in a useful form as input to any Regional Salt and Nutrient Management Planning efforts. In addition, Environmental Health will evaluate all Regional Salt and Nutrient Management Plans as they become available for additional constituents of concern and incorporate into future planning, any other water quality standards as referenced by approved Regional Salt and Nutrient Management Plans.

Watershed Management Coordination

Other than the Kern River, there are relatively few watersheds of significance in Kern County and limited watershed management activities or interest groups. However, with the development and implementation of this LAMP, the EHD will be maintaining GIS-based information on OWTS densities, wastewater loading, functioning status, and water quality factors that will be a useful reference for any watershed management activities in the future.

Evaluating Proximity to Public Sewers

Evaluating the proximity to public sewers for new and replacement OWTS is accomplished by the following:

1. OWTS permit instructions and informational pamphlets will advise applicants of the code requirement for connection to public sanitary sewer where the property is within 200 feet of an available sewer;

2. Permit application form to be completed and filed by the system designer and/or contractor, includes an entry related to sewer line proximity;

3. EHD permit review includes sewer proximity as a checklist item for certain geographical areas of the County;

4. The GIS-based inventory of OWTS prepared as part of this LAMP, includes a consolidated mapping of city and sewer district boundaries for the entire County. This will facilitate future identification and review of OWTS-public sewer proximity issues. As sewer district boundaries change in the future, GIS mapping will need to be updated. This is proposed to be done, at a minimum, every five years in coordination with the Water Quality Assessment and reporting to the RWQCBs per Section 6 of this LAMP.

OWTS Notification to Public Water System Owner(s)

Under Kern County Onsite Systems Manual (Part 1, Section 1.2), special horizontal setback requirements apply to OWTS located in the proximity of public water supply wells and public water system surface water intakes. Providing adequate notification to the owner(s) of public water systems about OWTS installations near their facilities will be accomplished by the following procedures:

1. EHD will rely primarily on information provided by the SWRCB Division of Drinking Water (DDW) to determine the locations and respective owner(s) of water wells and public water system surface water intake locations in Kern County;

2. At the time of permit application for any new or replacement OWTS, EHD staff will review the location of the proposed OWTS in relation to known public water wells and surface water intakes;

3. Where EHD staff determines the proposed OWTS dispersal system is closer than 150 feet to a public water well, or closer than 1,200 feet to a public water system surface water intake in a location tributary to the intake, notification of the proposed OWTS application will be sent to the water system owner(s). The notification will be accompanied by a copy of the permit application and supporting OWTS design information, including documented soils, topography, groundwater and percolation data.

4. Where EHD becomes aware of a failing OWTS located closer than 150 feet to a public water well, or closer than 2,500 feet to a public water system surface water intake in a location tributary to the intake, EHD shall notify the respective owner(s) and the SWRCB Division of Drinking Water as soon as practicable, but no later than 72 hours from the time of discovery of the failing OWTS. The notification will be accompanied by a copy of the permit application and supporting OWTS design information, including documented soils, topography, groundwater and percolation data.

5. The owner(s) receiving notification of proposed OWTS installations per (3) or (4) above will be afforded a 15-day period in which to submit comments on the proposed OWTS application.

6. Prior to issuing an OWTS installation permit for any system per (3) or (4) above, the Director will review and consider any comments and recommendations submitted by affected water system owner(s) per (5) above.

7. Upon issuance and/or denial of an OWTS installation permit per (3) or (4) above, the Director will provide notification to the affected water system owner(s) of the action taken.

Procedures for Dispersal Field Located Within Public Well/Intake Setback

New OWTS

In cases where a new OWTS is proposed on a lot created prior to the effective date of the State OWTS Policy (May 13, 2013) and the dispersal field does not meet the specified OWTS horizontal setbacks) from public water wells and public water supply intakes (per Manual Part 1, Section 1.2), the OWTS may be permitted subject to complying with the following requirements to address possible water source impacts:

1. The dispersal field shall be sited to comply with the setback requirements to the maximum extent practicable;
2. The OWTS shall incorporate supplemental treatment, including pathogen removal;
3. Pathogen removal is defined as achieving an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters;
4. Minimum vertical separation to groundwater shall be three (3) feet below the bottom of the dispersal field;
5. The minimum dispersal field soil cover shall be 12 inches;
6. Completion of a cumulative impact analysis regarding nitrate loading effects (per Ordinance Article 3) if the setback issue involves a public water well; and
7. Other measures as specified by the Director.

On a case-by-case basis, the Director may establish alternative OWTS siting and operational requirements to those listed above, where it is determined by the Director that the alternate requirements will provide a similar level of protection against adverse impact to the public water source.

Repair/Replacement OWTS

For repair or replacement of an existing OWTS where the dispersal field does not meet the specified OWTS horizontal setbacks from public water wells and public water supply intakes (per Manual Part 1, Section 1.2), the OWTS may be permitted subject to complying with the following requirements to address possible water source impacts:

1. The dispersal field shall be sited to comply with the setback requirements to the maximum extent practicable;
2. The OWTS shall incorporate supplemental treatment or other mitigation measures

specified by the Director, unless he/she finds no evidence of an existing or potential threat of impact to the public water source by the OWTS based on topography, soil depth, and groundwater conditions.

Phase-Out of Cesspool Usage

The use of cesspools for sewage disposal is not authorized under Kern County Onsite Wastewater Ordinance (Article 3). However, due to the age of many homes in the County (50 to 80+ years old), especially in remote mountain areas and agricultural areas, a number of cesspools still exist and continue to be discovered from time-to-time. Historically, discovery and abandonment of existing cesspools has come about: (a) voluntarily by the property owner; (b) in response to complaints; or (c) through OWTS inspections associated with property transfers or building addition/remodeling projects. Any cesspools identified will be required to come into compliance with current standards, to the fullest extent practical, as soon as possible.

Septic tank servicing also provides an opportunity for septic pumping contractors to discover the existence of cesspools, and advise homeowners on abandonment requirements and options. Under the new ordinance, the expanded range of alternatives for system repairs/ replacement is expected to provide some incentives and options to accelerate the gradual phase-out of the remaining cesspools in the County.

Section 5:
Prohibitions

The following describe the provisions contained in the Kern County LAMP corresponding with the required prohibitions set forth in Section 9.4 of the State OWTS Policy.

1. ***Cesspools:*** The use of cesspools for sewage disposal is not authorized under Kern County Onsite Wastewater Ordinance (Article 3).

2. ***OWTS over 10,000 gpd capacity:*** Kern County Onsite Wastewater Ordinance applies to any OWTS where the maximum daily flow volume of waste produced is 10,000 gpd or less (Article 1). If the amount of waste produced is more than 10,000 gpd or where a community system serving multiple discharges under separate ownership is proposed, the method of treatment and dispersal must be approved by RWQCB, as applicable.

3. ***OWTS with surface discharge:*** Surface discharge of wastewater from an OWTS is not authorized under Kern County Onsite Wastewater Ordinance. Article 1 requires that OWTS "…shall, at a minimum, consist of a septic tank and <u>subsurface dispersal</u> <u>system</u> for absorption and leaching of the effluent into the soil." **(emphasis added)**

4. ***OWTS on steep slopes (>30%) without slope stability report:*** Kern County Onsite Systems Manual (Part 1, Section 1.2) limits the placement of OWTS dispersal fields to areas with ground slope no greater 30%. Any OWTS dispersal field proposed on slopes >30% would only be considered in connection with OWTS repairs/corrective action or under a variance application, where an assessment and report addressing slope stability, drainage, and other pertinent geotechnical factors affecting the operation and and/or impacts from the construction and use of the proposed OWTS would be required.

5. ***Sizing reductions for IAPMO certified dispersal systems:*** Kern County Onsite Systems Manual (Part 1, Section 1.5) permits the use of leaching chambers (IAPMO certified) as a conventional dispersal method with the sizing based on bottom area only. Additionally, where chambers are used no sizing reduction greater than 30% (i.e., sizing multiplier of no less than 0.70) is permitted.

6. ***Supplemental treatment systems without monitoring:*** Under the Kern County Onsite Wastewater Ordinance, supplemental treatment is defined as an alternative system, and as such, is required to be inspected and monitored in accordance with an operating permit issued by the EHD per Code Article 3.

7. ***OWTS for RV Dump Stations:*** Kern County Onsite Wastewater Ordinance pertains to the treatment and dispersal of domestic wastewater which, by definition in the governing State OWTS Policy (referenced in Article 1), does not include wastewater from industrial processes or recreational vehicle (RV) dump stations. Domestic wastewater may include incidental RV holding tank discharges (e.g., at the owner's residence/storage location). Any proposals for RV Dump Stations will be referred to the appropriate RWQCB for permitting. This limitation does not apply to full hook-up sewer connections similar to those used at a recreational vehicle park.

8. ***Groundwater separation less than two (2) feet or less than 10 feet for seepage pits:*** Kern County Onsite Systems Manual (Part 1, Section 1.2) sets forth minimum siting requirements for OWTS dispersal fields for conventional and alternative OWTS. Neither section authorizes the installation of any OWTS dispersal system where the vertical separation to groundwater below the dispersal field is less than two (2) feet for trenches or less than 10 feet for seepage pits.

9. ***Where public sewer connection is available:*** For any property where the installation of a new, expanded, or replacement OWTS is proposed, Kern County Onsite Wastewater Ordinance (Article 3) requires connection to an available public sewer where the property line of the building served is within 200 feet of the sewer line, subject to approval by the sewer authority and the Kern County Local Agency Formation Commission, if necessary.

10. ***Proximity to public water system wells and surface water intakes:*** Kern County Onsite Systems Manual (Part 1, Section 1.2) sets forth minimum horizontal setback requirements for OWTS that include the following restrictions for OWTS dispersal systems located in the proximity of public water supply wells and public water system surface water intakes:

    a. **Public water well:**
        i. 150 feet setback for any dispersal system no greater than 10-feet deep;
        ii. 200 feet for any dispersal system greater that 10-feet deep;
        iii. Completion of 2-yr microbial transport study for any OWTS >20-ft deep and within 600 feet.

    b. **Public water system surface water intake:**
        i. 400 feet setback from edge of watercourse/water body where OWTS dispersal field is <1,200 feet to water supply intake;
        ii. 200 feet setback from edge of watercourse/water body where OWTS dispersal field is >1,200 feet to water supply intake.

    c. **Exceptions for replacement OWTS:** For replacement OWTS unable to meet the horizontal setback requirements of (a) or (b) above, the replacement dispersal field shall meet the setback requirements to the greatest extent practicable. Additionally, EHD will require the replacement OWTS to incorporate supplemental treatment and other measures, as appropriate, unless it is determined no evidence of an existing or potential threat of impact to the public water source by the OWTS based on topography, soil depth, and groundwater conditions.

    d. **Exceptions for new OWTS:** For new OWTS on parcels created prior to May 13, 2013, that are unable to meet the horizontal setback requirements of (a) or (b) above, the new dispersal field shall meet the setback requirements to the greatest extent practicable. Additionally, EHD will require the new OWTS to incorporate supplemental treatment, including pathogen removal, plus other requirements noted below. In accordance with State OWTS Policy, pathogen removal in this

case is defined as achieving an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters. Other requirements include:

i. Providing a minimum vertical separation to groundwater of three(3) feet below the bottom of the dispersal field;
ii. Providing a minimum dispersal field soil cover of 12 inches;
iii. Completion of a cumulative impact analysis regarding nitrate loading effects (per Ordinance Article 3) if the setback issue involves a public water well; and
iv. Other measures as specified by EHD.

On a case-by-case basis, the Director may establish alternative OWTS siting and operational requirements to those listed above, where it is determined by the Director that the alternate requirements will provide a similar level of protection against adverse impact to the public water source.

Section 6:
Program Administration

OWTS Permitting Records

The EHD will retain permanent records of OWTS permitting actions and will make those records available within 10 working days upon written request for review by the appropriate RWQCB, as applicable. This includes:

- Installation permits issued for new, repair, and replacement OWTS, including type of OWTS system (e.g., conventional trench or seepage pit, alternative OWTS) and tier;
- OWTS variances and/or exemptions issued, including tier, number, location, and description;
- Operating permits issued for alternative systems, OWTS with flows >2,500 gpd or other OWTS where the Director has determined the need for an operating permit;
- Septic tank pumper reporting data, including the number and location of septic tank pump-outs, organized according to geographic/hydrologic management areas of the County;
- List of applications and registrations issued for liquid waste haulers.

Water Quality Assessment Program

Objectives

The EHD will maintain an OWTS water quality assessment program having three primary objectives: (1) to determine the general operational status of OWTS in the County; (2) assess possible impacts of OWTS on groundwater and surface water quality, and their associated beneficial uses; and (3) identify areas for changes to existing OWTS management practices.

Hydrologic Area and Groundwater Basin Approach

The OWTS-water quality assessment will be organized according to the various hydrologic areas and groundwater basins delineated and presented in Section 2 of this LAMP and utilized in supporting GIS studies. This will allow the existing GIS-based mapping, OWTS inventories, and nitrate loading analyses to be utilized and updated. Additionally, localized focus areas within each hydrologic area may be delineated where warranted and may include joint cooperative efforts with other jurisdictions (e.g., water districts, community services districts) involved with water resources and wastewater management activities. For example, Golden Hills Community Services District (CSD) has historically been active and involved in review and oversight of OWTS serving properties within their jurisdiction. The CSD has been identified as a potential candidate for establishment of an Onsite Wastewater Disposal Zone (OSWDZ) per (State Health and Safety Code), to provide additional on-going monitoring and assessment of OWTS. The County will support the implementation of an OSWDZ for Golden Hills and other areas to supplement EHD oversight and

assessment of OWTS where warranted. Progress in the development of OSWDZs will be included in annual reporting to the RWQCB (per below) and addressed in greater detail in the 5-yr Water Quality Assessment report, including any additional OWTS monitoring/maintenance information from such programs, where available.

Operational Status of OWTS

The general operational status of OWTS will be assessed through compilation and review of the following types of information:

1. **Septic tank pumping logs:** The monthly septic tank reporting data submitted to the EHD will be compiled and filed electronically. This will allow the pump-out data to be organized by geographical/hydrological areas of the County and to be reviewed periodically for trends (e.g., frequency of pump-outs in general or for specific areas or properties) or other information relevant to OWTS operational conditions;

2. **Complaints and abatement of failing OWTS:** Complaints and abatement activities related to failing OWTS will be compiled and mapped (electronically) to facilitate ongoing review of the type and level of operational problems and identification of any trends;

3. **Variances issued for new and/or repair OWTS:** Information regarding variances for new and repair OWTS will be entered into the EHD OWTS database files to facilitate review and reporting;

4. **Performance Inspections:** Results of performance inspections of existing OWTS conducted in connection with building additions/remodel projects, or property transactions will be documented and compiled with property/OWTS data files;

5. **Alternative OWTS Inspection Reports:** Monitoring reports submitted periodically to EHD for alternative systems or other OWTS having an operating permit, will be reviewed individually at the time of report submission and will be compiled for annual review by EHD of all alternative OWTS;

6. **Special management areas:** Where special management programs for OWTS are implemented (e.g., under consideration for Golden Hills CSD), the EHD will utilize and incorporate monitoring and assessment information for OWTS in these designated areas, including any findings or recommendations that may be relevant to other areas or the County OWTS management program in general.

The data review and assessment will focus on both positive and negative findings, apparent trends, and areas for changes in practices. The assessment will maintain and update the existing inventory of OWTS in the county. To the greatest extent practical, the various types of OWTS data above will be entered into GIS-compatible files to facilitate review, mapping, and reporting.

Water Quality Assessment

The water quality assessment will include the following:

1. **Water Quality Parameters of Concern:** The initial focus of the water quality assessment program will be on two key water quality parameters – pathogens and nitrate-nitrogen. Other parameters of concern may be added if warranted.

2. **Wastewater Discharge Volumes:** Estimates of annual wastewater discharge from OWTS will be updated based upon the running inventory of OWTS per above.

3. **Nitrate Loading:** Nitrate loading estimates (by groundwater basin/geographic area) will be maintained and updated based on the running inventory of OWTS in the County.

4. **Water Quality Data Sources:** Relevant water quality monitoring data for pathogens and nitrate-nitrogen will be compiled from available sources. As follow-up to identified issues (e.g., increasing temporal trends), other constituents may in the future be compiled to discern between wastewater and other potential nitrate sources. Data sources are anticipated to include the following:

    - Receiving water quality monitoring data reported under alternative systems operating permits;
    - Water quality data from cumulative impact studies;
    - Groundwater Reports from Kern County Water Agency and similar local groundwater management agencies;
    - Groundwater Reports from other public sources, for example, United States Geological Survey, California Department of Water Resources, and Lawrence Livermore National Laboratory
    - Domestic water wells sampling, both from new wells and others as feasible based on access;
    - Public water system raw water quality data monitoring reports;
    - Reservoir or stream water quality sampling data for Kern River or other studies;
    - Receiving water sampling performed as part of any NPDES permits;
    - Groundwater sampling performed as part of Waste Discharge Requirements, such as some of the small wastewater treatment systems in the mountain regions of the County;
    - Data from the California Water Quality Assessment Database; and
    - Groundwater data collected as part of the Groundwater Ambient Monitoring and Assessment Program available in the Geotracker Secure Database.

Environmental Health will make every effort to collect or receive data from any and all water systems outside of our permitting jurisdiction. This may include obtaining data

directly from the water systems or establishing a partnership with them for monitoring. This issue will continue to be refined over the course of time.

5. **Assessment:** In addition to periodically updating the OWTS nitrate loading estimates for the county, it is anticipated that assessment of the data will include a review to: (a) determine relevance of the various data to OWTS; (b) identification of any obvious water quality degradation attributable to OWTS warranting follow-up investigation or action; (c) identification of any water quality degradation where OWTS may be implicated as a possible source; and (d) identification of water quality data/areas indicating no apparent issues of concern related to OWTS.

The County will consider utilizing a computer model to evaluate nitrate loading and groundwater recharge rates for higher density and/or clustered development within the Lahontan Regional Water Quality Control Board as dictated by the pace of development.

Reporting to Regional Water Boards

Annual Report

By February 1st of each year, an annual report pertaining to OWTS activities in Kern County will be submitted to the applicable RWQCB. The annual report will, at a minimum, include the following information, organized in a tabular spreadsheet format:

1. Number and location of complaints pertaining to OWTS operation and maintenance, including identification of those which were investigated and how they were resolved;

2. Number, location, and description of permits issued for new and replacement OWTS, including tier, any variances and/or exemptions issued;

3. Number and location of septic tank pump-outs per septic pumper reports;

4. List of applications and registrations issued, as part of the local septic tank pumper registration program pursuant to Section 117400 et seq. of the California Health and Safety Code.

The report will include: (a) a summary of whether any further actions related to OWTS are warranted to protect water quality or public health; (b) status of water quality data collection and review; and (c) any other information deemed appropriate by the Director of Environmental Health Services.

5-Yr Water Quality Assessment Report to RWQCB

Every five (5) years the annual report to the RWQCB will be accompanied by a Water Quality Assessment Report that summarizes the information and findings from the EHD Water

Quality Assessment Program described above. The report will present an overall assessment regarding any evidence of water quality impact from OWTS along with any recommended changes in the LAMP to address the identified impacts. Additionally, any groundwater water quality data generated by the EHD from monitoring activities will be submitted in electronic data format (EDF), for inclusion in Geotracker and any surface water quality data will be submitted to CEDEN in aSWAMP comparable format[2].

[2] CEDN stands for California Electronic Data Exchange Network; SWAMP stands for Surface Water Ambient Monitoring Program

Appendix A

Supporting Rationale for
Kern County OWTS Siting and Design Criteria Appendix A

Supporting Rationale for
Kern County OWTS Siting and Design Criteria

Following is a discussion of the supporting rationale (including literature references) for the various siting and design requirements for OWTS contained in Kern County's LAMP for those items that differ from the Tier 1 requirements of the State OWTS Policy. The topic areas addressed include: (1) groundwater separation requirements; (2) OWTS design and sizing; (3) use of seepage pits; (4) horizontal setback distances; and (5) allowable OWTS densities (lot size) for new subdivisions. Additionally, highlighted at the end are the various requirements and management practices contained in Kern County's LAMP that constitute a higher level of water quality and environmental protection relative to OWTS than provided in the Tier 1 requirements.

Pathogen Removal and Groundwater Separation Requirements:

Bacteria, viruses, and other pathogens are present in great numbers in sewage and represent an ongoing threat to public health. Preventing the transmission of disease is the foremost concern associated with the treatment and dispersal of sewage and is the basis for many of the established standards that dictate how, where, and when wastewater treatment and dispersal can occur. Ground waters and surface waters are afforded protection from OWTS contamination through the establishment of specific criteria pertaining to the soil properties, vertical separation (i.e., the distance from the bottom of the dispersal trench to the seasonal high groundwater below), and horizontal (surface water) setback requirements. The level of wastewater treatment (prior to dispersal) and the design of the dispersal system can also play a role in pathogen removal. The soil is critical, but the factors are complex, and there is no simple rule for proper design and operation. Attenuation and removal of pathogens in the soil is accomplished through such mechanisms as microbial predation, filtration, adsorption, and die-off.[3] Related factors include the depth, texture, and structure of the soil, hydraulic loading rate, and other physicochemical properties such as moisture, temperature, oxygen, and pH.

It is well known that soils have a tremendous capacity to remove bacteria from percolating wastewater. The retention and die-off of most, if not all, pathogenic bacteria occur within 2 to 3 feet of the soil infiltrative surface in a properly functioning OWTS (Anderson et al, 1994; Washington Dept. of Health, 1990). Viruses can also be retained and eliminated within a few feet, depending on the soil conditions; but it is generally accepted that they can persist longer and travel farther in the soil than bacteria (Anderson, et al, 1991; Ayres and Associates, 1993). Unlike bacteria, viruses are not always present in individual residential OWTS discharges, since it depends on the health status of the residents. Viruses are more likely to be consistently present at some level in commercial and community wastewater systems, which accept wastes from a broader segment of the population. Once reaching the water table, bacteria and viruses have been found to survive and travel significant distances with the groundwater (potentially hundreds of feet), depending on the rate of groundwater

[3] "Microbial predation" refers to consumption by other soil microbes; "filtration" refers to physical trapping between soil particles; "adsorption" refers to attachment to the surfaces of soil particles; "die-off" refers to degradation or inactivation due to the inability of the pathogen to sustain itself in the soil environment.

movement. Survival time in soil and groundwater is typically on the order of days to weeks for bacteria and weeks to months for viruses.

Consistent with current knowledge and practices for preventing pathogen impacts from OWTS, the Kern County LAMP includes a combination of siting and design requirements including: soil depth and percolation characteristics, minimum vertical separation to groundwater, minimum horizontal setbacks to various water/landscape features, dispersal field design/sizing criteria based on percolation rates, and, for some situations, options for use of supplemental treatment and alternative dispersal designs. Horizontal setbacks are the same for all OWTS (conventional and alternative) and are consistent with long-standing criteria contained in the guidelines of the Central Valley Regional Water Board and most local jurisdictions in California. The setback requirements also include more restrictive requirements for public water wells and public water system surface water intakes per the 2012 State OWTS Policy.

The key issue related to potential pathogen impacts from OWTS is the vertical separation below the dispersal trench to the seasonally high groundwater level (i.e.: water table). **Table A-1** lists the depth to groundwater requirements for conventional OWTS in Kern County, along with the corresponding groundwater separation requirements contained in the historical guidelines of the Central Valley Regional Water Board and the Tier 1 requirements in the State OWTS Policy. As indicated, the adopted approach in Kern County utilizes a standard depth to groundwater distance of 7 feet for soils with percolation rates in the range of 1 to 60 mpi; above 60 mpi conventional OWTS are not permitted. The County requirements for conventional OWTS are less restrictive for percolation rates under 5 mpi, but otherwise more restrictive than the historical Central Valley Regional Water Board Guidelines. For 6 to 30 mpi, the Kern County standards are more conservative than the historical RWQCB guidelines and essentially equivalent to the Tier 1 criteria (7 ft. vs 8 ft.). Above 60 mpi, Kern County standards are more conservative (safe) than both the historical RWQCB guidelines and the State Tier 1 requirements, since the County requirements do not allow conventional trench design for these conditions, and instead require an alternative design approach.

Table A-1.
Comparison of Depth to Groundwater Requirements for Conventional OWTS (feet, below trench bottom)

Percolation Rate (min per inch)	Kern County	Central Valley RWQCB Historical Guidelines	SWRCB OWTS Policy Tier 1 Requirements
1-5	7	*	20
6-30	7	5	8
31-60	7	5	5
61-120	Not permitted	5	5

*Requires demonstration of “adequate filtration”

Under this LAMP, the County proposes to allow reduced groundwater separation distances for different types of alternative treatment and dispersal systems as shown in **Table A-2**, also including the requirements for conventional OWTS for comparison.

Table A-2.
Proposed Depth to Groundwater Requirements for Conventional and Alternative OWTS
(Feet - below trench bottom)

Type of OWTS	Percolation Rate (MPI)	Min. Depth to Groundwater (feet)[i]		
		2	3	7
Conventional Septic Tank & Dispersal Trench	1-60			X
Conventional Trench w/Supplemental Treatment Pressure Distribution (PD) Trench	1-120		X	
Pressure Distribution w/Supplemental Treatment Mound Drip Dispersal w/Advanced Treatment	1-120	X		

[3]Measured from the bottom of the dispersal system

The supporting rationale for the reduced vertical separation requirement for the various alternative OWTS designs, is derived from research studies done over the past 30 to 40 years, largely funded by the US EPA and referenced in the *On-site Wastewater Treatment Systems Manual* (US EPA, 2002). These studies have documented how various advanced treatment and dispersal methods can improve the operation and treatment effectiveness of OWTS as compared with conventional septic tank-gravity dispersal trench designs. A major focus of the research efforts has been on finding methods to augment or improve the natural pollutant removal processes in the soil (especially related to pathogens) to help overcome limited soil depth and high groundwater conditions, which are a common constraint virtually everywhere OWTS are used. The following is a review of some of the key findings and principles that have emerged from the research and have supported changes in OWTS siting and design criteria.

1. **Pressure Distribution.** There is strong evidence and agreement in the professional literature that pressure distribution improves the performance of any soil absorption system as compared with standard gravity distribution, and should be the distribution method of choice (US EPA, 2002). This is due to two main factors: (1) pressure distribution disperses the wastewater flow uniformly over the entire available soil infiltrative surface, which allows the maximum absorption potential to be realized for any given soil condition; and (2) creation of wetting and draining cycles (via effluent dosing) promotes the maintenance of aerobic soil conditions at the infiltrative surface, which improves biodegradation and reduces the potential for soil clogging caused by the buildup of organic matter. The professional literature also notes that uniform spreading of the effluent discharge to the soil with the use of pressure distribution (or drip dispersal), ideally with timed-dosing, is critical to assure effective pathogen reduction in situations where the vertical separation is reduced.

2. **Supplemental Treatment:** Pathogen removal efficiencies can vary greatly amongst the different types of supplemental treatment systems that would be permitted and used under this LAMP. The greatest removal efficiencies are generally attributed to intermittent sand filters. Crites and Tchobanoglous (1998) present data showing fecal coliform removal efficiencies of 97.9 percent to 99.9 percent for intermittent sand filters. Leverenz, et. al. (2002), estimate intermittent sand filters as having the ability to produce effluent with fecal coliform concentrations <800 MPN/100 ml. For comparison, the fecal coliform concentration in effluent from a standard septic tank is similar to that in raw sewage and typically ranges from about 10,000 to 100,000 MPN/100 ml (Crites and Tchobanoglous, 1998). Additionally, however, an important purpose of the supplemental treatment unit in combination with the dispersal system design, is to establish and maintain aerobic/unsaturated conditions in the soil absorption field. Maintenance of aerobic soil conditions is conducive to pathogen removal and an improvement over the operational conditions of conventional gravity dispersal fields, which are designed to allow a saturated (anaerobic) soil-infiltrative surface. Research has demonstrated that aerobic effluent: (a) promotes the growth of aerobic soil microflora that can have antagonistic effects on viruses; and (b) reduces the amount of organic compounds that compete for adsorption sites with viruses and bacteria (Potts, 2003).

3. **Pathogen Removal in Soils:** The retention and die-off of most, if not all, pathogenic bacteria occur within 2 to 3 feet of the soil infiltrative surface in a properly functioning OWTS (Anderson et. al., 1994; Washington State DOH, 1990). Viruses can also be retained and eliminated within a few feet, depending on the soil conditions; but it is generally accepted that they can persist longer and travel farther in the soil than bacteria (Anderson et al, 1991; Ayres Associates, 1993). Studies have shown that vertical separation distances to groundwater of 12 to 18 inches, are sufficient to achieve good fecal coliform removal where the wastewater receives supplemental treatment prior to soil application, along with pressure distribution or drip dispersal methods (Converse and Tyler, 1998; Duncan et. al., 1994). Additionally, most of the research studies of OWTS pathogen removal have focused on sandy soil types; and the results of these studies have formed the basis for the soil depth criteria, such as those contained in the EPA Design Manual (2 to 4 feet unsaturated soil depth). Consequently, the soil depth criteria is already oriented toward the “worst case” conditions (sandy, permeable soils) and there is a built-in safety factor, with respect to pathogen removal for finer textured soils with higher silt and clay fractions.

As previously noted, while there is no simple rule or absolute formula for OWTS-groundwater separation, the Kern County depth to groundwater criteria related to type of OWTS and percolation rates are similar to standards adopted and followed in many other counties in California over the past 10 to 20+ years (i.e.: Butte, Nevada, Placer, Solano, Marin, Sonoma, Napa, Contra Costa, Mendocino, among others).

Additionally, an important aspect of siting and design of OWTS under these criteria is the process for determining seasonally high groundwater levels in the dispersal field area. The requirements in Kern County specify field observation methods for groundwater determination consistent with best industry practices. These requirements have been in effect for a number of years and will continue under the County LAMP.

Finally, the LAMP includes an operating permit program for all alternative OWTS that will ensure ongoing inspection and monitoring of OWTS for verification of proper performance.

Based on the above considerations, the criteria relative to the depth to groundwater requirements and use of alternative treatment and dispersal methods are consistent with the current state of knowledge and best management practices and would provide suitable protection against pathogen impacts from onsite wastewater treatment systems.

Dispersal Trench Sizing:

Dispersal trench sizing (i.e., length) is commonly based on three factors: (a) design wastewater flow; (b) trench infiltrative surface dimensions (width and depth); and (c) wastewater application rates (gpd/ft^2) related to percolation rate or soil type. Kern County requirements differ in some respects from the SWRCB Tier 1 criteria, but overall provide a more conservative (safe) design approach, as follows:

1. Kern County specifies the use of <u>peak daily wastewater flow</u> for dispersal system sizing; Tier 1 specifies the use of <u>average daily wastewater flow</u> (8.1.3). As a rule of thumb, average daily flow is typically about 50% of peak wastewater flow, resulting in 100% greater sizing/safety factor in the Kern County design approach.

2. The standard allowance for infiltrative surface in Kern County requirements is trench bottom areas, up to 3 ft^2 per lineal foot of trench, which is more conservative than the 4 ft^2 per lineal foot specified in the Tier 1 requirements (8.1.6). Kern County also has allowance for up to 7 ft^2 per lineal foot of trench under the category of "special design", where the system design is supported by both soils and percolation testing. This is higher than the Tier 1 requirement; however, Kern County also limits the use of conventional trenches (standard and special design) to sites having percolation of 60 mpi or less, compared with allowance for percolation rates up to 120 mpi in Tier 1.

3. **Table A-3** below shows a comparison of the wastewater application rate criteria based on percolation rate for a range of values, including Kern County requirements, Tier 1 criteria, US EPA, and other Northern California Counties. As can be seen, there are similarities and differences among all of the criteria. Kern County requirements are patterned after CPC, which have been followed in Kern County and several other California counties for many years. Kern County requirements are higher in the faster percolation range (, 10 mpi), similar in the middle range (10-60 mpi), and more conservative in the slower range (>60 mpi) where conventional OWTS dispersal fields are not permitted in Kern.

Table A-3
Wastewater Application Rates for Conventional OWTS Dispersal Field Sizing (gpd/ft^2)

Percolation Rate (mpi)	Kern County LAMP		SWRCB OWTS Policy Tier 1	USEPA Design Manual
	Soil Type	Application Rate*		
1-5	2	1.98	1.20	1.20
10	3	1.2	0.80	0.80
24	4	0.56	0.60	0.60
30	5	0.42	0.533	0.56
45	5	0.42	0.367	0.45
60	5	0.42	0.2	0.35
90	-	Not permitted	0.1	0.20
91-120	-	Not permitted	0.1	0.20

*Based on 3 ft^2/lf, 3-bedroom system

Seepage Pits:

Tier 1 of the State OWTS Policy permits seepage pits only for repairs. Tier 2 of the Policy provides only that where seepage pits are used, they shall maintain a minimum separation to groundwater of at least 10-feet, and various other setback requirements from public water wells related to the depth of the seepage pit. Kern County has historically allowed for the use of seepage pits in accordance with the most recent adopted version of the Kern County Code, including the additional requirements that (a) they only be used where disposal fields are not feasible; (b) they be limited to areas with percolation rates of 25 mpi or better; and (c) they maintain a minimum twelve (12') -ft vertical separation to groundwater. The Kern County LAMP retains these same existing provisions and requirements for the use of seepage pits.

Groundwater depths in the majority of areas using seepage pits in the County is often on the order of 100 to 300 feet below ground surface (e.g.: in the San Joaquin Valley and Mojave Desert areas). A study of the long-term effect of wastewater discharge impacts from seepage pits on groundwater quality in the Mojave River Basin was conducted jointly by the U.S. Geological Survey and the Lahontan Regional Water Board; findings were reported in Water Resources Investigations Report 93-4137 (U.S.G.S., 1995). The study confirmed a high rate of bacteria removal within a few feet of travel in the unsaturated zone below 30-ft deep seepage pits. The study was also unable to document any significant change in groundwater quality at an average depth of 150 feet below land surface from the seepage pits after many years of operation. The seepage pits in the area of study are estimated to account for 18% of the annual basin recharge. Rates of wastewater travel in the unsaturated zone ranged from 0.07 to 1.0 feet per day, affording several months to several years of travel time for wastewater constituents to undergo treatment in the unsaturated zone. The findings of this study support the continued limited use of seepage pits, in areas of the county having deep unsaturated zones for wastewater absorption.

