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STAFF REPORT IN SUPPORT OF A BASIN PLAN AMENDMENT TO PROHIBIT SEPTIC TANK DISCHARGES IN THE TOWN OF YUCCA VALLEY

California Regional Water Quality Control Board
California Environmental Protection Agency

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I. EXECUTIVE SUMMARY

The State Water Resources Control Board (State Water Board) and the nine Regional Water Quality Control Boards (regional water boards) are the "principal state agencies with primary responsibility for the coordination and control of water quality" (California Water Code (CWC) § 13001 of the Porter-Cologne Water Quality Control Act, CWC § 13000 et seq.). The State Water Board develops statewide policy, and each of the nine regional water boards adopts a region-specific water quality control plan (Basin Plan) in accordance with the California Water Code and the federal Clean Water Act (42 U.S.C. § 1251 et seq.). Basin Plans provide guidelines and describe the full range of regional water board activities that serve to optimize the beneficial uses of state waters by preserving and protecting water quality.

The Colorado River Basin Regional Water Quality Control Board (Regional Water Board) is responsible for protecting water quality within the Colorado River Basin Region (Region 7). The Region 7 Basin Plan provides the basis for the Regional Water Board's regulatory programs. The Basin Plan specifies beneficial uses and water quality objectives (jointly referred to as "water quality standards" in the Clean Water Act) for ground and surface waters within its region, and provides implementation plans that describe permitting options, waste discharge prohibitions, monitoring and enforcement, salt and nutrient controls, and other control measures necessary to preserve and protect water quality and beneficial uses. The Basin Plan also includes prohibitions on the use of septic tank-subsurface disposal systems (septic systems) in specific areas of Region 7.

Regional Water Board staff proposes to amend Chapter 4 of the Region's Basin Plan to also prohibit the discharge of wastes from septic systems in specific areas in the Town of Yucca Valley (Town), San Bernardino County, to mitigate and eliminate the threat of nitrate contamination to groundwater due to septic tank discharges. Because the Town lacks a municipal wastewater collection and treatment system, all residents and businesses in Yucca Valley use septic systems and subsurface disposal systems to treat and dispose of domestic wastewater. The only exceptions are Applebee's Restaurant, the Best Western Yucca Valley Hotel, and the Desert Vista Village and Drake Development subdivisions, which utilize on-site wastewater treatment package plants. Like many areas in California, the Town has experienced periods of rapid population growth and localized increases in septic system density, such as along the main business corridor, one of the areas addressed by this prohibition. This rise in system density in certain areas, combined with system failures due to age or inadequate maintenance in the Town as a whole, presents a significant threat to public health for Town residents due to increased wastewater loading to the vadose zone (unsaturated soil strata), and impacts to local groundwater used for municipal supply from nitrates, pathogens, and salts (total dissolved solids).

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To assist the Town and address the threat and impacts that septic systems have on ground water quality, the Hi-Desert Water District (HDWD) has prepared a Sewer Master Plan and received sewerage authority approval from the San Bernardino County Local Agency Formation Commission. In addition, HDWD is doing groundwater recharge studies for its basins to better understand potential impacts to groundwater quality from septic system discharges, and increased septic system density. The Sewer Master Plan calls for the construction of a municipal sewage collection and wastewater treatment facility (WWTF) in three phases. The prohibition bans discharges of wastes from septic systems in Phases 1, 2, and 3 in the Town, pursuant to a time schedule, with the prohibition becoming effective for Phase 1 (essentially the main business corridor in Town) by **March 17, 2016.**

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II. INTRODUCTION

Each regional water board is required to develop a water quality control plan, referred to as a Basin Plan, for the waters within its jurisdiction (CWC § 13240). The Basin Plan implements relevant provisions of the federal Clean Water Act and the California Water Code, and includes water quality objectives and beneficial uses for ground and surface waters within its region.

The Basin Plan also identifies implementation plans to achieve water quality objectives (CWC § 13242). Implementation plans may specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted (CWC § 13243). A prohibition on the use of septic systems must: "be supported by substantial evidence in the record that discharge of waste from such disposal systems will result in violation of water quality objectives, will impair present or future beneficial uses of water, will cause pollution, nuisance or contamination,[[1]] or will unreasonably degrade the quality of any waters of the state" (CWC § 13280). The current (2006) Basin Plan for the Colorado River Basin includes prohibitions on the use of septic systems in Cathedral City Cove, and in areas that overlie the Mission Creek and Desert Hot Springs Aquifers. These prohibitions were adopted in 2002 and 2004, respectively.

Regional Water Board staff is proposing to amend the Basin Plan to include a conditional prohibition of discharge from septic systems in specific areas of the Town of Yucca Valley (Town). Substantial evidence exists to indicate that septic system usage in the Town has caused a violation of water quality objectives in groundwater and threatens to cause conditions of pollution, contamination, and nuisance. The evidence also indicates that Nitrates from septic system discharges have impaired water quality and beneficial uses in the Warren Subbasin. Furthermore, failing septic systems and increased septic system density caused by periods of high growth can exacerbate nitrate contamination to groundwater. In short, the continued discharges of wastes from these septic systems would unreasonably degrade the quality of and result in widespread pollution of waters of the state. Therefore, the statutory requirements of CWC Sections 13243 and 13280 to impose this conditional prohibition have been satisfied.

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[1] "Pollution" is defined as "(1) an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects either of the following: (A) The waters for beneficial uses. (B) Facilities which serve these beneficial uses. (2) 'Pollution' may include 'contamination.'" (CWC § 13050(l).)
"Contamination" is defined as "an impairment of the quality of the waters of the state by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. 'Contamination' includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected." (CWC § 13050(k).)
"Nuisance" is defined as "anything which meets all of the following requirements: (1) Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. (2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. (3) Occurs during, or as a result of, the treatment or disposal of wastes." (CWC § 13050(m))

III. BACKGROUND

1. YUCCA VALLEY – GROUNDWATER USE

Historically, the sole source of municipal water supply for the Town is groundwater extracted from the Warren Subbasin, which is part of the Morongo Groundwater Basin. The Hi-Desert Water District (HDWD), the local water purveyor, initiated an artificial recharge program in February 1995 to reverse a decline in groundwater levels, which in some areas dropped about 300 feet from 1940 to 1994. HDWD operates thirteen supply wells in the Valley, and imports water from the California State Water Project (SWP) to recharge the Warren Subbasin through surface spreading. As a result of this recharge effort, groundwater levels have recovered by as much as 250 feet from 1995 to 2001.

Associated with the water level recovery, however, were groundwater nitrate (NO_3) concentration increases from background concentrations of 10 mg/L to levels exceeding the United States Environmental Protection Agency (USEPA) drinking water maximum contaminant level (MCL) and California Department of Public Health Primary MCL of 45 mg/L as nitrate (10 mg/L nitrate as nitrogen). As a result, HDWD removed wells 36L1 and 36K2 from service (see Figure B), and constructed a nitrate removal facility to treat groundwater extracted from three other impacted wells. The treated groundwater was then blended with well water not impacted by nitrate before distribution to the public. HDWD operated the nitrate removal facility from 2002 through November 2009.

In 2002, HDWD completed a "Drinking Water Source Assessment" report for each of its thirteen production wells. The assessment indicated that District wells ranked "very high" for vulnerability to nitrate contamination from septic systems, and that eight wells intersected nitrate plumes generated by septic system discharges. The District installed the above-mentioned water treatment facility to remove nitrates from groundwater. (Hi-Desert Water District, Source Water Assessments, December 2002)

In a 2003 report prepared by the U.S. Geological Survey, titled "Evaluation of the Source and Transport of High Nitrate Concentrations in Groundwater, Warren Subbasin, California" Water-Resources Investigations Report 03-4009 (USGS Report) (Appendix A), the USGS concluded that "septage from septic tanks was the primary source of nitrate (NO_3) to the ground-water system." (USGS Study, page 1). This USGS study was begun in 1997 in cooperation with HDWD and the Mojave Water Agency, in conjunction with the artificial groundwater recharge program.

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2. *YUCCA VALLEY – AREA DESCRIPTION*

The Town is in the southwestern area of the Mojave Desert, approximately 25 miles north of Palm Springs and 100 miles east of Los Angeles (Figure A). This southwestern part of the Mojave Desert is bordered to the north by the San Bernardino Mountains and to the south by the Little San Bernardino Mountains. The Town of Yucca Valley is the main population center in this area. The Town has experienced steady growth, increasing in population from 16,405 in 1992 to 21,044 in 2007. The current population is estimated at 25,500. Conservative growth estimates prepared for the Town of Yucca Valley by Stanley R. Hoffman and Associates indicate the Town's population will exceed 30,000 in 2021. These data were included in the Technical Advisory Committee's socio-economic sub-groups final report to the larger committee (see Section XI. Public Participation below).

