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LOCAL AGENCY MANAGEMENT PROGRAM FOR ONSITE WASTEWATER TREATMENT SYSTEMS LOS ANGELES COUNTY, CALIFORNIA

Submitted to:

California Regional Water Quality Control Board
Los Angeles Region

County of Los Angeles
Department of Public Health, Environmental Health

Project No. 603287.047
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LIST OF ACRONYMS

ANSI	American National Standards Institute
APMP	Advanced Protection Management Program
BOD	biochemical oxygen demand
CBOD	carbonaceous biochemical oxygen demand
CEDEN	California Environmental Data Exchange Network
CEG	Certified Engineering Geologist
CHG	Certified Hydrogeologist
CRWQCB	California Regional Water Control Board
DPH	Department of Public Health
DPW	Department of Public Works
EDF	Electronic deliverable format
EH	Environmental Health
EPA	Environmental Protection Agency
FOG	Fats, oil, grease
gpd	gallons per day
HUC	hydrologic unit code
IAPMO	International Associates of Plumbing and Mechanical Officials
IRWMP	Integrated regional watershed management plan
LAMP	Local Agency Management Program
LARWQCB	Los Angeles Regional Water Quality Control Board
LRWQCB	Lahontan Regional Water Quality Control Board
M gal	Million gallons
Mg/L	Milligrams-per-liter
MPI	Minutes per inch
MPN	Most probable number
msl	Mean sea level
NOWTS	Non-conventional onsite wastewater treatment systems
NPDES	National Pollutant Discharge Elimination System
NSF	National Sanitation Foundation
OWTS	Onsite wastewater treatment systems
PCE	Perchloroethylene
PE	Professional Engineer
PG	Professional Geologist
PS/GE	Professional Soil/Geotechnical Engineer
QC	Qualified Contractor
QP	Qualified Professional
REHS	Registered Environmental Health Specialist
RV	Recreational vehicle
RWQCB	Regional Water Quality Control Board
SNMP	Salt and Nutrient Management Plan
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
SWTR	Surface Water Treatment Rule

WDR	Waste Discharge Requirements
TCE	Trichloroethylene
TDS	Total dissolved solids
TKN	Total Kjeldahl Nitrogen
TMDL	Total maximum daily load
TN	Total Nitrogen
TSS	Total suspended solids
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
WMA	Wastewater management area
WQAP	Water Quality Assessment Program
WWTP	Waste water treatment plants

EXECUTIVE SUMMARY

Onsite wastewater treatment systems (OWTS) are useful and necessary structures that allow habitation at locations that are removed from centralized wastewater treatment systems. When properly sited, designed, operated, and maintained, OWTS treat domestic wastewater to reduce its polluting impact on the environment and most importantly protect public health. Estimates for the number of installations of OWTS in California as of 2012 are that more than 1 million systems are installed and operating. The vast majority of these are functioning in a satisfactory manner and meeting their intended purpose.

However, there have been occasions in California where OWTS for a varied list of reasons have not satisfactorily protected either water quality or public health. Some instances of these failures are related to the OWTS not being able to adequately treat and dispose of waste as a result of poor design or improper site conditions. Others have occurred where the systems are operating as designed but their densities are such that the combined effluent resulting from multiple systems is more than can be assimilated into the environment. From these failures we must learn how to improve our usage of OWTS and prevent such failures from happening again.

As California's population continues to grow, and we see both increased rural housing densities and the building of residences and other structures in more varied terrain than we ever have before, we increase the risks of causing environmental damage and creating public health risks from the use of OWTS. What may have been effective in the past may not continue to be as conditions and circumstances surrounding particular locations change. So necessarily more scrutiny of our installation of OWTS is demanded of all those involved, while maintaining an appropriate balance of only the necessary requirements so that the use of OWTS remains viable.

The State Water Resources Control Board (SWRCB) prepared a 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" (SWRCB, 2012). The purpose of the OWTS Policy is to allow the continued use of OWTS, while being protective of water quality and public health. The OWTS Policy recognizes that responsible local agencies can provide the most effective means to manage OWTS on a routine basis. Therefore, as an important element, it is the intent of the OWTS Policy to efficiently utilize and improve upon where necessary existing local programs through coordination between the State and local agencies. To accomplish this purpose, the OWTS Policy establishes a statewide, risk-based, tiered approach for the regulation and management of OWTS installations and replacements and sets the level of performance and protection expected from OWTS. In particular, the OWTS Policy requires actions for water bodies specifically identified as part the OWTS Policy where OWTS contribute to water quality degradation that adversely affect beneficial uses. The individual Tiers are defined as follows:

- Tier 0 – Existing OWTS: Existing OWTS that are properly functioning, and do not

meet the conditions of failing systems or otherwise require corrective action (for example, to prevent groundwater impairment) as specifically described in Tier 4, and are not determined to be contributing to an impairment of surface water as specifically described in Tier 3, are automatically included in Tier 0.

- Tier 1 – Low-Risk New or Replacement OWTS: New or replacement OWTS that meet low risk siting and design requirements as specified in Tier 1, where there is not an approved Local Agency Management Program per Tier 2. Los Angeles County has a Local Agency Management Program; therefore, OWTS in Los Angeles County will not qualify as Tier 1.

- Tier 2 – Local Agency Management Program for New or Replacement OWTS: California is well known for its extreme range of geological and climatic conditions. As such, the establishment of a single set of criteria for OWTS would either be too restrictive so as to protect for the most sensitive case, or would have broad allowances that would not be protective enough under some circumstances. To accommodate this extreme variance, local agencies may submit management programs ("Local Agency Management Programs") for approval, and upon approval then manage the installation of new and replacement OWTS under that program. Local Agency Management Programs approved under Tier 2 provide an alternate method from Tier 1 programs to achieve the same policy purpose, which is to protect water quality and public health. In order to address local conditions, Local Agency Management Programs may include standards that differ from the Tier 1 requirements for new and replacement OWTS. Once the Local Agency Management Program is approved, new and replacement OWTS that are included within the Local Agency Management Program may be approved by the Local Agency. A Local Agency, at its discretion, may include Tier 1 standards within its Tier 2 Local Agency Management Program for some or all of its jurisdiction. However, once a Local Agency Management Program is approved, it shall supersede Tier 1 and all future OWTS decisions will be governed by the Tier 2 Local Agency Management Program until it is modified, withdrawn, or revoked.

- Tier 3 – Impaired Areas: Existing, new, and replacement OWTS that are near impaired water bodies may be addressed by a Total Maximum Daily Load (TMDL) and its implementation program, or special provisions contained in a Local Agency Management Program. The TMDL and its implementation plan shall be established by the US Environmental Protection Agency, or adopted by the County as Basin Plan Amendment(s). If there is no TMDL or special provisions, new or replacement OWTS within 600 feet of water bodies impaired for nitrogen or pathogens must meet the specific requirements of Tier 3. In this Local Agency Management Program (LAMP), OWTS near impaired waterbodies and new or replacement OWTS within 600 feet of water bodies impaired for nitrogen or pathogens must meet the specific requirements of Tier 3, which includes requirements for supplemental treatment as a non-conventional OWTS (NOWTS) as well as inclusion in the Advanced Protection Management Program (APMP) described in this LAMP.

- Tier 4 – OWTS Requiring Corrective Action: OWTS that require corrective action or are either presently failing or fail at any time while the OWTS Policy is in effect are automatically included in Tier 4 and must follow corrective actions described in the OWTS Policy. Under the OWTS Policy, Tier 4 OWTS must continue to meet applicable requirements of Tier 0, 2 or 3 pending completion of corrective action. Tier 4 OWTS that are brought into compliance with Tier 2 or Tier 3 requirements may then be managed under this LAMP.

The OWTS Policy only authorizes subsurface disposal of domestic strength, and in limited instances high strength wastewater, and establishes minimum requirements for the permitting, monitoring, and operation of OWTS for protecting beneficial uses of waters of the State and preventing or correcting conditions of pollution and nuisance. This LAMP is intended to apply to all OWTS in Los Angeles County that have domestic wastewater design flows of up to 10,000 gallons per day (gpd) and that are located within: (a) unincorporated areas of Los Angeles County; (b) cities that contract with the County for Building and Safety approval; and (c) any city that enters into an agreement with the County for OWTS management pertaining to the LAMP.

For Tier 2 and Tier 3 OWTS that qualify for management under this LAMP as well as Tier 0 OWTS, the OWTS Policy conditionally waives the requirement for owners of OWTS to apply to the local RWQCB office for and receive Waste Discharge Requirements (WDR) in order to operate their systems when they meet the conditions set forth in the OWTS Policy. Nothing in the OWTS Policy or this LAMP supersedes or requires modification of TMDLs or Basin Plan prohibitions of discharges from OWTS.

Los Angeles County Codes Title 11 (Health and Safety) and Title 28 (Plumbing) detail the regulation, design, installation, use and maintenance of OWTS in Los Angeles County. The DPH published Requirements and Procedures for Conventional and Non-Conventional Onsite Wastewater Treatment Systems (also referred to as the "Professional Guide"), draft version dated May 2016, to detail requirements and procedures for obtaining approval from the DPH when installing or renovating an OWTS or NOWTS and when Tier 3 is required in Los Angeles County. These Codes and Professional Guide accompany and help form the basis for this LAMP. The May 2018 Professional Guide incorporates requirements from this LAMP. If discrepancies arise between the LAMP, Professional Guide and Codes, the more restrictive requirement will apply. The LAMP and Professional Guide comply with the OWTS Policy. The County is adopting subdivision density specifications from Tier 1 of the OWTS Policy in this LAMP, as shown in this LAMP and the Professional Guide. The Codes also comply with the OWTS Policy, except for some horizontal setback minimum requirements not currently specified, which will be amended to the Plumbing Code.

Table E-1. Allowable Average Densities per Subdivision

Average Annual Rainfall (in/yr)	Allowable Density (acres/single family dwelling unit)
0 – 15	2.5

>15 – 20	2
>20 – 25	1.5
>25 – 35	1
>35 – 40	0.75
>40	0.5

Table E-2. Minimum Horizontal Setback Distances

Minimum Horizontal Distance in Clear Required From:	Septic Tank	Disposal Field	Seepage Pit
Buildings or Structures[1]	5 feet (1.52 m)	8 feet (2.44 m)	8 feet (2.44 m)
Property line adjoining private property	5 feet (1.52 m)	5 feet (1.52 m)	8 feet (2.44m)
Public Water Well, Where depth of effluent dispersal system >10 feet[8,9]	200 (61 m)[9]	—	200 (61 m)
Public Water Well, Where depth of effluent dispersal system ≤10 feet[8]	150 feet (45.7m)	150 feet (45.7m)	—
Springs, and Flowing Surface Water[8,10]	100 feet[10] (30.5m)	100 feet[7,10] (30.5m)	150 feet[7,10] (45.7 m)
Vernal Pools, Wetlands, Lakes, Ponds, or Other (Non-Flowing) Surface Water Bodies[8,11]	200 feet[11] (61m)	200 feet[7,11] (61m)	200 feet[7,11] (61m)
Seepage pits	5 feet (1.52 m)	5 feet (1.52 m)	12 feet (3.66 m)
Disposal field	5 feet (1.52 m)	4 feet[4] (1.22 m)	5 feet (1.52 m)
On site domestic water service line	5 feet (1.52 m)	5 feet (1.52 m)	5 feet (1.52 m)
Distribution box	—	5 feet (1.52 m)	5 feet (1.52 m)
Pressure public water main	10 feet (3.05 m)	10 feet (3.05 m)	10 feet (3.05 m)
Private Water Wells[8]	100 feet (30.5 m)	100 feet (30.5 m)	150 feet (45.72 m)
Monitoring wells[12]	100 feet (30.5 m)	100 feet (30.5 m)	100 feet (30.5 m)
Unstable Land Mass or Areas Subject to Earth Slides[13]	100 feet (30.5 m)	100 feet (30.5 m)	100 feet (30.5 m)
High Water Mark of Reservoir, Lake, or Flowing	400 (122 m)	400 (122 m)	400 (122 m)

Minimum Horizontal Distance in Clear Required From:	Septic Tank	Disposal Field	Seepage Pit
Water Body, Type I[14]			
High Water Mark of Reservoir, Lake, or Flowing Water Body, Type II[15]	200 (61 m)	200 (61 m)	200 (61 m)
Trunk of any tree[16]	10 feet (3.05 m)	10 feet (3.05 m)	10 feet (3.05 m)
Notes: See Table 3-4 for the detailed notes 1-16 regarding horizontal setbacks in this table.			

The Los Angeles Regional Water Quality Control Board (LARWQCB), the Lahontan Regional Water Quality Control Board (LRWQCB) and the SWRCB acknowledge that the County of Los Angeles, its elected officials, officers, employees, and agents (County) shall not be liable for any harm, loss, injury, death, or other damages arising out of County's administration of the program.

1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

This document presents the proposed Local Agency Management Program (LAMP) for oversight of onsite wastewater treatment systems (OWTS) within the County of Los Angeles, 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" (SWRCB, 2012).

The SWRCB's OWTS Policy provides a multi-tiered strategy of management of OWTS in California. This LAMP has been prepared by Los Angeles County to obtain approval for OWTS management for new and replacement OWTS under Tier 2 of the OWTS Policy and for existing, new and replacement OWTS near impaired water bodies under Tier 3 of the OWTS Policy. As described in the LAMP, Los Angeles County intends to continue to provide local oversight of OWTS by implementing practices that: (a) are suited to local conditions; (b) meet or exceed environmental protections of the "default" siting and design requirements for OWTS under Tier 1 of the SWRCB's OWTS Policy; and (c) ensure the best opportunity for coordinated and comprehensive management of OWTS, public health and water quality in Los Angeles County.

This LAMP is intended to apply to all OWTS in Los Angeles County that have domestic wastewater design flows of up to 10,000 gallons per day (gpd) and that are located within: (a) unincorporated areas of Los Angeles County; (b) cities that contract with the County for Building and Safety approval; and (c) any city that

enters into an agreement with the County for OWTS management pertaining to the LAMP. Domestic wastewater includes all OWTS with domestic strength waste including single family dwellings, apartments, office buildings and some restaurants. This LAMP does not apply to OWTS 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 (RWQCB). The County will refer the applicant to the respective RWQCB for the issuance of a Waste Discharge Requirements (WDR). Design and sitting of those OWTS will still fall under the purview of the County. California law provides that a county health officer or comprehensive environmental agency is responsible for permitting the installation of and regulating OWTS within its jurisdictional boundaries (California Health and Safety Code, §§ 116275; 116500). In Los Angeles County, the Health Officer has designated the Director of Environmental Health ("the Director") and all Environmental Health Specialists working for Los Angeles County as Deputy Health Officers for the purpose of enforcing State and local environmental health law. With the exception of Long Beach, Pasadena and Vernon, all cities within the County have designated the County's Health Officer as their jurisdictions' health officer.

1.1.1 Authority to Operate Program

It is the responsibility of the County of Los Angeles, Department of Public Health (DPH), Environmental Health (EH) to protect health, prevent disease, and promote the health and wellbeing for all persons in the County. Within the DPH, the Environmental Health Division strives to promote health and quality of life by identifying, preventing, and controlling harmful environmental factors in Los Angeles County.

The OWTS Policy (formerly known as Assembly Bill 885) became effective on May 13, 2013. The OWTS Policy mandates the adoption of additional wastewater treatment and groundwater monitoring requirements. The purpose of the OWTS Policy is to allow the continued use of OWTS, while protecting water quality and public health. The OWTS Policy recognizes that responsible local agencies can provide the most effective means to manage OWTS on a routine basis. The OWTS Policy requirements are incorporated into this LAMP, which is projected to be approved within 2 years of submittal.

The OWTS Policy conditionally waives the requirement for owners of OWTS to apply for and receive Waste Discharge Requirements (WDR) in order to operate their systems when they meet the conditions set forth in the Policy. To receive coverage under the OWTS Policy and the included waiver of waste discharges, OWTS will only accept and treat flows of domestic wastewater with a design flow that does not exceed 10,000 gpd. In addition, OWTS that accept high-strength wastewater from commercial food service

buildings are covered under the OWTS Policy and the waiver of waste discharge requirements if the wastewater does not exceed 900 mg/L BOD and there is a properly sized and functioning oil/grease interceptor (a.k.a grease trap). Nothing in this LAMP or the OWTS Policy supersedes or requires modification of TMDLs or Basin Plan prohibitions of discharges from OWTS.

The DPH provides guidelines for preparation and submittal of site or project specific plans and feasibility reports in accordance with the Los Angeles County Code, Title 11 (Health and Safety) and Title 28 (Plumbing) and other regulations applicable to OWTS, in order to obtain approval for construction and installation of an OWTS or non-conventional OWTS (NOWTS) in the County.

All requirements in this LAMP are subject to amendments when deemed necessary by the DPH and in accordance with the OWTS Policy. The DPH will make every effort to notify the related industry and all interested parties of any revisions to these guidelines 30 days prior to the effective date of the implementation. This LAMP does not represent all applicable regulations in their entirety; other requirements may apply.

The DPH reserves the right to refer projects to the Regional Water Board for any applications. Applicants who have been denied an approval by the DPH under the LAMP regulations may apply to the Regional Water Board for the issuance of a Wastewater Discharge Requirement (WDR). A WDR is still subject to the jurisdictional Building and Safety requirements for the installation of OWTS/NOWTS.

1.1.2 Definitions

The following definitions apply to this LAMP:

"303 (d) list" means the same as "Impaired Water Bodies."

"At-grade system" means an OWTS dispersal system with a discharge point located at the preconstruction grade (ground surface elevation). The discharge from an at-grade system is always subsurface.

"Average annual rainfall" means the average of the annual amount of precipitation for a location over a year as measured by the nearest National Weather Service station for the preceding three decades. For example the data set used to make a determination in 2012 would be the data from 1981 to 2010.

"Basin Plan" means the same as "water quality control plan" as defined in Division 7 (commencing with Section 13000) of the Water Code. Basin Plans are adopted by each Regional Water Board, approved by the State

Water Board and the Office of Administrative Law, and identify surface water and groundwater bodies within each Region's boundaries and establish, for each, its respective beneficial uses and water quality objectives. Copies are available from the Regional Water Boards, electronically at each Regional Water Boards website, or at the State Water Board's Plans and Policies web page (http://www.waterboards.ca.gov/plans_policies/).

"Bedrock" means the rock, usually solid, that underlies soil or other unconsolidated, surficial material. Bedrock includes igneous, metamorphic, and sedimentary rock formations.

"CEDEN" means California Environmental Data Exchange Network and information about it is available at the State Water Boards website or http://www.ceden.org/index.shtml.

"Cesspool" means an excavation in the ground receiving domestic wastewater, designed to retain the organic matter and solids, while allowing the liquids to seep into the soil. Cesspools differ from seepage pits because cesspool systems do not have septic tanks and are not authorized under the OWTS Policy. The term cesspool does not include pit-privies and out-houses which are not regulated under the OWTS Policy.

"Clay" means a soil particle; the term also refers to a type of soil texture. As a soil particle, clay consists of individual rock or mineral particles in soils having diameters <0.002 mm. As a soil texture, clay is the soil material that is comprised of 40 percent or more clay particles, not more than 45 percent sand and not more than 40 percent silt particles using the USDA soil classification system.

"Cobbles" means rock fragments 76 mm or larger using the USDA soil classification systems.

"Dispersal system" means a leachfield, seepage pit, mound, at-grade, subsurface drip field, evapotranspiration and infiltration bed, or other type of system for final wastewater treatment and subsurface discharge.

"Domestic wastewater" means wastewater with a measured strength less then high-strength wastewater and is the type of wastewater normally discharged from, or similar to, that discharged from plumbing fixtures, appliances and other household devices including, but not limited to toilets, bathtubs, showers, laundry facilities, dishwashing facilities, and garbage disposals. Domestic wastewater may include wastewater from commercial buildings such as office buildings, retail stores, and some restaurants, or from industrial facilities where the domestic wastewater is segregated from the industrial wastewater. Domestic wastewater may include incidental RV

holding tank dumping but does not include wastewater consisting of a significant portion of RV holding tank wastewater such as at RV dump stations. Domestic wastewater does not include wastewater from industrial processes.

"Dump Station" means a facility intended to receive the discharge of wastewater from a holding tank installed on a recreational vehicle. A dump station does not include a full hook-up sewer connection similar to those used at a recreational vehicle park.

"Domestic well" means a groundwater well that provides water for human consumption and is not regulated by the State Water Resources Control Board, Division of Drinking Water.

"Earthen material" means a substance composed of the earth's crust (i.e. soil and rock).

"EDF" see "electronic deliverable format."

"Effluent" means sewage, water, or other liquid, partially or completely treated or in its natural state, flowing out of a septic tank, aerobic treatment unit, dispersal system, or other OWTS component.

"Electronic deliverable format" or **"EDF"** means the data standard adopted by the State Water Board for submittal of groundwater quality monitoring data to the State Water Board's internet-accessible database system Geotracker (http://geotracker.waterboards.ca.gov/).

"Escherichia coli" means a group of bacteria predominantly inhabiting the intestines of humans or other warm-blooded animals, but also occasionally found elsewhere. Used as an indicator of human fecal contamination.

"Existing OWTS as defined by the State OWTS Policy" means an OWTS that was constructed and operating prior to the effective date of the OWTS Policy, and OWTS for which a construction permit has been issued prior to the effective date of the Policy. The effective date of the OWTS Policy is May 13, 2013. In all other situations, existing OWTS is any constructed and operating OWTS.

"Feasibility Study" means the documents, test results, geological reports, etc. that are required to be prepared and submitted in order to demonstrate the feasibility of installing an OWTS or NOWTS, including the 100% future expansion area.

"Flowing water body" means a body of running water flowing over the earth in a natural water course, where the movement of the water is readily

discernible or if water is not present it is apparent from review of the geology that when present it does flow, such as in an ephemeral drainage, creek, stream, or river.

"Groundwater" means water below the land surface that is at or above atmospheric pressure.

"High-strength wastewater" means wastewater having a 30-day average concentration of biochemical oxygen demand (BOD) greater than 300 milligrams-per-liter (mg/L) or of total suspended solids (TSS) greater than 330 mg/L or a fats, oil, and grease (FOG) concentration greater than 100 mg/L prior to the septic tank or other OWTS treatment component.

"IAPMO" means the International Association of Plumbing and Mechanical Officials.

"Impaired Water Bodies" means those surface water bodies or segments thereof that are identified on a list approved first by the State Water Board and then approved by US EPA pursuant to Section 303(d) of the federal Clean Water Act.

"Local agency" means any subdivision of state government that has responsibility for permitting the installation of and regulating OWTS within its jurisdictional boundaries; typically a county, city, or special district.

"Major repair" means either: (1) for a dispersal system, repairs required for an OWTS dispersal system due to surfacing wastewater effluent from the dispersal field and/or wastewater backed up into plumbing fixtures because the dispersal system is not able to percolate the design flow of wastewater associated with the structure served, or (2) for a septic tank, repairs required to the tank for a compartment baffle failure or tank structural integrity failure such that either wastewater is exfiltrating or groundwater is infiltrating.

"Mottling" means a soil condition that results from oxidizing or reducing minerals due to soil moisture changes from saturated to unsaturated over time. Mottling is characterized by spots or blotches of different colors or shades of color (grays and reds) interspersed within the dominant color as described by the USDA soil classification system. This soil condition can be indicative of historic seasonal high groundwater level, but the lack of this condition may not demonstrate the absence of groundwater.

"Mound system" means an aboveground dispersal system (covered sand bed with effluent leachfield elevated above original ground surface inside) used to enhance soil treatment, dispersal, and absorption of effluent

discharged from an OWTS treatment unit such as a septic tank. Mound systems have a subsurface discharge.

"New OWTS" means an OWTS permitted after the effective date of the OWTS Policy.

"NOWTS" means a non-conventional OWTS. It provides additional treatment of the effluent to reduce Nitrogen (N), Total Suspended Solids (TSS), and the Biological Oxygen Demand (BOD). It may also provide disinfection against pathogens, and alternate methods of effluent dispersal. NOWTS corresponds to the Tier 3 OWTS described in the OWTS Policy and any OWTS with a requirement for supplemental treatment.

"NSF" means NSF International (a.k.a. National Sanitation Foundation), a not for profit, non-governmental organization that develops health and safety standards and performs product certification.

"Oil/grease interceptor" means a passive interceptor that has a rate of flow exceeding 50 gallons-per-minute and that is located outside a building. Oil/grease interceptors are used for separating and collecting oil and grease from wastewater.

"Onsite wastewater treatment system(s)" (**OWTS**) means individual disposal systems, community collection and disposal systems, and collection and disposal systems that use subsurface disposal. The short form of the term may be singular or plural. OWTS do not include "graywater" systems pursuant to Health and Safety Code Section 17922.12.

"Percolation test" means 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.

"Permit" means a document issued by a local agency that allows the installation and use of an OWTS, or waste discharge requirements or a waiver of waste discharge requirements that authorizes discharges from an OWTS.

"Person" means any individual, firm, association, organization, partnership, business trust, corporation, company, State agency or department, or unit of local government who is, or that is, subject to the OWTS Policy.

"Pit-privy" (a.k.a. outhouse, pit-toilet) means self-contained waterless toilet used for disposal of non-water carried human waste; consists of a shelter built above a pit in the ground into which human waste falls.

“Policy” means the OWTS Policy for Siting, Design, Operation and Management of OWTS.

“Pollutant” means any substance that alters water quality of the waters of the State to a degree that it may potentially affect the beneficial uses of water, as listed in a Basin Plan.

“Projected flows” means wastewater flows into the OWTS determined in accordance with any of the applicable methods for determining average daily flow in the *USEPA Onsite Wastewater Treatment System Manual, 2002,* or for Tier 2 in accordance with an approved Local Agency Management Program.

“Public Water System” is a water system regulated by the State Water Resources Control Board, Division of Drinking Water or a Local Primacy Agency pursuant to Chapter 12, Part 4, California Safe Drinking Water Act, Section 116275 (h) of the California Health and Safety Code.

“Public Water Well” is a ground water well serving a public water system. A spring which is not subject to the California Surface Water Treatment Rule (SWTR), CCR, Title 22, sections 64650 through 64666 is a public well.

“Qualified professional” means an individual licensed or certified by a State of California agency to design OWTS and practice as professionals for other associated reports, as allowed under their license or registration. Depending on the work to be performed and various licensing and registration requirements, this may include an individual who possesses a registered environmental health specialist certificate or is currently licensed as a professional engineer or professional geologist. For the purposes of performing site evaluations, Soil Scientists certified by the Soil Science Society of America are considered qualified professionals. A local agency may modify this definition as part of its Local Agency Management Program.

“Regional Water Board” is any of the Regional Water Quality Control Boards designated by Water Code Section 13200. Any reference to an action of the Regional Water Board in the OWTS Policy also refers to an action of its Executive Officer, including the conducting of public hearings, pursuant to any general or specific delegation under Water Code Section 13223.

“Replacement OWTS” means an OWTS that has its treatment capacity expanded, or its dispersal system replaced or added onto, after the effective date of the OWTS Policy.

“Sand” means a soil particle; this term also refers to a type of soil texture. As a soil particle, sand consists of individual rock or mineral particles in soils

having diameters ranging from 0.05 to 2.0 millimeters. As a soil texture, sand is soil that is comprised of 85 percent or more sand particles, with the percentage of silt plus 1.5 times the percentage of clay particles comprising less than 15 percent.

“Seepage pit” means a drilled or dug excavation, three to six feet in diameter, either lined or gravel filled, that receives the effluent discharge from a septic tank or other OWTS treatment unit for dispersal.

“Septic tank” means a watertight, covered receptacle designed for primary treatment of wastewater and constructed to:

1. Receive wastewater discharged from a building;
2. Separate settleable and floating solids from the liquid;
3. Digest organic matter by anaerobic bacterial action;
4. Store digested solids; and
5. Clarify wastewater for further treatment with final subsurface discharge.

“Service provider” means a person capable of operating, monitoring, and maintaining an OWTS in accordance to the OWTS Policy.

“Silt” means a soil particle; this term also refers to a type of soil texture. As a soil particle, silt consists of individual rock or mineral particles in soils having diameters ranging from between 0.05 and 0.002 mm. As a soil texture, silt is soil that is comprised as approximately 80 percent or more silt particles and not more than 12 percent clay particles using the USDA soil classification system.

