Santa Barbara County

LOS OLIVOS
WASTEWATER MANAGEMENT PLAN

September 2010

Environmental Health Services
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Executive Summary

Introduction

The Los Olivos Wastewater Management Plan (LOWWMP) has been prepared by Environmental Health Services for consideration by the County Board of Supervisors for use as a tool to address an existing groundwater quality problem in the Los Olivos Special Problems Area of the Santa Ynez Uplands Groundwater Basin.

The goal of the LOWWMP is to protect public health and safety by recommending a process to mitigate the negative effects of existing onsite wastewater treatment systems (OWTS) on groundwater quality under and around Los Olivos. The LOWWMP presents alternatives and recommendations for design, construction, monitoring, and maintenance standards intended to stop the upward trend of this contamination and gradually improve ground water quality. Implementation will require the community and policy makers to work together to agree on measures and an approach that focus on inspecting, repairing, upgrading or replacement utilizing current technology, and maintenance of the OWTS's in the Los Olivos Special Problems Area. This new generation of systems will help restore groundwater quality and contribute to the long-term health and safety of citizens that rely on this source of water.

The Los Olivos Special Problems Area designation was established in 1974. There are currently ten "Special Problems Areas" in the County of Santa Barbara, with this being the first management plan prepared to address onsite wastewater issues. More and more areas of California with increasing onsite wastewater effluent loads are identifying groundwater quality issues and are adopting management plans to address the problem. This is the first of several management plans that may be developed to address water quality issues in various areas of Santa Barbara County. Others in the Santa Ynez Valley include Ballard, Janin Acres, and the urbanized area near Santa Ynez Township.

The recommendations of the LOWWMP are essentially a compilation of "lessons learned" and new technologies from the applicable experience of other communities, modified as required, to the unique conditions in the Los Olivos area. The Environmental Protection Agency (EPA) has contributed to the discussion of this growing issue by offering the *EPA Guidelines for Management of Onsite/Decentralized Wastewater Systems*. The LOWWMP contains a number of elements of their recommended approach. The Regional Water Quality Control Board has also requested that this Management Plan be prepared. The LOWWMP is in harmony with the goals of the Santa Ynez Valley Community Plan.

The LOWWMP represents a foundation for the significant amount of effort that will be needed as the Los Olivos area shifts from traditional to advanced onsite wastewater treatment. It is intended to provide a reference for understanding why this shift is necessary and why it is necessary now. Advanced onsite wastewater treatment is now a commonly employed technology and has become a relatively economical option for protecting public health and the environment.

The LOWWMP is intended to be a living document, subject to updates as new technologies are developed and as our understanding of water quality preservation advances. The approach is intended to be practical. The LOWWMP does not propose to accomplish everything possible but to apply practical water quality solutions in the earliest possible timeframe.

Content of the Los Olivos Wastewater Management Plan

The Los Olivos Wastewater Management Plan begins with a primer on Onsite Wastewater Treatment Systems (OWTS), followed by definitions helpful in understanding the topic. A historic and regulatory setting is then presented for a greater understanding of the studies and regulatory actions that have helped define the Los Olivos Special Problems Area.

Because of some controversy in the past regarding the general knowledge and acceptance of the water quality data and subsequent "Special Problems Area" designation, a great deal of information is presented in the LOWWMP on the water quality data from well testing performed in the Los Olivos area. The Data is from 56 wells in the shallow groundwater basin, 19 of which have a history of testing, 14 of which show a trend of increasing nitrates (which is a key contaminant indicator) demonstrating the increasing trend in the problem area as a whole. The data collectively demonstrates a clear trend for increasing nitrate levels in the shallow groundwater under Los Olivos.

Like much of the Valley, the Special Problem Area is over both a perched, or shallow groundwater that is tapped by private wells generally between 25 and 180 feet deep and deeper aquifer which is tapped by wells between 250 and 600 feet deep. 32 private wells tested in the Los Olivos area demonstrate similar levels of nitrate in both shallow and deep aquifers as defined. However, outside the immediate area, deeper wells sampled show considerably less nitrates. Indicating that shallow wells in and around the problem area, as well as deeper wells immediately under or adjacent to the problem area are most influenced by the nitrate contamination.

> It is important to mention that the water purveyor Santa Ynez River Water Conservation District, Improvement District No.1 (ID#1) wells mentioned in this Plan are all located outside the special Problem Area proper, and are all drawing water from the deeper aquifer. It is also important to note that the domestic drinking water sampled from their wells has among the lowest concentrations of nitrates for water tested, and that although low levels of nitrates are present, the domestic water supply is well below the ½ MCL action level requiring increased sampling and reporting.

Although existing water quality in the special problem area is still generally under the action level requiring enhanced testing or the maximum contaminate level (MCL) for drinking water as defined by the EPA and State Department of Public Health, the upward trend toward actionable levels is consistent, and indicates a plan to reverse the trend is urgent. Use of one of ID#1's older wells, located on Refugio Road between Baseline Ave. and Highway 246, was discontinued in 1998 due to high nitrate concentrations. The well is relatively shallow, completed to a depth of 495', with the top of the screened interval at 195'. It is possible that the high nitrate concentrations in the well are, at least in part, due to migration of shallow groundwater from the Los Olivos area.

Based on the average annual rainfall of the Santa Ynez Valley, and the calculated effluent from the existing OWTS in the Special Problems Area, approximately 50% of the current groundwater recharge contributed by the surface rains directly over the Special Problem area is from area septic system effluent. This source of groundwater recharge mixes with other groundwater flows from upgradient of Los Olivos. The following conditions exist that have contributed to the problem and need to be addressed:

1. A high groundwater table exists in many areas of Los Olivos resulting in an inadequate separation from existing leach fields and dry wells. In some cases, septic system effluent is being discharged directly into the shallow groundwater table. Again, please note the discussion above (in box) regarding domestic drinking water drawn from deeper aquifers outside Los Olivos

2. The high density of OWTS combined with inadequate area for proper sizing or set-backs for leach fields. The Regional Water Quality Control Board has determined that a developed residential lot of less than one acre in size is insufficient for a competent leach field. Many leach fields currently exist on lots in Los Olivos that are less than one acre.

3. The age of many septic systems in the Los Olivos area exceed the expected life of septic tanks and/or dispersal systems. Many of these are no longer treating the wastewater or leaching effectively.

4. Many of the existing systems are not designed to current codes and requirements. A number of existing systems were installed under antiquated design standards under marginal site conditions.

The LOWWMP demonstrates that a reversal in water quality will be slow and require many years, due to the administrative and regulatory effort required, funding issues, capital construction costs, and the sluggish movement of the groundwater, with its slow ability to replace itself with cleaner water. In order for the current downward water quality trend to be reversed before negative consequences are potentially realized, implementation of a plan is recommended as soon as possible. It will take possibly decades for all the existing OWTS units to be repaired, replaced or upgraded to assure each parcel is not contributing to the increasing ground water quality problem.

The LOWWMP lays forth options for consideration with recommendations derived from the successful experiences of others, as well as current technologies that have been emerging in Southern and Central California. These technologies have been applied to some degree already in Santa Barbara County, such as advanced wastewater treatment systems for both residential and commercial use.

In addressing solutions to the ground water quality concerns, there are two major components of the LOWWMP. They are: the Commercial Component, which addresses the septic systems in the downtown core; and the Residential Component, which addresses the remaining septic systems in the Los Olivos Special Problems Area.

Separating out the commercial core is due, in part, to the understanding that there is currently some support within the business community to implement a downtown commercial component as soon as feasible. This support stems from the fact that as substandard systems fail, there are few options for repair and replacement of these systems because of the small, compact lots in the downtown area. This condition could limit the extent that the businesses may be able to do business as they desire, add restrooms, wash facilities or sinks, or engage in high water use activities. There is also a desire by the business community to be able to construct public restrooms.

Starting with the downtown commercial component has additional advantages for the community. The lots in the downtown core, on average, generate more wastewater effluent, and are situated in an undesirable setting for OWTS which combines most of the factors of concern listed above. The downtown core commercial area, as defined, consists of 52 lots which represent 12% of the lots within the Special Problems Area but contribute approximately 22% of the wastewater generated. The dispersal of effluent from these downtown OWTS is within an area known for shallow groundwater and small lot size. Many of the existing dispersal systems in the downtown core consist of dry wells that contact the ground water table during certain times of the year. Starting with the downtown could make a significant contribution to the protection of water quality under Los Olivos. This seems to be a natural prioritization strategy for obtaining the earliest groundwater quality benefit for expenditure of public resources.

Although a few of these downtown commercial lots may be able to accommodate advanced OWTS meeting the new proposed requirements on their lots, the most viable options for the downtown core include communal wastewater treatment systems utilizing a communal dispersal field, or treated to a level that allows dumping to surface waters. This treatment facility would be funded and operated by a locally controlled mechanism such as a Special Assessment District. Initial capital improvement costs are expensive but would be shared in a cooperative effort between users, grants, low-interest loans, and possibly other agencies.

The communal systems examined include package plants, three types of which are described in the Plan, and a fourth system known as a STEP (Septic Tank Effluent Pump) System with an advanced secondary treatment facility.

The package plants considered include common commercial units manufactured by AdvanTex, GE Corporation, and Hoot Systems, Inc.

In General these systems can be described as:

1. Package Plant Options with examples from three quality vendors. The following three systems are all capable of meeting the selected wastewater treatment effluent quality requirements for dispersal field disposal or release to surface waters:
    a. The AdvanTex Manufactured packed-bed filter system with scalable modules for varied flows, from onsite advanced septic to community treatment modules. Pre-engineered and available in package plant configurations.
    b. The Hoot Systems integrated fixed film/ activated sludge (IFFAS) treatment pre-engineered package plant.
    c. The GE pre-engineered, modular ultra-filtration based package plant for wastewater treatment and recycle, scalable for virtually any wastewater application from 5,000 gpd up to 5 mgd . This system is dual-trained for redundancy. System configurations include the Z-MOD S, fully containerized wastewater treatment plant as offered for the commercial project, with Z-MOD M skidmounted filtration plants to be combined with concrete process tanks, which lends itself to expansion, and Z-MOD L skid mounted plants for the potential expansion to add residential wastewater.

2. The STEP system is a concept that has become increasingly popular in communities with dense OWTS concentrations and has been implemented in a number of States since the late 1960's including California. This approach has continued to be used and has adopted new state-of-the-art technologies.

    The basic treatment process train of a STEP system includes state-of-the-art advanced secondary treatment and can be described as follows:

    a. Sewage from the business passes through a grease trap (if required) and then into an onsite septic tank (sometimes called an "interceptor tank"). Here the wastewater is treated through the biological septic process. The onsite goal is to remove as much of the grease, suspended solids and biological oxygen demand (BOD) as practical.
    b. From the STEP tank, a small pump would move the pre-treated wastewater to a collection system designed to carry septic tank effluent from the downtown business area to a compact communal advanced treatment system for additional treatment (and possibly disinfection).
    c. This highly treated effluent will be suitable for dispersal in a local field without contributing to groundwater contamination. It may also be recycled for irrigation purposes. It is estimated that approximately 5 acres is needed for an adequate dispersal system.

The residential component, while essential, is identified by the County as second in priority. The LOWWMP, for now, addresses residential lot OWTS issues in a general way, providing a preview of options and recommendations. This element of the LOWWMP will be developed in greater detail at some undetermined later date. Until then, the current strict practices for addressing new and replaced residential OWTS in the Los Olivos Special Problems Area will continue to be implemented.

The LOWWMP defines the roles and relationships of the various regulatory agencies that will be involved. It is anticipated that for implementation of both the commercial and residential components of the LOWWMP, a funding, operational, inspection & monitoring and reporting and enforcement structure will need to be put in place. It is recommended that a locally controlled Special Service District be created to assure these tasks are accomplished, either with staff or through contracted services.

The alternative of a centralized sewer collection and treatment system is presented as it is considered necessary to have a complete OWTS wastewater management plan, but this option is identified as unpopular among many residents and business owners in Los Olivos. This option is recommended to only be considered as a final option if efforts to correct the groundwater quality concerns are not successfully resolved through other feasible options.

It cannot be overstated that the purpose of this Management Plan is to protect and improve water quality for the health and well being of the current generation as well as future generations that will live in this beautiful area.

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Santa Barbara County
Los Olivos Wastewater Management Plan

1. Introduction

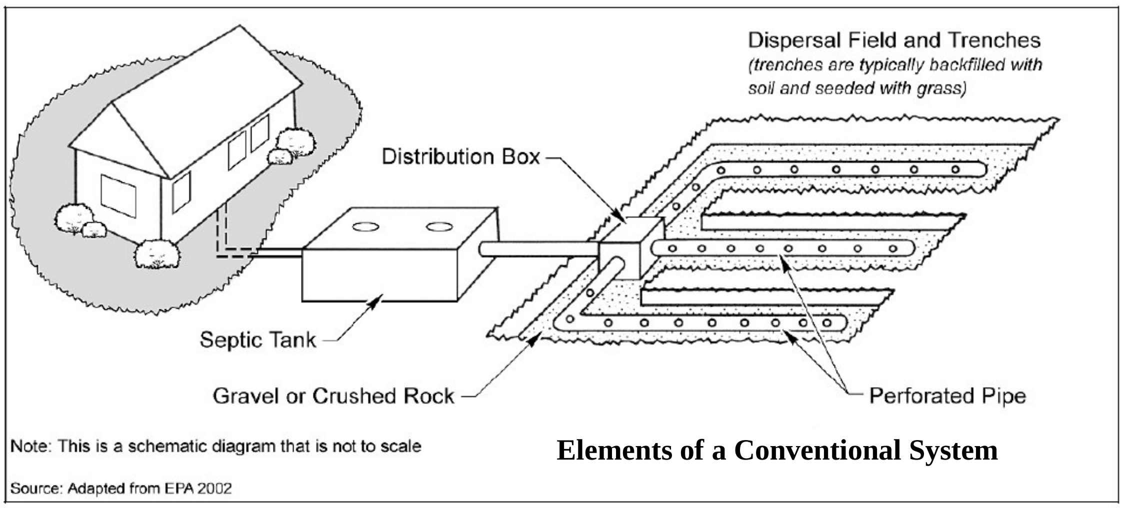
a. Septic System Primer

Because this Management Plan is principally about mitigating the negative effects of ineffective septic systems on ground water quality, we have provided this primer for understanding the fundamental issue of how these systems work, and how when they do not work properly, they can contribute significantly to contamination of the ground water supply.

The following is from the State Water Resources Control Board:

The growing accepted term for septic systems is Onsite Wastewater Treatment System (OWTS). By definition, it is a wastewater treatment system typically contained on the same parcel as the house or business generating the wastewater.

Conventional OWTS Systems. The vast majority of existing OWTS are "conventional systems" as opposed to "advanced systems" (defined later) and are designed to provide "passive" (i.e., minimally mechanical) operation and treatment of domestic wastewater. A conventional OWTS typically consists of a septic tank, a wastewater dispersal system, and the native underlying soil.



Elements of a Conventional System

The septic tank serves a number of important functions, including removal of some oils and grease (floatable materials, or scum) and settleable solids (sludge). Where wastewater is anticipated to have a large quantity of fats and grease, a separate grease trap preceding the septic tank is required for the system to function. The result of this primary treatment process is a middle layer of partially clarified effluent that exits the tank and is directed to the dispersal system. Tanks require pumping at infrequent intervals, depending on the rate that sludge and scum accumulate. EPA indicates that pumping may be needed every 1–7 years (EPA 2002, Special Issues Fact Sheet [SIFS] 1).

The septic tank allows digestion or decomposition of organic matter. In the oxygen-deprived (anaerobic) environment found in a septic tank, several types of bacteria break down biodegradable organic molecules for further treatment in the soil or by other unit processes. This digestion can reduce sludge and scum volumes by as much as 40–50%.

The dispersal system is where the septic tank effluent infiltrates the underlying soil. The soil is the final and most important treatment component for pathogen removal in a conventional OWTS. The soil must meet specific standards for permeability or "percolation", and be a safe distance from ground water so as not to be saturated from water. The soil may be native or imported fill material. As the wastewater infiltrates and percolates through the soil or fill, a variety of physical, chemical, and biochemical processes and reactions can filter or biodegrade some of the organic materials that remain after treatment in the septic tank. Many different dispersal system designs and configurations are used, but all incorporate soil infiltrative surfaces that are located in buried excavations (usually trenches or pits). The soil surface where the septic effluent first meets the soil is called the infiltrative surface and is only a few centimeters thick. It is the most biologically active zone and is often referred to as the "biomat." Material in the wastewater that is rich in carbon is quickly degraded in the biomat, and ammonia and organic nitrogen are converted to nitrate immediately below this zone if sufficient oxygen is present.

Good, unsaturated soils typically provide the oxygen needed to satisfy the oxygen demand generated by the microorganisms degrading the materials. If sufficient oxygen is not present, the metabolic processes of the microorganisms will be reduced or halted and both treatment and infiltration of the wastewater will be adversely affected. Also, it is the primary infiltrative zone where soil particles attract and hold contaminants through chemical and physical absorption (uptake into a solution) and adsorption (attachment onto the surface of particles). Pathogens and most phosphorus are removed in this zone.

If properly sited (i.e., with suitable soil and groundwater separation conditions), designed, and installed, conventional systems are capable of nearly complete removal of suspended solids, biodegradable organic compounds, and fecal coliform bacteria. However, other pollutants may not be removed as effectively. For example, conventional systems are expected to remove no more than 10–40% of the total nitrogen in domestic wastewater. Other pollutants that may not be completely removed include pharmaceuticals, other synthetic organic chemicals and viruses.

<u>Advanced Treatment OWTS</u>. Advanced treatment or "supplemental treatment" systems have "active" operation devices incorporated into the treatment train of an OWTS following the septic tank, or in place of the septic tank, to provide additional wastewater treatment before the wastewater enters the dispersal system. Advanced treatment units achieve a higher level of treatment than conventional OWTS. Currently, some but not all local agencies allow and regulate the use of advanced treatment units, usually to address site or soil limitations that would otherwise substantially reduce the ability of a conventional OWTS to effectively treat wastewater constituents (especially pathogens [bacteria and viruses] and nitrogen) to meet local and Regional Water Quality Control Board requirements.

The most common advanced wastewater treatment systems include: aerobic treatment units, anoxic systems, and disinfection systems. These are the major types of supplemental treatment units employed in California, as summarized from "Review of Technologies for the Onsite Treatment of Wastewater in California" (State Water Quality Control Board 2002).

- Aerobic treatment units (ATUs) are a broad category of pre-engineered wastewater treatment devices for residential and commercial use. They provide a secondary level of wastewater treatment, which means they are designed to oxidize both organic material and ammonium-nitrogen (to nitrate-nitrogen), decrease suspended solids concentrations, and reduce concentrations of pathogens. ATUs may increase nitrogen removal (denitrification) can be achieved by modifying the treatment process to incorporate an anaerobic/anoxic step or by adding the following treatments to the treatment train:

- A suspended growth System element (activated sludge process),
- An attached-growth system element (i.e., trickling biofilters),
- In the case of hybrid aerobic systems, a hybrid suspended-growth process combined with attached-growth system component.

These three systems are described in the definitions section of this plan.

Although they reduce concentrations of pathogens beyond the level allowed by a septic tank alone, most ATUs do not sufficiently reduce pathogens on their own to meet regulatory requirements.

Additional disinfection can be achieved through chlorination, ultraviolet (UV) radiation, ozonation, and/or soil filtration.

Increased nitrogen removal (denitrification) can be achieved by modifying the treatment process to incorporate an anaerobic/anoxic step or by adding the following treatments to the treatment train.

- Anoxic Systems. Anoxic treatment processes are characterized by the absence of free oxygen from the treatment process. Many aerobic treatment systems use anoxic or anaerobic stages to accomplish specific treatment objectives. Anoxic processes are typically used for the removal of nitrogen from wastewater through a process known as denitrification. Denitrification requires that nitrogen first be converted to nitrate, which typically occurs in an aerobic treatment process, such as a trickling filter or suspended-growth process. The nitrified water is then exposed to an environment without free oxygen. Organisms in this anoxic system metabolize the nitrate and release nitrogen gas. Efficient denitrification processes need a carbon source that is readily biodegradable.

- Disinfection Systems. Waterborne pathogens found in the United States include some bacteria, protozoa, and viruses. The process of disinfection destroys pathogenic and other microorganisms in wastewater and can be used to reduce the possibility of pathogenic organisms entering the environment. Currently, the effectiveness of disinfection is measured by the use of indicator bacteria. Indicator bacteria are selected groups of microorganisms that indicate the possible presence of disease-causing pathogens. It is difficult to detect all types of pathogenic organisms in water because of the wide array of microbes that occur in the natural environment. As a solution, indicator organisms that are easy to detect are typically used.

  A number of methods are available to disinfect wastewater. The most common types of on-site disinfection units use chlorine tablets, ultraviolet radiation, and ozonation.

  - Chlorination. Chlorine is a powerful oxidizing agent and is relatively inexpensive, but may inhibit the performance of subsequent soil treatment in the dispersal system because of its toxicity to soil microorganisms.

  - Ultraviolet Radiation. UV light is an effective disinfectant for water and wastewater. The technology is widely available. The effectiveness of UV irradiation highly depends on the quality of the wastewater to be treated. Wastewater particles have the ability to absorb UV radiation, yet the only UV radiation effective in destroying microorganisms is that which reaches the surface of the microorganisms. Lower levels of turbidity and suspended solids in the wastewater therefore lead to greater microorganism inactivation and result in improved disinfection.

- Ozonation. Ozone is a strong oxidant that is not chemically stable. It must be generated on-site near the point of use, making the system more complex than tablet chlorinators. It has been used in combination with other compounds for advanced oxidation treatment of wastewater. Ozone is used primarily for medium and large treatment facilities; however, ozone disinfection may become feasible for small systems in the future.

Community systems, also known as communal or decentralized systems, shared systems, cluster systems, and community septic systems, are OWTS for serving more than one property owner. Either a conventional OWTS or an OWTS with supplemental treatment can be used in a community system, depending on the type of soil underlying the dispersal field, the depth to groundwater, the proximity to wells or sensitive surface water resources, and other factors. The per capita impact on the environment through community systems is not believed to be different from the impact generated by smaller OWTS.

b. Glossary of Terms

- **Advanced Treatment OWTS.** An advanced treatment OWTS, sometimes referred to as "OWTS with supplemental treatment units", includes chemical, mechanical or electrical processes that enhance the treatment process in efficiency, or in removing contaminants that conventional treatment cannot.
- **Ammonia (ammonium or NH3)**: A key inorganic form of nitrogen, which converts over time to nitrate with the assistance of microorganisms.
- **Attached-Growth Aerobic Treatment Units (Trickling Biofilters).** Treating wastewater by trickling it over a biofilter is among the oldest and most well-characterized technologies for aerobic treatment. The trickling biofilter system basically consists of a medium (sand, gravel, or synthetic) on which a microbial community (biofilm) develops, a container or lined excavated pit to house the medium, a system for applying the wastewater to be treated to the medium, and a system for collecting and distributing the treated wastewater.
- **Conventional OWTS.** The vast majority of existing OWTS are conventional systems and are designed to provide "passive" (i.e., minimally mechanical) operation and treatment of domestic wastewater. A conventional OWTS typically consists of a septic tank, a wastewater dispersal system, and the native underlying soil.
- **Centralized Wastewater Treatment.** "Centralized" wastewater treatment refers to wastewater treatment at a city-wide or regional wastewater treatment plant intended to accept wastewater in accordance with a broad master plan for the community.
- **Decentralized Wastewater Treatment.** Decentralized wastewater treatment refers to onsite wastewater treatment or communal treatment facilities servicing a subset of residential or commercial lots within a narrowly defined urbanized area.
- **Dispersal Field.** A network of piping or hydraulic conduit with holes which distributes treated effluent throughout a field of appropriate soil type for final treatment through absorption, filtration, and other natural processes. A properly designed dispersal field will receive, under most weather conditions, the peak flows from the OWTS. Some jurisdictions, such as Santa Barbara County, require redundancy in the dispersal system (i.e., 100% replacement area) in case of failure.
- **Dosing**. A term used in reference to flowing effluent in "doses" of a pre-determined timing or volume to a dispersal system. Limitations of the site and/or system—such factors may be physical, biological, or monitoring, or some combination of these—may make dosing necessary. In its simplest form, dosing occurs incidentally when a pump is used to lift effluent to a higher elevation. But if the effluent-receiving media needs a "resting" period for infiltration, aeration, or some other process to take place, then dosing is appropriate for its intermittence. Dosing is also a means of achieving equal dispersal

which may ensure better treatment of the effluent, improve the longevity of the infiltration site, and prevent formation of clogging mats in treatment devices such as sand filters.

- **Dry Well.** A vertical method of effluent dispersal utilizing a 4'-6' diameter hole filled with rock and contains a central sewer pipe. Drywells are typically between ten feet and sixty feet deep. Additionally, the Plumbing Code stipulates a diameter of not less than 4 ft. and not more than 6 ft. Sometimes also referred to as a seepage pit, this is a generally undesirable alternative to a dispersal field because it creates a greater pollutant loading potential. These dispersal systems receive and store septic tank effluent until it gradually seeps into the surrounding sidewall soil.
- **Hybrid Aerobic Treatment Units.** Hybrid ATUs combine suspended- and attached-growth elements.
- **Inorganic Nitrogen:** Nitrate (NO3), Nitrite (NO2), and Ammonia (NH4). These are analyzed separately in wastewater's to determine the total inorganic nitrogen
- **Maximum Contaminant Levels (MCLs)** of Nitrogen acceptable (based in safe level of nitrogen in water for children six months or less) :

STATE:

45 mg/l Nitrate	(equates to 10ppm (10 mg/1) as nitrate-nitrogen. All references in this Plan to "Nitrate" levels is referencing this state of nitrogen.

EPA:

10 mg/l Nitrate-nitrogen	(per EPA Consumer Nitrate Fact Sheet: "Most nitrogenous materials in natural waters tend to be converted to nitrate, so all sources of combined nitrogen, particularly organic nitrogen and ammonia, should be considered as potential nitrate sources." This is why we measure Total Nitrogen.
1 mg/l Nitrite	
10 mg/l Nitrate + Nitrite	

- **Nitrate (NO3)**: Plant nutrient and inorganic fertilizer that enters water supply sources from septic systems, animal feed lots, agricultural fertilizers, manure, industrial waste waters, sanitary landfills and garbage dumps. It can also be defined as a compound which can have harmful effects on humans and animals. Nitrates in water can cause severe illness in infants (methemoglobine mia or "blue-baby" disease) and domestic animals. Nitrate is the nitrogen species of greatest concern in ground water and limited to 10 mg N/L in drinking water. Nitrates are usually expressed as nitrate nitrogen (mg N/L) most often but is also found in the literature as nitrate (mg/L) which will have a numeric value about 4.5 that of nitrate-nitrogen (mg N/L). In this Plan, cited test data is Nitrate (mg/l).
- **Nitrate formation.** Almost immediately upon entering the soils, material in the wastewater that is rich in carbon is quickly degraded and ammonia and organic nitrogen are quickly converted to nitrate. Nitrate does not biodegrade easily without deliberate treatment, and is soluble, so therefore remains in the effluent as it works its way toward groundwater.
- **Nitrite NO2**: is an intermediate in the creation of NO3, and contributes to the total Nitrate. Can also be reduced to ammonia
- **Nutrients:** Collective forms of nitrogen and phosphorous, and also includes carbon base compounds measured as BOD (biochemical oxygen demand) and TSS (Total Suspended Solids).
- **Onsite Wastewater Treatment System (OWTS)**. A system relying on natural processes and/or mechanical components to collect, treat, and disperse or reclaim wastewater from a single dwelling or building. Also known as a septic system, is a wastewater treatment system typically contained on the same parcel as the house or business generating the wastewater.

- **Organic Nitrogen:** This form of nitrogen is usually much higher before biological activity breaks down the organic matter releasing and or consuming the nitrogen as energy in the process.
- **Siting.** Typically used in reference to the dispersal field, proper site conditions are an important factor in ensuring the optimal functioning of an OWTS. The amount and type of soil available for treatment of the effluent is a key factor. In practice, this is measured as separation between the bottom of the dispersal field and the groundwater table, bedrock, or impervious soil layer. If the OWTS is properly sited, unsaturated soil (soil above groundwater level) with sufficient depth underlying the dispersal fields can, through absorption, filtration, and other natural processes, break down some effluent pollutants, and substantially reduce the levels of human pathogenic organisms (viruses and bacteria) and some chemical compounds in effluent before it reaches the underlying groundwater table or surface waters. The depth and type of unsaturated soil below the dispersal system are the most important factors in the treatment process. The distance from fresh water wells and surface waters is another key issue. In some cases, soil can be compacted, mixed with others soils to modify their absorption properties or replaced with imported soils to correct siting deficiencies.
- **Soil Types.** Certain soil types have properties that facilitate the natural processes for OWTS. Sandy soils can allow OWTS effluent to enter groundwater too quickly without effectively removing harmful constituents. Clay soils may not allow water to percolate fast enough, causing effluent to pond at or near the surface. One key function of the soil is to stop and hold contaminants. Note that, regardless of the length of time that wastewater is retained in the unsaturated soil layer, soil does not provide effective treatment of some soluble compounds that are resistant to biodegradation, such as nitrate.
- **Special Problems Areas.** Designation by County Board of Supervisors in policy or ordinance referring to areas where there are physical constraints affecting development and building activity.
- **Septic Tank.** A septic tank is a subsurface compartment designed to separate, remove, treat and store solid materials in domestic wastewater, while allowing liquid to pass out of the tank for separate treatment or disposal. The septic tank is the collection point for wastewater from the structure. The septic tank removes oils and grease (floatable materials) and settleable solids. In high grease circumstances, a grease-trap should be installed upstream of the septic tank. The result of this primary treatment process is a middle layer of partially clarified effluent that exits the tank and is directed to the dispersal system. Tanks require pumping at infrequent intervals, depending on the rate that sludge and scum accumulate. The septic tank also allows digestion or decomposition of organic matter with the help of several types of bacteria which break down biodegradable organic molecules for further treatment in the soil or by other unit processes.
- **Suspended-Growth Aerobic Treatment System.** In a suspended-growth aerobic treatment unit, microorganisms maintained in suspension using aeration provide aerobic treatment of the wastewater. Such designs typically consist of aeration, clarification, sludge return processes, and sludge wasting processes. The principal types of processes are classified as continuous flow reactor, sequencing batch reactor, and membrane bioreactor.
- **Total Kjeldahl Nitrogen (TKN)**: A test result that contains the sum of organic nitrogen and ammonia in a water body. Measured in milligrams per liter (mg/L). High measurements of TKN typically results from sewage and manure discharges to water bodies.
- **Total Nitrogen:** Total Nitrogen is the sum of nitrate (NO3), nitrite (NO2) and Total Kjeldahl Nitrogen (organic nitrogen and ammonia) **-** all expressed as N. Note that for laboratory analysis purposes.

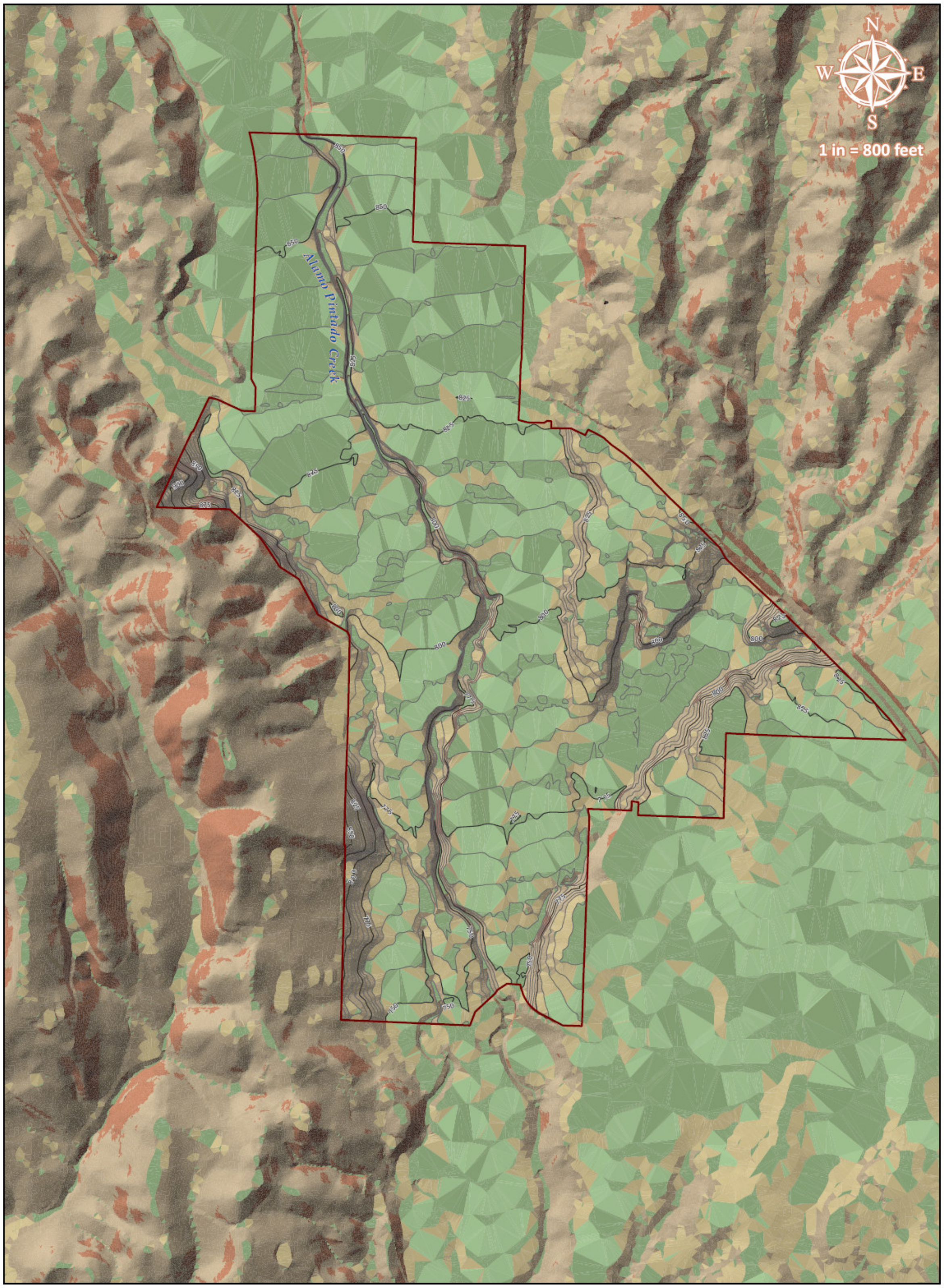
c. *History & Setting*

The unincorporated community of Los Olivos is located north of the City of Santa Barbara in the central part of the Santa Ynez Valley. Los Olivos has a base population of approximately 1000 residents. As a tourist destination in the Santa Barbara County wine country, the population may swell to two or three times that on weekends and holidays. While Los Olivos receives drinking water from the Santa Ynez River Water Conservation District, Improvement District No.1 (ID#1), there is no public sewer system. The approximately 340 residential and commercial parcels are entirely served by private onsite wastewater treatment systems (septic systems). Nearly two-thirds of the lots are less than one-half acre in size with many of these parcels comprising less than one-quarter acre. Located adjacent to Alamo Pintado Creek, the topography of the area is generally flat to gently sloping to the south. The general flow of water, both surface and groundwater, is toward the south.