Horizontal Setbacks:

Kern County's OWTS Ordinance includes horizontal setback distances that are equal to or exceed the SWRCB Tier 1 requirements in all respects, except for Tier 1 item 7.5.5, which specifies a 200-ft setback from "… vernal pools, wetlands, lakes, ponds, or other surface waters…". Kern County requirements treat these water bodies the same as "watercourses", with a 100-ft horizontal setback requirement, which is consistent with historical RWQCB guidelines and requirements found in all other jurisdictions reviewed. The SWRCB's rationale for the 200-ft setback distance is not known.

The County's 100-ft setback distance is meant to protect beneficial uses of both watercourses and water bodies, which primarily include contact and non-contact recreation and aquatic resources. Consistent with the State OWTS Policy, Kern County includes a 200-ft to 400-ft setback for surface waters in proximity to public water supply intakes – a beneficial use of water warranting a higher level of protection from waste sources.

The Tier 1 200-ft setback in Item 7.5.5 appears to be without substantial merit and is at odds with other setback requirements (e.g.: 100-ft setback from a domestic water supply well). The justification for a 200-ft setback from such water features as stock watering ponds, golf course lakes, and wetlands (that may or may not have any surface water features) is not known; and therefore, it is not included in Kern County OWTS requirements.

Allowable Densities for New Subdivisions:

Tier 1 (section 7.8) specifies that average development density (i.e., acres per dwelling unit/OWTS) be based on a sliding scale (0.5 to 2.5 acres) related to average rainfall. Kern County "Standards, Rules, and Regulations for Land Development" (Land Development), require a minimum lot size of 2.5 acres for land divisions relying on the use of domestic water wells, which complies with the most conservative criterion in Tier 1. Additionally, a cumulative impact assessment (e.g., nitrate loading) may also be required, the results of which could be the basis for increasing or decreasing the minimum lot size, or imposing other mitigation measures (e.g., supplemental treatment providing nitrogen removal), where warranted on a case-by-case basis. This would meet the same objective of Section 7.8, but would be done on the basis of site specific conditions and analysis.

For areas using OWTS where water supply is from a public system (not onsite wells), County Land Development requirements have historically specified a minimum lot size of 10,000 square feet and potentially as little as 7,200 square feet, substantially less than the Tier 1 requirements. However, as noted above, the new Ordinance includes provisions for the Director to require cumulative impact analysis where wastewater loading/density is of potential concern. This requirement would apply commonly to small-lot subdivision proposals and would provide site-specific analysis and mitigation measures to evaluate and address groundwater quality impact concerns related to lot size/density factors. In addition, any new development within the Lahontan Regional Water Quality Control Board's jurisdiction would be subject to conducting a cumulative impact assessment.

More Protective Aspects of Kern County LAMP:

The following highlight the more protective aspects of the Kern County LAMP, as compared with the Tier 1 requirements of the State OWTS Policy.

1. **Alternative OWTS:** Establishes requirements for alternative OWTS, providing better options, design guidance, and a managed system for dealing with repairs/replacement (where needed) for the approximately 16,500 existing OWTS in the county.

2. **Operating Permits:** Establishes an operating permit program for alternative OWTS to provide a higher level of performance monitoring and regular reporting to the County.

3. **Cumulative Impact Assessments:** Includes requirements and guidelines for conducting cumulative impact assessments related to nitrate loading, groundwater mounding, or other issues or locations of concern for certain situations based on size (flow) of the OWTS or density of systems. Tier 1 allows OWTS designs up to 3,500 gpd with no comparable requirements.

4. **Pump Systems:** Onsite Systems Manual includes design guidance and requirements for pump systems; none are provided in Tier 1.

5. **Pressure Distribution Systems:** Treats pressure distribution systems as an alternative OWTS, including requirements for operating permit and performance monitoring/reporting. Tier 1 (8.1.4) recognizes pressure distribution as a conventional trench design option without providing or referencing any design criteria.

6. **Cut Banks and Steep Slopes:** Includes horizontal setback requirement for cut banks and steep slopes, which represent potential avenues for effluent seepage.

7. **Peak vs Average Flow:** Dispersal system design is based on peak, rather than average wastewater flow as provided in Tier 1.

8. **Floodplains:** Includes setback and design requirements related to floodplains.

9. **Performance Evaluation Guidelines:** Provides procedures and criteria to guide performance evaluations of OWTS in connection with building remodel projects, property transfers, abatement investigations, etc.

References:

Anderson, D.L., A.L. Lewis, and K. M. Sherman. 1991. Human Enterovirus Monitoring at Onsite Sewage Disposal Systems in Florida. Pages 94-104 in *On-site Wastewater Treatment:*

Proceedings of the Sixth National Symposium on Individual and Small Community Sewage Systems, December 16-17, 1991, Chicago, IL. American Society of Agricultural Engineers, ST. Joseph, MI.

Anderson, D. L., R. J. Otis, J. I. McNeillie, and R. A. Apfel. 1994. In-situ Lysimeter investigation of Pollutant Attenuation in the Vadose Zone of a Fine Sand. In *On-Site Wastewater Treatment: Proceedings of the Seventh International Symposium on Individual and Small Community Sewage Systems*. American Society of Agricultural Engineers, St. Joseph, MI.

Ayres Associates. 1993. Onsite Sewage Disposal Research in Florida: An Evaluation of Current OSDS Practices in Florida. Report to the Department of Health and Rehabilitative Services, Environmental Health Program, Tallahassee, FL. Ayres Associates, Madison, WI.

California Regional Water Quality Control Board, Central Valley Region. *Water Quality Control Plan for the Central Valley Region* (Basin Plan).

Converse, J.C. and E.J. Tyler. 1998. Soil Dispersal of Highly Pretreated Effluent – Considerations for Incorporation into Code. In Proceedings: Seventh Annual Conference and Exhibits. National Onsite Wastewater Association, Northbrook, IL.

Crites, R. W. and G. Tchobanoglous. 1998. *Small and Decentralized Wastewater Management Systems.* WCB/McGraw-Hill, New York, NY.

Duncan, C.S., R. B. Reneau, Jr., and C. Hagedorn. 1994. Impact of Effluent Quality and Soil Depth on Renovation of Domestic Wastewater. In Onsite Wastewater Treatment: Proceedings of the Seventh International Symposium on Individual and Small Community Sewage Systems, ed. E. Collins. American Society of Agricultural Engineers, St. Joseph, MI.

Leverenz, H., G. Tchobanoglous, and J.L. Darby. August 2002. *Review of Technologies for the On-site Treatment of Wastewater in California*. University of California, Davis. Report No. 02-2. Prepared for California State Water Resources Control Board.

Potts, David A., et. al. 2003. Effects of Aeration on Water Quality from Septic Leachfields. Journal of Environmental Quality 33:1828-1838, 2004.

State Water Resources Control Board. June 2012. Final Draft Water Quality Control Policy for Siting, Design, Operation and Maintenance of On-site Wastewater Treatment Systems.

U.S. Environmental Protection Agency. February 2002*. Onsite Wastewater Treatment Systems Manual*. (EPA/625/R-00/008). Office of Water. Office of Research and Development. Washington, DC.

U.S. Geological Survey. 1995. Potential for Ground-Water Contamination from Movement of Wastewater through the Unsaturated Zone, Upper Mojave River Basin, California. Water Resources Investigations Report 93-4137.

Washington State Department of Health. October 1990. Vertical Separation – A Review of Available Scientific Literature and Listing from Fifteen Other States. Olympia, Washington.

http://www.doh.wa.gov/Portals/1/Documents/Pubs/337-094.pdf

Appendix B

OWTS Usage and Loading Estimates
For Kern County

General Approach and Scope

The following describes the process used to develop an inventory of the total number and distribution of residential OWTS in Kern County, organized and integrated with soils mapping and hydrologic information. The analysis was completed by Questa Engineering using GIS parcel data supplied by County of Kern, along with soils and hydrological data primarily from the USDA National Resource Conservation Service (NRCS), California Department of Water Resources (DWR), and the US Geological Survey (USGS).

There were four basic elements of this analysis as follows:

1. **Parcel Development Status:** Conduct a systematic GIS-based inventory to determine the development status (i.e., developed or vacant) of all residential parcels in non-sewered areas of the County. (Note: the analysis did not address OWTS serving commercial occupancies, or other non-residential uses, which may be significant locally, but overall represent a relatively small percentage of total OWTS discharges in the County. This can be addressed for selected areas in the future as an addendum to this analysis).

2. **General Soil/OWTS Suitability Mapping:** Define and construct GIS map of general soil associations for the County, focused on factors pertinent to the use of OWTS.

3. **Hydrologic Areas:** Delineate general hydrologic areas of the County, consistent with State databases, in a GIS format compatible with parcel and soils information.

4. **Groundwater Basins:** Identify and compile information on recognized groundwater basins in Kern County, including GIS map files compatible with parcel, soils, and hydrological data.

The geographic area covered in the analysis includes all of Kern County, with the parcel data analysis focused only on the unincorporated lands within the county. All incorporated property within the various cities was excluded, under the assumption that municipal sewer systems either serve or are available to all of these parcels. Some “islands” of unincorporated parcels were found to exist in the Bakersfield urban area; and for our initial analysis we assumed these parcels to be served by OWTS. If additional information reveals any of these parcels to be connected to municipal sewers corrections will be made to remove these parcels from OWTS status.

Additionally, any other unincorporated parcels determined to be connected to community sewer systems in other parts of the County, will have their OWTS status corrected.

Parcel Development Status

The first step in the analysis was to identify and create an inventory of the non-sewered parcels in the County, along with their development status (i.e., developed or vacant). It was found that this information is not readily available from any County department. Therefore, this was done according to the following process using the County GIS database.

1. **Identify Non-sewered Parcels:**

    a. First, parcels in the Kern County GIS parcel database, under field TRA_NO, which have a code number starting with 054 or greater, are considered unincorporated parcels.

    b. Next, city and sanitary district boundaries were applied to the County-wide data base to exclude parcels located within areas known to be served by public sewers. This included mainly incorporated lands, but it also included some unincorporated areas of (e.g. sanitary districts, county service areas, and community service districts) which are served by their own community wastewater facilities.

    c. In an effort to more accurately map sewered areas, individual treatment plants were contacted to obtain the current boundaries of their sewer service area. Sewer service boundaries for all 33 wastewater treatment facilities (WWTFs) listed in the SWRCB Kern County database, were either derived from paper maps, GIS shapefiles, or verbally described over the telephone. In many cases, such as with County Service Areas (CSAs), sewered areas had to be identified separately from other services (i.e. water service or sanitary service) and then added to the list of sewer service boundaries. A composite of all sewered areas was created in GIS, in order to exclude parcels located within sewered areas and focus solely on parcels that could potentially be developed with OWTS.

    d. From the above analysis, the total number of non-sewered parcels in the County (excluding non-development areas such as Federal lands) was determined to be 164,912.

2. **Determine Development Status:**

    a. County Assessor's information and other GIS parcel data were reviewed and found not to have any designation indicating whether or not a particular property is <u>developed</u> or <u>vacant.</u>

    b. Per discussions with knowledgeable County staff, "tax exemption value" and "tax exemption type" for each property were judged to be the most reasonable indicators.

    c. An iterative process was then followed to determine the "exemption type" most indicative of a developed vs. vacant property. Parcels in the Kern County GIS parcel database, under field EX_TYPE, which have a code letter of "H", are

considered developed with a home. Other EX_TYPE codes to be considered were “DA” and “DV”, which preclude “H” tax exemptions with exemptions for disabilities, but parcels could potentially still be developed with a residence.

d. Parcels with codes “DA” or “DV were then spot-checked against air photos to determine the presence/absence of buildings and other property features indicative of existing development for habitation. Parcels were also checked against another data field, “improvement value”; based on this review, we concluded that parcels assessments showing improvements value greater than $10,000, indicated a probable developed parcel.

e. The indicators as derived above were then assigned to the County-wide GIS inventory of unincorporated non-sewered parcels, with the following findings:

   i. Developed Parcels: 16,494
   ii. Vacant Parcels: 148,418
   Total Parcels: 164,912

Soils/ OWTS Suitability Mapping

General Soils Map: Figure B-1 presents a General Soils Map of Kern County compiled from information contained in several soil surveys and mapping published by the U.S. Department of Agriculture, which include: (1) Soil Survey of Kern County, California, Northwestern Area, 1988; (2) Soil Survey Kern County, California, Southeastern Part, 1981; (3) Soil Survey of Kern County, California, Southwestern Part, 2008; and (4) Online soils data base maintained by the Natural Resources Conservation Service (NRCS). The General Soils Map contained in the 1988 Soil Survey of Northwestern Kern County provided the baseline groupings of general soil associations, which were extended to cover other portions of the County.

Soils in the County can be grouped into general landform classifications as follows:

1. **Alluvial Plains, Fans, and Stream Benches (3, 5, 6, 11):** Soils found in the flat portions of the San Joaquin Valley and Mojave Desert are deep, well drained soils, derived from sedimentary parent material and formed in alluvial plains, fans, stream benches, flood plains, and basin rims. The deep, well drained fine sandy loam and clay loam soils in these areas are well suited for conventional OWTS.

2. **Basins (4):** Soils found in the basin areas of San Joaquin Valley are deep, well drained to somewhat poorly drained clays and silt loams. Restricted permeability and locally shallow perched groundwater conditions can pose a moderate constraint for OWTS.

3. **Foothills (2, 12):** The foothill soils of San Joaquin Valley and the Eastern footslopes of the Southern Sierra Nevada and Tehachapi Mountains are generally shallower, located on old fans and terraces that lie between the more recent alluvial soils on the valley floor and the soils of the uplands. Soils range from sandy loams to stratified coarse gravelly sand. Limited soil depth over bedrock, steep slopes, and somewhat

excessive permeability pose moderate to locally severe constraints for OWTS in the foothill regions.

4. **Uplands (1, 7, 8, 9, 10, 11, 14):** The mountain soils of the Temblor and Diablo Ranges to the west of San Joaquin Valley are shallow to deep and well drained loams situated on gently rolling to steep slopes. The Coast and Transverse Ranges to the south have moderately deep to very deep, well drained to excessively well drained fine sandy to gravelly loams. East of the San Joaquin Valley, mountainous areas include the Tehachapi and Greenhorn Ranges, continuing into the southern terminus of the Sierra Nevada Mountains. Soil is generally suitable for OWTS in the upland areas, limited by locally steep slopes and shallow soil depth, and in some areas by shallow seasonal groundwater conditions.

Soil-OWTS Suitability: The general mapping of soil conditions takes into account location and landform conditions, depth to bedrock, slope, subsurface texture, and drainage conditions of the soils, which are all key factors that can affect the suitability of the soils for onsite wastewater treatment. **Table B-1** was developed from the published soil survey information, summarizing the soil characteristics of the general soil associations mapped in **Figure B-1.**

The second to last right-hand column in **Table B-1,** highlights the key constraints and overall suitability designation for OWTS for each general soil association. The designations were developed and assigned based on the USDA soils information and Questa's best professional judgment. This is provided as a general assessment tool and is not a substitute for site-specific investigation of and planning for onsite wastewater treatment systems. It provides a general indication of the management and design issues likely to be encountered in each area. It does not take into account local constraints such as steep slopes, setback or other anomalous conditions that may be found on particular sites. The last column gives the estimated number of residential OWTS within each general soil area, determined by merging the GIS parcel data with the soil mapping boundaries.

Hydrologic Areas

Hydrologic Area Mapping: Kern County lies almost entirely within two hydrological and Water Quality Control Board Regions: Central Valley Region 5 and Lahontan Region 6 (east side of the county). Very small areas in the remote west edges of the county fall within the Central Coast Region. Utilizing watershed boundaries established by the California Department of Water Resources (DWR), eleven (11) hydrologic areas were delineated and labeled as shown in **Figure B-2**. Eight of the hydrologic areas are in the Central Valley Region and three within the Lahontan Region. The boundaries match DWR delineations, except that the expansive San Joaquin Valley area, was further divided geographically into four subareas: labeled Valley North, Valley West, Valley South, and Bakersfield Metropolitan Area.

OWTS Distribution by Soils

Kern County LAMP Fig.B-1

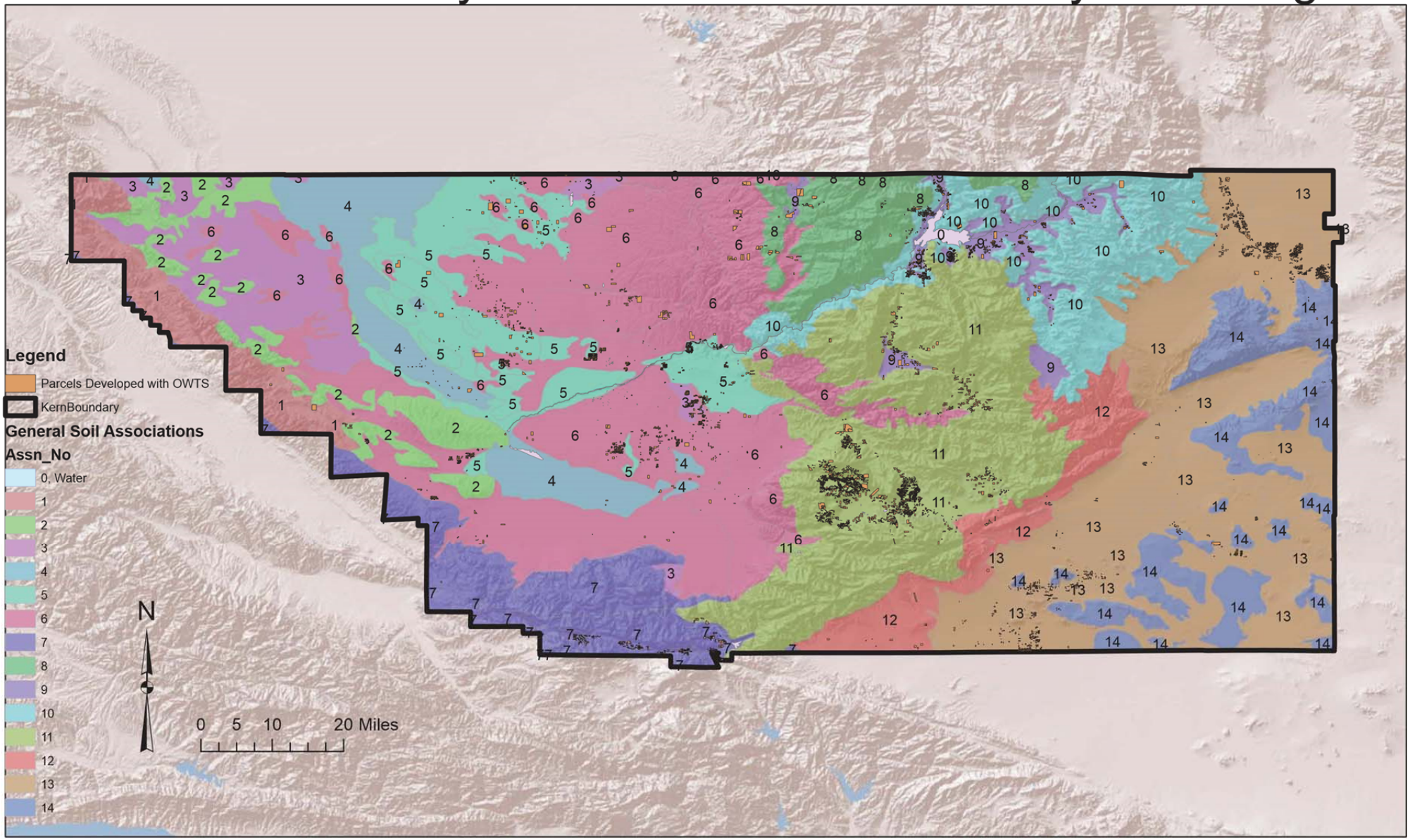


Table B-1: Kern County General Soil Associations

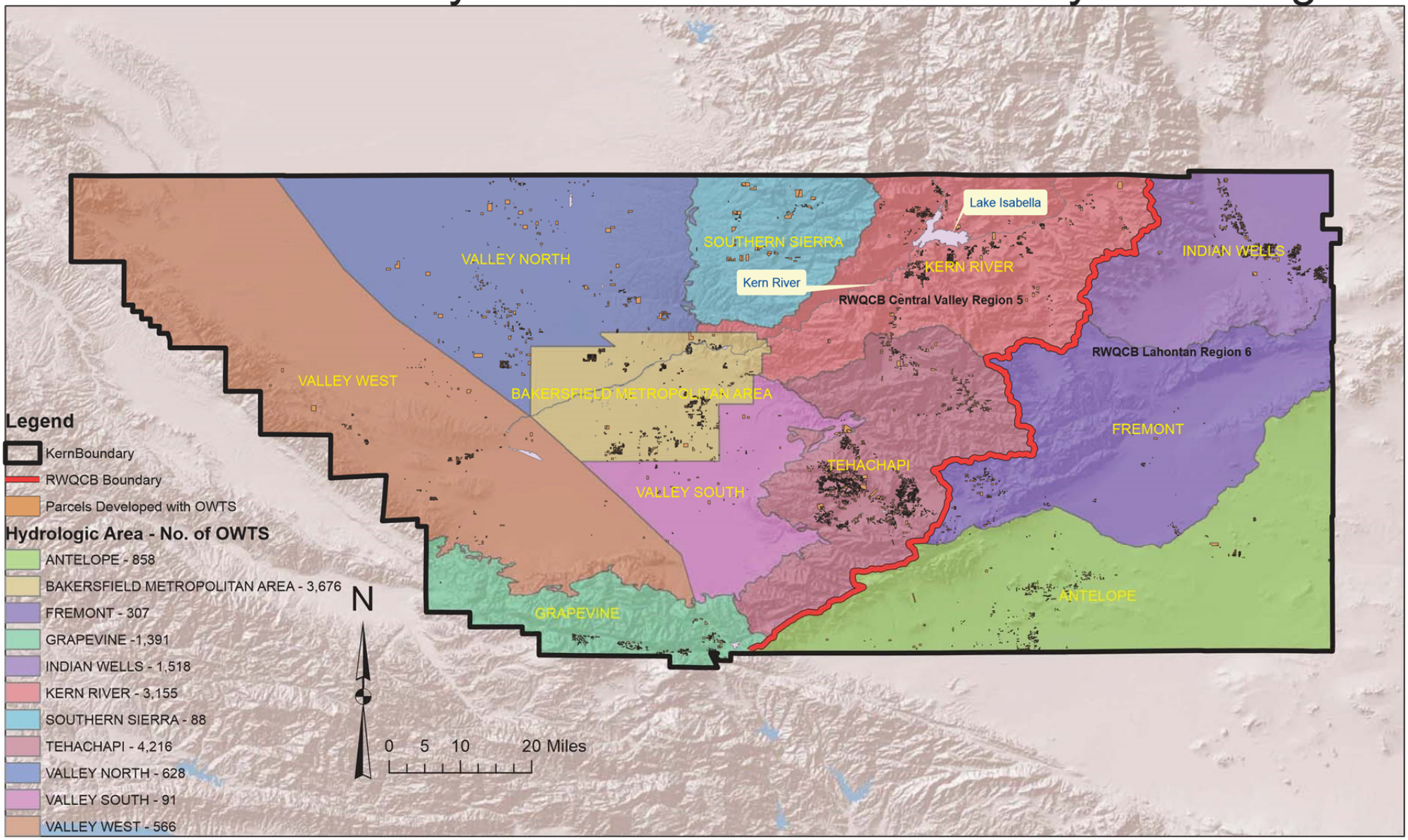
General Soil Association Number	Description	Soil Depth	Slope	Drainage	Soil Texture	Suitability and Con-straints for OWTS	Estimated Number of OWTS
1	**Soils on the Hills and Mountains of the Temblor and Diablo Ranges**	shallow to deep	mainly gently rolling to very steep 9-75%, some undulating	well drained	clay to sandy loam, some very sandy loam	Generally suitable conditions for conventional OWTS with locally steep slope limitations; potentially requiring shallow dispersal designs	5
2	**Soils on the Foothills of the Temblor and Diablo Ranges**	shallow to deep	rolling to steep, some very steep	well drained to somewhat excessively drained	mainly sandy loam, some fine sandy loam to stratified coarse gravelly sand	Generally suitable conditions for conventional OWTS with locally steep slope limitations; potentially requiring shallow dispersal designs	30
3	**Soils Mainly on Alluvial Fans, Alluvial Plains, and Terraces in the Western Part of the San Joaquin Valley**	deep	nearly level to moderately sloping	well drained	clay loam to sandy loam	Suitable conditions for conventional OWTS	936
4	**Soils Mainly in Basins of the San Joaquin Valley**	deep	nearly level to gently sloping, 0-5%	well drained to somewhat poorly drained	loam, fine sandy loam and clay	Suitable conditions for conventional OWTS; some inclusions of low permeability and perched groundwater favoring shallow dispersal designs	132
5	**Soils Mainly on Alluvial Fans, Alluvial Plains, Basin Rims, and Flood Plains in the Eastern Part of the San Joaquin Valley**	deep	nearly level to gently sloping, 0-5%	well drained to somewhat excessively drained	silt and clay loam to sandy loam	Suitable conditions for conventional OWTS; may be limited locally by cumulative groundwater loading effects from high density of OWTS	9,612
6	**Soils on Flood Plains, Alluvial Fans, Stream Terraces, and Fan Remnants of Southern and Southeastern Joaquin Valley**	moderately deep to very deep	nearly level to moderately sloping	well drained to somewhat excessively well drained	mainly clay loam to sandy loam, some gravelly loam and loamy sand	Suitable conditions for conventional OWTS; may be limited locally by cumulative groundwater loading effects from high density of OWTS	12,169

General Soil Association Number	Description	Soil Depth	Slope	Drainage	Soil Texture	Suitability and Constraints for OWTS	Estimated Number of OWTS
7	**Soils on the Coast and Transverse Range**	moderately deep to very deep	mainly gently sloping to steep, some nearly level	well drained	silty clay loam to very gravelly sandy loam	Generally suitable conditions for conventional OWTS; some local inclusions of steep slope; potentially requiring alternative treatment and/or shallow dispersal designs	1,380
8	**Soils and Rock outcrop on Hillslopes, Mountain Slopes, Flood Plains, Stream Terraces, Alluvial Fans, and Fan Remnants on the Western and Central Slopes of the Southern Sierra Nevada and Greenhorn Ranges**	mainly shallow to moderately deep, some very deep	mainly moderately steep to very steep, some nearly level	well drained to somewhat excessively drained	gravelly sandy loam to stony, boulder coarse sandy loam	Moderately constrained by steep slopes and shallow soils; potentially requiring alternative treatment and/or shallow dispersal designs	149
9	**Soils in Mountain Valleys, on Flood Plains, in Depressions, and on Stream Terraces, Inset Fans, Fan Aprons, Alluvial Fans, Fan Piedmonts, and Fan remnants of the Southern Sierra Nevada Range, Primarily Near Lake Isabella in South Fork Valley**	very deep	nearly level to moderately steep	well drained or somewhat poorly drained	fine sandy loam	Generally suitable conditions for conventional OWTS, with areas of shallow groundwater and low permeability con-straints; potentially requiring alternative treatment and/or shallow dispersal designs	2,230
				well drained or excessively drained	gravelly loamy coarse sand		
10	**Soils on the Hillslopes and Mountain Slopes on the East-ern Slopes of the Southern Sierra Nevada Range**	very shallow to moderately deep	moderately sloping to very steep	well drained to somewhat excessively drained	mainly gravelly loamy coarse sand, some boulder loamy coarse sand or fine sandy loam	Moderately to severely constrained by steep slopes and shallow soils; potentially requiring alternative treatment and/or shallow dispersal designs	866

General Soil Association Number	Description	Soil Depth	Slope	Drainage	Soil Texture	Suitability and Constraints for OWTS	Estimated Number of OWTS
11	**Soils on Uplands and in Valleys of the Sierra Nevada and Tehachapi Mountains**	moderately deep to very deep	nearly level to hilly, 0-30%	well drained	sandy loam to clay loam	Generally suitable conditions for conventional OWTS, with areas of shallow ground-water, steep slopes and high OWTS densities; potentially requiring alternative treatment and/or	4,875
12	**Soils on the Eastern Foot Slopes of the Sierra Nevada and Tehachapi Mountains**	rock outcrop and shallow	nearly level to steep	well drained to somewhat excessively drained	gravelly sandy loam and loamy coarse sand	Moderately to severely constrained by steep slopes and shallow coarse-textured soils; potentially suitable for supplemental treatment and/or shallow dispersal designs	36
13	**Soils of the Mojave Desert**	mainly deep to very deep, some shallow	nearly level to strongly sloping	well drained to excessively drained	sandy clay loam to very gravelly loamy sand	Generally suitable conditions for conventional OWTS; some local inclusions of steep slope limitations favoring shallow dispersal designs	5,215
14	**Soils of the Mojave Uplands**	shallow to deep	gently sloping to strongly sloping	well drained	sandy loam and silica lime cemented hard-pan	Moderately to severely constrained for conventional OWTS by steep slopes and shallow soils; potentially requiring shallow dispersal designs	73
		shallow and very shallow	very steep		coarse sandy loam to clay loam		

OWTS Distribution by Watershed

Kern County LAMP Fig.B-2



OWTS Distribution by Hydrologic Area:

The hydrologic area information was merged with the GIS parcel status data to segregate the developed unincorporated parcels (i.e., OWTS) according to their location in different hydrologic areas in the county. The results are presented in **Tables B-2** and **B-3** for the Central Valley and Lahontan regions of the county, respectively. Shown in the tables for each hydrologic area are the total land acreage comprising each hydrologic area, the lot area developed with OWTS, the number of OWTS, and the average lot size for the developed parcels. As indicated, about 84% of the OWTS are located in the Central Valley Region and 16% in the Lahontan Region. The greatest concentrations of OWTS are Bakersfield Metropolitan Area (22%, with lot size supporting OWTS average approximately 1.27 acres) and Tehachapi (26% of the total, average lot size of 3.72 acres). Other large concentrations of OWTS are in the Grapevine, Kern River, and Antelope hydrologic areas. Outside of the Bakersfield area average OWTS lot sizes range from about 1 to 38 acres in the different areas of the county, with the overall county-wide average being about 3 acres.

Table B-2.
OWTS Usage and Distribution Hydrologic Area, Kern County - Central Valley Region 5

Hydrologic Area	Total Watershed Area (acres)	Developed Lot Area (acres)	Number of Developed Parcels	Average Developed Lot Size (acres)
Bakersfield Metro Area	2,043,106	4,662	3,676	1.27
Valley North	2,626,729	6,080	628	9.68
Valley West	2,444,693		566	3.01
Valley South	1,276,966	761	91	8.37
Grapevine	373,658	1,625	1,391	1.17
Tehachapi		15,692	4,216	3.72
Kern River	747,589	5,271	3,155	1.67
Southern Sierra	264,235	3,337	88	37.92
TOTAL	**10,231,017**	**39,132**	**13,811**	**2.83**

Table B-3.
OWTS Usage and Distribution by Hydrologic Area, Kern County - Lahontan Region 6

Hydrologic Area	Total Watershed Area (acres)	Developed Lot Area (acres)	Number of Developed Parcels	Average Developed Lot Size (acres)
Antelope	2,146,292	2,855	858	3.32
Fremont	908,922	1,647	307	5.36
Indian Wells	535,095	4,893	1,518	3.22
TOTAL	**3,590,309**	**9,395**	**2,683**	**3.50**

Cumulative Wastewater Loading by Hydrologic Area:

Based on the estimated number and distribution of developed properties using OWTS determined above, estimates of the associated cumulative wastewater loading volumes were made for different geographical and hydrological regions of the County. This was done using an average daily wastewater flow of 150 gpd per OWTS, which is typical for rural residences, equal to about one-third to one-half the peak daily design flow used for system sizing. **Tables B-4** and **B-5** present the estimated volume of wastewater generated for each of the 11 general hydrological areas in the County for existing development conditions. Estimated wastewater volumes are shown in gallons per day (gpd) and million gallons per year (Mgal/yr.). Additionally, the average annual wastewater loadings, in gallons per acre, are calculated and presented based on the total acreage of non-sewered area within each hydrologic area. These results were used further to estimate the total annual nitrogen loading on a per acre basis, which are shown in the last column. This provides a basis for comparing and assessing the nitrogen loading in different hydrologic areas, tracking ongoing OWTS impacts from additional development in the future, and input to local or regional groundwater models.