“Single-family dwelling unit” means a structure that is usually occupied by just one household or family and for the purposes of the OWTS Policy is expected to generate an average of 250 gallons per day of wastewater.

“Site” means the location of the OWTS and, where applicable, a reserve dispersal area capable of disposing 100 percent of the design flow from all sources the OWTS is intended to serve.

“Site Evaluation” means an assessment of the characteristics of the site sufficient to determine its suitability for an OWTS to meet the requirements of the OWTS Policy.

“Soil” means the naturally occurring body of porous mineral and organic materials on the land surface, which is composed of unconsolidated materials, including sand-sized, silt-sized, and clay-sized particles mixed with varying amounts of larger fragments and organic material. The various combinations of particles differentiate specific soil textures identified in the soil textural triangle developed by the United States Department of

Agriculture (USDA) as found in Soil Survey Staff, USDA; *Soil Survey Manual, Handbook 18,* U.S. Government Printing Office, Washington, DC, 1993, p. 138. For the purposes of the OWTS Policy, soil will contain earthen material of particles smaller than 0.08 inches (2 mm) in size.

"Soil Structure" means the arrangement of primary soil particles into compound particles, peds, or clusters that are separated by natural planes of weakness from adjoining aggregates.

"Soil texture" means the soil class that describes the relative amount of sand, clay, silt and combinations thereof as defined by the classes of the soil textural triangle developed by the USDA (referenced above).

"State Water Board" is the State Water Resources Control Board.

"Supplemental treatment" means any OWTS or component of an OWTS, except a septic tank or dosing tank, that performs additional wastewater treatment so that the effluent meets a predetermined performance requirement prior to discharge of effluent into the dispersal field.

"SWAMP" means Surface Water Ambient Monitoring Program and more information is available at:
http://www.waterboards.ca.gov/water_issues/programs/swamp/

"Telemetric" means the ability to automatically measure and transmit OWTS data by wire, radio, or other means.

"TMDL" is the acronym for "total maximum daily load." Section 303(d)(1) of the Clean Water Act requires each State to establish a TMDL for each impaired water body to address the pollutant(s) causing the impairment. In California, TMDLs are usually adopted as Basin Plan amendments and contain implementation plans detailing how water quality standards will be attained.

"Total coliform" means a group of bacteria consisting of several *genera* belonging to the family *Enterobacteriaceae*, which includes Escherichia coli bacteria.

"USDA" means the U.S. Department of Agriculture.

"Waste discharge requirement" or **"WDR"** means an operation and discharge permit issued for the discharge of waste pursuant to Section 13260 of the California Water Code.

1.2 Geographical Area

While listed as the 74th largest county by area in the United States (U.S.), as of the 2014 U.S. Census Bureau's Population Estimates Program (PEP), the County has a reported population of 10,116,705, making it by far the most populous county in the U.S. The County seat is the City of Los Angeles. Los Angeles County is bound to the northwest by Ventura County, to the north by Kern County, to the east by San Bernardino County and to the southeast by Orange County.

According to the U.S. Census Bureau, the County has a total area of 4,751 square miles (12,310 km^2), of which 4,083 square miles (10,570 km^2) is land and 693 square miles (1,790 km^2) (15%) is surface water. Los Angeles County includes 70 miles (110 km) of coastline along the Pacific Ocean and encompasses towering mountain ranges, deep valleys, forests, islands, lakes, rivers and desert areas. The Los Angeles River, Rio Hondo, the San Gabriel River and the Santa Clara River flow within Los Angeles County, while the Santa Monica Mountains and the San Gabriel Mountains are the primary mountain ranges. The western extent of the Mojave Desert begins in the Antelope Valley, in the northeastern part of the County. San Clemente Island and Santa Catalina Island, part of the Channel Islands archipelago, are located off the coast.

Los Angeles County has 88 incorporated cities and many unincorporated areas. At 4,083 square miles (10,570 square kilometers (km^2), it is larger than the combined areas of the states of Rhode Island and Delaware. The County contains more than one quarter of all California residents and is one of the most ethnically diverse counties in the state and the country. Most of the population of Los Angeles County is located in the south and southwest, with major population centers in the Los Angeles Basin, San Fernando Valley and San Gabriel Valley. Other population centers are found in the Santa Clarita Valley, Pomona Valley, Crescenta Valley and Antelope Valley.

Los Angeles County is divided west-to-east by the rugged San Gabriel Mountains, filled with coniferous forests and subject to plentiful snowfall in the winter. The San Gabriel Mountains are part of the Transverse Ranges of southern California and are contained mostly within the Angeles National Forest. Most of the highest peaks in the County are located in the San Gabriel Mountains, including Mount San Antonio 10,068 feet (3,069 meters (m) at the Los Angeles-San Bernardino county lines, Mount Baden-Powell 9,399 feet (2,865 m), Mount Burnham 8,997 feet (2,742 m) and the well-known Mount Wilson 5,710 feet (1,740 m) where the Mount Wilson Observatory is located. Several smaller, lower mountains are located in the northern, western and southwestern parts of the County, including the San Emigdio Mountains, the southernmost part of Tehachapi Mountains and the Santa Monica Mountains.

1.3 Regulation of Onsite Wastewater Treatment Systems (OWTS)

The County of Los Angeles, Department of Public Health (DPH), Environmental

Health (EH) is responsible for regulating OWTS throughout: (a) unincorporated areas of Los Angeles County; (b) cities that contract with the County for Building and Safety approval; and (c) any city that enters into an agreement with the County for OWTS management pertaining to the LAMP. Currently, eleven (11) cities have entered into agreements with DPH for management of OWTS, including, Agoura Hills, Bradbury, La Canada-Flintridge, La Habra Heights, Lynwood, Palos Verdes Estates, Rolling Hills, Rolling Hills Estates, Lancaster, Palmdale and Walnut. OWTS are used almost exclusively for properties located outside of municipal sewer service boundaries, which includes large areas in the northern and northeastern portions of the County, as well as in the mountain regions. For select OWTS systems, DPH requires supplemental treatment so that effluent meets a predetermined performance requirement, and refers to these systems with supplemental treatment as nonconventional OWTS (NOWTS). DPH administers OWTS (including NOWTS) regulations within its jurisdiction. Countywide there are currently estimated to be 53,148 OWTS and 813 NOWTS.

The County has historically operated its OWTS program under the authority granted to it by two California Regional Water Quality Control Boards (RWQCBs): (1) Lahontan Region 6 for areas that drain the northeastern regions of the County; and (2) the Los Angeles Region 4 for the remaining areas of the County including Santa Catalina and San Clemente Islands. **Figure 1-1** is a map of Los Angeles County, showing the areas of the heaviest concentration of OWTS, major watersheds and the RWQCB boundaries. **Figure 1-2** shows a similar map for the areas of the heaviest concentration of NOWTS

Insert: Figure 1-1 Los Angeles County Distribution of OWTS

Insert: Figure 1-2 Los Angeles County Distribution of NOWTS

1.4 Los Angeles County Codes Applicable to OWTS

Los Angeles County Codes Title 11 (Health and Safety) and Title 28 (Plumbing) detail the regulation, design, installation, use and maintenance of OWTS in Los Angeles County (summarized below). Along with the Los Angeles County Professional Guide described in Section 1.5, these codes accompany and help form the basis for this LAMP. **Table 1-1** presents a brief synopsis of various sections of these codes.

Table 1-1. Los Angeles County OWTS Codes Summary

County of Los Angeles Health and Safety Code (Title 11)	
Chapter 11.02 – General Provisions and Definitions	This chapter describes general provisions and definitions under the Health Code, including, but not limited to, the authority of the director of public health, powers of deputies, and maximum punishment for violations under Title 11. This chapter includes provisions intended to supplement the laws and regulations of the state of California by prescribing higher standards of sanitation, health and safety.
Chapter 11.20 – Housing, Sections 11.20.010 through 11.20.140	These sections provide definitions related to housing.
Chapter 11.38 – Water and Sewers, Section 11.38.450 and 11.38.470	Plan review and permit requirements for waste disposal systems. Provides location specifications for private sewage disposal systems. This chapter will be updated with an ordinance to implement the LAMP.
Chapter 11.54 – Wells, Test Holes, Cesspools, Cisterns and Septic Tanks	This section describes general hazards associated with wells, test holes, cesspools, cisterns and septic tanks.
Chapter 11.56 – Hearings and Enforcement	Describes provisions for hearings and enforcement, including for nuisance abatement.
County of Los Angeles Plumbing Code (Title 28)	
Chapter 1 – Administration	Describes administration of the plumbing code, which is intended to provide minimum standards to preserve the public health, safety and welfare by regulating the design, construction, quality of material, and installation of plumbing.
Chapter 3 – General Regulations	The design of the OWTS system will comply with minimum standards, including accepted plumbing material standards, as specified in Chapter 3.
Appendix H	Pertinent minimum horizontal set-back distances in Table H-1. All components of OWTS will be installed in accordance with the setback requirements for “stream” as prescribed in Table H-1. Notwithstanding, the total capacity for the tank, whether combined with the supplemental treatment unit as one tank or separate from the supplemental treatment unit as a trash tank will meet or exceed the capacity requirements as prescribed in Table H-2.

1.5 Los Angeles County Requirements and Procedures for OWTS and NOWTS (Professional Guide)

The DPH published Requirements and Procedures for Conventional and Non-Conventional Onsite Wastewater Treatment Systems (also referred to as the "Professional Guide"), draft version dated May 2016, to detail requirements and procedures for obtaining approval from the DPH when installing or renovating an Onsite Wastewater Treatment System (OWTS) and when a Nonconventional Onsite Wastewater Treatment System (NOWTS) is required in Los Angeles County (summarized below). The May 2018 Professional Guide incorporates requirements from this LAMP. Along with the Los Angeles County Health and Safety Code and Plumbing Code described in Section 1.4, this Professional Guide accompanies and helps form the basis for this LAMP.

The Professional Guide describes the policy, procedural and technical details for implementation of the Codes. It includes an approval process flowchart, plan submittal checklist, service request application (including fees), and technical requirements for OWTS and NOWTS. The Professional Guide will be reviewed and updated from time-to-time, typically every three years, to ensure that OWTS and NOWTS continue to sufficiently treat domestic wastewater to reduce its polluting impact on the environment and most importantly protect public health. The Professional Guide will be maintained by the DPH. The Professional Guide document submitted with this LAMP, as well as any substantive changes in the future will require approval by the Director of EH and by the RWQCB.

The Professional Guide is divided into fourteen main chapters as follows:

1. **Projects That Require Plan Review and Feasibility Reports.** This chapter details the types of projects requiring plan review and feasibility reports where a public sewer is not available, including subdivision, new construction, expansion, remodel and system repair projects.

2. **Professional Qualifications for Preparing Feasibility Reports and Installation of OWTS.** This chapter describes the professional requirements of a Qualified Professional (QP) for preparation of feasibility reports and OWTS design. Additionally, this chapter describes the professional requirements of a Qualified Contractor (QC) for OWTS construction and repairs.

3. **Documents and Information Required for OWTS Plan Review.** This chapter discusses important information required in the service request application, feasibility report, floor plan, grading plan, plot plan, cross-sectional view, and site identification.

4. **Setbacks and Other Considerations.** This chapter describes the setback requirements for OWTS and NOWTS installations and the procedures to obtain a waiver for certain setbacks.

5. **Septic Tank Capacity and Requirements.** This chapter describes the design,

installation, maintenance and monitoring requirements for septic tanks with references to the Plumbing Code.

6. **Approved Dispersal Methods for Conventional OWTS.** This chapter presents requirements for design and construction of dispersal systems, leach beds, leach lines, infiltration chambers, seepage pits, and gravel-packed pits.

7. **Future Expansion Area.** This chapter details requirements for sufficient land area to allow for an entirely new dispersal system (e.g., 100% future expansion area) and when this requirement may be waived. Inspection, testing, failure, and a 10% expansion of the current footprint rule related to the future expansion area are also described in this chapter. Where adequate land is not available for a 100% future expansion area, supplemental treatment (e.g., NOWTS) will be required.

8. **Determining Depth of Groundwater.** This chapter describes procedures for site evaluation, permitting and subsurface exploration for determining the depth of groundwater, including high groundwater situations.

9. **Requirements Applicable to All Percolation Testing Types.** This chapter explains the percolation test requirements and procedures for properties with proposed OWTS, noting that plan approval of the construction proposal will expire one year from the date of the approval.

10. **Percolation Testing for Leach Lines and Leach Bed Dispersal Systems.** This chapter explains the requirements and procedures for percolation tests for leach lines and leach bed dispersal systems, along with related percolation rate calculations.

11. **Percolation Testing for Seepage Pit Dispersal Systems.** This chapter explains the requirements and procedures for percolation tests for seepage pit dispersal systems, along with related percolation rate calculations. Considerations for gravel packed pits are also included in this chapter. When percolation testing holes cannot be filled to presoak or to conduct a conventional percolation test due to drainage of water from the hole, the maximum absorption capacity allowed by the Plumbing Code is considered to be exceeded, and supplemental treatment is required.

12. **Non-Conventional Onsite Wastewater Treatment Systems Requirements.** Conditions warranting supplemental treatment are described in this chapter, i.e., when a NOWTS is required. A NOWTS is used to protect the groundwater in areas where soil percolates too fast for sufficient natural filtration to occur. Supplemental treatment is also required when a conventional system fails and a replacement system cannot meet the current requirements or setbacks for surface and ground water. This chapter includes requirements for design, demonstration, approval, operation, monitoring, laboratory testing, maintenance, inspection and reporting for NOWTS. Soil replacement

conditions, required soil depths, component/tank certification requirements and effluent concentration limits are provided. This chapter describes situations when neither an OWTS nor NOWTS are permitted as well.

13. **NOWTS Start up and Leak Test.** This chapter provides the requirement for a NOWTS to pass a DPH leak test and final/start-up inspection before obtaining approval from a Building and Safety Department Inspector. Procedures and guidelines for leak testing and inspection are described in this chapter.

14. **Sub-division Limitations.** This chapter describes limitations on allowable average densities for land development projects including Conditional Use Permits and parcel sub-division projects where public sewer is not available and that are proposed after the effective date of the LAMP.

1.6 Organization of this LAMP

This LAMP is organized to explain the design and management of OWTS in Los Angeles County. It is also intended to document compliance with the SWRCB OWTS Policy for 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 Los Angeles County Health and Safety Code (Title 11), Plumbing Code (Title 28) and Professional Guide (dated May 2016). The Professional Guide is attached as part of this LAMP. The following briefly summarizes the contents of this document.

- **Section 1 – Introduction and Background.** This section describes the purpose, scope, geographical area, regulations, laws, guidance and organization for the LAMP.

- **Section 2 – Environmental Conditions, OWTS Usage and Water Quality Management in Los Angeles County.** This section provides background information on environmental conditions related to OWTS usage and suitability. This section describes the extent of OWTS usage in the County and summarizes water quality management measures.

- **Section 3 – OWTS Siting, Design and Construction Requirements.** This section presents excerpts from the Health and Safety Code, Plumbing Code and Professional Guide summarizing requirements for siting, design and construction of OWTS, as per the requirements of the OWTS Policy.

- **Section 4 – Special Management Issues.** This section describes special OWTS management issues in Los Angeles County, as per the OWTS Policy.

- **Section 5 – Prohibitions.** This section presents prohibitions in Los Angeles County, as per prohibitions in the OWTS Policy.

- **Section 6 – Program Administration.** This section describes the plan for maintaining records, water quality assessment and reporting to the RWQCB, as per the OWTS Policy.

- **Appendix A – Supporting Rationale for Los Angeles County OWTS Siting and Design Criteria.**

- **Appendix B – Cumulative Nitrate and Salt Loading from OWTS in Los Angeles County.**

2.0 ENVIRONMENTAL CONDITIONS, OWTS USAGE AND WATER QUALITY MANAGEMENT IN LOS ANGELES COUNTY

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

2.1 Surface Water Hydrology

The surface water hydrology of Los Angeles County is influenced mainly by topographical and land form conditions, climate, and water resources management activities.

2.1.1 Topography

The County of Los Angeles covers 4,751 square miles. The topography within the County is 25 percent mountains, 10 percent coastal plain, and 65 percent foothills, valley, or desert. Elevations range from sea level to a maximum of 10,068 feet at the summit of Mount San Antonio. The County is divided into five principal drainage systems: Los Angeles River Basin, San Gabriel River Basin, Santa Clara River Basin, Coastal Basin, and Antelope Valley. The coastal plain slopes mildly and contains relatively few depressions or natural ponding areas. The slopes of the main river systems crossing the coastal plain, such as San Gabriel River, Los Angeles River, and Ballona Creek, range from 4 to 14 feet per mile. The mountain ranges within the County of Los Angeles are generally aligned in an east-west direction and are part of the Transverse Ranges. The major range in the County is the San Gabriel Mountains. Most of the mountainous areas lie below 5,000 feet with only 210 square miles above this elevation. The mountainous area is rugged. The deep “V”-shaped canyons with steep walls are separated by sharp dividing ridges. The average slope of the canyon floors ranges from 150 to 850 feet/mile in the San Gabriel Mountains.

2.1.2 Geology and Soils

Regional Setting: The present day geomorphic and geologic setting of Los Angeles County is the result of the complex interaction between the Pacific and North American Tectonic Plates that are obliquely colliding along a right-lateral, strike-slip transform fault boundary system represented by the San Andreas Fault and other related major fault systems. Both tensional forces and rotational compressive forces along this transform fault boundary created deep structural depressions, or pull-apart basins, that received thick deposits of Neogene-age sediments. These structural depressions are separated by uplifted blocks or mountain ranges consisting of Cretaceous and older sedimentary, metamorphic, and crystalline basement rocks that are bounded by normal, reverse and thrust-fault offsets.

Portions of three major geomorphic provinces occur within Los Angeles County; the Transverse Ranges, Peninsula Ranges, and the Mojave Desert. The primary geomorphic features within the east-west trending Transverse Ranges in Los Angeles County include the San Gabriel, Verdugo, and Santa Susana Mountains which are separated from the Santa Monica Mountains by the San Fernando Valley. The north-south trending Peninsular Geomorphic Province terminates against thrust faults that bound the southern limits of the Transverse Province. The primary geomorphic features of the Peninsular Ranges within Los Angeles County include the Puente and San Jose Hills, as an extension of the Santa Ana Mountains, the Coastal Plain, various uplifts related to the Newport-Inglewood Structural Zone, and the Palos Verdes Hills. The San Gabriel and Upper Santa Ana Valleys separate the Transverse Ranges from the peninsular range in the east-central portion of the County. The primary geomorphic feature of the Mojave Desert within Los Angeles County includes the high desert and Antelope Valley.

Geologic Setting: Igneous, sedimentary, and metamorphic rock groups that range in age from Precambrian to Holocene are present within the County. Sedimentary and volcanoclastic rocks were deposited in marine and continental depositional environments. The San Gabriel Mountains and Verdugo Hills are composed primarily of highly fractured igneous rock, with large outcrops of granitic rock exposed above coarse and porous alluvial soils. Faulting and deep weathering have produced pervious zones in the rock exposures. These rock masses have a comparatively shallow soil mantle formed in part by accelerated erosion on the steep slopes. Other mountainous and hilly areas within the County are composed primarily of folded and faulted sedimentary rocks, including shale, sandstone, and conglomerate, and volcanoclastic rocks. Residual soils in these areas are shallow and are generally less permeable than those of the San Gabriel Mountains. Valley and desert surface soils are alluvial and grade from coarse sand and gravel near canyon mouths to silty clay and clay in the

lower valleys and coastal plain. The alluvium accumulates through repeated deposition of sedimentary material and reaches depths as great as 18,000 feet in portions of the Coastal Plain. Where there is little clay, this material is often quite porous. Impervious lenses and irregularities divide the alluvium into several distinct groundwater basins. Valley soils are generally well drained with relatively few perched water or artesian areas.

2.1.3 Climate

The climate within the County varies greatly. The windward side of the San Gabriel Mountain range is Mediterranean while the leeward side in the Mojave Desert is arid. Precipitation, on average, is quite low. Most rain occurs during winter and early spring, typical of a Mediterranean climate. However, the amount received is usually lower than in other Mediterranean climates. Precipitation during summer months is infrequent, and rainless periods of several months are common. Average annual precipitation totals for representative areas within the County vary from as little as 7.8 inches in the Antelope Valley region, 15.5 inches in the Coastal Plain areas to 32.9 inches in the San Gabriel Mountains. However, the Los Angeles area is also subject to the phenomena typical of a microclimate. As such, the daytime temperatures can vary as much as 36°F (20°C) between inland areas such as the San Fernando Valley and San Gabriel Valley versus the coastal Los Angeles Basin.

2.1.4 Coastal Plain and Mountain Areas

As discussed above, most precipitation in the Los Angeles area occurs in the winter and early spring due to extratropical cyclones from the North Pacific. Major storms consist of one or more frontal systems, extending 500 to 1,000 miles in length. The frontal systems can produce rainfall simultaneously throughout the entire County, occasionally lasting four days or longer. These storms approach Southern California from the west or southwest with southerly winds that continue until the front passes. The mountain ranges lie directly across the path of the inflowing warm, moist air. The coastal and inland ranges cause the warm air to rise. As it rises, precipitation forms and falls. This orographic effect intensifies rainfall along the mountains and coastal areas. As a result, rainfall intensities and totals in these areas increase. The effect of snow melt on flood runoff is significant only in the few cases where warm spring rains from southerly storms fall on a snow pack. Temperatures throughout the County usually remain above freezing during major storms. Snow rarely falls on the coastal plain. Snowfall at elevations above 5,000 feet frequently occurs during winter storms. This snow melts rapidly except on the higher peaks and north facing slopes. January and July are the coldest and warmest months of the year, respectively. Seasonal temperature variations can be extreme across the County. Record high temperatures of 112°F (44.4°C) have been

recorded in the Coastal Plain Area and a high of 99°F (37.2°C) has been recorded at Mt. Wilson (5,700'msl) in the San Gabriel Mountains. Record low temperatures have been recorded in these same areas of 28°F (-2.2°C) and 9°F (-12.7°C) respectively.

2.1.5 Desert Areas

Orographic precipitation over the mountains produces a rain shadow on the leeward side of the mountains. As a result, the northern San Gabriel Mountains and the Mojave Desert regions experience very low annual precipitation amounts with rainfall occurring primarily during summer convective rainfall associated with monsoonal flow from the south and southwest. Flash flooding is possible in many of the desert areas as a result of intense and localized rainfall from convective summer storms. Average annual temperatures in the Mojave Desert range from a high of 91.4°F (33°C) to a low of 62.9°F (17.2°C). Temperatures and precipitation can vary wildly in all seasons across this region and a record high temperature of 134°F (57°C) a record low of 15°F (-9°C) have been recorded.

2.1.6 Watersheds

For the purposes of their water resources management activities, the County of Los Angeles, Department of Public Works (DPW) has defined eight major watersheds and the LA County subwatershed GIS data layer 1 divides the County's watersheds into 2,655 subwatersheds. The sizes of the subwatersheds range between 35 and 125,000 acres, with an average of approximately 8,000 acres. Maps of the subwatersheds are available from the Los Angeles County Geographic Information Systems (GIS) Data Portal at http://dpw.lacounty.gov/general/spatiallibrary/site_options.cfm (LA County subwatershed GIS data layer 1).

The locations and approximate boundaries of the major watersheds within the County are shown on **Figure 2-1**. This information was downloaded directly from the Los Angeles County GIS Data Portal. A description of the major watersheds is provided below to help understand the hydrologic conditions within each watershed.

Insert: Figure 2-1 Los Angeles County Watersheds

2.1.6.1 Santa Clara River

The Santa Clara River originates in the northern slopes of the San Gabriel Mountains at Pacifico Mountain and travels west into Ventura County, discharging into the Pacific Ocean near the City of Ventura. The river runs approximately 100 miles from the headwaters near Acton, California, to the ocean. The river drains an area of

approximately 1,600 square miles. The upper portion of the river, within the County of Los Angeles, has a watershed area of approximately 644 square miles. Ninety percent of this area is mountainous with steep canyons; while the remaining ten percent is alluvial valleys. The area is mostly undeveloped with a large portion in the Angeles National Forest. There are some mixed-use developed areas concentrated in or near the City of Santa Clarita. The watershed is currently experiencing an accelerated rate of development in areas adjacent to the river.

The Santa Clara River and its tributaries are ephemeral streams characterized by alluvial soils. Discharge occurs quickly during rainfall events and diminishes quickly after rainfall has ceased. As in other county watersheds, the mountain and foothill areas are susceptible to debris-laden flows during intense rainfall, especially when a watershed is recovering from fire. The river remains in a generally natural state with some modifications related to the development of the floodplain. The expected population increase will continue to produce floodplain encroachment, requiring additional bank protection, channelization, and channel crossings. The expected population increase, as well as increased imperviousness, will impact the hydrologic characteristics of the river and the sediment balance. Some of the major tributaries in the County's portion of the Santa Clara River watershed include: Castaic Creek, San Francisquito Canyon, Bouquet Canyon, Sand Canyon, Mint Canyon, and the South Fork of the Santa Clara River.

2.1.6.2 Los Angeles River

The Los Angeles River Watershed covers over 830 square miles. The watershed includes the western portion of the San Gabriel Mountains, the Santa Susana Mountains, the Verdugo Hills, and the northern slope of the Santa Monica Mountains. The river flows from the headwaters in the western San Fernando Valley and outlets in San Pedro Bay near Long Beach. The river crosses the San Fernando Valley and the central portion of the Los Angeles Basin. The watershed terrain consists of mountains, foothills, valleys, and the coastal plain.

The Los Angeles River and many of its tributaries have been the subject of extensive engineering work to reduce the impacts of flood events. Prior to development, the Los Angeles River system was typical of other streams in the southwest. The river's channel was broad and often shifted location within the flood plain due to the high sediment loads. The stream location within the coastal plain has varied greatly over the years. Between 1815 and 1825, the river changed course completely. Breaking its banks in what is now

Downtown Los Angeles, the river followed the course of Ballona Creek, reaching the ocean at a location 20 miles from its current outlet.

Numerous flood control facilities were constructed in the early 20th century, as development began to take place on this wide flood plain. The concrete sections of the Los Angeles River were constructed between the late 1930's and the 1950's. Channel improvements and extensive watershed development decrease times of concentration and increase runoff flow rates and volumes. The Los Angeles County Flood Control district constructed three major dams during this period: Pacoima, Big Tujunga and Devil's Gate. The dams were built to reduce downstream flow rates and conserve water for ground water recharge purposes. In the Rio Hondo drainage area, several dams were constructed including Eaton Wash, Sierra Madre, Santa Anita and Sawpit. Additionally, the U.S. Army Corps of Engineers operates four major dams in the watershed to assist in flood control. The four dams are Hansen, Lopez, Sepulveda and Whittier Narrows.

2.1.6.3 San Gabriel River

The San Gabriel River Watershed is located in the eastern portion of the County. The river drains the San Gabriel Mountains to the north and is bounded by the Los Angeles River Watershed and Santa Ana River Watersheds. The watershed drains 640 square miles. The Santa Gabriel River watershed outlets into the Pacific Ocean between Long Beach and Seal Beach after passing through the Alamitos Bay estuary. Tributaries to the San Gabriel River include: Walnut Creek, San Jose Creek, and Coyote Creek.

The upper portions of the watershed are contained almost entirely within the Angeles National Forest and are nearly untouched by development. The mountains in this area are extremely rugged with steep V-shaped canyons. The vegetation is dominated by chaparral and coastal sage scrub with patches of oak woodlands. Conifers are dominant at higher elevations. The streambeds in the area contain sycamore and alder woodlands.

In contrast, the lower part of the watershed is mostly developed below the mouth of the San Gabriel Canyon. The developments include commercial, residential, and industrial use. The developed area in the San Gabriel Valley and Los Angeles Basin comprises 26% of the total watershed area.

Similar to the Los Angeles River, the San Gabriel River once occupied a wide floodplain and shifted course to accommodate large flows and sediment loads. Development of the floodplain required

changing the character of the river dramatically since periodic inundation of the floodplain was not compatible with the new land uses.

Several major dams and debris basins impound floodwaters and prevent debris flows originating in the San Gabriel Mountains. These include Cogswell Dam, San Gabriel Dam, Morris Dam, Big Dalton Dam, San Dimas Dam, Live Oak Dam, and Thompson Creek Dam. Many of these facilities were constructed in the 1930's and have proven their worth by preventing significant damage from large flood events. Major flood events occurred in 1938, 1969, 1978, 1983, 1998, and 2005. Additionally, the U.S. Army Corps of Engineers operates the Santa Fe Dam and Whittier Narrows Dam in the watershed to assist in flood control.

