

CHAPTER 3

Environmental Setting, Impacts, and Mitigation Measures

3.1 Overview

This chapter provides a project-level impact analysis of the physical environmental effects of implementation of the Soquel Creek Water District (SqCWD or District) Well Master Plan (WMP or proposed project) as described in Chapter 2, Project Description.

3.1.1 Scope of Analysis

Chapter 3 is organized by environmental resource topic as follows:

Chapter 3 Sections	
3.1 Overview	3.9 Traffic and Circulation
3.2 Geology, Soils, and Seismicity	3.10 Hazardous Materials
3.3 Groundwater Resources	3.11 Utilities and Service Systems
3.4 Surface Water Hydrology and Water Quality	3.12 Cultural Resources
3.5 Biological Resources	3.13 Aesthetics
3.6 Land Use and Recreation	(References included under each section)
3.7 Air Quality and Greenhouse Gases	
3.8 Noise and Vibration	

Each section of Chapter 3 contains the following elements, based on the CEQA requirements:

- **Setting.** This subsection presents a description of the existing physical environment conditions in the vicinity of the project with respect to each resource area at an appropriate level of detail to allow the reader to understand the impact analysis.
- **Regulatory Framework.** This subsection describes the existing laws and regulations applicable to protection of the environmental resource area, and the governmental agencies responsible for enforcement that are relevant to the proposed project.
- **Impact Discussion.** This subsection evaluates the potential for the proposed project to adversely affect the physical environment described in the setting. Significance criteria for evaluation of environmental impacts are defined at the beginning of each impact analysis section, along with a discussion, Approach to Analysis, which explains how the significance

criteria are specifically applied in evaluating the project. The conclusion of each impact analysis is expressed in term of the impact significance, which is discussed further in Section 3.1.2, below.

- **Mitigation Measures.** In each subsection, mitigation measures are identified for all of the impacts found to be significant or potentially significant, consistent with CEQA Guidelines Section 15126.4(a)(1) which states that an EIR “shall describe all feasible measures which could minimize significant adverse impacts...” Section 15126.4(a)(3) also states that, “mitigation measures are not required for effects which are not found to be significant.” All mitigation measures are proposed as part of the project.

In the course of this evaluation, the SqCWD determined that the proposed project would have no impact on public services, agriculture and forestry resources, or mineral resources. In accordance with CEQA Guidelines Section 15128, effects determined not to be significant are not required to be discussed in detail in the EIR. Resource areas not applicable to the project and explanations why there would be no impacts are described below.

Public Services

The proposed project would not include the construction of housing or other structures in the area, nor would it increase the number of workers in the area. Therefore, the project would not require any new or physically altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for any public services, including fire protection, police protection, schools, or other services. Therefore, the project would have no impacts related to public services. Impacts related to impacts on emergency response plans and access routes for emergency service providers are addressed in Section 3.9, Traffic and Circulation.

Agriculture and Forestry Resources

The proposed well sites are located in urban areas and no agricultural uses occur at the well sites or within the greater SqCWD service area. The California Department of Conservation’s Farmland Mapping and Monitoring Program (FMMP) identifies the proposed well as Urban and Built-Up Land, defined as “...land [that] is used for residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures” (California Department of Conservation, 2008). The proposed well sites do not contain agricultural uses and are not zoned for such uses. Therefore, the proposed project would not convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use, and would not conflict with existing zoning for agricultural land use or a Williamson Act contract. Therefore, the project would have no impact on agricultural resources.

The project sites do not include any lands zoned or managed for forest or timber uses. Implementation of the proposed project would not affect any large tracts of land with a high density of trees. Although construction activities could require the removal of mature oak or riparian trees to accommodate the proposed facilities, the removal of these isolated trees is not considered a loss or conversion of forest land. The impacts of tree removal are thoroughly evaluated in Section 5.6, Biological Resources. No further consideration of this topic is required in this EIR.

Mineral Resources

The California Geological Survey (CGS) (formerly the Division of Mines and Geology) classifies the regional significance of non-fuel mineral resources in accordance with the California Surface Mining and Reclamation Act (SMARA) of 1975. Mineral Resource Zones (MRZ) are classified on the basis of geologic factors, without regard to existing land use and land ownership. The areas are categorized into four general classifications (MRZ-1 through MRZ-4). MRZ-1 are areas with no significant mineral deposits, or where it is judged that little likelihood exists for the presence of mineral deposits; MRZ-2 areas contain significant mineral deposits; MRZ-3 refers to areas containing mineral deposits, the significance of which cannot be evaluated from available data; and MRZ-4 zones are those for which the available data are inadequate to classify them in any other MRZ category. With the exception of the Granite Way–Aptos Village Well site, which is mapped as MRZ-1, all other proposed well sites are mapped as MRZ-4 (CDMG, 1987).

The proposed well sites are located in areas designated by the State of California as MRZ-1 and MRZ-4, which are not areas known to include regionally significant mineral resources. Although the MRZ-4 areas are not classified with respect to mineral resources, the proposed wells and associated improvements would be located on small parcels within urban areas where mineral extraction would be unlikely. Implementation of the WMP would have no effect on mineral resources that could otherwise be harvested. Therefore, implementation of the WMP would not result in a loss of mineral resources or make them inaccessible, and would have no impacts related to mineral resources.

3.1.2 Impact Significance Determinations

The significance criteria used in this EIR are based on the guidance regarding the thresholds of significance in the CEQA Guidelines' Appendix G. The significance criteria used to analyze each environmental resource area are presented in each section of Chapter 3 before the discussion of impacts. The categories used to designate impact significance are described below:

- **Not Applicable (N/A).** An impact is considered not applicable to the WMP project if there is no potential for impacts or the environmental resource does not occur within the project area.
- **Beneficial.** An impact is considered beneficial if it is determined that implementation of the WMP would improve an environmental resource or result in a beneficial effect on the environment.
- **Less than Significant (LS).** This determination applies if there is a potential for some limited impact, but not a substantial adverse effect that qualifies under the significance criteria as a significant impact. No mitigation is required.
- **Potentially Significant, Mitigable (PSM).** These determinations apply if there is the potential for a substantial adverse effect that meets the significance criteria, but mitigation is available to reduce the impact to a less-than-significant level.

- **Significant Unavoidable (SU).** This determination applies to impacts that are significant but for which there appears to be no feasible mitigation available to reduce the impacts to a less-than-significant level. Appropriate and feasible mitigation is applied to lessen the impact, but the residual effect remains significant and therefore the impact is unavoidable.

In determining the significance of a potential project impact, the analysis first describes the nature, frequency, magnitude, and/or severity of a potential effect and determines whether it is significant, potentially significant, less than significant, or not applicable to the project.

As part of the significance determination process, the analysis considers whether or not compliance with applicable regulations would result in implementation of environmental protection measures that could reduce a potentially significant impact to a less-than-significant level. If so, the impact is considered to be less than significant, since it is assumed that the project sponsor will comply with all regulations. In cases where there are no applicable regulations, or such regulations exist but by themselves would not reduce an impact to a less-than-significant level, then the impact is considered *potentially significant* or *significant*. If there are feasible measures available that could reduce these potentially significant or significant impacts to a less-than-significant level, then the impact is defined as potentially significant but mitigable (PSM), and the EIR identifies mitigation measure(s) to address the potentially significant impact. The EIR identifies mitigation measures to address all potentially significant and significant impacts.

Within each section in this chapter, a summary table is included at the beginning of the impact discussion to summarize the potential impacts by individual project components and indicate the level of impact significance before and after mitigation. Environmental impacts are numbered throughout this EIR, using the section number followed by sequentially numbered impacts. Mitigation measures are numbered to correspond to the impact numbers; for example, Mitigation Measures 3.2-1a and 3.2-1b address Impact 3.2-1.

3.1.3 References – Overview

California Department of Conservation, “Santa Cruz County Important Farmland 2006” [Map]. Division of Land Resource Protection, Farmland Mapping and Monitoring Program. Published May 2008.

California Division of Mines and Geology (CDMG), *Mineral Land Classification: Aggregate Materials in the San Francisco-Monterey Bay Area*. Special Report 146, Part IV, 1987.

3.2 Geology, Soils, and Seismicity

3.2.1 Introduction

This section presents an assessment of the geologic, seismic, and soils issues related to implementation of the WMP. The regional setting describes general topography, geologic substrate, soil resources, and seismicity and identifies local geologic and seismic hazards that could affect some elements of the WMP. Existing geologic conditions at each of the proposed well sites are described. The regulatory framework discussion summarizes the laws pertinent to geologic and seismic considerations for the WMP. The impact analysis presents a discussion of potential impacts and associated mitigation measures.

3.2.2 Regional Setting

Topography

The proposed well sites are located in the communities of Soquel and Aptos within a region generally characterized by coastal beaches with cliff terraces, and farther inland by the steep uplands of the Santa Cruz Mountains. The upland areas are cut by numerous creeks and deep ravines. Surface elevations range from mean sea level (msl) to over 2,700 feet above msl at the ridges of the Santa Cruz Mountains. Elevations at the proposed well sites range from roughly 120 feet above msl at the O'Neill Ranch Well site to approximately 410 feet above msl at the Austrian Way Well site. With the exception of the O'Neill Ranch Well site, the proposed well sites are relatively level. The O'Neill Ranch Well site slopes north towards an unnamed tributary to Soquel Creek.

Geology

The Santa Cruz Mountains form the spine of the San Francisco Peninsula and extend 80 miles southeast from Daly City in the north to the Pajaro River, near Watsonville, where the mountain range merges with the southern Gabilan Range. The western margin of the Santa Cruz mountain range is distinguished by the dramatic coastline formed where the bedrock uplands of the range meet the Pacific Ocean. Much of the coastline in the Santa Cruz/Soquel area is situated on an uplifted marine terrace, known as the "Lowest Emergent Terrace," which is the youngest in a series of marine terraces that form uplands east of Highway 1.

Bedrock in this region consists primarily of sandstone, siltstone, mudstone, and shale with smaller bodies of volcanic material. The most widespread of these sedimentary units are the Purisima Formation (siltstone and sandstone), the Butano Sandstone, the Santa Cruz Mudstone, the Monterey Formation (mudstone and siltstone), the San Lorenzo Formation (sandstone, mudstone, and shale), the Vaqueros Sandstone, and the Santa Margarita Sandstone (USGS, 1989). Due to the complex structural setting of the region, these rocks are heavily folded, sheared, and faulted, which can make them heavily fractured. They are often covered by colluvium, alluvium, and other terrace deposits. Regional hydrogeologic conditions are described in Section 3.3, Groundwater Resources.

Soils

Soils at the proposed well sites are mapped as belonging to the Watsonville-Elkhorn-Pinto Series.¹ The Watsonville-Elkhorn-Pinto Series is generally found on marine terraces and old alluvial fans. Soils of this series are mainly cultivated for field and row crops, irrigated and annual pasture, and specialty crops such as strawberries and Brussels sprouts (USDA NRCS, 1980). Specific soil map units at individual well sites are presented in Section 3.2.3, below.

Seismicity

The Santa Cruz Mountains are considered a region of high seismic activity. The proposed well sites could experience the effects of a major earthquake from one of the active or potentially active faults located within 100 miles. An active fault is one where displacement has occurred within the past 10,000 years; a potentially active fault has shown evidence of displacement within the past 1.6 million years. The 2007 California Building Code (CBC) places Santa Cruz County within Seismic Zone 4. Areas within Zone 4 are expected to experience maximum magnitudes and damage in the event of an earthquake. The U.S. Geological Survey (USGS) 2007 Working Group on California Earthquake Probabilities has indicated that there is a 63 percent chance of one or more earthquakes of Richter magnitude 6.7 or higher occurring in the San Francisco Bay Area between 2003 and 2032 (USGS, 2008a).

Richter magnitude is a measure of the size of an earthquake as recorded by a seismograph, a standard instrument that records ground shaking at the location of the instrument. The reported Richter magnitude for an earthquake represents the highest amplitude measured by the seismograph at a distance of 100 kilometers from the epicenter. Richter magnitudes vary logarithmically, with each whole number step representing a tenfold increase in the amplitude of the recorded seismic waves. Earthquake magnitudes are also measured by their moment magnitude, which is related to the physical characteristics of a fault, including the rigidity of the rock, the size of fault rupture, and movement or displacement across a fault (CGS, 2002).

Ground movement during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material. The composition of underlying soils, even those relatively distant from faults, can intensify ground shaking. For this reason, earthquake intensities are also measured in terms of their observed effects at a given locality. The Modified Mercalli (MM) intensity scale (**Table 3.2-1**) is commonly used to measure earthquake damage due to ground shaking. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total); intensities ranging from IV to X can cause moderate to significant structural damage.² The intensities of an earthquake will vary over the region of a fault and generally decrease with distance from the epicenter of the earthquake.

¹ The soil series is a subdivision of a family and consists of soils that are similar in all major profile characteristics.

² The damage level represents the estimated overall level of damage that will occur for various MM intensity levels. The damage, however, will not be uniform. Not all buildings perform identically in an earthquake. The age, material, type, method of construction, size, and shape of a building all affect its performance.

**TABLE 3.2-1
MODIFIED MERCALLI SCALE (ABRIDGED)**

Intensity Value	Intensity Description	Average Peak Acceleration^a
I	Not felt except by a very few persons under especially favorable circumstances.	< 0.0017 g
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	< 0.014 g
III	Felt quite noticeably indoors; especially on upper floors of buildings, but many people do not recognize it as an earthquake.	< 0.014 g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound.	0.014–0.039 g
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned.	0.039–0.092 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; minor fallen plaster or damaged chimneys. Damage slight.	0.092–0.18 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken.	0.18–0.34 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls.	0.34–0.65 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse.	0.65–1.24 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 1.24 g
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24 g

^a g is gravity = 980 centimeters per second squared. Acceleration is scaled against acceleration due to gravity or the acceleration with which a ball falls if released at rest in a vacuum (1.0 g). Acceleration of 1.0 g is equivalent to a car traveling 100 meters (328 feet) from rest in 4.5 seconds.

SOURCES: ABAG, 2003; CGS, 2003.

Regional Faults

No confirmed active, potentially active, or ancient fault features lie directly within any of the proposed well sites (Jennings, 1994). There are two major faults relatively near the proposed well sites that have the potential to produce a major earthquake: the San Andreas fault to the east and the San Gregorio fault to the west (see **Figure 3.2-1**). These faults are known as strike-slip faults.³

In addition, the smaller, potentially active Zayante-Vergeles fault and the active Monterey Bay fault are also located at a distance capable of affecting the WMP area. Figure 3.2-1 depicts active faults in the vicinity of the proposed well sites. **Table 3.2-2** lists the regional faults, along with the dates of their most recent activity and the estimated maximum moment magnitude of a characteristic event.

**TABLE 3.2-2
ACTIVE AND POTENTIALLY ACTIVE REGIONAL FAULTS
IN THE VICINITY OF THE PROPOSED WELL SITES**

Fault	Nearest Proposed Well Site	Location Relative to Well Site	Recency of Faulting^a	Historical Seismicity (Richter Magnitude)	Maximum Moment Magnitude^b
San Andreas	Polo Grounds	6 miles northeast	Historic – Active	M 7.1: 1989 M 8.25: 1906 M 7.0: 1838 Many <M 6	7.3
San Gregorio	O'Neill Ranch	14 miles southwest	Potentially Active	NA	6.9
Zayante-Vergeles	Polo Grounds	2 miles northeast	Potentially Active	NA	6.8
Monterey Bay	O'Neill Ranch	9 miles southwest	Active	NA	NA
Ben Lomond	O'Neill Ranch	4 miles northeast	Inactive	NA	NA

NA = Not applicable and/or not available

^a Recency of faulting from Jennings (1994). Historic: displacement during historic time (within the past 200 years), including areas of known fault creep; Holocene: evidence of displacement during the past 10,000 years; Quaternary: evidence of displacement during the past 1.6 million years; Pre-Quaternary: no recognized displacement during the past 1.6 million years (but not necessarily inactive).

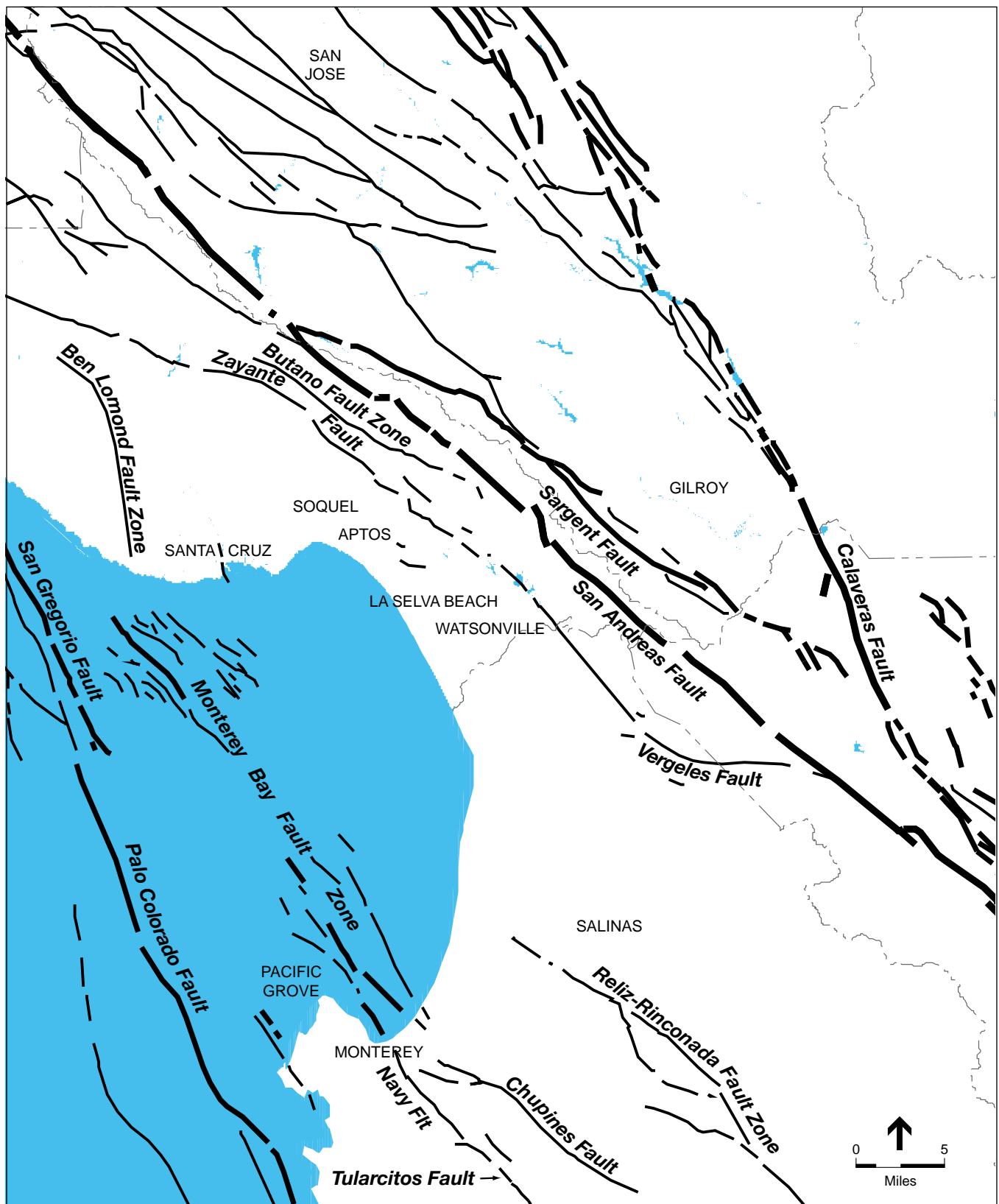
^b Maximum moment magnitude from Peterson et al. (1996). This is the maximum earthquake magnitude that could occur within the specified fault zone.

SOURCES: Jennings, 1994; Hart and Bryant, 1997; and Peterson et al., 1996.

San Andreas Fault

The San Andreas Fault Zone extends nearly the entire length of California and marks the boundary between the North American plate to the east and the Pacific plate to the west. During recorded history, numerous California earthquakes with magnitudes over 6.5 have occurred on this fault,

³ The principal movement experienced along a strike-slip fault is parallel to the trend of the fault.



SOURCE: Jennings, 1994

SqCWD Well Master Plan EIR . 205491

Figure 3.2-1
Regional Fault Map

from Los Angeles to Point Arena.⁴ Locally, the San Andreas fault was responsible for the 1906 San Francisco earthquake (magnitude 8.25) and the more recent 1989 Loma Prieta earthquake (magnitude 7.10). The Loma Prieta earthquake was centered in the Santa Cruz Mountains; it caused significant damage within Santa Cruz County (including damage to structures in Santa Cruz) and triggered thousands of landslides throughout the county (USGS, 1998a). The San Andreas fault is one of three faults that pose the greatest threat to the Bay Area, with a 21 percent chance of causing a magnitude 6.7 or greater earthquake before 2032 (USGS, 2008b).

San Gregorio Fault

The San Gregorio fault runs along the coastline of Santa Cruz County from Monterey northward. It trends onshore approximately 2 miles south of the town of Pescadero at Point Año Nuevo. Northward from Point Año Nuevo, it passes offshore again, and connects with the San Andreas fault near the town of Bolinas in Marin County. The northern end of the fault has a complex interconnection with the San Andreas Fault Zone; the southern (offshore) extent of the fault zone is less well known. The most recent earthquake along the San Gregorio fault occurred after the period from 1270 AD to 1400 AD, but prior to the arrival of Spanish missionaries in 1775 AD (Bryant et al, 1999). The San Gregorio fault has a 6 percent chance of causing a magnitude 6.7 or greater earthquake before 2032 (USGS, 2008b).

Zayante-Vergeles, Monterey Bay, Ben Lomond Faults

The potentially active Zayante-Vergeles Fault Zone is a major northwest-striking structural element of the Santa Cruz Mountains that is associated with the nearby bend of the larger San Andreas Fault Zone. The active Monterey Bay Fault Zone is located entirely offshore and extends discontinuously across Monterey Bay southeast to the Monterey Peninsula. The Ben Lomond fault, located about five miles northwest of the WMP area, is not considered active and may be too old to be considered a potentially active feature. The fault trends southeast from Boulder Creek to the area around Felton and is observed in small offsets.

Potential Geologic Hazards

Surface Fault Rupture

Surface fault rupture is typically observed and expected on or within close proximity to the causative fault trace.⁵ The Zayante-Vergeles and the Monterey Bay faults are the closest faults to the WMP area, but are at least two miles away. None of the proposed well sites or pipeline alignments are within a delineated Alquist-Priolo Earthquake Fault Zone (CGS, 1997); therefore, surface fault rupture is unlikely.

⁴ Magnitudes herein are expressed as moment magnitudes.

⁵ Fault rupture is displacement at the earth's surface resulting from fault movement associated with an earthquake.

Seismic Ground Shaking

Strong ground shaking from earthquakes generated by active faults in the Bay Area would present a hazard to facilities constructed under the proposed WMP. During the life of the wells, it is likely that at least one moderate to severe earthquake will cause strong ground shaking within the vicinity of the proposed well sites. Ground-shaking intensity is related to the size (i.e., magnitude) of an earthquake, distance from the epicenter, and the response of the underlying geologic materials. As a rule, the greater the earthquake magnitude and the closer the fault rupture to the site, the greater the intensity of ground shaking. Violent shaking is generally expected at and near the epicenter of a large earthquake, although studies of recent earthquakes, such as those conducted after the 1992 Landers earthquake, indicate that directional ground motion along a fault can cause strong ground shaking farther away from the epicenter. Seismic hazards due to ground shaking can cause the greatest amounts of damage to structures, utilities, and unsecured equipment.

Liquefaction

Liquefaction is the sudden temporary loss of shear strength⁶ in saturated, loose to medium dense, granular sediments subjected to ground shaking. Liquefaction generally occurs when seismically induced ground shaking causes pore water pressure⁷ to increase to a point equal to the overburden pressure.⁸ Liquefaction can cause foundation failure of buildings and other facilities due to the reduction of foundation bearing strength. The potential for liquefaction depends on the duration and intensity of earthquake shaking, particle size distribution of the soil, density of the soil, and elevation of the groundwater. Areas at risk due to the effects of liquefaction are typified by a high groundwater table and underlying loose to medium-dense, granular sediments, particularly younger alluvium and artificial fill. The USGS has produced a map showing zones of liquefaction potential for Santa Cruz County (USGS, 1975). The potential for liquefaction at all of the proposed well sites is mapped as being low, with the exception of the Granite Way–Aptos Village Well site. This well site was mapped as having a moderately high potential for liquefaction.

Earthquake-Induced Settlement

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid compaction and settling of subsurface materials (particularly loose, non-compacted, and variable sandy sediments) due to the rearrangement of soil particles during prolonged ground shaking. Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Typically, areas underlain by artificial fills, unconsolidated alluvial sediments, slope wash, and areas with improperly engineered construction fills are susceptible to this type of settlement. In recognition of the variability of underlying material in the WMP area, earthquake-induced settlement is discussed further in this section.

⁶ Shear strength refers to the internal resistance of a body to tangential stress.

⁷ Pore water pressure refers to the stress transmitted by the water that fills the voids between particles in saturated soils.

⁸ Overburden pressure is the vertical pressure from overlying materials.

Slope Instability and Landslides

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Rock slopes exposed to either air or water can undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience shallow soil slides, rapid debris flows, or deep-seated rotational slides.⁹

The 1989 Loma Prieta earthquake demonstrated that Santa Cruz County is subject to earthquake-induced slope failure. Landslides and slope failures were triggered by this earthquake over an area of 5,400 square miles (CGS, 1992). Most of these slope failures occurred in the Santa Cruz Mountains; however, other failures occurred along the coastal bluffs and within some of the canyon walls of the creeks.

As discussed briefly above, with the exception of the O'Neill Ranch Well site, which contains a moderate slope towards an unnamed tributary to Soquel Creek to the north, the proposed well and treatment facilities would be sited on relatively level ground. Landslide hazard mapping for Santa Cruz County indicate none of the proposed well sites are within a designated landslide hazard area (Santa Cruz County GIS, 2004). Also, according to a map of landslide deposits in Santa Cruz County, none of the proposed well sites are located within or adjacent to a mapped landslide deposit (USGS, 1998b).

Land Subsidence

Land subsidence is the temporary or permanent lowering of the land surface associated with the compaction of unconsolidated sediments. Overdrafting of groundwater aquifers and extensive declines in groundwater levels can result in compression and compaction of clay layers in an aquifer system due to the decrease in interstitial pore water pressure. Land subsidence can change gradients in streams and pipes, and cause flooding and structural damage to roads, bridges, and buildings.

Aquifer-system deformation can be fully reversible (elastic) or largely permanent (inelastic). Elastic deformation occurs when sediments compress as pore pressure decreases, and expand equally as pore pressure increases. The consequent subsidence and rebound of the land surface commonly occur seasonally, coincident with groundwater discharge and recharge. The effective stress threshold at which inelastic compaction begins is generally exceeded when groundwater levels decline past historic low levels. In these stress ranges, the materials compress inelastically, and the compaction and subsequent land subsidence are largely permanent and irreversible, despite any subsequent water recovery. Because clays are often highly compressible, and subject to rearrangement of the grains, depressurization of clay aquitard strata results in more compaction and subsidence than depressurization of less compressible, coarser-grained deposits.

There is no known anecdotal evidence of land subsidence in the Soquel-Aptos Groundwater Basin, and there are no formal studies on subsidence in the region. Although subsidence is unlikely due to the fact that the ocean boundary prevents groundwater levels from dropping too low, ongoing extraction in the basin could cause future subsidence.

⁹ Rotational slides are slope failures that occur on a curved plane, concave upward, as opposed to a linear plane.

Soil Erosion

Soil erosion is the process whereby soil materials are worn away and transported downslope either by wind or water. Rates of erosion can vary depending on the surface soil material and structures, slope angle and length, and land use. The erosion potential for soils at the proposed well sites varies from slight to moderate, with steeper areas having a higher erosion potential (USDA NRCS, 1980). Soil containing high amounts of fine sand or silt can be easily eroded, while clayey soils are generally less susceptible. Exposed soils disturbed by grading and earthmoving activities are particularly susceptible to erosion.

Expansive Soils

Expansive soils are characterized by a shrink-swell¹⁰ characteristic. Structural damage may result over a long period of time, usually resulting from inadequate soil and foundation engineering or the placement of structures directly on expansive soils. Expansive soils are largely composed of clays, which expand in volume when water is absorbed and shrink when dried. Soil materials at the proposed well sites vary and, according to the U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS), may contain soils with a high shrink-swell potential. Geotechnical investigations typically identify areas containing expansive soil materials and provide geotechnical recommendations to address expansive soils, where appropriate.

3.2.3 Existing Conditions at Individual Well Sites

Geologic and soils information for the proposed well sites is discussed below. Seismic conditions are generally the same for each site, given their relative proximity to one another; therefore, seismicity is not discussed on an individual site basis.

O'Neill Ranch Well Site

The O'Neill Ranch Well site is located at an approximate elevation of 120 feet above msl. The site slopes steeply (approximately 40 percent) to the north towards the unnamed tributary to Soquel Creek. The site is underlain by Watsonville loam soils, which occur as deep loams that are typically found in nearly level to moderately steep terrain of the coastal terraces (USDA NRCS, 1980). The Watsonville soils are somewhat poorly drained¹¹ and have slow permeabilities.¹² In addition, the Watsonville soils can have high shrink-swell properties that limit their use. The erosion hazard of this soil unit is described as slight to moderate. The potential for liquefaction at this site is considered to be low (USGS, 1975).

¹⁰ "Shrink-swell" is the cyclical expansion and contraction that occurs in fine-grained clay sediments from wetting and drying. Structures located on soils with this characteristic may be damaged over a long period of time, usually as the result of inadequate foundation engineering.

¹¹ Drainage of soils refers to their natural ability to remove water; poorly drained soils can be saturated for long periods of time, and well-drained soils remove water readily.

¹² Permeability is the quantitative measurement of how many inches per hour that water moves through soil.

Cunnison Lane Well Site

The Cunnison Lane Well site is located at an approximate elevation of 155 feet above msl and is relatively level, sloping about 4 to 6 percent west toward an unnamed tributary to Noble Gulch. The site is also underlain by Watsonville loam soils (described above for the O'Neill Ranch Well site) (USDA NRCS, 1980). These soils are somewhat poorly drained, have slow permeabilities, and can have high shrink-swell properties that limit their use. The erosion hazard of this soil unit is described as slight to moderate. The potential for liquefaction at this site is considered to be low (USGS, 1975).

Austrian Way Well Site

The Austrian Way Well site is located at approximately 405 feet above msl and is relatively level. The proposed well and treatment facilities would be constructed on relatively level land in the southwest portion of the parcel that slopes gently to the east and south. The northern and eastern portions of the Austrian Way Well site parcel slope steeply (approximately 30 percent) northeast and east toward a deep creek canyon formed by Aptos Creek. The site is underlain by the Nisene-Aptos complex soils, which consist of a mix of sandy loams, loams, stony loams, and coarse sand (USDA NRCS, 1980). These soils are deep and well drained, are capable of rapid runoff, and have a high potential for erosion hazards. The potential for liquefaction at this site is considered to be low (USGS, 1975).

Granite Way–Aptos Village Well Site

The Granite Way–Aptos Village Well site is located at an approximate elevation of 200 feet above msl and slopes gently (2 to 3 percent) to the southeast. The site is underlain by Watsonville loam soils (described above for the O'Neill Ranch Well site) (USDA NRCS, 1980). These soils are somewhat poorly drained, have slow permeabilities, and can have high shrink-swell properties that limit their use. The erosion hazard of this soil unit is described as slight to moderate. The Granite Way–Aptos Village Well site was mapped as having a moderately high potential for liquefaction (USGS, 1975).

Polo Grounds Well Site

The Polo Grounds Well site is located at Polo Grounds Regional Park. Elevations at the Polo Grounds Regional Park range from 165 feet above msl at the junction of North Polo Drive and South Polo Drive, to approximately 200 feet above msl at the location of the existing irrigation well. The existing irrigation well is located on level ground that slopes gently (1 to 2 percent) to the southwest. Along the Valencia Creek corridor to the north, slopes are moderately steep to steep (approximately 35 to 45 percent) down into the creek. Soils at the Polo Grounds Regional Park are mapped as Soquel and Danville loams (USDA NRCS, 1980). Both of these soil types are characterized as well drained soils that formed in alluvium, with slow to medium runoff and slow permeability. The potential for liquefaction at this site is considered to be low (USGS, 1975).

3.2.4 Regulatory Framework

Federal and State Regulations

Building Codes

The California Building Code (CBC), which is codified in Title 24, Part 2, of the California Code of Regulations, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, egress facilities, and general building stability. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all building and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable.

The CBC is based on the International Building Code. The 2007 CBC is based on the 2006 International Building Code published by the International Code Conference. In addition, the CBC contains necessary California amendments that are based on the American Society of Civil Engineers (ASCE) Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion in building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the City of Capitola or the Local Coastal Zone, therefore, local building and zoning ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.

While the District is exempt from all zoning and building ordinances for water production projects per California Government Code Section 53091 (d) and (e), the District anticipates utilizing Santa Cruz County's grading and erosion control standards as guidelines during construction activities where appropriate.

Grading Ordinance

The Santa Cruz County Grading Ordinance requires grading permits for activities involving any of the following: (1) moving more than 100 cubic yards of earth; (2) creating a cut slope greater than 5 feet high; (3) creating fills greater than 2 feet deep on slopes greater than 20 percent, or any fill

used for structural support; or (4) any shoreline protection project. The ordinance sets minimum grading plan requirements to ensure proper grading, prevent accelerated soil erosion, protect fish and wildlife habitats, and prevent increased flood hazards and visual degradation (County Code, Chapter 16.20).

Erosion Control Ordinance

The Santa Cruz County Erosion Control Ordinance requires preparation of an erosion control plan (ECP) for all development plans. At a minimum, ECPs must provide a detailed description of existing and proposed contour lines; details of erosion/sediment control measures and specific construction techniques to be used onsite; a drainage plan that details drainage control devices; a revegetation plan that includes all disturbed soils; and the proposed construction schedule. Well drilling and repair are exempt from specific provisions of the ordinance, provided they do not accelerate erosion. Construction activities associated with well buildings, treatment plants, and pipeline installation, however, are not exempt from the ordinance (County Code, Chapter 16.22).

3.2.5 Impacts and Mitigation Measures

Significance Criteria

CEQA defines a significant effect on the environment as a substantial or potentially substantial adverse change in the physical conditions within the area affected by the project. A geologic, soils-related, or seismic hazard impact would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA Guidelines:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
 - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
 - Strong seismic ground shaking;
 - Seismic-related ground failure, including liquefaction; or
 - Landslides.
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the 1997 UBC, creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;

- Change substantially the topography or any unique geologic or physical features of the site; or
- Potentially result in onsite or offsite land subsidence that could cause substantial structural damage, increased flooding, or altered drainage patterns.

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

Soils capable of supporting septic tanks or alternative wastewater disposal systems. The WMP would not result in the construction of buildings or structures for human occupancy that would require the use of septic systems or alternative wastewater disposal systems. Therefore, impacts related to the capacity of soils in the project area to support septic tanks or alternative wastewater disposal systems are not applicable to the project and are not discussed further.

Substantial changes to topography or any unique geologic or physical features. The proposed wells and associated improvements would be constructed in urban areas and have been previously graded and disturbed. No unique geologic or physical features exist at the proposed well sites. Grading and earthwork activities at the proposed well sites would not substantially alter the topography of the sites, or affect any unique geologic or physical features. Thus, no impacts related to substantial changes to topography or unique geologic or physical features would occur and no additional discussion is warranted.

Approach to Analysis

This analysis presents potential impacts associated with construction, maintenance, and operation activities individually for each of the proposed well sites based on site-specific geologic conditions and regional seismicity. The project components would be designed and constructed in accordance with applicable provisions of the CBC, which would protect the proposed facilities from substantial structural damage in the event of a major earthquake. Because no habitable structures are proposed as part of the WMP, increased seismic risks to human health would not result from WMP implementation.

Potential geologic and soils hazards to proposed structures and infrastructure are primarily related to ground shaking and associated ground failure (e.g., liquefaction); these general hazards are present to some extent at all of the proposed well sites. Because no active or potentially active faults exist on or in the immediate vicinity of the proposed wells and infrastructure, the potential for surface fault rupture is very low.

The proposed well sites would be most susceptible to erosion during construction activities. Construction-related soil erosion is addressed in Section 3.4, Surface Water Hydrology and Water Quality.

Impact Summary

**TABLE 3.2-3
SUMMARY OF IMPACTS – GEOLOGY, SOILS, AND SEISMICITY**

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way – Aptos Village Well Site	Polo Grounds Well Site
Impact 3.2-1: Proposed facilities and associated infrastructure could be susceptible to damage from surface fault rupture.	LS	LS	LS	LS	LS
Impact 3.2-2: Ground motion generated during an earthquake could result in structural damage to proposed facilities and associated infrastructure, potentially resulting in service disruptions.	LS	LS	LS	LS	LS
Impact 3.2-3: Proposed facilities and associated infrastructure could be susceptible to seismically induced ground failure, including liquefaction and settlement.	LS	LS	LS	LS	LS
Impact 3.2-4: Proposed facilities and associated infrastructure could be subjected to geologic hazards, including expansive soils and differential settlement.	LS	LS	LS	LS	LS
Impact 3.2-5: Proposed facilities are located in areas susceptible to slope instability.	PSM	LS	LS	LS	LS
Impact 3.2-6: Project implementation could potentially result in land subsidence that would cause substantial structural damage, flooding, or altered drainage patterns.	LS	LS	LS	LS	LS
Impact 3.2-7: Project construction activities could result in a substantial loss of topsoil.	PSM	PSM	PSM	PSM	LS

LS = Less than Significant impact, no mitigation required

PSM = Potentially Significant impact, can be Mitigated to less than significant

Impact Discussion

Impact 3.2-1: Proposed facilities and associated infrastructure could be susceptible to damage from surface fault rupture.

All Sites

None of the proposed well sites or related infrastructure improvements are located within an Alquist-Priolo Earthquake Fault Zone, and no active or potentially active faults exist within or in the immediate vicinity of any of the sites. The closest active or potentially active fault to any of the proposed well sites is the Zayante-Vergeles fault, which is located approximately 2 miles northeast of the Polo Grounds Well site. Due to the distance from the proposed well sites, the Zayante-Vergeles fault and other active and potentially active regional faults in the Soquel-Aptos area are not considered to pose a surface-faulting hazard. Although surface fault rupture is not necessarily restricted to the area within an Alquist-Priolo Earthquake Fault Zone, the potential risk of surface rupture is highest along active faults. Thus, potential impacts related to surface fault rupture would be less than significant, and no mitigation is necessary.

Mitigation: None required.

Impact 3.2-2: Ground motion generated during an earthquake could result in structural damage to proposed facilities and associated infrastructure, potentially resulting in service disruptions.

All Sites

Ground shaking is an unavoidable hazard for structures and associated infrastructure within the project region. Seismically-induced ground shaking could occur at all of the proposed well sites. Although some of the sites are closer than others to active faults, the relative difference in distance is inconsequential, as all sites have the potential to experience strong ground shaking. The WMP components would likely experience at least one major earthquake (magnitude 6.7 or greater) sometime during the operational lifetime of the proposed wells (USGS, 2008a). The degree of hazard depends on the geologic conditions of the site, construction materials, and construction quality. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the moment magnitude, and the duration of shaking. The 1989 Loma Prieta earthquake reportedly caused more than 60 water main breaks in Santa Cruz (CGS, 1990). However, mandatory adherence to the engineering and construction practices of the CBC would minimize potential damage from an earthquake, and any potential interruption of service would likely be temporary. This impact is considered to be less than significant, and no mitigation is required.

Mitigation: None required.

Impact 3.2-3: Proposed facilities and associated infrastructure could be susceptible to seismically induced ground failure, including liquefaction and settlement.

Liquefaction that results in ground failure can potentially damage roads, underground pipelines, and buildings with shallow foundations. Elements of the WMP located in areas considered susceptible to liquefaction could be subject to liquefaction hazards during a seismic event. Seismically induced settlement can occur in areas underlain by compressible sediments, such as artificial fills, unconsolidated alluvial sediments, slope wash, and areas with improperly engineered construction fills.

The engineering design and construction of the proposed wells, treatment facilities, pipelines, and associated infrastructure would be conducted according to the seismic requirements contained in the CBC. Mandatory adherence with these standard engineering and construction practices would prevent potentially significant impacts associated with seismically induced ground failure.

Granite Way–Aptos Village Well Site

The Granite Way–Aptos Village Well site is mapped as having a moderately high potential for liquefaction. In the absence of site-specific geotechnical studies, it is assumed that this site could be subjected to earthquake-induced settlement. Mandatory adherence to standard engineering and construction practices contained in the CBC would prevent significant impacts related to soil liquefaction and settlement. Thus, this impact would be less than significant, and no mitigation is required.

All Other Sites

The O'Neill Ranch, Cunnison Lane, Austrian Way, and Polo Grounds Well sites are mapped within an area characterized as having a low potential for liquefaction. It is possible that these sites are underlain by compressible sediments that could be subject to settlement. Although the potential for liquefaction at these sites is already low, hazards related to soil liquefaction and settlement at these sites would be further reduced by mandatory adherence to standard engineering and construction practices contained in the CBC. Thus, potential impacts related to soil liquefaction and settlement would be less than significant, and no mitigation is required.

Mitigation: None required.

Impact 3.2-4: Proposed facilities and associated infrastructure could be subjected to geologic hazards, including expansive soils and differential settlement.**All Sites**

Soils containing a high percentage of clays are generally most susceptible to expansion. Expansive soils can damage foundations of above-ground structures, paved roads and streets, and concrete slabs. Soil materials at the proposed well sites vary and, according to the USDA NRCS, may contain soils with a high shrink-swell potential.

If not properly engineered, mud and loose fine-grained sediments (clay and silt) can settle after a building or other load is placed on the surface. Differential settlement would be a concern in areas that have not previously supported structures and where new structures would place loads heavier than the soils could tolerate. However, due to the relative size and weight of the proposed well facilities, the potential for differential settlement is considered very low.

Hazards associated with expansive soils would be remedied during site preparation, grading, and construction through standard engineering practices that correct adverse soil conditions. Trenches, access pits, and excavations would be backfilled with engineered fill materials, which would also reduce impacts from expansive soils. Although expansivity in a soil can cause damage to structural features over time, there is a low potential for this to occur in an appropriately engineered soil base. As with any municipal construction project, foundation soils supporting the project-related improvements would be appropriately engineered by a geotechnical or civil engineer to withstand expected structural loads, thereby minimizing the potential for settlement. Thus, potential impacts

related to geologic hazards such as expansive soils and differential settlement would be less than significant, and no mitigation is necessary.

Mitigation: None required.

Impact 3.2-5: Proposed facilities are located in areas susceptible to slope instability.

Slope failures, commonly referred to as landslides, involve the downslope displacement and movement of material, either triggered by gravity or by earthquakes. With the exception of the O'Neill Ranch Well site, the proposed well sites are located in relatively level areas that are not susceptible to slope failure.

O'Neill Ranch Well Site

The O'Neill Ranch Well site slopes steeply (approximately 40 percent) north toward the unnamed tributary to Soquel Creek. To construct a level construction area, a portion of the site would be graded and leveled using engineered fill. If not appropriately constructed, the proposed facilities at this site could be subject to damage as a result of slope instability. Additionally, failure of the creek bank could contribute to sedimentation in downstream water bodies. Potential water quality impacts related to soil erosion are addressed in Section 3.4, Surface Water Hydrology and Water Quality. The impact to slope instability is considered potentially significant, but would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.2-5 (Slope Stability Analysis)**.

All Other Sites

The Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds Well sites are located on relatively level ground and in areas with a low potential for slope instability. Therefore, impacts related to slope instability would be less than significant, and no mitigation is necessary.

Mitigation Measures

Measure 3.2-5: Slope Stability Analysis (applies to O'Neill Ranch Well site only). The District shall contract with a licensed geotechnical engineer to conduct a design-level slope stability analysis of the O'Neill Ranch Well site. The investigation shall evaluate the geotechnical conditions and characteristics of the project site and provide recommendations for the design and construction of the proposed well and appurtenances to reduce the potential impact from slope failure to a less-than-significant level. Recommended slope stability strategies shall be consistent with local building codes and the most recent version of the CBC. All recommendations provided by the licensed geotechnical engineer shall be incorporated into the final design plans and construction specifications.

Significance after Mitigation: Less than Significant.

Impact 3.2-6: Project implementation could potentially result in land subsidence that would cause substantial structural damage, flooding, or altered drainage patterns.**All Sites**

Subsidence in the Soquel-Aptos Groundwater Basin could potentially occur as a result of continued groundwater extractions and associated compaction of the confining clay layers. However, this type of subsidence is usually associated with severe, long-term withdrawal in excess of recharge. Further, the ocean boundary helps to protect the basin from risk of subsidence by preventing extreme declines in groundwater levels. There is no known anecdotal evidence of land subsidence in the Soquel-Aptos Groundwater Basin. Formal subsidence studies have not yet been initiated in the basin (SqCWD and CWD, 2007).

The current *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area* (SqCWD and CWD, 2007) identifies key basin management issues, establishes specific basin management goals and objectives, and details the specific projects, programs, and policies that are being implemented to manage the Soquel-Aptos Groundwater Basin. Mandatory basin management elements contained in the Groundwater Management Plan further protect the basin from land subsidence.

SqCWD and CWD maintain groundwater monitoring programs to manage pumping, provide early detection of seawater intrusion, and corroborate groundwater storage efforts. Element 1 of the Groundwater Management Plan expands the existing monitoring well network and enhances data coordination among all local agencies in the Soquel-Aptos Groundwater Basin (SqCWD and CWD, 2007). Ongoing groundwater monitoring efforts would continue to ensure that severe declines in groundwater levels do not occur, thereby protecting the basin from subsidence.

Element 3 of the Groundwater Management Plan is comprised of a GPS- or satellite-based subsidence monitoring program to be developed in coordination with the California Department of Water Resources (DWR). Once implemented, the subsidence monitoring program would consist of a set of benchmarked stations where land surface elevation is periodically measured. Land surface elevations would initially be surveyed every two years. If no significant subsidence is observed after the first two years, surveying would be conducted every five years (SqCWD and CWD, 2007).

There is currently no evidence, anecdotal or otherwise, of subsidence in the Soquel-Aptos Groundwater Basin. Groundwater conditions at or near the historical low groundwater elevations at SqCWD's municipal wells during drought conditions have been experienced periodically within the Soquel-Aptos Groundwater Basin, and would continue to be experienced periodically within the groundwater basin irrespective of the WMP. Implementation of the WMP would not translate to increased groundwater pumping by the District. Further, the District has set a long-term goal to limit average groundwater pumping to the sustainable yield of the groundwater basin. Therefore, implementation of the WMP would not exacerbate current groundwater overdraft conditions in the basin or result in land subsidence. Therefore, potential impacts related to land subsidence from WMP implementation would be less than significant, and no mitigation is necessary.

Mitigation: None required.

Impact 3.2.7: Project construction activities could result in a substantial loss of topsoil.

Construction activities such as backfilling, grading, and compaction can remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized during construction, can be subject to soil loss and erosion by wind and stormwater runoff. Without proper controls, increased soil erosion during construction could result in a substantial loss of topsoil. The mitigation measure prescribed below is consistent with the Santa Cruz County Erosion Control Ordinance and the Santa Cruz County Grading Ordinance.

Polo Grounds Well Site

As described under Impact 3.4-1 in Section 3.4, Surface Water Hydrology and Water Quality, because construction activities at the Polo Grounds Well site would result in more than one acre of land disturbance, the SqCWD or its construction contractor(s) would be required to develop and implement a site-specific stormwater pollution prevention plan (SWPPP) in accordance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. The SWPPP would prescribe site-specific erosion control measures to prevent substantial erosion and loss of topsoil at the Polo Grounds Well site during project construction activities. Thus, this impact is considered less than significant, and no additional mitigation is necessary.

All Other Sites

As described under Impact 3.4-1 in Section 3.4, Surface Water Hydrology and Water Quality, construction activities at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites would result in soil disturbances of less than one acre at each site and are therefore not subject to the requirements of the NPDES Construction General Permit. Without proper controls, construction activities at well sites with less than one acre of soil disturbance could result in substantial loss of topsoil, a potentially significant impact. However, implementation of **Mitigation Measure 3.4-1a (Erosion Control Plan)**, which would require that appropriate erosion/sediment control measures and practices be implemented during construction at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites, potentially significant impacts related to loss of topsoil would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.4-1a: Erosion Control Plan (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). See Section 3.4, Hydrology and Water Quality, for description.

Significance after Mitigation: Less than Significant.

3.2.6 References – Geology, Soils, and Seismicity

- Association of Bay Area Governments (ABAG), Modified Mercalli Intensity Scale, available online at <http://www.abag.ca.gov/bayarea/eqmaps/doc/mmi.html>, October 15, 2003.
- Bryant, W.A., and Cluett, S.E., compilers, 1999, Fault number 60b, San Gregorio fault zone, Sur Region section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, <http://earthquakes.usgs.gov/regional/qfaults>, accessed August 8, 2009.
- California Geological Survey (CGS), *The Loma Prieta (Santa Cruz Mountains), California Earthquake of October 17, 1989*. Special Publication 104, 1990.
- California Geological Survey (CGS), *Landslides and other Geologic Features in the Santa Cruz Mountains, California, Resulting from the Loma Prieta Earthquake of October 17, 1989*. Open-File Report 91-05, 1992.
- California Geological Survey (CGS), *Fault-Rupture Hazard Zones in California*, Special Publication 42, 1997.
- California Geological Survey (CGS), *How Earthquakes and Their Effects Are Measured*, Note 32, 2002.
- California Geological Survey (CGS), Background Information on the Shake Maps, available online at <http://quake.usgs.gov/research/strongmotion/effects/shake/about.html>, April 21, 2003.
- Hart, E.W. and W.A. Bryant, Fault-Rupture Hazard Zones in California: Alquist-Priolo Special Studies Zones Act of 1972 with Index to Special Studies Zones Maps, CGS Special Publication 42, 1997.
- Jennings, C.W., Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions, CGS Geologic Data Map No. 6, 1:750,000, 1994.
- Peterson, M.D., W.A. Bryant, and C.H. Cramer, PSHA for the State of California, CGS Open-File Report issued jointly with the USGS, CGS 96-08 and USGS 96-706, 1996.
- Santa Cruz County Geographic Information System (GIS), Landslide Hazards Areas Map, December 22, 2004.
- Santa Cruz County Planning Department, *1994 County of Santa Cruz General Plan and Local Coastal Program*. Approved December 19, 1994.
- Soquel Creek Water District (SqCWD) and Central Water District (CWD), *Groundwater Management Plan – 2007, Soquel-Aptos Area, Santa Cruz County, CA*. Prepared by HydroMetrics, LLC. Adopted April 17, 2007.
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Soil Survey for Santa Cruz County, California, 1980.
- U.S. Geological Survey (USGS), Map Showing Geology and Liquefaction Potential of Quaternary Deposits in Santa Cruz County, California, MF-648, William R. Dupre, 1975.

- U.S. Geological Survey (USGS), Geologic Map of Santa Cruz County, California, Earl E. Brabb, Map I-1905, 1989.
- U.S. Geological Survey (USGS), *The Loma Prieta, California Earthquake of October 17, 1989—Landslides*, USGS Professional Paper 1551-C, 1998a.
- U.S. Geological Survey (USGS), Preliminary Map of Landslide Deposits in Santa Cruz County, California, A Digital Map Database. Open File Report 98-792. Landslides mapped by Cooper-Clark & Associates, 1975; Digital compilation by Sebastian Roberts & Andrew D. Baron, 1998b.
- U.S. Geological Survey (USGS), The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2), Executive Summary. Prepared by the Working Group on California Earthquake Probabilities. Open File Report 2007-1437. 2008a.
- U.S. Geological Survey (USGS), San Francisco Bay Region Earthquake Probability, 2008b.

3.3 Groundwater Resources

3.3.1 Introduction

This section describes the groundwater resources used by SqCWD for water supplies and evaluates the potential for the WMP to result in significant impacts to non-District wells and unfavorable groundwater conditions in the study area. This section also describes the existing environmental conditions and the regulatory framework as it applies to groundwater resources in the study area. Section 3.3.5, Impacts and Mitigation Measures, presents the significance criteria applied in the analysis of potential environmental impacts associated with WMP implementation. The impact analysis includes a discussion of the potential for WMP-related impacts to nearby wells, local aquifers, and groundwater resources. Mitigation for potential impacts is provided, as appropriate.

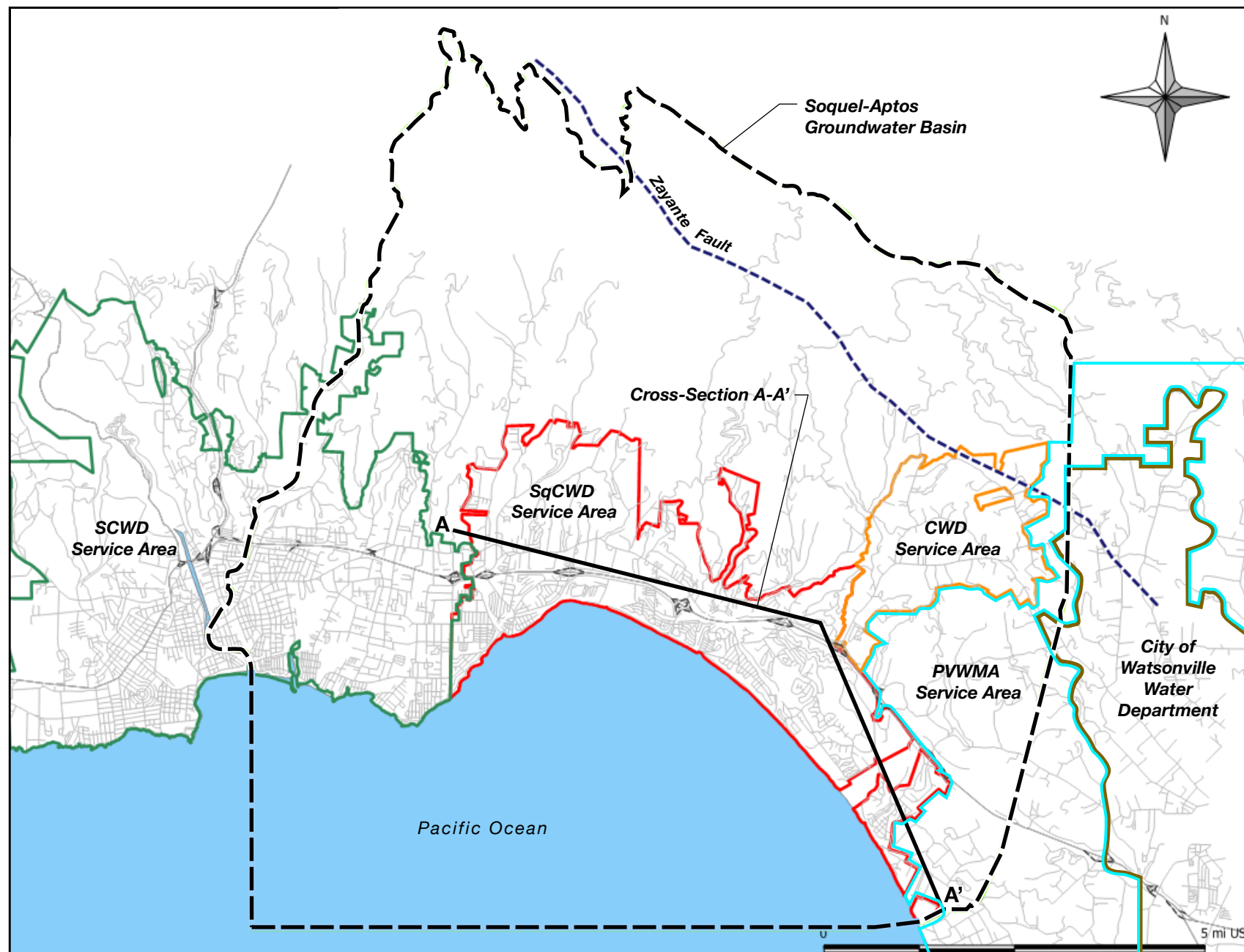
3.3.2 Environmental Setting

The study area for the groundwater resources analysis consists of the Soquel-Aptos Groundwater Basin. The Soquel-Aptos Groundwater Basin boundary generally follows the Zayante fault to the north, forms a smooth line that encompasses the service areas of Central Water District (CWD) and SqCWD along its eastern boundary, extends offshore approximately two miles south of Pleasure Point, and is bound by Branciforte Creek to the west (see **Figure 3.3-1**). The basin, which was first described in the *Groundwater Assessment of Alternative Conjunctive Use Scenarios - Technical Memorandum 2: Hydrogeologic Conceptual Model* report (Johnson et al., 2004), encompasses groundwater flow and recharge sources that affect the groundwater resources used by the District (SqCWD and CWD, 2007). Although the basin's boundary does not constitute a single, well-defined hydrogeologic¹ basin, it adequately defines the area that is managed by, or is of concern to, various neighboring water agencies including SqCWD, CWD, and the City of Santa Cruz Water Department (SCWD) (HydroMetrics, 2007a). SqCWD, CWD, and SCWD operate municipal wells in the Soquel-Aptos Groundwater Basin. In addition, the Pajaro Valley Water Management Agency (PVWMA) operates within the basin as a state-chartered water management agency and is an agricultural purveyor. SqCWD, CWD, and PVWMA rely exclusively on groundwater to meet their needs, while SCWD and the City of Watsonville use a combination of groundwater and surface water supplies to meet demand (SqCWD and CWD, 2007).

Hydrogeologic Framework

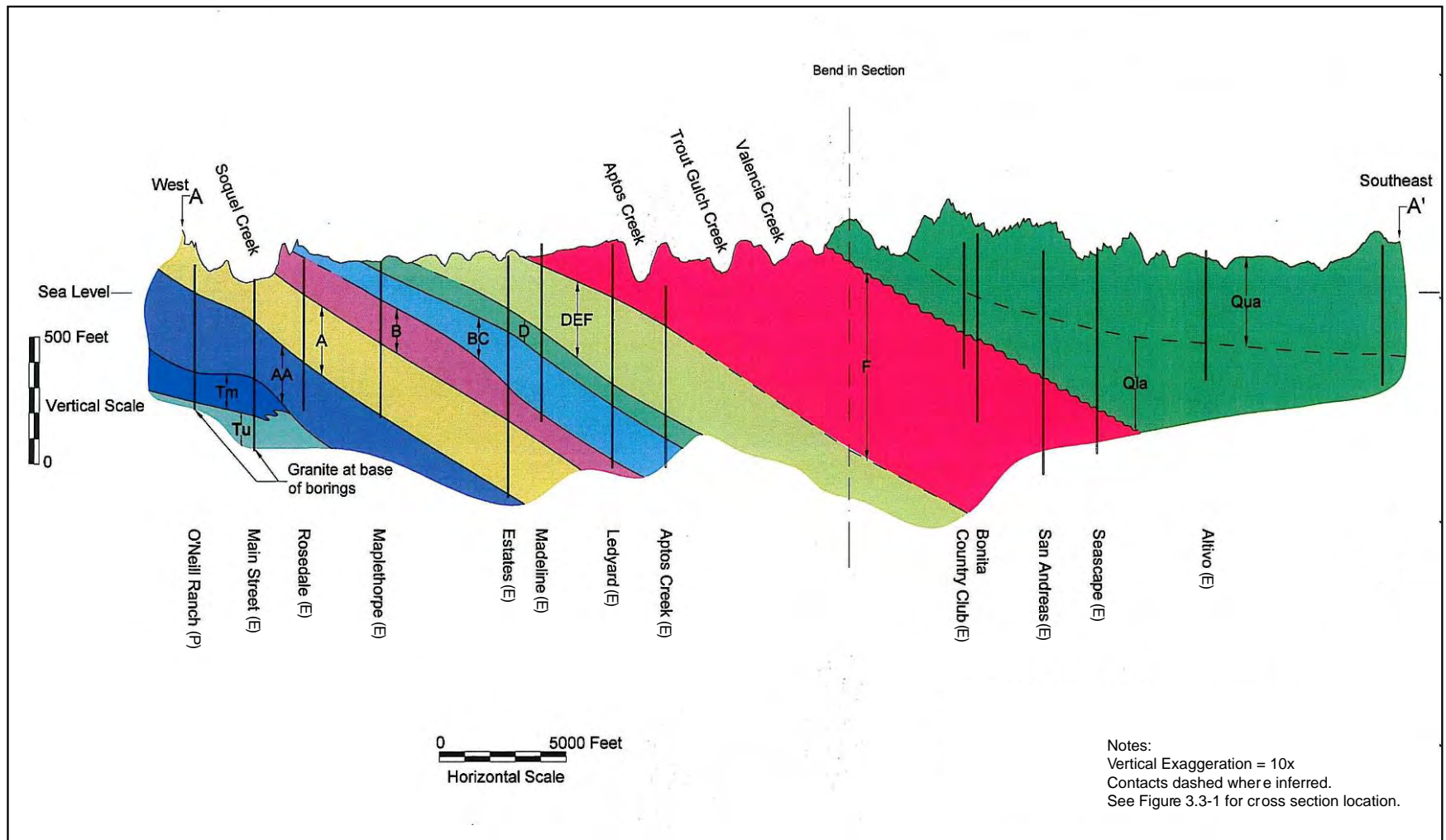
The primary water-bearing units within the Soquel-Aptos Groundwater Basin are the Purisima Formation and the Aromas Red Sands (Aromas) aquifer. **Figure 3.3-2** illustrates the groundwater units underlying SqCWD's service area. Due to the proximity of the basin to Monterey Bay, these groundwater formations have offshore ocean outcrops, which present opportunities for seawater intrusion along the coast.

¹ Hydrogeology is the study of the interrelationships of geologic materials and processes with water, especially groundwater.



SOURCE: HydroMetrics LLC, 2008b

SqCWD Well Master Plan EIR . 205491
Figure 3.3-1
 Soquel-Aptos Groundwater basin



Purisima Formation

The SqCWD extracts groundwater from the deep water-bearing zones within the Purisima Formation, a 2,000-foot-thick body of sandstone interbedded with layers of siltstone and claystone. Beneath the Soquel-Aptos Groundwater Basin, the Purisima Formation overlies a “basement” rock made up of ancient intrusive (i.e., granite) and chemically and structurally altered (metamorphic) rocks.² The gradual uplift of the California coast has caused the units of the Purisima Formation to tilt (dip) from the west to the east. This easterly dip causes the lowermost (oldest) units to occur along ridgetops in the western portion of the Soquel-Aptos Groundwater Basin; the uppermost (youngest) units are buried beneath the Pajaro Valley to the southeast. The northern boundary of the Purisima Formation appears to be within a tightly folded syncline north of the Zayante fault along the upper portions of the Soquel and Aptos Creek watersheds. The Zayante fault may have been an important geologic structural feature in this region millions of years ago, but by about 23 million years ago, seismic activity had decreased. The Zayante fault serves as the basin boundary and, given its structure and orientation, could affect groundwater flow where it intersects Soquel Creek.

The Purisima Formation is a collection of distinct geologic units, which hydrogeologists have assigned the identification letters AA through F. Purisima Unit AA is the deepest and oldest unit, while Purisima Unit F is the most shallow and youngest of the units. Some of the Purisima Formation units transmit and store groundwater (also known as aquifers); some restrict or impede groundwater movement (also known as aquitards); and some contain geologic materials that act as both aquifers and aquitards. **Table 3.3-1** summarizes the hydrogeologic characteristics of the individual Purisima Formation units in order of youngest to oldest. The hydrogeologic units presented in the table were first proposed by Johnson et al. (2004) to conceptualize the distribution of hydrogeologic properties and groundwater pumping effects.

Aromas Aquifer

SqCWD wells pump groundwater from the semi-confined and unconfined units of the Aromas aquifer. The Aromas aquifer is one of several sedimentary terrace deposits that form the hills and coastal terraces east and southeast of Aptos. These poorly consolidated deposits are younger than the Purisima Formation and lie over it within the study area. The Aromas aquifer is composed of sand deposited by rivers, the bay, and by wind, and contains interbedded layers of silt and clay. Within the Soquel-Aptos Groundwater Basin, the Aromas aquifer is about 400 feet thick and divided into the 225-foot-thick upper aquifer unit (Qua) and the 175-foot-thick lower aquifer unit (Qla). Most production wells are screened in the lower Aromas aquifer unit; none of the SqCWD production wells are screened in the upper unit (SqCWD, 2006).

² Basement rocks are typically the oldest and deepest rocks underlying a particular area. Under the Soquel-Aptos area, the basement rocks were formed during the Jurassic period, about 136 million years ago.

**TABLE 3.3-1
PURISIMA FORMATION HYDROGEOLOGIC UNITS**

Purisima Formation Unit	Average Thickness (Feet)	Hydrogeologic Characteristics	Hydrogeologic Significance
Unit F Aquifer	150 to 500+	Sequence of alternating moderately coarse- and fine-grained zones. This unit is often screened in conjunction with the lower Aromas aquifer.	The Polo Grounds and Aptos Jr. High Wells are screened in this unit.
Unit DEF Aquifer	~330	Moderately coarse aquifer includes intermittent fine-grained zones. The top of this aquifer is poorly defined.	The T. Hopkins and Aptos Creek Wells are screened in this unit. The proposed Granite Way-Aptos Village Well would be screened in the upper part of this unit.
Unit D Aquitard	~80	Fine-grained sediments that act as an aquitard.	Wells west of Aptos Creek and shallow wells are screened in upper portion of the unit.
Unit BC Aquifer	~200	Moderately coarse-grained unit with distinct 15- to 20-foot thick coarse-grained unit at the top of the unit.	Water-bearing aquifer with some thin aquitards. The proposed Austrian Way Well would be screened in this unit.
Unit B Aquitard	~150	Consists of fine-grained sediments that act as an aquitard.	Few wells are screened across this unit.
Unit A Aquifer	~250	Most consistently coarse-grained aquifer within the Purisima Formation.	Distinct and highly permeable. Many groundwater wells are screened in this unit. The proposed Cunnison Lane Well would be screened in this unit.
Unit AA Aquifer	150 to 300	Consists of interbedded, moderately coarse- and fine-grained zones underlying the well-defined aquifer A.	Few wells are screened in aquifer AA. The proposed O'Neill Ranch Well would likely be screened in this unit.
Unit Tm Aquitard	0 to 200	Consists of fine-grained sediments near the base of the Purisima Formation that act as an aquitard where present.	Few wells penetrate fine-grained material.
Tu Aquifer	0 to 300	Comprises the lower part of the Tertiary-age sediments below the base of the Purisima Formation.	This aquifer has only been observed in deep wells and is limited in extent.

SOURCE: HydroMetrics, 2008.

Offshore Geology

Areas of exposed Purisima Formation units extend offshore of the project area due to the geologic orientation and dip of the beds. The offshore extension of the Purisima Formation is an important aspect of the relationship between the onshore fresh groundwater and the offshore saltwater, because such a structural configuration can allow the transmission of freshwater towards the ocean and, under other conditions, cause saltwater to move inland. The potential for seawater intrusion into the Purisima Formation aquifers is discussed in detail below. The Purisima Unit A outcrops the nearest to shore off Pleasure Point and is closest to the City of Santa Cruz's Live

Oak Well Field. Offshore, the Aromas aquifer is difficult to distinguish; however, studies suggest it is exposed offshore in the shallow waters in the southeast portion of the Soquel-Aptos Groundwater Basin (SqCWD, 2006).