Table B-4. Estimated OWTS Wastewater & Nitrogen Loading - Central Valley Region

Hydrologic Area	Developed Lot Area (acres)	Number of Developed Parcels	Discharge Volume (gpd)	Discharge Volume (Mgal/yr.)	Average Wastewater Loading gal/ac-yr.	Estimated Annual Nitrogen Loading* (lbs. /ac-yr.)
Bakersfield Area	4,662	3,676	551,400	201	43,171	25.2
Valley North	6,080	628	94,200	34	5,655	3.3
Valley West	1,704	566	84,900	31	18,186	10.6
Valley South	761		13,650	5	6,547	3.8
Grapevine	1,625	1,391	208,650	76	46,866	27.4
Tehachapi	15,692	4,216	632,400	231	14,710	8.6
Kern River	5,271	3,155	473,250	173	32,771	19.1
Southern Sierra		88	13,200	5	1,444	0.8
TOTAL	**39,132**	**13,811**	**4,835,850**	**756**	**19,323**	

***Based on 150 gpd per OWTS, at a concentration of 70 mg-N/L

Table B-5. Estimated OWTS Wastewater & Nitrogen Loading - Lahontan Region

Hydrologic Area	Developed Lot Area (acres)	Number of Developed Parcels	Discharge Volume (gpd)	Discharge Volume (Mgal/yr.)	Average Wastewater Loading (gal/ac-yr.)	Estimated Annual Nitrogen Loading* (lbs. /yr.)
Antelope	2,855	858	128,700	50	16,454	9.6
Fremont	1,647	307	46,050	17	10,206	6.0
Indian Wells	4,893	1,518	227,700	83	16,986	9.9

TOTAL	**9,395**	**2,683**	**402,450**	**147**	**15,635**	

***Based on 150 gpd per OWTS, at a concentration of 70 mg-N/L

Groundwater Basins

Groundwater Basin Mapping:

Utilizing boundaries established by the California Department of Water Resources (DWR), sixteen (16) alluvial groundwater basins were delineated and labeled as shown in **Figure B-3**. Eleven (11) basins are located in the Tulare Lake Hydrologic Region and five (5) basins are located in the South Lahontan Hydrologic Region. There are also small fractional portions of groundwater basins that lie predominantly in neighboring counties (San Bernardino, Los Angeles) which area shown in **Figure B-3.** These were omitted from further analysis due to the small percentage of each basin falling within Kern County, as well as the absence of any overlying parcel development in these remote areas of the County.

For the 16 groundwater basins, **Table B-6** summarizes the basin characteristics, including surface area, storage, and annual recharge as reported by DWR in Bulletin 118 (DWR, 2003). Also included in **Table B-6** is groundwater monitoring data, including depth to groundwater, and water quality monitoring data available through DWR. The depths to groundwater presented reflect the range of measurements from the most recent well monitoring data available in the DWR Groundwater Library. Where available, data are included from the edges as well as the center of each basin. For reference, Attachment A includes recent mapping of depth to groundwater for the regional aquifer and perched groundwater zones in the Tulare Lake Groundwater Basin, the largest basin in Kern County.

OWTS Distribution by Groundwater Basin:

In an analysis similar to the one performed by hydrologic region, the groundwater basin boundaries were merged with the GIS parcel status data to obtain estimates of the number of developed unincorporated parcels/ OWTS overlying each of the recognized alluvial groundwater basins in the county. The results are presented in **Table B-7**, along with projected wastewater loading volumes, based on an average discharge of 150 gpd per residential OWTS.

OWTS Distribution by Watershed

Kern County LAMP Fig.B-2

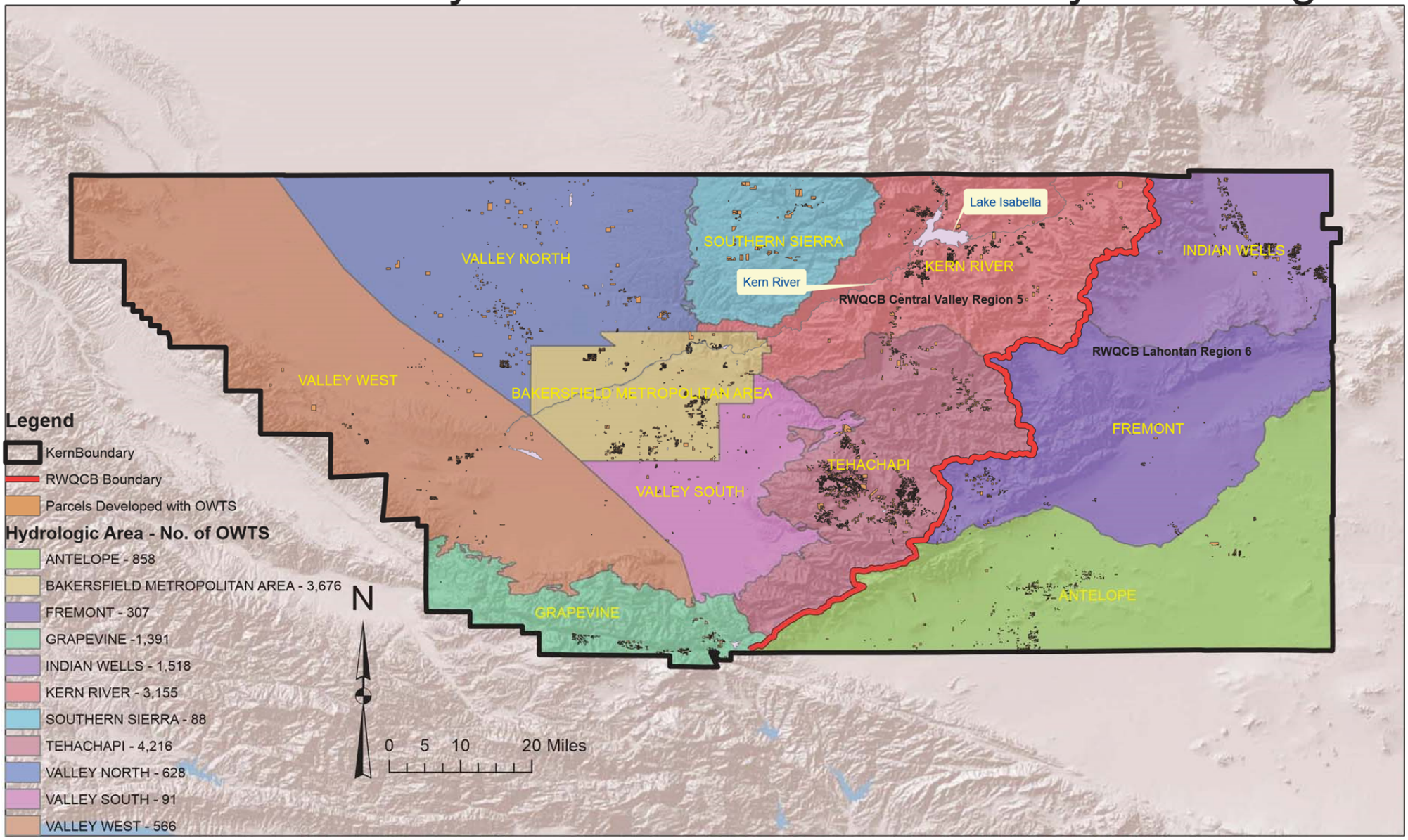


Table B-6. Kern County Groundwater Basin Characteristics

GW Basin Name	Basin No.	Hydrologic Area	Surface Area (AC)	Storage Volume (AC-FT)	Annual Recharge Volume (AC-T/YR)	Depth to Groundwater (ft., bgs)	Water Quality			
							TDS (mg/L)		Nitrate	
							Range	Ave.	# Wells Mon-itored	# Wells Exceeding MCL
San Joaquin Valley	5-22.14	Tulare Lake Valley [1]	1,945,000	40,000,000	1,534,000	5 to 20 (perched); 50 to 300+ (regional)	150 - 5,000	400 - 450	475	38
Kern River Valley	5-25	Kern River	74,000	N/A		9 to 63	253 - 480	378	76	5
Walker Basin Creek Valley	5-26	Tehachapi	7,670	-	-	22 to 102	-	-	-	-
Cummings Valley	5-27	Tehachapi	10,000	98,000	4,500	0 to 110	-	344	15	0
Tehachapi Valley West	5-28	Tehachapi	14,800	225,000	4,000	1 to 57	280 - 365	315	30	2
Castaic Lake Valley	5-29	Grapevine	3,600	-	-	37 to 52	570 - 605	583	8	0
Brite Valley	5-80	Tehachapi	3,170	26,000	3,000	51	-	-	-	-
Cuddy Canyon	5-82	Grapevine	3,300	-	-	67 to 130	690 - 695	690	5	0
Cuddy Ranch Area	5-83	Grapevine	4,203	-	-	33 to 42	480 - 645	550	6	0
Cuddy Valley	5-84	Grapevine	3,500	77,000	510	no data	325-645	407	10	0
Mil Potrero	5-85	Grapevine	2,300	-	3,100 [2]	artesian to 50	372 - 657	460	7	0
Antelope Valley	6-44	Antelope	1,010,000 [3]	68,000,000	48,000	20 to 280	200 - 800	300	243	8
Tehachapi Valley East	6-45	Fremont	24,000	150,000	3,000	284	298 - 405	361	10	0
Fremont Valley	6-46	Fremont	335,000	4,800,000	-	110 to 212	398 - 1,400	596	15	0
Indian Wells Valley	6-54	Indian Wells	382,000 [4]	2,050,000	15,100	13 to 212	192 - 950	390	58	1
Kelso Lander	6-69	Fremont	11,200	-	-	no data	360 -1300	-	-	-

* Primary data source: DWR Bulletin 118, California's Groundwater

1. *Extends over sub-areas designated Valley North Valley West, Valley South, and Bakersfield Metropolitan*
2. *Includes estimate of 400 AC-FT/YR from 1,900 OWTS in 8,800 watershed area (CM Engineering, 1970)*
3. *Groundwater basin extends over portions of Kern, Los Angeles, and San Bernardino Counties*
4. *Groundwater basin extends over portions of Kern, Inyo, and San Bernardino Counties*

Table B-7. OWTS Loading Volumes, Kern County Groundwater Basins (Updated April 2016)

GW Basin Name	Surface Area of Basin (ac)	Annual Recharge Volume (AC-FT/YR)	Number of Developed Parcels with OWTS	Basin-wide OWTS Density (acres per OWTS)	Estimated Daily OWTS Discharge (gpd)	Estimated Annual OWTS Discharge		OWTS Loading as Percentage of Annual Basin Recharge Volume (%)
						Mgal/yr.	AC-Ft/yr.	
San Joaquin Valley	1,945,000	1,534,000	4,939	394	740,850	270	830	0.05
Kern River Valley	74,000		2,322	32	348,300	127	390	
Walker Creek Basin Valley	7,670	-	71	108	10,650	4	12	
Cummings Valley	10,000	4,500	276	36	41,400	15	46	1.03
Tehachapi Valley West	14,800	4,000	1,606	9	240,900	88	270	6.75
Castaic Lake Valley	3,600	-	93	39	13,950	5	16	
Brite Valley	3,170	3,000	141	22	21,150	8	24	0.79
Cuddy Canyon	3,300	-	361	9	54,150	20	61	
Cuddy Ranch Area	4,203	-	138	30	20,700	8	23	
Cuddy Valley	3,500	510	241	15	36,150	13	40	7.94
Mil Potrero*	2,300	3,100	1,900	1	285,000	104	319	10.30
Antelope Valley	1,010,000	48,000	597	1,692	89,550	33	100	0.21
Tehachapi Valley East	24,000	3,000	69	348	10,350	4	12	0.39
Fremont Valley	335,000	-	353	949	52,950	19	59	
Indian Wells Valley	382,000	15,100	1,501	254	225,150	82	252	1.67
Kelso Lander	11,200	-	0		0	0	0	0.00
Total			14,608	0	2,191,200	800	2,454	

** Includes estimated 400 ac-ft./yr. recharge from 1,900 OWTS located in 8,800 acre surrounding watershed (CM Engineering, 1970); 343 OWTS directly over gw basin.*

Using estimates of annual groundwater recharge volumes for each basin (where available), we also calculated the percentage of basin recharge contributed by OWTS. The calculated percentages represent the average over the full extent of the groundwater basin; localized contributions in different parts of the basin would vary above and below the average based on the density of OWTS discharges in a given area. It should also be noted that, in the case of the Mil Potrero basin in the Grapevine hydrologic area, based on a 1970 study referenced by DWR, OWTS contribution to groundwater recharge presented in **Table B-7** includes the indirect effects from an estimated 1,900 OWTS located in the 8,800 acre watershed area encompassing and surrounding the 2,300-acre groundwater basin. The current GIS parcel analysis indicates only 343 of the 1,900 OWTS lie directly over the Mil Potrero basin.

The OWTS contribution to groundwater recharge is potentially an issue with regard to cumulative effects on groundwater quality, nitrate-nitrogen in particular. As indicated by the calculations in **Table B-7**, the recharge percentage contributions from OWTS is typically on the order of 1 to 2 percent for most of the County, which would typically produce only very small effects on groundwater-nitrate concentrations. In those basins indicating recharge percentages on the order of 5 to 10% or more (e.g., Tehachapi Valley West, Cuddy Valley, Mil Potrero), the nitrate loading effects could be potentially significant locally in areas of high OWTS density, possibly contributing to elevated groundwater- nitrate concentrations affecting drinking water supplies. Water sample results for local groundwater supplies in the area would be helpful in assessing the actual nitrate loading effect in these areas. The relative contribution from OWTS was not calculated for several groundwater basins where DWR reported unavailability of information on basin recharge. As a follow-up step, an effort should be made in the future to develop preliminary estimates of recharge in Kern Valley and the other small groundwater basins in the Tehachapi and Grapevine hydrologic areas due to the significant use of OWTS in these areas.

References

California Department of Water Resources. 2003. California's Groundwater, DWR Bulletin 118. Update 2003.

California Department of Water Resources, Basin Boundaries (GIS File, September 2006, I08_B118_CA_GroundwaterBasins)

California Department of Water Resources, Water Data Library, (Groundwater Levels) http://www.water.ca.gov/waterdatalibrary/index.cfm

California Interagency Watershed Map 1999 (Updated GIS file May, 2004 Calwater 2.2.1 or"calw221")

Kennedy Jenks Consultants. November 2011. Kern County Integrated Water Resources Management Plan, Tulare Lake Basin Portion, Final Update. Prepared for Kern County

Water Agency.

Kern County Website, GIS Download Data (Parcels, City Limits, Bakersfield General Plan Boundaries), http://esps.kerndsa.com/gis/gis-download-data

Kern River Watershed Coalition Authority. Groundwater Quality Assessment Report, Kern County. February 2015. Prepared by Provost and Prichard, Land IQ, Todd Groundwater.

USDA, Natural Resources Conservation Service. 1981. Soil Survey of Kern County, California, Southeastern Part.

KERN COUNTY ONSITE SYSTEMS MANUAL

PART 1

SITING, DESIGN, AND CONSTRUCTION REQUIREMENT FOR OWTS

Onsite Systems Manual – Part 1
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1.1 INTRODUCTION

1.2 SITING CRITERIA AND SITE EVALUATION

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1.7 INSPECTION AND TESTING

1.8 CUMULATIVE IMPACT ASSESSMENT GUIDELINES

1.1 Introduction

GENERAL

This part of the Onsite Systems Manual provides technical standards and guidelines for the design and construction of various onsite wastewater treatment and disposal technologies and components as authorized for implementation of Kern County Onsite Wastewater Ordinance. General requirements and principles include the following:

1. Where permitted by County Code, the building sewer shall be permitted to be connected to a private sewage disposal system in accordance with the provisions of these technical standards;

2. The type of OWTS shall be determined on the basis of location, soil characteristics, topography, groundwater conditions, and shall be designed to receive all sewage from the building(s) served;

3. The system, except as otherwise approved, shall consist of a septic tank with effluent discharging into a subsurface disposal field, into one or more seepage pits, or into a combination of subsurface disposal field and seepage pits;

4. Provisions are included for the approved use of “engineered” or “alternative systems”, which refers to 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 conventional drain field trenches or seepage pit(s) for the purpose of producing a higher quality wastewater effluent and improved performance of and siting options for effluent dispersal;

5. No property shall be improved in excess of its capacity to properly treat and absorb sewage effluent by the means provided in County Code and these technical standards;

6. Nothing contained in this section shall be construed to prevent the Director from requiring compliance with additional requirements than those contained herein, where such additional requirements are essential to maintain a safe and sanitary condition.

INSTALLATION PERMIT

A permit must be obtained from the Kern County Environmental Health Division (EHD) 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 200 feet of the structure. OWTS cannot be used if soil

conditions, topography, high groundwater or other factors indicate this method of sewage disposal is unsuitable.

LAND DIVISIONS

OWTS requirements for land divisions contained in Part 5 of this Manual – "Standards, Rules and Regulations for Land Development". The standards are intended to safeguard the public health, and are enforced by the County's Environmental Health Division (EHD). They are primarily intended to apply to residential units.

It is the responsibility of the land developer and his/her technical consultants to provide to the EHD any and all data needed to satisfy the content and the intent of these Standards.

For new divisions of land, soil profiles, percolation tests and groundwater determinations will be required on every parcel unless the EHD 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.

OWTS REPAIRS

OWTS that require corrective action to address a current or threatened failure condition shall be repaired in a manner, approved by the EHD that brings the OWTS into substantial conformance with Ordinance requirements to the greatest extent practicable. The repair work shall be implemented as soon as is reasonably possible and in accordance with any time limits issued by the EHD.

The overall goal with all OWTS repairs is to obtain a practical, timely and effective long-term correction to the failure condition. In determining the level of corrective work required, Environmental Health will take into consideration a variety of factors, including:

1. Public health and safety;
2. Soil characteristics and groundwater separation;
3. Setbacks from wells and streams;
4. Ground slope and setback from unstable landforms;
5. OWTS sizing standards;
6. Other setback criteria (e.g., foundations, pipelines, trees).

Submittal requirements for OWTS repairs may vary case-by-case, and will depend on the nature of the failure condition, the property location and type of occupancy, and the type of corrective work needed.

NOTIFICATION TO PUBLIC WATER SUPPLY OWNER(S)

Proposed OWTS. Where EHD staff determines the proposed OWTS dispersal system is closer than 150 feet to a public water well, or closer than 1,200 feet to a public water system surface water intake in a location tributary to the intake, steps will be taken to notify and consider input from the public water supply owner(s) as follows:

1. Notification of the proposed OWTS application will be sent to the water system owner(s). The notification will be accompanied by a copy of the permit application and supporting OWTS design information, including documented soils, topography, groundwater and percolation data.

2. The owner(s) receiving notification of proposed OWTS installations per (1) above will be afforded a 15-day period in which to submit comments on the proposed OWTS application.

3. Prior to issuing an OWTS installation permit for any system per (1) above, EHD will review and consider any comments and recommendations submitted by affected water system owner(s) per (2) above.

4. Upon issuance and/or denial of an OWTS installation permit per (1) above, EHD will provide notification to the affected water system owner(s) of the action taken.

Failing OWTS. Where EHD becomes aware of a failing OWTS located closer than 150 feet to a public water well, or closer than 2,500 feet to a public water system surface water intake in a location tributary to the intake, EHD shall notify the respective owner(s) and the SWRCB Division of Drinking Water as soon as practicable, but no later than 72 hours from the time of discovery of the failing OWTS.

ALTERNATIVE OWTS

General Provisions. Alternative OWTS may be permitted by the EHD 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; (b) EHD determines that an alternative OWTS would provide

equal or greater protection to public health and the environment than a conventional OWTS; or (c) necessary to comply with requirements adopted for Mountain and Groundwater Impact Areas.

Alternative OWTS may be used for land divisions, in accordance with conditions and requirements in Part 5 of this Manual as approved by the EHD.

Types of alternative OWTS permitted are limited to those identified in Part 3 of this Manual, and which have been approved by the EHD and the appropriate CRWQCB.

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.

Specific Requirements

1. **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 3 of this Manual.

2. **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 EHD, along with the requirement for permit renewal, typically on an annual basis.

3. **Performance Monitoring and Reporting.** Performance monitoring and reporting is required for all alternative OWTS in accordance with conditions established by the EHD at part of the operating permit. Performance monitoring requirements are covered in Parts 3 and Part 4 of this Manual.

4. **Design and Construction Guidelines.** Design and construction guidelines for approved alternative treatment and dispersal technologies are provided in Part 3 of this Manual.

VARIANCES

As provided in Kern County OWTS Ordinance, Article 4, variance from the terms of the Ordinance and requirements as prescribed in this Onsite Systems Manual may be granted by the EHD, under the following conditions:

1. The variance will not harm the public health, safety and welfare of the people of Kern County;
2. Due to special conditions or exceptional characteristics of the property, its location or surroundings, a literal enforcement of this chapter and Onsite Systems Manual would result in unnecessary hardship;

3. The hardship was not caused with the intent to avoid the requirements of the Ordinance or Onsite Systems Manual;

4. The variance will not have any adverse environmental effect on the use of the adjoining property.

1.2 Siting Criteria and Site Evaluation

SITING CRITERIA

Approval of any conventional OWTS shall require compliance with the following minimum siting criteria.

1. **Soil Depth.** For conventional OWTS, minimum depth of soil beneath the bottom of the dispersal field shall be 7 feet for leaching trenches or beds, and 12 feet for seepage pits. For alternative OWTS, minimum soil depth may be reduced to 3 feet for trench systems, and 10 feet for seepage pits.

2. **Vertical separation to ground water.** Minimum vertical separation distance between the bottom of the dispersal field shall be 7 feet for leaching trenches or beds, and 12 feet for seepage pits. For alternative OWTS utilizing supplemental treatment, minimum depth to groundwater may be reduced to 2 feet for trench systems, and 10 feet for seepage pits.

3. **Soil Percolation Rate.** For conventional disposal trenches or beds, the average soil percolation rate in the proposed disposal field area shall not be faster than one minute per inch (1 mpi) nor slower than 60 mpi, determined in accordance with procedures prescribed in this Manual. For seepage pits, percolation rates shall not be slower than 25 mpi. Soils having percolation rates between 60 and 120 mpi will require the use of an alternative OWTS, as provided in Article 3 of the County OWTS Ordinance and in accordance with methods and requirements detailed in Part 3 of this Manual.

4. **Ground Slope.** Maximum ground slope in the disposal field area shall not exceed thirty (30) percent.

5. **Horizontal Setbacks.** Minimum horizontal setback distances from various site features to OWTS components shall be as listed in **Table 1-1**.

6. **Areas of Flooding.** OWTS shall not be located in the primary floodplain or "floodway" as determined or estimated from published floodplain maps or on the basis of historical evidence acceptable to the director. OWTS are not permitted in secondary floodplain areas unless: (1) they are protected by flood control devices approved by the Kern County Water Agency or Kern County Department of Public works; (2) they are constructed with appropriate measures to minimize infiltration of floodwaters into the system and discharges from the system into the floodwater.

7. **OWTS Located on Property Served.** OWTS shall be located on the same property as the building(s) being served. An exception may be granted by the Director for existing lots of record, where the OWTS may be located on an adjoining property within a non-revocable easement.

Table 1-1. Minimum horizontal setback distances for OWTS

Site Feature	Minimum Setback Distance (feet)			
	To Bldg. Sewer	To Septic Tank[1]	To Disposal Field	To Seepage Pit
Building or structures	2	5	8	8
Property line adjoining private property	Clear	5	5	8
Non-public water supply wells and springs	50	100	100	150
Public water supply wells	50	150	150[2]	200[2]
Streams (perennial or seasonal flow)				
• General (from top of bank)	50	50	100	100
• Between 1,200 to 2,500 ft. from public water system intake[3]	50	100	200	200
• Within 1,200 ft. from public water system intake[3]	50	100	400	400
Lakes and Reservoirs (from high water mark)				
• General	50	200	200	200
• Within 1,200 feet from a public water supply intake[3]	50	400	400	400
Non-classified stream or drainage ditch	25	25	25	25
Cuts or steep embankments (from top of cut/embankment)	-	10	4 X h[4,5]	4 X h[4,5]
Unstable land mass	-	100	100[5]	100[5]
Large trees	-	10	-	10
Seepage pit	-	5	5	12
Disposal field	-	5	4	5
Domestic water line	1	5	5	5
Distribution box	-	-	5	5
Pressure public water main	10	25	25	25

[1] Also applies to supplemental treatment units and pump/dosing tanks;

[2] 200' for trench or seepage pit >10'deep; 2-yr microbial travel study required for seepage pit >20' deep within 600 feet of public water well, per SWRCB Policy section 9.4.10.3.

[3] 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 13, 2013), comply to maximum extent practicable and incorporate supplemental treatment for pathogens per sections 10.8 and 10.10 of SWRCB OWTS Policy.

[4] h equals the height of cut or embankment, in feet.

[5] Setback distance may be reduced in accordance with recommendations provided in a geotechnical report prepared by a civil engineer or professional geologist.

SITE EVALUATION

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 specified in this Manual. Site evaluations shall be conducted by qualified professionals, and evaluations shall be made in accordance with the following general requirements and referenced procedures. The EHD shall be notified prior to the site evaluation to coordinate with and allow for verification by department staff.

1. **General Site Features.** Site features to be determined by inspection shall include:

    a. Land area available for treatment components and for primary and reserve dispersal fields;

    b. Ground slope in the primary and reserve dispersal area(s);

    c. 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 reserve dispersal area(s);

    d. Location of wells, streams, and other bodies of water within 200 feet of the primary and reserve dispersal area(s);

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

2. **Soil Profiles**

    a. Soil characteristics shall be evaluated by soil profile test pit observations. A minimum of one test pit in the primary dispersal field and one in the 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.

    b. An augured test hole may be an acceptable alternative to a test pit where the EHD determines that:

        i. The use of a backhoe/excavator is impractical because of access or because of the fragile nature of the soils; or

        ii. It is necessary only to verify conditions expected on the basis of prior soils investigations; or

        iii. It is done in connection with geotechnical investigations.

c. The following factors shall be observed and reported from the ground surface to a limiting condition, up to a minimum of seven (7) feet below the bottom of the proposed dispersal system, which may be reduced to three (3) feet where an alternative OWTS is proposed.

   i. Thickness and coloring of soil layers, soil structure, and texture according to United States Department of Agriculture (USDA) classification;

   ii. Depth to a limiting condition such as hardpan, rock strata, impermeable soil layer, or saturated soil conditions;

   iii. Depth to observed groundwater;

   iv. Depth to and description of soil mottling (redoximorphic features);

   v. Other prominent soil features which may affect site suitability, such as coarse fragments, consistence, roots and pores, and moisture content.

3. **Depth to Groundwater Determination.** The anticipated highest level of groundwater in the primary and reserve area shall be estimated:

   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 EHD.

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

   Where the director has been provided adequate evidence to demonstrate suitable soil conditions and groundwater separation, testing requirements may be waived.

4. **Percolation Testing.** Determination of a site's suitability for dispersal of effluent and for OWTS design shall be made by the completion of percolation testing in accordance with procedures approved by the EHD (Manual Part 2).

5. **Land Divisions.** 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 (See Part 5 of this Manual).

6. **Cumulative Impact Assessment.** Kern County OWTS Ordinance Article 3, authorizes EHD 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. Where required, such studies shall be conducted in accordance with the guidelines provided in Part 1.8 of this Manual. The results shall be submitted for review by EHD as part of the project/site evaluation process, 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.

7. **Reporting.** All site evaluation information, including test results for primary and reserve dispersal areas, shall be submitted to the EHD with the OWTS permit application.

1.3 Wastewater Design Flows

Daily wastewater flow estimates shall be developed for use in design, evaluation and monitoring of all OWTS.

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 number of bedrooms in accordance with criteria in **Table 1-2.** Design flows for a primary residence and secondary dwelling unit shall be determined independently, regardless of whether the flows are treated separately or in a combined OWTS.

Table 1-2.
Wastewater Design Flows for Single Family Residences

No. of Bedrooms	Design Flow (gal/day)
1	150
2	300
3	450
4	600
5	675
6	750
>6	+ 75 per bedroom

2. **Multiple Dwelling Units or Apartments.** Wastewater flows used for the design of OWTS for multiunit residences or apartments units shall be based on the number of dwelling units in accordance with criteria in **Table 1-3.**

Table 1-3.
Wastewater Design Flows for Multi-Unit Residences

No. of Dwelling Units	Design Flow (gal/day)
2	600
3	750
4	1,000
5	1,125
6	1,250
7	1,375
8	1,500
9	1,625

10	1,750
>10	+125 per unit

3. **Non-residential Facilities.** Wastewater flows used for design of OWTS for commercial, institutional, recreational and other non-residential facilities shall be the greater of that estimated from the following two methods:

   a. Facility/Occupancy Method - based on the projected activities, occupancy and facilities, using wastewater generation guidelines provided in **Table 1-4;** and

   b. Fixture Unit Method - based on total drainage fixture unit value, per California Plumbing Code (Table 702.1) or the most recent adopted version of the Kern County Plumbing Code (KCPC), and criteria in **Table 1-5**.

For facilities not listed in **Table 1-4** the wastewater design flow shall be estimated based on either: (a) appropriate literature references (e.g., US EPA Onsite Wastewater Treatment Systems Manual, 2002) 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 1-4** 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 1-4.
Estimated Wastewater Flow Rates

Type of Occupancy	Design Flow (gallons per day)
Airports	
- Per employee	15
- Per passenger	5
Auto washers	Per equipment mfg.
Bowling alleys, snack bar only (per lane)	75
Camps (per person)	
- With central comfort station	35
- With flush toilets, no showers	25
- Day camps, no meals served	15
- Summer and seasonal	50
Churches, sanctuary, religious halls (per seat)	
- without kitchen	5
- with kitchen waste	7
Dance halls (per person)	5
Day care (per patron, employee)	15

Factories and industrial buildings (per employee) - no showers - with showers - cafeteria, add	 25 35 5
Hospitals - per bed - kitchen waste only (per bed) - laundry waste only (per bed)	 250 35 5
Type of Occupancy	**Design Flow (gallons per day)**
Hotels, no kitchen waste (per bed x 2)	60
Institutions (per person) - resident - nursing home - rest home	 75 125 125
Laundries, self-service - minimum 10 hours per day (per wash cycle) - commercial	 50 Per manufacturer
Motel (per bed space) - no kitchen - with kitchen	 50 60
Offices (per employee)	20
Parks - mobile homes (per space) - picnic parks, toilets only (per parking space) - Recreational vehicles (per space) • without water hook-up • with water and sewer hook-up	 250 20 75 100
Restaurants – cafeterias - per employee - toilet (per customer) - kitchen waste (per meal - add for cocktail lounge (per customer) - kitchen waste – disposable service (per meal)	 20 7 6 2 2
Schools - staff and office (per person) - elementary students (per student) - intermediate and high (per student) • with gym and showers, • with cafeteria, add - boarding, total waste (per person)	 20 15 20 5 3 100
Service station, toilets - for 1st bay - add for each additional bay	3 1000 500
Stores - per employee - public restrooms, add per 10 ft^2 of floor space	 20 1
Swimming pools, public (per person)	10
Theaters - auditoriums (per seat) - drive-in (per space)	 5 10

Table 1-5.
Estimated Sewage Flow by Fixture Unit Value

Total Fixture Units per CPC Table702.1	Design Flow[1] (gallons per day)
15	375
20	500
25	600
33	750
45	1,000
55	1,112
60	1,250
70	1,375
80	1,500
90	1,625
100[2]	1,750

[1] Equal to 50% of required septic tank volume; assumes 2-day detention time;
[2] Additional fixture units over 100, 12.5 gallons per fixture unit

4. **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:

    a. religious facilities
    b. schools special event
    c. 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:

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

2. 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;

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

4. An operating permit for the OWTS shall be required and shall include provisions for monitoring and documenting compliance with the flow equalization design parameters.

1.4 Septic Tank Requirements

1. **Capacity.** The liquid capacity of all septic tanks shall conform to Table 1-6 as determined by: (a) the number of bedrooms or apartment units in dwelling occupancies and (b) the estimated waste/sewage design flow rate or the number of plumbing fixture units for non-residential facilities, as determined from the most recent adopted version of the Kern County Plumbing Code, whichever is greater.

Table 1-6.
Septic Tank Capacity

Single Family Dwellings # of Bedrooms	Multi-family or Apartments # of Dwelling Units	Other Uses: Maximum Fixture Units per CPC Table702.1	Minimum Septic Tank Capacity[4,5] (gallons)
1 or 2	-	15	750
3	-	20	1,000
4	2 units	25	1,200
5 or 6[1]	3	33	1,500
-	4	45	2,000
-	5	55	2,225
-	6	60	2,500
-	7	70	2,750
-	8	80	3,000
-	9	90	3,250
-	10[2]	100[3]	3,500

Notes:
[1] Additional bedrooms, 150 gallons each
[2] Additional dwelling units, 250 gallons each
[3] Additional fixture units over 100, 25 gallons per fixture unit
[4] Septic tank sizes in this table include sludge storage capacity and the connection of domestic food waste disposal units without further volume increase.
[5] Minimum capacity determined from estimated wastewater flow shall be equal to at least two (2) days the maximum daily design flow.

2. **Plans.** Plans for septic tanks shall be submitted to the EHD for approval. Such plans shall show dimensions, reinforcing, structural calculations, and such other pertinent data as required.

3. **Design.** Septic tank design shall be such as to produce a clarified effluent consistent with accepted standards and shall provide adequate space for sludge and scum accumulations.

4. **Construction Materials.** Septic tanks shall be constructed of solid durable materials not subject to excessive corrosion or decay and shall be watertight.

5. **Compartments.** Septic tanks shall have not less than two compartments unless otherwise approved by the EHD. The inlet compartment of any septic tank shall be not less than two-thirds of the total capacity of the tank, nor less than 500 gallons liquid capacity, and shall be not less than 3 feet in width and 5 feet in length. Liquid depth shall be not less than 2 feet nor more than 6 feet. The secondary compartment of a septic tank shall have a capacity of not less than 250 gallons and a capacity not exceeding one-third of the total capacity of such tank. In septic tanks having a 1,500 gallon capacity, the secondary compartment shall be not less than 5 feet in length.

6. **Access Manholes**

   a. Access to each septic tank shall be provided by at least two (2) manholes twenty (20) inches in minimum diameter. One (1) access manhole shall be located over the inlet and one (1) access manhole shall be located over the outlet. Wherever a first compartment exceeds twelve (12) feet in length, an additional manhole shall be provided over the baffle wall.

   b. Septic tanks shall have the required manholes accessible by extending the manhole openings to grade, or at most 6 inches below finished grade, in a manner acceptable to the EHD.

   c. Access openings at grade or above shall be locked or secured to prevent unauthorized access.

7. **Pipe Opening Sizes.** The inlet and outlet pipe openings shall not be larger in size than the connecting sewer pipe. The vertical leg of round inlet and outlet fittings shall not be less in size than the connecting sewer pipe nor less than 4 inches. A baffle-type fitting shall have the equivalent cross-sectional area of the connecting sewer pipe and not less than a 4-inch horizontal dimension where measured at the inlet and outlet pipe inverts.