The San Gabriel River has been channelized below Santa Fe Dam to aid in flood prevention. However, the channel invert was left unlined for much of its length between Santa Fe Dam and Florence Avenue in Downey. The unlined bottom promotes infiltration of flood waters released from upstream dams. Public Works installed rubber dams to further utilize the river bottom for ground water recharge. The most significant spreading ground facilities in the County are located in the San Gabriel River watershed. Runoff resulting from storm events is diverted into the spreading facilities and allowed to recharge groundwater. Major spreading grounds are located at the mouth of San Gabriel Canyon and in the Montebello area downstream of the Whittier Narrows Dam.

2.1.6.4 Antelope-Fremont Valleys

Although the Antelope Valley and Fremont Valley Watersheds are separated by a topographic and hydrologic divide in the Antelope Valley, they are often referred to collectively as the Antelope-Fremont Valleys watershed.

The Antelope Valley Watershed is a large, closed basin in the western Mojave Desert. This watershed straddles the Los Angeles-Kern County line and drains a total of 3,387 square miles. Approximately 80 percent of the watershed is characterized by a low to moderate slope (0-7 percent). The remaining 20 percent consists of foothills and rugged mountains, some of which reach up to 3,600 feet in elevation. The floor of the Antelope Valley Watershed generally lacks defined natural channels outside of the foothills and is subsequently subject to unpredictable sheet flow patterns. The Antelope Valley Watershed is a closed basin with no outlets to the ocean. All water that enters the watershed either infiltrates into the

underlying groundwater basin, or flows toward three playa lakes located near the center of the watershed.

A playa lake is formed when rain fills a playa, or small, round depression in the surface of the ground. Playa lakes are usually endorheic, which means they have no outflow of water. The playa lakes in the Antelope Valley Watershed are all located on Edwards Air Force Base. They include the following: Rosamond Lake, which covers approximately 21 square miles; Rogers Dry Lake, which is located east of Rosamond Lake and encompasses approximately 32 square miles; and Buckhorn Dry Lake, which is located between Rosamond and Rogers Dry Lake, encompassing three square miles. These playa lakes are usually dry, and they only receive water following large winter storms. Surface runoff that collects in the dry lakes quickly evaporates from the surface, and only a small quantity of water infiltrates to the groundwater due to the nearly impermeable nature of the playa soils.

The Fremont Valley Watershed receives surface water runoff from Lone Tree Canyon, Cache Creek, and other ridges adjacent to the area. Throughout most of this watershed surface water drains toward Koehn Lake, which is a generally dry lake about 20 miles northeast of the community of Mojave. In the southwestern portion of the Fremont Valley Watershed, surface water runoff flows south towards Rosamond. The Antelope Valley Watershed receives surface water runoff from the San Gabriel Mountains and the Tehachapi Mountains, including Big Rock Creek, Littlerock Creek, Oak Creek, and Cottonwood Creek. There are multiple intermittent or ephemeral waterways in the area which convey surface water runoff to Rosamond Lake during extreme rain events. Rosamond Lake, which is located on Edwards Air Force Base northeast of Lancaster, remains dry most of the year.

Within the Los Angeles County portion of the Antelope Valley, the County Sanitation Districts of Los Angeles County operate sewage treatment plants for portions of the Cities of Lancaster and Palmdale. Sewage disposal needs for the remainder of Los Angeles County in this watershed are by OWTS.

2.1.6.5 Santa Monica Bay

The Santa Monica Bay or Coastal watershed is comprised of a number of individual watersheds that outlet into Santa Monica and San Pedro Bays. These include the major watersheds of Malibu Creek, Topanga Creek, Ballona Creek, and the Dominguez Channel. These watersheds have unique topographic and hydrologic characteristics ranging from undeveloped to highly urbanized. For

simplicity, these coastal watersheds are grouped together due to their relatively small sizes.

The Malibu Creek Watershed is comprised of 109 square miles at the western end of the County of Los Angeles and extends into Ventura County. Most of the watershed is undeveloped public land. There is sporadic but increasing development throughout the area. The most extensive development is centered along US Highway 101. The northern portion is hilly while the southern portion, near the ocean, is rugged mountain terrain. Malibu Creek drains into the Pacific Ocean near the Malibu Civic Center.

Topanga Creek drains 18 square miles in the central Santa Monica Mountains. The watershed is primarily rural with widely scattered residential and commercial development. The creek flows unobstructed along its course and empties into the Santa Monica Bay in an unincorporated portion of the County east of Malibu.

Ballona Creek is a flood control channel that drains the western Los Angeles basin. The watershed area is bounded by the Santa Monica Mountains on the north and the Baldwin Hills on the south. It extends east nearly to downtown Los Angeles. The total watershed area is roughly 130 square miles. The area is primarily developed but includes undeveloped areas on the south slope of the Santa Monica Mountains. The land use is 64% residential, 8% commercial, 4% industrial, and 17% open space. The major tributaries to Ballona Creek include: Centinela Creek, Sepulveda Canyon Channel, Benedict Canyon Channel, and numerous storm drains. The watershed drains into Santa Monica Bay at Marina del Rey.

2.1.6.6 Santa Ana

Los Angeles County encompasses a relatively thin sliver of the Santa Ana Watershed located in the northeastern portion of the County.

The Santa Ana watershed covers an area of about 2,700 square miles in parts of Orange, San Bernardino, Riverside, and Los Angeles Counties. The Santa Ana Basin is substantially urbanized: about 32 percent of the land use is residential, commercial, or industrial, and the area is home to more than 4 million people. Agricultural land use accounts for about 10 percent of the watershed.

The Santa Ana River is the largest stream system in southern California, beginning in the San Bernardino Mountains, which reach altitudes exceeding 10,000 feet, and flowing more than 100 miles to the Pacific Ocean near Huntington Beach. The San Jacinto River is

a tributary of the Santa Ana River, but it normally terminates in Riverside County at Lake Elsinore.

Most of the precipitation in the watershed occurs between November and March. Consequently, under natural conditions, the Santa Ana River would be intermittent with little or no flow in the summer months.

Ground water is the main source of water supply in the watershed, providing about 66 percent of the consumptive water demand. Inland aquifers, upstream from Prado Dam, underlie about 1,200 square miles of the watershed. Coastal aquifers, downstream from Prado Dam, underlie about 400 square miles. Thickness of these aquifers ranges from several hundred to more than 1,000 feet. Depth to ground water ranges from several hundred feet near the flanks of mountains to near land surface along rivers and wetlands, and in the coastal plain.

Enhanced recharge of ground water is an important component of the hydrologic cycle in the Santa Ana watershed. The volume of water recharged is 37 percent of the volume pumped, with most of the enhanced recharge consisting of surface water derived from precipitation within the basin. Discharge from wastewater treatment facilities is also an important component of the hydrologic cycle, providing base flow in many parts of the drainage network. These activities are among the many factors affecting water quality in the watershed.

2.1.6.7 Mojave

The Mojave Watershed encroaches into Los Angeles County at several relatively small sections along the northeastern county line between San Bernardino and Los Angeles Counties. The Mojave Watershed encompasses approximately 4,500 square miles in total and is located almost entirely within San Bernardino County. Total population in the watershed is increasing every year and was nearly one-half million by the end of year 2015. Much of the existing and projected future population is concentrated in the Victor Valley, which includes the incorporated cities of Victorville, Hesperia, Apple Valley, and Adelanto.

The primary geographic and hydrologic feature of the watershed is the Mojave River. The headwaters of the Mojave River are in the San Bernardino Mountains, which annually receives greater than 40 inches of precipitation at its highest elevations. Much of the winter precipitation in the San Bernardino Mountains falls in the form of snow that provides spring recharge to the Mojave River system.

Historically, the annual recharge from the headwaters is approximately 75,000 acre-feet. The Mojave River channel, through both surface and subsurface flow, transects the watershed a linear distance of approximately 120 miles to its terminus at Silver Dry Lake near the Community of Baker. Aside from intense storm events, the Mojave River channel is typically dry downstream of the Mojave Forks Dam except in select locations where ground water is forced to the surface by geologic structures.

The Mojave River has been selected as a priority or "focus" watershed because of numerous water quality and quantity issues. Historically known for its agricultural, industrial and military land uses, the Victor Valley has significantly changed during the last several decades into a satellite of Southern California's urbanization. Urban growth has significantly modified the arena of waste discharges that could potentially affect water quality, including stormwater and wastewater treatment. There are also numerous water quality issues associated with past and current agricultural, industrial, and military land uses throughout the watershed. Because of water quality degradation associated with past industrial activities, some waters in the Mojave River watershed are listed as a water quality limited segments for priority organics on the federal Section 303(d) list of impaired water bodies.

Typical of southwestern arid environments, the Mojave Watershed has limited water resources. Surface water from the headwaters in the San Bernardino Mountains quickly percolates into the porous sands of the young Mojave River alluvium. Thus, ground water is the primary source of water supply in most of the watershed. In a constant state of overdraft since the 1950's, the ground water resources of the Mojave Watershed were formally adjudicated in 1996 through a stipulated judgment. The stipulated judgment was appealed shortly thereafter. The California Supreme Court issued a decision in the case on August 22, 2000 that affirmed water rights priority in cases of competing water apportionment.

2.1.6.8 Calleguas

A very small portion of the Calleguas Creek watershed is located at the very western edge of Los Angeles County. The entire Calleguas watershed encompasses approximately 343 square miles the majority of which lies within Ventura County California. This greater watershed is made of up 7 sub-watersheds at the 12 digit HUC (hydrologic unit code) scale. Undeveloped areas account for 50% of the land in the greater watershed while 25% is urban, and 25% is agricultural. Most of the urban areas, including the communities of Moorpark, Simi Valley and Thousand Oaks are located in the upper

sub-watershed and most of the agriculture is located in the middle and lower sub-watersheds. The portion that lies within Los Angeles County is located in the mountainous area just west of the Santa Clarita Valley.

2.1.6.9 Middle Kern-Upper Tehachapi-Grapevine

The Middle Kern-Upper Tehachapi-Grapevine Watershed encroaches slightly into the boundaries of Los Angeles County at the very northwestern corner of the County near the town of Gorman. Specifically, the portion of the watershed that includes the Castaic Lake Valley Groundwater Basin (5-29) member of the Tulare Lake Hydrologic Region.

Erosion along the Garlock Fault is responsible for forming the basin's northeast and southwest arms. Castaic Lake represents a structural depression or sag pond developed on the Garlock Fault (DWR 1965). A geologic map of the area of Castaic Lake area depicts the geology as Quaternary playa deposits of recent age, consisting of silt, clay and sandy clay. The remainder of the basin is mapped as younger alluvium with small areas of older alluvium at the basin margins. Very little data is available for the basin. Of the two available well completion reports for wells near Castaic Lake in the northeast arm of the basin, both intercept bedrock of the Garlock Fault Zone at depths of 50 feet or less – both produced less than 3 gpm and were destroyed after drilling. The near surface material in these wells was silty sand, clayey sands, and sandy clays.

Irrigation and municipal supply wells in the basin's west side and north arm, near the center of the basin fill, are capable of producing over 200 gpm. One log for an irrigation well in the northern arm of the basin suggested artesian conditions were encountered after completion.

2.2 Groundwater

Groundwater resources in Los Angeles County are managed and utilized by literally hundreds of different agencies and integrated management groups across the geographic area. Within the Los Angeles basin itself, the Central Basin and the West Coast Basin (**Figure 2-2**) provide 40 percent of the water used by almost 4 million people living in the 43 cities that overlie these two basins alone. For the purpose of this LAMP **Figure 2-2** identifies eighteen separate groundwater basins within Los Angeles County. Many of these basins have numerous sub-basins identified within them that are defined by various geologic or hydrogeologic boundary conditions. The following is a description of the hydrology, groundwater quality, and impairments for the nine major groundwater basins shown on **Figure**

2.2.1 Antelope Valley (6-44)

Description – Antelope Valley Groundwater Basin underlies an extensive alluvial valley in the western Mojave Desert. The elevation of the valley floor ranges from 2,300 to 3,500 feet above sea level. The basin is bounded on the northwest by the Garlock fault zone at the base of the Tehachapi Mountains and on the southwest by the San Andreas fault zone at the base of the San Gabriel Mountains. The basin is bounded on the east by ridges, buttes, and low hills that form a surface and groundwater drainage divide and on the north by Fremont Valley Groundwater Basin at a groundwater divide approximated by a southeastward-trending line from the mouth of Oak Creek through Middle Butte to exposed bedrock near Gem Hill, and by the Rand Mountains farther east.

Runoff in Big Rock and Little Rock Creeks from the San Gabriel Mountains and in Cottonwood Creek from the Tehachapi Mountains flows toward a closed basin at Rosamond Lake (Jennings and Strand 1969). Rogers Lake is a closed basin in the northern part of Antelope Valley that collects ephemeral runoff from surrounding hills (Rogers 1967). Average annual rainfall ranges from 5 to 10 inches.

Groundwater Quality - Groundwater quality is excellent within the upper or "principal" aquifer but degrades toward the northern portion of the dry lake areas. Considered to be generally suitable for domestic, agricultural, and industrial uses, the water in the principal aquifer has a total dissolved solids (TDS) concentration ranging from 200 to 800 milligrams per liter (mg/L). The deeper aquifers typically have higher TDS levels. Hardness levels range from 50 to 200 mg/L and high fluoride, boron, and nitrate concentrations have been measured in some areas of the basin. Arsenic is a concern in parts of the region and has been observed in some water supply wells. Research conducted by Waterworks and USGS has shown the problem to reside primarily in the deep aquifer. It is not anticipated that the existing arsenic concentrations will lead to future loss of groundwater as a water supply resource for the region. Portions of the basin have experienced nitrate levels above the maximum contaminant level (MCL) of 10 mg/L as N. Most, if not all, water supply wells in the Antelope Valley draw groundwater from the principal aquifer. The SNMP and future monitoring plan will focus on the groundwater quality in the principal aquifer (Antelope Valley SNMP 2014).

The overall basin concentration of each constituent meets the SNMP water quality management goals. Compared to the other sub-basins, North Muroc and Peerless generally have higher concentrations of TDS, chloride, chromium, fluoride, and boron. This is not a concern, however, as the concentrations for these constituents meet all drinking water regulations. As

discussed in the previous section, these constituents are naturally occurring (Antelope Valley SNMP 2014).

Impairments – Arsenic is a concern in the Antelope Valley. The elevated arsenic concentrations in the Gloster, Neenach, North Muroc, Peerless, and Willow Springs sub-basins exceed the regulatory drinking water and SNMP water quality management goals. High arsenic in groundwater is naturally occurring, resulting from dissolution of rocks and minerals. Arsenic concentrations above the MCL of 10 µg/L are not used for potable applications. Wells with concentrations above the MCL are typically treated to remove arsenic, blended to dilute arsenic concentration, or shut down (Antelope Valley SNMP 2014).

2.2.2 Acton Valley (4-05)

Description – The Acton Valley Groundwater Basin is bounded by the Sierra Pelona on the north and the San Gabriel Mountains on the south, east, and west. The valley is drained by the Santa Clara River. Average annual precipitation ranges from 10 to 16 inches.

Water Quality – Groundwater in the basin is generally calcium bicarbonate in character. However, in the broad valley north of Acton, 2 wells have calcium-magnesium sulfate character and 9 wells have calcium magnesium bicarbonate character (Slade 1990). Water sampled from 5 public supply wells in the basin show an average TDS content of approximately 579 mg/L and a range of 424 to 712 mg/L. TDS content ranged from 279 to 480 mg/L during June 1988 through July 1989 (Slade 1990).

Impairments – Water sampled from 75 wells measured during 1989 show high concentrations of TDS, sulfate, and chloride in the northern part of the basin with some of these concentrations exceeding drinking water standards (Slade 1990; DWR 1993). The water from two wells in the basin have nitrate concentrations that exceed drinking water standards (DWR 1968).

2.2.3 Santa Clara River Valley East (4-04.07)

Description – The Santa Clara River Valley East Subbasin is bordered on the north by the Piru Mountains, on the west by impervious rocks of the Modelo and Saugus Formations and a constriction in the alluvium (DPW 1933), on the south by the Santa Susana Mountains, and on the south and east by the Gabriel Mountains. The surface is drained by the Santa Clara River, Bouquet Creek, and Castaic Creek. Average annual precipitation ranges from 14 to 16 inches.

Water Quality – Groundwater in the alluvial aquifer varies from calcium bicarbonate character in the east to calcium sulfate character in the western

part of the subbasin (Slade 2002). Nitrate content decreases to the west and TDS content increases from about 550 to 600 mg/L in the east to about 1,000 mg/L in the west (Slade 2002). Groundwater in the Saugus Formation aquifer is of calcium bicarbonate character in the southeast, calcium sulfate in the central, and sodium bicarbonate in the western parts of the subbasin (Slade 2002). TDS content in the Saugus Formation aquifer ranges from about 500 to 900 mg/L (Slade 2002). Water sampled from 59 public supply wells show an average TDS content of 695 mg/L in the subbasin and a range from 300 to 1,662 mg/L.

Impairments – Nitrate content has exceeded 45 mg/L in some parts of the subbasin with a well in the central part of the subbasin reaching 68 mg/L (DWR 1968; 1977). TDS content may also be elevated, particularly in the western part of the subbasin to become unsuitable for domestic use (DWR 1968; 1979). Trichloroethylene and ammonium perchlorate have been detected in four wells in the eastern part of the subbasin (Slade 2002).

2.2.4 San Fernando Valley (14-12)

Description – The San Fernando Valley Groundwater Basin was adjudicated in 1979 and includes the water-bearing sediments beneath the San Fernando Valley, Tujunga Valley, Browns Canyon, and the alluvial areas surrounding the Verdugo Mountains near La Crescenta and Eagle Rock. The basin is bounded on the north and northwest by the Santa Susana Mountains, on the north and northeast by the San Gabriel Mountains, on the east by the San Rafael Hills, on the south by the Santa Monica Mountains and Chalk Hills, and on the west by the Simi Hills. The valley is drained by the Los Angeles River and its tributaries. Precipitation in the San Fernando Valley ranges from 15 to 23 inches per year and averages about 17 inches.

Water Quality – In the western part of basin, calcium sulfate-bicarbonate character is dominant, and in the eastern part of basin, calcium bicarbonate character dominates (ULARAW 1999). Total dissolve solids range from 326 to 615 mg/L, and electrical conductivity ranges from 540 to 996 µmhos (ULARAW 1999). Data from 125 public supply wells shows an average TDS content of 499 and a range from 176 to 1,160.

Impairments – A number of investigations have determined contamination of volatile organic compounds such as trichloroethylene (TCE), perchloroethylene (PCE), petroleum compounds, chloroform, nitrate, sulfate, and heavy metals (Setmire 1985; ULARAW 1999). TCE, PCE and nitrate contamination occurs in the eastern part of the basin and elevated sulfate concentration occurs in the western part of the basin (ULARAW 1999).

2.2.5 Raymond (4-23)

Description – The Raymond Basin is located in the northwest part of the San Gabriel Valley, in eastern Los Angeles County, and was considered a part of the San Gabriel Valley Groundwater Basin (4-13) in Bulletin 118-75 and Bulletin 118-80. The Raymond Basin includes the water-bearing sediments bounded by the contact with consolidated basement rocks of the San Gabriel Mountains on the north and the San Rafael Hills on the southwest. The west boundary is delineated by a drainage divide at Pickens Canyon Wash and the southeast boundary is the Raymond fault. Precipitation averages in the basin range from about 19 inches in valley to 25 inches in upland areas. The average precipitation over the basin is about 21 inches.

Water Quality – Groundwater in this basin is typically calcium bicarbonate in character. The average total dissolved solids content in the Hydrologic Region South Coast California's Groundwater Raymond Groundwater Basin Bulletin 118 last update 2/27/04. Pasadena portion of the basin is about 400 mg/L, with a high of 600 mg/L (PWP 2000). The Electrical Conductivity of groundwater ranges from 436 to 895 µmhos/cm (PWP 2000). Data for 70 public supply wells indicate an average TDS content of 346 mg/L with a range from 138 to 780 mg/L.

Impairments – Fluoride content occasionally exceeds recommended levels of 1.6 mg/L, near the San Gabriel Mountain front (maximum of 3.1 mg/L; average of 1.0 mg/L; [DWR 1978]). High nitrate concentrations are found in water from some wells near Pasadena (RBMB 1999). Volatile organic compounds are detected in wells near Arroyo Seco (RBMB 1999). Radiation is occasionally detected near the San Gabriel Mountains (DWR 1978). A Superfund site exists near the Jet Propulsion Laboratories because of Perchlorate contamination (RBMB 1999).

2.2.6 San Gabriel Valley (4-13)

Description – The San Gabriel Valley Groundwater Basin is located in eastern Los Angeles County and includes the water-bearing sediments underlying most of the San Gabriel Valley and includes a portion of the upper Santa Ana Valley that lies in Los Angeles County. This basin is bounded on the north by the Raymond fault and the contact between Quaternary sediments and consolidated basement rocks of the San Gabriel Mountains. Exposed consolidated rocks of the Repetto, Merced, and Puente Hills bound the basin on the south and west, and the Chino fault and the San Jose fault form the eastern boundary (DWR 1966). The Rio Hondo and San Gabriel drainages have their headwaters in the San Gabriel Mountains, then surface water flows southwest across the San Gabriel Valley and exit through the Whittier Narrows, a gap between the Merced

and Puente Hills. Precipitation in the basin ranges from 15 to 31 inches, and averages around 19 inches.

Water Quality – Water within the basin is primarily calcium bicarbonate in character. In the north, west and central regions of the basin, TDS ranges from 90 to 4,288 mg/l and averages around 367 mg/l (DWR unpublished data). In the southern portion of the basin the TDS averages around 1,222 mg/l (PBWM 1999). TDS content ranges from 500 to 1,500 mg/l in the eastern part of the basin (Smith 2000), and from 200 to 500 mg/L in the northeast part (JMM 1985). Data from 259 public supply wells shows an average TDS content of 318 mg/L and a range of 172 to 914 mg/L.

Impairments – Four areas of the San Gabriel Valley Groundwater Basin are Superfund Sites. Trichloroethylene, Perchloroethylene, and Carbon Tetrachloride contaminate the Whittier Narrows, Puente basin, Baldwin Park and El Monte areas (DWR 1998).

Within the Six Basins Area there exists high levels of nitrates in the northeastern part of the Pomona Basin, and a plume of volatile organic compounds occupies the southern portion of Pomona Basin (SBWM 2000). The Puente Basin has numerous sites where clean-up operations are in affect. There is an EPA assigned Superfund Site, the Puente Valley Operable Unit, which is cleaning up plumes of TCE and PCE (EPA 1998).

2.2.7 Coastal Plain of Los Angeles Santa Monica (4-11-01)

Description – The Santa Monica Subbasin underlies the northwestern part of the Coastal Plain of Los Angeles Groundwater Basin. It is bounded by impermeable rocks of the Santa Monica Mountains on the north and by the Ballona escarpment on the south. The subbasin extends from the Pacific Ocean on the west to the Inglewood fault on the east. Ballona Creek is the dominant hydrologic feature and drains surface waters to the Pacific Ocean.

Water Quality – Analyses of water from 7 public supply wells indicate an average TDS content of 916 mg/L and a range of 729 to 1,156 mg/L.

Impairments – None known.

2.2.8 Coastal Plain of Los Angeles West-Coast (4.11.03)

Description – The West Coast Subbasin of the Coastal Plain of Los Angeles Basin is adjudicated and commonly referred to as the “West Coast Basin.” It is bounded on the north by the Ballona Escarpment, an abandoned erosional channel from the Los Angeles River. On the east it is bounded by the Newport-Inglewood fault zone, and on the south and west by the Pacific Ocean and consolidated rocks of the Palos Verdes Hills (DWR 1999). The surface of the subbasin is crossed in the south by the Los Angeles River

through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap, both of which then flow into San Pedro Bay. Average precipitation throughout the subbasin is 12 to 14 inches.

Water Quality – The character of water in the Gaspur zone of the subbasin is variable. Seawater intrusion has produced deterioration of water quality over time. Early tests indicated that the water was sodium bicarbonate in character. It is questionable whether this is representative of the entire zone, because the higher quality water residing outside the subbasin is calcium bicarbonate in nature (DPW 1952).

The Gardena water-bearing zone exhibits a calcium-sodium bicarbonate character and is of good quality. In the Silverado zone, the character of water varies considerably. In the coastal region of this zone, the water is calcium chloride in character, and then transitions into sodium bicarbonate moving inland. The Pico formation is sodium bicarbonate in nature and is of good quality (DPW 1952). Data from 45 public supply wells shows an average TDS content of 720 mg/L and a range of 170 to 5,510 mg/L.

Impairments – Seawater intrusion occurs in the Silverado zone along the Santa Monica Bay and in the Gaspur zone in the San Pedro Bay. Two seawater barrier projects are currently in operation. The West Coast Basin Barrier Project, which runs from the Los Angeles Airport to the Palos Verde Hills, and the Dominguez Gap Barrier Project which covers the area of the West Coast Basin bordering the San Pedro Bay. Injection wells along these barriers create a groundwater ridge, which inhibits the inland flow of salt water into the subbasin to protect and maintain groundwater elevations (DWR 1999).

2.2.9 Coastal Plain of Los Angeles Central (4.11.04)

Description – The Central Subbasin occupies a large portion of the southeastern part of the Coastal Plain of Los Angeles Groundwater Basin. This subbasin is commonly referred to as the “Central Basin” and is bounded on the north by a surface divide called the La Brea high, and on the northeast and east by emergent less permeable Tertiary rocks of the Elysian, Repetto, Merced and Puente Hills. The southeast boundary between Central Basin and Orange County Groundwater Basin roughly follows Coyote Creek, which is a regional drainage province boundary. The southwest boundary is formed by the Newport Inglewood fault system and the associated folded rocks of the Newport Inglewood uplift. The Los Angeles and San Gabriel Rivers drain inland basins and pass across the surface of the Central Basin on their way to the Pacific Ocean. Average precipitation throughout the subbasin ranges from 11 to 13 inches with an average of around 12 inches.

Water Quality – TDS content in the subbasin ranges from 200 to 2,500 mg/l according to data from 293 public supply wells. The average for these 293 wells is 453 mg/l.

Impairments – None known

Insert: Figure 2-2 Los Angeles County Groundwater Sub-Basins

2.3 Geologic Factors, OWTS Suitability and Soils

Geologic Factors and OWTS Suitability

Geology is crucial 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. Geologic conditions are typically of greater significance in the mountainous regions, where the rock formations may influence the suitability for and effects of OWTS in areas with relatively thin or poorly developed soils, and or relatively shallow groundwater.

Geologic factors are addressed for new OWTS based on:

- Information from the basic site evaluations for all installations;
- For dispersal systems located on natural slopes over 30%, information from the slope evaluation;
- For unstable land masses or areas subject to earth slides, information from the geotechnical study, including assessment of hydrogeologic conditions, water movement and slope evaluation.

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 Requirements and Procedures for Conventional and Non-Conventional Onsite Wastewater Treatment Systems (DPH, 2016) requires detailed site evaluation to document suitable soil characteristics and depth for each new OWTS installation consistent with industry practices and appropriate for the conditions and requirements in Los Angeles County (See Section 3). The observed depth and engineering 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.

Soil Mapping and Soil Hydrologic Groups

Los Angeles County has a complex geology and mapping of individual soil types and associated soil engineering properties is not practical at the scale of the individual project site. However, for informational purposes, soils that share certain characteristics can be grouped and shown at a county-wide scale as map units (**Figure 2.3**). A map unit is a collection of areas defined and named the same in terms of their soil components or miscellaneous areas or both (NSSH 627.03). Soil scientists assign map unit components to hydrologic soil groups. Map unit components assigned to a specific hydrologic soil group have similar physical and runoff characteristics. Soils in the United States, its territories, and Puerto Rico have been assigned to hydrologic soil groups. The assigned groups can be found by consulting soils information published by the Natural Resources Conservation Services (NRCS, 2016).