Groundwater Flow and Occurrence

The hydrogeologic formations described above transmit water through a complex system made up of layers of highly permeable units of sand and gravel (aquifers) separated by layers of low-permeability units of silts and clays or shale (aquitards). Prior to human settlement in the Soquel-Aptos region, groundwater likely flowed from the inland hills toward the ocean. These natural flow patterns have been disrupted by drawdown cones that have developed around municipal, industrial, domestic, and agricultural wells due to long-term groundwater extractions; in much of the basin, these cones of depression have extended to the coastline (HydroMetrics, 2009a).

Groundwater Elevations

Groundwater elevation contour maps provide a tool for observing local groundwater flow conditions within the Soquel-Aptos Groundwater Basin. Groundwater contours show lines of equal potential, similar to the way in which elevation contours on topographic maps illustrate lines of equal elevation. Groundwater flows from areas of high potential to areas of low potential, and the steeper the groundwater gradient, the faster groundwater will move toward the low-potential areas. Monitoring groundwater elevations over time provides essential information to identifying overdraft conditions associated with declining groundwater elevations. Monitoring also helps to determine whether saltwater is entering the coastal areas of the Soquel-Aptos Groundwater Basin, as groundwater elevations below sea level indicate the potential for seawater intrusion.

SqCWD, CWD, and SCWD maintain a network of wells within the Soquel-Aptos Groundwater Basin for monitoring water quality and water levels. The monitoring network covers the units within the Purisima Formation that are the source of water supply for the western two-thirds of SqCWD's service area; and the Aromas aquifer, which overlies the Purisima Formation in the eastern third of the SqCWD service area, and is the source of water supply for that portion of SqCWD's service area (SqCWD, 2005). The results of the groundwater monitoring are compiled annually and were most recently presented in the *Annual State of the Basin Report for Water Year 2008* (HydroMetrics, 2009a) for the hydrogeologic units used for water supplies by SqCWD.

Within the units of the Purisima Formation, the groundwater elevation contours show that groundwater generally flows from the northern hills toward areas of depressed water levels in the vicinity of the production wells; these depressed levels have been caused by high rates of groundwater extraction at specific wells, ultimately leading to the formation of a trough center anchored by multiple water supply wells that are generally screened in the same unit. The contours additionally suggest that a portion of the groundwater pumped by the SqCWD wells is derived from beneath Monterey Bay. This same general pattern of groundwater flow has persisted for years, except that recent monitoring results from Purisima Unit A indicate a shallower trough compared with observations from previous years. This is likely the result of SqCWD's recent efforts to move pumping inland and reduce extractions from the central coastal area (HydroMetrics, 2007a).

Water levels in the Aromas aquifer are characterized by a moderate seawater gradient in upland areas that transitions to a relatively flat gradient throughout the coastal plain. Groundwater in the Aromas aquifer generally flows from the hills toward the Pacific Ocean, but appears to be almost entirely captured by municipal, private, and agricultural wells in the coastal plain area (HydroMetrics, 2007a).

Groundwater Balance

A specific accounting of groundwater recharge to the Soquel-Aptos Groundwater Basin has not been completed. However, the *Groundwater Assessment of Alternative Conjunctive Use Scenarios - Technical Memorandum 2: Hydrogeologic Conceptual Model* report (Johnson et al., 2004) reaffirmed previous conclusions that the basin is experiencing overdraft conditions. Multi-year declines in water levels have appeared in both aquifers, indicating that sustainable levels of pumping have been exceeded, thereby increasing the potential for seawater intrusion. In addition, the *Groundwater Levels to Protect against Seawater Intrusion and Store Freshwater Offshore* report (HydroMetrics, 2009b) indicates that coastal water levels are at elevations that risk seawater intrusion. Technical studies of groundwater basin conditions for SqCWD's service area indicate that, even with conservation savings, a supplemental source of supply needs to be developed within the near future, and that basin overdraft and seawater intrusion could worsen if groundwater continues to be the sole source of water for SqCWD (SqCWD, 2005).

Previous studies have estimated the groundwater extraction reductions needed to restore and stabilize locally depressed coastal groundwater levels while taking into account the quantity of groundwater available for extraction for a specific time period based on natural or enhanced groundwater recharge. Within the Soquel-Aptos Groundwater Basin, groundwater recharge occurs from precipitation, underflow, creek flow, and return flow. In order to manage groundwater extractions within the basin boundary, SqCWD must account for other municipal purveyors and private wells that pump groundwater within that boundary, including SCWD and CWD. These factors were used to develop the pumping goal established in the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area*, which is currently no more than 4,800 acre-feet/year (ac-ft/yr) on average for the District (SqCWD and CWD, 2007).

Average groundwater production/pumping rates for the years 2005 through 2008 indicate that SqCWD currently produces approximately 4,830 acre-feet (ac-ft) of water annually. An estimated 3,030 ac-ft of groundwater is pumped from the Purisima Formation to serve a portion of the city of Capitola and the communities of Soquel, Seacliff Beach, and Aptos. The remaining 1,800 ac-ft is pumped from the Aromas aquifer for the communities of Seascape, Rio Del Mar, and La Selva Beach (HydroMetrics, 2009a). As a result of ongoing conservation efforts and implementation of demand offset programs, the District has effectively reduced average annual demand by approximately 570 ac-ft when compared to average annual demand from 2001 to 2005, which was 5,400 ac-ft (1.76 billion gallons) (SqCWD, 2009). Based on available information and assuming an average pumping rate, it appears that the District should limit its groundwater pumping to 4,800 ac-ft/yr or less in order to stabilize locally depressed coastal groundwater levels. When a supplemental supply is available, pumping should be reduced below 4,800 ac-ft/yr over multiple years to restore groundwater levels to protective elevations. However, with

adequate storage, pumping could exceed the pumping goal for short durations without adversely impacting the groundwater basin. As shown in Table 2-2 in Chapter 2, Project Description, based on average demand, conservation savings of approximately 730 ac-ft/yr are estimated for the year 2010, resulting in a projected adjusted demand of 4,800 ac-ft/yr for 2010, which is within the District's established pumping goal. However, the adjusted average demand for 2015, projected to be 4,911 ac-ft/yr, indicates that a supplemental source of supply is needed in the future in order for the SqCWD to limit pumping to not more than 4,800 ac-ft/yr (SqCWD, 2009).

Groundwater Quality

Groundwater quality in the Soquel-Aptos Groundwater Basin is influenced by a number of factors, including natural geochemical properties and flow within the different hydrogeologic formations, groundwater pumping and the potential for induced seawater intrusion, land use practices, and accidental releases of contaminants into the environment. Historically, the issues with groundwater quality for drinking water resources have included impacts from potential seawater intrusion, nitrate contamination, naturally occurring elevated metals, and anthropogenic contamination. Groundwater drawn from the Soquel-Aptos Groundwater Basin does not regularly exceed any primary drinking water standards (see the Regulatory Framework section, below, for a description of federal and state drinking water standards). A few naturally occurring constituents exceed secondary drinking water standards, and other naturally occurring constituents are closely monitored even though they remain below established drinking water standards (SqCWD and CWD, 2007).

The California Department of Public Health (CDPH), in accordance with Section 11672.60 of the California Health and Safety Code, implements the Drinking Water Source Assessment Program for the purpose of protecting sources of drinking water (see description in Regulatory Framework, below). In 2002, the District completed its source water assessment for all District wells tapped within the underlying Purisima Formation and Aromas aquifer, with the exception of the Aptos Jr. High Well. As of May 2010, a source water assessment for the Aptos Jr. High Well is currently being drafted by the District for submittal to CDPH. A source water assessment lists possible contaminating activities and the susceptibility of drinking water supplies to the identified contamination threats. Aromas aquifer supplies are considered to be most vulnerable to on-site residential septic systems and potential leakage from sewer lines. Purisima Formation supplies are considered to be most vulnerable to contamination from dry cleaners, historical and active automobile gas stations, sewer collection systems, home manufacturing, grazing, known contaminant plumes, photo processing/printing establishments, and utility stations/maintenance areas. The District monitors potential contamination in the vicinity of its wells and works with other agencies to proactively protect the quality of its groundwater resources (SqCWD and CWD, 2007).

Seawater Intrusion

The hydrologic zone along the coast where fresh groundwater and ocean saltwater meet is referred to as the saltwater/freshwater interface and is comprised of brackish (a mixture of freshwater and saltwater) to saline water (water with high concentrations of salt). Aquifers that are not actively pumped or are otherwise in a predevelopment condition provide a certain amount

of freshwater outflow at the coast. Because this ocean outflow exerts seaward hydraulic pressure, it holds seawater at equilibrium offshore from the coast and hinders its onshore advancement.

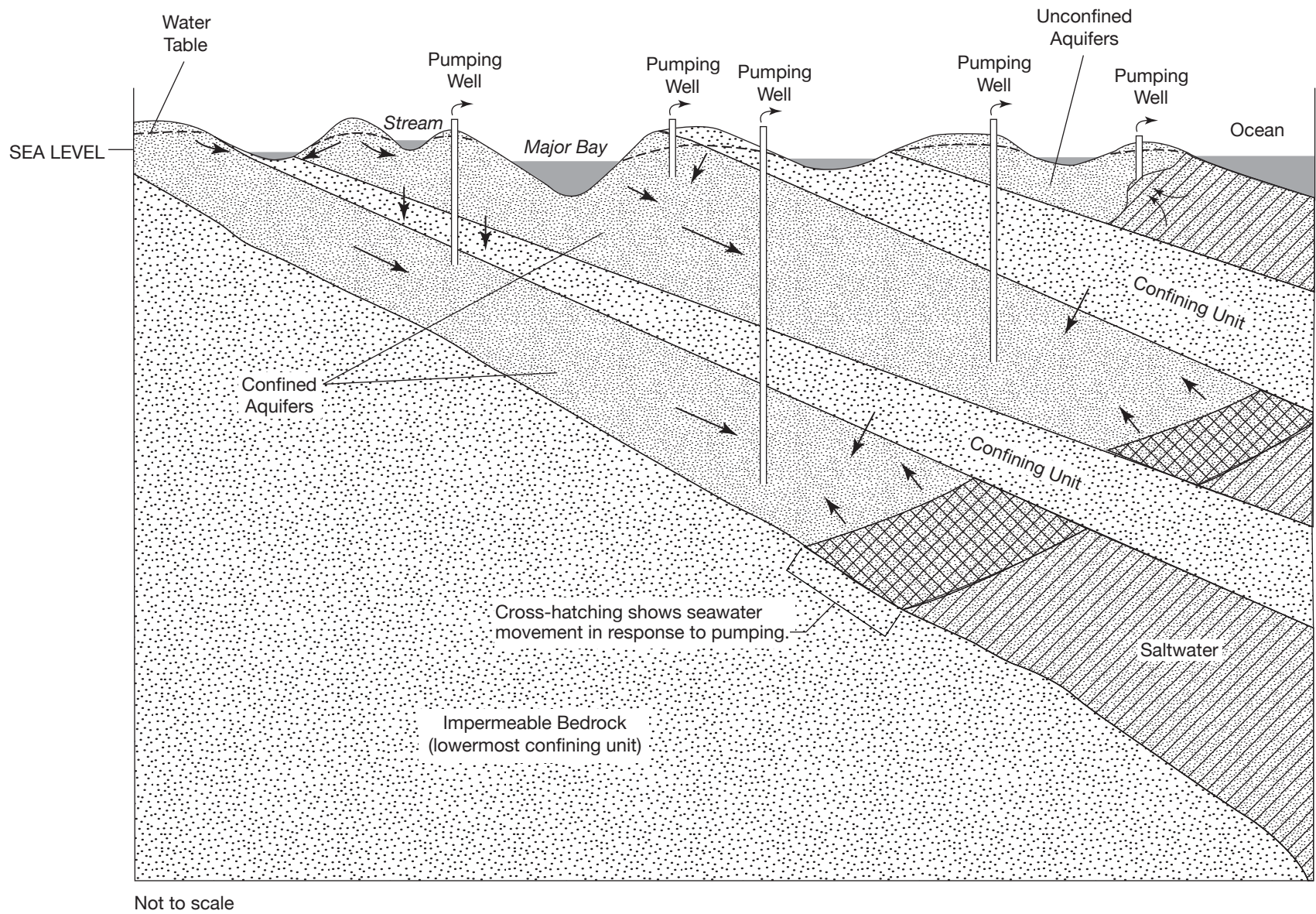
In unconfined coastal aquifers, denser saltwater extends landward along the base of the aquifer as a wedge under the freshwater flowing to the ocean. The freshwater in an unconfined aquifer discharges readily offshore into the ocean; because of the wedge-shaped boundary, the saltwater/freshwater interface can stay relatively close to shore. The deepest portion of the saltwater wedge may extend beneath the land surface, even when ample freshwater is flowing to the ocean. In confined and semi-confined aquifer systems like that found in the Purisima Formation, the location of the saltwater/freshwater interface can vary depending on the conditions and characteristics of the particular zones. Because freshwater discharge to the ocean varies with each zone, the resultant saltwater/freshwater interface can be complex, developing as a function of the hydraulic pressures and ability of the aquifer to transmit water.

After the onshore aquifer is developed and active pumping begins within the onshore aquifers, the onshore hydraulic pressure exerted by the freshwater declines, allowing the saltwater wedge to advance landward and the saltwater/freshwater interface to migrate further toward the shore. This landward migration of the interface is typical during drought periods. The saltwater/freshwater interface then re-establishes closer to shore at a new equilibrium position. If outflow diminishes even further, the interface migrates closer to shore, possibly causing saltwater to affect the onshore pumping well.

The extent of interface migration depends on the amount of water pumped from a particular aquifer and the amount of leakage from overlying geologic units. When the saltwater/freshwater interface is far offshore, there is an increased potential that leakage and recharge from other aquifers could replenish the freshwater lost to pumping. Under these conditions, the advancing saltwater wedge remains offshore. Water withdrawn from lower aquifer units can be replaced by inland groundwater recharge, freshwater or seawater migrating landward through the aquifer, or saltwater or freshwater leaking from overlying units.

There are three major mechanisms for seawater intrusion in the Soquel-Aptos Groundwater Basin. The first mechanism occurs in shallow aquifers when the cone of depression of coastal wells reaches the shoreline, pulling saltwater into the well. The second mechanism occurs in deeper aquifers when pumping depressions extend far offshore until reaching pathways such as paleochannels³, faults, or fractures. The third mechanism occurs when the saltwater/freshwater interface migrates landward in response to the decline of onshore groundwater levels to below sea level. The first two mechanisms describe the capture of seawater from above, and the third represents a saltwater wedge migrating along the aquifer base. An interface can also be drawn locally upward from beneath a pumping well in a process called “upconing.” **Figure 3.3-3** provides a graphical representation of the basic mechanisms of seawater intrusion.

³ Paleochannels are channels that formed millions of year ago in response to geologic and tectonic changes along the coast.



SOURCE: Johnson et. al., 2004

SqCWD Well Master Plan EIR . 205491

Figure 3.3-3
Migration of Saltwater/Freshwater Interface
in Response to Groundwater Pumping

Instances of the first mechanism have occurred in the past near Aptos, but may not be occurring now since the shallow coastal wells are no longer operating. There is reasonable concern that the second and third mechanisms may be affecting the Purisima Formation aquifers under current conditions. The third type of mechanism is actively occurring along the southern coast off the Aromas aquifer (Johnson et al., 2004). Increasing concentrations of chloride and total dissolved solids⁴ (TDS) in groundwater are the primary indicators of potential seawater intrusion within the Soquel-Aptos Groundwater Basin, and the coastal monitoring wells are regularly sampled for TDS and chloride.

SqCWD's coastal monitoring wells in the Purisima Formation currently show no indication of seawater intrusion. However, in the past, elevated chloride and TDS concentrations have been detected in shallow monitoring wells in the Seacliff area (Purisima Unit DEF), shallow monitoring wells in the Pleasure Point area (Purisima Unit A), and deeper monitoring wells near the mouth of Aptos Creek (Purisima Unit B) (SqCWD and CWD, 2007). Previous instances of seawater intrusion have also occurred where Purisima Units DEF and F are exposed at the coast. The first instance resulted from drawdown in a former SqCWD production well, the Hillcrest Well, which began capturing saltwater during its final years of operation. Another former SqCWD production well, the Seacliff Well, also appeared to pull a saltwater wedge inland prior to its retirement in the mid-1980s. Taking the Hillcrest and Seacliff Wells offline apparently caused the saltwater wedge to retreat, and the saltwater/freshwater interface then stabilized (SqCWD, 2006). Evidence of historical seawater intrusion, when combined with depressed groundwater elevations, represents a significant potential for seawater intrusion to occur in the Purisima Formation (HydroMetrics, 2007a and 2009b).

Seawater intrusion is not currently detected in production wells in the Aromas aquifer; however, water quality data from coastal monitoring wells suggest ongoing seawater intrusion in the vicinity of Seascap. Information from monitoring wells suggests that the saltwater/freshwater interface is actively moving inland and poses a threat to future groundwater quality. Continued onshore movement of the interface seems likely under current conditions, considering that relatively steady increases in salt concentrations have occurred over the past 10 to 15 years, while the groundwater levels have further declined or remained relatively the same. Seawater intrusion has continued despite recent pumping reductions in the Aromas aquifer initiated by SqCWD and validates the theory presented by Johnson et al. (2004) that intrusion appears to result from general overuse of the Aromas aquifer rather than pumping by any one entity (SqCWD, 2006).

Nitrate Contamination

Nitrate is a naturally occurring compound that is formed in the soil when nitrogen and oxygen combine. Common sources of nitrogen in the soil are fertilizers, livestock waste, and septic systems. High levels of nitrate can cause health problems for infants such as the dangerous condition called methaemoglobinaemia⁵, also known as "blue baby syndrome." Elevated

⁴ "Total dissolved solids" refers to the concentration of all inorganic and organic substances dissolved in water. TDS, used as a quantitative measure of water quality, is commonly expressed in milligrams per liter or parts per million.

⁵ Methaemoglobinaemia is a rare, potentially fatal blood disorder in which the blood is unable to carry oxygen to cells in the body. The disorder may be caused by high levels of nitrates in drinking water.

concentrations of nitrate have been detected in the La Selva Beach area of the Aromas aquifer, although these detections have not exceeded the State of California Maximum Contaminant Level⁶ for drinking water (45 milligrams per liter [mg/L]). Nitrate contamination in the Aromas aquifer is most likely due to runoff and leaching of fertilizers, leaching from septic tanks and sewage, and erosion of natural deposits (SqCWD and CWD, 2007).

Metals

Naturally occurring concentrations of iron and manganese⁷ are found throughout the Purisima Formation above the secondary drinking water standards of 0.30 and 0.050 mg/L, respectively. Arsenic⁸ has also been detected at low concentrations in the Purisima Formation, but levels remain below the primary drinking water standard of 0.010 mg/L. Wells within the SqCWD service areas known to contain elevated concentrations of iron/manganese or arsenic are generally operated in tandem with a single treatment facility prior to distribution to customers. Hexavalent chromium⁹ is also present due to naturally occurring metallic elements in water, soil, and rocks in the Aromas aquifer. Concentrations of hexavalent chromium are elevated within service area IV but are below the California Maximum Contaminant Level for total chromium¹⁰ of 0.050 mg/L. Although detected concentrations are below the primary drinking water standard, SqCWD is currently importing water from service area III to blend with water in service area IV to reduce hexavalent chromium levels (SqCWD and CWD, 2007).

Other Chemicals of Concern

Sources of anthropogenic contaminants within the Soquel-Aptos Groundwater Basin include fuels, methyl tert-butyl ethylene (MTBE), and tetrachloroethylene (PCE). Fuels release into the environment through leaking underground storage tanks and other accidental spills. MTBE was used as a fuel oxygenate until the mid-1990s when it was discovered that, due to its high water solubility, the substance is extremely mobile once introduced to the groundwater system. PCE is a common dry-cleaning solvent. These contaminants have been identified within the Soquel-Aptos Groundwater Basin. Most notable is the detection of hydrocarbons and PCE near the City of Santa Cruz Live Oak Well Field (SqCWD and CWD, 2007). For specific information on existing conditions related to contaminated soil and shallow groundwater in the vicinity of the proposed well sites, see Section 3.10, Hazardous Materials.

⁶ Maximum Contaminant Levels represent the highest level of a contaminant that is allowed in drinking water.

⁷ Both iron and manganese occur naturally in the Purisima Formation as a result of the dissolution of metals within the aquifer. Neither constituent poses a health concern but can result in undesirable aesthetics, causing discoloration of the water.

⁸ Arsenic detections in SqCWD wells are most likely associated with the natural occurrence of arsenic resulting from the depositional and geochemical conditions in the Soquel-Aptos coastal environment.

⁹ Chromium is a naturally occurring metallic element that can be found in water, soil, and rocks. Hexavalent chromium is known to cause cancer in humans and is likely to be more toxic when inhaled than when ingested.

¹⁰ While no state or federal drinking water standards currently exist for hexavalent chromium (chromium VI), there is a state drinking water standard for total chromium, which assumes a mixture of chromium III and chromium VI.

3.3.3 Groundwater Management

SqCWD is proactively working on stabilizing and restoring the groundwater basin to healthy conditions through regular groundwater level and quality monitoring from production wells and dedicated monitoring wells; development and implementation of water conservation and strict demand offset programs; redistribution of pumping to move it inland away from critical coastal areas; and conjunctive use planning.

- **Groundwater Monitoring.** Groundwater levels and quality are monitored with a network of dedicated monitoring wells operated by SqCWD, CWD, and SCWD. The monitoring network focuses on the coast, but also includes inland wells and is specifically designed to identify trends and changes in groundwater elevations and quality.
- **Conservation and Demand Offset.** Since 1997, SqCWD has adopted numerous conservation programs including a tiered rate structure, rebates on water-efficient appliances, indoor and outdoor water use surveys, extensive public outreach and school education, and a strict water demand offset program that requires new development to “offset” or neutralize its projected water use.
- **Pumping Redistribution.** SqCWD has historically modified its pumping distribution to help control seawater intrusion and minimize well interference. SqCWD’s ability to redistribute pumping is limited by the fact that its existing wells are heavily concentrated along the coast. Implementation of the WMP would enable SqCWD to redistribute pumping inland and away from the critical coastal areas as well as to reduce pumping depressions at specific locations.
- **Conjunctive Use Planning.** Conjunctive use planning efforts are currently focused on the scwd² Seawater Reverse Osmosis Cooperative Desalination Program. The program involves constructing a 2.5-million-gallon-per-day (mgd) ocean water desalination plant in Santa Cruz. SqCWD would operate the desalination plant to alleviate pumping demands in the Soquel-Aptos area during normal and wet years as well as off-peak periods in drought years. In dry years, SqCWD would rely on existing groundwater supplies from May through October, and the City of Santa Cruz would operate the desalination plant to supplement its surface water supplies. (See the discussion of the 2006 *Integrated Resources Plan* in Section 2.2.6, Groundwater Management, of Chapter 2, Project Description, for additional discussion regarding conjunctive use planning and supplemental water supplies.)

Interagency Coordination of Groundwater Management

Since 1996, SqCWD and CWD have worked toward a regional approach to groundwater management through the development of the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area* (SqCWD and CWD, 2007). The plan, which was recently updated in April 2007, established basin management goals and objectives and adopted protocols that promote efficient and effective groundwater management. These objectives are supported by a series of specific elements that define projects, programs, and policies that will be implemented as part of the groundwater management plan. A brief summary of goals and objectives is provided below.

Goal 1: Ensure Water Supply Reliability for Current and Beneficial Uses. One of the primary goals of the management strategy is to ensure that adequate water supplies are available to meet residential, commercial, institutional, agricultural, and fire suppression uses within the

SqCWD and CWD service areas. The specific basin management objectives for ensuring water supply reliability are to: pump within the sustainable yield of the basin; develop alternative water supplies to achieve a long-term balance between recharge and withdrawals to meet current and future demand; and manage groundwater storage for future beneficial uses and drought reserve.

Goal 2: Maintain Adequate Water Quality. This goal is aimed at maintaining water quality to meet current and future beneficial uses of groundwater resources in the Soquel-Aptos Groundwater Basin. The specific basin management objectives are to: meet existing water quality standards for beneficial uses, such as drinking water standards; maintain groundwater levels to prevent seawater intrusion; and prevent and monitor contaminant pathways.

Goal 3: Prevent Adverse Environmental Impacts. This goal aims to prevent adverse environmental impacts on riparian and aquatic ecosystems. The specific basin management objectives are to: maintain or enhance the quantity and quality of groundwater recharge by participating in land use planning processes; avoid alteration of stream flows that would adversely impact the survival of populations of aquatic and riparian organisms; and protect the structure and hydraulic characteristics of the groundwater basin by avoiding withdrawals that cause subsidence.

The WMP is designed specifically to be consistent with the management goals and basin management objectives of the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area* and fulfills the requirements of Element 8 of the plan, which calls for redistributing pumping both vertically and horizontally to achieve more uniform drawdown, reduce susceptibility to seawater intrusion, and minimize local pumping depressions.

3.3.4 Regulatory Framework

Federal and State Regulations

Safe Drinking Water Act

The federal Safe Drinking Water Act, passed by Congress in 1974 and amended in 1986 and 1996, is the nation's primary law regulating drinking water quality and is implemented by the U.S. Environmental Protection Agency (U.S. EPA). Implementation and enforcement of both the federal and California Safe Drinking Water Acts are under the jurisdiction of the California Department of Public Health (CDPH) (formerly the California Department of Health Services). The U.S. EPA sets national primary drinking water standards (i.e., Maximum Contaminant Levels) to protect against both naturally occurring and man-made contaminants that may be found in drinking water. CDPH sets state primary drinking water standards that are at least as stringent as, and sometimes more stringent than, those developed by the U.S. EPA. Primary drinking water standards are based on health considerations for contaminants that are known to cause harmful health effects; secondary drinking water standards are set for "nuisance contaminants" that may cause physical or aesthetic problems and are not directly harmful. Drinking water regulations are set forth in the California Code of Regulations, Titles 17 and 22.

Wellhead Protection

In 1999, the CDPH established the Drinking Water Source Assessment and Protection Program to protect sources of drinking water, in accordance with Section 11672.60 of the California Health and Safety Code. The program requires preparation of a groundwater source assessment report for all individual municipal well sites. Groundwater source assessment reports must include a delineation of the area around a drinking water source through which contaminants might move and reach the drinking water supply; an inventory of possible contaminating activities that might lead to a release of microbial or chemical contaminants within the delineated area; and a determination of possible contaminating activities to which the drinking water source is most vulnerable. In 2002, SqCWD completed its source water assessment for all District wells within the underlying Purisima Formation and Aromas aquifer, with the exception of the Aptos Jr. High Well. (As of May 2010, a source water assessment for the Aptos Jr. High Well is currently being prepared by the District for submittal to CDPH.)

Groundwater Management Act

In 1992, the State of California adopted Assembly Bill (AB) 3030 (Water Code Sections 10750 et seq.) to encourage local public water agencies and purveyors in the state to adopt formal management plans for groundwater resources within their jurisdiction. In September 2002, Senate Bill (SB) 1938 was signed into law amending sections of the California Water Code related to groundwater management. The bill sets forth specific requirements for the groundwater management plans of public agencies seeking state funds administered through DWR for the construction of groundwater production or groundwater quality projects. The *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area* (SqCWD and CWD, 2007) was updated in April 2007 to meet the revised requirements of SB 1938 related to groundwater management.

Urban Water Management Planning Act

The Urban Water Management Planning Act, enacted in 1983 by the state legislature, requires urban water suppliers that provide water to 3,000 or more customers, or that provide over 3,000 ac-ft of water annually, to prepare an urban water management plan (UWMP). UWMPs are updated every five years and must describe and evaluate existing and planned sources of water supply; discuss the reliability of the water supply with respect to seasonal or climatic shortages; and describe demand management measures to be implemented by the water supplier. The *2005 Soquel Creek Water District Urban Water Management Plan Update* (SqCWD, 2005) satisfies the requirements of the Urban Water Management Planning Act.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act was passed by the state legislature in 1969 and is the primary statute covering the quality of waters in California. The act specifies water quality provisions and discharge requirements for regulating the discharge of waste that could affect the quality of state waters. Under the act, the State Water Resources Control Board has the ultimate authority over state water rights and water quality policy. The nine regional boards are responsible for the oversight of water quality on a day-to-day basis at the local and regional level.

Central Coast Regional Water Quality Control Plan (Basin Plan)

The Central Coast Regional Water Quality Control Board's (RWQCB) Basin Plan sets standards for both groundwater and surface water. The Central Coast RWQCB has established water quality objectives for selected ground waters; these objectives are intended to serve as a water quality baseline for evaluating water quality management in the basin. Specific water quality objectives have not been defined for the Soquel-Aptos Groundwater Basin, but the general objectives are applicable.

General objectives have been established for taste, odor, and radioactivity; for municipal and domestic supply, additional general objectives have been established for bacteria, organic chemicals, and various chemical constituents; and for agricultural supply, general objectives follow the University of California Agricultural Extension Service water quality guidelines. In addition, agricultural supply must be handled in such a manner that no controllable water quality factor is allowed to degrade the quality of any groundwater resource or adversely affect long-term soil productivity (RWQCB, 1994).

Water Well Standards

Under California Water Code Section 231, enacted in 1949, DWR is responsible for developing standards for the protection of well water quality. Authority for enforcing the standards as they apply to the construction, destruction, and modification of water wells rests with the Santa Cruz County Environmental Health Services. The California Water Code requires contractors that construct or destruct water wells to have a C-57 Water Well Contractor's License, follow DWR well standards, and file a completion report with DWR (Water Code Sections 13750.5 et seq.). The SqCWD would obtain the appropriate permits for installation of the new water supply wells and abandonment and destruction of the Monterey Well.

Well Completion Reports

DWR is responsible for maintaining a file of well completion reports (DWR Form 188), which must be submitted whenever a driller works on a water well. Well completion reports must be filed with DWR within 60 days from the date of the work. Well completion reports may be used by public agencies conducting groundwater studies, provided that the information is kept confidential and is used only for the purpose of conducting the study (Water Code Sections 13751 and 13752).

Groundwater Rights

In California, water rights involve the right to use water, not the right to own water. While the Water Code implies the existence of groundwater rights, their doctrinal bases and characteristics are essentially the product of the decisions of the courts. There are three types of groundwater rights:

Overlying Rights. All property owners above a common aquifer possess a mutual right to the reasonable and beneficial use of a groundwater resource on land overlying the aquifer from which the water is taken. Overlying rights are correlative (related to each other) and overlying users of a common water source must share the resource on a pro rata basis in times of shortage. A property overlying use takes precedence over all non-overlying uses.

Appropriative Rights. Non-overlying uses and public uses, such as municipal uses, are called appropriative uses. Among groundwater appropriators, the “first in time, first in right” priority system applies. Appropriative users are entitled to use the surplus water available after the overlying user’s rights are satisfied.

Prescriptive Rights. Prescriptive rights are gained by trespass or unauthorized taking that can yield a title because it was allowed to continue longer than the five year statute of limitations. Claim of a prescriptive water right to non-surplus water by an appropriator must be supported by many specific conditions, including a showing that the pumpage occurred in an open manner, was continuous and uninterrupted for five years, and was under a claim of right.

From a water law standpoint, SqCWD’s right as a public agency to store via in-lieu recharge and to recapture water in the Soquel-Aptos Groundwater Basin can be summarized by the following general rules:

- The District has the right to recapture water that has been added to the groundwater supply as a result of in-lieu recharge;
- The District has the right to prevent other groundwater producers from extracting the replenished supply, although this could require litigation, and in some cases, adjudication of all rights to the groundwater basin may be necessary to determine rights to the total supply; and
- The underground storage and recovery of the groundwater basin cannot substantially interfere with the basin’s native or natural groundwater supply.

Material Injury. Groundwater case law has generally adopted the threshold that “...material injury... turns on the existence of an appreciable diminution in the quantity or quality of water...” (Bachman et al., 2005 as cited in HydroMetrics, 2009a). A reasonable definition of “appreciable” in the context of this EIR is if the project would render a nearby well incapable of meeting its:

1. Historically measured maximum daily production level;
2. Historically measured dry-season production levels; or
3. Historically measured annual production levels under drought conditions.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the City of Capitola or in the Local Coastal Zone, therefore, ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program. However, the District adheres to Santa Cruz County’s well construction standards and requirements for the destruction of abandoned wells, maintenance of inactive wells, as well as well reporting requirements.

Santa Cruz County Environmental Health Services

At the local level, the Santa Cruz County Environmental Health Services enforces the well reporting requirements of the California Water Code (Sections 13750.5 et seq.) through enforcement of Title 7, Chapter 7.70, Water Wells, of the Santa Cruz County Code. The Santa Cruz County Environmental Health Services well program provides permitting for the construction, destruction, and repair/modification of all wells, including geothermal heat exchange wells, cathodic protection wells, test wells, and monitoring wells.

3.3.5 Impacts and Mitigation Measures

Significance Criteria

The following significance criteria are adapted from Appendix G of the CEQA Guidelines in order to capture the full range of potential impacts that could result from project implementation. An impact to groundwater resources or water quality would be considered significant if it would:

- Violate any groundwater quality standards or otherwise substantially degrade groundwater quality;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the regional groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Result in an increase in groundwater pumping above historical levels, thereby creating or exacerbating unfavorable groundwater conditions in the Soquel-Aptos Groundwater Basin;
- Result in physical damage to nearby non-District wells caused by depressed static water levels below the top of the well screen or a loss of yield in nearby non-District wells such that there is an appreciable diminution in the quantity or quality of water; or
- Result in an appreciable diminution in the quantity or quality of water available to other users such that a nearby well is rendered incapable of meeting its:
 - Historically measured maximum daily production level;
 - Historically measured dry-season production levels; or
 - Historically measured annual production levels under drought conditions.

In practice, this could result if a substantial percentage of the well screen were dewatered, thereby reducing the rate of production or capacity of the neighboring well, or if groundwater flow patterns were altered such that seawater intrusion reached the neighboring well.

Significance Criteria Not Applicable to the WMP

Due to the nature of the proposed project, there would be no impacts related to the following criterion; therefore, no impact discussion is provided for the reasons described below:

Interfere substantially with groundwater recharge. Development of the proposed project would result in a combined total of approximately 10,750 square feet of new impervious area. Approximately 2,500 square feet of new impervious surfaces would be created at the O'Neill Ranch Well site; 1,750 square feet at the Cunnison Lane Well site; 2,525 square feet at the Austrian Way Well site; 800 square feet at the Granite Way-Aptos Village Well site; and 3,100 square feet at the Polo Grounds Well site. Considering the locations of the proposed well sites and proximity to each other, this additional impervious area would be negligible when compared to the overall recharge area of the basin and would not constitute a significant impediment to groundwater recharge. Thus, no impact related to interference with groundwater recharge would occur, and this issue is not discussed further.

Approach to Analysis

In general, the hydrologic effects of the WMP can be divided into: (1) regional effects due to the redistribution of pumping on the Soquel-Aptos Groundwater Basin; (2) potential drawdown and yield effects on nearby wells, including production wells of neighboring water districts, production wells of neighboring mutual water companies, and private wells; (3) adverse effects on the beneficial uses of groundwater resulting from the potential migration of contaminants from nearby remediation sites to District and non-District wells; and (4) the effects of redistributed pumping on stream baseflow. The impact analysis below addresses the first three concepts; stream-aquifer interactions and potential impacts to stream flow from WMP implementation are discussed in Section 3.4, Surface Water Hydrology and Water Quality.

The impact analysis for groundwater resources relies primarily on the data and conclusions developed by HydroMetrics in its analysis of the hydrologic effects of the WMP. HydroMetrics' findings and conclusions are presented in the letter report titled *Hydrologic Effects of Well Master Plan*, dated November 2009. HydroMetrics prepared the letter report to provide supporting technical documentation for the hydrologic impact analysis of the WMP, specifically, the potential impacts that could result from developing the proposed well sites and redistributing SqCWD's pumping throughout the planned production well network and away from the coast. HydroMetrics' letter report is provided as **Appendix C** of this EIR. Secondary sources of technical and regulatory data and information were derived from relevant regional planning documents and water quality plans.

In its letter report, HydroMetrics provided a comprehensive analysis of the existing groundwater conditions and the changes that would occur under implementation of the WMP. The evaluation (1) describes the geologic and hydrogeologic environment; (2) presents and discusses the proposed well sites and describes the likely pumping distributions that would be implemented by the District to meet the goals of the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area*; (3) describes a proposed rating system for the analyses of effects on wells; and (4) details the approach for conducting the analyses of well effects. Using its conceptual model of the geologic formations and water-bearing strata, HydroMetrics then analyzed the potential effects of WMP implementation, including development of the proposed well sites and redistribution of pumping, on water levels and yield at nearby non-District wells and categorized the effects based on the rating system.

Application of Groundwater Model

The analyses of the potential effects of the proposed municipal water supply wells on neighboring non-District wells are based on the anticipated drawdown around each of the individual proposed wells. HydroMetrics used a groundwater model to estimate future drawdown, which applied an analytical solution to a multi-aquifer system. The Multi-Layer-Unsteady (MLU) model calculated the drawdown within the aquifer units while accounting for groundwater leakage between layers, consistent with the hydrogeologic characteristics of the individual aquifer units and the amount of leakage between the units. Model parameters used in the analysis were obtained from various data sources including published local data derived from aquifer tests or specific capacity data from nearby pumping wells, and published regional values. The data sources and model parameters used in the analyses are provided in Appendix C; refer to Appendix C for a detailed discussion of the hydrologic analysis completed by HydroMetrics.

Impact Summary

**TABLE 3.3-2
SUMMARY OF IMPACTS – GROUNDWATER RESOURCES**

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.3-1: Increased production capacity would enable SqCWD to increase pumping, potentially causing or exacerbating unfavorable groundwater conditions in the Soquel-Aptos Groundwater Basin.	Beneficial impact with implementation of WMP				
Impact 3.3-2: Implementation of the WMP could result in physical damage to nearby non-District wells caused by depressed static water levels below the top of the well screen or a loss of yield such that there is an appreciable diminution in the quantity or quality of water.	PSM	PSM	PSM	PSM	PSM
Impact 3.3-3: Implementation of the WMP could otherwise substantially degrade the quality of groundwater resources in the Basin such that one or more of its beneficial uses would be compromised.	LS	PSM	N/A	N/A	N/A
Impact 3.3-4: Implementation of the WMP would provide adaptation benefits for the generally accepted outcomes of climate change on water supply resources.	Beneficial impact with implementation of WMP				
<hr/>					
LS = Less than Significant impact, no mitigation required PSM = Potentially Significant impact, can be Mitigated to less than significant N/A = Not Applicable or no impact					

Impact Discussion

Impact 3.3-1: Increased production capacity would enable SqCWD to increase pumping, potentially causing or exacerbating unfavorable groundwater conditions in the Soquel-Aptos Groundwater Basin.

The potential annual production of each existing and proposed well is based on each well's anticipated instantaneous pumping rate, assuming that each well operates 50 percent of the time (i.e. 12 hours per day). Based on the potential annual production of each well, implementation of the WMP would increase SqCWD's annual well production capacity by approximately 1,830 ac-ft/yr, from 8,010 to 9,840 ac-ft/yr. This increased capacity would not translate to an increase in groundwater pumping; rather, it would provide redundancy and flexibility in SqCWD's system while simultaneously reducing susceptibility to seawater intrusion and achieving a more uniform drawdown of the basin. With implementation of the WMP, pumping would be distributed among all of the active wells to meet the goals of the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area*, subject to the constraints of meeting water demand within each of SqCWD's four service areas and the limited capacity to transfer water between service areas.

As described in Chapter 2, Project Description, with implementation of the WMP, the District would have a sufficient number of strategically placed wells to allow the District to more evenly redistribute its pumping and shift extractions away from the coast. Although the District has developed hypothetical pumping scenarios based on the existing groundwater conditions in the basin (described below), the actual distribution of pumping amongst wells would be determined through monitoring activities and adaptive management strategies. Data collected from ongoing groundwater and surface water monitoring programs would be analyzed and reported annually. The groundwater monitoring data would be used to characterize groundwater storage trends, groundwater levels, and changes in groundwater contours, as well as to detect seawater intrusion and landward movement of the seawater/freshwater interface. Surface water monitoring proposed as part of the WMP and as specified by Mitigation Measures 3.4-3a (Monitor Streamflow along Soquel Creek) and 3.4-3b (Monitor Streamflow along Aptos Creek) would help to identify any changes in stream flow that may be attributable to groundwater pumping (see Section 3.4, Surface Water Hydrology and Water Quality, for a discussion of streamflow effects). With implementation of the WMP, this data would form the basis for annual modifications to the distribution of pumping by SqCWD. Evidence of seawater intrusion, stream baseflow depletion, anthropogenic contamination, or excessive drawdown could all be cause for modifying the groundwater pumping distribution. Implementation of the WMP would provide the SqCWD with more flexibility to shift pumping in response to short-term hydrologic conditions and long-term water-level trends, thereby improving groundwater conditions in the basin.

SqCWD has set a goal to limit its pumping to no more than 4,800 ac-ft/yr in order to meet the basin management objective of pumping within the basin's sustainable yield established in the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area*. A supplemental supply is needed by the SqCWD to maintain pumping within the pumping goal while meeting future demand in 2015 and into the future. As discussed in the *2006 Integrated Resources Plan* (SqCWD, 2006), SqCWD is pursuing a conjunctive use water supply project with SCWD, the scwd² Seawater Reverse Osmosis

Cooperative Desalination Program.¹¹ SqCWD would use the desalinated water from the project to provide water to restore the groundwater basin and for growth consistent with the Santa Cruz County General Plan / Local Coastal Program (County of Santa Cruz, 1994). SqCWD would operate the desalination plant to alleviate pumping demands in the Soquel-Aptos Groundwater Basin during normal and wet precipitation years as well as off-peak periods in drought years. With a supplemental supply in place, pumping during normal and wet years would be maintained within the SqCWD's pumping goal of 4,800-ac-ft/yr. In dry years, SqCWD would rely solely on groundwater supplies from May through October, and the SCWD would operate the desalination plant to supplement their surface water supplies. If the desalination project progresses as planned, SqCWD would have secured access to a minimum of 1,158 ac-ft/year of supplemental supplies by 2015. Additional water supplies from desalination could be available in years when the SCWD does not claim its full allocation of desalination supplies, which is about 1,642 ac-ft/year. If the regional desalination project is not implemented, SqCWD would need to implement an alternate supplemental water supply project. Once a supplemental supply is available to the District, a portion would be used to meet the supply shortfall until buildout in 2050, and a portion could be used to increase groundwater levels through in-lieu recharge, thereby restoring the basin and correcting the existing overdraft problem. (See the discussion of the *2006 Integrated Resources Plan* in Section 2.2.5, Groundwater Management, of Chapter 2, Project Description, for additional discussion regarding conjunctive use planning and supplemental water supplies.)

Although the actual distribution of pumping would depend on monitoring and adaptive management strategies, to demonstrate how SqCWD could reallocate pumping under future conditions with the WMP, HydroMetrics developed four hypothetical pumping redistribution scenarios (Scenarios 1 through 4). The redistribution scenarios represent potential modifications to the groundwater pumping distribution to address factors such as evidence of seawater intrusion, localized depressions in groundwater levels, reduced production capacity of individual wells, increased transfer capacity between service areas, etc. The redistribution scenarios were based on an evaluation of each well's depth, screened aquifer unit, maximum instantaneous pumping rate, and distance from the coastal area. For planning purposes, the maximum annual production capacity of any given well was calculated based on the production capacity when the well is operating 50 percent of the time. The four hypothetical redistribution scenarios can be summarized as follows:

Redistribution Scenario 1. Scenario 1 uses all five proposed wells and assumes the existing transfer capacity between service areas is maintained. Pumping is distributed evenly within service areas. This is considered the most likely pumping scenario.

Redistribution Scenario 2. Scenario 2 uses four of the proposed wells, excluding the Cunnison Lane Well from the system. Scenario 2 assumes the existing transfer capacity between service areas is maintained. Pumping is less evenly distributed in Service Areas II and III than in Scenario 1.

¹¹ As of the writing of this EIR, a separate project-level environmental review of the scwd² Seawater Reverse Osmosis Cooperative Desalination Program is currently underway.

Redistribution Scenario 3. Scenario 3 uses four of the proposed wells, excluding the Austrian Way Well from the system. The scenario also assumes the existing transfer capacity between service areas is maintained. As a result, more pumping occurs in Service Area I and the Estates Well pumps more than in Scenario 1. This scenario also includes a change in Service Area IV blending policy such that transfers from Service Area III to Service Area IV are no longer necessary.

Redistribution Scenario 4. Scenario 4 uses all five proposed wells but assumes a total increase in transfer capacity of 200 gallons per minute (gpm) from Service Areas I and II to Service Areas III and IV. Therefore, pumping is increased in Service Areas I and II and decreased in Service Areas III and IV when compared to Scenario 1.

Overall, with implementation of the WMP, future groundwater production by SqCWD would range from approximately 4,300 to 5,675 ac-ft/yr. **Table 3.3-3** compares the existing distribution of pumping among active SqCWD wells to distribution under Scenarios 1 through 4 using the projected average annual water demand in 2050. The current distribution of pumping by SqCWD is based on the average of water years 2005 through 2008.

Implementation of the WMP would likely occur over a five-year period, with one new well constructed each year. Redistribution of pumping as wells are brought into service are presented in **Table 3.3-4**. This redistribution is based on well operations under Scenario 1, without a supplemental supply in place and based on average annual pumping for the years 2005 to 2008.

Table 3.3-5 shows the minimum and maximum pumping with the WMP for 2050 conditions and compares it to maximum pumping without the WMP. With implementation of the WMP, groundwater production would range from 4,300 to 5,675 ac-ft/yr. The lower production rate of 4,300 ac-ft/yr assumes a groundwater recovery allowance of approximately 500 ac-ft/yr would be available in excess of demand and could be used for restoration of groundwater levels through in-lieu recharge in the initial years after a supplemental water supply becomes available. In a 2050 drought year, when it is assumed that supplemental supplies are secured but would not be available to the SqCWD during summer months (SqCWD would operate the desalination plant during summer months of drought years; therefore, no supplemental supply from desalination would be available for SqCWD during summer months of drought years), groundwater pumping by SqCWD is projected at 4,800 ac-ft/yr. This production rate assumes both precautionary drought rationing of 15 percent during the summer months and supplemental supply from the desalination plant during the winter months (SqCWD, 2005). Both with and without implementation of the WMP, in a 2050 nondrought year, the maximum SqCWD demand is projected at 5,675 ac-ft/yr. Should the District not have a supplemental supply source available to make up the difference between the District's 4,800-ac-ft/yr pumping goal established by the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area* and demand, the District has the legal authority to declare a water supply emergency and thereby impose use restrictions to reduce demand and maintain groundwater pumping within sustainable levels until a supplemental supply is developed.

Under future conditions with the WMP and with a supplemental supply in place, groundwater recovery would vary on an annual basis depending on hydrologic conditions, but overall it is anticipated to increase incrementally over time. The SqCWD has established protective water

**TABLE 3.3-3
PUMPING REDISTRIBUTION SCENARIOS FOR AVERAGE 2050 WATER DEMAND**

Service Area	Well Name	Potential Annual Production at 50% Operation (ac-ft/yr)	Actual Water Years 2005-2008		2050 Groundwater Production Average Water Year with Supplemental Supply (ac-ft/yr)			
			Average Annual Production (ac-ft/yr)	Percent of Time Operating (%)	Scenario 1 ^a	Scenario 2 ^b	Scenario 3 ^c	Scenario 4 ^d
I	Cunnison Lane	430	0	0%	180	0	215	285
	Garnet	570	370	32%	200	200	200	200
	Main Street	950	720	38%	720	650	720	720
	O'Neill Ranch	600	0	0%	600	500	600	600
	Rosedale	690	490	36%	140	310	140	140
	Maplethorpe	0	0	0%	0	0	0	0
	Monterey	0	0	0%	0	0	0	0
II	Tannery II	770	430	28%	140	320	175	240
	Aptos Creek	320	230	36%	0	0	230	0
	Austrian Way	200	0	0%	200	200	0	200
	Estates	580	380	33%	285	380	380	430
	Granite Way	200	0	0%	195	195	150	195
	Ledyard	140	170	59%	100	140	100	100
	Madeline	180	90	25%	90	0	90	90
III	T. Hopkins	180	150	41%	150	105	0	150
	Aptos Jr. High School	330	70	11%	330	330	300	330
	Bonita	650	570	44%	280	340	280	270
	Country Club	300	270	45%	270	370	270	270
	Polo Grounds	400	30 ^e	4%	400	400	300	400
	San Andreas	800	620	39%	370	250	360	180
	Seascape	620	30	2%	0	0	0	0
IV	Altivo	500	180	18%	150	110	150	0
	Sells	430	60	7%	0	0	140	0
TOTAL (ac-ft/yr) =			4,860		4,800	4,800	4,800	4,800
Total Aromas Aquifer =			1,830		1,800	1,800	1,800	1,450

NOTES:

^a Scenario 1: Most likely scenario. Utilizes all five proposed wells to minimize seawater intrusion by moving pumping inland and evenly distributing pumping near coast.

^b Scenario 2: Utilizes four proposed wells to minimize seawater intrusion. Assumes Cunnison Lane Well is not developed. Less evenly distributes pumping when compared to Scenario 1.

^c Scenario 3: Utilizes four proposed wells to minimize seawater intrusion. Assumes Austrian Way Well is not developed. Assumes transfers from Service Area III to Service Area IV are no longer necessary.

^d Scenario 4: Utilizes all five proposed wells to minimize seawater intrusion by increasing transfer capacity between Service Areas II and III of 200 gpm (320 ac-ft/yr).

^e Average annual production from the Polo Grounds Well for water years 2005 through 2008 is based on average annual pumping by the Santa Cruz County Parks and Recreation Department. The Polo Grounds Well is not currently part of the SqCWD groundwater production system.

**TABLE 3.3-4
PUMPING DISTRIBUTION AS WELLS COME ONLINE (SCENARIO 1)**

Service Area	Well Name	Max Annual Production at 50% Operation (ac-ft/yr)	Actual Water Years 2005-2008		Operating Plan as Wells Come Online - Based on Scenario 1 (2005-2008 Demand, Supplemental Supply Not Yet Available)				
			Average Annual Production (ac-ft/yr)	Percent of Time Operating (%)	2011 Polo Grounds	2012 O'Neill Ranch	2013 Granite Way	2014 Cunnison Lane	2015 Austrian Way
I	Cunnison Lane	430	0	0%	0	0	0	180	180
	Garnet	570	370	32%	370	200	200	200	200
	Main Street	950	720	38%	720	720	720	720	720
	O'Neill Ranch	600	0	0%	0	600	600	600	600
	Rosedale	690	490	36%	490	245	245	140	140
	Maplethorpe	0	0	0%	0	0	0	0	0
	Monterey	0	0	0%	0	0	0	0	0
II	Tannery II	770	430	28%	430	245	245	170	170
	Aptos Creek	320	230	36%	170	170	0	0	0
	Austrian Way	200	0	0%	0	0	0	0	200
	Estates	580	380	33%	380	380	380	380	285
	Granite Way	200	0	0%	0	0	195	195	195
	Ledyard	140	170	59%	170	170	145	145	100
	Madeline	180	90	25%	90	90	90	90	90
III	T. Hopkins	180	150	41%	150	150	150	150	150
	Aptos Jr. High School	330	70	11%	330	330	330	330	330
	Bonita	650	570	44%	280	280	280	280	280
	Country Club	300	270	45%	270	270	270	270	270
	Polo Grounds	400	30 ^a	4%	400	400	400	400	400
	San Andreas	800	620	39%	370	370	370	370	370
IV	Seascape	620	30	2%	0	0	0	0	0
	Altivo	500	180	18%	180	180	180	180	160
	Sells	430	60	7%	60	60	60	60	20
TOTAL (ac-ft/yr) =			4,860		4,860	4,860	4,860	4,860	4,860
Total Aromas Aquifer =			1,830		1,890	1,890	1,890	1,890	1,830

NOTES:

Year 2011: Like Scenario 1 in Aromas aquifer except reduced pumping from Aptos Creek Well.

Year 2012: Reduce pumping from Garnet Well to 200 ac-ft/yr and reduce pumping from other Service Area I wells.

Year 2013: Eliminate pumping from Aptos Creek Well.

Year 2014: Like Scenario 1 in Service Area I except higher pumping at Tannery II Well.

Year 2015: Like Scenario 1 in Service Area II except slightly higher pumping in Service Area IV.

^a Average annual production from the Polo Grounds Well for water years 2005 through 2008 is based on average annual pumping by the Santa Cruz County Parks and Recreation Department. The Polo Grounds Well is not currently part of the SqCWD groundwater production system.

TABLE 3.3-5
PUMPING DISTRIBUTION DURING FUTURE MINIMUM AND MAXIMUM PUMPING PERIODS WITH AND WITHOUT PROJECT

Service Area	Well Name	Max Annual Production at 50% Operation (ac-ft/yr)	Actual Water Years 2005-2008		Projected 2050 Water Demand		
			Average Annual Production (ac-ft/yr)	Percent of Time Operating (%)	Minimum Pumping With WMP and With Supplemental Supplies during Groundwater Restoration (500 ac-ft/yr in-lieu recharge)	Maximum Pumping With WMP and Without Supplemental Supplies	Maximum Pumping Without WMP and Without Supplemental Supplies
I	Cunnison Lane	430	0	0%	100	230	0
	Garnet	570	370	32%	200	200	370
	Main Street	950	720	38%	660	720	720
	O'Neill Ranch	600	0	0%	600	600	0
	Rosedale	690	490	36%	140	300	650
	Maplethorpe	0	0	0%	0	0	0
	Monterey	0	0	0%	0	0	0
	Tannery II	770	430	28%	75	300	610
II	Aptos Creek	320	230	36%	0	0	230
	Austrian Way	200	0	0%	200	200	0
	Estates	580	380	33%	260	450	545
	Granite Way	200	0	0%	195	195	0
	Ledyard	140	170	59%	70	100	170
	Madeline	180	90	25%	90	90	90
	T. Hopkins	180	150	41%	100	150	150
III	Aptos Jr. High School	330	70	11%	330	330	330
	Bonita	650	570	44%	280	280	570
	Country Club	300	270	45%	105	270	270
	Polo Grounds	400	30	4%	400	400	30
	San Andreas	800	620	39%	370	620	700
	Seascape	620	30	2%	0	0	0
IV	Altivo	500	180	18%	125	180	180
	Sells	430	60	7%	0	60	60
TOTAL (ac-ft/yr) =			4,860		4,300	5,675	5,675
Total Aromas aquifer (ac-ft/yr) =			1,830		1,610	2,140	2,140

levels in coastal monitoring wells to protect the basin from seawater intrusion over the long-term (HydroMetrics, 2009b). The basin is considered recovered when average annual water levels rise to these protective levels. Once groundwater levels are recovered, the Soquel-Aptos Groundwater Basin could accommodate pumping above the pumping goals during drought years with only minimal effects on the groundwater basin.

Implementation of the WMP would not lead to an increase in groundwater pumping. With or without a supplemental supply in place, the District would continue to pursue conservation and demand offset programs to maximize use of water supplies. As described in Chapter 2, Project Description, Section 2.2.5, Groundwater Management, if groundwater monitoring were to indicate that a groundwater overdraft exceeding the sustainable yield of the groundwater basin threatens the public health, safety, and welfare of the community, the District would declare a groundwater emergency and implement its Water Supply Emergency Response Plan, which calls for progressively more restrictive water rationing and water use curtailment by District customers (SqCWD, 2005). The District would implement its Water Supply Emergency Response Plan in a future groundwater emergency with or without the WMP. As previously stated, the purpose of the WMP is not to increase pumping, but rather to provide the SqCWD the flexibility to redistribute pumping in response to both short-term and long-term monitoring results, which would result in a beneficial effect compared to existing conditions.

Therefore, implementation of the WMP would have a beneficial impact on groundwater conditions in the Soquel-Aptos Groundwater Basin, and no mitigation is necessary.

Mitigation: None required.

Impact 3.3-2: Implementation of the WMP could result in physical damage to nearby non-District wells caused by depressed static water levels below the top of the well screen or a loss of yield such that there is an appreciable diminution in the quantity or quality of water.

Long-term operation of a municipal supply well can cause local depressions in groundwater levels in the area around the well. Neighboring wells that are within that local groundwater depression can be adversely impacted through physical damage to the well or from loss of yield.

If the proposed wells were to lower groundwater levels at neighboring non-District wells such that water levels would fall below the top of the well screen, physical damage to the neighboring wells could result. Water levels that fall below the top of a well screen invite corrosion of the screen and aeration of the well. In conventional practice, the pump intake for a groundwater well would normally be located above the level of the screen, and the pump normally draws the water level down inside the well casing only to a level which is above the top of the screen. If groundwater levels dropped in a domestic water supply well that followed this conventional practice, it might be necessary to lower the pump intake to maintain the necessary water supply. Lowering the pump to a level below the top of the screened interval might create issues for the well owner such as increased pumping costs or alterations to the well. Because the pump

normally draws the water level down inside the well faster than water can flow into the well, the water level could be drawn down below the top of the screen, causing water to fall through the screen and into the well, thus creating a number of potential problems. This falling water entrains air and can result in highly aerated water being pumped from the well. The aerobic conditions that would be created could facilitate bacteria growth and lead to bacterial contamination or plugging of the well. In addition, cavitation¹² effects due to bubbles in the aerated water could cause the pump's efficiency to drop, or cause the pump to fail prematurely.

Lowered groundwater levels at a neighboring well could also result in a decrease in well yield. An overall lowering of local groundwater levels can effectively reduce the pressure that causes water to flow through an aquifer toward a neighboring well, thereby affecting the well yield of that well. As described above under the heading Significance Criteria, impacts to well yield would be considered significant if WMP implementation were to render a nearby well incapable of meeting its historically measured maximum daily production level, historically measured dry-season production levels, or historically measured annual production levels under drought conditions. In practice, this could result if a substantial percentage of the well screen were dewatered, thereby reducing the rate of production or capacity of the neighboring well, or if groundwater flow patterns were altered such that the water quality of the well was adversely affected (HydroMetrics, 2009a).

Analytical Methodology

The potential for the proposed municipal water supply wells to cause damage to or result in a loss in yield at nearby non-District wells was determined by calculating the expected drawdown in local groundwater levels. An analysis of drawdown in the vicinity of the proposed wells was conducted by HydroMetrics using the MLU model and summarized in the *Hydrologic Effects of Well Master Plan* (HydroMetrics, 2009a), which is provided as **Appendix C** of this EIR.

The MLU model was used to assess potential impacts to neighboring non-District wells resulting from implementation of the WMP. The drawdown analysis evaluated future pumping from each of the proposed wells individually based on the estimated instantaneous pumping rate of each well, as well as future pumping from the combination of all of the District's wells, acknowledging the planned overall redistribution of pumping under the WMP and considering total production. The overall redistribution of pumping in the collective drawdown analysis is based on Scenario 1, the redistribution scenario most likely to be used by the SqCWD. Potential impacts to neighboring wells were evaluated based on the multiple aquifer conditions present at each individual site and the estimated changes in water level after 182.5 days (six months) of pumping, which is the assumed duration of the dry season. Drawdown and yield effects from the SqCWD's wells would be greatest at the end of the dry season; drawdown calculations over periods of longer than six months would be less realistic because groundwater recharge between late fall and mid-spring helps groundwater levels recover each year. Approximately 61 percent of the District's pumping occurs over the dry season.

¹² Cavitation is defined as the formation and collapse of gas pockets or bubbles on the blade of a pump impeller or the gate of a valve; collapse of these pockets or bubbles drives water with such force that it can cause pitting of the gate or valve surface.

Drawdown impacts were evaluated at any private production well within 1,000 meters (3,280 feet) of the proposed SqCWD wells, as well as municipal production wells located at greater distances. Well logs and locations for private production wells in the vicinity of SqCWD's proposed well sites were obtained from the County of Santa Cruz Environmental Health Department, the California Department of Water Resources (DWR), and the County of Santa Cruz private well database (Wolcott, 1999). Well information for nearby non-District municipal wells was provided by SCWD and CWD. Private production wells that are not registered with DWR and for which well logs and screen intervals are not available were not included in the analysis. In general, the model scenarios use realistic and conservative hydrogeologic assumptions to predict possible impacts to neighboring wells. It should be noted that in some cases, the available well information for neighboring wells indicates that the static water level at these wells is already at, or below, the top of the well screen. In these cases, it is assumed that the impacts to the screen have already occurred and the additional drawdown caused by implementation of the WMP would not present additional significant impacts. Potential drawdown impacts to private wells were based on the average top-of-screen depth in neighboring private wells for which information is available. The average top-of-screen depth is an appropriate benchmark for the drawdown analysis because it would be unreasonable for the shallowest well in a basin to constrain the use of basin storage by all users.

HydroMetrics also used the MLU model to analyze the collective water level and yield impacts from future pumping at the proposed well sites, and redistribution of pumping among all active SqCWD wells based on the greatest anticipated drawdown, as well as under drought conditions where appropriate. The O'Neill Ranch Well is the only well where the District's overall drought-year pumping (from the O'Neill Ranch Well and other District wells in the vicinity) would be greater than overall nondrought-year pumping. Therefore, the collective analysis for the O'Neill Ranch Well is based on drought conditions because this is when the greatest potential for drawdown would occur. Because there would be no difference in pumping between drought years vs. nondrought years at the Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds Wells, the evaluation of collective impacts for these wells represents both drought and nondrought conditions.

O'Neill Ranch Well Site

Potential Impacts to Private Wells from Pumping the O'Neill Ranch Well. Localized drawdown that would result from implementation of the O'Neill Ranch Well, without consideration of redistribution and operational changes to other SqCWD wells, is based on the estimated instantaneous pumping rate of the O'Neill Ranch Well. Water produced from the O'Neill Ranch Well would provide an estimated 750 gpm for Service Areas I and II. This well would likely be completed in Purisima Unit AA and the Tu aquifer. At least 13 private wells are located within 1,000 meters of the O'Neill Ranch Well site, of which, 11 have well construction information available. Since 61 percent of pumping occurs over the dry season, the well would produce 369 ac-ft over the dry season. The modeling results indicate that if the O'Neill Ranch Well pumped 369 ac-ft over the dry season, changes in groundwater levels at the 11 neighboring private wells would range from -3.0 to -11.2 feet. Comparisons of available water level data, screen intervals, and estimated drawdowns show that pumping at the O'Neill Ranch Well would

not drop water levels below the average top-of-screen depth in neighboring private wells, and would therefore not cause physical damage to “average” neighboring wells. As stated above, the average top-of-screen depth is an appropriate benchmark because it would be unreasonable for the shallowest well in a basin to constrain the use of basin storage by all users. The predicted changes in groundwater levels could potentially produce a decrease in pump discharge at neighboring wells of up to 1 gpm, but would not cause a significant decline in the yield available to the “average” private wells. However, although unlikely, the possibility exists for adverse impacts to shallower “non-average” private wells, or to private wells for which well log information is not available. The potential for adverse effects on “non-average” private wells is considered to be a potentially significant impact.

Collective Impacts to Private Wells Near the O’Neill Ranch Well from Redistribution of Pumping. HydroMetrics also used the MLU model to analyze the collective water level and yield impacts from future pumping at the O’Neill Ranch Well and redistribution of pumping among active SqCWD wells for drought years. During droughts, future pumping by the District in the vicinity of the O’Neill Ranch Well would be expected to increase because pumping at the existing Garnet Well (located in the coastal area) would likely be reduced by 100 ac-ft/yr and transferred inland to the existing Main Street Well, located approximately ¾-mile northeast of the proposed O’Neill Ranch Well.

Since 61 percent of pumping occurs during the dry season, pumping at the Main Street Well would increase by 61 ac-ft over a six month period when compared to the existing condition, potentially resulting in increased drawdown effects at private wells in the vicinity of the O’Neill Ranch Well during drought years. The drawdown predicted at the 11 private neighboring wells would range from -3.4 to -11.8 feet. These results indicate an additional decrease in water levels under drought conditions (with collective pumping effects incorporated) of -0.4 to -0.6 feet compared to when pumping only the O’Neill Ranch Well. The estimated drawdown corresponds with a maximum loss in well yield of less than 1 gpm in neighboring private wells. Comparisons of available water level data, screen intervals, and estimated drawdown indicate that this additional decrease in water levels would not cause water levels to drop below the average top-of-screen depth in neighboring wells. Therefore, the MLU model results indicate that the additional drawdown from a drought year pumping redistribution would be marginal, and would not substantially affect “average” private wells near the O’Neill Ranch Well. However, although unlikely, the possibility exists for adverse impacts to shallower “non-average” private wells, or to private wells for which well log information is not available, a potentially significant impact.

Potential Impacts to SCWD’s Live Oak Wellfield from Pumping the O’Neill Ranch Well. The SCWD’s Live Oak Wellfield is located between 7,700 and 9,700 feet from the proposed O’Neill Ranch Well, and between 3,800 and 5,900 feet away from the District’s existing Garnet Well. Due to the proximity of the Live Oak Wellfield to the coastal area, and because existing groundwater gradients and elevations are below sea level at the coastline, this well field is susceptible to seawater intrusion. The evaluation of potential impacts to the Live Oak Wellfield from implementation of the WMP are based largely on historical monitoring data that correlate water levels at the Pleasure Point monitoring well and pumping by the SCWD at the Live Oak Wellfield. The Pleasure Point

monitoring well is an appropriate gauge for potential impacts to the Live Oak Wellfield because the monitoring well is screened in Purisima Unit A, which is suspected to be the most likely pathway for seawater intrusion in the vicinity of the Live Oak Wellfield.

The analysis of localized drawdown at the Live Oak Wellfield from future pumping at the O'Neill Ranch Well, without consideration of pumping redistribution at other SqCWD wells, is based on the estimated instantaneous pumping rate of the O'Neill Ranch Well. To estimate the impact from pumping the O'Neill Ranch Well, the analysis considered the minimum static water levels recorded in the Live Oak Wells observed from 1988 to 1992 (the last extended drought period). Static water levels at that time were lower by approximately -15 feet. The MLU model calculated the maximum change in water levels at the Live Oak Wellfield from pumping the O'Neill Ranch Well to be -0.7 feet. This estimated decrease in water levels from pumping at the O'Neill Ranch Well would be marginal and would not cause static water levels at the three active Live Oak Wells to fall below the top of the well screens.

In addition to lowered water levels, well yield effects at the Live Oak Wellfield could also result from implementation of the WMP. Therefore, the potential for the WMP to induce changes in groundwater gradients and groundwater elevations along the coast was also evaluated. To quantify potential well yield effects at the Live Oak Wellfield, the estimated maximum drawdown at the Pleasure Point monitoring well from pumping the O'Neill Ranch Well was compared to historical data correlating water levels at the Live Oak Wellfield and water levels at Pleasure Point. The results indicate that long-term pumping at the O'Neill Ranch Well, in the absence of the overall redistribution of pumping that would occur under the WMP, could decrease the yield of the Live Oak Wellfield by approximately 40 ac-ft/yr, or approximately 6 percent of the planned production from these wells over the pumping season. Because the City of Santa Cruz' water supplies are considered only marginally adequate during drought conditions, and because these wells provide potable water to a large number of end-users, any decrease in well yield at the Live Oak Wells would be considered a restrictive effect, meaning that the municipal wells could be adversely affected. However, as discussed below, these potential impacts would be offset by the proposed pumping redistribution.

Collective Impacts to the Live Oak Wellfield from Redistribution of Pumping. Although a decrease in well yield of 40 ac-ft/yr at the Live Oak Wellfield from pumping the O'Neill Ranch Well could be considered detrimental, the reduced pumping at the Garnet Well and the redistribution of groundwater pumping that would occur with WMP implementation would offset most of the negative effects of the new pumping at the O'Neill Ranch Well. With implementation of the WMP, the existing Garnet Well would remain as the SqCWD's closest well to the Live Oak Wellfield and would consequently have the greatest effect on groundwater conditions at the Live Oak Wellfield. The proposed redistribution of pumping under the WMP would shift future pumping away from the Garnet Well (located in the coastal area) and Pleasure Point area during both nondrought and drought years in order to meet the objective of reducing susceptibility to seawater intrusion. As described above, drought year pumping at the Garnet Well would be reduced by an additional 100 ac-ft/yr during drought years. Thus, to be conservative, the analysis of collective

drawdown and well yield effects on the SCWD's Live Oak Wellfield is based on pumping during nondrought years since this is when pumping at Garnet Well would be the greatest.