The soils consist mostly of silty, clay, loam and silty clay. These soils are relatively impermeable and therefore are not especially suitable for the use of conventional systems. Many of the onsite systems in the township utilize drywells to discharge wastewater. Dibblee geologic maps shows the majority of the town to be underlain by alluvium with groundwater measured at 12 to 5 ft below ground surface during the winter wet season. Consequently, wastewater is being discharged directly into or close to the shallow water table.

See Topographic Elements Map, Next Page.

Topographic Elements



TOPOGRAPHY : SLOPE

< 1%	5 - 20%	5 - Foot Contours
1 - 2%	20 - 45%	25 - Foot Contours
2 - 5%	> 45%	Special Problems Area Boundary

MNS ENGINEERS INC

Los Olivos overlies the Santa Ynez Uplands Groundwater Basin which is used extensively as a source of agricultural and domestic-municipal water supply. The groundwater basin has been identified by the Central Coast Regional Water Quality Control Board as one of three basins in Santa Barbara County experiencing increased groundwater nitrate concentrations; and has been recommended for a wastewater management plan. Appendix 1 contains their January 24, 2000 letter to the County Health Department flagging high nitrates in the Los Olivos Area and encouraging the completion of this Wastewater Management Plan. Also included as a part of Appendix 1 is their initial letter on the subject dated May 9, 1991, which encouraged a Wastewater Management plan and recommends specific limits on development.

Please see Section 2- Groundwater Testing for recitation of the history of groundwater testing for this area. Sampling in 1977 indicated some groundwater-nitrate levels in Los Olivos were higher and approached or equaled the maximum contaminant level for drinking water. Subsequently other factors were considered and Los Olivos was identified as a "Special Problems Area" due to poor groundwater quality associated with the existing OWTS's. Due to generally unsuitable conditions for onsite wastewater disposal (poor soils, shallow groundwater, small lot sizes coupled with the age and antiquated design requirements to which many of the systems were originally built) and a lack of intensive agricultural activities elsewhere in the drainage basin, the use of onsite systems in Los Olivos is believed to be largely responsible for the elevated concentration of nitrates in groundwater in the area. The Central Coast Regional Water Quality Control Board has for many years recommended that a wastewater management plan be developed for Los Olivos to mitigate and control the impacts of onsite wastewater systems on the surface and ground water resources of the area. In order to better protect the health and safety of the community, it has been decided to develop and implement such a local plan at this time.

In 1975 the Santa Barbara County Health Department conducted a door-to-door sanitary survey of residences and businesses in Los Olivos to assess the status of onsite wastewater system conditions. The study included approximately 100 properties and revealed that nearly all of the systems were functioning (i.e., draining) satisfactorily. However, the study also determined that about 60% of the properties were served by drywells that generally extend into permeable alluvial deposits. Groundwater level determinations from local water wells and monitoring wells also showed evidence of perched groundwater levels (during the wet season) at depths of 5 to 15 feet in areas of the town. This indicates that many of the drywells discharge septic tank effluent directly into the perched groundwater zones.

In 1977 the Health Department and the Regional Water Quality Control Board obtained water samples from a series of ten (10) wells located in and around the town of Los Olivos, within the defined problems area. For purposes of privacy, specific addresses and APN numbers are omitted from this Plan, although the data is on record at Santa Barbara County Environmental Health Services. Maps contained within this study indicate approximate location of wells, typically within a few hundred feet. These wells are named Wells EJ4 through EJ13.

In 1980, County Environmental Health Services again tested the same wells that were tested in 1977 and confirmed that the Nitrate levels were still high and trending upward. See Sections 2 and 3 for test results and trend data.

In 1995 a Septic Tank Maintenance District Study was completed for the Santa Ynez area. This study (Lawrance, Fisk & McFarland, Inc. (LFM))concluded that Los Olivos, whose common problems were judged to be groundwater-nitrate impacts and shallow, perched groundwater, would benefit from a STMD (Septic Tank Maintenance District) approach through the provision of improved guidance in the proper design, operation and maintenance of septic systems.

In 2003 a Septic System Sanitary Survey of the Los Olivos area (as well as other problem areas in the County) was performed by Questa Engineering. The specific goals of the Sanitary Survey were to:

- Assess the impacts of existing onsite systems on surface water and groundwater;
- Identify areas of the County that are problematic for the use of onsite systems;
- Determine the condition of the onsite systems surveyed;
- Identify areas of the County where onsite system inspection and servicing is recommended;
- Identify areas were conversion of onsite systems to sanitary sewers is warranted and feasible.

The Questa study involved the following major work elements:

- Compilation and review of background file data, reports, maps and other information relevant to onsite wastewater system practices and impacts;
- Design and implementation of field and information surveys;
- Design and implementation of water quality sampling study in areas of onsite wastewater system usage;
- Problem assessment, including GIS mapping and analysis of survey findings, water quality data and other factors; and
- Report preparation, including presentation of data, findings, identification/rating of problem areas, and recommendations relative to onsite wastewater system management practices and needs for public sewerage.

The Questa study GENERAL RECOMMENDATIONS included:

- The water quality monitoring program developed and conducted during this Sanitary Survey should be continued.
- A periodic review and evaluation of onsite wastewater system information compiled in the County's permit and GIS database system should be made.
- Measures should be taken to provide or encourage training and education of onsite wastewater system installers and pumping contractors.
- The County Wastewater Ordinance should be amended to provide a mechanism for the issuance of operating permits for systems employing alternative or enhanced treatment and disposal technologies, or for other special circumstances.
- The County regulations for drywells should be revised to require the installation of dual (200%) capacity fields in all new installations, and enhanced treatment systems in problematic or sensitive locations.

Questa also recommended that the County study the possibility of implementing a community wastewater facility for the town of Los Olivos. This wastewater management plan, however, provides more detailed consideration to preferred alternative options, including: (1) continued use of repaired or upgraded onsite wastewater systems, particularly the adoption of new, proven technologies for OWTS; (2) Communal treatment and/or treated effluent dispersal for businesses in the downtown commercial core that have little alternative but to consider this approach due to lot constraints; (3) sewerage connection to Solvang; and (4) joint sewerage project with Ballard.

In the 2003 survey, extensive review of permit files was accomplished, assembled in a spreadsheet, which was then linked to the GIS database for use along with the 800 to 900 permit files already compiled by the Health Department staff. At the conclusion of this effort, essentially all of the current hard copy permit files were converted to electronic (GIS-compatible) format. At the conclusion of the search, approximately 2,500 permit files were added to the Envision database. Septic Tank Inspection reports were also reviewed.

In preparing this management plan, all of the Environmental Health Services (EHS) files for private, single parcel water wells were examined. They show the nitrate problem is consistent through the 1980's, 1990's and 2000's for wells in or close to Los Olivos. This is true for private wells in both shallow (between 0 and 180 feet deep and two deep wells (272 and 359 feet deep). Additionally, sampling results for wells 5A (now off-line due to iron bacteria, not nitrates), 4, 5, 6 & 7 maintained and operated by the Santa Ynez River Water Conservation District, Improvement District No.1 (ID#1) were examined and small concentrations of nitrates were found.

Due to the heterogeneous terra deposits (ref 1965 and 1985 USGS reports) in the Santa Ynez Uplands basin it is likely that there is a connection between the shallow and deep aquifers, the evidence being the presence of measurable nitrates. The water quality issues around Los Olivos, Ballard and surrounding areas is viewed by the RWQCB as a regional issue meaning the shallow and deep aquifers are affected to some degree and there is a combined nitrate load influence in the shallow groundwater from Ballard and Los Olivos. What we don't know is to what extent the shallow and deep aquifer influence each other. It is more difficult to demonstrate any trends in the deeper aquifers outside the Special Problem Area, as the concentrations fluctuate, probably due to increased precipitation some years, and other reasons.

Please see Section 2- Groundwater Testing for recitation of the history of groundwater testing for this area, along with mapping of historical nitrate concentrations.

One current effort, The Santa Ynez Valley Community Plan (SYVCP) supersedes the "Valley Blueprint" and is intended to implement the Blueprint by translating "the vision" into formal policy that will preserve the character while enhancing its unique qualities of the Valley. The SYVCP was adopted by the County Board of Supervisors on October 6, 2009, and became effective November 6, 2009, and includes general policies related to onsite wastewater treatment systems intended to protect ground water. This wastewater Management Plan is consistent with the SYVP. See Item d.5. below.

d. Regulatory Background

There are over 9,000 onsite wastewater disposal systems (septic systems) in Santa Barbara County. These systems typically provide a safe and effective means of handling domestic sanitation needs in rural areas of the County. A large number of onsite wastewater systems are also located in the inland regions of the County, discharging to soils and underlying groundwater resources that are relied upon as a source of drinking water.

Onsite wastewater systems that were designed to antiquated standards, or not properly maintained have the potential to impact water quality. In some cases, elevated groundwater-nitrate levels have been observed in water supply wells in close proximity to areas having a high density of onsite wastewater systems. Aside from specific areas in the Santa Ynez Area, there are other localized areas of the County where homeowners suffer from chronic surface failures and clogging of septic systems due to poor soil conditions, drainage problems, limited land area or simply old installations. Examples include the Hope Ranch, Rincon Point, Padero Lane and Painted Cave areas of the County. In response to the various local problems and the growing concerns about the use and public health and water quality impacts of onsite wastewater systems, the Santa Barbara County Environmental Health Services has been engaged in a number of activities over the past several years to improve the understanding and overall management of onsite wastewater systems in the County. Efforts in this regard have included the following:

(1) County Wastewater Ordinance

In 1999 the County regulations for onsite sewage disposal systems were updated with changes to Chapter 29, Article II of the County Code. Included in the Ordinance were changes related to system siting and design standards, requirements for provision of septic tank access risers, a prohibition against hollow seepage pits and a requirement that they be abandoned or modified upon discovery, and new inspection and reporting requirements for onsite wastewater system servicing. Environmental Health Services has continued to review the regulations in light of pending statewide regulations regarding on-site systems (ref. State legislation sponsored by Assembly member Hannah-Beth Jackson, AB 885). Updates to the County regulations are expected to focus on management issues, provisions for use of enhanced treatment-disposal technologies and other improvements in design practices.

The County Code revisions adopted in 1999 established requirements that when a septic system is serviced, an inspection is conducted. The findings from the inspection are then required to be reported to the Public Health Department; over the years, much information has been gained on the state of septic system failures that can be found county-wide as well as those septic systems that are not experiencing operational problems. In the current County Code, a septic system failure is defined as: “Failure of an onsite sewage disposal system means the occurrence of one or more of the following: (a) Discharge into the onsite sewage disposal system results in back-up of sewage in to the structure served. (b) Discharge of septic tank effluent on to the surface of the ground or into any surface water. (c) The disposal field requires modification in order to adequately absorb septic tank effluent. (d) The septic tank requires pumping more frequently than once every two years.” In addition, septic tank pumping companies are finding and reporting conditions of sewage surfacing around manholes of septic tanks, indicating in some instances that the sewage disposal field is not able to accept effluent at the time of the inspection.

(2) Special Problems Areas

Chapter 10, Article XIII of the Santa Barbara County Code provides for the delineation of “Special Problems Areas” for certain areas of the County where there are physical constraints affecting development and building activity. Development proposals within a Special Problems Area (SPA) require additional discretionary review by a committee of representatives of Division of County Roads, Flood Control, Planning and Development, Environmental Health Services and Fire Departments. This committee may impose any and all reasonable and necessary conditions to prevent or mitigate present or potential problems that might result from the development proposal, for the protection of property damage, public health and safety. Within Santa Ynez Valley, Los Olivos, Ballard and Janin Acres have all been designated Special Problems Areas due to constraints and historic problems with the use of onsite sewage disposal systems

(3) Septic Tank Inspection Reports

The 1999 changes to the County Wastewater Ordinance instituted requirements for voluntary maintenance and mandatory reporting of the condition and noted deficiencies whenever an onsite wastewater system is serviced. The program requires a licensed septic tank pumper to inspect and file a report with the Public Health Department whenever a septic tank is serviced. Based on these reports, notices of violation or recommendations for correction are mailed to the owner. For instance, when a hollow seepage pit is found, the homeowner is required, by Ordinance, to convert it to a drywell by filling it with gravel. Information contained in the Septic Tank Inspection Report includes: sketch of location of onsite wastewater treatment system in relation to residence, type of disposal system, septic tank information, condition of tank, signs of surfacing effluent, recommended repairs, and if the condition poses any imminent danger. The voluntary maintenance program has been in effect since 1999 and many thousand inspections/reports have subsequently been completed.

(4) Public Education.

A website has been established (http://www.countyofsb.org/phd/environmentalhealth.aspx?id=1444), educational pamphlets have been developed, and periodic workshops are put on by Environmental Health staff throughout the County to help inform and educate homeowners about the new County regulations and basic operational and maintenance aspects of onsite wastewater systems. See section 8.o.2 for more discussion on public education and outreach.

(5) Santa Ynez Valley Community Plan

The Santa Ynez Valley Community Plan (SYVCP) was adopted by the County Board of Supervisors in October 2009 and is a policy document with a self-stated purpose “to preserve the character while enhancing its unique qualities of the Valley”. The Plan was developed over the course of 50+ community meetings with the involvement of hundreds of Valley citizens.

The SYVCP endorses the concept of a wastewater management plan for Los Olivos and contains several significant recommendations concerning OWTS. The SYVCP has adopted a number of applicable goals, policies actions and development standards regarding wastewater that apply to Los Olivos. They are:

SANTA YNEZ VALLEY COMMUNITY PLAN OCTOBER 6, 2009
WASTEWATER GOALS, POLICIES, ACTIONS AND DEVELOPMENT STANDARDS.

GOAL WW-SYV: Ensure adequate wastewater treatment and disposal throughout the planning area.

Policy WW-SYV-1: Development and infrastructure shall achieve a high level of wastewater treatment, in order to best serve the public health and welfare.

DevStd WW-SYV-1.1: Septic system installations shall only occur on parcels that are free of site characteristics listed under “VIII.D.3.i. Individual, Alternative and Community Systems Prohibitions” in the *Water Quality Control Plan for Central Coast Basin, Region 3* by the Regional Water Quality Control Board. Adherence to Regional Water Quality Control Board and other applicable state standards, applicable zoning regulations and the County Wastewater Ordinance shall constitute a finding of consistency with Land Use Development Policy 4.

DevStd WW-SYV-1.2: To the maximum extent feasible, development requiring private sewage disposal shall utilize gravity flow of wastewater to the septic tank and disposal field to minimize mechanical failure, which may cause surfacing of effluent. For lots of record where gravity flow of effluent is unavailable, pumping may be allowed. For new subdivisions where gravity flow to the public sewer is unavailable, the lift station shall be owned and/or maintained by a public agency such as a community services district. Private operation and maintenance of a shared or community lift station shall be prohibited.

DevStd WW-SYV-1.3: N/A

DevStd WW-SYV-1.4: In the event that improvements are made to sewage treatment facilities within the Plan Area such that recycled water is available on a given construction site, projects disturbing an area of 0.5 acres or more shall use recycled water for dust suppression activities during grading and construction. Recycled water should not be used in or around crops for human consumption.

DevStd WW-SYV-1.5: For developments in the Plan Area proposed under the Agricultural Industrial Overlay, the siting and design of onsite wastewater treatment and disposal facilities for agricultural industrial operations shall be protective of water resources. The applicant shall submit engineering drawings of the onsite treatment system for review and approval by Planning and Development and shall demonstrate compliance with Waste Discharge Requirements from the Regional Water Quality Control Board prior to approval of Land Use Permits. Planning and Development shall inspect prior to occupancy clearance.

Policy WW-SYV-2: Pollution of surface and groundwater shall be avoided. Where contribution of potential pollutants of any kind is not prohibited and cannot be avoided, such contribution shall be minimized to the maximum extent practical.

DevStd WW-SYV-2.1: To reduce the possibility of prolonged effluent daylighting, two disposal fields shall be built to serve each septic system as required by Environmental Health Services so that when one field begins to fail, the other field can immediately be put into use. An additional third expansion area shall be set aside where no development can occur, except for driveways on constrained sites as provided below in Development Standard WW-SYV-2.3. In the expansion area, a disposal field should be constructed when any other disposal field is in a state of failure.

DevStd WW-SYV-2.2: For remodels of plumbed structures where the existing septic system must be enlarged, or where septic system repairs are required due to failure, in addition to the enlargement and/or repair of the existing septic system, an additional disposal field shall be installed to the maximum extent feasible.

DevStd WW-SYV-2.3: Where feasible, measures to decrease the amount of nitrates filtering through soil to groundwater shall be required, including: 1. Shallow-rooted non-invasive plants (maximum root depth of four feet) shall be planted above all leach fields to encourage evapotranspiration of effluent and uptake of nitrates. Impervious surfaces, such as paved driveways, shall not be constructed above leach fields. If site constraints require a driveway to be located above a leach field in order to ensure reasonable use of property, turf block or other suitable pervious surface shall be used. 2. For properties of 5 acres or less and in areas with insufficient separation to groundwater, advanced treatment for the removal of nitrates shall be required on septic systems utilizing drywells as the disposal field. Existing septic systems that utilize drywells that have failed, or that need to be modified, must also install advanced treatment.

DevStd WW-SYV-2.4: Septic systems and other potential sources of water pollution shall be a minimum of 100 feet from the geologic top of bank of tributary or creek banks (reference point as defined by Planning and Development and Environmental Health Services). Modifications to existing sources of potential water pollution shall meet this buffer to the maximum extent feasible.

Continued Below….

DevStd WW-SYV-2.5: Development shall not be approved where individual or cumulative impacts of septic systems for new development would cause pollution of creeks unless this would preclude reasonable use of property.

DevStd WW-SYV-2.6: N/A (relates to storm water)

DevStd WW-SYV-2.7: N/A (relates to storm water)

DevStd WW-SYV-2.8: N/A (relates to storm water)

Policy WW-SYV-3: Annexation of inner-rural and rural area(s) to a sanitary district or extensions of sewer lines into inner-rural and rural area(s) as defined on the land use plan maps shall not be permitted unless required to prevent adverse impacts on an environmentally sensitive habitat or to protect public health.

Action WW-SYV-3.1: The County shall work cooperatively with the Regional Water Quality Control Board to pursue feasibility, fiscal, and environmental studies that evaluate the possibility of developing and implementing a community wastewater facility for the downtown core of Los Olivos. In studying the community wastewater facility option, detailed consideration should also be given to alternative solutions, including, but not limited to: (1) defining areas of the town where septic system upgrades may continue to be feasible; (2) various locations and technologies for collection, treatment and disposal and/or wastewater reuse for the town and (3) potential mandatory septic system maintenance programs. Community input shall be sought regarding the content of the studies and potential alternative solutions to be considered.

Action WW-SYV-3.2: N/A

Action WW-SYV-3.3: The County shall work cooperatively with the Santa Ynez Community Service District and Regional Water Quality Control Board to pursue feasibility, fiscal, and environmental studies to evaluate the possibility of implementing an Onsite Wastewater Management Plan or other alternative solutions for the town of Los Olivos, Ballard and portions of West Santa Ynez. Community input shall be sought regarding the content of the studies and potential alternative solutions to be considered.

These goals, policies, actions and development standards are considered part of this LOWWMP.

(6) The State Water Resources Control Board (SWRCB)

The SWRCB is considering adoption of regulations that will establish new statewide requirements for the design, permitting, construction and operation of Onsite Wastewater Treatment Systems (OWTS) including standard onsite wastewater systems. The SWRCB has issued Proposed Regulations and Proposed Statewide Waiver for Onsite Wastewater Treatment Systems (OWTS) (Septic Systems). (Ref. Title 27, Division 5, Chapter 1, Article 1, also known as State Assembly Bill AB885). The intent is to establish minimum requirements for the permitting, monitoring and operation of OWTS to prevent conditions of pollution and nuisance. This regulation would be imposed on discharges intended to exclude most single family residences, but include most commercial businesses. These new proposed guidelines would impose groundwater testing requirement on many OWTS owners with wells on their properties. Performance Requirements and contaminant levels are established. These draft requirements preceded by a fact sheet and frequently asked questions are included in Appendix 2. Note that these are preliminary documents and should only be used as such.

Because of concerns that there would be no “grandfathering” of any of the 1.4 million existing functioning systems, the SWRCB has provided a conditional waiver. Also attached to this draft document in Appendix 2 is the Statewide Waiver Of Waste Discharge Requirements For Discharges From Onsite Wastewater Treatment Systems. To qualify for coverage under this Order, the OWTS must meet the criteria below:

(a) Persons who discharge waste that impairs or threatens to impair waters of the state must file a report of waste discharge with the Regional Water Board.
(b) A Water Board may waive the reporting of a discharge of waste for a type of discharge. A statewide waiver will allow owners of onsite wastewater systems to avoid filing a report of waste discharge so long as the provisions of the waiver are complied with.

It may be that a final version of the OWTS Standards from the State will not be completed and adopted for some time. We can only be aware of the draft and potential requirements.

For more information, go to:
www.waterboards.ca.gov/water_issues/programs/septic_tanks

(7) Central Coast Regional Water Quality Control Board

The Regional Water Quality Control Board has expressed concern about Los Olivos and the upper Santa Ynez Valley for quite some time. The following is a chronological history of their interest and involvement regarding this concern:

(a) The Central Coast Regional Water Quality Control Board (CCRWQCB) has identified the need to plan for adequate sewage disposal for “urbanizing areas” since the 1960’s. The County has reference to a “final draft” of a resolution in 1969 entitled “Adopting Policy Statement Regarding Sewerage Facilities And Septic Tanks In Urbanizing Areas In The Central Coast Region.”

(b) The 1975 Basin Plan produced by the CCRWQCB identified “the unsewered areas of the community of Santa Ynez” as one of the areas for which septic tank maintenance districts had been recommended. Santa Ynez was also recommended for a study “to determine the necessity of constructing sewers.” Santa Ynez was subsequently sewered.

(c) Resolution 82-09 amended the Basin Plan in 1982 as follows:

1. Item 13 of the Local Agencies section, on page 10 of that document, reads as follows: "Wastewater Management Plans should be prepared and implemented for applicable portions of San Martin, San Lorenzo Valley, Carmel Valley, Carmel Highlands, Prunedale, El Toro/Canyon Del Rey, Margarita/Garden Farms, Los Osos/Baywood Park, Arroyo Grande, Nipomo, Los Alamos, upper Santa Ynez Valley, and Los Olivos/Ballard."

2. Resolution 82-09 also added the following management principle: "14. The Regional Board intends to discourage high density development on septic tank disposal systems and generally will require increased size of parcels with slower percolation rates. Consideration of development will be based upon the percolation rates and engineering reports supplied. In any questionable situation, engineer designed systems will be required."

(d) The staff report for "Individual/Community On-Site Sewage Disposal Systems" dated December 1982 included a discussion of the impacts of system density.

1. The report recommended a minimum lot size of one acre for percolation rates between 30 and 60 min/inch.
2. It also discouraged the use of seepage pits because of the head pressure and reduced treatment.
3. It included a recommendation for an on-site wastewater management plan for Los Olivos/Ballard with similar language to (c)1 above.
4. It recommended a minimum separation of 10 feet between seepage pits and highest groundwater.

(e) Both (c)1 and (c)2 above were repeated the following year in Resolution 83-12 which made Basin Plan Prohibitions mandatory.

(f) In a letter dated December 5, 1990 commenting on a proposed restaurant in Los Olivos, the Regional Water Quality Control Board commented on a proposed restaurant project on a 0.65 acre lot in Los Olivos. Estimated wastewater flow was 2,200 GPD. The letter reiterated the recommendation for a wastewater management plan and went on to "recommend denial of high density development, such as proposed, until a wastewater management plan for the area is completed and approved by the Board." Such a plan was tentatively scheduled to be completed at the time, but was delayed due to extended drought conditions which it was believed would alter the results of a groundwater study.

In response to an EHS request for clarification of the term "high density development," the RWQCB wrote a follow up letter dated May 9, 1991 that stated the opinion that "high density development" for the Los Olivos area "should be any development more intense than one single family home on a one acre lot." The letter also noted the Basin Plan restricts new commercial development to a design wastewater flow equivalent to one single family residence per acre, or no more than 375 gallons per acre per day (See Appendix 1). As a result of this restrictive standard, commercial projects in Los Olivos are limited to very low water uses and many proposed projects are eventually withdrawn.

(g) Item 3a above was repeated in September 1994 version of the Basin Plan.

(h) An October 5, 1995 letter from the Regional Water Quality Control Board confirmed their policy of limiting new septic systems to new lots of at least one acre unless soil constraints for septic systems are ***particularly favorable***, in which case the minimum size shall be not less than ½ acre. To be considered particularly favorable, site conditions must comply with the Basin Plan prohibition ***and recommendations***. This letter went on to say that "areas in Los Olivos/Ballard and the upper Santa Ynez River valley are likely to be unfavorable for on-site systems."

(i) A May 20, 1997 letter from the RWQCB clarified that "While secondary dwelling units should be generally limited to minimum parcel size of at least two acres, where soil and other physical constraints are particularly favorable, parcel size shall not be less than one acre." The letter also stated that "Areas not 'particularly favorable' are areas such as upper Santa Ynez Valley and Los Olivos/Ballard."

(j) The CCRWQCB Basin Plan regulates onsite wastewater systems and has undergone significant revisions. Resolution No. R3-2008-0005 and R3-2009-0012 were adopted to update and revise existing Basin Plan criteria for siting, design, management and maintenance of onsite wastewater systems. Most of the revisions provide clarifying language to existing requirements. The CCRWQCB recognizes that any additional standards it imposes may be more stringent than those requirements contained in the State WRCB OWTS AB885 regulations when they are finally adopted. If the State requirements, when adopted, prove to be more stringent, then the CCRWQCB will adopt the more stringent requirements.

For more information, go to:
http://www.swrcb.ca.gov/rwqcb3/water_issues/programs/septics/index.shtml.

(8) EPA Recommended Guidelines

In the 1997 Response to Congress on Use of Decentralized Wastewater Treatment Systems, EPA determined that with the technology now available, adequately managed decentralized systems can protect public health and the environment as well as provide long-term solutions for our nation's wastewater needs. The report also cited five major barriers to increasing the use of decentralized wastewater treatment systems, including the lack of adequate management (i.e., site selection, design, installation, and operation and maintenance).

The Guidelines for Management of Onsite/Decentralized Wastewater Systems (Guidelines) are a set of recommended, voluntary practices needed to raise the level of performance of onsite/decentralized wastewater systems through improved management programs. Five separate model programs are presented as a progressive series. Management requirements of wastewater systems become more rigorous as the system technologies become more complex or as the sensitivity of the environment increases. Each of the model programs share the common goal of protecting human health and the environment. Each model approach includes program elements and program activities needed to achieve the management objectives. The Guidelines address the sensitivity of the environment in the community and the complexity of the system used. The five model management programs are

(c) System inventory and awareness of maintenance needs
(d) Management through maintenance contracts
(e) Management through operating permits
(f) Utility operation and maintenance
(g) Utility ownership and management

EPA developed the Guidelines to assist communities in establishing comprehensive management programs for onsite/ decentralized wastewater systems to improve water quality and protect public health. The Guidelines also will help states, tribes, and communities develop, modify, and implement laws and regulations in areas of onsite/decentralized wastewater system management planning. Each model program includes a set of recommended approaches for planning, siting, design, performance, installation, operation, maintenance, and monitoring of wastewater systems.

Additionally, the EPA has provided the *Handbook for Managing Onsite and Clustered (Decentralized) Wastewater Treatment Systems*, which is intended to be at resource for communities looking for creative and affordable ways to address their wastewater management needs. It serves as a source of practical tools and resources. Those who will benefit from this handbook include sanitarians, regulators, other wastewater professionals, community leaders, planners, and utility managers. For more info, go to http://www.epa.gov/owm/septic/pubs/onsite_handbook.pdf.

e. GIS Mapping of Los Olivos

In early 2000 the County undertook the development of a Geographic Information System (GIS) analysis to begin the process of locating, characterizing and tracking the onsite wastewater systems in the unincorporated area of the County. GeoDigital Mapping Incorporated completed a report titled *Implementation of a GIS for Assessment of Septic System Risks in Santa Barbara Questa Engineering Corporation 1-2 210029 Santa Barbara/March 2003 County*. The base map for the data was derived from parcel data created by the Santa Barbara County Assessors Office. Parcels with onsite wastewater treatment systems were identified through the Auditor's billing records, Assessor's property database and sanitary district records. Environmental Health Services is in the process of converting historical and new "hard file" permit information into the GIS database system.

In 2009, for this LOWWMP, the GIS data base was created with the following existing and new data sets:

(a) Parcel & Size (Already in County GIS System)
(b) Land Use designation (Already in County GIS System)
(c) Topography (Already in County GIS System)
(d) Watercourses and Water bodies (Already in County GIS System)
(e) Leach or Drywell (Already in County GIS System)
(f) Type of Commercial (Winery, restaurant, institutional, retail)
(g) System Age, condition
(h) Advanced Treatment System Locations
(i) Soils percolation rates (Suitable for percolation, Not Suitable for percolation)
(j) Known groundwater quality chemical analysis test results for Nitrates
(k) Available space for leaching (lots less than 1 acre, greater than one acre)

Many of the Data sets are incomplete, but contain all the known data for that data set. This will be a foundation for continued study, tracking and planning. The GIS data base creates a powerful tool for visualizing both problems and progress.

2. Groundwater Quality Issues

a. General Overview of Nitrates – an Indicator of OWTS Impacts on Groundwater

While this plan addresses nitrates as an indicator of the negative impacts of failed septic system on the groundwater, onsite system effluent has other constituents that negatively impact groundwater. This wastewater management plan is needed to address or reverse the overall negative impacts that failed onsite systems are having on the groundwater beneath the problem area. This clarification is important to understand. Although nitrates are one way to measure contamination, other contaminates may be present.

According to the U.S. EPA, nitrates are naturally occurring compounds that find their way into drinking water supplies in a number of ways. Because nitrates are easily soluble, they can move through the soil structure and end up in the groundwater table. The common sources of nitrates being added to the ground water are fertilizers, livestock waste, and septic system effluent.

A typical conventional onsite septic system consists of a septic tank and a soil absorption field, also known as leach field. Wastewater enters the septic tank and the solids settle. The septic tank can function as an anaerobic bioreactor promoting digestion of retained organic matter. This clarified septic tank effluent, which contains high concentrations of pathogens and nutrients including nitrogen and phosphorus compounds, is then released to the leach field for further treatment through biological digestion, adsorption, and infiltration into underlying soils. Pathogen removal takes place through aerobic digestion when the effluent is exposed to the oxygen in the pores of the soil structure. Conventional onsite septic system work well if it is properly designed, installed in areas with appropriate soils and hydraulic capacity, and well maintained.

Failed and improperly designed septic systems can cause serious environmental and health impacts because they are not adequate for minimizing nitrate contamination of ground water, attenuating pathogens and reducing phosphorus. Nitrates that leach into ground water used as a drinking water source can cause severe health problems, especially for very young children, if found in very high concentrations.

In perched or shallow water tables, contamination from leach fields and dry wells can be problematic. With shallow water tables, there is less soil through which the effluent can percolate. The decrease in soil contact prevents contaminants from being filtered out in sufficient quantities to prevent contamination.

According to John C. Romero of Colorado's Division of Water Resources, research conducted on the infiltration of contaminants by surface spreading shows that effluent passed through a minimum of 3 to 7 feet of soil removes sufficient coliform bacteria to make the water drinkable. Contaminants also move laterally, via surface runoff and movement in the aquifer. Studies in the shallow groundwater tables in the Netherlands, where the water table is often less than 10 ft from the ground surface, E. coli levels in dry soil were found to diminish because the soil's bacteria destroyed the E. coli through aerobic digestion. In wet soil, however, the bacteria were capable of traveling a lateral distance of 25 ft, as well as percolating downward. The results of this study confirms that self-purification of onsite wastewater effluent takes place in the top 10 ft of soil if the soil has enough free oxygen to encourage aerobic digestion.

For more background on groundwater contaminants, and more specifically related to nitrates, Please see:

Web Sources

USGS website - http://water.usgs.gov/nawqa/nutrients/pubs/wcp_v39_no12/
CDC website - http://www.cdc.gov/nasd/docs/d001201-d001300/d001233/d001233.pdf
EPA Septic Fact Sheet - www.epa.gov/owm/septic/pubs/septicfc.pdf
WQA Nitrate Fact Sheet - http://www.wqa.org/pdf/TechBulletins/TB-Nitrite-Nitrate.pdf

Text Sources

Pettyjohn, Wayne A. "Good Coffee Water Needs Body." *Water Quality In A Stressed Environment*, 1972, pp. 194-199.
Romero, John C. "The Movement of Bacteria and Viruses Through Porous Media." *Water Quality In A Stressed Environment*, 1972, pp. 200-223.

b. Health Implications

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

The EPA has set an enforceable standard called a Maximum Contaminant Level (MCL) for combined nitrates and nitrite as N for nitrates at 10 parts per million (ppm), and for nitrites at 1 ppm, because EPA believes this level of protection would not cause any of the potential health problems described below. When tested independent from nitrite or total nitrogen, the test MCL standard for nitrates is 45 mg/l. (10 mg/L nitrate-nitrogen (NO_3-N) = 44.3 mg/L nitrate (NO_3-)

When ingested by people and animals, excess nitrate enters the bloodstream and attach to the red blood cells. The red blood cells are responsible for delivering oxygen from the lungs to the rest of the body. Nitrate molecules prevent oxygen molecules from attaching to the red blood cells, thus causing health conditions associated with oxygen deprivation. The primary health side effect of nitrate contamination is methemoglobinemia (or “blue baby syndrome”). Blue baby syndrome is mostly exhibited in newborns and infants 6 months and younger. This is caused by: consumption of nitrates by pregnant or nursing women or the use of nitrate contaminated water to make formula. The symptoms of this condition are shortness of breath and bluish skin, especially around the eyes and mouth. This condition can be fatal in small children.