Annual rainfall in Yucca Valley averages 6.5 inches with most of this water lost to evaporation. Evapotranspiration averages 66.5 inches per year. The Valley is located within the Morongo Groundwater Basin. The area topography typically slopes toward Highway 62 from the north and south, while storm water generally flows to the east via Yucca Creek.

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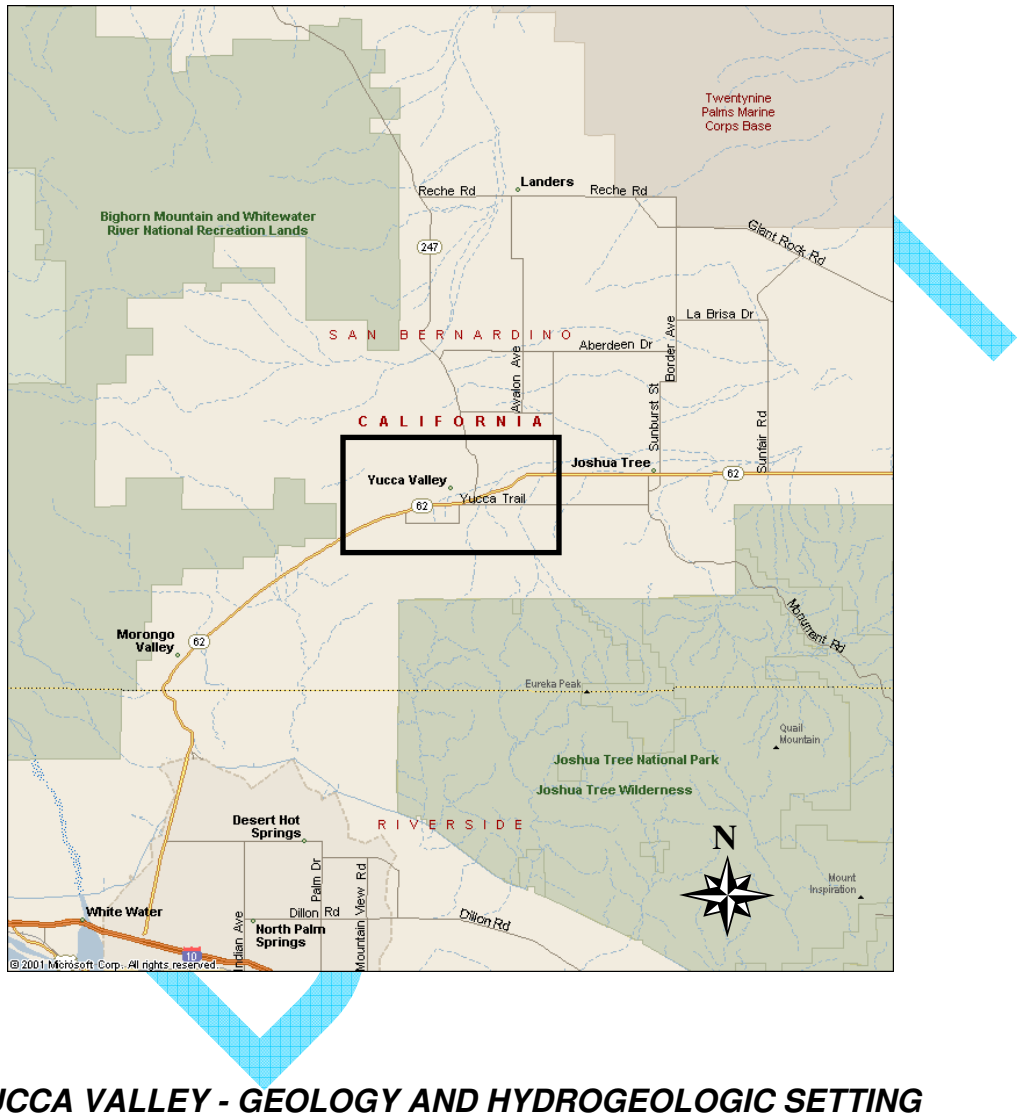
Figure A
Yucca Valley Location Map



3. *YUCCA VALLEY - GEOLOGY AND HYDROGEOLOGIC SETTING*

The Town is in the southwest corner of the Morongo Groundwater Basin. The Warren Valley Groundwater Subbasin (Warren Subbasin) is part of the Morongo Groundwater Basin, and it includes water bearing sediments beneath the Town and the surrounding area. The Warren Subbasin is bounded to the north by the Pinto Mountain fault, to the south by the Little San Bernardino Mountains, to the east by a bedrock constriction called the "Yucca Barrier", and to the west by a bedrock constriction/topographic divide that separates Warren Valley from Morongo Valley. Water-bearing deposits in the Warren Subbasin cover about 5.5 square miles (mi^2) of the 19 mi^2 Subbasin area. The hydrogeology is complex due to tectonic activity with faults compartmentalizing water-bearing deposits into five major hydrogeologic sub-units: the west, midwest, mideast, east, and northeast hydrogeologic units (Figure B).

Quaternary alluvial fan deposits overlie Tertiary aged basement complex throughout most of the basin. The alluvium consists of poorly sorted detrital sand and gravel eroded from neighboring mountains, and varies in thickness from a few feet along the basin border to more than 1,000 feet at the basin axis. The alluvium becomes slightly consolidated with depth, and finer grained down slope toward the basin axis.

Productive water-bearing sediments occur in the unconsolidated to partly consolidated Miocene to Quaternary alluvial fan deposits characterized by unconfined, interbedded gravels, conglomerates, and silts. These deposits average about 11 percent specific yield, and have well yields up to 4,000 gallons per minute. Regionally, continental deposits are interpreted to range up to 10,000 feet in thickness. Wells in the Warren Subbasin are known to reach 1,610 feet below ground surface without encountering bedrock. Geophysical studies suggest Warren Valley basin deposits may exceed 2,000 feet in depth (California's Groundwater Bulletin 118, Updated 2/27/04).

Natural recharge to the Warren Subbasin varies from year to year, and occurs by percolation of precipitation and ephemeral streams from Water Canyon in the north and Covington Canyon in the south, and from minor amounts of groundwater flow in the adjacent fractured bedrock. Natural recharge is supplemented by percolation of septic tank effluent, and State Water Project water delivered via the Morongo Basin Pipeline to spreading grounds near the Yucca Valley Airport (California's Groundwater Bulletin 118, updated 2/27/04).

In 1977, in response to an increasing overdraft problem, the Warren Basin was adjudicated by the Superior Court of San Bernardino County, and HDWD was appointed as the Watermaster for the basin.