As indicated in Table 3-3, pumping at the Garnet Well during nondrought years would decrease by an estimated 170 ac-ft/yr under Scenario 1 when compared to the existing condition. Because 61 percent of pumping generally occurs during the dry season, pumping at the Garnet Well would decrease by 104 ac-ft/yr during the dry season when compared to the existing condition. The results of the collective analysis indicate the maximum drawdown at the Live Oak Wellfield could be up to -2.8 feet at one of the Live Oak Wells. Thus, even with the beneficial effect of decreased pumping at the Garnet Well, water levels at the Live Oak Wellfield are predicted to decline slightly. However, the estimated drawdowns correspond with less than one percent of the total pumping discharge rate, or only 2 gpm in one of the Live Oak Wells, and would not diminish the amount of water available to SCWD. The SCWD could achieve the planned production from these wells of 645 ac-ft over a 210-day pumping season by operating the wells approximately 8 minutes longer per day. More importantly, the estimated drawdown at the Pleasure Point Well is estimated to be zero. Therefore, the redistribution of pumping would not adversely affect the yield of the Live Oak Wells due to increased seawater intrusion risk.

Additionally, as described in Chapter 2, Project Description, Section 2.6, Future Operations and Maintenance, ongoing groundwater monitoring data would be used to characterize groundwater levels and changes in groundwater contours, as well as to detect seawater intrusion and landward movement of the seawater/freshwater interface. This data would form the basis for annual modifications to the distribution of pumping by the SqCWD. Evidence of seawater intrusion or excessive drawdown would trigger modifications to the District's pumping distribution, and would ensure that the overall redistribution of pumping consequently would not adversely affect the risk of seawater intrusion to the Live Oak Wellfield. However, due to the uncertainties regarding potential adverse effects on SCWD's wells, this EIR conservatively considers potential impacts on SCWD's well yield to be a potentially significant impact.

Cunnison Lane Well Site

Potential Impacts to Private Wells from Pumping the Cunnison Lane Well. Localized drawdown that would result from implementation of the proposed Cunnison Lane Well, without consideration of redistribution and operational changes to other SqCWD wells, was evaluated based on the estimated instantaneous pumping rate of the well. This well would provide an estimated 538 gpm for Service Areas I and II. The well would be completed in Purisima Unit A. There are approximately 26 neighboring wells within 1,000 meters of the Cunnison Lane Well site, of which 23 have well construction information available. Since 61 percent of pumping occurs during the dry season, the well would produce 265 ac-ft during the dry season. The modeling results indicate that if the Cunnison Lane Well pumped 265 ac-ft during the dry season, changes in groundwater levels at the 23 identified neighboring private wells would range from -2.1 to -6.5 feet. Comparisons of available water level data, screen intervals, and estimated drawdown show that pumping at the Cunnison Lane Well would not cause water levels to drop below the average top-of-screen depth in neighboring private wells, and would therefore not cause physical damage to "average" neighboring wells. The predicted changes in yield indicate

that the lowered groundwater levels could produce a decrease in pump discharge at neighboring wells of up to 0.3 gpm. This predicted drawdown effect on well yield is marginal, and no significant impacts in well yield at “average” neighboring wells would result. However, the potential for adverse effects at shallower “non-average” private wells, or at private wells for which well log information is not available, is considered a potentially significant impact.

Collective Impacts to Private Wells near the Cunnison Lane Well from Redistribution of Pumping. The MLU model was used to evaluate collective water level and yield impacts in the vicinity of the Cunnison Lane Well from the proposed redistribution of pumping among active SqCWD wells. In addition to pumping the Cunnison Lane Well, the analysis considers future pumping at the existing Rosedale and Tannery II Wells because pumping at these wells affect groundwater conditions in the vicinity of the Cunnison Lane Well. To be conservative, the collective analysis for the Cunnison Lane Well is based on the maximum pumping condition during nondrought years and without a supplemental supply in place (total annual production of 5,675 ac-ft/yr, see Table 3-5), which is when pumping in the vicinity of the Cunnison Lane Well would be the greatest.

Under the maximum pumping condition, the proposed Cunnison Lane Well would produce an estimated 230 ac-ft/yr, and pumping at the existing Rosedale and Tannery II Wells would decrease by 350 and 310 ac-ft/yr, respectively, compared to the current annual average production from 2005 to 2008. The effects of the new pumping at the proposed Cunnison Lane Well would be offset by the decrease in pumping at the Rosedale and Tannery II Wells. Since 61 percent of the pumping occurs during the dry season, the simulation predicts that redistributing pumping as described would raise water levels in the 23 neighboring wells between 0.7 to 5.7 feet over the dry season. This increase in water levels would slightly improve the yield of the neighboring wells. Thus potential impacts on private wells in the vicinity of the Cunnison Lane Well would be less than significant, and no mitigation is necessary.

Austrian Way Well Site

Potential Impacts to Private Wells from Pumping the Austrian Way Well. Localized drawdown that would result from implementation of the proposed Austrian Way Well, without consideration of redistribution and operational changes to other SqCWD wells, was evaluated based on the estimated instantaneous pumping rate of the well. The Austrian Way Well would be used to meet demand in Service Area II. Based on a test well and evaluation of this site in 2007, the production capacity at the proposed Austrian Way Well site is estimated at 250 gpm, and it would likely be screened in Purisima Unit BC. Approximately 10 neighboring wells have been identified within 1,000 meters of the site, of which 8 neighboring wells have well construction information available. Since 61 percent of pumping occurs during the dry season, the well would produce 123 ac-ft during the dry season. The MLU model results indicate that if the Austrian Way Well pumped 123 ac-ft during the dry season, changes in groundwater levels at the 8 neighboring private wells would range from -1.2 to -2.7 feet. Comparisons of available water level data, screen intervals, and estimated drawdown show that pumping at the Austrian Way Well would not cause significant impacts to any of the identified neighboring wells for which well log information is available. Changes in yield indicate that the lowered groundwater levels

could produce a decrease in pump discharge at neighboring wells of less than 0.2 gpm of the tested rates of between 8 and 30 gpm at the 8 wells. Therefore, any effects on water levels at nearby well screens from pumping the Austrian Way Well would not materially affect the yield available to private wells for which well log information is available, and the drawdown effect on yield is considered marginal. However, the potential for adverse effects at private wells for which well log information is not available is considered a potentially significant impact.

Collective Impacts to Private Wells near the Austrian Way Well from Redistribution of Pumping. Collective water level and yield impacts from pumping the Austrian Way Well and redistributing pumping were addressed through a qualitative analysis. The nearest existing SqCWD production well is the Madeline Well, located over 3,000 feet away. The next nearest well is the Ledyard well, which is over 4,000 feet away. The distance of these wells from the proposed Austrian Way Well suggest that changes in their pumping would have little if any effect on groundwater levels near the Austrian Way Well. Thus, the potential collective effects on water levels and well yields in the vicinity of the Austrian Way Well that would result from the proposed redistribution of pumping among active SqCWD wells would be the same as the effects of pumping the Austrian Way Well individually. Thus, it is reasonable to expect that potential impacts to water levels and well yield at private wells for which well log information is available would be marginal. However, the potential for adverse effects at private wells for which well log information is not available is considered a potentially significant impact.

Granite Way–Aptos Village Well Site

Potential Impacts to Private Wells from Pumping the Granite Way-Aptos Village Well. It is estimated that the Granite Way-Aptos Village Well would produce 245 gpm of capacity for Service Area II, and it would be screened in Purisima Unit DEF. Approximately 13 neighboring wells have been identified within 1,000 meters of the site, of which 10 neighboring wells have well construction information available. Assuming 61 percent of pumping occurs during the dry season, the well would produce 121 ac-ft during the dry season. For the analysis of drawdown effects from pumping at the Granite Way-Aptos Village Well without consideration of redistribution and operational changes at other SqCWD wells, the modeling results indicate that if the Granite Way-Aptos Village Well pumped 121 ac-ft during the dry season, changes in groundwater levels at the 10 neighboring private wells would range from -1.2 to -2.2 feet. Comparisons of available water level data, screen intervals, and estimated drawdown show that pumping at the Granite Way-Aptos Village Well would not cause water levels to drop below the average top-of-screen depth in neighboring private wells, and would therefore not cause physical damage to typical neighboring wells. Changes in yield indicate that the lowered groundwater levels could produce a decrease in pump discharge at neighboring wells of less than 0.2 gpm, but would not significantly affect the yield available to “average” neighboring wells. However, the potential for adverse effects at shallower “non-average” private wells, or at private wells for which well log information is not available, is considered a potentially significant impact.

Collective Impacts to Private Wells Near the Granite Way-Aptos Village Well from Redistribution of Pumping. Collective water level and yield impacts from pumping the Granite Way-Aptos Village Well and redistributing pumping were also analyzed using the MLU model.

Because pumping from SqCWD wells in the vicinity of the Granite Way-Aptos Village Well is anticipated to be the same for future nondrought and drought years with a supplemental supply in place, as well as for the maximum pumping condition without a supplemental supply in place (total annual production of 5,675 ac-ft/yr, see Table 3-5), the collective analysis for the Granite Way-Aptos Village Well addresses all of these conditions. Under the WMP, either the existing T. Hopkins Well or existing Aptos Creek Well would be removed from production and maintained as an inactive well, depending on the performance of these wells when the proposed Granite Way-Aptos Village Well comes online. The removal of either the T. Hopkins Well or Aptos Creek Well from production would help to offset any drawdown effects on private wells in the vicinity of the proposed Granite Way-Aptos Village Well.

The MLU model predicted collective drawdown effects based on an annual production of 195 ac-ft/yr at the proposed Granite Way-Aptos Village Well, and a reduction in annual pumping at the Aptos Creek Well from the average 230 ac-ft/yr (based on average annual production for 2005 to 2008) to 0 ac-ft/yr for future conditions. The drawdown predicted at the 10 neighboring wells over the dry season would range from -0.4 to -1.6 feet. The model results indicate that, overall, the drawdown in the vicinity of the Granite Way-Aptos Village Well that would result from WMP implementation would be marginal, resulting in less-than-significant impacts to water levels and well yields at neighboring private wells. However, the potential for adverse effects at shallower “non-average” private wells, or at private wells for which well log information is not available, is considered a potentially significant impact.

Polo Grounds Well Site

Potential Impacts to Private Wells from Increased Pumping at the Polo Grounds Well. With implementation of the WMP, the existing irrigation well at Polo Grounds Regional Park would be converted to a mid-sized municipal potable water well with a 500-gpm capacity to provide water for Service Area III. The well is approximately 400 feet deep and is completed in Purisima Unit F. Approximately 13 neighboring wells have been identified within 1,000 meters of the site. Of these, 9 neighboring wells have well construction information available. Assuming 63 percent of pumping occurs during the dry season, the well would produce 254 ac-ft during the dry season or 224 ac-ft greater than under existing conditions. The calculated drawdown effects from pumping at the Polo Grounds Well, without consideration of redistribution and operational changes at other SqCWD wells, indicate that if the Polo Grounds Well pumping was increased by 224 ac-ft during the dry season, changes in groundwater levels at the 9 neighboring private wells would range from -1.9 to -4.0 feet. One well has a pumping water level of just 1 foot above the bottom of the lower screen, and the additional 3 feet of drawdown at this well would desaturate all screens in this well. However, this poorly performing well should already be considered damaged and should not constrain the use of the basin storage by all users. At three other nearby wells, static pumping levels are already at the top of the screen and risks due to corrosion, aeration, or cavitation are already present. Thus, comparisons of available water level data, screen intervals, and estimated drawdown indicate that pumping at the Polo Grounds Well would not cause significant physical impacts to the identified neighboring wells. Further, the changes in water levels would decrease pump discharges at neighboring wells only by up to 0.2 gpm, and would not significantly affect the yield available to the “average” neighboring wells. However,

the potential for adverse effects at shallower “non-average” private wells, or at private wells for which well log information is not available, is considered a potentially significant impact.

Collective Impacts to Private Wells near the Polo Grounds Well from Redistribution of Pumping. Collective water level and yield impacts from pumping the Polo Grounds Well and redistributing pumping were also analyzed using the MLU model. Collective impacts could occur because in addition to the increased pumping at Polo Grounds Well when compared to existing conditions (the irrigation well is currently operated by Santa Cruz Department of Parks and Recreation), there may also be an increase in annual pumping at the nearby Aptos Jr. High Well. Similar to the Granite Way-Aptos Village Well, future pumping at the Polo Grounds Well is anticipated to be the same for future nondrought and drought years with a supplemental supply in place, as well as for the maximum pumping condition without a supplemental supply in place (total annual production of 5,675 ac-ft/yr, see Table 3-5); thus, the collective analysis for the Polo Grounds Well addresses all of these conditions.

The MLU model assumed annual pumping at the Aptos Jr. High Well would increase from the 70 ac-ft/yr pumped from the well between 2005 to 2008, to 330 ac-ft/yr in future conditions, which translates to an estimated increase in pumping of 164 ac-ft over the dry season. The drawdown at the 9 neighboring wells was predicted to range from -2.7 to -5.6 feet. These results indicate that the additional drawdown from the overall pumping redistribution would not cause significant impacts to “average” private wells near the Polo Grounds Well. Additionally, reduced pumping at the existing Bonita Well would also provide additional water level offsets in the vicinity of the neighboring wells. However, the potential for adverse effects at shallower “non-average” private wells, or at private wells for which well log information is not available, is considered a potentially significant impact.

Potential Impacts to CWD’s Wellfields from Increased Pumping at the Polo Grounds Well. Five active wells operated by the CWD are located between 2,800 and 7,500 feet from the Polo Grounds Well. Two of the five wells are presumably completed in Purisima Unit F; the other three wells are completed in the Aromas aquifer, which is conservatively lumped with Purisima Unit F for the purpose of this analysis. Simulated groundwater drawdown from pumping the Polo Grounds Well during nondrought years, without consideration of redistribution and operational changes at other SqCWD wells ranges from -0.2 to -2.1 feet at the CWD wells. By subtracting the water level changes induced by pumping the Polo Grounds Well from the static and pumping water levels, it is apparent that this change in water levels would not drop below the top of any well screen that is currently submerged. Changes in yield indicate that the lowered groundwater levels could produce a decrease in pump discharge at CWD wells of approximately 0.2 to 3.2 gpm (or 0.1 to 0.6 percent), which would not substantially affect the yield available to the CWD wells.

To estimate the impact to CWD’s Wellfields from pumping the Polo Grounds Well during drought conditions, the analysis considered the minimum static water levels recorded in the CWD wells observed from 1993 to 1994 (following the last extended drought period). Static water levels at that time were lower by up to 35 feet. The calculations indicate that pumping the Polo Grounds Well would not lower water levels below the top of the screen interval in four of the five

CWD wells. The pumping water level at CWD's Rob Roy No. 10 Well was 6 feet lower at the end of the last drought and the water level dropped to just 1 foot above the top of the screen. The proposed pumping at the Polo Grounds Well would lower this level by an additional 1.4 feet, potentially leaving approximately 0.4 foot of the well screen dewatered. This decline in water levels and associated well screen dewatering at the Rob Roy No. 10 Well could cause physical damage and have a restrictive effect on the well. However, as described in Chapter 2, Project Description, Section 2.6, Future Operations and Maintenance, ongoing collection and analysis of groundwater monitoring data would form the basis for annual modifications to the distribution of pumping by the SqCWD. Indications of excessive drawdown would trigger the District to modify its pumping distribution, and would ensure that the overall redistribution of pumping consequently would not adversely affect the Rob Roy No. 10 Well.

Collective Impacts to CWD's Wellfields Near the Polo Grounds Well from Redistribution of Pumping. The analysis of collective drawdown and yield impacts in the vicinity of the Polo Grounds Well from the proposed pumping redistribution considered the anticipated increase in pumping at the Aptos Jr. High Well and decrease in pumping at the Bonita Well. Future pumping from SqCWD wells in the vicinity of the Polo Grounds Well is anticipated be the same for future nondrought and drought years with a supplemental supply in place, as well as for the maximum pumping condition without a supplemental supply in place (total annual production of 5,675 ac ft/yr, see Table 3.3-5); thus, the collective analysis addresses all of these conditions.

The results of the analysis indicated the redistribution of pumping would result in additional water-level declines of between 0.3 and 1.0 feet over the drawdown predicted by pumping the Polo Grounds Well alone. The net drawdown is approximately 0.9 to 2.0 feet. These effects would be essentially the same as the effects of pumping at the Polo Grounds Well individually. Therefore, the redistribution of pumping in the vicinity of the Polo Grounds Well is not anticipated to substantially affect water levels or well yields at CWD's wellfields except under the drought conditions described above. However, due to uncertainties regarding the potential for pumping by SqCWD to adversely affect CWD's production wells, this EIR conservatively considers impacts to CWD wells due to pumping at the Polo Grounds Well as potentially significant.

Limitations to Analysis

Some of the identified neighboring wells have not submitted well construction logs to DWR, which is a requirement under California State Law; therefore, detailed information for these wells was not available for the analysis. However, the number of well construction logs made available to the analysis is sufficient to reasonably evaluate the overall impacts on neighboring wells. It is likely that those wells without available well logs are constructed, and are installed to depths, similar to those wells with available construction details. Therefore, the lack of well construction data for some wells is not considered a significant deficiency of the analysis.

Drought year water levels are not available for private wells. Therefore, where the anticipated drawdown would be greatest during drought years, the collective analysis evaluated drawdown impacts at private wells during drought years by extrapolating from recorded drought-year water

levels in municipal wells. During the most recent extended drought period, recorded water levels in municipal supply wells showed a drop of between -4 and -35 feet. Under drought conditions, private wells throughout the basin would be expected to experience a similar decline in groundwater levels. Droughts are considered temporary conditions and the water level decline that occurs, especially during an extended drought, would likely be far greater than the minor drawdown experienced by private wells due to implementation of the WMP. Groundwater levels would return to near original levels following the drought. Given the historic regional well declines caused by drought condition, the project is not expected to contribute to the increment of drawdown, which places the well in an adverse condition. Therefore, the lack of drought data for some wells is not considered a significant deficiency of the analysis.

Impact Conclusion

Implementation of the WMP would not translate into an overall increase in pumping by the District. Groundwater conditions at or near the historical low groundwater elevations at SqCWD's municipal wells during drought conditions, and subsequent effects to individual pumpers, have been experienced periodically within the Soquel-Aptos Groundwater Basin, and will continue to be experienced irrespective of the WMP. The District is not responsible for ensuring the adequacy of individual wells to operate at the historical low groundwater elevations that have been experienced within the basin. Maintenance of groundwater elevations above historical lows, including during drought periods, should not adversely affect an overlying property owner's ability to exercise the reasonable and beneficial use of groundwater on land overlying the groundwater basin.

The MLU model analysis provides a detailed evaluation of potential changes in the local groundwater levels and well yields at neighboring non-District wells resulting from implementation of the WMP. The analysis uses realistic and conservative assumptions of groundwater conditions in the vicinity of the proposed well sites. Under the modeled scenarios, the model predicts that adverse effects related to physical damage to or loss of yield at "average" private wells in the vicinity of all five of the proposed well sites would not result. However, although unlikely, future pumping at the O'Neill Ranch, Cunnison Lane, Polo Grounds, and Granite Way-Aptos Village Wells, and possibly at the Austrian Way Well, could potentially result in adverse effects at shallower "non-average" private wells, or at private wells for which well log information is not available. Because private wells are generally shallower than municipal wells, these wells are more sensitive to minor decreases in groundwater levels. To be conservative, the potential for the WMP to adversely affect "non-average" private wells is considered a potentially significant impact. However, with implementation of **Mitigation Measure 3.3-2a (Voluntary Monitoring and Mitigation Program for Private Wells)**, which would require that the District monitor any adverse effects resulting from future District pumping and develop a mechanism for mitigation, potential impacts to private wells would be reduced to a less-than-significant level.

In addition, due to the uncertainties regarding potential adverse effects on SCWD's wells in the vicinity of the O'Neill Ranch Well site, and on CWD's wells in the vicinity of the Polo Grounds Well, this EIR conservatively considers potential impacts on SCWD and CWD wells,

respectively, to be a potentially significant impact. However, with implementation of **Mitigation Measures 3.3-2b (Adaptive Management to Address Restrictive Effects at SCWD Wells)** and **3.3-2c (Adaptive Management to Address Restrictive Effects at CWD Wells)**, this impact would be reduced to a less-than-significant level. These mitigation measures require that the SqCWD conduct ongoing monitoring of groundwater levels and modify pumping if it is determined that SqCWD pumping is resulting in restrictive effects on SCWD and CWD wells, respectively.

Mitigation Measures

Measure 3.3-2a: Voluntary Monitoring and Mitigation Program for Private Wells (applies to all sites). As a condition of project approval, the SqCWD shall offer to private well owners the opportunity to participate in a voluntary program to monitor long-term changes in groundwater conditions at participating private wells, and provide a means by which the SqCWD mitigates for impacts to private wells as a result of physical damage and or loss in well yield. The following program applies to private wells that are within 1,000 meters (approximately 3,300 feet) of the proposed new SqCWD wells.

Terms of Monitoring and Mitigation Program

At least 12 months prior to the commencement of pumping at each proposed well site, the SqCWD shall mail notices to private well owners within 1,000 meters of the well site to provide information about the monitoring and mitigation program and the registration process. To participate in the monitoring and mitigation program, private well owners would be required to register formally for the program, either by filling out a registration form online, submitting a registration form by mail, or in person at the SqCWD office. As part of the registration process, each individual well owner would be required to enter into an agreement with the SqCWD holding the SqCWD harmless from any damage related to installation of the meter and water level transducer/data logger, granting limited access to SqCWD personnel to collect data from the private well, and accepting the terms and conditions of the program. The agreement shall also set forth the mitigatory actions that shall be taken by the SqCWD if it is determined that private wells have been adversely impacted as the result of SqCWD pumping. Participants in this program would consent to have the SqCWD install a production meter and water level transducer/data logger on their well at least six months prior to planned start-up of the corresponding new SqCWD well. Participants would be required to submit any existing information and data available for their well to the SqCWD (e.g. driller's logs, water level data, pumping records, etc.) to provide baseline information upon which to measure restrictive impacts attributable to SqCWD pumping. In cases where well log information is not available, a baseline condition would be established for that well during the registration process. All costs associated with the monitoring equipment and installation shall be borne by the SqCWD. The duration of the monitoring shall be 10 years, or less if canceled by the private well owner.

Data from the production meter shall be collected by the private well owner on a quarterly basis and provided to the SqCWD. In addition, participating private well owners shall grant SqCWD staff permission to access the property, download data from the water level transducers/data loggers, and record production meter readings on an annual basis. Prior to visits by SqCWD staff, the SqCWD shall provide participants with 14-day advance notice by mail of the schedule for the site visit (within a 48-hour window).

Demonstrating Restrictive Effects

The monitoring data shall be used to evaluate if SqCWD pumping of specific wells has had a restrictive effect on a participating private well. The evaluation and determination of restrictive effects shall be conducted by the SqCWD's groundwater hydrologist. For the purposes of the monitoring and mitigation program, restrictive effects shall be limited to the following:

1. Damage to the private well or pump caused by water levels falling below the top of well screens leading to screen corrosion or aeration of well water. If this type of damage is demonstrated, it is considered a restrictive effect caused by SqCWD pumping if one or more of the following conditions are met:
 - (a) SqCWD pumping has caused static water levels at the private well to fall below the top of the well screens and the static water levels were above the screen prior to the SqCWD's pumping modifications in the vicinity of the corresponding new SqCWD well. Some private wells have static water levels (when the pump is off) that are already below the top of the screen. In these cases, a marginal amount of additional drawdown is of little consequence because the risk of screen collapse due to corrosion is already present.
 - (b) SqCWD pumping has caused pumping water levels at the private well to fall below the top of the well screen and the pumping water levels were above the screen prior to the SqCWD's pumping modifications in the vicinity of the corresponding new SqCWD well. At some wells, pumping water levels (when the pump is on) are already below the top of the screen. Additional corrosion is not a restrictive effect in these situations because corrosion has already been induced by the existing low water levels, and a small increment of additional drawdown would not substantially increase the aeration/cavitation risk.
2. There is an appreciable diminution in the quantity of water produced by the private well. A reasonable definition of "appreciable" in this context is if historical production data is available for that private well for the previous six months and it is demonstrated that the SqCWD's pumping modifications in the vicinity of the corresponding new SqCWD well has rendered the nearby private well incapable of meeting its:
 - (a) Historically measured maximum daily production level;
 - (b) Historically measured dry-season production levels; or
 - (c) Historically measured annual production levels under drought conditions.

In practice, diminution in the quantity of water produced by the private well could result if a substantial percentage of the well screen were dewatered or water levels fall below the pump intake.

Mitigatory Actions

In the event the operation of a new SqCWD well causes a restrictive effect on a participating private well, the SqCWD shall assume responsibility for the restrictive effect and address the impact by taking one or more of the mitigatory actions described below, as determined appropriate based on effectiveness and least cost to the SqCWD:

1. If well monitoring data indicates an increased risk of damage to the private well as a direct result of SqCWD actions, the SqCWD shall respond proactively to inspect the well with a video log. If inspection shows an imminent risk of damage, then the SqCWD would take one of the appropriate mitigating actions described in items 2 through 5, below.
2. Replace and/or lower the well pump of the private well, which may include replacing the existing pump with a smaller physical size of equal production capacity.
3. Redistribute SqCWD pumping to restore water levels at the impacted well.
4. Drill a deeper replacement well for the affected private well owner.
5. Provide the affected private well owner with water service from the SqCWD. The option to connect to the SqCWD is conditioned by proximity to existing SqCWD mains and being within the SqCWD's service area or approved annexation by the Local Agency Formation Commission (LAFCO). The SqCWD would waive fees and charges associated with connecting to its system; however, the customer would be responsible for the rates and charges associated with service and water quantity that are paid by similarly classified customers.

As described above, for private wells that do not have driller's logs, the SqCWD reserves the right to evaluate the condition of the well during the registration process. The evaluation may include videoing the interior of the well.

In the event that there is well screen or pump failure prior to completion of mitigatory action and the well cannot serve the existing use, the SqCWD shall make a reasonable endeavor to provide an interim water supply, which may include a temporary connection to the SqCWD or delivering water via a tender truck to a storage tank on the property.

Measure 3.3-2b: Adaptive Management to Address Restrictive Effects at SCWD Wells (applies only to O'Neill Ranch Well site). As part of the SqCWD's adaptive management strategy, the SqCWD shall review groundwater level and water quality data from production and monitoring wells owned by the Santa Cruz Water Department (SCWD) in conjunction with data collected from the SqCWD's own production and monitoring wells to assess whether SqCWD pumping in the vicinity of the O'Neill Ranch Well has had a restrictive effect on the SCWD's existing Live Oak Wellfield. If restrictive effects are detected, the SqCWD shall modify pumping such that SqCWD pumping in the vicinity of the O'Neill Ranch Well is reduced. This mitigation measure addresses two possible restrictive effects on SCWD's production wells:

1. *Risk of damage to the production well caused by static or pumping water levels falling below the top of well screens.* This effect could occur if static or pumping water levels are above the top of the well screen prior to pumping at the O'Neill Ranch Well, and subsequently fall below the top of the well screen after the O'Neill Ranch Well is brought online and SqCWD pumping in the vicinity is increased. At one Live Oak Well, Beltz Well #7, pumping water levels are currently below the top of the well screen; thus, any lowering of pumping water levels would not be considered a restrictive effect unless the well screen were to become fully dewatered.

2. *Reduced well yields due to an increased risk of seawater intrusion.* This effect could occur if groundwater levels at SCWD's coastal monitoring wells were to fall below groundwater elevations that protect against seawater intrusion as a direct result of increased pumping by the SqCWD in the vicinity of the O'Neill Ranch Well.

This mitigation measure assumes the current average production at any Live Oak Well - defined as the average annual production for water years 2005 through 2008 - will not increase. If there is no increase in average annual production at individual Live Oak Wells and restrictive effects from increased pumping by the SqCWD in the vicinity of the O'Neill Ranch Well are observed, the SqCWD shall reduce pumping at the nearby Garnet Well such that overall pumping in the vicinity is reduced. If restrictive effects are observed and groundwater level declines at inland monitoring wells exceed the calculated drawdown presented in the *Hydrologic Effects of Well Master Plan* (HydroMetrics, 2009), the SqCWD shall reduce pumping at the O'Neill Ranch Well.

If a cooperative groundwater monitoring and mitigation agreement that includes specific provisions for monitoring and management of groundwater levels is established between the SqCWD and SCWD, the cooperative agreement could supersede this measure.

Measure 3.3-2c: Adaptive Management to Address Restrictive Effects at CWD Wells (applies only to Polo Grounds Well site). As part of the SqCWD's adaptive management strategy, the SqCWD shall review groundwater monitoring data from Central Water District's (CWD) existing production and monitoring wells in conjunction with data collected from the SqCWD's own production and monitoring wells to assess whether increased pumping by the SqCWD in the vicinity of the Polo Grounds Well has had a restrictive effect on CWD's existing production wells. This mitigation measure addresses two possible restrictive effects on CWD's production wells:

1. *Risk of damage to the production well caused by static or pumping water levels falling below the top of well screens.* This effect could occur if static or pumping water levels are above the top of the well screen prior to SqCWD pumping at the Polo Grounds Well, and subsequently fall below the top of the well screen after the Polo Grounds Well is retrofitted and SqCWD pumping in the vicinity is increased. CWD's Rob Roy Well No. 4 and Cox Well No. 5 have pumping water levels that are currently below the top of the well screens; thus, any lowering of pumping water levels would not be considered a restrictive effect unless the well screens were to become fully dewatered.
2. *Reduced well yield due to increased pumping lift.* This effect could occur if future pumping from the Polo Grounds Well were to adversely affect well yield at CWD's wells such that the wells must be pumped more than 50 percent of the time, averaged over a year. However, since annual production from CWD's wells for the water years 2005 through 2008 has been just over half of the wells' production capacity, small decreases in pumping rates can easily be compensated for by increased operating time without resulting in adverse effects.

This mitigation measure assumes the current production at any individual CWD well - defined as the average annual production for water years 2005 through 2008 - will not increase. If lowered groundwater levels and restrictive effects at CWD's wells from increased pumping by the SqCWD in the vicinity of the Polo Grounds Well are observed,

the SqCWD shall mitigate the restrictive effects by reducing pumping at the Polo Grounds and/or Aptos Jr. High Wells.

If a cooperative groundwater monitoring and mitigation agreement that includes specific provisions for monitoring and management of groundwater levels is established between the SqCWD and CWD, the cooperative agreement could supersede this measure.

Significance after Mitigation: Less than Significant.

Impact 3.3-3: Implementation of the WMP could otherwise substantially degrade the quality of groundwater resources in the Basin such that one or more of its beneficial uses would be compromised.

The Basin Plan defines the beneficial uses of groundwater as municipal, domestic, and agricultural water supply. With implementation of the WMP, the redistribution of pumping among SqCWD's active wells would shift pumping away from the coast and protect against seawater intrusion. Implementation of the WMP would also improve operational flexibility and enable the District to shift pumping in response to short-term hydrologic conditions and long-term water level trends, thereby improving groundwater conditions in the basin. These aspects of the WMP would have a beneficial effect on the groundwater basin.

However, future pumping under the WMP could potentially alter groundwater gradients and the direction of groundwater flow and induce the migration of contaminants from nearby remediation sites towards nearby production wells, adversely affecting the beneficial uses of the groundwater resources if contamination is drawn into drinking water wells. The likelihood for contamination would reach any individual well is dependent upon several factors, including the presence of known groundwater contamination within ¼-mile of the proposed well sites, the type of aquifer (confined or unconfined), aquifer material (porous materials or fractured rock), pathways of contamination (i.e. presence of abandoned or improperly destroyed wells), static groundwater conditions (depth), and well operations.

O'Neill Ranch Well Site

As discussed in Section 3.10, Hazardous Materials, five active environmental cases with known, ongoing monitoring of groundwater contaminant levels are located within ¼-mile of the O'Neill Ranch Well site. HydroMetrics evaluated the potential for future pumping in the vicinity of the O'Neill Ranch Well to substantially affect groundwater gradients or the direction of groundwater flow such that contaminated groundwater from these sites migrates to District or private production wells. The results of the analysis indicate future pumping at the O'Neill Ranch Well would not substantially alter the flow gradient or affect the groundwater flow direction. Therefore, potential impacts to groundwater quality resulting in the impairment of beneficial uses of local groundwater resources are considered less than significant, and no mitigation is necessary.

Cunnison Lane Well Site

An active LUST cleanup facility, the Quik Stop at 5505 Soquel Drive near Hardin Way, is located approximately 800 feet south of the Cunnison Lane Well site. Groundwater at this facility is contaminated by methyl tertiary butyl ether (MTBE) and tert-butyl alcohol (TBA).

Groundwater remediation of the shallow aquifer is ongoing at this site. As part of the remediation requirements, the facility is required to submit quarterly monitoring reports to the RWQCB.

The results of the drawdown analysis performed by HydroMetrics for the Cunnison Lane Well indicate that future pumping at the Cunnison Lane Well, without consideration of the proposed redistribution of pumping, could lower groundwater levels and interfere with groundwater remediation at the Quik Stop facility, and possibly induce the migration of contaminated groundwater towards private and SqCWD production wells in the vicinity. However, with the redistribution of pumping proposed under the WMP, groundwater levels in the vicinity of the Cunnison Lane Well and Quick Stop remediation wells are not predicted to decline.

Although unlikely, this analysis conservatively considers the potential for future pumping from District wells in the vicinity of the Cunnison Lane Well to induce the migration of contaminants towards District or non-District wells a potentially significant impact. However, implementation of **Mitigation Measure 3.3-3 (Operating Restrictions for Cunnison Lane Well)**, which would restrict the District from operating the Cunnison Lane Well until all remediation activities at the Quik Stop facility are terminated, this impact would be reduced to less than significant. Because the identified impacts to groundwater quality in the vicinity of the Cunnison Lane Well are based on the potential for pumping to adversely affect the effectiveness of the remediation wells, this impact could not occur after the groundwater remedial pumping is terminated.

All Other Sites

There are no active environmental cases with known groundwater contamination within 1/2-mile of the Austrian Way, Granite Way-Aptos Village, and Polo Grounds Well sites. Thus, no impact to groundwater quality from nearby contamination sites would occur, and no mitigation is necessary.

Mitigation Measures

Measure 3.3-3: Operating Restrictions for Cunnison Lane Well (applies only to Cunnison Lane Well site). As a condition of Well Master Plan approval, the SqCWD shall be restricted from operating the Cunnison Lane Well until all groundwater remediation activities at the Quik Stop facility are completed. For the purposes of this mitigation, remediation activities shall be deemed complete when the responsible party for the Quik Stop facility terminates the extraction and treatment of contaminated groundwater. Because ongoing monitoring of contaminant levels in groundwater at the Quik Stop facility would likely continue after extraction and treatment activities have been completed, and because it can sometimes take years for environmental cases to be formally closed by the responsible agency, the development restrictions imposed by this mitigation measure shall not depend on case closure.

Significance after Mitigation: Less than Significant.

Impact 3.3-4: Implementation of the WMP would provide adaptation benefits for the generally accepted outcomes of climate change on water supply resources.

A number of analyses have been performed over the past 5 to 10 years to assess the hydrologic impacts of climate change on California's water resources. Some of the more robust findings are presented below:

- The Sierra Nevada spring snowpack is expected to continue to decrease due to an increase in the elevation of the freezing line, more precipitation falling as rain rather than snow, and an earlier snowmelt (DWR, 2006; California Climate Change Center, 2006; Roos, 2005).
- Rivers and streams fed by mountain watersheds are expected to exhibit an increase in stream flow in winter and early spring and a decrease in late spring and summer (Hamlet et al., 2005; Maurer and Duffey, 2005; Hayhoe et al., 2004).
- Greater conflicts among water supply, hydropower, and flood control in reservoir operations are anticipated (DWR, 2006).
- Warmer temperatures are expected to reduce some reservoir coldwater pools, which could affect the temperature of reservoir releases and increase stream temperatures, potentially disrupting aquatic species (DWR, 2006).
- Warmer temperatures could cause increases in water demand in both agricultural and municipal regions (DWR, 2006; Kiparsky and Gleick, 2003).
- Sea level rise will affect coastal areas and estuaries and could threaten levees (IPCC, 2007; DWR, 2006).

These generally accepted outcomes of global warming indicate that water resources will become more limited in the future. Secondary effects will likely include inundation of the shoreline, more frequent and severe flooding, increasing coastal erosion and faster cliff retreat, more frequent and severe wildfires, a less reliable water supply, increased incidence of disease and mortality both from effects of heat waves and from changing patterns of disease distribution, and disruption of ecological systems. Because SqCWD primarily relies on groundwater resources for water supply, inundation of the shoreline could increase the potential for seawater intrusion to affect the coastal aquifer systems. Additionally, availability of groundwater is likely to be influenced by withdrawals (reflecting development, demand and availability of other sources) and recharge (determined by temperature, timing and amount of precipitation, and surface water interactions) (IPPC, 2007).

According to a recent study conducted for California, sea level is projected to rise by about eight to 24 inches over this century, relative to mean sea level between 1980 and 1999, in response to changes in oceanic temperature and the exchange of water between oceans and land-based reservoirs, such as glaciers and ice sheets (Pacific Institute, 2009).

Under natural conditions, the saltwater/freshwater interface can be described by the well-known Ghyben-Herzberg principle, which provides a simple relationship between the depth of the salt-water interface below sea level to the height of the free groundwater surface. The principle

describes the interface as being 40 times the height of the water table above sea level. Because saline water is denser than fresh water, the salt water forms a wedge beneath the fresh water in the landward direction. In more complex, layered groundwater systems, the location of the seawater/freshwater interface may vary among the different aquifers (HydroMetrics, 2007b). In either case, the rise in sea level has the potential to raise the salt-water interface over time and increase the susceptibility of the groundwater system to future seawater intrusion issues.

Additionally, according to a modeled regional climate change of ten hydrologic regions of California, the Central Coast area could experience a median increase in temperature of 2.3°C and a decrease in the average annual precipitation of -12.3 percent (Snyder et al, 2004). Increases in temperature correlate with increased demand in water supplies, and a decrease in annual precipitation would cause a decrease in the amount of groundwater recharge.

As stated in Chapter 2, Project Description, two of the specific objectives of the WMP are to meet the basin management objectives of uniform drawdown of the aquifers and redistribution of pumping away from coastal areas to reduce susceptibility to seawater intrusion, and to increase the flexibility of the SqCWD water supply system to respond to peak, maximum-day demand in all four service areas. By implementing the WMP and achieving these objectives, the SqCWD would increase the ability to adapt to these potential impacts of climate change on the local water supply. Additionally, implementation of the WMP would include a groundwater and surface water monitoring plan that would provide for early detection of seawater intrusion, corroborate groundwater storage efforts, and increase the ability of the SqCWD to pump within its established pumping goal. Increasing the operational flexibility of the system increases the ability of SqCWD to respond and adapt to changes in the environment, and the actions needed to support these objectives are part of the WMP. Therefore, implementation of the WMP would provide beneficial impacts to potential future climate change.

Mitigation: None required.

3.3.6 References – Groundwater Resources

California Climate Change Center, *Our Changing Climate, Assessing the Risks to California*, A Summary Report from the California Climate Change Center, 2006.

California Department of Water Resources (DWR), *Progress on Incorporating Climate Change into Planning and Management of California's Water Resources*, Technical Memorandum Report, July 2006.

California Department of Water Resources (DWR), *State Water Project Delivery Reliability Report-2005*, April 2006.

Hayhoe, K., D. Cayan, C.B. Field, P.C. Frumhoff, E.P. Maurer, N.L. Miller, S.C. Moser, S.H. Schneider, K.N. Cahill, E.E. Cleland, L. Dale, R. Drapek, R.M. Hanemann, L.S. Kalkstein, J. Lenihan, C.K. Lunch, R.P. Neilson, S.C. Sheridan, and J.H. Verville, *Emissions Pathways, Climate Change, and Impacts on California*, 2004.

- Hamlet, A., P.W. Mote, M.P. Clark, and D.P. Lettenmaier, *Effects of Temperature and Precipitation Variability on Snowpack Trends in the Western United States*, Journal of Climate, 2005.
- HydroMetrics LLC, 2007a. *Annual State of the Basin Report, Water Year 2006*, prepared for Soquel Creek Water District, March 2007.
- HydroMetrics LLC, 2007b. *Seawater Intrusion Analysis Report, Seaside Basin, Monterey County, California*, prepared for Seaside Basin Watermaster, October 2007.
- HydroMetrics LLC, 2008b. *Annual State of the Basin Report, Water Year 2007*, prepared for Soquel Creek Water District, August 2008.
- HydroMetrics LLC, 2009a. *Hydrologic Effects of Well Master Plan*, November 2009.
- HydroMetrics LLC, 2009b. *Groundwater Levels to Protect against Seawater Intrusion and Store Freshwater Offshore*. Prepared for Soquel Creek Water District. January 2009.
- Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis, Summary for Policymakers*, 2007.
- Johnson, N. M., D. Williams, E.B. Yates, and G. Thrupp. *Groundwater Assessment of Alternative Conjunctive Use Scenarios – Technical Memorandum 2: Hydrogeologic Conceptual Model*, Prepared for Soquel Creek Water District, September 2004.
- Kiparsky, M. and P.H. Gleick, *Climate Change and California Water Resources: A Survey and Summary of Literature*, California Water Plan, Vol. 4, Reference Guide, 2003.
- Maurer, E and P.B. Duffy, *Uncertainty in Projections of Streamflow Changes due to Climate Change in California*, Geophysical Research Letters, Vol. 32, L03704, 2005.
- Pacific Institute, *The Impacts of Sea-Level Rise on the California Coast*. May 2009.
- Regional Water Quality Control Board (RWQCB), Central Coast Region, *Water Quality Control Plan for the Central Coast Region*, September 8, 1994.
- Roos, M., *Accounting for Climate Change*, California Water Plan Update 2005, Vol. 4, 2005.
- Santa Cruz County Environmental Health Services. Drinking Water Regulatory Program, Santa Cruz County Code Chapter 7.70 – Water Wells. Available at http://sccounty01.co.santa-cruz.ca.us/eh/drinking_water/drinking_water_home.htm, accessed December 2008.
- County of Santa Cruz, *1994 County of Santa Cruz General Plan and Local Coastal Program*. Approved December 19, 1994.
- Snyder, Mark A., Lisa C. Sloan, and J.L. Bell. *Modeled Regional Climate Change in the Hydrologic Regions of California: A CO2 Sensitivity Study*, Journal of the American Water Resources Association, Paper No. 02153, June 2004.
- Soquel Creek Water District (SqCWD), *Urban Water Management Plan Update 2005*, December 2005.

Soquel Creek Water District (SqCWD), *Soquel Creek Water District Integrated Resources Plan*. Prepared by Environmental Science Associates, 2006.

Soquel Creek Water District (SqCWD) and Central Water District (CWD), *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area, Santa Cruz County, California*, February 2007.

Soquel Creek Water District (SqCWD), Revised Demand Projections, Calculated by Ron Duncan, 2009.

Wolcott, Justine. *Urban Private Wells ESRI Shapefile*, County of Santa Cruz, Department of Environmental Health. September 1999.

3.4 Surface Water Hydrology and Water Quality

3.4.1 Introduction

This section describes the existing surface water hydrology conditions at the proposed well sites, including drainage features and general drainage patterns. The regulatory framework provides a summary of applicable regulations related to stormwater drainage and surface water quality. Potential impacts to surface water hydrology and water quality are discussed for each proposed well site. The impact analysis also evaluates the potential for proposed changes in groundwater pumping to affect the baseflow of local streams (specifically in Soquel and Aptos Creeks). Mitigation for potential impacts is provided, as appropriate. Existing groundwater conditions and potential WMP-related impacts to local aquifers and groundwater resources are discussed in Section 3.3, Groundwater Resources.

3.4.2 Regional Setting

Climate

The climate of Santa Cruz County is characterized as Mediterranean with cool, wet winters and hot, dry summers. Along the coast and as far as 10 miles inland, summer temperatures are cooled by morning and evening fog. Total precipitation averages approximately 29 inches per year, with most precipitation occurring between November and March (Western Regional Climate Center, 2010).

Regional Topography and Surface Water Hydrology

The coastline in Santa Cruz County is situated on an uplifted marine terrace—one of the many marine terraces that form the uplands east of Highway 1 along the coastal flank of the Santa Cruz Mountains. In general, surface water runoff originates in the upland areas and is conveyed by various coastal creeks across the marine terraces to Monterey Bay. During the last 1 million years, coastal uplift, together with an oscillating sea level, caused the streams to incise deep canyons across the marine terraces. Lagoon environments and beaches, built by sediment carried in the creeks, formed at the coast where these creeks and canyons meet the Pacific Ocean. Ongoing accumulation of sediment transported by creeks and coastal erosion processes continue to sculpt the Santa Cruz County coastline.

The proposed well sites are located within the Big Basin Hydrologic Unit.¹ The Big Basin Hydrologic Unit is comprised of several smaller subareas, including the Aptos Soquel Hydrologic Subarea, which in turn contains several smaller watersheds, the largest of which are the Soquel and Aptos Creek watersheds (RWQCB, 2002).

¹ Hydrologic units are analogous to major watersheds.

Soquel Creek drains approximately 47 square miles from its headwaters in the Santa Cruz Mountains to the Pacific Ocean. Major tributaries include Moores Gulch, Burns Creek, Grover Gulch, Bates Creek, and Noble Gulch. The Soquel Lagoon is formed where Soquel Creek empties into the ocean at Capitola Beach.

The Aptos Creek watershed encompasses approximately 24.5 square miles. Major tributaries to Aptos Creek include Valencia Creek, Mangels Creek, Trout Gulch, and Bridge Creek. Approximately 60 percent of the watershed is composed of the Forest of Nisene Marks State Park; the remaining 40 percent is mostly privately owned (Coastal Watershed Council, 2003).

Stream-Aquifer Interactions

Typically, surface water features such as streams and lakes are connected hydraulically to shallow, unconfined aquifers. Groundwater discharge to creeks occurs in areas where the water table intersects and flows into the creek channel. Water discharged from groundwater to surface streams is known as baseflow and is an important source of continual creek flow between rainstorms. Baseflow augmentation from groundwater is intrinsically related to the type of streamflow regime, whether ephemeral, intermittent, or perennial. Ephemeral streams flow only during and immediately after storms; intermittent streams flow only during certain times of the year (e.g., the rainy season); and perennial streams flow continuously during wet and dry times, with baseflow dependent on groundwater movement into the channel. Ephemeral and intermittent creeks are dependent on precipitation for streamflow; however, due to baseflow from groundwater, perennial creeks are capable of maintaining sustainable amounts of low flow, even during the dry season. The magnitude of baseflow that is delivered to a perennial creek depends on the hydrogeologic characteristics of the underlying water-bearing aquifers, the connectivity of the deeper aquifer zones to the shallower water table zones, and the amount of groundwater pumping in all aquifers.

The impact of District groundwater pumping on surface water, specifically Soquel Creek, has been a point of deliberation for many years and has resulted in several studies and associated reports. Stream-aquifer interactions in the SqCWD service area were analyzed in a conceptual hydrogeologic study prepared for the District (Johnson et al., 2004). The study addressed the stream-aquifer interaction issue by reviewing past reports and synthesizing available data to develop a working interpretation that is consistent with known hydrogeology of the Soquel-Aptos Groundwater Basin. The study concluded that pumping from deep wells almost certainly can decrease the amount of baseflow available to Soquel Creek and other area streams, but that the effect is “masked” by other factors (such as logging, grazing, rural and urban development, riparian evapotranspiration,² erosion and sedimentation of streambeds, effects of the Loma Prieta earthquake, and effects of shallow groundwater pumping from sources above the deeper Purisima Formation aquifers). Neither the recent hydrogeologic study nor previous studies demonstrate long-term trends or pumping-related baseflow depletion in Soquel Creek. However, aquifer tests and groundwater gradients in the groundwater system near the District’s existing Main Street Well showed that downward leakage from the shallow aquifer to deep aquifers pumped by the SqCWD wells does occur. Regardless

² Evapotranspiration is the loss of water to the atmosphere by evaporation from plants and soil surface bodies.

of this discrepancy, the significant finding from the studies is that baseflow is affected by several factors, including groundwater pumping, but that the effect of pumping would need to be equal to or greater than the effects of other factors to be detectable in historic data (Johnson, et al, 2004). In response to public concerns regarding the potential for groundwater pumping to result in stream baseflow depletion, Impact 3.4-3 in Section 3.4.5, below, evaluates the potential effects of the WMP on nearby streams.

Beneficial Uses of Surface Waters

The *Water Quality Control Plan for the Central Coast Region* (Basin Plan), prepared by the Central Coast Regional Water Quality Control Board (RWQCB), identifies the beneficial uses of surface waters within its region and specifies water quality objectives to maintain the continued beneficial uses of these waters. The assigned beneficial uses of surface waters in the vicinity of the proposed well sites are presented in **Table 3.4-1**.

**TABLE 3.4-1
ASSIGNED BENEFICIAL USES OF SURFACE WATERS**

Water Body	Main Tributaries	Beneficial Uses	Section 303(d) Water Quality Impairments
Soquel Creek	Soquel Creek, Bates Creek, Noble Gulch, Grover Gulch, Love Creek, Moores Gulch	MUN, AGR, IND, GWR, REC-1, REC-2, WILD, COLD, MIGR, SPWN, BIOL, FRESH, COMM, RARE	Not Applicable
Soquel Lagoon	Soquel Creek, Bates Creek, Noble Gulch, Grover Gulch, Love Creek, Moores Gulch	REC-1, REC-2, WILD, COLD, MIGR, SPWN, RARE, EST, COMM, SHELL	Nutrients, Pathogens, Sedimentation/Siltation
Aptos Creek	Valencia Creek, Mangels Creek, Trout Gulch, Bridge Creek	MUN, AGR, IND, GWR, REC-1, REC-2, WILD, COLD, MIGR, SPWN, BIOL, EST, FRESH, COMM	Pathogens, Sedimentation/Siltation
Valencia Creek	Trout Gulch	MUN, REC-1, REC-2, WILD, WARM, SPWN, RARE, COMM	Pathogens, Sedimentation/Siltation

KEY: MUN = Municipal and Domestic Supply; AGR = Agricultural Supply; IND = Industrial Process Supply; GWR = Groundwater Recharge; FRESH = Freshwater Replenishment; REC-1 = Water Contact Recreation; REC-2 = Non-Water-Contact Water Recreation; COMM = Commercial and Sport Fishing; WARM = Warm Fresh Water Habitat; COLD = Cold Freshwater Habitat; WILD = Wildlife Habitat; EST = Estuarine Habitat; BIOL = Preservation of Biological Habitats of Special Significance; RARE = Rare, Threatened, or Endangered Species; MIGR = Migration of Aquatic Organisms; SPWN = Spawning, Reproduction, and/or Early Development; SHELL = Shellfish Harvesting.

SOURCES: RWQCB, 1994; RWQCB, 2007.

Surface Water Quality

The Soquel Lagoon is included on the Section 303(d) List of Impaired Water Bodies (see discussion of Section 303(d) under Regulatory Framework, below) for nonattainment of water quality objectives for nutrients, pathogens, and sedimentation/siltation. Exceedance of water quality objectives is

attributed to failing septic and sanitary sewer systems, urban runoff/storm sewers, nonpoint-source pollution,³ construction/land development, and natural sources (RWQCB, 2007).

Aptos and Valencia Creeks are included on the Section 303(d) List of Impaired Water Bodies due to impairment by pathogens and sedimentation/siltation. Potential sources of contamination in Aptos Creek have been identified as urban runoff/storm sewers, land development, and channel erosion. Potential sources of contamination in Valencia Creek include agriculture, failing septic and sanitary sewer systems, and construction/land development (RWQCB, 2007).

Flood Hazards

Flooding is inundation of normally dry land as a result of rise in the level of surface waters or rapid accumulation of stormwater runoff. Flooding can also occur due to tsunamis, seiches, or dam failures.

Regional flooding hazards, as evaluated by the Federal Emergency Management Agency (FEMA), are presented in community Flood Insurance Rate Maps (FIRMs). FEMA FIRMs for Santa Cruz County indicate none of the proposed well sites are within a 100-year flood hazard zone (i.e. storm with a likelihood of occurring every 100 years) (FEMA, 2006).

Tsunamis are ocean waves caused by an underwater earthquake, landslide, or volcanic eruption. Low-lying areas along the coast are most vulnerable to tsunamis. Elevations at the proposed well sites range from roughly 120 feet above mean sea level (msl) at the O'Neill Ranch Well site to approximately 410 feet above msl at the Austrian Way Well site. Tsunami inundation maps for Santa Cruz County indicate none of the project components are susceptible to inundation by tsunamis (Santa Cruz County GIS, 2005).

A seiche is a rhythmic motion of water in a partially or completely landlocked water body caused by landslides, earthquake-induced ground accelerations, or ground offset. None of the proposed well sites are located in close proximity to an enclosed body of water capable of producing seiche waves.

3.4.3 Existing Conditions at Individual Well Sites

O'Neill Ranch Well Site

The O'Neill Ranch Well site is a vacant site located in the lower Soquel Creek watershed. There are no drainage improvements on the site. The site slopes steeply north (approximately 40 percent) toward an unnamed ephemeral tributary to Soquel Creek that flows west-to-east along the northern site boundary. Above Soquel Drive, the tributary to Soquel Creek is an earthen channel with a thick canopy and dense vegetative understory. At Soquel Drive between Robertson Street and Daubenbiss Avenue, the tributary to Soquel Creek is culverted for approximately 1,000 feet to its confluence with Soquel Creek, approximately 2,200 feet southeast of the O'Neill Ranch Well site.

³ Nonpoint-source pollution is pollution originating from a diffused source, such as overland stormwater runoff, atmospheric deposits, or failing septic systems.

Cunnison Lane Well Site

The Cunnison Lane Well site is an undeveloped site located within the lower Soquel Creek watershed. The majority of the site is relatively level, sloping about 4 to 6 percent west toward an unnamed tributary to Noble Gulch. In the vicinity of the Cunnison Lane Well site, the tributary to Noble Gulch is moderately incised, exhibits moderately steep creek banks (1 horizontal: 1 vertical), and is shaded by a riparian canopy. The tributary to Noble Gulch flows north-to-south along the western site boundary to Soquel Drive; it is conveyed within a culvert beneath the Soquel Drive road crossing and continues south to its confluence with Noble Gulch.

Austrian Way Well Site

The Austrian Way Well site is a 3.18-acre, District-owned parcel located in the upper Aptos Creek watershed. The site borders the Forest of Nisene Marks State Park to the east. The proposed well and treatment facilities would be constructed at the southwest portion of the parcel (approximately one-third of the site) in a relatively level area that slopes gently to the east and south. The northern and eastern portions of the Austrian Way Well site slope steeply (approximately 30 percent) northeast and east toward a deep creek canyon formed by Aptos Creek. Aptos Creek flows north-to-south approximately 1,140 feet east of the site. Existing structures and site improvements include the 500,000-gallon Austrian Tank, a paved access road, and overhead PG&E power lines.

Granite Way–Aptos Village Well Site

The Granite Way–Aptos Village Well site is within the proposed Aptos Village Plan project area in the Aptos Creek watershed. Nearby creeks are Aptos Creek (900 feet west), Trout Gulch (1,200 feet southeast), and Valencia Creek (1,200 feet south). The Granite Way–Aptos Village Well site is generally flat, sloping gently (2 to 3 percent) to the southeast. The well would likely be placed on a small portion of APN 041-011-20, a 4-acre parcel located off Cathedral Drive next to Village Drive. Although currently vacant, remnant concrete structures and foundations associated with past land uses are still evident on the property.

Polo Grounds Well Site

The Polo Grounds Regional Park is a 62-acre park located in the Aptos Creek watershed. The majority of the park is covered in turf grass and slopes gently (1 to 2 percent) to the southwest. The existing irrigation well is located on level ground at the east end of the park in the “great meadow.” Valencia Creek, a tributary to Aptos Creek, is located less than 400 feet north of the irrigation well. Along the Valencia Creek corridor to the north, the site slopes steeply (approximately 35 to 45 percent) to the north towards the creek. Valencia Creek flows in a southwesterly direction along the northern park boundary and behind single-family residences along North Polo Drive, ultimately converging with Aptos Creek below Highway 1.

3.4.4 Regulatory Framework

Federal and State Regulations

Clean Water Act

The federal Clean Water Act, enacted by Congress in 1972 and amended several times since inception, is the primary federal law regulating water quality in the U.S. and forms the basis for several state and local laws throughout the country. Its objective is to reduce or eliminate water pollution in the nation's rivers, streams, lakes, and coastal waters. The Clean Water Act prescribes the basic federal laws for regulating discharges of pollutants into waters of the U.S., which includes setting water quality standards for contaminants in surface waters, establishing wastewater and effluent discharge limits from various industry categories, and imposing requirements for controlling nonpoint-source pollution. At the federal level, the Clean Water Act is administered by the U.S. EPA. At the state and regional levels, the act is administered and enforced by the State Water Resources Control Board (SWRCB) and the RWQCBs.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act is the primary statute covering the quality of waters in California. The act sets out specific water quality provisions and discharge requirements regulating the discharge of waste within any region that could affect the quality of state waters. Under the act, the SWRCB has the ultimate authority over state water rights and water quality policy. The nine RWQCBs are responsible for the oversight of water quality on a day-to-day basis at the local/regional level. Within each region, the RWQCBs have prepared and periodically updated Basin Plans that identify existing and potential beneficial uses for specific water bodies.

Water Quality Control Plans (Basin Plans)

Each RWQCB is required to develop, adopt, and implement a Water Quality Control Plan (Basin Plan) for its respective region. The *Water Quality Control Plan for the Central Coast Region* (Basin Plan), last printed in 1994, is continuously amended as regional water quality issues are identified. The Basin Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in each region. Basin Plans identify beneficial uses of surface waters and groundwater within the corresponding region; specify water quality standards, known as water quality objectives, for both surface water and groundwater; and develop the actions necessary to maintain the standards to control nonpoint and point sources of pollutants to the state's waters. All discretionary projects requiring permits from the RWQCB (i.e., waste and pollutant discharge permits) must implement Basin Plan requirements (i.e., water quality standards), taking into consideration the beneficial uses to be protected.

Section 303(d) List of Impaired Water Bodies

Section 303(d) of the federal Clean Water Act requires states to identify water bodies that do not meet water quality standards and are not supporting their beneficial uses. Each state must submit an updated list, called the Section 303(d) List of Impaired Water Bodies, to the U.S. EPA by April

of each even-numbered year. In addition to identifying the water bodies that are not supporting beneficial uses, the list also identifies the pollutant or stressor causing impairment and establishes a schedule for developing a control plan to address the impairment. As previously discussed, Soquel Lagoon, Aptos Creek, and Valencia Creek are listed on the Section 303(d) List.

Placement of a water body on the Section 303(d) List acts as the trigger for developing a TMDL pollution control plan for each water body and associated pollutant/stressor on the list. The TMDL serves as the means to attain and maintain water quality standards for the impaired water body. During each Section 303(d) listing cycle, the water bodies on the list are prioritized, and a schedule is established for completing the TMDLs. TMDLs for Soquel Lagoon, Aptos Creek, and Valencia Creek have been developed and approved by the RWQCB.

NPDES Program

In 1987, amendments to the Clean Water Act added section 402(p), which established a framework to protect water quality by regulating industrial, municipal, and construction-related sources of pollutant discharges to waters of the U.S. In California, the National Pollutant Discharge Elimination System (NPDES) is administered by the SWRCB through the RWQCBs and requires that municipalities obtain permits which outline programs and activities to control stormwater pollution. The Phase I NPDES stormwater program regulates stormwater discharges from major industrial facilities, large and medium-sized municipal separate storm sewer systems (those serving more than 100,000 persons), and construction sites that disturb five or more acres of land. The NPDES Phase II stormwater program provides coverage for small municipal separate storm sewer systems (MS4s) and construction activities disturbing between one and five acres of land.

NPDES Municipal Stormwater Permit

The Stormwater Management section of the Santa Cruz County Flood Control and Water Conservation District (SCCFCWCD) coordinates the County's NPDES Phase II Stormwater Management Program. The SCCFCWCD develops and implements specific programs to meet NPDES requirements and to reduce the discharge of pollutants to the "maximum extent practicable." The stormwater programs incorporate best management practices (BMPs), treatment control measures, and other appropriate source control and site design features to reduce the pollutant load in stormwater discharges and manage runoff flows.

In 2003, the Central Coast RWQCB added Provision C.3 to the municipal stormwater permit requirements. In accordance with these updated requirements, new development and redevelopment projects that involve the creation or replacement of 10,000 square feet or more of impervious surfaces are required to incorporate treatment measures and other appropriate source control and site design features to reduce the pollutant load in stormwater discharges and manage runoff flows. Project site designs must minimize the area of new roofs and paving. Where feasible, pervious surfaces should be used instead of paving so that runoff can percolate to the underlying soil. Runoff from impervious areas must be captured and treated. The municipal permit specifies ways to calculate the required size of treatment devices. Further, in addition to incorporating treatment controls,

projects creating or replacing an acre or more of impervious area must also provide flow control so post-project runoff does not exceed estimated pre-project rates and durations.

NPDES Construction General Permit

Construction activities with one or more acres of soil disturbance are regulated by the SWRCB under the statewide General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (NPDES Construction General Permit, Order No. 2009-0009-DWQ). Adopted on September 2, 2009 by the SWRCB, Order No. 2009-0009-DWQ became effective July 1, 2010 and supercedes the General Permit for Stormwater Discharges Associated with Construction Activity (Order No. 99-08-DWQ). Projects involving a total disturbance of one or more acres on noncontiguous parcels with less than one acre of disturbance per parcel may not be subject to the NPDES Construction General Permit requirements if parcels are stabilized before additional parcels are disturbed.

The Construction General Permit requires that the project applicant and/or contractor pay an annual fee and file permit registration documents prior to commencing construction. The permit registration documents include a Notice of Intent (NOI), a risk assessment, a site map, a stormwater pollution prevention plan (SWPPP), and a signed certification statement. The permit specifies a risk-based permitting approach that includes requirements specific to three overall levels of risk, determined based on the potential for the project to cause sedimentation as well as the sensitivity of the receiving water to sedimentation. The three risk levels are used to determine specific numeric action levels and effluent limitations for pH and turbidity, as well as requirements for a rain event action plan, BMP implementation, monitoring, and reporting.

The SWPPP must be prepared and implemented by qualified professionals,⁴ and include site-specific measures to ensure that: all pollutants and their sources are controlled; non-stormwater discharges⁵ are identified and either eliminated, controlled, or treated; site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges; and BMPs are completed and maintained to reduce or eliminate pollutants after construction. The SWPPP must demonstrate that calculations and design details as well as BMP controls for site run-off are complete and correct. The NPDES Construction General Permit specifies minimum BMP requirements for stormwater control based on the risk level of the site. Post-construction stormwater performance standards must be included for sites not covered by a municipal stormwater permit. If applicable, the post-construction performance standards address water quality, runoff reduction, drainage density, and channel protection requirements for the receiving water.

⁴ The Construction General Permit specifies minimum qualifications for a qualified SWPPP developer and qualified SWPPP practitioner.

⁵ Non-stormwater discharges include those from improper dumping, accidental spills, and leakage from storage tanks or transfer areas.

The NPDES Construction General Permit specifies numeric action levels for pH and turbidity, requires effluent and receiving water monitoring to demonstrate compliance with permit requirements, and requires corrective action must be taken if these limitations are exceeded. The results of the monitoring and corrective actions must be reported annually to the SWRCB.

NPDES General Permit for Discharges with Low Threat to Water Quality

The NPDES program requires all facilities that discharge pollutants into waters of the U.S. to obtain a permit. The Central Coast RWQCB has issued the Regionwide General NPDES Permit for Discharges with Low Threat to Water Quality (General Permit) (Order No. R3-2006-0063, NPDES No. CAG993001) to cover discharges considered to be a low threat to water quality, including discharges associated with the maintenance and testing of water supply wells, tanks, and pipelines to surface waters, including creeks. Similar to other NPDES permits, the discharger must complete a NOI to obtain coverage under the general permit. All dischargers must comply with specified effluent limitations and the self-monitoring program required by the general permit.

NPDES Waste Discharge Regulations

The NPDES program requires all facilities that discharge pollutants into waters of the United States to obtain a permit. The discharge permit provides two levels of control for the protection of water quality: technology-based limits and water-quality-based limits. Technology-based limits are based on the ability of dischargers in the same category to treat wastewater, while water-quality-based limits are required if technology-based limits are not sufficient to provide protection of the water body. Water-quality-based effluent limitations required to meet water quality criteria in the receiving water are based on criteria specified in the National Toxics Rule, the California Toxics Rule, and the Basin Plan. NPDES permits must also incorporate TMDL waste load allocations when they are developed.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the City of Capitola or in the Local Coastal Zone, therefore, local building and zoning ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.

While the District is exempt from all zoning and building ordinances for water production projects per California Government Code Section 53091 (d) and (e), the District anticipates utilizing Santa Cruz County's grading and erosion control standards as guidelines during construction activities where appropriate.

Santa Cruz County Design Criteria

The *Santa Cruz County Design Criteria* (SCCDPW, 2006) provides hydraulic design guidelines for the design of culverts, storm drains, and other drainage infrastructure within a county right-of-way or county drainage easement. Projects requiring work within these areas must obtain an encroachment permit from the Santa Cruz County Department of Public Works' (SCCDPW) and adhere to the minimum design requirements. The proposed connections to the storm drain system at all of the proposed well sites would be subject to the design criteria.

Grading Ordinance

The Santa Cruz County Grading Ordinance requires grading permits for activities involving any of the following: (1) moving more than 100 cubic yards of earth; (2) creating a cut slope greater than 5 feet high; (3) creating fills greater than 2 feet deep on slopes greater than 20 percent, or any fill used for structural support; or (4) any shoreline protection project. The ordinance sets minimum grading plan requirements to ensure proper grading, prevent accelerated soil erosion, protect fish and wildlife habitats, and prevent increased flood hazards and visual degradation (County Code, Chapter 16.20).

Erosion Control Ordinance

The Santa Cruz County Erosion Control Ordinance requires that an erosion control plan (ECP) be submitted for all development plans in conjunction with applications for building and grading permits. At a minimum, ECPs must provide a detailed description of existing and proposed contour lines; details of erosion/sediment control measures and specific construction techniques to be used onsite; a drainage plan that details drainage control devices; a revegetation plan that includes all disturbed soils; and the proposed construction schedule. Well drilling and repair are exempt from specific provisions of the ordinance, provided they do not accelerate erosion. Construction activities associated with well buildings, treatment plants, and pipeline installation, however, are not exempt from the ordinance (County Code, Chapter 16.22).

3.4.5 Impacts and Mitigation Measures

Significance Criteria

The following significance criteria are adapted from Appendix G of the CEQA Guidelines. A project is considered to have a significant impact on surface water hydrology and water quality if it would result in any of the following:

- Violate any water quality standards or waste discharge requirements;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river in a manner that would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increasing the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

- Substantially influence the baseflow of local streams as a result of groundwater pumping;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Inundation by seiche,⁶ tsunami, or mudflow.

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

Placement of housing or structures within a 100-year flood hazard area. The proposed well sites are not located within a 100-year flood hazard zone. The proposed project does not include housing or structures for human occupancy, and would not entail the construction of any permanent aboveground improvements that might affect or be affected by a 100-year flood storm event. Therefore, significance criteria related to the placement of housing or structures within a 100-year flood zone and the obstruction of 100-year flood flows are not applicable and are not discussed further.