The health effects of nitrates in drinking water are not as readily evident in healthy adults. When adults exhibit the characteristics of excess nitrate consumption, it is because they either 1) have insufficient stomach acids or 2) do not produce the enzyme methemogoblin reductase, which returns the red blood cells to their normal state.

Although nitrate and nitrite have not been demonstrated to be carcinogenic, nitrite does react with some compounds in the human stomach to form 'N-nitroso' compounds. Most N-nitroso compounds have been found to be carcinogenic. Data from a number of epidemiological studies have nevertheless only been suggestive in relation to this issue. Some geographical correlation studies have also suggested associations between nitrate levels in water supplies and some forms of gastric cancer, however, follow up studies have been equivocal. This could be the result of the intake of dietary components of vegetables, such as vitamins C and E, which decrease the risk of gastric cancer, may well mask or antagonize the effects of high nitrate intake in such correlation studies.

A more general concern in relation to the inorganic component of Total Nitrogen is its environmental effects, where elevated levels of nitrogen (and phosphorus) often cause enhanced algal growth. In surface water this may ultimately manifest itself as cyanobacterial (blue-green algal) blooms which can produce hepatotoxins, neurotoxins and endotoxins and affect human health through contact or consumption.

c. Removing High Concentrations of Nitrates

There are a number of ways to reduce high concentrations of nitrates in the soil and water table. To remove the nitrates in drinking water that has already been pumped from a contaminated water table, the EPA has approved the use of reverse osmosis, ion exchange, and electrodialysis. While this removes the nitrates, all of these methods do not disinfect the water if it is contaminated with bacterial or viral pathogens. To actually remove nitrates and pathogens from the water table, the best practical solution is to remove the cause of the excess nitrates and pathogens and then wait for the water table to dilute and improve naturally. As water from precipitation events and irrigation percolates to the water table, it leaches the contaminants from the soil and will eventually dilute the water table.

Several Nitrogen removal technologies exist for OWTS effluent, both in the septic/pretreatment process and in the method of dispersal. See Sections 7 and 8 for a discussion of these technologies.

In the case of Los Olivos, a significant reduction in nitrates in the ground water may be realized through correcting the onsite wastewater systems that are improperly designed or have failed. The goal of this Wastewater Management Plan is to improve groundwater quality in the Los Olivos area to within acceptable regulatory limits, for the sake of public health and safety.

d. Overview of Los Olivos Groundwater Quality Issues

As indicated in the History and Setting, there is a history of unfavorable findings concerning onsite wastewater treatment in the Los Olivos area. Los Olivos lies in the watershed of Alamo Pintado Creek, a perennial stream, which flows through the west side of the town. The creek is accessible and there is evidence that children play in the creek; however, there are no other significant recreational uses. Alamo Pintado Creek is tributary to the Santa Ynez River (at Solvang). The Santa Ynez River below Lake Cachuma is listed by the Water Resources Control Board as a 303(d) impaired water body, which means it has excessive contamination from nutrients, salinity and sedimentation. This listing also requires, by law, that the local jurisdictions develop a plan for improvement of the water quality in these water bodies. Onsite wastewater systems are not specifically identified as a contributing source for nitrates, except under the broad category of “nonpoint source” pollution. Sampling results referenced in the 2002 Sanitary Survey, as well as tests from March, 2009 indicate consistently high levels of bacteria in Alamo Pintado Creek within and downstream of Los Olivos.

Los Olivos overlies the Santa Ynez Uplands Groundwater Basin, which is used extensively as a source of agricultural and domestic-municipal water supply. The groundwater basin has been identified by the Regional Water Board as one of three basins in Santa Barbara County experiencing increases in groundwater-nitrate concentrations; and has been recommended for further investigation of the sources and corrective strategies. The majority of the onsite wastewater systems in Los Olivos use drywells that discharge directly into or close to the water table. Historical groundwater sampling indicates elevated groundwater-nitrate levels under Los Olivos that, in some cases, exceeded the MCL of 45 mg/l. Where Nitrates +Nitrites as N were measured, the results are similar in that elevated levels are evident, as well as some cases where the MCL of 10 mg/l is exceeded.

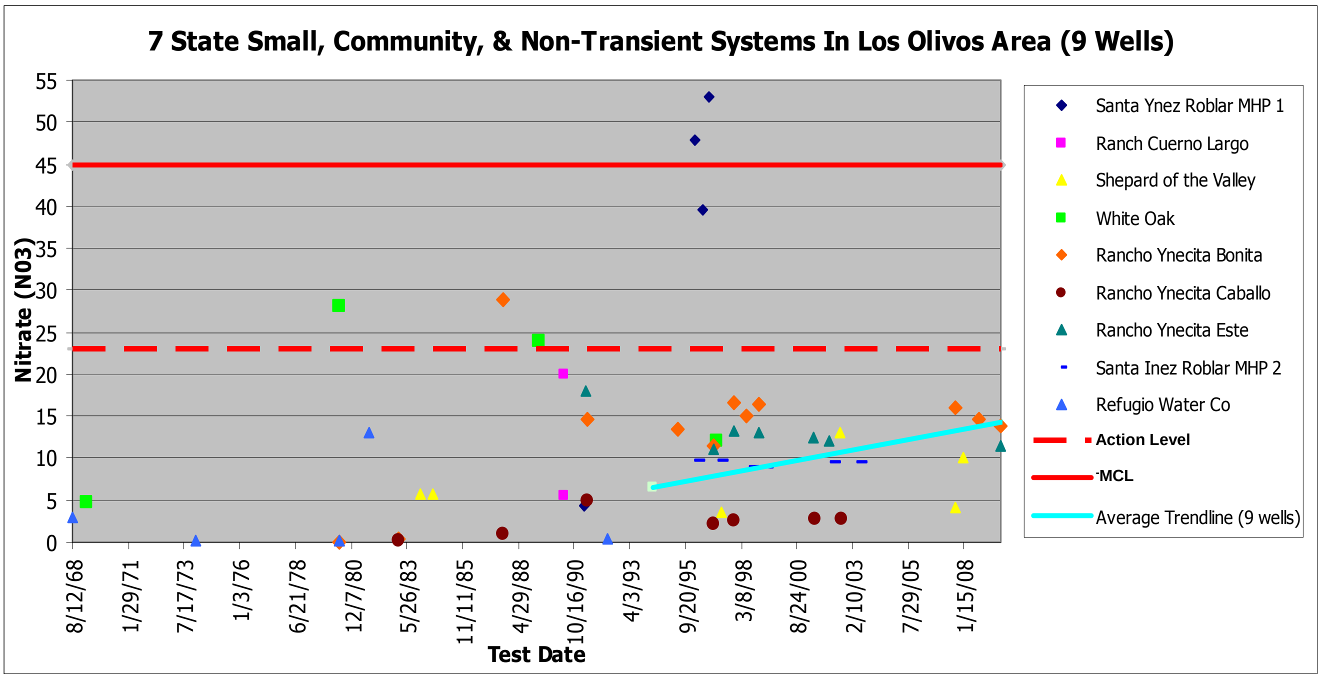
(1) Groundwater Investigations & Water Quality Data

There is a history of ground-water test data that indicates there is a trend toward increasing nitrate levels in the groundwater below and in the surrounding groundwater around Los Olivos. This is principally true of shallow groundwater wells. This conclusion is drawn from data collected from a number of small public & private water systems in the vicinity of the study area (classified as “State Small”, “Community”, & “Non-Transient” Systems) from 1971 and 2005. Also considered is private well data from a focused sampling of various private wells in 1977, and 1980, and sampling from newly developed private water wells as they were required to test between 1968 and 2005. The data represents data from approximately 56 wells in the shallow groundwater basin, 19 of which have a history of testing (14 of which show a trend of increasing nitrates) which given the variables in sampling and testing is statistically significant in demonstrating the increasing trend in the problem area as a whole). The data collectively demonstrates a clear trend for increasing nitrate levels in the shallow groundwater under Los Olivos.

Whether we look at these data sets separately or together, we see an increasing trend in nitrate concentrations in the groundwater table, with the epicenter, or highest readings originating under Los Olivos proper.

(2) Multi-Parcel/Multi-User Water System Data

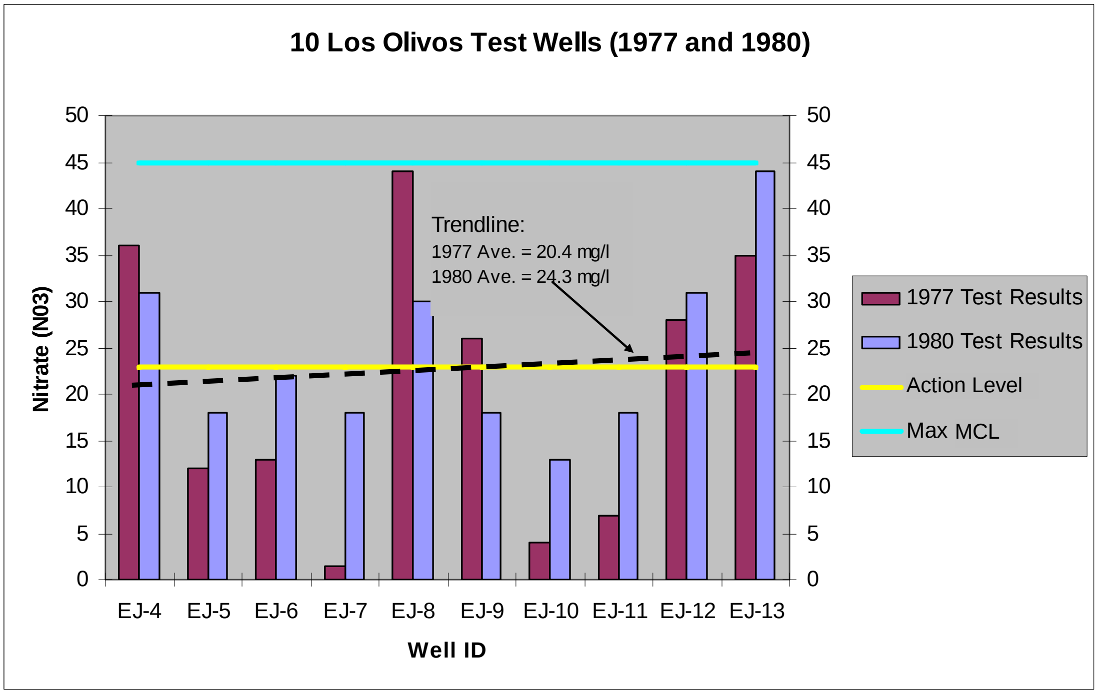
Looking at the data from the multi-parcel systems shown below, we can see individual samples from three of the nine wells exceed the action levels for enhanced testing. Two samples from one well exceed the MCL for nitrate. If we were to place a linear mathematical trend line for these wells, 7 of them clearly trend up, some significantly. The average trend line, which represents the average nitrate levels of all wells for the given years, clearly trends up from 1994-present (2009). Although the trend is valid for 1971-2008, continued monitoring is necessary to validate the trend line.



(3) 1977 and 1980 Focused Sampling Data.

Los Olivos was designated a Special Problems Area 1n 1974 based on well water quality test reports at the time. In 1977 the County conducted a focused test program of 10 wells. This testing program showed half of the wells in excess of the action level for enhanced testing. One well nearly exceeded the MCL. In 1980 the same wells were tested with the results graphed below.

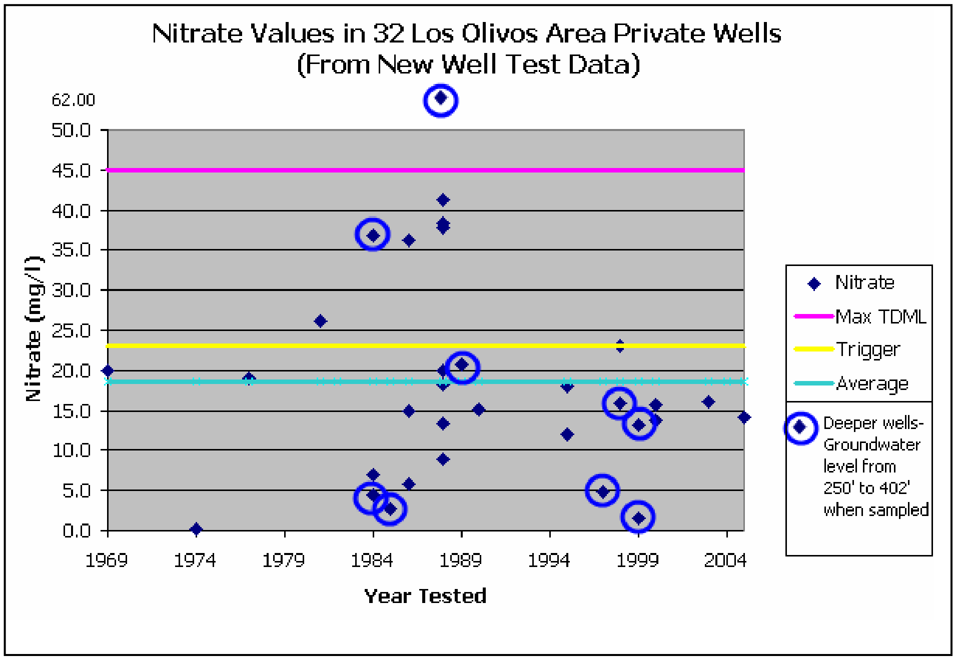
It can be seen from the data that the average nitrate levels trend upward with the average of the sampling increasing above the action level in 1980. Again several nitrate levels are alarmingly high, but in this time-frame below the MCL.



(4) Private Well Development Sampling Data.

The County Environmental Health Services maintains records of private wells developed in the County. These private wells are sampled and a chemical analysis performed prior to receiving certification for domestic use. From available records, a sampling of 32 wells were found within or near the defined Los Olivos Special Problems Area. Care was taken to not select wells down gradient of Ballard.

The results are charted below and show an average nitrate level of 19 mg/l, with 7 wells yielding samples above the 23 mg/l action level for enhanced testing.

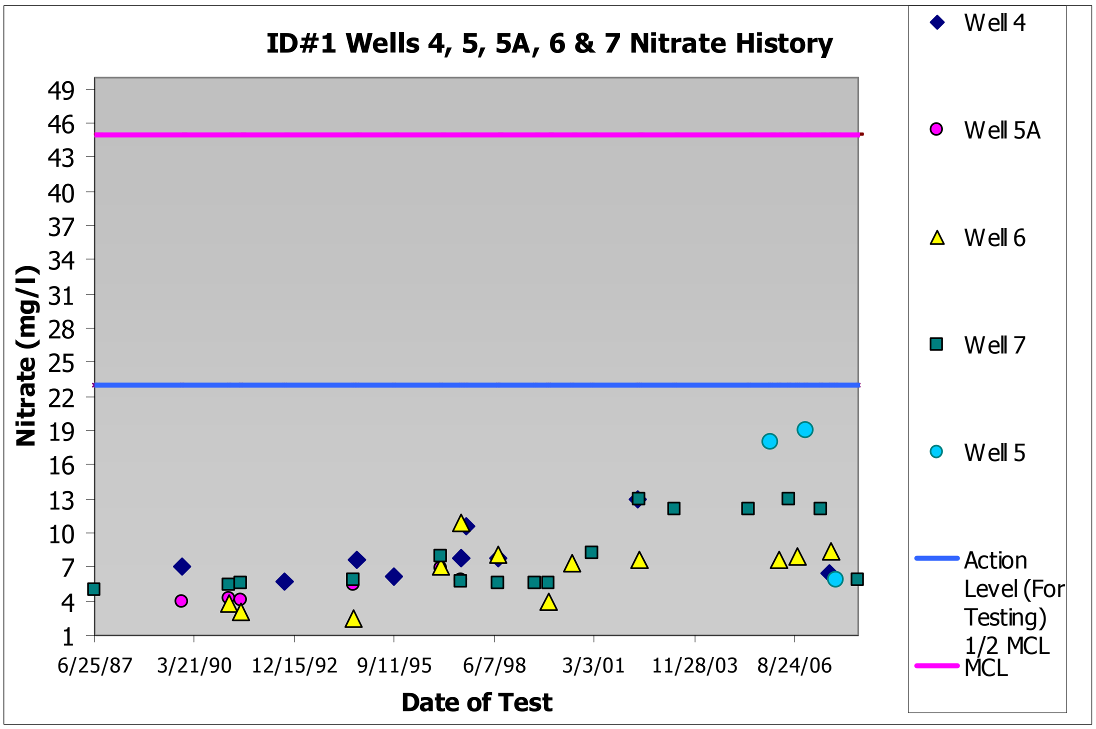


(5) Santa Ynez River Water Conservation District ID#1 Data

ID#1 regularly tests for Nitrates in their groundwater to assure water quality. The following graph (below) represents 49 tests for Nitrates performed on wells 4, 5, 5A, 6 and 7 between 1987 and 2009.

As stated previously, because of their location and depth, the wells of ID#1 are less influenced by the water quality issues than wells in the shallow groundwater, and in the immediate vicinity of Los Olivos. The data for these four wells outside the Los Olivos Special Problems Area is shown only for general information

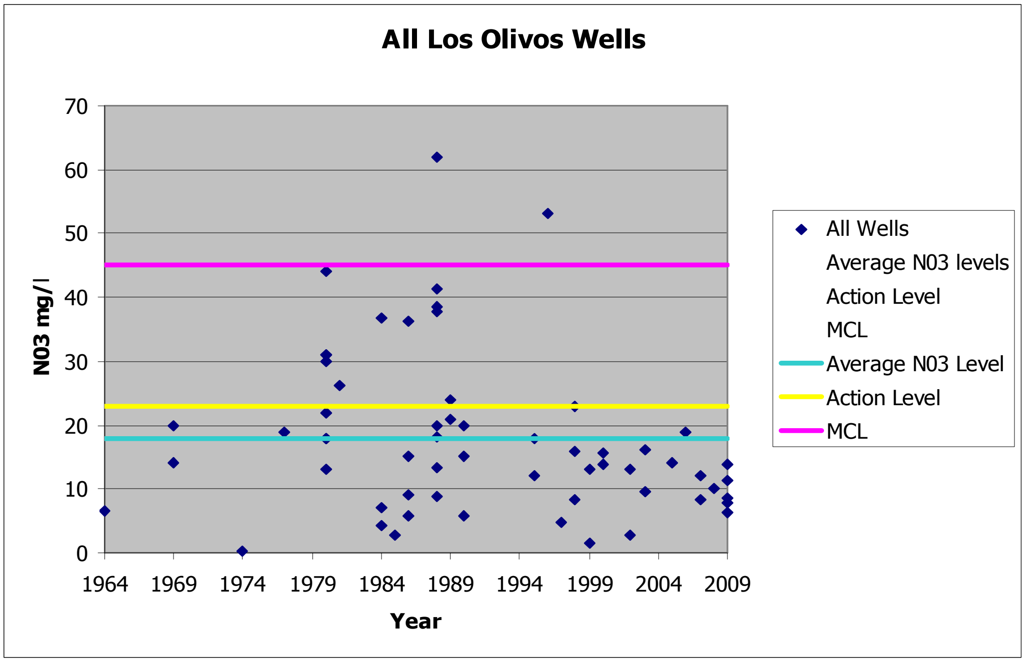
Use of one of the District's older wells, located on Refugio Road between Baseline Ave. and Highway 246, was discontinued in 1998 due to high nitrate concentrations. The well is relatively shallow, completed to a depth of 495', with the top of the screened interval at 195'. It is possible that the high nitrate concentrations in the well are, at least in part, due to migration of shallow groundwater from the Los Olivos area.



(6) Overall Well Data Summary of Historic Testing

Of the 60 historic well chemical samplings for nitrate we can observe that the average Nitrate concentration is 18 mg/l, just 5 mg/l less than the action level for enhanced testing.

The USGS does some limited testing, and the available test data on-line is quite old (late 1950's to early 1970's) and is not charted here. However, trends from this data show a consistent upward trend in nitrate concentration proportional to the population of the time.



(7) Summary of the 2003 Septic System Sanitary Survey Report.

The 2003 Septic System Sanitary Survey Report rated the Los Olivos Special Problems Area a high priority for the County to address based on their indicating factors. Los Olivos rated high in every indicating factor except (e) below, which was rated medium.

(a) Geology/Soils/ Groundwater Constraints

The Report clarifies that the valley has problem soils for onsite wastewater. They are primarily recent and older alluvial deposits with low to moderate permeability. The identified Paso Robles Formation composed of Monterey Shale detritus is one specific formation that may be unsuitable for septic leaching. Other identified concerns are clay soils that do no percolate sufficiently creating perched water conditions in large part of town. Perched water is defined as water elevated above other strata. This water can mingle eventually with deeper water, as well as surface creeks and streams.

(b) Lot Sizes/Density Of Systems

Los Olivos proper has very small lots, many less than 0.25 acres. The Report identifies the inadequacy of these small lots to support leach fields that comply with current leach field standards.

(c) Total Number Of Systems

There are approximately 350 systems in this semi-urban town setting. This is a very high concentration of septic effluent. Analysis shows that 50% (or more, due to evaporation) of the groundwater that enters the groundwater basin on the Los Olivos Special Problem Area is from septic effluent.

(d) System Type And Age

There are many old systems extending into groundwater as well as code compliance problems. This Wastewater Management Plan maps the age of the existing systems and shows that the vast majority of systems in the problem area are at or beyond their typical useful life. Many of these systems do not comply with current septic system design and installation standards.

(e) Proximity/Threat To Surface Water Uses
As the community is immediately adjacent to Alamo Pintado Creek, the creek testing program in the report shows significant organic contaminant content. This creek is tributary to Santa Ynez River, which in turn is 303(d) listed due to similar contamination. Section 2.d. discusses this issue further.

(f) Proximity/Threat To Groundwater Uses
Los Olivos overlies a groundwater basin with documented groundwater-nitrate problems. There are documented trends that the contamination is increasing in the shallow groundwater between 0 and 180 feet deep. Also, two deeper (272 and 359 feet deep) private wells directly within the Special Problem Area have actionable levels of nitrates.

(g) Evidence Of Water Quality Impact
This report has some limited citing of test evidence of elevated nitrate levels found in previous testing as well as identification of chronic high bacteria levels in Alamo Pintado Creek

(h) Overall Problem Rating
Compared to other Special Problems Areas for groundwater contamination, Los Olivos was given a High Problem Rating, due to the large number and very high density of septic systems, the lack of suitable soil and groundwater conditions for leach fields for onsite wastewater systems throughout a large portion of the town, the age and non-conforming design of the systems, and the existence and continuing threat of impacts to both surface and groundwater resources in the area.

(8) Regional Water Quality Control Board Perspective

The CCRWQCB has been aware of past testing results and has encouraged the County Health Department to prepare a wastewater management plan. See Appendix 1.

3. Need for a Los Olivos Wastewater Management Plan (LOWWMP)

The data as presented is indicative of the need to develop an action plan for reducing the trend of onsite wastewater system contribution to the increasing nitrate levels in the groundwater, and allowing the groundwater table to “heal” by natural dilution over time.

a. Overview of Los Olivos Wastewater Generated

Current Demand

There are approximately 418 parcels in the Los Olivos Special Problems Area. The typical septic tank maximum daily capacity ranges between 800 gallons and 1500 gallons. A few restaurants or hotels may have flows up to 2500 GPD or more. After distributing these based on EHS data on tank sizes (EHS has info on only about 40% of the parcels), and assumptions on the balance, the average tank capacity for all parcels is 1160 gallons. The approximate maximum daily wastewater generated can be calculated based on the 2006 Uniform Plumbing Code Appendix K equation a.1. : Flow x 1.5 = septic tank size.

Using this method the calculated maximum daily (peak) flows are then estimated at (1160 x 418)/1.5 = 323,000 GPD. As a practical matter, the volume of the average daily flows would be considerably less, perhaps a half, or 162,000 GPD.

As a back-check on the estimated average daily flows, we can consider a percentage of the anticipated water usage that is expected to generate wastewater.

Per The 2005 Urban Water Management Plan, prepared by the Central Coast Water Authority with support from the County and the SYRWCD, the water demand in the SYRWCD service area is 267 gallons per person per day. With a population within the Special Problem Area of approximately 1,200, the water demand could be estimated at 320,000 GPD. With an assumed 50% wastewater return rate, the wastewater to OWTS's could be estimated at 192,000 GPD, which correlates fairly closely (within 15%) with the 162,000 GPD calculated using septic tank data. In calculations elsewhere in this plan, 180,000 GPD is used for an average daily wastewater flow to be conservative.

For comparison purposes, the community of Los Alamos has approximately 540 connections to their wastewater facility for flows of average 112,000 GPD in the summer and 109,000 GPD in the winter. We see that the 180,000 GPD average estimate is a rational, conservative assumption. If an average wastewater flow is known, a maximum (peak) design flow is typically calculated by applying a peaking factor (multiplier) to average daily flows. This factor can range from 1.5-4.0 depending on a number of factors such as rainfall (wet weather flows) and a variety of unknowns that could increase the flows significantly. For purposes of this report we will use the maximum flows calculated from the average septic tank sizes which has been calculated as shown above as 323,000 GPD.

If we break the peak flows down into residential and commercial components we can assume:

(1100 x 366)/1.5 =	268,400 GPD Residential Max. Flows (83%)
(1600 x 52)/1.5 =	55,500 GPD Commercial Max. Flows (17%)
	324,000 GPD (100%)

Applying the proportional reduction to achieve the estimated average daily flows, we can assume:

(180,000 x 0.83 =	149,400 GPD Residential Avg. Daily Flows
(180,000 x 0.17 =	30,600 GPD Commercial Avg. Daily Flows
	180,000 GPD

The downtown area, as defined in this plan, consists of 52 parcels. Assuming the larger septic tank capacity size for the commercial lots, the anticipated maximum flows may be calculated at (1500 x 52)/1.5 = 52,000 GPD. An average daily use would be 50-60% or 26,000-31,200 GPD. This represents approximately 18% of the estimated flows generated.

It is interesting to compare the contribution of rainfall over the Los Olivos Problem Area vs. septic effluent to the groundwater recharge. With an estimated average rainfall of approximately16" per year (Santa Ynez Rain station), an estimated absorption of 12 inches per year, and a total acreage of 441 acres, the groundwater attributed to rain is 442 AF which equates to 144,000,000 gallons, or 390,000 GPD on average. We can see that the OWTS contribution to the groundwater volume within the problem area is roughly 50%. Contaminated water from a large % of poorly sited, poorly performing OWTS's could easily overwhelm the naturally clean water supply. Note that these sources of groundwater recharge combine with existing underground groundwater, so that the overall water quality is not determined simply by contributions from the Special Problem Area alone, but is improved by mixing with unimpaired ground water.

Future Demand

Within the downtown core of Los Olivos almost all of the properties are already developed or are in the process to obtain permits for development. Estimated flows from those proposed developments are reflected in the calculations above. Consequently, while there may be some incremental increase in demand, given the existing constraints, significant changes in total flow are not anticipated. Modest increases can be addressed in the implementation, or design and construction phase of Plan implementation. Per the residential component of this plan, when the residential component is implemented, new onsite systems as well as repairs for a failing system must include advanced treatment.

b. Onsite Wastewater Treatment System Age

There is currently no regular monitoring or testing of the operational condition of septic systems in the Los Olivos Area. As a result, the data regarding the number of failed septic tanks and dispersal fields is almost non-existent. The exhibit on the following page indicates the age of the known systems and indicates the large number of systems for which age information is unknown,

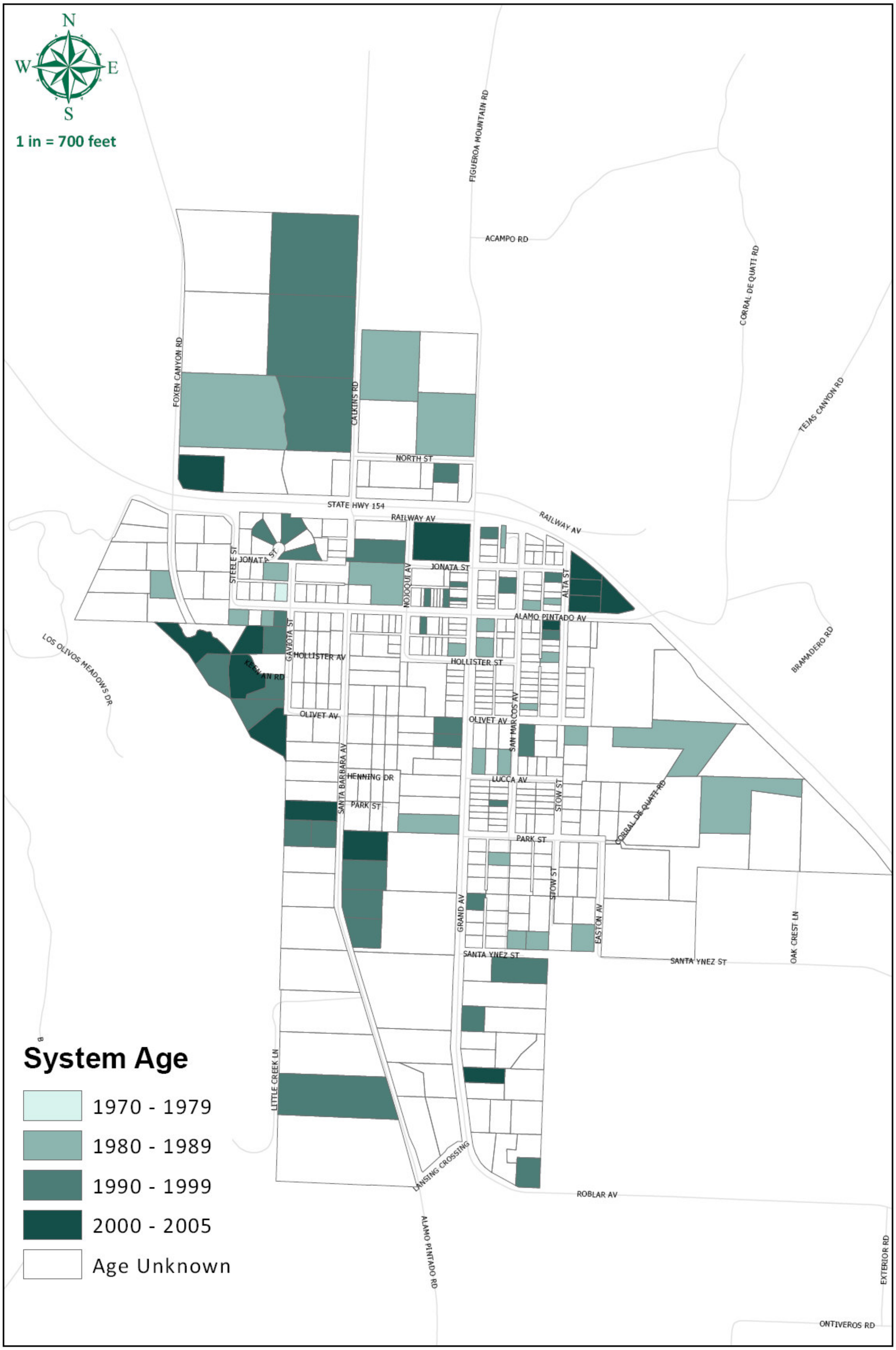
The life expectancy of a septic system depends on the following factors:

- Septic Tank Pumping Frequency: providing you are starting with a functional and reasonably-designed septic system, the most significant step you can take to extend the septic system life is to have the septic tank cleaned or "pumped" on an appropriate schedule.
- How the Septic System is Used: including water usage level and what materials flushed and rinsed down the drains of the structure or dwelling to the septic system. Conserving water reduces the load on the absorption field. Avoiding flushing chemicals or items that don't biodegrade reduces the solid build-up rate in the septic tank.
- Soil Conditions such as the soil percolation rate and the amount and level of ground water or surface water that affect the soil absorption area or drain field.
- Septic Tank Materials: a steel septic tank rusts away, first losing its baffles (which lead to drain field clogging) and eventually rusting at its bottom or sides. The rate of rust depends on the soil conditions and soil acidity and other factors. A concrete septic tank can have a very long life, in excess of 40 years, except for cases of poorly-mixed concrete or possibly acidic soils which may reduce that span. Plastic or fiberglass septic tanks can expect to have a similar life unless they are mechanically damaged.
- Life of Special Components such as effluent pumps or septic grinder pumps, septic filters, septic media, and sand bed filter systems often determines the need for repair of alternate-design septic systems that use these components.
- Nearby trees or plants whose roots invade system components.

In general, a steel septic tank system can fail in 10-15 years, and a concrete septic tank can last in excess of 40 years, unless there is a highly reactive aggregate. Dispersal fields can function for a few years if the septic tanks are not pumped and maintained, or they can last 20 years under ideal conditions.

Given these general guidelines, and based on available information, many of the OWTS in use in Los Olivos do not meet standards for adequately treating wastewater and are probably negatively impacting the groundwater. These conditions also likely exist unknown to many owners.

As indicated previously in the management plan, if the septic tank and/or dispersal system is not functioning as designed, then the system is not adequate for protecting groundwater quality.


N
W
E
S
1 in = 700 feet
FIGUEROA MOUNTAIN RD
ACAMPO RD
CORRAL DE QUATI RD
TEJAS CANYON RD
FOXEN CANYON RD
CALKINS RD
NORTH ST
STATE HWY 154
RAILWAY AV
JONATA ST
STEELE ST
NOJOQUI AV
ALTA ST
ALAMO PINTADO AV
BRAMADERO RD
LOS OLIVOS MEADOWS DR
GAVIOTA ST
HOLLISTER AV
HOLLISTER ST
KESLAN RD
OLIVET AV
SAN MARCOS AV
SANTA BARBARA AV
HENNING DR
LUCCA AV
PARK ST
STOW ST
GRAND AV
EASTON AV
SANTA YNEZ ST
OAK CREST LN
LITTLE CREEK LN
LANSING CROSSING
ROBLAR AV
ALAMO PINTADO RD
EXTERIOR RD
ONTIVEROS RD
System Age
1970 - 1979
1980 - 1989
1990 - 1999
2000 - 2005
Age Unknown

c. *Dispersal Field Constraints*

It has previously been explained that a critical component of dispersal systems, or "leach fields" is the need for an adequate area for absorption of the effluent from the system. The competent design of a dispersal field requires knowledge of many factors including:

- The size, geometry and slope of the land available in which septic components can be placed.
- The slope of the land in the area where septic components will be placed. For example, leach line trenches generally run parallel to the slope of a hill not "up and down" the hill.
- The soil characteristics (soil percolation rate).
- The anticipated average and maximum daily wastewater flow.
- The type of septic system (since different effluent handling methods need different total effluent disposal areas and different total linear feet, such as comparing a conventional drainfield trench with a gravel-less system or a shallow drip dispersal system.
- The exact locations of property boundaries, and the locations of any nearby wells, streams, lakes, driveways, buildings, or any other site features that require a separation distance between septic system components and that site feature.
- The local building codes which may specify certain septic component distances, set-backs, capacities, as well as the requirement for a reserve area on the site to permit future septic system expansion, repair, or replacement.