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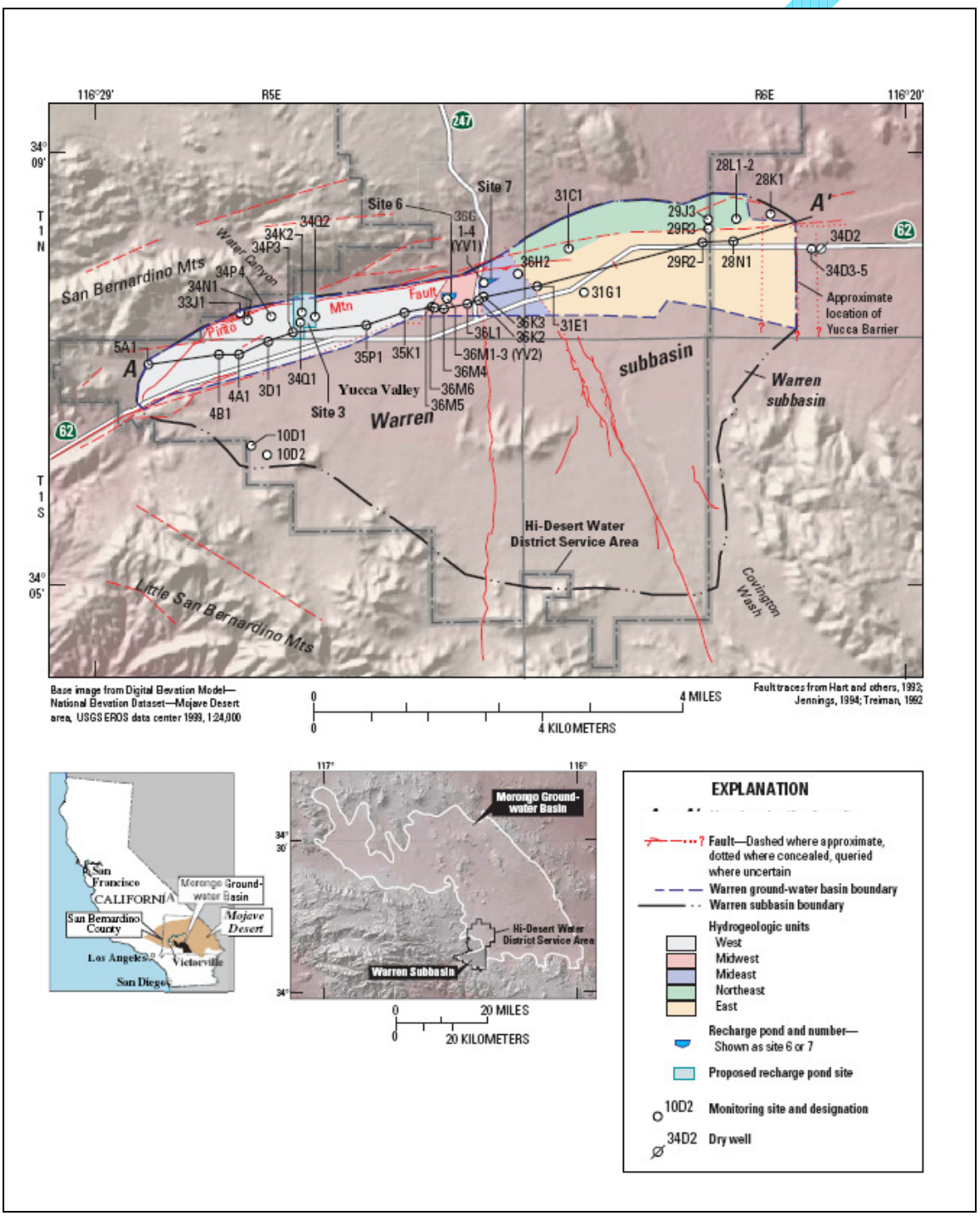
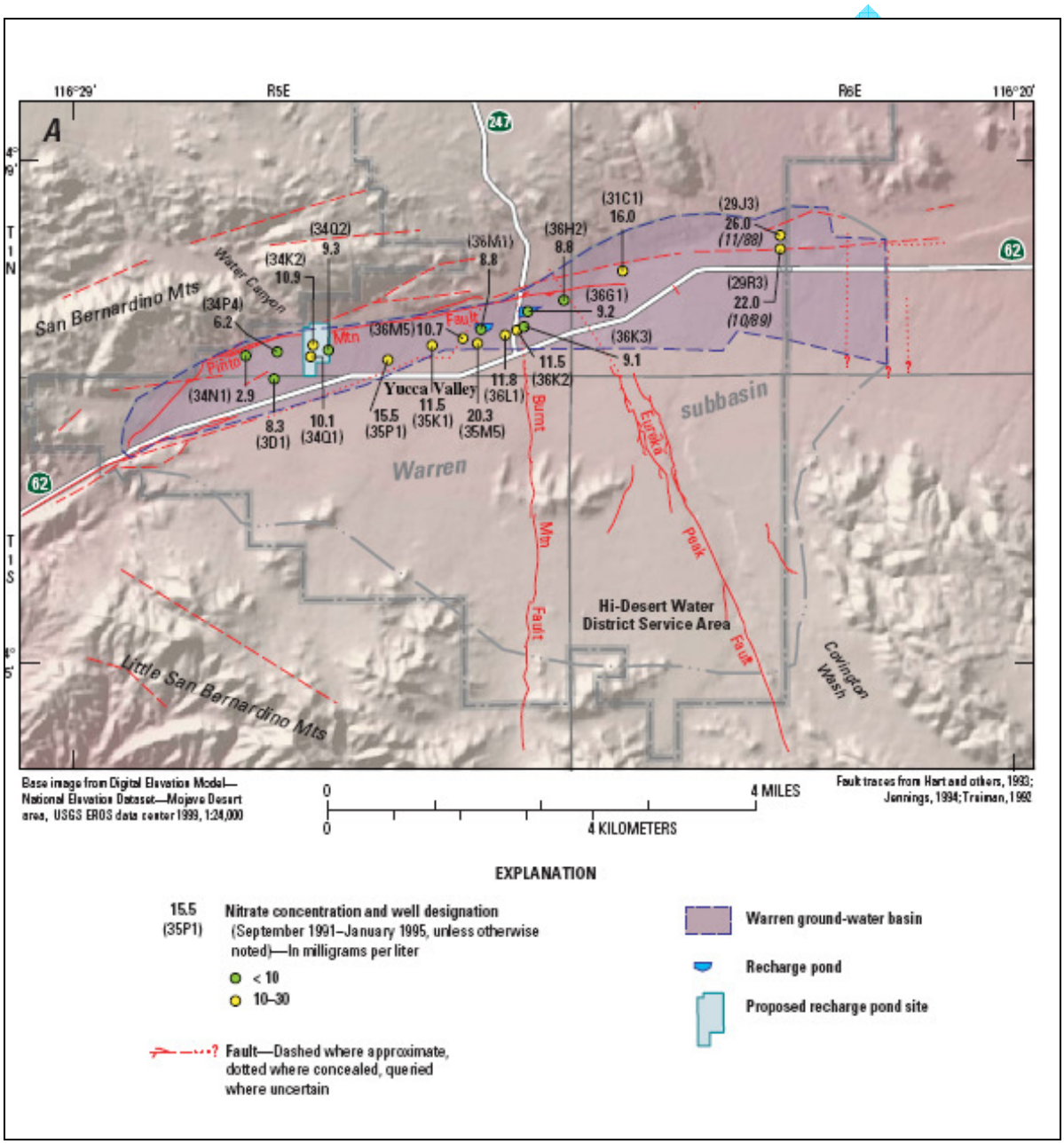
FIGURE B
Yucca Valley Water Bearing Hydrogeologic Units



from USGS Report 03-4009

Figure C
Municipal Wells & Recharge Basins



from USGS Report 03-4009

4. SEPTIC SYSTEM USE IN YUCCA VALLEY

HDWD estimates that it will service a population approximating 80,000 when the Yucca Valley area is completely developed. HDWD estimates that water was provided to 25,500 Town residents via 10,000 service connections in 2008, and that 8,500 housing units (including multi-family dwellings) are currently within its

jurisdiction. With the exception of a few units in new subdivisions serviced by "package plants" (small wastewater treatment facilities), all dwellings use septic tanks and subsurface disposal systems to treat and dispose of wastewater.

Businesses and restaurants in Yucca Valley are generally located along Highway 62, the main business corridor. There are fifty-three restaurants in the Town, and like most dwellings, all restaurants use septic systems for wastewater disposal except for Applebees Restaurant, which has an advanced treatment system and waste discharge requirements (WDRs) issued by the Regional Water Board. Other package plant treatment systems in the Town also have WDRs issued by the Regional Water Board (e.g., the Best Western Yucca Valley Hotel and Suites). Other than these few exceptions, wastewater discharges generated by businesses, restaurants, and housing units are not regulated by the Regional Water Board. Residential housing typically use leach fields for wastewater disposal, while businesses use seepage pits due to limited space.

Two relatively new subdivisions in Yucca Valley, the Desert Vista Village and Desert Knoll, with 105 lots and 177 lots respectively, each have a sewer system and package treatment plant designed for denitrification (i.e., nitrogen removal). Wastewater flows appear to be less than the minimum needed to successfully operate these package plants, however, due to poor sales of homes in the subdivisions. Without this minimum loading, the package plants perform similarly to community septic systems (i.e. provide primary treatment) albeit with long detention times. When home sales increase and hydraulic loads reach 20% of design flows (approximately 21 and 36 homes for each respective subdivision), the package plants should be able to adequately treat (i.e., denitrify) the wastewater flows generated by the subdivision residents.

The use of septic systems must be balanced against environmental and site-specific factors, such beneficial uses of receiving waters, depth to groundwater, as septic system density, and soil type. The systems must also be properly engineered, installed, and maintained, and soils must have the appropriate characteristics to handle the liquid loading from the septic systems. Soils in the Town are mostly porous and permeable with high percolation rates. These factors, combined with the high density of septic systems found in some areas of the Town,[2] are among the factors that contribute to septic system effluent, locally contaminating groundwater with salts (particularly nitrates). This contamination pathway was demonstrated in a 2003 study of the Yucca Valley area by the United States Geological Survey (USGS), which found groundwater contaminated with nitrates and other salts from septic system discharges (Appendix A). The contamination of the groundwater beneath the Town violates the Basin Plan's water quality objectives, which directly impacts the beneficial uses of the groundwater.

[2] Approximately 92% of the Town is zoned for residential and commercial development on one-half acre or smaller lots. The highest density occurs with multi-family zoning, which allows up to ten dwelling units per acre (see Appendix B).

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IV. REGULATORY BASIS

1. BASIN PLAN – BENEFICIAL USES

Groundwater in the area subject to this conditional prohibition occurs within the Warren Hydrologic Area of the Joshua Tree Hydrologic Unit.

Designated Beneficial Uses for Groundwater in the Joshua Tree Hydrologic Unit

Designated Beneficial Uses	Description
Municipal and domestic supply (MUN).	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
Industrial process supply (IND)	Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

Source: California Regional Water Quality Control Plan for the Colorado River Basin Region (CRWQCB--CRBR, June 2006)

Nitrate (NO_3), Total Dissolved Solids (TDS), and pathogens are the main constituents of concern in septic system effluent. As previously mentioned, the primary Maximum Contaminant Level (MCL) for nitrate allowed in public drinking water systems is 45 mg/L, which is equivalent to 10 mg/L nitrate expressed as nitrogen (NO_3-N).