Failure of a levee or dam. The proposed well sites are not located down gradient of, nor in close proximity to, any dams or levees. Thus, the significance criterion related to damage from the failure of levee or dam is not relevant to the proposed project and no additional discussion is warranted.

Inundation by seiche, tsunami, or mudflow. The proposed well sites are not in close proximity to enclosed bodies of water capable of producing seiche waves, and are not located within a tsunami inundation zone. The proposed well sites are located in urban areas with no notable hillsides located immediately upgradient that could produce mudflows. Given the setting and nature of the proposed improvements, the significance criterion related to inundation by seiche, tsunami, or mudflow is not applicable and is not discussed further.

Approach to Analysis

The impact analysis for surface water hydrology and water quality evaluates the potential for increased soil erosion and sedimentation, water quality degradation, and changes in stormwater runoff and stream flow attributable to implementation of the proposed project. The proposed well sites are evaluated individually, with consideration of regulatory requirements as well as the

⁶ A seiche is a rhythmic motion of water in a partially or completely landlocked water body caused by earthquakes, landslides, tsunamis, or local changes in atmospheric pressure.

intent of local ordinances for protecting water quality and minimizing soil erosion. The analysis of construction-related impacts is based largely on site-specific topographic and hydrologic characteristics and the total soil disturbance that would occur at each site. The analysis of long-term impacts to water quality considers future discharges associated with project operations and potential changes in the rate or volume of stormwater runoff. The potential for the future redistribution of groundwater pumping under the proposed project to adversely affect baseflow in nearby streams is also evaluated and relies on the working interpretation of stream-aquifer interactions presented in the *Hydrologic Effects of the Well Master Plan* (HydroMetrics, 2009) prepared by the District's consulting hydrologists.

Impact Summary

TABLE 3.4-2
SUMMARY OF IMPACTS – SURFACE WATER HYDROLOGY AND WATER QUALITY

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.4-1: Implementation of the WMP could result in construction-related erosion and impacts to water quality.	PSM	PSM	PSM	PSM	LS
Impact 3.4-2: Concentrated raw groundwater discharges from periodic maintenance activities and well pump testing could cause scouring and erosion along creek banks and channels.	PSM	PSM	PSM	PSM	PSM
Impact 3.4-3: The proposed redistribution of groundwater pumping could adversely affect the baseflow in local creeks.	LS	LS	LS	LS	LS
Impact 3.4-4: Implementation of the WMP could increase flooding hazards as a result of altered drainage patterns or an increase in the volume of stormwater runoff from the proposed well sites.	PSM	PSM	PSM	PSM	PSM

LS = Less than Significant impact, no mitigation required
PSM = Potentially Significant impact, can be Mitigated to less than significant

Impact Discussion

Impact 3.4-1: Implementation of the WMP could result in construction-related erosion and impacts to water quality.

Construction of the proposed project would produce a significant amount of soil disturbance at each site where a new well is proposed. Earthwork that would occur as part of construction activities at the proposed well sites and along pipeline alignments includes site clearing, excavation, soil stock piling, backfilling, and grading. In the absence of proper controls, exposed soils and soil stockpiles could be transported by wind or water and accumulate in storm drains

and receiving water bodies, potentially resulting in increased sediment loads and adversely affecting water quality.

Construction activities would also involve the use of hazardous materials such as adhesives, solvents, paints, and lubricants that, if not managed appropriately, could adhere to soil particles, become mobilized by rain or runoff, and contribute to nonpoint-source pollution. Well installation would generate groundwater and non-hazardous drilling fluids. The drilling fluids would be stored onsite and circulated through the wells. Baker tanks would be used to control drilling fluids generated during well development. Raw groundwater extracted during well development would be discharged in accordance with NPDES Construction General Permit or the NPDES General Permit for Discharges with a Low Threat to Water Quality, as appropriate, and would require sediment control BMPs prior to discharging to storm drains or creeks.

Construction activities resulting in one or more acres of soil disturbance at individual well sites, including construction of well and treatment facilities and installation of auxiliary pipelines, would be required to comply with the requirements of the NPDES Construction General Permit. Because the proposed wells would be developed on noncontiguous parcels at a rate of approximately one well per year, the applicability of NPDES Construction General Permit requirements must be evaluated individually for each site. **Table 3.4-3** summarizes anticipated soil disturbances and the applicability of NPDES Construction General Permit requirements for each well site. Mandatory compliance with the NPDES Construction General Permit requirements for sites resulting in one or more acres of soil disturbance would require the SqCWD or its contractor(s) to develop and implement a site-specific SWPPP that prescribes erosion control measures and water quality BMPs to minimize pollutant loads, including hazardous construction chemicals, in stormwater discharges. The SWPPP would also contain provisions for the discharge of raw groundwater extracted during well development to ensure downstream water quality is not adversely affected.

Without proper controls, construction activities at well sites with less than one acre of soil disturbance not subject to the requirements of the NPDES Construction General Permit could cause significant soil erosion and/or result in the accidental release of hazardous construction chemicals to stormwater runoff, adversely affecting water quality in downstream water bodies. The mitigation measures prescribed below are consistent with the requirements of the Santa Cruz County Erosion Control Ordinance and the Santa Cruz County Grading Ordinance, and would avoid potentially significant soil erosion and associated impacts to surface water quality during construction.

O'Neill Ranch Well Site

Earthwork activities associated with the proposed improvements at the O'Neill Ranch Well site would include well drilling, excavation, the import of gravel and engineered fill, and site grading. As indicated in Table 3.4-3, construction activities at the O'Neill Ranch Well site are estimated to result in 0.4 acre of total soil disturbance; thus, construction activities at this site would not be subject to the requirements of the NPDES Construction General Permit. Due to the steepness of the site and proximity to the unnamed tributary to Soquel Creek, construction activities at the O'Neill

TABLE 3.4-3
APPLICABILITY OF NPDES CONSTRUCTION GENERAL PERMIT REQUIREMENTS AND
SITE CONSIDERATIONS FOR INDIVIDUAL WELL SITES

Proposed Well Site	Total Projected Soil Disturbance (acres)	Site Gradients (percent slope)	Nearby Water Bodies (distance in feet)	Subject to NPDES Requirements?
O'Neill Ranch	0.4	The majority of the site slopes steeply (~40 percent) to the north	Unnamed Tributary to Soquel Creek (along northern parcel boundary); Rodeo Creek (1,700 feet to the west); and Soquel Creek (2,200 feet to the east).	No
Cunnison Lane	0.2	Slopes moderately (4 to 6 percent) to the west	Unnamed Tributary to Noble Gulch (along western parcel boundary); Noble Gulch (500 feet to the east); Tannery Gulch (3,700 feet to the east); and Soquel Creek (3,900 feet to the west)	No
Austrian Way	0.5	Area proposed for development slopes gently (~1 percent) to the east and south; the northern and eastern portions of the parcel slope steeply (~ 30 percent) east towards Aptos Creek	Aptos Creek (1,140 feet east); and Tannery Gulch (3,500 feet to the west).	No
Granite Way–Aptos Village	0.1	Slopes gently (2 to 3 percent) to the southeast	Aptos Creek (900 feet to the west); Trout Gulch (1,200 feet to the southeast); and Valencia Creek (1,200 feet to the south).	No
Polo Grounds	3.7	Majority of site slopes gently (1 to 2 percent) to the southwest; slopes along Valencia Creek corridor range from 35 to 45 percent	Valencia Creek (less than 400 feet to the north)	Yes

SOURCE: ESA, 2010.

Ranch Well site, if not properly managed, could generate large quantities of loose, erodible soils and increase sediment loads in downstream water bodies, adversely affecting water quality. This impact is considered potentially significant. However, with implementation of **Mitigation Measures 3.4-1a (Erosion Control Plan)** and **3.4-1b (Construction Best Management Practices)**, which would require that appropriate erosion/sediment control measures and water quality BMPs be implemented during construction, potentially significant construction-related water quality impacts would be reduced to a less-than-significant level.

Cunnison Lane Well Site

Construction activities at the Cunnison Lane Well site would result in approximately 0.2 acre of total soil disturbance. Given the proximity to the unnamed tributary to Noble Gulch, earthwork, grading activities, and the use of hazardous construction chemicals at the Cunnison Lane Well site could result in construction-related erosion and impacts to water quality, a potentially significant impact. However, with implementation of **Mitigation Measures 3.4-1a (Erosion Control Plan)** and **3.4-1b (Construction Best Management Practices)**, which would require that appropriate erosion/sediment control measures and water quality BMPs be implemented during construction, potentially significant construction-related water quality impacts would be reduced to a less-than-significant level.

Austrian Way Well Site

Construction activities at the Austrian Way Well site would result in an estimated 0.5 acre of total soil disturbance. Although the proposed well and treatment facilities would be sited on relatively level ground, construction activities at the Austrian Way Well site, if not properly managed, could increase soil erosion, result in the accidental release of hazardous construction chemicals, and adversely affect water quality in receiving water bodies, a potentially significant impact. However, with implementation of **Mitigation Measures 3.4-1a (Erosion Control Plan)** and **3.4-1b (Construction Best Management Practices)**, this impact would be reduced to a less-than-significant level.

Granite Way–Aptos Village Well Site

Proposed well construction and pipeline installation activities for the Granite Way–Aptos Village Well site would result in an estimated 0.1 acre of soil disturbance. Unless properly managed, construction activities could result in increased soil erosion, accidental releases of hazardous construction chemicals, and adverse effects on surface water quality in receiving water bodies, a potentially significant impact. However, with implementation of **Mitigation Measures 3.4-1a (Erosion Control Plan)** and **3.4-1b (Construction Best Management Practices)**, this impact would be reduced to a less-than-significant level.

Polo Grounds Well Site

Construction activities at the Polo Grounds Regional Park would result in an estimated 3.7 acres of soil disturbance, much of which is attributable to the 2,690-foot sewer lateral to connect to sanitary sewer main at North Polo Drive, the 2,680-foot potable water pipeline to connect to the water distribution system at North Polo Drive, the additional 560 feet of potable water pipeline to connect to the distribution system at South Polo Drive, and the 1,100 foot raw water pipeline needed to connect to the existing stormwater drainage system. Because construction at this site would result in more than one acre of total soil disturbance, construction activities would be required to comply with the requirements of the NPDES Construction General Permit. The District would be required to prepare a site-specific SWPPP to be implemented during construction activities. The SWPPP would include BMPs to prevent significant soil erosion and adverse impacts to water quality during construction. Mandatory compliance with NPDES Construction General Permit requirements at the Polo Grounds Well site would prevent

significant impacts to water quality during construction. Construction-related soil erosion and water quality impacts are therefore considered less than significant, and no additional mitigation is necessary.

Mitigation Measures

Measure 3.4-1a: Erosion Control Plan (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). The SqCWD shall incorporate into contractor specifications the requirement that the contractor prepare and implement a site-specific Erosion Control Plan prior to construction mobilization. The Erosion Control Plan must provide: a detailed map of existing and proposed contour lines; details regarding the specific construction techniques to be used onsite; a drainage plan that details the drainage control devices and erosion/sediment control measures to be implemented during construction; a revegetation plan that includes all disturbed areas; and a construction schedule that outlines the sequence of construction activities and provides target dates for stabilization of disturbed areas. At a minimum, the Erosion Control Plan shall specify the following erosion/sediment control measures for implementation during construction activities:

- Construction activities adjacent to creeks and associated riparian habitat shall be confined to the minimum disturbance area required for the proposed project.
- Silt fencing shall be installed in all areas where construction occurs within 100 feet of actively flowing water.
- Spoils shall be placed in areas that do not drain towards adjacent waterways. If this is not possible, sediment barriers shall be installed to intercept sediment before it reaches the channels.

Measure 3.4-1b: Construction Best Management Practices (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). The SqCWD shall incorporate into contractor specifications the requirement that, in addition to the Erosion Control Plan, the contractor implement construction Best Management Practices (BMPs) to minimize the accidental release of hazardous construction materials during construction. At a minimum, the following BMPs shall be required:

Water Quality Best Management Practices

- Place drip pans under construction vehicles and all parked equipment
- Check construction equipment for leaks regularly
- Refuel vehicles and equipment no less than 100 feet from adjacent creeks, drainages, and storm drains to minimize the risk of run-on, runoff, and spills that could affect water bodies
- Conduct fueling in paved and curbed areas to contain spills if this is possible; if not, refuel over drip pans or absorptive mats
- Cover all storm drain inlets when paving or applying seals or similar materials to prevent the offsite discharge of these materials
- When concrete is to be used in construction within 100 feet of streams, concrete wash areas shall be located so they do not drain directly into streams.

If a concrete wash area drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. Concrete wash areas shall be graded if necessary to reduce the potential for erosion.

- Equipment and materials shall be stored at least 50 feet from waterways. No debris (such as trash and spoils) shall be deposited within 100 feet of creeks. Staging and storage areas for equipment, materials, fuels, lubricants, and solvents shall be located outside of the stream channel and banks.

Waste Management and Hazardous Materials Pollution Control

- Require secondary containment of hazardous construction chemicals to prevent the accidental release of these chemicals to the stormwater drainage system and adjacent waterways
- Remove trash and construction debris from the project area at regular intervals
- Store all hazardous materials in an area protected from rainfall and stormwater run-on and prevent the offsite discharge of leaks or spills
- Minimize the potential for contamination of adjacent creeks, drainages, and other waters by maintaining spill containment and clean up equipment onsite, and by properly labeling and disposing of hazardous wastes
- Train construction personnel in proper material delivery, handling, storage, cleanup, and disposal procedures
- Document compliance with storage and handling requirements for hazardous materials on a daily basis

Significance after Mitigation: Less than Significant.

Impact 3.4-2: Concentrated raw groundwater discharges from periodic maintenance activities and well pump testing could cause scouring and erosion along creek banks and channels.

The proposed wells would be operated in a similar manner as existing facilities. Raw groundwater produced during startup/shutdown of well pumps would be routed to the filter backwash reservoir for subsequent treatment and delivery to customers. Raw groundwater produced during startup/shutdown of well pumps would not cause scouring and erosion along creek banks and channels.

Raw groundwater produced during periodic maintenance activities (i.e., flushing of the well and treatment facilities) and well pump tests would either be discharged to the local sanitary sewer system or discharged to the local stormwater drainage system. Periodic flushing, which is needed to wash debris out of the well and treatment facilities, would occur roughly once per year. Well pump testing would be performed approximately once every two years to evaluate the capacity and efficiency of the wells and check for equipment problems. Raw groundwater discharges to the local stormwater drainage system would be conducted in accordance with NPDES permit requirements for Discharges with a Low Threat to Water Quality. Although these raw

groundwater discharges would occur only infrequently, these concentrated discharges could cause erosion or scouring of creek banks and channels and degrade water quality. (For a discussion of potential impacts to sanitary sewer capacity associated with discharges that are routed to the sanitary sewer, see Impact 3.11-3 in Section 3.11, Utilities and Service Systems.) The rate, flow, and volume of raw groundwater discharges produced during periodic maintenance activities and well pump tests are shown below in **Table 3.4-4**.

**TABLE 3.4-4
RATE, FLOW, AND VOLUME OF RAW WATER DISCHARGES PRODUCED
DURING MAINTENANCE AND PUMP TESTING**

Well Name	Potential Locations of Raw Water Discharges	Pumping Rate (gpm) ^a	Flow (cfs) ^b	4-Hour Periodic Flushing (gallons) ^c	48-Hour Pump Tests (gallons) ^d
O'Neill Ranch	<ul style="list-style-type: none"> Sanitary sewer system Local storm drain system to unnamed tributary of Soquel Creek 	750	1.7	180,000	2,160,000
Cunnison Lane	<ul style="list-style-type: none"> Sanitary sewer system Local storm drain system to unnamed tributary of Noble Gulch 	538	1.2	129,120	1,549,440
Austrian Way	<ul style="list-style-type: none"> Sanitary sewer system Local storm drain system 	250	0.6	60,000	720,000
Granite Way–Aptos Village	<ul style="list-style-type: none"> Existing raw water discharge pipeline at T-Hopkins Treatment Plant 	245	0.5	58,800	705,600
Polo Grounds	<ul style="list-style-type: none"> Sanitary sewer system Local storm drain system to Valencia Creek 	500	1.1	120,000	1,440,000

^a Pumping rates based on Table 3 of the *Hydrologic Effects of Well Master Plan* (HydroMetrics, 2009).

^b Flow rate of raw water discharges.

^c Periodic flushing is the repeated injecting and flushing out of water in a well system to wash away debris.

^d Well pump tests are typically run for at least 48 hours and continue until stabilization has been reached, or for 5 days.

SOURCE: ESA, 2010; HydroMetrics, 2009.

O'Neill Ranch Well Site

Raw groundwater discharges produced during maintenance activities and well pump tests at the O'Neill Ranch Well site could be routed to the existing stormwater drainage system and subsequently discharged to the unnamed tributary to Soquel Creek that runs along the northern parcel boundary. The riparian zone along the tributary is sensitive to erosion due to steep slopes. Depending on the condition of the existing creek outfall and the flow rate in the tributary at the time of the discharges, discharges of raw groundwater could result in sedimentation and subsequent degradation of water quality in the tributary. This impact is considered potentially significant. However, with implementation of **Mitigation Measure 3.4-2 (Coordinate Raw Groundwater Discharges with SCCDPW)**, which would require that the SqCWD coordinate future operations with SCCDPW to ensure raw groundwater discharges to the stormwater

drainage system do not result in creek erosion or degradation of water quality, this impact would be reduced to a less-than-significant level.

Cunnison Lane Well Site

As indicated in Table 3.4-4, raw groundwater discharges produced during periodic maintenance activities and well pump tests at the Cunnison Lane Well could be conveyed to the local stormwater drainage system and ultimately discharged to the unnamed tributary to Noble Gulch. Similar to the impact discussion for the O'Neill Ranch Well site, these raw groundwater discharges could cause creek erosion or scouring and adversely affect water quality, a potentially significant impact. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.4-2 (Coordinate Raw Groundwater Discharges with SCCDPW)**.

Austrian Way Well Site

Raw groundwater discharges produced during periodic maintenance activities and well pump testing at the Austrian Way Well site could be conveyed to the local stormwater drainage system and result in soil erosion and degradation of water quality in receiving water bodies, a potentially significant impact. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.4-2 (Coordinate Raw Groundwater Discharges with SCCDPW)**, which would require that the SqCWD coordinate with the SCCDPW on any discharges of raw groundwater to the local stormwater drainage system.

Granite Way–Aptos Village Well Site

Raw groundwater discharges produced during periodic flushing of the well and during well pump testing at the Granite Way–Aptos Village Well would occur via the existing raw groundwater discharge pipeline that conveys discharges from the T. Hopkins Treatment Plant and T. Hopkins Well to Aptos Creek. If the flow rate or volume of raw groundwater discharges from this existing raw groundwater discharge pipeline were to increase as a result of the proposed Granite Way–Aptos Village Well site, the potential exists for these discharges to cause erosion along Aptos Creek, a potentially significant impact. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.4-2 (Coordinate Raw Groundwater Discharges with SCCDPW)**, which would require that the SqCWD coordinate with SCCDPW on any discharges of raw groundwater to the local stormwater drainage system or nearby creeks.

Polo Grounds Well Site

Raw groundwater discharges produced during maintenance activities and well pump testing at the Polo Grounds Well could be discharged to Valencia Creek via the existing storm drain and creek outfall (shown in Figure 2-7). As described in Section 3.5, Biological Resources, Valencia Creek and the associated riparian corridor is known to support habitat for special-status species, including California coast steelhead, California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle. Discharges of raw groundwater, although infrequent, could result in sedimentation and subsequent degradation of water quality in Valencia Creek, a potentially significant impact. However, with implementation of **Mitigation Measure 3.4-2 (Coordinate**

Raw Groundwater Discharges with SCCDPW), this impact would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.4-2: Coordinate Raw Groundwater Discharges with SCCDPW (applies to all sites). The SqCWD shall coordinate the design of individual well and treatment facilities with the Santa Cruz County Department of Public Works (SCCDPW) to confirm that the condition and capacity of existing stormwater drainage infrastructure, including creek outfalls, are adequate to handle raw groundwater discharges produced during periodic maintenance activities and well pump testing. For each of the proposed well sites, the SqCWD shall provide the SCCDPW with information regarding the proposed location(s) of raw groundwater discharges to the local stormwater drainage network, discharge volumes and flow rates, and general timing and frequency of discharges. If deemed necessary by the SCCDPW, the SqCWD shall contribute funds towards improvements to stormwater drainage infrastructure (e.g., erosion protection at creek outfalls) and adhere to any reasonable and standard operational modifications imposed by the SCCDPW (e.g., flow attenuation during wet weather). Funding for drainage improvements by the SqCWD, if needed, shall be determined based on established funding mechanisms of the SCCDPW.

Significance after Mitigation: Less than Significant.

Impact 3.4-3: The proposed redistribution of groundwater pumping could adversely affect the baseflow in local creeks.

Groundwater extraction can deplete baseflow in streams by intercepting groundwater that would otherwise seep into the stream (in gaining stream reaches) or by increasing the rate at which water seeps out of the stream (in losing stream reaches). Secondary impacts of baseflow depletion can include decreases in the total amount of aquatic habitat, interference with the migration of anadromous fish, and increased water temperature. Because groundwater baseflow to creeks can be affected by groundwater pumping, the proposed redistribution of groundwater pumping could potentially alter the baseflow of nearby creeks, particularly at proposed well sites adjacent to perennial creek channels.

The letter report, *Hydrologic Effects of Well Master Plan* (HydroMetrics, 2009) prepared by the District's consulting hydrologists, describes a working interpretation of stream-aquifer interaction in the SqCWD service area that is consistent with the known hydrogeology of the Soquel-Aptos Groundwater Basin. HydroMetrics LLC (HydroMetrics) evaluated water level and streamflow data to analyze the potential effects of WMP implementation on nearby streams. Several site-specific conditions must be met in order for well pumping to deplete stream baseflow: (1) the presence of a stream in close proximity to the well site that exhibits baseflow during the dry season (perennial stream) and that is designated as critical habitat; (2) a hydraulic connection between the stream and groundwater aquifer; and (3) a probable future net increase in groundwater pumping in the vicinity of the well based on the WMP's pumping redistribution scenarios. Only the O'Neill Ranch Well and Austrian Way Well meet all conditions for potential streamflow depletion, and were

evaluated in further detail. A summary of the analyses is provided below. HydroMetrics' full letter report is provided as **Appendix C** of this EIR.

Interpretation of aquifer tests and groundwater gradients in the groundwater system indicated that downward leakage from shallow aquifers to deep aquifers pumped by District wells does occur; thus, pumping from deep wells could decrease the amount of baseflow available to Soquel Creek, Aptos Creek, and other local streams. However, previously observed changes in baseflow do not correlate with changes in groundwater pumping, and both the recent and previous studies have demonstrated no long-term trends or pumping-related baseflow depletion. The effect of groundwater pumping is masked by various other factors that collectively have a greater impact on baseflow by inducing increases or decreases in precipitation recharge over a watershed. However, it is estimated that chronic baseflow depletions as small as 0.5 cfs could be detected, and that, if groundwater production from inland wells were to increase, such thresholds could be exceeded.

O'Neill Ranch Well Site

The O'Neill Ranch Well site is bordered by an unnamed ephemeral tributary to Soquel Creek. Ephemeral creeks do not receive groundwater baseflow; thus, well development at this site would not affect baseflow in the unnamed tributary adjacent to the site. Other creeks in the vicinity include Rodeo Gulch approximately 1,700 feet to the west, Soquel Creek approximately 2,200 feet to the east, and Arana Gulch located 6,700 feet to the west. The only nearby creek that meets the necessary conditions for baseflow depletion and that is designated as critical fish habitat is Soquel Creek. As discussed in Section 3.4.2, interpretations of aquifer tests and groundwater gradients along Soquel Creek near the District's existing Main Street Well indicate a downward leakage from shallow aquifers to deep aquifers pumped by District wells (Johnson, et al, 2004).

The streamflow effect analysis for the O'Neill Ranch Well considers future operation of other SqCWD wells in the area – Main Street, Rosedale, and Garnet Wells – because their potential effects on baseflow along Soquel Creek could overlap. Due to its distance from Soquel Creek, the proposed O'Neill Ranch Well would have a smaller effect on baseflows when compared to the effects from pumping at the Main Street Well, the effects of which have thus far been below the detection threshold of 0.5 cfs. Based on the streamflow analysis conducted by HydroMetrics, the depletion of baseflow along Soquel Creek that could result from implementation of the WMP is estimated to be between 0.07 and 0.14 cfs. Because adverse effects on steelhead habitat resulting from a 0.07- to 0.14-cfs reduction in stream baseflow are extremely difficult to substantiate, potential impacts to stream baseflow from future pumping in the vicinity of the O'Neill Ranch Well are considered less than significant. No mitigation is required.

However, although not required, due to the designation of Soquel Creek as critical steelhead habitat, the SqCWD is committed to implementing **Improvement Measure HYD-1 (Monitor Streamflow along Soquel Creek and Modify Pumping if Baseflow Depletion is Detected)** to address any potential changes in baseflow depletion attributable to District pumping in the vicinity of the O'Neill Ranch Well. As specified in the improvement measure, the SqCWD would evaluate surface and groundwater monitoring data and reduce pumping in the vicinity of the O'Neill Ranch Well if baseflow depletion from groundwater pumping is detected.

Cunnison Lane Well Site

The Cunnison Lane Well site is bordered by an intermittent tributary to Noble Gulch, which in turn drains to Soquel Creek. Other intermittent creeks in the site vicinity include Noble Gulch 500 feet to the east, and Tannery Gulch 3,700 feet to the east. Intermittent creeks do not receive groundwater baseflow; thus, the proposed Cunnison Lane Well would not affect baseflow in the unnamed tributary, Noble Gulch, or Tannery Gulch. Soquel Creek, located 3,900 feet to the west, is the only perennial creek in proximity to the Cunnison Lane Well site that exhibits a hydraulic connection to groundwater. However, the plausible redistribution scenarios that were prepared by HydroMetrics to demonstrate future pumping in the basin indicate that pumping of the Cunnison Lane Well would be more than offset by decreases in pumping from the existing Tannery II well nearby, resulting in a net decrease in groundwater pumping in this area east of Soquel Creek. The net decrease in pumping in this area may possibly result in beneficial effects to baseflow in Soquel Creek. Because the potential effects of pumping the Cunnison Lane Well on Soquel Creek would be the same or smaller than existing effects, this impact is considered less than significant and no mitigation is necessary.

Austrian Way Well Site

Aptos Creek runs north-to-south approximately 1,140 feet east of and 350 feet below the Austrian Way Well site. Tannery Gulch, located 3,500 feet to the west, has a small watershed with intermittent flows, and therefore, is unlikely to have summer baseflow. The connection between Aptos Creek and groundwater is complex. Because groundwater at shallow depths tends to leak downward to deeper aquifers, similar to the pattern discussed above for Soquel Creek, pumping from the Austrian Way Well could affect shallow groundwater levels and baseflow along Aptos Creek. However, in the vicinity of the Austrian Way Well site, the existing downward gradient is buffered by layers of low conductivity clays and silts in the Purisima Formation. HydroMetrics' streamflow analysis concluded that, because of this layering, pumping from the Austrian Way Well would only minimally increase the existing leakage rate between the shallow and deeper aquifers and any baseflow depletion would be difficult to detect. Thus, potential impacts related to baseflow depletion are considered less than significant.

Although not required, due to the designation of Aptos Creek as critical steelhead habitat and uncertainties regarding stream-aquifer interaction in the vicinity of the Austrian Way Well site, the SqCWD is committed to implementing **Improvement Measure HYD-2 (Monitor Streamflow along Aptos Creek and Modify Pumping if Baseflow Depletion is Detected)** to address any potential changes in baseflow depletion attributable to pumping from the Austrian Way Well. As specified in the improvement measure, the SqCWD will install a new stream gauge in Aptos Creek, evaluate surface and groundwater monitoring data, and reduce pumping from the Austrian Way Well if baseflow depletion from groundwater pumping is detected.

Granite Way–Aptos Village Well Site

The nearest creeks to the Granite Way–Aptos Village Well site are Aptos Creek (900 feet west), Trout Gulch (1,200 feet southeast), and Valencia Creek (1,200 feet south). The plausible redistribution scenarios developed by HydroMetrics indicate the proposed pumping redistribution strategy would result in a net decrease in pumping at wells near the Granite Way–Aptos Village

Well, which would be expected to have no effect, and possibly a beneficial effect, on nearby streams when compared to the existing condition. Thus, potential impacts to baseflow in local creeks are considered less than significant, and no mitigation is necessary.

Polo Grounds Well Site

The Polo Grounds Well is less than 400 feet from Valencia Creek. The streamflow effect analysis for the Polo Grounds Well considers future operations of both the Polo Grounds Well and the existing Aptos Jr. High School Well, located within 1,000 feet of Valencia Creek, because their potential effects on baseflow along Valencia Creek could potentially overlap, provided a hydraulic connection between streamflow and groundwater exists. Historical water levels indicate that a large vertical separation has existed between the Valencia Creek bed and the water table for the last 30 years, indicating that there is no hydraulic connection between surface water and groundwater in the vicinity of the Polo Grounds Well. Thus, increased pumping in this area is not anticipated to deplete baseflow in nearby streams. Potential impacts to baseflow in Valencia Creek are therefore considered less than significant, and no mitigation is required.

Mitigation: None required; however, as part of future pumping operations at the O'Neill Ranch and Austrian Way Well sites, the SqCWD is committed to implementing the improvement measures presented below.

Improvement Measures

Improvement Measure HYD-1: Monitor Streamflow along Soquel Creek (applies only to O'Neill Ranch Well site). As part of the SqCWD's adaptive management strategy, the SqCWD would analyze groundwater and stream flow monitoring data and modify pumping if baseflow depletion along Soquel Creek related to future pumping in the vicinity of the O'Neill Ranch Well is detected. For the purposes of this improvement measure, the area of potential effect is conservatively defined as an approximately 10,000-foot reach of Soquel Creek in the vicinity of the proposed O'Neill Ranch Well.

As part of future operations associated with the O'Neill Ranch Well, the SqCWD would review streamflow monitoring data from the following existing stream gauges: the SqCWD-owned stream gauge on the west branch of Soquel Creek; the SqCWD-owned stream gauge on upper Soquel Creek; the U.S. Geological Survey (USGS) Stream Gauge No. 11160000 located on Soquel Creek and within the area of potential effect; the USGS Stream Gauge No. 11160500 on the San Lorenzo River; and, when available, the stream gauge on Aptos Creek that would be installed during implementation of the Austrian Way Well (see Improvement Measure HYD-2, below). The SqCWD would also continue to monitor shallow groundwater levels using data collected from the existing groundwater monitoring network.

Streamflow and groundwater monitoring data would be reviewed annually to determine if there is a reduction in stream baseflow resulting from increased pumping by the SqCWD in the vicinity of the O'Neill Ranch Well. Data collected from shallow groundwater monitoring wells and existing stream gauges along Soquel Creek would assist the SqCWD in correlating any changes in stream flow with changes in shallow groundwater gradients. Data collected from stream gauges on the west branch of Soquel Creek, upper Soquel

Creek, the San Lorenzo River, and Aptos Creek would be compared to data collected from the USGS Stream Gauge No. 11160000 on Soquel Creek and used to develop relationships between baseflow in Soquel Creek within the area of potential effect relative to baseflow at the other stream gauges.

If streamflow and groundwater monitoring data reveal a decrease in stream baseflow exceeding the 0.5-cfs detection threshold, and if the timing and magnitude of the baseflow depletion correlates with increased groundwater pumping by the SqCWD in the vicinity of the O'Neill Ranch Well rather than with other possible causes of baseflow depletion, the SqCWD would redistribute pumping until continued monitoring indicates the effect is again below the detection threshold.

Improvement Measure HYD-2: Monitor Streamflow along Aptos Creek and Modify Pumping if Baseflow Depletion is Detected (applies only to Austrian Way Well site). As part of the SqCWD's adaptive management strategy, the SqCWD would install a new stream gauge on Aptos Creek, analyze groundwater and stream flow monitoring data, and modify pumping if baseflow depletion along Aptos Creek from future pumping from the Austrian Way Well is detected. For the purposes of this improvement measure, the area of potential effect is conservatively defined as an approximately 8,000-foot reach of Aptos Creek in the vicinity of the proposed Austrian Way Well.

Since there is not an existing stream gauge on Aptos Creek that would be appropriate for monitoring potential baseflow effects from future pumping, as part of this improvement measure, the SqCWD would install a new stream gauge downstream of the area of potential effect. A possible location for the stream gauge would be upstream of the confluence of Aptos Creek and Mangels Gulch to eliminate Mangels Gulch flow as a factor in baseflow changes along Aptos Creek. If a suitable location upstream of this confluence is not identified, a location downstream of the confluence, such as the site of the deactivated United States Geological Survey (USGS) Stream Gauge No. 11159700 near the confluence of Aptos Creek with Valencia Creek, would be used. Installation and monitoring of the new stream gauge would begin at least one year in advance of pumping the Austrian Way Well.

As part of future operations associated with the Austrian Way Well, the SqCWD would review surface and groundwater monitoring data from: the new Aptos Creek stream gauge; the District's existing network of groundwater monitoring wells; the USGS Stream Gauge No. 11160500 on the San Lorenzo River; USGS Stream Gauge No. 11160000 on Soquel Creek; and the SqCWD-owned stream gauges on upper Soquel Creek and on the west branch of Soquel Creek.

The streamflow and groundwater monitoring data would be used to determine if there is a reduction in stream baseflow resulting from pumping at the Austrian Way Well. Data collected from shallow groundwater monitoring wells and the new stream gauge on Aptos Creek would assist the SqCWD in correlating any changes in stream flow with changes in shallow groundwater gradients. Data collected from stream gauges on the San Lorenzo River and Soquel Creek would be compared to data collected from the new Aptos Creek stream gauge and used to establish relationships between baseflow in Aptos Creek relative to baseflow at the other stream gauges.

If streamflow and groundwater monitoring data reveal a decrease in stream baseflow exceeding the 0.5-cfs detection threshold, and if the timing and magnitude of the baseflow depletion correlates with groundwater pumping at the Austrian Way Well rather than with

other possible causes of baseflow depletion, the SqCWD would redistribute pumping until continued monitoring indicates the effect is again below the detection threshold.

**For a discussion of the secondary effects of stream gauge installation, see Section 4.3, Impacts Associated with Implementation of Improvement Measure HYD-2.

Impact 3.4-4: Implementation of the WMP could increase flooding hazards as a result of altered drainage patterns or an increase in the volume of stormwater runoff from the proposed well sites.

All Sites

Stormwater runoff volumes and rates generated from unpaved areas can increase when the impervious surface area increased, and the capability of surface water infiltration is reduced or eliminated. Increases in impervious surfaces can increase peak flows in creeks and the local stormwater drainage system, potentially resulting in increased flooding.

Implementation of the WMP would result in the construction of approximately 2,500 square feet of new impervious surfaces at the O'Neill Ranch Well site; 1,850 square feet at the Cunnison Lane Well site; 1,850 square feet at the Austrian Way Well site; 800 square feet at the Granite Way-Aptos Village Well site; and 1,600 square feet at Polo Grounds Regional Park. These increases in impervious surfaces would result in only a negligible increase in stormwater volumes, if any. Further, the new impervious surface areas at each of the proposed well sites would be substantially less than the thresholds provided in Provision C.3 of the NPDES Municipal Stormwater Permit, which requires that new development and redevelopment projects that involve the creation or replacement of 10,000 square feet or more of impervious surfaces incorporate treatment measures and other appropriate source control and site design features to manage runoff flows. Thus, impacts associated with increased flooding hazards from increases in impervious surface area at the individual well sites would be less than significant.

However, raw groundwater discharges produced during periodic maintenance activities involving flushing the well and treatment facilities (approximately once per year) and well pump testing (approximately once every two years) could potentially increase localized flooding in downstream areas, particularly if these discharges were to occur during high precipitation events and/or the local stormwater drainage system does not have sufficient capacity to handle the flows. This impact is considered potentially significant.

All proposed connections to the local stormwater drainage system would be designed in accordance with SCCDPW drainage design criteria. Connections to the local stormwater drainage system would require an encroachment permit from the SCCDPW for work in county rights-of-way and county drainages, and the construction plans for the well and treatment facilities would be reviewed and approved by SCCDPW prior to construction. Implementation of **Mitigation Measure 3.4-2 (Coordinate Raw Groundwater Discharges with SCCDPW)** would require that the SqCWD coordinate raw groundwater discharges with SCCDPW to ensure that the existing stormwater

drainage infrastructure can accommodate raw groundwater discharges without increasing localized flooding, increasing peak storm flows, or resulting in creek erosion or scouring. As required by the mitigation measure, SqCWD would provide the SCCDPW with information regarding the proposed location(s) of raw groundwater discharges to the local stormwater drainage network, discharge volumes and flow rates, and the general timing and frequency of discharges. If deemed necessary by the SCCDPW, the SqCWD would contribute funds towards improvements to stormwater drainage infrastructure and/or adhere to any reasonable and standard operational modifications imposed by the SCCDPW. With mitigation implementation, potential impacts related to localized flooding would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.4-2: Coordinate Raw Groundwater Discharges with SCCDPW (applies to all sites). See description above.

Significance after Mitigation: Less than Significant.

3.4.6 References – Surface Water Hydrology and Water Quality

Coastal Watershed Council, *Aptos Creek Watershed Final Annual Report*, July–December, 2003.

Federal Emergency Management Agency (FEMA), 2006. Flood Insurance Rate Map (FIRM) for Santa Cruz County, California and Incorporated Areas – Map Numbers 06087C0352S, 06087C0356D, and 06087C0357D. Effective March 2, 2006.

HydroMetrics LLC, 2009. *Hydrologic Effects of Well Master Plan*, November 2009.

Johnson, N. M., D. Williams, E.B. Yates, and G. Thrupp. *Groundwater Assessment of Alternative Conjunctive Use Scenarios – Technical Memorandum 2: Hydrogeologic Conceptual Model*, Prepared for Soquel Creek Water District, September 2004.

Regional Water Quality Control Board (RWQCB), Central Coast Region, *Water Quality Control Plan for the Central Coast Region*, September 8, 1994.

RWQCB, Central Coast Region (Region 3), Watershed Management Initiative, January 2002.

RWQCB, Central Coast Region (Region 3), 2006 CWA Section 303(d) List of Water Quality Limited Segments Requiring TMDLs, approved June 28, 2007.

Santa Cruz County Geographic Information System (GIS), Tsunami Inundation Areas Map, March 31, 2005.

Santa Cruz County Department of Public Works (SCCDPW), *Design Criteria Containing the Standards for the Construction of Streets, Stormwater Systems, Sanitary Sewers, Water Systems, and Driveways within the Unincorporated Portion of Santa Cruz County*, June 2006.

Western Regional Climate Center, Period of Record Monthly Climate Summary, Santa Cruz, California (047916), Period of Record: 1/1/1893 to 12/31/2009, available online at <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7916>, accessed June 9, 2010.

3.5 Biological Resources

3.5.1 Introduction

This section describes the existing biological resources within the proposed WMP area and regional vicinity. Information used in preparation of this section includes field observations, the California Natural Diversity Database (CNDDDB) of the California Department of Fish and Game (CDFG, 2008), and California Native Plant Society (CNPS) Electronic Inventory (2008). In addition, ESA reviewed and incorporated applicable information from the *Santa Cruz Water Department's Integrated Water Plan Program Draft EIR* (City of Santa Cruz, 2005) and the *O'Neill Ranch Well Initial Study/Mitigated Negative Declaration* (SqCWD, 2001). Habitat quality and species distribution were considered in evaluating the likelihood of special-status species occurrence in the WMP area. No protocol-level special-status species surveys or formal wetland delineations were conducted for this analysis.

3.5.2 Regional Setting

The Santa Cruz coastal region has a Mediterranean climate and contains a mosaic of oak, mixed evergreen, and redwood forests, native and non-native grasslands, scrub communities, stream and wetland communities, coastal dunes, beach and intertidal communities near the ocean, and riparian scrubs and forests along waterways. The proximity of the coastal mountains has partially isolated the area and resulted in a high degree of endemism (i.e., species restricted to this area alone) in addition to relatively high species diversity.

Urban and agricultural development in the region has reduced open space, limiting large expanses of most of the natural communities. Despite land use changes and habitat fragmentation, the regional biotic context in the WMP area is robust due to local conservation efforts, the preservation of open space (including deep, densely vegetated canyons that indent the coastline and inhibit casual use), and the juxtaposition of Monterey Bay and a rocky shoreline, which is difficult to access in many places.

3.5.3 Existing Conditions at Individual Well Sites

Past and ongoing development and human activities have altered natural vegetative patterns or otherwise limited large expanses of most natural communities in the Soquel-Aptos area. Plant communities found in the vicinity of the proposed well sites include mixed riparian woodland, oak woodland, eucalyptus woodland, redwood forest, coastal scrub, grassland, developed and ornamental landscaping, and ruderal (disturbed and weedy) vegetation. Communities occurring within and adjacent to the proposed well sites are listed in **Table 3.5-1** and described below, along with wildlife species typically associated with each community.

**TABLE 3.5-1
PLANT COMMUNITIES WITHIN AND ADJACENT TO INDIVIDUAL WELL SITES**

Proposed Well Site	Plant Communities Present
O'Neill Ranch	Mixed riparian woodland Coast live oak woodland Eucalyptus woodland Non-native grassland/ruderal Developed and ornamental landscaping
Cunnison Lane	Mixed riparian woodland Eucalyptus woodland Mixed grassland Developed and ornamental landscaping
Austrian Way	Interior live oak woodland Mixed grassland Developed and ornamental landscaping
Granite Way–Aptos Village	Mixed riparian woodland Coast live oak woodland Eucalyptus woodland Non-native grassland/ruderal Developed and ornamental landscaping
Polo Grounds	Mixed riparian woodland Coast live oak woodland Redwood forest Coastal scrub Non-native grassland Ruderal Developed and ornamental landscaping

SOURCE: ESA, 2008.

Plant Communities and Associated Wildlife Species

The vegetation/habitat classification presented herein is based on field observations and the CDFG *List of California Terrestrial Natural Communities Recognized by the CNDDDB* (CDFG, 2002). This EIR also relies on *A Manual of California Vegetation* (Sawyer and Keeler-Wolf, 1995), which maintains a more detailed inventory of terrestrial natural communities based on the dominant plant species present.

Mixed Riparian Woodland

Mixed riparian woodland occurs along riparian corridors adjacent to the O'Neill Ranch, Cunnison Lane, and Polo Grounds Well sites. This community type is also known as central coast riparian woodland. Overstory tree species vary from site to site, but coast live oak (*Quercus agrifolia*) is a common dominant and is found at all sites. Associate tree species include interior live oak (*Quercus wislizenii*), California buckeye (*Aesculus californica*), willow (*Salix* sp.), California bay laurel (*Umbellularia californica*), and bigleaf maple (*Acer macrophyllum*), with non-native eucalyptus (*Eucalyptus globulus*) also present at several sites. Understories along creeks are generally disturbed and support a mix of native and non-native species, including California blackberry (*Rubus ursinus*), Himalaya blackberry (*Rubus armeniacus* [= *R. discolor*]), cape ivy (*Delairea odorata*), and Algerian ivy (*Hedera canariensis*). Other less common species include creeping snowberry

(*Symphoricarpos mollis*), blue elderberry (*Sambucus mexicana*), coastal wood fern (*Dryopteris arguta*), and hedge nettle (*Stachys ajugoides* var. *rigida*).

Riparian areas provide nesting habitat and diverse insects that are attractive to a variety of bird species. Foliage, bark, and ground substrates provide a variety of foraging areas. Birds that forage for insects in riparian habitats include Bewick's wren (*Thryomanes bewickii*), northern oriole (*Icterus galbula*), black-headed grosbeak (*Pheucticus melanocephalus*), downy woodpecker (*Picoides pubescens*), Nuttall's woodpecker (*Picoides nuttallii*), and white-breasted nuthatch (*Sitta carolinensis*). There are a few species that are adapted to foraging for insects in flight, such as black phoebe (*Sayornis nigricans*), western wood pewee (*Contopus sordidulus*), and tree swallow (*Tachycineta bicolor*). Riparian forests provide important nesting habitat for Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), white-tailed kite (*Elanus leucurus*), and other raptors. Amphibians and mammals such as western toad (*Bufo boreas*), Pacific chorus frog (*Hyla regilla*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), and mule deer (*Odocoileus hemionus*) may use riparian habitat in the WMP area.

Oak Woodland

This community occurs (with coast live oak dominant) at the O'Neill Ranch, Granite Way–Aptos Village, and Polo Ground Well sites; it consists of a dense to sparse cover of primarily multi-stemmed coast live oak (*Quercus agrifolia*), with a variable understory of shrubs and grasses depending on canopy cover. Canopy associates include eucalyptus and California bay. The understory includes poison-oak (*Toxicodendron diversilobum*), sticky monkey flower (*Mimulus aurantiacus*), and California blackberry, as well as herbaceous species such as vetch (*Vicia* sp.), mustards (*Brassica* spp.), and bracken fern (*Pteridium aquilinum*). There is a densely canopied oak woodland dominated by interior live oak at the Austrian Way Well site, with Douglas fir (*Pseudotsuga menziesii*) as an associate and a sparse understory of native and non-native herbaceous species, including yerba buena (*Satureja douglasii*), California blackberry, bedstraw (*Galium aparine*), and English ivy (*Hedera helix*).

Oak woodland habitats provide food and shelter for a variety of bird species, including insect eaters such as chestnut-backed chickadee (*Parus rufescens*), white-breasted nuthatch, and warbling vireo (*Vireo gilvus*). Other species attracted to this habitat include song sparrow (*Melospiza melodia*), California quail (*Callipepla californica*), and California towhee (*Pipilo crissalis*), which glean insects from the foliage on the ground. Western scrub jay (*Aphelocoma californica*), acorn woodpecker (*Melanerpes formicivorus*), and squirrels (*Sciurus* sp.) are dependent on the acorns during the winter. Raptors such as Cooper's hawk and sharp-shinned hawk are known to nest in coastal oak woodlands. Cavities within oak trees provide nesting sites for western screech owl (*Otus kennicottii*), western bluebird (*Sialia mexicana*), and ash-throated flycatcher (*Myiarchus cinerascens*), and roosting sites for bats. In addition, downed branches provide cover for various reptiles, amphibians, and small mammals.

Eucalyptus Woodland

This community consists of a dense to sparse cover of blue gum eucalyptus trees. The understory is typically sparse or absent due to the alleopathic chemicals and high volumes of forest debris (such as bark, limbs, and branches) produced by the trees. Eucalyptus woodland intersperses with coast live oak woodland along the riparian corridor at the O'Neill Ranch and Cunnison Lane Well sites, and also occurs in several stands at the Granite Way–Aptos Village Well site.

Mature eucalyptus stands provide nesting and roosting habitat for various larger bird species, such as American crow (*Corvus brachyrhynchos*) and common raven (*Corvus corax*), as well as for red-tailed hawk (*Buteo jamaicensis*) and other raptors. Common reptiles such as gopher snake (*Pituophis melanoleucus*) and northern alligator lizard (*Elgaria coerulea*) may also inhabit the understory of these stands.

Redwood Forest

Second-growth redwood forest occurs adjacent to the Austrian Way and Polo Grounds Well sites. In the Soquel-Aptos area, this forest type is dominated by coast redwood (*Sequoia sempervirens*), with associates in the overstory including tanoak (*Lithocarpus densiflorus*), coast live oak, and Douglas fir. Understory species include typical redwood forest associates such as wild ginger (*Asarum caudatum*), redwood sorrel (*Oxalis oregana*), bracken fern (*Pteridium aquilinum*), western sword fern (*Polystichum munitum*), and the ubiquitous California blackberry. Because recreational use is high at the Polo Grounds Well site, the understory consists of large areas of exposed soils and duff due to recreational use.

Redwood forests, particularly older forests, are generally characterized as supporting low animal species diversity. Animals typical of redwood forest habitat include birds such as Steller's jay (*Cyanocitta stelleri*) and varied thrush (*Ixoreus naevius*); mammals, especially bats, which use snags and tree cavities, as well as woodrats (*Neotoma* spp.) and mule deer (*Odocoileus hemionus*); and invertebrates such as the banana slug (*Ariolimax columbianus*). Redwood forest amphibians include a variety of salamanders, such as California slender salamander (*Batrachoseps attenuatus*), which inhabit wetter areas of the forest floor, particularly where they can shelter under woody debris.

Coastal Scrub

Coastal scrub is a complex and highly variable community in which species vary according to latitude, altitude, and slope aspect. Coastal scrub occurs adjacent to the proposed footprint at the Polo Grounds Well site. A relatively moist slope to the south and east of the site supports a dense canopied coastal scrub, with willow and coyote brush (*Baccharis pilularis*) dominant. Other species in the shrub layer include California coffeeberry (*Rhamnus californica*), poison oak, California blackberry, and blue elderberry. The herbaceous layer is dominated by non-native grasses and poison hemlock (*Conium maculatum*).

Common wildlife species that utilize coastal scrub habitat include gopher snakes and western fence lizards (*Sceloporus occidentalis*), California quail (*Callipepla californica*), wrenitit (*Chamaea fasciata*), and spotted towhee (*Pipilo maculatus*). Coyote (*Canis latrans*), mule deer,

and brush rabbit (*Sylvilagus bachmani*) are some of the mammals likely to utilize coastal scrub habitat in the WMP area.

Grasslands

Two grassland communities are found within the WMP area: a mixed grassland and a typical non-native annual grassland type. The mixed grassland is characterized by dense herbaceous cover dominated by California wild oat (*Danthonia californica*), a native perennial bunch grass, in association with non-native annual grasses including rattail fescue (*Vulpia myuros*), greater quaking grass (*Briza maxima*), Italian ryegrass (*Lolium multiflorum*), and wild oat (*Avena barbata*). Associated forbs¹ are primarily non-native annuals or perennials and include rough cat's ear (*Hypochaeris radicata*), fiddle dock (*Rumex acetosella*), and English plantain (*Plantago lanceolata*). This grassland type occurs at the proposed Cunnison Lane and Austrian Way Well sites. Non-native grassland, which occurs at all of the proposed well sites, is typically composed of a variety of annual grasses, often associated with numerous species of annual and perennial forbs. This introduced plant community is common and widespread in California and in the Soquel-Aptos region. Plant species typical of non-native grasslands in the WMP area include annual grasses such as farmer's foxtail (*Hordeum murinum* ssp. *leporinum*), soft chess (*Bromus hordeaceus*), ripgut grass (*Bromus diandrus*), foxtail brome (*Bromus rubens*), and wild oat. Non-native herbs such as filaree (*Erodium cicutarium*), field bindweed (*Convolvulus arvensis*), burclover (*Medicago polymorpha*), rough cat's ear, cut-leaved geranium (*Geranium dissectum*), and English plantain frequently occur as subdominants. Although native herbaceous species are often found in non-native grasslands throughout the region—including lupines (*Lupinus* spp.), tarweeds (*Hemizonia* spp.), California poppy (*Eschscholzia californica*), and blue dicks (*Dichelostemma pulchellum*)—they are notably lacking from both grassland types at the proposed well sites.

Grasslands can provide refuge for reptiles and amphibians such as western fence lizard, northern alligator lizard, and California slender salamander, and birds such as mourning dove (*Zenaida macroura*) and western meadowlark (*Sturnella neglecta*). Grasslands can also be important foraging grounds for aerial and ground-foraging insect eaters such as *Myotis* bat species and pallid bat (*Antrozous pallidus*). Mammals such as Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Spermophilus beecheyi*), black-tailed jackrabbit (*Lepus californicus*), and coyote forage within annual grasslands in the WMP area. Small rodents attract raptors (birds of prey), including red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and white-tailed kite.

Ruderal Vegetation

Ruderal vegetation occurs in areas that are subject to repeated or otherwise profound disturbance; this vegetation type is made up of opportunistic species that have adapted to such conditions by having short-term reproductive strategies (i.e., they are generally annuals that germinate, flower, and set large amounts of seed in a short period of time). Ruderal vegetation may include some native species, but is typically dominated by non-native and often highly invasive species, including poison

¹ Herbaceous species, not including grasses or grass-like plants.

hemlock, French broom (*Genista monspessulanus*), Himalaya blackberry, and bristly ox-tongue (*Picris echioides*). Ruderal vegetation often intergrades with non-native grassland and is found at the proposed O'Neill Ranch, Granite Way–Aptos Village, and Polo Grounds Well sites.

Ruderal areas provide limited foraging or nesting habitat for a few birds and small mammals. Wildlife species occurring in ruderal areas are generally those that tolerate proximity to human activity and disturbance. Within the WMP area, wildlife utilizing adjacent higher quality habitats may forage and occasionally nest within ruderal areas.

Developed and Ornamental Landscaping

This community type includes areas occupied by buildings, roads, parking lots, and other developed facilities, as well as adjacent landscaped or heavily disturbed areas. Vegetation in these areas consists mostly of non-native species. Urban and developed areas tend to be landscaped with non-native ornamental plant species, thus displacing native plants. Developed and ornamental landscaping occurs within or adjacent to all of the proposed well sites. Residential and commercial areas and other ornamental landscaping provide little habitat for wildlife, except for those species adapted to human habitation, such as striped skunk, opossum, raccoon, European starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), and mourning dove.

Wetlands and Streams

Wetlands

No wetlands were identified within or adjacent to the proposed well sites. In addition, the stream reaches found near the well sites do not support wetland vegetation within or adjacent to disturbance areas.

Streams

There are several streams within the vicinity of the proposed well sites that drain directly to Monterey Bay, or to other water bodies that drain to Monterey Bay. Two are perennial, one is seasonal, and one is ephemeral. These streams are likely subject to Sections 404 and 401 of the Clean Water Act, and Sections 1600–1616 of the Fish and Game Code. An unnamed ephemeral tributary to Soquel Creek borders the northern parcel boundary of the O'Neill Ranch Well site. A seasonal tributary to Noble Gulch (which is in turn a tributary to Soquel Creek) flows north-to-south along the western parcel boundary of the Cunnison Lane Well site. These tributaries to Soquel Creek support mixed riparian woodland habitat. Valencia Creek and its riparian corridor runs northeast-to-southwest along the northern boundary of Polo Grounds Regional Park. There is a well-developed redwood forest along the creek near the existing irrigation well at the Polo Grounds Well site. In addition, Aptos Creek is located approximately 450 feet west of the existing T. Hopkins Treatment Plant, which would provide treatment for the proposed Granite Way–Aptos Village Well.

Aquatic habitat within these drainages has the potential to support common fish species such as Sacramento squawfish (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis*) and threespine stickleback (*Gasterosteus aculeatus*). Aptos Creek, Valencia Creek, Soquel Creek, and

other larger streams in the WMP area are known to support migratory and spawning habitat for steelhead (*Oncorhynchus mykiss*),² a federal threatened species. Tidewater goby (*Eucyclogobius newberryi*), a federal endangered species (USFWS, 2004), inhabit estuarine areas at the mouths of Aptos Creek and Soquel Creek and can occur in aquatic habitats up to one mile upstream (CDFG, 2005). These streams may also support the following special-status amphibian and reptile species: California red-legged frog (*Rana draytonii*) (federal threatened), foothill yellow-legged frog (*Rana boylei*) (California species of special concern and former federal species of concern³), and southwestern pond turtle (California species of special concern and former federal species of concern).

Wildlife Movement Corridors

Wildlife movement corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or by areas of human disturbance or urban development. Topography and other natural factors in combination with urbanization have fragmented or separated large open-space areas. The fragmentation of natural habitat creates isolated “islands” of vegetation that may not provide sufficient area to accommodate sustainable populations and can adversely affect genetic and species diversity. Movement corridors mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished and promotes genetic exchange with separate populations. Within the WMP area, streams and drainages such as Valencia Creek, Aptos Creek, and Soquel Creek serve as primary corridors for wildlife moving through agricultural and/or developed habitats.

Special-Status Species

A number of species known to occur in the Soquel-Aptos area are protected pursuant to federal and/or state endangered species laws, or have been designated as species of concern by the USFWS or species of special concern by the CDFG. In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not included in any listing. Species recognized under these terms are collectively referred to as “special-status species.” For purposes of this EIR, special-status species include:

- Plant and wildlife species listed as rare, threatened, or endangered under the federal or state endangered species acts
- Species that are candidates for listing under either federal or state law
- Species formerly designated by the USFWS as species of concern or by the CDFG as species of special concern
- Species protected by the federal Migratory Bird Treaty Act (16 USC 703–711)

² Streams in the WMP area support the central California coast Distinct Population Segment of steelhead.

³ “Species of concern” is an informal term that is not defined in the Federal Endangered Species Act. The Sacramento Office of the U.S. Fish and Wildlife Service no longer uses this designation and recently stopped maintaining species of concern lists. Many former federal species of concern are considered sensitive by CDFG and other agencies, as well as organizations with recognized expertise in plant or wildlife populations. Thus, former species of concern are considered in this EIR.

- Bald and golden eagles protected by the federal Bald Eagle Protection Act (16 USC 668)
- Species (such as candidate species) that may be considered rare or endangered pursuant to Section 15380(b) of the CEQA Guidelines

Appendix D lists 32 special-status plant species and 49 special-status wildlife species reported to occur in the vicinity of the proposed well sites based on information from the following sources: CNDDDB and CNPS Electronic Inventory (2008), USFWS (2010), biological literature of the region, and previous environmental documentation for other projects in the WMP vicinity (SqCWD, 2001; City of Santa Cruz, 2005). Special-status plants and wildlife are evaluated in this document based on a plausible likelihood of habitat loss or construction-related disturbance from implementation of the WMP projects. Special-status species with a moderate or higher potential to occur within the WMP area are described below.

O'Neill Ranch Well Site

The proposed well and water treatment facility at the O'Neill Ranch Well site is located within non-native annual grassland that was being used as a construction staging area at the time of ESA's initial site survey in 2006; however, grassy vegetative cover was restored when ESA revisited the site in January 2009. The proposed facilities would be located adjacent to coast live oak woodland, and some components would be built within the dripline of the adjacent oaks. Eucalyptus trees are interspersed with the coast live oak woodland to the east of the site. The site slopes steeply northward toward an ephemeral tributary to Soquel Creek and adjacent riparian habitat. The site is bound to the east by a mobile home park, to the south by Soquel Drive and commercial development, and to the west by several auto repair shops. The proposed potable water pipeline to connect to SqCWD's existing water distribution system would be installed within the Soquel Drive road right-of-way and would extend approximately 1,750 linear feet from the O'Neill Ranch Well site to the Soquel Drive/Daubenbiss Avenue intersection. The proposed 370-foot-long storm drain extension would also be installed within the Soquel Drive right-of-way. Existing vegetation along the pipeline alignment consists primarily of ornamental vegetation along the road right-of-way. The potable water pipeline would cross the tributary to Soquel Creek at the location of a culvert under Soquel Drive, where there is a limited amount of willow riparian habitat mixed with non-native species and associated with the drainage.

Special-Status Plants. The O'Neill Ranch Well site is not expected to support special-status plants due to the type and quality of the habitat found there. Of the numerous special-status plant species known to occur in the region, only one—Santa Cruz tarplant (*Holocarpha macradenia*)—was determined to have more than low potential to occur at any of the project sites. However, this species is not expected to occur at the O'Neill Ranch Well site (see Appendix D and the description of habitats presented above). Santa Cruz tarplant occurs in sandy to sandy clay soils that are seasonally saturated and support mixed or perennial grasslands with other native forbs. The species also often occurs in similar grasslands that support non-native grasses and forbs. Soils at this site are loamy and do not appear to become seasonally saturated, and the grassland that occurs is composed almost entirely of non-native species. The grassland area at the O'Neill Ranch Well site was previously used as a construction staging area for the commercial shopping center located opposite Soquel

Drive in 2006. These factors combine to provide poor quality habitat for Santa Cruz tarplant at the O'Neill Ranch Well site.

Special-Status Wildlife. The unnamed tributary to Soquel Creek provides potential nonbreeding aquatic habitat for California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle. Although steelhead (central California coast Distinct Population Segment (DPS)) are known to occur in Soquel Creek it is unlikely that they utilize habitat within the tributary due to its ephemeral nature and the fact that its lower reaches are culverted for 1,000 feet or more upstream from its confluence with Soquel Creek. Coast live oak woodland, riparian habitat, and ornamental landscaping on and surrounding the project site may support nesting raptors, including Cooper's hawk, sharp-shinned hawk, long-eared owl (*Asio otis*), and white-tailed kite, as well as other special-status birds. Oaks and other trees within oak woodland and riparian habitat may support roosting pallid bat, Pacific western big-eared bat (*Corynorhinus townsendii townsendii*), long-eared myotis (*Myotis evotis*), and long-legged myotis (*M. volans*). Oak woodland and riparian areas also provide potential habitat for San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), though nests of this species were not observed during the ESA site visits.

Cunnison Lane Well Site

The well and water treatment facility at the Cunnison Lane Well site is proposed within non-native annual grassland that is likely maintained regularly. A seasonal tributary to Noble Gulch (which, in turn, is a tributary to Soquel Creek) supporting riparian habitat is located adjacent to the western portion of the site. The site is bound to the east by an undeveloped parcel supporting non-native annual grassland, coast live oak woodland, and ornamental vegetation, and to the north and south by residential development and ornamental vegetation.

Special-Status Plants. The mixed grassland at the Cunnison Lane Well site appears to be a remnant of the coastal prairies that once covered the site vicinity. Although the cover of grasses and forbs is relatively dense and has a very low native species component, this site has the potential to support Santa Cruz tarplant.

Special-Status Wildlife. The tributary to Noble Gulch provides potential nonbreeding aquatic habitat for California red-legged frog, foothill yellow-legged frog, southwestern pond turtle, and steelhead are known to occur in Soquel Creek. The frogs and turtle may utilize aquatic habitat in the tributary. However, it is unlikely that steelhead occur in the tributary. Noble Gulch is not included within Critical Habitat designated for the Central Coast steelhead because it lacks the elements that constitute critical habitat for this fish, therefore it is unlikely that this even smaller tributary would provide suitable habitat. Oaks and other trees within riparian habitat on the site may support nesting raptors, including Cooper's hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite; other special-status birds; and roosting pallid bat, Pacific western big-eared bat, long-eared myotis, and long-legged myotis. Special-status birds may also nest in ornamental vegetation surrounding the site. Riparian habitat along this unnamed tributary to Noble Gulch provides potential habitat for San Francisco dusky-footed woodrat, although nests of this species were not observed during ESA's site visit.

Austrian Way Well Site

The proposed well and water treatment facility at the Austrian Way Well site is located within interior live oak woodland, which continues to the north and south. Residential development and ornamental landscaping are located to the west. The existing Austrian Tank is adjacent to the east side of the footprint for the proposed well and treatment plant. To the east of the site, oak woodland intergrades with redwood forest habitat within the Forest of Nisene Marks State Park. Aptos Creek runs north to south about 1,140 feet east of the Austrian Way Well site. The proposed 200-foot-long sanitary sewer lateral to connect to the sanitary sewer system at Austrian Way and Jennifer Drive, and the 600-foot-long raw water pipeline to connect to the local stormwater drainage system at the intersection of Austrian Way and Vienna Drive, would pass through the oak woodland and along the existing paved access road to Austrian Way.

Special-Status Plants. The oak woodland is densely canopied, with a sparse understory that is not expected to include special-status plants. The mixed grassland bordering the paved access road to this site appears to be a remnant of the coastal prairies that once occurred in the site vicinity. Although the cover of grasses and forbs in this grassland is relatively dense and has a very low native species component, this site has the potential to support Santa Cruz tarplant.

Special-Status Wildlife. Oaks and other trees within and surrounding the Austrian Way Well site may support nesting raptors, including Cooper's hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite; other special-status birds; and roosting pallid bat, Pacific western big-eared bat, long-eared myotis, and long-legged myotis. Conifers in redwood forest habitat to the east of the project site may provide nesting habitat for Vaux's swift (*Chaetura vauxi*). Woodland habitat on and surrounding the project site also provides potential habitat for San Francisco dusky-footed woodrat, though nests of this species were not observed during the ESA site visit.

Granite Way–Aptos Village Well Site

The proposed Granite Way–Aptos Village Well site is located within a dirt road in a highly disturbed ruderal area that contains bare foundations from previous structures. The site is surrounded by ornamental trees as well as some coast live oaks and other native tree species. There is residential development to the north and commercial development to the south. A proposed 520-foot-long raw water pipeline would be used to convey raw groundwater that is produced from the Granite Way–Aptos Village Well to existing infrastructure for subsequent treatment at the T. Hopkins Treatment Plant. The proposed raw water pipeline would be routed west through an area currently characterized as barren and ruderal⁴ to an existing raw water pipeline at Aptos Creek Road; the existing raw water pipeline connects with the T. Hopkins Treatment Plant to the north. The T. Hopkins Treatment Plant is approximately 450 feet east of Aptos Creek and associated riparian habitat.

⁴ The Aptos Village Plan proposes to develop this area as a parking lot (Santa Cruz County, 2010).

Special-Status Plants. With the exception of the riparian corridor along Aptos Creek, native plant communities no longer exist in the vicinity of this highly disturbed site, and vegetative cover in the understory consists primarily of non-native ruderal species. Therefore, the well site and pipeline alignment are not expected to support special-status plants.

Special-Status Wildlife. Aptos Creek, located approximately 450 feet west of the Granite Way–Aptos Village Well site, provides potential aquatic habitat for tidewater goby, steelhead, California red-legged frog, Foothill yellow-legged frog, and southwestern pond turtle. Both tidewater goby and steelhead have been observed in this drainage (CDFG, 2006). Coho salmon (central California coast Evolutionarily Significant Unit) were last reported in Aptos Creek in 1973 (Hagar Environmental Science, 2003). Aptos Creek provides potential habitat for this species, though coho salmon are currently believed to be absent in the vicinity of the T. Hopkins Treatment Plant (Hagar Environmental Science, 2003). Oaks and other trees within woodland and riparian habitat and ornamental landscaping on the project site may support nesting raptors, including Cooper’s hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite, and other special-status birds. Pallid bat, Pacific western big-eared bat, long-eared myotis, and long-legged myotis may roost in these trees as well. Yellow warbler (*Dendroica petechia brewsteri*) and yellow-breasted chat (*Icteria virens*) may nest within riparian vegetation along Aptos Creek. This area also provides potential habitat for San Francisco dusky-footed woodrat, though nests of this species were not observed during the ESA site visit.

Polo Grounds Well Site

The existing irrigation well at the Polo Grounds Well site is located within non-native annual grassland at the eastern end of the Polo Grounds Regional Park. Valencia Creek and associated riparian habitat form the northern boundary of the park. The alignment of the proposed potable water pipeline that connects to South Polo Drive runs southwest through non-native annual grassland, then along the paved park road and through turf grass and ornamental landscaping to the existing water main within South Polo Drive. The alignment of the proposed sanitary sewer lateral that connects to North Polo Drive, runs southwest through non-native grassland and along the paved park road before heading north across turf grass, west through ruderal habitat adjacent to the northern terminus of North Polo Drive. Polo Grounds Regional Park is bordered by Valencia Creek and redwood forest to the north, oak woodland and coastal scrub to the east and south, and residential development to the west. The proposed connection to the stormwater drainage system would extend west approximately 1,100 feet from the location of the existing irrigation well along the northern margin of the great meadow to an existing storm drain that discharges to Valencia Creek. Valencia Creek is a designated biotic resource⁵ under the 1994 Santa Cruz County General Plan (Santa Cruz County, 1994).