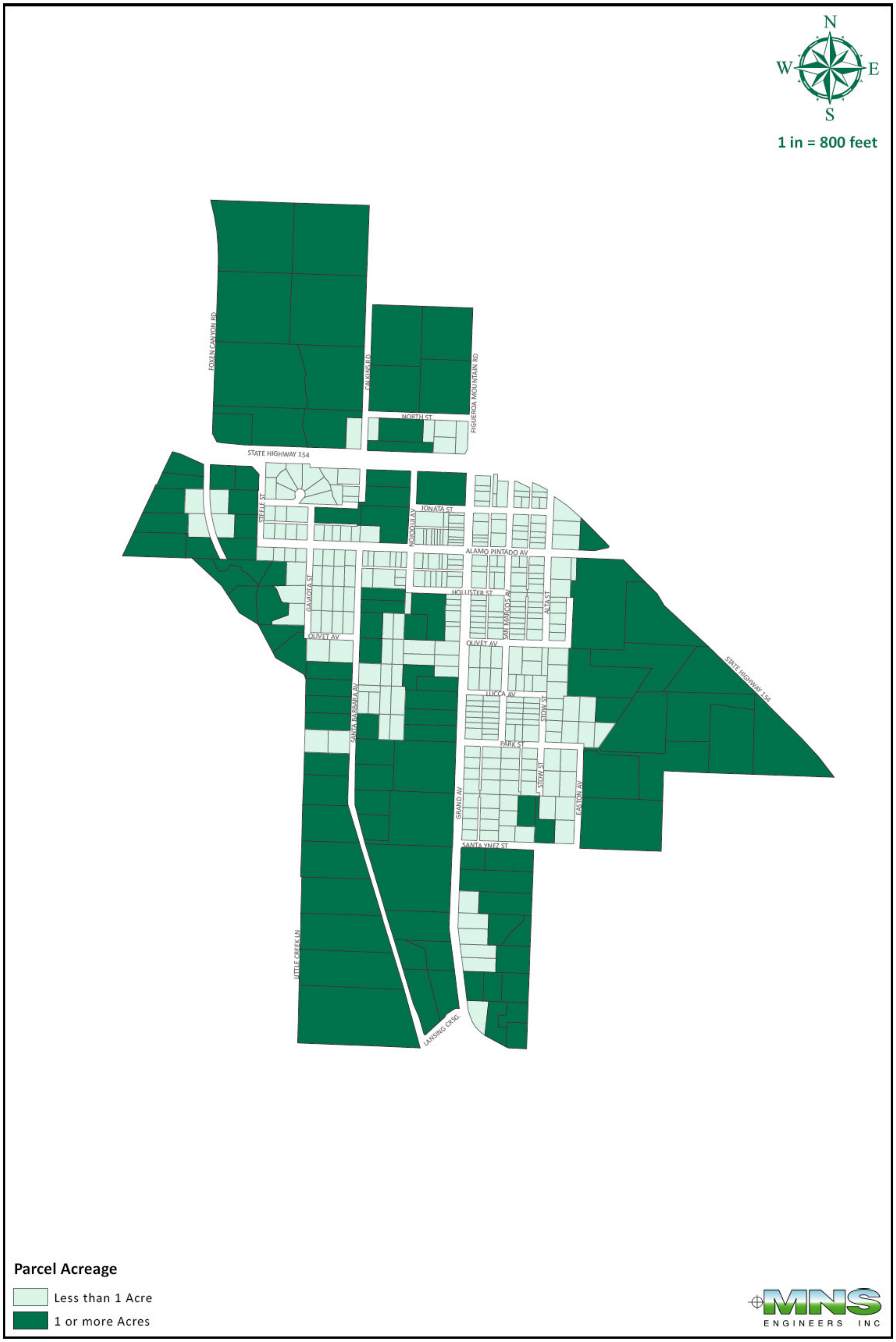
The RWCQB does not support the creation of new lots of less than one acre when septic systems are proposed. If it is a lot of record then a septic system could be approved if it meets regulatory design requirements.

The exhibit on the following page indicates the number of parcels that are less than one acre in size, and would therefore not meet the criteria for development today due to inadequate dispersal field area. Most of these are developed, however, and have existing dispersal fields. While many may have met the minimum design standards for a dispersal field when initially built, there are many that would marginally meet, or not meet at all, the recommended requirements for conventional systems today.

Residential Parcel Mitigation: The most promising mitigation for this deficiency of land for a dispersal field would be to provide advanced treatment of the wastewater prior to dispersal, so that any potential net increase in ground water contamination is avoided.

Commercial Parcel Mitigation: Commercial wastewater flows are generally much larger than residential flows. The land requirement for dispersal is much more for many of these parcels. This challenge could be met by a cooperative dispersal system shared by the downtown core business owners.

Parcels by Area



d. Nitrate Concentration Trends

The increasing nitrate concentration trends are plotted in charts shown in section 2d (Water Quality Test Data). Although some wells already exceed the MCL for nitrate, others have been shown to trend upward. As previously shown and stated, 14 of 19 wells within the shallow groundwater basin with a history of tests show an upward trend. This average linear trend line based on the years tested suggests that many of these wells may hit the action level limits for enhanced testing within the next 5-10 years.

e. Urgency of Need

Drinking water standards are established by the United States Environmental Protection Agency (EPA) and adopted by the State. The California Department of Public Health enforces those standards for large public water systems, while Environmental Health Services (EHS) enforces them for the small water systems and private water systems. The Water Boards are tasked with protecting the water resources of the State. This regulatory oversight is in place to assure that safe, clean water is provided to the citizens of Los Olivos. As the degrading water quality trend is clear, the need for early local action is critical to avoid measures that may be imposed by regional, state, or national agencies. These measures may be required if groundwater contaminate levels are not abated over the next decade or two.

If a wastewater management plan is not adopted to resolve the contaminant problem at its source, we will continue to see an increase in the number of wells that will exceed the MCL's for various contaminants. Many may be private wells without annual testing requirements, putting the user's health at risk, particularly that of their infants who are more susceptible to the health effects of these contaminants as discussed in this plan. The health of animals that drink the water will also be at risk. An additional concern is that outside regional, state and federal agencies will become involved and impose solutions. The water supply may be reduced as wells are abandoned, especially wells owned and operated by water purveyors. Expensive treatment of ground water may be required. These agencies may step in and direct measures regarding wastewater management that allow for less local input and control.

In order for the current downward water quality trend to be reversed before these consequences are potentially realized, implementation of a plan is recommended as soon as possible. It will take possibly decades for all the residential OWTS units to be repaired, replaced or upgraded to assure each parcel is not contributing to the increasing ground water quality problem. It may likewise take years to implement a cooperative OWTS for those businesses in the downtown core that desire or need to participate in a cooperative system..

4. LOWWMP Goals

The general goal of this wastewater management plan is to protect public health and safety by mitigating the effects of the use of OWTS on groundwater quality under and around Los Olivos. This will require the community to work together to stop the upward trend of OWTS contributions to contamination in the groundwater by focusing on repairing, upgrading or replacing, and then maintaining the OWTS's in the Los Olivos Special Problems Area. Specific steps toward achieving this goal include:

a. Reduction of Nitrates Through Enhanced Design & Maintenance Standards

Recommendations include:

(1) Modern design standards will need to be included even in traditional OWTS systems when it is determined that site conditions of a specific parcel are suitable for a traditional system.

(2) Advanced onsite wastewater treatment standards will apply to all residential parcels that cannot meet the minimum standards for a traditional OWTS.

(3) Parcels with high ground water tables will have specific dispersal field requirements that are known to work even in this environment. Shallow drip dispersal fields are an example.

(4) A comprehensive plan that includes inspection, maintenance and record-keeping will be required. A regular ground water quality testing program is recommended to measure effectiveness of the plan. As it takes years for groundwater to "change-out" the commitment needs to be for the long term.

(5) A cooperative OWTS for the commercial wastewater generated by businesses in the downtown core, with a common dispersal field is a key element of the plan due to the high flows.

(6) Implementation shall place a priority on development of a cooperative OWTS for the downtown core, followed by a program to work with the residential OWTS owners in the repair, upgrade or replacement of their systems as appropriate. Costs will always be considered as well as the most beneficial use of any public or grant funding that may be available to assist.

b. The Numbers: What can we expect?

In order to model expected results, some communities with similar issues to the Los Olivos Special Problems Area (e.g., Los Osos and Malibu) have spent millions of dollars drilling well grids, sampling and developing groundwater hydrology models, mapping details of groundwater flow rates and mapping contaminant concentration level gradients. They have expended millions of dollars in an effort to quantify with a high degree of accuracy the rate of improvement that might be experienced in groundwater quality. There are also very simple calculations that can generalize how water quality may be expected to change as a wastewater management plan is implemented. Following is an example of a simplified model.

Under Los Olivos, we know the groundwater flows generally south, away from the hills and toward the Santa Ynez River, as does Alamo Pintado Creek. We have data from a total of 60 area wells and trend data from 19 wells that provide a general measure of the problem and the trend. We know much about the shallow groundwater table, the size of the parcels, and need to repair, upgrade or replace many systems due to their age.

For purposes of this LOWWMP the modeling approach is simplified and modest, but meaningful on an order of magnitude, to provide a graphical and tabular concept of the dynamics involved in reversing the contribution of OWTSs to groundwater degradation.

(1) The Modeling Approach: There are 418 parcels within the problem area. An estimated average daily wastewater load can be calculated. Although the percentage of contributing systems is not fully known this simplified model assumes all except very recently installed systems are contributing to the higher nitrogen levels measured in the groundwater. By allocating the nitrate load among these parcels, we can make assumptions on reductions of the nitrate loads as the various parcels are demonstrated to have an OWTS that meet the new design, construction and maintenance standards. Since the best model is an empirical model, by correlating to well-water testing over a number of years of implementing this plan we will be able to fine-tune this rudimentary model and become increasingly confident in projecting groundwater quality improvement.

(2) Groundwater Flows & Influence: Water in the groundwater basin moves very slowly, and the overall volume is very large. As the contaminants from inefficient OWTS effluent are reduced, it will take a very long time for existing nitrates to migrate out of the groundwater basin. For example, if the average permeability of the soil at well depth is assumed at 0.6 in./hr (see soils map in Section 8a3), and the distance across the Los Olivos Special Problems Area is 1.1 miles, then it can be calculated that it may take up to 13 years for water to flow the length of the Special Problems Area. It is difficult to estimate this time-frame precisely due to changes in soil types and densities, as well as influence from pumping. The point is, however, that it may take many years after we begin to reduce the contaminant contributions into the groundwater to see the full benefits of the effort.

Example of a Simplified Mathematical Model: With a few simplifying assumptions we can create a simplified but helpful model in understanding possible "order of magnitude" nitrate reductions that could be realized as the LOWWMP is implemented. "Implementation" is defined as simply repairing/upgrading and replacing existing OWTS's over a reasonable time frame. One simplifying assumption in this model is the assumption that zero nitrates are generated by the replacement units, when the actual removal is up to 96% less nitrates. As this is an "order of magnitude" exercise, this is an acceptable assumption.

If we assume we can replace 50% of the offending systems in ten years, 100% replacement in 20 years and we assume that the groundwater flows will require 13 years

Los Olivos
Water Quality Improvement Model Example

Wastewater Flows

		Average GPD per parcel	Total GPD
Residential Parcels	367	700	256900
Commercial Parcels	51	1020	52020
TOTALS	418	1720	308920

Snapshop every 5 years for 20 Year Program

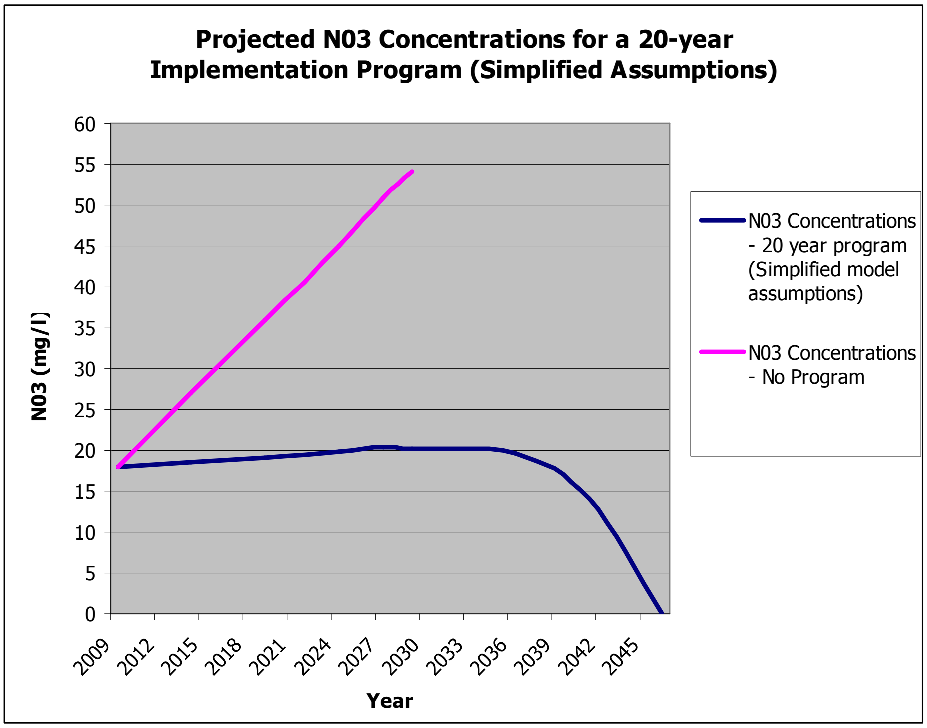
	OWTS inspected, repaired/replaced over 20 years (Cumulative)							
	Year 5	% total GPD	Year 10	% total GPD	Year 15	% total GPD	Year 20	% total GPD
No. Improved Res. Systems	10	0.02	110	0.25	220	0.50	367	0.83
No. Improved Com. Systems	51	0.17	51	0.17	51	0.17	51	0.17
% of ADT treated for N03		0.2		0.4		0.7		1.0
% of ADT Not Compliant **(A)**		0.8		0.6		0.3		0.0

Year Expected to See This Average Test Result (Program year + 13-year groundwater change-out flow rate)	**(B)** Average Test well N03 Concentration based on current trend mg/l (if no change)	**Anticipated Average N03 Contaminat Levels in given year (A x B)**				Tabulated Projected N03 rates	Year Expected to See This Average Test Result (Program year + 13-year groundwater change-out flow rate)
2009	18					18	2009
2014	27	21.8				20.5	2027
2019	36		21.0			19.7	2036
2024	45			15.0		14.1	2041
2029	54				0.0	0.0	2046

Notes:
1. This Simplified Example assumes a 13-year groundwater change-out flow rate
2. This Simplified Example assumes a return to trace levels of nitrogen

to "change-out" the contaminated water, we should be able to see the full benefit of a 50% reduction in approximately 23 years, and a 100% reduction in 33 years, all other factors remaining constant. However, as increases in nitrate concentrations in wastewater flows are not constant, we will likely experience an increase in the remaining marginal OWTS systems while others are upgraded. The trend lines in the test data indicate that without action we can expect the nitrate concentrations to potentially increase by 50% in 10 years. Because of these factors, system replacements will not result in a one-for-one correlation in nitrate level reductions.

However, we can calculate an optimistic result and chart a potential improvement curve. As mentioned above, the data and chart will be self-correcting as trends are observed in a regular testing program.



The simplified model and projections of improved water quality are helpful to understand the slow nature of reversing the nitrate contamination trend.

5. Wastewater Management Plan Implementation

There are many ways to implement an effective wastewater management plan. Here we examine and compare EPA recommendations, the Oregon STEP-system Model, Los Osos, approach, and the Malibu Approach

a. EPA Management Plan Models

To help communities ensure that all OWTS—alternative or conventional— are designed, installed, and maintained properly, the U.S. Environmental Protection Agency (EPA) issued guidelines that describe the main elements of an effective OWTS program (EPA, 2003). The guidelines describe five management models, with the more complex models associated with the use of alternative OWTS in environmentally sensitive areas.

The following table identifies the five EPA models for management plans which respond to various levels of risk to water quality, addressing higher risk with more stringent controls.

Typical applications	Program description	Benefits	Limitations
1. Homeowner Awareness Model			
◆ Areas of low environmental sensitivity where sites are suitable for conventional onsite systems	◆ Systems sited and constructed based on prescribed criteria ◆ Maintenance reminders ◆ Inventory of all systems	◆ Code-compliant system ◆ Ease of implementation ◆ Inventory of systems that is useful for tracking and areawide planning	◆ No compliance ID mechanism ◆ Sites must meet siting requirements ◆ Cost to maintain database
2. Maintenance Contract Model			
◆ Areas of low to moderate environmental sensitivity where sites are marginally suitable for conventional onsite systems due to small lots, shallow soils or low-permeability soils ◆ Small cluster systems	◆ Systems properly sited and constructed ◆ More complex treatment options (mechanical, clusters of homes) ◆ Service contracts must be maintained ◆ Inventory of all systems ◆ Contract tracking system	◆ Lower risk of treatment system malfunctions ◆ Homeowner's investment protected	◆ Difficulty tracking and enforcing compliance due to reliance on the owner or contractor to report a lapse in services ◆ No mechanism provided to assess the effectiveness of the maintenance program
3. Operating Permit Model			
◆ Areas of moderate environmental sensitivity such as wellhead or source water protection zones, shellfish-growing waters, or bathing/water contact recreation areas ◆ Systems treating high-strength wastes, or large-capacity systems	◆ Performance and monitoring requirements ◆ Engineered designs allowed but may provide prescriptive designs for specific sites ◆ Regulatory oversight by issuing renewable operating permits that may be revoked for noncompliance ◆ Inventory of all systems ◆ Tracking of operating permit and compliance monitoring ◆ Minimum for large-capacity systems	◆ Systems can be located in more environmentally sensitive areas ◆ Regular compliance monitoring reports ◆ Noncompliant systems identified and corrective actions required ◆ Less need for regulation of large systems	◆ Higher level of expertise and resources for regulatory authority to implement ◆ Requires permit tracking system ◆ Regulatory authority needs enforcement powers
4. Responsible Management Entity (RME) Operation			
◆ Areas of moderate to high environmental sensitivity where reliable and sustainable system operation and maintenance is required (sole-source aquifers, wellhead or source water protection zones, critical aquatic habitats, and outstanding value resource waters) ◆ Cluster systems	◆ System performance and monitoring requirements ◆ Professional O&M services through RME (public or private) ◆ Regulatory oversight by issuing operating or NPDES permits directly to RME (system ownership remains with property owner) ◆ Inventory of all systems ◆ Tracking system for operating permit and compliance monitoring	◆ O&M responsibility transferred from the system owner to a professional RME that holds the operating permit ◆ Problems identified before malfunctions occur ◆ Onsite treatment in more environmentally sensitive areas or for treatment of high-strength wastes ◆ One permit for a group of systems	◆ Enabling legislation might be necessary to allow RME to hold the operating permit for an individual system owner ◆ RME must have owner's approval for repairs; might be conflict if performance problems are identified and not corrected ◆ Need for easement/right of entry ◆ Need for oversight of RME by the regulatory authority
5. Responsible Management Entity (RME) Ownership Model			
◆ Areas of greatest environmental sensitivity, where reliable management is required. Includes sole source aquifers, wellhead or source water protection zones, critical aquatic habitats, and outstanding value resource waters ◆ Preferred management program for cluster systems serving multiple properties under different ownership	◆ Establishes system performance and monitoring requirements ◆ Professional management of all aspects of decentralized systems ◆ RMEs own or manage individual systems ◆ Trained and licensed professional owners/operators ◆ Regulatory oversight through NPDES or other permit ◆ Inventory of all systems ◆ Tracking of operating permit and compliance monitoring	◆ High level of oversight if system problems occur ◆ Model of central sewerage that reduces the risk of noncompliance ◆ Onsite treatment in environmentally sensitive areas ◆ Effective planning and watershed management ◆ Potential conflicts between the user and RME removed ◆ Greatest protection of environmental resources and homeowner investment	◆ Enabling legislation or formation of special district might be required ◆ Might require significant financial investment by RME for installation or purchase of existing systems or components ◆ Need for oversight of RME by the regulatory authority; might limit competition ◆ Homeowner associations may not have adequate authority

The ideal implementation level would be the least expensive, bureaucratic or intrusive strategy that works. The level 2. “Maintenance Contract Model” or level 3 “Operating Permit Model” are recommended for the residential component of the WWMP.

A very thorough survey and study of maintenance issues relative to alternative and advanced treatment systems in the Great Lakes Region where they are being more commonly used, was published in the Winter 2006 Small Flows Quarterly. This excellent, comprehensive analysis of the experience in this region, and the implications on system management strategies is attached in its entirety as appendix 7.

Challenges to implementing a level 2 strategy are clearly spelled out in this study. They include:

- Owners explicitly identified concerns with their ability to ensure that alternative systems continue to operate as designed.
- The public agency’s inability to follow up on the renewal of maintenance contracts.
- A lack of a legal mechanism for enforcing contract renewal requirements
- The lack of a computerized database for tracking actions
- The lack of staff time to effectively check or re-inspect the systems.
- Ensuring that new homeowners were aware of, and compliant with, the proper maintenance of their systems.

Implementing a level 3 strategy has similar challenges, but the greater emphasis on inspection and recordkeeping may be essential. The study cites challenges to be:

- Any gap in an agency's capacity to implement a “Maintenance Contract” management model translates into an inability to implement a successful “Operating Permit” management model as well.
- Most locales along the Great Lakes do not have the capacity to implement all the program elements associated with the "Operating Permit Management Model.”

The Study also cites one motivating factor that addresses the need for adequate funding:

“The protection of critical aquifers is often driven by additional policies and regulatory requirements. In such cases, there may be more support for implementing program elements for which agencies otherwise do not have the backing. In cases where agencies are understaffed and under-funded, even this support may not be enough.”

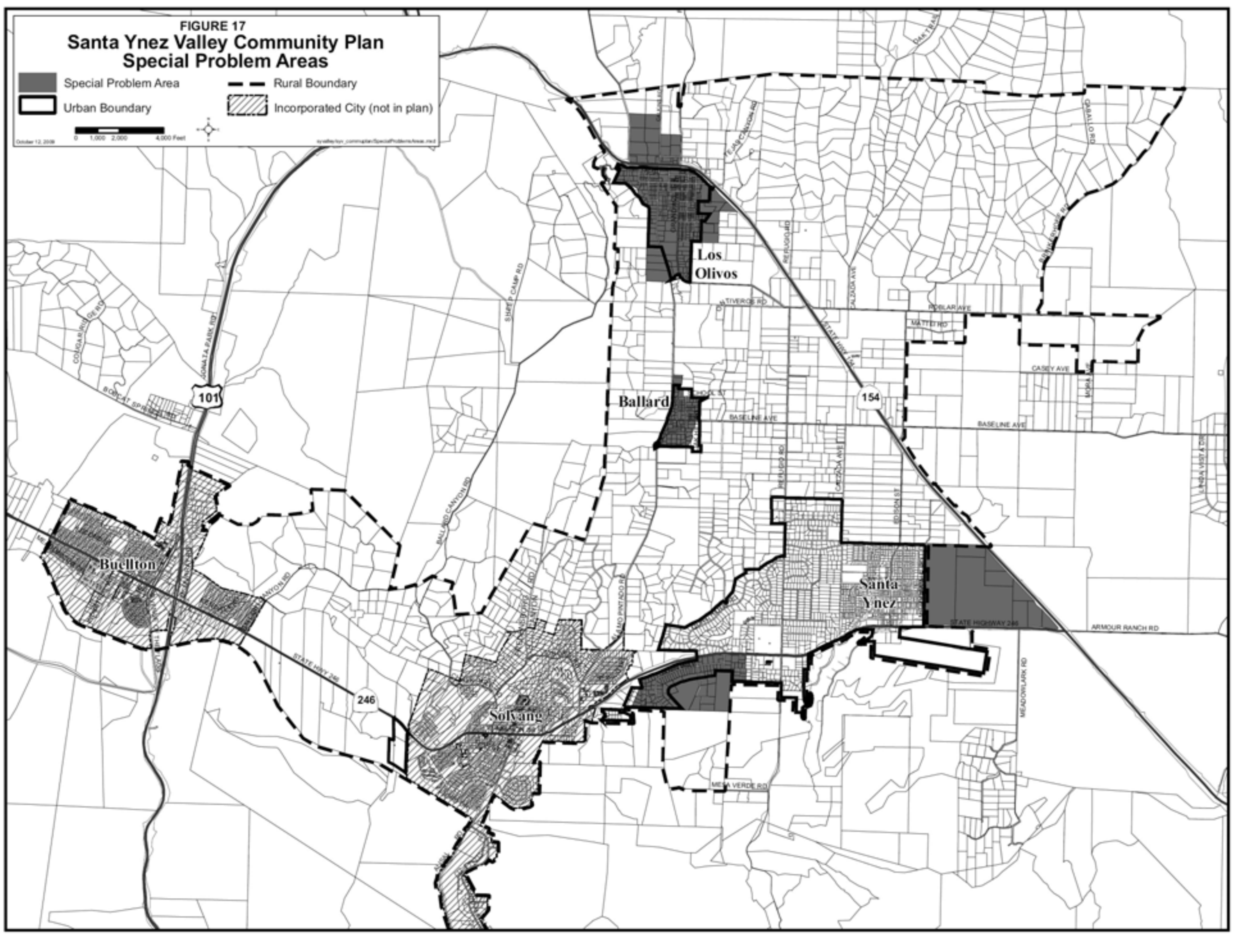
This statement reiterates the concern that if the local community does not protect critical aquifers, they could be regulated heavily by other agencies in the future. The commercial component of this WWMP, which recommends a communal septic system for the Downtown core (see section 7) will require a level 4 “Responsible Management Entity (RME) Operation” model or a level 5 “Responsible Management Entity (RME) Ownership” model.

6. Boundaries: Area Covered by Plan

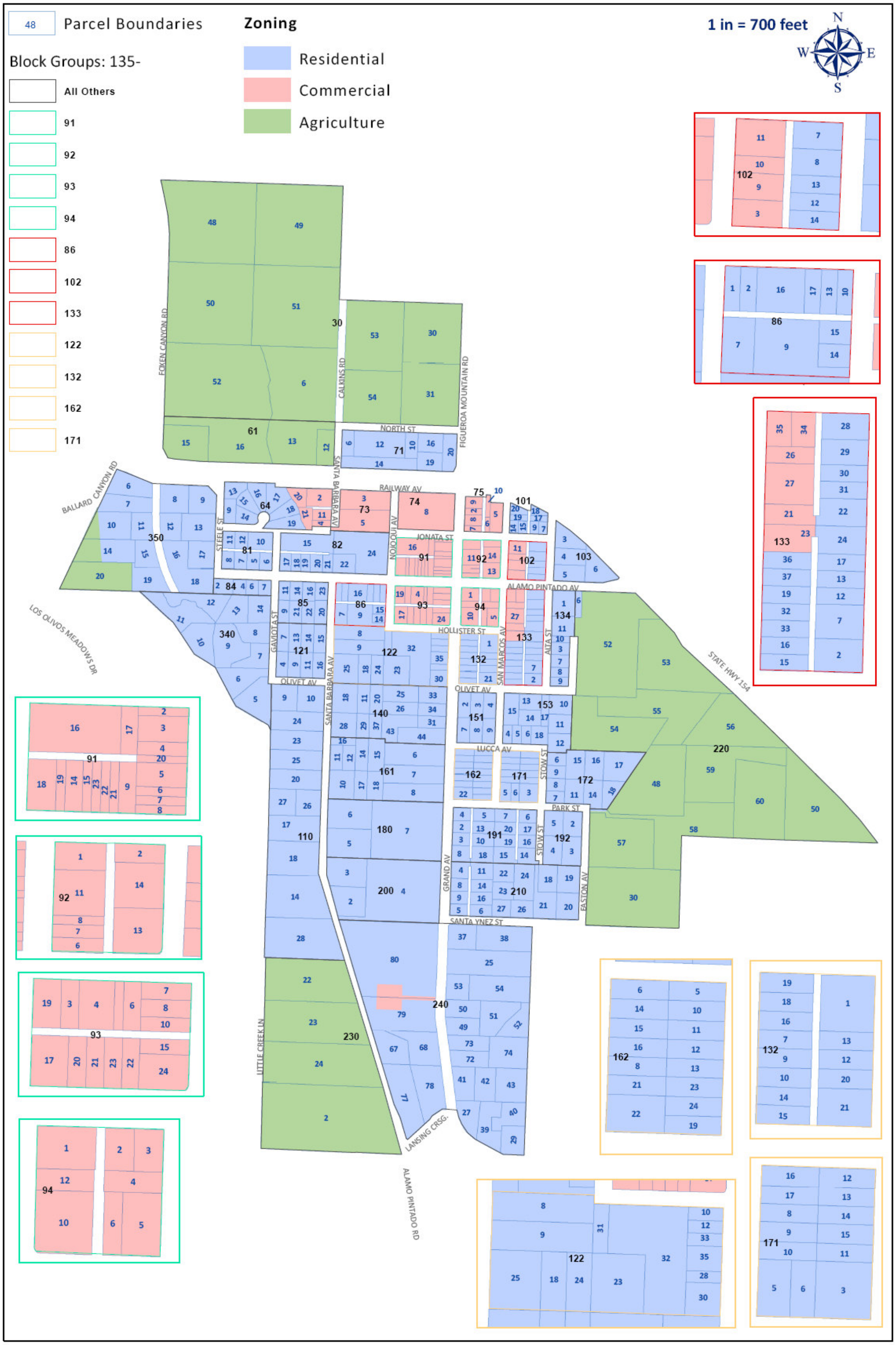
a. Los Olivos Special Problems Area

The Los Olivos Special Problems Area is one of four identified in the Santa Ynez Valley by the SYVCP. Fortunately the others are down gradient from Los Olivos, so they do not influence the groundwater quality in the vicinity of Los Olivos. All water quality data used in the development of Section 2 was collected from wells located up gradient or generally north of the township of Ballard and under or within the vicinity of Los Olivos.

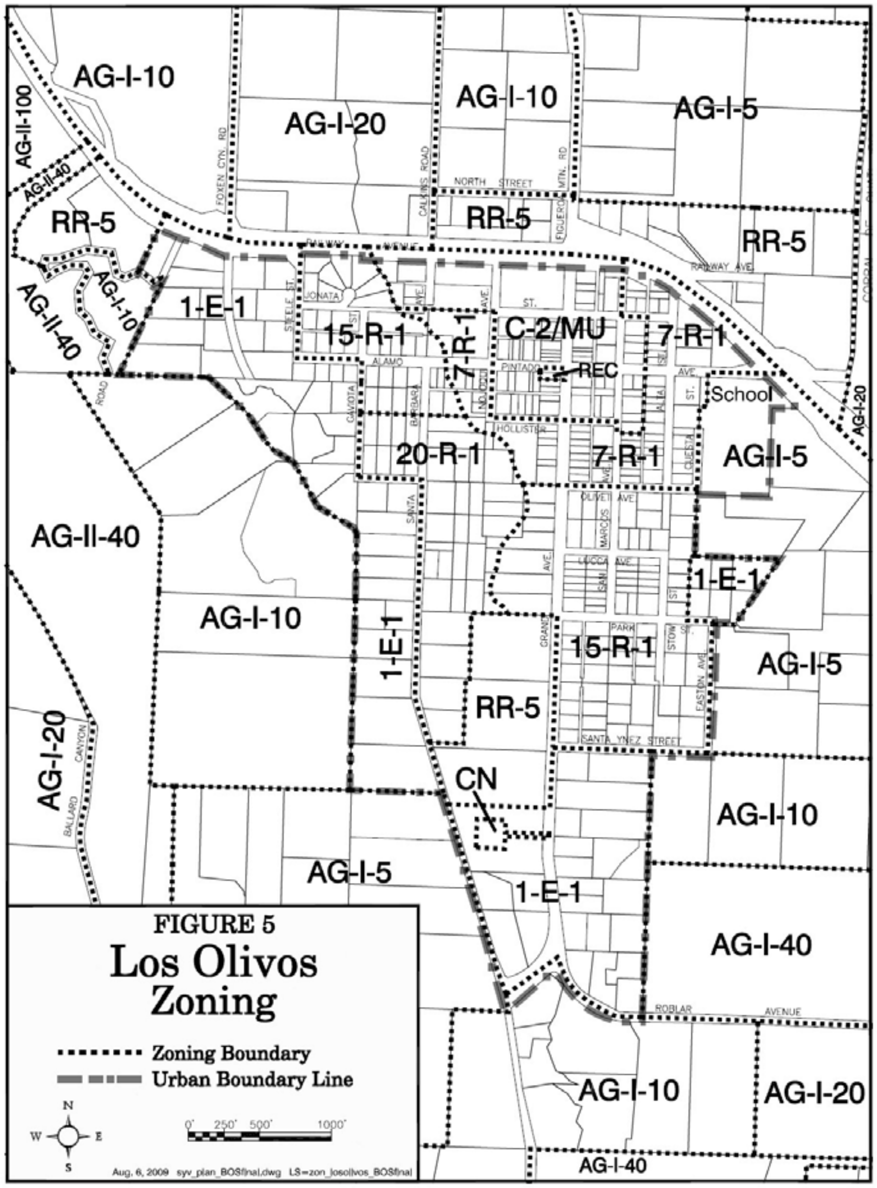
The boundary of the problem area contains 418 parcels. The map on the following page shows those parcels identified by Assessor's Parcel Number (APN). Also the three basic zoning categories are color-coded: residential, commercial and agricultural. The residential and commercial areas define the two major components of this Management Plan.