Soils were originally assigned to hydrologic soil groups based on measured rainfall, runoff, and infiltrometer data (Musgrave, 1955). Since the initial work was done to establish these groupings, assignment of soils to hydrologic soil groups has been based on the judgment of soil scientists. Assignments are made based on comparison of the characteristics of unclassified soil profiles with profiles of soils already placed into hydrologic soil groups. Most of the groupings are based on the premise that soils found within a climatic region that are similar in depth to a restrictive layer or water table, transmission rate of water, texture, structure, and degree of swelling when saturated, will have similar runoff responses. The classes are based on the following factors:

- Intake and transmission of water under the conditions of maximum yearly wetness (thoroughly wet);
- Soil not frozen;
- Bare surface soil; and
- Maximum swelling of expansive clays.

The slope of the soil surface is not considered when assigning hydrologic soil groups. In its simplest form, hydrologic soil group is determined by the water transmitting soil layer with the lowest saturated hydraulic conductivity and depth to any layer that is more or less water impermeable (such as a fragipan or duripan) or depth to a water table (if present). The least transmissive layer can be any soil horizon that transmits water at a slower rate relative to those horizons above or below it. For example, a layer having a saturated hydraulic conductivity of 9.0 micrometers per second (1.3 inches per hour) is the least transmissive layer in a soil if the layers above and below it have a saturated hydraulic conductivity of 23 micrometers per second (3.3 inches per hour). Water impermeable soil layers are among those types of layers recorded in the component restriction table of the National Soil Information System (NASIS) database. The saturated hydraulic conductivity of an impermeable or nearly impermeable layer may range from essentially 0 micrometers per second (0 inches per hour) to 0.9 micrometers per second (0.1 inches per hour). For simplicity, either case is considered

impermeable for hydrologic soil group purposes. In some cases, saturated hydraulic conductivity (a quantitatively measured characteristic) data are not always readily available or obtainable. In these situations, other soil properties such as texture, compaction (bulk density), strength of soil structure, clay mineralogy, and organic matter are used to estimate water movement.

The four hydrologic soil groups (HSGs) are described as (Figure 2.3):

Group A — Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10 percent clay and more than 90 percent sand or gravel and have gravel or sand textures. Some soils having loamy sand, sandy loam, loam or silt loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

The limits on the diagnostic physical characteristics of group A are as follows. The saturated hydraulic conductivity of all soil layers exceeds 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer and a water table are in group A if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 10 micrometers per second (1.42 inches per hour).

Group B — Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

The limits on the diagnostic physical characteristics of group B soils are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] ranges from 10.0 micrometers per second (1.42 inches per hour) to 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer and a water table are in group B if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 4.0 micrometers per second (0.57 inches per hour) but is less than 10.0 micrometers per second (1.42 inches per hour).

Group C — Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than

50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

The limits on the diagnostic physical characteristics of group C are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] is between 1.0 micrometers per second (0.14 inches per hour) and 10.0 micrometers per second (1.42 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a restriction and a water table are in group C if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 0.40 micrometers per second (0.06 inches per hour) but is less than 4.0 micrometers per second (0.57 inches per hour).

Group D — Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential. All soils with a depth to a water impermeable layer less than 50 centimeters [20 inches] and all soils with a water table within 60 centimeters [24 inches] of the surface are in this group, although some may have a dual classification, as described in the next section, if they can be adequately drained.

The limits on the physical diagnostic characteristics of group D are as follows. For soils with a water impermeable layer at a depth between 50 centimeters and 100 centimeters [20 and 40 inches], the saturated hydraulic conductivity in the least transmissive soil layer is less than or equal to 1.0 micrometers per second (0.14 inches per hour). For soils that are deeper than 100 centimeters [40 inches] to a restriction or water table, the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface is less than or equal to 0.40 micrometers per second (0.06 inches per hour).

As a result of construction and other disturbances, the soil profile can be altered from its natural state and the listed group assignments generally no longer apply, nor can any supposition based on the natural soil be made that will accurately describe the hydrologic properties of the disturbed soil. In these circumstances, an onsite investigation should be made to determine the hydrologic soil group. The information provided in Figure 2-3 is provided as a general assessment tool and is not a substitute for site-specific investigation of and planning for OWTS. 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 variations in soil types and is not intended to be used for engineering or design purposes.

Insert: Figure 2-3 Los Angeles County Hydrologic Soil Group Polygons in

Watersheds Map

2.4 OWTS Usage Estimates

The DPH maintains a comprehensive inventory of existing OWTS usage in Los Angeles County. As of January 28 2016, 53,148 OWTS and 813 NOWTS were listed in the inventory. The estimate includes all OWTS within the County's jurisdiction.

OWTS are used almost exclusively on properties located outside of municipal sewer service boundaries, which primarily includes large areas in the northern and northeastern portions of the County, as well as in the mountain regions. The portions of the County served by OWTS include: (a) unincorporated areas of Los Angeles County; (b) cities that contract with the County for Building and Safety approval; and (c) any city that enters into an agreement with the County for OWTS management pertaining to the LAMP. Currently, eleven (11) cities have entered into agreements with DPH for management of OWTS, including, Agoura Hills, Bradbury, La Canada-Flintridge, La Habra Heights, Lynwood, Palos Verdes Estates, Rolling Hills, Rolling Hills Estates, Lancaster, Palmdale and Walnut. **Figure 2-4** provides a map of average annual precipitation in these geographic areas.

To assist with present and future management of OWTS and water quality assessments, **Figure 2-5** shows the Los Angeles County Estimated Existing Development of OWTS in the RWQCB regions and watersheds within LA County. **Table 2-1** and **Table 2-2** summarize the number of OWTS by watershed area, based on the mapped locations on **Figure 2-5**. Some properties from the comprehensive inventory list are not included in **Figure 2-5, Table 2-1 and Table 2-2** due to un-mappable addresses and duplicate addresses due to multiple permits at the file address.

Table 2-1. South County Area (Los Angeles RWQCB Region 4),

Estimated Existing OWTS by Watershed

Watershed	OWTS Number	NOWTS Number
Calleguas	0	0
Los Angeles	10,951	134
San Pedro Channel Islands Watershed	3	0
San Gabriel	2,545	81
Santa Ana	143	2
Santa Clara (RWQCB Region 4)	11,287	102
Santa Monica Bay	7,238	379

Table 2-2. North County Area (Lahontan RWQCB Region 6), Estimated Existing OWTS by Watershed

Watershed	OWTS Number	NOWTS Number
Antelope-Fremont Valleys	16,955	41
Mojave	127	1

Insert: Figure 2-4 Los Angeles County Average Annual Precipitation Map

Insert: Figure 2-5 Los Angeles County Estimated Existing Development of OWTS

2.5 Water Quality Management Measures

The following discussion describes how the LAMP addresses elements listed under Section 9.1 of the OWTS Policy for protection of water quality. Areas defined in Basin Plans where discharges from OWTS are prohibited, such as the Malibu Civic Center area, and compliance with TMDL implementation plans provide additional water quality protection in LA County from OWTS.

Groundwater Quality Protection

- Soil conditions and lot size. DPH requires detailed soil and site evaluations during the permit application process in accordance with requirements in the Plumbing Code and the Professional Guide. The Professional Guide requires the submittal of a feasibility report with a general soil description and any features that may affect subsurface wastewater dispersal. Depth of permeable soil and percolation characteristics below the dispersal field are used to identify the appropriate siting, design and construction requirements for the OWTS (Section 3.0). An OWTS is a private sewage disposal system consisting of a septic tank where solids settle and the effluent is dispersed into a leach field or seepage pit. This method relies upon gravity and the natural filtration capacity of the soil, which causes contaminants to be removed from the effluent as it percolates down through the soil. Soil conditions must allow sufficient absorption and treatment of wastewater discharged through subsurface dispersal systems to ensure protection of groundwater. A minimum of 3 feet depth of undisturbed soil shall be available. When there is insufficient lot area or improper soil conditions for adequate sewage disposal for the building or land use proposed no building permit will be issued and no OWTS will be permitted. Where space or soil conditions are critical, no building permit will be issued until engineering data and test reports satisfactory to the DPH have been submitted and approved.

- Geologic conditions. The site evaluation includes description of slopes and topographical features, including location of all down banks and man-made cuts, and unstable land forms, on or off the property. Natural ground slopes in dispersal areas greater than 30 percent require a slope evaluation report approved by a California Certified Engineering Geologist or a California Registered Professional Soil/Geotechnical Engineer to address any possible

potential for slope destabilization for any proposed hillside installation. The report shall address whether any unstable land mass or areas subject to earth slides require a setback of 100 feet or indicate other setbacks that should be allowed, in accordance with the Professional Guide requirements

- Hydrogeologic conditions. A site-specific hydrogeologic assessment may be prepared for site-specific evaluation and must be prepared and certified by a registered Geologist, Hydrogeologist or Engineering Geologist in accordance with the Professional Guide requirements. Where the assessment confirms that neither the proposed dispersal system nor the subject drainage course will ever generate sufficient lateral infiltration that could negatively impact each other, declaring the location for the proposed dispersal area suitable, possible waiver of the setback requirements may be granted by the DPH. The assessment will be based on a study of the interrelationship between the geologic conditions and surface and subsurface waters, conducted in at least one excavation located directly between the dispersal system and the subject drainage course to a depth not less than 10 feet below the anticipated bottom of the dispersal system. The hydrogeological assessment will describe the determining factors and examine the hydrogeological properties that provided a basis for the conclusion and ensure the protection of groundwater quality. The assessment will identify the existence of any hydrogeological elements that could support the possibility of lateral infiltration, such as, high hydraulic gradients, high hydraulic conductivity of soil, slow-permeable or impermeable layers, saturated zones, presence of perched water, elevation differential between the dispersal system and the drainage course, potential inflow of surface and subsurface water and wastewater, possibility of groundwater recharge, presence of vegetative growth, seasonal variations and climatic factors, etc. In situations where hydraulic gradient suggests the possibility of effluent migration toward the drainage course, even though the hydrogeological assessment has concluded that OWTS will not have any impact on the drainage course, the DPH may require a NOWTS with supplemental treatment and disinfection components.

- Groundwater Conditions. Much of the population of the County depends on water pumped from groundwater sources for water supply and this resource must be protected from future impacts due to OWTS. The site evaluation must include evidence of groundwater depth to the satisfaction of DPH. Site plot plans will show all vegetation and trees, especially oak trees and groundwater indicators such as willows, reeds, cattails, and other hydrophilic plants to ensure adequate OWTS siting (See Section 3.4, horizontal setbacks). The locations of borings to establish current groundwater/subsurface water levels and percolation tests (including failures and their corresponding percolation rates) will be clearly documented in the site evaluation. This information helps determine suitable OWTS design and the minimum vertical separation distance between the bottom of the dispersal system to groundwater. Requirements for vertical separation to groundwater are described further in Appendix A and include:

- Vertical separation distance of 5 feet for conventional OWTS with percolation rates between 5 and 60 minutes per inch, a vertical separation distance of 20 feet for conventional OWTS with percolation rates greater than 1 minute per inch and less than 5 minutes per inch, and a vertical separation distance of 10 feet for all seepage pits;

- Los Angeles County does not allow for reduced groundwater separation distances based on percolation rates, but does allow for reduced vertical separation distance based on inclusion of supplemental treatment for a NOWTS dispersal system;

- No provision for vertical separation distance of less than 2 feet.

- Areas with High Use of Domestic Wells. Domestic wells are used widely in rural unincorporated areas that also use OWTS. California State Water Resources Control Board, Division of Drinking Water regulates the use of domestic water wells under the Safe Drinking Water Act requirements separate from this LAMP. In the County the horizontal setbacks from domestic wells are required to ensure the protection of the groundwater supply from OWTS near domestic wells. Horizontal setback requirements are summarized in Section 3.4, **Table 3-4**. The RWQCB may identify specific areas of high domestic well usage in cumulative impact studies, as discussed in Appendix B, with the availability of supplemental treatment technologies to mitigate impacts to groundwater in these areas if necessary.

- Density Limitations. The requirement to install supplemental treatment on new lot subdivisions that exceed the Tier 1 density limitation based on average annual rainfall helps protect groundwater from high density development using OWTS which could overload the assimilative capacity of the groundwater. Existing lots in the Antelope Valley area under the authority of the Lahontan RWQCB will remain subject to the limitation of 1 single family residence per half acre or 500 gal/acre/day of wastewater that was in effect prior to the adoption of the LAMP.

Surface Water Quality Protection

- Minimum water body setback requirements. Horizontal setbacks from flowing and non-flowing surface water bodies are required to protect surface water. Horizontal setback requirements are summarized in Section 3.4, **Table 3-4**.

  If the site-specific natural filtration occurs too fast, there is an increased potential for contaminated effluent to reach the groundwater and/or nearby surface water bodies. It is under these conditions that a NOWTS becomes an option to continue pursuit of a building permit. When utilizing a

NOWTS, the effluent is pre-treated, removing contaminants prior to dispersal of the effluent into the soil. In summary, a NOWTS is used in areas where soil percolates too fast for natural filtration to occur. An OWTS that utilizes, in addition to the septic tank, one or more supplemental treatment components to treat the effluent prior to discharge on the dispersal field is considered a NOWTS. For new construction, a property owner will be required to install a NOWTS utilizing a pre-treatment component when a system utilizes a seepage pit as well. A NOWTS is required where the percolation rate for a specific soil is greater than 5.12 gallons per square foot of leaching area per 24 hours; or for a system that utilizes leach lines/fields where the percolation rate for a specific soil is faster than 5 minutes per inch. Section 3.5, below, details the conditions when a NOWTS is required.

- NOWTS may also provide alternatives to a property owner when:
  - An existing private sewage disposal system has failed; or
  - A property owner wishes to install pressurized drip system.
- Flood protection measures. The site evaluation will identify any flood zone/area within 200 feet of the property line, as required by DPH in the Professional Guide. The Professional Guide includes additional requirements and considerations for flood zones, including avoiding installing OWTS within flood plain/hazard areas. Where suitable sites outside of flood hazard areas are not available, wastewater dispersal systems may be permitted in flood hazard areas on sites where the effects of inundation, under conditions of the design, are minimized. Applicants are advised to contact the local Building and Safety office to inquire whether additional requirements apply. Due to site constraints of a property, located within a flood hazard area, the applicant shall be required to demonstrate that the proposed OWTS is designed with additional protective measures to prevent contamination of surface water or runoffs and minimize other risks associated with flooding, such as, infiltration into the dispersal system when the area is inundated by flood water or the potential of scour over and into the dispersal system that could adversely impact the absorption capability of the dispersal system and the overall function of the OWTS.
- Public Water Supply. The horizontal setback standards for OWTS components are included in this LAMP to protect public water supply features. Further discussion related to public water supply is included in **Appendix A**, Section 3.4, Section 4 and Section 5. **Table 3-4** summarizes horizontal setback requirements in LA County.

Impaired Water Bodies, Section 303(d) List (Nitrogen or Pathogens).

Impaired water bodies pursuant to Section 303(d) of the Clean Water Act exist within Los Angeles County. Some of the County impaired water bodies listed due

to nitrogen or pathogen indicators or showing OWTS as a potential contributing source pursuant to section 303(d) of the Clean Water Act have TMDL levels established by the RWQCB as shown in **Table 2-3**. Existing, new, and replacement OWTS as defined by the State OWTS Policy that are near impaired water bodies may be addressed by a TMDL and its implementation program, or by special provisions in a LAMP.

It is the responsibility of the owner of existing, new or replacement OWTS (as defined by the State OWTS Policy) to confirm whether the location of his/her system relative to impaired water bodies will classify the system as Tier 3. The SWRCB provides a map tool on their website http://www.waterboards.ca.gov/water_issues/programs/owts/index.shtml that assists residents in determining if they are within 2,000 feet of an impaired water body. This distance is the distance from an impaired water body that the SWRCB considers to be "near" to a system. If you enter a property address into the map tool, nearby impaired waters for nitrogen compounds and/or pathogens should be listed. If no nitrogen - or pathogen-impaired water bodies listed in Attachment 2 of the OWTS Policy and this LAMP are identified within 2,000 feet of an address, there is a lower potential for the OWTS to be classified under the Tier 3 requirements or covered under a TMDL implementation plan based on distance to an impaired water body. If there are nitrogen- or pathogen-impaired water bodies that are identified within 2,000 feet of an address using the map tool, there is a higher potential for the OWTS to be classified under the Tier 3 requirements or covered under a TMDL implementation plan. Due to data limitations, property owners are strongly advised to conduct further investigation beyond the SWRCB mapping tool with the help of their local agencies, RWQCB and/or SWRCB to determine whether their system falls into the Tier 3 category before making any changes to their system. See the SWRCB website http://www.waterboards.ca.gov/water_issues/programs/owts/index.shtml.

OWTS near impaired water bodies that are not listed as impaired due to nitrogen or pathogen indicators, and do not have a TMDL and are not covered by a Local Agency Management Program with special provisions, are not addressed by Tier 3. Tier 3 for Impaired Areas is defined as follows:

> Tier 3 - Impaired Areas: Existing, new, and replacement OWTS as defined by the State OWTS Policy that are near impaired water bodies may be addressed by a TMDL and its implementation program, or special provisions contained in a Local Agency Management Program. The TMDL and its implementation plan shall be established by the US Environmental Protection Agency, or adopted by the County as Basin Plan Amendment(s). If there is no TMDL or special provisions, new or replacement OWTS within 600 feet of water bodies impaired for nitrogen or pathogens must meet the specific requirements of Tier 3. In this LAMP, OWTS near impaired waterbodies and new or replacement OWTS within 600 feet of water bodies impaired for nitrogen or pathogens must meet the specific requirements of Tier 3, which includes requirements for supplemental treatment as a NOWTS as well as inclusion in the Advanced

Protection Management Program (APMP) described in this LAMP.

The impaired water bodies shown in **Table 2-3** require a 600 feet boundary for OWTS until a TMDL with OWTS allotment is established by the RWQCB in a TMDL implementation plan. Tier 3 applies to OWTS within the 600 feet boundary until the TMDL with OWTS allotment is established. Section 4.2, below provides additional information for management of OWTS near impaired water bodies.

Until a TMDL with OWTS allotment is established, new or replacement OWTS within 600 feet of an impaired water body must meet the specific requirements of Tier 3, which involves inclusion in an APMP. **Appendix B** describes development of the APMP. For Tier 3 systems, the APMP requires that supplemental treatment for nitrogen and/or pathogens must be used, based on the source of impairment of the nearby water body. Supplemental treatment classifies a system as a NOWTS, and requirements for NOWTS are described in greater detail in Section 3.5 and Section 3.6, below.

Table 2-3. Water Bodies Impaired for Pathogens or Nitrogen that are Subject to Tier 3 in Los Angeles County

RWQCB Region	Impaired Water Body	TMDL Completion Date	Plan with OWTS allotment
4	Coyote Creek	TBD – Pathogens	NA
4	Malibu Creek (Includes Las Virgenes Creek and Malibu Lagoon)	2013[2] – Nitrogen	Yes (See Section 4.2)
		TBD – Pathogens	NA
4	San Gabriel River Reach 1 (Estuary to Firestone)	June 2016 – Pathogens	NA
4	San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam)	June 2016 – Pathogens	NA
4	San Gabriel River Reach 3 (Whittier Narrows to Ramona)	June 2016 – Pathogens	NA
4	San Jose Creek Reach 1 (San Gabriel Confluence to Temple Street)	June 2016 – Pathogens	NA
4	San Jose Creek Reach 2 (Temple Street to Interstate -10 at White Ave.)	June 2016 – Pathogens	NA
4	Sawpit Creek	June 2016 – Pathogens	NA
4	Walnut Creek Wash (Drains from Puddingstone Reservoir)	June 2016 – Pathogens	NA

4	Malibou Lake	2003[1] – Nitrogen	NA
4	Westlake Lake	TBD – Nitrogen	NA
4	Mint Canyon Creek	2004[1] – Nitrogen	NA
4	Santa Clara River Lakes (Lakes Hughes, Muntz, and Elizabeth)	2017 – Nitrogen	Yes[3]

Notes:

1. USEPA TMDL approval date.
2. EPA-established TMDL. For Malibu Creek, OWTS allotments for Nitrogen and Phosphorus were established in the TMDL Implementation Plan (USEPA, 2013). The implementation plan includes a study to determine if any areas can be excluded from requirements. No action required by homeowners until study is completed until 2022.
3. The Santa Clara River Lakes TMDL includes a study to determine if any areas can be excluded. No action required by homeowners until the study is completed in 2022.

TBD = TMDL Completion Date is to be determined. TMDL is not yet adopted by the RWQCB as a Basin Plan Amendment, approved by the USEPA, or established by the USEPA.

NA = Not available. No TMDL implementation plan with OWTS allotment has been established yet.

Las Virgenes Creek, Malibu Lagoon, Westlake Lake, Mint Canyon Creek and Santa Clara River Lakes (Lakes Hughes, Muntz, and Elizabeth) water bodies are included in the above list because they have been identified as being impaired for nitrogen or pathogens with OWTS as a potential contributing source. The remaining water bodies shown above were identified in the State OWTS Policy as impaired for pathogens or nitrogen with OWTS as a potential contributing source. **Appendix B** includes additional discussion of the water bodies impaired due to nitrogen and/or pathogens in Los Angeles County.

Subdivision Densities, High Density of OWTS, Parcel Size, and Cumulative Impacts

The average density for any subdivision of property made by Tentative Approval pursuant May 13, 2018, to the Subdivision Map Act implemented under this Tier 2 LAMP shall not exceed the allowable OWTS density values in **Table 2-4** for a single-family dwelling unit, or its equivalent, for those parcels that rely on OWTS. The County is adopting these subdivision density specifications from Tier 1 of the OWTS Policy. The County will accept the use of NOWTS as a variance when the allowable density cannot be met. The County will require the recordation of a covenant for the use of a NOWTS. Lots created prior to the implementation of this LAMP are not subject to the aforementioned minimum lot size requirements, however they will be subject to the design requirements of this LAMP.

For parcel formed by tentative subdivision made before May 13, 2018, the minimum lot size for a single family dwelling is ½ acre, or a maximum parcel loading rate of 500 gal/(acre/day).

Figure 2-4 includes a map of average annual rainfall for the geographic regions in the County.

Table 2-4. Allowable Average Densities per Subdivision

Average Annual Rainfall (in/yr)	Allowable Density (acres/single family dwelling unit)
0 - 15	2.5
>15 - 20	2
>20 - 25	1.5
>25 - 35	1
>35 - 40	0.75
>40	0.5

As part of the sub-division process, plans and a feasibility study must be submitted for evaluation and will document adequate area for the DPH requirement for a 100% future expansion area for the OWTS dispersal system. The RWQCB may identify specific areas in cumulative impact studies as described in Appendix B, with the availability of supplemental treatment technologies to mitigate impacts to groundwater in these areas, if necessary.

Geographic Areas with Older Non-Conforming OWTS Installations and Setbacks

Older, non-conforming OWTS may exist in remote rural, recreational or agricultural areas in the North County, in areas near Malibu, or elsewhere in the County. Typical non-conforming OWTS are small systems constructed prior to modern codes. Some systems consist of cesspools, which are prohibited by the State OWTS policy. Complaints, applications for updates and/or repairs, and pumper truck reports help identify non-conforming systems. Non-conforming systems and cesspools can be upgraded to conforming OWTS or NOWTS depending on space available. The availability of supplemental treatment technologies may help to mitigate impacts to groundwater, if necessary. Cesspool phase out is addressed in Section 4.13. Otherwise, if older systems are not brought into compliance with the requirements of this LAMP and do not qualify under Tier 0, then the system will not qualify for conditional waiver from the requirement for owners of OWTS to apply for and receive Waste Discharge Requirements and the RWQCB should be contacted.

3.0 OWTS SITING, DESIGN AND CONSTRUCTION REQUIREMENTS

This section presents excerpts from the Los Angeles County Code Title 11 (Health and Safety), Title 28 (Plumbing) and the Professional Guide describing the main requirements for siting, design, operation and maintenance for new and replacement OWTS in Los Angeles County. As per Section 9.0 of the OWTS Policy, these main requirements are part of the proposed Tier 2 Local Agency Management Program for this LAMP. Discussion is included where requirements differ from applicable Tier 1 standards found in Sections 7.0 and 8.0 of the OWTS Policy for low risk new and replacement OWTS, as appropriate.

3.1 Site Evaluations for OWTS

General Site Evaluation and Siting Standards

Any evaluation for OWTS should first verify that the new, replacement or existing OWTS as defined by the OWTS State Policy does not lie within an area subject to a Basin Plan prohibition of discharges from OWTS, such as the Malibu Civic Center area. Additionally, the evaluation should verify whether the new, replacement or existing OWTS lies within an area subject to considerations for an impaired water body, including compliance with a TMDL implementation plan with OWTS allotment, or within the 600 feet boundary of an impaired water body subject to Tier 3 and compliance with the APMP (Section 4.2).

When installing, replacing, repairing or modifying an OWTS, plans and a feasibility report must first be approved by the DPH. The applicant will submit a package to DPH for approval, including a service request form, application checklist, fee payment, feasibility report, and relevant site plans. In all instances, the DPH will review the submittal package to verify information provided, check proper system design and determine compliance with site suitability criteria identified in the Plumbing Code, Professional Guide and LAMP. DPH will identify concerns or obstacles that may prevent the proposed installation of an OWTS during the site evaluation.

Feasibility reports will be prepared by qualified professional(s) who possess a valid California license/permit to conduct the testing, and/or to prepare or contribute to the preparation of a feasibility report. The QP who prepares the feasibility report must sign the report. The feasibility report shall clearly identify the following:

- The property address, ownership information, the Qualified Professional's information, the date of the testing, and the description of the procedures.

- The name and the profession of the person(s) who performed the actual percolation testing procedure and their working relationship with the QP who signed the report.

- A site-specific determination of seasonal and historical subsurface water levels,

including information regarding the methods utilized to reach the determination. This should include all available historical data that supports the findings concluded by the QP.

- Percolation testing data including the failures of test holes.
- A general soil description and any features that may affect subsurface wastewater dispersal.
- A soil profile excavation down-logged by a California Professional Geologist or California Certified Engineering Geologist. This report is to be included with the percolation test data.
- Evidence that the proposed dispersal system meets the setback to groundwater.
- Depth of groundwater in the general area based on prior geological studies of the area, well completion reports or other relevant sources.
- Lot size.
- Project estimated flow.
- Conformance to density criteria, where applicable.

The feasibility report will describe the site specific natural ground slope and topographical features, area available for the system and dispersal field, proximity to cuts, steep slopes, unstable land masses within 100 feet, water bodies, wells, and other features that limit the available dispersal area, 100% future expansion area, and horizontal setback requirements. Surface water treatment plants for drinking water located within 1,200 feet of the system will be identified in the feasibility report as well.

Soil Depth

For existing, new or replacement OWTS as defined by the State OWTS Policy, the feasibility report will include all necessary soil and site evaluations performed by a QP, who is retained by the owner. Section 4.4 and Table 4-3 summarize the education and qualification requirements for a QP. Evaluations will be made in accordance with requirements in the Plumbing Code, Professional Guide and LAMP.

A site evaluation shall determine that a minimum of 3 feet of adequate soil depth is present in the dispersal area. Soil depth is measured vertically to the point where bedrock, hardpan (a distinct layer of soil that is largely impervious to water), or impermeable soils are encountered or an adequate depth that has been determined by the DPH. Soil depth shall be determined through the use of soil profile(s) in the dispersal area and the designated dispersal system replacement

area, as viewed in excavations exposing the soil profiles in representative areas, unless the DPH has determined through historical or regional information that a specific site soil profile evaluation is unwarranted.

Depth to Groundwater and Percolation Testing

A site evaluation shall determine whether the anticipated highest level of groundwater within the dispersal field and its required minimum dispersal zone is not less than prescribed in **Table 3-1**. Percolation testing shall be completed in accordance with procedures detailed in the Professional Guide. Prior to conducting any percolation tests, a site evaluation, including subsurface exploration, shall be conducted by a California Professional Geologist or a California Certified Engineering Geologist to determine the depth of groundwater. Depth to groundwater estimation may use one or a combination of the following methods:

- Direct observation of the highest extent of soil mottling observed in the examination of soil profiles, as viewed in excavations exposing the soil profiles in representative areas, recognizing that soil mottling is not always an indicator of the uppermost extent of high groundwater; or

- Direct observation of groundwater levels during the anticipated period of high groundwater via groundwater exploration test holes; or

- In areas with alluvial geology where previous excavations and prior reports by Professional Geologists within the property have proven that there are no high subsurface water concerns, and the soil profile is similar within 10 feet of the anticipated bottom of dispersal field or seepage pit, a statement signed by a QP attesting to the data that substantiates the findings may be accepted.