Special-Status Plants. Grasslands at the Polo Grounds Well site are not expected to support Santa Cruz tarplant or other special-status plant species due to their dense cover and general lack of a native plant species component. In similar fashion, coastal scrub at the Polo Grounds Well site is

⁵ Biotic resources, as defined in the 1994 Santa Cruz County General Plan, are areas of special biological significance.

not expected to support special-status plant species due to the dense herbaceous and shrub layers and lack of openings in the shrub canopy. The second-growth redwood forest along Valencia Creek is not expected to support special-status plant species due to high disturbance levels from recreational use and the prevalence of dense groundcover (primarily California blackberry) in other areas.

Special-Status Wildlife. Valencia Creek provides potential aquatic habitat for tidewater goby, steelhead, California red-legged frog, Foothill yellow-legged frog, and southwestern pond turtle. Both tidewater goby and steelhead have been observed in this drainage (CDFG, 2006). As discussed above, Valencia Creek provides potential habitat for coho salmon, though this species is currently believed to be absent from the site vicinity. Oaks and other trees within woodland and riparian habitat and ornamental landscaping on the site may support nesting raptors (including Cooper's hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite), Vaux's swift, and other special-status birds. Pallid bat, Pacific western big-eared bat, long-eared myotis, and long-legged myotis may roost in these trees as well. Yellow warbler (*Dendroica petechia brewsteri*) and yellow-breasted chat (*Icteria virens*) may nest within riparian vegetation along Valencia Creek. This area and woodland surrounding the site also provides potential habitat for San Francisco dusky-footed woodrat, though nests of this species were not observed during the ESA site visit.

Critical Habitat

Monterey Spineflower, Robust Spineflower, and Santa Cruz Tarplant. In 2002, the USFWS designated critical habitat for three federally listed plant species in the project region: Monterey spineflower, robust spineflower, and Santa Cruz tarplant (USFWS, 2002a; 2002b; 2002c). None of the proposed well sites are located within designated critical habitat for these species. However, the O'Neill Ranch Well site is within 300 feet of Santa Cruz tarplant critical habitat Unit G, which is located to the north across the ephemeral stream, and the Cunnison Lane Well site is within 0.5 mile of Unit H. The Austrian Way Well site is within 1.3 miles of Unit H. The Polo Grounds Well site is within 0.5 mile of robust spineflower critical habitat Units C and D, and within 0.5 mile of Monterey spineflower critical habitat Unit F.

Scotts Valley Spineflower and Scotts Valley Polygonum. Two critical habitats for these two species endemic to Scotts Valley were designated by USFWS in 2002 and 2003 (USFWS, 2003), respectively. Both species share the same critical habitat units, which are located on either side of Highway 17 in the vicinity of Vine Hill Way in Scotts Valley. None of the proposed well sites are located within these designated critical habitat units, which are approximately 5 miles distant from the project area.

Zayante Band-winged Grasshopper. USFWS designated critical habitat for the Zayante band-winged grasshopper in 2001 (USFWS, 2001). However, none of the proposed well sites are located within designated critical habitat units for this grasshopper, which are located in the mountains between Highway 17 and Highway 9 to the west of the project area and north of Highway 1.

Central California Coast Steelhead. Critical habitat for the central California coast Evolutionarily Significant Unit of steelhead was designated in September 2005 and went into effect on January 2, 2006. The critical habitat designation includes all areas that are known or assumed occupied by

the species and that contain physical and biological features essential to the conservation of the species (NMFS, 2005). Critical habitat is designated in both the Soquel Creek and Aptos Creek watersheds. Within the Soquel Creek watershed, the critical habitat designation includes the main stem of Soquel Creek, the West and East Branches, Moores Gulch, and Bates, Hester, and Hinckley Creeks. In the Aptos Creek watershed, the main stem Aptos Creek as well as Valencia Creek have been designated. Streams providing critical habitat in the vicinity of the proposed well sites include Soquel Creek, Aptos Creek, and Valencia Creek.

California Red-Legged Frog. The USFWS designated critical habitat for California red-legged frog in 2006 (USFWS, 2006). This designation includes two units within Santa Cruz County: SCZ-1 North Coastal Santa Cruz County and SCZ-2 Watsonville Slough. Neither of these units is located in the vicinity of the WMP area. USFWS has recently proposed revisions to California red-legged frog critical habitat (USFWS, 2008). The size of SCZ-1 would be expanded significantly and SCZ-2 would remain the same. None of the proposed well sites would be located within the revised critical habitat.

3.5.4 Regulatory Framework

The following framework discusses applicable biology-related federal, state, and local regulations.

Regulation of Special-Status Species

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (16 United States Code [USC] 1533[c]). Pursuant to the requirements of FESA, a federal agency reviewing a proposed project within its jurisdiction must determine whether any federally listed, threatened, or endangered species or species proposed for federal listing may be present in the project area, and whether the project would have a potentially significant impact on such species. In addition, the federal agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed for listing under FESA or to result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]). Substantial adverse impacts on these species or their habitats would be considered potentially significant in this EIR.

Procedures for addressing federally listed species follow two principal pathways, both of which require consultation with the USFWS, which administers FESA for all terrestrial species, or the National Marine Fisheries Service (NMFS), which administers FESA for all fish species. The first pathway (FESA, Section 10(a) Incidental Take Permit) is set up for situations where a nonfederal government entity (or where no federal nexus exists) must resolve potential adverse impacts to species protected under FESA. The second pathway (FESA, Section 7 Consultation) involves projects with a federal connection or requirement; typically these are projects where a federal lead agency is sponsoring or permitting the proposed project. For example, a permit from the U.S. Army Corps of Engineers may be required if a project would result in wetland impacts. In these instances, the

federal lead agency (e.g., the Corps) initiates and coordinates the following steps: informal consultation with the USFWS to establish a list of target species; preparation of a biological assessment to evaluate the potential for the project to adversely affect listed species; coordination between state and federal biological resource agencies to assess impacts/proposed mitigation; and development of appropriate mitigation for all significant impacts on federally listed species.

The FESA administering agency ultimately issues a final biological opinion on whether the project would affect a federally listed species. A Section 10(a) Endangered Species Incidental Take Permit would be necessary when the “taking”⁶ or harming of a species is incidental to the lawful operation of a project.

The USFWS also publishes a list of candidate species. Species on this list receive special attention from federal agencies during environmental review, although they are not otherwise protected under FESA. Candidate species are those for which the USFWS has sufficient biological information to support a proposal to list as endangered or threatened.

Species listed under FESA that are known or likely to occur in the WMP area and that could be affected by the WMP include tidewater goby, central California coast steelhead, central California coast coho salmon, California red-legged frog, and Santa Cruz tarplant (see Appendix D).

California Endangered Species Act

Section 2080 of the California Fish and Game Code prohibits the taking of plants and wildlife listed under the authority of the California Endangered Species Act of 1984 (CESA). In accordance with CESA, the CDFG maintains lists of threatened and endangered species (California Fish and Game Code 2070). The CDFG also maintains a list of candidate species, which are species the CDFG has formally noticed as being under review for addition to either the list of endangered species or the list of threatened species, and a list of species of special concern that serves as a watch list. Pursuant to the requirements of CESA, an agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the WMP area, and whether implementation of the WMP components would have a potentially significant impact on such species.

The only species listed under CESA that is known or likely to occur in the WMP area and that could be affected by the WMP is Santa Cruz tarplant (see Appendix D).

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or wildlife.

⁶ Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct.

This section was included in the guidelines primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on, for example, a candidate species that has not yet been listed by either the USFWS or CDFG. Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

CEQA also calls for the protection of other locally or regionally significant resources, including natural communities. Although natural communities do not at present have legal protection of any kind, CEQA calls for an assessment of whether any such resources would be affected and requires a finding of significance if there would be substantial losses. Natural communities listed by the CNDDDB as sensitive are considered by CDFG to be significant resources and fall under the CEQA Guidelines for addressing impacts. Local planning documents such as general plans often identify these resources as well.

Resources covered under this protection that occur in the WMP area include special-status plant species and riparian forests.

Other Statutes, Codes, and Policies Affording Limited Species Protection

Migratory Bird Treaty Act. The federal Migratory Bird Treaty Act (16 USC, Section 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. Birds of prey are protected in California under the Fish and Game Code, Section 3503.5, 1992. Section 3503.5 states that it is “unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.” Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “taking” by the CDFG. Any loss of fertile eggs, nesting raptors, or any activities resulting in nest abandonment would constitute a significant impact. Project impacts to these species are not considered significant in this EIR unless the species are known or have a high potential to nest in the WMP area or to rely on it for primary foraging.

Plants. The legal framework and authority for the state’s program to conserve plants are woven from various legislative sources, including CESA, the California Native Plant Protection Act (Fish and Game Code Section 1900–1913), the CEQA Guidelines, and the Natural Communities Conservation Planning Act.

The Native Plant Protection Act of 1977 (Fish and Game Code Section 1900 et seq.) gives the CDFG authority to designate state endangered, threatened, and rare plants and provides specific protection measures for identified populations. Sensitive plant and wildlife species that would qualify for listing but are not currently listed are afforded protection under CEQA. The CEQA Guidelines, Section 15065 (“Mandatory Findings of Significance”) requires that a reduction in numbers of a rare or endangered species be considered a significant effect. CEQA Guidelines

Section 15380 (“Rare or Endangered Species”) provides for the assessment of unlisted species as rare or endangered under CEQA if the species can be shown to meet the criteria for listing.

The California Native Plant Society (CNPS) maintains a list of special-status plant species based on collected scientific information. Designation of these species by the CNPS does not confer legal status or protection under federal or state endangered species legislation. CNPS designations are as follows:

- List 1A (plants presumed extinct)
- List 1B (plants rare, threatened, or endangered in California and elsewhere)
- List 2 (plants rare, threatened, or endangered in California, but more numerous elsewhere)
- List 3 (plants about which more information is needed – a review list)
- List 4 (plants of limited distribution – a watch list)

In general, plants appearing on CNPS List 1A, 1B, or 2 meet the criteria of Section 15380 of the CEQA Guidelines; thus, substantial adverse effects to these species would be considered significant. CNPS List 1A, 1B, or 2 plants also meet the definitions provided in California Fish and Game Code Section 1901 (Native Plant Protection Act) or Sections 2062 and 2067 (CESA). Although a number of special-status plants meeting these criteria are known to occur in the WMP area, none of them are expected to occur at or in the immediate vicinity of the proposed well sites; therefore, no special-status plants meeting the criteria would be affected by WMP implementation.

Wetlands

U.S. Army Corps of Engineers

Wetlands and other waters (e.g., rivers, streams, and natural ponds) are a subset of “waters of the U.S.,”⁷ and receive protection under Section 404 of the Clean Water Act (CWA). The U.S. Army Corps of Engineers has primary federal responsibility for administering regulations that concern waters of the U.S. In this regard, the Corps acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in “navigable waters,”⁸ and the Clean Water Act (Section 404), which governs specified activities in waters of the U.S., including wetlands.

⁷ The term “waters of the U.S.,” as defined in Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]), includes: (1) all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (2) all interstate waters, including interstate wetlands; (3) all other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce, including any such waters that are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce; (4) all impoundments of waters otherwise defined as waters of the U.S. under the definition; (5) tributaries of waters identified in numbers (1) through (4); (6) territorial seas; and (7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in numbers (1) through (6).

⁸ Navigable waters are defined as those waters that are subject to the ebb and flow of the tide or that are presently used, have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

The Corps requires a permit if a project proposes placement of structures within navigable waters and/or alteration of waters of the U.S. Some classes of fill activities may be authorized under Regional General or Nationwide permits if specific conditions are met. The construction and operations proposed under the WMP would not result in the placement of fill within a stream or wetland and will therefore not require Section 404 permitting.

Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB) regulates waters of the state under the Porter-Cologne Water Quality Control Act. In addition, under Section 401 of the Clean Water Act, the RWQCB has review authority over Section 404 permits. The RWQCB has a policy of no net loss of wetlands and typically requires mitigation for all impacts to wetlands before it will issue a water quality certification. Dredging, filling, or excavation of waters of the state constitutes a discharge of waste to such waters, and prospective dischargers are required to submit a report of waste discharge to the RWQCB.

California Department of Fish and Game

Under Sections 1600–1616 of the California Fish and Game Code, the CDFG regulates activities that would substantially divert, obstruct the natural flow of, or substantially change rivers, streams, and lakes. The jurisdictional limits of the CDFG are defined in Section 1602 of the Fish and Game Code as the “bed, channel, or bank of any river, stream, or lake,” or any activity that would “deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.” The CDFG requires a streambed alteration agreement for activities within its jurisdictional area. Potential impacts to the jurisdictional area of the CDFG are considered significant in this EIR.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed improvements evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. However, although the SqCWD is not legally bound to the land use plans and policies of Santa Cruz County, these plans and policies are discussed in this section with respect to the second and fifth significance criteria in Section 3.5.5, below. The second criterion indicates a project would have a significant effect on the environment if it were to “have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS”; the fifth criterion indicates a project would result in a significant effect if it were to “conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.” None of the proposed well sites are within the incorporated limits of the City of Capitola or in the Local Coastal Zone, therefore, ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.

While the District is exempt from all zoning and building ordinances for water production projects per California Government Code Section 53091 (d) and (e), the District anticipates utilizing Santa Cruz County's Riparian Corridor and Wetland Protection standards as guidelines during project implementation where appropriate.

1994 Santa Cruz County General Plan

The Santa Cruz County General Plan (Santa Cruz County, 1994) identifies sensitive habitats in the project area and provides objectives and policies for their management.

Objective 5.1: Biological Diversity. To maintain the biological diversity of the County through an integrated program of open space acquisition and protection, identification and protection of habitat and wildlife corridors and habitats, low-intensity and resource-compatible land uses in sensitive habitats and mitigations on projects and resource extraction to reduce impacts on plant and animal life.

Policy 5.1.1: Sensitive Habitat Designation. The following areas are among those designated as sensitive habitat:

- a) Areas that provide habitat for locally unique biotic species/communities, including, but not limited to, coastal scrub;
- b) Areas adjacent to essential habitats or rare, endangered, or threatened species as defined below;
- c) Areas that provide habitat for species of special concern as listed by the CDFG in the Special Animals List, CNDDb;
- d) Areas that provide habitat for rare or endangered species that meet the definition of Section 15380 of CEQA;
- e) Areas that provide habitat for rare, threatened or endangered species as designated by the State Fish and Game Commission, USFWS, or CNPS;
- f) All lakes, wetlands, estuaries, lagoons, streams, and rivers; and
- g) Riparian corridors.

Policy 5.1.4: Sensitive Habitat Protection Ordinance. Implement the protection of sensitive habitats by maintaining the existing Sensitive Habitat Protection ordinance. The ordinance identifies sensitive habitats, determines which uses are allowed in and adjacent to sensitive habitats, and specifies required performance standards for land in or adjacent to those areas. Any amendments to this ordinance will require a finding that sensitive habitats will be afforded equal or greater protection by the amended language.

Policy 5.1.6: Land Division and Density Requirements in Sensitive Habitats. Sensitive habitats will be protected against any significant disruption of habitat values: and any proposed development within or adjacent to these areas must maintain or enhance the functional capacity of the habitat. Reduce in scale, redesign, or if no other alternative exists, deny any project which cannot sufficiently mitigate significant adverse impacts on sensitive habitats unless approval of a project is legally necessary to allow a reasonable use of the land.

Policy 5.1.11: Wildlife Resources Beyond Sensitive Habitats. For areas that may not meet the definition of sensitive habitat, yet contain valuable wildlife resources (such as

migration corridors or exceptional diversity), protect these wildlife habitat values and species and use other mitigation measures identified through environmental review process.

Policy 5.1.12: Habitat Restoration with Development Approval. Require as a condition of development approval, restoration of any areas of the subject property that is identified as degraded sensitive habitat, with the magnitude of restoration to be commensurate with the scope of the project. Such conditions may include erosion control measures, removal of non-native or invasive species, planting with characteristic native species, diversion of polluting runoff, water impoundment, and other appropriate means. The object of habitat restoration activities will be to enhance the functional capacity and biological productivity of the habitat(s) and whenever feasible, to restore them to a condition which can be sustained by natural occurrences, such as tidal flushing of lagoons.

Objective 5.2: Riparian Corridors and Wetlands. To preserve, protect, and restore all riparian corridors and wetlands for the protection of wildlife and aquatic habitat, water quality, erosion control, open space, aesthetic and recreational values and conveyance and storage of flood waters.

Policy 5.2.1: Designation of Riparian Corridors and Wetlands. Designate the following areas as Riparian Corridors:

- a) 50 feet from the top of a distinct channel or physical evidence of high water mark on perennial stream;
- b) 30 feet from the top of a distinct channel or physical evidence of high water mark of an intermittent stream as designated from the general plan maps and through field inspection of undesignated intermittent and ephemeral streams;
- c) 100 feet from the high water mark of a lake, wetland, estuary, lagoon, or natural body of standing water;
- d) The landward limit of a riparian woodland community; and
- e) Wooded arroyos within urban areas.

Wetlands are transitional areas between terrestrial and aquatic systems are where the water table is usually at or near the surface, or the land is covered by shallow water. Under a unified methodology now used by all federal agencies, wetlands are defined as “those areas meeting certain criteria for hydrology, vegetation, and soils.” Examples of wetlands are saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.

Policy 5.2.2: Riparian Corridor and Wetland Protection Ordinance. Implement the protection of Riparian Corridors and Wetlands through the Riparian Corridor and Wetland Protection ordinance (Title 16 Environmental and Resource Protection, Chapter 16.30 Riparian Corridor and Wetlands Protection). The ordinance identifies and defines riparian corridors and wetlands, determines the uses that are allowed in and adjacent to these habitats, and specifies required buffer setbacks and performance standards for land in and adjacent to these areas. Any amendments to this ordinance will require a finding that riparian corridors and wetlands will be afforded equal or greater protection by the amended language.

Policy 5.2.3: Activities within Riparian Corridors and Wetlands. Development activities, land alteration, and vegetation disturbance within riparian corridors and wetlands and

required buffers will be prohibited unless an exception is granted per the Riparian Corridor and Wetlands Protection Ordinance.

Policy 5.2.4: Riparian Corridor Buffer Setback. Require a buffer setback from riparian corridors in addition to the specified distances found in the definition of riparian corridor. This setback will be identified in the Riparian Corridor and Wetland Protection ordinance and established based on stream characteristics, vegetation and slope. Allow reductions to the buffer setback only upon approval of a riparian exception. Require a 10-foot separation from the edge of the riparian corridor buffer to any structure. For wetlands, the buffer setback is included in the riparian corridor which surrounds the wetland.

Policy 5.2.7: Compatible Uses with Riparian Corridors. Allow compatible uses in and adjacent to riparian corridors that do not impair or degrade the riparian plant and animal systems, or water supply values, such as non-motorized recreation and pedestrian trails, parks, interpretive facilities, and fishing facilities.

Santa Cruz County Riparian Corridor and Wetlands Protection Ordinance

Santa Cruz County (Title 16, Environmental and Resource Protection, Chapter 16.30, Riparian Corridor and Wetlands Protection) regulates riparian corridors and protects wetlands. The purpose of the code is to eliminate or minimize development activities in the riparian corridor in order to preserve, protect, and restore riparian corridors for: the protection of wildlife habitat, water quality, aquatic habitat, open space, and cultural, historical, archeological, paleontological, and aesthetic values; the transportation and storage of floodwaters; and the prevention of erosion. In the event development within a riparian corridor or wetland cannot be avoided, the ordinance requires that appropriate mitigation measures be implemented to avoid impacts on these resources. For example, development activities requiring tree removal within a riparian corridor could mitigate the impact by tree replacement and monitoring, exotic species removal, and/or habitat restoration. Suitable mitigation is determined on a case-by-case basis.

3.5.5 Impacts and Mitigation Measures

Significance Criteria

Criteria outlined in the CEQA Guidelines were used to determine the level of significance of identified impacts to biological resources. These criteria are discussed below.

CEQA Guidelines Section 15065 directs lead agencies to find that a project may have a significant effect if it has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish and wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or wildlife community, reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory.

CEQA Guidelines Section 15380 further provides that a plant or wildlife species, even if not on one of the official lists, may be treated as “rare or endangered” if, for example, it is likely to become endangered in the foreseeable future.

CEQA Guidelines Section 15382 identifies a significant effect on the environment as a “...substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.”

Appendix G of the CEQA Guidelines (as revised) indicates that implementation of the WMP and its components would have a significant effect on the environment if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

In addition to the significance criteria above, the CDFG and USFWS consider a project to have a significant impact if it were to:

- Cause a change in species composition or result in the measurable degradation of sensitive habitats such as wetlands, oak woodlands, and/or perennial grasslands.

Approach to Analysis

Potential impacts to biological resources are presented individually for each proposed well site. As indicated, mitigation would be implemented on a site-by-site basis to reduce the collective impacts of the proposed WMP to less-than-significant levels. Potential impacts resulting from implementation of the proposed WMP components were evaluated based on a field reconnaissance survey performed by qualified ESA biologists and a review of the following sources:

- Existing resource maps and aerial photographs of the proposed well sites and pipeline alignments.
- Data presented in the CNDDDB and the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California, and an unofficial species list for Santa Cruz County from the USFWS (2010).
- Standard biological references (e.g., Hickman, 1993; Mayer and Laudenslayer, 1988; Thomas, 1961).

- Previous environmental impact reports, other environmental documents, and resources surveys for the general WMP area.
- Other available literature regarding the natural resources of the area.

Based on site visits conducted by ESA biologists in June 2006, and review of relevant maps and biological resources documentation for the WMP area, a list was prepared of special-status species that were observed or had the potential to occur due to the presence of basic habitat types. Species were then evaluated to determine their potential to occur. Species with a low potential to occur are species whose known current distribution or range does not include the WMP area, species whose specific habitat requirements (e.g., serpentine grasslands, as opposed to grasslands occurring on other soils) are not present, or species that are presumed to have been extirpated from the WMP area. Species with a moderate potential to occur are those for whom suitable habitat is present at one or more project sites, even though the species have not necessarily been observed during general biological surveys conducted at the project sites.

Impact Summary

**TABLE 3.5-2
SUMMARY OF IMPACTS – BIOLOGICAL RESOURCES**

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.5-1: Construction activities could result in temporary disturbance to or mortality of Santa Cruz tarplant, a federal and state endangered species.	N/A	PSM	PSM	N/A	N/A
Impact 3.5-2: Construction activities could result in removal of or damage to mature oaks and riparian trees that are within or adjacent to the construction footprint.	PSM	PSM	PSM	PSM	PSM
Impact 3.5-3: Construction activities could result in impacts to aquatic habitat through degradation of water quality and impacts to riparian habitat through tree removal.	PSM	PSM	PSM	PSM	PSM
Impact 3.5-4: Construction activities could result in impacts to special-status aquatic species.	PSM	PSM	N/A	N/A	PSM
Impact 3.5-5: Implementation of the WMP could result in impacts to special-status bird species.	PSM	PSM	PSM	PSM	PSM
Impact 3.5-6: Implementation of the WMP could result in impacts to special-status bat species.	PSM	PSM	PSM	PSM	PSM
Impact 3.5-7: Implementation of the WMP could result in impacts to San Francisco dusky-footed woodrat.	PSM	PSM	PSM	N/A	PSM
Impact 3.5-8: Implementation of the WMP could result in impacts to common wildlife and migratory wildlife corridors.	LS	LS	LS	LS	LS
Impact 3.5-9: Project operations could have adverse effects on special-status fish species.	LS	LS	LS	LS	LS

LS = Less than Significant impact, no mitigation required

PSM = Potentially Significant impact, can be Mitigated to less than significant

N/A = Not Applicable or no impact

Impact Discussion

Impact 3.5-1: Construction activities could result in temporary disturbance or mortality of Santa Cruz tarplant, a federal and state endangered species.

Project-related construction activities have the potential to adversely affect potential habitat for Santa Cruz tarplant, a federal and state endangered plant species known to occur in the Santa Cruz coastal region.

O'Neill Ranch Well Site

Proposed construction activities at the O'Neill Ranch Well site would primarily occur in disturbed non-native grassland, with relatively minor work occurring in oak woodland and riparian habitat. Pipelines associated with the O'Neill Ranch Well would be installed within the Soquel Drive right-of-way. As noted above, this site is not expected to support Santa Cruz tarplant due to the quality and types of habitat that occur there. Therefore, construction activities at this site would have no impact on Santa Cruz tarplant, and no mitigation is necessary.

Cunnison Lane Well Site

The mixed grassland at the Cunnison Lane Well site has the potential to support Santa Cruz tarplant. Construction activities at this site could result in indirect and direct disturbance or mortality as a result of well drilling, trenching for pipelines, and stockpiling soil and materials. Construction effects could include trampling and other soil compaction as well as removal of, or damage to, individual plants. Therefore, construction of the proposed well and treatment plant at this site would result in a potentially significant impact on this federal and state endangered species. However, with implementation of **Mitigation Measures 3.5-1a (Botanical Surveys for Santa Cruz Tarplant)** and **3.5-1b (Avoidance Measures for Santa Cruz Tarplant)**, which would require pre-construction surveys and avoidance measures for Santa Cruz tarplant, potential impacts to Santa Cruz tarplant would be reduced to a less-than-significant level.

Austrian Way Well Site

Construction activities at the Austrian Way Well site would primarily take place in densely canopied oak woodland with a sparse understory that is not expected to include special-status plants or to support Santa Cruz tarplant. However, the mixed grassland bordering the access road to this site has the potential to support this special-status species. The pipelines connecting new facilities to the existing sanitary sewer, stormwater drainage, and water distribution systems would be located within this access road. The project would result in a potentially significant impact on Santa Cruz tarplant if the potential habitat afforded by the mixed grassland was used for laydown, spoils storage, or otherwise disturbed by construction activities. However, with implementation of **Mitigation Measures 3.5-1a (Botanical Surveys for Santa Cruz Tarplant)** and **3.5-1b (Avoidance Measures for Santa Cruz Tarplant)**, potential impacts to Santa Cruz tarplant would be reduced to a less-than-significant level.

Granite Way–Aptos Village Well Site

Proposed well construction and pipeline installation activities at the Granite Way–Aptos Village Well site would primarily occur in areas currently characterized as barren and ruderal. As noted above, this site is not expected to support Santa Cruz tarplant due to the quality and type of habitats that occur there. Therefore, no impact on Santa Cruz tarplant is anticipated, and no mitigation is necessary.

Polo Grounds Well Site

Proposed grading activities related to the conversion of the existing irrigation well to a municipal well, construction of water treatment plant, and pipeline installation activities at the Polo Grounds Well site would primarily occur in non-native grassland and developed and ornamental areas, as well as within existing roadways. As noted above, this site is not expected to support Santa Cruz tarplant due to the quality and type of habitats that occur there. Therefore, no impact on Santa Cruz tarplant is anticipated, and no mitigation is necessary.

Mitigation Measures

Measure 3.5-1a: Botanical Surveys for Santa Cruz Tarplant (applies to Cunnison Lane and Austrian Way Well sites). A qualified botanist shall conduct presence/absence survey for Santa Cruz tarplant within the limits of construction.

- Surveys shall be conducted in accordance with USFWS survey guidelines.
- Surveys shall be conducted prior to the start of construction, during the period when the species is identifiable and repeated seasonally, as needed, to provide a complete species list.
- The results of the surveys shall be filed as part of the project administrative record; if the presence of Santa Cruz tarplant is confirmed, a copy of the survey results shall also be forwarded to the USFWS and/or CDFG as appropriate.
- In the event that Santa Cruz tarplant is proven absent, then no additional mitigation is necessary.

Measure 3.5-1b: Avoidance Measures for Santa Cruz Tarplant (applies to Cunnison Lane and Austrian Way Well sites). In the event that Santa Cruz tarplant is present or assumed present, the District and its contractor(s) shall avoid disturbance to the species by establishing a visible buffer zone prior to construction in coordination with a qualified biologist, or by redesigning or relocating the proposed structure and/or staging area.

- The appropriate buffer zone would be established during subsequent environmental review following presence/absence surveys.
- In the event it is not feasible to avoid disturbance to Santa Cruz tarplant, the appropriate federal and state agencies shall be consulted.
- If the project requires a federal permit, the District shall consult with the USFWS to obtain a Biological Opinion following completion of a Biological Assessment and shall determine appropriate avoidance and/or mitigation requirements.

- The District shall consult with the CDFG to obtain a Section 2081 permit or letter of concurrence from the CDFG and shall determine appropriate avoidance and/or mitigation requirements.
- Agency requirements may include redesigning or relocating the proposed well outside the area of Santa Cruz tarplant occurrence or establishing a Santa Cruz tarplant mitigation area, which would be preserved in perpetuity.

Significance after Mitigation: Less than Significant.

Impact 3.5-2: Construction activities could result in removal of or damage to mature oaks and riparian trees that are within or adjacent to the construction footprint.

A number of large-diameter, and often multi-stemmed, oaks and riparian trees are located within or adjacent to the construction footprints for the proposed well sites and pipeline alignments. Some of these trees may require removal to accommodate the proposed facilities, or could be damaged during construction activities. Trees that occur within or immediately adjacent to the construction footprint could be damaged by construction activities such as excavating, grading, and soil compaction. Extensive damage to branches, trunks, or roots could result in tree mortality.

While the District is exempt from County's zoning and building regulations, the District proposes to utilize Santa Cruz County's Riparian Corridor and Wetland Protection standards as guidelines during project implementation. Implementation of **Mitigation Measures 3.5-2a (Tree Survey)**, **3.5-2b (Protective Measures for Mature Trees)**, **3.5-2c (Tree Replacement)**, and **3.5-2d (Monitoring for Replacement Plantings)** were developed to be consistent with the Riparian Corridor and Wetland Protection Ordinance. These mitigation measures would only be applied to mature trees within the riparian corridor or other sensitive habitat, such as oak woodland.

O'Neill Ranch Well Site

Although the majority of the construction activities at the O'Neill Ranch Well site would occur in disturbed non-native grassland, a number of oak trees are present along the northern boundary of the construction footprint. Portions of the proposed well and treatment facilities could require construction within the dripline of several oak trees and require tree removal or result in damage to oak trees. Therefore, construction activities at the O'Neill Ranch Well site could result in a potentially significant impact on mature oaks and riparian trees. However, with implementation of **Mitigation Measures 3.5-2a (Tree Survey)**, **3.5-2b (Protective Measures for Mature Trees)**, **3.5-2c (Tree Replacement)**, and **3.5-2d (Monitoring for Replacement Plantings)**, which would require provisions for the protection of trees to be preserved, the replacement of mature trees that are removed, and monitoring of replacement plantings, this impact would be reduced to a less-than-significant level.

Cunnison Lane Well Site

Construction at the Cunnison Lane Well site would occur primarily in mixed grassland and thus would not likely require the removal of any mature trees. Although construction activities at this site would occur adjacent to the riparian corridor along the unnamed tributary to Noble Gulch that borders the western edge of the property, no mature trees would be removed to accommodate the proposed improvements. However, there is a low possibility that mature trees could be damaged during construction, a potentially significant impact. Implementation of **Mitigation Measures 3.5-2a (Tree Survey), 3.5-2b (Protective Measures for Mature Trees), 3.5-2c (Tree Replacement), and 3.5-2d (Monitoring for Replacement Plantings)** would reduce this impact to a less-than-significant level.

Austrian Way Well Site

Development at the Austrian Way Well site would take place primarily in a densely canopied oak woodland and could result in removal of and/or damage to several oaks and Douglas firs. Thus, construction activities at this site could result in a potentially significant impact on mature trees. However, implementation of **Mitigation Measures 3.5-2a (Tree Survey), 3.5-2b (Protective Measures for Mature Trees), 3.5-2c (Tree Replacement), and 3.5-2d (Monitoring for Replacement Plantings)** would reduce this impact to a less-than-significant level.

Granite Way–Aptos Village Well Site

Proposed well construction and pipeline installation activities for the Granite Way–Aptos Village Well site would primarily occur in an area that is currently barren and ruderal. The proposed well and pipelines would be constructed within the boundaries of the future Aptos Village Plan project. Although there are a number of coast live oak trees in the vicinity of the proposed well site, well construction would not require tree removal, nor would the installation of the proposed 520-foot-long raw groundwater pipeline because this pipeline is proposed within a parking lot that will be developed in the future as part of the Aptos Village Plan project. However, construction could result in damage to mature trees if excavation activities were to occur within tree driplines. This is considered to be a potentially significant impact. However, implementation of **Mitigation Measures 3.5-2b (Protective Measures for Mature Trees), 3.5-2c (Tree Replacement), and 3.5-2d (Monitoring for Replacement Plantings)** would reduce this impact to a less-than-significant level.

Polo Grounds Well Site

Proposed well construction and pipeline installation activities at the Polo Grounds Well site would primarily occur in non-native grassland and developed and ornamental areas. Construction activities could require the unanticipated removal of and/or damage to mature trees along the alignments for the proposed sanitary sewer lateral, potable water pipeline, and lateral connection to the stormwater drainage system, particularly where these pipeline alignments are adjacent to the riparian corridor of Valencia Creek. Removal of, or damage to, mature trees within the riparian corridor would be considered a potentially significant impact. However, implementation of **Mitigation Measures 3.5-2a (Tree Survey), 3.5-2b (Protective**

Measures for Mature Trees), 3.5-2c (Tree Replacement), and 3.5-2d (Monitoring for Replacement Plantings) would reduce this impact to a less-than-significant level.

Mitigation Measures

Measure 3.5-2a: Tree Survey (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Polo Grounds Well sites). Prior to the commencement of construction activities, the SqCWD shall conduct a tree survey that includes a map indicating the size and species of all mature riparian trees or oaks within, or immediately adjacent to, the construction footprint. All surveyed trees shall be tagged with a unique identifier. For the purposes of the tree surveys, mature trees are defined as follows:

- Any single oak tree which is equal to or greater than 6 inches diameter at breast height (dbh).
- All other trees with a 12-inch dbh or greater.

Measure 3.5-2b: Protective Measures for Mature Trees (applies to all sites). Prior to the commencement of construction activities at each well site, the SqCWD shall clearly identify mature riparian or oak trees to be removed and retained.

- Prior to the start of construction activities, mature trees that will be preserved that occur adjacent to, or within, the construction zone shall be tagged with a unique identifier and clearly delineated by installing protective fencing material around the dripline of each tree.
- The delineation markers shall remain in place for the duration of construction activities.
- Where construction activities must encroach upon the dripline of a mature tree, special construction techniques shall be employed to allow the roots of remaining trees within the project site to breathe and obtain water (examples include, but are not limited to, using hand equipment for trenching and allowing only one excavation across a tree's dripline). Tree wells or other techniques may be used where appropriate.
- Excavation adjacent to any trees shall be performed in a manner that causes only minimal root damage.
- The following shall not occur within the dripline of any retained tree: parking, storage of vehicles, equipment, machinery, and stockpiles of excavated soils or construction materials.
- All pruning of retained trees shall be performed by a certified arborist.
- No more than 25 percent of a tree's canopy shall be removed during pruning of retained trees.

Measure 3.5-2c: Tree Replacement (applies to all sites). The SqCWD shall replace mature riparian or oak trees removed or damaged during project-related construction activities in accordance with the following guidelines.

- For each oak tree, equal to or greater than 6 inch dbh, that is removed or damaged during construction activities, the SqCWD shall plant replacement trees of the same oak species, preferably using local stock. Compensation shall be based on dbh of removed trees and replacement shall be at a 1:1 ratio. For example, if a 24-inch dbh oak is removed, then it could be replaced with a single 24-inch dbh tree, two 12-inch dbh trees, or 3 trees with 8-inch dbh, etc.
- The SqCWD shall replace trees at a 1:1 ratio for all other trees that are removed or damaged during construction activities and that are either:
 - a) Equal to or greater than 20-inch dbh;
 - b) Consist of a sprout clump of five or more stems each of which is greater than 12-inch dbh; or
 - c) Any group consisting of five or more trees each of which is greater than 12-inch dbh.
- Non-native trees shall be replaced with native tree species and the compensation shall be based on the total dbh of the removed or damaged trees.
- Where feasible and desirable, replacement trees shall be planted on-site and within the same general area as the trees removed.
- If replanting trees on the same site is not feasible or desirable, the SqCWD shall designate a suitable planting site elsewhere in the same watershed.

Measure 3.5-2d: Monitoring for Replacement Plantings (applies to all sites). The SqCWD shall develop and implement a five-year monitoring program for replacement plantings. Applicable performance standards shall include 100 percent survival rate of replacement plantings and self-sustainable trees at the end of the five years.

Significance after Mitigation: Less than Significant.

Impact 3.5-3: Construction activities could result in impacts to aquatic habitat through degradation of water quality and impacts to riparian habitat through tree removal.

Construction activities could result in increased soil erosion and sedimentation in downstream waterbodies, as well as accidental discharges of toxic construction chemicals that could adversely affect water and aquatic habitat. In addition, if construction activities encroach into riparian corridors and/or require the removal of riparian trees, riparian habitat could be degraded.

As discussed in Section 3.4, Surface Water Hydrology and Water Quality, construction-related impacts to water quality at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites would be reduced to a less-than-significant level with implementation of Mitigation Measures 3.4-1a (Erosion Control Plan) and 3.4-1b (Construction Best Management Practices). These mitigation measures would also address the secondary effects of these construction-related water quality impacts on riparian habitat at these sites. For

construction activities at the Polo Grounds Well site, where soil disturbances would be greater than 1 acre, the District would be required to obtain coverage under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit, and develop and implement a site-specific stormwater pollution prevention plan (SWPPP).

Construction activities at the O'Neill Ranch, Cunnison Lane, and Polo Grounds Well sites could encroach on the riparian corridors of adjacent creeks and drainages. The SqCWD is exempt from County zoning and building regulations and, therefore, no riparian corridor setbacks are required for the project (Deming, 2007). However, appropriate mitigation measures to prevent degradation of the riparian corridor during construction activities are prescribed below.

O'Neill Ranch Well Site

Construction activities at the O'Neill Ranch Well site could encroach on the riparian corridor of the unnamed tributary to Soquel Creek that runs along the northern parcel boundary. Due to the steep site slopes and proximity to the tributary, earthmoving activities at this site could result in increased soil erosion and sediment load in the unnamed tributary to Soquel Creek, and the accidental release of hazardous construction chemicals into site runoff, resulting in potentially significant impacts to aquatic habitat. Since construction activities at the O'Neill Ranch Well site would result in less than 1 acre of soil disturbances, construction activities would not be subject to the requirements of the NPDES Construction General Permit. However, implementation of **Mitigation Measures 3.4-1a (Erosion Control Plan)** and **3.4-1b (Construction Best Management Practices)**, which would require that appropriate erosion/sediment control measures and BMPs be implemented to protect water quality during construction, would thereby provide some protection for aquatic habitat.

As described above in Impact 3.5-2, construction activities could require tree removal or result in damage to oak trees along the riparian corridor of the tributary, resulting in potentially significant impacts to riparian habitat. However, implementation of **Mitigation Measures 3.5-2a (Tree Survey)**, **3.5-2b (Protective Measures for Mature Trees)**, **3.5-2c (Tree Replacement)**, and **3.5-2d (Monitoring for Replacement Plantings)**, which include provisions for the protection of trees to be preserved and the replacement and monitoring of trees to be removed, would address potential impacts to riparian habitat associated with potential removal of or damage to riparian trees. With implementation of these mitigation measures, potential impacts to riparian and aquatic habitat during construction would be reduced to a less-than-significant level.

Cunnison Lane Well Site

Preliminary site plans for the Cunnison Lane Well site indicate the proposed facilities at this site could involve construction within the limits of the riparian corridor. Construction activities at this site could also result in increased soil erosion and the accidental release of hazardous construction chemicals, resulting in potentially significant impacts on riparian habitat. Implementation of **Mitigation Measures 3.4-1a (Erosion Control Plan)** and **3.4-1b (Construction Best Management Practices)** would require that appropriate erosion/sediment control measures and BMPs be implemented to protect water quality during construction, which would thereby provide some protection for aquatic habitat.

It is possible that construction of the proposed facilities at this site would require tree removal or result in damage to mature riparian trees, a potentially significant impact. However, implementation of **Mitigation Measures 3.5-2a (Tree Survey), 3.5-2b (Protective Measures for Mature Trees), 3.5-2c (Tree Replacement), and 3.5-2d (Monitoring for Replacement Plantings)** would include provisions for the protection of trees to be preserved and the replacement and monitoring of trees to be removed. With implementation of these mitigation measures, potential impacts to riparian and aquatic habitat during construction would be reduced to a less-than-significant level.

Austrian Way Well Site

Preliminary site plans for the Austrian Way Well site indicate the proposed well and treatment plant would be sited on relatively level ground, about 350 feet above and 750 feet distant from Aptos Creek. Given the distance from the creek, no direct impacts to riparian habitat would occur at this site. However, construction activities at this site could result in increased soil erosion and the accidental release of hazardous construction chemicals, adversely affecting water quality and aquatic habitat in receiving waterbodies, a potentially significant impact. However, with implementation of **Mitigation Measures 3.4-1a (Erosion Control Plan) and 3.4-1b (Construction Best Management Practices)**, potential impacts to aquatic habitat during construction would be reduced to a less-than-significant level.

Granite Way–Aptos Village Well Site

Proposed well construction and pipeline installation activities at the Granite Way–Aptos Village Well site would not occur within the bed and banks of Aptos Creek or associated riparian habitat. However, eroded sediment or hazardous construction chemicals could be accidentally released to downstream waterbodies during construction activities, potentially resulting in adverse effects on aquatic habitat. This impact is considered potentially significant.

Implementation of **Mitigation Measures 3.4-1a (Erosion Control Plan) and 3.4-1b (Construction Best Management Practices)** would protect water quality during construction, thereby reducing impacts to aquatic habitat to a less-than-significant level.

Polo Grounds Well Site

Proposed construction activities at the Polo Grounds Well site could result in potential impacts to aquatic and riparian habitat along Valencia Creek. Construction activities at this site could also result in the accidental discharge of eroded sediment or hazardous construction chemicals into the creek. Construction activities at the Polo Grounds Well site would result in soil disturbances of greater than 1 acre and therefore would be subject to the requirements of the NPDES Construction General Permit. The site-specific SWPPP that would be prepared and implemented during construction activities would ensure secondary impacts to aquatic habitat associated with potential degradation of water quality are less than significant.

However, installation of pipelines could require tree removal or result in damage to mature trees in the riparian corridor, a potentially significant impact. Implementation of **Mitigation Measures 3.5-2a (Tree Survey), 3.5-2b (Protective Measures for Mature Trees), 3.5-2c (Tree**

Replacement), and **3.5-2d (Monitoring for Replacement Plantings)**, which include provisions for the protection of trees to be preserved and the replacement and monitoring of trees to be removed, would address potential impacts to riparian habitat associated with removal of or damage to trees. With implementation of these mitigation measures and mandatory compliance with NPDES Construction General Permit requirements, impacts to riparian and aquatic habitat during construction would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.4-1a: Erosion Control Plan. See Section 3.4, Surface Water Hydrology and Water Quality, for description.

Measure 3.4-1b: Construction Best Management Practices. See Section 3.4, Surface Water Hydrology and Water Quality, for description.

Measure 3.5-2a: Tree Survey. See description above.

Measure 3.5-2b: Protective Measures for Mature Trees. See description above.

Measure 3.5-2c: Tree Replacement. See description above.

Measure 3.5-2d: Monitoring for Replacement Plantings. See description above.

Significance after Mitigation: Less than Significant.

Impact 3.5-4: Construction activities could result in impacts to special-status aquatic species.

Valencia, Aptos, and Soquel Creeks provide potential habitat for central California coast steelhead and central California coast coho salmon. California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle may occur at some of the proposed well sites. At the O'Neill Ranch, Cunnison Lane, and Polo Grounds Well sites, project construction could require the removal of riparian vegetation, which could adversely affect sensitive habitat for these species. Construction activities near creeks and drainages could also result in mortality or other adverse impacts to special-status aquatic species by altering stream substrate or other habitat features or disrupting essential migratory corridors. Direct mortality of special-status aquatic species could occur from entrapment in open trenches or from construction equipment.

O'Neill Ranch Well Site

Soquel Creek is known to support migratory and spawning habitat for both tidewater goby and central California coast steelhead. Central California coast coho salmon also have the potential to occur in Soquel Creek. The tributary to Soquel Creek along the northern boundary of the project site is ephemeral, indicating that it would not provide aquatic habitat for long enough during the year to support a spawning steelhead population. Fine-grained sediment in the streambed makes it unsuitable as spawning habitat for steelhead. In addition, the final 1,000 feet of the tributary

upstream of its confluence with Soquel Creek is culverted, which provides a significant barrier for steelhead migration. However, California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle may occur in the tributary. Construction activities associated with the well and treatment facilities could result in soil erosion and increased sediment loads in the tributary, thereby adversely affecting special-status aquatic species in the tributary and downstream in Soquel Creek, a potentially significant impact. **Mitigation Measures 3.5-4a (Biological Monitor and Biological Resources Education Program), 3.5-4b (Avoidance Measures for Special-Status Aquatic Species), and 3.5-4c (Construction Monitoring)** would require a permitted biological monitor, a worker education program, exclusion fencing, and construction monitoring. With implementation of these mitigation measures, potentially significant impacts to special-status aquatic species would be reduced to a less-than-significant level.

Cunnison Lane Well Site

A tributary to Noble Gulch, which in turn is a tributary to Soquel Creek, runs north-to-south across the western site boundary. Soquel Creek is known to support migratory and spawning habitat for both tidewater goby and central California coast steelhead. However, it is unlikely that either of these fish occur in the tributary to Noble Gulch. Noble Gulch is not included within Critical Habitat designated for the Central Coast steelhead because it lacks the elements that constitute critical habitat for this fish, therefore it is unlikely that this even smaller tributary would provide suitable fish habitat. However, the tributary maintained flow in June 2006, suggesting that it may support California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle. Construction activities associated with the well and treatment facilities could result in potentially significant impacts to special-status aquatic species in the adjacent tributary, and downstream in Noble Gulch and Soquel Creek. However, implementation of **Mitigation Measures 3.5-4a (Biological Monitor and Biological Resources Education Program), 3.5-4b (Avoidance Measures for Special-Status Aquatic Species), and 3.5-4c (Construction Monitoring)** would reduce these impacts to a less-than-significant level.

Austrian Way Well Site

The Austrian Way Well site is located in an upland area, approximately 1,140 feet west of Aptos Creek. Raw groundwater discharges produced during maintenance activities and well pump testing at the Austrian Way Well would be routed to the stormwater drainage system at the intersection of Austrian Way / Vienna Drive. Therefore, no impacts to special-status aquatic species from construction of the proposed improvements at this site would occur, and no mitigation is required.

Granite Way–Aptos Village Well Site

Aptos Creek is known to support migratory and spawning habitat for both tidewater goby and central California coast steelhead. Though not recently observed in the site vicinity, central California coast coho salmon also have the potential to occur within Aptos Creek. California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle may also occur in Aptos Creek. However, construction activities associated with the Granite Way-Aptos Village Well site would occur in upland areas away from Aptos Creek, and thus no riparian vegetation would be removed during construction. The 520-foot-long raw water pipeline would terminate approximately

450 feet east of Aptos Creek and is not anticipated to affect special-status species or habitat along the creek corridor. Therefore, no impacts to special-status aquatic species are anticipated, and no mitigation is required.

Polo Grounds Well Site

Valencia Creek is known to support migratory and spawning habitat for both tidewater goby and central California coast steelhead, and Valencia Creek provides potential habitat for central California coast coho salmon, though this species is currently believed to be absent from the site vicinity. California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle may also occur in Valencia Creek. Although the majority of proposed construction activities would occur in upland areas away from Valencia Creek, installation of the proposed sanitary sewer lateral, potable water pipeline, and the lateral connection to the stormwater drainage system would involve construction adjacent to the Valencia Creek riparian corridor, resulting in potentially significant impacts to special-status aquatic species. However, implementation of **Mitigation Measures 3.5-4a (Biological Monitor and Biological Resources Education Program)**, **3.5-4b (Avoidance Measures for Special-Status Aquatic Species)**, and **3.5-4c (Construction Monitoring)** would reduce these impacts to a less-than-significant level.

Mitigation Measures

Measure 3.5-4a: Biological Monitor and Biological Resources Education Program (applies to O'Neill Ranch, Cunnison Lane, and Polo Grounds Well sites). The SqCWD shall utilize a biological monitor permitted to handle California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle during construction activities. The biological monitor shall be responsible for implementation of the biological resources education program and for all aspects of construction monitoring described in Measures 3.5-4b and 3.5-4c.

The SqCWD shall implement a biological resource education program for construction crews and contractors (primarily crew and construction foremen) prior to construction. As appropriate, the education program shall include a brief review of tidewater goby, steelhead, coho salmon, California red-legged frog, foothill yellow-legged frog, southwestern pond turtle, and other special-status species and sensitive resources that could exist in the WMP area (including their life history and habitat requirements, the locations of sensitive habitat, and their legal status and protection). The education program shall include materials describing sensitive resources, resource avoidance, permit conditions, and possible fines for violations of state or federal environmental laws. Training sessions will be repeated for all new employees before they access the project site and periodically throughout project construction.

Measure 3.5-4b: Avoidance Measures for Special-Status Aquatic Species (applies to O'Neill Ranch, Cunnison Lane, and Polo Grounds Well sites). As part of contract specifications, the following avoidance measures for California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle shall be implemented during construction activities:

- Under the direction of the biological monitor, exclusionary fencing (i.e., silt fencing) shall be installed around all construction areas that are within 100 feet of or adjacent to aquatic habitat.

- Once exclusion fencing is in place, it shall be maintained until completion of construction within or adjacent to the enclosure. The biological monitor shall regularly monitor the enclosure and the integrity of the fence during construction and notify the contractor if any repairs are necessary.

Measure 3.5-4c: Construction Monitoring (applies to O'Neill Ranch, Cunnison Lane, and Polo Grounds Well sites). A qualified biological monitor permitted to handle California red-legged frog, foothill yellow-legged frog, and southwestern pond turtle shall be present onsite during all construction activities occurring within 300 feet of all creeks in the vicinity of the proposed well sites. Should California red-legged frog, foothill yellow-legged frog, or southwestern pond turtle individuals be found within the construction site, the monitor shall be authorized to stop any work that is threatening the safety of the individual until the appropriate agency (USFWS or CDFG) can be contacted and an appropriate course of action is determined.

Significance after Mitigation: Less than Significant.

Impact 3.5-5: Implementation of the WMP could result in impacts to special-status bird species.

Trees and shrubs within woodland and riparian habitats and ornamental landscaping on and adjacent to the proposed well sites may provide nesting habitat for raptors and other special-status birds such as Cooper's hawk, sharp-shinned hawk, long-eared owl, white-tailed kite, Vaux's swift, yellow warbler, and yellow-breasted chat. Construction activities associated with the WMP, including the removal of trees and other nesting habitat during the breeding season, could result in the direct mortality of special-status birds. In addition, human disturbance and construction noise could cause nest abandonment and death of young or the loss of reproductive potential at active nests located near project activities.

O'Neill Ranch Well Site

Coast live oak woodland, riparian habitat, and ornamental landscaping on and surrounding the O'Neill Ranch Well site may support nesting raptors, including Cooper's hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite, as well as other special-status birds. Construction of the proposed well and treatment facilities at this site could require the removal of oaks or other trees. Construction of the potable water and stormwater drainage pipelines along Soquel Drive would not necessarily require the removal of ornamental landscaping, but construction noise and human disturbance of breeding birds could occur in areas along the pipeline alignments. As discussed above, tree removal and construction activities within and adjacent to nesting habitat for special-status birds would result in a potentially significant impact. However, with implementation of **Mitigation Measure 3.5-5 (Protective Measures for Special-Status Birds)**, which provides provisions to minimize impacts on special-status bird species, this impact would be reduced to a less-than-significant level.

Cunnison Lane Well Site

Oaks and other trees within and surrounding the Cunnison Lane Well site may support nesting raptors, including Cooper's hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite, as well as other special-status birds. Construction of the proposed well and treatment facilities at the Cunnison Lane Well site are not anticipated to require the removal of trees within riparian habitat. However, construction of the proposed well and treatment plant adjacent to the tributary to Noble Gulch could result in damage to mature trees, including trees that provide nesting habitat for special-status bird species. Construction activities adjacent to nesting habitat for special-status birds would result in a potentially significant impact to these species. However, implementation of **Mitigation Measure 3.5-5 (Protective Measures for Special-Status Birds)** would reduce this impact to a less-than-significant level.

Austrian Way Well Site

Oaks, conifers, and other trees within and surrounding the Austrian Way Well site may support nesting raptors, including Cooper's hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite, as well as Vaux's swift and other special-status birds. Construction of the well and treatment facilities could require the removal of oaks or other trees. As discussed above, construction activities within and adjacent to nesting habitat for special-status birds would result in a potentially significant impact. However, implementation of **Mitigation Measure 3.5-5 (Protective Measures for Special-Status Birds)** would reduce this impact to a less-than-significant level.

Granite Way–Aptos Village Well Site

Oaks and other trees in the vicinity of the Granite Way–Aptos Village Well site may support nesting raptors, including Cooper's hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite, as well as yellow warbler, yellow-breasted chat, and other special-status birds. Thus, construction activities within and adjacent to nesting habitat for special-status birds could disrupt nesting birds, a potentially significant impact. Implementation of **Mitigation Measure 3.5-5 (Protective Measures for Special-Status Birds)** would reduce this impact to a less-than-significant level.

Polo Grounds Well Site

Oaks and other trees within and adjacent to the Polo Grounds Well site may support nesting raptors, including Cooper's hawk, sharp-shinned hawk, long-eared owl, and white-tailed kite, as well as Vaux's swift, yellow warbler, yellow-breasted chat, and other special-status birds. Construction activities associated with the treatment facility and installation of pipelines would occur adjacent to riparian habitat along Valencia Creek and could result in damage to or removal of trees that provide nesting habitat for special-status birds, a potentially significant impact. Implementation of **Mitigation Measure 3.5-5 (Protective Measures for Special-Status Birds)** would reduce this impact to a less-than-significant level.

Mitigation Measures

Measure 3.5-5: Protective Measures for Special-Status Birds (applies to all sites): The SqCWD shall avoid disturbing the nests of special-status birds through preconstruction surveys and seasonal restrictions.

If construction activities (i.e., ground clearing and grading, including the removal of trees or shrubs) are scheduled to occur during the nonbreeding season (September 1 through January 31), no mitigation is required.

If construction activities are scheduled to occur during the breeding season (February 1 through August 31), the following measures shall be implemented to avoid potential adverse effects to nesting special-status raptors and other birds:

- Not more than 2 weeks prior to the start of construction (including vegetation removal and any ground disturbing activities) a qualified wildlife biologist shall conduct preconstruction surveys of all potential nesting habitat within 500 feet of project activities where access is available.
- If active nests are found during preconstruction surveys, a no-disturbance buffer acceptable in size to the CDFG shall be created around active raptor nests and nests of other special-status birds during the breeding season or until it is determined that all young have fledged. Typical buffers are 500 feet for raptors and 250 feet for other nesting birds. Raptor or other bird nests initiated during construction are presumed to be unaffected and no buffer is necessary. However, the take of any individuals shall be prohibited.
- If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation is required. Trees and shrubs within the construction footprint that have been determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed.

Significance after Mitigation: Less than Significant.

Impact 3.5-6: Implementation of the WMP could result in impacts to special-status bat species.

All Sites

Oaks and other large trees within woodland and riparian habitats on or adjacent to the proposed well sites may provide roosting habitat for pallid bat, Pacific western big-eared bat, long-eared myotis, and long-legged myotis. Construction activities associated with the WMP, including tree removal and other proposed activities, could result in direct mortality of special-status bats. In addition, construction noise and human disturbance within and adjacent to large trees and other potential roosting habitat could cause roost abandonment and death of young. Tree removal and/or other construction activities within and adjacent to roosting habitat for special-status bat species would result in potentially significant impacts to these species. However, with implementation of **Mitigation Measure 3.5-6 (Bat Avoidance Measures)**, which would minimize adverse effects on special status bats through pre-construction surveys and seasonal restrictions, these impacts would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.5-6: Bat Avoidance Measures (applies to all sites). The SqCWD shall avoid disturbing the roosts of special-status bats through preconstruction surveys and seasonal restrictions.

Not more than 2 weeks prior to construction activities (i.e., ground clearing and grading, including the removal of trees or shrubs) within 200 feet of trees potentially supporting special-status bats, a qualified biologist shall survey for special-status bats. If no evidence of bats (i.e., direct observation, guano, staining, strong odors) is present, no further mitigation is required.

If evidence of bats is observed, the following measures are required to avoid potential adverse effects on special-status bats:

- A no-disturbance buffer acceptable in size to the CDFG shall be created around active bat roosts during the breeding season (April 15 through August 15). Bat roosts initiated during construction are presumed to be unaffected, and no buffer is necessary. However, the take of individuals shall be prohibited.
- Trees showing evidence of bat activity shall be removed during the period least likely to affect the bats, as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula and between August 15 and April 15 for maternity roosts). If exclusion is necessary to prevent indirect impacts to bats due to construction noise and human activity adjacent to trees showing evidence of bat activity, these activities shall be conducted during these periods as well.

Significance after Mitigation: Less than Significant.

Impact 3.5-7: Implementation of the WMP could result in impacts to San Francisco dusky-footed woodrat.

Although San Francisco dusky-footed woodrat was not observed during site visits, suitable coast live oak woodland and riparian habitats for this species exist within the WMP area. If San Francisco dusky-footed woodrats are present within the construction disturbance area, vegetation removal, grading, and other construction activities could cause destruction of nests and mortality of individuals.

O'Neill Ranch Well Site

Oak woodland and riparian areas within and adjacent to the O'Neill Ranch Well site provide potential habitat for San Francisco dusky-footed woodrat. Construction of the well and treatment facility at this site could require the removal of mature oaks and riparian vegetation, resulting in a potentially significant impact to San Francisco dusky-footed woodrat. However, with implementation of **Mitigation Measure 3.5-7 (Avoidance Measures for San Francisco Dusky-Footed Woodrat)**, which would minimize adverse effects through preconstruction surveys and relocation protocols, this impact would be reduced to a less-than-significant level.

Cunnison Lane Well Site

Riparian habitat along the tributary to Noble Gulch provides potential habitat for San Francisco dusky-footed woodrat. As discussed above, vegetation removal and other construction activities adjacent to riparian habitats would result in a potentially significant impact to San Francisco dusky-footed woodrat. Implementation of **Mitigation Measure 3.5-7 (Avoidance Measures for San Francisco Dusky-Footed Woodrat)** would reduce this impact to a less-than-significant level.

Austrian Way Well Site

Oak woodland habitat on and surrounding the Austrian Way Site Well site provides potential habitat for San Francisco dusky-footed woodrat. Vegetation removal and construction activities within woodland habitats could result in a potentially significant impact to San Francisco dusky-footed woodrat. However, implementation of **Mitigation Measure 3.5-7 (Avoidance Measures for San Francisco Dusky-Footed Woodrat)** would reduce this impact to a less-than-significant level.

Granite Way–Aptos Village Well Site

Riparian habitat along Aptos Creek provides potential habitat for San Francisco dusky-footed woodrat. However, pipeline installation activities associated with the raw water pipeline would avoid Aptos Creek and its riparian corridor. Thus, construction at the Granite Way–Aptos Village Well site would not result in impacts to San Francisco dusky-footed woodrat, and no mitigation is necessary.

Polo Grounds Well Site

Riparian habitat along Valencia Creek adjacent to the Polo Grounds Well site provides potential habitat for San Francisco dusky-footed woodrat. Construction activities and vegetation removal adjacent to riparian habitat could result in a potentially significant impact to San Francisco dusky-footed woodrat. However, with implementation of **Mitigation Measure 3.5-7 (Avoidance Measures for San Francisco Dusky-Footed Woodrat)**, this impact would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.5-7: Avoidance Measures for San Francisco Dusky-Footed Woodrat (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Polo Grounds Well Sites): The SqCWD shall avoid disturbing San Francisco dusky-footed woodrat through preconstruction surveys and relocation.

Not more than two weeks prior to construction (including vegetation removal and any ground disturbing activities), a qualified wildlife biologist shall conduct a preconstruction survey to identify active woodrat nests within 10 feet of proposed ground disturbance. If woodrat nests are found and are determined by the wildlife biologist to be uninhabited, no further mitigation is required. If woodrat nests are found to be active, relocation measures shall be implemented.

Active woodrat nests within 10 feet of proposed disturbance areas shall be relocated offsite to suitable habitat under the supervision of a qualified wildlife biologist. Understory vegetation shall first be cleared from around the nest. Next, the wildlife biologist shall disturb the nest and allow all woodrats to leave the nest. Finally, the wildlife biologist shall remove the nest sticks and pile them at the base of a suitable oak, bay, or other tree off the site. Stick piles shall be placed at least 100 feet from each other or at another suitable distance, as determined by the wildlife biologist.

Significance after Mitigation: Less than Significant.

Impact 3.5-8: Implementation of the WMP could result in impacts to common wildlife and migratory wildlife corridors.

All Sites

Construction of the proposed well and treatment facilities could result in the displacement of common wildlife and the removal of wildlife habitat in the WMP area. Displacement of common wildlife individuals would be considered less than significant because of the abundance of the species and the availability of habitat within the WMP area. In general, impacts to common wildlife habitats, populations, and communities are not expected to be substantial and would also be considered less than significant.

Within the WMP area, streams and drainages such as Valencia Creek, Aptos Creek, and Soquel Creek serve as primary corridors for wildlife moving through developed areas. Most effects on wildlife corridors would occur during construction activities. These activities would primarily be located in upland areas within or adjacent to commercial and/or residential areas. All well and treatment facilities would be placed within upland habitat, thus avoiding permanent impacts to wildlife corridors. Although proposed facilities would be fenced, habitat surrounding the well sites would continue to facilitate wildlife movement through the WMP area. Thus, WMP implementation is not likely to significantly affect wildlife movement through the region or fragment habitat for migratory or resident wildlife.

As described in Chapter 2, Project Description, the proposed well facilities would include permanent lighting in compliance with security requirements. A new source of night lighting that may result in impacts to special-status and common wildlife. Night lighting can be detrimental to animals in nearby areas for a variety of reasons, including disruption of circadian rhythms, disruption of melatonin levels, avoidance due to light sensitivity in species with exceptional night vision, increased predation, increased mortality on roads, and decreased food consumption by small, nocturnal, herbivorous animals (Bier, 2006). However, all of the proposed well sites contain existing sources of night lighting, ranging from street lights to lights on existing facilities and lights from nearby residences. In addition, permanent lighting fixtures at the proposed well sites would be motion-sensored, and therefore would not contribute substantially to light pollution in the area surrounding each well site.

Thus, potential impacts to common wildlife and migratory corridors would be less than significant, and no mitigation is necessary.

Mitigation: None required.

Impact 3.5-9: Project operations could have adverse effects on special-status fish species through depletion of streamflow due to groundwater pumping.

Future operations of the proposed wells and redistribution of pumping could affect special-status fish species by depleting streamflow in nearby creeks, thereby decreasing the total amount of critical habitat for these species and potentially interfering with fish migration.

The evaluation of the potential for future pumping to deplete streamflow in nearby creeks is based on the streamflow analysis presented in the *Hydrologic Effects of Well Master Plan* (HydroMetrics, 2009). The following site-specific conditions must be met in order for well pumping to adversely affect special-status fish species as a result of streamflow depletions: (1) the presence of a stream in close proximity to the well site that exhibits baseflow during the dry season (perennial stream) and that is designated as critical habitat; (2) a hydraulic connection between the stream and groundwater aquifer; and (3) a probable future net increase in groundwater pumping in the vicinity of the well based on the WMP's pumping redistribution scenarios. Only the O'Neill Ranch Well and Austrian Way Well meet all conditions for potential streamflow depletion.

O'Neill Ranch Well Site

As described in Impact 3.5-4, the tributary to Soquel Creek that runs west-to-east along the northern boundary of the O'Neill Ranch Well site is an ephemeral stream that is unlikely to support California coast steelhead. However, Soquel Creek is known to support migratory and spawning habitat for both tidewater goby and California coast steelhead. Thus, significant baseflow depletion effects associated with groundwater pumping in the vicinity of the O'Neill Ranch Well site would have the potential to adversely affect critical habitat for special-status fish species in Soquel Creek.

As described in Impact 3.4-3 in Section 3.4, Surface Water Hydrology and Water Quality, the streamflow analysis conducted by the District's groundwater hydrologist, HydroMetrics LLC (HydroMetrics), indicates that future pumping in this area could result in an estimated depletion of baseflow of between 0.07 and 0.14 cubic feet per section (cfs). Because the adverse effects on steelhead habitat resulting from a 0.07- to 0.14-cfs reduction in stream baseflow are extremely difficult to substantiate, potential impacts to special-status fish species associated with stream baseflow depletion from future pumping in the vicinity of the O'Neill Ranch Well are considered less than significant. No mitigation is required.

However, although not required, given the designation of Soquel Creek as critical steelhead habitat, the SqCWD is committed to implementing **Improvement Measure HYD-1 (Monitor Streamflow along Soquel Creek and Modify Pumping if Baseflow Depletion is Detected)** to

ensure adverse effects on critical habitat for special-status species would not occur. As specified in the improvement measure, the SqCWD would evaluate surface and groundwater monitoring data and reduce pumping in the vicinity of the O'Neill Ranch Well if baseflow depletion from groundwater pumping is detected.

Cunnison Lane Well Site

A tributary to Noble Gulch runs north-to-south along the western boundary of the Cunnison Lane Well site. In turn, Noble Gulch is a tributary to Soquel Creek. As described in Impact 3.5-4, it is unlikely that tidewater goby or California coast steelhead occur in the tributary to Noble Gulch that is located adjacent to the Cunnison Lane Well site.

As described in Impact 3.4-3 in Section 3.4, Surface Water Hydrology and Water Quality, future pumping at the Cunnison Lane Well would be more than offset by decreases in pumping from existing wells near Soquel Creek, resulting in a net decrease in groundwater pumping in the vicinity of Soquel Creek. Because the potential effects of pumping the Cunnison Lane Well on Soquel Creek would be the same or smaller than existing effects, no depletion of stream baseflow is anticipated. Thus, potential impacts on special-status fish species are considered less than significant and no mitigation is necessary.

Austrian Way Well Site

The Austrian Way Well site is located approximately 1,140 feet west of Aptos Creek. Aptos Creek is known to support migratory and spawning habitat for both tidewater goby and California coast steelhead. Significant baseflow depletion effects associated with groundwater pumping at the Austrian Way Well site would have the potential to adversely affect critical habitat for special-status fish species in Aptos Creek. As described in Impact 3.4-3 in Section 3.4, Surface Water Hydrology and Water Quality, the streamflow analysis performed by HydroMetrics indicates that due to the presence of layers of low conductivity clays and silts in this area if the Purisima Formation, future pumping from the Austrian Way Well would only minimally increase the existing leakage rate between the shallow and deeper aquifers and any baseflow depletion would be difficult to detect. Thus, potential impacts related to baseflow depletion are considered less than significant. No mitigation is required.

Although not required, due to the designation of Aptos Creek as critical steelhead habitat and uncertainties regarding stream-aquifer interaction in the vicinity of the Austrian Way Well site, the SqCWD is committed to implementing **Improvement Measure HYD-2 (Monitor Streamflow along Aptos Creek and Modify Pumping if Baseflow Depletion is Detected)** to address any potential changes in baseflow depletion attributable to pumping from the Austrian Way Well. As specified in the improvement measure, the SqCWD will install a new stream gauge in Aptos Creek, evaluate surface and groundwater monitoring data, and reduce pumping from the Austrian Way Well if baseflow depletion from groundwater pumping is detected.

Granite Way–Aptos Village Well Site

The proposed Granite Way–Aptos Village Well is located approximately 1,000 feet east of Aptos Creek. With respect to a depletion of stream baseflow, the plausible redistribution scenarios

developed by HydroMetrics indicate a net decrease in pumping at wells near the Granite Way-Aptos Village Well, which would be expected to have no effect, and possibly a beneficial effect, on nearby streams when compared to the existing condition. Thus, potential impacts to baseflow and related impacts to special-status fish species are considered less than significant, and no mitigation is necessary.