Los Olivos Special Problem Area Parcels



The most recent zoning information is that published in the recently adopted SYVCP as shown below:



(1) Commercial Component of Los Olivos WWMP

This component addresses OWTS's serving the commercial parcels in the downtown core. The LOWWMP focuses on managing the effluent from existing OWTS in use in the commercial area and discussing options for a collective OWTS including a shared disposal field. This is not a new concept. The SYVCP recommends it, and it has been discussed for a number of years among some Los Olivos Business owners with the understanding that very few of the commercial parcels have sufficient suitable area for their own dispersal fields. This is due both to size and set-back requirements to the creek or neighbors.

(2) Residential Component of Los Olivos WWMP

This component addresses new OWTS located on residential parcels within the Special Problems Area that require repair or replacement to minimize the impact to groundwater quality. This component, while essential, is identified by the County as second in priority, in terms of application of County resources to implement, with the understanding that the commercial component could yield more immediate benefit. Subsequently this wastewater management plan does not fully address all of the details of a residential component at this time.

7. Commercial Component: Downtown Core

A unique area of concern within the Los Olivos Special Problems Area is the "downtown core" or commercial district. Factors such as the existence of many smaller lots, higher water uses, and shallow groundwater table combine to compel the consideration of enhanced treatment of effluent from existing OWTS as well as a communal facility to collect, treat and dispose of the wastewater for this area. Of the estimated 180,000 average GPD of wastewater generated in the Los Olivos Special Problems Area, approximately 40,000 GPD is anticipated to be generated by the downtown core.

As shown in the System Age Map in Section 3.b., there are also many septic systems in the downtown core which are at or beyond their useful life. All of the concerns raised in this Plan regarding OWTS in the Special Problems Area particularly apply to the downtown core.

a. Downtown Core Commercial Area

The exhibit following Section 7.f.4 identifies the downtown commercial area of the Los Olivos Downtown Core Area. There are 51 lots with a variety of commercial uses. Restaurants, hotels, bed & breakfasts, tasting rooms, and potential new public restrooms are considered the high-water users. In considering a communal system for some or all of the commercial lots, several positive considerations include:

(1) Water Conservation & Beneficial Reuse of Treated Wastewater

The concept of a communal WW treatment is to treat the wastewater closer to where it is generated, rather than collecting the wastewater and conveying it to one centralized location for treatment, or to an adjacent community. In the 1970's, regulatory agencies encouraged moving to centralized treatment for either single or multiple communities for the purpose of providing higher levels of treatment and improved water quality. However, where wastewater is reused near its source, the result of conveying wastewater away from the community to a centralized location is an increase in cost by having to return the treated water to the community for beneficial reuse. The increased interest in reuse in recent years is consistent with communal treatment.

(2) Reduce the construction and annual energy costs

A focused communal treatment system may be a favorable over a community-wide central treatment system. In a communal treatment system, the smaller quantity of treated wastewater effluent is more easily distributed to agricultural fields, parks, schools and other properties that desire low-cost, beneficial reuse water close to where it is generated. However, there are several issues with communal treatment, including the ability to meet strict effluent quality limits and other regulations and potentially adverse neighbor impacts. In small communities with a small commercial center such as Los Olivos, capital costs for centralized treatment infrastructure is often prohibitively expensive. By having to develop several sites, communities may lose the economy of scale for many aspects of centralized treatment, resulting in higher costs for some aspects of the project.

(3) Downtown Public Restrooms

There is generally a popular desire among the businesses in the commercial area of Los Olivos to have a public restroom. This WWMP only addresses the wastewater issues associated with the possibility of two new public restrooms. Preparing options for implementing the construction of public restroom facilities is a task that should be accomplished in a cooperative effort with the business owners and the appropriate department of Santa Barbara County. There is a possibility that a newly formed Special Services District could take on responsibility for such a project.

b. Treatment Options for the Downtown Core

With a few exceptions, the commercial lots in Los Olivos are not able to have functional, efficient traditional OWTS's that will not contribute to the contamination the groundwater. There is simply not sufficient room to place a competent leach line system, or the groundwater table is too high to allow for a competent dry well. Failed and inefficient systems will need to be identified and replaced with an alternative treatment system. Options include:

(1) Onsite Wastewater Treatment Pre-Treatment and Pumping/Trucking

This has been suggested as a commercial venture that could provide beneficial reuse. The basic concept is that de-greased and treated effluent would flow to a holding tank, which would be pumped at regular intervals and delivered to an off-site tank that feeds a leach field with a shallow drip dispersal system. This approach is only appropriate as an interim, emergency or short term measure for the following reasons:

- It is expected that the CCRWQCB would not accept or allow this approach to be permitted for the long term. It is unprecedented as a community approach and would be counter to existing policy.
- Pumping & trucking costs cannot be shown to have a life-cycle cost advantage. Depending on the business, pumping could be required weekly, or even more frequently. Even at the rate of $600 per pumping, the equivalent capital investment of a dispersal field would be spent each year.
- There would be no long-tern reliability, as the typical infrastructure investment and commitment in a dispersal field is not present. The dispersal field, if maintained, will function day and night and is a "fail-safe" solution.
- An approach that would address most of the downtown core is needed. Most of the businesses downtown have the challenge of marginal or improperly configured leach fields making this type of venture large and labor intensive.
- This approach may also meet public resistance as the activity would require frequent pumper trucks in close proximity to restaurants, galleries and other businesses.

(2) Onsite Wastewater Treatment: Advanced Treatment Systems

Compact, advanced onsite wastewater treatment systems (OWTS) have become increasingly popular throughout the US as one tool in addressing water quality issues in Special Problems Areas, or areas where ideal conditions for traditional septic systems do not exist. Their popularity has brought down their cost to affordable levels. Some facts about this option that show its benefits and limitations are:

- Many advanced OWTS's can treat septic effluent to water quality levels far beyond traditional septic tanks. When maintained and working properly, the concerns for contribution to poor groundwater quality are greatly abated. Some systems can reduce BOD, TSS, and fecal coliform by up to 98%. And they can reduce nitrogen by up to 70%. The effluent is still not suitable for drainage to creeks or for any surface irrigation application, but must be released to a competent leach field.

- Most advanced OWTS's are compact, and are placed underground within an envelope similar or slightly larger than a traditional septic tank.

- Leach fields downstream of advanced OWTS's generally have a longer life.

- Under current standards, as well as new standards recommended by this plan, septic systems must not only adequately treat wastewater, but must dispose of the effluent via percolation in leach fields that must match or exceed the effluent load. Otherwise, the mounding water creates a neighborhood nuisance, and some supplemental treatment benefits of the soil are lost. Within the commercial area where lots are too small, or groundwater tables are two high to meet leach field standards to absorb the volumes of water generated, regardless of the effluent quality, systems will not meet the standards.

- They require, inspection, testing and maintenance on an annual basis, to maintain filters, pump accumulated biosolids and assure quality of the effluent.

(3) Communal Systems Such as a "STEP" OWTS

The STEP (Septic Tank Effluent Pump) system is a concept that has become increasingly popular and has been implemented in a number of communities since the late 1960's in the United States. Examples of operating STEP systems may be found in Yuba City, CA; Montcalm County, MI; Delpca, MI; Brooks, OR; Elkton, OR; Glide, OR; Claron, WA; Lear Lake, WA; Newport WA; Malibu CA, and Olympia, WA.

The basic concept is that raw sewage from the business passes through a grease trap (if required) and then into an on site septic tank (sometimes called an "interceptor tank"). Here the wastewater is treated through the biological septic process. The onsite goal is to remove as much of the grease, suspended solids and biological oxygen demand (BOD) as practical. From the STEP tank, a small pump would move the pre-treated wastewater to a collection system designed to take wastewater from the downtown business area to a compact communal advanced treatment system for additional treatment (and possibly disinfection) so the wastewater will be suitable for dispersal in local fields without contributing to groundwater contamination. It may also be recycled for irrigation purposes. The type and location of the dispersal system and fields depends on level of treatment.

The STEP System approach may be desired because of strict compliance with the SYVCP, it's adaptation of advanced OWTS technology for nitrogen and other contaminant removal, compatibility with shallow dispersal technology, and proven success in many communities.

(4) Package Plant Systems

A package Plan System is a pre-engineered, shop manufactured and field assembled compact wastewater treatment plant. Examples of package plant vendors with local experience include the GE, Hoot Systems, and AdvanTex (Orenco) Package plants. These three vendors each have a different approach to treatment and are examples of how different treatment technologies can still result in a compact treatment facility. Appendix 8 provides additional data and exhibits on these three systems.

There are other package plants online in the County of Santa Barbara, including a local facility of similar size on the Chumash Resort and Casino. These package plants all have the capability to treat effluent to Title 22 Drinking Water Standards, which allow water to be discharged to a drainage facility or stream. All three technologies generate sludge which would require handling and shipping to an approved landfill or composting facility certified to receive this waste material.

Advantages of a package plant include relatively low cost compared to centralized treatment, there are qualified operators in the County, the technology is “tried and true”, and package plants can be clustered if used for the residential component. All three could have significant elements of their process placed underground, however the AdvanTex system is the only one designed to be nearly 100% underground.

Depending on the technology, power costs can be very expensive or only moderately expensive. A spreadsheet comparing the various package plant technologies is presented below, following Section 7.b.

(5) Tertiary Treatment (Disinfection)

Disinfection technologies are discussed in Section 1. Although not typically required for land dispersal, if implemented for the communal OWTS, a ultraviolet light source radiation disinfection system is recommended. It is a relatively inexpensive and commonly incorporated technology and is now being used at the Chumash package WWTP. It produces no hazardous by-products, as does chlorination. If effluent is treated to Title 22 levels which allow discharging to grade, then disinfection is required.

The system uses germicidal ultraviolet lamps which produce short wave radiation lethal to bacteria, virus and other microorganisms. Throughout the years ultraviolet technology has become well established as a method of choice for its effectiveness, economy, safety, speed, ease of use. All UV sterilizers required sediment pre-filtration to reduce or eliminate the possibility that a targeted contaminant could "hide" behind a sediment particle in the "shadow" of the UV light and therefore not receive a full dose of UV light. Accordingly, manufacturers strongly recommend sediment pre-filtration down to a level of 5 microns or smaller. This requirement is compatible with the capabilities of advanced OWTS technology.

Disinfection will be required if surface distribution is used for dispersal. The costs associated include the addition of a disinfection unit, some minor additional maintenance costs and additional power costs to operate the system. Capital costs for disinfection are included in the system cost estimates which are identified as Title 22 compliant.

(6) Grease Traps

All septic systems are prone to a quick/early failure if grease is allowed to enter the septic system. A properly sized grease trap is an essential component to a successful communal treatment system. Although current County requirements assure new restaurants and other commercial facilities have properly designed grease traps, There are existing commercial properties without grease traps. It is highly likely that all food-serving establishments without Grease traps have failed or inefficient leach fields and dry wells. There are also commercial properties with cross-connected dishwater and sewage drains that will need to be re-plumbed. All OWTS or communal wastewater treatment options will require adequately sized and installed grease traps prior to connection to the communal or community system.

The Spreadsheet below was prepared with input from the three package plant vendors mentioned and compares their different design, cost and performance features.

Comparison of Some Options for Downtown Collective Treatment System

Flow Requirements: Advanced Onsite wastewater Treatment or package plant with the capacity for 55,500 GPD Commercial Max. Flows (30,600 GPD Commercial Avg. Daily Flows) with expandable capability in the future, if desired by the residential Community, for 268,400 GPD Residential Max. Flows (149,400 GPD Residential Avg. Daily Flows) for a potential future total of 324,000 GPD Max. Flows (180,000 GPD Avg. Daily Flows

	System Name	Hoot Commercial System	AdvanTex Commercial System	Membrane Bioreactor System from GE (MBR) "ZMOD-L" system with the 16M cassette
1	**System Type**	Integrated fixed film/ activated sludge(IFFAS)) treatment	Manufactured packed-bed filter systems. Scalable modules for varied flows, from onsite advanced septic to community treatment modules. Available in Package Plant configurations. Pre-engineered.	Pre-engineered, modular ultra-filtration based package plants for wastewater treatment and recycle, scalable for virtually any wastewater application from 5,000 gpd up to 5 MGD . Dual-trained for redundancy. System configurations include the Z-MOD S, fully containerized wastewater treatment plant as offered for the Commercial project, Z-MOD M skidmounted filtration plants to be combined with concrete process tanks, quoted as an option for the Commercial project which lends itself to expansion, and Z-MOD L skid mounted plants for larger projects such as the potential expansion to add residential wastewater.
2	**Adaptable for use downstream of a STEP System Approach?**	Yes, however a STEP System can be eliminated with a Hoot System	Yes. AdvanTex has a unit that is specifically designed to combine with STEP systems, as packed-bed filters benefit (reduced system size) from the pre-treatment provided in STEP tanks. Advantec also has a complete Title 2 package plant that can work independant of a STEP System.	Yes, However, utilizing MBR technology eliminates the need for Septic or STEP systems.
3	**System Description**	The package will consist of mechanical spiral screen/grit removal, equalization station, STM aerators for treatment, COP mechanical clarifiers, disinfection equipment & chamber, Post aeration, automated RAS & WAS valving w/ flow monitoring, sludge drying beds w/ polymer system, dual channel analyzers, VFD drives, integrated system controller w/ telemetry or remote monitoring. tertiary sand filter(title 22 certified).Can Meet Title 22 effluent requirements.	AdvanTex is a packed-bed bioreactor. Very few moving parts: primarily recirculation & dosing pumps feeding distribution manifolds. Treats to an advanced secondary treatment level in basic configuration and often adapted to meet higher levels of treatment, including Title 22 effluent qualities, by incorporating chemical feed systems, tertiary filtration, and UV disinfection. Advatex uses approximately 100hp per 1MGD as compared to MBR 500hp per 1MGD and activated sludge at approximately 350hp per 1MGD.	Skid mounted packaged filtration systems are combined with an enhanced activated sludge process producing tertiary level treatment. Advantages include skid mounting of most equipment for ease of installation; smaller footprint required than conventional treatment; simplified treatment process- no need for septics, STEP or other pretreatment except for grinder pumps or screening; cost competitive with other tertiary treatment technologies. MBR system are known for having the highest quality effluent of any proven wastewater processes. Biiological process equipment can be supplied by GE as required. Chemical systems are supplied for membrane cleaning. Effluent systems including turbidity measurement and UV disinfection. Z-MOD systems are easily expandable to accommodate residential if the community decides to join the Core Business District on the centralized system. The effluent will be Title 22 for discharge to the River or reuse.
4	**Resume of Installations**	30 years plus of experience in the Commercial Treatment Industry. With thousands of systems installed, For treatment systems that exceed 120,000 GPD, Hoot partners with a major international player in the treatment industry to bring you the Hoot-TEC treatment line of STM Aerators with a reduced footprint & automated process control.	Founded by professional engineers with specific focus on small community wastewater applications. Orenco designs, manufactures, and markets equipment for decentralized wastewater applications, including municipal, community, commercial facilities, schools, camps, and parks. Since the early 1980's, Orenco engineers have assisted customers in finding right-sized, affordable solutions in all 50 US states and in more than 50 countries around the globe. Detailed references for specific community systems supplied separately, including: Hebo, OR; Hillsdale, NY; Bethel Heights, AR; Elm Springs, AR; Starbuck, WA; South Alabama Utilities; Schodack Landing, NY; Amesville, OH. Other available upon request.	GE brings over thirty years of experience in onsite wastewater treatment and/or recycle for land development, commercial, institutional, and small rural communities, with over 260 packaged plant installation in North America and the Caribbean alone. Packaged Plant installations in California include Valley View Casino, Carneros Inn, Thunder Valley, Cache Creek, Viejas, Rio Vista, Malibu Pier, and Point Dume Village. A detailed referenced list and case studies are supplied separately. The Huntsville Tennessee System commissioned 2004, is similar in size to the community wide system needed for Los Olivos.

	System Name	Hoot Commercial System	AdvanTex Commercial System	Membrane Bioreactor System from GE (MBR) "ZMOD-L" system with the 16M cassette
5	**Can the system be established to treat the downtown and later be expanded to community wide flows, if the community chooses to do that?**	Absolutely, not only is it scalable but easily expandable. This type of treatment with its 1/3 footprint size compared to typical extended aeration can be mirrored or multiplied to meet future demand, this also allows for locating the process on a minimum amount of property or even indoors.	As noted above, the AdvanTex treatment system is modular and easily expanded as flows increase. Use of individual 42'x7.5' "RT" modules expand capacity in increments of 15,000 GPD.	There are 2 system configuration options: 1) Utilize the Z-MOD M plant for the commercial portion supplied with fewer membranes. Add membranes to the existing system and add up to 2 more Z-MOD M systems as residential flow is brought on line. 2) Install a singleZ-MOD L 96 for all phases of development.
6	**Recommended unit (with price) for initial treatment of 30,600 gpd Ave. flows and 55,500 peak flows to Title 22 standards.**	Hoot-Tec 30C, Quote pending on local regulations for redundancy(MNS Note, Price expected to be comparable to GE Package Plant System: Approx. $845,000)	Four units would be proposed for initial installation. AdvanTex Commercial RT units include the necessary recirculation and dosing tankage for process control. Disinfection and tertiary filtration will be added to meet Title 22 standards. Installed price for secondary treatment with tertiary filtration, disinfection and reuse pumps is estimated at $800,000.	Option 1- Z-MOD S fully containerized WWTP $ 695,000 Option 2 - Z-MOD M 16D $ 506,000 with bio tanks supplied by others. Effluent is tertiary treated WW for Title 22 reuse.(MNS Notes: Biotanks could cost an additional $200,000 for option 2. Both options add $150,000 for installation.)
6a	**Recommended unit (with price) for initial treatment of 30,600 gpd Ave. flows and 55,500 peak flows to drip system dispersal.**	Hoot-Tec 30C, Quote pending on local regulations for redundancy	Four units would be proposed for this option as well. AdvanTex Commercial RT units include the necessary recirculation and dosing tankage for process control. Installed price for secondary treatment with discharge pumps for delivery to drip dispersal field is estimated at $550,000.	recommend reuse
7	**Please comment on price assuming two possible levels of Effluent quality: Title 22 if we dump to the creek, and something less of we use a drip dispersal field.**	Will Treat to Title 22 for surface release.See price info above	Orenco can provide a packaged solution for both alternatives. The future addition of a Title 22 approved filter could be phased into the project and simply "bolted on" to the treatment train. AdvanTex systems can be designed around any effluent discharge requirements necessary. Pricing is typically expected to be between $12-$25 per peak treated gallon (installed) for Title 22 effluent. Price is typically expected to be between $9-$15 per peak treated gallon (installed) for non-title 22 effluent going to drip or other subsurface dispersal system.	MBR plus UV will treat to Title 22 for surface release .See price info above.
8	**Energy use (Cost per unit of wastewater treated?)**	9.18 kWh per 31,000 gpd	With lower power costs and lifecycle costs than many of the available options, AdvanTex-Facility is an ideal option for "green" projects. This treatment option has been used to obtain LEED credits on several high profile installations. Part of the benefit is that the system adjusts pump run times based on actual flow through the system, so energy is consumed based on real-time treatment system demand. Other systems typically operate constantly regardless of flow. To meet Title 22 effluent quality at 1MGD, average energy requirements would be approximately 1300 kWh/day. For phase one, energy use should average less than 100 kWh/day. The first LEED Platinum certification, Audubon at Debs Park in the City of Los Angles, used Advantex to achieve their water reuse. In Santa Barbara County, AdvavanTex was used by Goleta Water District to achieve their LEED silver certification rating at their upgraded Water facility.	For the commercial development, the plant energy requirements are approximately 170 kW/day.
9	**Sludge production (cy per unit of wastewater treated?)**	Based on the design parameters and the 31,000 gpd, the STM will produce 44 lbs/day of dry solids.	When combined with effluent sewer collection, typically <50% of conventional collection & treatment processes. It has not been necessary to provide separate tankage for sludge. Organic loading is maintained within the endogenous metabolic range. The endogenous coefficient (Cend) is typically 0.05 d-1. Solids sampling under normal operational conditions do not indicate gross sloughing. Cubic Yard of sludge production from wastewater unit is too low to estimate. For conservative estimating, 1/2 yd per year should be used.	almost identical to a conventional process, but the volume will be less as we waste at ~10,000 mg/L

	System Name	Hoot Commercial System	AdvanTex Commercial System	Membrane Bioreactor System from GE (MBR) "ZMOD-L" system with the 16M cassette
10	**Maintenance costs (i.e. hrs/week)**	1.5 man hours per week/	Maintenance of pre-manufactured, packaged PBF's is particularly service friendly and especially suited for management programs, due to a) Training and support of installers and service providers, b) Detailed installation and operation manuals that identify specific service, testing and troubleshooting techniques, c) Specially engineered mediums, that can be cleaned with a small pressure washer in the event of system abuse or overuse and put back into service within a matter of minutes, and d) Controls that monitor and alert service providers directly upon electro-mechanical malfunctions, as well as water usage and system functioning abnormalities. Controls also self-adjust treatment processes based on actual flows through the treatment plant so operators are not required to make basic system adjustments. As a result, the management of AdvanTex treatment systems can be more user-friendly, effective, reliable, and trouble-free than municipal alternatives and, in the event of an individual malfunction, much more manageable and environmentally friendly. Conservative estimate for O&M is $24,000 per year, or 6-7 hrs/wk. This would or 6-7 hrs/wk. This would include some provision for monitoring, sampling, reporting, and other compliance activities related to Title 22 requirements. If non-Title 22 option is pursued, O&M costs for phase I could be roughly half this estimate.	Available shelf and online spares, parts, service contracts and process tracking software. Membrane related maintenance should be negligible, say 10 hrs/year. The rest comes down to the equipment in the plant, which isn't any more than other processes
11	**Size of area required for treatment facility including sludge handling, etc.**	depending on equipment layout but typically 50' x 60'	Plant can be designed for secondary, tertiary, and disinfection within a 50' x 50' area. Septage handling (including dewatering and sludge treatment) will require additional space.	Package plant needs support of Bioreactor tanks with a total volume of 45,000 gallons to treat a 300/300 load. With Solids handling and disinfection, the plant footprint will be approximately 60' x 100' min.
12	**Odor**	Minimal	When operating normally, AdvanTex treatment systems are odorless.	A healthy MBR plant will have no odor.
13	**Aesthetics (screening?)**	see above (#5)	Mostly Underground in vaults, except for power drops and control boxes. Above grade alternative is available, and installation in existing buildings or new building can be evaluated. I either case (buried, above grade, or inside building) all system components have access hatches or lids for ease of maintenance. All hatches & lids can be manufactured in colors or patterns for least visual impact and highest aesthetic quality.	The package plant itself is easily disguised, Compact footprint allows installation inside existing buildings. The bioreactor tanks (up to 45,000 gallons are typically buried or at grade, with pumps located above ground. A sludge dewater unit would be required and space for bins to hold the sludge for shipping.
14	**Grease? (I assume grease is a problem for all options, so we intend to enhance enforcement on grease-traps in the commercial area)**	Grease removal by greasetrap at each parcel prior to collection	Grease removal by greasetrap at each parcel prior to collection	Grease removal by grease trap at each parcel prior to collection
15	**disinfection is desired regardless of system chosen. please comment on propriety of using UV disinfection (clarity of treated effluent)**	UV disinfection lights are used regularly on our Hoot residential units. Any make and model can be utilized with this treatment process.	Disinfection can be included or specified, and would be incorporated into any design to meet Title 22 effluent requirements. UV is the most common form of disinfection used after AdvanTex, based on the low turbidity effluent produced by the AdvanTex treatment process. All other common disinfection alternatives have been successfully incorporated into AdvanTex designs.	Disinfection Included

	System Name	Hoot Commercial System	AdvanTex Commercial System	Membrane Bioreactor System from GE (MBR) "ZMOD-L" system with the 16M cassette
16	**Services (Design, Installation, Equipment supply, construction, testing & start-up**	Hoot assists 100% with every phase of the project, we feel this is paramount for superior installations and long term relationships. We can supply you with previous project engineers, owners, operators, & USDA inspectors as references to this statement	Design assistance, installation training and assistance, Equipment supply, Construction inspections, start-up, and follow-up are all included in the price of the treatment package. Operation and maintenance manual and start-up fees will be single line items, additional services are provided when specifying Orenco equipment. Orenco Systems maintains contact with system operators through online "Operators Forum", where operators can discuss questions and issues with each other and with Orenco staff. Operators also receive periodic newsletters and invitations to training workshops held at Orenco production facility in Oregon and elsewhere throughout the country.	GE can offer assistance with design or provide complete engineering of the project. Design assistance, equipment supply, O and M manuals, project specific drawings, installation inspection, onsite startup, commissioning and training, and one year of 24/7 emergency phone support are included with each system. Following receipt of a purchase order, a dedicated project manager, mechanical and electrical engineers, and field service representative are assigned to the project and follow through until substantial completion. GE's Life Cycle Managers follow up for the life of the plant.
17	**Any other "brag points".**	Hoot Systems is a private family owned company which prides itself on quality, efficiency, and accuracy of its process designs. We offer a superior level of commitment not easily found in today's market	Small and Decentralized package treatment plants and their manufacturers are not all alike. Orenco has always been committed to the long term performance of its treatment systems; our engineers know that design integrity and project support matter. Orenco AdvanTex Treatment Systems meet the requirements of sustainability by protecting the "triple bottom line" of social, environmental, and fiscal benefits. For these reasons, AdvanTex is consistently chosen by developers and municipalities looking for wastewater technology that supports their sustainability goals. We are proud to have been the treatment system of choice for several LEED certified projects. Orenco has been the leader in small and decentralized wastewater management for over 25 years, and we are committed to maintaining that position through technical innovation, manufacturing quality, and long term project support.	As the need for clean water continues to become more pressing, GE is playing a leading role in preserving the environment and protecting public health with clean, safe water supplies. GE's teamwork, dedication, and persistence is responsible for bringing membrane systems to hundreds of sites in more than 40 countries, and numerous awards such as the Manning Innovation Award and the prestigious Stockholm Industry Water Award. . The UF Membrane division employs over 1,400 people worldwide with 850 staff employed in North America and is 100% focused on developing, manufacturing, and supporting leading-edge, hollow fiber water and wastewater treatment solutions. GE packaged onsite wastewater plants have been employed in numerous LEED Gold and Platinum faciliites arcoss North America, including the Solaire Building in New York's Battery Park, the first environmentally advanced residential tower in the country.
18	**Contact Info**	2885 Highway 14 E. Lake Charles, LA 76707 (888) 878-HOOT www.hootsystems.com	Orenco Systems, Inc./814 Airway Ave/Sutherlin, OR 97479/www.orenco.com/800-348-9843	ZENON Environmental Corp dba GE Water and Process Technologies/ 3239 Dundas Street West, Oakville, Ontario L6M 4B2 PH 905 465-3030

c. Implementation of Advanced OWTS/Modification of Existing OWTS

If this approach were adopted for the downtown core, the general requirements for installation of new OWTS or modifying existing OWTS's would include the following:

(1) Land Use process- The recently adopted SYVCP has established land use and zoning maps for the Los Olivos area. The downtown core system, if applied should be sized to potentially accept maximum allowable flows from commercial lots based on approved commercial uses as shown on this map, with the addition of capacity for public restrooms. The County will continue to issue permits for systems with flows of less than 2500 gpd.

(2) System Permitting- The County will continue to permit OWTS's that do not exceed flows requiring RWQCB permits. The current process for approving advanced OWTS's is:

(a) Chapter 29 of the County Code requires that a LUP/CDP be issued by County Planning & Development prior to issuance of an OWTS construction permit. In the case of a **change in use or remodel of an existing structure** connected to an OWTS, EHS staff will conduct an OWTS evaluation in order to determine if the existing system is adequate for the proposed use. If the existing system is determined to be adequate for the proposed use, EHS staff will sign the approved evaluation/certification permit and forward a copy to the case planner. If it is determined that the existing system is not adequate for the proposed use, a separate modification permit will be required. The review process for a modification permit is the same as for new construction.
(b) Once in receipt of the EHS "ready to issue" memo, P&D will make the LUDP-4 finding of adequate wastewater disposal. If all other requirements are met and necessary findings can be made, P&D will proceed to approve the LUP/CDP and forward a copy to EHS. Upon receipt of the approved Land Use Permit or confirmation of approval via e-mail, EHS staff will issue the OWTS construction or modification permit.
(c) OWTS's also require a Land Use Permit (LUP) by County ordinance at this time. It may be desirable to modify this requirement as this management plan is more fully implemented to streamline the permit process.

Current highlights of the existing County OWTS Ordinance include (Article II, Chapter 29, Sections 29-6 through 29-14 of the Santa Barbara County Code) the following requirements, followed by recommended modifications in bold:

- The purpose of the ordinance is to ensure that existing and future on-site **advanced treatment** disposal systems are constructed, serviced, modified, repaired and abandoned in a manner that protects the health and safety of the people of this county.
- A permit, inspection and final approval from Environmental Health Services is required for construction, reconstruction, repair, modification or abandonment of any on-site sewage disposal system or gray water system within the unincorporated area of the County. **New and replaced OWTS's shall be advanced treatment OWTS's as approved by EHS.**
- A satisfactory percolation or performance test report is required for any new on-site sewage disposal system, as well as evidence of depth to groundwater
- A Land Use or Coastal Development Permit from the County Planning & Development Department is required for any new structure to be served by a new on-site sewage disposal system.

- Permits are now valid for a period of one year (extended from six months).
- Hollow seepage pits and cesspools are prohibited. Upon discovery, they must be abandoned **and replaced with advanced OWTS's permitted by** Environmental Health Services
- Drywells are permitted only if leach lines are not feasible, as determined by a registered civil/geotechnical engineer with concurrence of Environmental Health Services. Drywells must be capable of absorbing at least five times the required septic tank capacity, after pre-saturation. A satisfactory performance test by a registered civil or geotechnical engineer is required. A 10-foot minimum separation to groundwater is required.
- Septic system inspections:
  - When a septic tank is pumped, all contents must be removed by a registered septic tank pumper and the tank must be Inspected for deterioration, corrosion, damage, evidence of disposal field failure or other deficiencies
  - Inspections and reports must be completed by a "Qualified Inspector." A "Qualified Inspector" is defined as a contractor with a sanitation systems (C-42), plumbing (C-36) or engineering ("A") license, or an individual who has successfully completed a certification program approved by Environmental Health Services.
  - Written reports, on forms provided by Environmental Health Services, must be submitted within 30 days of servicing of an on-site sewage disposal system.
  - **Advanced OWTS's shall be inspected, tested, maintained in accordance with manufacturer's recommendations, and reports submitted to EHS as required by the permit.**
- Failure of an on-site sewage disposal system is defined as: discharge to the surface of the ground or into any surface water, back-up into the structure, a need to modify the system, or a need to pump the tank more often than once in two years.
- On-site disposal systems are required to be upgraded to current standards **(advanced OWTS)** upon failure of the system or if the septic tank is deteriorated or if the top of the baffle is no longer above the liquid level within the tank.

(3) Shallow dispersal systems shall be considered, as they are sometimes a feasible approach where traditional leach fields are not.

(4) Future Connection to a Communal System – All new OWTS shall be designed to minimize the expense for future connection to a communal system. One recently installed new OWTS already has done this in anticipation of a future communal system being built.

(5) Dispersal Field Replacement: With some exceptions, most dispersal fields in the downtown core do not meet current standards. For most parcels, physical limitations would prevent any hope of success in installing an adequate dispersal field. Even if the effluent is treated to drinking standards, the water contributes to a potential soil over-saturation nuisance, and does not receive the full benefit of potential treatment by the soil. This over saturation includes liability issues associated with overlapping plumes of wastewater, effects on structural foundations, liquefaction of soil in an earthquake, perceived health issues by neighbors, etc. Dumping to drains that lead to watercourses and streams would require a higher level of treatment than these systems typically provide and each system owner would need to obtain additional County, State and Federal Permits. Whether such a permit is even feasible is in question. Certainly it would be very expensive to pursue, as such permits require biological studies, drainage studies, permit fees, possible easements, etc.

Each Parcel submitting a replacement design would be evaluated based on code compliance, and new leach fields installed accordingly. Exceptions to the standards should no longer be made. The concept of communal treatment with an associated communal dispersal field as suggested in the communal treatment option is one solution. Shared septic systems between neighbors are not allowed by the California Plumbing Code. Pumping from holding tanks has been suggested by some but is not permitted and could only be allowed as a temporary measure during repairs.

d. *Implementation of Repairs to Existing Systems*

Minor deficiencies to existing OWTS that do not meet the definition of a failed system may be repaired. Replacement will be required when either the septic tank or leach system fails. Other considerations that shall be applied to existing system repair includes:

(1) Water Use Restriction Requirement: If the system functions but the water usage exceeds the system design, the user may be required to implement water use reduction measures until the system fails and is replaced.

(2) Repair & Replacement timing: It is recommended that repair and replacement be scheduled in accordance with development of a communal system, or as existing systems fail, as defined above. It is also recommended that replacement of all systems be complete by the end of the recommended 20-year implementation schedule of this plan.

e. *Implementation of a Communal Treatment System for Downtown Core*

As is discussed above, the consideration of physical limitations, technologies, methods of treatment, and business community goals suggest a communal system serving the downtown core is appropriate, as many of the commercial parcels could not meet the standards and requirements of the Plan without some cooperative community efforts. This communal effort could include as participants any number or all of the downtown core parcels, depending on the need and desire of the owners.

The fundamental steps to implementation include: planning, funding analysis, community and Board of Supervisor coordination, permitting, implementation of a maintenance funding strategy, design, and construction. Much of this work would be accomplished with the help of contracted wastewater professionals.

The three principal options for a communal wastewater treatment system for the Downtown Core include: 1. Centralized Treatment Plant; 2. An Advanced OWTS Process applied to multiple parcels (STEP system); and 3. A Package Treatment Plant. Considerations for the implementation of these three general cooperative or communal options for the downtown core include:

(1) There are a number of centralized traditional wastewater treatment plant technologies that can be applied to the small number of parcels in the downtown core. The most common systems in this region of the Central Coast includes the traditional Advance Integrated Pond System (AIPS) or Facultative Pond treatment facility. These technologies typically require a larger foot-print than the advanced OWTS or package plant communal systems.

Local examples of the AIPS include the Buellton WWTP and the Mission Hills WWTP. The Buellton system is more compact, has less treatment time, and therefore requires more sludge handling. The Mission Hills plant has very large ponds which increases the treatment time of the beneficial bacteria digestion process and generates very little sludge. The larger storage ponds also allow for longer retention time for more nitrate removal. Both plants have percolation ponds. Both adaptations of the aeration pond technology have efficient nutrient reductions and reliability in meeting effluent quality requirements.