- Where a conflict in the above methods of examination exists, the direct observation method indicating the highest level shall govern.

In areas that are known to have high groundwater and/or where observation of mottling, oxidation, staining, crystal buildup, seeps, weeps or other features that may indicate presence of groundwater in the past or present or where groundwater or moisture seepage (seeps, perched-water, etc.) is present within 10 feet below the expected bottom of the dispersal field or seepage pit, the QP shall, on a continuous basis, monitor and measure the presence of moisture and depth to high groundwater through a groundwater level observation well. Chapter 8 in the Professional Guide provides a detailed description of the manner in which to conduct testing in areas of known or observed high subsurface water.

Depth to groundwater determinations are required on every property 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 compliance with applicable siting criteria for all proposed OWTS locations.

Table 3-1. Minimum Vertical Separation to Groundwater for Leach Field and Leach Bed Dispersal Systems
(feet, below trench bottom)

Percolation Rate (min per inch)	Los Angeles County LAMP and Plumbing Code Minimum Vertical Separation, Proposed Tier 2
<1	Not allowed
1 - <5	20 feet minimum vertical separation
5-60	5 feet minimum vertical separation
>60	Not Allowed

The depth to groundwater requirements for OWTS in the County are discussed in greater detail in **Appendix A**.

A feasibility report shall include percolation testing and evaluation of the suitability of the soils for absorption of wastewater in the dispersal zone. Percolation testing is required on every property 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 compliance with applicable siting criteria for all proposed OWTS locations. Prior to performing percolation testing, the QP will notify the DPH of the date and time of all percolation tests to be performed, at least one business day in advance. The DPH representative may visit the site to observe the testing procedure. The feasibility report will clearly disclose the name and the profession of the person who performed the actual percolation testing procedure and the working relationship to the QP consultant who directly supervised the work. A sufficient number of percolation tests shall be conducted within the anticipated dispersal system on all properties proposing to use an OWTS. The entire percolation test procedures, including presoak shall be performed by a QP or trained individual(s) that are supervised by the QP. All percolation test rates shall be performed by presoaking of percolation test holes and continuing the test until a stabilized rate is achieved. In the County, percolation test results in the dispersal field for OWTS will not be faster than five minute per inch (5 MPI) or slower than sixty minutes per inch (60 MPI). The County requires increased groundwater separation distances based on percolation rates of at least 1 minute per inch but slower than 5 minutes per inch. The County does allow reduced separation for NOWTS dispersal systems as shown in **Table 3-2**.

Table 3-2. Minimum Vertical Separation to Groundwater with Percolation Rates for OWTS, NOWTS and Seepage Pits

Type of OWTS	Percolation Rate	Min. Depth to Groundwater[1] (feet)
Conventional Septic Tank with leach line, leach field or infiltrative chambers	1 - <5	20

Conventional Septic Tank, leach line, leach field or infiltrative chambers	5-60	5
NOWTS with leach lines, leach field, or infiltrative chambers	1 - 60	3
Seepage Pits, and Gravel-Packed Pits	Between 0.83 and 5.12 gallons per square foot in 24 hours	10
Seepage Pits and Gravel-Packed Pits – With NOWTS and disinfection system.	Greater than 5.12 gallons per square foot in 24 hours	10
Soil Replacement: the manufactured/engineered soil shall provide homogenized absorption capability, requires the use of a NOWTS that uses disinfection and an alternate method of wastewater disposal.	Greater than 5.12 gallons per square foot in 24 hours	2ft as a variance for existing systems only. Otherwise, 5 ft.

[1] Measured from the bottom of the dispersal system

Special Notification to Owner of Surface Water Treatment Plant for Drinking Water

During the feasibility study, the QP will determine if the OWTS is within 1,200 feet of an intake point for a surface water treatment plant for drinking water, is in the drainage catchment in which the intake point is located, and located such that it may impact water quality at the intake point such as being upstream of the intake point for a flowing water body. If the OWTS is within 1,200 feet of an intake point for a surface water treatment plant for drinking water, is in the drainage catchment in which the intake point is located, and is located such that it may impact water quality at the intake point:

- The DPH will provide a copy of the permit application to the owner of the water system of their proposal to install an OWTS within 1,200 feet of an intake point for a surface water treatment plant. If the owner of the water system cannot be identified, then the DPH will notify the State Water Resources Control Board, Division of Drinking Water.

- The permit application package will include a topographical plot plan for the parcel showing the OWTS components, the property boundaries, proposed structures, physical address, and name of property owner.

Geotechnical Report/Slope Evaluation Report

A Slope Evaluation Report approved by a qualified professional is required whenever natural ground slopes in dispersal areas are greater than 30%. A California Certified Engineering Geologist or a California Registered Professional Soil/Geotechnical Engineer shall address whether any unstable land mass or areas subject to earth slides require a setback of 100 feet or indicate other setbacks that should be allowed.

A geotechnical report from a qualified professional will be required for any unstable land mass or area subject to earth slides when proposed set back distance will be less than 100 feet.

Cumulative Impact Assessment

During the site assessment and prior to issuing a permit to install an OWTS, the DPH will consider results from cumulative impact studies, if available.

In specific areas that have been identified as areas of high domestic well usage, the RWQCB may complete cumulative impact studies for new OWTS installations based on the number of OWTS systems in the geographic area, as appropriate. Typically, non-residential and large flow OWTS managed under the RWQCB WDR permit process would be the greatest contributing factor for such studies. If the results of cumulative impact studies indicate that OWTS (domestic sources) may be impacting groundwater, testing including analytes may be recommended by the RWQCB to constrain the impact of OWTS. The RWQCB may recommend additional testing for analytes, including nitrogen, bacteria, TDS, chloride, sulfate and/or boron, as appropriate. Appendix B provides additional discussion of cumulative impact assessment considerations.

Subdivision Densities

The average OWTS density for any subdivision of property made by Tentative Approval pursuant to the Subdivision Map Act implemented under this Tier 2 LAMP shall not exceed allowable density values for a single-family dwelling unit, or its equivalent, for those units that rely on OWTS (Section 3.0). The County will accept the use of NOWTS as a variance when the allowable density cannot be met.

3.2 Wastewater Flows for OWTS Design

The design of new and replacement OWTS shall be based on influent wastewater quality, quantity, the site characteristics and the required level of treatment for protection of water quality as well as public health. Because of the many variables encountered, it is not possible to set absolute values for waste/sewage flow rates for all situations. The designer should evaluate each situation and, if figures in **Table 3-3** need modification, they should be made with the concurrence of the

DPH. Estimated flow rates are provided in the County Plumbing Code, as summarized in **Table 3-3**.

Table 3-3. Estimated Waste/Sewage Flow Rates

Type of Occupancy	Unit Gallons (liters) Per Day
1. Airport	15 (56.8) per employee
	5 (18.9) per passenger
2. Auto Washers	Check with equipment Manufacturer
3. Bowling Alleys (snack bar only)	75 (283.9) per lane
4. Camps:	
Campground with central comfort station	35 (132.5) per person
Campground with flush toilets, no showers	25 (94.6) per person
Day camps (no meals served)	15 (56.8) per person
Summer and seasonal	50 (189.3) per person
5. Churches (Sanctuary)	5 (18.9) per seat
with kitchen waste	7 (26.5) per seat
6. Dance Halls	5 (18.9) per person
7. Factories:	
No showers	25 (94.6) per employee
With showers	35 (132.5) per employee
Cafeteria, add	5 (18.9) per employee
8. Hospitals	250 (946.3) per bed
Kitchen waste only	25 (94.6) per bed
Laundry waste only	40 (151.4) per bed
9. Hotels (no kitchen waste)	60 (227.1) per bed (2 person)
10. Institutions (Resident)	75 (283.9) per person
Nursing Home	125 (473.1) per person
Rest Home	125 (473.1) per person
11. Laundries, self service (minimum 10 hours per day)	300 per machine
Commercial	Per manufacturer's specifications
12. Motel	50 (189.3) per bed space
with kitchen	60 (227.1) per bed space
13. Office	20 (75.7) per employee
14. Parks	
Picnic parks (toilets only)	20 (75.7) per parking space
Recreational vehicles:	
without water hookup	75 (283.9) per space
with water and sewer hookup	100 (378.5) per space
15. Restaurants—Cafeterias	50 (189.3) per seat
16. Schools—Staff and office	20 (75.7) per person
Elementary students	15 (56.8) per person

Type of Occupancy	Unit Gallons (liters) Per Day
Intermediate and High	20 (75.7) per student
with gym and showers, add	5 (18.9) per student
with cafeteria, add	3 (11.4) per student
Boarding, total waste	100 (378.5) per person
17. Service stations, toilets	1000 (378.5) for 1st bay 500 (1892.5) for each additional bay
Recreational vehicle dump station	750
18. Stores	20 (75.7) per employee
public restrooms, add	1 per 10 sq. ft.(4.1/m2) of floor space
19. Swimming pools, public	10 (37.9) per person
20. Theaters, auditoriums	5 (18.9) per seat
drive in	10 (37.9) per space

3.3 Materials and Equipment

The design of the OWTS system will comply with minimum standards, including accepted plumbing material standards, as specified in the Plumbing Code. Materials and equipment for OWTS construction, replacement or repair will be reviewed and evaluated by the DPH.

Septic tanks must be watertight, properly vented and constructed of reinforced concrete, heavyweight reinforced concrete blocks, fiberglass or other durable non-corrodible materials as approved by the director. Septic tanks shall be designed to withstand any anticipated weight placed above it. All septic tanks shall be listed and approved by IAPMO or an ANSI accredited testing organization.

All OWTS approved under the LAMP shall have a septic tank equipped with an effluent filter located in the outlet compartment in such a manner to be easily serviced.

Design and materials for special conditions or materials not provided for in the Plumbing Code shall be permitted to be used only by special permission of the Director after the Director has been satisfied as to their adequacy. Nothing in the Plumbing Code is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by the Plumbing Code. If alternative materials are included in the OWTS design, technical documentation will be submitted to the DPH to demonstrate equivalency. The Director will have the authority to approve or disapprove the system, method, or device for the intended purpose.

3.4 Conventional OWTS Requirements

Design requirements for conventional OWTS are detailed in the Professional Guide and Plumbing Code for the County. There are no key issues related to Los

Angeles County's LAMP Tier 2 OWTS variations relative to SWRCB Tier 1 requirements. County Tier 2 requirements are as stringent in the protection of public health and of the environment as SWRCB Tier 1 requirements. However, the County's LAMP adopts some horizontal setback minimums not currently specified in the County's plumbing code, which will be amended to the Plumbing Code.

Siting Requirements

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

1. A site evaluation shall determine that a minimum of 3 feet of adequate soil depth is present in the dispersal area. Soil depth is discussed further in Section 3.1, above.

2. The total depth of fill over leach lines to ground level, to include the gravel over the pipe, shall not exceed 24 inches. A depth of 12 to 18 inches of earthen cover is required over leach lines.

3. The minimum vertical separation distances to groundwater and the required soil percolation rates for conventional OWTS are summarized in Section 3.1, above. The OWTS must comply with the vertical separation distances shown in **Table 3-1**.

4. Where suitable sites outside of flood hazard areas are not available, wastewater dispersal systems may be permitted in flood hazard areas on sites where the effects of inundation, under conditions of the design, are minimized. Applicants are advised to contact the local Building and Safety office to inquire whether additional requirements apply.

5. Where natural ground slopes in dispersal areas are greater than 30%, approval for a conventional OWTS is dependent on the findings of the slope evaluation report prepared by a qualified professional.

6. The OWTS must comply with the horizontal setbacks shown in **Table 3-4**. Additional discussion of horizontal setbacks is included in Appendix A.

Table 3-4. Minimum Horizontal Setback Distances

Minimum Horizontal Distance in Clear Required From:	Septic Tank	Disposal Field	Seepage Pit
Buildings or Structures[1]	5 feet (1.52 m)	8 feet (2.44 m)	8 feet (2.44 m)
Property line adjoining private property	5 feet (1.52 m)	5 feet (1.52 m)	8 feet (2.44m)
Public Water Well, Where	200 feet (61	—	200 feet

depth of effluent dispersal system >10 feet[7,8]	m)[8]		(61 m)
Public Water Well, Where depth of effluent dispersal system ≤10 feet[7]	150 feet (45.7m)	150 feet (45.7m)	—
Springs, and Flowing Surface Water[7,9]	100 feet[9] (30.5m)	100 feet[6,9](30.5m)	150 feet[6,9](45.7 m)
Vernal Pools, Wetlands, Lakes, Ponds, or Other (Non-Flowing) Surface Water Bodies[7,10]	200 feet[10] (61m)	200 feet[6,10] (61m)	200 feet[6,10] (61m)
Seepage pits	5 feet (1.52 m)	5 feet (1.52 m)	12 feet (3.66 m)
Disposal field	5 feet (1.52 m)	4 feet[4] (1.22 m)	5 feet (1.52 m)
On site domestic water service line	5 feet (1.52 m)	5 feet (1.52 m)	5 feet (1.52 m)
Distribution box	—	5 feet (1.52 m)	5 feet (1.52 m)
Pressure public water main	10 feet (3.05 m)	10 feet (3.05 m)	10 feet (3.05 m)
Private Water Wells[7]	100 feet (30.5 m)	100 feet (30.5 m)	150 feet (45.72m)
Monitoring wells[11]	100 feet (30.5 m)	100 feet (30.5 m)	100 feet (30.5 m)
Unstable Land Mass or Areas Subject to Earth Slides[12]	100 feet (30.5 m)	100 feet (30.5 m)	100 feet (30.5 m)
High Water Mark of Reservoir, Lake, or Flowing Water Body, Type I[13]	400 feet (122 m)	400 feet (122 m)	400 feet (122 m)
High Water Mark of Reservoir, Lake, or Flowing Water Body, Type II[14]	200 feet (61 m)	200 feet (61 m)	200 feet (61 m)
Trunk of any tree[15]	10 feet (3.05 m)	10 feet (3.05 m)	10 feet (3.05 m)

Notes:

When disposal fields and/or seepage pits are installed in sloping ground, the minimum horizontal distance between any part of the leaching system and ground surface shall be fifteen (15) feet (4.57m).

1. Including decks, patios, porches and steps, whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, carports, covered walks, covered driveways and similar structures or appurtenances.
2. Reserved.
3. Reserved.
4. Plus two (2) feet (.61m) for each additional (1) foot (.305m) of depth in excess of one (1) foot (.305m) below the bottom of the drain line. (See also Section K 6 in Appendix K of the Plumbing Code.)
5. Reserved.
6. These minimum clear horizontal distances shall also apply between disposal field, seepage pits, and the

ocean mean higher high tide line.
7. Where special hazards are involved, the distance required shall be increased as may be directed by the Authority Having Jurisdiction.
8. If the depth of the effluent dispersal system exceeds 20 feet (6.1m) and is within 600 feet (182.88m) of a public water well, the setback must be such that there is at least two-year travel time for microbiological contaminants
9. Includes springs and flowing surface water bodies where the edge of that water body is the natural or levied bank for creeks and rivers, or may be less where site conditions prevent migration of wastewater to the water body.
10. Distance from vernal pools, wetlands, lakes, ponds, or other surface water bodies where the edge of that water body is the high water mark for lakes and reservoirs, and the mean high tide line for tidally influenced water bodies.
11. Where regulatory or legitimate data requirements necessitate, the required distance to monitoring wells may be decreased as may be directed by the Authority Having Jurisdiction. If the monitoring well is installed to monitor the groundwater at the waste effluent discharge, the setbacks do not apply.
12. Unstable land mass or areas subject to earth slides shall be identified by a registered engineer or registered geologist; other setback distances are allowed, if recommended by a geotechnical report prepared by a qualified professional.
13. 400 feet (121.92m) from the high water mark of a reservoir, lake, or flowing water body when the effluent dispersal system is within 1,200 feet (365.76m) from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies.
14. 200 feet (60.96m) from the high water mark of a reservoir, lake, or flowing water body when the effluent dispersal system is located more than 1,200 feet (365.76m) but less than 2,500 feet (762m) from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies.
15. For Oak trees, this requirement extends to 5 feet (1.52m) outside of the drip line or 15 feet (4.57m) from the trunk, whichever is greater.

Septic Tank Requirements

Septic tanks must have the minimum capacity shown in **Table 3-5** for single family and multiple dwelling units. The capacity for a septic tank to be utilized for single or multiple family dwelling shall be determined based on the number of bedrooms and bedroom equivalents. Septic tanks may be voluntarily oversized to improve the retention time, which should be clearly noted on the plans.

Table 3-5. Capacity of Septic Tanks*

Single-Family Dwellings** Number of Bedrooms	Multiple Dwelling Units or Apartments—One Bedroom Each	Other Uses: Maximum Fixture Units Served (per Plumbing Code)	Minimum Septic Tanks Capacity in Gallons (Liters)
1 or 2		15	750 (2,838)
3		20	1,000 (3,785)
4	2 units	25	1,200 (4,542)
5 or 6	3	33	1,500 (5,677.5)

	4	45	2,000 (7,570)
	5	55	2,250 (8,516.3)
	6	60	2,500 (9,462.5)
	7	70	2,750 (10,408.8)
	8	80	3,000 (11,355)
	9	90	3,250 (12,301.3)
	10	100	3,500 (13,247.5)

Notes:
Extra bedroom, 150 gallons (568 liters) each.
Extra dwelling units over 10,250 gallons (946 liters) each.
Extra fixture units over 100, 25 gallons (95 liters) per fixture unit.
* Septic tank sizes in this table include sludge storage capacity and the connection of domestic food waste disposal units without further volume increase.
* * Applies to mobile homes not installed in a mobile home park.

Structural requirements for septic tanks include the following items:

- All new septic tanks shall comply with the most current version of the Los Angeles County Plumbing Code, Title 28, Appendix K.

- All new or replacement tanks shall be approved by IAPMO or stamped and certified by a California registered civil engineer as meeting industry standards and their installation shall be according to manufacturer's recommendations.

- New and replacement tanks on conventional OWTS shall be equipped with an effluent filter to prevent the solids in excess of 3/16th of an inch from passing to the dispersal area. All filters shall meet NSF 46 certification standards.

- All joints between the septic tank and its components shall be watertight and constructed of solid, durable materials to prevent excessive corrosion or decay.

- The inverts of all outlets shall be level and the invert of the inlet shall be at least one inch higher than the outlets.

- All septic tank access points shall have watertight risers the tops of which are set not more than six (6) inches below grade. Access openings at grade or above shall be locked or secured to prevent unauthorized access.

- Any tank proposed to be installed within a driveway must be traffic-rated and

equipped with traffic-rated risers with traffic-rated covers set at grade. Non-traffic rated tanks shall not be installed within 5 feet of any road or driveway.

- OWTS that utilize pumps to move effluent from the septic tank to the dispersal system shall be equipped with one of the following: a visual, audible, or telemetric alarm that alerts the owner or service provider in the event of pump failure. All pump systems shall, at minimum, provide sufficient storage space in the pump chamber during a 24-hour power outage or pump failure and shall not allow an emergency overflow discharge. The capacity for the storage space for pump chamber shall be equal or greater than the sum of 300 gallons for first bedroom and 150 gallons for each additional bedrooms or bedroom equivalent rooms thereafter.

- When the existing system is required to be exposed to establish the size and capacity of the septic tank and/or dispersal field or seepage pit, the Department may visit the site and verify the dimensions with the QP/QC. The QP/QC shall notify this Department of the date and the time of the uncovering of the OWTS, at least one business day in advance for possible observation by the Department representative.

Percolation Rate and Dispersal Methods for Conventional OWTS

Leach Fields and Leach Beds:

- The average soil percolation rate in the proposed dispersal field area shall not be faster than five MPI (5 MPI) nor slower than sixty MPI (60 MPI), using the methods presented in the Professional Guide and Plumbing Code. The minimum effective absorption area in disposal fields is predicated on the required septic tank capacity and estimated waste/sewage flow rate.

- Dispersal sizing required by the OWTS Policy uses the maximum application rate determined from stabilized percolation rates provided in the OWTS Policy, or from soil textures and structures determined in the OWTS Policy. This LAMP utilizes the Ryon Formula and actual system testing to insure an appropriate disposal system sizing for the local soil conditions. Additional discussion of the dispersal system sizing methodology is provided in Appendix A.

The conventional leach bed system consists of multiple perforated lines installed in an excavation with a minimum 36 inches in width, maximum of 100 linear feet in length and containing 12 to 36 inches of gravel beneath a system of perforated distribution pipes through which sewage effluent seeps into the surrounding soil. Perforated pipes shall neither be installed greater than 6 feet apart nor closer than 3 feet to the sidewall of the leach bed. The area designated as a leach bed shall be at least 50% greater than the area required for leach lines. The dispersal field/area may not be covered or paved over and in no case may a vehicle be driven or placed over the dispersal field/area.

The conventional leach line system consists of one or more trenches. Each trench shall be 36 inches in width, maximum of 100 feet in length, and contain 12 to 36 inches of gravel beneath a single perforated distribution pipe through which sewage effluent seeps into the surrounding soil. When more than 1 leach line is required to be installed, they shall be equal in length and size and be provided effluent from a distribution box rather than an overflow pipe connecting the leach lines in series. The distance between trenches shall be a minimum of 4 feet, measured from closest sidewall to sidewall. The distance between trenches shall be increased by 2 feet for every additional foot of gravel beneath the perforated lines. Leach lines on hillside properties shall be installed level with the contour of the land.

An infiltrative chamber system consists of semicircular chambers installed contiguously with the open portion of the infiltrative chambers on the ground. The infiltrative surface area credit shall be limited to the calculated floor area beneath the open portion of the chamber, excluding the area beneath the base of walls where infiltrative chamber is placed on the ground. The infiltrative surface area may be reduced to seventy percent (70%) of the area that it would be required for a conventional leach field dispersal system. Use of gravel under the infiltrative chambers is optional; however, no additional sidewall credit will be given when gravel is used.

All gravel, stone, slag and similar materials used for filtration purposes shall be thoroughly washed to be free of fines (small particles). More detailed information regarding OWTS system design is provided in the Professional Guide and Plumbing Code.

Seepage Pit

The seepage pit system consists of one or more covered circular excavations, four to six feet in diameter with an interior lining of six inches of gravel and sewer brick or concrete liners allowing effluent to seep into the surrounding soil. The pit shall have a minimum effective sidewall of 10 feet below its sewer inlet pipe.

The seepage pit(s) must be sized to hold a volume of at least five (5) times the volume of the proposed size of the septic tank divided by the amount of water absorbed during the percolation test. When groundwater depth prevents a single pit from meeting this requirement, additional seepage pits must be constructed. Multiple seepage pits shall have effluent delivered to them from a distribution box rather than connecting the pits in series.

The installation of a seepage pit is only allowed as part of an existing, conventional OWTS when it is required to install the future expansion area, the soil meets percolation rate requirements, and inadequate surface area exists for leach lines or a leach field.

The installation of seepage pits for new construction requires the use of a NOWTS with the exception of new construction meeting the following conditions, which will be allowed the use of a conventional OWTS:
- One unit dwelling with maximum 4 bedrooms or 1,200 gallons tank.
- All setback requirements are met.
- The soil characterization does not include bedrocks.

Gravel packed pits are seepage pits that are filled with gravel of ¾ to 2 ½ inches in size up to the cap level, allowing effluent to seep into the surrounding soil. The gravel must be washed and free of silt. All of the limitations on seepage pits apply to gravel packed pits.

The gravel packed pit(s) must be sized to hold a volume of at least five (5) times the volume of the proposed size of the septic tank divided by the amount of water absorbed during the percolation test. The same requirements for percolation testing of a seepage pit apply to a gravel packed pit if the test is performed without gravel pack being added.

Future Expansion Area

Every new conventional OWTS and new NOWTS, regardless of the type of the dispersal system, shall be provided with a sufficient land area for an entirely new dispersal system (100% future expansion area):

- When soil profile and percolation tests confirm alluvium geology and uniformity in geology has been established by the Professional Geologist, the required percolation testing for the 100% future expansion area may be waived. The uniformity in geology shall be established through both soil profile studies and percolation testing of more than one hole.

- Where proposed future expansion areas are in bedrock, hardpan or fractured rock formation, the future pits shall be tested to establish percolation rates for each individual pit.

If the dispersal system proposed for the 100% future expansion area is installed concurrently with the construction of a new system, the future expansion system may not be utilized until the present system has failed.

Any expansions beyond the current footprint of the existing structure or addition of any new detached structures, shall require the demonstration of the feasibility of installing the 100% future expansion area, regardless of whether the proposed renovation will increase the design flow or demand greater capacity than the existing OWTS:

- As a part of an approval for 100% future expansion, a previously approved existing OWTS that has been in service for more than 15 years is required to

be inspected by a Qualified Contractor.

- If previous approval of the OWTS is not available or did not include approval of the 100% future expansion area AND the renovation/expansion neither increases the design flow, nor demands a greater capacity, the existing OWTS shall be evaluated by a Qualified Contractor, in addition to proving out the 100% future expansion area by a Qualified Professional.

When the present dispersal system has failed and the 100% future expansion area is to be utilized, the new dispersal system shall be interconnected with the existing system with an approved flow diversion device to allow the alternate use of the two dispersal systems.

An expansion of up to 10% of the current footprint may be allowed without requiring to prove out the feasibility for the 100% future expansion area so long as the expansion:

- Does not increase the design flow or require greater capacity,

- Does not take up more than 10% of the remaining available undeveloped area on the property, where no unfavorable geological conditions, such as, bedrock formation, etc. exist,

- All required setbacks can be met,

- The location and direction of the proposed expansion is in a manner that will not interfere with the installation of the 100% future expansion area when needed in the future.

- Applicants who elect to utilize the exemption under 10% expansion rule, shall submit a signed statement from a California Professional Geologist or a California Certified Engineering Geologist substantiating that there are areas available on the property for the installation of the 100% future expansion area and there are no unfavorable geological conditions, such as, bedrock formation, etc. exist within the property that may prevent the installation of the 100% future expansion area when needed in the future.

- Only one use of the 10% expansion rule will be granted to a property.

In situations where adequate land is not available for a second 100% future expansion area, the dispersal system that is being installed shall be equipped with supplemental treatment component. Additionally, the effectiveness of the 100% future expansion area (dispersal system) shall be determined in accordance with similar procedures required for the present dispersal system. Moreover, the 100% future expansion area shall be capable of supporting the installation of a dispersal system of the same capability and characteristics as the present dispersal system.

When approving a future expansion area for a system without prior approval, the approval issued by the Department will only encompass the 100% future expansion area, approving only the renovation/expansion and not the existing OWTS. The Department may require other additional improvements to ensure that the minimum required standards have been met.

3.5 NOWTS Requirements

Non-conventional Onsite Wastewater Systems (NOWTS) perform additional treatment of effluent to reduce its impact on the environment. This usually includes the effluent being pumped in small amounts to a specialized filter media where the effluent is processed mechanically, chemically, and biologically. These processes include treatment by aerobic bacteria to reduce the Biological Oxygen Demand (BOD) and convert ammonia to nitrate as well as mechanical filtration of suspended solids. A reduction in total nitrogen is accomplished by an aerobic treatment unit, media filters, sand bed filters or fixed film processors. In the areas of the County regulated by the Los Angeles Regional Water Quality Control Board, NOWTS are required to include a disinfection system under the following conditions.:

- A NOWTS is required with a new seepage pit or where the percolation rate exceeds the accepted rate for a replacement seepage pit (exceeding 5.12 gallons per square foot of dispersal area per 24 hours).

- A NOWTS with or without an alternate method of wastewater dispersal may be used where the percolation rate exceeds accepted rates for a leach line or leach bed (faster than 5 minutes for the drop of the 5^{th} to 6^{th} inch and less than 20 feet vertical separation from groundwater).

- A NOWTS will be required when there is less than three (3) feet, but at least two (2) feet of continuous, natural, undisturbed soil underneath the proposed dispersal system, which is a variance allowed for replacement systems only. The dispersal field may not overlie groundwater protected for drinking water supplies.

- Soil replacement in conjunction with a NOWTS with an alternate method of wastewater dispersal is required where the percolation rate is slower that accepted (slower than 60 minutes for the drop of the 5^{th} to 6^{th} inch for a leach line or leach bed system) or when there is less than two (2) feet of continuous, natural, undisturbed soil below the proposed dispersal system. This is a variance allowed for replacement systems only. The dispersal field may not overlie groundwater protected for drinking water supplies. Soil replacement is further discussed in section 3.5 including definition and

process.