Polo Grounds Well Site

Valencia Creek is known to support migratory and spawning habitat for both tidewater goby and California coast steelhead, and provides potential habitat for California coast coho salmon. The streamflow analysis conducted by HydroMetrics indicates that there is no hydraulic connection between surface water and groundwater in the vicinity of the Polo Grounds Well. Thus, increased pumping in this area is not anticipated to deplete baseflow in Valencia Creek or other nearby streams. Potential impacts to special-status fish species as a result of future pumping at this site is therefore considered less than significant, and no mitigation is required.

Mitigation: None required; however, the SqCWD is committed to implementing the improvement measures presented below.

Improvement Measures

Improvement Measure HYD-1: Monitor Streamflow along Soquel Creek and Modify Pumping if Baseflow Depletion is Detected. See Section 3.4, Surface Water Hydrology and Water Quality, for description.

Improvement Measure HYD-1: Monitor Streamflow along Aptos Creek and Modify Pumping if Baseflow Depletion is Detected. See Section 3.4, Surface Water Hydrology and Water Quality, for description.

3.5.6 References – Biological Resources

Bier, Paul, “Effects of Artificial lighting on terrestrial mammals,” in *Ecological Consequences of Artificial Night Lighting*. Ed. Catherine Rich and Travis Longcore. Washington: Island Press, 2006.

California Department of Fish and Game (CDFG), List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database, May 2002.

California Department of Fish and Game (CDFG), California Natural Diversity Database (CNDDB) printout for USGS 7.5-Minute topographic quadrangles: Soquel and Watsonville West, information dated June 01, 2008, accessed October 2008.

California Native Plant Society (CNPS), CNPS Electronic Inventory for 7.5-minute topographic quadrangles: Soquel and Watsonville West, information dated 2008.

City of Santa Cruz, *Santa Cruz Water Department Integrated Water Plan Draft Program EIR*, June 2005.

- Deming, M., AICP, Assistant Planning Director, County of Santa Cruz Planning Department, letter to Soquel Creek Water District re: County Permit Requirements for Water District Facilities on APN 030-341-10, October 5, 2007.
- Hagar Environmental Science, *Aptos Creek Fisheries Habitat Assessment*, Technical Memorandum prepared for the Coastal Watershed Council, March 2003.
- Hickman, J. (ed.), *The Jepson Manual of Higher Plants of California*, University of California Press, Berkeley, CA, 1993.
- HydroMetrics LLC, 2009. *Hydrologic Effects of Well Master Plan*, November 2009.
- Jennings, M. and M. Hayes, *Amphibian and Reptile Species of Special Concern in California*, California Department of Fish and Game, Rancho Cordova, CA, 1994.
- Mayer, K.E. and W.F. Laudenslayer (eds.), *A Guide to Wildlife Habitats of California*, California Department of Fish and Game, Sacramento, CA, 1988.
- National Marine Fisheries Service (NMFS), *Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California*, Federal Register Vol. 70, No. 170, September 2, 2005.
- Sawyer, J.O. and T. Keeler-Wolf, *A Manual of California Vegetation*. Sacramento, California Native Plant Society, 1995.
- Santa Cruz County, *General Plan and Local Coastal Program, Land Use Plan*, 1994.
- Santa Cruz County Planning Department, *Final Aptos Village Plan*, adopted February 23, 2010.
- Santa Cruz County Municipal Code, Title 16, Environmental and Resource Protection, Chapter 16.34, Significant Trees Protection.
- Soquel Creek Water District (SqCWD), *O'Neill Ranch Well Final Initial Study/Mitigated Negative Declaration*, December 2001.
- Thomas, J.H., *Flora of the Santa Cruz Mountains: A Manual of the Vascular Plants*, Stanford University Press, Stanford, CA, 1961.
- University of California, Online Jepson Interchange, Consortium of California Herbaria, Berkeley Mapper (online database of California herbaria specimens), available online at <http://ucjeps.berkeley.edu/consortium/>, accessed February 1, 2010.
- U.S. Fish and Wildlife Service (USFWS), *Programmatic Formal Endangered Species Act Consultation on Issuance of Permits under Section 404 of the Clean Water Act or Authorizations under the Nationwide Permit Program for Projects that May Affect the California Red-Legged Frog*, letter to U.S. Army Corps of Engineers district offices, dated January 26, 1999.
- U.S. Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Zayante band-winged grasshopper (Trimertropis infantilis); Final Rule*, Federal Register, Vol. 66, No. 26, February 7, 2001.

- U.S. Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Holocarpha macradenia (Santa Cruz tarplant): Final Rule*, Federal Register, Vol. 67, No. 200, October 16, 2002a.
- U.S. Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Critical Habitat Designation for Chorizanthe robusta var. hartwegii (Scotts Valley Spineflower): Final Rule*, Federal Register, Vol. 67, No. 103, May 29, 2002b.
- U.S. Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Chorizanthe pungens var. pungens (Monterey Spineflower): Final Rule*, Federal Register, Vol. 67, No. 103, May 29, 2002c.
- U.S. Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for Polygonum hickmanii (Scotts Valley Polygonum): Final Rule*, Federal Register, Vol. 68, No. 67, April 8, 2003.
- U.S. Fish and Wildlife Service (USFWS), *Draft Recovery Plan for the Tidewater Goby*, Pacific Region, Portland, OR, October 2004.
- U.S. Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Red-Legged Frog, and Special Rule Exemption Associated with Final Listing for Existing Routine Ranching Activities: Final Rule*, Federal Register Vol. 71, No. 71, April 13, 2006.
- U.S. Fish and Wildlife Service (USFWS), *Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for California Red-Legged Frog; Proposed Rule*, Federal Register, Vol. 73, No. 180, September 16, 2008.
- U.S. Fish and Wildlife Service (USFWS), *Federally Listed Threatened and Endangered Species Which May Occur in Santa Cruz County, California*, [Unofficial Species List], available online at <http://ventura.fws.gov>, accessed February 1, 2010.

3.6 Land Use Planning and Recreation

3.6.1 Introduction

This section describes existing land uses in the vicinity of the proposed well sites and evaluates the potential land use impacts, including impacts to established recreational uses and activities, that could result from construction and operation of the WMP facilities. Mitigation measures to reduce impacts are identified, as appropriate. Pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15125(d), this section also describes local land use plans and policies and the manner in which they apply to the proposed project, and discusses the proposed project's consistency with applicable plans and policies.

3.6.2 Regional Setting

Regional Land Use and Planning Setting

Santa Cruz County is located on the coast between the San Francisco Bay Area and the Monterey Peninsula. Santa Cruz is the second smallest county in California, encompassing a total area of 282,240 acres (441 square miles). The U.S. Census Bureau estimates the county population for 2009 to be about 256,218 (U.S. Census Bureau, 2010).

The physical environment of Santa Cruz County is varied in character, containing such features as the forested Santa Cruz Mountains in the north and northeast, the mid-county coastal terraces (where a large portion of the county's population is located), and the alluvial south county, which is predominately in agricultural use. The coastal communities of Aptos, Soquel, La Selva Beach, Rio Del Mar, Seascape, and Seacliff Beach are located in eastern Santa Cruz County and border the Monterey Bay.

Five major state highways connect Santa Cruz with adjacent counties. Highway 1 follows the coast from San Francisco south to the cities of Santa Cruz, Capitola, Watsonville, and Monterey. Highway 9 traverses the county from the city of Santa Cruz through the unincorporated communities of Felton, Ben Lomond, and Boulder Creek. Highway 17 traverses west-to-east from the city of Santa Cruz through the Santa Cruz Mountains to Santa Clara County. Highways 129 and 152 connect the city of Watsonville with neighboring Santa Clara County.

Consistent with the California Coastal Act of 1976 and Measure J (the growth management referendum of 1978), the County maintains a distinction between urban and rural areas through the use of a stable urban/rural boundary. Urban and rural areas are delineated by an Urban Services Line (USL) and a Rural Services Line (RSL).

Urban development is concentrated within the four incorporated cities of Scotts Valley, Santa Cruz, Capitola, and Watsonville and the unincorporated areas of Live Oak, Soquel, Aptos, and Freedom, as defined by the USL. It is Santa Cruz County policy to direct a large share of growth into areas within the USL to facilitate the provision of services and preserve the character of the rural portion of the county. Four of the five proposed well sites are located within the unincorporated

communities of Soquel and Aptos, while the O'Neill Ranch Well site is just west of the Soquel community, within jurisdictional area of the Santa Cruz County Redevelopment Agency.

In addition to the areas within the USL, there are also urban enclaves (located outside the USL) that may or may not have all urban services. These enclaves are defined by an RSL and include Davenport, Boulder Creek, Boulder Creek Country Club, Bear Creek Estates, Ben Lomond, Felton, Paradise Park, La Selva Beach, Place de Mer, Sand Dollar Beach, Canon del Sol, Sunset Beach, Pajaro Dunes North, and Pajaro.

Parks and Community Facilities

County-owned parks in Santa Cruz County fall under the jurisdiction of the Santa Cruz County Parks Department, while the state-owned parks are operated by the Santa Cruz District of the California State Park system. County-maintained parks in the project area include Anna Jean Cummings Park (A.J. Cummings Park), Aptos Park, Brommer Park, Coffee Lane Park, Richard Vessey Park, Soquel Lions Park, Polo Grounds Regional Park, and Winkle Farm Park. The Polo Grounds Well site is located within the Polo Grounds Regional Park. In combination, the County's parks provide numerous active and passive recreational facilities, including ballfields, dog run areas, picnic areas, and playgrounds.

The Forest of Nisene Marks State Park, which offers approximately 10,000 acres of semi-wilderness, including trail camping facilities, is the closest state-operated park to the proposed well sites (in particular, to the Austrian Way Well site).

The Santa Cruz County Parks Department uses a level of service standard of 2 to 3 acres per 1,000 residents for community parks and 3 acres per 1,000 residents for neighborhood parks, to determine where there is unmet needs and prioritize future capital investments in parks and recreation. Currently, the County meets the standard for parks and recreational facilities.

Bikeways and Trails

Bicycle facilities in the project area are classified as bike lanes, bike paths, and alternate routes. A bike lane is a lane on the roadway that is designated for use by bicycles by means of striping, pavement legends, and signs. A bike path is physically separated from the motor vehicular traffic and used by bicyclists, pedestrians, skaters, and other non-motorized travelers. Alternate routes are favorable routes for bicyclists. Alternate routes are not necessarily signed for bicycle use and can include bike routes and walkways. In the Soquel-Aptos area, striped bike lanes exist along Soquel Drive between Capitola Road and Freedom Boulevard (SCCRTC, 2007).

Recreational hiking trails of the Forest of Nisene Marks State Park are located as close as 250 feet (Old Growth Loop Trail) and 650 feet (Terrace Trail) east of the Austrian Way Well site. The closest trailhead (Vienna Woods Trail) is approximately 2,000 feet to the north of the site (Art of Geography, 2007). None of the other proposed well sites are in close proximity to recreational hiking trails.

3.6.3 Existing Land Use Conditions at Individual Well Sites

A summary of General Plan land use designations and corresponding densities and zoning designations is provided in **Table 3.6-1**.

**TABLE 3.6-1
GENERAL LAND USE DESIGNATIONS AT PROPOSED WELL SITES**

Well Site	Land Use Planning Jurisdiction	Predominant General Plan Land Use Designations	Zoning Designation
O'Neill Ranch	Santa Cruz County Redevelopment Agency	Community Commercial, Urban Low Residential (4.4–7.2 units per acre), Urban Medium Residential (7.3–10.8 units per acre), Urban High Residential (10.9–17.4 units per acre), Urban Open Space, Service Commercial	C-2 (Community Commercial)
Cunnison Lane	Santa Cruz County – Soquel Planning Area	Community Commercial, Urban Medium Residential (7.3–10.8 units per acre), Urban Low Residential (4.4–7.2 units per acre)	R-1 (Single-Family Residential)
Austrian Way	Santa Cruz County – Aptos Planning Area	Public Facility, Existing Park and Recreation, Urban Low Residential (4.4–7.2 units per acre)	RA (Residential Agriculture)
Granite Way–Aptos Village	Santa Cruz County – Aptos Planning Area	Community Commercial, Urban Low Residential (4.4–7.2 units per acre), Urban Medium Residential (7.3–10.8 units per acre), Existing Parks and Recreation	C-2 (Community Commercial)
Polo Grounds	Santa Cruz County – Aptos Planning Area	Existing Parks and Recreation, Urban Very Low Residential (1.0–4.3 units per acre)	PR (Park)

SOURCE: Santa Cruz County, 1994; Santa Cruz County Planning Department, 2010 (this source for Granite Way-Aptos Village Well site zoning designation only).

O'Neill Ranch Well Site

Land uses in the vicinity of the O'Neill Ranch Well site, as designated by the Santa Cruz County General Plan, consist of Community Commercial, Service Commercial, Urban Open Space, Urban Low Residential, Urban Medium Residential, and Urban High Residential. The O'Neill Ranch Well parcel itself is designated as Community Commercial, which is “designed to satisfy a broader need for goods and services and provide concentrated centers of commercial developments”. The parcels west and south of the site also have this designation and contain various retail, commercial, and light industrial establishments ranging from small to medium in size. Adjacent land uses to the southeast and east along the proposed pipeline alignment are designated as Urban High Residential. To the north is Urban Open Space, with Urban Low Residential and Urban Medium Residential farther north and northwest of the site, respectively. Service Commercial uses are located farther west and southwest of the site. Service Commercial uses consist of “a wide variety of services and light industry [such as] facilities for auto repair, warehouses, lumberyards, automobile dealers, electronics assembly and manufacturing” (Santa Cruz County, 1994). Soquel Drive serves as one of the main commercial and industrial corridors

in this part of Santa Cruz County and is highly urbanized within the boundaries of the SqCWD service area. The O'Neill Ranch Well site is located within a C-2 (Community Commercial) zoning district.

Cunnison Lane Well Site

The Cunnison Lane Well site is located in a residential neighborhood, which the General Plan designates as Urban Low Residential and Urban Medium Residential. The proposed well site and parcels to the north, northeast, and south are designated as Urban Low Residential. Urban Medium Residential, part of which is designated as affordable housing, is located southeast of the proposed well site across Cunnison Lane. Areas west and southwest of the Cunnison Lane Well site are designated as Existing Parks and Recreation (Santa Cruz County, 1994). Soquel Drive is approximately 600 feet to the south. The Cunnison Lane Well site is located within a R-1 (Single-Family Residential) zoning district.

Austrian Way Well Site

The Austrian Way Well site is surrounded by residential and open space uses. The General Plan designates land use at this site as Public Facility. The Forest of Nisene Marks State Park, located to the northeast, east, and southeast, is designated as Existing Parks and Recreation. Urban Low Residential land uses, made up primarily of single-family homes, are located to the northwest, west, and southwest (Santa Cruz County, 1994). The Austrian Way Well site is located within a RA (Residential Agriculture) zoning district.

Granite Way–Aptos Village Well Site

The Granite Way-Aptos Village Well site is located within the boundaries of the Aptos Village Plan, which was approved on February 23, 2010 by the Santa Cruz County Board of Supervisors. Adoption of Aptos Village Plan will require that the zoning and General Plan land use designations for the area encompassing the proposed well site be amended to reflect the mixed use, commercial, and residential uses designated in the Aptos Village Plan. Per the Aptos Village Plan, the Granite Way-Aptos Village Well site would be wedged between residential land uses that extend north of the site and commercial land uses to the south. The proposed 520 feet of new raw water pipeline needed to connect to existing infrastructure for subsequent treatment at the T. Hopkins Treatment Plant would be installed primarily in an area designated as a parking lot (Santa Cruz County Planning Department, 2010).

The Granite Way–Aptos Village Well site is currently owned by Barry Swenson Builders. Under the WMP, the proposed well site would be transferred to the District.

Polo Grounds Well Site

The Polo Grounds Well site is located within Polo Grounds Regional Park, a 62-acre park located in Aptos between North Polo Drive and South Polo Drive and above Rio del Mar Boulevard. Existing park facilities include three soccer fields, three baseball diamonds, a dog park, paved

parking areas, and a grassy area known as the “great meadow”. The existing irrigation well is located at the east end of the great meadow.

The General Plan designates the park land uses as Existing Parks and Recreation. Surrounding land uses consist of Mountain Residential to the north, Urban Very Low Residential to the east and southeast, and Urban Low Residential along South Polo Drive and North Polo Drive. Designated land uses along the proposed water pipeline and sanitary sewer lateral consist of Existing Parks and Recreation and Urban Low Residential (Santa Cruz County, 1994). The Polo Grounds Well site is located within a PR (Park) zoning district.

3.6.4 Regulatory Framework

California Government Code

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, and transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the City of Capitola or the Local Coastal Zone, therefore, ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.

3.6.5 Impacts and Mitigation Measures

Significance Criteria

Based on Appendix G of the CEQA Guidelines, implementation of the WMP would result in a significant impact to land use if it would:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

Implementation of the WMP would result in a significant impact to recreational resources if it would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated; or
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

In addition, due to the nature of the proposed project, this EIR considers that the WMP would have a significant effect on recreational resources if it were to:

- Result in physical environmental effects that would physically degrade recreational resources or result in the deterioration of the quality of the recreational experience.

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

- Divide an established community. With the exception of new pipelines, the proposed well and treatment facilities would be constructed within the existing lot boundaries and would not interfere with or change existing street plans. Although new pipelines would be installed within and/or across roadway rights-of-way, new pipelines would be installed below grade and would not divide the community. Therefore, no impacts related to division of an established community would result from implementation of the WMP, and no additional discussion is provided.
- Conflict with any applicable habitat conservation plan or natural community conservation plan. There is no existing habitat conservation plan or natural community conservation plan applicable to the project area. Therefore, this criterion is not applicable to the proposed project and is not discussed further.
- Include recreational facilities or require the expansion of recreational facilities. The proposed project would not include the construction of housing or other structures that would increase population in the Soquel-Aptos area such that there would be a need to construct new recreational facilities. Additionally, the project does not propose the construction of new recreational facilities or require the expansion of existing recreational facilities. Thus, the significance criterion related to the expansion of recreational facilities is not applicable to the proposed project and is not discussed further.
- Long-term or permanent increase in use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated. The project would not cause an increase in residents in the area or an increase in the numbers of recreationists in the project area. While project construction may result in temporary displacement and relocation of recreationists at Polo Grounds Regional Park to other recreational facilities, this would be a short-term increase at alternative facilities during the 12-month construction period for the Polo Grounds Well site (discussed in Impact 3.6-3, below). Therefore, impacts related to a long-term or permanent increase in use of existing recreational facilities are not applicable to the project.

Approach to Analysis

The analysis below focuses on potential impacts to recreational resources and project consistency with applicable plans and policies. Recreational resources with the potential to be adversely affected by the proposed project are those resources that, because of their proximity, could be directly or indirectly affected by the proposed project. The analysis of impacts to recreational resources evaluates the potential for construction and operation of the proposed facilities to substantially disrupt or displace existing recreational uses and activities.

Pursuant to the CEQA Guidelines Section 15125(d), this section also evaluates project consistency with applicable land use plans and policies. Although the SqCWD is not legally bound to the land use plans and policies of Santa Cruz County, these plans and policies are discussed in this section to the extent they provide land use planning information relevant to evaluating the project with respect to significance criteria under CEQA, which requires an analysis of the compatibility of a proposed project with certain aspects of adopted local land use plans and policies adopted for the purpose of mitigating environmental effects.

Impact Summary

**TABLE 3.6-2
SUMMARY OF IMPACTS – LAND USE AND RECREATION**

Impact	O'Neill Ranch Well Site	Cunison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.6-1: Construction activities could result in direct and indirect impacts to established recreational uses and activities.	N/A	N/A	LS	N/A	PSM
Impact 3.6-2: Operation and maintenance of facilities proposed under the WMP could result in long-term impacts to adjacent recreational uses and activities.	N/A	N/A	LS	N/A	LS
Impact 3.6-3: Construction activities at the Polo Grounds Well site would temporarily increase the use of other recreational facilities in the area.	N/A	N/A	N/A	N/A	LS
Impact 3.6-4: Implementation of the WMP could conflict with goals, policies, and programs of affected jurisdictions.	PSM	PSM	PSM	PSM	PSM

LS = Less than Significant impact, no mitigation required

PSM = Potentially Significant impact, can be Mitigated to less than significant

SU = Significant Unavoidable impact

N/A = Not Applicable or no impact

Impact Discussion

Impact 3.6-1: Construction activities could result in direct and indirect impacts to established recreational uses and activities.

Direct impacts on recreational uses and activities could result if construction activities were to overlap geographically such that they would temporarily interfere with or impede use of recreational facilities. Indirect impacts on existing recreational uses and activities could also occur as a result of construction-related noise increases, dust and exhaust emissions, traffic congestion and safety hazards, and/or interrupted access, the combination of which could deteriorate the recreational experience.

With the exception of four days during which 24-hour drilling would be required at sites where new wells would be developed, construction activities would typically be limited to daytime hours Monday through Friday. Pipeline installation associated with the wells and treatment facilities would proceed at a rate of approximately 100 feet per day. Generally, construction-related noise increases would vary depending on the phase of work.

Temporary construction impacts are discussed in detail in Sections 3.7, Air Quality and Greenhouse Gases; 3.8, Noise and Vibration; and 3.9, Traffic and Circulation. Project-related construction activities would result in temporary emissions of fine particulate matter (i.e. fugitive dust) during earthmoving and grading activities and diesel particulate exhaust emissions from construction equipment. Construction activities would generate temporary and intermittent noise at the proposed well sites, as well as along proposed pipeline alignments. Noise levels would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. Temporary construction-related impacts related to traffic and circulation could include increased traffic congestion, increased traffic safety hazards, and potential conflicts with public transit, bicycle, and pedestrian facilities.

O'Neill Ranch Well Site

The closest recreational facility to the O'Neill Ranch Well site is A.J. Cummings Park, located approximately 1,750 feet north of the site. No impacts to established recreational uses and activities would result from construction activities at the O'Neill Ranch Well site.

Cunnison Lane Well Site

The closest recreational resource to the Cunnison Lane Well site is Richard Vessey Park, located approximately 1,750 feet southeast of the site. No impacts to established recreational uses and activities would result from construction activities at the Cunnison Lane Well site.

Austrian Way Well Site

The Austrian Way Well site borders the Forest of Nisene Marks State Park, which provides 30 miles of trails used for hiking, mountain biking, and horseback riding. The closest trails to the proposed well site are the Old Growth Loop Trail (approximately 250 feet to the east), the Terrace Trail (650 feet to the east) and the Vienna Woods Trail (2,000 feet to the north).

The duration of construction activities at the Austrian Way Well site is estimated at 12 months. Construction-related fugitive dust and exhaust emissions at this site would be considerably lower than the Monterey Unified Air Pollution Control District (MBUAPCD) thresholds (see Impact 3.7-1 in Section 3.7, Air Quality and Greenhouse Gases). Thus, construction-related dust and exhaust emissions would not result in significant secondary impacts to nearby recreational uses.

During certain phases of construction, it is possible that noise from the operation of heavy construction equipment would be audible from recreational users at nearby trails. Daytime construction-related noise increases would be reduced with implementation of **Mitigation Measures 3.8-2a (Noise Controls During Daytime Construction)**. In addition, since hikers would be in close proximity to construction activities for only a short period of time while they

hike along the trail segments closest to the Austrian Way Well site, any audible construction noise would not substantially degrade the recreational experience.

Access to the Forest of Nisene Marks State Park is via Aptos Creek Road and Soquel Drive. Vehicular access to the park is not available in the immediate vicinity of the Austrian Way Well site. Thus, no secondary impacts related to traffic congestion or impeded access to recreational land uses would result.

Overall, the combination of construction-related air quality emissions and increased noise levels would result in less than significant impacts to established recreational uses and activities at the Forest of Nisene Marks State Park.

Granite Way–Aptos Village Well Site

The closest recreational facility to the Granite Way-Aptos Village Well site is Aptos Village Park, approximately 750 feet west of the site and immediately west of Aptos Creek Road. Due to the small disturbance area associated with construction activities at this site, construction-related dust and exhaust emissions would not affect recreational uses at the park. Construction-related noise increases at the park would be greatest during installation of the raw water pipeline near the intersection of Aptos Creek Road and the future road that would be constructed under the Aptos Village Plan. However, construction-related noise increases would be masked by noise generated by vehicle traffic along Soquel Drive and Highway 1. Thus, no impact to recreational activities at Aptos Village Park during construction would be less than significant, and no mitigation is necessary.

Polo Grounds Well Site

The existing Polo Grounds Well is located at the eastern end of the 62-acre Polo Grounds Regional Park in a grassy area known as the “great meadow”. This area of the Polo Grounds Regional Park includes a 1-acre dog park. West of the dog area are three soccer fields and three baseball diamonds.

The duration of construction activities at the Polo Grounds Well site is estimated at 12 months. Construction staging and activities associated with the proposed well and treatment facilities at the east end of the park would disrupt recreational uses at the dog park, a portion of which would be fenced off and not accessible to the public during construction activities. Pipeline installation, which would occur along the park access road and adjacent to playing fields, would also have an adverse effect on recreational uses due the potential for these construction activities to temporarily displace little league baseball and soccer games during certain phases of construction. Further, the combination of construction-related noise increases, dust and exhaust emissions, and reduced parking availability resulting from construction vehicle parking and trenching within or adjacent to the park access road could be disruptive to recreational users and degrade the recreational experience.

Temporary emissions of fugitive dust and equipment exhaust during construction, although estimated to be below MBUAPCD thresholds, could be bothersome to recreational users.

Daytime noise increases during construction of the well and treatment facility and during pipeline installation could also be disruptive to recreational users.

Since the proposed pipeline connections associated with the Polo Grounds Well and treatment facility would affect only the eastern terminuses of North Polo Drive and South Polo Drive, and would not require extensive construction within these road right-of-ways, pipeline installation would not substantially affect circulation patterns along these public roadways. However, vehicle, bicycle, and pedestrian traffic along the park access road could be adversely affected by pipeline installation activities. Potential adverse effects on vehicular, bicycle, and pedestrian traffic during construction would be addressed with implementation of **Mitigation Measure 3.9-3b (Traffic Management Plan)**.

Overall, impacts to recreational uses from the combination of construction-related noise, diesel and exhaust emissions, and impeded access through the park would be potentially significant. However, with implementation of **Mitigation Measure 3.6-1 (Construction Notification and Event Scheduling at Polo Grounds Regional Park)**, which would require that the SqCWD provide advanced notification to the public and other recreational users about construction activities, and work with the Santa Cruz County Parks Department to ensure event scheduling does not conflict with construction activities, potential impacts to established recreational uses and activities would be reduced to a less-than-significant level.

Mitigation Measures

Mitigation Measure 3.6-1: Construction Notification and Event Scheduling at Polo Grounds Regional Park (applies to Polo Grounds Well site only). At least three months in advance of construction activities, the SqCWD shall work actively with: Santa Cruz County Parks Department; Santa Cruz County Little League; the Aptos High School Recreation Department; and other local recreational users to notify them of the nature, extent, and duration of construction activities. The SqCWD shall post signage at the Polo Grounds Regional Park providing information regarding the construction activities as well as other available parks and recreational facilities in the area.

In addition, to ensure that games and other special events at the Polo Grounds Regional Park would not be adversely affected by construction activities, the SqCWD shall work with the Santa Cruz County Parks Department to ensure scheduling of games and special events at the Polo Grounds Regional Park does not interfere with construction activities.

Measure 3.8-2a: Noise Controls During Daytime Construction. See Section 3.8, Noise and Vibration, for description.

Measure 3.9-3b: Traffic Management Plan. See Section 3.9, Traffic and Circulation, for description.

Significance after Mitigation: Less than Significant.

Impact 3.6-2: Operation and maintenance of facilities proposed under the WMP could result in long-term impacts to adjacent recreational uses and activities.**Austrian Way and Polo Grounds Well Sites**

Once the proposed well facilities are developed, regular maintenance activities at each well site would occur approximately three times per week and would not generate a significant number of new vehicle trips. Post-construction emission sources would consist primarily of vehicle trips associated with maintenance and inspection activities, and maintenance and testing of emergency generators. These air emissions would not adversely affect nearby recreational uses. Although pump operations and maintenance of emergency generators could increase ambient noise levels in the immediate vicinities of the wells, these noise increases would not substantially disrupt nearby recreational uses. Thus, impacts to established recreational uses and activities during project operations and maintenance activities would be less than significant, and no mitigation is required.

O'Neill Ranch, Cunnison Lane, and Granite Way-Aptos Village Well Sites

Since there are no recreational facilities in close proximity to the O'Neill Ranch, Cunnison Lane, and Granite Way-Aptos Village Well sites, no impact to established recreational uses would result during project operations and maintenance activities.

Mitigation: None required.

Impact 3.6-3: Construction activities at the Polo Grounds Well site would temporarily increase the use of other recreational facilities in the area.**Polo Grounds Well Site**

As stated above, the Polo Grounds Well site is located in recreational land use area (Polo Grounds Regional Park) and project construction would occur adjacent to recreational playing fields. Construction activities, particularly associated with pipeline installation, could interfere with recreational uses at the Polo Grounds Regional Park. Pipeline installation would occur simultaneously with other construction activities during the 12-month construction period but would not completely preclude use of all the fields at the Polo Grounds Regional Park.

During project construction activities associated with the Polo Grounds Well, some recreation events at Polo Grounds Regional Park may have to be held at other county recreational facilities. However, because WMP construction activities would be temporary and would not affect all the playing fields at once, the demand for playing fields at other county recreational facilities would not substantially degrade these other facilities. Thus, this impact is considered less than significant, and no mitigation is necessary.

All other well sites

All other well sites are not located in or near a recreational facility and would have no impact on demand for parks and recreation services.

Mitigation: None required.

Impact 3.6-4: Implementation of the WMP could conflict with goals, policies, and programs of affected jurisdictions.

Pursuant to California Government Code Section 53091, SqCWD, as a public water utility, is not subject to the building and zoning ordinances of local jurisdictions for projects involving facilities for the production, generation, storage, treatment or transmission of water. It is, however, the practice of SqCWD to work with neighboring jurisdictions and communities during project planning and to conform to local land use plans and policies to the extent possible. Thus, the physical environmental effects of the WMP on the resources protected by the applicable land use plans and policies of local jurisdictions is analyzed in this EIR within the corresponding resource sections in Section 3, Environmental Setting, Impacts, and Mitigation Measures. This impact analysis evaluates project consistency with these plans and policies.

The WMP consists of the construction and operation of well facilities to provide redundancy and flexibility in SqCWD's system while simultaneously reducing susceptibility to seawater intrusion and achieving a more uniform drawdown of the basin. The facilities proposed under the WMP are within the jurisdiction of Santa Cruz County. The plans and policies of the County emphasize repairs and improvements to public facilities and infrastructure to meet existing and future water supply needs, as well as management of groundwater resources in such a way as to prevent adverse effects. Although well facilities are considered industrial in nature, the plans and policies identified under the 1994 Santa Cruz County General Plan do not specifically preclude water infrastructure development within residential, commercial, public, or open space areas. A number of well facilities, including those owned by SqCWD, the City of Santa Cruz Water Department (SCWD), and Central Water District (CWD) are located throughout the county of Santa Cruz. Existing wells are situated in residential, commercial, industrial, and recreational areas.

Santa Cruz County Land Use Plans and Policies

Consistency with plans and policies of Santa Cruz County are described below.

Santa Cruz County Riparian Corridor and Wetlands Protection

Santa Cruz County (Title 16, Environmental and Resource Protection, Chapter 16.30, Riparian Corridor and Wetlands Protection) regulates riparian corridors and protects wetlands. As stated in Section 3.5, Biological Resources, the O'Neill Ranch, Cunnison Lane, and Polo Grounds Well sites lie in close proximity to potentially jurisdictional streams and associated riparian habitat, including unnamed tributaries to Soquel Creek and Valencia Creek. Construction activities at these sites may require a nationwide permit from the Corps, a water quality certification from the RWQCB, and a streambed alteration agreement from the CDFG. These permits would be obtained prior to project implementation and would contain conditions of approval designed to minimize adverse effects on wetland resources. In addition, appropriate measures that would help prevent degradation of the riparian corridor have been incorporated in this EIR including Mitigation Measures 3.4-1a

(Erosion Control Plan) and 3.4-1b (Construction Best Management Practices) in Section 3.4, Surface Water Hydrology and Water Quality. Impacts to riparian trees would be addressed through implementation of Mitigation Measures 3.5-2a (Tree Survey), 3.5-2b (Protective Measures for Mature Trees), 3.5-2c (Tree Replacement), and 3.5-2d (Monitoring for Replacement Plantings). Therefore, the WMP would be in compliance with the Santa Cruz County Riparian Corridor and Wetlands Protection Ordinance.

Grading Ordinance

The Santa Cruz County Grading Ordinance sets minimum grading plan requirements to ensure proper grading, prevent accelerated soil erosion, protect fish and wildlife habitats, and prevent increased flood hazards and visual degradation (County Code, Chapter 16.20). As stated in Section 3.4, Surface Water Hydrology and Water Quality, grading and earthwork associated with construction of the well sites could affect water quality in nearby creeks and tributaries. However, implementation of Mitigation Measures 3.4-1a (Erosion Control Plan) and 3.4-1b (Construction Best Management Practices) would ensure compliance with the County's Grading Ordinance.

Erosion Control Ordinance

The Santa Cruz County Erosion Control Ordinance requires that an erosion control plan (ECP) be submitted for all development plans in conjunction with applications for building and grading permits. As stated in Section 3.4, Surface Water Hydrology and Water Quality, well drilling and repair are exempt from specific provisions of the ordinance, provided they do not accelerate erosion. However, construction activities associated with pump chemical buildings, treatment facilities, and pipeline installation are not exempt from the ordinance (County Code, Chapter 16.22). With the exception of construction activities at the Polo Grounds Well site, which would result in greater than one acre of soil disturbance, construction activities at all other well sites would require less than one acre of soil disturbance and would not be subject to the requirements of the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. At the Polo Grounds Well site, the construction contractor(s) would be required to prepare and implement a storm water pollution prevention plan (SWPPP) in accordance with the NPDES Construction General Permit. The SWPPP would ensure compliance with the Erosion Control Ordinance. For all other proposed well sites, implementation of Mitigation Measures 3.4-1a (Erosion Control Plan) and 3.4-1b (Construction Best Management Practices) would reduce erosion during construction. Implementation of these measures would ensure compliance with the County's Erosion Control Ordinance.

Santa Cruz County Noise Ordinance

The Santa Cruz County Noise Ordinance prohibits offensive noise—defined as loud, boisterous, irritating, penetrating, or unusual sound—between the hours of 10:00 p.m. and 8:00 a.m. within 100 feet of any building regularly used for sleeping, or which disturbs any person of ordinary sensitivities. As stated in Section 3.8, Noise and Vibration, well drilling activities proposed between the hours of 10:00 pm and 8:00 a.m. for four days at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites would be inconsistent with the restrictions of Chapter 8.30 of the County Code. Implementation of Mitigation Measures 3.8-1a

(Nighttime Noise Controls During Well Drilling) and 3.8-1c (Nighttime Well Drilling Notification) would help to reduce these noise levels below the nighttime noise thresholds. At sites where residential receptors are located within 100 feet of the proposed wells, Mitigation Measure 3.8-1b (Hotel Accommodations During Nighttime Well Drilling) would help to address temporary noise impacts to sleep interference.

Conflicts with the Santa Cruz County Noise Ordinance during daytime construction would be addressed through Mitigation Measures 3.8-2a (Noise Controls During Daytime Construction) and 3.8-2b (Construction Notification). Conflicts with the County Noise Ordinance from long-term maintenance and operations would be addressed through Mitigation Measures 3.8-4a (Submersible Pump) and 3.8-4b (Generator Noise Attenuation Features). Thus, with the exception of temporary conflicts with the County's ordinance time limits for a period of up to four days during well drilling activities, the WMP would generally be in compliance with the County's Noise Ordinance.

Hazardous Materials Ordinance

The Santa Cruz County Hazardous Materials Ordinance requires “users of hazardous and toxic materials to eliminate or minimize the use of such materials wherever possible, and in all cases to minimize the release, emission, or discharge of hazardous materials to the environment, and to properly handle all hazardous materials and to disclose their whereabouts.” Implementation of Mitigation Measure 3.4-1b (Construction Best Management Practices) would require all equipment and materials storage areas to be routinely inspected for leaks, and records maintained for documenting compliance with the storage and handling requirements for hazardous materials. Hence construction activities would be in compliance with the Hazardous Materials Ordinance.

Mitigation Measures

Measure 3.4-1a: Erosion Control Plan. See Section 3.4, Surface Water Hydrology and Water Quality, for description.

Measure 3.4-1b: Construction Best Management Practices. See Section 3.4, Surface Water Hydrology and Water Quality, for description.

Measure 3.5-2a: Tree Survey. See Section 3.5, Biological Resources, for description.

Measure 3.5-2b: Protective Measures for Mature Trees. See Section 3.5, Biological Resources, for description.

Measure 3.5-2c: Tree Replacement. See Section 3.5, Biological Resources, for description.

Measure 3.5-2d: Monitoring for Replacement Plantings. See Section 3.5, Biological Resources, for description.

Measure 3.8-1a: Nighttime Noise Controls During Well Drilling. See Section 3.8, Noise and Vibration, for description.

Measure 3.8-1b: Hotel Accommodations During Nighttime Well Drilling. See Section 3.8, Noise and Vibration, for description.

Measure 3.8-1c: Nighttime Well Drilling Notification. See Section 3.8, Noise and Vibration, for description.

Measure 3.8-2a: Noise Controls During Daytime Construction. See Section 3.8, Noise and Vibration, for description.

Measure 3.8-2b: Construction Notification. See Section 3.8, Noise and Vibration, for description.

Significance after Mitigation: Less than Significant.

3.6.6 References – Land Use Planning and Recreation

Art of Geography, Forest of Nisene Marks State Park Map, September 2007.

Santa Cruz County, *General Plan and Local Coastal Program*, May 24, 1994.

Santa Cruz County, Zoning Ordinance, accessible at <http://ordlink.com/codes/santacruzco/index.htm>.

Santa Cruz County Planning Department, *Final Aptos Village Plan*, adopted February 23, 2010.

Santa Cruz County Regional Transportation Commission (SCCRTC), *Santa Cruz County Bikeway Map*, 2007.

SqCWD, *O'Neill Ranch Well Initial Study/Mitigated Negative Declaration*. Prepared by Environmental Science Associates (ESA) for Soquel Creek Water District, 2001.

U.S. Census Bureau, 2010. State and County Quickfacts for Santa Cruz County, California. Available online: <http://quickfacts.census.gov/qfd/states/06/06087.html>. Accessed June 17, 2010.

3.7 Air Quality and Greenhouse Gases

3.7.1 Introduction

This section provides an overview of existing air quality conditions within the Soquel-Aptos area, presents the associated regulatory framework, and analyzes potential impacts that would result from construction and operation of the facilities proposed under the WMP. This section discusses greenhouse gas emissions (GHG) in accordance with AB 32 – California’s Global Warming Solutions Act and the March 2010 amendments to the CEQA Guidelines, and estimates the WMP’s carbon footprint, or contribution to climate change.

3.7.2 Regional Setting

Climate and Meteorology

The primary factors that determine air quality are the locations of air pollutant sources and the amounts of pollutants emitted, although meteorological and topographical conditions are also important. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

Facilities and infrastructure that would be constructed under the WMP are located within the North Central Coast Air Basin (NCCAB), which encompasses Santa Cruz, Monterey, and San Benito Counties. The combination of the NCCAB’s topography and climate create the potential for smog formation (MBUAPCD, 2008a). During the summer months, a warm air mass frequently descends over the lower, cool, moist marine air layer. The warm upper layer forms a cap over the marine layer and inhibits the air pollutants generated near the ground from dispersing upward. Light summer and fall winds and the nearby mountains further limit the horizontal dispersal of pollutants. Concentrating volumes of pollutants in this manner allows the summer and fall sunlight to generate high levels of smog. In the winter and spring, the general absence of deep, persistent inversions and occasional storms usually result in good air quality for the NCCAB. In Santa Cruz County, coastal mountains exert a strong influence on atmospheric circulation, which also results in generally good air quality.

Existing Air Quality

Ambient air quality standards establish levels of air quality that must be maintained to protect the public from the adverse effects of state pollution. The Monterey Bay Unified Air Pollution Control District’s (MBUAPCD) regional air quality monitoring network provides information on ambient concentrations of criteria air pollutants. Monitored ambient air pollutant concentrations reflect the number and strength of emissions sources and the influence of topographical and meteorological factors. The MBUAPCD operates 10 air quality monitoring stations throughout the NCCAB. These stations are located in Monterey, Moss Landing, Salinas, Hollister, Carmel Valley, Santa Cruz, Scotts Valley, Davenport, and Watsonville. In addition, the National Park Service operates a monitoring station at the Pinnacles National Monument in San Benito County. The closest station to the SqCWD

service area is the Santa Cruz monitoring station, which is located at 2544 Soquel Avenue in Santa Cruz, approximately 1.5 miles west of the O'Neill Ranch Well site. The Santa Cruz monitoring station monitors the levels of ozone, fine suspended particulate matter less than 2.5 microns¹ in diameter (PM_{2.5}), and suspended particulate matter less than 10 microns in diameter (PM₁₀). The closest station that monitors for carbon monoxide (CO), nitrogen dioxide (NO₂), and sulphur dioxide (SO₂) is the Davenport station, approximately 12 miles northwest of the SqCWD service area.

Table 3.7-1 presents a five-year summary of air pollutant concentration monitoring data collected from these stations. Pollutant concentrations measured at the Santa Cruz station should be generally representative of background air pollutant concentrations in the Soquel-Aptos area. Data from the Davenport station would also be representative because CO, NO₂, and SO₂ are localized pollutants, as opposed to ozone which is regional due to its photochemical reaction process.

**TABLE 3.7-1
AIR POLLUTANT SUMMARY FOR THE WMP AREA, 2004–2008**

Pollutant	Standard ^b	Concentrations, by Year ^a				
		2004	2005	2006	2007	2008
Ozone						
Highest 1-hour-average concentration, ppm	0.09	0.085	0.071	0.067	0.072	0.086
Highest 8-hour-average concentration, ppm	0.07	0.077	0.055	0.057	0.066	0.066
Respirable Particulate Matter (PM ₁₀)						
Highest 24-hour-average concentration, µg/m ³	50	80	47	37	32	44.0
Annual Arithmetic Mean, µg/m ³	20	18.1	17.5	18.4	18.0	18.8
Fine Particulate Matter (PM _{2.5})						
Highest 24-hour-average concentration, µg/m ³	35 (federal only)	22.6	21.7	12.6	18.3	14.9
Carbon Monoxide (CO)						
Highest 8-hour-average concentration, ppm	9.0	1.03	0.90	0.83	0.95	1.30
Nitrogen Dioxide (NO ₂)						
Highest 1-hour-average concentration, ppm	0.18	0.032	0.030	0.030	0.029	0.034
Sulfur Dioxide (SO ₂)						
Highest 24-hour-average concentration, ppm	0.04	0.005	0.004	0.005	0.004	0.005

NOTES:

^a Data for ozone and PM₁₀ and PM_{2.5} are from the Santa Cruz–2544 Soquel Avenue monitoring station. Data for CO, NO₂, and SO₂ are from the Davenport monitoring station.

^b State standard, not to be exceeded.

Values that are presented in **bold**, exceed the applicable standard; N/A=Not Available; ppm=parts per million; µg/m³=micrograms per cubic meter.

SOURCE: CARB, 2010.

¹ A micron is one one-millionth of a meter.

Ozone

Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving hydrocarbons and nitrogen oxides (NO_x). Significant ozone production generally requires about three hours in a stable atmosphere with strong sunlight. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production. Ozone causes eye and respiratory irritation, reduces resistance to lung infections, and may aggravate pulmonary conditions in persons with lung disease. Ozone also damages vegetation. As shown in Table 3.7-1, ozone concentrations at the Santa Cruz monitoring station have remained steady throughout the years, and only the federal eight-hour standard has been violated once in the past five years.

Carbon Monoxide

CO is an odorless, invisible gas usually formed as the result of incomplete combustion of organic substances. Ambient concentrations normally correspond closely to the spatial and temporal distributions of vehicle traffic. Concentrations of CO are also influenced by wind speed and atmospheric mixing. Under inversion conditions, CO concentrations may be distributed more uniformly over the area surrounding the vehicular sources. When CO combines with hemoglobin in the blood, the oxygen-carrying capacity of the blood is reduced and the release of oxygen is inhibited or slowed (MBUAPCD, 2008a). As a result, less oxygen reaches the brain, heart, and other body tissues and can lead to fatigue, headaches, and dizziness. This condition is especially critical for fetuses and people with cardiovascular diseases, chronic lung disease, or anemia.

As shown in Table 3.7-1, background CO concentrations have not exceeded the state standards in the past five years. However, CO concentrations in the vicinity of congested intersections and freeway segments would likely be higher than the monitoring data shown in the table.

Fine and Respirable Suspended Particulate Matter (PM_{2.5} and PM₁₀)

Particulate matter in the atmosphere results from combustion, entrained road dust from motor vehicle tires, and many kinds of dust- and fume-producing industrial and agricultural operations. Some of these operations, such as demolition and construction activities, contribute primarily to increases in local particulate matter concentrations, while others, such as vehicle traffic, affect regional particulate matter concentrations. Both PM_{2.5} and PM₁₀ consist of particulates that can be inhaled into the lungs and cause adverse health effects. Among the health effects associated with exposure to particulate matter are premature mortality and aggravation of respiratory and cardiovascular disease (MBUAPCD, 2008a).

Table 3.7-1 indicates that background PM₁₀ concentrations at the Santa Cruz monitoring station have varied somewhat over the past five years, and violated the state standard on one occasion during this time. PM_{2.5} concentrations at the Santa Cruz monitoring station have also varied in the past five years, but have not violated the state standard.

Sulfur Dioxide

SO₂ is a colorless acidic gas with a strong odor at high concentration levels. High concentrations of SO₂ affect breathing and may aggravate existing respiratory and cardiovascular disease. The major source category for SO₂ is fuel-burning equipment combusting fossil fuels. Table 3.7-1 indicates that background SO₂ concentrations at the Davenport monitoring station have been well below the state standard in the past five years.

Nitrogen Dioxide

NO₂ is the “whiskey brown”-colored gas readily visible during periods of heavy air pollution. NO₂ can irritate the lungs, cause pneumonia, and lower resistance to respiratory infections. As indicated in Table 3.7-1, ambient levels in the NCCAB are well below the standards for ambient air quality.

Lead

Gasoline-powered automobile engines were once the major source of airborne lead in urban areas. California eliminated the use of lead additives in fuel, which resulted in substantial reductions in ambient lead concentrations. Ambient levels in the NCCAB are well below the applicable standard and are expected to continue declining (MBUAPCD, 2008b).

Toxic Air Contaminants (Diesel Particulate Matter)

In August 1998, the California Air Resources Board (CARB) identified particulate emissions from diesel-fueled engines (diesel particulate matter [DPM]) as a toxic air contaminant (CARB, 2000). Long-term exposure to DPM carries the risk of chronic health effects. To address this risk, CARB has developed a risk management guidance document and risk reduction plan to reduce DPM and the associated health risk by 75 percent by 2010 and 85 percent by 2020. Since approval of these documents in September 2000, CARB has adopted a series of rules for stationary and portable diesel engines, solid waste collection vehicles, transport refrigeration units, and idling diesel vehicles. Additional measures and specific regulations to reduce DPM emissions will be evaluated and developed over the next several years. In addition, in May 2004, the U.S. Environmental Protection Agency (U.S. EPA) adopted a comprehensive national program known as the Clean Air Nonroad Diesel Rule to reduce emissions from future nonroad diesel engines by more than 90 percent by integrating engine and fuel controls (U.S. EPA, 2004).

Greenhouse Gases

Gases in the atmosphere that affect the earth’s heat balance by absorbing infrared radiation are collectively referred to as GHGs. Both natural processes and human activities emit GHGs. The accumulation of GHGs in the atmosphere regulates the earth’s temperature and maintains a habitable climate; however, emissions from human activities such as fossil fuel combustion have elevated the concentration of these gases in the atmosphere. Increasing GHG concentrations have contributed to an overall increase in the average temperature of the earth’s atmosphere and have contributed to climate change.

The GHGs considered to be most responsible for climate change are water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Enhancement of the greenhouse effect can occur when concentrations of these gases exceed the natural concentrations in the atmosphere. Of these gases, CO₂ and methane are emitted in the greatest quantities from human activities. Emissions of CO₂ are largely by-products of fossil fuel combustion, whereas methane primarily results from off-gassing associated with agricultural practices and landfills. SF₆ is a GHG commonly used in the utility industry as an insulating gas in transformers and other electronic equipment. SF₆, while comprising a small fraction of the total GHGs emitted annually world-wide, is a much more potent GHG with 23,900 times the global warming potential as CO₂.² To account for the warming potential of GHGs, GHGs are often quantified and reported as CO₂ equivalents (CO₂e). There is widespread international scientific agreement that human-caused increases in GHGs contribute to global warming, although there is much uncertainty concerning the magnitude and rate of the warming.

Climate Change

Climate models indicate that temperatures in California are expected to increase by 4.7 to 10.5 degrees Fahrenheit by the end of the century if GHG emissions continue to proceed at a medium or high rate (California Climate Change Center, 2006). Lower GHG emission rates would reduce the projected warming to 3 to 5.6 degrees Fahrenheit. Almost all climate scenarios include a continuing trend of warming through the end of the century given the vast amounts of greenhouse gases already released and the difficulties associated with reducing emissions to a level that would stabilize the climate. CARB estimated that in 2006, California produced 484 million gross metric tons of CO₂e GHG emissions (CARB, 2009). CARB found that transportation is the source of 38 percent of the State's GHG emissions; followed by electricity generation at 22 percent, and industrial sources at 21 percent.

According to the 2006 California Climate Action Team Report (CAT), the following climate change effects are predicted in California over the course of the next century (CAT, 2006):

- A diminishing Sierra snowpack declining by 70 to 90 percent, threatening the State's water supply.
- Increasing temperatures from 8 to 10.4 degrees Fahrenheit under the higher emission scenarios, leading to a 25 to 35 percent increase in the number of days that ozone pollution standards are exceeded in most urban areas.
- Coastal erosion along the length of California and seawater intrusion into the Delta from sea level rise. This would exacerbate flooding in already vulnerable regions.
- Increased vulnerability to forest fires due to pest infestation and increased temperatures.

² Global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere. CO₂ is assigned a global warming potential of 1.

- Increased challenges for the State's important agriculture industry from limited water supplies, increasing temperatures, and saltwater intrusion into the Delta.
- Increased electricity demand, particularly in the hot summer months.

Further, increased sea level elevations as a result of climate change can adversely affect groundwater resources by increasing the susceptibility of coastal aquifers to saltwater intrusion. Adverse impacts to regional water resources, increased risk of wildfires, changing weather expectations for farmers and ranchers, and public health hazards associated with higher peak temperatures, heat waves, and decreased air quality are discussed further below.

Effects on Regional Water Resources

Depending on the climate model, global warming is predicted to result in a slight increase or decrease of precipitation in California. However, the form in which precipitation occurs could change substantially. Warmer winters would lead to less snow and more rain. As a result, the Sierra snowpack would be reduced and would melt earlier. This change could lead to increased flood risks as more water flows into reservoirs and rivers during the winter rainy period. Late spring and summer flows to reservoirs would decrease due to melted snow packs and would reduce the availability of water supplies for cities, agriculture, and rivers during drier months. Increased temperatures would also lead to a rise in sea level, both from thermal expansion and the melting of land-based glaciers. During the past century, sea levels along the California coast have risen by approximately seven inches. Climate forecasts indicate the sea level would rise by 7 to 23 inches over the next 100 years depending on the climate model (Meehl *et al.*, 2007). Substantial melting of either the Greenland or Antarctic ice sheets would lead to an even greater increase; however, current climate models do not indicate that this would occur within the next 100 years, which is the boundary of most climate models. Longer forecast periods are inherently less reliable as they require more assumptions, and tend to compound the effects of assumptions that may be incorrect. Increases in sea level could lead to increased coastal flooding, salt water intrusion into aquifers, and disrupt wetlands and estuaries.

Increased Vulnerability to Regional Wildfires

Increased temperatures would lead to increased evapotranspiration. The summers would likely be drier, and vegetation would also be more likely to dry out, resulting in increasingly more inflammable forests and wildlands. In addition, warmer temperatures could lead to the expansion of pests that kill and weaken trees, leading to increases in the amount of highly inflammable dead trees, and further increasing the risk of large forest fires.

Effects on Regional Weather Extremes

The temperature increases presented in climate change models are yearly averages. Within those averages is the potential for substantially hotter summers and/or colder winters. As a result of global climate change the weather is expected to become more variable, with larger extremes. In California, the increase in temperatures is expected to lead to more days with temperatures in excess of 95 degrees. Increased days of extreme heat has implications for public health as Californians would face greater risk of death from dehydration, heat stroke/exhaustion, heart attack,

stroke, and respiratory distress caused by extreme heat. In addition, increased temperatures have implications for agricultural crops, particularly long-term crops such as grapes and fruit trees that are planted in particular locations to take advantage of micro-climates.

Effects on Regional Air Quality

Increased temperatures can increase air quality problems. Increased temperatures create the conditions in which ozone formation can increase. In addition, hotter temperatures would likely result in increased electricity use to power air conditioners and refrigerators. Increased power use has the potential to result in increased air pollutant emissions as more electrical generation is needed to meet the demand.

3.7.3 Existing Conditions at Individual Well Sites

Some receptors are considered more sensitive than others to air pollutants. The reasons for greater than average sensitivity include pre-existing health problems, proximity to emissions source, or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because children, people suffering from illness, and the elderly are more susceptible to respiratory distress and other air-quality-related health problems than the general public. Residential areas are also sensitive to poor air quality because people who usually stay home do so for extended periods of time, with associated greater exposure to ambient air quality. Recreational uses are also considered sensitive due to the greater exposure to ambient air quality conditions and because vigorous exercise places a high demand on the respiratory system.

O'Neill Ranch Well Site

The closest residential receptors are approximately 200 feet east and southeast of the proposed well and treatment plant at the O'Neill Ranch Well site. The site is located on Soquel Drive, where the predominant local source of air pollutants is motor vehicle traffic.

Cunnison Lane Well Site

There are residential receptors within 50 feet of the Cunnison Lane Well site on adjacent parcels to the north and south. The site lies approximately 600 feet from Soquel Drive, where the predominant source of air pollutants is motor vehicle traffic on Soquel Drive and Highway 1.

Austrian Way Well Site

There are residential receptors within 50 feet of the Austrian Way Well site along the western parcel boundary. The site lies approximately 3,000 feet from Soquel Drive, where the predominant source of air pollutants is motor vehicle traffic.

Granite Way–Aptos Village Well Site

The closest existing residential receptors to the Granite Way–Aptos Village Well site are located approximately 150 feet north of the site. However, because the site is within the boundaries of the proposed Aptos Village Project Plan, future land uses in this area may be altered prior to development

of the proposed well. The Aptos Village Project Plan indicates future land uses would consist mainly of small- to medium-scale community commercial and residential uses. The closest major sources of air pollution are Soquel Drive and Highway 1, located approximately 400 feet and 1,200 feet from the proposed well site, respectively.

Polo Grounds Well Site

There are residential receptors approximately 500 feet east of the existing Polo Grounds irrigation well, and within 50 feet of the proposed sewer lateral and water pipeline to North Polo Drive, and sanitary sewer lateral to South Polo Drive. The site is approximately 4,000 feet from Soquel Drive, where the predominant source of air pollutants is motor vehicle traffic.

3.7.4 Regulatory Framework

Plans, Policies, and Standards

Both the U.S. EPA and CARB have established ambient air quality standards for common pollutants. These ambient air quality standards represent safe levels of contaminants that avoid specific adverse health effects associated with each pollutant. Ambient air quality standards are in place for “criteria” pollutants, which include ozone, CO, NO₂, SO₂, PM₁₀, PM_{2.5}, and lead. **Table 3.7-2** presents both the state and national ambient air quality standards. The state and national standards differ in some cases, with state standards generally being more stringent than the national standards. This difference is particularly true for ozone and PM₁₀.

The federal Clean Air Act and the state Clean Air Act of 1988 require that CARB use air quality monitoring data to designate portions of the state that do not meet the national or state ambient air quality standards as “nonattainment areas.” Because of the difference between national and state standards, the designation of nonattainment areas is often different under federal and state legislation. As shown in Table 3.7-2, the NCCAB is designated as an unclassified/attainment area for the national 8-hour ozone standard. The NCCAB is designated as a nonattainment/transitional area for the state 1-hour ozone standard (the federal 1-hour ozone standard was revoked in 2005). The NCCAB exceeds the state standard for PM₁₀, but is within the federal PM₁₀ standard and both state and federal PM_{2.5} standards (MBUAPCD, 2008b).

The state Clean Air Act requires local air pollution control districts to prepare air quality attainment plans. These plans must provide for districtwide emission reductions of 5 percent per year averaged over consecutive three-year periods or, if not, provide for adoption of “all feasible measures on an expeditious schedule.” To meet this requirement for ozone, the MBUAPCD developed the *2008 Air Quality Management Plan for the Monterey Bay Region* (MBUAPCD, 2008b). This plan is the fifth revision to the *1991 Air Quality Management Plan for the Monterey Bay Region*. The 2008 Air Quality Management Plan (AQMP) revises emission inventories and emission forecasts, updates the analysis of emission reductions needed to meet and maintain the state ozone standard, and adopts five stationary-source control measures. These sources are solvent cleaning operations, spray booths, degreasing operations, adhesives and sealants, and natural-gas-fired fan-type central furnaces and residential water heaters. In addition, in December 1995, the MBUAPCD

**TABLE 3.7-2
STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS
AND NCCAB ATTAINMENT STATUS**

Pollutant	Averaging Time	Standard ^a		Attainment Status ^b	
		State ^c	National ^d	State	National
Ozone	1 hour	0.09 ppm	N/A	Nonattainment	N/A
	8 hour	0.070 ppm	0.075 ppm	N/A	Attainment
Carbon Monoxide	1 hour	20 ppm	35 ppm	Unclassified	Unclassified / Attainment
	8 hour	9 ppm	9 ppm	Unclassified	Unclassified / Attainment
Nitrogen Dioxide	1 hour	0.18 ppm	N/A	Attainment	N/A
	Annual Arithmetic Mean	N/A	0.053 ppm	N/A	Unclassified / Attainment
Sulfur Dioxide	1 hour	0.25 ppm	N/A	Attainment	N/A
	24 hour	0.04 ppm	0.14 ppm	Attainment	Unclassified
Fine Particulate Matter (PM _{2.5})	24 hour	N/A	35 µg/m ³	N/A	Unclassified / Attainment
	Annual Arithmetic Mean	12 µg/m ³	15 µg/m ³	Unclassified	Unclassified / Attainment
Respirable Particulate Matter (PM ₁₀)	24 hour	50 µg/m ³	150 µg/m ³	Nonattainment	Attainment
	Annual Arithmetic Mean	20 µg/m ³	50 µg/m ³	Nonattainment	Unclassified / Attainment
Sulfates	24 hour	25 µg/m ³	N/A	Attainment	N/A
Lead	30 day	1.5 µg/m ³	N/A	Attainment	N/A
	Calendar quarter	N/A	0.15 µg/m ³	N/A	Attainment
Hydrogen Sulfide	1 hour	0.03 ppm	N/A	Attainment	N/A
Vinyl Chloride (chloroethene)	24 hour	0.01 ppm	N/A	Attainment	N/A
Visibility-Reducing Particles	8 hour	see note e	see note f	Attainment	N/A

NOTES:

^a ppm = parts per million by volume; µg/m³ = micrograms per cubic meter.

^b N/A=Not Applicable.

^c California standards for ozone, carbon monoxide, sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, PM₁₀, and visibility-reducing particles are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

^d National standards other than for ozone and particulates, and those pollutant standards that are based on annual averages are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the three-year average of the 4th highest daily concentrations is 0.08 ppm or less.

^e The statewide standard for visibility-reducing particles (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

^f The U.S. EPA encourages state and tribal communities to participate in regional planning organizations to address visibility.

SOURCE: MBUAPCD, 2008b.

prepared the *1995 Report on Attainment of the California Fine Particulate Standard in the Monterey Bay Region*. This report, which was updated in 1996 and 1998, found that existing controls on sources of NO_x emissions, which are precursors to PM₁₀, could lead to attainment and maintenance of the state PM₁₀ standard through 2010.

Regulatory Agencies

CARB regulates local air quality through its established state ambient air quality standards and vehicle emission standards and by setting guidelines, conducting research activities, and planning and coordinating activities. The U.S. EPA also regulates direct emissions from motor vehicles.

On the regional level, the MBUAPCD is the agency empowered to regulate air pollutant emissions in Santa Cruz County. The MBUAPCD is primarily responsible for regulating air pollution emissions from stationary sources (such as factories) and indirect sources (such as traffic associated with new development) and for monitoring ambient pollution concentrations. The MBUAPCD regulates air quality through its permit authority over most types of stationary emission sources and through its planning and review activities. The MBUAPCD is also designated to regulate toxic air contaminant emissions.

Greenhouse Gas Emissions

In 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC) to evaluate the impacts of climate change and to develop strategies that nations could implement to curtail global climate change. In 1992, the United Nations Framework Convention on Climate Change established an agreement with the goal of controlling GHG emissions.

The U.S. EPA annually publishes the Inventory of U.S. Greenhouse Gas Emissions and Sinks for estimating sources of GHGs, which is generally consistent with the Intergovernmental Panel on Climate Change (IPCC³) Guidelines for National Greenhouse Gas Inventories. Currently, the federal Clean Air Act does not specifically regulate GHG emissions. However, in *Massachusetts v. U.S. EPA*, decided April 2, 2007, the U.S. Supreme Court determined that the U.S. EPA has the authority to regulate GHG emissions from cars and trucks under the federal Clean Air Act. As of August 2009, the U.S. EPA has not set federal ambient air quality emissions standards for GHGs.

At the state level, there are currently no state regulations that set ambient air quality emissions standards for GHGs. However, California has passed laws directing the CARB to develop actions to reduce GHG emissions, and several state legislative actions with a bearing on climate change and GHG emissions have come into force in the past decade.

³ The IPCC was established by the World Meteorological Organization and the United Nations Environment Programme in 1988 to assess the potential impacts of climate change and options for mitigation and adaptation. The IPCC Guidelines for National Greenhouse Gas Inventories have been accepted by the United Nations Framework Convention on Climate Change.

Executive Order S-3-05

In 2005, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of GHG would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32 (California Global Warming Solutions Act of 2006)

In 2006, California passed the California Global Warming Solutions Act of (Assembly Bill No. 32; California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), which requires CARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020 (representing an approximate 25 percent reduction in emissions). Under AB 32, the CARB must adopt regulations by January 1, 2011 to achieve reductions in GHGs to meet the 1990 emission cap by 2020.

California Climate Action Team (CAT)

In response to Executive Order S-3-05, the Secretary of the California Environmental Agency (Cal EPA) created the California Climate Action Team (CAT). The CAT is comprised of 14 agencies and divided into 11 subgroups, nine of which address specific economic sectors, and two that address implementing a multi-sector approach to addressing climate change. The subgroups consist of representatives from appropriate state agencies and departments.

In March 2006, the CAT published the Climate Action Team Report to Governor Schwarzenegger and the Legislature (the “2006 CAT Report”). The 2006 CAT Report identifies strategies that the State could pursue to reduce climate change GHG emissions. These are strategies that could be implemented by various State agencies to ensure that the Governor’s targets are met and can be met with existing authority of the State agencies. The CAT Report provides GHG emission reduction strategies.

In March 2008, CAT subgroups submitted more than 100 GHG reduction measures to the CARB Office of Climate Change to be considered for inclusion in CARB’s Scoping Plan. Cal EPA also submitted a Report Card collected from CAT agencies on proposed GHG reduction measures, including an estimate of the actual emissions reductions anticipated from those measures (Cal EPA, 2006).

CARB Climate Change Scoping Plan

In December of 2008, CARB adopted the Climate Change Scoping Plan (AB 32 Scoping Plan) outlining the State’s strategy to achieve the 2020 greenhouse gas emissions limit. The AB 32 Scoping Plan, developed by CARB in coordination with CAT, proposes a comprehensive set of recommended actions designed to reduce overall greenhouse gas emissions in California. The measures in the AB 32 Scoping Plan approved by the Board will be developed over the next two years and be in place by 2012. GHG reduction measures proposed for the Water sector are presented in

Table 3.7-3 below. Three of the measures target reducing energy requirements associated with providing reliable water supplies and two measures are aimed at reducing the amount of non-renewable electricity associated with conveying and treating water. The final measure focuses on sustainable funding for implementing these actions.

**TABLE 3.7-3
WATER-RELATED RECOMMENDED ACTIONS
OF CLIMATE CHANGE SCOPING PLAN**

ID #	Sector	Strategy Name
W-1	Water	Water Use Efficiency
W-2	Water	Water Recycling
W-3	Water	Water System Energy Efficiency
W-4	Water	Reuse Urban Runoff
W-5	Water	Increase Renewable Energy Production
W-6	Water	Public Goods Charge (Water)

SOURCE: CARB, 2008b.

OPR on CEQA and Climate Change

The Governor's Office of Planning and Research (OPR) June 2008 Technical Advisory (OPR, 2008) provides informal guidance for public agencies as they address the issue of climate change in their CEQA documents. The June 2008 Technical Advisory offers recommendations for identifying GHG emissions, determining significance under CEQA, and mitigating impacts.

The June 2008 OPR Advisory states that lead agencies under CEQA should develop their own approach to performing a climate change analysis for projects that generate GHG emissions. The approach should be consistent for analyzing all such projects, and analyses should be performed based on the best available information. If a lead agency determines that GHGs may be generated by a proposed project, the agency is responsible for quantifying estimated GHG emissions by type and source. The June 2008 OPR Advisory also states that the lead agency must assess whether project emissions are individually or cumulatively significant and implement strategies to avoid, reduce, or otherwise mitigate the impacts of those emissions when impacts are potentially significant. Regional agencies can attempt to reduce GHG emissions through their planning processes, according to the June 2008 OPR Advisory. Regional transportation planning agencies can adopt plans and programs that address congestion relief and reduce vehicle miles traveled (VMT), for example.

Subsequent to the release of the 2008 Technical Advisory, OPR has developed proposed guidelines for the mitigation of GHG emissions or the effects of GHG emissions under CEQA, following Senate Bill 97. On April 13, 2009, OPR submitted additions and amendments to the CEQA Guidelines to the Secretary for Natural Resources. The new CEQA Guidelines adopted by the California Natural Resources agency and became effective March 18, 2010.

CARB Preliminary Draft Staff Proposal, October 2008

In its Staff Proposal, CARB is took a first step toward developing recommended statewide interim thresholds of significance for GHGs that may be adopted by local agencies for their own use. The proposal does not attempt to address every type of project that may be subject to CEQA, but instead focuses on common project types that, collectively, are responsible for substantial GHG emissions – specifically, industrial, residential, and commercial projects. CARB is developing these thresholds in these sectors to advance climate objectives, streamline project review, and encourage consistency and uniformity in the CEQA analysis of GHG emissions throughout the State.

Figure 3.7-1 presents the CARB staff’s preliminary interim threshold concepts for industrial projects. The objective is to develop thresholds for projects in this sector that would result in a substantial portion of the GHG emissions from new projects being subject to CEQA’s mitigation requirement, consistent with a lead agency’s obligation to “avoid or minimize environmental damage where feasible.”