8. **Pipe Extension.** The inlet and outlet pipe or baffle shall extend 4 inches above and not less than 12 inches below the water surface. The invert of the inlet pipe shall be at a level not less than 2 inches above the invert of the outlet pipe.

9. **Free Vent Area.** Inlet and outlet pipe fittings or baffles and compartment partitions shall have a free vent area equal to the required cross-sectional area of the house sewer or private sewer discharging therein to provide free ventilation above the water surface from the disposal field or seepage pit through the septic tank, house sewer, and stack to the outer air.

10. **Sidewalls.** The sidewalls shall extend not less than 9 inches above the liquid depth. The cover of the septic tank shall be not less than 2 inches above the back vent openings.

11. **Partitions and Baffles.** Partitions or baffles between compartments shall be of solid, durable material and shall extend not less than 4 inches above the liquid level. The transfer port between compartments shall be a minimum size equivalent to the tank inlet, but in no case less than 4 inches in size, shall be installed in the inlet compartment side of the baffle so that the entry into the port is placed 65 percent to 75 percent in the depth of the liquid. Wooden baffles are prohibited.

12. **Effluent Filter.** Septic tanks shall be designed to prevent solids in excess of three-sixteenths (3/16) of an inch in diameter from passing to the dispersal system. Septic tanks that use a NSF/ANSI Standard 46 certified septic tank effluent filter at the final point of effluent discharge from the OWTS and prior to the dispersal system shall be deemed in compliance with this requirement.

13. **Structural Design**. The structural design of septic tanks shall comply with the following requirements:

    a. Each such tank shall be structurally designed to withstand all anticipated earth or other loads. Septic tank covers shall be capable of supporting an earth load of not less than 500 pounds per square foot (lb. /ft^2) where the maximum coverage does not exceed 3 feet.

    b. In flood hazard areas, tanks shall be anchored to counter buoyant forces during conditions of the design flood. The vent termination and service manhole of the tank shall be not less than 2 feet above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or the outflow of the contents of the tanks during conditions of the design flood.

14. **Materials.** The materials used for constructing a septic tank shall be in accordance with the following:

    a. Materials used in constructing a concrete septic tank shall be in accordance with applicable standards in the most recent adopted version of the Kern County Plumbing Code.

    b. Septic tanks constructed of alternate materials shall be permitted to be approved by the EHD where in accordance with approved applicable standards. Wooden septic tanks are prohibited.

15. **Prefabricated Septic Tanks.** Prefabricated septic tanks shall comply with the following requirements:

    a. Manufactured or prefabricated septic tanks shall comply with approved applicable standards and be approved by the EHD.

    b. Independent laboratory tests and engineering calculations certifying the tank capacity and structural stability shall be provided as required by the EHD.

16. Septic tanks shall be limited to those approved by the IAPMO or stamped and certified by a California registered civil engineer as meeting the industry standards, and their installation shall be according to the manufacturer's instructions.

17. **Water-tightness Testing Requirements.** Septic tanks or other primary components shall be filled with water to flow line prior to requesting inspection. Seams or joints shall be left exposed (except the bottom), and the tank shall remain water-tight. All new septic tank installations and modifications to existing septic tanks shall undergo water-tightness testing as follows:

    a. **Tanks Located in Areas of Shallow Groundwater or Flooding.** The testing shall be done with the access 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) inche**s** into the risers, and monitored for a 1-hour period, with no measurable drop in the water level.

    b. **All Other 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.

1.5 Conventional Disposal Trenches and Beds

1. **General**

   The construction dimensions of the subsurface sewage effluent disposal area of an onsite wastewater treatment system shall be based on soils analysis and/or percolation tests.

2. **Sizing**

   a. **Minimum Effective Absorption Area.** The minimum effective absorption area required shall be sufficient for absorption of the daily quantity of liquid waste discharging there into, determined per **Table 1-7**, based on either (1) the required septic tank capacity in gallons (liters), and/or (2) the estimated daily waste/sewage flow, whichever is greater.

   b. **Absorption Capacity.** The absorption capacity of disposal trenches and beds shall be based on the effective absorption area (per below) and the percolation characteristics of the underlying and surrounding soil, as determined from results of field exploration and design criteria in **Table 1-7**.

   c. **Effective Absorption Area.** The effective absorption area of a disposal trench shall normally be calculated as the bottom width. Sidewall area in excess of the required 12 inches and not exceeding 36 inches below the leach line shall be permitted to be added to the trench bottom area where computing absorption areas.

   d. **Leaching Beds.** Where leaching beds are permitted in lieu of trenches, the area of each such bed shall be not less than 50 percent greater than the requirements for trenches. Perimeter sidewall area in excess of the required 12 inches and not exceeding 36 inches below the leach line shall be permitted to be added to the trench bottom area where computing absorption areas.

   e. **Leaching Chambers.** Leaching chambers shall be sized on the bottom absorption area (nominal unit width) in square feet.

Table 1-7
Design Criteria of Five Typical Soils

Type of Soil	Required Square Feet for leaching area per 100 gallons tank capacity	Maximum Absorption Capacity in gal/ft^2 of leaching area for a 24-hour period
Coarse sand or gravel	20	5.0
Fine sand	25	4.0
Sandy loam or sandy clay	40	2.5
Clay with considerable sand or gravel	90	1.1
Clay with small amount of sand or gravel	120	0.8

3. **Construction**

   Disposal fields shall be constructed in accordance with **Table 1-8**.

Table 1-8.
General Disposal Field Requirements

Item	Minimum	Maximum
Number of drain lines per field	1	-
Length of each line	-	100 feet
Bottom width of trench	18 inches	36 inches
Spacing of lines, center-to-center	6 feet	-
Depth of earth cover of lines	12 inches	-
Grade of lines	Level	Inches per 100 ft.
Filter material under drain lines	12 inches	-
Filter material over drain lines	2 inches	

4. **Distribution Lines.** Distribution lines shall be constructed of perforated ABS pipe, perforated PVC pipe, or other materials approved by the Director, provided that sufficient openings are available for distribution of the effluent into the trench area.

5. **Filter Material.** Before placing filter material or drain lines in a prepared excavation, all smeared or compacted surfaces shall be removed by raking to a depth of one (1) inch and the loose material removed. Clean stone, gravel, slag, or similar material acceptable to the Director, varying in size from three fourths (3/4) inch to two and one-half (2-1/2) inches shall be placed in the trench to the depth and grade required by this section. Drain pipe shall be placed on the filter material in an approved manner. The drain lines shall then be covered with filter material to the minimum depth required by this section and this covered with material approved by the Director to prevent closure of voids with earth backfill. No earth backfill shall be placed over the filter material until after inspection and acceptance.

Exception: Plastic leaching chambers approved by the EHD may be used in lieu of pipe and filter material. Chamber installations shall follow the rules for disposal fields, where applicable, and shall conform to manufacturer's installation instructions.

6. **Capped Inspection Riser.** A capped inspection riser, typically consisting of 3" or 4" perforated pipe, shall be installed within each trench to provide a means of observing the effluent level in the trench.

7. **Grade Board.** A grade board staked in the trench to the depth of filter material shall be utilized when the distribution line is constructed of material which will not maintain alignment without continuous support.

8. **Distribution Boxes**. Where two or more drain lines are installed, an approved distribution box of sufficient size to receive lateral lines shall be installed at the head of each disposal field. The inverts of outlets shall be level, and the invert of the inlet shall be not less than 1 inch above the outlets. Distribution boxes shall be designed to ensure equal flow and shall be installed on a level concrete slab in natural or compacted soil.

9. **Laterals.** Laterals from a distribution box to the disposal field shall be approved pipe with watertight joints. Multiple disposal field laterals, where practicable, shall be of uniform length.

10. **Connections.** Connections between a septic tank and a distribution box shall be laid with approved pipe with watertight joints on natural ground or compacted fill.

11. **Spacing**

    a. Minimum spacing between trenches or leaching beds shall be not less than 4 feet plus 2 feet for each additional foot of depth in excess of 1 foot below the bottom of the drain line.

    b. Distribution drain lines in leaching beds shall be not more than 6 feet apart on centers, and no part of the perimeter of the leaching bed shall exceed 3 feet from a distribution drain line.

    c. When seepage pits are used in combination with disposal fields, the filter material in the trenches shall terminate at least five (5) feet from the seepage pit excavation.

12. **Surface Covering.** Disposal fields, trenches, and leaching beds shall not be paved over or covered by concrete or a material that is capable of reducing or inhibiting a possible evaporation of sewer effluent.

    Exceptions: Exceptions may be granted under the following conditions:

(a) for soil Types 2 or 3: disposal trench sizing shall be increased by 25% or disposal trenches shall be constructed using traffic-rated chambers with no sizing reduction credit as normally given for chambers;

(b) for soil Types 4 or 5: disposal trench sizing shall be increased by 25% and the trenches shall be constructed using traffic-rated chambers, with no sizing reduction credit;

(c) for soil Types 2 through 5: no sizing increase or chamber construction requirement would apply if supplemental treatment is provided;

(d) for any large flow OWTS (>1,500 gpd design flow), supplemental treatment is required except where the portion of trench installed under paved area amounts to less than 25% of the total system capacity.

13. **Joints.** Where necessary on sloping ground to prevent excessive line slope, leach lines or leach beds shall be stepped. The lines between each horizontal section shall be made with watertight joints and shall be designed so each horizontal leaching trench or bed shall be utilized to the maximum capacity before the effluent shall pass to the next lower leach line or bed. The lines between each horizontal leaching section shall be made with approved water-tight joints and installed on natural or unfilled ground.

14. **Dosing Tanks.** Automatic siphon or dosing tanks shall be installed when required or as permitted by the EHD. Minimum requirements include the following:

    a. Horizontal setbacks for dosing siphon tanks shall be the same as for septic tanks; and

    b. Designer submittal requirements shall be the same as for pump systems, including hydraulic design calculations, selection of dosing siphon and dosing tank, copy of manufacturer data sheet(s), operation and maintenance guidelines.

1.6 Seepage Pit Requirements

1. **Sizing**

    a. **Effective Absorption Area.** The effective absorption area of any seepage pit shall be calculated as the excavation sidewall area in square feet (m^2) below the inlet, excluding impermeable soil zones where identified during field exploration.

    b. **Absorption Capacity.** The absorption capacity of seepage pits shall be based on the effective absorption area per (a) and the percolation characteristics of the surrounding soil, as determined from results of field exploration and design criteria in **Table 1-7**.

    c. **Minimum Effective Absorption Area.** The minimum effective absorption area required shall be sufficient for absorption of the daily quantity of liquid waste discharging there into, determined per **Table 1-7**, based on either (1) the required septic tank capacity in gallons (liters), and/or (2) the estimated daily waste/sewage flow, whichever is greater.

    d. **Multiple Pits and Disposal Combinations.** The minimum required absorption area may be provided in one or more seepage pits or in combination with other dispersal methods, e.g., trenches, beds.

2. **Multiple Installations**

    a. **Level Sites**. Multiple seepage pit installations on level sites (where the inlet pipe elevations are the same) shall be served through an approved distribution box. Distribution boxes shall have their locations permanently marked with a steel post, concrete marker or other durable material. Additionally, each distribution box shall have an inspection riser of white PVC or concrete of at least eight (8) inches in diameter. The inspection riser shall allow inspection access to the distribution box. Each riser shall terminate with an approved screw type cap.

    b. **Sloping Sites.** For multiple seepage pit installations on sloping sites where the inlet pipe elevations differ, the distribution piping shall be designed to provide serial overflow from one pit to another (highest to lowest elevation).

3. **Construction**

    a. Each seepage pit shall be circular in shape and shall have an excavated diameter of not less than four (4) feet. Approval shall be obtained prior to construction for any pit having an excavated diameter greater than six (6) feet.

4. **Spacing**

   a. Minimum horizontal spacing between seepage pits shall be 12 feet, measured from sidewall to sidewall.

   b. When seepage pits are used in combination with disposal fields, the filter material in the trenches shall terminate at least five (5) feet from the seepage pit excavation.

5. **Lining**

   Seepage pits may be constructed in one of two ways, as follows:

   a. An eight (8) inch (204 mm) white, or other similar approved color, sewer pipe of approved material shall be installed true and plumb in the center of the seepage pit excavation extending from the bottom of the seepage pit excavation to the inlet depth. The sewer pipe shall have one (1) inch holes drill each 120 degrees of the sewer pipe circumference at twelve (12) inch intervals on center minimum for the entire length of the sewer pipe to the inlet depth. The sewer pipe shall then extend watertight to grade and shall be capped with an approved screw type, accessible cap. The void between the sewer pipe and the seepage pit excavation shall then be filled with clean stone, gravel, or similar filter material acceptable to the EHD, varying in size from the three fourths (3/4) inch to two and one-half (2-1/2) inches.

   b. Pre-cast concrete circular sections approved by the EHD may be used. The void between the pre-cast circular sections and the seepage pit excavation shall have a minimum of six (6) inches of clean three-fourths (3/4) inch gravel or rock filter material. An approved type one or two piece reinforced concrete slab cover shall be installed on top of the pre-cast concrete circular sections. Each such cover shall have twenty- five hundred (2,500) pounds per square inch minimum compressive strength shall be not less than five (5) inches thick and shall be designed to support an earth load of not less than four hundred (400) pounds per square foot. Each such cover shall be provided with an eight (8) inch minimum inspection hole and shall be coated on the underside with an approved bituminous or other nonpermeable protective compound. An eight (8) inch white, or similar approved color, sewer pipe of approved material shall be installed true and plumb extending watertight from the cover inspection hole to grade and shall be capped with an approved accessible cap.

6. **Sidewall.**

   A seepage pit shall have a minimum sidewall of 10 feet below the inlet.

7. **Cover**

   The cover of a seepage pit shall be constructed and located as follows:

a. Approved-type one or two-piece reinforced concrete slabs of not less than 2,500 lb./in^2 minimum compressive strength, not less than 5 inches thick, and designed to support an earth load of not less than 400 pounds per square foot (lb./ft^2). Each such cover shall be provided with a 9 inch minimum inspection hole with plug or cover and shall be coated on the underside with an approved bituminous or other non-permeable protective compound.

b. The top of the arch or cover shall be not less than 18 inches but not exceed 4 feet below the surface of the ground.

8. **Inlet Fitting**

An approved vented inlet fitting shall be provided in the seepage pit so arranged as to prevent the inflow from damaging the sidewall.

Exception: Where using a one- or two-piece concrete slab cover inlet, fitting shall be permitted to be a one-fourth bend fitting discharging through an opening in the top of the slab cover. On multiple seepage pit installations, the outlet fittings shall comply with paragraph 2 above.

1.7 Construction Inspection and Testing

At a minimum, inspection of conventional OWTS installation should include the items listed below.

1. Pre-construction inspection where the construction staking or marking of the various system components is provided and construction procedures discussed;

2. Open trench inspection of dispersal trench dimensions and conditions;

3. Drain rock and perforated pipe materials and placement;

4. Location and proper installation of diversion valve(s);

5. Location, size, materials, and water-tightness testing of septic tank per Section 1.4.16 of this Manual; and

Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, and final trench backfill/cover and erosion control has been completed.

Any field changes to the approved OWTS design shall be documented in a set of “as-built” drawings supplied to EHD by the system designer, which shall be required before final written notice of installation approval is issued by EHD.

Additional requirements pertaining to inspection and testing of Alternative OWTS installations are detailed in Part 3 of this Manual.

1.8 Cumulative Impact Assessment Guidelines

1. **General Provisions.** County OWTS Ordinance Article 3 authorizes EHD 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.

   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 EHD 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.

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

   a. 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.

   b. 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, EHD may identify and require analysis of cumulative impact issues other than those listed above which could pose potential water quality, public health, or safety risks.

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

   a. Registered Civil Engineer
   b. Registered Environmental Health Specialist
   c. 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 acceptable to the EHD.

4. **Cases Requiring Cumulative Impact Assessment.** All new development proposed within the Lahontan Regional Water Quality Control Board basin shall require a cumulative impact assessment. Other cases where cumulative impact assessments shall be required are listed in **Table A.** Additionally, EHD reserves the right to require the completion of a cumulative impact assessment in any case where special circumstances related to the size, type, or location of the OWTS warrant such analysis.

Table A.
Projects Requiring Cumulative Impact Assessment*

Type of Project	Lot Size (acres)	Design Wastewater Flow (gpd)	Groundwater Mounding Analysis	Nitrate Loading Analysis
Residence, including 2nd dwelling unit(s)	-	< 750	No	No
Residence, including 2nd dwelling unit(s)	< 1	750 +	No	Yes
Multiunit and Non-residential	< 1	750 +	No	Yes
	< 2	**1,500+**	**Yes**	**Yes**
	< 3	**2,000+**	**Yes**	**Yes**
		1,500+	Yes	Per lot size criteria
	-	2,500+	Yes	Yes
Subdivisions	2.5+	-	No	No
	<2.5	-	No	Yes

*Note: EHD 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.

5. **Methods**

   a. **Groundwater Mounding Analysis**

      i. 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.

ii. 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.

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

iv. 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.

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

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

6. **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:

i. climatic data (e.g., precipitation, evapotranspiration rates);
ii. groundwater occurrence, depth and flow direction(s);
iii. background groundwater quality data, if available;
iv. soil conditions and runoff factors;
v. wastewater characteristics (i.e., flow and nitrogen content); and,
vi. 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:

   i. For individual residential systems: 50 gpd/bedroom;
   ii. 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:

   i. Residential wastewater: 70 mg/l
   ii. Non-residential wastewater: as determined from sampling of comparable system(s) or from literature values.

EHD may require the use of more conservative values than cited above if the values are judged (by EHD) 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.

7. **Evaluation Criteria**

a. **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:

   i. 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 Part 2.2 of this Manual, as applicable, for the type of OWTS and site conditions. For example, where a 5-foot vertical separation to the native groundwater level is required, a short-term “mounding” rise of the water table to within 2.5 feet of trench bottom would be acceptable

during peak wet weather conditions. At no time shall groundwater rise to within 2 feet of trench bottom.

ii. Requirement for Large Systems. Notwithstanding (a) above, for all OWTS with design flows of 2,500 gpd or more (i.e., "large systems"), the groundwater mounding analysis shall demonstrate that the minimum required groundwater separation, per Part 2.2 of this Manual, will be maintained beneath the system during peak wet weather conditions.

EHD may require, in any individual case or in specific geographical areas, a minimum of 2 feet of groundwater clearance ("mounded" conditions) where deemed necessary for protection of public health, or based upon specific requirements or recommendations of the Regional Water Board.

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

i. For Areas Served By Individual Water Wells.

(a) 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);

(b) 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.

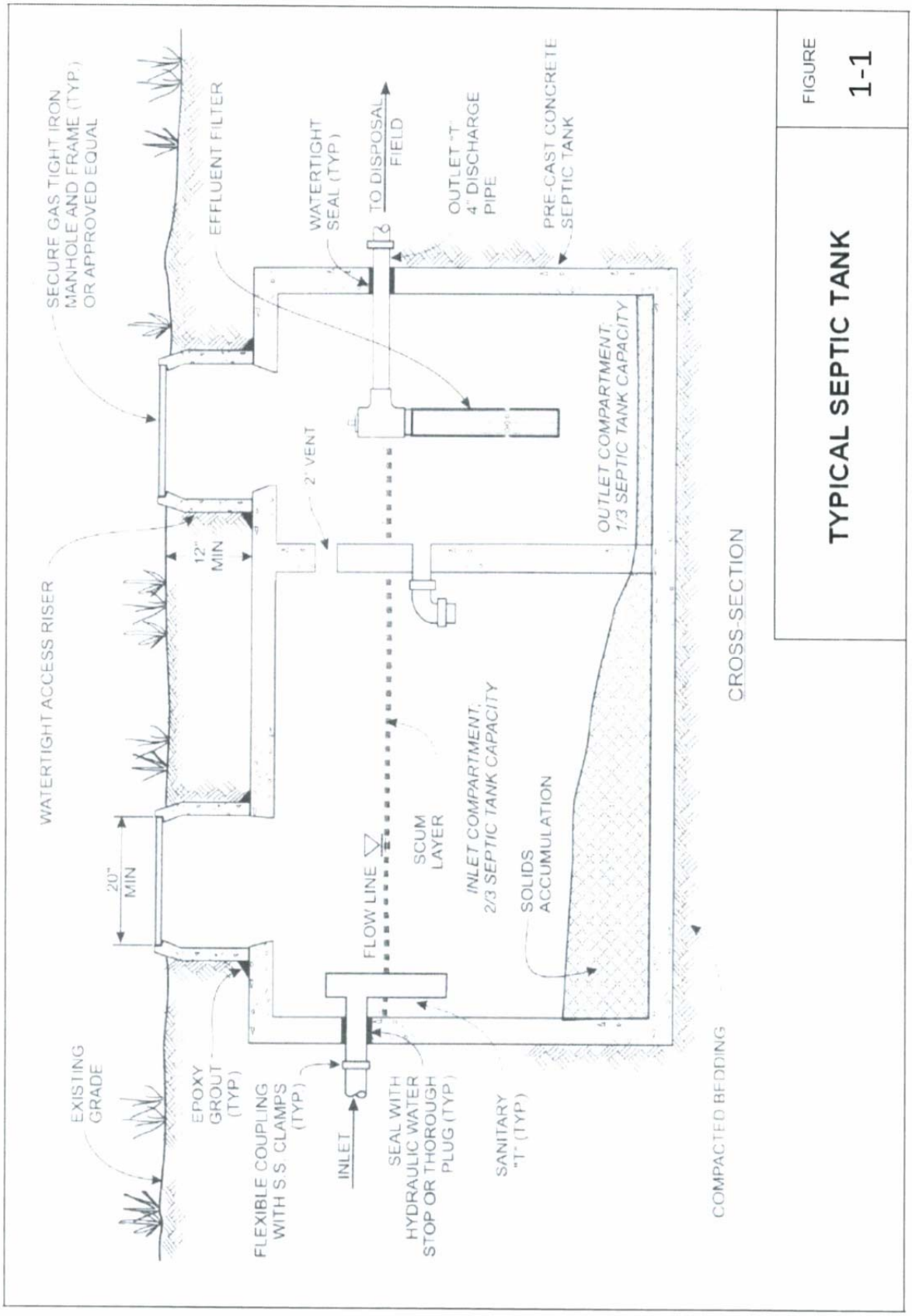
c. For Areas Not Served by Individual Water Wells.

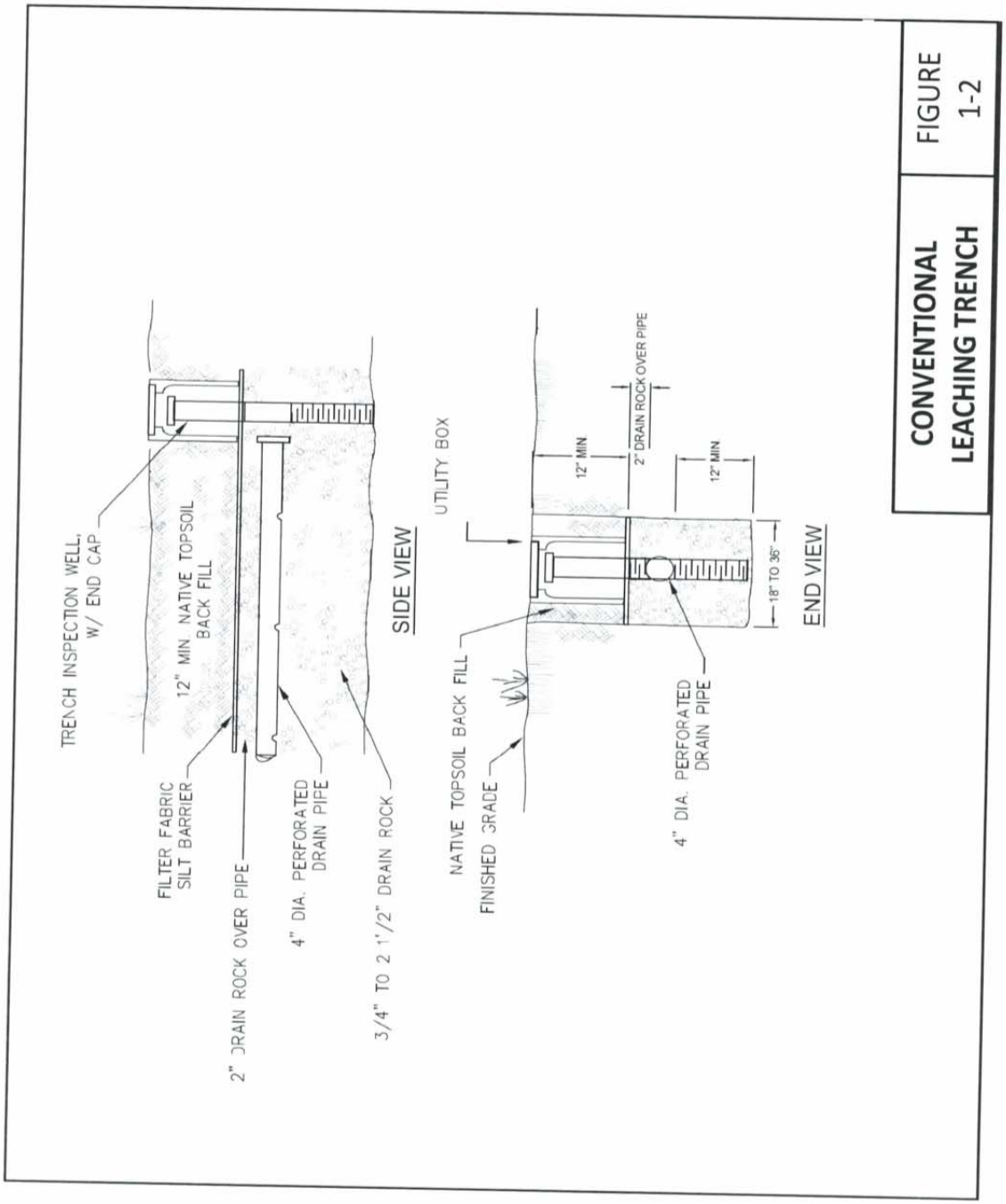
i. Existing Lots of Record: OWTS installed on existing lots of record shall not cause the groundwater nitrate-nitrogen concentration to exceed 10 mg-N/L at the nearest existing or potential point of groundwater withdrawal (e.g., water well location); <u>and</u>

ii. 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.

EHD may require, in any individual case or specific geographical areas, more stringent nitrate-nitrogen compliance criteria when deemed

necessary for protection of public health, or based on specific requirements or recommendations of the RWQCB.


SECURE GAS TIGHT IRON MANHOLE AND FRAME (TYP.) OR APPROVED EQUAL
EFFLUENT FILTER
WATERTIGHT SEAL (TYP)
TO DISPOSAL FIELD
OUTLET "T" 4" DISCHARGE PIPE
PRE-CAST CONCRETE SEPTIC TANK
WATERTIGHT ACCESS RISER
12" MIN
2" VENT
OUTLET COMPARTMENT, 1/3 SEPTIC TANK CAPACITY
INLET COMPARTMENT, 2/3 SEPTIC TANK CAPACITY
SCUM LAYER
FLOW LINE
SOLIDS ACCUMULATION
20" MIN
EXISTING GRADE
EPOXY GROUT (TYP)
FLEXIBLE COUPLING WITH S.S CLAMPS (TYP)
INLET
SEAL WITH HYDRAULIC WATER STOP OR THOROUGH PLUG (TYP)
SANITARY "T" (TYP)
COMPACTED BEDDING
CROSS-SECTION
TYPICAL SEPTIC TANK
FIGURE
1-1


TRENCH INSPECTION WELL, W/ END CAP
12" MIN NATIVE TOPSOIL BACK FILL
FILTER FABRIC SILT BARRIER
2" DRAIN ROCK OVER PIPE
4" DIA. PERFORATED DRAIN PIPE
3/4" TO 2 1/2" DRAIN ROCK
SIDE VIEW
UTILITY BOX
NATIVE TOPSOIL BACK FILL
FINISHED GRADE
12" MIN
2" DRAIN ROCK OVER PIPE
12" MIN.
18" TO 36"
4" DIA. PERFORATED DRAIN PIPE
END VIEW
CONVENTIONAL LEACHING TRENCH
FIGURE 1-2

KERN COUNTY ONSITE SYSTEMS MANUAL

PART 2

DESIGN GUIDELINES, POLICIES, AND PROCEDURES

Leach Line Requirements

Site plans for leach lines do not have to be done by an engineer unless they are required to be fully engineered. All commercial systems must be fully engineered. In general, residential systems do not require full engineering unless otherwise required by EHD. Factors such as rock outcroppings, high ground water concerns, high slopes, area history, etc., may require a residential project to be fully engineered as determined by EH.

Engineered leach line plans shall be prepared by a **Qualified Professional (QP)** or by an individual under the supervision of a QP. The following are considered QP: A California Professional Geologist, a California Certified Engineering Geologist, a California Registered Professional Engineer, California Registered Professional Soil/ Geotechnical Engineer, or a California Registered Environmental Health Specialist (REHS).

The following are requirements for a leach line application: *(Please address these points on the site plan and report.)*

1. A percolation test is required for all leach line applications; (Please refer to the information sheet titled "Percolation Test Requirements" for specifics.)

2. A site plan shall be included labeling the location of the following:

    a. Location of and size of septic tank;

    b. Location and type of leach lines (standard, special, or infiltrator);

    c. 100% expansion area;

    d. Location of distribution box;

    e. Location of residence(s) and number of bedrooms;

    f. Commercial systems will require a floor plan showing the location of all fixture; units along with a drainage fixture unit list;

    g. Location of water well(s), if any, within 100 feet of septic system;

    h. Location of any geological features (i.e. large streams, trees, rock outcroppings, rivers, etc.);

i. All setbacks;

j. Location of percolation testing;

k. Cutout diagram of leach line;

l. Proof that 15 feet to daylight principle can be met in sloping areas.

3. Three copies of site plan. If site plans are engineered, they shall be signed and wet stamped by the engineer;

4. Indicate soil type on report;

5. Location of septic system shall be staked out prior to initial site inspection;

6. Leach systems installed under concrete or asphalt require 25% additional leaching area;

7. Minimum 150 square feet of trench bottom shall be provided for each leach system (min. 50 ft. of line);

8. Maximum leach line length is 100 feet per line;

9. Show calculations used to size leach system.

    a. Ryon method may be used for systems that are fully engineered.

NOTES:

- Leach systems are not allowed in Type 1 soil.
- Mound system or systems requiring import of soil will have to be engineered and a percolation test conducted on imported material.
- Engineered plans require verification of no adverse geologic conditions (i.e. bedrock, groundwater) 7 feet below the bottom of the proposed trench.
- Advanced systems which require pumps, dosing chambers, timers, mechanical parts, etc. shall be engineered.
- Plans are valid one year from the date of approval.

Engineered Seepage Pit Feasibility Report Requirements

A feasibility report shall be prepared by a **Qualified Professional (QP)** or by an individual under the supervision of a QP. The following are considered QP: A California Professional Geologist, a California Certified Engineering Geologist, a California Registered Professional Engineer, California Registered Professional Soil/ Geotechnical Engineer or a California Registered Environmental Health Specialist.

The following are requirements for an engineered seepage pit: *(Please address these points in the feasibility report.)*

1. A log of the soils encountered in 5 ft. increments;

2. Description of the soil and soil type listed using California Plumbing Code (CPC)(type 1-4);

3. Soil boring shall be performed within 35 feet of the proposed seepage pit(s);

4. The location for soil boring shall be selected so as to provide a good representation of the entire leach system;

5. Verification of no adverse geologic conditions (i.e. bedrock, ground water) 12 feet below the bottom of the proposed pit;

6. A site plan shall be included labeling the location of the following:

    a. Location of and size of septic tank Location of seepage pits;

    b. 100% expansion area Location of distribution box;

    c. Location of residence(s) and number of bedrooms;

    d. Commercial systems will require a floor plan showing the location of all fixture units along with a drainage fixture unit list;

    e. Location of water well(s), if any, within 150 feet of septic system;

    f. Location of any geological features (i.e. large streams, trees, rock outcroppings, rivers, etc.);

    g. All setbacks;

    h. Location of soil borings.

7. Diagram of the proposed seepage pit including pit diameter, depth of inlet, and total depth;

8. Location of septic system shall be staked out prior to initial site inspection;

9. Diagram of the proposed septic tank;

10. Absorption capacity shall be calculated based on the quantity of liquid waste discharging and the character and porosity of the surrounding soil using CPC design criteria:

    a. Soil type **SHALL NOT** be averaged;

    b. Total capacity shall be shown in gallons;

    c. Show calculations.

11. Each report and site plan shall be wet stamped and signed with an original signature by the QP who either performed or supervised the testing.

NOTES:

- Seepage pits are not allowed in Type 1 or Type 5 soil. If either soil type is encountered, it shall not be counted in total absorption capacity. Excessive layers of Type 1 or 5 soil will necessitate installation of leach lines

- Properties with adequate space to install leach lines will not be allowed to install seepage pits.

- Commercial projects shall size their septic tank based on drainage fixture units or the estimated flow rate, whichever is greater. Provide list of fixtures and their drainage fixture units or show how the estimated flow rate was determined. Show location of fixtures on site plan.

- Plans are valid one year from the date of approval.