2. BASIN PLAN – GROUNDWATER QUALITY OBJECTIVES

The Basin Plan for the Colorado River Basin Region has narrative groundwater quality objectives, which state in relevant part:

> "…the Regional Board's objective is to minimize the quantities of contaminants reaching any groundwater basin. …the objective will be to maintain the existing water quality where feasible."

3. GUIDELINES FOR DESIGNING SEPTIC SYSTEMS

In 1979, the Regional Water Board adopted: "Guidelines for Sewage Disposal from Land Developments" to establish minimum criteria for septic systems necessary to comply with water quality objectives, and to protect beneficial uses of groundwater within the region. These guidelines prescribe percolation rates, soil characteristics,

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minimum depth to groundwater, and ground slopes needed to protect groundwater from effluent impacts.

In addition, septic systems installed in Yucca Valley must meet requirements prescribed by the San Bernardino County Health Department discussed in various publications including: "Got Septic?"; "FAQ's for Single Family Residences"; "FAQ's for Multiple Residences/Commercial Projects"; "Minimum Setbacks and Locations of Septic System", and "How to Size Your Leach Lines".

In accordance with CWC Section 13291, which became law pursuant to Assembly Bill 885, the State Water Board issued draft regulations for septic systems statewide. The public comment period for the draft regulations extended from November 7, 2008, to February 23, 2009. During this time, the State Water Board received over 2,500 e-mails, and hundreds of comment letters. In addition, the State Water Board recorded hours of oral comments from twelve public workshops held throughout the state. State Water Board staff is currently revising the draft regulations to address the comments received.

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V. PROBLEM STATEMENT

1. WATER QUALITY AND PUBLIC HEALTH ISSUES ASSOCIATED WITH SEPTIC SYSTEM USE

A conventional septic system consists of a septic tank, and either a leach field or a seepage pit. The function of the septic tank is to remove solids and floatables, while the leach field, or seepage pit, allows the clarified wastewater to percolate into the underlying soil. If soil conditions are appropriate, some filtering and biological treatment of nutrients and bacteria found in septic tank wastewater occurs in the vadose zone (unsaturated soil strata) reducing nutrient loading and the threat to human health posed by bacteria and other pathogens. However, even under proper operation and maintenance of the septic systems (tank and subsurface disposal system), the systems still pose a threat to water quality because certain constituents (e.g., salts and organic chemicals) pass-through the system and can reach and impact groundwater quality. Typical constituents found in domestic wastewater are listed in Table 1, below (USEPA, 2002).

Table 1
Typical Constituents and Concentration Ranges in Residential Wastewater

Constituent	**Concentration In milligrams/liter[3]**
Total Solids	500-880
Volatile Solids	280-375
Total Suspended Solids	155-330
Volatile Suspended Solids	110-265
Biochemical Oxygen Demand	155-286
Chemical Oxygen Demand	500-660
Total Nitrogen (TN)	26-75
Ammonia (NH4)	4-13
Nitrites and Nitrates (NO_2 –N; NO_3-N)	<1
Total Phosphorus (TP)	6-12
Fats, Oils, and Grease	70-105
Volatile Organic Compounds	0.1-0.3
Surfactants	9-18
Total Coliforms (TC)[4]	10^8-10^{10}
Fecal Coliforms (FC)[5]	10^6-10^8

The use of decentralized systems (including septic systems) is usually a low-cost, long-term approach to wastewater treatment, particularly in less densely populated areas (EPA Response to Congress, April 1997). These low density areas

[3] Based on assumed water use of 60 gallons/person/day.
[4] Most probable number of organisms per 100 milliliters.
[5] Most probable number of organisms per 100 milliliters.

assimilate the waste within the soil, and provide filtration by percolation, minimizing the threat to public health due to exposure to inadequately treated waste. Typically, bacteria present within the top five feet of soil can reduce the amount of nitrogen in septic tank effluent through a process called "biological denitrification", which converts NO_3 into nitrogen gas.

2. *MAINTENANCE PROBLEMS AND FAILURES ASSOCIATED WITH SEPTIC SYSTEMS*

Septic systems can fail, which may result in severe short-term or long-term adverse impacts to groundwater. Town staff, who are responsible for issuing permits to replace failed septic tanks, leach fields, and seepage pits, provided the following data for the Town from 2002 through March 2010 (Table 2):

Table 2
Town of Yucca Valley - Septic System Component Replacement Permits
2002 – March 2010

Component Requiring Permit for Replacement	Commercial/Industrial	Residential
Septic Tanks	16	480
Leach Fields	3	124
Seepage Pits	35	140

The data in Table 2 translate to a failure rate (i.e., number of replacements/number of septic systems) of **8.8%** for Residential (or 8,500 residences), and **5.4%** for Commercial and Industrial (or 1,000 businesses)**.** Ninety-two percent of the failures occur in areas scheduled to be sewered during one of three wastewater facility treatment and collection installation phases (Figure E). Some septic systems are repaired without a permit. Thus, the above failure rates are very conservative estimates.

Septic system malfunctions can result from a number of factors, including, but not limited to:

a) **Poor soil conditions:**

If sediments are too coarse grained, wastewater percolation will be too fast and filtration poor. Alternatively, if sediments are too fine grained, wastewater can not percolate quickly enough, which may cause the wastewater to pond on the surface. Shallow bedrock, caliche, and other impermeable layers can also cause wastewater surfacing.

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b) Elevated groundwater:

An elevated groundwater table can reduce or eliminate treatment provided by a properly functioning leach field disposal system. The Regional Water Board's 1979 "Guidelines for Sewage Disposal for Land Developments" requires a minimum ten-foot separation between the ground surface and the highest anticipated groundwater elevation, and a minimum five foot separation between the base of the disposal facility and the highest anticipated groundwater elevation. If these minimum separations are not maintained, effluent may surface and/or contaminate groundwater. Groundwater in Yucca Valley is generally deep (i.e., typically greater than 100 feet), except where mounding occurs due to artificial recharge.

c) Hydraulic overloads caused by high septic system density:

A high density of septic systems (i.e., several per acre), and/or septic system use beyond design capacity can exacerbate septic system failure rates.

d) Improper design or construction

Properly designed septic systems are sized and constructed according to site specific conditions, and the requirements of the Uniform Plumbing Code (UPC). Improperly designed/constructed septic systems typically result in premature failure. In the past, many septic tanks installed in Yucca Valley were constructed of steel. Steel tanks can oxidize (rust) over time, causing a loss of structural integrity and creating a safety hazard.

e) Use of seepage pits for subsurface disposal

A seepage pit is basically a covered pit with porous walls through which treated effluent can seep into the surrounding soil. The use of seepage pits for wastewater disposal inhibits the conversion of NH_4 (ammonia) to NO_3 (nitrate), a process known as biological oxidation that is essential to the biological denitrification process that occurs to some extent in properly designed leach fields. Additionally, wastewater discharges from the pit into the surrounding soil typically occur several feet below the ground surface, where adequate sources of carbon needed for biological denitrification are unavailable. The lack of oxidizing conditions and a carbon source hinders denitrification, enhancing nitrate movement into groundwater (EPA 9009-F-01-001, Seepage Pits May Endanger Groundwater Quality).

f) Lack of septic system maintenance:

If septic systems are not properly designed and regularly maintained, failures can result. If residents dispose of hazardous chemicals, toxic substances, pesticides or other chemicals into septic systems, surface and/or groundwater quality may be adversely impacted. Restaurants typically install grease traps before their septic tanks, and require more maintenance than residential systems. Regional Water Board staff has

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observed overflows from restaurant systems in parking lots on several occasions, and received complaints from the public regarding unpleasant odors emanating from on-site systems in restaurant parking lots.

Regional Water Board staff reviewed records from January 2006 thru May 2008 from four septic tank pumping companies that service the Town. The record review included 1,471 addresses with 1,335 single-family residences, 33 restaurants, 11 mobile home parks, and 92 other non-residential systems. The 1,471 addresses represent 15% of the estimated 9,500 septic systems in use in the Town. Data indicate that 1,335 residential septic tanks (i.e., 17.3% of all residential systems) were pumped once every three years. Forty-eight residential systems required multiple pumpings in the same year, which indicates problems with those systems. Restaurants required pumping on average 3.1 times per year, or 8.5 times as frequently as residential systems, while other non-residential systems required pumping three times as often as residential systems, or approximately 1.1 times per year. Pumping frequency for restaurants varied from once in 29 months to once per month, which was the case for several establishments, highlighting the difficulty of treating restaurant discharges using septic systems. This is due to high flow rates which increase the potential for carry over of solids; the presence of fats, oils, and grease in the waste stream; and the high "strength" (i.e., organic loading) of wastewater. Use and proper maintenance of grease traps is critical to effectively treating restaurant discharges using on-site wastewater systems. Clogging of seepage pits and drain fields by grease is a frequent cause of failure.