CARB staff’s objective in this proposal is to develop a threshold of significance that would result in the vast majority (approximately 90 percent statewide) of the GHG emissions from new industrial projects being subject to CEQA’s requirement to impose feasible mitigation. CARB believes this can be accomplished with a threshold that allows small projects to be considered insignificant. CARB staff used existing data for the industrial sector to derive a proposed hybrid threshold. The threshold consists of a quantitative threshold of 7,000 metric tons of CO₂ equivalent per year (MTCO₂e/year) for operational emissions (excluding transportation), and performance standards for construction and transportation emissions. These performance standards have not yet been developed.

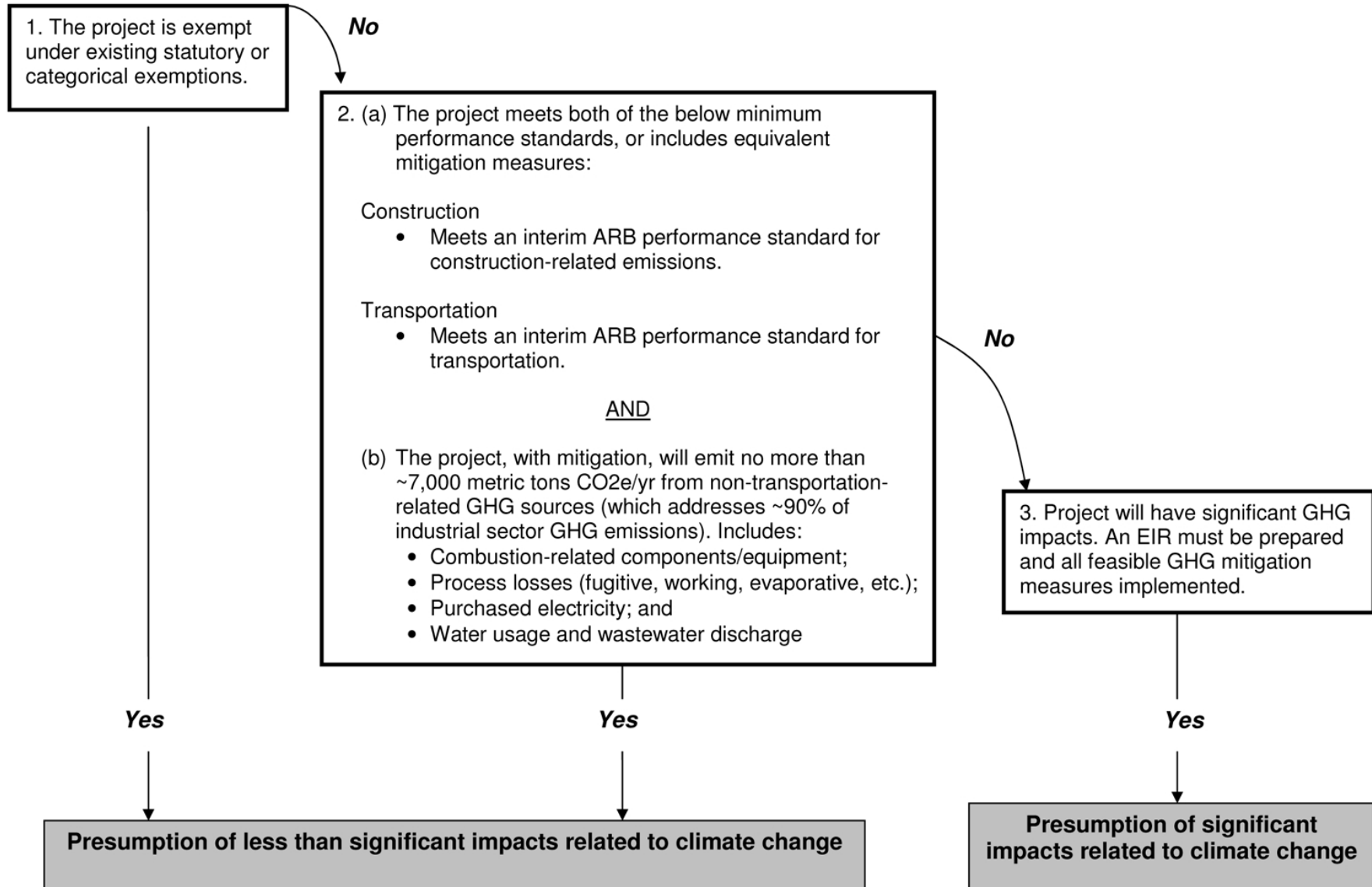
1994 Santa Cruz County General Plan

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed improvements evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. However, although the SqCWD is not legally bound to the plans and policies of Santa Cruz County related to air quality and GHGs, these plans and policies are discussed in this section with respect to the seventh significance criterion in Section 3.7.5, below. The eighth criterion was added to Appendix G of the CEQA Guidelines as part of the amendments adopted by the California Natural Resources Agency on December 9, 2010 and effective March 18, 2010. This criterion indicates a project would have a significant effect on the environment if it were to “conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases”.

The Santa Cruz County General Plan (Santa Cruz County, 1994) identifies the following Air Quality Policy for the purpose of reducing GHG emissions.

Policy 5.18.9: Greenhouse Gas Reduction. Implement state and federal legislation promoting the national goal of 35% reduction of carbon dioxide and other greenhouse gases by 2000.

Preliminary Draft Proposal for Industrial Projects



3.7-14

3.7.5 Impacts and Mitigation Measures

Significance Criteria

Based on Appendix G of the CEQA Guidelines, implementation of the WMP would result in a significant impact to air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people;

Based on Appendix G of the CEQA Guidelines, implementation of the WMP would result in a significant impact to GHGs if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

In addition, based on AB 32, the following significance criterion is added:

- Conflict with the State goal of reducing GHG emissions in California to 1990 levels by 2020, as set forth by AB 32, California Global Warming Solutions Act of 2006.

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

Conflict with applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG, or conflict with State goal of reducing GHG emissions to 1990 levels by 2020, as set forth by AB 32. As described above, Santa Cruz County has adopted Conservation and Open Space Policy 5.18.9, Greenhouse Gas Reduction, in support of state and federal legislation regarding the reduction of CO₂ and GHG emissions. Although the policy is outdated, the proposed project would not conflict with the intent of implementing state and federal legislation promoting the reduction of CO₂ and GHG emissions. Further, the proposed project would not interfere with implementation of AB 32 because it would be consistent with the water-related Recommended Actions designed to achieve the 2020 GHG emissions limit prescribed by AB 32, as established in CARB's Climate Scoping Plan. Therefore, this significance criterion is not applicable and is not discussed further.

MBUAPCD's CEQA Air Quality Guidelines

The MBUAPCD's *CEQA Air Quality Guidelines* recommends analytical methodologies and provides evaluation criteria for determining the level of significance of project impacts within its jurisdiction (MBUAPCD, 2008a). The MBUAPCD's evaluation criteria for determining air quality impacts provide defined thresholds for pollutant emissions. Projects that would generate emissions below the defined thresholds are considered to have a less-than-significant impact on air quality; projects that exceed the thresholds must provide further analysis, such as MBUAPCD-approved air dispersion modeling to refute (or validate) a determination of significance, or must acknowledge a potentially significant air quality impact. The thresholds for specific air quality pollutants from the *CEQA Air Quality Guidelines* are presented below.

Construction Emissions

MBUAPCD guidelines indicate that construction activities that directly generate 82 pounds per day (ppd) or more of PM₁₀ should be presumed to have a significant impact on local air quality when such activities are located nearby and upwind of sensitive receptors.⁴ Projects requiring minimal earthmoving on 8.1 or more acres per day or grading and excavation on 2.2 or more acres per day would result in potentially significant impacts; such projects must provide further analysis to refute (or validate) a determination of significance or must acknowledge a potentially significant air quality impact. Construction emissions of ozone precursors (i.e., volatile organic compounds [VOCs] or NO_x) that would be associated with typical construction equipment (e.g., cranes, backhoes, forklifts, etc.) are accommodated in the emissions inventories of state- and federally required air plans and are presumed by the MBUAPCD to not have a significant impact on the attainment and maintenance of the ozone standards.

Operational Emissions of Criteria Pollutants

MBUAPCD guidelines indicate that individual projects with direct (stationary) and/or indirect (mobile) operational emissions of criteria pollutants that exceed any of the following thresholds should be presumed to have a significant impact on local or regional air quality:⁵

- 137 ppd of VOCs (direct + indirect)
- 137 ppd of NO_x (direct + indirect)
- 82 ppd of PM₁₀ (onsite)
- 550 ppd of CO (direct)
- 150 ppd of SO₂ (direct)

⁴ Projects that exceed this threshold may use MBUAPCD-approved PM₁₀ dispersion modeling to refute (or validate) the initial determination. If modeling demonstrates that direct emissions under individual or cumulative conditions would not cause an exceedance of the state PM₁₀ ambient air quality standard (50 micrograms per cubic meter) at existing receptors, as averaged over 24 hours, the impact would not be considered significant.

⁵ Projects that exceed any of these thresholds must provide further analysis to refute (or validate) a determination of significance or must acknowledge a potentially significant air quality impact.

Local Carbon Monoxide Concentrations

MBUAPCD guidelines indicate that projects that generate traffic that affect levels of service⁶ (LOS) at intersections or road segments could indirectly cause or contribute to violations of state or national ambient air quality standards for CO. Because long-term operations of any individual well proposed under the WMP would only result in very minor increases in maintenance worker trips, WMP implementation would not result in long-term ongoing impacts to traffic volumes and would not affect county LOS standards (see Section 4.9, Traffic and Circulation), nor result in potentially significant impacts on CO concentrations.

For the cumulative analysis of CO, increases in traffic that could result under the WMP **should be** combined with impacts of other closely related past, present, and reasonably foreseeable future projects. The cumulative impact **should be** compared to the above criteria to determine if cumulative development could cause an exceedance of state or national ambient air quality standards at existing or reasonably foreseeable receptors. If so, CO modeling **should be** undertaken.

Cumulative Impacts for Ozone

Cumulative impacts for ozone are based on consistency of the WMP with the AQMP for the Monterey Bay region. Projects that are consistent with the AQMP are not considered cumulatively significant, because the AQMP addresses attainment of the state ozone ambient air quality standard and maintenance of the federal standards. The Association of Monterey Bay Area Governments (AMBAG) performs consistency determinations for infrastructure-related projects, while the MBUAPCD determines consistency for all other projects.

CAPCOA CEQA and Climate Change white paper

In January 2008, the California Air Pollution Control Officers Association (CAPCOA) issued a “white paper” on evaluating GHG emissions under CEQA (CAPCOA, 2008). The CAPCOA white paper strategies are not guidelines and have not been adopted by any regulatory agency; rather, the paper is offered as a resource to assist lead agencies in considering climate change in environmental documents.

The CAPCOA white paper addresses what constitutes new emissions, how baseline emissions should be established, what should be considered cumulatively considerable under CEQA, what a “business as usual” scenario means, and whether an analysis should include life-cycle emissions. The white paper considers GHG impacts to be exclusively cumulative impacts (CAPCOA, 2008).

The CAPCOA white paper contains a Climate Change Significance Criteria Flow Chart that proposes a tiered approach to determining significance under CEQA. The flow chart would consider a proposed *plan*’s impact to be significant unless a General Plan for the project area exists

⁶ The traffic elements of general plans serve to guide the maintenance and improvement of the circulation system at the county and city level. LOS designations represent the applicable goals from the traffic elements of the general plans. According to Policy 3.12.1 of the Santa Cruz County General Plan and Local Coastal Program, LOS C is considered the objective, but LOS D is the minimum acceptable level of service (where costs, right-of-way requirements, or environmental impacts of maintaining adequate LOS are excessive, capacity enhancement may be considered infeasible). Projects that would cause service levels at an intersection or on an uninterrupted highway segment to fall below LOS D during the weekday peak hour are required to mitigate their traffic impacts (Santa Cruz County, 1994).

that is in compliance with AB 32, by showing that GHG emissions for 2020 would be less than 1990 emissions for the plan area. The flow chart would consider a proposed *project's* impact to be significant unless one of the following can be demonstrated:

- The project is exempt under SB 977;
- The project is on the 'Green List';⁸
- A General Plan for the project area exists that is in compliance with AB 329; or
- GHG emissions are analyzed and mitigated to less-than-significant.

The CAPCOA white paper considers GHG impacts to be exclusively cumulative impacts.

Approach to Analysis

The methodology recommended in the MBUAPCD *CEQA Air Quality Guidelines* was used to evaluate air quality impacts. Impacts related to GHG emissions were evaluated based on the CAPCOA CEQA and Climate Change white paper (CAPCOA, 2008), which provides recommended strategies for evaluating GHG emissions under CEQA. While the WMP would result in the generation of new vehicle trips to maintain proposed wells and associated facilities, the number of new vehicle trips would be relatively modest. Consequently, the following analysis focuses on impacts related to construction emissions, new stationary sources of air pollution (diesel emergency generators), and consistency of the WMP with the AQMP for the Monterey Bay region.

Impact Summary

**TABLE 3.7-4
SUMMARY OF IMPACTS – AIR QUALITY AND GREENHOUSE GASES**

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.7-1: Construction activities associated with proposed facilities could generate significant emissions of criteria pollutants, including particulate matter.	LS	LS	LS	LS	LS
Impact 3.7-2: Operation and maintenance of the proposed facilities would result in increased air pollutant emissions.	LS	LS	LS	LS	LS
Impact 3.7-3: Installation and operation of the proposed facilities could contribute to a significant cumulative impact to air quality.	LS	LS	LS	LS	LS

⁷ SB 97 specifies that projects that are funded under November 2006 Proposition 1B (Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act) may be exempt from analysis until January 1, 2010.

⁸ The 'Green List', proposed under the CAPCOA white paper, would be a list of projects and project types that are deemed a positive contribution to California's efforts to reduce GHG emissions.

⁹ For General Plans to be in compliance with AB 32 this would require demonstration that projected 2020 emissions would be equal to or less than 1990 emissions.

TABLE 3.7-4 (Continued)
SUMMARY OF IMPACTS – AIR QUALITY AND GREENHOUSE GASES

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.7-4: Installation and operation of the proposed facilities would generate GHG emissions that could have a significant impact on the environment.	LS	LS	LS	LS	LS
Impact 3.7-5: Construction and operation of the proposed facilities could result in objectionable odors.	LS	LS	LS	LS	LS

LS = Less than Significant impact, no mitigation required

Impact Discussion

Impact 3.7-1: Construction activities associated with proposed facilities could generate significant emissions of criteria pollutants, including particulate matter.

Construction activities at each of the proposed well sites would include ground clearing, well drilling and development, construction of the pump and chemical building, construction of the treatment plant (where applicable), and excavation trenches for pipeline installation, as necessary. In particular, excavation for pipeline installation associated with each of the proposed well sites could generate substantial amounts of fugitive dust. Wells and associated facilities would be developed sequentially at an estimated rate of one well per year, so potential air quality impacts associated with construction would not overlap.

Well drilling and development would require 24-hour construction activities over a three- to four-day period. Subsequent construction of the pump and chemical building, treatment plant (where applicable), and pipeline installation (as applicable) would occur over a five-month period. The majority of earth removed during well drilling would be moist or saturated and therefore is not expected to result in quantifiable dust emissions.

O'Neill Ranch Well Site

Construction at the O'Neill Ranch Well site would include earthwork on approximately 0.4 acre for the proposed well and treatment plant and the installation of pipelines. Pipeline installation, which would be completed at a rate of approximately 100 linear feet per day, could add to the total soil disturbance on a given day of construction. Assuming a worst-case scenario for earthmoving activities on 0.4 acre on a given day and a fugitive dust emission rate of 38 ppd per acre (MBUAPCD, 2008a), peak daily emissions of fugitive dust PM₁₀ during construction would be 15.2 ppd.

In addition, well development construction activities would generate diesel particulate exhaust emissions associated with onsite equipment (i.e., drill rig, crane, backhoe, forklift, air compressor) and offsite mobile sources (i.e., light and heavy duty trucks). For the purpose of emission estimates, it is assumed that each piece of onsite equipment would operate eight hours a day, with the exception of the drill rig, which would operate 24 hours per day during peak construction activities. It is assumed that during the peak of construction, 20 light duty truck trips and 10 heavy duty truck trips would be required each day. Maximum onsite and offsite PM₁₀ exhaust emissions that would be associated with well development activities are estimated to be approximately 3 ppd.

Maximum combined daily PM₁₀ construction emissions of fugitive dust and exhaust are estimated to be approximately 18.2 ppd. Because this worst-case emission scenario is less than the 82-ppd emission threshold for PM₁₀, construction-related emissions of PM₁₀ would be considered less than significant.

As noted above, construction emissions of ozone precursors (i.e., VOCs and NO_x) that would be generated by typical construction equipment are accommodated in the emissions inventories of state- and federally required air plans and are presumed by the MBUAPCD to not have a significant impact on the attainment and maintenance of the ozone standard. However, because well development construction would include the use of non-typical construction equipment (i.e., a drill rig), the maximum daily construction VOC and NO_x emissions from this source was compared to the VOC and NO_x operational significance thresholds of 137 pounds per day. For the maximum worst-case-day scenario, it is assumed that one drill would operate 24 hours during one day. It is estimated that daily emissions associated with 24 hours of drilling would result in the generation of approximately 2 pounds and 28 pounds of VOC and NO_x, respectively (see **Appendix G**). Therefore, impacts associated with non- PM₁₀ criteria pollutants are considered to be less than significant. As such, impacts due to emissions from construction-related vehicles would be less than significant, and no mitigation is necessary.

Cunnison Lane Well Site

Earthwork associated with construction of the well and treatment plant at the Cunnison Lane Well site would result in soil disturbance of about 0.2 acre. Assuming earthmoving activities on 0.2 acre on a given day, and a fugitive dust emission rate of 38 ppd per acre (MBUAPCD, 2008a), peak daily fugitive dust emissions of PM₁₀ during construction would be 7.6 ppd. Construction-related exhaust emissions for the Cunnison Lane Well site would be similar to those discussed above for the O'Neill Ranch Well site. Therefore, combined maximum daily PM₁₀ construction emissions of fugitive dust and equipment exhaust are estimated to be approximately 10.6 pounds per day and daily VOC and NO_x emissions associated with operations of the drill rig would be approximately 2 pounds and 28 pounds, respectively. Impacts would be less than significant, and no mitigation is necessary.

Austrian Way Well Site

Construction of the well and treatment plant at the Austrian Way Well site would result in soil disturbance of about 0.5 acre. Assuming a worst-case scenario for earthmoving activities on one-half acre on a given day and a fugitive dust emission rate of 38 ppd per acre (MBUAPCD, 2008a),

peak daily fugitive dust emissions of PM₁₀ during construction would be 19 ppd. Construction-related exhaust emissions for the Austrian Way Well site would be similar to those discussed above for the O'Neill Ranch Well site. Therefore, combined maximum daily PM₁₀ construction emissions of fugitive dust and equipment exhaust are estimated to be approximately 22 pounds per day and daily VOC and NO_x emissions associated with operations of the drill rig would be approximately 2 pounds and 28 pounds, respectively. Impacts would be less than significant, and no mitigation is necessary.

Granite Way–Aptos Village Well Site

Earthwork related to well construction and pipeline installation at the Granite Way–Aptos Village Well site would result in approximately 0.1 acre of soil disturbance. Assuming earthmoving activities on 0.1 acre on a given day, and a fugitive dust emission rate of 38 ppd per acre (MBUAPCD, 2008a), peak daily fugitive dust emissions of PM₁₀ during construction would be 3.8 ppd. Construction-related exhaust emissions for the Granite Way–Aptos Village Well site would be similar to those discussed above for the O'Neill Ranch Well site. Therefore, combined maximum daily PM₁₀ construction emissions of fugitive dust and equipment exhaust are estimated to be approximately 6.8 ppd and daily VOC and NO_x emissions associated with operations of the drill rig would be approximately 2 pounds and 28 pounds, respectively. Impacts would be less than significant, and no mitigation is necessary.

Polo Grounds Well Site

Earthwork associated with conversion of the irrigation well to a municipal well, treatment plant construction, pipeline installation, and associated facilities would result in an estimated total soil disturbance of about 3.7 acres. Assuming a worst-case scenario for earthmoving activities on 2 acres on a given day, and a fugitive dust emission rate of 38 ppd per acre (MBUAPCD, 2008a), peak daily fugitive dust emissions of PM₁₀ during construction would be 76 ppd. Construction-related exhaust emissions for the Polo Grounds Well site would be similar to those discussed above for the O'Neill Ranch Well site. Therefore, combined maximum daily PM₁₀ construction emissions of fugitive dust and equipment exhaust are estimated to be approximately 79 ppd and daily VOC and NO_x emissions associated with operations of the drill rig would be approximately 2 pounds and 28 pounds, respectively. Since these construction emissions are below the thresholds defined by the MBUAPCD, impacts would be less than significant, and no mitigation is necessary.

Mitigation: None required.

Impact 3.7-2: Operation and maintenance of the proposed facilities would result in increased air pollutant emissions.

Operational emission sources for the proposed WMP include vehicle trips associated with sodium hypochlorite delivery and maintenance and inspection activities, as well as the regular operation of emergency generators for maintenance purposes. The SqCWD Operations and Maintenance Department would visit each well site approximately five times per week to check well pumps and

chlorination equipment and record the volume of water pumped. While regular maintenance and inspection of the proposed wells would result in additional vehicle trips (approximately eight trips, or four round-trips, per day), the number of trips required would not generate substantial air emissions. Assuming ten trips per day and a trip length of 15 miles and using year 2010 emission factors from CARB's 2007 Emission Factors (CARB, 2007) model used to calculate emission rates from all motor vehicles, project emissions of CO would be less than 2 pounds per day, while all other pollutants would be less than 1 pound per day. Therefore, vehicle-related emissions would be well below applicable MBUAPCD thresholds.

Under the WMP, four new diesel emergency generators with up to 300 horsepower would be installed (one at the O'Neill Ranch, Cunnison Lane, and Austrian Way Well sites and one at the converted well at the Polo Grounds Well site). Operation of the emergency generators would produce limited emissions that would be regulated through a Permit to Operate from the MBUAPCD, pursuant to MBUAPCD Rule 1010, Subsection 3.2.1.3.1. This permit would set limits on emissions and the hours of operation for each generator in a given year, thereby limiting emissions to levels acceptable by the MBUAPCD. The permits would require the following operating parameters and diesel particulate emission standards for new stationary emergency diesel engines over 50 horsepower (hp):

- Diesel particulate matter limit of less than 0.15 grams per brake horsepower/hour (g/bhp-hr); or
- Off-road Engine Certification Standard for an off-road engine of the same hp rating; and
- Less than 50 hours per year for non-emergency operations.

Maximum daily emissions from generator operations, assuming all four new generators were tested on the same day, would be 46 pounds per day of NO_x. Securing permits from the MBUAPCD for the emergency standby generators would ensure less than significant operational air quality impacts related to the use of generators.

O'Neill Ranch Well Site

Operation of the proposed well and treatment plant at the O'Neill Ranch Well site would result in the generation of two new vehicle trips per day and the maintenance operation of the emergency generator. The SqCWD typically tests generators for a one-hour period every week. Generating emissions were calculated assuming a generator size of 275 kiloWatts and 50 hours per year of maintenance operations as restricted by MBUAPCD. The emission factors of the U.S. EPA used in these calculations (U.S. EPA, 2004) which are considered conservative relative to CARB certification requirements. Assuming one hour of operation on a given day at full percent load, a 275-kiloWatt generator would emit 11.4 ppd of NO_x, 2.46 ppd of CO, and less than 1 ppd of PM₁₀, VOC and SO₂. These emissions would be less than the MBUAPCD significance thresholds of 137 ppd for VOC and NO_x, 82 ppd of PM₁₀, 550 ppd of CO, and 150 ppd of SO₂.

The testing of emergency generators would also result in emissions of DPM, which is an identified toxic air contaminant in the state of California. However, as a condition of the permit, the proposed generators would be required to comply with Rule 1000 of the MBUAPCD, which could require the

implementation of best available control technology for toxic air contaminants. Operational equipment that complies with Rule 1000 would not result in significant air quality impacts relative to toxic air contaminants (MBUAPCD, 2008a). This impact would be less than significant, and no mitigation is necessary.

Cunnison Lane Well Site

Air pollutant emissions resulting from operation and maintenance activities at the Cunnison Lane Well site would be identical to those discussed above for the O'Neill Ranch Well site; therefore, impacts would be less than significant, and no mitigation is necessary.

Austrian Way Well Site

Air pollutant emissions resulting from operation and maintenance activities at the Austrian Way Well site would be identical to those discussed above for the O'Neill Ranch Well site; therefore, impacts would be less than significant, and no mitigation is necessary.

Granite Way–Aptos Village Well Site

Proposed improvements at the Granite Way-Aptos Village Well site do not include an emergency generator. Therefore, impacts to air pollutant emissions resulting from operation and maintenance activities at this site would be less than significant, and no mitigation is necessary.

Polo Grounds Well Site

Air pollutant emissions resulting from operation and maintenance activities at the Polo Grounds Well site would be identical to those discussed above for the O'Neill Ranch Well site; therefore, impacts would be less than significant, and no mitigation is necessary.

Mitigation: None required.

Impact 3.7-3: Installation and operation of the proposed facilities could contribute to a significant cumulative impact to air quality.

All Sites

According to the MBUAPCD *CEQA Air Quality Guidelines*, projects that are consistent with the AQMP would not result in cumulative [or collective] impacts related to ozone, as regional emissions have been factored into the AQMP. While the SqCWD's total production capacity would be increased by the new wells proposed under the WMP, all active wells would be operated for a shorter duration each day, thereby extending their useful life and minimizing residual pumping depressions. However, the WMP would not result in an increase in total groundwater production. Consequently, the WMP is not considered growth inducing (see Chapter 4, Growth-Inducement Potential and Secondary Effects of Growth).

AMBAG analyzed the consistency of the WMP with the AQMP and determined that the WMP would be consistent (AMBAG, 2006). Therefore, the WMP would not have a significant cumulative air quality impact related to ozone. This impact is less than significant, and no mitigation is required.

Mitigation: None required.

Impact 3.7-4: Installation and operation of the proposed facilities would generate GHG emissions that could have a significant impact on the environment.

All Sites

According to the CAPCOA, GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative greenhouse gas emission impacts from a climate change perspective (CAPCOA, 2008).

The proposed project would generate GHG emissions from a variety of sources. First, GHG emissions would be generated during construction of the proposed wells and treatment facilities, and installation of associated pipelines and appurtenances. Proposed project operations would generate GHG emissions from both stationary sources and mobile sources. Stationary sources associated with the proposed project consist of testing and maintenance of four back-up diesel generators. Mobile sources of air pollutants associated with the proposed project consist of motor vehicle trips generated by maintenance employees. Pumps would also indirectly contribute to GHG emissions by electricity use. The GHG emissions that would result from the proposed project were calculated and are presented in **Table 3.7-5**. Total annual GHG emissions for the proposed project are estimated at 617 metric tons (Mtons) per year.

**TABLE 3.7-5
ANNUAL OPERATIONAL GHG EMISSIONS (in metric tons per year)**

Air Pollutant	CO₂	CO₂e (CH₄)	CO₂e (N₂O)	Total CO₂e
Construction (one year)	140	0.48	0.41	141
Generators	43.6	0.15	0.13	43.9
Vehicle Trips	18.7	0.05	0.65	19.4
Pumps	553	0.11	0.69	554
Total (operational)	615	0.31	1.47	617

SOURCES: ESA, 2008; URBEMIS2007; AP-42; and CCAR, 2009.

The quantitative thresholds for GHG emissions as proposed by CARB are presented in Figure 3.7-1. As can be seen in this figure, CARB methodology for industrial land uses includes only non-transportation sources. If an industrial project emits more than 7,000 Mtons of CO₂e from non-transportations sources, it would be considered to result in a significant impact relative to GHG emissions. Because non-transportation related GHG emissions from operations of the proposed

project are estimated to be 598 Mtons per year of CO₂e, impacts would be considered to have a less than significant impact with respect to the proposed thresholds of CARB. No mitigation is required.

Mitigation: None required.

Impact 3.7-5: Construction and operation of the proposed facilities could result in objectionable odors.

Construction activities that would be associated with the WMP could result in temporary odors from use of diesel fueled equipment. These odors would be temporary and would be unlikely to result in a nuisance to nearby receptors. Odor impacts during construction would be less than significant.

Facilities that would operate under the WMP are wells, potable water treatment plants, and associated pipelines and equipment. Operation of these facilities would not be expected to result in odors because of the low biological content (and consequent anaerobic activity) of the potable water contained at the facilities, as well as the enclosed nature of the project treatment facilities. In addition, at well sites where a new diesel emergency generator is proposed (i.e., all sites except Granite Way-Aptos Village Well site), testing of emergency generators would occur approximately once a week for one hour during the daytime. Testing of emergency generators would result in temporary odors from the diesel fuel, but the odors would occur only one hour per week and would be unlikely to result in a nuisance to nearby receptors. Therefore, impacts associated with operational odor would be less than significant, and no mitigation is required.

Mitigation: None required.

3.7.6 References – Air Quality and Greenhouse Gases

- Association of Monterey Bay Area Governments (AMBAG), Consistency determination for Soquel Creek Water District Well Master Plan, Letter from Todd Muck, AMBAG, Senior Transportation Planner, to Chris Sanchez, ESA, Senior Associate, 2006.
- California Air Pollution Control Officers Association (CAPCOA), 2008. CAPCOA White Paper - CEQA and Climate Change, January 2008.
- California Air Resources Board (CARB), 2000. California's Diesel Risk Reduction Program, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel Fueled Engines and Vehicles*, October 2000.
- California Air Resources Board (CARB). 2007 Emission Factors (EMFAC2007) Model. Available online at http://www.arb.ca.gov/msei/onroad/latest_version.htm. Accessed February 1, 2010.

California Air Resources Board (CARB), 2008. *Climate Change Scoping Plan: a framework for change*, December 2008.

California Air Resources Board (CARB), *California Greenhouse Gas Inventory for 2000-2006 – Summary by IPCC Category*, last updated Friday March 13, 2009. Available online: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_ipcc_00-06_sum_2009-03-13.pdf, accessed June 26, 2009.

California Air Resources Board (CARB), *Air Quality Data Statistics*, available online at <http://www.arb.ca.gov/adam/welcome.html>, accessed on August 7, 2010.

California Climate Action Team (CCAT), 2006. *Report to Governor Schwarzenegger and the California Legislature*, March 2006.

California Climate Change Center, *Our Changing Climate, Assessing the Risks to California, A Summary Report from the California Climate Change Center*, 2006.

California Environmental Protection Agency (Cal EPA), 2006. *Executive Summary, Climate Action Team Report to Governor Schwarzenegger and the California Legislature*, March 2006.

Governor's Office of Planning and Research (OPR), 2008. CEQA AND CLIMATE CHANGE: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review. Sacramento, CA: OPR. Retrieved October 23, 2008, from <http://opr.ca.gov/index.php?a=ceqa/index.html>.

Meehl, G.A., T.F. Stocker, W.D. Collins, P. Friedlingstein, A.T. Gaye, J.M. Gregory, A. Kitoh, R. Knutti, J.M. Murphy, A. Noda, S.C.B. Raper, I.G. Watterson, A.J. Weaver and Z.C. Zhao, 2007: Global Climate Projections. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Monterey Bay Unified Air Pollution Control District (MBUAPCD), 2008a. *CEQA Air Quality Guidelines*, adopted October 1995, revised February 1997, August 1998, December 1999, September 2000, September 2002, June 2004, and February 2008.

Monterey Bay Unified Air Pollution Control District (MBUAPCD), 2008b. *2008 Air Quality Management Plan for the Monterey Bay Region*, September 2008.

U.S. Environmental Protection Agency (U.S. EPA), 2004. Clean Air Nonroad Diesel – Final Rule, May 2004. Available online at <http://www.epa.gov/nonroad-diesel/2004fr.htm>, accessed June 9, 2010.

3.8 Noise and Vibration

3.8.1 Introduction

This section evaluates the potential noise impacts associated with constructing and operating the WMP project. It describes the existing noise environment, presents relevant noise regulations and standards, and identifies sensitive noise receptors that could be affected by the proposed project. Potential noise impacts on these receptors are evaluated, and mitigation provided where appropriate.

Noise Principles and Descriptors

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound can be caused either by its pitch or its loudness. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. Loudness is a function of the intensity of sound waves combined with the reception characteristics of the human ear.

Several noise measurement scales are used to describe noise at a particular location. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound and the decibel (dB) is the unit of measurement used to quantify sound intensity. Because sound can vary in intensity by over 1 million times within the range of human hearing, a logarithmic scale is used to keep sound pressure numbers at a convenient and manageable range. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called “A-weighting,” expressed as “dBA.” The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated.

Time variations in noise exposure are typically expressed in terms of a steady-state energy level (called L_{eq}) that represents the acoustical energy of a given measurement. L_{eq} (24) is the steady-state energy level measured over a 24-hour period. Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dBA increment be added to “quiet time” noise levels to form a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL). CNEL adds a 5-dBA “penalty” during the evening hours (7:00 p.m. to 10:00 p.m.) and a 10-dBA penalty during the night hours (10:00 p.m. to 7:00 a.m.). Another 24-hour noise descriptor, called the day-night noise level (L_{dn}), is similar to CNEL. While both add a 10-dBA penalty to all nighttime noise events between 10:00 p.m. and 7:00 a.m., L_{dn} does not add the evening 5-dBA penalty. In practice, L_{dn} and CNEL usually differ by less than 1 dBA at any given location for transportation noise sources. Common acoustical terms are defined in **Table 3.8-1**.

**TABLE 3.8-1
DEFINITIONS OF ACOUSTICAL TERMS**

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Noise Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this EIR are A-weighted, unless otherwise indicated.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after adding 5 dB in the evening (from 7:00 p.m. to 10:00 p.m.) and after adding 10 dB to sound levels measured in the night (between 10:00 p.m. and 7:00 a.m.).
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after adding 10 dB to levels measured in the night (between 10:00 p.m. and 7:00 a.m.).
L_{max}	The maximum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, time of occurrence, tonal or informational content, as well as the prevailing ambient noise level.

SOURCE: ESA, 2010.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. Because the effects of noise on people vary from person to person, it is not possible to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the baseline noise condition (typically the existing environment) to which one has adapted: the so-called "ambient noise" level. In general, the more a new noise exceeds the

existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. Some examples of public reaction to various noise levels are provided in **Figure 3.8-1**.

With regard to increases in A-weighted noise levels, the following relationships occur:

- Under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dBA.
- Outside of such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise.
- It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA.
- A change in level of 5 dBA is a readily perceptible increase in noise level.
- A 10-dBA change is recognized as twice as loud as the original source (Caltrans, 1998a).

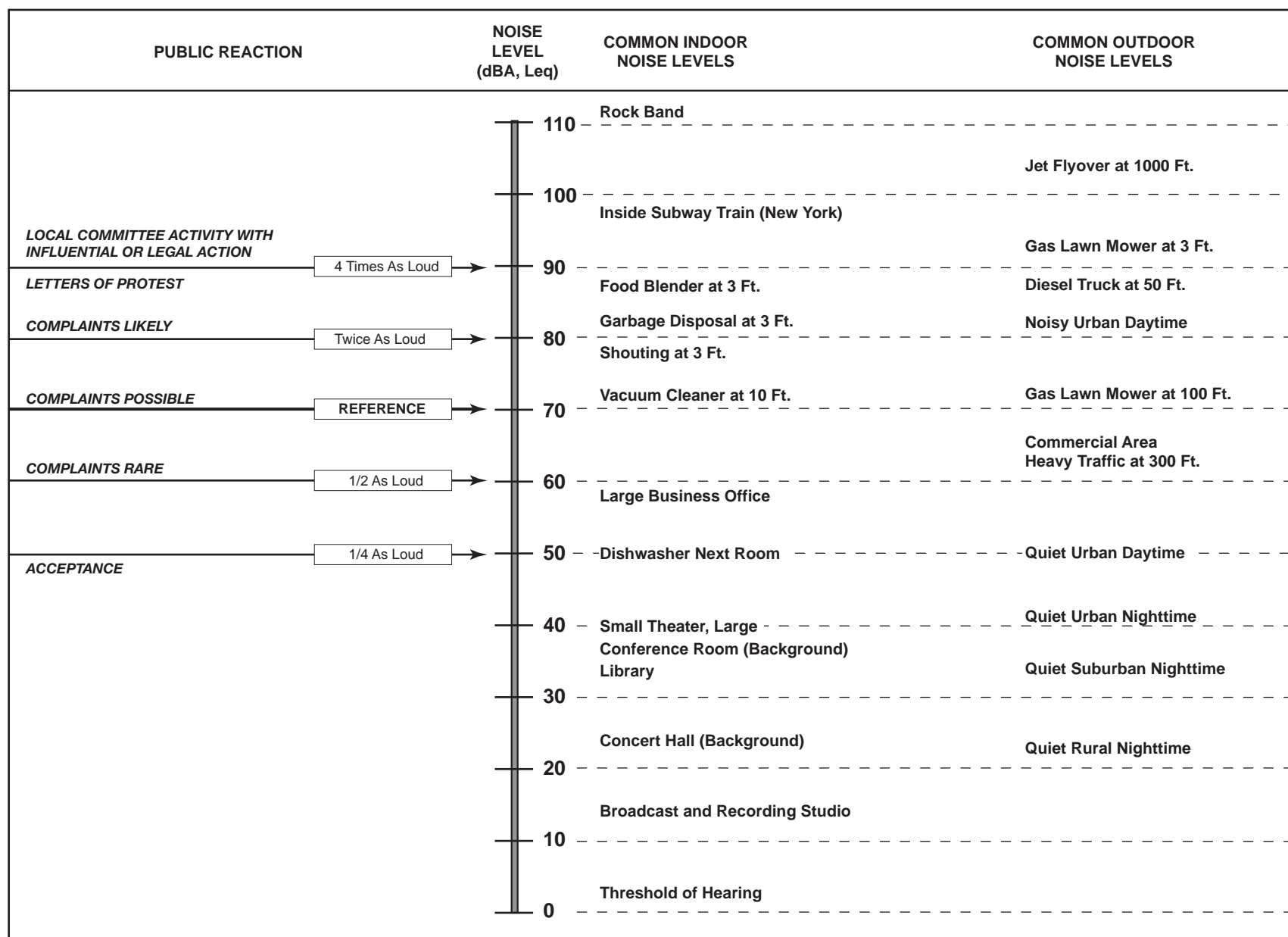
These relationships occur in part because of the logarithmic nature of sound and the decibel system. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple linear fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Point sources of noise, including stationary mobile sources such as idling vehicles or onsite construction equipment, attenuate (lessen) at a rate of approximately 7.5 dBA per doubling of distance from the source, based on the inverse square law and the equation for spherical spreading of noise waves over soft surfaces, such as dirt, grass, bushes, and intervening structures (Caltrans, 1998b).

Vibration Principles

Vibration refers to groundborne noise and perceptible motion. Vibration is a trembling, quivering, or oscillating motion of the earth. It is similar to noise in that both are forms of energy that propagate through matter as waves. Vibration is transmitted in noise-like (compression) or ocean-like (transverse) waves through the earth. Natural sources of vibration include earthquakes, volcanic eruptions, sea waves, and landslides. Artificial sources of vibration include explosions, machinery, traffic, trains, and construction equipment. Vibration sources can also be described as continuous, such as factory machinery, or transient, such as freight trains or truck passbys.

The most common impacts from vibration include annoyance, damage to structures and/or equipment, disruption of vibration-sensitive operations or activities, and triggering of landslides. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Ground vibrations from most construction activities very rarely reach the levels that can damage structures, but can achieve the audible and feel-able ranges in buildings very close to construction sites (DOT, 2006). Activities such as pavement breaking and demolition of structures generate vibrations that are potentially damaging to buildings at distances of less than 25 feet from the source (Hendricks, 2002). At 50 feet,



SOURCE: Caltrans Transportation Laboratory Noise Manual, 1982;
and modification by ESA, 2009.

SqCWD Well Master Plan EIR . 205491

Figure 3.8-1
Effects of Noise on People

vibrations are readily perceptible, but pose virtually no risk of architectural damage to normal buildings. Historical buildings, buildings in poor condition, or buildings previously damaged in earthquakes can sustain damage from pavement breaking and demolition within 50 to 100 feet from the source (Hendricks, 2002).

3.8.2 Regional Setting

Noise generated by vehicle traffic is the most significant source of noise in the vicinity of the proposed well sites. Roadways associated with the highest traffic-related noise in the WMP area include Soquel Drive and Highway 1. The Final EIR for the 1994 Santa Cruz County General Plan and Local Coastal Program (County of Santa Cruz, 1993) predicted noise levels near roadways in Aptos and Soquel with future development in the county for the year 2010. The Final EIR predicted future noise levels 50 feet from the centerline of Soquel Drive in Aptos and Soquel would range from 67 to 70 dBA, L_{dn} .

3.8.3 Existing Conditions at Individual Well Sites

Some land uses are considered more sensitive to ambient noise levels than others because of the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, hotels, schools, churches, and hospitals are generally more sensitive to noise than commercial and industrial land uses.

Short-term noise monitoring of daytime ambient noise levels at the proposed well sites was conducted by ESA staff on July 11, 2006 and July 12, 2006. Noise data was collected in five minute intervals between the hours of 10 a.m. and 12 p.m. at the perimeter of each well site nearest to sensitive receptors.

O'Neill Ranch Well Site

There are residential receptors approximately 200 feet east and southeast of the proposed well and treatment plant at the O'Neill Ranch Well site, and within 50 feet of the pipeline alignments along Soquel Drive. Daytime noise levels at the O'Neill Ranch Well site were monitored at 62 dBA, L_{eq} .

Cunnison Lane Well Site

The closest residential receptors to the Cunnison Lane Well site are about 50 feet from the proposed well and treatment plant on adjacent parcels located immediately north and south of the site. The site lies approximately 600 feet from Soquel Drive, the closest major noise source in the area. Daytime noise levels at this site were monitored at 45 dBA, L_{eq} .

Austrian Way Well Site

There are residential receptors within approximately 50 feet of the proposed location of the well building at the Austrian Way Well site. The site lies approximately 3,000 feet from Soquel Drive, the closest major noise source in the area. Daytime noise levels at this site were monitored at 43 dBA, L_{eq} .

Granite Way–Aptos Village Well Site

There are residential receptors within approximately 150 feet of the proposed well and pump building at the Granite Way–Aptos Village Well site. The site lies approximately 400 feet from Soquel Drive and 1,200 feet from Highway 1, the closest major noise sources in the area. Daytime noise levels at this well site were monitored at 51 dBA, L_{eq} .

Polo Grounds Well Site

There are residential receptors approximately 500 feet east of the existing irrigation well at Polo Grounds Regional Park. The irrigation well is located approximately 4,000 feet from Soquel Drive, the closest major noise source in the area. Daytime noise levels at the irrigation well were monitored at 43 dBA, L_{eq} . Portions of the proposed potable water pipeline and sanitary sewer lateral are within 50 feet of residences along South Polo Drive and North Polo Drive. Aptos Junior High School is located approximately 1,000 feet away from the well site, but is shielded by intervening topography. In addition to nearby residences, visitors to the Polo Grounds Regional Park are considered as sensitive receptors.

3.8.4 Regulatory Framework

Federal and State Guidelines

Federal Guidelines

The federal Noise Control Act of 1972 established a requirement that federal agencies administer their programs to promote an environment free of any noise that jeopardizes public health or welfare. The U.S. Environmental Protection Agency (U.S. EPA) was given the responsibility for:

- Providing information to the public regarding identifiable effects of noise on public health or welfare
- Publishing information on the levels of environmental noise that will protect public health and welfare within an adequate margin of safety
- Coordinating federal research and activities related to noise control
- Establishing federal noise emission standards for selected products distributed in interstate commerce

The U.S. EPA identified indoor and outdoor noise limits to protect against effects on public health and welfare. Outdoor limits of 55 dBA, L_{dn} and indoor limits of 45 dBA, L_{dn} are identified as desirable to protect against speech interference and sleep disturbance for residential areas and areas with educational and healthcare facilities. The U.S. Department of Housing and Urban Development has established guidelines for evaluating noise impacts on residential projects (U.S. HUD, 1991). Sites are generally considered acceptable if they are exposed to outdoor noise levels of 65 dBA, L_{dn} or less, normally unacceptable if they are exposed to levels of between 65 and 75 dBA, L_{dn} , and unacceptable if exposed to levels of 75 dBA, L_{dn} or greater.

State Guidelines

In 1987, the California Department of Public Health (formerly the California Department of Health Service) published guidelines for the noise elements of local general plans. These guidelines include a sound level/land use compatibility chart that categorizes various outdoor L_{dn} ranges by land use. These guidelines identify the normally acceptable range for low-density residential uses as less than 65 dBA and conditionally acceptable levels as between 55 and 70 dBA.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the City of Capitola or the Local Coastal Zone, therefore, ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.

While the proposed WMP facilities are exempt from all local zoning and building ordinances per California Government Code Section 53091 (d) and (e), the Santa Cruz County construction time limits (see Santa Cruz County noise ordinance discussion below) and noise level land use compatibility standards for project operations (see policies 6.9.1 and 6.9.4, below) are taken into consideration in determining whether the proposed project would result in a significant noise effect under the California Environmental Quality Act (CEQA).

1994 Santa Cruz County General Plan

Local noise standards established by the Noise Element of the Santa Cruz County General Plan (Santa Cruz County, 1994) are presented below.

Objective 6.9a: Noise Environment. To promote land uses which are compatible with each other and with the existing and future noise environment. Prevent new noise sources from increasing the existing noise levels above acceptable standards and eliminate or reduce noise from existing objectionable noise sources.

Policy 6.9.1: Land Use Compatibility Guidelines. Require new development to conform with the Land Use Compatibility Guidelines (see **Figure 3.8-2**, below). All new residential and noise sensitive land developments should conform to a noise exposure standard of 60 dBA, L_{dn} (day/night average noise level) for outdoor use and 45 dBA, L_{dn} for indoor use. New development of land which cannot be made to conform to this standard shall not be permitted. Assure a compatible noise environment for various land uses through site planning, building orientation and design, interior layout, and physical barriers, landscaping, and buffer areas where appropriate.

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE – L _{dn} or CNEL (dBA)						
	55	60	65	70	75	80	85
Residential, Hotels, and Motels							
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds							
School, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches							
Office Buildings, Business Commercial, and Professional							
Auditoriums, Concert Halls, and Amphitheaters							
Industrial, Manufacturing, Utilities, and Agriculture							
	Normally Acceptable Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.						
	Conditionally Acceptable New construction or development may be permitted only after a detailed analysis of the noise reduction requirements, and needed noise insulation features are included in the design.						
	Unacceptable New construction or development shall generally not be undertaken because the mitigation is usually not feasible to comply with noise element policies.						

SqCWD Well Master Plan EIR . 205491

SOURCE: County of Santa Cruz, 1994.

Figure 3.8-2
Land Use Compatibility Guidelines

Policy 6.9.4: Commercial and Industrial Development. For all new commercial and industrial developments which would increase noise levels above the maximum allowable standards of the Land Use Compatibility Guidelines in Figure 3.8-2, or **Table 3.8-2**, the best available control technologies will be used to minimize noise levels. In no case shall the noise levels exceed the maximum allowable standards of Figure 3.8-2.

Policy 6.9.7: Construction Noise. Require mitigation of construction noise as a condition of future project approvals.

Santa Cruz County Noise Ordinance

The Santa Cruz County noise ordinance is described in Chapter 8.30 of the County Code. The ordinance is intended to prohibit offensive noise—defined as loud, boisterous, irritating, penetrating, or unusual sound—between the hours of 10:00 p.m. and 8:00 a.m. within 100 feet of any building regularly used for sleeping, or which disturbs any person of ordinary sensitivities.

TABLE 3.8-2
MAXIMUM ALLOWABLE NOISE EXPOSURE FROM STATIONARY SOURCES^a

Noise Level Descriptor	Daytime^b (7 a.m. to 10 p.m.)	Nighttime^{b,c} (10 p.m. to 7 a.m.)
Hourly L_{eq} – average hourly noise level, dB ^d	50	45
Maximum level, dB ^d	70	65
Maximum level, dB – impulsive noise ^e	65	60

^a As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property-line noise mitigation measures.

^b Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced 5 dB if the ambient hourly L_{eq} is at least 10 dB lower than the allowable level.

^c Applies only where the receiving land use operates or is occupied during nighttime hours.

^d Sound level measurements shall be made with "slow" meter response.

^e Sound level measurements shall be made with "fast" meter response.

SOURCE: County of Santa Cruz, 1994.

3.8.5 Impacts and Mitigation Measures

Significance Criteria

Per Appendix G of the CEQA Guidelines, a project would result in a significant noise and/or vibration impact if it were to:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generate excessive groundborne vibration or groundborne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an area covered by an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

Exposure of people to airport-related noise. The proposed well sites would be located more than two miles from Santa Cruz County's only public airport (Watsonville Municipal

Airport) and its two private use airports (Bonny Doon Village Airport and Monterey Bay Academy Airport). None of the proposed well sites are within an area covered by an airport land use plan. Thus, significance criteria related to airport-related noise are applicable and are not discussed further.

For the purposes of this EIR, noise impacts during well construction, maintenance, and operation would be considered significant if they would conflict with performance standards as evidenced in the following:

- Be inconsistent with the restrictions set forth in Chapter 8.30 of the Santa Cruz County Municipal Code, including construction time limits;
- Substantially interfere with affected land uses. Substantial interference could result from a combination of factors, including the generation of construction noise at sensitive receptor locations lasting long periods of time at any one location (i.e., more than two weeks); and/or construction activities that would affect noise-sensitive uses during the nighttime.
- Result in increased long-term operational noise levels that would exceed the allowable noise exposure standards contained in the Noise Element of the Santa Cruz County General Plan and Local Coastal Program, as noted in Table 3.8-2; or
- Result in increased long-term operational noise levels that would exceed the normally acceptable land use compatibility guidelines shown in Figure 3.8-2.

Approach to Analysis

The WMP proposes the construction of production wells and treatment plants and the installation of pipeline in residential areas of Soquel and Aptos. General information regarding construction equipment and construction scenarios is described in Chapter 2, Project Description, Section 2.5, Project Construction.

This analysis evaluates short-term noise and vibration impacts associated with project construction activities, and long-term noise and vibration impacts associated with future operations and maintenance of the proposed facilities. For construction-related noise and vibration, the analysis considers: the proximity of sensitive receptors; typical noise and vibration levels associated with construction equipment; the potential for construction noise levels to substantially interfere with daytime and nighttime land use activities; the duration that sensitive receptors would be affected; and whether construction activities would occur outside of the construction time limits provided in the local noise ordinance. Temporary noise increases during project construction were evaluated based on available noise data and calculations using the principles of noise propagation.

For long-term impacts associated with future operations and maintenance of the proposed facilities, the analysis considers: the proximity of sensitive receptors to the proposed well and treatment facilities; typical noise levels for turbine pumps and submersible pumps; typical noise levels from testing of emergency generators; and the potential for operational noise to exceed the maximum allowable noise exposure standards from stationary sources (shown in Table 3.8-2).

The assessment of potential noise impacts from new stationary sources (e.g., emergency generators, pumps) utilized the following noise data:

- 24-hour noise data collected by ESA on July 11, 2006 and July 12, 2006 at an existing SqCWD production well that is operated with a submersible pump motor (Main Street Well) (ESA, 2006);
- Short-term daytime noise data collected by ESA between 10 a.m. and 12 p.m. on July 11, 2006 and July 12, 2006 at the perimeter of each of the proposed well sites (ESA, 2006);
- The results of an acoustical survey conducted by the SqCWD on April 3, 2008 at an existing SqCWD production well that is operated with an aboveground turbine pump motor (Bonita Well) (SqCWD, 2008).

Impact Summary

**TABLE 3.8-3
SUMMARY OF IMPACTS – NOISE AND VIBRATION**

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.8-1: Well drilling construction activities would temporarily generate nighttime noise levels that would adversely affect nearby sensitive receptors and would be inconsistent with the local noise ordinance.	SU	SU	SU	SU	N/A
Impact 3.8-2: Daytime construction activities would temporarily generate noise levels that would adversely affect nearby sensitive noise receptors.	PSM	PSM	PSM	PSM	LS
Impact 3.8-3: Construction of the proposed facilities could damage structures or generate vibrations that would cause annoyance or interference with vibration-sensitive activities.	LS	LS	LS	LS	N/A
Impact 3.8-4: Operation and maintenance of the proposed facilities could generate noise levels above existing ambient levels.	LS	PSM	PSM	PSM	LS

LS = Less than Significant impact, no mitigation required

PSM = Potentially Significant impact, can be Mitigated to less than significant

SU = Significant Unavoidable impact

N/A = Not Applicable or no impact

Impact Discussion

Impact 3.8-1: Well drilling construction activities would temporarily generate nighttime noise levels that would adversely affect nearby sensitive receptors and would be inconsistent with the local noise ordinance.

As described in Chapter 2, Project Description, Section 2.5, Project Construction, drilling of the boreholes for the new production wells proposed at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites would require 24-hour construction for

approximately four continuous days. Because the Polo Grounds Well is an existing well, 24-hour construction would not occur at the Polo Grounds Well site. The following discussion analyzes potential noise impacts associated with nighttime construction activities. Potential impacts associated with daytime construction activities are analyzed in Impact 3.8-2.

O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well Sites

The distances from the proposed well sites to sensitive noise receptors are 50 feet for the Cunnison Lane and Austrian Way Well sites, 150 feet for the Granite Way-Aptos Village Well site, and 200 feet for the O'Neill Ranch Well site. Temporary noise increases during well drilling and development would depend on the size and type of machine, but is commonly documented to generate 85 dBA at a distance of 50 feet (Layne Christiansen, 2000). Given the noise attenuation rate of approximately 7.5 dBA for every doubling of distance, drilling noise levels at 50 feet, 150 feet, and 200 feet would be approximately 85 dBA, 73 dBA, and 70 dBA, respectively. Because well drilling would occur 24 hours a day over a four-day period at each well drilling site, this construction work would affect nearby residential uses during the nighttime, causing substantial interference to nearby sensitive receptors.

In addition, nighttime well drilling activities at the Cunnison Lane and Austrian Way Well sites would violate the Santa Cruz County noise ordinance, described in Chapter 8.30 of the County Code, which prohibits loud noise between the hours of 10:00 p.m. and 8:00 a.m. within 100 feet of any building regularly used for sleeping, or which disturbs any person of ordinary sensitivities. Well drilling activities proposed between the hours of 10:00 p.m. and 8:00 a.m. at the Cunnison Lane and Austrian Way Well sites would be inconsistent with the restrictions of Chapter 8.30 of the County Code.

The necessity to drill consistently over 24-hour periods for four consecutive days would result in a temporary, yet, significant noise impact at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites. While implementation of **Mitigation Measures 3.8-1a (Nighttime Noise Controls During Well Drilling)**, **3.8-1b (Hotel Accommodations During Nighttime Well Drilling)**, and **3.8-1c (Nighttime Well Drilling Notification)** would, to a degree, reduce the intensity of nighttime interference to nearby residential uses, nighttime project construction activities would continue to be relatively loud compared to nighttime ambient noise levels, and at the Cunnison Lane and Austrian Way Well sites, construction activities would not be in compliance with the County noise ordinance prohibiting offensive noise within 100 feet of residences during nighttime hours. Consequently, there are no feasible mitigation measures available that would reduce this impact to a less-than-significant level. Therefore, although temporary and intermittent, well drilling and development would be anticipated to have a significant and unavoidable noise impact on nearby noise-sensitive receptors at the three sites.

Polo Grounds Well Site

No well drilling would occur at the Polo Grounds Well site. Project construction activities would occur during daytime hours and would not conflict with Santa Cruz County construction time limits prohibiting offensive noise between the hours of 10:00 pm and 8:00 a.m., therefore, no nighttime well drilling impacts would occur associated with the Polo Grounds Well site.

Mitigation Measures

Measure 3.8-1a: Nighttime Noise Controls During Well Drilling (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). The SqCWD shall include construction specification requirements for installation and maintenance of sound walls or noise blankets during 24-hour construction activities. Specifications shall include use of appropriate materials (e.g., solid wood no less than half an inch thick). The sound walls and/or noise blankets shall be installed to a height that intercepts the line of sight between the drill rig exhaust and sensitive receptors.

Measure 3.8-1b: Hotel Accommodations During Nighttime Well Drilling (applies to Cunnison Lane and Austrian Way Well sites). The SqCWD shall offer to provide hotel accommodations for all residents within 100 feet of well drilling sites for the duration of 24-hour well drilling activities.

Measure 3.8-1c: Nighttime Well Drilling Notification (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). At least two weeks prior to well drilling construction activities, but no more than one month in advance, written notification shall be provided to residents located within 500 feet of well drilling activities identifying the type, duration, and frequency of 24-hour well drilling construction activities.

Significance after Mitigation: Significant and Unavoidable at O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites. No impact at Polo Grounds Well site.

Impact 3.8-2: Daytime construction activities would temporarily generate noise levels that would adversely affect nearby sensitive noise receptors.

With the exception of well drilling activities, all other construction activities, including construction of the pump and chemical building, installation of treatment facilities, pipeline installation, concrete removal, paving, stockpiling, and truck hauling, would occur during daytime hours. Daytime construction would occur for periods of up to 12 months at the O'Neill Ranch, Cunnison Lane, Polo Grounds, and Austrian Way Well sites; because treatment facilities are not proposed at the Granite Way-Aptos Village Well site, the duration of daytime construction activities at this site would be approximately one month.

Typical Construction Noise Sources

Project construction activities would generate temporary and intermittent noise at and near the proposed well sites, as well as along the proposed pipeline alignments. Noise levels would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. In addition, depending on the number of trips and the types of vehicles used, construction-related truck and vehicle trips could increase ambient noise levels along access routes. **Table 3.8-4** shows typical noise levels produced by various types of construction equipment at 50 feet.

**TABLE 3.8-4
TYPICAL CONSTRUCTION EQUIPMENT NOISE AT 50 FEET**

Construction Equipment	Noise Level (dBA, L _{eq} at 50 feet)
Earthmoving Equipment	
Front Loaders	85
Backhoes	80
Dozer	85
Trucks	88
Stationary Equipment	
Generators	81
Compressors	81
Impact Equipment	
Jack Hammers	88
Pneumatic Tools	85

SOURCE: DOT, 2006.

Noise-sensitive land uses (such as residential uses) are located along the proposed pipeline alignments. During pipeline installation, nearby residences could be exposed to noise levels as high as 88 dBA. Pipeline installation, which would proceed at approximately 100 feet per day, would advance along the roadway at a pace that would expose sensitive receptors to elevated noise levels for a period of approximately three or four days rather than for the entire construction period. Therefore, it is not anticipated that pipeline installation would cause substantial interferences to nearby noise-sensitive receptors. Therefore, potential impacts that would be associated with pipeline construction activities are considered to be less than significant.

Noise-sensitive land uses are also located in the vicinity of the proposed well sites. The distance from the proposed well sites to sensitive noise receptors varies from 50 feet at the Cunnison Lane, Austrian Way, and Polo Grounds Well sites, to 200 feet at the O'Neill Ranch Well site. Given a noise attenuation of approximately 7.5 dBA for every doubling of distance, peak construction noise levels would range from 88 dBA at residential receptors adjacent to the Cunnison Lane, Austrian Way, and Polo Grounds Well sites to 73 dBA at approximately 200 feet in the vicinity of the O'Neill Ranch Well site. While construction activities would occur when the majority of people are at work, retired persons, people who work at home, and people caring for children in their homes could be adversely affected by noise when construction activities occur in close proximity. Due to the duration of noise exposure at residences near the O'Neill Ranch, Cunnison Lane, and Austrian Way Well sites (up to 12 months), and at the Granite Way-Aptos Village site (approximately one month), well development construction activities would substantially interfere with affected land uses and associated impacts are considered to be potentially significant.

In addition, construction-related vehicle trips to and from the proposed well sites could raise ambient noise levels along construction routes, depending on the number of trips made, hours of travel, and the types of vehicles used. Some of the truck routes used during construction would include roads that pass through residential areas and/or roadways that have low traffic volumes.

However, noise from intermittent construction-related truck trips would be unlikely to substantially raise roadside noise levels above existing levels, as a doubling of traffic volumes would be necessary to raise roadside noise by 3 dBA (Caltrans, 1998a).

O'Neill Ranch Well Site

There are residential receptors approximately 200 feet east and southeast of the proposed well and treatment plant at the O'Neill Ranch Well site. The site is located on Soquel Drive, where daytime noise levels were monitored at 62 dBA, L_{eq} . Given a noise attenuation rate of approximately 7.5 dBA for every doubling of distance and the data presented in Table 3.8-4, noise levels at residential receptors during non-drilling construction activities would be approximately 73 dBA during peak equipment operations. This noise level would occur during daytime hours and would be similar to levels associated with construction of one single-family residence. Because the construction noise associated with the proposed well and treatment plant at nearby receptors would last for up to one year, construction-related daytime noise impacts at the site would be potentially significant.

Proposed improvements associated with the O'Neill Ranch Well include approximately 1,750 feet of potable water pipeline from the proposed well site, along Soquel Drive to Daubenbiss Avenue to connect to the existing SqCWD water distribution system. This pipeline would pass within 50 feet of residences along Soquel Drive. Trenching activities for the pipeline would involve operations of a backhoe, a truck and potentially a loader. A backhoe and compactor would then be used to backfill the excavation. Based on the estimated pipeline installation rate of 100 feet per day, construction noise levels of up to 88 dBA would be expected to occur during daytime hours at residences along Soquel Drive over a period of about three to four days as pipeline work would approach and recede from a particular receptor. Because pipeline construction noise would affect individual receptors for less than one week, pipeline installation activities would generate less than significant land use noise interference impacts.

Implementation of **Mitigation Measures 3.8-2a (Noise Controls During Daytime Construction)** and **3.8-2b (Construction Notification)** would reduce the potentially significant noise impacts during well and treatment plant construction to a less-than-significant level.

Cunnison Lane Well Site

The closest residential receptors are approximately 50 feet from the proposed well and treatment plant at the Cunnison Lane Well site. Daytime ambient noise levels at this site were monitored at 45 dBA, L_{eq} . Noise levels during pipeline installation and typical construction activities of the treatment plant facilities could be 88 dBA during peak equipment operations. Similar to the O'Neill Ranch Well site, pipeline construction activities associated with the Cunnison Lane Well site would be less than significant due to the associated short-term duration (i.e., three to four days) of noise exposure that would occur at sensitive receptor locations along the pipeline route. However, because noise associated with the construction of the proposed well and treatment plant at nearby receptors would last for up to one year, construction-related daytime noise impacts at the site would be potentially significant. Implementation of **Mitigation Measures 3.8-2a (Noise**

Controls During Daytime Construction) and **3.8-2b (Construction Notification)** would reduce these daytime noise impacts to a less-than-significant level.

Austrian Way Well Site

There are residential receptors within approximately 50 feet of the proposed well and treatment plant at the Austrian Way Well site. Daytime ambient noise levels at this site were monitored at 43 dBA, L_{eq} . Noise levels during pipeline installation and construction of the treatment plant facilities are estimated to be up to 88 dBA during peak equipment operations. Similar to the O'Neill Ranch Well site, noise impacts from pipeline installation activities would be less than significant due to the short-term duration (i.e., three to four days) of noise exposure that would occur at sensitive receptors along the pipeline alignment. However, because increased noise levels associated with construction of the proposed well and treatment plant at nearby receptors would last for up to one year, construction-related daytime noise impacts at the site would be potentially significant. However, implementation of **Mitigation Measures 3.8-2a (Noise Controls During Daytime Construction)** and **3.8-2b (Construction Notification)** would reduce this impact to a less-than-significant level.

Granite Way–Aptos Village Well Site

The closest residential receptors to the Granite Way–Aptos Village Well site are currently approximately 150 feet away. However, it should be noted that at the time the proposed well is constructed at this site, planned residential development associated with the Aptos Village Plan project could result in residences as close as 50 feet of the Granite Way–Aptos Village Well site. Daytime noise levels at this proposed well site were monitored at 51 dBA, L_{eq} . Noise levels at existing residential receptors during construction of the well facilities would be 76 dBA during peak equipment operations. Similar to the O'Neill Ranch Well site, pipeline construction activities associated with the Granite Way–Aptos Village Well site would be less than significant due to the associated short-term duration (i.e., three to four days) of noise exposure that would occur at sensitive receptor locations along the pipeline alignment. Because the noise associated with construction of the proposed well at nearby receptors would last for a duration of approximately one month, daytime noise impacts associated with construction of the well would be potentially significant. However, implementation of **Mitigation Measures 3.8-2a (Noise Controls During Daytime Construction)** and **3.8-2b (Construction Notification)** would reduce these construction-related daytime noise impacts to a less-than-significant level.

Polo Grounds Well Site

There are residential receptors approximately 500 feet east of the existing irrigation well at Polo Grounds Regional Park. Daytime noise levels at the Polo Grounds Well site were monitored at 43 dBA, L_{eq} . Noise levels during construction of the treatment plant would be 88 dBA during peak equipment operations, which would be attenuated to about 63 dBA at the nearest receptor. This daytime construction activity noise level at the Polo Grounds Well site would not be expected to substantially interfere with nearby residences. Therefore, construction-related noise impacts at the Polo Grounds Well site would be less than significant. Similar to the O'Neill Ranch Well site, pipeline construction activities associated with the Polo Grounds Well site

would be less than significant due to the associated short-term duration (i.e., three to four days) of noise exposure that would occur at sensitive receptor locations along the pipeline alignment. Thus, all construction-related noise impacts at the Polo Grounds Well site would be less than significant, and no additional mitigation is required.

Mitigation Measures

Measure 3.8-2a: Noise Controls During Daytime Construction (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites).

The SqCWD shall incorporate the following noise controls into contractor specifications to reduce construction noise levels:

- With the exception of well drilling, noise-generating construction activities shall generally occur between the hours of 8 a.m. to 6 p.m.
- All construction equipment shall be muffled and maintained in good operating condition. All internal combustion-engine-driven equipment shall be fitted with intake and exhaust mufflers that are in good condition.
- Construction contractors shall locate fixed construction equipment such as compressors as far as possible from noise-sensitive receptors during construction.
- When construction occurs 100 feet of existing residences, if feasible, the construction contractors shall construct temporary sound walls or barriers to shield the noise-generating construction activities from these sensitive receptors. Specifications shall include use of appropriate materials (e.g., solid wood no less than half an inch thick) and shall be installed to a height that intercepts the line of sight between the majority of construction activities and the sensitive receptors.

Measure 3.8-2b: Construction Notification (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). Prior to construction, written notification shall be provided to potentially affected residents located within 250 feet of these sites identifying the type, duration, and frequency of construction activities. Notification materials shall also identify a mechanism for residents to register complaints with SqCWD if construction noise levels are overly intrusive or construction occurs outside the permitted hours.

Significance after Mitigation: Less than significant.

Impact 3.8-3: Construction of the proposed facilities could damage structures or generate vibrations that would cause annoyance or interference with vibration-sensitive activities.

Of the various types of construction activities associated with the proposed facilities, well drilling is the only type of activity identified by the U.S. and California Departments of Transportation as one that can result in vibration impacts (DOT, 2006; Caltrans, 1998a). Vibration impacts can be assessed with respect to the potential for structural damage of nearby buildings and also with respect to the potential for annoyance or interference with vibration-sensitive activities.

The potential for structural damage can be assessed by comparing the predicted peak particle velocity (PPV) at the nearest structure to the DOT damage criterion for fragile buildings (0.20 inches per second) or for extremely fragile historic buildings (0.12 inches per second). Using DOT data, vibration from drilling at a distance of 50 feet is estimated to be 0.031 inches per second, which is less than either of the structural criteria.