If implemented, a centralized treatment plant would require a significantly larger footprint than a STEP or package plant approach. Expansion of this type of plant would require the addition and/or enlargement of ponds, aeration equipment and associated power supply, and an increase in sludge handling and drying facilities.

(2) An advanced OWTS processes applied to multiple parcels (STEP System) approach can have a significantly smaller footprint per system when multiple systems are used throughout a neighborhood, or when used in conjunction with septic pre-treatment such as in STEP System (defined below). A detailed list of the OWTS technologies that were examined are included in Appendix 5. Although there are variations of in the collection methods from the on-site septic tanks to the communal secondary treatment system, a model approach with a track-record of success is the STEP system.

A STEP (Septic Tank Effluent Pump) system includes an on-site septic tank on each parcel, a screen chamber, and a small, high-pressure pump within the tank. The liquid waste is pumped through a small pressure line into sewer lines leading to the communal secondary treatment facility. Because of the septic pre-treatment, the secondary treatment facility can be much smaller than a traditional treatment plant, and can even be designed to be mostly underground and out-of-site.

Aside from the small footprint, other advantages of a STEP system for Los Olivos include:

(1) A history of success through various regions of the country, including California. STEP systems are in use in most states from California to Alaska and Florida to Maine, although the most rapid advancement of the use of this approach is in the western U.S. A sampling of communities with STEP systems include Susanville, (Spaulding) CA, Sonoma County (Monte Rio) CA, Lake County, CA (in development), Placer County CA, Los Gatos Ca, Penn Valley CA,Olympia WA, Yelm WA, Missoula MT, Camas WA, Somers CT, Mobile AL, Crystal Lakes CO, Browns IL, Eddyville IL, New Minden IL, Hillsdale NY, and Eckton OR.

It is interesting to note that Oregon's Department of Environmental Quality, for example, requires engineers to consider STEP systems whenever a new wastewater collection project is contemplated. The number of STEP systems is continuing to increase.

(2) The STEP concept places the primary treatment at the source, adding a level of accountability for the wastewater.

(3) Shallow burial of small-diameter mains means installation costs and disruption to the community is minimized during construction.

(4) Water infiltration and inflow are avoided because of the nature of the collection system.

(5) Consistency with the SYVCP goals to use OWTS technology, meets EPA guidelines, RWQCB requirements, County Environmental Health goals.

Disadvantages of a STEP system are typically cited as the added burden to the property owner beyond centralized treatment: maintenance of a septic tank. The only other significant disadvantage is the need for an easement for access to the STEP pump for power supply and maintenance, which is typically done by an association, district, or municipality. There are some examples of leaking STEP septic tank when improperly designed or installed.

The RWQCB has permit jurisdiction over all communal systems treating effluent from 5 or more dwellings being served by a common treatment and disposal system or any combination of commercial, industrial, or dwelling units having a total discharge in excess of 2,5OO gallons per day regardless of the mode of treatment and disposal.

Citations (More available upon request):

- STEP Pressure Sewers Are a Viable Wastewater Collection Alternative**,** David J. Tollefson and Robert F. Kelly, *Journal (Water Pollution Control Federation)*, Vol. 55, No. 7 (Jul., 1983), pp. 1004-1014 Published by: Water Environment Federation Stable URL: http://www.jstor.org/stable/25042008
- Crites, R. W. and G. Tchobanoglous. 1998. Small and decentralized wastewater management systems, McGraw-Hill Book Company, New York, NY.
- White, Kevin D., Kathryn A Wilhelm, W. Malcolm Steeves, and Harold C. Baker. 2000. Implementation of a decentralized wastewater management system employing reuse in suburban Mobil, Alabama. Water Environment Federation 73rd Annual Conference and Exposition on Water Quality and Wastewater Treatment, Anaheim California.
- Septic Tank Effluent Pump Systems, Harold L. Ball, P.E. and Terry R. Bounds, P.E., *This paper was first presented by Harold L. Ball, P.E., at the 1998 Conference on Environmental Engineering, in Chicago, Illinois. The conference was organized by the American Society of Civil Engineers.*

(3) The spreadsheet above compares three vendor approaches to package plant technology. A package plant system would be implemented in a fashion similar to a centralized system, but within a smaller footprint.

The AdvanTex system is specifically designed to be primarily underground, minimizing visual impacts. Major elements of the Hoot and GE systems can also be put underground. All three package plant approaches would require roughly the same area, and would fit within a parcel of ½ acre or less. A key consideration in size is the size of the aeration tank and treatment time. Also related to this consideration is the generation of sludge and the size of the sludge handling and drying facilities.

A key advantage to a package plant approach is the shorter time of construction, and certain economies associated with the maintenance of a consolidated, compact facility.

In San Luis Obispo County, the community of Los Osos has debated and considered both STEP and packaged plant systems. The community has had split opinions on the merits of each, and has had some vacillation through the decision making process. As of this writing, construction has been delayed because of this issue. The RWQCB regulates package plants, and would issue Waste Discharge Requirements for the facility. These requirements would include relevant Basin Plan requirements, monitoring program requirements, prohibitions, reclamation specifications, groundwater limitations, and provisions.

f. Collection System Options For a Communal System

The commercial communal treatment and dispersal system concept requires a collection piping system for the downtown core.

Conventional collection systems are typically installed in urban areas or areas of high population density. These systems are standard across the U.S. since the practice of installing municipal sewage collection systems began in the mid 19th century. They require large diameter piping which is constructed on a design grade with manholes routinely spaced throughout. They are designed to carry fluids and solids by gravity and have to be cleaned by mechanical cleaning equipment. Large pump stations are required to lift the sewage to higher elevations to maintain gravity flow. The minimum allowable pipe size for a conventional collection system is eight inches in diameter. These sewer lines are usually constructed at depths ranging from 5 to 25 feet and are placed in public or private easements. Due to the excessive depth of construction, a great deal of surface area must be disturbed. As a result, the construction of a conventional collection system can be very expensive.

There are alternatives to an expensive, traditional, deep gravity sewer collection system. The high groundwater table motivates the look at alternatives. There are three main categories of alternative collection systems with several variations within each category. They are pressure sewers, small diameter gravity sewers and vacuum sewers. Many collection systems consist of combinations of different alternative collection systems as well as combinations of alternative and conventional collection systems. These are described in greater detail below:

(1) Pressure Sewers

Pressure sewers are the most popular and most common of the alternative collection systems. They typically have small diameter (2 to 4 inches) PVC pipe, installed in shallow trenches just below the frost line in the same manner as a water line. In fact, a pressure sewer collection system resembles a water distribution system. The collection system has valves to isolate certain areas and cleanouts installed at the ends of each branch of the system. In order to move the sewage or septage, the pressure sewer system requires pumps at each household or at centralized locations.

There are two distinct types of pressure sewer systems, solids handling and solids removal. The solids handling system has grinder pumps at each household. The grinder pumps grind the raw sewage into a slurry before it is pumped into the collection system. The solids removal system has a septic tank at each household which provides pretreatment of the sewage, the same as a traditional on-site septic system with drainfield. The septic tank usually includes a screened vault to prevent solids from being discharged into the dispersal line. The flow into the vault is through holes about mid-height in the tank, which allows the solids to settle and the scum to rise so the effluent comes from a relatively “clear zone.”

A septic tank with the pump inside the tank is called a Septic Tank Effluent Pump (STEP) unit which has been discussed above. The one without the pump is called a Septic Tank Effluent Filter (STEF) unit. This approach is less common from the STEP approach. The STEP unit pump is usually a fractional horsepower and receives its power from the individual residence, or directly from the power utility. The effluent from the STEF unit must flow by gravity to another larger tank where it is pumped into the pressure sewer. These larger tanks are called cluster pump stations and usually have pumps of one to five horsepower. They receive power from the utility.

(2) Small Diameter Gravity Sewers (SDGS)

Small Diameter Gravity Sewers (SDGS) are constructed in much the same manner as pressure sewers, except they rely on gravity to move the septage from the septic tank to final treatment through small diameter pipes which follow the natural topography. These sewers are somewhat limited in their application because the collection lines must run downhill. However, if the topography is appropriate, SDGS can eliminate the need for pumps. SDGS rely on septic tanks for solids removal and a STEF tank must be installed at each household. It is not uncommon to combine pressure and SDGS systems in certain topographic systems.

(3) Vacuum Sewers

This type of technology has found limited use in the U.S. Vacuum sewers consist of small diameter collection lines which are placed on grade and can go uphill by using a stair step effect. A centralized vacuum station is required to create the vacuum on the collection system analogous to a vacuum cleaner. Some of the vacuum systems require special plumbing in the household while others use conventional household plumbing. Vacuum sewers are not usually combined with other types of collection systems.

(4) Comparison Between Conventional and Alternative Sewer Collection Systems

There are many factors to consider when deciding what system is best for a community. There are advantages and disadvantages to each type of collection system and these are site specific. Each site is different and one system does not fit all situations. In general, alternative collection systems should be considered for smaller rural communities with low population density and site specific environmental conditions. The cost effectiveness of alternative collection systems decreases as population density increases. This is due to the capital cost associated with each household connection and limited available space.

Physical site location conditions of the area are also a major factor. Shallow bedrock, high groundwater conditions, extremely flat or very hilly terrain and limited room for construction make alternative collection systems more cost effective than conventional systems. It is also critical in these alternative systems to use water tight septic tanks which have been field tested for leakage. It is also important to assure there is no storm drain cross-connection to the household sewer system. These systems must use high quality pumps and filter screens. A possible system routing for a communal system in the downtown core is shown on the following page.

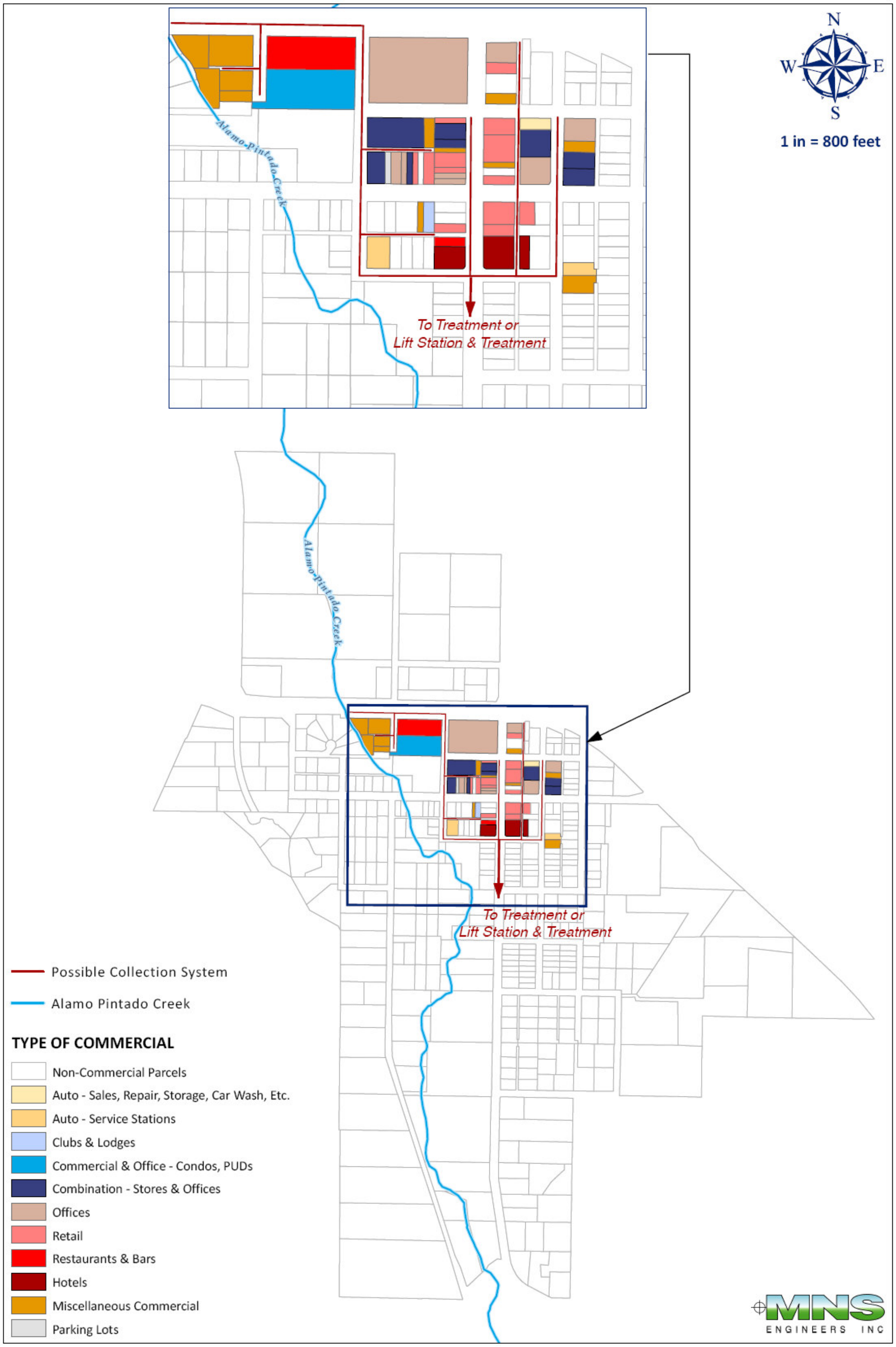
There are advantages to selecting a pressurized or vacuum collection system for the downtown core. The advantages are generally realized by the smaller pipe sizes required and the shallow depth of installation. These advantages include:

- Reduction of conflict with existing utilities, which would cause expensive relocations. A traditional gravity sewer system would likely have to be installed at an expensive depth.
- Reduced size of the pipe that would be required for gravity flow systems. Gravity mains would typically be 8” in diameter, a pressure or vacuum system would likely be 4”-6” in diameter.
- In certain areas of the downtown core, there is known to be a shallow depth to groundwater during the rainy season. Installation is very expensive in larger, deeper trenches under these conditions.

The principal disadvantage is the need for grinder pumps at each parcel to reduce solids and facilitate flow of materials through the system.

Wastewater Management Plan for the Township of Los Olivos

Possible Wastewater Collection System Routing



g. *Dispersal Options for Communal System*

Generally, treated wastewater can be dispersed to creeks or rivers if treated to Title 22 drinking water standards, or treated to an appropriate, lesser level, dispersed to percolate into and recharge the groundwater basin via percolation ponds, irrigation on open fields, leach fields, or shallow drip dispersal fields.

Dispersal Fields

A key factor in the success of a cooperative treatment system that utilizes a dispersal field will be the successfully acquisition of adequate dispersal area(s), either through long-term lease or purchase. Various types of dispersal systems may be considered depending on the level of treatment and characteristics of the dispersal field.

The maximum daily volume of effluent anticipated from the 52 commercial lots and two new public restrooms (counted the same as an additional lot for effluent calculations) is estimated at 55,000 gpd (See section 3.a.) with an average daily flow rate of 30,600 gallons.

Options previously discussed and to be considered would be:

(1) Traditional Leach Fields. This would only be a viable solution in areas where groundwater separation, soils and siting is not a problem. It is anticipated that this system will not be used unless conditions are ideal.

(2) Shallow Drip Systems. As discussed in the Residential component section (Section 8), this is a promising option. This option provides another level of aerobic treatment and nitrogen plant uptake.

Area required: For vegetation using 0.16 to 0.22 gpd/sf by evapotranspiration, such as grass or densely planted grain, a treated effluent or treated wastewater flow of 1000 gallons per day would supply the water needs of a planted area of 4600 to 6400 sq. ft. without having to add fresh water. Since we can over-apply, we will assume a 0.5 gpd/sf for the drip field loading. Applying the recycled water at this rate would require an area of approximately 55,000 gpd x 1/0.5 gpf/sf x .000023 sf/acre = 2.6 acres. Three (3) acres is recommended if a shallow drip system is used.

The key advantage of a shallow drip system is the elimination of the need for wet weather storage because the emitted doses of water are dispersed at a rate that will be accepted by the soil even when saturated. It is anticipated that for such a system, which can have redundancy within the same area, "set aside" areas normally required by the permitting agency would not apply nor be required. County EHS has confirmed they would support this approach.

(3) Surface Distribution. Because of public health requirements, the system effluent will be required to be treated to recycled water standards, and distributed using recycled water guidelines. The wastewater will require disinfection by ultraviolet radiation. If the wastewater can meet the strictest standards, there is potential for permitted release of wastewater to a local stream.

Spray irrigation may not puddle, mound or induce runoff from the site and therefore, there are restrictions on the amount of water that can be disposed of based on the evapotranspiration and the precipitation rates of the site. In addition, spray irrigation must be carefully implemented in anticipation of, during or 48 hours following a rain event to help protect the site from being inundated by effluent water before and after the rain event. Therefore, some wet weather storage and/or supplemental underground dispersal is recommended. The acreage needs are similar to that of drip irrigation, but storage tanks or a pond to accommodate wet weather considerations is recommended. Supplemental fresh water may be needed to prevent plant stress.

There are a number of larger, agricultural fields in the vicinity that may be suitable for dispersal fields. Fields may be leased or purchased. The recycled water has value as a constant, reliable source of irrigation water for animal feed grains.

(4) Treat to Title 22 drinking water standards and release to surface waters. This is the approach generally used by centralized treatment plants such as the Solvang WWTP. The Chumash package plant also treats its wastewater to Title 22 Standards.

This approach has the principal advantage of eliminating the need to purchase land for dispersal and the cost of a dispersal system. The disadvantages include the increased costs of additional treatment facilities, energy consumption, permitting and water quality testing requirement. This approach also also generally requires more monitoring and operation time.

h. Options for Handling of Sludge & Septage

The extent to which sludge or septage is generated will vary greatly depending upon approach. For a communal treatment alternative utilizing a STEP system, septic tanks at each lot will still need to be pumped at regular intervals. It is assumed that the current practice of transporting this septage material to a publicly operated wastewater treatment plant, under permit and inspection of the CCRWQCB will be continued. This current disposal method remains dependant on the willingness of a publicly operated treatment plant to accept the material.

Any of the options of advanced treatment or centralized treatment will generate a sudge by-product requiring handling, drying and disposal. Typically sludge is collected and sent to an on-site drying facility to reduce the moisture content and weight of the sludge. This is important to reduce the cost of shipping and cost for disposal. The typical drying facility options include evaporation beds and mechanical dewatering equipment.

It may not be practical to consider the construction of sludge drying beds. The location of the communal treatment facility may not be in a location where land for drying beds can be purchased economically, will be visually acceptable, or where concern for odors will permit them. The compact, low visual impact treatment site would be compromised with drying beds.

Pumping and trucking of the sludge to an offsite disposal facility may be preferred. In addition to trucking the dried sludge offsite, it may be possible, depending on the waste characteristics after treatment, for the sludge to be composted and utilized as fertilizer and/or soil amendments by the general public. The current recommended options for package plant treatment are capable of producing a sludge that currently meets composting-acceptable levels.

Class A biosolids, direct land application of sludge may not be viable over the long term. In San Luis Obispo County, an Interim Biosolids Ordinance has been adopted which in essence places a moratorium on any increase in land-applied biosolids. Composted biosolids are not impacted by the ordinance. Similar restrictions may be enacted in other areas of Califomia including Santa Barbara County.

Shipping WWTP sludge to existing composting facilities is common practice in Santa Barbara County. It is not recommended to create a new composing facility but use one or more of the same facilities used by other WWTP operators in the area. At an average daily flow of 40,000 GPD, up to approximately 250 cubic yards of sludge may need to be composted each year, depending on technology. The most efficient of the communal treatment options in reducing the sludge volume is the STEP system. A STEP system could reduce the sludge generated by as much as an order of magnitude, or 10%. However, because of STEP tank "pre-treatment" or digestion, much of the primary treated septage will remain in the STEP tanks and require pumping on a 3-5 year schedule and be trucked to current septage disposal facilities.

For information purposes, the following discussion on sludge composting id offered:

Existing biosolids composting facilities use appropriate laboratory testing to ensure pathogen removal, acquire the appropriate ratio of green waste to biosolid generation, and have the appropriate land available for the composting facility. Properly composted biosolids will meet the requirements for Class A, Exceptional Quality biosolids. This type of compost product can be used without restriction as a landscape amendment. However, because of the wastewater origin of biosolids, it is likely that compost may be subject to future increased regulation and restriction.

A typical ratio of 1/3 biosolid to 2/3 green waste (grass clippings/landscape trimmings) is maintained for successful composting.

i. Implementation Schedule for Commercial Component/Downtown Core Section of the LOWWMP

As previously mentioned, this LOWWMP can be viewed as two plans in one. The "Residential Component" section of the Plan addresses the future of residential wastewater treatment, and the "Commercial Component/Downtown Core" section of the Plan that addresses the future of commercial wastewater treatment which is defined here as wastewater generated from the commercially zoned downtown core.

A recommended priority of the LOWWMP is implementation of the Downtown Core component of the Plan. If implemented, the 52 parcels that compose the downtown core as identified in this Plan, could eventually be connected to a communal treatment system. Public restrooms could also connect to this communal system, and focus can then turn to facilitating residential conversion to advanced OWTS, as appropriate.

It is important that this plan partner with business owners and specific community organizations such as the Los Olivos Business Organization (LOBO), The Preservation of Los Olivos Organization (POLO), and The Santa Ynez Valley Alliance prior to adoption of the LOWWMP.

Anticipated milestones for implementation may include:

- Staff & Public Review
- Public Workshops
- Planning Commission Review
- Board of Supervisors Review
- Board of Supervisors Action
- Create and implement Details of Funding Plan
- Implement Guidelines and Design Requirements
- Implement Capital Project (Commercial Component/downtown Core)
- Implement Inspection and Operations & Maintenance Plan

If the downtown core component were to be implemented in the first five years, while residential conversion were completed over the next 10-20 years, a simplified model for water quality in Section 4b shows a possible Nitrate reduction scenario that will keep Nitrate levels (on average) at or below the action level for enhanced testing.

Although immediate efforts to implement a communal system is recommended if this approach is adopted, a practical implementation for 100% compliance of the requirements of this Plan is recommended in section 7g, “Repairs to Existing Systems” below.

j. Siting & Visual Effects

Communal treatments systems, if designed to maximize the underground installation of components, will have little visual impact on the community. Siting shall be either in existing County property, or acquired by negotiation and purchse. The site shall be in a location that facilitates an economical collection system, is not impaired with high groundwater, is near a source of power, and in an area with appropriate access. It should be downwind from nearby structures.

The STEP system, as an example, may have the following visual elements to consider:

1. Business will still be required to have grease traps and septic STEP tanks on their property. These components are underground and at grade, minimizing the visual impact.
2. The common OWTS system supporting secondary treatment for the downtown core will primarily be underground, except for a relatively small control panel and the electrical power drop and meter panel for the system. It is desirable to fence the area of the system for security and safety purposes.
3. The effluent dispersal system will be underground or spray irrigation with minimal or no visual impact.

k. Effect on Growth

This WWMP addresses the repair, upgrade or replacement of existing, substandard or failing septic systems. All analysis has been performed based on the existing 418 parcels within the Los Olivos Special Problems Area. The Communal OWTS for the downtown core will be sized based on the approved zoning in the recently adopted SYCP. In the case of some parcels, this will result in an assumed capacity greater than the parcel’s current use, if that use is less than the zoned potential. The system will also be sized to accommodate two public restrooms. There is no intent to size the system for future changes in zoning.

That being said, in the selection of commercially available tanks, pumps & equipment it is common practice to select the logical size to accommodate the flow requirements which sometimes provides a slightly larger capacity. Estimated flows are also by design somewhat conservative, as is the size of the dispersal field. This small excess capacity is not intended to be used, but to provide a measure of safety.

l. Cost Comparisons and Centralized Treatment

Developing a traditional, centralized treatment plant for the Special Problems Area or connecting to an existing centralized wastewater treatment plant is also an option, but is understood to be generally unpopular and would only become an option if local efforts to abate water quality contamination failed, and communal or OWTS options became impractical or infeasible.

As discussed in Section 9, connection to a centralized collection system is feasible, but very expensive and difficult to construct due to the high groundwater table. The costs for centralized vs. decentralized wastewater treatment for the Los Olivos Special Problems Area can be summarized and compared as follows.

Costs to Agency:

System	1. OWTS Treatment Costs ($ mil)	2.Dispersal &/or Land ($ mil)	3.Treatment Plant ($ mil)	4.Collection System + Laterals + STEP (if Applic.) ($ mil)	5.O&M Costs over 20 years ($ mil)	Total Cost ($ mil)
AdvanTex STEP System(Downtown)	.55	1.5		1.8	.5	**$4.35**
AdvanTex Package Plant (Downtown)		.5	.8	.4	1.5	**$3.2**
GE or Hoot Commercial Package Plant (Downtown)		.5	.85	.4	1.82	**$3.57**
Residential Advanced OWTS	7.3				.11	**$7.41**
Centralized Package Treatment Plant (Whole Area). Includes WW Storage, Sludge Handling & Building		1.5	4.8	3.8	4.3	**$14.4**
Sewer to Solvang WWTP			Unkown Annual Treatment Fee to Solvang	5.1	.35	**Unknown**

Maintenance Costs For Residents:

System	Annual Maintenance Cost	Notes
Communal OWTS (Downtown)	$9,360	Cost for 52 lots for STEP tanks if used. Includes sludge removal
Communal OWTS (Downtown)	$20,000	Cost for 52 lot Communal OWTS maintenance
Communal Package Plant (Downtown)	$91,000	If Package plant used. Includes water quality testing, maint. Worker half day.
Residential Advanced OWTS	$190,000	Total per year for 366 residential lots. Includes system maint, filter change, agency management fees, sludge removal
Centralized PackageTreatment Plant	$215,000	For all 418 lots, Includes full time staff, materials, solids disposal, etc

The soft costs for consultants associated with the implementation of this Wastewater Management Plan Include:

Establish Authority/Environmental:

1. Form Special Services District (Engineering Report, hearings, BOS adoption) $60,000
2. CEQA compliance $50,000

Residential Component:

1. Draft and adopt Ordinance & Code $15,000

2. Develop Engineering Standards & Standard details $ 25,000
3. Educational Component $5,000

Commercial Component:

1. Draft and adopt Ordinance & Code $15,000
2. Develop Engineering Standards & Standard details for Businesses (STEP tanks) $ 25,000
3. Obtain easements/agreements/ for STEP tank access $ 162,000 ($ 3,000 /business x 54 businesses), Secondary/tertiary Treatment facility ($30,000) & Distribution Field Design Collection System ($30,000)
4. Design Secondary/tertiary Advanced Septic Treatment System $ 100,000
5. Design Distribution System $ 40,000
6. RWQCB Permit costs $3500

Not included are New District Costs to buy computer(s), establish inspection and tracking protocols, and County staff costs.

m. Operation and Maintenance of Communal System

The following will be key elements for the long-term, on-going success of a communal OWTS:

- Mandatory participation in maintenance costs by users.
- Service of specialized equipment by vendors authorized/certified by equipment manufacturer.
- It is necessary that operation and maintenance of a communal treatment facility be performed by licensed operators. For example, the Santa Ynez Band of Chumash Indians has recently constructed a 200,000 gallon capacity communal wastewater treatment package plant on the Reservation. Per the license agreement with the EPA, the plant is owned by the Chumash, but maintained and operated by the SYCSD to help insure protection of nearby resources and the Santa Ynez River.
- In regard to the proposed STEP tanks, inspection and maintenance by either the property owner or a new Special Services District.

(1) Operation and Maintenance of the Communal OWTS

Operation and maintenance of any onsite treatment system requires an understanding of the system’s basic treatment processes, basic troubleshooting and diagnostics.

There are things that service providers can do to be detail-oriented and proactive about system maintenance and troubleshooting. Several of these are highlighted below. This information is provided to contribute to the overall understanding of the maintenance requirements of the recommended STEP System process.

(a) System Configuration, Components, and Component Functions. Service providers should have copies of and be familiar with all the system’s manuals (installation, operation, and maintenance) and be trained and authorized by the system manufacturer or manufacturer’s rep. Providers should have a schematic of each system’s configuration as shown in Figure 1 and should always keep a copy at the site (e.g., inside the control panel), as well as in the office files. Ideally, the service provider would also be involved in the system’s installation to ensure that consideration has been given to post-installation servicing requirements. For example, the service provider can ensure that all components are accessible for servicing from “ground” level, with no excavation required. The service provider can also ensure that effluent filters are visible from tank access openings and that the filter can be removed, without obstructions, for cleaning.

(b) Performance Expectations (Norms) at Each Stage of the Treatment Process. Secondary and advanced treatment processes are affected by influent flows and by influent strength. Most regulations and O&M guidelines focus on influent flows, but strength is even more important. The load on any given system is a function of "flow plus strength," which is called "mass loading."

(c) Routine Maintenance Procedures and Frequencies. Maintenance is classified as either preventive or corrective. Preventive maintenance anticipates the potential problems that cause down-time or that jeopardize the functioning of the system and includes actions taken to prevent equipment breakdowns. (Remember: "You can pay me now or pay me later.") Preventive maintenance includes equipment surveillance, servicing, lubrication, and operating a maintenance information system, which helps perform these functions efficiently. Preventive maintenance is cheaper than corrective maintenance and also provides a more efficient, reliable, and long-term operation with the least amount of annoying downtime for system users and the maximum amount of safety for operating personnel. Manufacturers are responsible for defining preventive maintenance procedures, frequencies, and expectations (norms) for all system components: tanks (sludge and scum monitoring), screens or filters, pumps, aeration equipment, manifolds (pressure residuals or squirt heights), control panels and meters, ventilation equipment, etc. Manufacturers and/or regulatory authorities should also define procedures, frequencies, and expectations for monitoring effluent quality. Service activities should be performed three months after start-up and then every 6-12 months, or as frequently as necessary. Typically, NSF certified systems require a minimum of four inspections with sampling during the first two years, and then annual inspections with sampling are recommended. Routine maintenance checklists are the service provider's best friend (see samples, Appendix). At start-up (and at regular intervals thereafter), the service provider needs to get together with the system user (especially residential homeowners) to review the Owner's Manual, which should be provided by the system's manufacturer. Users need to know:

- The "Do's and Don'ts" of system use and their role and responsibilities for cost-effective Preventive maintenance.
- Their responsibility for keeping their household plumbing in good (leak-free) working order.
- Their responsibility for maintaining the building sewer by ensuring that nothing but the building sewer is connected to the septic tank (not gutters, not downspouts, not perimeter drains, not water softener backwash lines, etc.)

These periodic meetings with the users also allow the service provider to track and record significant changes in the household (e.g., number of occupants, changes in water use, use of detergents/cleaners, disposal of cleaning compounds, etc.), which can help when assessing system performance. While providing O&M services, the service provider must be sure to use proper personal protection equipment, such as rubber gloves and clothing, to cover parts of the body that will be exposed to sewage or effluent.

One area of routine maintenance that's commonly misunderstood — both by system users and by service providers — are septic tank pump-out intervals. The pump-out interval must be long enough to ensure thorough digestion of solids for solids management. Intervals that are too short not only retard anaerobic digestion, but force users to pay significantly more for service and pumping. Service providers must periodically inspect and record tank liquid depths, color of scum, and color of effluent, as well as measure and chart the sludge and scum thickness with a scum utility tool to assure adequate clear space. Measurement of the septic tank sludge and scum depths should be done after the first year of installation and approximately every three years thereafter to determine when the septic tank needs pumping.

(d) Effluent Sampling and Other Indicators
To evaluate the operation and efficiency of all treatment and disposal facilities, service providers need to do effluent sampling on a regular basis.

(e) Advanced Troubleshooting and Diagnosis – Nitrogen and Denitrification
Nitrogen is a tell-tale performance indicator and a critical parameter to monitor and observe. As processes become overloaded or saturated, or as they begin to clog, oxygen transfer tends to suffer. Nitrifying microbes show the first signs of this. In packed bed filters, degradation in the nitrification process can be detected months before increased turbidity, BOD5, or TSS act as indicators of system distress or inefficiency.

The estimated cost of operating and maintaining this communal secondary wastewater treatment system is approximately $20,000 per year. This represents 2 days/month maintenance activity plus pumping and sludge hauling.

(2) Easements and Operation and Maintenance of the STEP Tanks

If a STEP system approach is selected. The issue of easements for operation and maintenance needs to be understood. New STEP tanks are commonly installed with the new common treatment system, but existing Septic Tanks may be used if sited properly and suitable for conversion. Many communities that have installed a community-wide STEP system own and maintain the complete STEP tanks, or own and maintain the STEP pumps & power supply and inspect the tanks. When this is done, it is for community acceptance, or to more readily assure this essential primary treatment process is protected and maintained across the whole community system. Failure or misuse of STEP tanks can severely influence the common secondary treatment advanced OWTS. One key consideration therefore, is the issue of easements.

If the system is publicly owned, STEP easements will be required. Elizabeth Dietzmann, J.D., discusses this issue in the 2006 “Small Flows Quarterly”. She points out that these easements are “unique and will require a new kind of easement language.” Traditional easement language will not cover the complexity of a STEP system, making these easements challenging to establish.

Also of critical concern is the maintenance of private grease traps. County Ordinance already specifies strict requirements for installation and maintenance of grease traps. However, it is known that inspection and enforcement has not been thorough in the past, so specific steps to assure compliance of this existing ordinance will need to be implemented for the Los Olivos Special Problems Area.

n. Operation and Maintenance of Centralized or Package Plant Treatment System

If the centralized treatment or package plant options were adopted the O & M approach would be simplified. The facilities would all be publicly owned, more centralized and maintained & operated by a public entity such as the County, another local service district or a new special services district.

The estimated cost to operate a centralized treatment and collection systems is $215,000, which includes full-time staff (estimated at 4), sludge disposal, plant operation materials & equipment.

o. Commercial Component Monitoring/Inspection and Reporting

As with all systems within the Special Problems Area, the existing septic systems in the commercial area should be inspected, and as systems are repaired or replaced, an on-going monitoring/inspection and reporting program should be implemented. A number of experts recommend implementing a GIS system for location and mapping, as well as for recording fundamental demographic system date, such as system age, repair history, leech system, type, condition, etc.

If or when a communal system is implemented, monitoring and inspection of the communal treatment system as well as grease traps should be a centralized function of the maintenance agency. It is recommended that this function be accomplished in conjunction with a operations and maintenance strategy described herein. The facility will be under the permit and reporting authority of the CCRWQCB, who will issues a wastewater discharge order and permit defining the obligations for monitoring, inspection and reporting.