Most area businesses, including restaurants, are located in the Town's main business corridor along California State Highway 62. The majority of areas zoned for high density--up to ten dwelling units per acre--are located along this corridor (Appendix B). Phase 1 of HDWD's planned municipal sewer system (Figure E) was designed to capture as many of these high density areas as practicable.

In summary, septic system failures are likely to occur if systems are improperly designed, installed or maintained; hydrogeologic conditions are unsuitable; and/or septic system density is too high. Discharges from failed systems can adversely affect public health and ground and surface water quality. Typical contaminants found in domestic wastewater, and their potential environmental impacts, are provided in Table 3 (USEPA, 2002).

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Table 3: Typical Septic Tank Constituents of Concern in Groundwater

CONSTITUENTS OF CONCERN	REASON FOR CONCERN
Pathogens	Parasites, bacteria, and viruses can cause disease through direct and indirect body contact, or ingestion of contaminated water. Pathogens can persist, and migrate significant distances in ground and surface waters.
Nitrogen	Nitrogen is an aquatic plant nutrient that contributes to eutrophication and loss of dissolved oxygen in surface waters such as lakes. Nitrogenous compounds migrating to groundwater typically oxidize to nitrate. In drinking water, excess levels of nitrate can cause methemoglobinemia, or "blue baby" disease in infants, which can be fatal.
Toxic Organic Compounds	Organic compounds toxic to humans and aquatic life are present in household chemicals and cleaning agents. These compounds can persist in groundwater and contaminate down-gradient sources of drinking water. Some organic compounds accumulate in ecosystem food chains.
Heavy Metals	Heavy Metals can cause serious human health concerns, including cancer.
Dissolved Inorganic Compounds	Sodium is deleterious to soil structure (dispersion agent), and septic system leach field performance. Salts and some dissolved ions, are resistant to degradation, and very mobile in groundwater.
Endocrine Disruptor Compounds	The occurrence of pharmaceuticals, cleaners, and personal care products (e.g., shampoo) in wastewater, is an emerging water quality concern and public health issue.

NITROGEN TRANSFORMATION

Nitrogen is the major constituent of concern in septic system effluent in Yucca Valley. Most nitrogenous compounds in septic tank effluent eventually convert to nitrate in soil by the processes discussed below.

The mobility of ammonium and organic forms of nitrogen in soil are dependent upon the oxidation-reduction potential of the soil. Ammonium and organic forms of

nitrogen in septic tank effluent are not very mobile. Most organic nitrogen is converted to ammonium-nitrogen (NH_4^+-N) by bacterial enzymes as indicated below; a process known as mineralization.

Organic N $\rightarrow$ bacterial enzymes (mineralization) $\rightarrow$ NH_4^+ + other products

Mineralization can be carried out under aerobic or anaerobic conditions. In both instances, ammonium-N is first converted to nitrite, and then to nitrate by soil bacteria (nitrification).

$NH_4^+ + 1.5\ O_2 \rightarrow$ Nitrosomonas $\rightarrow$ NO_2^- (nitrite) + $2H^2$ + H_2O + energy

NO_2^- (nitrite) + $0.5\ O_2 \rightarrow$ Nitrobacter (Nitrification) $\rightarrow$ NO_3^{-2} (Nitrate) + energy

Nitrification occurs in soil under aerobic conditions only. Unlike ammonium and organic forms of nitrogen, nitrate ions are very soluble and readily migrate with water. Under suitable conditions, most nitrogen in septic tank effluent is converted to nitrate, which can migrate to groundwater by percolation of wastewater or rainfall. Under anaerobic conditions, nitrate is converted into nitrogen gas in the unsaturated zone (denitrification) if an energy source is available.

NO_3^{-2} + organic carbon (energy) $\rightarrow$ denitrifying bacteria (denitrification) $\rightarrow$ N_2 + H_2O + CO_2

Some nitrogen escapes into the atmosphere through the denitrification process (see Figure D). The remaining nitrate percolates through the vadose zone, eventually contacting groundwater. When septic systems fail, various species of nitrogen (i.e., nitrate, nitrite, and ammonia) occur in wastewater effluent, contaminating groundwater through percolation. Percolation of septic tank effluent can introduce high levels of nitrate into groundwater, violating water quality objectives. High nitrate concentrations in water used for domestic supply may cause methemoglobinemia ("blue baby syndrome") in infants six months or younger that consume water with nitrate levels that exceed the maximum contaminant level (MCL). These infants may become seriously ill and die if untreated (http://*water.epa.gov/drink/contaminants/basicinformation/nitrate.cfm*).

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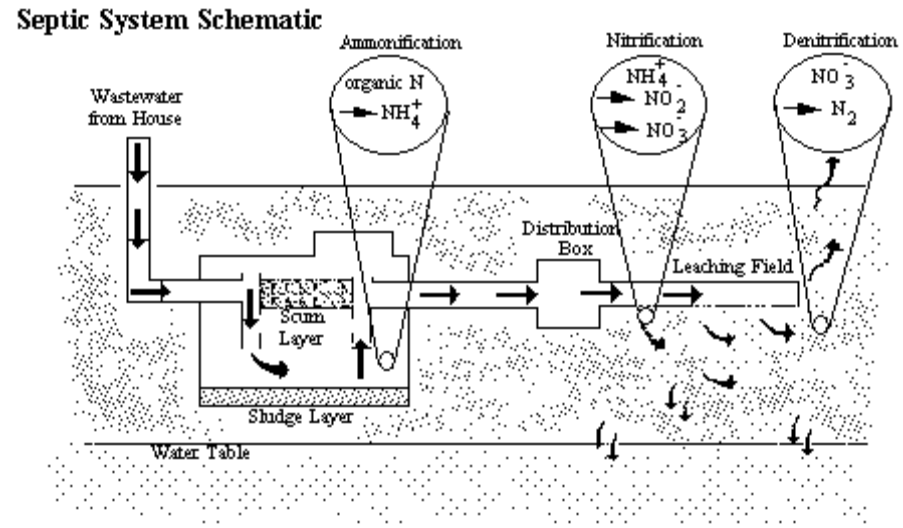
Figure D. Schematic of Septic System Nitrification & Denitrification Processes



N = nitrogen, NH_4^+ = ammonium ion, NO_2^- = nitrite, NO_3^- = nitrate, N_2 = nitrogen (gas)

Malfunctioning septic systems are a significant source of groundwater contamination. According to the USEPA, septic tank discharges are the third leading cause of groundwater pollution in the United States.(USEPA, Onsite Wastewater Treatment Systems Manual, February, 2002). Poorly functioning septic systems are a threat to public health, and ground and surface water quality, and deflate property value (Id.). Septic systems are not a suitable option for wastewater disposal in high-density areas (i.e., residences on small, ≤ ½ acre lots) because they may not provide sufficient dilution for percolating effluent, thereby contributing excess nutrients to groundwater. Additionally, high septic system density may cause wastewater to mound or surface, potentially exposing the public to health threats from inadequately treated wastewater. The Regional Water Board has adopted waste discharge prohibitions for septic tanks in the Cathedral City Cove area, and for areas that overly the Mission Creek or Desert Hot Springs aquifers to protect groundwater from the threat of contamination posed by septic systems in those areas (California Regional Water Quality Control Plan for the Colorado River Basin Region, June 2006).

3. WATER QUALITY AND PUBLIC HEALTH IMPACTS OF SEPTIC SYSTEM USE IN YUCCA VALLEY

Virtually all residents in the Town use septic systems and subsurface disposal systems to treat and dispose of domestic wastewater. The exact number of septic systems in Yucca Valley is unknown, but is believed by staff to exceed 9,500. If septic systems are installed on all buildable lots, the number of septic systems in Yucca Valley will approximate 25,000 (Town of Yucca Valley Master Plan). At least

some septic systems are currently "failing", causing inadequately treated wastewater to percolate to, and contaminate groundwater. Failures are due to disintegrating steel septic tanks, and failed disposal systems (Table 2).

a) Nitrogen Loading to Groundwater in Yucca Valley Due to Septic System Use

Total nitrogen (TN) in septic system effluent typically ranges from 20 to 85 mg/l, averaging around 40 mg/l (Metcalf & Eddy, 3rd Edition). Using an average wastewater flow rate of 83 gpd/capita (HDWD-MWH Preliminary Design Report Part 1), nitrogen loading from septic systems in Yucca Valley is conservatively estimated by regional water board staff at over 94 tons per year. (Appendix E)

b) Pollution, Contamination and Nuisance Resulting From Failing Septic Systems in Yucca Valley

As indicated by the maps of repair permits issued in Appendix C, failing septic systems in Yucca Valley are an ongoing problem. On multiple occasions, Regional Water Board staff has observed grease and effluent overflowing in restaurant parking lots in Yucca Valley. Effluent discharges from failed systems can percolate to groundwater. As a result, these discharges have violated water quality objectives for nitrate, total dissolved solids (TDS), and/or pathogens, thereby impacting beneficial uses. Surfacing discharges from failed systems are a hazard to public health since they consist of sanitary wastes and the public is directly exposed to them. Discharges of sanitary waste from septic system failures also generate odors and aesthetic conditions offensive to the community; hence, the discharges create a nuisance since they interfere with the public's enjoyment and use of property. Continued use of septic systems in Yucca Valley will continue to cause conditions of pollution, contamination, and nuisance, thereby unreasonably degrading the water quality of waters of the State.