APPLICATION FOR SEPTIC SYSTEM PERMIT

Type of Septic System: ☐ Construct New ☐ Repair ☐ Engineered ☐	Permit #

MARK ONE OF THE BOXES BELOW FOR THE PARTY RESPONSIBLE FOR PAYMENT OF FEES

SITE INFORMATION			OWNER'S INFORMATION		
Site Address:			☐ **Name:**		
City:	State:	Zip:	Address:		
Source of Water ☐ **WELL** ☐ **PUBLIC**			City:	State:	Zip:
APN:			Phone:		
Lot Size:			e-mail:		
ENGINEER / CONTRACTOR or CONTACT PERSON					
☐ **Engineer:**			☐ **Contractor:**		
Address:			Address:		
City:	State:	Zip:	City:	State:	Zip
Contact :	Phone:		Contact:	Phone:	
e-mail:			e-mail:		
Propose septic location has been staked/marked ☐ **YES** ☐ **NO**					

Description of work to be done_____-
__
_____-
_____

- **SEPTIC SYSTEM LOCATION MUST BE MARKED/STAKED OR RE-INSPECTION FEES WILL APPLY**
- PROVIDE THREE (3) SETS OF SEPTIC PLANS (Plans will be no larger than 11 X 17)
- REVIEW FEE OF $100 PER HOUR FOR ENGINEERED PLANS
- SITE INSPECTION FEE; $100 PER HOUR (When possible inspections are combined to minimize costs)

OFFICE USE ONLY

Site Inspection Approved By:_____
Printed Name Signature Date

Plans Approved By:_____
Printed Name Signature Date

Plans Rejected By:_____
Printed Name Signature Date

Billed:_____ **Site in Mountain/Groundwater Area** ☐ **YES** ☐ **NO**
Date

PERCOLATION TEST DATA LOG

COMPLETE THE FOLLOWING SHEET AND SUBMIT WITH PERCOLATION REPORT

SITE ADDRESS: _____

APN: _____ TEST PERFORMED BY: _____

TEST DATE: _____ TEST HOLES WERE PRESATURATED FOR _____ HOURS

HOLE #	1				2				3			
DEPTH												
	TIME (MIN)		WATER LEVEL DROP (IN)	PERC RATE (MIN/IN)	TIME (MIN)		WATER LEVEL DROP (IN)	PERC RATE (MIN/IN)	TIME (MIN)		WATER LEVEL DROP (IN)	PERC RATE (MIN/IN)
	INITIAL	FINAL			INITIAL	FINAL			INITIAL	FINAL		

MINIMUM OF 2 TEST HOLES REQUIRED; MINIMUM OF 3 TEST PER HOLE REQUIRED; AVERAGE PERC RATE MAY BE USED
IF 5 OR MORE TEST PER HOLE ARE PERFORMED, OTHERWISE SLOWEST PERC RATE SHALL BE USED.

NUMBER OF TEST PER HOLE: ____
FINAL RATE TO BE USED IN DESIGN: _____ MINUTES PER INCH. SOIL ☐☐☐☐☐ TYPE

SIGNATURE OF QUALIFIED PROFESSIONAL: _____

TYPICAL SEWAGE DISPOSAL DESIGN CALCULATIONS

Minimum Horizontal Distance In Clear Required From:	Building Sewer	Septic Tank	Disposal Field	Seepage Pit
Buildings or structures	2 Feet	5 Feet	8 Feet	8 Feet
Property line adjoining private property	Clear	5 Feet	5 Feet	8 Feet
Water Supply Wells	50 Feet	100 Feet	100 Feet	150 Feet
Streams	50 Feet	*50 Feet	*100 Feet	100 Feet
Non-classified Streams	*25 Feet	*25 Feet	*25 Feet	* 25 Feet
Large Trees	-----	10 Feet	-----	10 Feet
Seepage Pits or Cesspools	-----	5 Feet	5 Feet	12 Feet
Disposal Field	-----	5 Feet	4 Feet	5 Feet
Domestic Water Line	1 Foot	5 Feet	5 Feet	5 Feet
Distribution Box	-----	-----	5 Feet	5 Feet
Pressure Public Water Main	25 Feet	25 Feet	25 Feet	25 Feet

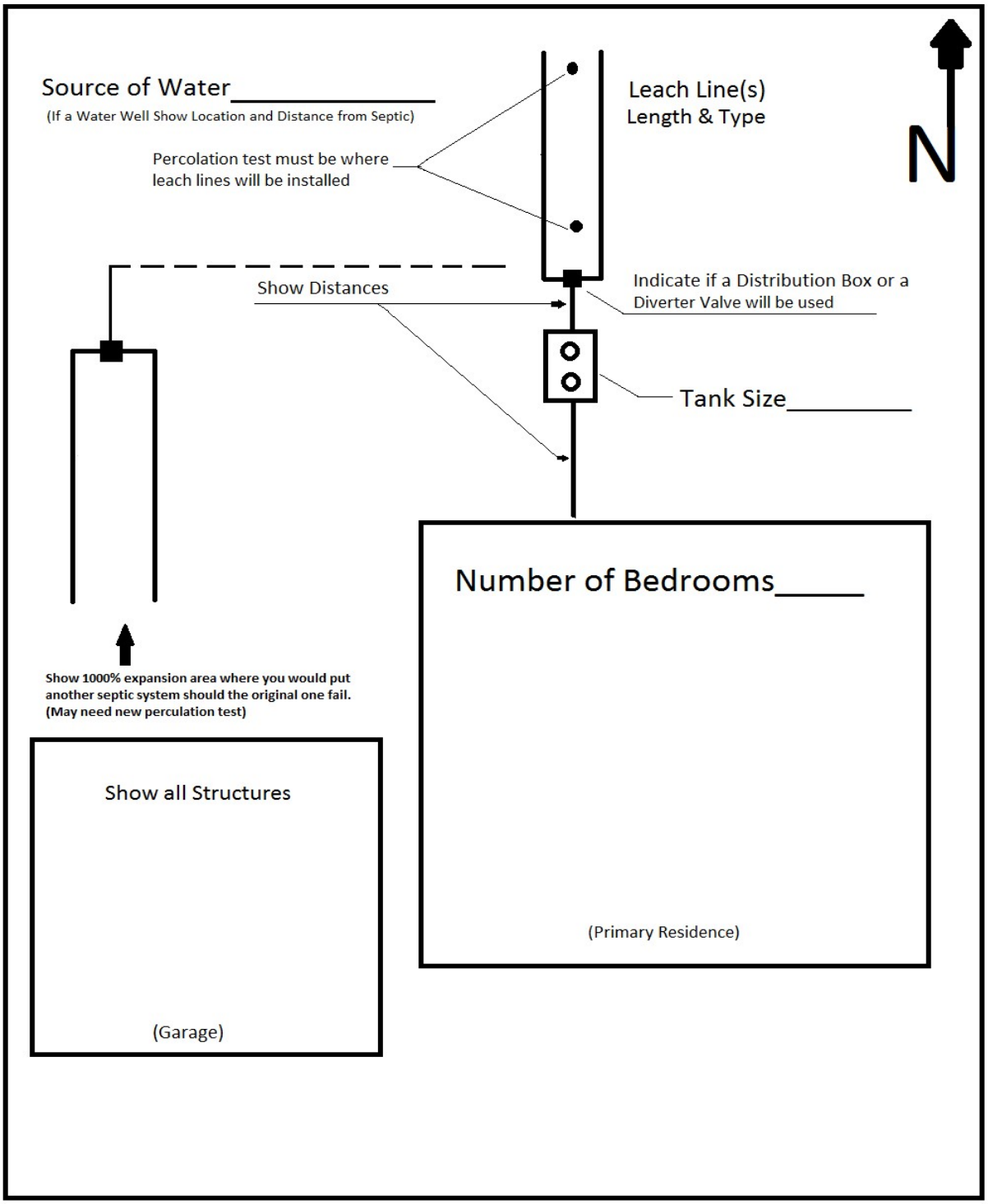
*** Per County Ordinance and Kern County Environmental Health Services Division**.

TABLE 11 - 4
AREA OF DISPOSAL FIELD
Required absorption area on square feet per one hundred (100) gallons of septic tank liquid capacity for five (5) types of soil.

Type of Soil	Square feet per 100 gallons
1. Coarse sand or gravel	20
2. Fine sand	25
3. Sandy loam or sandy clay	40
4. Clay with considerable sand or gravel	90
5. Clay with small amount of sand or gravel	120

*** Minimum Absorption Area is 150 Square Feet.**
Maximum Leach Line Length is 100 Feet.

EXAMPLE SEPTIC SITE PLAN



APN_____ Site Address_____

Show Street Location and Cross Streets

EHS-9/17/14

TYPICAL SEPTIC TANK SIZE DETAIL	KERN COUNTY ENVIRONMENTAL HEALTH SERVICES 2700 "M" STREET, SUITE 300 BAKERSFIELD, CA 93301 PHONE: (661) 862-8700

SINGLE-FAMILY DWELLING NUMBER OF BEDROOMS		MINIMUM SEPTIC TANK CAPACITY IN GALLONS
1 OR 2	SIZE OF TANK REQUIRED	750
3	SIZE OF TANK REQUIRED	1000
4	SIZE OF TANK REQUIRED	1200
5 OR 6	SIZE OF TANK REQUIRED	1500

EXAMPLE

GIVEN: 4-BEDROOM HOUSE OR MOBILE HOME - SILTY SOIL - U.P.C. TYPE 3

REQUIRED: 1200-GALLON SEPTIC TANK, SIZED FOR LEACHING AREA FOR SOIL TYPE 3, WHICH REQUIRES 40 SQ. FT. LEACHING PER 100 GALLONS OF TANK SIZE.

$\frac{1200}{100} \times 40 = 480$ SQ. FT. LEACHING AREA.

STANDARD LEACH TRENCH 480/3 SQ. FT. /FT. = 160 FT. USE TWO 80-FOOT-LONG LEACH LINES.

SPECIAL LEACH TRENCH $\frac{480}{7} = 68.6$ FT.

USE ONE 69-FOOT-LONG LEACH LINE.

Maximum length of any leach line is 100 feet. If over 100 feet is needed, then a distribution box is required with multiple lines 100 feet or less in length.

NOTE: The above drawing is intended as a guide for those desiring to prepare plans. Because of varying conditions from one project to another, details as shown may not meet the requirements of the Uniform Plumbing Code. A representative of the Kern County Department of Environmental Health Services will be happy to answer questions upon request.

L19

TRENCH BOTTOM AREA OF DISPOSAL FIELDS

(Per Appendix I, Sections 13 and 16(i), Uniform Plumbing Code)

LEACH LINES

BOTTOM WIDTH OF TRENCHES

Length of Leach Lines in Feet	18 Inches Sq. Ft.	24 Inches Sq. Ft.	30 Inches Sq. Ft.	36 Inches Sq. Ft.
1	1.5	2	2.5	3
2	3	4	5	6
3	5	6	8	9
4	6	8	10	12
5	8	10	13	15
10	15	20	25	30
20	30	40	50	60
30	45	60	75	90
40	60	80	100	120
50	75	100	125	150
60	90	120	150	180
70	105	140	175	210
80	120	160	200	240
90	135	180	225	270
100	150	200	250	300

L29 (04/28/99)

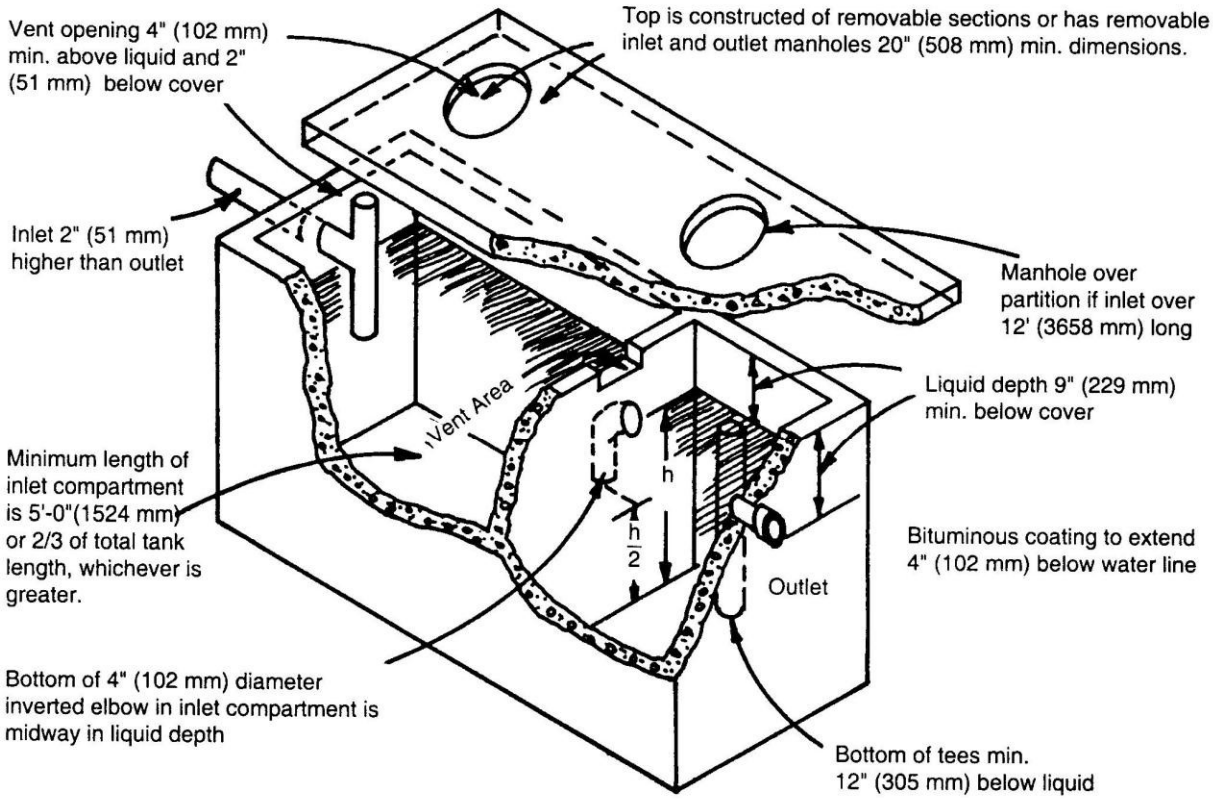
Effective sidewall absorption areas of seepage pits (per Appendix I, Sections 13 + 17, Uniform

Plumbing Code). The effective absorption area should be exclusive of bedrock or impervious soils. Minimum of 12 feet to groundwater - diameters greater than 6 feet requires prior approval of the Administrative Authority.

Seepage Pit Sidewall Area			
Depth Feet Below Inlet	**3' Diameter**	**4' Diameter**	**5' Diameter**
	SQ. FT.	SQ. FT.	SQ. FT.
1	9	13	16
2	19	25	31
3	28	38	47
4	38	50	63
5	47	63	79
6	56	75	94
7	66	88	110
8	75	101	126
9	85	113	141
10	94	126	157
11	104	138	173
12	113	151	189
13	122	163	204
14	132	176	220
15	141	189	236
16	150	201	251
17	160	214	267
18	169	226	283
19	179	239	299
20	188	251	314
21	198	264	330
22	207	277	346
23	217	289	361
24	226	302	377
25	236	314	393
26	245	327	408
27	254	339	424
28	264	352	440
29	273	364	456
30	283	377	471
31	292	390	487
32	301	402	503
33	310	415	518
34	320	427	534
35	330	440	550
36	339	452	566
37	348	465	581
38	358	478	597
39	367	490	613
40	377	503	628
41	386	515	644
42	395	528	660
43	405	540	675
44	415	553	691
45	424	566	707
46	433	578	723
47	442	591	738
48	452	603	754
49	462	616	770
50	471	628	785

ENVIRONMENTAL HEALTH SERVICES DIVISION L31 (05/31/96)

Septic Tank Detail



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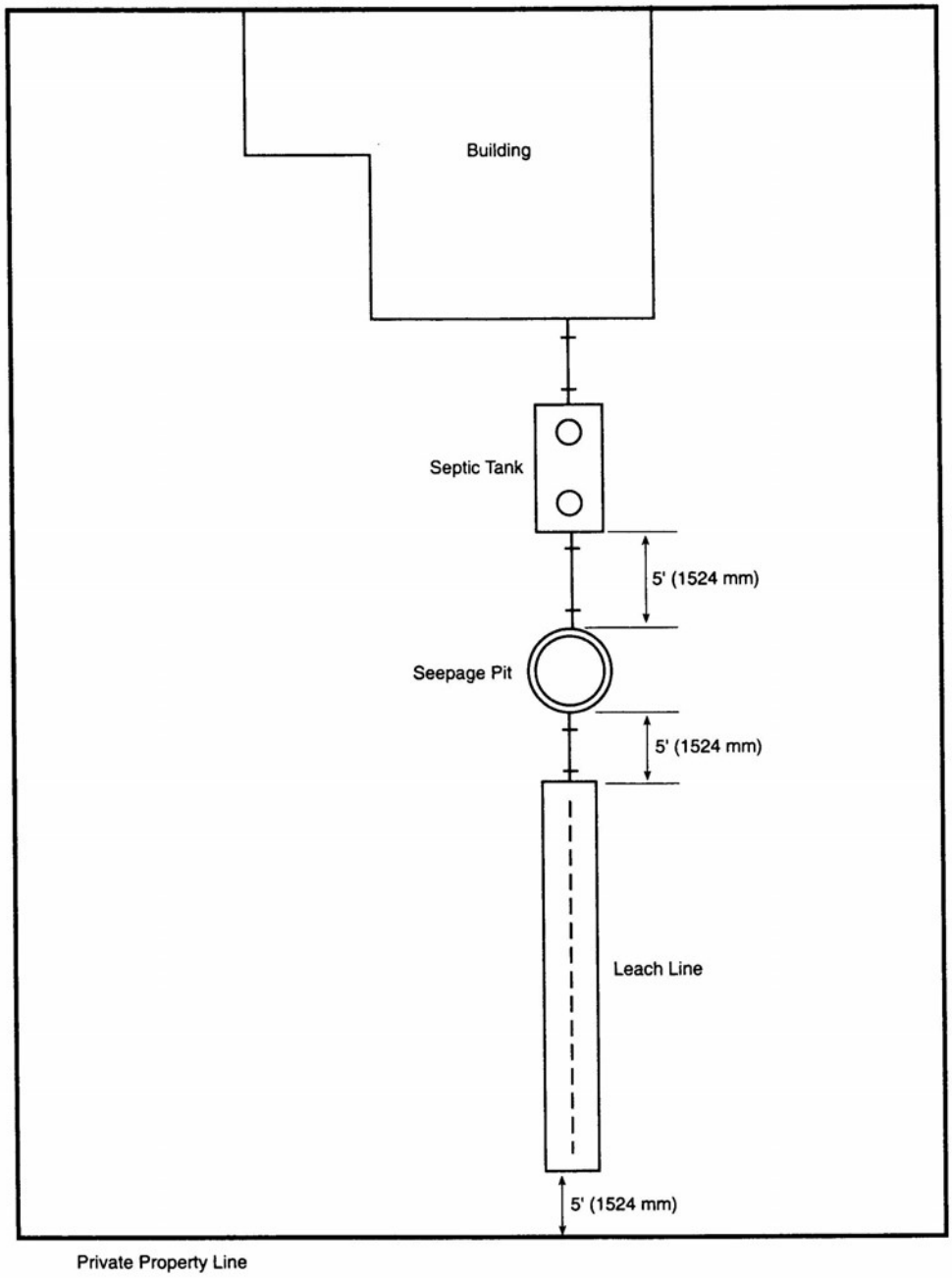
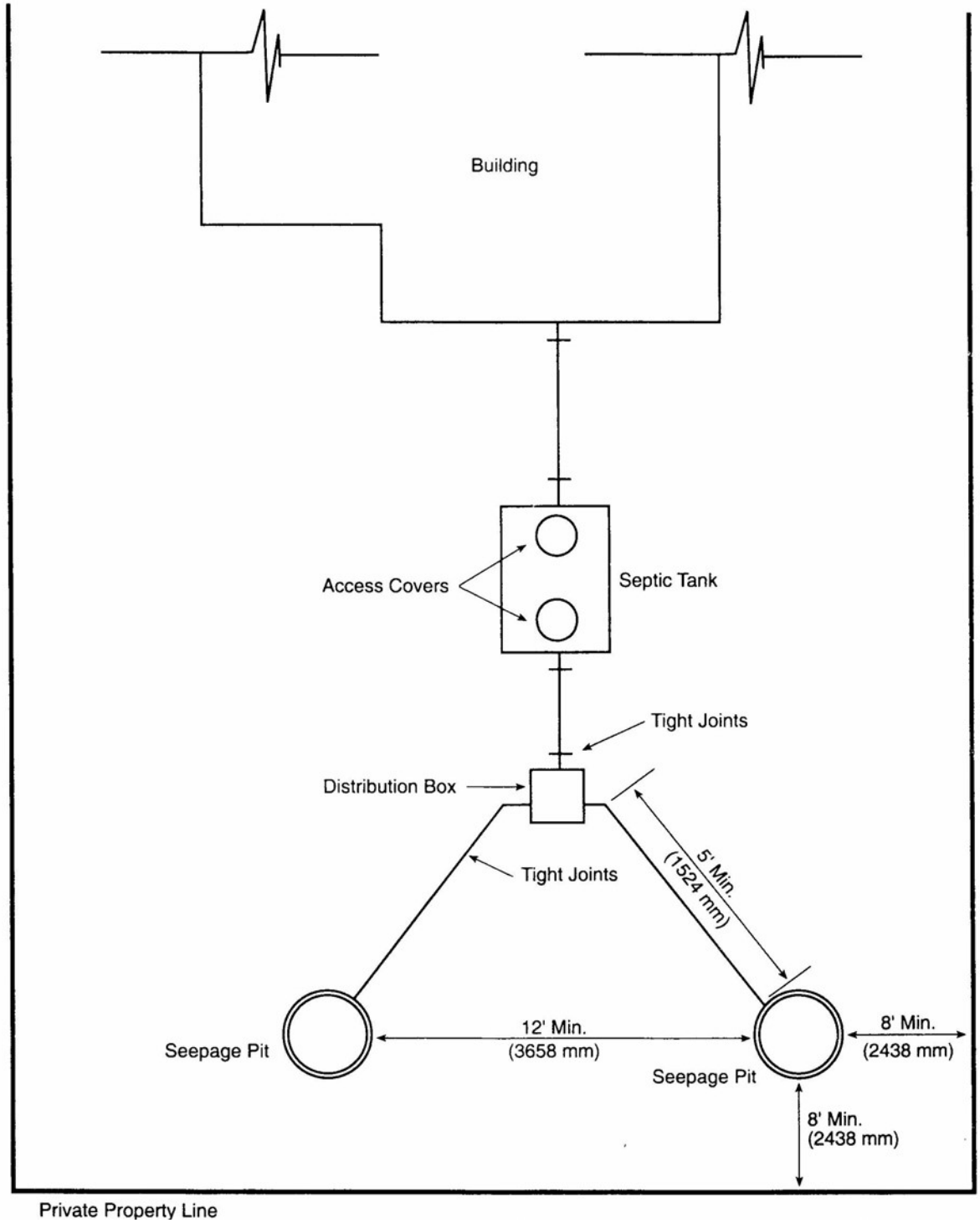
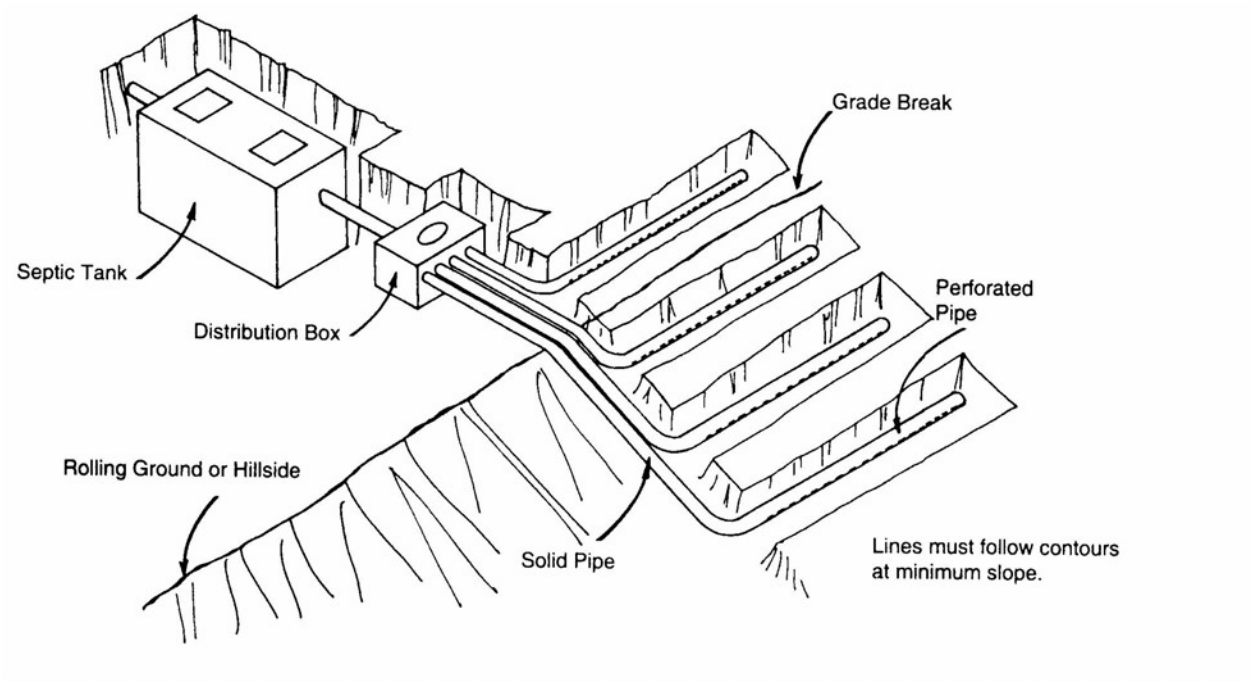


Figure K-4
Septic Tank System with a Combination Seepage Pit and Leach Line

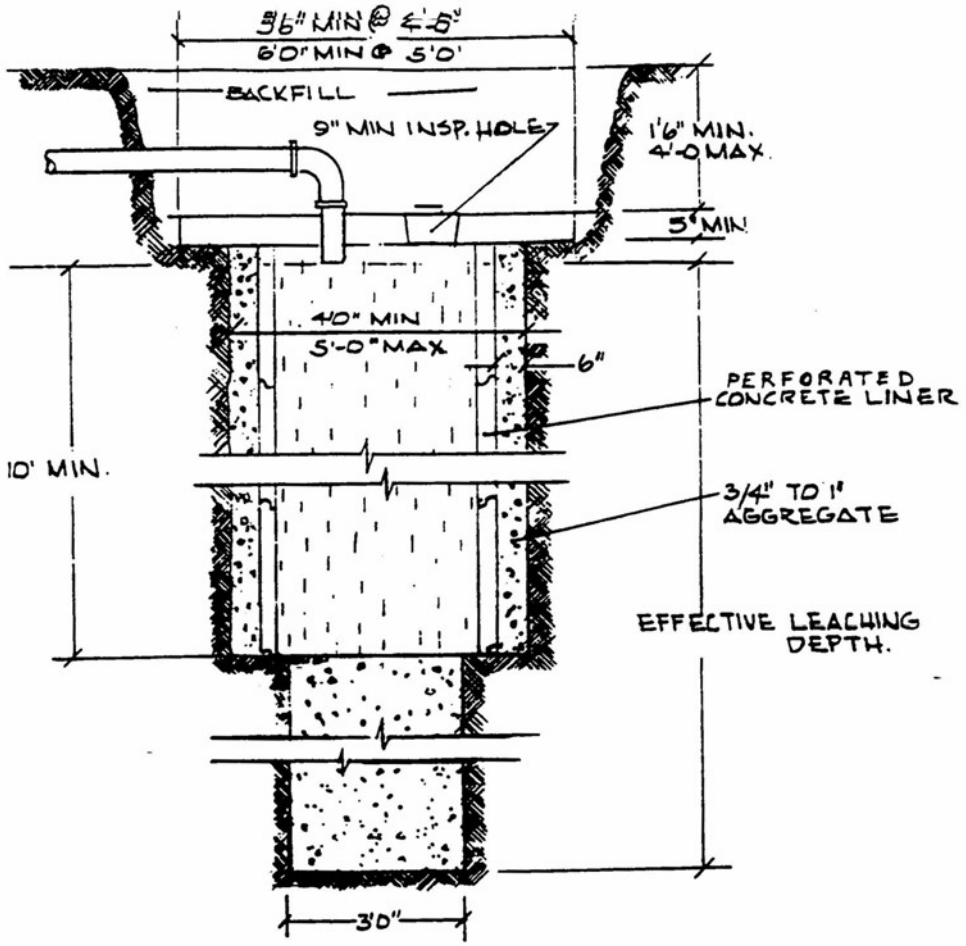
SEPTIC TANK WITH SEEPAGE PITS



SEPTIC SYSTEM LOCATED IN SLOPED TERRAIN



TYPICAL SEEPAGE PIT DESIGN



Seepage pits are prohibited where percolation rates exceed 25 minutes per inch (U.P.C. type 5 or worse soils).

Soil conditions must be demonstrated 12 feet below the proposed working depth of seepage pits.

NOTE: The above drawing is intended as a guide for those desiring to prepare plans. Because of varying conditions between projects, details as shown may not meet the requirements of the Uniform Plumbing Code.

KERN COUNTY ONSITE SYSTEMS MANUAL

PART 3

REQUIREMENTS FOR ALTERNATIVE OWTS

3.0 Introduction

GENERAL

"Alternative OWTS" is a type of OWTS that utilizes either a method of wastewater treatment other than a conventional septic tank for the purpose of producing a higher quality wastewater effluent and/or a method of wastewater dispersal other than a gravity-fed disposal trench or seepage pit for effluent dispersal.

As provided in the Kern County Code (Article 3), Alternative OWTS may be used for system repairs, existing lots of record, and for land divisions, in accordance with conditions and requirements in Part 5 of this Manual as approved by the Director.

This section of the Onsite Systems Manual provides technical guidance and requirements for the application, design, construction and management of various alternative onsite wastewater treatment and dispersal technologies suited to the conditions and constraints in Kern County.

ALTERNATIVE TREATMENT SYSTEMS

Requirements are provided for the following alternative treatment systems:

1. Intermittent Sand Filters
2. Proprietary Treatment Units

County Code allows for the future addition of other alternative treatment systems, as may be approved by the Director and the appropriate California Regional Water Quality Control Board(s). Upon approval, such other alternative treatment systems will be incorporated into this Manual, including a listing of applicable requirements, similar to the information provided for intermittent sand filters and proprietary treatment units.

Dispersal systems receiving effluent from an alternative treatment system shall be sited, designed and constructed in accordance with the respective design and construction requirements for the particular type of dispersal system (e.g., conventional trenches, pressure distribution, mound system, at-grade or drip dispersal), as specified in this Manual.

ALTERNATIVE DISPERSAL SYSTEMS

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

1. Pressure Distribution Trenches
2. Mound Systems
3. At-grade Systems
4. Raised Sand Filter Bed (aka Open-bottom Sand Filter)
5. Subsurface Drip Dispersal

County Code allows for the future addition of other alternative dispersal systems, as may be approved by the Director and the appropriate California Regional Water Quality Control Board(s). Upon approval, such other alternative dispersal systems will be incorporated into this Manual, including a listing of applicable requirements, similar to the information provided for pressure distribution trench systems and subsurface drip dispersal.

DEPTH TO GROUNDWATER REQUIREMENTS

A primary basis for using alternative OWTS is to compensate for reduced vertical separation distance to groundwater below the dispersal system. **Table 3-1** summarizes the depth to groundwater requirements that apply to conventional OWTS and various types of alternative OWTS. Seepage pits (not displayed in the table) normally require 12-ft vertical separation to groundwater, which can be reduced to 10-ft separation where supplemental treatment is used.

Table 3-1.
Depth to Groundwater Requirements for Conventional and Alternative OWTS
(feet, below trench bottom)

Type of OWTS	Percolation Rate (MPI)	Min. Depth to Groundwater (feet)		
		2	3	7
Conventional Septic Tank & Dispersal Trench	1-60			X
Conventional Trench w/Supplemental Treatment Pressure Distribution (PD) Trench At-grade (1-60 mpi only)	1-120		X	
Pressure Distribution w/Supplemental Treatment Mound At-grade w/Supplemental Treatment Raised Sand Filter Bed Drip Dispersal w/Supplemental Treatment	1-120	X		

OPERATION AND MAINTENANCE GUIDELINES

Operation and maintenance guidelines for each alternative OWTS installation shall be supplied to the system owner by the designer, with a copy also provided to EHD. Final approval of system installation shall be contingent upon confirmation by EHD that required operation and maintenance guidelines have been provided.

Minimum items expected to be contained in the operation and maintenance guidelines include the following:

1. General description of the OWTS, design capacity, and any special permit or operating conditions;

2. Brief description of the key components and their function;

3. For each component, describe recommended inspection and maintenance activities, including frequency; provide copies of manufacturer operation and maintenance instructions and “trouble-shooting” guides, as applicable;

4. General preventative measures for proper use and maintenance of the OWTS (e.g., “Dos and Don’ts”);

5. Copy of system plans or “as-built” drawings, as applicable.

6. Contact information for the following:
    a. Designer
    b. Installer
    c. Maintenance contractor
    d. Environmental Health Division

7. Other information, references or documents, as appropriate.

3.1 Requirements for Intermittent Sand Filters

DESCRIPTION

Intermittent sand filters (ISF) 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".

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

SITING CRITERIA

1. **Sand Filter Treatment Unit**. All siting criteria for septic tanks as specified Part 1 of this Manual shall also apply to intermittent 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, with certain exceptions as noted. Exceptions allowed for supplemental treatment may include reduction in vertical separation distance to groundwater from standard 7 feet to minimum of 3 feet or 2 feet (measured from bottom of dispersal trench), depending upon the type of dispersal system. Refer to the adopted requirements for the specific type of dispersal system for applicable requirements and supplemental treatment allowances.

DESIGN CRITERIA

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

2. **Pressure Dosing**. Septic tank effluent shall be applied to the sand filter treatment unit by pressure dosing (i.e., pump system). The pressure distribution system shall be designed in accordance with accepted engineering practices to achieve, at a minimum:

b. Uniform dosing of effluent over the surface application area of the sand filter distribution bed;

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

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

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

f. 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 "Requirements for 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 one full day of wastewater flow at design conditions.