- A NOWTS with an alternate method of wastewater dispersal is required where groundwater or surface water setbacks cannot be met, if space permits. Systems other than NSF 245 certified can be utilized if the licensed qualified contractors can demonstrate they have the knowledge to design and install those systems. Owners will be required to perform quarterly testing of the effluent. This is a variance allowed for replacement systems only. Examples of such systems may be mound or horizontal seepage pits.

- A NSF 245 certified NOWTS with or without an alternate method of wastewater dispersal is required near an impaired water body. If the water body is impaired for nitrogen, a disinfection component is not required.

- A NSF 245 certified NOWTS is required in a TMDL area. The addition of a disinfection system is required for a TMDL for pathogens.

- A NOWTS with disinfection system is required in situations where an alternative setback for a drinking water well is used because a normal setback cannot be achieved.

In the areas of the Antelope Valley regulated by the Lahontan Regional Water Quality Control Board, the need for a disinfection system shall be evaluated on a case-by-case basis, and chlorine shall not be used unless all other means of disinfection have been deemed not feasible. This is needed to prevent the formation of chlorine disinfection byproducts, which are carcinogens.

Section 2.5 provides additional information regarding impaired water bodies. Table 2-3 lists the current water bodies impaired for pathogens or nitrogen that are subject to Tier 3 in Los Angeles County and require management under the APMP within this LAMP (Appendix B). The APMP requires supplemental treatment with a NOWTS within the 600 feet boundary near impaired water bodies.

Site evaluation, plans, operation and maintenance guidelines, other permitting requirements, design and construction for NOWTS shall conform to all requirements for conventional OWTS as well as any additional requirements specified in the Professional Guide and Plumbing Code for the type of NOWTS proposed.

Required Soil Depths

A site evaluation shall determine that a minimum of 3 feet natural soil depth is present in the dispersal area. Soil depth is measured vertically to the point where

bedrock, hardpan, or impermeable soils are encountered or an adequate depth that has been determined by the DPH. Soil depth shall be determined through the use of soil profile(s) in the dispersal area and the designated dispersal system replacement area, as viewed in excavations exposing the soil profiles in representative areas, unless the DPH has determined through historical or regional information that a specific site soil profile evaluation is unwarranted.

Vertical Separation to Groundwater

The County allows for alternative NOWTS dispersal systems as shown in **Table 3-2** (Minimum Vertical Separation to Groundwater with Percolation Rates for OWTS, NOWTS and Seepage Pits).

Horizontal Setbacks

Horizontal Setback requirements for new developments using NOWTS are the same as the requirements for conventional systems (**Table 3-4**). Where the horizontal setbacks cannot be met for a replacement system, approval from the Director is required. If approval is not granted, applicants can refer to the Regional Water Board for the issuance of a Wastewater Discharge Requirement (WDR). Jurisdictional Building and Safety requirements may still apply for the authorization to install the system regardless of the WDR.

Soil Replacement

For the purposes of this document, soil means the naturally occurring body of porous mineral and organic materials on the land surface, which is composed of unconsolidated materials, including sand, silt, and clay particles mixed with varying amounts of fragments and organic material. Where undisturbed earth has insufficient depth to satisfy the minimum depth requirements or has poor absorption rate, engineered soil with similar composition characteristics of loamy sand, certified by a California Registered Professional Soil/Geotechnical Engineer, may be added to the existing native soil so that the site conditions meet or exceed the specific depth and absorption rate requirements. The engineered soil shall be re-composed and re-graded uniformly to provide homogenized absorption capability, equivalent to soil category of loamy sand. The qualified professional shall prove through sieve analysis and other quantifying tests that the desirable composition and compaction has been achieved. The compaction characteristics of the engineered soil shall correspond as close as possible to the native soil of the surrounding area. Adequate number of percolation tests shall be conducted in the area where engineered soil has been provided to confirm that the percolation rates are in correlation with loamy sand soil category. The results of the percolation tests conducted in the area shall affirm uniformity in soil composition and compaction.

Additional requirements:

- A pressurized distribution system is required where engineered soil is used in order to comply with the minimum soil depth and/or the absorption rate requirements. Pressurized distribution means a type of dispersal system that employs a pump and distribution piping with small diameter perforation (1/4 of an inch or less) or drip emitters that are installed at a depth of 6 inches (Tier 1 requirement) below grade and a minimum of 6 inches apart or as recommended by the manufacturer and approved by the DPH, to distribute effluent into soil with uniform distribution.

- Soil replacement shall not compromise the protection of the groundwater; a minimum of 5 feet of separation to groundwater from the lowest point of the dispersal system shall be allowed for new construction and a minimum of 2 feet for replacement systems.

- Percolation testing shall be done in those areas where engineered soil has been provided to ensure that new soil meets or exceeds the absorption rate requirements.

- Engineered soil shall compensate for the lack of in-place soil at a ratio of 1.5 to 1; so that a 1-foot deficiency in the soil column depth would require 1.5 feet of engineered soil material. In no case shall engineered soil compensate for more than 2 feet of the minimum native soil depth requirements.

NOWTS Design and Constructions Requirements

All supplemental treatment systems and components shall be installed and operated in accordance with their respective manufacturer's recommendations and are subject to review and acceptance by the DPH. Acceptance of supplemental treatment systems by the DPH is contingent upon a demonstration through extensive field and test data confirming that the supplemental treatment system will produce continuous and long-range results. Systems with NSF 245 certification are considered to meet this requirement. This acceptance is subject to revocation when the supplemental treatment system is deemed inadequate by the DPH.

The supplemental treatment technology being demonstrated shall meet or exceed secondary treatment standards and shall provide reduction in Biochemical or Carbonaceous Biochemical Oxygen Demand (BOD/CBOD), Total Suspended Solids (TSS) concentrations and Total Nitrogen as prescribed further.

The following requirements shall apply to Supplemental Treatment Units:

- Systems must be NSF 245 certified, or equivalency determined through demonstration testing unless they are installed for bacteriological reduction as a result of Tier 3 requirements. If the systems are only required to treat for

bacteria, the systems must be NSF 40 certified.

- For disinfection, the State OWTS Policy requires that supplemental treatment components be designed to provide sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L and shall further achieve an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters.

- Tanks must be IAPMO or similarly certified.

- Supplemental treatment components, other than that of disinfection, shall be designed to reduce the concentration of BOD/CBOD, TSS and Total Nitrogen (TN).

- Supplemental treatment components, other than that of disinfection, shall produce an effluent concentration level that meets or surpasses the following requirements:

  - BOD – 30 mg/L or CBOD5 – 25 mg/L
  - TSS – 30 mg/L
  - Total Nitrogen – At least a 50% average reduction of influent (Total Nitrogen)
  - pH – 6.0 to 9.0 SU

- NOWTS shall be equipped with a visual or audible alarm as well as a telemetric alarm that notifies the owner and the service provider of the NOWTS in the event of system malfunction. The telemetric monitoring system shall be capable of continuously assessing the operation of the supplemental treatment system. The owner must enter a covenant with the County prior to approval of the system.

- NOWTS shall be monitored by a service provider who is certified by the components' manufacturer and maintains the NOWTS in accordance with the operation and maintenance manual for the components and as prescribed by the DPH. The NOWTS designed to meet the treatment performance requirements outlined above shall be inspected by the service provider as frequently as needed or more frequently as required by the DPH to ensure proper operation at all times. The reports of all maintenance records shall be forwarded to the DPH on a quarterly basis or more frequently as deemed by the DPH.

- The laboratory analysis of the influent to the septic tank and effluent from supplemental treatment components shall be conducted on an annual basis or more frequently as deemed by the DPH. Effluent samples shall be taken by service provider under contract at the point of discharge; the sample shall then

be taken to a ELAP certified laboratory for such analysis. The results of the laboratory analysis shall be forwarded to DPH. The lab report shall clearly specify the location/address where sample was taken from. The laboratory analysis must include BOD, TN (which consists of ammonia, organic nitrogen, nitrate, and nitrite), TSS, and pH. Bacteriological analysis is also required when the system is equipped with a disinfection device. The lab results must confirm that the supplemental treatment water quality and bacteriological standards described above are met.

- NOWTS owners must enter into an agreement with the County prior to approval of their systems.

- The data provided in monitoring laboratory analysis reports are subject to verification by the DPH.

- NOWTS owners are required to obtain an annual Public Health Permit upon issuance of the Certificate of Occupancy by Building and Safety.

The DPH may exercise the option of requiring samples to be taken while a DPH representative is present and/or by an independent party authorized by the DPH. Standard requirements to ensure proper “Chain of Custody” shall apply.

3.6 Types of NOWTS Permitted

NOWTS have three components; a supplemental treatment system, a disinfection system when required by the DPH, and may have an alternate method of wastewater effluent dispersal.

The supplemental treatment system can be either an aerobic treatment unit, a packaged treatment plant, other systems NSF 245 certified, or any systems approved by the DPH based on performance assessment to provide effluent quality equal to the standards for NSF 245 certification.

For disinfection, the State OWTS Policy requires that supplemental treatment components be designed to provide sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L and shall further achieve an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters.

Alternative methods of wastewater effluent can either be a pressurized dosing system, a mound system, a pressurized subsurface drip dispersal system, or other technologies meeting compliance.

4.0 SPECIAL OWTS MANAGEMENT ISSUES

The below discussion describes provisions under Tier 2 in this LAMP for special OWTS management issues as per sections 9.2.1 through 9.2.12 of the OWTS Policy.

4.1 OWTS and NOWTS Inspection, Monitoring, Maintenance and Repair

Requirements for inspection, monitoring, maintenance and repair are summarized in **Table 4-1** below. All systems for which a permit is required will be inspected, which is a requirement from the Plumbing Code, Chapter 1, Section 104. No portion of any system shall be concealed until inspected and approved. The DPH nor the county is liable for expense entailed in the removal or replacement of material required to permit inspection. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions related to OWTS or of other codes and laws. Inspections presuming to give authority to violate or cancel the provisions related to OWTS or other codes and laws shall not be valid.

Table 4-1 Summary of Los Angeles County Provisions for OWTS/NOWTS Inspection, Monitoring, Maintenance and Repairs

Activity	Code or Professional Guide	Inspections	Monitoring	Maintenance & Repairs	Permit Required
NOWTS Construction	Plumbing Code and Professional Guide	Site Evaluation for setbacks Leak Test Start up and telemetry test	N/A	N/A	Building and Safety and EH approvals required
NOWTS Operation	Title 11 and Professional Guide	Annual Inspection by a qualified septic technician	Telemetry monitoring by service provider. Annual effluent testing per Professional Guide	Service contract required. Maintenance schedule as specified by manufacturer	Public Health Permit
OWTS Construction	Plumbing Code and Professional Guide	Site evaluation for setbacks	N/A	N/A	Building and Safety and EH approvals required

Activity	Code or Professional Guide	Inspections	Monitoring	Maintenance & Repairs	Permit Required
OWTS Operation	N/A	None	None	Maintenance, including pumping of sludge every 3-5 years recommended	None
OWTS/NOWTS Building Additions & Remodels	Plumbing Code and Professional Guide	Performance inspection required by QC prior to application for building addition or remodel; evaluation procedures specified in Professional Guide. EH conducts inspection of setbacks after submission of application.	May involve water sampling, dye testing or other monitoring	Maintenance, repair, system upgrade, and designation of future expansion area may be required as per Professional Guide	Building and Safety and EH approvals required
Point of Sale Inspections	N/A	Inspection of OWTS conducted by independent maintenance provider or professional in conjunction with sale of a property or re-financing.	May involve water sampling, dye testing or other monitoring	Maintenance and/or repair/system upgrade work may be recommended or required as a result of inspection findings.	N/A

Activity	Code or Professional Guide	Inspections	Monitoring	Maintenance & Repairs	Permit Required
Complaint Investigations (Abatement)	Title 11	Inspections of OWTS/NOWTS by EH staff in response to complaints or observed violation(s).	May involve water sampling, dye testing or other monitoring	Maintenance and/or repair work/system upgrade may be required as a result of inspection findings.	N/A

4.2 OWTS Near Impaired Water Bodies

As described in Section 2.5, the below impaired water bodies are listed pursuant to section 303(d) of the Clean Water Act for impairment due to nitrogen or pathogen indicators. Some of these impaired water bodies have TMDL levels established by the RWQCB.

OWTS near impaired water bodies that are not listed as impaired due to nitrogen or pathogen indicators, and do not have a TMDL and are not covered by a Local Agency Management Program with special provisions, are not addressed by Tier 3.

No other special provisions related to impaired water bodies have been adopted for OWTS in Los Angeles County.

Consideration of pathogen impairment for Malibu Creek (including Las Virgenes Creek and Malibu Lagoon segments) will continue to be managed under the APMP with requirement for Tier 3 systems (NOWTS) until a TMDL with OWTS allotment is established for pathogens.

Currently, Malibu Creek has a TMDL with OWTS (a.k.a. septic) allotment for nitrogen. **Table 2-3** in Section 2.5, above, summarizes the current status of TMDLs for relevant impaired water bodies. **Figure 4-1** shows the water bodies in Los Angeles County that are impaired due to nitrogen or pathogen indicators.

Water Bodies Impaired for Pathogens Subject to Tier 3:

- Coyote Creek
- Malibu Creek (Includes Las Virgenes Creek and Malibu Lagoon)
- San Gabriel River Reach 1 (Estuary to Firestone)

- San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam)
- San Gabriel River Reach 3 (Whittier Narrows to Ramona)
- San Jose Creek Reach 1 (San Gabriel Confluence to Temple Street)
- San Jose Creek Reach 2 (Temple Street to Interstate -10 at White Ave.)
- Sawpit Creek
- Walnut Creek Wash (Drains from Puddingstone Reservoir)

Water Bodies Impaired for Nitrogen Subject to Tier 3:

- Malibu Creek (Includes Las Virgenes Creek and Malibu Lagoon)
- Westlake Lake
- Mint Canyon Creek
- Santa Clara River Lakes (Lakes Hughes, Muntz, and Elizabeth)

The above impaired water bodies require a 600 feet boundary for OWTS until a TMDL with OWTS allotment is established by the RWQCB in a TMDL implementation plan. Until a TMDL with OWTS allotment is established, new or replacement OWTS within 600 feet of an impaired water body must meet the specific requirements of Tier 3, which involves inclusion in an APMP. **Appendix B** describes development of the APMP. For Tier 3 systems, the APMP requires that supplemental treatment for nitrogen and/or pathogens must be used, based on the source of impairment of the nearby water body. Supplemental treatment classifies a system as a NOWTS, and requirements for NOWTS are described in greater detail in Section 3.5 and Section 3.6, above.

Malibu Creek – TMDL with OWTS Allotment for Nitrogen:

Consideration of nitrogen impairment for Malibu Creek will be managed under the TMDL implementation plan for Malibu Creek (USEPA, 2013) once a relevant OWTS allotment for Domestic OWTS is defined by the RWQCB. TMDLs for nitrogen have not yet been established for segments within the Malibu Creek Watershed. Appendix B provides information for determining whether a system location is considered near to an impaired water body, including a map tool provided by the SWRCB.

Table 4-2 summarizes the OWTS (septic systems) nitrogen allotment for Malibu Creek, which includes domestic and commercial septic systems (USEPA, 2013). The USEPA has defined an OWTS (septic systems) phosphorus allotment for Malibu Creek as well (USEPA, 2013). The highest priority for implementation actions for the septic systems category is to ensure that commercial septic systems do not contribute to nutrient loading to the Malibu Lagoon subwatershed area, specifically in the areas of the Malibu Colony Plaza, Cross Creek Plaza, and Malibu Civic Center. These commercial systems may have been improperly sited

adjacent to the lagoon, in a groundwater table with historic levels that do not allow as least 10 feet between the groundwater and septic system. Septic systems that are poorly sited have options available for meeting the load allocations under the TMDLs. One possible method of compliance is pretreatment via Nitrogen Reduction Systems (NRS) of effluent to remove nutrients prior to leachfield discharge (USEPA, 1999). The principal treatment mechanism for these systems would be biological nitrification-denitrification. WDR permitting and permit limits are the primary mechanism for the RWCB to enforce the load allocations for commercial systems. See the individual TMDL implementation plan for detailed requirements (USEPA, 2013).

Table 4-2 Summary of TMDL with OWTS Allotment for Impaired Water Body - Malibu Creek

Source Category	Existing Loads	% of Existing Load	Target Reduction (%)	Load Allocation
SUMMER:				
Septic Systems	91 pounds/day	22%	93	6 pounds/day
WINTER:				
Septic Systems	47,285 pounds per 6 months	9%	Not specified	8 mg/L per day

4.3 Variances and Exceptions

Section 9.4 of the OWTS Policy identifies items that are not allowed to be managed by a local agency. Prohibited items are summarized in Section 5.0 of this LAMP and no variance or exception will be granted by the DPH for new or repair/replacement OWTS applications that include a prohibited item. Applicants may be referred to the local RWQCB for further guidance and evaluation related to items that the DPH are not allowed to manage, as applicable.

Applicants may make inquiries with the Chief of the Land Use Program. Decisions by the Chief may be appealed to the Director of EH.

On a case-by-case basis, the Director may establish alternative siting and operational requirements, 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 and Public Health. Specific provisions for variances and exceptions are summarized below.

New OWTS/NOWTS installations:

No part of a septic system shall be installed in an ingress/egress easement on a private road intended to provide access to more than one property without a variance from the DPH and written authorization from the local Fire Department. When determined by the Department through adequate tests conducted by the QP throughout the property that no favorable area for installation of the system is available on the property, the Department may authorize the installation of the system or part thereof in the easement.
A variance to specified horizontal setbacks may be permitted for lots created prior to the effective date of the OWTS Policy (May 13, 2013) subject to meeting the following requirements:

- The septic tank and dispersal field shall be sited to comply with the horizontal setback requirements to the maximum extent practicable;

- The system shall incorporate supplemental treatment, including pathogen removal;

- 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 based on analysis of total coliform with a minimum detection limit of 2.2 MPN per 100 milliliters;

- Minimum vertical separation to groundwater shall be two (2) feet below the bottom of the dispersal field;

- The minimum dispersal field soil cover shall be 6 inches;

- Other measures as specified by the Director, e.g., hydrological assessment, are always required.

Repair/Replacement OWTS/NOWTS:

- A variance to specified horizontal setbacks may be permitted for repair/replacement of an existing system subject to meeting the following requirements:

    - The dispersal field shall be sited to comply with the setback requirements to the maximum extent practicable;

    - The system 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 system based on topography, soil depth and groundwater conditions.

    - Other measures as specified by the Director, e.g., hydrological assessment.

Figure 4-1

4.4 Professional, Contractor and Maintenance Provider Qualifications

Table 4-3. Qualifications for OWTS Practitioners

OWTS Activity	Required Work	Prof. Guide Section(s)	Minimum QC or QP Qualifications
Soil and Site Evaluations and OWTS Design, *except as noted below*	Percolation testing, surface setbacks, and system design	Chapter 2	PG, CEG, PE, PS/GE, REHS
Subsurface Exploration[1]	Conduct field studies and evaluate geology, soils, percolation, groundwater, slopes and other factors for design and use of OWTS.	Chapter 2	PG, CEG
Geological Assessment[1]	Determination of uniform geology where extreme geologic conditions do not exist	Chapter 2	PG
Soil Profile[1]	Prepare soil profile of any test pits	Chapter 2	PG, CEG
Slope Evaluation[1]	Address potential slope destabilization for proposed hillside installation	Chapter 2	CEG, PS/GE
Hydrological Assessment[1]	Prepare/certify assessment to request waiver of setback requirements from a blue line stream/tributary and confirm the dispersal system and drainage course will not generate sufficient lateral infiltration to negatively impact each other, declaring the location for the proposed dispersal area suitable	Chapter 2	PG, CEG, CHG
OWTS Install, Repair or Replacement	All work related to install of new and replaced OWTS, and repair of existing OWTS	Chapter 2	General Building/ Engineering Contractor License: Class A, Class B, Class C-42 or Class C-36
Certification Inspection of Existing OWTS	For purposes of certification inspection of existing OWTS, contractors who possess only a General Building Contractor (Class B) license are not qualified to perform the inspection	Chapters 1 and 2	General Engineering Contractor License: Class A, Class C-42 or Class C-36
OWTS Operation, Monitoring, and Maintenance	A person capable of operating, monitoring and maintaining an OWTS in accordance with LAMP and DPH requirements may perform these tasks (e.g., pumping).	Chapters 5 and 12	Owner, manufacturer, or certified service provider, as prescribed by the DPH
1. The noted OWTS activity will be performed by a qualified professional on a specific site to			

contribute to a feasibility report for installation of OWTS, as applicable.
CEG = California Certified Engineering Geologist; CHG = California Certified Hydrogeologist; PE = California Professional Engineer; PG = California Professional Geologist; PS/GE = California Professional Soil/Geotechnical Engineer; QC = Qualified Contractor (QC); QP = Qualified Professional (QP), not employed by the County of Los Angeles; and REHS = California Registered Environmental Health Specialist.

4.5 Education and Outreach

Los Angeles includes the following main sources for education and outreach regarding OWTS:

- **Appendix H of the County Plumbing Code.** See Section 1.4 for a summary of the relevant sections of the Plumbing Code.

- **Professional Guide.** The *Requirements and Procedures for Conventional and Non-Conventional Onsite Wastewater Treatment Systems and Non-Conventional Onsite Wastewater Treatment Systems* Draft dated May 2016 (the "Professional Guide") will be finalized upon approval of this LAMP and incorporates provisions of the LAMP. See Section 1.5 for further description of the content of the Professional Guide.

The final Professional Guide, as well as any substantive changes in the future will require approval by the Director of EH and by the RWQCB. The DPH will make every effort to notify the related industry and all interested parties of any revisions to the Professional Guide 30 days prior to the effective date of the implementation.

A noticed hearing with opportunity for public comment must precede approval of this LAMP by the RWQCB. The State Water Board shall then approve Local Agency Management Programs at a regularly noticed board hearing and shall provide for public participation, including notice and opportunity for public comment.

The OWTS policy also requires notification to local water purveyors prior to local OWTS permitting. The public water system owner shall have 15 days from receipt of the permit application to provide recommendations and comments to DPH.

The DPH will make resources available on its website for individual homeowner's information

4.6 Septage Management

Septage is produced as a result of pumping the septic tank for an OWTS or NOWTS during normal maintenance by the owner, in support of a real estate transaction, or in support of repairs using a registered septic pumper and hauler.

Septic Pumpers and haulers are required to register with the local jurisdiction (Health and Safety Code Section 117400-117450), which requires registration with the Local Sanitation District in areas covered by this LAMP. Under normal conditions, a properly sized tank can be expected to operate effectively for more than five years without needing pumping (Bounds, 1997). The frequency of pump out under normal conditions will vary depending on the size and hydraulic and organic load handled by the tank.

Septage receiving facilities in Los Angeles County occur at the below waste water treatment plants (WWTPs).

South County (Los Angeles RWQCB Region 4):

- LA County – Pomona Liquid Waste Disposal Station, Pomona
- LA County – Joint Water Pollution Control Plant, Carson
- LA County – Saugus Water Reclamation Plant, Saugus

North County (Lahontan RWQCB Region 6):

- LA County – Lancaster Water Reclamation Plant, Lancaster

The County Sanitation Districts of Los Angeles County tracks the volume of septage processed at the above receiving facilities from both domestic and commercial sources under their Liquid Waste Disposal Program and ensures that capacities are adequate for the County's septage generation. The current volumes of waste received at the above facilities from septage sources are small relative to the treatment and conveyance capacity at the facilities. No formal predictions for future septage generation have been necessary, as the facilities could accommodate a significant increase in the amounts of septage currently received and capacity limitations have not been identified as a concern. **Table 4-4** presents septage generation data from 2014 and 2015.

Table 4-4. Annual Septage Generation in Los Angeles County

Septage Receiving Facility	Annual Septage Generation (million gallons)	
	2014	2015
Pomona[1]	13.9	13.0
Carson[1]	18.6	21.1
Saugus[1]	4.3	5.0
Lancaster[1]	0.6	0.9
Total (Commercial and Domestic)[1]	37.4	40.0
Estimated Annual Contribution from Domestic OWTS/NOWTS[2]	16.2	16.2

Notes:
1. 2014 and 2015 Data Source: Annual Load, Volume and Receipt Reports, Liquid Waste Disposal Program, January – December 2014 and January – December 2015.2. Assuming an average pumping frequency of once every five (5) years and a pump-out volume of 1,500 gallons per tank for the 53,148 OWTS and 813 NOWTS permitted in the County (as of January 28 2016), the annual volume of septage generated by domestic OWTS and NOWTS in the County was calculated. The estimated value of 16.2 million gallons per year suggests the contribution from NOWTS and OWTS is approximately 40 to 43% of the total annual septage generated.

4.7 Onsite Maintenance Districts

Currently Los Angeles County has not established onsite wastewater maintenance districts or zones and no plans currently exist to establish them. It is unlikely that a new district will be formed to oversee onsite maintenance for OWTS as the Departments of Public Health and Building and Safety perform these duties.

4.8 Regional Salt and Nutrient Management Plans

Salt and Nutrient Management Plans (SNMPs) are required for each basin/sub-basin in California in accordance with the SWRCB's Recycled Water Policy, which was adopted by the State Water Board through Resolution No. 2009-0011 on February 3, 2009, and became effective on May 14, 2009. Per the Recycled Water Policy, SNMPs will be developed by local water and wastewater entities, together with local salt/nutrient contributing stakeholders, through a locally driven and controlled, collaborative process. It is the intent of the Recycled Water Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of groundwater's beneficial uses. The SNMP should be completed and submitted to the Regional Water Board by May 2016.

Appendix B provides information for cumulative nitrate and salt loading from OWTS in Los Angeles County, including methodology for estimating wastewater discharge volumes, nitrate loading and salt loading contributions to groundwater from OWTS. Estimates of nitrogen and salt loading will contribute to the program level Regional SNMP efforts underway and headed up by the RWQCB in conjunction with the stakeholders of the relevant groundwater basins. The DPH will contribute to the planning efforts providing data and input regarding OWTS. In Los Angeles County, Salt and Nutrient Management Plans developed or approved by the RWQCB may support future Basin Plan amendments. The Salt and Nutrient Management Plan for Antelope valley was completed May 2014.

4.9 Watershed Management Coordination

With thousands of permitted, as well as nonpoint source, discharges into the receiving waters of the County, improving the water quality of the region's watersheds is a significant undertaking. The County Watershed Management Division was established in August 2000 within the DPW to address the flood risk management, water quality, water conservation, open space, and recreational needs of the Los Angeles County Flood Control District. The DPW uses an integrated, multipurpose approach that is consistent with watershed management principles. These principles are carried out through a framework of collaboration and partnerships, combined with sound science and local knowledge, as a foundation for well-planned actions. Outcomes are monitored so that multi-purpose projects may be adapted over time to achieve improved results. The Department of Water and Power and DPH are key county departments in collaboration with DPW regarding watershed management issues. The county has established programs that include an integrated regional watershed management plan (IRWMP) for coastal watersheds, watershed management areas (WMAs), and WPAs. Programs under the RWQCB (e.g., NPDES) augment the county's efforts for watershed management.

During preparation of this LAMP, the DPH collaborated with the DPW, industry professionals, local authorities, stakeholders and the RWQCB for input into the LAMP for regulations, policies and management issues. The DPH will continue to work collaboratively to ensure adequate coordination regarding OWTS considerations for watershed management. This LAMP and the OWTS policy require adherence to OWTS prohibitions in Basin Plans and compliance with TMDL implementation plans for the County, which help to responsibly manage OWTS in local watersheds and near impaired water bodies. Under the provisions of the newly formulated LAMP, the DPH anticipates increased collaboration with the RWQCB for water quality assessment reporting under the LAMP.

4.10 Evaluating Proximity to Public Sewers

No plans will be accepted or approved for the installation, alteration, or repair of any OWTS or part thereof, on any property for which a connection with a public

sewer is available within 200 feet. The public sewer may be considered as not available when such public sewer or any building or exterior drainage facility connected thereto is located more than 200 feet from any proposed building or exterior drainage facility on any lot or premises that abuts and is served by such public sewer. When a new dispersal system is required, the existing septic tank should be replaced with a new tank unless it is certain that public sewer will be available within two years.