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VI. REGULATORY APPROACHES TO ADDRESS SEPTIC SYSTEM FAILURE IN YUCCA VALLEY

1. MEMORANDUM OF AGREEMENT

In June of 2008, the Regional Water Board, the Town of Yucca Valley, and the Hi-Desert Water District entered into a Memorandum of Agreement (MOA) in order to provide interim policy to mitigate the impacts from septic systems, while the proposed WWTF is built and this proposed regulation is implemented. The MOA is intended to clarity the roles, duties, and responsibilities of each Party with respect to the proposed municipal WWTF, and for addressing groundwater contamination caused by septic tank systems. Under the terms of the MOA, the Town reviews, approves, and oversees the installation and maintenance of those septic systems, pursuant to USEPA standards, that discharge 2,500 gallons per day or less. Generally, the San Bernardino County Health Department requires an onsite percolation test performed by a State certified engineer or geologist, and a report summarizing test results for their review and approval. Percolation test reports submitted to the County for the Yucca Valley area indicate soils typically meet the minimum criteria established by the County/Regional Water Board.

CWC Section 13280 prohibits the use of new or existing septic systems if there exists:

> *….substantial evidence in the record that discharge of waste from such disposal systems will result in a violation of water quality objectives, will impair present or future beneficial uses of water, will cause pollution, nuisance, or contamination, or will unreasonably degrade the quality of any waters of the State.*

Regional Water Board staff and other agencies have collected evidence to indicate septic system use in Yucca Valley has caused and continues to cause:

a. violations of water quality objectives;
b. impairment of groundwater beneficial uses;
c. conditions of pollution, nuisance, and/or contamination and
d. unreasonable degradation of the quality of State waters.

This evidence is substantial and thus, supports the Regional Water Board staff's decision to propose amending the Region's Basin Plan to incorporate a conditional waste discharge prohibition for certain septic systems in Yucca Valley.

2. BASIN PLAN AMENDMENT

Regional Water Board staff propose to amend Chapter 4 of the Region's Basin Plan to prohibit septic system use in three areas of the Town to address

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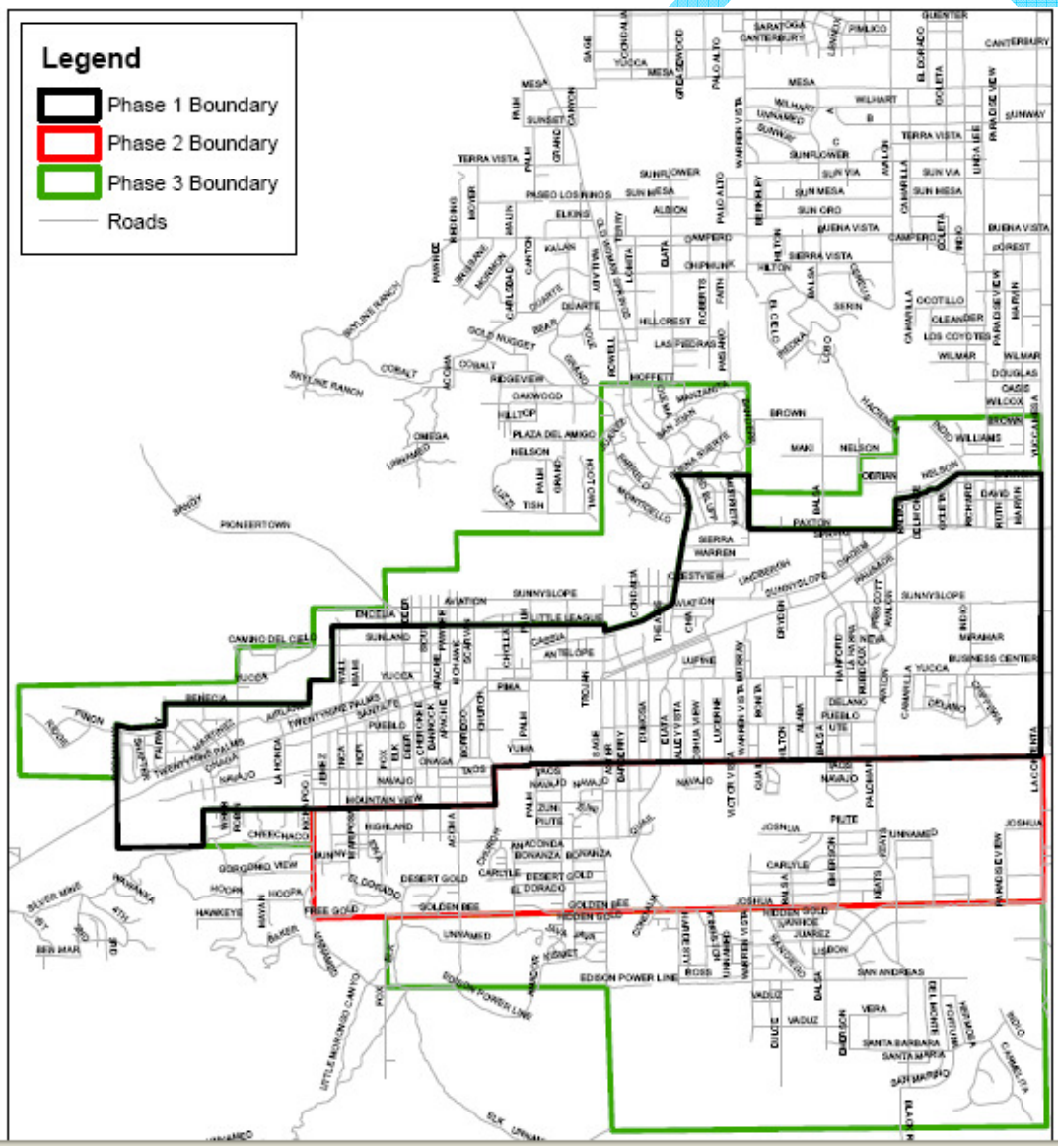
groundwater pollution and degradation caused by septic tank effluent. The amendment proposes that all septic system discharges within the Phase 1 cease by March 17, 2016, within Phase 2 by March 17, 2019; and within Phase 3 by March 17, 2021. The proposed prohibition recognizes the time needed to design, finance, and construct a sanitary sewer system and the lack of disposal alternatives in the interim. Figure E, below, shows the areas covered by each Phase.

Figure E
HDWD SEWER MASTER PLAN PHASES



From HDWD-MWH Sewer Master Plan, January 2009

The Phase 1 area is bounded by the Nelson Avenue to the north, Onaga Trail to the south, La Contenta Road to the east, and Rockaway Avenue to the west. The Phase 2 area is bounded by Onaga Trail to the north, Golden Bee Drive to the south, La Contenta Road to the east, and Kickapoo Trail to the west. The Phase 3

area covers the remaining residential customers on the west end of HDWD's service area along with some low to medium density residential customers located north of the Yucca Wash up to Cobalt Road.

a) Septic System Prohibition Considerations

The proposed Basin Plan amendment provides an adaptive approach for addressing this problem. As indicated above, the hydrogeology of Yucca Valley is complex, with most areas characterized by hilly topography with shallow alluvium overlying fractured bedrock. Septic system density varies in the Town. However, the USGS Study clearly indicates groundwater in the Town has been degraded by septic system discharges, particularly in areas with high densities of residential lots (i.e., several septic systems per acre). This is caused in part by the poor performance of septic systems in high density areas due to inadequate soils and excessive loading.

The proposed Basin Plan amendment will prohibit the discharge of septic system effluent in densely populated areas along the main business corridor (Phase 1), as well as in two other relatively low-density areas within the three-phased collection system delineated in HDWD's Sewer Master Plan. Construction of a sanitary sewer system designed to serve these lots is the most cost-effective solution. Eliminating discharges in high-density areas may facilitate proper operation of septic systems in low-density areas by improving assimilative capacity of the groundwater. Under this scenario, property owners located outside the sewer master plan area benefit from the elimination of discharges within the plan's area through improved groundwater quality.

However, if this approach is determined later to be ineffective in addressing groundwater quality throughout the Town, and septic system effluent is shown to continue to adversely impact community groundwater supplies, the prohibition may need to be amended to prohibit septic system discharges elsewhere in the Town. This adaptive approach will enable water quality concerns to be addressed in a timely manner, and may also help reduce the hardship residents would have to endure if faced with a blanket discharge prohibition for both small and large lots.