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

   a. 1.2 gpd/ft.^{2} for individual residential OWTS

   b. 1.0 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 plain view; i.e., it may be square, rectangular or an irregular shape.

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 Media Specifications

Sieve Size	Percent Passing
3/8	100
#4	90-100
#10	62-100
#16	45-62
#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 EHD to verify conformance with the above specifications.

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**. 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 similar to that used for under-drain applications. Filter fabric shall be non-woven, shall not act as a wicking agent and shall be permeable.

11. **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.

12. **Under-drain**

a. **Material**. The under-drain 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 under-drain shall have a minimum depth of 9 inches.

c. **Grade**. The under-drain 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 under-drain 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 under-drain 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 under-drain 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 under-drain 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 airline can be connected. Alternate manifold designs (e.g., using drip tubing) that achieve the same objectives may be considered and approved by EHD.

14. **Inspection Standpipes**. A vertical inspection standpipe shall be installed in the gravel distribution bed of each sand filter compartment. The pipe 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 standpipes 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. Inspection pipes shall be sealed against surface infiltration with a bentonite or concrete annular seal through the soil backfill zone.

15. **Internal Pump System**. 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 under-drain;

b. pump operating depth shall be entirely within the depth of the under-drain; 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 under-drain.

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;

   f. Inspection schedule listing critical control points; and

   g. Operation and maintenance guidelines.

3. **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 EHD may be required.

   a. Pre-construction inspection where the construction staking or marking of the sand filter is provided and construction procedures discussed;

   b. Water tightness of septic tank and dosing (pump) tank;

   c. Sand filter dimensions, structure and liner;

d. Under-drain piping and filter rock;

e. Sand quality and placement;

f. Piping installation and hydraulic ("squirt") test of the distribution system;

g. Functioning and setting of all control devices; and

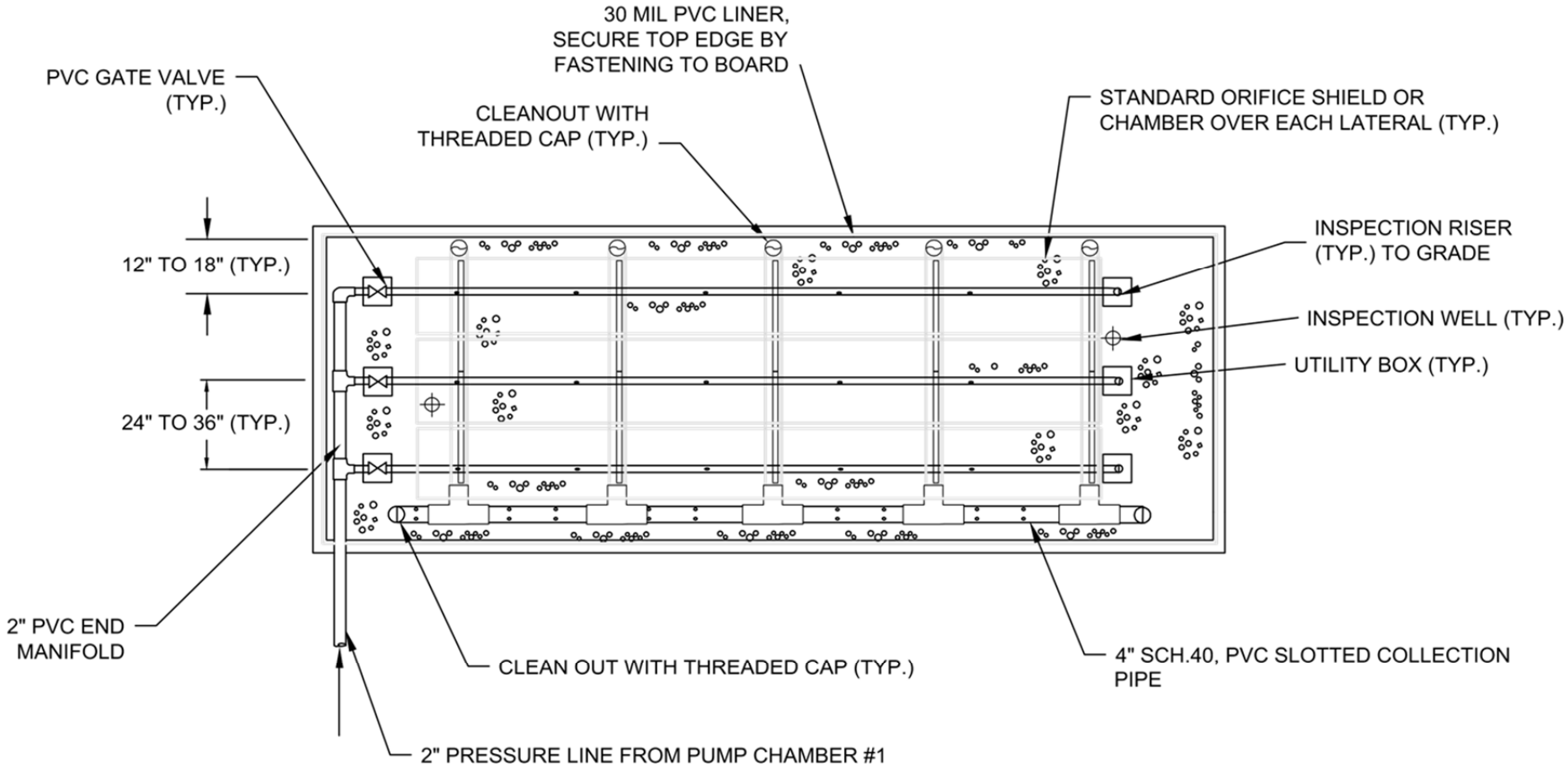
h. Final inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed, erosion control has been completed, and operation and maintenance guidelines provided for owner.

MANAGEMENT REQUIREMENTS

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

Table SF-2. Intermittent Sand Filter System Management Requirements

	Work	Minimum Frequency
Inspection	• Observe surface conditions on and around filter for effluent leakage, drainage/infiltration, erosion or other problems. • Check/measure water level in inspection standpipes in filter bed. • Perform all inspection work as recommended by designer or equipment manufacturer. • Perform inspection protocol for pump systems (per O&M Guidelines and Performance Evaluation Guidelines, Part 4 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 EHD per permit requirements. • Standard report to describe findings, analyze performance, and detail actions taken. • Report emergency or failure conditions to EHD immediately.	• According to permit conditions, typically every year, depending on system size, usage, history, location.



PLAN VIEW

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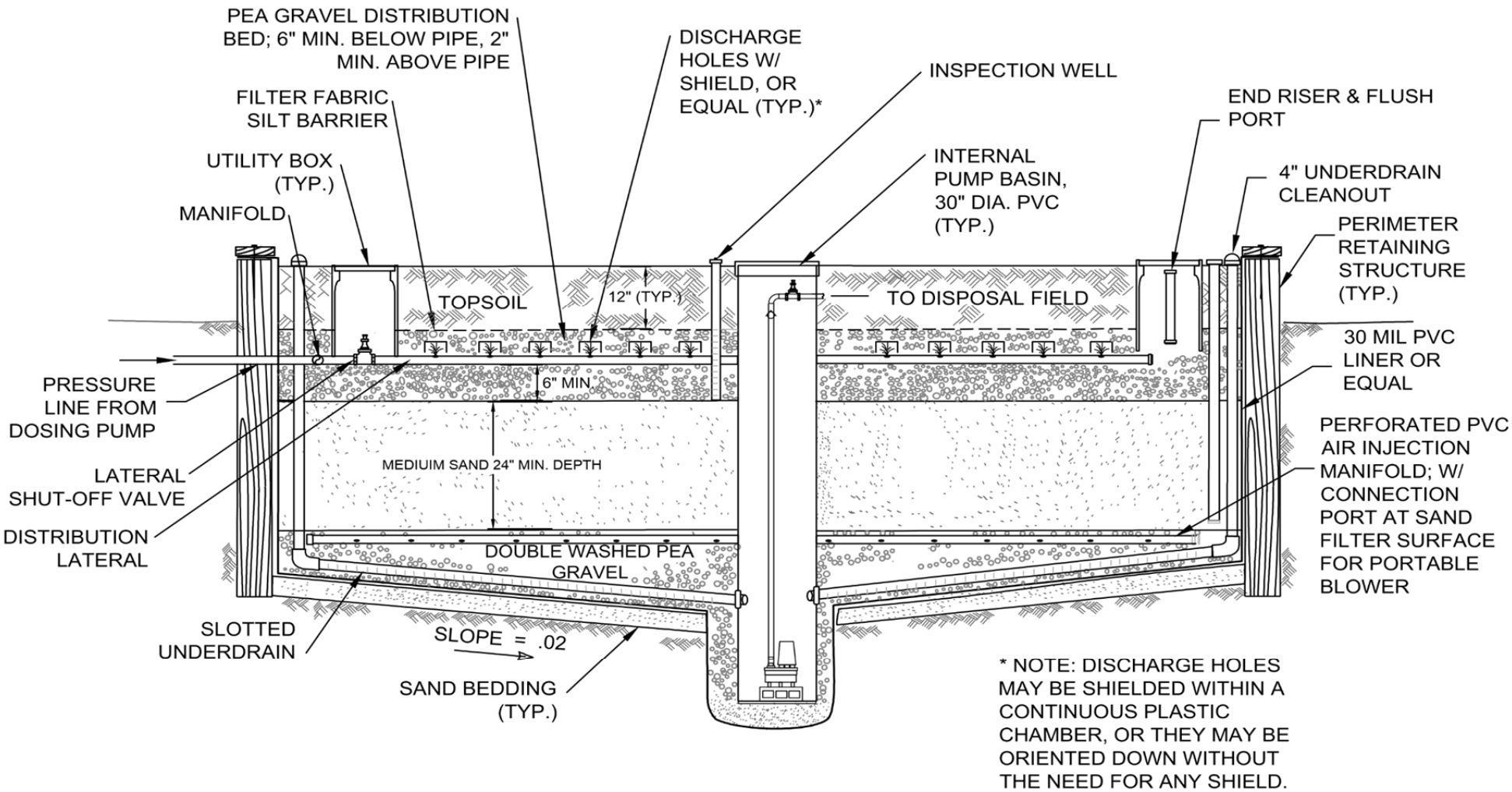
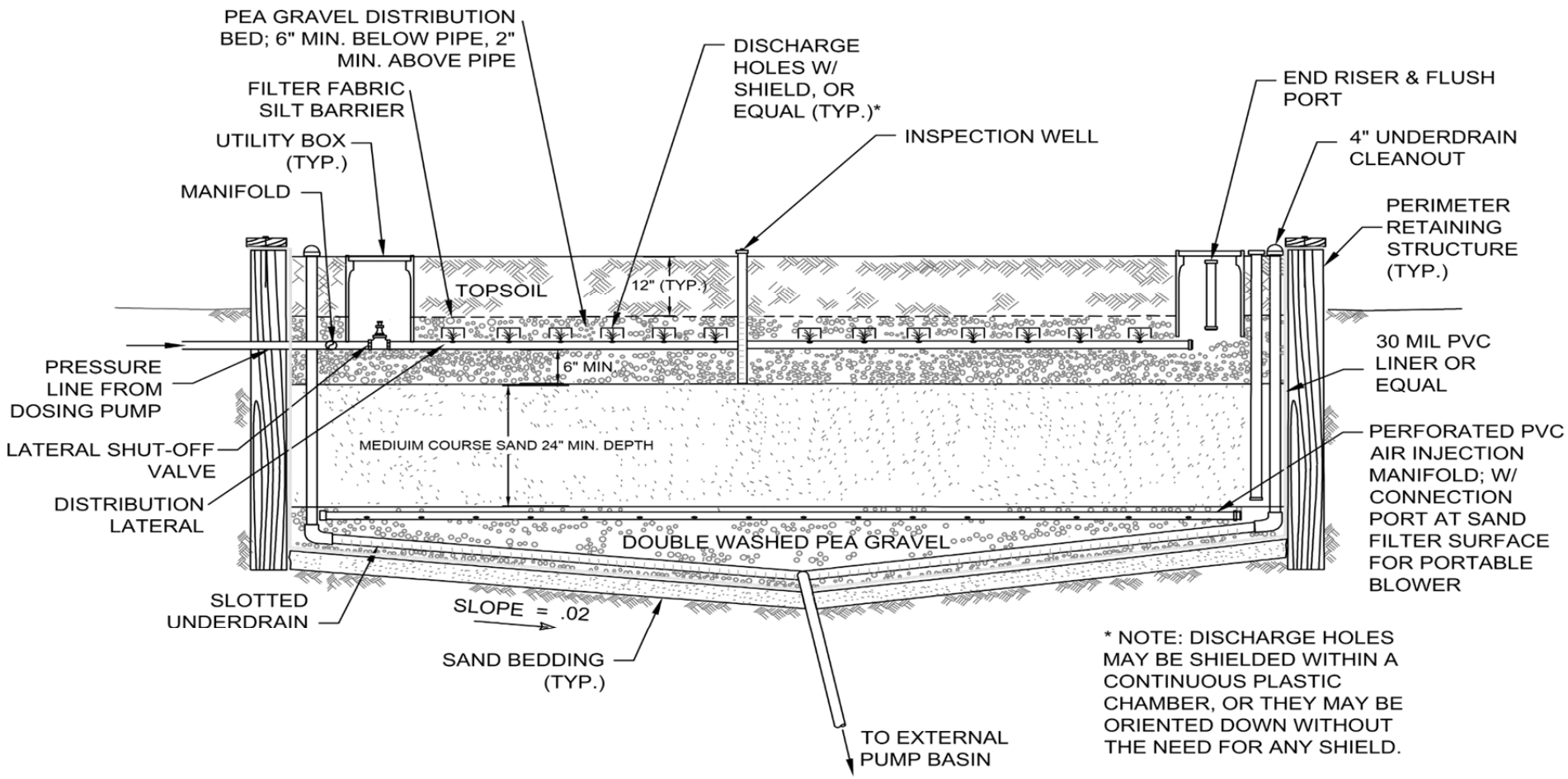
INTERMITTENT SAND FILTER
PLAN VIEW



INTERMITTENT SAND FILTER
WITH INTERNAL PUMP BASIN



INTERMITTENT SAND FILTER
WITH EXTERNAL PUMP BASIN

3.2 Requirements for Proprietary Treatment Units

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 Manual. Effluent from proprietary treatment units designed and operated in accordance with these guidelines will be considered to meet the criteria for "supplemental treatment".

SITING CRITERIA

1. **Treatment Unit**. All siting criteria for septic tanks, as specified in Part 1 of this Manual 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. Refer to the adopted guidelines for the specific type of dispersal system for applicable requirements and supplemental treatment allowances.

DESIGN AND CONSTRUCTION REQUIREMENTS

1. **NSF Standards 40 and 245.** 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 either (a) certification by a third-party listing agency of equivalent performance; or (b) third-party engineering review of the design proposal.

   Where the OWTS is required to provide nitrogen reduction, in addition to complying with **NSF Standard 40** above, the treatment unit shall also be compliant with **NSF Standard 245** – demonstrating a minimum 50% reduction of total nitrogen (effluent vs influent concentration).

2. **Design Wastewater Flow**. Sizing and design of proprietary treatment units shall be based on the projected wastewater flow for the structure or facility being served, determined in accordance with wastewater flow estimation guidelines in Part 1 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 one full day of wastewater flow at design conditions.

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 EHD 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 KCEHD 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.

        iii. Copies of operation and maintenance guidelines provided for system owner and service provider.

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	Minimum 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 EHD per permit requirements. • Standard report to describe findings, analyze performance, and detail actions taken. • Report crisis or failure conditions to EHD immediately.	• According to permit conditions, typically every year, depending on system size, usage, history, location.

3.3 Requirements for Pressure Distribution Trenches

DESCRIPTION

Pressure distribution (PD) trench systems are a variation of a conventional gravity drain field system that use a pump and small-diameter pressure piping to achieve broad, uniform distribution of wastewater throughout the dispersal field for improved soil absorption and better treatment of percolating effluent. Pressure distribution can be used in conjunction with standard or special dispersal trench designs, and with chamber systems; and can be used in conjunction with either septic tank effluent or with supplemental treatment. This section covers requirements for PD trench systems.

Pressure distribution trench systems are permitted and/or required for the following situations:

1. To allow reduction of vertical separation to groundwater or soil depth below trench bottom from 7 feet to 3 feet; where PD trenches are used in combination with supplemental treatment, the depth to groundwater may be reduced to 2 feet;
2. For large flow systems, e.g., with dispersal field lengths (primary) exceeding 500 lineal feet; and
3. Others as may be determined necessary due to site-specific soil, geology or other conditions.

SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for PD trench systems shall be those applicable to conventional dispersal fields, as specified in Part 1 of this Manual.
2. **Vertical Separation Requirements.**
    a. **Depth to Groundwater.** Minimum depth to seasonal high groundwater for PD trench systems receiving septic tank effluent, as measured from trench bottom, shall be three (3) feet; where used in combination with supplemental treatment, the minimum depth to groundwater shall be two (2) feet.
    b. **Soil Depth**. Minimum depth of soil, as measured from trench bottom to impermeable soil or rock, for PD trench systems shall be three (3) feet.
3. **Reserve Area/Dual System**. A reserve area having suitable site conditions and sufficient area for full, 100% replacement of the primary PD trench dispersal field shall be provided or a complete dual primary and secondary PD trench system shall be installed initially, including, including an approved flow diversion device (pressure-rated), intended to allow alternate use of the two fields.

DESIGN CRITERIA

1. **Treatment**. Pressure distribution may be used with either septic tank effluent or with supplemental treatment.

2. **Design Wastewater Flow.** PD trench systems shall be designed on the basis of the projected wastewater flow for the structure or facility being served, determined in accordance with wastewater flow estimation requirements in Part 1 of this Manual.

3. **Pressure Dosing**. Septic tank effluent shall be applied to the PD trench system by pressure dosing, utilizing a pump system or dosing siphon. 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 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.** PD trenches shall conform to the same design and construction requirements as standard or special trenches, per Part 1 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° 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 this Manual.
7. **Trench Sizing**. PD trench sizing shall conform to the same sizing requirements as standard or special trenches, as applicable, per Part 1 of this Manual.

ENGINEERING PLANS AND CONSTRUCTION

1. **Reference Guidelines**. In addition to the requirements set forth herein, design and construction of PD trench 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 PD trench 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 plans for any site over 20% slope;
    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; and
    h. Operation and maintenance guidelines.

3. **Construction Inspection.** At a minimum, inspection of the PD trench system installation should include the items listed below. This is in addition to inspection work required for a supplemental treatment system, if used. Joint inspection by the designer, contractor, and EHD may be required.
    a. Pre-construction inspection where the construction staking or marking of the various system components is provided and construction procedures discussed;
    b. Water tightness of septic tank and dosing (pump) tank;
    c. Layout and excavation of dispersal trenches and piping;
    d. Drain rock material and placement;
    e. Piping installation and hydraulic (“squirt”) test of the distribution system;
    f. Functioning and setting of all control devices; and

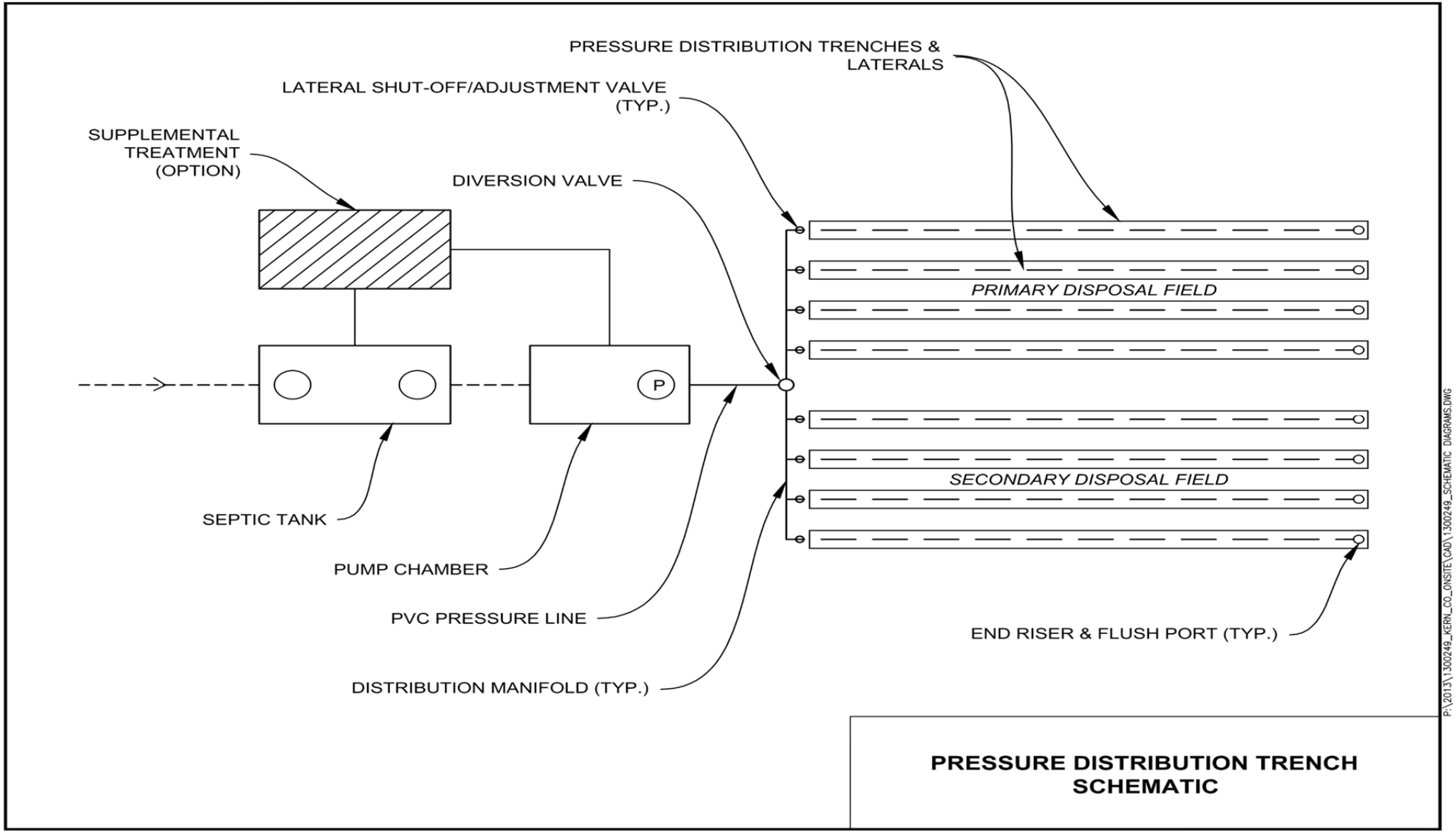
g. Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, the system is fully operational, erosion control has been completed and operation and maintenance guidelines are provided for owner.

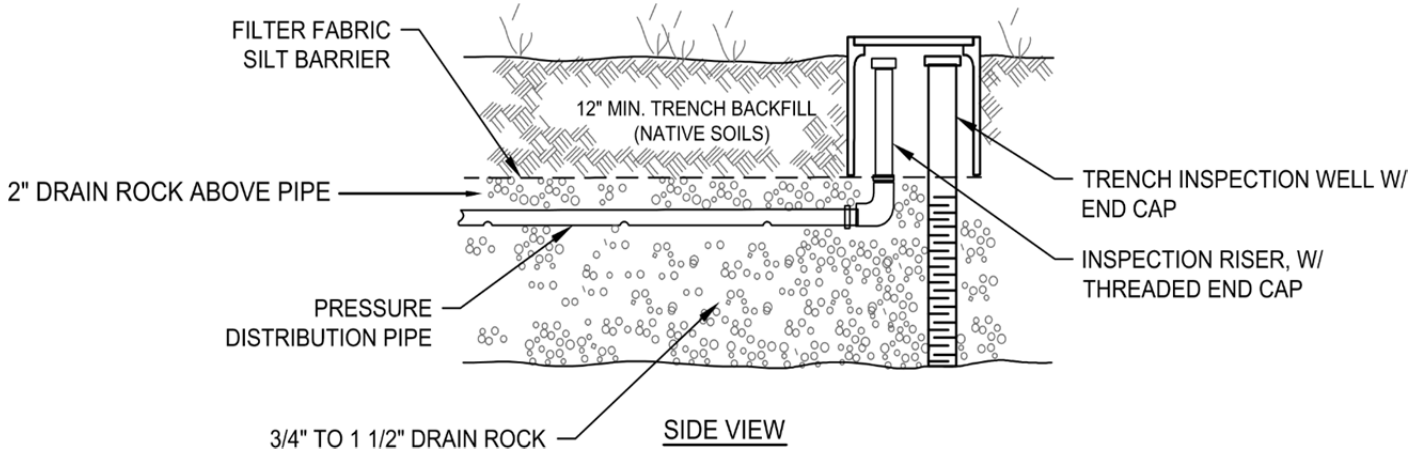
MANAGEMENT REQUIREMENTS

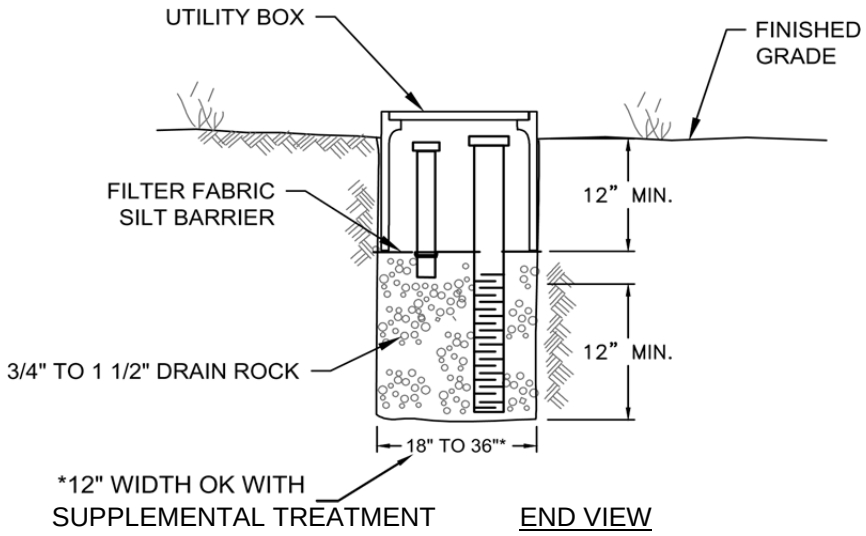
Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for pressure distribution trench systems are outlined in **Table PD-1.**

Table PD-1. Pressure Distribution Trench System Management Requirements

	Work	Minimum 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 4 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... • Obtain and analyze water samples from any monitoring wells, as applicable, per permit requirements.	• Measure trench water levels annually. • Other monitoring according to permit conditions, as applicable.
Reporting	• Report findings to EHD 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 EHD immediately.	• According to permit conditions, typically every year, depending on system size, usage, history, location.


PRESSURE DISTRIBUTION TRENCHES & LATERALS
LATERAL SHUT-OFF/ADJUSTMENT VALVE (TYP.)
SUPPLEMENTAL TREATMENT (OPTION)
DIVERSION VALVE
P
PRIMARY DISPOSAL FIELD
SECONDARY DISPOSAL FIELD
SEPTIC TANK
PUMP CHAMBER
PVC PRESSURE LINE
DISTRIBUTION MANIFOLD (TYP.)
END RISER & FLUSH PORT (TYP.)
P:\2013\1300249_KERN_CO_ONSITE\CAD\1300249_SCHEMATIC DIAGRAMS.DWG
PRESSURE DISTRIBUTION TRENCH SCHEMATIC





PRESSURE DISTRIBUTION TRENCH

3.4 Requirements for Mound Systems

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. Mounds utilize the shallow surface soils for broad distribution of effluent, and are 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.

SITIING CRITERIA

1. **Setbacks**. Horizontal setback requirements for mound systems shall be those applicable to conventional disposal fields, as specified in Part 1 of this Manual.

2. **Soil Depth**. Minimum depth of soil, as measured from ground surface to impermeable soil or rock, for mound systems shall be two (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. **Depth to Groundwater.** Minimum depth to seasonal high groundwater, as measured from ground surface, shall be two (2) feet.

4. **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.

5. **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%.

6. **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.

DESIGN CRITERIA

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

2. **Design Wastewater Flow**. The mound system shall be designed on the basis of the projected wastewater flow for the structure or facility being served, determined in accordance with wastewater flow estimation requirements in Part 1 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 "Requirements for Pressure Distribution Trenches" 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 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 EHD 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.

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

i. Top of the sand fill shall extend horizontally beyond the gravel distribution bed:

a) 1 foot in the upslope direction

b) 2 feet in the down-slope direction

c) 2 feet in the longitudinal (side) direction

ii. Maximum slope of the top of the sand surface shall be 3 horizontal to 1 vertical.

iii. 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.9 below.

6. **Gravel Distribution**

a. **Bed 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 under-drain 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**.

i. 1.2 gpd/ft.^{2} for individual residential OWTS; and

ii. 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:

i. **Basal Wastewater Application Rates**.

a) **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.

ii. **Wastewater Flow.** The wastewater flow used for sizing the basal area shall be the design wastewater flow for the system.

iii. **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 3 for expanded table listing interpolated values.

10. **Linear Loading Requirements**

a. **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.

b. **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.

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

i. 100 gpd/bedroom for residential systems; (note: this is 2/3 of the 150 gpd/bedroom used for system design);

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

d. **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

11. **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.9.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.

12. **Inspection Standpipes**. A minimum of six inspection standpipes 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 standpipes shall be constructed of 2" to 4" diameter pipe, equipped with a wrench-tight cap or pipe plug and a bottom cap. All standpipes 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 standpipes shall be sealed with a bentonite or concrete annular seal (or equivalent) to a depth of 12 inches, minimum.

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;

g. An inspection schedule listing critical control points; and

h. Operation and maintenance guidelines.

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

   a. Pre-construction inspection where the construction staking or marking of the mound system is provided and construction procedures discussed;

   b. Water tightness of septic tank and dosing (pump) tank;

   c. Clearing and ripping/plowing of the mound basal area soils;

   d. Sand material and placement;

   e. Pea gravel distribution bed and piping installation;

   f. Hydraulic (“squirt”) test of the distribution system;

   g. Functioning and setting of all control devices;

   h. Placement of filter fabric silt barrier and soil cover;

   i. Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed, erosion control has been completed, and operation and maintenance guidelines provided for owner.

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 4 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 required ▪ Record work done.	▪ Distribution system maintenance annually. ▪ Other maintenance as required.
Water Monitoring & Sampling	▪ Measure and record water levels in observation standpipes 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 EHD per permit requirements. ▪ Standard report to include dates, inspection standpipe and monitoring well readings and other data collected, work performed, corrective actions taken, and performance summary. ▪ Report public health/water quality emergency to EHD immediately.	▪ According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.

3.5 Requirements for At-Grade Systems

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.

SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for At-grade systems shall be those applicable to conventional disposal fields, as specified in Part 1 of this Manual.

2. **Vertical Separation Requirements.**

    a. **Soil Depth**. Minimum depth of soil, as measured from ground surface to impermeable soil or rock, for At-grade systems shall be three feet. This 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.

    b. **Depth to Groundwater.** Minimum depth to seasonal high groundwater for At-grade systems, as measured from ground surface, shall be 3 feet for systems receiving septic tank effluent, and 2 feet where used in combination with supplemental treatment.

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).

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 vertical separation to groundwater is at least 3 feet.

    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 reduction in the vertical separation to groundwater to a minimum of 2 feet.

2. **Design Wastewater Flow**. At-grade systems shall be designed on the basis of the projected wastewater flow for the structure or facility being served, determined in accordance with wastewater flow estimation guidelines in Part 1 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 “Requirements for Pressure Distribution Trenches” 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 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-1**.

Table AG-1.

Wastewater Application Rates for At-grade System[1]

Percolation Rate (MPI)	Septic Tank Treatment (gpd/ft^2)	Supplemental Treatment (gpd/ft^2)
1-5	1.2	1.2
10	0.8	0.8
24	0.60	0.60
30	0.56	0.56
45	0.45	0.45
60	0.35	0.35
90	NA	0.20
91-120	NA	0.20

[1] Interpolate between reference values for other percolation rates; see end of Part 3 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 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-1**.

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

g. **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.

h. **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.

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

   i. 100 gpd/bedroom for residential systems; (note: this is 2/3 of the 150 gpd/bedroom used for system design);

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

j. **Loading Rate Criteria**. Maximum linear loading rates for At-grade systems vary according to ground slope and percolation rate as indicated in **Table AG-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 AG-2. 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 side slope 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.

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 EHD may be required.

a. Pre-construction inspection where the construction staking or marking of the At-grade system is provided and construction procedures discussed;

b. Water tightness of septic tank and dosing (pump) tank;

c. Clearing and ripping/plowing of the At-grade basal area soils;

d. Pea gravel distribution bed and piping installation;

e. Hydraulic ("squirt") test of the distribution system;

f. Functioning and setting of all control devices;

g. Placement of filter fabric silt barrier and soil cover;

h. Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed, erosion control has been completed, and operation and maintenance guidelines provided for owner.

MANAGEMENT REQUIREMENTS

Recommended minimum procedures and frequency for inspection, maintenance, monitoring and reporting activities for At-grade systems are outlined in **Table AG-3**.

Table AG-3. 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 4 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 EHD 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 EHD immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.

3.6 Requirements for Raised Sand Filter Bed Systems

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. 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.

SITIING CRITERIA

1. **Setbacks**. Horizontal setback requirements for raised sand filter bed systems shall be those applicable to conventional disposal fields, as specified in Part 1 of this Manual.
2. **Depth to Groundwater.** Minimum depth to seasonal high groundwater, as measured from ground surface, shall be 2 feet.
3. **Soil Depth**. Minimum depth of soil, as measured from ground surface to impermeable soil or rock, for raised sand filter bed systems shall be 2 feet. This soil depth requirement shall apply within the sand bed area and in the adjacent area extending a distance of 25 feet down-slope of the system.
4. **Percolation Rate**. Average percolation rate for raised sand filter bed 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 sand bed area and in the adjacent area extending a distance of 25 feet down-slope of the system.
5. **Ground Slope**. Maximum ground slope for raised sand filter bed 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 shall be 15%.
6. **Reserve Area/Dual System.** A reserve area having suitable site conditions and sufficient area for full, 100% replacement of the primary raised sand filter bed shall be provided or a complete dual primary and secondary raised sand filter bed system shall be installed initially.