Groundwater Monitoring: The groundwater in Los Olivos is rapidly approaching the action level requiring enhanced testing of nitrate contamination. Once tests show that the water crosses the 23 mg/l N03 level, it can be expected that all well owners may need to pay for testing imposed under CCRWQCB Groundwater Monitoring Requirements (GWR's). This is currently required in Region 4. Timely implementation of the plan may allow the community to avoid this.

p. Commercial Component Funding Options

The design, obtaining of necessary easements, formulation of a maintenance structure or contracting for maintenance, and construction of the communal system represent the initial costs of implementation. There will also be on-going operational and maintenance costs of the system, costs for sludge removal, and potential lease fees.

Funding mechanisms for initial capital costs are often covered by State grants, various types of low interest loans, and local agency funding or assessment funding. Or a combination of those sources. Section 7l summarizes the capital costs of various options.

(1) Grants and Loans

Several viable opportunities include:

(a) Environmental Education Grants: The Grants Program sponsored by EPA's Environmental Education Division (EED), Office of Children's Health Protection and Environmental Education, supports environmental education projects that enhance the public's awareness, knowledge, and skills to help people make informed decisions that affect environmental quality. EPA awards grants each year based on funding appropriated by Congress. Annual funding for the program ranges between $2 and $3 million. Most grants will be in the $15,000 to $25,000 range.

(b) EPA Clean Water State Revolving Fund (CWSRF) loans to fund water quality protection projects for wastewater treatment, non-point source pollution control, and watershed and estuary management. CWSRFs have funded over $68 billion, providing over 22,700 low-interest loans to date.

CWSRFs offer:

- Low interest rates, flexible terms
- Significant funding for non-point source pollution control and estuary protection
- Assistance to a variety of borrowers
- Partnerships with other funding sources

  Key features of the program include:
- Low Interest Rates, Flexible Terms—Nationally, interest rates for CWSRF loans average 2.2 percent, compared to market rates that average 4.6 percent. For a CWSRF program offering this rate, a CWSRF funded project would cost 20 percent less than projects funded at the market rate. CWSRFs can fund 100 percent of the project cost and provide flexible repayment terms up to 20 years.
- Significant Funding for Non-point Source Pollution Control and Estuary Protection—CWSRFs provided more than $220 million in 2008 to control pollution from non-point sources and for estuary protection, more than $2.9 billion to date.
- Assistance to a Variety of Borrowers—The CWSRF program has assisted a range of borrowers including municipalities, communities of all sizes, farmers, homeowners, small businesses, and nonprofit organizations.
- Partnerships with Other Funding Sources—CWSRFs partner with banks, nonprofits, local governments, and other federal and state agencies to provide the best water quality financing source for their communities.

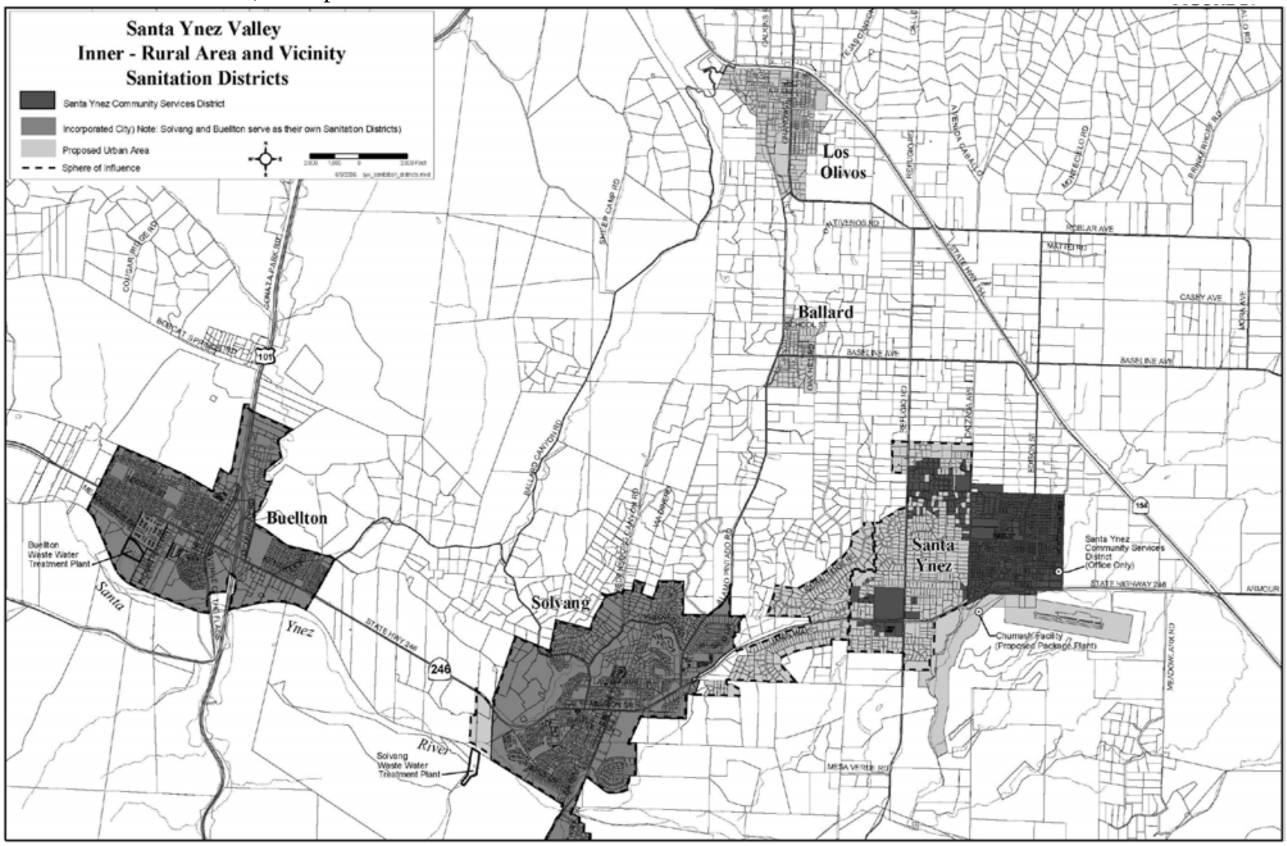
See http://www.epa.gov/epahome/grants.htm for more information on EPA Grants

(2) Special Services District

The SYVCP cites as one of its policies that urbanized areas are not to annex to existing sanitation districts or extend their sewer collection systems into these existing sewer districts. The goal is for wastewater to be treated locally in a communal system. This policy eliminates the possibility of annexing to the Santa Ynez Community Services District (SYCSD) or to the City of Solvang, but does not necessarily prohibit entering into an "out of area service agreement". Once a funding mechanism is in place, it may be desirable to consider such an agreement for system inspection and maintenance.
Within the Santa Ynez Valley there exists several Sanitary Districts. As can be seen in the exhibit on the following page prepared for the SYVCP, Los Olivos, as well as other areas in the valley are designated as "Urban Areas" potentially suitable for creation of a sanitary services district.

The formation of a special service district is a common occurrence, and State law along with County ordinance governs the process. There are approximately 3400 special service districts providing focused services throughout California. About 85% of these perform a single function. They localize costs and control costs. They have power to do things (corporate power), to raise funds (tax power), but do not have the ability to regulate private behavior toward a public goal (police power). 25% of service districts classify as "enterprise districts" and are run like a business and charge a fee for their services. About two-thirds of all special service districts in the State are "independent", meaning they have their own Board of Directors and are not dependant on any other governance board or structure. A community's voters usually elect a board of five directors for an independent district.

If formed, a Los Olivos Sanitary Services District would likely be an independent, single function, enterprise district.



Special districts have several ways to raise funds. These can typically include:

- Charge fees for services (most common)
- Collect property tax revenues (limited by Prop. 13)
- Issue bonds to pay for capitol improvements

Special Districts also have obligations. These include fees to assist in funding the Local Agency Formation Commission (LAFCO).

Advantages of a Special Services District are:

- Services can be tailored to citizen demands
- Costs can be linked to benefits
- Responsiveness to constituents

Disadvantages include:

- Districts can sometimes be inefficient compared to cooperative alternatives with other agencies
- Districts sometimes hamper regional planning because of frequent non-coordination of efforts with other entities in the region
- Districts can reduce accountability and create a "who's in charge" concern among constituency

Additional Web resources are:

- University of California, Institute of Government Studies
  http://www.igs.berkeley.edu:8880/library/localweb.html
- California Special Districts Association

http://www.csda.net/links.htm

- LAFCO Directory
  http://ceres.ca.gov/planning/bol/1999/lafco.html
- California Association of LAFCO's
  http://www.calafco.org/

(3) Special Assessment District

Special Assessment Districts, also called Benefit Assessment Districts or "Mello-Roos" Districts (named after the authors of the legislation) is only a fund-raising strategy and cannot provide services. For example, a Special Service District may use the creation of an assessment district to raise funds.

(4) County Funding

The County has demonstrated its commitment to participate in the funding of past studies, current water quality testing and the preparation of the Los Olivos Wastewater Management Plan. There is no capital improvement program budget for infrastructure at this time. The County will continue to investigate participation options as the LOWWMP is approved and implemented.

q. Commercial Component Authority and Liability

The principal regulatory authority for systems exempt from SWRCB permit requirements will remain with the County of Santa Barbara. The County Health Department has ministerial duties that cannot be delegated. For those not exempt from SWRCB requirements, the Central Coast Regional Water Control Board will have permitting authority. They similarly have ministerial responsibilities relative to water quality that cannot be delegated.

Most Septic and advanced septic systems will remain under the permitting authority of the County. One of the compelling reasons a WWMP must be prepared and implemented is to assure that authority remains local. Continuing water quality degradation will eventually elevate action and implementation authorities to regional and State and federal levels.

It is anticipated that the formation of a Los Olivos Sanitary District will create a local authority for action and funding for implementation of any portions of the LOWWMP that require inspection, record keeping, community education and outreach, etc

Anticipated agency roles are:

- <u>County of Santa Barbara:</u> Develop policies and requirements for design and construction of OWTS's, work with the newly formed Special Services District to determine appropriate level of inspection and details desired in record keeping. Coordinate with the CCRWQCB in the development of the LOWWMP, and water quality issues as appropriate. The County Health Department Environmental Health Services Division (EHS) is the designated administrative authority for OWTS throughout the County. As such it is responsible for enforcing State and local regulations & policies for the siting and construction of septic systems through an integrated permit, inspection and enforcement program.

  The County of Santa Barbara Public Works Department has expressed an interest in maintaining any new centralized wastewater treatment facilities as it does in other unincorporated areas of the County.

- SWRCB & CCRWQCB: The State Water Resources Control Board (SWRCB) is a policy making and enforcement Board of five appointed by the Governor. They are one of the Boards under the umbrella of the Cal/EPA. Their mission is to ensure the highest reasonable quality for waters of the State, while allocating those waters to achieve the optimum balance of beneficial uses.

  The Central Coast Regional Water Quality Control Board (CCRWQCB-Region 3) in San Luis Obispo develops and enforces water quality objectives and implementation plans that will best protect the beneficial uses of the State's waters. The CCRWQCB has nine part-time Members, also appointed by the Governor, and confirmed by the Senate.

  The CCRWQCB has developed a "Basin Plan" for their hydrologic areas, establish water quality requirements, issue waste discharge permits, take enforcement action against violators, and monitor water quality.

  They have the authority to require the development of this LOWWMP, and this Plan has been developed as a result of their request, in conjunction with the County Health Department desire to implement a Plan. The CCRWQCB has enforcement authority to levy fines, direct actions, or both.

- EPA: Works under Congressional Authority and implements federal policy and enforcement of clean water protections and standards to protect people and the environment. Fund education programs and some projects to meet these goals. Typically functions as a resource for standards, good practices. The EPA is not directly involved in the LOWWMP implementation

- Los Olivos Special Services District: If formed, this new locally governed Special Services District would have authority to raise funds and implement the goals of the LOWWMP. The operation and maintenance of the communal or collective OWTS for the downtown core could successfully be financed and operated under the management of this Special Services District. This would include the proposed collection system, the septic treatment facility, and potentially the dispersal fields. The LOSD may contract for staff support from a private contractor or another local community services district with the staff and expertise to provide the services.

  The community may alternatively choose to pursue a special assessment district, and then contract with another local District with qualified WWTP operators for operation of the plant. SYCSD has qualified personnel that could be contracted to assume these responsibilities.

  The CCRWQCB permits all commercial wastewater systems, and will permit the communal treatment system for the downtown core. They will need to approve the design, as well as authorize the system, method of treatment, level of treatment, operational strategy, etc. All reports and coordination will be with the CCRWQCB.

8. Residential Component

As previously indicated, this Wastewater management plan does not fully address all of the details of a residential component at this time. However, the following general requirements are anticipated. The details will be developed on a separate timeframe from the commercial component of the Plan.

a. Condition of Residential Onsite Wastewater Treatment Systems in the Los Olivos Area

This section is a general overview of the existing conditions and associated concerns for the condition of the residential OWTS's and potential solutions.

(1) System Maintenance, Age & Useful Life

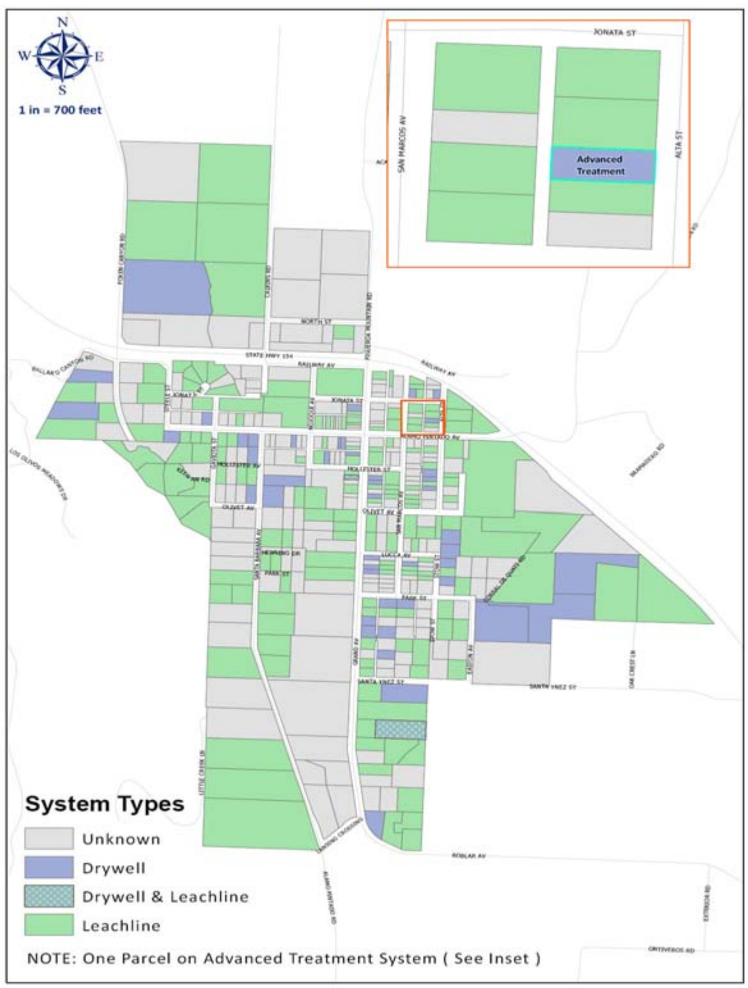
Septic tanks require regular maintenance. Pumping, or removal of solids must take place on a periodic basis or else the system will not retain its healthy environment for the anaerobic digestion process or the retention time needed for this digestion to take place. Pumping should be as-needed based upon inspection or experience but typically is done every 3-5 years.

The exhibit in Section 3b shows a map identifying the age of existing onsite wastewater treatment systems within the Los Olivos Special Problems Area boundary. The typical life expectancy of a septic tank is usually much longer than the leach field or dry well. The general life expectancy of a leach (dispersal) field or dry well is 20-30 depending upon the care of the user and the maintenance of the septic tank. The life expectancy of the dispersal field is also dependant on the soil type. (see item 4 below) The general life expectancy of a septic tank is 40-50 years. Most of the OWTS's in the Los Olivos area are 30-40 years old or older.

In the future, systems will require inspection, testing and, maintenance according to a schedule. Reporting and documentation is an essential part of the program succeeding.

(2) Dispersal System Types

The adjacent map shows the known dispersal field types in the problem area. Although some newer technologies for leaching trench dispersal systems are being utilized on some parcels, newer, cleaner technologies have generally not been adopted.



Leachlines are discussed in detail in section 8g. Drywells and possibly some old cesspools are in use in the Los Olivos area. Cesspools are not permitted, but some of very early origin have been found even in recent years in the Santa Ynez Valley.

- **Dry Well/Seepage pit**: The term "dry well" is rarely used for a wastewater effluent dispersal method in other parts of the country. However it is commonly used in this context in the Santa Ynez Valley and some other Central Coast regions. A dry well is a hole in the ground intended to receive septic effluent from a septic tank. A dry well is typically 40 feet deep and 4-6 feet square (or round) depending on the amount of drainage to be handled and the percolation rate of the soil.

Dry wells may be permitted where site space or soil conditions do not permit a conventional leach field. However even if effluent is successfully "disposed-of" it is probably not being adequately treated if it's coming out of a conventional septic tank.

- **Cesspool**: "Cesspool" means a single chamber with permeable sides and bottom to allow liquid to be absorbed into the surrounding soil while retaining solids within the chamber. These are not permitted in Santa Barbara County.

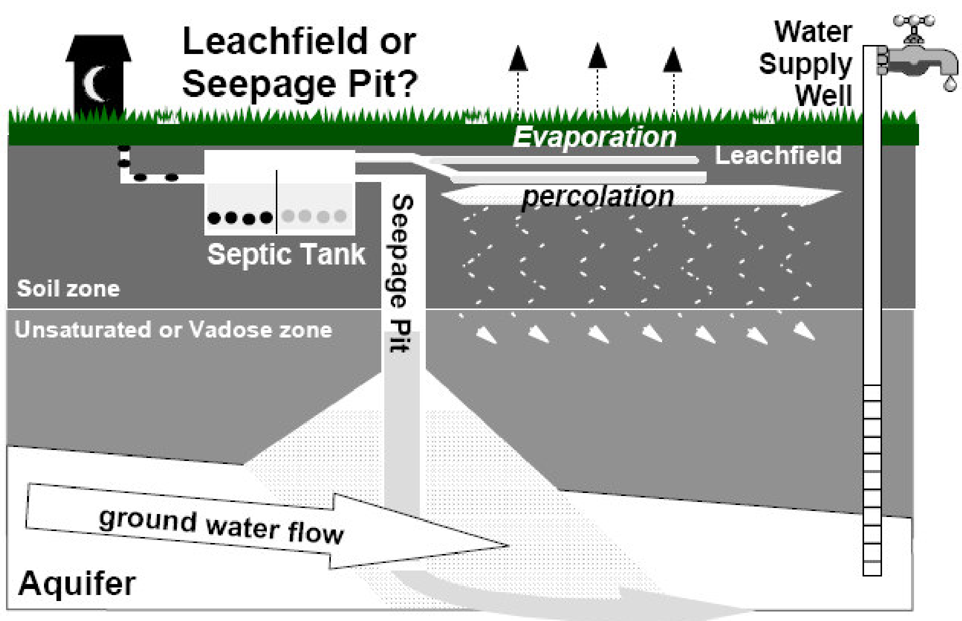
As mentioned above, older drywells/seepage pits that were not installed in accordance with current standards including adequate groundwater separation requirements, may not adequately be treating the effluent from a septic system. The EPA (ref . EPA District 9, 909-F-01-001 April 2001) provides the following perspective (keep in mind this quote applies to improperly installed systems):

“While the use of cesspools for sewage disposal has been prohibited in most states for a number of years, some local ordinances still allow for the construction of drywells as a means of dispersing effluent from septic tanks. When used in this fashion, they are more commonly called “seepage pits.” This method of effluent dispersal is deficient for a number of reasons:

1. Seepage pits disperse effluent in anoxic, or oxygen-poor, environments, where pathogens (especially viruses) may not be treated before they reach the water table. They place fluids below the root zone, where there is no immediate uptake by plants of the water and nutrients, nor is there the potential for treatment by evaporation or evapotranspiration.

2. If septic tanks and other treatment components are not properly sized, constructed and maintained, seepage pits may receive sewage solids (essentially functioning like cesspools.)

3. Water tables are not static, and may rise above the bottom of the seepage pit, flooding



it and allowing direct contact of pathogens and nitrogen species with ground water.

4. Seepage pit construction and use may open up pathways to cracks and fissures in rock, sending effluent directly to waterways.

5. Depending on their depth, seepage pits may allow contaminated ground water to pollute pristine aquifers.

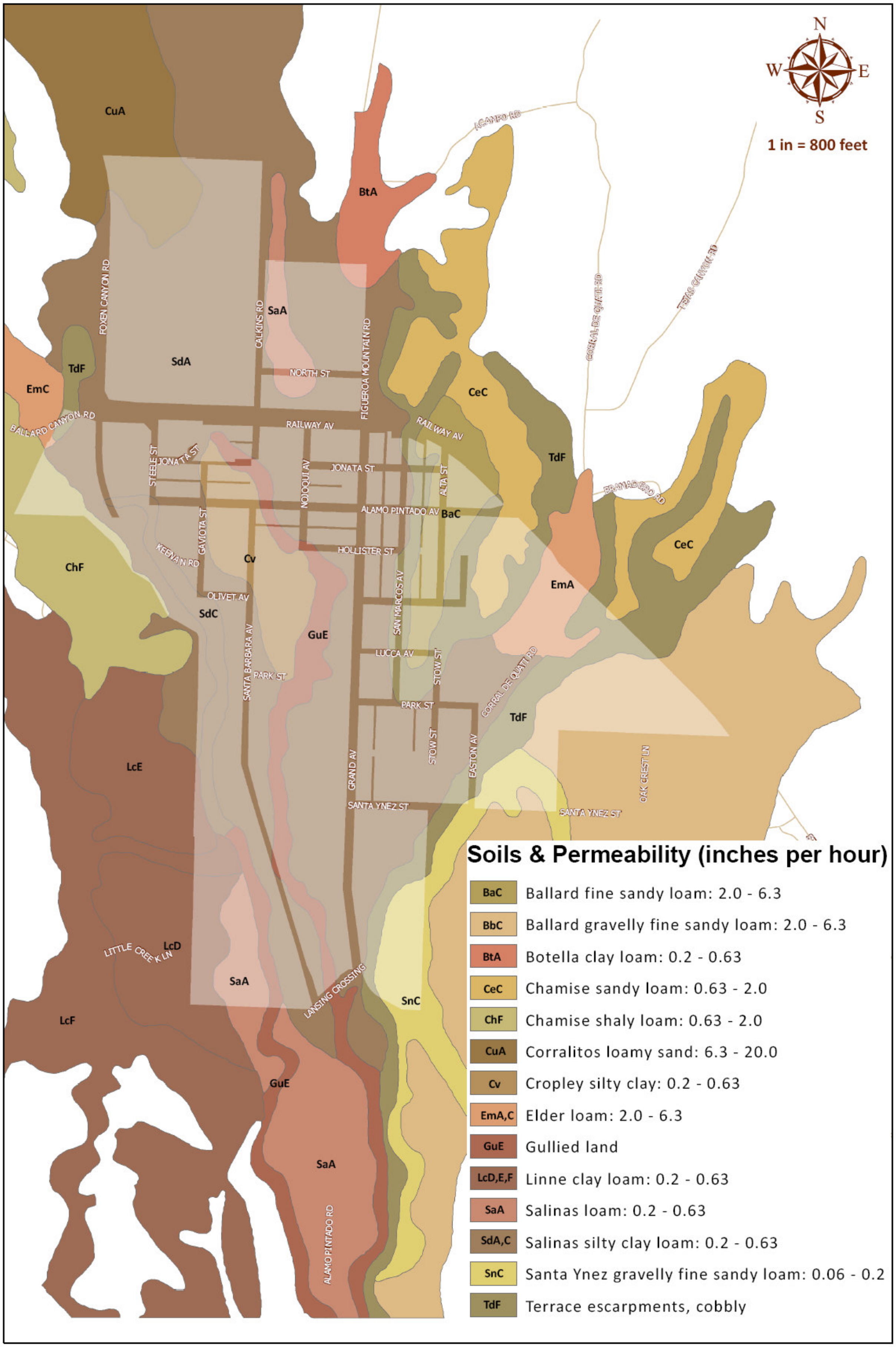
6. Seepage pits used for the disposal of untreated or partially treated industrial or commercial waste may pose additional hazards to ground water quality, if the effluent contains soluble toxics.

Seepage pits may cause other hazards not directly related to water quality. They are a hazard for people, animals and property that may fall into them. The Ground Water Office at EPA, Region 9 discourages the use of seepage pits for onsite sewage (or septic) system effluent, particularly on steep slopes, fractured rock areas, areas with shallow ground water, and/or areas where ground water provides the sole source of drinking water. Exceptions should only be allowed where the seepage pit is backfilled with cobbles or other weight-bearing material, where the sanitary waste stream has been treated (e.g., disinfection, nitrogen removal), and no other effluent dispersal mechanism is feasible. Regulators should assess cumulative impacts based on the number and types of other nearby subsurface discharges."

Even with advanced treatment there are concerns with drywells if there are inadequate set-backs, causing drainage plumes to overlap with others, extend into creeks & drainage courses or under structures, etc. It is recommended that drywells generally not be permitted except in very narrow circumstances in conjunction with advanced treatment systems and absence of critical concerns among those cited above. See section 8.h for further discussion and design guidelines for drywells.

(3) Soil Types

As discussed above, a key component in the success of onsite wastewater treatment is the dispersal field. The following map shows the soil types within the problem area. It can be seen that the various soils in the area have a wide range of permeability. A suitable permeability for OWTS dispersal is typically within the .006 - .34 in/hr Range (.8 - 5 gal/sf/day). Permeability within a soil classification can change widely with compaction, so must be determined through percolation tests.


N
W
E
S
1 in = 800 feet
CuA
BtA
SaA
SdA
TdF
EmC
CeC
ChF
Cv
GuE
SdC
BaC
EmA
LcE
LcD
LcF
SnC
FOXEN CANYON RD
CALKINS RD
FIGUEROA MOUNTAIN RD
NORTH ST
RAILWAY AV
BALLARD CANYON RD
JONATA ST
STEELE ST
NOJOQUI AV
ALTA ST
ALAMO PINTADO AV
HOLLISTER ST
KEENAN RD
GAVIOTA ST
OLIVET AV
SAN MARCOS AV
LUCCA AV
STOW ST
PARK ST
SANTA BARBARA AV
CORRAL DE QUATI RD
EASTON AV
GRAND AV
SANTA YNEZ ST
OAK CREST LN
LITTLE CREEK LN
LANSING CROSSING
ALAMO PINTADO RD
Soils & Permeability (inches per hour)
BaC Ballard fine sandy loam: 2.0 - 6.3
BbC Ballard gravelly fine sandy loam: 2.0 - 6.3
BtA Botella clay loam: 0.2 - 0.63
CeC Chamise sandy loam: 0.63 - 2.0
ChF Chamise shaly loam: 0.63 - 2.0
CuA Corralitos loamy sand: 6.3 - 20.0
Cv Cropley silty clay: 0.2 - 0.63
EmA,C Elder loam: 2.0 - 6.3
GuE Gullied land
LcD,E,F Linne clay loam: 0.2 - 0.63
SaA Salinas loam: 0.2 - 0.63
SdA,C Salinas silty clay loam: 0.2 - 0.63
SnC Santa Ynez gravelly fine sandy loam: 0.06 - 0.2
TdF Terrace escarpments, cobbly

(4) Depth to Groundwater

Design criteria for siting and design are intended to prevent adverse impacts on groundwater from onsite sewage disposal systems. The most important factors are the provision of sufficient depth of unsaturated soil below the dispersal field (or drywell) where filtering and breakdown of wastewater constituents can take place. Without adequate separation distance to the water table, groundwater becomes vulnerable to contamination with pathogenic bacteria and viruses, as well as other wastewater constituents (e.g. nitrogen). Highly permeable soils (e.g. sands and gravels) also provide minimal treatment of the percolating wastewater and normally require greater separation distances to afford proper groundwater percolation.

(5) Other Siting Concerns

Property line setbacks are important to avoid overlap of dispersal field plumes. Where there is a high concentration or density of septic systems in a given area (i.e. small lot sizes), the plumes overlap and groundwater can be degraded from the accumulation of nitrate, chloride and other salts that are not filtered or otherwise removed to a significant extent by percolation through the soil. Set-backs from creeks and drainage courses that flow into creeks are important to avoid dispersal field plumes from encroaching on creek water.

(6) Onsite Wastewater Treatment System Density in Los Olivos

Recognized as an urbanized area within the county, Los Olivos has many small residential parcels approximately ½ acre in size. Los Olivos has the same density characteristics of the other “problem areas” in the County and the urbanized trend is not reversing. The community is becoming increasingly popular and the pressure for existing commercial uses to expand to their legal capacity is evident. As tourism increases, a need for public restroom facilities will also increase. Dispersal field setbacks will need to be maintained, and parcel sizes remain large enough to accommodate them. Where these parameters cannot be met, advanced OWTS’s will be required to compensate for inadequate dispersal field area.

(7) Condition Of Existing Onsite Wastewater Treatment Systems.

Without periodic inspection by a trained and qualified individual, there is no way to know of the functionality or efficiency of a system. Experience has shown many residents neglect maintenance and ignore signs of system failure. One consistent element of every successful OWTS wastewater treatment management plan is a reliable maintenance and inspection program, which is a key feature of this WWMP. See Section 8q.

b. Traditional Onsite Wastewater Treatment

The State Water Resources Control Board defines traditional or conventional Onsite wastewater treatment as a “gravity-operated system consisting of a septic tank that receives wastewater directly from a residence or business for wastewater clarification.” After clarification of the wastewater by the septic tank, the septic tank effluent passes to the dispersal system field (generally trenches and pits) for percolation down through the soil for final treatment, eventually reaching groundwater. The vast majority of existing onsite wastewater treatment systems, perhaps as many as 99 percent, are conventional (CWTRC 2003).

While conventional systems can effectively reduce pathogens, soluble constituents resistant to biological degradation are not removed. Studies indicate that the effluent reaching groundwater from such systems seldom meets federal drinking water standards (Maximum

Contaminant Levels), especially for total nitrogen. Pathogens do pass through the septic tank treatment process and, where dispersal fields are inadequately designed, through the subsurface soils to groundwater intact [Rogers et al. 1988; AZDEQ 1997; USEPA (2002 and 1980)]; Peterson and Ward 1987).

Although [onsite wastewater treatment system] effluent, once in the groundwater, will sometimes be diluted so that the groundwater nitrate levels are below the Maximum Contaminant Levels, plumes extending from problem areas with a high concentration of these systems often violate the Maximum Contaminant Levels for nitrogen (Woessner 1987, Robertson 1995).

c. Implementation Schedule for Residential Section of the LOWWMP

This LOWWMP can be viewed as "two plans in one." A "Residential Component" of the plan that addresses the future of residential onsite wastewater treatment, and the "Commercial Component" of the Plan that addresses the future of commercial wastewater treatment which is defined here as wastewater generated from the commercially zoned downtown core.

These two components will be implemented on different schedules, and may even be adopted by the County on different schedules. The public workshop process will encourage discussion and dialogue, as well as partnership in the residential component of the plan. A future with clean water in the valley is the common goal. Public input discussion and dialogue prior to adoption of new guidelines and a specific timeline will be important.

This being said, it is also clear from the data that contamination and N03 concentration trends must be considered. A recommended implementation schedule, once the management plan is adopted, is a phased 20-year repair, upgrade and replacement program. Phasing means an initial emphasis on identifying and permitting improvements to older, non-functioning or poor-condition systems, followed by other priorities as established during a detailed inspection program.

It is anticipated that the adoption of the commercial component may be less controversial and may occur more rapidly than the residential element. The rational to proceed with implementation of the commercial component first is:

(1) There is a long-lead process of developing a detailed funding strategy & plan for a communal treatment system, as well creating the needed authority and implementation body, environmental and design work.

(2) The commercial lots represent 12% of the lots within the Special Problems Area but represent approximately 22% of the wastewater generated, all within an area known for shallow groundwater and small lot size. Starting with the downtown could make a significant contribution to the protection of water quality under Los Olivos.

d. A Review of Current Technologies for OWTS: Advanced and Traditional

In preparation of this Management Plan, a review of current technologies for residential septic treatment was reviewed. It is clear that advanced septic treatment is desirable in many instances in the Los Olivos area, however, in some instances traditional septic may still be appropriate if designed, installed and maintained properly.

This Management Plan does not determine and map which parcels will require advanced treatment, but will outline the criteria for determining when advanced onsite wastewater treatment is required.

Although new technologies are emerging at a rapid rate, we have summarized current technologies as of the publication date of this Management Plan in Appendix 5.

e. System Design Approaches and Innovations

In reviewing standards in several other problem areas and across the State of California, it was observed that the local design standards for traditional systems, although based on the Uniform Plumbing Code, and guided by some regional and local standards, are quickly becoming antiquated. More agencies throughout northern California, and an increasing number of southern California communities are adopting more stringent and comprehensive design recommendations and looking to industry resources and organizations such as the California Onsite Wastewater Association (COWA). These focused, special interest industry experts that are constantly developing new tools and strategies for effective OWTSs and dispersal fields.

Currently residential onsite waste water system design in Santa Barbara County is overseen by Environmental Health Services (EHS). The procedures specified for design are coincident with requirements from the Regional Water Quality Control Board, the California Plumbing Code, and some local planning documents and specific EHS standards. Landowners utilizing onsite sewage disposal systems must demonstrate that sufficient space and soil absorption capacity is available for a traditional system to operate within these guidelines.

(1) Percolation Tests

To determine the soil absorption capacity percolation tests are performed by a registered civil engineer. In Santa Barbara County and many places throughout the United States there is no standard for performing percolation tests. The only common practice among all jurisdictions is the percolation test is performed at the depth of the proposed dispersal field. It is recommended that the County adopt one or two acceptable methods for performing percolation tests to promote more consistency in results.

(2) Conventional Dispersal Fields

Conventional dispersal fields typically consist of 4” perforated pipes placed in beds of gravel at a depth of more than 16 inches below the ground surface — below the most biologically active soil zone — where oxygen cannot easily penetrate and the potential for further treatment is minimal. High Capacity leaching chambers set at a similar depth is a newer technology utilizing the same leaching principals and has become a standard alternative to traditional “pipe & gravel” dispersal fields. Over time, excessive biomat, will develop leading to drainfield clogging and failure.