Based on site conditions, a septic system prohibition is necessary to protect public health and water quality in Yucca Valley. Community feedback to Regional Water Board staff at town hall meetings, and during meetings with HDWD (June 13, 2007) attended by several of community residents and other interested individuals, suggests community support for groundwater protection and the construction of a sanitary sewer system, but significant concerns over the cost of such municipal system.

b) Economic Considerations

California Environmental Quality Act (CEQA) regulation (Public Resources Code § 21159) requires that economics be considered when evaluating

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methods of compliance for proposed Basin Plan amendments. CWC Section 13280 requires the Regional Water Board to consider factors identified in CWC Section 13241, which includes economic considerations and the need for housing. Affordable housing is still available to Yucca Valley, with many residences consisting of manufactured homes. A report from the US Census Bureau recorded 16,865 people residing in the Town of Yucca Valley in the year 2000, with a median household income of $30,420. This was considerably lower than the state median household income for 2000, estimated at $47,493.

Regional Water Board staff believes that the proposed amendment will in the long-term have a positive impact on property values, given that converting to a public sewer system typically increases market value, while a failing septic system decreases market value. HDWD's Collection System Value Engineering Study evaluated sewer collection improvements/costs in Yucca (*Preliminary Value Engineering Study Report, HDWD Collection Systems*, August 2008*).* The study estimated capital costs to construct a Wastewater Treatment Plant (WWTP) and conventional sewer system ranging from $85 million to $128 million, or $8,500 to $12,800 per residence assuming 10,000 water connections, and no financial assistance. HDWD, using the engineering consulting firm of Webb and Associates, subsequently estimated costs during the formation of the assessment district. They estimated the cost for the WWTP and conventional sewer system at approximately $125 million, or approximately $15,000 per residence assuming all three phases covered by the sewer master plan pay their fair share. In addition, each parcel owner will need $3,000 to $6,000 to construct lateral sewer lines, connect to the main sewer, and properly abandon their existing septic system (see Table 3, below). The lateral sewer line will cost $80-$150 per foot to construct depending on: terrain; easements needed; engineering work required; pipe and backfill materials; methods of construction; and surface restoration. Septic system abandonment involves: (1) obtaining a permit (approximately $300), (2) pumping the tank, (3) removing and disposing of the lid, and (4) filling of the empty septic tank with compacted dirt or sand ($600-$1600). Finally, there may be specific local agency requirements for septic tank abandonment. Once sewers are constructed, the process can take four to six months to complete. It is emphasized that all costs presented in this staff report are preliminary estimates. HDWD anticipates that the Webb and Associates Engineers Report will be finalized and available in January 2011.

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Table 3
Approximate Cost to Connect to Conventional Sewer

Item Unit Cost	*Number of Units Total Average Cost*
Sewer Connection Fee $8,500	1 dwelling $8,500
Septic Abandonment Fee $300	1 tank $300
Pump & Fill Septic Tank $1,200	1 tank $1,200
Lateral Construction $100/foot	30 feet $3,000
Total Cost	1 dwelling $13,000

As an alternative to a conventional sewer and WWTP, HDWD has also considered a Septic Tank Effluent with Pumped or Gravity collection system (STEP/STEG), and a recirculating textile system (RTS) system, for wastewater treatment. This system offers advantages, including reduced capital costs for both wastewater collection and treatment. With a STEP/STEG, septic tanks are retained and used for primary treatment, which allows use of small diameter collection lines installed to contour local topography. Capital costs for a central treatment system are typically reduced, since influent has received primary treatment. However, operation and maintenance costs may increase because service providers are usually responsible for facilities on individual properties, resulting in increased service calls from property owners.

Total capital cost estimates for constructing a STEP/STEG collection system and RTS treatment plant range from $29 million to $115 million, or $2,900 to $11,500 per residence assuming 10,000 water connections, and no financial assistance.

Table 4
Approximate Cost to Connect to STEP/STEG System

Item Unit Cost	*Number of Units Total Average Cost*
Sewer Connection Fee $8,500	1 dwelling $8,500
Lateral Construction $37.50/foot	30 feet $1,125
Total Cost	1 dwelling $9,675

With a median household income of $30,420 in the year 2000 revenue is not expected to increase significantly since a large portion of the Town's population is retired. Thus, converting to a sewered system will be a significant burden to many Town residents. To defray economic impacts, the Town, HDWD, or community can apply for funding through grants or

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other sources, or extend expenses over several years by forming an assessment district. With an assessment district, the HDWD and/or the Town of Yucca Valley can address septic tank impacts to the environment and public health through a centralized authority. This will require HDWD to develop a mechanism to assess sewer costs in a given service area. Some of the costs shown in Tables 3 and 4 above can be amortized over several years to minimize immediate costs to residents.

CWC section 13291.5 states:

> *It is the intent of the Legislature to assist private property owners with existing systems who incur costs as a result of the implementation of the regulations established under this section by encouraging the state board to make loans under Chapter 6.5 (commencing with Section 13475) to local agencies to assist private property owners whose cost of compliance with these regulations exceeds one-half of one percent of the current assessed value of the property on which the onsite sewage system is located.*

HDWD is exploring this and other options to obtain financial assistance to sewer Yucca Valley, and to assist local residents. Regional Water Board staff is committed to working with HDWD, municipalities and other entities to identify and procure funding to mitigate the financial burden to Yucca Valley residents.

c) Other Considerations

In addition, CWC section 13281 requires the Regional Water Board to consider Health and Safety Code section 117435, such as evaluating adverse impacts if septic systems discharges are permitted, failure rates of individual disposal systems, and other criteria.

As part of a cooperative agreement between HDWD and USGS, it was observed (letter to Joe Glowitz, from USGS, April 27, 2009) that a well located in the east hydrogeologic subunit sampled on February 4, 2009, had a nitrate as N concentration of 18.4 mg/L (federal MCL for nitrate as N is 10 mg/L). This is significant because the east hydrogeologic unit has not received any recharge, suggesting that the high nitrate concentration in groundwater in this area may be due to downward migration of septic tank effluent rather than rising groundwater intersecting effluent plumes.

In general, Town residents support constructing a wastewater treatment plant/sewer, given adverse impacts to groundwater and public health from septic system discharges, provided it is not cost prohibitive.

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3. PROHIBITION OF NEW DISCHARGES?

Regional Water Board staff considered including an immediate prohibition of new septic system discharges in the Basin Plan Amendment for the business corridor of Yucca Valley, Phase 1 in HDWD's Sewer Master Plan. Such a prohibition of new discharges would not have been a strict moratorium on new construction, because building could have proceeded so long as developers used holding tanks, package plants, or other means for waste disposal. This option could also have been implemented for new housing developments in Yucca Valley on an interim basis, until sewer infrastructure is constructed by HDWD. However, proliferation of package plants throughout the Town could have significant impact on the environment and undermine the viability of a centralized sewage collection and treatment system for the Town (see also CEQA Checklist discussion on pg. 19). Therefore, the Regional Water Board will continue to review new development on a case-by-case basis pursuant to the MOA it has with the Town and HDWD.

Efforts set forth by HDWD and the Town to provide sewer service to areas at risk of groundwater contamination from septic tank discharges, combined with the positive community response to convert to sewer, obviates the need for an immediate discharge prohibition for new development. However, if the sewer effort fails to win public approval or stalls for other reasons, the Regional Water Board may need to take other measures to protect water quality. These may include prohibiting new wastewater discharges throughout Yucca Valley and progressive enforcement (e.g., cease and desist orders and administrative civil liability complaints) to ensure dischargers and responsible parties comply with the terms of this prohibition.

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VII. COMPLIANCE WITH CALIFORNIA ENVIRONMENTAL QUALITY ACT AND CONSIDERATION OF ALTERNATIVES

The California Secretary for Natural Resources has certified the basin planning process as meeting the requirements of Public Resources Code section 21080.5 of the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). (CEQA Guidelines, tit. 14, § 15251(g); Cal. Code Regs., tit. 23, § 3782.) Based on the Secretary's certification, the basin planning process is exempt from certain environmental review requirements of CEQA, including preparation of an Initial Study, Negative Declaration, and Environmental Impact Report. However, as part of the Basin Planning process, the Regional Water Board is required to prepare: (1) a Basin Plan amendment; (2) an Environmental Checklist that identifies potentially significant adverse environmental impacts of the amendment, measures to mitigate significant adverse environmental impacts identified in the Checklist, and (3) a description of the proposed amendment and range of reasonable alternatives to comply with the amendment,. (Cal. Code Regs., tit. 23, § 3777.)

Regional Water Board staff has prepared this draft staff report, Environmental Checklist, and proposed Basin Plan amendment for distribution to interested parties, including Town residents. These documents may be revised based on comments received from the public or the Regional Water Board. If revised, the final staff report will address any additional CEQA considerations, including economics, which may arise as a result of any changes to the proposed amendment.

The Environmental Checklist also contains a detailed discussion on alternatives to the proposed prohibition (Preferred Alternative), including the "No Action" alternative. It also has a detailed discussion on the range of reasonable alternatives/methods available to comply with the proposed prohibition. The Preferred Alternative is summarized in the following Section.