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 Wastewater Flow**. Raised sand filter bed systems shall be designed on the basis of the projected wastewater flow, determined in accordance with requirements in Part 1 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 “Requirements for Pressure Distribution Trenches” 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 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 plain 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	45-62
#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 EHD 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 3 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:

        i. 100 gpd/bedroom for residential septic systems (note: this is 2/3 of the 150 gpd/bedroom used for system design);

        ii. Design wastewater 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 under-drain 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.

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 EHD may be required.

    a. Pre-construction inspection where the construction staking or marking of the raised sand filter bed is provided and construction procedures discussed;

    b. Water tightness of dosing (pump) tank;

    c. Raised sand bed dimensions, structure and liner;

    d. Sand material and placement;

    e. Piping installation and hydraulic ("squirt") test of the distribution system;

    f. Function and setting of all control devices.

    g. Final Inspection to verify that all construction elements are in conformance with the approved plans and specifications, all inspection wells are installed, erosion control has been completed, and operation and maintenance guidelines provided for owner.

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 4 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 EHD 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 EHD immediately.	• According to permit conditions, typically every 1 to 2 years, depending on system size, usage, history, location.

3.7 Requirements for Sub-surface Drip Dispersal

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 9 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.

SITING CRITERIA

1. **Setbacks**. Horizontal setback requirements for subsurface drip dispersal systems shall be those applicable to conventional disposal fields, as specified in Part 1 of this Manual.

2. **Depth to Groundwater.** Minimum depth to seasonal high groundwater, as measured from the bottom of the dripline shall be two (2) feet.

3. **Soil Depth**. Minimum depth of soil, as measured from the bottom of the dripline to impermeable soil or rock, shall be two (2) feet.

4. **Percolation Rate**. The average soil percolation rate in the proposed subsurface drip dispersal field area shall be within the range of 1 to 120 minutes per inch (MPI), as determined at depths of 1 to 2 feet below ground surface.

5. **Ground Slope**. Ground slope in areas used for drip dispersal shall be less than 30 percent.

6. **Dual System**. Two drip dispersal fields, each one hundred percent of the total size required for the design wastewater flow, shall be installed and interconnected with an approved flow diversion device (pressure-rated), to allow alternate or combined use of the two fields.

7. **Dual System Replacement Area**. Sufficient area meeting all applicable siting criteria shall be provided for full replacement of the original dual drip dispersal field.

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 Wastewater Flow**: Subsurface drip dispersal systems shall be designed on the basis of the projected wastewater flow for the structure or facility being served, determined in accordance with wastewater flow estimation guidelines in Part 1 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 Percolation Rate (MPI)	Soil Type* (information only)	Wastewater Application Rate (gpd/ft^2)
5-10	Fine Sand	1.2
11-20	Sandy Loam	1.0
21-30	Loam	0.7
31-45	Clay Loam	0.6
46-60	Silt-Clay Loam	0.4
61-120	Clay, non-swell	0.2

*Soil types listed for reference information only; design shall be based on site-specific percolation data.

4. **Drip field Sizing.**

    a. Minimum sizing of the drip field area shall be equal to the design wastewater flow divided by the applicable wastewater application rate from **Table DD-1.** As an example, for a design flow of 450 gpd in soils having an average percolation rate between 46 and 60 MPI, the minimum required drip field area for a single (100%) would be:

$$450\ gpd/0.4\ gpd/ft^2 = 1{,}125\ ft^2$$

b. For sizing purposes, effective ground surface area used for drip field sizing calculations shall be limited to 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 of dispersal area.

c. Drip fields may be divided into multiple zones which may be located in different areas of a site, as desired or needed to provide the required drip field size. A single continuous drip field area is not required. However, any areas proposed for drip dispersal shall be supported by field observations and 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 drip field sizing for each zone.

5. **Pressure Dosing.** Secondary-treated effluent shall be delivered to the drip field 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 drip field and components.

   Additional requirements for design and construction of pressure distribution piping systems contained in "Requirements for Pressure Distribution Trenches" 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 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. **Drip field 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 nine (9) and twelve (12) inches below native grade. Deeper placement of driplines may be considered by EHD 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. There shall be a minimum spacing of 12 inches between emitters and no emitter shall be located less than 12 inches from the supply and return manifolds.

12. **Dual System Operation.** Unless exempted by EHD, 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 Standpipes**. A minimum of three (3) inspection standpipes, 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 standpipe shall be located within the drip field area.

    b. One standpipe shall be located 10 to 15 feet up-gradient of the drip field.

    c. One standpipe shall be located 10 to 15 feet down-gradient of the drip field.

    d. Inspection standpipes 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 standpipes 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 (nickel) slots at nominal 1" spacing, or equivalent commercially-slotted pipe. Inspection standpipes shall be sealed with a concrete annular seal (or equivalent) for stability and to prevent surface infiltration.

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%;

    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; and

    h. Operation and maintenance guidelines.

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 EHD may be required.

a. 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;

b. Water tightness of effluent dosing (pump) tank;

c. Drip field layout, piping materials and installation, and all associated valves and connections;

d. Hydraulic testing of the drip system;

e. Functioning and setting of all control devices; and

f. Final Inspection to verify that all construction elements are in conformance with the approved plans, specifications, and manufacturer recommendations, all inspection standpipes are installed, erosion control has been completed, and operation and maintenance guidelines provided for owner and service provider.

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	Minimum 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 4 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 EHD 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 EHD immediately.	• According to permit conditions, typically every year, depending on system size, usage, history, location.

KERN COUNTY ONSITE SYSTEMS MANUAL

PART 5

STANDARDS,
RULES, AND REGULATIONS
FOR LAND DIVISIONS

Sewage Disposal, Water Supply, And Preservation of Environmental Health

Definitions

The definitions set forth in the following section shall apply throughout these standards.

Alluvium
: Sediment deposited by a river.

Disposal field
: The required absorption area on square feet per one hundred (100) gallons of septic tank liquid capacity.

Domestic Water
: Water plumbed to a dwelling or structure which is intended to be used for, but not limited to, drinking, food preparation, dish washing, and bathing. Domestic water must also be potable.

Easement
: A grant of one (1) or more of the property rights by the owner to or for the use by the public, a corporation, or another person or entity.

Effluent
: The liquid outflow of any facility designed to treat, convey, or retain wastewater.

Expansion Area
: Additional seepage pits or subsurface drain fields, equivalent to at least one hundred (100) percent of the required original system that may be installed if the original system cannot absorb all the sewage.

Floodplain
: A land area adjoining a river, stream, watercourse, or lake which is likely to be flooded, including alluvial cones, wherein streams may change their course. “Primary” floodplain refers to the channel and adjacent areas where the bulk of the flood flow occurs, also commonly known as the “floodway”. “Secondary” floodplain refers to areas outside the primary floodplain that are subject to inundation, but where there is no significant flood flow or current.

Groundwater
: Water stored underground in the spaces between rocks or sediments.

Leach bed

The joining of leach line trenches into one large square area.

Leach line

A series of horizontal trenches that hold a level perforated pipe that is used to distribute the wastewater throughout a rock absorption system where it eventually soaks into the soil particles.

Percolation Test

A method of testing water absorption of the soil. The test is conducted with clean water and test results can be used to establish the dispersal system design. Test must be accomplished by registered civil engineers, certified engineering geologists, or approved Registered Environmental Health Specialist.

Potable Water

Water safe for drinking, culinary and domestic purposes, and meets all requirements of the health officer.

Public Entity

A local agency which is empowered to plan, design, finance, construct, operate, maintain, and to abandon, if necessary, any sewerage system, the expansion of any sewerage system and the sewage treatment facilities serving a land development.

In addition, the entity may, per Health and Safety Code (Sections 6950-6982),be empowered to provide permits and to have supervision over the location, design, construction, operation, maintenance, abandonment of individual OWTS, and to conduct any monitoring or surveillance programs required for water quality control purposes.

Seepage Pit

A covered pit with an open-jointed or perforated lining through which wastewater effluent seeps into the surrounding soil, sometimes called a leaching pit or leaching pool.

Septic Tank

A water tight, covered receptacle designed and constructed to receive the discharge of sewage from a building sewer, to separate solids from the liquid, to digest organic matter, to store digested solids through a period of detention, and to allow the clarified anaerobic liquids to discharge for final disposal or additional (supplemental) treatment.

Setback

The required minimum distance between a proposed OWTS and various building, landscape, and water features as specified under Siting Criteria in the Kern County Onsite Systems Manual, Part 1.

Sewage

Any combination of water-carried waste, discharged from buildings.

Sewage system

A network of wastewater collection, conveyance, treatment, and disposal facilities interconnected by sewers.

Private system: a private sewerage disposal system or any part thereof, or the building sewer to the point of connection to a public sewer main which typically parallels the center line of the roadway. A private system is sometimes referred to as private disposal system.

Public system: a common sewerage system or any part thereof which is operated by the county, or by a county service area, or by any political subdivision or public entity.

Streams

Surface: a continual or seasonal flow of water in channel having a definite bed and banks.

Non-classified: a flow of water within a well-defined course only during a period of storm runoff.

Chapter I General

Section 601-1

The Environmental Health Division's "Standards for Land Development" include the aspects of sewage, water supply, and preservation of environmental health. The standards are intended to safeguard the public health, and are enforced by the County's EHD. They are primarily intended to apply to residential units. The applicant may request a variance from the requirements of these Standards.

The Director of the Public Health Services Department may grant exceptions. He is authorized to approve a variance if it is determined that the granting of such variance will not result in any nuisance or menace to the public health, and may conditionally approve a variance if it is determined to be necessary to meet the goals and objectives of these Standards.

Section 601-2

It is the responsibility of the land developer and his technical consultants to provide to the EHD any and all data needed to satisfy the content and the intent of these Standards.

Section 601-3

Regulations of the State of California or other governmental agencies that are more restrictive in nature have precedence over these Standards.

Section 601-4

All references herein to the California Plumbing Code relate to the current edition as adopted by the County of Kern.

Chapter II Sewage Disposal by Individual Onsite Wastewater Treatment Systems

Section 602-1

Consideration should be given to the construction of a community sewerage system and treatment plant if connection to a public sewer is not possible. Where sewage disposal by individual onsite wastewater treatment systems (OWTS) such as septic tanks with disposal fields or seepage pits is proposed, the following standards shall apply:

1. A soils report regarding the feasibility of using individual OWTS in accordance with the standards of good public health and engineering practice is required. Three copies of the report must be submitted. The report must be prepared by a registered civil engineer, qualified in the field of soils engineering, or by some other specialist acceptable to the EHD. The report is subject to the review and approval of the Division.

2. The report must include the results of soil percolation tests. Percolation tests shall be made in accordance with the U.S. Public Health Service test procedure (Manual of Septic Tank Practice, Part I). Any departure from that procedure must first be approved by the EHD. The submittal of soil test hole logs is also required, with soils classified in accordance with the Kern County Onsite Systems Manual and by either the U.S.D.A. Soil Classification System or Unified Soil Classification System.

   Where soil and bedrock conditions permit, the test pits or borings shall extend to minimum depths of seven (7) feet below the bottoms of proposed disposal trenches or twelve (12) feet below the bottoms of pits. The Engineer must specify whether disposal trenches and/or pits are to be used. The number of test holes and percolation tests is ordinarily at the discretion of the engineer, but they are required to state whether or not the soil in each lot in a development is capable of satisfactorily absorbing sewage effluent.

   Soil and percolation test hole locations must be accurately plotted on the map which accompanies the report. If the soil types vary within the development, the map shall indicate limits of the different types, and a lot-by-lot list of soil types shall be submitted.

3. For purposes of standardization, Appendix Tables 1 and 2 shall be used to correlate percolation rates with soil types.

Section 602-2.1

Individual OWTS may be used only where sufficient area for them is provided and where the density of such systems and of the resulting sewage effluent will not have an adverse effect upon water quality or public health.

1. The minimum allowable lot size where individual OWTS are used is considered to be a function of soil properties, climate, geology, and topography. The required minimum lot size where individual OWTS are used is 10,000 square feet net, except as follows:

    a. In desert, valley, or foothill areas, lots may be less than 10,000 square feet net but no less than 7,200 square feet net, where individual systems are used, provided that the following criteria, over and above those contained elsewhere in these Standards, are satisfied:
        i. A functioning public entity providing potable water exists or is provided.
        ii. The site is shown on the Geologic Map of California as “Recent Alluvium”, as published by the California Division of Mines and Geology.
        iii. The soils for septic tank purposes are Type 2 (Fine sand) per Appendix Table 2.
        iv. The natural slope of the surface of the ground throughout the site does not exceed ten (10%) percent.
        v. Other pertinent environmental quality control factors, in the discretion of the Director of the Public Health Services Department, allow the smaller lot size.

2. In all areas, each lot shall be provided with an adequate site for subsurface disposal of sewage effluent within the boundaries of the lot. The site must have a natural slope of thirty (30%) percent or less; it must be located to allow disposal by gravity flow, and its size for single family residential use, whether leaching trenches or disposal pits are used, shall be in accordance with Appendix Table 3.

3. The required minimum size of the effluent disposal field area for multiple dwelling lots, in which leaching trenches or seepage pits are used, shall be determined by the following information:

    a. The required area in square feet and the required septic tank capacity in gallons, in accordance with requirements in the Kern County Onsite Systems Manual (Part 1).

b. The proposed number of dwelling units, the number of bedrooms in each unit, and the soil type in the future effluent disposal area must be known in order to derive the required area.

c. Also, the use of dual disposal systems, which entails alternate, periodic use and resting of trenches or pits, is required on multiple dwelling lots.

Section 602-2.2

In designing lots and sewage disposal sites prior to the filing of a tentative map, the following factors shall be considered:

1. Space shall be allowed on the lot for expansion of the original disposal field. The square footages given in Appendix Table 3 are intended to satisfy initial expansion area requirements for disposal fields. The use of dual disposal systems, which entails alternate, periodic use and resting of trenches and pits, may be required at the reasonable discretion of the Director of the Public Health Services Department. Where dual disposal systems are to be used, each one-half of the system shall have an absorption area equal to at least two-thirds of that required by the current Kern County OWTS design standards, per Onsite Systems Manual, Part 1, an expansion area capable of accommodating at least 50% of the original installation is required in Types 1, 2, and 3 soils; at least 87% in Type 4 soil; and 125% in Type 5 soil.

2. The design of the lot should be easily accessible for future maintenance, repair, reconstruction, or connection to future public sewers.

3. The installation of sewage disposal systems within easements is not permitted without prior approval of the easement holder. Slope easements are included in this prohibition.

4. The disposal system must be located so that sewage effluent will not percolate out through the surface of the embankment. As a guideline, disposal systems should be set back at a ratio of 4 to 1 from embankments; for example, for each vertical foot of embankment height, the disposal system should be located four feet horizontally from the top of the embankment. Setbacks should be adjusted to suit local geologic conditions.

5. The following minimum setbacks from water wells are required:

System	All Water Wells	Public Water Supply Wells
Sewer or water-tight septic tank	100 feet	150 feet
Leaching Field	100 feet	150 feet*
Seepage Pit	150 feet	150 feet*

*200 feet for any trench or seepage pit >10' deep; 2-yr microbial travel study required for seepage >20' deep within 600 feet of public water supply well.

These setback distances may be increased where deemed necessary by the Director of the Public Health Services Department.

6. Disposal systems should not have to be installed underneath pavement or other impervious ground surface coverings. If it is necessary to install disposal fields beneath impervious surface coverings, the disposal system and required areas shall: (1) be increased by 25%; and (2) be installed using traffic-rated chambers in place of standard pipe and drain rock, with no reduction credit for chambers.

7. The use of aerobic or other supplemental treatment equipment in place of or in addition to conventional septic tanks is not acceptable as a basis for reduction of the subsurface disposal area. The installation of electro-mechanical sewage disposal devices must have a provision for periodic professional maintenance, and is subject to approval by the EHD as an "alternative OWTS" in accordance with provisions of Kern County OWTS Ordinance Article 3.

8. A lot is not suitable for residential use if the sewage disposal system cannot be installed within its boundaries.

9. Bedrock, other impervious formations, and the maximum seasonal elevation of the ground water level shall be at least seven (7) feet below the bottoms of disposal trenches or twelve (12) feet below the bottoms of seepage pits.

   In very pervious soils, for example, Types 1 and 2, the required separation between ground water level and the bottoms of disposal trenches or pits may be increased at the discretion of the Director of the Public Health Services Department.

10. The installation of sewage disposal systems in areas underlain by carbonate rocks or by fractured bedrock is not permitted unless evidence indicates that solution cavities or open fractures will not serve as conduits for the passage of improperly filtered sewage effluent into ground waters, springs, or surface streams.

Professional findings or opinions in this regard shall be submitted where applicable.

11. No sewage or sewage effluent may be discharged within 100 feet (horizontally) of any water source or the high water mark of a river, stream, canal, lake, or other surface body of water.

    Sewage disposal systems shall be located as far as possible from a non-classified stream or its established easement and in no case closer than 25 feet thereto unless certified by a qualified engineer that is safe to do so without creating a nuisance or endangering the watershed.

Section 602-3

The engineer is required to submit a statement that all lots have been designed in compliance with these standards. For “alternative OWTS” and other specially engineered systems, the engineer shall certify that the system(s) have been installed according to the approved plans when required by the EHD.

Section 602-4

One copy of a topographical analysis map on the tentative map base (or on a larger scale map) may be required at the Director of the Public Health Services Department’s discretion. Slope percentage categories shall be depicted in accordance with the following color code:

Slope Range	Color
0 to 30%	Uncolored
Greater than 30 %	Colored

Additionally, the map shall show all easements and locations of rock out-crop, high groundwater, and spring discharge. The portions of lots allocated for the subsurface disposal of sewage effluent shall be delineated, and their approximate areas in square feet indicated. The approximate size of irregularly-shaped lots must also be shown.

Section 602-5

Where watercourses, significant drainage channels, or bodies of water traverse or adjoin a lot, a predevelopment plan, showing how OWTS can be installed and still remain at the necessary distance from the high water mark, may be required.

Lines depicting the required setbacks from such watercourses, drainage channels, or bodies of water shall be indicated on a copy of the tentative map.

Section 602-6

The use of disposal fields, wherever conditions permit, is preferred to that of pits. Seepage pits are prohibited where percolation rates for them exceed 25 minutes per inch (U.S. Public Health Service test procedure). In lieu of seepage pits, the

engineer may consider the use of “alternative OWTS” or “specially designed”, deeper disposal trenches in accordance with applicable provisions and requirements of Kern County OWTS Ordinance, Article 3 and Onsite Systems Manual.

Section 602-7

If the engineer determines that the building of fill pads for the installation of disposal fields is necessary, he/she must submit design criteria for such pads and fields. Where any fill pad is to be built in sloping terrain, the EHD shall require the sub-divider to furnish findings of an engineer or engineering geologists qualified in such matters regarding the possibility of soil slippage or landslide of the pad area, along with recommended design measures to mitigate such hazards. The engineer shall certify that the fills are constructed in accordance with the design recommendations.

Section 602-8

If lot-grading adversely changes the engineer’s initial report on percolation characteristics of the soil in a proposed sewage disposal area, the system installed therein shall be designed in accordance with specific recommendations of a soils engineer or other specialist acceptable to the EHD.

Section 602-9

If underground irrigation lines or other pipelines, either abandoned or proposed for abandonment, exist within a proposed land development, their locations must be shown on the tentative map, and they must be removed or destroyed as part of the subdivision improvements.

Section 602-10

When a geological hazards report for land development is prepared (either at the developer’s will or as a requirement of any governmental agency), it shall include findings and recommendations concerning probable adverse effects of such hazards on the integrity of water supply and sewage disposal facilities. A copy of the report shall be furnished to the EHD.

Section 602-11

When a flood hazard is found to exist, the engineer shall define it and shall submit his recommendations for protecting the integrity of water wells, water quality, and OWTS. Where applicable, the limits of the 100-year flood line shall be indicated on the tentative map.

The installation of public or private sewage disposal systems in a primary floodplain is prohibited.

In a secondary floodplain, individual sewage disposal systems are not permitted unless protected by flood control devices approved by the Water Agency or the Department of Engineering and Survey Services and constructed in accordance

with the requirements of the EHD so as to minimize infiltration of floodwaters into the systems and discharges from the systems into the floodwater.

Section 602-12

EHD acceptance of proposed water supply and sewage disposal methods is contingent upon clearance of those proposals through the State Regional Water Quality Control Board and/or the State Department of Public Health.

Section 602-13

If a private domestic water well and individual OWTS are to be constructed on a lot, the minimum lot size shall be 2 ½ acres gross. In order to preclude interference with neighboring installations, water wells shall be located with consideration of required setback distances from existing or future neighboring OWTS.

Where demonstrated by a qualified civil engineer or geologist to be practical from the public health and engineering viewpoints, an exception may be granted to allow lot design of one (1) acre net minimum size where the construction of a private domestic water well and individual OWTS is proposed. This will normally entail completion of a cumulative impact assessment per Kern County OWTS Ordinance, Article 3 and applicable guidelines contained in the Onsite Systems Manual, Part 1.

Section 602-14

In accordance with the Kern County Onsite Wastewater Treatment Systems Ordinance, all individual OWTS must be installed under permit with the EHD of the Public Health Services Department...

Section 602-15

In areas which are determined by the EHD to be unsafe for installation of individual sewage disposal systems, and where it is considered likely that a nuisance or health hazard might be created, said areas shall be served by an approved public or community sanitary sewer system.

Section 602-16

If a “package treatment plant” is proposed as a means of community sewage disposal, the engineer must submit design criteria for the plant to the EHD and receive approval from the appropriate Regional Water Quality Control Board.

Section 602-17

In larger land developments, consideration should be given to setting aside easements and areas for possible future use for sewage collector lines and treatment plant sites. In some cases, the EHD may require such provisions.

Section 602-18

If a proposed land development is to be served by a public or community sewerage system, a letter from the appropriate agency or company signifying its capability and its intention to furnish its sewerage facilities to the property must be submitted to the EHD. If construction has not begun within one year of the date the “will serve” letter is issued, an updated letter will be required.

Section 602-19

The sewerage statement on the tentative map for a land development for which individual sewage disposal systems are proposed should be worded: “Sewerage: Individual septic tank systems to be furnished by each subsequent lot owner”, or similar.

Section 602-20

The findings and comments of the EHD regarding a proposed land development are ordinarily based upon the most recent of available tentative map. If the design is later changed significantly, a reappraisal of the development by this Department may be necessary.

Chapter III Water Supply

Section 603-1

There must be an adequate supply of potable domestic water for the needs of the development.

Section 603-2

The quality of the domestic water supply shall meet the current U.S. Environmental Protection Agency Drinking Water Standards. Should those standards be replaced by those of some Federal or State agency, the newer standards shall apply.

Section 603-3

Where domestic water supply by private wells is proposed, a report prepared by a qualified engineer or geologist outlining findings and opinions concerning the adequacy of the quantity and quality of groundwater is required. The report shall include, but not be limited to data on the chemical and bacteriological qualities of the groundwater (chemical and bacteriological analysis must be made by a State-approved laboratory).

Section 603-4

Tank-truck hauling of domestic water for land developments or lots within new land developments is not permitted.

Section 603-5

Domestic water supply wells shall be drilled and constructed in accordance with the Kern County Ordinance Code. The installation of private water wells within easements or in building setback areas is not permitted.

Section 603-6

All domestic water supply systems must be under EHD or State Department of Public Health permit. A permit to construct a new water system for a subdivision must be obtained prior to recordation of the final map. If an existing system is to be expanded, its permit must be updated prior to recordation of the final map.

Construction of any water supply facilities shall be in compliance with the Kern County Zoning Ordinance, and any Variance, Conditional Use Permit, Modification, or other requirement shall be obtained prior to recordation of the final map.

Section 603-7

Existing water wells which have been, or are proposed to be abandoned shall be destroyed in accordance with the Kern County Ordinance Code prior to recordation of final map.

Section 603-8

If the proposed land development is to be served by a public domestic water supply, a letter from the appropriate agency or company signifying its capability and its intention to furnish domestic water to the property must be submitted to the EHD. If construction has not begun within one year of the date the "will serve" letter is issued, an updated letter will be required.

Section 603-9

Sources of domestic water supply are not permitted in floodplains unless protected by flood control devices approved by the Water Agency or the Engineering and Survey Services Department and constructed in accordance with the requirements of the EHD so as to minimize infiltration of floodwaters there into.

Chapter IV Preservation of Environmental Health

Section 604-1

Any aspect of the design of a proposed development which in the opinion of the Director of the Public Health Services Department is likely or highly possible to cause serious public health problems; or likely to cause degradation of environmental quality by pollution or contamination shall be cause for a recommendation from the EHD for disapproval of the development.

EHD activities in this regard will be coordinated with the appropriate State agencies.

Section 604-2

Violations of health and safety laws within a proposed land development must be abated prior to EHD acceptance of the development.

Uncovered or abandoned shafts, pits, wells, and any other possible hazards, shall be properly destroyed, filled, or otherwise corrected.

Section 604-3

Land developments are subject to review and regulation with regard to all aspects pertinent to the EHD.

Appendix

Table 1. Percolation rates correlated with soil types.

Percolation Rate Minutes/Inch	Soil Type
Less than one	1
1 to 3	2
3+ to 10	3
10+ to 25	4
25+ to 60	5
Greater than 60	Unacceptable

Table 2. Design criteria of five typical soils.

	Type of Soil	Required sq. ft. Of leaching area/ 100 gal. (m^2/L)	Maximum absorption capacity in gals./sq. ft. of leaching area for a 24 hr. period (L/m^2)
1	Coarse sand or gravel	20 (0.005)	5.0 (203.7)
2	Fine Sand	25 (0.006)	4.0 (162.9)
3	Sandy loam or sandy clay	40 (0.010)	2.5 (101.8)
4	Clay with considerable sand or gravel	90 (0.022)	1.1 (44.8)
5	Clay with small amount of sand or gravel	120 (0.030)	0.8 (32.6)

Table 3. Minimum size of disposal site (square feet) required according to soil type in disposal area.

Soil Type in Disposal Area	Required minimum size of disposal site (square feet) *
1	2,000
2	2,500
3	4,500
4	13,000
5	21,000

* Exclusive of any areas occupied by structures, setbacks, and easements on the lot and in accordance with the requirements of the Kern County Onsite Systems Manual (Part__) and these standards.

The minimum disposal area required by the table above (which includes expansion area) is for standard leaching trenches which provide three (3) square feet of leaching area per lineal foot, or special leaching trenches which provide seven (7) square feet of leaching area per lineal foot.

KERN COUNTY ONSITE SYSTEMS MANUAL

PART 4

OWTS PERFORMANCE
AND
MONITORING REQUIREMENTS

4.1 OWTS PERFORMANCE REQUIREMENTS

A. GENERAL

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, and operate in such a manner as to not create odors or vector attraction, be properly vented, and have a functional baffle.

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 30-day average constituent limitations:

Constituent	(1) Where required for reduced separation to GW	(2) Where Pathogen or Nitrogen treatment Required
Biochemical Oxygen Demand (BOD), mg/L	30	30
Total Suspended Solids (TSS), mg/L	30	30
Fecal Coliform, MPN/100 ml	N/A	200*
Total Nitrogen, % reduction (effluent/influent)	N/A	50%**

*Due to proximity to public water supply well or surface water intake per SWRCB OWTS Policy; where applicable, additional requirements for pathogens include: (a) minimum 3-ft separation to groundwater below dispersal field; and (b) minimum 12 inches of soil cover over dispersal piping.
** Per results or recommendation of cumulative impact assessment, Kern County OWTS.

2. **Sand Filters.** Sand filters shall:

   a. be operated to maintain uniform effluent distribution throughout the sand filter bed;

   b. not result in 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; and

   c. Dispersal field and components shall:

      i be operable and in good condition;

      ii maintain uniform distribution of effluent throughout the dispersal field;

      iii not result in continuously ponded effluent in the dispersal trench (or bed) to a level above the invert (bottom) of the distribution pipe; and

      iv 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 ponded effluent within the gravel distribution bed or in the sand fill (for mounds); 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 drip field;

   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.

4.2 OWTS MONITORING REQUIREMENTS

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.

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.

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.

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 EHD 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 EHD; and (c) payment of an annual fee established by the Board of Supervisors.

Additionally, the EHD 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.

REPORTING

Monitoring results shall be submitted to the EHD 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.

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 applicable Regional Water Quality Control Board 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.

4.3 OWTS PERFORMANCE EVALUATION GUIDELINES

PURPOSE AND PERFORMANCE CRITERIA

Inspection and performance evaluation of an OWTS may be required 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 KCEHD. 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.

INSPECTION RESPONSIBILITY

The inspections shall be carried out by any of the following:

1. Registered Civil Engineer

2. Professional Geologist

3. Registered Environmental Health Specialist

4. Other onsite wastewater maintenance providers 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.

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.

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, cut banks, 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.

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.

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.

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:

    a. Measure the location of the static water line in the septic tank (at the outlet side) as an initial reference point.

b. Begin surcharging the tank with water to start the hydraulic load test.

c. 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.

d. 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. <u>It should be emphasized that these are guidelines only;</u> 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).

FINAL LEACH FIELD 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.

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.

CLEAN UP

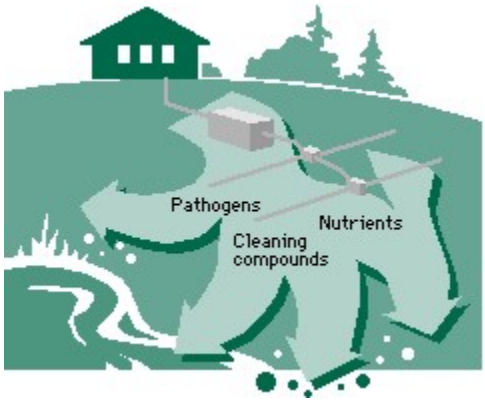
At the completion of the OWTS inspection and testing, replace all access lids and clean all tools before leaving the site. All tools and equipment that come into contact with wastewater should be cleaned and disinfected with a 1:5 bleach solution, then rinsed with fresh water; and all contaminated rinse water should be disposed of in the septic tank.

KERN COUNTY ONSITE SYSTEMS MANUAL

PART 6

OWTS USER INFORMATION

Septic System Owner's Guide



Safety and Health

Why You Need Good Wastewater Treatment

The septic system is designed to treat wastewater for a specific site. Proper treatment of wastewater reduces health risks to humans and animals and prevents surface and groundwater contamination.

Risks to Human and Animal Health

It is unhealthy for humans, pets, and wildlife to drink or come in contact with surface or ground water contaminated with wastewater.

Inadequate treatment of wastewater allows bacteria, viruses, and other disease-causing pathogens to enter groundwater and surface water. Hepatitis, dysentery, and other diseases may result from bacteria and viruses in drinking water. Disease-causing organisms may make lakes or streams unsafe for recreation. Flies and mosquitoes that are attracted to and breed in wet areas where wastewater reaches the surface may also spread disease.

Inadequate treatment of wastewater can raise the nitrate levels in groundwater. High concentrations of nitrate in drinking water are a special risk to infants. Nitrate affects the ability of an infant's blood to carry oxygen, a condition called methemoglobinemia (blue-baby syndrome).

Risk of Contaminating Water

A septic system that fails to treat sewage can also allow excess nutrients to reach nearby lakes and streams promoting algae and weed growth. Algal blooms and abundant weeds may make the lake unpleasant for swimming and boating, and can affect water quality for fish and wildlife habitat. As plants die, settle to the bottom, and decompose, they use oxygen that fish need to survive.

Many synthetic cleaning products and other chemicals used in the house can be toxic to humans, pets, and wildlife. If allowed to enter a failing septic system, these products may reach groundwater, nearby surface water, or the ground surface.

In the soil treatment portion of the septic system (drain field or mound), bacteria and viruses in the sewage are destroyed by the soil and naturally-occurring microscopic organisms. Nutrients are absorbed by soil particles or taken up by plants. However, these processes only work in soil that has air in it. The soil cannot be saturated with water. Near lakes, streams, and wetlands soil conditions may be saturated. When the soil is saturated, biological breakdown will be incomplete and nutrients will move much greater distances, sometimes hundreds of feet from the drain field or mound, and possibly into surface water. **Even systems that appear to be working well or that are in compliance with local design and installation codes may allow nutrients or bacteria to reach the ground or surface water.**

Safety Checklist

- ✓ **Never enter the septic tank**. The tank has a manhole for cleaning and inspection from the outside only. The tank contains very little oxygen and has high levels of hydrogen sulfide, methane, carbon dioxide, and other life-threatening gases.

- ✓ **Never use electrical** lights, appliances, or tools in or close to the water or wet ground near the septic tank or drain field. This can result in explosion or electrical shock.

- ✓ **Always remember** that the liquid and solid contents of the septic system are **capable of causing infectious diseases**. After working on any part of the septic system, always wash hands thoroughly before eating, drinking, or smoking. Change clothes before coming into contact with food or other people.

- ✓ **Keep vehicles and other heavy equipment away,** from the septic system. The tank and other components may collapse due to weakness from corrosion.

- ✓ **Never smoke near septic tank openings**. Gases such as methane that may be present are potentially combustible.

- ✓ **Keep children and other spectators away** from the septic system when it is being cleaned or excavated.

- ✓ If there is a **smell of sewer gases** in your home, **immediately call** a plumber or other qualified person to identify the source and correct it. If the gas smell is very strong, **evacuate the building** until the problem is corrected and the gases are removed.