This LAMP incorporates the following procedures for evaluating the proximity of public sewer systems to new or replacement OWTS installations:

- Chapter 1 of the Professional Guide informs permit applicants of the above requirement to connect to public sewer if available within 200 feet.

- The proximity to public sewer must be included in the site evaluation.

- DPH verify public sewer proximity during the site evaluation process while reviewing the permit application.

- Building and Safety Department plan checks for building permits includes a redundant verification of the proximity to public sewer prior to approval.

4.11 OWTS Notification to Public Water System Owner(s)

Providing notice to public water system owners will be implemented as follows:

- The QP will rely upon information provided by the State Water Resources Control Board (Division of Drinking Water) and by the DPH (Drinking Water Program) to determine the location and owner of public water wells or intake locations during the site evaluation and permit application review. The location of the public well or water system intake location may be verified during field inspection.

- If the OWTS is within 1,200 feet of an intake point for a surface water treatment plant for drinking water, is in the drainage area catchment in which the intake point is located, and is located such that it may impact water quality at the intake point such as upstream of the intake point for a flowing water body, or if the OWTS is within a horizontal sanitary setback from a public well, the OWTS policy requires notification to local water purveyors prior to issuing an installation or repair permit for an OWTS. Horizontal setbacks in the county related to public wells are included in Table 3-4.

- The public water system owner shall have 15 days from receipt of the permit application to provide recommendations and comments to DPH.

- DPH will review and consider any comments and recommendations received from the public water system owner.

- DPH will inform the public water system owner of the issuance or denial of the permit application.

4.12 Policies and Procedures when a Proposed OWTS Dispersal Area is within the Horizontal Sanitary Setback of a Public Well

A NOWTS including disinfection is required by DPH where a conventional OWTS exists on a property and surface or subsurface water conditions are such that the current setback requirements cannot be met. The following supplemental treatment for nitrogen and pathogens are required by DPH to comply with the OWTS Policy when a proposed OWTS dispersal area is within the horizontal sanitary setback of a public well or a surface water intake point (10.9 and 10.10 of the OWTS Policy):

- Supplemental treatment requirements for nitrogen:
  - Effluent from the supplemental treatment components designed to reduce nitrogen shall be certified by NSF, or other approved third party tester, to meet a 50 percent reduction in total nitrogen when comparing the 30-day average influent to the 30-day average effluent.
  - Where a drip-line dispersal system is used to enhance vegetative nitrogen uptake, the dispersal system shall have at least six (6) inches of soil cover.
- Supplemental treatment requirements for pathogens
  - Supplemental treatment components designed to perform disinfection shall provide sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L and shall further achieve an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters. As described in the Professional Guide, the DPH also requires that if the NOWTS includes a disinfection component, the effluent shall be tested for E. coli with an acceptable concentration of 2.2 MPN/100mL.
  - The minimum soil depth and the minimum depth to the anticipated highest level of groundwater below the bottom of the dispersal system shall not be less than three (3) feet. All dispersal systems shall have at least twelve (12) inches of soil cover.

The above systems with supplemental treatment will be permitted as NOWTS.

4.13 Phase-Out of Cesspool Usage

Because the OWTS Policy does not allow cesspools to be managed by a local

agency, cesspool usage is not authorized under this Tier 2 LAMP. Cesspools are being designated as public nuisance in the County code of ordinances, and are required to be replaced by approved systems. A number of cesspools may exist and continue to be discovered occasionally in the County. DPH will gradually phase out cesspools as they are discovered during communications with property owners, in response to complaints, applications for updates and/or repairs, pumper truck reports, or during inspections. Supplemental treatment options will help to phase-out of the remaining cesspools in the county. The DPH will mandate septic tank pumping contractors to report cesspools or non-conforming/failing systems to the DPH. The number of cesspools encountered and replaced will be incorporated in the County annual report to the Regional Water Board.

5.0 PROHIBITIONS

In Los Angeles County, when space is not available for a leach bed or leach line and percolation test results for a seepage pit are slower than 0.83 gallons per square foot of dispersal area per 24 hours, the property is not suitable for construction using either an OWTS or NOWTS.

Section 9.4 of the OWTS Policy identifies items that are not allowed to be managed by a local agency. The following items should be incorporated into the Los Angeles County Code of Ordinances and the Professional Guide, as indicated below.

- The County will phase out cesspool usage, which cannot be managed by a local agency (OWTS Policy, Section 9.4.1). Phasing out of cesspool usage is described in Section 4.12 of this LAMP.

- OWTS receiving a projected flow over 10,000 gallons per day are not managed by DPH (OWTS Policy, 9.4.2).

- OWTS that utilize any form of effluent disposal that discharges on or above the post installation ground surface such as sprinklers, exposed drip lines, free-surface wetlands, or a pond are not managed by DPH (OWTS Policy, 9.4.3).

- A slope evaluation report is required where natural ground slopes in dispersal areas are greater than 30 percent to address potential slope destabilization (OWTS Policy, Section 9.4.4).

- Leaching area for International Association of Plumbing and Mechanical Officials (IAPMO) certified dispersal systems may not use a multiplier less than 0.70 (OWTS Policy, Section 9.4.5).

- OWTS utilizing supplemental treatment must have requirements for periodic monitoring or inspections (OWTS Policy, Section 9.4.6), which is consistent with the current Plumbing Code and Professional Guide.

- OWTS must not receive significant amounts of waste dumped from RV holding tanks such as at RV dump stations (OWTS Policy 9.4.7), which is consistent with the current

Plumbing Code and Professional Guide.

- Separation from the bottom of the dispersal system to groundwater must not be less than 2 feet for OWTS or less than 10 feet for seepage pits (OWTS Policy 9.4.8). The County's current Plumbing Code and Professional Guide meet or exceed this requirement for vertical separation. In Los Angeles County the separation from the bottom of the dispersal system to groundwater must not be less than 5 feet for OWTS without supplemental treatment, and must not be less than 10 feet for seepage pits. Vertical separation in Los Angeles County is discussed in additional detail in Appendix A.

- The County's current Plumbing Code and Professional Guide exceed the OWTS Policy requirements prohibiting the installation of new or replacement OWTS where public sewer is available (OWTS Policy 9.4.9). Specifically, in Los Angeles County no plans will be accepted or approved for the installation, alteration, or repair of any OWTS or part thereof, on any property for which a connection with a public sewer is available within 200 feet. In Los Angeles County, no exceptions are made for repair or replacement OWTS based on cost considerations.

- The OWTS Policy contains additional horizontal setback conditions that must be amended to the Los Angeles County Code of Ordinances and that have been included in the May 2016 Professional Guide (OWTS Policy 9.4.10). For new or replacement OWTS where the depth of dispersal system does not exceed 10 feet, the OWTS must be at least 150 feet from a public water well. If the depth of the effluent dispersal system exceeds 10 feet in depth, the OWTS must be at least 200 feet from public water well. If the depth of the effluent dispersal system exceeds 20 feet and is within 600 feet of a public water well, the setback must be such that there is at least two-year travel time for microbiological contaminants. Horizontal setbacks in Los Angeles County are discussed in additional detail in Appendix A.

- On a case-by-case basis, the director may establish alternative 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.

6.0 PROGRAM ADMINISTRATION

6.1 OWTS Permitting Records

The DPH will retain permanent records of OWTS permitting actions and will make those records available within 10 working days upon written request for review by either the Los Angeles or Lahontan RWQCB. This includes:

- Installation approvals issued for new, repair and replacement OWTS;

- OWTS variances issued, including number, location and description; and

- Operating permits issued for NOWTS.

6.2 Staffing of Land Use Program

Within the Environmental Health Division, the Land Use Program is responsible for reviewing and approving plans for OWTS within designated cities and unincorporated areas of the County of Los Angeles in an effort to protect groundwater sources. Program personnel also inspect and permit sewage pumping vehicles, chemical toilet pumping vehicles, and toilet rental agencies. In addition, personnel are responsible for evaluating subdivision requests and conducting environmental reviews within its scope.

The DPH will ensure adequate staffing of the Land Use Program to oversee and ensure proper implementation of this LAMP. Staff will be adequate to process permit applications, engage the RWQCB when appropriate, maintain records, update guidance/ordinance, and complete notification/reporting tasks.

6.3 Water Quality Assessment Program

The following sections present the general objectives and approach for the Water Quality Assessment Program (WQAP). WQAP details are provided in Appendix B.

Objectives

The DPH will maintain an OWTS WQAP having three primary objectives: (1) to determine the general operational status of OWTS within Los Angeles County's jurisdiction; (2) to assess and monitor possible impacts of OWTS on groundwater and impaired surface waters and their associated beneficial uses; and (3) to identify areas for changes to existing OWTS management practices to improve water quality from OWTS impacts.

Geographic Approach

It is anticipated that the GIS data will allow for the WQAP to be organized according to various watersheds, groundwater sub-basins, U.S. Postal Service Zip Code areas, or to delineated impaired water bodies for use in environmental studies and the preparation of the Advanced Protection Management Program (APMP; Appendix B). The WQAP will use GIS-based mapping, OWTS inventory, nitrate-nitrogen data, and additional water quality assessment parameters to evaluate potential OWTS impacts. In regions where the initial water quality assessment determines that OWTS discharges may adversely affect groundwater and/or surface water quality, additional parameters may be considered to determine actual impacts of OWTS discharge. Other water quality assessment parameters may include bacteria, total dissolved solids (TDS), chloride, sulfate, boron, and various isotopes and anthropogenic chemicals as discussed in Appendix B. Other localized focus areas can be delineated from the GIS and water quality assessment parameters in the future if warranted.

OWTS Operational Status

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

- Septic tank pumper inspection reports;
- Complaints and abatement activities for failing OWTS;
- Variances issued for new and/or repair OWTS;
- Performance inspections of existing OWTS in connection with building additions/remodel projects, or property transactions;
- Monitoring reports for alternative systems or other OWTS having an operating permit.

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 within Los Angeles County's jurisdiction.

Water Quality Assessment

The water quality assessment will include the following:

- Water Quality Parameters of Concern. The initial focus of the water quality assessment program will be on nitrate and fecal coliform bacteria. However, in regions where the initial water quality assessment determines that OWTS discharges may adversely affect groundwater and/or surface water quality, additional parameters may be considered to determine actual impacts of OWTS discharge.
- Wastewater Discharge Volumes. Estimates of annual wastewater discharge volumes from OWTS will be updated based upon the running inventory of OWTS per above.
- Nitrate Loading. Nitrate loading estimates (by watershed) will be maintained and updated based on the running inventory of OWTS in the County.
- Water Quality Data Sources. Relevant water quality monitoring data for (pathogens, nitrate-nitrogen and TDS) will be compiled from available sources, anticipated to include:
  - Water quality data from cumulative impact studies;
  - Los Angeles County Waterworks Districts (LACWD) Annual Water Quality Reports;
  - Domestic water wells sampling from new wells or other;

- Public water system raw water quality data monitoring reports;
- Reservoir or stream water quality sampling data from available watershed special studies;
- Receiving water sampling performed as part of an NPDES permit;
- Groundwater sampling performed as part of Waste Discharge Requirements;
- Groundwater data collected as part of Salt and Nutrient Management Plans
- 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 Database.

- Assessment. In addition to periodically updating loading estimates for OWTS water quality assessment parameters within the County, it is anticipated that data assessment will include a review that is designed to: (a) determine relevance of the various data to OWTS; (b) identify any likely water quality degradation attributable to OWTS; (c) identify changes to the LAMP undertaken to address impacts from the OWTS.

- The laboratory analytical protocol for bacteria assessment will use the Most Probable Number (MPN) for the determination of fecal coliforms.

6.4 Reporting to RWQCBs

The following sections provide RWQCB reporting information.

Annual Report

An annual report pertaining to OWTS activities in Los Angeles County for submission to the Los Angeles RWQCB by February 1st of each year, with a copy also sent to the Lahontan RWQCB. The annual report will, at a minimum, include the following information, organized in a tabular spreadsheet format:

- Number and location of complaints pertaining to OWTS operation and maintenance, and identifying those which were investigated and how they were resolved;
- Number, location and description of permits issued for new and replacement OWTS, including any variances issued;
- Results of NOWTS inspections and effluent testing completed;
- Any enforcement actions including permit suspension or revocations, referrals

to the District or City Attorney for prosecution, and referrals to the Regional Water Quality Control Board to submit a Report of Waste Discharge due to non-compliance.

- Number, location and results of septic tank pumper inspection reports;
- Number of cesspools encountered and replaced;
- 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;
- Water quality data collected from sources identified above.

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

5-Year 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 DPH Water Quality Assessment Program described under heading 2 for the Annual Report. The 5-year report will present an overall assessment regarding any evidence of water quality impact from OWTS along with any recommended changes in the LAMP designed to address the identified impacts. The County will utilize existing data to create a baseline assessment, and thereafter, will collect data annually to assess changes. Appendix B provides additional discussion of assessment related to OWTS. Additionally, any groundwater water quality data generated by the DPH from monitoring activities will be submitted for inclusion in Geotracker.

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Appendix A
Supporting Rationale for Los Angeles County OWTS Siting and Design Criteria

SUPPORTING RATIONALE FOR
LOS ANGELES COUNTY OWTS SITING AND DESIGN CRITERIA

Appendix A is a discussion of siting and design requirements for OWTS within Los Angeles County that differ from SWRCB Tier 1 requirements. The topics in this appendix include: (1) Los Angeles County LAMP Tier 2 Variations from SWRCB OWTS Tier 1 Requirements; (2) OWTS Policy Items That Are Not Allowed to be Managed in a LAMP; (3) Tier 4 OWTS Requiring Corrective Action; (4) Los Angeles County's Tier 2 OWTS vertical separation from groundwater and the use and requirements on Seepage Pits, Infiltrative Chambers, and Gravel-Packed Pits; (5) Subdivision densities; (6) NOWTS (7) dispersal system sizing methodology; and (8) horizontal setbacks.

Appendix B addresses the Water Quality Assessment Program (WQAP) for identifying Tier 0 (existing OWTS) that are determined to be contributing to an impaired surface water body listed in Attachment 2 of the SWRCB OWTS Policy, and for developing an Advanced Protection Management Program (APMP) for these OWTS.

A-1. Los Angeles County LAMP Tier 2 Variations from SWRCB OWTS Tier 1 Requirements

There are no key issues related to Los Angeles County's LAMP Tier 2 OWTS variations relative to SWRCB Tier 1 requirements. County Tier 2 requirements are as stringent in the protection of public health and of the environment as SWRCB Tier 1 requirements. However, the County's LAMP will need to adopt some horizontal setback minimums not currently specified in the County's plumbing code (see Section A-4).

Los Angeles County's LAMP Tier 2 OWTS vertical separation from groundwater requirements are listed in Table A-1. Table A-1 also provides the depth to groundwater from historical guidelines of the South Lahontan and Los Angeles RWQCB, and the Tier 1 requirements in the SWRCB OWTS Policy. As indicated in Table A-1, the adopted minimum depth to groundwater and the required soil percolation rate shows the County requirements for conventional OWTS.

A-2. OWTS Policy Items That Are Not Allowed to be Managed in a LAMP

Section 9.4 of the OWTS Policy identifies items that are not allowed to be managed by a local agency. The following items should be incorporated into the Los Angeles County Code of Ordinances and the Professional Guide, as indicated below.

- The County will phase out cesspool usage, which cannot be managed by a local agency (OWTS Policy, Section 9.4.1). Phasing out of cesspool usage is described in Section 4.13 of this LAMP.

- OWTS receiving a projected flow over 10,000 gallons per day are not managed by DPH (OWTS Policy, 9.4.2).

- OWTS that utilize any form of effluent disposal that discharges on or above the post installation ground surface such as sprinklers, exposed drip lines, free-surface wetlands, or a pond are not managed by DPH (OWTS Policy, 9.4.3).

- A slope evaluation report is required where natural ground slopes in dispersal areas are greater than 30 percent to address potential slope destabilization (OWTS Policy, Section 9.4.4).

- Leaching area for International Association of Plumbing and Mechanical Officials (IAPMO) certified dispersal systems may not use a multiplier less than 0.70 (OWTS Policy, Section 9.4.5).

- OWTS utilizing supplemental treatment must have requirements for periodic monitoring or inspections (OWTS Policy, Section 9.4.6), which is consistent with the current Plumbing Code and Professional Guide.

- OWTS must not receive significant amounts of waste dumped from RV holding tanks such as at RV dump stations (OWTS Policy 9.4.7), which is consistent with the current Plumbing Code and Professional Guide.

    - Separation from the bottom of the dispersal system to groundwater must not be less than 2 feet for OWTS or less than 10 feet for seepage pits (OWTS Policy 9.4.8). The County's current Plumbing Code and Professional Guide meet or exceed this requirement for vertical separation. In Los Angeles County, the separation from the bottom of the dispersal system to groundwater must not be less than 5 feet for OWTS without supplemental treatment, and must not be less than 10 feet for seepage pits.

- The County's current Plumbing Code and Professional Guide exceed the OWTS Policy requirements prohibiting the installation of new or replacement OWTS where public sewer is available (OWTS Policy 9.4.9). Specifically, in Los Angeles County no plans will be accepted or approved for the installation, alteration, or repair of any OWTS or part thereof, on any property for which a connection with a public sewer is available within 200 feet. In Los Angeles County, no exceptions are made for repair or replacement OWTS based on cost considerations.

- The OWTS Policy contains additional horizontal setback conditions that must be amended to the Los Angeles County Code of Ordinances and that have been included in the May 2016 Professional Guide (OWTS Policy 9.4.10). For new or replacement OWTS where the depth of dispersal system does not exceed 10 feet, the OWTS must be at least 150 feet from a public water well. If the depth of the effluent dispersal system exceeds 10 feet in depth, the OWTS must be at least 200 feet from a public water well. If the depth of the effluent dispersal system exceeds 20 feet and is within 600 feet of a public water well, the setback must be such that there is at least two-year travel time for microbiological contaminants.

A-3. Tier 4 OWTS Requiring Corrective Action

OWTS that require corrective action, are presently failing, or that fail while this LAMP is in effect are automatically included in Tier 4. OWTS included in Tier 4 are subject to the following requirements (OWTS Policy, Section 11):

- If the OWTS dispersal system is no longer adequately percolating effluent such that there is pooling effluent, discharges of wastewater to the surface, or wastewater has backed up into plumbing fixtures, the dispersal system must be replaced, repaired, or modified so as to return it to its proper function and comply with Tier 1, 2 or 3.

- Any OWTS septic tank failure such that wastewater is exfiltrating or groundwater is infiltrating shall be repaired to bring the tank into compliance with the requirements of the appropriate OWTS Tier.

- Any other OWTS component failure shall be repaired so as to return the OWTS to proper functioning condition and return the OWTS to Tier 1, 2, or 3.

- Any OWTS that has affected or will affect groundwater or surface water to a degree that makes it unfit for drinking or other uses, or is causing a human health condition or other public nuisance shall be modified or upgraded to abate its impact.

- Owners of OWTS included in Tier 4 will complete any corrective action as directed by the Health Officer. Owners of a perceived failed system will be directed to have their system evaluated to determine whether it has failed and the reason for the failure. Owners of failed OWTS will complete and submit an application form to the DPH in accordance with the Professional Guide. If the owner is unable to comply with the corrective requirements of Tier 4, the RWQCB may authorize repairs that are in substantial conformance, to the greatest extent possible, with Tier 1 or Tier 3. Alternatively, the RWQCB may require the owner to submit a report of waste discharge for evaluation on a case-by-case basis. Where appropriate, the DPH may authorize repairs that are in substantial conformance, to the greatest extent possible, with Tier 2. Failure to meet the requirements of Tier 4 is subject to further enforcement action.

- Owners of failing OWTS will address any corrective action requirements in compliance, and must comply with a time schedule of any corrective action notice received from the DPH or RWQCB, to retain coverage under this LAMP.

- Failure to meet the requirements of Tier 4 constitute a failure to meet the conditions of the waiver of waste discharge requirements contained in this LAMP, and are subject to further enforcement actions.

A-4. Los Angeles County's Tier 2 OWTS Vertical Separation from Groundwater and the Use and Requirements on Seepage Pits, Infiltrative Chambers, and Gravel-Packed Pits

TABLE A-1

Comparison of Depth to Groundwater Requirements for OWTS with Leach Line, Leach Field or Infiltrative Chamber Dispersal Systems. (feet, below trench bottom)

Percolation Rate (min per inch)	Los Angeles County LAMP and Plumbing Code	South Lahontan RWQCB Guidelines	Los Angeles RWQCB Guidelines	SWRCB OWTS Policy Tier 1 Requirements
<5	20	20	20	20
5-60	5	-	-	-
>60	Not Allowed	-	-	-
6-30	-	8	8	8
31-120	-	5	5	5

Table A-1 shows the proposed depth to groundwater requirements for Los Angeles County under the Tier 2 LAMP. Under the OWTS Policy (Section 9.4.8), the minimum separation from the bottom of the dispersal system to groundwater must be at least 5 feet for OWTS with percolation rates between 5 – 60 MPI, 20 feet for conventional OWTS with percolation rates of 1 - <5 MPI, 2 feet for NOWTS with pressurized drip dispersal systems, and 10 feet for seepage pits; the proposed depth to groundwater requirements for the Tier 2 LAMP are in compliance with the minimum separation required in the OWTS Policy, but differ from Tier 1 between 6 and 30 MPI as shown in **Table A-1**.

Los Angeles County does not allow for reduced groundwater separation distances based on percolation rates, but does allow for non-conventional OWTS (NOWTS) dispersal systems as shown in **Table A-2.** Table A-2 provides NOWTS dispersal systems requirements, which are presented in detail in the following sections.

TABLE A-2

Los Angeles County Depth to Groundwater Requirements for OWTS and NOWTS

Type of OWTS	Percolation Rate	Min. Depth to Groundwater[1] (feet)
Conventional Septic Tank, leach line, leach field or infiltrative chambers	1- <5	20
Conventional Septic Tank, leach line, leach field or infiltrative chambers	5-60	5

NOWTS with leach line, leach field, or infiltrative chambers	1 - 60	3
Seepage Pits, and Gravel-Packed Pits	Between 0.83 and 5.12 gallons per square foot in 24 hours	10
Seepage Pits and Gravel-Packed Pits – With NOWTS and disinfection system.	Greater than 5.12 gallons per square foot in 24 hours	10
Soil Replacement: the manufactured/engineered soil shall provide homogenized absorption capability, requires the use of a NOWTS system that uses pressurized drip tubing or other non-conventional method of	Greater than 5.12 gallons per square foot in 24 hours	2ft as a variance for existing systems only. Otherwise, 5 ft.

[1] Measured from the bottom of the dispersal system

A-5. Subdivision Densities

The average density for any subdivision of property made by Tentative Approval pursuant to the Subdivision Map Act implemented under this Tier 2 LAMP shall not exceed the allowable OWTS density values in Table A-3 for a single-family dwelling unit, or its equivalent, for those parcels that rely on OWTS. The County will amend the Los Angeles County Code of Ordinances to include the allowable average densities per subdivision requirements, which will be applicable to Conditional Use Permit and land Subdivision projects.

Exception to the subdivision densities requirements may be granted if an NOWTS is proposed.

Lots created prior to the implementation of this LAMP are not subject to the aforementioned minimum lot size requirements, however they will be subject to the design requirements of this LAMP.
Existing lots in the Antelope Valley area under the authority of the Lahontan Water Board are subject to the limitation of 1 single family residence per half acre, or a maximum parcel loading rate of 500 gal/(acre/day) that was in effect prior to the adoption of the LAMP.

Figure 2-4 includes a map of average annual rainfall for the geographic regions in the County.

TABLE A-3

Allowable Average Densities per Subdivision

Average Annual Rainfall (in/yr)	Allowable Density (acres/single family dwelling unit)
0 - 15	2.5
>15 - 20	2
>20 - 25	1.5
>25 - 35	1
>35 - 40	0.75
>40	0.5

A-6. NOWTS

The supporting rationale for the NOWTS dispersal systems are presented below.

Supplemental Treatment

NOWTS are required under these conditions:

- Where percolation rates are too fast or too slow. Specifically, where the percolation rate exceeds 5.12 gallons per square foot of dispersal area per 24 hours, or where the percolation rate is faster than 5 minutes per inch without 20 feet separation to groundwater or is slower than 60 minutes per inch for a new or replacement OWTS.

- For seepage pits at existing construction with an absorption rate faster than 5.12 gallons per square foot of dispersal area,

- For new construction with flows larger than a 4 bedroom house using seepage pits,

- For systems under Tier 3 regulation near impaired water bodies requiring supplemental treatment under the APMP,

- For insufficient depth of undisturbed soil depth between leach lines and bedrock,

- There is less than three (3) feet of continuous, natural, undisturbed soil beneath an existing, new or replacement conventional dispersal system,

- For retrofit of an existing system where setbacks cannot be met,

- The property of the proposed system is within the 600 feet boundary of an impaired water body that is listed for pathogens or nitrogen and no TMDL implementation plan with OWTS allotment has been established,

- For areas where the groundwater is known to have high level of nitrogen or pathogens and that can be attributed to high density of OWTS.

- The property lies within an area covered by a TMDL implementation plan with OWTS allotment that requires supplemental treatment for OWTS <10,000 GPD [Note that it is possible that OWTS <10,000 GPD may not be required to include supplemental treatment in every TMDL implementation plan], and

- The future expansion area requirements cannot be met.

All supplemental treatment systems and components shall be installed and operated in accordance with their respective manufacturers' recommendation and are subject to review and acceptance by the DPH. Acceptance of supplemental treatment systems by the DPH is contingent upon a demonstration through extensive field and test data confirming that the supplemental treatment system will produce continuous and long-range results. This acceptance is subject to revocation when the supplemental treatment system is deemed inadequate by the DPH.

The supplemental treatment technology being demonstrated shall meet or exceed secondary treatment standards and shall provide reduction in Biochemical or Carbonaceous Biochemical Oxygen Demand (BOD/CBOD), Total Suspended Solids (TSS) concentrations and Total Nitrogen as prescribed further.

The following requirements shall apply to Supplemental Treatment Units:

- Systems must be NSF 245 certified or pass a demonstration test, unless they are installed for bacteriological reduction as a result of Tier 3 requirements. If the systems are only required to treat for bacteria, the systems must be NSF 40 certified or pass a demonstration test.

- For disinfection, the State OWTS Policy requires that supplemental treatment components be designed to provide sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L and shall further achieve an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters. Additionally, the DPH requires that if the NOWTS includes a disinfection component, the effluent shall be tested for fecal coliform bacteria with an acceptable concentration of less than or equal to 200 MPN/100mL.

- Tanks must be IAPMO or similarly certified.

- Supplemental treatment components, other than that of disinfection, shall be designed to reduce the concentration of BOD/CBOD, TSS and Total Nitrogen (TN).

- Supplemental treatment components, other than that of disinfection, shall produce

an effluent concentration level that meets or surpasses the following requirements:

- BOD – 30 mg/L or CBOD5 – 25 mg/L
- TSS – 30 mg/L
- Total Nitrogen – At least a 50% average reduction of influent (Total Nitrogen)
- pH – 6.0 to 9.0 SU

- NOWTS shall be equipped with a visual or audible alarm as well as a telemetric alarm that notifies the owner and the service provider of the NOWTS in the event of system malfunction. The telemetric monitoring system shall be capable of continuously assessing the operation of the supplemental treatment system. The owner must enter a covenant with the County prior to approval of the system.

- NOWTS with supplemental components shall be monitored by a service provider who is certified by the components' manufacturer and maintains the NOWTS in accordance with the operation and maintenance manual for the components and as prescribed by the DPH. The NOWTS designed to meet the treatment performance requirements outlined above shall be inspected by the service provider as frequently as needed or more frequently as required by the DPH to ensure proper operation at all times. The reports of all maintenance records shall be forwarded to the DPH on a quarterly basis or more frequently as deemed by the DPH.

- The laboratory analysis of the effluent from supplemental treatment components shall be conducted on an annual basis or more frequently as deemed by the DPH. Effluent samples shall be taken by service provider under contract at the point of discharge; the sample shall then be taken to a laboratory certified for such analysis. The results of the laboratory analysis shall be forwarded to DPH. The lab report shall clearly specify the location/address where sample was taken from. The laboratory analysis must include BOD, TN (which consists of ammonia, organic nitrogen, nitrate, etc.), TSS, and pH. Bacteriological analysis is also required when the system is equipped with a disinfection device. The laboratory findings must meet the RWQCB standards.