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VIII. RECOMMENDED ALTERNATIVE – SEPTIC SYSTEM PROHIBITION

Regional Water Board staff is recommending that the Regional Water Board amend the Region's Basin Plan to prohibit septic system use in three areas of the Town, in accordance with the following time schedule for each area, or sooner than the prescribed time schedule if sewer service becomes available:

- Phase 1 by March 17, 2016
- Phase 2 by March 17, 2019
- Phase 3 by March 17, 2022

The HDWD's Sewer Master Plan (January 2009) proposes three phases of sewer service for the Town and the surrounding area (Figure E). Areas selected for sewer service pose the greatest risk to public health and water quality due to a high density (too many septic systems per unit area), or a high failure rate (causing wastewater surfacing and/or groundwater impacts). Sewering these areas, along with a hook-up requirement when sewer service becomes available, should mitigate current impacts to public health and water quality from septic system use in the Town.

If, however, the septic system prohibition proposed above fails to adequately address public health and water quality impacts in Yucca Valley, the Regional Water Board may need to amend the Basin Plan further. Such amendments may include, for example, extending the area subject to the prohibition. Alternatively, if the sewer project does not go forward due to financial problems or for other reasons, the Regional Water Board may need to amend the Basin Plan to immediately prohibit all new septic systems discharges, and eliminate existing systems via a time schedule order.

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IX. PUBLIC PARTICIPATION

Public participation is an integral part of the Basin Plan amendment process. On November 15 2007, Regional Water Board staff published a Public Notice inviting concerned, interested, and affected individuals, as well as public and private entities, to participate in a Technical Advisory Committee (TAC) to develop a Basin Plan amendment to conditionally prohibit septic systems in Yucca Valley. The reason for this action was to eliminate groundwater impacts from discharges of septic system effluent. The objectives of the TAC were as follows:

- advise staff to develop and implement the prohibition;
- provide expert opinion and scientific evaluations;
- provide CEQA documentation;
- identify financial assistance/resources, and
- assist with public outreach and education.

The TAC, which conducted its first meeting on February 21, 2008, was comprised of nine individuals representing the community, HDWD, and the Town. The TAC conducted a total of ten meetings before it was formally dissolved in May 2009.

On June 13, 2007, Regional Water Board staff conducted a town hall meeting in Yucca Valley with representatives from HDWD and the Town to discuss septic system problems and potential solutions.

On December 18, 2007, Regional Water Board staff held a public workshop and CEQA Scoping Meeting in the HDWD's meeting room in Yucca Valley. Board staff presented the draft environmental checklist and an overview of the Basin Plan amendment. HDWD staff presented findings from its sewer feasibility study. Interested parties, community representatives, and area residents were present, and provided comments. Comments received and responses from staff are posted on the Regional Water Board's webpage.

The Regional Water Board will consider adoption of the proposed Basin Plan amendment at a public hearing scheduled as follows:

Thursday, March 17, 2011, 10:00 a.m.: ****.
City of La Quinta, City Council Chambers
78-495 Calle Tampico
La Quinta, CA 92253

The Basin Plan amendment may be revised in response to comments received during the public hearing. A Notice for the Public Hearing will be mailed to residents and interested parties in the affected area, published in local newspapers, and posted in local libraries and post offices. Additionally, the Notice and all relevant documents will be posted on the Regional Water Board's webpage.

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X. SCIENTIFIC PEER REVIEW

Health and Safety Code, §57004 requires that the scientific basis of any statewide plan, basin plan, plan amendment, guideline, policy, or regulation undergo external peer review before adoption by the State or Regional Board. The "scientific basis" and "scientific portions" are defined as those "foundations of a rule that are premised upon, or derived from, empirical data or other scientific findings, conclusions, or assumptions establishing a regulatory level, standard, or other requirement for the protection of public health or the environment." Accordingly, regional water board staff submitted the draft staff report in support of the proposed basin plan amendment to prohibit septic tank discharges in the Town of Yucca Valley to the peer review process in July of 2010. Two peer reviewers were chosen by State Water Board staff, in a process independent of regional board staff.

Both of the participating peer reviewers concurred that the scientific information presented in the staff report supports the proposed septic tank discharge prohibition. One reviewer stated:

> "I felt the staff report was very well written and highlights the evidence for failing septic tanks in the Yucca Valley area – something that is not covered in the USGS report. This result, in conjunction with all the evidence provided by the USGS, indicates that the proposed amendment to the basin plan is needed and scientifically warranted."

The second peer reviewer concluded:

> "The installation of a sewer during Phase I implementation is justified by the annual rate of failure of septic systems within Yucca Valley. Septic systems for residential development at that density along with commercial establishments exceed waste accommodation rates and the soil's infiltration capacity."

The comment letters from both reviewers, and regional water board staff responses to comments, can be found in Appendix F.

XI. SUMMARY

Laboratory analyses of groundwater samples collected from supply wells in the Town indicate an exceedance in the drinking water standard (i.e., maximum contaminant level) for nitrate (NO_3). As a result, HDWD removed supply wells from service and treated well water to remove NO_3^- before distribution to the public. The USGS Study concluded that septage from septic tanks is the primary source of NO_3 to the ground-water system (in Yucca Valley). This investigation provided the core scientific basis to prohibit septic tank use in the Town.

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HDWD's 2002 "Source Water Assessment" completed for Yucca Valley's production wells rated *all* supply wells "most vulnerable" to nitrate contamination from septic systems. Irrespective of the source(s) of the existing nitrate contamination in groundwater, additional mass loading of nitrate from new development/high density septic system use will clearly cause further degradation to groundwater. It is therefore necessary to immediately protect vulnerable sub-basins in the Yucca Valley area not currently impacted by nitrates, where high density septic system use may ultimately lead to further water quality degradation.

Violations of water quality objectives and conditions of pollution, contamination, and nuisance have resulted from septic system use in the Yucca Valley area. The building boom that has occurred over the last 10 years has exacerbated water quality problems associated with septic system use in the area, including excess nutrients (nitrate) in groundwater.

In June 2007, Regional Water Board staff, in collaboration with HDWD and Town officials formalized discussions to address water quality and public health concerns caused by septic system use in the Town. These discussions led to the adoption of a Memorandum of Agreement (MOA) to establish interim policy to mitigate the impact from the septic systems while a municipal sewage collection and treatment system for the Town is designed and built**.** On September 19, 2007, the Regional Water Board adopted Resolution R7-2007-0074 in support of the efforts by the Town of Yucca Valley and the HDWD to phase out wastewater discharges from septic systems. The resolution states, in relevant part:

"...*The Regional Board considers construction of the RWWTF* (regional wastewater treatment facility) *proposed by the District and Yucca Valley and elimination of the groundwater quality threat and impacts from septic systems in Yucca Valley to be strategic regional water quality priorities…"*

In response to violations of water quality objectives for nitrate, scientific evidence, directives from the Regional Water Board, and requests from local entities, Regional Water Board staff is proposing a Basin Plan amendment to prohibit septic tank discharges in three areas of the Town to protect high quality municipal beneficial use groundwater aquifers vulnerable to degradation from septic system discharges

REGIONAL BOARD CONTACT

All enquiries regarding the proposed Basin Plan Amendment should be directed to: Jon Rokke (760) 776-8959

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REFERENCES

1. Hi-Desert Water District, Source Water Assessments, December 2002
2. USGS, Evaluation of the Source and Transport of High Nitrate Concentrations in Groundwater, Warren Subbasin, California, (Water-Resources Investigations Report 03-4009)
3. USEPA, Onsite Wastewater Treatment Systems Manual, February 2002.
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7. California's Groundwater Bulletin 118, updated 2/27/04
8. California Regional Water Quality Control Plan for the Colorado River Basin Region, June 2006
9. HDWD-MWH Preliminary Design Report, Volume 1, January 2009
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12. US Census Bureau, Yucca Valley town, California, Census 2000 Demographic Profile Highlights
13. Metcalf & Eddy, Wastewater Engineering Treatment Disposal and Reuse, 3rd Edition 1991
14. Letter from USGS to Joe Glowitz, April 27, 2009
15. Technical Advisory Committees Socio-economic subgroup Final Report
16. Onsite Wastewater Treatment Systems by Burkes & Minnis, 1994

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APPENDIX A

U.S. Department of the Interior
U.S. Geological Survey

Evaluation of the Source and Transport of High Nitrate Concentrations in Groundwater, Warren Subbasin, California

Water-Resources Investigations Report 03-4009

(Attach complete report)

APPENDIX B

(Attach Town of Yucca Valley Zoning Map)

APPENDIX C

(Attach Septic Failure Data and Location Maps)

APPENDIX D

(Attach Recent Nitrate and Ground water Elevation Data)

APPENDIX E

(Attach CEQA Checklist)

APPENDIX F

(Attach Scientific Peer Review Comment Letters, and Staff Responses to Comments Letters)