Troubleshooting

Finding an Existing System

Finding the septic system may not be an easy task, but is necessary for proper maintenance of the septic tank, troubleshooting problems, and making future plans for the property. Many counties and cities with permit and inspection programs for septic systems will have this information on file. If no plans exist, the following steps can be taken.

First, locate the septic tank. If the access manhole or inspection pipes are at ground level, they will be easy to find. Unfortunately, they are often buried several inches or even several feet, below the ground surface.

With a metal rod as a probe, start poking around in the soil 10 to 15 feet from the foundation of the house. A metal detector may be of assistance in finding the tank since most concrete septic tanks contain metal reinforcing rods.

Next, locate the drain field. Mounds are easy to find, but a drain field system in the ground may be more difficult. Try looking around the yard in the general direction where the sewer pipe left the house for an area where the grass grows differently. These clues may help locate the drain field:

- An area where the grass isn't growing well, or where the grass is greener or grows faster;
- An area where there is a slight depression or mound; and
- An area where the soil is soggy when the rest of the yard is dry.

Often, a licensed contractor or inspector has tools to locate the tank. Once the tank is located, be sure to make a map of its location. If the soil treatment system cannot be found, there may not be one or it may be discharging into ground or surface water.

Common Problems

Existing septic systems may fail for a number of reasons. For the owner, the system is failing if it is not treating the wastewater effectively. The most common causes of system failure are excessive water, improper maintenance, or an inadequately designed system. ***Diagnosing the specific causes may be difficult for the owner and often requires the skills of a professional***. The following chart shows common problems and their possible causes and remedies.

Septic System Troubleshooting Guide for Homeowners

Problem	Risks	Potential Causes	Potential Remedies
Sewage backs up into house and/or plumbing fixtures don't drain or are sluggish.	Human contact with sewage is a serious public health risk. Many waterborne diseases exist in household sewage. AVOID CONTACT.	• Excess water entering system • Improper plumbing • Blockage in plumbing • Improper operation • Pump failure • Improper system design • Roots clogging pipes	• Fix leaks • Install water-saving fixtures • Stop using garbage disposal • Clean septic tank and check pumps • Replace broken or cracked pipes and remove roots • Seal pipe connections • Avoid willow trees near system
Sewage surfacing in yard	Human contact with sewage is a serious public health risk. Many water-borne diseases exist in household sewage.	• Excess water use • System blockages • Improper system elevations • Undersized soil treatment system • Pump failure or improper operation	• Fix leaks • Install water-saving fixtures • Clean septic tank and check pumps • Consult professionals • Fence off area until problem is fixed
Sewage odors — indoors	Toxic gases can cause discomfort and illness.	• Sewage surfacing in yard • Improper plumbing • Sewage backup in house • Unsealed ejector sump pump • Roof vent pipe frozen closed	• Repair plumbing • Clean septic tank and check pumps • Replace water in drain traps
Sewage odors — outdoors	Major nuisance, but no serious health risk	• Source other than owner's system • Sewage surfacing in yard • Inspection pipe caps damaged or removed	• Clean tank and check pumps • Replace damaged caps • Repair or replace drain field
Contaminated drinking or surface waters	The above public health risks are magnified by possible ingestion of contaminated water. Drinking contaminated water can cause health problems such as dysentery, hepatitis, and, for infants, methemoglobinemia.	• System too close to well, water table, or fractured bedrock • Cesspool or drywell in use • Sewage discharges to surface or groundwater • Improper well construction • Broken water supply pipe • Source other than homeowner's system • Broken sewage lines	• Replace your well and/or septic system • Contact a local unit of government to investigate other potential sources

Problem	Risks	Potential Causes	Potential Remedies
Lift station alarm activated	Tank effluent may back up into the house.	• Pump failed • Fuse breaker tripped • Pump unplugged • Controls malfunctioning	• Check breaker and plugs • Check controls and pump • Make sure professional replaces pump with proper size unit
Distribution pipes and/or soil treatment system freezes in winter	The system may be inoperable.	• Improper construction • Check valve in lift station not working' • Foot or vehicle traffic over piping • Low flow rate • Lack of use • Undersized	• Check construction • Examine check valve and/or replace it • Keep people and vehicles off area • Increase water use • Have someone use water in house if you are away • Increase frequency of pump cycling • Operate septic tank as a holding tank • Pump system in fall and use carefully over winter months • Don't use antifreeze

Use and Operation

The effectiveness of a septic system in treating sewage depends on how the homeowner uses and operates the system. Water-use habits, fixtures and appliances, product selection, and septic additives and cleaners all affect how well a septic system works. The septic system operates every time wastewater enters the system.

Water Use

The total amount of water and the pattern of water use affects how the septic system works. For complete and uniform treatment of wastes, the system needs time to work. The ideal situation would be to have wastewater enter the system as evenly as possible throughout the day and week. Every time water is used, waste-water enters the septic tank and an equal amount of water leaves the tank for the drain field. Large volumes of water entering the system in a short period of time may agitate and re-suspend sludge and scum into the liquid contents. If this happens, suspended solids are carried into the soil treatment system, clogging soil pores and preventing adequate treatment.

Excessive water use puts an unnecessary load on the septic system. Allowing faucets to drip, fixtures to leak, and using running water to wash and rinse dishes, shave, and brush teeth are wasteful water habits. In most households, toilet flushing is the largest user of water, followed by bathing, laundry, and dishwashing.

One of the best ways to reduce the amount of water treated by the septic system is to replace old water-using appliances. If a major remodeling is planned, regulations may require upgrades to low water use appliances. For example, local government units may have adapted the new state building codes requiring low-flush toilets in new construction or when replaced by a plumber. Whether remodeling or not, consumers may choose low-flow showerheads, hand-held showers with pause control, and temperature control valves to reduce water use, save energy, and save money. The way appliances are used affects how much water passes through the septic system, as shown in the chart.

Typical Ranges of Water Used (in gallons)

ACTION	TYPICAL USE	CONSERVATIVE USE	ULTRA-CONSERVATIVE USE
Toilet-flushing	6 (old standard)	1.5-3 (low-flow)	Composting toilet
Tub bath	30 (1/2 filled)	15 (1/4 filled)	Sponge bath
Shower			
10 min	50 (5 gal/min)	25 (2.5 gal/min)	3 (camper style)
3 min	15 (5 gal/min)	7.5 (2.5 gal/min)	
Laundry – full load			
Top loading	50-60 (older models)	40 (newer models)	
Front loading	33 (older models)	17-28 (newer models)	Laundromat
(suds-saver reuses most of the "wash fill" for the 2nd load)			
Dishwashing			
Machine	12-15 (old-reg. cycle)	6-9 (new-reg. cycle)	
(Pre-rinsing before loading ads 3-5 gal.)			
Hand	16 (faucet rinse)	6 (basin rinse)	
Teeth-brushing	2 (faucet running)	1/8 (wet brush; brief rinse)	
Hand-washing	2 (faucet running)	1 (basin; brief rinse)	
Shaving	3-5 (faucet running)	1 (basin; brief rinse)	

Improving Septic System Performance: Room by Room

By controlling water use, selecting appropriate products, and making wise disposal decisions, the homeowner can improve performance of the septic system and avoid major problems!

A typical Minnesotan uses about 110 gallons of water per day. About 60 percent of that water is used in the bathroom. Reducing water use conserves the water resources and helps the septic system.

In the course of daily living, many materials used in the home enter the waste-water system for disposal and treatment. Some are obvious and others much less obvious.

Home Management Ideas to Improve Septic System Performance:

Bathroom

- Install a new low-flow toilet. New units give a complete flush with 1 1/2 gallons per flush. Caution: displacing water with bricks or water bottles in old toilet tanks often gives less than a total flush.
- Repair leaky faucets and toilets immediately.
- Flush toilets less often. In many cases, the toilet can be used several times for liquid waste before flushing.
- Do not use "every flush" toilet bowl disinfectants that are placed in the tank or bowl.
- Do not flush facial tissues, paper towels, or personal hygiene products down the toilet.
- Do not flush cigarette butts or unwanted prescription or over the counter medications down the toilet.
- Use moderate amounts of white toilet paper. Toilet paper should break up easily in water. Some dyes used for toilet paper are difficult for bacteria to break down.
- Take showers instead of tub baths. Showers use less water than tub baths (about 5 gallons per inch in tub). Take shorter showers.
- Install low-flow shower heads, hand held showers with pause control, and temperature balance valve controls.
- Shut off water in the shower while lathering and shampooing.
- Do not run the hot water in the shower to warm the bathroom.
- Reduce use of drain cleaners by minimizing the amount of hair that goes down the drain.
- Shut off water while shaving and brushing teeth (save up to 5 gallons per minute).
- Fill basin to wash hands instead of washing under running water.
- Reduce use of cleaners by doing more scrubbing with less cleanser.

Kitchen

- Install low-flow faucets.
- Repair leaky faucets.
- Keep a pitcher of drinking water in the refrigerator instead of running the tap every time to get cool water.
- Hand wash dishes in the basin instead of under running water.
- Wash only full loads in the dishwasher.
- Install low-water-use dishwasher; use liquid detergent in the dishwasher.
- Use low-phosphate (0 to 5%) dishwasher soaps.

- Use the minimum amount of soap necessary to do the job. This is often less than suggested by manufacturers.
- Do not use a garbage disposal or dispose of vegetables, meat, fat, oil, coffee grounds and other undigested food products in the septic system. (Use composting or garbage service.)
- Reduce the use of drain cleaners by minimizing the amount of grease and food particles that go down the drain
- Use minimal amounts of mild cleaners, as needed only.
- When using drinking water treatment devices, be sure there is a shutoff valve so the system doesn't run continuously when the reservoir is full. Some units may reject up to 8 gallons for every 1 gallon retained.

Laundry

- Select a front-loading washing machine that uses 40% less water.
- Use suds-saving top-loading washing machine to reduce water and detergent use.
- Wash only full loads. Adjust load level settings for small loads.
- Distribute wash loads evenly throughout the week to avoid overloading the system with large volumes of water.
- Install filter on washer to remove lint.
- Use no-phosphate laundry detergents.
- Use the minimum amount of detergent or bleach necessary to do the job. This is often less than suggested by manufacturers.
- Use liquid detergents (powdered detergents add fine particles to the sludge accumulation).
- Use highly biodegradable powdered detergents if liquid detergents are undesirable.

Basement and Utility Rooms

- Recharge the water softener as infrequently as possible to reduce water use.
- Reroute the water softener recharge water outside the septic system. It does not need to be treated.
- Route chlorine-treated water from swimming pools and hot tubs outside of septic system to a ditch or separate dry well.
- Route roof drains and basement drainage tile water (sump pumps) outside of septic system and away from the drain field.
- Dispose of all solvents, paints, antifreeze, and chemicals through local recycling and hazardous waste channels. Consult local solid waste officials for proper methods. These materials kill valuable bacteria in the system and may pass through to contaminate drinking water.

- Never let wash water from latex paint on brushes or rollers go down the drain and into the septic system.

Septic Starters, Feeders, Cleaners, and Other Additives

There is no quick fix or substitute for proper operation and regular maintenance. Do not use starters, feeders, cleaners, and other additives.

! There's no such thing as a safe AND effective septic system additive. !

Starters: A starter is not needed to get the bacterial action going in the septic tank. There are naturally occurring bacteria present in wastewater.

Feeders: It is not necessary to "feed" the system additional bacteria, yeast preparations, or other home remedies. There are millions of bacteria entering the system in normal sewage. If the bacterial activity level is low, figure out what is killing them (for example, cleaners) and correct it. High levels of activity will return after the correction.

Cleaners: Additives effective in removing solids from the septic tank will probably damage the soil treatment system. Many additives suspend the solids that would normally float to the top or settle to the bottom of the tank. This allows them to be flushed into the soil treatment system, where they clog pipes and soil pores leading to partial or complete failure of the system.

Other Additives: Additives, particularly degreasers, may contain carcinogens (cancer-causing agents) that flow directly into the groundwater along with the treated sewage.

! Additives and cleaners are heavily promoted to homeowners through direct mail and telephone. Don't be misled !

KERN COUNTY ONSITE SYSTEMS MANUAL

PART 7

REQUIREMENTS FOR

SEWAGE PUMPING, GREASE TRAPS, AND TOILET RENTAL BUSINESS

TERMS AND CONDITIONS OF OPERATION OF

SEWAGE PUMPING,

GREASE PUMPING,

AND TOILET RENTAL AGENCIES

IN KERN COUNTY

Environmental Health Division

2700 “M” Street, Suite 300

Bakersfield, CA 93301

Office: (661)862-8740

Fax: (661)862-8701

E-Mail: eh@co.kern.ca.us

http://kernpublichealth.com/solid-waste/

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Introduction

- According to the **California Health and Safety Code, Section 117400 et seq.**, those who wish to enter into the business of sewage pumping or the rental of portable toilets, or both, must register their business with the local Health Officer of that city, town, or county in which is desires to conduct this activity.

- Pursuant to **Section 19310 of the Food and Agricultural Code**, grease haulers are required to register with the California Food and Agriculture Department.

- Likewise, **Kern County Ordinance Code 8.04.030** requires that those who desire to conduct these same businesses within Kern County "shall apply for an environmental health permit on the form provided, pay to the health officer the prescribed fee and penalty, if any, and shall at all ties possess said permit."

- The Kern County Public Health Services Department, Environmental Health Division (KCEHD), has the enforcement authority to register, issue environmental health permits, and regulate the activities of sewage pumping, grease trap pumping, and toilet rental businesses.

- The following information and application reflects the Terms and Conditions of Registration individuals and businesses conducting sewage pumping, grease trap pumping, and/or toilet rental businesses agree to follow. In so doing they will comply with both state law and the policies established by the Health Officer.

If there are any further questions, you may contact our office and ask to speak to a Solid Waste Specialist.

Disease Hazards of Sewage

Exposure to human fecal waste can occur through the following methods:

- Swallowing
- Eating with soiled hands
- Contact with flies, cockroaches, etc.
- Soft tissue around the eyes and nose
- Cut and scratches on the skin
- Contact with hoses, hand tools, etc.
- Inhalation

Infectious diseases caused by the improper handling or disposal of sewage include:

- Dysentery
- Salmonellosis
- Hepatitis
- Typhoid fever
- Poliomyelitis (Polio)
- Paratyphoid fever
- Cholera

Sewage can also contain:

- Toxic chemicals
- Pesticides
- Heavy metals
- Parasites

Some of these materials can accumulate in the body over time, resulting in poor health or malignant (cancerous) health conditions.

It is important that those involved in the care of sewage disposal systems exhibit good sanitary practices and take precautions when handling and disposing of sewage wastes. It is recommended that sewage workers wear appropriate protective gear, including:

- Coveralls
- Rubber boots
- Non-absorbent gloves
- Eye protection

Additionally, appropriate measures are required to protect the public health by preventing contamination of soil and water. This is done by:

1. Maintaining vehicles and equipment in a clean, sanitary condition.

2. Maintaining leak-proof and fly-tight vessels, tanks, pumps, hoses, and holding containers reduces the incidence of accidental spillage, odors, and the attraction of vectors.

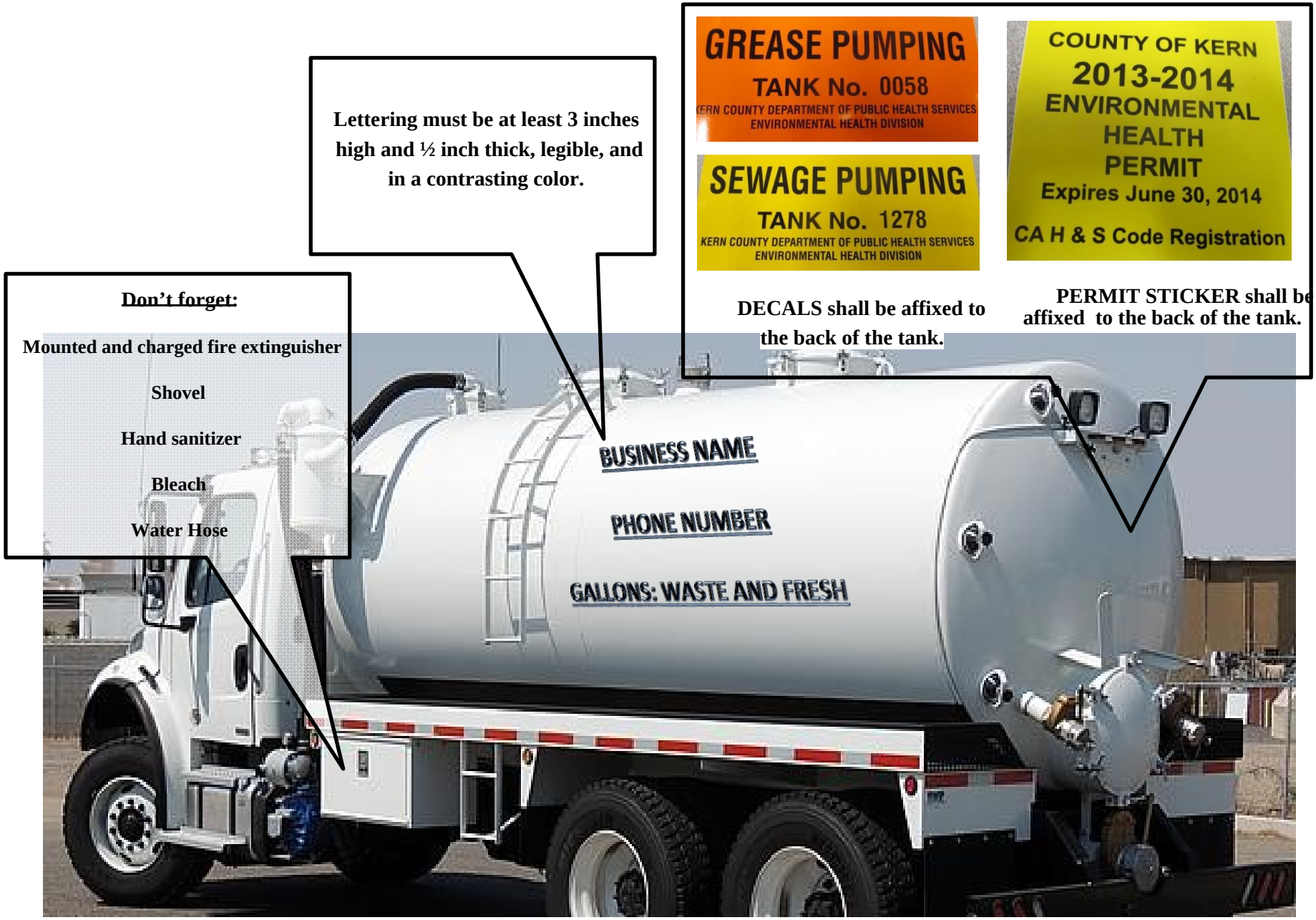
3. The immediate clean-up and proper disinfection of contaminated areas ensures that disease causing organisms are effectively destroyed.

Proof of Knowledge by Written Examination

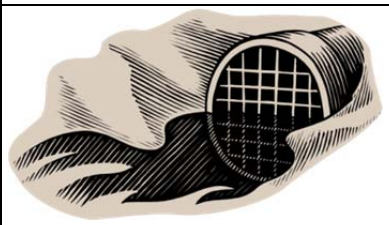
California Health and Safety Code, Section 117420, the health officer shall issue a "registration" only after the applicant satisfactorily completes an examination. The test consists of twenty (20) questions, which measure the applicant's knowledge of sanitary laws and ordinances, as well as equipment and reporting requirements within Kern County. The questions have been taken entirely from the contents of this booklet. The application package is not complete until the applicant passes the test with a passing grade of 70%. If applicant fails the test, he/she may retake the test within 10 days. If the applicant fails the test the second time, he/she shall fill out a new application and resubmit all application materials. The application package is not complete until applicant passes the test.

Minimum Operator Requirements

It is the responsibility of the applicant that vehicle drivers possess the correct class of driver's license to operate a sewage pumping, grease trap pumping, and/or toilet cleaning business pumping vehicle. When pulling a trailer and the gross vehicle weight is 10,001 pounds or higher, a Class A license is required. When operating a single unit and the gross vehicle weight is 26,001 pounds or more, a Class B license is required. It is also the responsibility of the applicant to ensure that all operators of sewage pumping, grease trap pumping, and/or toilet cleaning vehicles are knowledgeable in observing sanitary principles and laws and in operating their equipment.


Lettering must be at least 3 inches high and ½ inch thick, legible, and in a contrasting color.
GREASE PUMPING
TANK No. 0058
KERN COUNTY DEPARTMENT OF PUBLIC HEALTH SERVICES
ENVIRONMENTAL HEALTH DIVISION
SEWAGE PUMPING
TANK No. 1278
KERN COUNTY DEPARTMENT OF PUBLIC HEALTH SERVICES
ENVIRONMENTAL HEALTH DIVISION
COUNTY OF KERN
2013-2014
ENVIRONMENTAL
HEALTH
PERMIT
Expires June 30, 2014
CA H & S Code Registration
DECALS shall be affixed to the back of the tank.
PERMIT STICKER shall be affixed to the back of the tank.
Don't forget:
Mounted and charged fire extinguisher
Shovel
Hand sanitizer
Bleach
Water Hose
BUSINESS NAME
PHONE NUMBER
GALLONS: WASTE AND FRESH

Minimum Requirements for ALL Vehicles

Permits and Decals	Lettering	Equipment
__1. Copy of the current health permit within the vehicle at all times.	__9. Business name and phone number affixed on both sides of the vehicle.*	__15. Racks are constructed and maintained so as to be easily cleanable.
__2. Current health permit registration stickers affixed to the tank.	__10. Tank volume affixed on both sides of the vehicle. **	__16. Discharge gates or valves are constructed and maintained to prevent leakage or spillage.
__3. Sewage/Grease pumping decals affixed to the tank.	__11. Tanks with split volumes shall be so indicated on both sides of the tank. **	__17. Discharge gates or valves are constructed to discharge contents in a manner which will not cause pollution or create a nuisance.
Tank Construction __4. Tank is metal, and welded or riveted.	__12. Lettering a minimum of 3inches in height and ½-inch diameter.	__18. Pumps are constructed and maintained to prevent leakage or spillage.
__5. Tank is watertight and splash proof.	__13. Lettering is distinctly contrasting from the background.	__19. Adequate hoses are present to properly reach sources without spilling onto the surface of the ground.
__6. All access ports are adequately sealed and do not leak.	__14. Lettering is legible during daylight hours from a distance of fifty (50) feet.	__20. A water hose present with a minimum 5/8-inch diameter and fifty (50) feet in length.
__7. The tank has an automatic shut-off valve to prevent overflow.		__21. A mounted and charged fire extinguisher.
__8. The tank is properly baffled to prevent sloshing.		__22. Shovel(s) in good repair.
*Vehicles which are able to unhitch waste tanks from the vehicle itself, must permanently affix information to the tank, not only the doors of the vehicle. **Tank volume must be placed on the tank itself, not the door(s) of the vehicle.		__23. Hand cleaner and/or hand soap. __24. One (1) gallon of liquid bleach or other approved disinfectant for disinfecting small spills.

Portable Chemical Toilet Requirements

__1. Toilets maintained clean and sanitary.	__5. Doors are self-closing and lock from the inside.	__9. Toilets have a minimum of ten (10) square feet of floor area when equipped with a urinal, and a minimum of eight (8) square feet of floor space when not equipped with a urinal.
__2. Toilets maintained free of refuse or debris.	__6. Toilets have adequate ventilation ports which are fly screened and vector-proof.	
__3. Toilets free of ponding of septage, sewage, and/or wastewater.	__7. Toilets are constructed with smooth, nonabsorbent, and easily cleanable surfaces.	
__4. Portable chemical toilet pumping vehicles have fresh water to service toilet units.	__8. Toilets have a holding tank with a minimum of forty (40) gallons	

Maintenance Yards and Storage Facility Requirements

__1. Zoning is approved by the Kern County Planning Department or local planning authority.	__4. The facility is free of ponding, pooling, standing sewage or septic waste water effluent, fecal material, or grease waste on the surface of the ground.	__7. Appropriate land use approval has been granted for stationary holding tanks and containment vessels used for the temporary portable waste, sewage, and grease prior to transport for disposal.
__2. Property owner authorization to use the property for storage purposes.	__5. The facility is free of stagnant water which would provide a breeding area for mosquitos and other insects.	__8. The property is free of refuse, trash, debris, and excessive weeds.
__3. The property is free from cross connection hazards to the public water system.	__6. The operator has supplied a hazardous materials operational business plan to the local authority of the storage of hazardous materials and hazardous wastes.	

Disposal and Interim Storage of Waste

1. All sewage, portable toilet, and grease trap wastes shall be disposed of at a municipal waste water treatment plant.

2. Copies of disposal permits/letters of authorization or approved "*Will Serve Letter"* issued by any treatment plant shall be submitted to Kern County Environmental Health Division (KCEHD) within fifteen (15) days of issuance. A "*Will Serve Letter"* is a written document, which promises to provide or allow the use of their waste disposal plant, upon completion of the Environmental Health Permit Registration.

3. Firms operating in Kern County which plan to utilize land application disposal sites require prior approval from KCEHD.

4. Stationary Tanks used for the interim storage of sewage before transporting to an approved disposal location, require land use approval from the local authority for this activity.

5. Vehicles and/or tankers used for the interim storage of sewage, must possess a valid health permit/registration issued by KCEHD.

Assembly Bill 1333 and Grease Pumpers

On August 28, 2006, the Governor of California signed into Law **Assembly Bill 1333**. According to this Assembly Bill, vehicles which pump grease interceptors/traps cannot be used to pump any other waste. In Kern County, **businesses must designate vehicles for the sole purpose of pumping grease or other wastes—but the same vehicle cannot be used pump grease and other waste streams.**

In addition, this bill mandates that the entire grease trap tank shall be pumped.
Used interchangeably in some parts of the country, "traps" may refer to the small, indoor, above-grade system used to prevent kitchen grease from entering the sewer system, while "interceptors" may refer to the large, external, below-ground devices. For purposes of this Registration Pamphlet, "traps" will be used for both.

Documentation and Reporting

Record Retention

All pertinent records for the current and previous **two (2) years** shall be kept accurate and made available for inspection upon request. Pertinent records include:

1. Customer receipts;
2. Waste manifests;
3. Monthly pumping reports; and
4. Information requested in the Health and Safety Registration Application.

Mandatory Reporting

A change in company address shall be reported in writing to KCEHD by registered mail within **two (2) working days.**

Additionally, any change in the following shall be reported in writing to KCEHD **within five (5) working days**:

1. Any change in vehicle storage yard location;
2. Addition or removal of pumping vehicles;
3. Change in company ownership; and
4. Change in/addition of waste disposal locations.

All discharges, including spills exceeding five (5) gallons, in areas not intended for discharge shall be reported to KCEHD **within twenty-four (24) hours** of said discharge. Written notification shall be provided to KCEHD **within five (5) working days**. Written notification may be submitted via fax to: (661) 862-8701, via mail, or via E-mail to: eh@co.kern.ca.us.

Customer Records

The customer shall receive from the sewage/grease trap pumping business, a written statement showing the services rendered. It is also understood, that the entire septic tank/grease trap shall be pumped. The following information is required on the customer's written receipt or statement:

1. Customer name, physical address, and date of pumping service;
2. The number of compartments pumped;
3. Estimated gallons removed;
4. The type of septic containment device pumped: e.g. septic tank, cesspool, sewage well, vault, privy, restaurant grease trap, wastewater pond; and
5. Any repairs and replacement parts used.

Monthly Pumping Reports

According to the **California Health and Safety Code, Section 117435(a),** all sewage pumping and grease trap pumping businesses shall file with the health officer, or his or her duly authorized representative, a report specifying the pumping activities over a given frequency. These reports are legal documents, and it is very important they are closely reviewed by the operator before being submitted to the Division.

1. All companies shall submit a **typed or legibly printed** pumping report of activities to this Division no later than **the 15th day of the following month.**

2. Reports are specific to pumping activities within the designated month. If a pumping activity from a previous month is omitted from that month's report, it shall not be included on the following month's report. A corrected report shall be submitted reflecting the previously omitted activity.

3. Interim storage of sewage, portable toilet, and grease trap wastes in stationary tanks, transfer, or out-of-service vehicles shall be reporting in the Monthly Pumping Report.

4. If no pumping activity has occurred for the month, **"No Activity"** or **"No Pumping This Month"** shall be written on the pumping report and submitted.

SEWAGE PUMPING REPORT

MONTHLY PUMPING REPORT

Company _____

Address _____

Return to:

Kern County Environmental Health Division
2700 "M" Street, Suite 300

Report for the month of: _____

FA: _____

Waste Types:
1=Septic
2=Grease
3=Other: Specify

RESIDENT NAME (Last, First) OR BUSINESS NAME	ADDRESS OF JOB	CITY	DATE PUMPED	DATE	DISPO	Other	TANK DECAL #	Gallons

Include your company's full name and address.

The FA# is assigned to all new companies upon registration with Kern County Environmental Health Division (Example: FA0001234).

ddress _____

.kern.ca.us

Submit by the 15th of the following m

OR BUSINESS NAME B COMPLETED	PHYSICAL ADDRESS OF JOB	CITY	DATE PUMPED

Include the complete business name or residential customer name for the property being services. This is not a real estate or title company who requests the pumping for a real estate transaction.

The complete physical address of where the pumping activity took place, including the city. If an address is unavailable, the use of an Assessor Parcel Number or an intersection is sufficient.

When material is pumped from the same address, the volumes pumped shall be reported separately.

The date of the pumping activity.

@co.kern.ca.us

Waste Types:
1=Septic
2=Grease
3=Other: Specify

of the following month

	DATE PUMPED	DATE DISPOSED	DISPOSAL LOCATION	WASTE Type	WASTE Other Specify	TANK DECAL #	Gallons

The "Tank Decal #" is the number found on the "Septic" or "Grease" sticker issued by Kern County Environmental Health.

The type of waste pumped:

1) Septic

(2) Grease trap

(3) Other. "Other" must be approved by this Division in writing prior to being pumped.

The specific disposal location of where waste is discharged. Your company must provide proof of authorization from the disposal facility, before obtaining a Health Permit from this Division.

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT:

OWNER/OPERATOR SIGNATURE DATE

Print name of person signing above

The completed report shall be signed by the operator or authorized representative.

A report must be submitted even if pumping is not performed during the month. **If no pumping occurs for the month, write "No Pumping This Month" across the report.**

TOILET RENTAL AGENCY MONTHLY REPORTING

TOILET CLEANING MONTHLY REPORT

Company _____

Address _____

_____

FA _____

Return to:
Kern County Environmental Health Division
2700 "M" Street, Suite 300
Bakersfield, CA 93301
Office: (661) [illegible]

Month of _____ 20 _____

MUST BE RECEIVED BY THE 15TH OF THE FOLLOWING MONTH

DISPOSAL DATE	

The FA# is assigned to all companies upon registration with Kern County Environmental Health Division (E xample: FA0001234).

Include your company's full name and address.

DISPOSAL DATE	DISPOSAL LOCATION	GALLONS DISPOSED

The specific disposal location of where waste is discharged. Your company shall provide proof of authorization from the disposal facility, before obtain ing a Health Permit from this Divisi on.

The completed report shall be signed by the operator or authorized representative.

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FORGOING IS TRUE AND CORRECT:

_____
OWNER/OPERATOR SIGNATURE **DATE**

_____
Print name of person signing above

A report must be submitted even if pumping is not performed during the month. **If no pumping occurs for the month, write "No Pumping This Month" across the report.**

Special Conditions

Waste Streams

1. Sewage pumping vehicles may only be used for pumping and transporting sewage and/or chemical toilet wastes in accordance with **AB 1333**.

2. **Penal Code 374.5(c)** **prohibits** grease trap pumping vehicles from transporting or removing "yellow grease, cooking grease, recyclable cooking oil, septic wastes, or fluids collected at car washes".

3. Any material hauled in a sewage pumping vehicle is considered to be contaminated with sewage and therefore must be deposited at a sewage treatment plant or permitted land disposal site.

4. Sewage pumping vehicles may **not** be used for:

    a. Pumping Grease Traps
    b. Spreading Water
    c. Hauling Oilfield Waste
    d. Hauling Car Wash Wastes
    e. Hauling Other Industrial Wastes

5. Other waste streams must be approved in advance by the KCEHD. Written notice must be received by this Division prior to approval.

California State Agency Requirements

Those pumping companies that engage in pumping grease interceptors shall also comply with the requirements of the Department of Food and Agriculture (CDFA). This includes registering with the CDFA and displaying the grease hauler registration decal.

Other Conditions

All permit fees must be paid prior to operating in Kern County. Kern County operates on a fiscal year, which commences on July 1st and ends on June 30th. The purpose of the health permit fee is to cover the initial cost of vehicle and storage yard inspections, and the review of monthly pumping reports. These fees are subject to change, pending approval of the Kern County Board of Supervisors.

Enforcement

When an operator of a sewage pumping, grease pumping, or toilet rental business is found in violation with the terms and conditions of the Health and Safety Registration, KCEHD may initiate enforcement action.

1. Methods of enforcement action include:

    a. Kern County Ordinance Code 8.04.190 (B): Failure to obtain or possess an Environmental Health Permit as required is a misdemeanor.

    b. Legal Notice or Notice of Violation

    c. Request for a Compliance Review

    d. Request for an Administrative Hearing

    e. Notice to Appear in Court

Kern County Ordinance Code 8.04.160: If the Director of Public Health Services determines that applicable laws have not been complied with, he may suspend or revoke the permit after first issuing a notice, setting forth the acts or omissions with which the permittee is charged and informing him of his right to a hearing.

California Public Resource Code, Section 16053: Up to $5,000 in civil penalties for the first violation, and up to $10,000 for second or subsequent violations.

Kern County Ordinance Code 8.04.130: The Director of Public Health Services is authorized to charge for services rendered by the personnel of the EHD, which are necessary to the performance of their duties as required by law. These charges are in addition to the health permit and fee(s) associated with the sewage pumping vehicle(s), grease pumping vehicle(s), and/or toilet rental business.