- NOWTS owners with supplemental treatment components must enter into an agreement with the County prior to approval of their systems.

- NOWTS owners are required to obtain an annual public health permit upon the certificate of occupancy being issued by building and safety.

The data provided in monitoring laboratory analysis reports are subject to verification by the DPH.

<u>Note</u>: The DPH may exercise the option of requiring samples to be taken while a DPH representative is present and/or by an independent party authorized by the DPH.

Additional requirements to ensure proper "Chain of Custody" shall apply.

Soil Replacement

For the purposes of this document, soil means the naturally occurring body of porous mineral and organic materials on the land surface, which is composed of unconsolidated materials, including sand, silt, and clay particles mixed with varying amounts of fragments and organic material.

Where undisturbed earth has insufficient depth to satisfy the minimum depth requirements or has poor absorption rate, manufactured/engineered soil with similar composition characteristics of loamy sand, certified by a California Registered Professional Soil/Geotechnical Engineer, may be added to the existing native soil so that the site conditions meet or exceed the specific depth and absorption rate requirements. The manufactured/engineered soil shall be re-composed and re-graded uniformly to provide homogenized absorption capability, equivalent to soil category of loamy sand. The qualified professional shall prove through sieve analysis and other quantifying tests that the desirable composition and compaction has been achieved. The compaction characteristics of the manufactured soil shall correspond as close as possible to the native soil of the surrounding area. Adequate number of percolation tests shall be conducted in the area where manufactured soil has been provided to confirm that the percolation rates are in correlation with loamy sand soil category. The results of the percolation tests conducted in the area shall affirm uniformity in soil composition and compaction.

Additional requirements:

- A pressurized distribution system is required where engineered soil is used in order to comply with the minimum soil depth and/or the absorption rate requirements. Pressurized distribution means a type of dispersal system that employs a pump and distribution piping with small diameter perforation (1/4 of an inch or less) or drip emitters that are installed at a depth of 6 inches (Tier 1 requirement) below grade and a minimum of 6 inches apart or as recommended by the manufacturer and approved by the DPH, to distribute effluent into soil with uniform distribution.

- Soil replacement shall not compromise the protection of the groundwater; a minimum of 5 feet of separation to groundwater from the lowest point of the dispersal system shall be allowed and a minimum of 2 feet for replacement systems

- Percolation testing shall be done in those areas where engineered soil has been provided to ensure that new soil meets or exceeds the absorption rate requirements.

- Engineered soil shall compensate for the lack of in-place soil at a ratio of 1.5 to 1; so that a 1 foot deficiency in the soil column depth would require 1.5 feet of

engineered soil material. In no case shall engineered soil compensate for more than 2 feet of the minimum native soil depth requirements.

A site evaluation shall determine that a minimum of 3 feet soil depth is present in the dispersal area. Soil depth is measured vertically to the point where bedrock, hardpan, or impermeable soils are encountered or an adequate depth that has been determined by the DPH. Soil depth shall be determined through the use of soil profile(s) in the dispersal area and the designated dispersal system replacement area, as viewed in excavations exposing the soil profiles in representative areas, unless the DPH has determined through historical or regional information that a specific site soil profile evaluation is unwarranted.

A-7. Dispersal System Sizing Methodology

Dispersal sizing required by the SWRCB OWTS Policy uses the maximum application rate determined from stabilized percolation rates provided in Table 3 of the OWTS Policy, or from soil textures and structures determined in Table 4 of the OWTS Policy. This LAMP utilizes the Ryon Formula and actual system testing to insure an appropriate disposal system sizing for the local soil conditions.

The Ryon Formula is as follows:

$$A = \frac{T + 6.24}{29} x \frac{C}{2}$$

Where A = Square feet of 3-foot wide trench dispersal area

T = Time in minutes for the 6th inch of water to drain

C = Proposed septic tank capacity

The resulting “A” must be divided by 3 to arrive at the length of a 3 foot wide trench with 1 foot of filter material below the perforated pipe provided for the dispersal system. For trenches proposing 2 feet of filter material below the pipe, “A” must be divided by 5 to arrive at the length of trench. For trenches proposing 3 feet of filter material below the pipe, “A” must be divided by 7.

Absorption rates faster than 60 minutes for the water level to drop from the 5th to 6th inch do not meet the minimum requirements. Conversely, absorption rates of faster than 5 minutes for the water to drop from the 5th to 6th inch shall not be accepted and will require Supplemental Treatment. OWTS with nonconforming absorption rates are required to either replace the native soil for absorption rates slower than 60 MPI, or provide supplemental treatment of the sewage effluent prior to discharging into the receiving

environment below ground surface for absorption rates faster than 5 MPI.

A-8. Horizontal Setbacks

The location of OWTS components is regulated by the SWRCB Policy and is dependent upon horizontal distance from specific characteristics susceptible to contamination effects. Similar horizontal setback requirements have been established in Los Angeles County and are found in Table K-1 in Appendix K of the Plumbing Code of Ordinances. Although County Ordinances require different setback distances depending on the OWTS component under consideration, Tier 2 requirements may not be any less stringent than those for Tier 1 established by the SWRCB. Horizontal setback distances currently required by the County are as follows:

TABLE A-4

Current Location of Sewage Disposal System Requirements from the Plumbing Code

Minimum Horizontal Distance in Clear Required From:	**Septic Tank**	**Disposal Field**	**Seepage Pit**
Buildings or Structures[1]	5 feet (1.52 m)	8 feet (2.44 m)	8 feet (2.44 m)
Property line adjoining private property	5 feet (1.52 m)	5 feet (1.52 m)	8 feet (2.44 m)
Water supply wells[8]	50 feet (15.24 m)	100 feet (30.5m)	150 feet (45.7m)
Streams and other bodies of water[8]	50 feet (15.24 m)	100 feet[7] (30.5m)	150 feet[7] (45.7 m)
Trees	10 feet (3.05 m)	—	10 feet (3.05 m)
Seepage pits	5 feet (1.52 m)	5 feet (1.52 m)	12 feet (3.66 m)
Disposal field	5 feet (1.52 m)	4 feet[4] (1.22 m)	5 feet (1.52 m)
On site domestic water service line	5 feet (1.52 m)	5 feet (1.52 m)	5 feet (1.52 m)
Distribution box	—	5 feet (1.52 m)	5 feet (1.52 m)
Pressure public water main	10 feet (3.05 m)	10 feet (3.05 m)	10 feet (3.05 m)

Note:
When disposal fields and/or seepage pits are installed in sloping ground, the minimum horizontal distance between any part of the leaching system and ground surface shall be fifteen (15) feet (4.57 m).

1. Including decks, patios, porches and steps, whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, carports, covered walks, covered driveways and similar structures or appurtenances.
2. Reserved.
3. Reserved.
4. Plus two (2) feet (610 mm) for each additional (1) foot (3.05 m) of depth in excess of one (1) foot (3.05 m) below the bottom of the drain line. (See also Section K 6 in Appendix K of the Plumbing Code.)
5. Reserved.
6. For parallel construction—For crossings, approval by the Health Department shall be required.
7. These minimum clear horizontal distances shall also apply between disposal field, seepage pits, and the ocean mean higher high tide line.
8. Where special hazards are involved, the distance required shall be increased as may be directed by the Authority Having Jurisdiction.

The SWRCB OWTS Policy contains the following horizontal setback conditions for OWTS treatment components and dispersal systems to be located a minimum of:

- 5 feet from parcel property lines and structures (OWTS Policy Section 7.5.1) [The Plumbing Code currently meets or exceeds this requirement].

- 100 feet from private water wells and monitoring wells, unless regulatory or legitimate data requirements necessitate that monitoring wells be located closer (OWTS Policy Section 7.5.2) [Must be amended to the Los Angeles County Code of Ordinances].

- 100 feet from any unstable land mass or any areas subject to earth slides identified by a registered engineer or registered geologist; other setback distance are allowed, if recommended by a geotechnical report prepared by a qualified professional (OWTS Policy Section 7.5.3) [Must be amended to the Los Angeles County Code of Ordinances].

- 100 feet from springs and flowing surface water bodies where the edge of that water body is the natural or levied bank for creeks and rivers, or may be less where site conditions prevent migration of wastewater to the water body (OWTS Policy Section 7.5.4) [Must be amended to the Los Angeles County Code of Ordinances].

- 200 feet from vernal pools, wetlands, lakes, ponds, or other surface water bodies where the edge of that water body is the high water mark for lakes and reservoirs, and the mean high tide line for tidally influenced water bodies (OWTS Policy Section 7.5.5) [Must be amended to the Los Angeles County Code of Ordinances].

- For new or replacement OWTS where the depth of dispersal system does not exceed 10 feet, the OWTS must be at least 150 feet from a public water well. If the depth of the effluent dispersal system exceeds 10 feet in depth, the OWTS must be at least

200 feet from a public water well. If the depth of the effluent dispersal system exceeds 20 feet and is within 600 feet of a public water well, the setback must be such that there is at least two-year travel time for microbiological contaminants (OWTS Policy Section 9.4.10).

- 150 feet from a public water well where the depth of the effluent dispersal system does not exceed 10 feet (OWTS Policy Section 7.5.6) [Must be amended to the Los Angeles County Code of Ordinances].

- 400 feet from the high water mark of a reservoir, lake, or flowing water body when the effluent dispersal system is within 1,200 feet from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies (OWTS Policy Section 7.5.7) [Must be amended to the Los Angeles County Code of Ordinances].

- 200 feet from the high water mark of a reservoir, lake, or flowing water body when the effluent dispersal system is located more than 1,200 feet but less than 2,500 feet from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies (OWTS Policy Section 7.5.8) [Must be amended to the Los Angeles County Code of Ordinances].

In addition to the State mandated minimum requirements for OWTS treatment components and dispersal systems horizontal setback and the Plumbing Code horizontal setback requirements (Table K-1 in Appendix K of the Plumbing Code), the County has added an additional requirement given its particular location and needs. Tier 2 OWTS under this LAMP must be located a minimum distance of:

- 10 feet from the trunk of any tree (for Oak trees, this requirement extends to 5 feet outside of the drip line or 15 feet from the trunk, whichever is greater) [Specified in the Professional Guide].

OWTS regulated by the LAMP must meet all of the above horizontal setback requirements for Tier 2 consideration, summarized in Table 3-4. Table 3-4 summarizes the horizontal setbacks required under this LAMP, including setbacks that must be amended to the Los Angeles County Code of Ordinances, discussed above.

Appendix B
Cumulative Nitrate and Salt Loading from OWTS in Los Angeles County

APPENDIX B

WATER QUALITY ASSESSMENT PROGRAM (WQAP)

B-1 OVERVIEW OF WQAP

As required by Section 9.3.1 of the OWTS Policy, the County will maintain a Water Quality Assessment Program (WQAP) to determine the general operation status of OWTS and to evaluate the impact of OWTS discharges, and assess the extent to which groundwater and local surface water quality may be adversely impacted. The County shall make available the WQAP to the RWQCB for its review prior to its implementation. The focus of the assessment will be areas where different and/or additional requirements are needed to protect water quality, including consideration of the following items:

- Degree of vulnerability to pollution from OWTS due to hydrogeological conditions,
- High Quality waters or other environmental conditions requiring enhanced protection from the effects of OWTS,
- Shallow soils requiring a dispersal system installation that is closer to ground surface than is standard,
- OWTS is located in area with high domestic well usage,
- Dispersal system is located in an area with fractured bedrock,
- Dispersal system is located in an area with poorly drained soils,
- Surface water is vulnerable to pollution from OWTS,
- Surface water within the watershed is listed as impaired for nitrogen or pathogens,
- OWTS is located within an area of high OWTS density,
- A parcel's size and its susceptibility to hydraulic mounding, organic or nitrogen loading, and whether there is sufficient area for OWTS expansion in case of failure,
- Geographic areas that are known to have multiple, existing OWTS predating any adopted standards of design and construction including cesspools,
- Geographic areas that are known to have multiple, existing OWTS located within the pertinent setbacks identified in the Professional Guide.

As part of the WQAP, the DPH will continue to maintain the inventory for OWTS and NOWTS in the County, including system location information (**Figure 1-1** and **Figure 1-2**). **Figure 2-5** shows the number of OWTS and NOWTS in each watershed. The WQAP will include evaluation of available water quality data for nitrates and pathogens as reported under existing monitoring programs for domestic wells, public systems/wells and/or beach water quality or from other sources. The WQAP will also include review of complaints, variances, failures, and any information resulting from inspections. Data for other constituents which are needed to adequately characterize the impacts of OWTS/NOWTS on water quality may also be included in the assessment, where these

data are available.

If elevated nitrogen or pathogen levels are reported under monitoring programs the results are not necessarily indicative of issues with domestic OWTS, considering that larger commercial systems and systems managed under the WDR permit process by the RWQCB tend to have significantly larger design flows and larger contribution to septic loads throughout the County.

As described in Section 6.4 of the LAMP (reporting to the RWQCBs), every five (5) years the annual report to the RWQCB will be accompanied by the Water Quality Assessment Report that summarizes the information and findings from the WQAP.

B-2 OWTS GEOGRAPHIC AREAS

The GIS data will allow for the OWTS and water quality data to be organized according to various geographical areas. The OWTS distribution can be organized by watersheds, groundwater sub-basins, U.S. Postal Service Zip Code areas, or by delineated impaired water bodies for use in environmental studies and the preparation of the APMP.

The following sections provide a general discussion for the geographical areas of OWTS covered by Los Angeles County's LAMP.

Within Los Angeles County's Jurisdiction

Los Angeles County has contracts with City of Agoura Hills, City of Bradbury, La Canada-Flintridge, City of La Habra Heights, City of Lynwood, City of Palos Verdes Estates, City of Rolling Hills, City of Rolling Hills Estates, City of Lancaster, City of Palmdale and the City of Walnut. The OWTS located within these cities will be included in the Water Quality Assessment Program (WQAP) and will be included in development of the APMP. Additionally, any cities that do not now contract with Los Angeles County for LAMP services, but elect to do so in the future, will be included. OWTS can be geographically referenced by cities if needed.

Zip Code

The current OWTS inventory provides for ready geographical reference by U.S. Postal Service Zip Code. Although of some use for evaluating OWTS distributions, distribution by zip code has limited use for watershed, groundwater basin and impaired water body analysis.

Watershed

OWTS distribution by watershed will provide information on potential contributions of OWTS to impaired water. This will aid with development of water quality parameters loading analyses and potential impacts to impaired water Total Maximum Daily Load

(TMDL) levels. Other localized focus areas within each watershed may be delineated in the future if warranted.

TABLE B-1

South County Area (Los Angeles RWQCB Region 4), Estimated Existing OWTS by Watershed

Watershed	OWTS Number	NOWTS Number
Calleguas	0	0
Los Angeles	10,951	134
San Pedro Channel Islands Watershed	3	0
San Gabriel	2,545	81
Santa Ana	143	2
Santa Clara (RWQCB Region 4)	11,287	102
Santa Monica Bay	7,238	379

TABLE B-2

North County Area (Lahontan RWQCB Region 6), Estimated Existing OWTS by Watershed

Watershed	OWTS Number	NOWTS Number
Antelope-Fremont Valleys	16,955	41
Middle Kern-Upper Tehachapi-Grapevine	1	0
Mojave	127	1
Santa Clara (RWQCB Region 6)	70	0

Impaired Surface Water (Figure 4-1)

Impaired water bodies identified below require a 600 feet boundary until a TMDL with OWTS allotment is adopted. Tier 3 applies to OWTS within the 600 feet boundary until the TMDL with OWTS allotment is established.

- **Water Bodies Impaired for Pathogens subject to Tier 3:**
  - Coyote Creek
  - Malibu Creek (Includes Las Virgenes Creek and Malibu Lagoon)
  - San Gabriel River Reach 1 (Estuary to Firestone)
  - San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam)

- San Gabriel River Reach 3 (Whittier Narrows to Ramona)
- San Jose Creek Reach 1 (San Gabriel Confluence to Temple Street)
- San Jose Creek Reach 2 (Temple Street to Interstate -10 at White Ave.)
- Sawpit Creek
- Walnut Creek Wash (Drains from Puddingstone Reservoir)

- **Water Bodies Impaired for nitrogen subject to Tier 3:**

  - Malibu Creek (Includes Las Virgenes Creek and Malibu Lagoon)
  - Malibou Lake
  - Westlake Lake
  - Mint Canyon Creek
  - Santa Clara River Lakes (Lakes Hughes, Muntz, and Elizabeth)

  Las Virgenes Creek, Malibu Lagoon, Westlake Lake, Mint Canyon Creek and Santa Clara River Lakes (Lakes Hughes, Muntz, and Elizabeth) water bodies are included in the above list because they have been identified as being impaired for nitrogen or pathogens with OWTS as a potential contributing source. The remaining water bodies shown above were identified in the State OWTS Policy as impaired for pathogens or nitrogen with OWTS as a potential contributing source.

- **TMDLs:**

  - Some of the County impaired water bodies listed due to nitrogen or pathogen indicators pursuant to section 303(d) of the Clean Water Act have TMDL levels established by the RWQCB.
  - Tier 3 applies to OWTS within the 600 feet boundary for the above impaired water bodies until the TMDL with OWTS allotment is established.

B-3 OWTS IMPACT ANALYSES - METHODOLOGY

Data and Assumptions

The following data will be used to estimate the impact of OWTS on surface and groundwater quality. Assumptions related to each data set are summarized in the relevant section.

OWTS Discharge Volumes

Individual OWTS are normally designed on the basis of the estimated maximum daily sewage flow from the residence or building(s) served. The standard design factor for the County is 150 gallons per day (gpd) per bedroom. The design sewage flow is purposely

set with a margin of safety above the actual wastewater flows, in order to accommodate maximum usage of an individual system. However, based on information from the US EPA OWTS Manual (2002) the actual residential sewage generation rates are found to be in the range of 45 to 70 gpd/per capita. This US EPA estimate is consistent with Los Angeles Department of Water and Power's average water usage for a family of four at 77 gallons per person per day (308 gallons per family per day), 62% of which is used for indoor purposes according to the University of California Los Angeles Institute of the Environment and Sustainability. Using these two sources, the estimate for actual residential sewage generation rate for the County is about 48 gpd per person per day (77 gallons per person per day x 62%). Therefore, an average family of four would produce about 200 gpd of residential sewage. A value of 200 gpd will be used to estimate the average wastewater flow from residential OWTS in each region.

Background Nitrogen Concentration

Background nitrogen concentration will be assumed based on water quality sampling of wells in non-agricultural areas where OWTS discharge is not anticipated to affect water quality. In the absence of this data for the County, a value will be assumed from a review of data on background nitrogen concentrations in regions with similar climate and geology.

Soil Denitrification

Total nitrogen removal in the upper soil zones (via denitrification) is typically assumed to remove 10 to 25 percent of the total nitrogen. For this loading calculation, it was estimated that 15 percent of the total nitrogen in the percolating OWTS effluent would be removed by denitrification, based on the average permeability of soil in the region. Seepage pits shall be excluded from this calculation as their effluents are not subject to soil denitrification.

Rainfall Recharge (Deep Percolation)

The recharge area will be calculated by estimating the total acreage of non-sewered land within each region considered (watersheds, groundwater sub-basins, U.S. Postal Service Zip Code areas). Non-sewered acreage includes the parcels currently developed with OWTS, vacant developable parcels, as well as the public lands and open space easement areas. Land areas served by public sewers will be excluded from the "recharge area".

Deep percolation will be estimated through completion of a water balance analysis, which will take into account rainfall, runoff and evapotranspiration losses.

Infiltration Rate

Infiltration rates for each region considered will be assumed based on soil type and data from percolation tests conducted by the county in each region where OWTS are present.

Groundwater Levels

Estimates for the minimum depth to groundwater have been obtained from well groundwater levels databases and from the underground storage tank case list at the Department of Water Resources (DWR). Additionally, groundwater levels from wells found on the Los Angeles County well database were used to estimate local groundwater levels. The website locations are provided in the list of references at the end of this section. It should be noted that the depths obtained are considered estimates only and may vary significantly depending on which aquifer is tapped into.

Nitrate-Nitrogen Loading

A nitrate loading analysis will be completed using an annual chemical-water balance analysis. The methodology to be followed is described in the publication "Predicting Groundwater Nitrate-Nitrogen Impacts" (Hantzsche and Finnemore, *Groundwater*, Vol. 30, No. 4, July-August 1992). According to this methodology, the long-term concentration of nitrate as nitrogen (NO_3-N or nitrate-nitrogen) in the upper saturated groundwater zone can be closely approximated by the quality of percolating recharge waters. Considering only the contributions from OWTS and natural sources picked up by rainfall leaching of soil and vegetation, the average concentration of nitrate-nitrogen in recharge water, n_r, is estimated using the following equation:

$$n_r = \frac{W n_w (1 - d) + R n_b}{(W + R)}$$

where: n_r = resultant average concentration of NO_3-N in recharge water, mg-N/l
W = average annual volume of wastewater entering the soil, acre-ft/yr (AFY)
n_w = total nitrogen concentration of wastewater, mg-N/l
d = fraction of NO_3-N loss due to denitrification in the soil
R = average annual volume of rainfall recharge in sub-basin area, AFY
n_b = background NO_3-N concentration of rainfall recharge at the water table, exclusive of wastewater, agriculture or other development influences, mg-N/l

Once nitrate loading has been determined for each of the regions covered by the LAMP, concentrations will be compared to Maximum Contaminant Levels (MCLs, drinking water standards) to determine areas where further investigation may be warranted. Nitrate concentrations will also be compared to groundwater nitrate concentration data to determine regions where nitrate discharges from OWTS may be affecting groundwater quality. These regions will be subject to additional assessment to evaluate the actual impact of OWTS discharge on groundwater quality.

Additional Water Quality Assessment Parameters

In regions where the initial water quality assessment determines that OWTS discharges may adversely affect groundwater and/or surface water quality, additional parameters may be considered to determine actual impacts of OWTS discharge. Additional

parameters may include:

- Bacteria
- TDS
- Chloride
- Sulfate
- Boron
- Other parameters, such as isotopes and anthropogenic compounds, may be added, as necessary

B-4 POTENTIAL DATA GAPS

Based on the OWTS location, additional data acquisition could be required. This data could include:

- Rainfall Data
- Soil Type/Infiltration Rate
- Groundwater Level
- Groundwater Nitrate data
- Additional analytes that could be needed to further constrain the impact of OWTS include:
  - Bacteria
  - TDS
  - Chloride
  - Sulfate
  - Boron
- Additional analytes that may be needed to verify OWTS impacts to groundwater are discussed in the following sections.

B-5 VERIFICATION OF OWTS IMPACTS TO GROUNDWATER

Because nitrate, bacteria, TDS, chloride, sulfate and boron have other potential sources in the environment, additional studies should be considered to verify that the impacts to groundwater are related to OWTS.

The ratio of nitrogen's two stable isotopes (^{14}N and ^{15}N) can be used effectively to discern the presence of human wastes (enriched in the ^{15}N isotope) in plants and algae that uptake nitrate, contributing to the eutrophication of surface waters.

Somewhat less mobile than the inorganic anions are a variety of organic substances that can dissolve in groundwater at detectable concentrations. There are two groups of these organic substances that are most useful. Household products such as cleaning agents and foods represent the first group. Linear alkyl benzenes (LABS) are components of common surfactants (e.g., detergents) and ethylene diaminetetraacetic acid (EDTA) is a chelating agent present in many cleaning products. These two compounds have a moderate to high water solubility and their biodegradability is limited. Caffeine is highly water-soluble and has been detected in wastewaters at concentrations approaching 1 mg/L. While caffeine can biodegrade in surface water ecosystems, it is often useful for groundwater.

A second group of organic substances includes pharmaceuticals such as ibuprofen, acetaminophen, ethinylestradiol and codeine. These drugs are less soluble than household products, but are quite stable in water and routinely analyzed by commercial laboratories. Although not pharmaceuticals, a number of sterols produced naturally by the human body (e.g., coprostanol, cholesterol) are also useful in identifying the presence and source of fecal contamination—particularly for surface water releases.

Perhaps the least mobile indicators of human wastewater are the various microorganisms (e.g., viruses, bacteria, protozoa) that are often filtered out or adsorbed by soil particles; however, they are mobile in groundwater flowing through coarse-grained materials (e.g., sands and gravels). Specifically, Escherichia, Streptococci and Clostridia bacteria are routinely analyzed to monitor wastewater releases to the environment. Coliphage viruses are also useful as an indicator of wastewater components (specifically coliform bacteria) in freshwater and seawater because they are more mobile than their larger bacterial hosts.

The combination of indicator compounds employed to identify the presence and extent of releases from OWTS depends on local hydrogeologic conditions, background water chemistry and characteristics of potential contributors. In addition, the extent to which specific sources of sewage contamination must be identified will influence both the number and detection limits of indicator compounds. Generally, common anions are the quickest and least costly first-tier indicators to employ. If the anion data are inconclusive or confounded by other contributing sources in the area, organic chemicals related to household products and/or nitrogen isotope ratios are often the second tier indicators, depending on whether surface or ground waters are impacted. If the household product and isotope indicators are inconclusive or unfeasible, the third tier indicators are usually pharmaceuticals, fecal sterols and/or coliphage viruses.

It should be noted that any combination of indicators could be initially employed for a specific investigation, depending on the environment impacted and the required certainty of the source(s). Moreover, bacterial pathogens or their indicators should be tested as part of any first tier investigation as they are potentially the most hazardous components of OWTS releases and may be mobile even in environments where hydrologic or chemical conditions suggest otherwise. In some cases, initial tests for suspected viruses or protozoa are also warranted.

B-6 DEVELOPMENT OF THE ADVANCED PROTECTION MANAGEMENT PROGRAM

An APMP will be implemented for all OWTS systems that are determined to be Tier 3 and located within 600 feet of a water body listed as impaired due to nitrogen or pathogen indicators pursuant to section 303(d) of the Clean Water Act.

The geographic area for each water body's APMP is defined by the applicable TMDL, if one has been approved. If there is not an approved TMDL, it shall be 600 linear feet [in the horizontal (map) direction] of a water body where the edge of that impaired water body is the natural or levied bank for creeks and rivers, the high water mark for lakes and reservoirs, and the mean high tide line for tidally influenced water bodies, as appropriate. OWTS near impaired water bodies that are not listed as impaired due to nitrogen or pathogen indicators, and do not have a TMDL and are not covered by a Local Agency Management Program with special provisions, are not addressed by Tier 3.

It is the responsibility of the owner of existing, new or replacement OWTS to confirm whether the location of his/her system relative to impaired water bodies will classify the system as Tier 3. The SWRCB provides a map tool on their website http://www.waterboards.ca.gov/water_issues/programs/owts/index.shtml that assists residents in determining if they are within 2,000 feet of an impaired water body. This distance is the distance from an impaired water body that the SWRCB considers to be "near" to a system. If you enter a property address into the map tool, nearby impaired waters for nitrogen compounds and/or pathogens should be listed. If no nitrogen - or pathogen-impaired water bodies listed in Attachment 2 of the OWTS Policy and this LAMP are identified within 2,000 feet of an address, there is a lower potential for the OWTS to be classified under the Tier 3 requirements or covered under a TMDL implementation plan based on distance to an impaired water body. If there are nitrogen- or pathogen-impaired water bodies that are identified within 2,000 feet of an address using the map tool, there is a higher potential for the OWTS to be classified under the Tier 3 requirements or covered under a TMDL implementation plan. Due to data limitations, property owners are strongly advised to conduct further investigation beyond the SWRCB mapping tool with the help of their local agencies, RWQCB and/or SWRCB to determine whether their system falls into the Tier 3 category before making any changes to their system. See the SWRCB website http://www.waterboards.ca.gov/water_issues/programs/owts/index.shtml.

OWTS that are properly functioning prior to the establishment of TMDLs for an impaired water body shall not be subject to the APMP if the owner (1) signs a legally binding document to connect to a centralized wastewater collection and treatment system within 48 months of the nearby water body being classified as impaired due to the influence of OWTS; and (2) specifies that the date of connection is within 9 years of the nearby water body being classified as impaired due to the influence of OWTS.

For OWTS that are subject to the APMP, approved supplemental treatment for nitrogen and/or pathogens must be used, based on the source of impairment of the nearby water body.

Any assessment of particular OWTS failure contributing to the water body impairment will be done by the Water Board.