(3) Shallow Dispersal Fields

In conjunction with advanced OWTSs, COWA promotes the use of shallow percolation fields no more than 12 inches deep wherever feasible. The theory of a shallow percolation system is not only to have percolation but use plant life to absorb the nitrogen rich effluent. More formally known as Shallow Pressurized Dispersal Systems (SPDSs), this concept is used to treat and disperse or reuse onsite wastewater in a manner that takes the greatest advantage of the treatment potential of the highly active shallow soil where 98% of soil microbes and 40% of plant roots are concentrated.

If used, a shallow dispersal system is designed with data from an Infiltration test which also determines dosing frequency. Shallow dispersal fields are superior in their effectiveness as well as efficiency in treating the effluent for nitrates. They are also a superior choice when shallow groundwater tables are present, as in most parts of Los Olivos.

In a well-cited report by Orenco Systems, Inc they state "The full potential of the soil to remove residual contaminants and pathogens and continue infiltrating wastewater can be best realized by using advanced treatment of septic tank effluent coupled with dispersal in the shallow soil mantle."

f. Advanced Onsite Wastewater Treatment Design

Using current technologies, it is possible to produce almost any required effluent water quality. In a 2002 study for the California State Water Resources Control Board (Leverenz et al., 2002), more than 200 vendors were identified for individual onsite wastewater treatment technologies. While the cost may be high with some of the technologies identified, developments are proceeding at such a rapid pace that treatment costs associated with advanced treatment systems are becoming more affordable and are more than competitive with centralized facilities, especially when the cost of wastewater collection is considered. Common treatment systems include packed-bed reactors, biological treatment units, and constructed wetlands.

Advanced onsite wastewater treatment, (also commonly referred to as supplemental treatment, alternative treatment, innovative treatment or pretreatment) is the preferred approach for system replacement in the Los Olivos Special Problems Area when a standard system cannot be installed to meet the standards, or if required by EHS or the SWRCB. Advanced OWTS provides active treatment prior to the discharge of wastewater into the dispersal field. Accordingly, septic systems with supplemental treatment rely less on the soil for treatment. Advanced treatment components can be discussed and distinguished by the type of treatment provided (Buchholz 1980, USEPA 2002).

The use of supplemental treatment systems increases soil wastewater acceptance and minimizes the possibility that untreated or partially treated wastewater will reach sensitive receptors or adversely affect human health (Tyler 1994, USEPA 2002, Carlile 1994). Because supplemental treatment occurs before the wastewater is discharged to the soil, thus providing treatment that usually takes place in the soil for conventional onsite wastewater treatment, onsite wastewater treatment with supplemental treatment components require less soil to provide the similar level of treatment provided by conventional systems. Accordingly, supplemental treatment systems are usually required where the soil lacks the capacity to treat the wastewater due to soil conditions (either quantity or soil type) or where water passes through the soil very slowly (e.g.: clay soils).

A generic specification for a recirculating filter-type advanced OWTS tank that is increasingly being used in the County of Santa Barbara is attached as Appendix 6. This is a generic spec for an Advantex system.

g. Dispersal or Leach Field Design

The following design guidelines for dispersal fields will be evaluated for potential inclusion in the management plan as the residential component is developed:

(1) Shallow Dispersal Fields

Possible requirement for shallow, drip dispersal fields.

(2) Traditional Dispersal/Leach Fields

For traditional leach fields, a uniform percolation test method shall be specified by the County and used with the current requirement for a minimum of three perc tests and one deep boring per field.

The design professional shall discuss in their OWTS design report, the soil absorption capacity based on soil type. The soil shall be classified to a depth of 4 feet. Sampling methods and laboratory techniques for soil classification for using the US Department of Agriculture textural triangle are available from COWA. Their publication "Understanding Soils for Onsite Sewage Treatment Systems", developed by the California Wastewater Training and Research Center at California State University, Chico.

(3) SYVCP Dispersal Field Related Standards

Standards from the SYVCP shall be adopted as minimum standards and in some cases where justified, more stringent requirements may be adopted. The SYVCP standards include:

(a) DevStd WW-SYV-2.1: To reduce the possibility of prolonged effluent daylighting, two disposal fields shall be built to serve each septic system as required by Environmental Health Services so that when one field begins to fail, the other field can immediately be put into use (for a total 200% capacity). An additional third expansion area (additional 100% capacity) shall be set aside where no development can occur, except for driveways on constrained sites as provided below in Development Standard WW-SYV-2.3. In the expansion area, a disposal field should be constructed when any other disposal field is in a state of failure.

(b) DevStd WW-SYV-2.2: For remodels of plumbed structures where the existing septic system must be enlarged, or where septic system repairs are required due to failure, in addition to the enlargement and/or repair of the existing septic system, an additional disposal field shall be installed to the maximum extent feasible.

(c) DevStd WW-SYV-2.3: Where feasible, measures to decrease the amount of nitrates filtering through soil to groundwater shall be required, including: 1. Shallow-rooted non-invasive plants (maximum root depth of four feet) shall be planted above all leach fields to encourage evapotranspiration of effluent and uptake of nitrates. Impervious surfaces, such as paved driveways, shall not be constructed above leach fields. If site constraints require a driveway to be located above a leach field in order to ensure reasonable use of property, turf block or other suitable pervious surface shall be used. 2. For properties of 5 acres or less and in areas with insufficient separation to groundwater, advanced treatment for the removal of nitrates shall be required on septic systems utilizing drywells as the disposal field. Existing septic systems that utilize drywells that have failed, or that need to be modified, must also install advanced treatment.

(d) DevStd WW-SYV-2.4: Septic systems and other potential sources of water pollution shall be a minimum of 100 feet from the geologic top of bank of tributary or creek banks (reference point as defined by Planning and Development and Environmental Health Services). Modifications to existing sources of potential water pollution shall meet this buffer to the maximum extent feasible.

h. Dry Well Design

Although dry wells have historically been allowed in certain circumstances in the Santa Ynez Valley, their use in the Los Olivos Special Problems Area will be scrutinized carefully. Exceptions used in conjunction with advanced OWTS's will be considered only in very specific circumstances where alternatives are infeasible.

(1) Approval for Use of Dry Wells

The types of conditions where it would be warranted generally include sites where soil, geologic and groundwater conditions are marginal, there is a history of problems, land area is limited, or where there is otherwise a high risk of impacting sensitive receiving waters.

(2) Guidelines & Requirements

1. New dry wells are generally not approved for use in the Los Olivos Special Problems Area.
2. Advanced treatment OWTS may be required with use of drywell.
3. New or replacement drywells will be required to include the installation of dual (200%) capacity fields in all new installations, in addition to advanced treatment OWTS.

i. New/modifications (increase in flow to existing systems)

(1) Existing traditional OWTSs: Applications for increases in fixture units (sinks, water closets, wash basins, etc) should be reviewed and handled in accordance with guidelines for new system application to allow for a close technical review of modifications or upgrades to the system. Advanced treatment OWTS will generally be required in the Los Olivos Special Problems Area, with exceptions only to parcels with ideal conditions for traditional OWTS. Increases in system size will only be permitted if within zoning guidelines, SYVCP guidelines, RWQCB and EHS guidelines.

(2) Advanced treatment OWTS. Where advanced treatment OWTS is in-use, the proposed increase in fixture units will be handled as a modification and system capacities will be reviewed. Increases in system size will only be permitted if within zoning guidelines, SYVCP guidelines, RWQCB and EHS guidelines.

j. Repairs

Similar to section i. above, significant repairs requiring EHS approval shall be reviewed and handled similarly to a new system application in terms of a close technical review of modifications or upgrades to the system. Advanced treatment OWTS will generally be required in the Los Olivos Special Problems Area, with exceptions only for parcels with a basic OWTS could be installed that meets all standards. Significant repairs may trigger the requirement for replacement or upgrade to advanced treatment OWTS, as appropriate.

Minor repairs may not trigger this level of review. Minor repairs consist of replacement of fittings, filters, valves, and the principal lateral to the septic tank. Replacement of the septic tank or dispersal field components are not considered minor.

k. Visual Effects

There are no community visual impacts associated with the adoption of the proposed OWTS guidelines for the residential component of the LOWWMP. Individual property owners should be aware, however, that control panels, and accessible lids to the mechanical functions of advance OWTS may be visible in their yards or on their properties. These can be low profile and unobtrusive, and if desired, easily screened with appropriate landscaping.

l. Effect on Growth

This WWMP addresses the repair, upgrade or replacement of existing, substandard or failing septic systems. All analysis has been performed based on the existing 418 parcels within the Los Olivos Special Problems Area. There is no centralized system, and new units are essentially a function of zoning. See section 8.i. for a discussion on new or modified systems resulting from increased flows.

As both components of this wastewater management plan are adopted and implemented, it is anticipated that the "Special Problems Area" status and associated additional development review will eventually be removed. This would eliminate an existing discouragement or limitation to development, and may be perceived by some as growth inducing.

However, this plan requires that new design standards and technologies be applied to the area permanently. It is possible that the costs associated with construction of advanced OWTSs and the associated maintenance costs, as well as sanitary district fees, even if modest, may discourage some growth.

m. Centralized Treatment

Collecting and moving wastewater from the Los Olivos Special Problems Area to a new or existing centralized treatment plant would only become an option if local efforts to abate water quality failed, and decentralized OWTS became impractical or infeasible.

As discussed in Section 9, connection to a centralized collection system is feasible, but very expensive and difficult to construct due to the high groundwater table. See section 9 for a discussion on potential costs for this option

n. Public Acceptance of These New Standards& Regulations

(1) Experience in adopting New Standards & Regulations

It has been shown in virtually every "Special Problems Area" in the State that has had a compelling health and safety need to adopt new standards for decentralized wastewater treatment, that the citizenry has been unhappy with the imposition of additional governmental regulations and the cost of retrofitting or replacing existing traditional onsite wastewater systems with advanced treatment systems.

This being said, it has also been shown that carefully implemented education and outreach are effective in gaining a level of acceptance and cooperation.

(2) Public Education and Outreach

Public outreach and education is an important component of any wastewater management program, regardless of the types of treatment systems used. The protection of public health and water resources is a community function that requires support from citizens in the form of user fees, state and local rules, and agency oversight. An informed and educated population will likely ensure that leaders from the public and private sectors act in the best interests of the community, and pursue policies and practices that are both effective and efficient.

EPA has developed a wide variety of training materials on conducting outreach and social marketing programs. Getting In Step: A Guide for Conducting Watershed Outreach Campaigns (http://www.epa.gov/nps/outreach.html) outlines the basic steps for outreach, and contains a wealth of case studies, examples, and resources that can be used by wastewater management programs.

Engaging and Involving Stakeholders

Outreach and educational efforts that seek to motivate action or support are almost always part of long-term, multifaceted programs that also include engaging and involving stakeholders, working with public officials, and securing financial assistance. In addition, projects that involve regulatory action or tax/fee increases are likely to spark considerable discussion, interest, and possibly concern. Involving the public, especially key stakeholders that will be affected by a new action, is highly recommended in these instances.

Stakeholder involvement methods work best when they are undertaken early, before any definite proposals are put forward. Ideally, stakeholders would be engaged after a problem or issue was first identified, so that they could be involved in characterizing it, studying its potential impacts, identifying who might be affected, and identifying what sort of solutions/responses might be warranted.

EPA produced a stakeholder involvement guide as part of the agency's nonpoint source pollution control program that contains useful information for those developing stakeholder involvement plans. The guide, called Getting In Step: Engaging and Involving Stakeholders in Your Watershed, explores a wide range of stakeholder involvement approaches and techniques and includes information on how to prepare for and facilitate meetings, deal with conflict, and build a sustainable program. This guide is available at: (http://www.epa.gov/nps/toolbox/print/stakeholderguide.pdf)

(3) Sweeping Mandatory Inspection-Upgrade Program Not Recommended –For Now

Presently, the County's Septic System Inspection and Reporting requirements are essentially a voluntary-type program, since they are linked to septic tank servicing activity. This is an excellent program element and has helped identify and correct a large number of onsite wastewater system deficiencies in the County. However, the problem areas of the County are in need of a more rigorous inspection program due to the age and density of the systems, difficult site constraints, and general lack of voluntary maintenance and retrofit implementation of advanced onsite wastewater system technology. The actual or potential threat to public health and water quality raises this issue. It is recommended that eventually mandatory inspections be implemented and all new and known failed systems be required to be updated to current standards.

If a mandatory upgrade for all systems is ever adopted, the general objective would be to require inspection and servicing of each onsite wastewater treatment system similar to that performed under the existing Septic Tank Inspection requirements. Some modifications or additions to the inspection work may be appropriate. One addition would be to require that the inspector conduct an abbreviated performance test of the system (sometimes referred to as a "hydraulic load test") to verify flow conditions and proper functioning of the system. Also, identification of additional details regarding the system components and layout may be warranted, since most properties in the Los Olivos Area have no system permit information on file with the County. A time frame for completion of the inspection work should be set (e.g., 3 to 5 years). It would be reasonable to exempt systems recently permitted and built, or inspected and upgraded. At the end of the inspection time frame a review should be made to determine the course of action for each area – i.e., whether or not to continue or disband the mandatory inspection program, adopt different requirements, encourage public sewerage or other measures.

o. Operation and Maintenance- Residential OWTS

(1) Importance of Proper Operation and Maintenance

Within the Los Olivos Special Problems Area, attention to long-term operation and maintenance of alternative or enhanced treatment and disposal technologies for OWTSs will benefit the ground water quality. Neglect of existing OWTSs and general disinterest in groundwater quality issues have contributed to the lack of proper operation and maintenance in the past. This is understandable as these are technical issues related to "unseen" resources. As Los Olivos transitions from passive to active advanced treatment systems, O&M will become not only more important, it will become critical. OWTS owners will need to demonstrate they have a contract with an approved vendor for system maintenance.

(2) Increased Oversight

A higher level of maintenance oversight will be necessary, which would be facilitated by the use of operating permits. Under the operating permit program, the County will specify an appropriate frequency of inspection and reporting, which in most cases will be annually. Special circumstances that should also be considered for the issuance of operating permits include, for example, onsite systems serving commercial facilities and multifamily residential developments. The current County of Santa Barbara “Evaluation Of Existing On-Site Sewage Treatment System” form. or an enhanced version of it, will be used. See Appendix 4

(3) Certified Service Providers

Service providers certified as specified in the County Code or authorized/certified by equipment manufacturers may inspect and provide assurance that the system components are checked and remain functional. The inspection work can also be done by properly qualified maintenance/service contractors or Special Services District staff.

When required, alternative or enhanced treatment systems will be approved only with a maintenance agreement with a properly qualified maintenance/service contractor.

(4) Septic System Septage Disposal

The number of residential septic tanks is approximately 367. When converted to enhanced or advanced treatment, the volume of sludge is not expected to be appreciably larger than current levels. If septic tanks are pumped when 1/3 full (estimated at 5 years and the average residential tank size is 1000 gals, the sludge generation is expected to be approximately 24,450 gallons of sludge per year on average. It is assumed that the current practice of transporting this material to a publicly operated wastewater treatment plant, under permit and inspection of the CCRWQCB will be continued. This current disposal method remains dependant on the willingness of a publicly operated treatment plant to accept the material.

p. Residential Component Monitoring/Inspection and Reporting

As has been discussed there are a number of levels of management that can be employed, from educational and fully voluntary programs to municipally monitored and inspected programs. Presently, the County’s Septic System Inspection and Reporting requirements are essentially a voluntary-type program, since they are linked to current septic tank servicing activity. This is an excellent program element and has helped identify and correct a large number of septic system deficiencies in the County. However, the areas of the County are in need of a more rigorous inspection program due to the age and density of the systems, difficult site constraints, and general lack of voluntary maintenance and retrofit implementation of advanced septic system technology. The actual or potential threat to public health and water quality raises this issue. It is recommended that all new and known failed systems be required to be updated to current standards.

Property owners utilizing onsite systems with advanced treatment are required to enter into maintenance agreements with manufacturer trained and approved technicians. The maintenance agreements (MA) require effluent monitoring for constituents of concern. Should the effluent quality not meet the standards specified in the MA, necessary repairs and or adjustments would have to be performed to bring the system back into compliance.

Should the LOWWMP be adopted and implemented, it is anticipated that all septic systems within the Special Problems Area will eventually require replacement of the standard septic tank with and advanced or enhanced treatment septic tank where standard systems do not meet the requirements. Another general objective would be to require an inspection and servicing of each septic system similar to that performed under the existing Septic Tank Inspection requirements. Some modifications or additions to the inspection work may be appropriate. One addition would be to require that the inspector conduct an abbreviated performance test of the system (sometimes referred to as a “hydraulic load test”) to verify flow conditions and proper functioning of the system. Also, identification of additional details regarding the system components and layout may be warranted, since most properties in the Los Olivos area have no septic system permit information on file with the County.

A time frame for completion of the inspection work should be set (e.g., 3 to 5 years). It would be reasonable to exempt systems recently permitted and built or inspected and upgraded. At the end of the inspection time frame a review should be made to determine the course of action for each area – i.e., whether or not to continue or disband the mandatory inspection program, adopt different requirements, encourage public sewerage or other measures. Essential components of the program will include:

1. Inspection Guidelines And Forms
2. Licensing or Certification for Inspection
3. System Performance Testing (Hydraulic Loading Test)
4. System Components and Configuration
5. Schedules for Compliance and Inspection
6. Post-Repair/Upgrade Inspections
7. Frequency Of Inspections
8. Plan for Measuring Effectiveness of the Inspection Program
9. Record Keeping and Record Management Protocol

q. Residential Component Funding Options

Repair and retrofit of existing septic systems shall be the financial responsibility of the property owner. Operations and regular maintenance are the responsibility of the property owner. The typical model for adopted Management Plans in other areas in the U.S. includes some regular inspection or testing program in order to assure compliance with the Management Plan. This program of inspection, follow-up and, in some cases, enforcement, implies some level of staffing funding. Various methods of funding are available that allow for collection or assessment of fees. These include:

(1) Special Services District

See Commercial Component Funding Options, 7.p.2

(2) Special Assessment District

See Commercial Component Funding Options, 7.p.3

(3) Funding Assistance Programs for Conversion to Advanced Septic

The following websites provide households (homeowners and renters) with loan and/or grant opportunities and financial assistance for converting to advanced on-site septic treatment. Unless otherwise noted, the household is responsible for contacting and applying for the assistance.

(a) California State Controller's Office
Property Tax Postponement for Senior Citizens, Blind or Disabled Citizens

Synopsis: Allows eligible homeowners to postpone payment of the property taxes on their principle place of residence. Special assessments are eligible for postponement. Additional Information: http://www.sco.ca.gov/col/taxinfo/ptp/index.shtml
How to Apply: Visit the link above and complete the required application, or call 1-800-952-5661

(b) California State Franchise Tax Board
Homeowner and Renter Assistance
Synopsis: Once-a-year payment to qualified individuals for part of their property taxes or portion of their rent that indirectly covers property taxes. Special assessments are not eligible for postponement, however, qualifying individuals can lower their overall tax liability by receiving the payment. Additional Information: http://www.ftb.ca.gov/individuals/hra/index.shtml
How to Apply: Visit the link above and complete the required application or call 1-800-868-4171

(c) United States Department of Agriculture, Rural Development
Single Family Housing Repair Loans/Grants - Section 504
Synopsis: Loan and/or grant to low income households for home improvements. Qualifying households may use funds for "on-lot" costs. Additional Information: http://www.rurdev.usda.gov/CA/pdf files and documents/SFH Repair504.pdf
How to Apply: Contact Al Correale at the Santa Maria Office, 805-928-9269 x4.

r. Residential Component Authority & Liability

The principal regulatory authority for systems exempt from SWQCB permit requirements will remain with the County of Santa Barbara. The County Health Department has ministerial duties that cannot be delegated. For those not exempt from SWQCB requirements, the Central Coast Regional Water Control Board will have permitting authority. They similarly have ministerial responsibilities relative to water quality that cannot be delegated.

Most residential septic and advanced septic systems will remain under the permitting authority of the County. One of the compelling reasons a WWMP must be prepared and implemented is to assure that authority remains local. Continuing water quality degradation will eventually elevate action and implementation authorities to regional and State and federal levels.

It is anticipated that the formation of a Los Olivos Sanitary District will create a local authority for action and funding for implementation of any portions of the LOWWMP that require inspection, record keeping, community education and outreach, etc

Anticipated agency roles are:

- Los Olivos Special Services District: This would be a newly formed Locally governed Special Services District with authority to raise funds and implement the goals of the LOWWMP. Actions for the residential component would include outreach & education, provide informational resources on wastewater technologies and solutions. Work with the County to determine appropriate level of inspection and details desired in record keeping. See the Commercial Component Authority and Liability Section 7.q. for additional discussion.

- County of Santa Barbara: See the Commercial Component Authority and Liability Section 7.q.

- SWRCB & CCRWQCB: See the Commercial Component Authority and Liability Section 7.q.

- EPA: See the Commercial Component Authority and Liability Section 7.q.

9. Centralized Treatment Options

If efforts at implementing a successful advanced OWTS and/or communal/OWTS treatment element of this WWMP fail, the alternative would be a traditional, centralized wastewater treatment plant with a collection system. This is currently an unpopular and undesirable option. This option is also in conflict with the SYVCP policy WW-SYV-3. Although this is the least desirable approach based on current community opinion, it is necessary to address as a known alternative with proven satisfactory results in reducing groundwater contamination in Special Problems Areas.

a. Evolving Waste Discharge Requirements from RWQCB

A future factor that may make this option more important to consider is the potential adoption of more stringent wastewater quality standards by the EPA or SWQCB that cannot be practically or economically met through advanced OWTS. This may include treatment for removal of pharmaceuticals, heavy metals, arsenic, or other chemical or elemental contaminants.

b. Los Olivos Area-wide collection system.

A potential routing for a "backbone" collection system that could serve the entire Los Olivos Special Problems Area is shown on the exhibit on the following page. The area-wide collection system is feasible, but very expensive and difficult to construct. See the discussion on wastewater collection system options. Traditional gravity sewer mains will range in size from 8" diameter to 16" diameter, and will be buried at a depth of between 6'-12'. Approximately 4 miles of sewer mains, 1 mile of 4" laterals and approximately three lift stations will be required. The estimated capital cost is for centralized treatment is $3.8 million.

c. Centralized Treatment Plant

Total project costs for a traditional AIPS treatment plant including obtaining easements, design, construction management and permitting could cost as much as $18.7 million. This option is not explored in detail as the preferred and somewhat similar option of a centralized package treatment plant is discussed below and in Section 7 of this document Note also that this is a "centralized treatment" option not in accord with the policies of the adopted SYVCP.

d. New Package Plant

A package plant with the capacity to treat the entire Los Olivos Special Problems Area would require a capacity of approximately 180,000-320,000 gpd. This facility is estimated to have a total project cost of approximately $14.4 million. The discussions and comparison's of package plants are discussed in the section 7 of this document. Note again that this may be considered a "centralized treatment" option not in accord with the policies of the adopted SYVCP.

e. Solvang Regional Wastewater treatment

The Solvang wastewater treatment plant lies downstream approximately 6 miles from Los Olivos. The City of Solvang wastewater treatment plant collects and treats wastewater from within the Solvang city limits and the Santa Ynez Community Service District (SYCSD) service boundary. The plant has a capacity of 1.50 million gallons per day (mgd) that is contractually allocated between the City of Solvang (1.21 mgd) and SYCSD (0.29 mgd). The Solvang plant capacity is currently reserved between these two municipalities but could accept additional flows from other areas in the region.

In addition to possible treatment plant modifications, a 6.7 mile long pipeline route would be required which may include up to a half mile of replacement of existing Solvang Trunk Mains. The estimated cost of construction for this collection system is:

32,700 ft. 15" trunk main =	$3.9 million
2,280 ft 24" and 30" Main replacement =	$370,000
6,000 ft 8" collection main =	$510,000
418 lateral connections =	<u>$1.04 million</u>
TOTAL	$5.82 million

*Assume no new lift station required
** Manholes and pavement repair included

It is unknown what cost-sharing fees would be required of Los Olivos if they were to connect to the Solvang WWTP, or if Solvang would adopt a policy allowing connection. It is known that the Santa Ynez Community Services Districthas purchased capacity in the City of Solvang's wastewater treatment plant rather than build and maintain its own treatment facility. Their contract with Solvang provides treatment of a maximum of 200,000 gallons per day. The district pays an administrative fee of 28.67 percent of the annual operation and maintenance of the plant based on a percentage of total flows, and an additional 20 percent of any capital improvements to the plant.

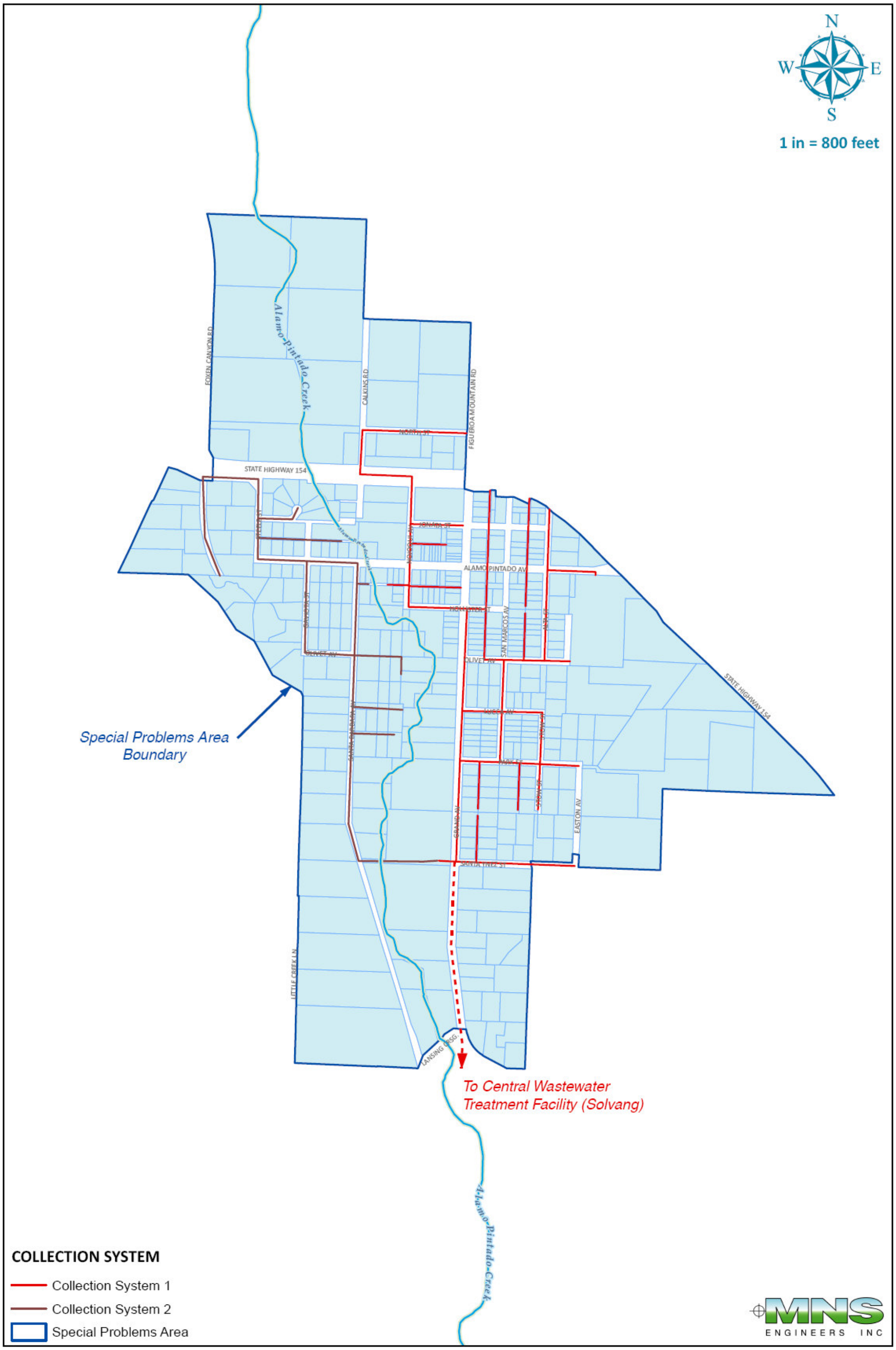
As stated above, the SYVCP language is intended to prohibit such an arrangement.

f. Joint system with Ballard

Because of the adopted Santa Ynez Valley Community Plan policy WW-SYV-3, the WWMP does not address in detail options to connect services between rural areas. This policy reads as follows:

"Annexation of inner-rural and rural area(s) to a sanitary district or extensions of sewer lines into inner-rural and rural area(s) as defined on the land use plan maps shall not be permitted unless required to prevent adverse impacts on an environmentally sensitive habitat or to protect public health."

Centralized Collection System Treatment Option



10. Record Keeping

a. *A Database and Record Keeping for Residential Systems*

Under the recommended category 2 or 3 management model for OWTSs (Section 5a), a data base will be developed. This data base will include an inventory of parcels, multiple parameters of OWTS status, metrics and progress toward meeting them, contact information, etc.

Effectively managing individual and clustered wastewater treatment system depends on data system inventories, inspection and service reports, and records ranging from installer contact information to manufacturer operating manuals. The availability of electronic database systems and online reporting and data retrieval capabilities has transformed information collection and management over the past 20 years. Management entities can now track system installation and even operation remotely and have the ability to view inventory and other information from their office or browser-enabled cell phones.

Inventorying wastewater treatment systems is often a huge undertaking for communities, which can take considerable time and resources. It is important that an inventory be designed to collect information in the most efficient manner possible based on a community's needs. The first step in designing a wastewater inventory is to identify existing sources of data. There are a number of data sources that can be mined to help build a system inventory, including property records, service provider records, billing/fee collection records, and permit records.

Inspections, Surveys, and Analytical Tools

Inventories of existing systems can be developed through inspections, surveys, and analytical tools. In many cases, developing a new management program, or enhancing an existing one, focuses on a group of wastewater systems believed to pose elevated risks to groundwater or surface waters, such as those in a well recharge zone or around a recreational lake. In these cases, inventory information can be collected and walkover inspections can be conducted simultaneously.

GIS tools for understanding, tracking and adjusting various elements of the WWMP could prove very useful. Maps showing installation locations, accounting of systems, dates and results of inspections, etc are valuable tools to demonstrate and maintain success.

Efficient record keeping involves the use of a data management system that includes database development, data entry, data access and retrieval, data analysis, and data use. The use of electronic databases, spreadsheets, and geographic information systems increases the ease of collecting, storing, retrieving, using, and integrating data. A basic information management system should include the following data:

- System owner and contact numbers
- System location and components from as-built drawings lot-level plans
- Site evaluation information and provider
- System designers, inspectors, and permitting officials
- Operation and maintenance activities such as dates, performing individuals, and reports
- Complaints including dates, responding personnel, and reports
- System rehabilitations (dates, as-builts, contractors, and approving official)
- Monitoring data (dates, reports, sampling, and analytical performers)

See the EPA website at http://www.epa.gov/owm/septic/pubs/dwm_4.pdf for more information.

b. Reporting

The CCRWQCB permits all commercial wastewater systems, and would permit the communal OWTS for the downtown core. They would need to approve the design, as well as authorize the system, method of treatment, level of treatment, operational strategy, etc. All reports and coordination will be with the CCRWQCB.

Most state and local governments now require reports regarding new system installations and major repairs, and some are also beginning to track inspections and services, such as tank inspections and pumpouts. Currently, Santa Barbara County, requires mandatory reporting of service calls by tank pumpers in order to inventory the systems and identify potential problems. Such reporting is often conducted as part of the management requirements for enhanced individual and clustered systems, which typically feature pumps, float switches, timers, and sometimes modems and other electronic equipment.

Maintenance Reporting

Reporting tools are typically used to monitor more advanced systems or those that are considered high-risk dischargers. Owners and service providers of these systems periodically file maintenance and monitoring reports with local or state agencies.

11. OWTS Education and Training

EHS and any facilitating funding organization shall provide or encourage training and education of septic system installers and pumping contractors.

Presently, the Environmental Health Services provides educational information and workshops for homeowners. As regulations change and different technologies come into more common use, installers and septic tank pumping contractors also require continuing education. This is needed to assure consistent understanding and application of practices and better performance and quality of onsite systems. There are a variety of efforts at the national and state level to provide improved education and training for all individuals involved in different aspects of onsite wastewater treatment and disposal. County EHS will strive to make contractors aware of educational needs and opportunities and facilitate or sponsor local training activities whenever possible. In the near future, additional training and accreditation may be required for contractors involved with the installation or maintenance of more advanced systems.

12. Monitoring Water Quality & Enforcement

Operators of public water systems in the area are a regular and reliable source of groundwater data. Water quality monitoring data from the public water systems in the area will be used to track water quality. Private well test data, as it becomes available will also continue to be used to track water quality.

The Santa Barbara County code requires that whenever an onsite wastewater treatment system i.e. septic system is serviced, all compartments of the septic tank are to be pumped by a registered septic tank pumper and the tank inspected for signs of deterioration, corrosion, damage, disposal field failure or other deficiencies. A written report of the inspection is to be submitted to EHS within 30 days of the service/inspection.

If the pump out report indicates that there is a problem with the septic system the determination is made whether or not a Recommendation to Correct or a Notice to Correct a Substandard Septic System is mailed to the property owner. The Recommendation to Correct deals with minor items where no repair permit is required. Examples would be conditions such as slow draining disposal field, missing inlet or outlet tees and undersized or obsolete septic tanks.

The Notice to Correct Substandard Septic System (NTC) mandates repairs that are required by Chapter 29 of the County Code and a 30 day time limit is given to correct the deficiencies. Examples of defects that would result in a NTC include septic tanks that are failing, made of inappropriate material or located beneath a structure. Also included are failing disposal fields, cesspools or hollow seepage pits. Such repairs require a permit and inspection by EHS.

If within 30 days Environmental Health does not receive verification that the deficiencies noted in the Notice to Correct Substandard Septic System have been completed then a second 30 day notice is sent out. After the second 30 day notice has expired then a Notice of Violation is sent out indicating which deficiencies are still pending and the property owner is given an additional 30 days after which a Notice of Determination of Fine is sent to the property owner.

The administrative fines for noncompliance could be as much as $100.00 per violation per day. At this time an Office Hearing is set up with the property owner. If the Office Hearing results in compliance the requirements of Chapter 29 of the County Code then the Director of Environmental Health Services may reduce the fines imposed as part of the Office Hearing. If the problem is still not resolved then civil actions can result. If the property owner contests the fines, they may appeal to the Director of Environmental Health Services for relief.