For assessment of the potential for annoyance or interference with vibration-sensitive activities, the DOT identifies different impact levels depending on the land use and frequency of events. Generally, these impact levels were developed for transportation projects, where impacts persist over time, and not specifically for construction vibration impacts, which are temporary. Notwithstanding this consideration, the vibration impact criterion for infrequent events at residential land uses is 80 vibration decibels (Vdb). Using DOT data, groundborne vibration from drilling at a distance of 50 feet is estimated to be 81 Vdb.

O'Neill Ranch Well Site

There are residential receptors approximately 200 feet east and southeast of the proposed well and treatment plant at the O'Neill Ranch Well site. Vibration would be less than the 0.12 inches per second PPV criterion for structural damage to extremely fragile historic buildings and less than the 80 Vdb criterion for infrequent events at residential land uses. Therefore, construction-related vibration impacts would be less than significant at the O'Neill Ranch Well site, and no mitigation is necessary.

Cunnison Lane Well Site

There are residential receptors within approximately 50 feet of the proposed well and treatment plant at the Cunnison Lane Well site. Using DOT data, vibration from drilling at a distance of 50 feet is estimated to be 0.031 inches per second, which is less than either of the structural criteria.

Using DOT data, groundborne vibration from drilling at a distance of 50 feet is estimated to be 81 Vdb. This predicted vibration level at nearby residences is marginally in excess of the DOT standard for general vibration assessment at residential land uses. However, given the temporary nature of the potential vibrations and the fact that the DOT criteria were developed to assess annoyance from long-standing operational vibration, construction-related vibration impacts are not predicted to result in structural damage of even the most sensitive structures and are therefore considered less than significant. No mitigation is necessary.

Austrian Way Well Site

There are residential receptors within approximately 50 feet of the proposed well and treatment plant at the Austrian Way Well site. Vibration impacts would be less than the 0.12 inches per second PPV criterion for structural damage to extremely fragile historic buildings and less than the 80 Vdb criterion for infrequent events at residential land uses. Therefore, construction-related vibration impacts would be less than significant at the Austrian Way Well site, and no mitigation is necessary.

Granite Way–Aptos Village Well Site

There are residential receptors within approximately 150 feet of the proposed well at the Granite Way–Aptos Village Well site. Vibration impacts would be less than the 0.12 inches per second PPV criterion for structural damage to extremely fragile historic buildings and less than the 80 Vdb criterion for infrequent events at residential land uses. Therefore, construction-related vibration impacts would be less than significant at the Granite Way–Aptos Village Well site, and no mitigation is necessary.

Polo Grounds Well Site

There are residential receptors approximately 500 feet east of the existing irrigation well at the Polo Grounds Well site. Because the well already exists, no impact from well drilling and associated vibration would occur. No mitigation is required.

Mitigation: None required.

Impact 3.8-4: Operation and maintenance of the proposed facilities could generate noise levels above existing ambient levels.

The proposed facilities would generate noise due to the operation of pumps, testing, and maintenance of emergency generators, as well as regular maintenance and worker vehicle trips. Each well would be equipped with a turbine pump that would be driven by either an aboveground or submersible electric motor with up to 300 horsepower. Aboveground motors would be enclosed within the pump building.

Aboveground turbine pumps motors of this size have been monitored by SqCWD at the existing Bonita Well to generally operate at a noise level of ranging from 60 dBA to 81 dBA immediately outside of the pump building, depending on the orientation of the building. Aboveground turbine pumps generate increased noise levels of 85 dBA at a distance of 30 feet from the pump building during pump initiation and shut-down episodes (SqCWD, 2008).

The District operates submersible pump motors at its Main Street Well. At the Main Street Well site, daytime hourly noise levels (which included traffic noise from Main Street) were recorded at 53 to 56 dBA, Leq, and nighttime noise levels (when pumps are less active) were monitored at 44 to 49 dBA, Leq (ESA, 2006).

Pump motor operational noise at the nearest sensitive receptors could be in excess of daytime and the nighttime noise exposure standards for stationary sources presented in Table 3.8-2. The well pumps would not operate continuously; this analysis assumes that on average, the pumps would run continuously for 12 hours per day, depending on demand. Consequently, pump noise would only contribute to a portion of an averaged nighttime hourly noise level.

Vehicle trips associated with regular maintenance and operations would total approximately 4 to 5 round trips per week for each well site. Thus, long-term vehicle trips would not result in a

noticeable increase in traffic volumes on local roadways and would not substantially affect the noise environment.

Testing and maintenance of emergency generators would occasionally increase noise levels at adjacent sensitive receptors, depending on the engine size and presence/absence of acoustical controls. ESA has monitored unenclosed diesel generators (86 horsepower) and found that they emit a noise level of 69 dBA at a distance of 50 feet. The proposed generators would be up to 300-horsepower and would result in a greater noise emission. This noise would occur for one hour during the daytime approximately once a week (52 times a year) at each well location during testing and maintenance of generators.

Section 13.10.663 (11) of the Santa Cruz County noise ordinance requires that backup generators be operated only during power outages and for testing and maintenance purposes. If the facility is located within 100 feet of a residential dwelling unit, noise attenuation measures must be included to reduce noise levels at the facility to a maximum exterior noise level of 60 dBA, L_{dn} at the property line and a maximum interior noise level of 45 dBA, L_{dn} within nearby residences, consistent with the Santa Cruz County Land Use Compatibility Guidelines.

O'Neill Ranch Well Site

There are residential receptors approximately 200 feet east and southeast of the proposed well and treatment plant at the O'Neill Ranch Well site. Based on noise monitoring from the aboveground pump and motor at the District's existing Bonita Well and noise attenuation calculations for stationary sources, daily operations at the O'Neill Ranch Well site, assuming use of an aboveground turbine pump and optimal orientation of a standard pump building, would result in a noise level of 41 dBA at the nearest residences. This predicted noise level is less than the hourly average noise level standards for daytime and nighttime hours of 50 and 45 dBA, respectively. Maximum noise levels from pump start-up/shut-down episodes would be 64 dBA, which would be less than the County's daytime and nighttime maximum stationary source noise standards of 70 dBA and 65 dBA, respectively. Therefore, noise impacts from operation and maintenance activities at the O'Neill Ranch Well site would be less than significant, and no mitigation is required.

Because the proposed emergency generator would be located more than 100 feet from the nearest receptor, the requirements of Section 13.10.663 (11) of the County Municipal Code would not apply to this site, and impacts associated with intermittent noise from weekly testing of emergency generators would be less than significant. No mitigation is necessary for operation of the emergency generator at this site.

Cunnison Lane Well Site

There are residential receptors within approximately 50 feet of the proposed well and treatment plant at the Cunnison Lane Well site. Based on noise monitoring from the existing aboveground pump and motor at the Bonita Well and noise attenuation calculations for stationary sources, it is estimated that noise levels at nearby residences from regular operations and maintenance activities at the Cunnison Lane Well site would be 56 dBA, assuming use of an aboveground turbine pump and optimal orientation of a standard pump building. This predicted noise level

would exceed the hourly average noise level standards for daytime and nighttime hours of 50 and 45 dBA, respectively. It is estimated that maximum noise levels from pump start-up/shut-down episodes would be 79 dBA, which would exceed the daytime and nighttime maximum noise standards of 70 dBA and 65 dBA, respectively. Thus, impacts associated with operational noise levels at this site would be potentially significant. However, implementation of **Mitigation Measure 3.8-4a (Submersible Pump)**, which would require use of a quieter submersible pump, would reduce this impact to a less-than-significant level.

Because the proposed emergency generator at this site would be located approximately 50 feet from the nearest receptor, Section 13.10.663 (11) of the County Municipal Code would require that intermittent noise from weekly testing of emergency generators not exceed 60 dBA, L_{dn} at the nearest property line. Given the relatively low ambient background noise levels at the Cunnison Lane Well site, generator noise that exceeds 74 dBA for one hour would result in an exterior noise level greater than 60 L_{dn} , a potentially significant impact. However, implementation of **Mitigation Measure 3.8-4b (Generator Noise Attenuation Features)**, which requires the use of a low-noise generator or installation of acoustical enclosures around the generator, would reduce this impact to a less-than-significant level.

Austrian Way Well Site

There are residential receptors within approximately 50 feet of the proposed well and treatment plant at the Austrian Way Well site. Based on noise monitoring from the existing aboveground pump and motor at the Bonita Well and noise attenuation calculations for stationary sources, it is estimated that daily operations at the Austrian Way Well site would result in noise levels of 56 dBA, assuming use of an aboveground turbine pump and optimal orientation of a standard pump building. This predicted noise level would exceed the hourly average noise level standards for daytime and nighttime hours of 50 dBA and 45 dBA, respectively. Estimated maximum noise levels from pump start-up/shut-down episodes would be 79 dBA, which would exceed both the daytime and nighttime maximum noise standards of 70 dBA and 65 dBA, respectively. Therefore, operation of an aboveground turbine pump at this location would result in a potentially significant noise impact on the nearest residential receptors. However, implementation of **Mitigation Measure 3.8-4a (Submersible Pump)**, which would require use of a quieter pump, would reduce this impact to a less-than-significant level.

Because the proposed emergency generator would be located less than 100 feet from the nearest receptor, Section 13.10.663 (11) of the County Municipal Code would require that intermittent noise from weekly testing of emergency generators not exceed 60 dBA, L_{dn} at the nearest property line. Given the relatively low ambient background noise levels at the Austrian Way Well site, generator noise that exceeds 74 dBA for one hour would result in an exterior noise level greater than 60 L_{dn} . Increased noise levels from emergency generator testing at this site would be considered a potentially significant impact. However, implementation of **Mitigation Measure 3.8-4b (Generator Noise Attenuation Features)** would reduce this impact to a less-than-significant level.

Granite Way–Aptos Village Well Site

There are residential receptors within approximately 150 feet of the proposed well at the Granite Way–Aptos Village Well site. However, it should be noted that at the time the proposed well is constructed at this site, planned residential development associated with the Aptos Village Plan project could result in residences as close as 50 feet of the Granite Way–Aptos Village Well site. Based on noise monitoring from on the aboveground pump at motor at the District’s existing Bonita Well and noise attenuation calculations for stationary sources, it is estimated that daily operations at the Granite Way–Aptos Village Well site would result in noise levels of 44 dBA with operation of an aboveground turbine pump and motor, assuming optimal orientation of a standard pump building. This predicted noise level is less than the hourly noise level standards for daytime and nighttime hours of 50 dBA and 45 dBA, respectively.

However, since the Granite Way–Aptos Village Well site would be constructed within the proposed Aptos Village Plan, it is possible that once the Aptos Village Plan project is implemented, residential receptors would be closer than 150 feet from the proposed well and could be as close as 50 feet from the proposed well and pump. Therefore, increased ambient noise levels from continuous operation of the well pump and motor, and intermittent noise level increases from start-up/shut-down of the well pump and motor, could exceed both daytime and nighttime hourly and maximum noise standards, resulting in a potentially significant noise impact at the nearest sensitive receptors. However, with implementation of **Mitigation Measure 3.8-4a (Submersible Pump)**, operational noise impacts would be reduced to a less-than-significant level.

An emergency generator is not proposed at the Granite Way–Aptos Village site. Thus, no impacts associated with increased noise levels during generator testing would result.

Polo Grounds Well Site

There are residential receptors approximately 500 feet east of the existing Polo Grounds irrigation well. Based on noise monitoring from the aboveground pump and motor at the District’s existing Bonita Well and noise attenuation calculations for stationary sources, it is estimated that daily operations at the Polo Grounds Well site would result in noise levels of 31 dBA with operation of an aboveground pump and motor, assuming optimal orientation of a standard pump building. This predicted noise level is less than the hourly noise level standards for daytime and nighttime hours of 50 and 45 dBA, respectively. Maximum noise levels from pump start-up/shut-down episodes would be 54 dBA, which would be less than the daytime maximum noise level standards for daytime and nighttime hours of 70 and 65 dBA, respectively. Therefore, both normal operations and intermittent start-up/shut-down operations at this site would result in a less than significant noise impact on the nearest sensitive receptors. No mitigation is required.

Because the proposed emergency generator would be located more than 100 feet from the nearest receptor, the requirements of Section 13.10.663 (11) of the County Municipal Code would not apply to this site, and impacts associated with intermittent noise from weekly testing of emergency generators would be less than significant. No mitigation is required.

Mitigation Measures

Measure 3.8-4a: Submersible Pump (applies to Cunnison Lane, Austrian Way, and Granite Way-Aptos Village well sites). SqCWD shall install submersible pumps instead of turbine pumps at the Cunnison Lane, Austrian Way, and Granite Way-Aptos Village well sites to reduce potential noise impacts to residences located near these well sites. Submersible pumps are quieter than turbine pumps because they are below grade and attenuated by surrounding water, although they have reduced longevity compared to a turbine pump. Post construction monitoring shall verify that the use of submersible pumps have reduced operational noise at the nearest receptors to within daytime and nighttime hourly noise standards or additional attenuation shall be applied to ensure compliance with the noise standards.

Measure 3.8-4b: Generator Noise Attenuation Features (applies to Cunnison Lane and Austrian Way Well sites). SqCWD shall install either a low-noise generator or install acoustical enclosures around the proposed diesel generators at the Cunnison Lane and Austrian Way Well sites sufficient to insure that intermittent noise from weekly testing of emergency generators does not exceed 60 dBA, L_{dn} at the nearest property line. Successful performance of this mitigation measure shall be verified through post construction monitoring.

Significance after Mitigation: Less than Significant.

3.8.6 References – Noise and Vibration

- California Department of Transportation (Caltrans), Traffic Noise Analysis Protocol for New Highway Construction and Highway Reconstruction Projects, October 1998a.
- California Department of Transportation (Caltrans). *Technical Noise Supplement*, 1998b.
- Environmental Science Associates (ESA), Noise Monitoring Data from Main Street Well, July 11, 2006 and July 12, 2006.
- Hendricks, Rudy, California Department of Transportation, *Transportation Related Earthborne Vibrations, Technical Advisory, Vibration TAV-02-01-R9601*, February 20, 2002.
- County of Santa Cruz, *Final Environmental Impact Report – Santa Cruz County 1994 General Plan and Local Coastal Program*, Certified December 2, 1993.
- County of Santa Cruz, *General Plan and Local Coastal Program*, May 24, 1994.
- Layne Christiansen, Noise Evaluation Ingersoll Rand TH-75E Reverse Circulation Rotary Drilling Rig, 2000.
- Soquel Creek Water District (SqCWD), Bonita Well Site, Acoustical Survey. April 3, 2008.
- U.S. Department of Transportation (DOT), Federal Transit Administration, *Transit Noise and Vibration Impact Assessment, Final Report*, May 2006.
- U.S. Department of Housing and Urban Development, Office of Community Planning and Development, *The Noise Guidebook*, 1991.

3.9 Traffic and Circulation

3.9.1 Introduction

This section provides an overview of existing transportation and circulation facilities and traffic conditions within the Soquel-Aptos area and vicinity and relevant regulations governing the transportation network. Potential impacts on traffic, transportation, and circulation that could result from implementation of the WMP are evaluated, and mitigation measures are prescribed, as appropriate.

3.9.2 Regional Setting

Roadway Network

Regional access to project areas and local roadways is provided by State Highway 1 (Highway 1) and Soquel Drive (see Figure 2-1).

Highway 1 is a north-south regional highway with two lanes in each direction, with auxiliary lanes at major interchanges through the project area. Freeway interchanges that provide access to the project area are located at 41st Avenue, Bay Avenue, Park Avenue, State Park Drive, and Rio Del Mar Boulevard. The Santa Cruz County Regional Transportation Commission (SCCRTC) is working with Caltrans on plans to widen Highway 1 to three lanes in each direction from Morrissey Boulevard in Santa Cruz to Larkin Valley/San Andreas Road in Aptos; the added lanes would be high-occupancy vehicle lanes (restricted to carpools, buses and emergency vehicles during peak traffic periods). The current schedule indicates that if funding is secured, the road widening project would be constructed from 2012 to 2014 (SCCRTC, 2008).

Soquel Drive is a two- to five-lane east-west roadway that serves a mix of commercial and residential land uses. The roadway has three to five lanes and discontinuous sidewalks in and near the communities of Soquel and Aptos, and becomes a two-lane facility with no sidewalks or on-street parking outside of the commercial areas. Bicycle lanes are continuous from downtown Santa Cruz, through Soquel and Aptos to Freedom Boulevard. Soquel Drive has a constrained right-of-way at a historic bridge and railroad overpass near Aptos Village. The majority of the roadway is posted at 35 miles per hour.

Transit Service

Transit service along the project corridor is provided by Santa Cruz METRO, which is operated by the Santa Cruz Metropolitan Transit District. Santa Cruz METRO provides regional fixed-route bus service in Santa Cruz County, with commuter service to Santa Clara County. Routes that provide service along the project corridor are described below.

Route 53 Capitola/Dominican provides loop service with scheduled stops at the Capitola Mall Transit Center and Dominican Hospital. The route operates on a portion of the project corridor on Soquel Drive. Route 53 runs every two hours, between 9:05 a.m. and 5:55 p.m. on weekdays.

Route 54 Aptos/La Selva Beach provides service with scheduled stops at the Capitola Mall Transit Center, Cabrillo College, and La Selva Beach. The route operates on a portion of the project corridor on Soquel Drive. Route 54 has one commute-period run at 6:25 p.m. on weekdays. Weekend service is provided every two hours between 8:15 a.m. and 6:25 p.m.

Route 55 Rio Del Mar provides service with scheduled stops at the Capitola Mall Transit Center, Cabrillo College, and Aptos Beach. The route operates on a portion of the project corridor on Soquel Drive. Route 55 runs every hour between 7:30 a.m. and 5:25 p.m. on weekdays.

Routes 69W/69N Capitola Road/Cabrillo/Watsonville provides service between Santa Cruz and Watsonville. The two routes operate within portions of the corridor with some overlapping sections. The routes provide service in the project corridor on Soquel Drive. Route 69W runs every hour between 6:37 a.m. and 7:15 p.m. on weekdays, and on weekends between 8:37 a.m. and 9:15 p.m. Route 69N has a 30-minute headway on weekdays only, between 7:00 p.m. and 9:30 p.m.

Route 70 Santa Cruz/Cabrillo provides service with scheduled stops at the Santa Cruz METRO Center and Cabrillo College during the school term only. The route operates on a portion of the project corridor on Soquel Drive. Route 70 has 30-minute headways on weekdays only, between 7:30 a.m. and 2:00 p.m. (toward the college), and 11:30 a.m. and 3:40 p.m. (toward the Santa Cruz METRO Center).

Route 71 Santa Cruz to Watsonville provides service with scheduled stops at the Santa Cruz METRO Center, Cabrillo College, and Watsonville Transit Center. The route operates throughout the project corridor on Soquel Drive. Route 71 has 30-minute headways between 6:10 a.m. and 12:45 a.m. on weekdays and weekends.

Bicycle and Pedestrian Network

Santa Cruz County Regional Transportation Commission (SCCRTC) classifies bicycle facilities in the project area as bike lanes, bike paths, and alternate routes. A bike lane is a lane on the roadway that is designated for use by bicycles by means of striping, pavement legends, and signs. A bike path is physically separated from the motor vehicular traffic and used by bicyclists, pedestrians, skaters, and other non-motorized travelers. Alternate routes are favorable routes for bicyclists. Alternate routes are not necessarily signed for bicycle use and can include bike routes and walkways. In the Soquel-Aptos area, bicycle lanes are striped on Soquel Drive between Capitola Road and Freedom Boulevard (SCCRTC, 2007).

Pedestrian facilities include sidewalks, crosswalks, and pedestrian signals. The Soquel-Aptos area contains pedestrian facilities along local roadways and at major intersections. There are sidewalks on portions of Soquel Drive, and pedestrian signal heads and crosswalks at signalized intersections. Other roadway segments in the project area have discontinuous, unpaved shoulders and lack improved pedestrian facilities.

3.9.3 Existing Conditions at Individual Well Sites

O'Neill Ranch Well Site

The proposed O'Neill Ranch Well site is located on Soquel Drive, northeast of the intersection of 41st Avenue and Soquel Drive. Access would be provided from Soquel Drive. Designated bike lanes exist along Soquel Drive, 41st Avenue south of Highway 1, and Porter Street. Alternate bicycle routes identified in the Santa Cruz County Bikeway Map exist along Robertson Street and Main Street south of East Walnut Street (SCCRTA, 2007). Santa Cruz METRO bus routes 53, 69, 70, and 71 run along Soquel Drive past the O'Neill Ranch Well site.

Cunnison Lane Well Site

The proposed Cunnison Lane Well site is located in a residential neighborhood off Soquel Drive, at Cunnison Lane, about ½ mile west of Park Avenue. Access to the site would be from Soquel Drive and Cunnison Lane. The only designated bicycle facilities in the immediate vicinity of the site are designated bike lanes along Soquel Drive (SCCRTA, 2007). There is no bus service along Cunnison Lane.

Austrian Way Well Site

The proposed Austrian Way Well site is located in a residential neighborhood at Austrian Way and Jennifer Drive. Access to the site would be from Soquel Drive, Vienna Drive, and Austrian Way. There are no designated bicycle facilities in the vicinity of the Austrian Way Well site (SCCRTA, 2007). There is no bus service in the immediate vicinity of this site.

Granite Way–Aptos Village Well Site

The proposed Granite Way–Aptos Village Well site is located at the end of Granite Way between Village Drive and Cathedral Drive. The Aptos Village is immediately to the south. Access to the site would be from Soquel Drive, Trout Gulch Road, Cathedral Drive, and Granite Way. Designated bike lanes exist along Soquel Drive and Trout Gulch Road (SCCRTA, 2007). There is no bus service along Granite Way or along the proposed pipeline alignments.

Polo Grounds Well Site

The existing irrigation well that would be converted to a municipal well is located at Polo Grounds Regional Park off Huntington Drive. North Polo Drive and South Polo Drive provide access to residences that border the western end of the park. Access to the Polo Grounds Well and proposed treatment plant would be from Rio del Mar Boulevard, Monroe Avenue, and Huntington Drive. There are no designated bicycle facilities in the immediate vicinity of the Polo Grounds Well site (SCCRTA, 2007). There are no bus routes along South Polo Drive and North Polo Drive.

3.9.4 Regulatory Framework

Federal Regulations

There are no federal regulations that address traffic and circulation impacts associated with the proposed project.

State Regulations

California Department of Transportation

Caltrans manages interregional transportation, including the management and construction of the California highway system. In addition, Caltrans is responsible for permitting and regulation of the use of state roadways. The Soquel-Aptos area includes one access roadway that falls under Caltrans' jurisdiction, Highway 1.

The Caltrans Highway Design Manual (Caltrans, 2009) includes specific requirements for non-motorized transportation facilities that must be followed by all city, county, regional, and local agencies responsible for designated bicycle facilities or roads where bicycle travel and pedestrian travel is permitted. The requirements include design speeds, signage, striping, and other related design issues to enhance motorist, bicyclist, and pedestrian safety and mobility.

The development and regulation of the Soquel-Aptos area transportation network primarily involves state and local jurisdictions. All roads within the WMP area are under the jurisdiction of state and local agencies. The State of California handles permitting and regulation of the use of state roads, while local jurisdictions implement state permitting, policies, and regulations, as well as manage and regulate the use of local roads. The proposed project would require encroachment permits from Santa Cruz County Department of Public Works (SCCDPW) prior to construction within local roadways.

Transportation analysis in California is guided by policies and standards set at the state level by Caltrans, as well as by local jurisdictions. Jurisdictions regulate speed limits and other driving standards on local roadways. Caltrans and local jurisdictions generally assess the impacts of long-term, not short-term, traffic conditions.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed improvements evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. However, although the SqCWD is not legally bound to the land use plans and policies of Santa Cruz County, general plan policies pertaining to level of service (LOS) standards are discussed in this section because they relate to the second significance criterion in Section 3.9.5, below, which indicates a project would have a significant

effect on the environment if it were to “exceed, individually or cumulatively, a [level of service] LOS standard established by the county congestion management agency for designated roads and highways.” None of the proposed well sites are within the incorporated limits of the City of Capitola or in the Local Coastal Zone, therefore, ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.

1994 Santa Cruz County General Plan

The Santa Cruz County General Plan (Santa Cruz County, 1994) includes goals and objectives to guide the Santa Cruz County Planning Department in planning bicycle and pedestrian facilities; none of these goals and objectives apply to the SqCWD. With respect to motorized vehicles, the general plan establishes LOS standards for designated local roadways. Policies regarding roadway service levels apply to long-term, not short-term, traffic conditions.

Objective 3.12: Level of Service. To ensure that development shall not create traffic which will exceed acceptable levels of service on surrounding roadways.

Policy 3.12.1: Levels of Service (LOS) Policy. In reviewing the traffic impacts of proposed development projects or proposed roadway improvements, LOS C should be considered the objective, but LOS D as a minimum acceptable (where costs, right-of-way requirements, or environmental impacts of maintaining LOS under this policy are excessive, capacity enhancement may be considered infeasible). Review development projects or proposed roadway improvements to the Congestion Management Program network for consistency with Congestion Management Plan goals.

Proposed development projects that would cause LOS at an intersection or on a uninterrupted highway segment to fall below D during the weekday peak hour will be required to mitigate their traffic impacts. Proposed development projects that would add traffic at intersections or on highway segments already at LOS E or F shall also be required to mitigate any traffic volume resulting in a 1% increase in the volume/capacity ratio of the sum of all critical movements. Projects shall be denied until additional capacity is provided or where overriding finding of public necessity and or benefit is provided.

3.9.5 Impacts and Mitigation Measures

Significance Criteria

The thresholds for determining the significance of impacts for this transportation and circulation analysis are based on the environmental checklist in Appendix G of the CEQA Guidelines. According to these guidelines, the project would be considered to have a significant impact on traffic and circulation if it would:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, freeways, pedestrian and bicycle paths, and mass transit;

- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or roadways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

In addition to the above-listed criteria, the following criteria are derived from common engineering practice to apply to the project-specific analysis presented herein:

- Substantially increase traffic safety hazards due to increased traffic volumes; or
- Cause substantial damage or wear of public roadways by increased movement of heavy vehicles

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system. Implementation of the WMP would not result in any permanent effects on local roadways, nor would it permanently affect public transportation, bicycle, and pedestrian facilities that are located along local roadways. Thus, the proposed project would not conflict with plans, ordinances, or policies that establish measures of effectiveness for the performance of the circulation system. Therefore, this significance criterion is not applicable and is not discussed further.

Conflict with the applicable congestion management program, including LOS standards. The LOS standards¹ established by county congestion management agencies and documented in congestion management plans are intended to regulate long-term traffic impacts due to future development and do not apply to temporary construction projects. Implementation of the WMP would not result in long-term, ongoing effects on traffic and congestion. Long-term operations of the proposed wells and treatment facilities would not result in notable changes to traffic and circulation conditions; these would be similar to the existing traffic and circulation conditions within the WMP area, with the addition of a minimal increase in maintenance worker trips. Increases in traffic volumes generated by construction projects end when construction activities end. As such, county LOS standards are not used to evaluate potential project impacts presented herein. Therefore, this significance criterion is not applicable and is not discussed further.

¹ A qualitative description of a facility's performance based on average delay per vehicle, vehicle density, or volume-to-capacity ratios. Levels of service range from LOS A, which indicates free-flow or excellent conditions with short delays, to LOS F, which indicates congested or overloaded conditions with extremely long delays.

Changes in air traffic patterns. The closest airport to the proposed well sites is the Watsonville Municipal Airport, about ten miles away. The proposed project would not alter air traffic patterns nor result in substantial safety risks associated with airport operations. Therefore, this significance criterion is not applicable and is not discussed further.

Increased hazards due to a design feature or incompatible uses. Proposed improvements under the WMP would not include new design features (e.g., new facilities or obstructions within public roadways) or alterations of existing features (e.g., road realignment). In addition, the minimal traffic generated by the proposed project would be compatible with the mix of vehicle types (autos and trucks) currently using project area roads. Therefore, WMP implementation would not result in hazards caused by a design feature or incompatible use. Therefore, this significance criterion is not applicable and is not discussed further.

Conflict with adopted policies, plans, or programs supporting public transit, bicycle, or pedestrian facilities. Implementation of the WMP would not permanently change the existing or planned transportation network in the Soquel-Aptos area, and therefore would not conflict with policies, plans, or programs related to public transit, bicycle, or pedestrian travel. When the project is completed, operations and maintenance activities are expected to be similar to existing conditions and would not result in long-term increases in transit demand. Therefore, this significance criterion is not applicable and is not discussed further.

Approach to Analysis

The assessment of impacts on traffic and circulation that would result from implementation of WMP components includes temporary construction-related increases in traffic volumes, parking demand, and traffic safety hazards during project construction activities. Construction characteristics, including proposed manpower and equipment, site location, and rate of construction were used to conservatively estimate the number of vehicle trips that would be generated as a result of project construction activities.

As described in Chapter 2, Project Description, Section 2.5, Project Construction, the total duration of construction activities at each well site with proposed treatment facilities – O’Neill, Cunnison Lane, Austrian Way, and Polo Grounds – is approximately 12 months; the total duration of construction activities at the Granite Way-Aptos Village Well site is 1 month. Construction of the WMP components could cause short-term disruption of traffic flow and increased congestion generated by construction vehicles and/or the loss of a travel lane to accommodate the construction work zone, but these potentially significant effects would be limited to the construction periods for each of the individual well sites.

Regular maintenance of well pumps and treatment facilities at each well site by SqCWD Operations and Maintenance personnel would occur approximately five times per week. About every four weeks, the District landscaper would visit each well site to cut and trim vegetation; adjust or repair the irrigation system; and make minor repairs to the fence, gate, security lighting, or other onsite facilities. Post-construction maintenance activities would be similar to existing conditions, and would not generate a significant number of new vehicle trips. Although regular maintenance activities would briefly affect local roadway segments, such effects would be

negligible compared to existing conditions and would not result in a noticeable increase in traffic on local roadways. Therefore, mitigation measures identified in this EIR are focused on reducing the short-term construction effects; long-term mitigation measures are not needed.

Impact Summary

**TABLE 3.9-1
SUMMARY OF IMPACTS – TRAFFIC AND CIRCULATION**

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way – Aptos Village Well Site	Polo Grounds Well Site
Impact 3.9-1: Short-term traffic increases on local roadways due to construction-related vehicle trips.	PSM	PSM	PSM	PSM	PSM
Impact 3.9-2: Construction activities associated with individual well sites could increase wear-and-tear on the designated haul routes used by construction vehicles to access the sites.	PSM	PSM	PSM	PSM	PSM
Impact 3.9-3: Construction activities related to pipeline installation could temporarily increase traffic congestion and safety hazards on local roadways.	PSM	PSM	PSM	PSM	PSM
Impact 3.9-4: Pipeline installation could temporarily disrupt emergency access along pipeline alignments.	PSM	PSM	PSM	PSM	PSM
Impact 3.9-5: Construction activities could have temporary impacts on public transportation, bicycle, and pedestrian facilities.	PSM	PSM	PSM	PSM	PSM

PSM = Potentially Significant impact, can be Mitigated to less than significant

Impact Discussion

Impact 3.9-1: Short-term traffic increases on local roadways due to construction-related vehicle trips.

All Sites

The potential traffic and transportation effects of the WMP, including short-term traffic increases on local roadways, would be confined to the construction phase. The primary impact from the movement of construction trucks would be a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of trucks compared to passenger vehicles.

Implementation of the WMP would likely occur over a five-year period, with one new well constructed each year. Construction activities related to the development of each well site would generate both construction worker and truck delivery trips. As discussed in Chapter 2, Project Description, a 24-hour construction schedule would be required for drilling the production well boreholes and the subsequent well construction and development. The 24-hour well construction

and development activities would last about four days. The next phase of construction would entail construction of the well housing and treatment facilities and installation of any necessary pipelines. Proposed hours of construction for the second phase are Monday through Friday, 8:00 a.m. to 5:00 p.m. for most project facilities adjacent to or within the road right-of-way.

The estimated average crew size of 10 is not expected to exceed 15 round trips (30 one-way trips) from construction workers traveling to and from each worksite on an average day. Accounting for the delivery of construction components (which would be shipped on demand to the individual well sites throughout the construction period), the total number of construction truck trips would be approximately 10 round trips (20 one-way trips) per workday during the construction period. Most project-related hauling and deliveries would be dispersed throughout the day, thus lessening the effect on peak-hour traffic. However, project truck traffic on weekdays from 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. would coincide with peak-period traffic and, therefore, would have the greatest potential to impede traffic flow.

Although these project-generated construction trips are not expected to substantially affect traffic flow on roadways, any potentially significant impacts associated with this short-term increase in vehicle trips would be mitigated to less-than-significant levels with implementation of **Mitigation Measure 3.9-1 (Designated Haul Routes)**. Thus, this impact is considered potentially significant but mitigable.

Mitigation Measures

Measure 3.9-1: Designated Haul Routes (applies to all sites). As part of the traffic control/traffic management plan for roadway segments and intersections prescribed under Mitigation Measure 3.9-3b (Traffic Management Plan), the SqCWD (and the construction contractor) shall specify designated haul routes for the project based on consultation with SCCRTC and other agencies with local roadway jurisdiction.

Significance after Mitigation: Less than Significant.

Impact 3.9-2: Construction activities associated with individual well sites would increase wear-and-tear on the designated haul routes used by construction vehicles to access the sites.

The use of large trucks to transport equipment and material to and from construction sites could affect road conditions on the designated haul routes by increasing the rate of road wear. The degree to which this impact would occur depends on the design (pavement type and thickness) and existing condition of the road. Major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. Project impacts are expected to be negligible on those roads. Residential streets are generally not built with a pavement thickness that will withstand substantial truck traffic volumes.

O'Neill Ranch Well Site

Wear-and-tear on Soquel Drive and 41st Avenue is expected to be negligible, as these roads are major arterials. However, the edge of the pavement, where the access driveway would be located, could experience some wear from vehicles entering and exiting the roadway, a potentially significant impact. However, with implementation of **Mitigation Measure 3.9-2 (Rehabilitation of Damaged Roads)**, which requires rehabilitation of any roadways damaged during project construction activities, this impact would be reduced to a less-than-significant level.

Cunnison Lane Well Site

Wear-and-tear on Soquel Drive is expected to be negligible, as this road is a major arterial. However, potentially significant impacts associated could occur on Cunnison Lane, a local roadway. Implementation of **Mitigation Measure 3.9-2 (Rehabilitation of Damaged Roads)** would reduce potential wear-and-tear impacts to a less-than-significant level.

Austrian Way Well Site

Wear-and-tear on Soquel Drive is expected to be negligible, as this road is a major arterial. However, potentially significant impacts due to wear-and-tear could occur on Vienna Drive, Austrian Way, and Jennifer Drive, which are local roadways. Implementation of **Mitigation Measure 3.9-2 (Rehabilitation of Damaged Roads)** would reduce potential wear-and-tear impacts to a less-than-significant level.

Granite Way–Aptos Village Well Site

Wear-and-tear on Soquel Drive is expected to be negligible, as this road is a major arterial. However, potentially significant impacts could occur on Granite Way, a local road, and Trout Gulch Road and Cathedral Drive, collector roads. However, implementation of **Mitigation Measure 3.9-2 (Rehabilitation of Damaged Roads)** would reduce wear-and-tear impacts to a less-than-significant level.

Polo Grounds Well Site

Wear-and-tear on Rio del Mar Boulevard is expected to be negligible, as this road is a major arterial. However, potentially significant impacts could occur on Monroe Avenue and Huntington Drive, which are collector roads, as well as along South Polo Drive and North Polo Drive if these roads are used for construction traffic. However, implementation of **Mitigation Measure 3.9-2 (Rehabilitation of Damaged Roads)** would reduce potential wear-and-tear impacts to a less-than-significant level.

Mitigation Measures

Measure 3.9-2: Rehabilitation of Damaged Roads (applies to all sites). Prior to construction activities at each of the proposed well sites, the SqCWD shall determine the preconstruction conditions of local roadways and collector roads along designated haul routes, and any appropriate post-construction rehabilitation measures. If noticeable wear-and-tear occurs, the SqCWD shall repair the damaged roadways to a structural condition equal to that which existed prior to construction activities.

Significance after Mitigation: Less than Significant.

Impact 3.9-3: Construction activities related to pipeline installation could temporarily increase traffic congestion and safety hazards on local roadways.

Implementation of the WMP would require installation of pipelines to connect the new facilities to the existing water distribution system, and to the sanitary sewer system at sites where treatment plants are proposed and to the storm drainage system at sites that are not bordered by a creek or drainage. As described in Chapter 2, Project Description, Section 2.5.1, Typical Construction Scenarios, the ideal temporary construction easement for pipeline installation would be 25 feet wide (i.e., 12 feet for access by trucks and loaders, a 2-foot-wide trench, and additional width for maneuvering). The length and type of pipelines needed would vary for each of the proposed well sites, but all of the sites would require the installation of pipelines within or across roadway rights-of-way.

Pipeline construction within roadways would temporarily disrupt traffic and circulation patterns in the vicinity, particularly if lane closures or road detours are required. Pipeline installation within roadways would temporarily reduce roadway capacities, potentially increasing congestion and delays for vehicles as well as increasing traffic safety hazards for bicyclists, pedestrians, and motor vehicles. Impacts would be greatest when construction occurs within or adjacent to regional arterials such as Soquel Drive and during peak travel periods.

O'Neill Ranch Well Site

The O'Neill Ranch Well site would require 1,750 feet of new 12-inch water pipeline to connect to existing infrastructure at Soquel Drive / Daubenbiss Avenue, 370 feet of new storm drain pipeline to connect to the existing stormwater drainage system along Soquel Drive, and a sanitary sewer lateral to connect to the sanitary sewer system in front of the property on Soquel Drive. These pipelines would be installed within the Soquel Drive right-of-way and could require temporary lane closures. The impact to traffic congestion and safety hazards along Soquel Drive would be potentially significant. However, implementation of **Mitigation Measures 3.9-3a (Road Encroachment Permit Requirements)**, **3.9-3b (Traffic Management Plan)**, **3.9-3c (Special Construction Techniques)**, and **3.9-3d (Circulation and Detour Plan)** would mitigate potential traffic impacts associated with pipeline installation within Soquel Drive to a less-than-significant level. These mitigation measures include provisions for reducing potential construction-related impacts to vehicles, public transit, and non-motorized travel along affected roadways and intersections.

Cunnison Lane Well Site

Proposed improvements at the Cunnison Lane Well site include lateral connections to the existing sanitary sewer system, potable water distribution system, and stormwater drainage system along Cunnison Lane. Installation of these pipelines would encroach on the road right-of-way, require temporary lane closures, and result in potentially significant impacts from traffic congestion

and increased traffic safety hazards. However, implementation of **Mitigation Measures 3.9-3a (Road Encroachment Permit Requirements)**, **3.9-3b (Traffic Management Plan)**, **3.9-3c (Special Construction Techniques)**, and **3.9-3d (Circulation and Detour Plan)** would mitigate potential impacts related to encroachment in road right-of-ways to less-than-significant levels.

Austrian Way Well Site

Proposed improvements at the Austrian Way Well site include a 200-foot-long lateral connection to the existing sanitary sewer main at the intersection of Austrian Way and Jennifer Drive, a 600-foot-long raw water pipeline to connect to the local stormwater drainage system at the intersection of Austrian Way and Vienna Drive, and a potable water pipeline to connect to the SqCWD's water distribution system in front of the site along Austrian Drive. The installation of these pipelines would encroach on road right-of-ways and could potentially increase traffic congestion and safety hazards, a potentially significant impact. Implementation of **Mitigation Measures 3.9-3a (Road Encroachment Permit Requirements)**, **3.9-3b (Traffic Management Plan)**, **3.9-3c (Special Construction Techniques)**, and **3.9-3d (Circulation and Detour Plan)** would mitigate potential impacts related to encroachment in the road right-of-way to less-than-significant levels.

Granite Way–Aptos Village Well Site

The Granite Way–Aptos Village Well site would require approximately 520 feet of new raw water pipeline to connect to an existing raw water pipeline at Aptos Creek Road for subsequent treatment at the existing T. Hopkins Treatment Plant. The new raw water pipeline would traverse through a future parking lot that will be developed as part of the approved Aptos Village Plan project. The proposed raw water pipeline would be connected to the existing raw water pipeline in the Aptos Creek Road right-of-way. Thus, pipeline installation could result in temporary lane closures, disrupted traffic flow, and increased traffic safety hazards, a potentially significant impact. However, implementation of **Mitigation Measures 3.9-3a (Road Encroachment Permit Requirements)**, **3.9-3b (Traffic Management Plan)**, **3.9-3c (Special Construction Techniques)**, and **3.9-3d (Circulation and Detour Plan)** would mitigate potential impacts associated with temporary lane closures and increases in construction traffic to less-than-significant levels.

Polo Grounds Well Site

Conversion of the existing irrigation well to a municipal well at the Polo Grounds Well site would require installation of a 2,680-foot-long potable water pipeline to connect the well with the SqCWD's existing water distribution system at the east end of North Polo Drive, an additional 560 feet of potable water pipeline to connect to the existing water distribution system at the east end of South Polo Drive, and a 2,690-foot-long sanitary sewer lateral to connect to the existing sanitary sewer main at the east end of North Polo Drive. Because the proposed pipeline connections would affect only the easternmost terminuses of these roadways, and would not require extensive construction along road right-of-ways, construction activities associated with pipeline installation would not substantially affect circulation patterns. However, if construction activities for the pipeline connections extend to the road right-of-ways of South Polo Drive and North Polo Drive, roadway encroachment permits from SCCDPW may be required. In addition, construction-related vehicles and haul trucks traveling along local roadways would result in short-term increases in

traffic congestion and safety hazards, a potentially significant impact. Implementation of **Mitigation Measures 3.9-3a (Road Encroachment Permit Requirements)** and **3.9-3b (Traffic Management Plan)** would mitigate potential impacts associated with construction activities to a less-than-significant level.

Mitigation Measures

Measure 3.9-3a: Road Encroachment Permit Requirements (applies to all sites). The construction contractor(s) shall obtain and comply with road encroachment permits for roads that are affected by pipeline installation to ensure safe traffic flow through and around construction work zones, and safe access for police, fire, and other rescue vehicles.

Measure 3.9-3b: Traffic Management Plan (applies to all sites). As part of contract specifications, the construction contractor(s) shall prepare and implement a traffic control/traffic management plan. The plan shall:

- Specify the construction work hours, haul routes, and work area boundaries.
- Specify traffic control measures to be implemented during construction, including limits on the lengths of open trenches and designated haul routes that limit truck traffic on local roadways and residential streets to the extent feasible. As necessary, flaggers and/or signage shall be provided to guide motorized and non-motorized vehicles around the construction area and minimize safety hazards.
- Identify all access and parking restrictions and signage requirements.
- Outline a plan for notifying affected residents and businesses prior to the start of construction. Advance public notification shall include posting notices and appropriate signage regarding construction activities. The written notification shall include the construction schedule, the exact location and duration of activities within or adjacent to each street (i.e., which lanes and access points/driveways would be blocked on which days and for how long), and a toll-free telephone number for receiving questions or complaints.
- Require coordination of construction activities with emergency service providers in the area at least one month in advance. Emergency service providers will be notified of the timing, location, and duration of construction activities. All roads shall remain accessible for emergency service vehicles at all times.
- Include the requirement that all open trenches be covered with metal plates at the end of each workday to accommodate traffic and access.
- Specify the street restoration requirements.

Measure 3.9-3c: Special Construction Techniques (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). The contractor(s) shall identify all roadway locations where special construction techniques (e.g., horizontal boring, directional drilling) would be used to minimize impacts to traffic flow. These special techniques shall be outlined in the Traffic Management Plan.

Measure 3.9-3d: Circulation and Detour Plan (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). At sites requiring

temporary lane closures and/or construction within the road shoulder, the contractor(s) shall develop circulation and detour plans to minimize impacts to local street circulation. This may include the use of signing and flagging to guide vehicles through and/or around the construction zone.

Significance after Mitigation: Less than Significant.

Impact 3.9-4: Pipeline installation could temporarily disrupt emergency access along pipeline alignments.

All Sites

WMP implementation would have temporary effects on traffic flow, particularly during pipeline installation within or across roadways. Temporary reductions in travel lanes and road capacity to accommodate the construction zone could result in delays for emergency vehicles in the vicinities of the construction areas. In addition, pipeline installation could potentially disrupt emergency vehicle access to land uses along the alignments, a potentially significant impact. However, implementation of a traffic control/traffic management plan as described in **Mitigation Measure 3.9-3b (Traffic Management Plan)**, which would require that the construction contractor(s) provide advanced notification to emergency service providers of all work within road right-of-ways and maintain emergency vehicle access throughout construction, this impact would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.9-3b: Traffic Management Plan. See description above.

Significance after Mitigation: Less than Significant.

Impact 3.9-5: Construction activities could have temporary impacts on public transportation, bicycle, or pedestrian facilities.

WMP implementation would not affect policies or programs that support alternative transportation, or result in long-term effects on alternative transportation corridors or facilities (e.g., bike paths, bike lanes, sidewalks, bus turnouts, etc.). However, project construction activities could temporarily affect bicycle travel, pedestrian travel, and public transportation along affected roadways in the project vicinity.

O'Neill Ranch Well Site

The proposed project would have no long-term impacts on demand for alternative transportation or on alternative transportation facilities (i.e., public transit, bicyclists, and pedestrian). However, pipeline installation could disrupt access to bus stops operated by Santa Cruz METRO, which provides service along Soquel Drive (see the discussion of transit service in the Regional Setting,

above). In addition, temporary lane closures and/or construction within the shoulders of Soquel Drive during pipeline installation could conflict with bicycle traffic along the designated bike lane, and pedestrian travel along the sidewalks. At the O'Neill Ranch Well site, impacts on alternative transportation modes and facilities would be potentially significant.

However, implementation of **Mitigation Measure 3.9-5 (Consultation with Santa Cruz METRO)**, which would require coordination with Santa Cruz METRO to minimize construction effects on bus transit service, and implementation of a traffic management plan as required by **Mitigation Measure 3.9-3b (Traffic Management Plan)**, which would include provisions to minimize impacts to bicyclists and pedestrians in the vicinity of the O'Neill Ranch Well site, this impact would be reduced to a less-than-significant level.

All Other Sites

The Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds Well sites would not affect public transportation facilities because there is no bus service along the roadways that would be directly affected by construction activities at these sites. However, construction activities within street right-of-ways could result in increased safety hazards for bicyclists and pedestrians traveling along the local roadways. Impacts to bicyclists and pedestrians is considered potentially significant, but could be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.9-3b (Traffic Management Plan)**, which would include provisions to minimize impacts to bicyclists and pedestrians.

Mitigation Measures

Measure 3.9-5: Consultation with Santa Cruz METRO (applies only to O'Neill Ranch Well site): The contractor(s) will consult with Santa Cruz METRO at least one month prior to construction to coordinate bus stop relocations (as necessary) and to reduce potential interruption of transit service on Soquel Drive between 41st Avenue and Daubenbiss Avenue.

Measure 3.9-3b: Traffic Management Plan (applies to all sites). See description above.

Significance after Mitigation: Less than Significant.

3.9.6 References – Traffic and Circulation

California Department of Transportation (Caltrans), *Highway Design Manual*, Chapter 1000 Bikeway Planning and Design, last updated July 24, 2009.

Monterey County, *North County Area Plan*, amended 1994.

Santa Cruz County, *1994 General Plan and Local Coastal Program for the County of Santa Cruz*, 1994.

Santa Cruz County Regional Transportation Commission (SCCRTC), *Santa Cruz County Bikeway Map*, 2007.

Santa Cruz County Regional Transportation Commission (SCCRTC), Milestone Project Schedule for the Highway 1 High Occupancy Vehicle (HOV) Lanes Widening Project, updated September 2008.

Santa Cruz Metropolitan Transit District, METRO, available online at www.scmtd.com, scheduled information effective September 18, 2008.

3.10 Hazardous Materials

3.10.1 Introduction

This section presents an evaluation of the potential for hazards and hazardous materials impacts related to the WMP elements that could potentially affect human health and/or the environment. Potential impacts include accidental releases of hazardous materials during construction, exposure to hazardous materials and/or hazardous wastes during project operation, and impacts to groundwater quality from nearby contamination sites. The Regulatory Framework summarizes applicable regulations related to hazardous materials use, transport, and disposal. For each project element, the existing conditions of the project area and the potential WMP-related hazardous materials impacts are analyzed and appropriate mitigation measures prescribed, as necessary.

As used in the EIR, the term “hazardous materials” refers to both hazardous substances and hazardous wastes. Under federal and state laws, materials, including wastes, may be considered hazardous if they are specifically listed by statute as such or if they are poisonous (toxicity), can be ignited by open flame (ignitability), corrode other materials (corrosivity), or react violently, explode, or generate vapors when mixed with water (reactivity). A hazardous material is defined in the California Health and Safety Code (California Health and Safety Code, 2010) as:

Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. “Hazardous materials” include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment. (Section 25501[o])

In some cases, past industrial or commercial activities on a site could have resulted in spills or leaks of hazardous materials to the ground, resulting in soil and/or groundwater contamination. Hazardous materials may also be present in building materials and released during building demolition activities. If improperly handled, hazardous materials and wastes can cause public health hazards when released to the soil, groundwater, or air. The four basic exposure pathways through which an individual can be exposed to a chemical agent include: inhalation, ingestion, bodily contact, and injection. Exposure can come as a result of an accidental release during transportation, storage, or handling of hazardous materials. Disturbance of subsurface soil during construction can also lead to exposure of workers or the public from stockpiling, handling, or transportation of soils that have been contaminated by hazardous materials from previous spills or leaks.

3.10.2 Existing Conditions at Individual Well Sites

ESA reviewed information regarding existing conditions in the vicinity of each well site to evaluate the potential to encounter hazardous materials in soil or groundwater during project construction. Information regarding the potential presence of hazardous materials at the proposed well sites was obtained through observations of site conditions during ESA site visits and review of regulatory agency lists of documented hazardous materials release sites within a ¼-mile radius of each well

site. Regulatory agency list searches were performed in October 2008 using the California Department of Toxic Substances Control (DTSC) Envirostor database, the California State Water Resources Control Board (SWRCB) Geotracker database, and the Santa Cruz County Environmental Health Services (SCCEHS) Site Mitigation List. The DTSC Envirostor database provides information on investigation, cleanup, permitting and/or corrective actions that are planned, being conducted, or have been completed under DTSC's oversight. It includes the following lists: Federal Superfund; State Response; Cortese; Voluntary Cleanup; School Cleanup; Military Evaluation; Hazardous Waste Permit; and Hazardous Waste Corrective Action. The SWRCB Geotracker database includes the following lists: Leaking Underground Storage Tank (LUST) Cleanup Sites; Spills, Leaks, Investigation and Cleanup (SLIC) Sites; and Permitted Underground Storage Tank (UST) Facilities. The SCCEHS maintains a county Site Mitigation List that identifies properties with documented hazardous material releases that are either currently under investigation or that have been granted case closure by the agency. Identified facilities were characterized with respect to their potential to affect subsurface conditions at the proposed well sites according to the following criteria:

1. *Whether the facility has had a documented hazardous materials release that has affected soil or groundwater quality.* Facilities that are permitted to use or store hazardous waste but have not had a documented release were considered to have a low potential to affect project components.
2. *Whether the status of the environmental case is active (indicating ongoing environmental investigation or remediation) or unknown.* Cases that are listed as closed, because remediation or cleanup has been completed and approved by the regulatory agency, were considered to have a low potential to affect project components.
3. *Whether soil quality has been affected at the facility.* Only facilities located within or immediately adjacent to proposed well sites would have the potential to affect soil quality at the well site.
4. *Whether groundwater contamination has been identified at the facility.* Groundwater plumes can migrate over greater distances, potentially affecting groundwater at a proposed well site if it is located downgradient of a contaminated facility.

The District's consulting hydrologists, HydroMetrics LLC (HydroMetrics), performed additional review of active environmental cases¹ with registered groundwater monitoring wells located within 1,000 meters (about 2/3-mile) of the proposed well sites and evaluated the potential for future pumping under the WMP to affect the contaminant plumes at the identified facilities (HydroMetrics, 2009). Data for this evaluation were obtained from well logs provided by the Department of Water Resources and the SWRCB Geotracker database.

O'Neill Ranch Well Site

The O'Neill Ranch Well site is currently vacant and located in an area dominated by mixed commercial and residential land uses. A commercial shopping center is located on the south side of Soquel Drive, across the street from the site. To the west of the site on Soquel Drive are several auto

¹ Active environmental cases are sites where soil and/or groundwater contamination is known to have occurred and site investigation or remediation (cleanup actions) have been undertaken, that are identified on regulatory agency lists.

repair shops, which typically use and store small quantities of petroleum products and solvents. The closest repair shop, Old Volks Home, is approximately 500 feet from the site while the others are approximately 1/8-mile from the site. A gasoline station is located on 41st Avenue, approximately 1/8-mile south from the O'Neill Ranch Well site.

The regulatory agency list review identified three LUST facilities within 1/4-mile of the O'Neill Ranch Well site: 4100 Soquel Drive; Service Station No. 88 at 2700 41st Avenue; and Ponza Brothers at 3131 Porter Street. The cleanup status of each of these facilities is listed as "cleanup completed/case closed," indicating that the threat to human health or the environment from residual contamination is low. Two facilities with registered USTs were identified within 1/4-mile of the site, however, there have been no reported releases from the permitted tanks. In addition, none of the listed sites are situated upgradient with respect to the presumed groundwater flow direction to the west, therefore, the likelihood of encountering hazardous materials in soil or shallow groundwater at the O'Neill Ranch Well site is considered low.

Five facilities undergoing post-remedial action groundwater monitoring related to fuel leaks were identified within approximately 2/3-mile of the O'Neill Ranch Well site. These include the following:

- Exxon 7-2081, 2501 South Main Street;
- BP 11240, 2178 41st Avenue;
- Exxon 7-3604, 836 Bay Street;
- Redtree, 819 Bay Street; and
- 76 2452, 4860 Soquel Drive.

The O'Neill Ranch Well site is not located within a designated CAL FIRE High Fire Hazard Severity Zone (CAL FIRE, 2005).

Cunnison Lane Well site

The Cunnison Lane Well site is an undeveloped site located in an area dominated by urban residential open space, and parkland. No evidence of hazardous material use at the site was observed during site visits by ESA staff.

The regulatory agency list review identified an active LUST cleanup facility, Quik Stop at 5505 Soquel Drive near Hardin Way, approximately 800 feet south of the Cunnison Lane Well site. Groundwater remediation of the shallow aquifer is ongoing at this site, with five on-site and three off-site groundwater monitoring wells. Samples from four of the eight wells collected in March 2009 were reported to contain detectable concentrations of methyl tertiary butyl ether (MTBE) at concentrations up to 117 micrograms per liter (ug/L) or parts per billion (ppb). In addition, three of the wells were reported to contain detectable concentrations of tert-butyl alcohol (TBA) at concentrations up to 2,260 ppb. Total petroleum hydrocarbons as gasoline and benzene were detected in one well at concentrations of 161 ppb and 3.8 ppb, respectively. The depth to impacted groundwater is reportedly between 17 and 24 feet below ground surface. The groundwater plume extends off-site to the south, in the groundwater flow direction (Compliance & Closure, 2009a).

Since April 2001, groundwater remediation has been on-going at the Quik Stop facility using a groundwater extraction and treatment system. Groundwater is pumped out of three wells and treated using a carbon filter system to remove hydrocarbons. During this time, a total of 898,242 gallons of groundwater have been extracted and treated, removing approximately 930 pounds of MTBE and 260 pounds of TBA from groundwater (Compliance & Closure, 2009b).

The Cunnison Lane Well site is not within a designated CAL FIRE High Fire Hazard Severity Zone (CAL FIRE, 2005). The Lindenfeld Family School, located at 5661 Soquel Drive, is located within approximately 1/4-mile of the proposed well site.

Austrian Way Well Site

The Austrian Way Well site is located at the edge of a single-family residential neighborhood bordering the Forest of Nisene Marks State Park. Existing site improvements include the District's Austrian Tank and facilities, as well as a paved access road. Aptos Creek runs north-to-south approximately 1,140 feet east of the site. No evidence of hazardous material contamination was evident during ESA site visits. An overhead electrical transformer at the site appears to be relatively new and in good condition, with no visible surface staining below. (Older transformers have been associated with leaks of PCB-type oils.)

The regulatory agency list review did not identify any environmental cases within 1/4-mile of the Austrian Way Well site. Further, no active groundwater contamination cleanup facilities were identified within 2/3-mile of the proposed well site.

The site is not within a designated CAL FIRE High Fire Hazard Severity Zone (CAL FIRE, 2005).

Granite Way–Aptos Village Well Site

The Granite Way–Aptos Village Well site is located at the end of Granite Way behind the proposed Aptos Village Plan project. Surrounding land uses include several residences, a lumber yard, and undeveloped land. Although mostly undeveloped, concrete foundation pads from previous structures remain on the site. In the immediate vicinity of the proposed well site is a large concrete foundation pad with several subgrade troughs that may have been used for drainage. This foundation is possibly associated with an historic warehouse similar to another one in the area that was used for apple packing. Historic Sanborn maps indicate a large lumber mill previously existed in the vicinity of the proposed well site (EDR, 2006).

The regulatory agency list review identified three LUST sites within 1/4-mile of the site. Advanced Tire, located at 8026 Soquel Drive, is approximately 400 feet south of the site. While this site is listed as an open case on the GeoTracker database, this address is also listed as the Aptos Village Garage on the SCCEHS Site Mitigation List as having been closed by the local agency in 2000. The GeoTracker database indicates that remediation was performed in 2000 and contains no further reports. Two other sites, the Chevron Station at 7719 Soquel Drive and Frito Lay at 2825 Mattison Lane, are both listed as "cleanup completed/case closed." Further, no active groundwater contamination facilities were identified within 2/3-mile of the well site.

The Granite Way-Aptos Village Well site is not located within a designated CAL FIRE High Fire Hazard Severity Zone (CAL FIRE, 2005).

Polo Grounds Well Site

The existing irrigation well is located at the Polo Grounds Regional Park, a 62-acre park located in Aptos between North Polo Drive and South Polo Drive and above Rio del Mar Boulevard. Park facilities include three soccer fields, three baseball diamonds, a dog park, paved parking areas, and a grassy area known as the “great meadow.” The irrigation well is located at the east end of the park in the “great meadow.” Valencia Creek flows southwest along the northwest park boundary.

The regulatory agency list review did not identify any environmental cases within ¼-mile of the proposed improvements at the Polo Grounds Well site. Further, no active groundwater contamination facilities were identified within 2/3-mile of the site.

Polo Grounds Regional Park is not within a designated CAL FIRE High Fire Hazard Severity Zone (CAL FIRE, 2005). The Aptos Junior High School, located at 1001 Huntington Drive, is located within ¼-mile of the Polo Grounds Well.

3.10.3 Regulatory Framework

Federal, state, and local laws and regulations govern the range of hazardous materials issues that may be encountered during construction and operation of the proposed facilities. Various state and local regulatory agencies implement these laws and regulations to minimize risks to human health and the environment from hazardous materials. This section describes the regulatory oversight of hazardous materials storage and handling, emergency response, site investigation and cleanup, and worker safety. In addition, regulations regarding fire hazards and water wells are discussed.

Federal Regulations

Safe Drinking Water

The Safe Drinking Water Act, originally authorized in 1974 and amended in 1986 and 1996, authorizes the U.S. Environmental Protection Agency (EPA) to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. Drinking water standards are called maximum contaminant levels (MCLs). Primary MCLs address health concerns; secondary MCLs address aesthetic issues such as taste and odor. MCLs established by California regulations may be more stringent than federal requirements. The Safe Drinking Water Act does not regulate private wells which serve fewer than 25 individuals.

Storage and Handling

The Federal Resource Conservation and Recovery Act of 1976 (RCRA) enables the U.S. EPA to administer a “cradle-to-grave” regulatory program that extends from the manufacture of hazardous materials to their disposal, thereby regulating the generation, transportation, treatment, storage, and

disposal of hazardous waste. Under RCRA, individual states may implement their own hazardous materials programs as long as the state program is at least as stringent as federal RCRA requirements. California regulations are equal to or more stringent than federal regulations. The California Environmental Protection Agency (Cal EPA), Department of Toxic Substances Control (DTSC), has primary oversight responsibility to regulate the generation, transportation, treatment, storage, and disposal of hazardous materials and waste. A number of agencies participate in enforcing hazardous materials management requirements. In Santa Cruz County, the Santa Cruz County Health Department, Environmental Health Division (SCCEHS) is the local Certified Unified Program Agency (CUPA) that administers the hazardous materials management, underground storage tank, site remediation, and emergency response programs.

State and federal laws require detailed planning and management to provide that hazardous materials are properly handled, used, stored, and disposed of, and in the event that such materials are accidentally released, to reduce risks to human health or the environment. Businesses that handle specified quantities of chemicals are required to submit a Hazardous Materials Business Plan (HMBP) in accordance with community right-to-know laws. This plan allows local agencies to plan appropriately for a chemical release, fire, or other incidents. The HMBP must include the following: an inventory of hazardous materials; site and facility layouts; emergency response procedures for release of hazardous materials; evacuation plans; and employee safety training.

Hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

Soil and Groundwater Contamination

In Santa Cruz County, remediation of contaminated sites is generally performed under the oversight of the DTSC, the RWQCB, and/or the SCCEHS. At sites where contamination is suspected or known to occur, the project sponsor is required to perform a site investigation and draw up a remediation plan, if necessary. For typical development projects, site remediation is completed either before or during the construction phase of the project. When site cleanup is satisfactorily completed, the agency issues a site closure letter stating that no further action is required.

Site remediation or development may also be subject to regulation by other agencies. For example, if dewatering of a hazardous waste site were required during construction, subsequent discharge to the sewer system could require a permit from the municipal sewer agency and discharge to the stormwater collection system could be subject to the requirements of the National Pollutant Discharge Elimination System (NPDES) Permit for Discharges with Low Threat to Water Quality, which is enforced by the Central Coast RWQCB.

Emergency Response

California has developed an emergency response plan to coordinate emergency services provided by federal, state, and local government and private agencies. Responding to hazardous materials

incidents is one part of this plan. The plan is administered by the State Office of Emergency Services (OES), which coordinates the responses of other agencies. The SCCEHS Emergency Response Team provides the capabilities for hazardous materials emergencies within the project area. ERT members respond and work with local fire and police agencies, California Highway Patrol, California Department of Fish & Game, California Department of Transportation, U.S. Coast Guard and National Marine Sanctuary personnel.

Worker Safety

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the work place. The California Division of Occupational Safety and Health (Cal OSHA) and the federal OSHA are the agencies responsible for ensuring worker safety in the workplace. Cal OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices. At sites known or suspected to be contaminated by hazardous materials, workers must have training in hazardous materials operations and a Site Health and Safety Plan must be prepared. The Health and Safety Plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the contaminated site.

Hazardous Materials Transportation

The United States Department of Transportation regulates hazardous materials transportation on all interstate roads. Within California, the state agencies with primary responsibility for enforcing federal and state regulations and for responding to transportation emergencies are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). Together, federal and state agencies determine driver-training requirements, load labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Hazardous Structural and Building Components

Numerous state and federal laws and regulations manage and control exposure to asbestos, lead-based paint and polychlorinated biphenyls (PCBs).² These regulations cover the demolition, removal, cleanup, transportation, storage and disposal of asbestos and lead-containing material. Regulations also outline the permissible exposure limit, protective measures, monitoring, and compliance to ensure the safety of construction workers exposed to these materials. Because exposure to hazardous building components is not anticipated during the construction of new project facilities, these laws and regulations are not discussed in detail in this section.

² PCBs are persistent organic pollutants that have been used in capacitors and transformers, heat transfer fluids, hydraulic fluids, lubricating and cutting oils, and as additives in pesticides, paints, sealants, plastics, and retardants. PCBs were banned by the U.S. EPA in 1987 due to environmental and human health concerns.

State Regulations

Water Well Standards

The California Department of Water Resources (DWR) has responsibility for developing standards for wells for the protection of water quality under California Water Code Section 231, enacted in 1949. Authority for enforcing the standards for construction, destruction, and modification of water wells rests with SCCEHS. The California Water Code requires that contractors that construct or destruct water wells have a C-57 Water Well Contractor's License, follow DWR well standards, and file a completion report with DWR (CWC Sections 13750.5, et seq).

Drinking Water Source Assessment and Protection Program

The 1996 federal Safe Drinking Water Act amendments require each state to develop and implement a Source Water Assessment Program. Section 11672.60 of the California Health and Safety Code requires the California Department of Public Health (CDPH) (previously the Department of Health Services) to develop and implement a program to protect sources of drinking water, specifying that the program must include both a source water assessment program and a wellhead protection program. In response to these legal mandates, the CDPH developed the Drinking Water Source Assessment and Protection Program (DWSAP) as California's wellhead protection program. Preparation of a drinking water source assessment report is required for all individual municipal well sites. The source assessment includes a delineation of the area around a drinking water source through which contaminants might move and reach that drinking water supply, and an assessment of possible contamination activities that might lead to the release of microbiological or chemical contaminants within the area.

California Public Resources Code

The California Public Resources Code includes fire safety regulations that: restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors³ on construction equipment that has an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided onsite for various types of work in fire-prone areas.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) & (e) provides that facilities for the production, generation, storage, treatment, or transmission of water are exempt from local (i.e. city and county) building and zoning ordinances. The proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the City of

³ A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

Capitola or the Local Coastal Zone; therefore, ordinances applicable to these jurisdictions do not apply, including the Santa Cruz County Local Coastal Program.

While the District is exempt from all zoning and building regulations for water production projects per California Government Code Section 53901 (d) & (e), the District utilizes the County of Santa Cruz requirements as guidelines for fire and toxic hazards.

1994 Santa Cruz County General Plan

The Santa Cruz County General Plan (Santa Cruz County, 1994) contains the following objectives and policies to minimize fire hazards and toxic hazards to citizens and residents of Santa Cruz County:

Objective 6.5: Fire Hazards. To protect the public from the hazards of fire through citizen awareness, mitigating the risks of fire, responsible fire protection planning and built-in systems for fire detection and suppression.

Policy 6.5.8: Public Facilities Within Critical Fire Hazard Areas. Discourage location of public facilities and critical utilities in Critical Fire Hazard Areas. When unavoidable, special precautions shall be taken to ensure the safety and uninterrupted operation of these facilities.

Objective 6.6: Hazardous and Toxic Materials. To eliminate, to the greatest degree possible, the use of hazardous and toxic materials, and where it is not feasible completely to eliminate the use of such materials, then to minimize the reduction in the use of such materials, so as to ensure that such materials will not contaminate any portion of the County's environment, including the land, water, and air resources of the County.

Policy 6.6.1: Hazardous Materials Ordinance. Maintain the County's Hazardous Materials Ordinance, placing on users of hazardous and toxic materials the obligation to eliminate or minimize the use of such materials wherever possible, and in all cases to minimize the release, emission, or discharge of hazardous materials to the environment, and to properly handle all hazardous materials and to disclose their whereabouts. Further, maintain the County's ordinance relating to ozone-depleting compounds. Ensure that any amendment of existing ordinance provisions is based on a finding that the amendments will provide protection to the environment and the community against toxic hazards that is equal to or stronger than the existing provisions.

3.10.4 Impacts and Mitigation Measures

This section describes potential project impacts related to hazards and hazardous materials and presents mitigation measures that would reduce any significant impacts.

Significance Criteria

Consistent with Appendix G of the CEQA Guidelines, a project is considered to have a significant hazards or hazardous materials impact if it would result in any of the following:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;
- Be located within an area covered by an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip and would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

Be located within an area covered by an airport land use plan or in the vicinity of a private airstrip. The proposed well sites would be located more than two miles from Santa Cruz County's only public airport (the Watsonville Municipal Airport) and its two private use airports (Bonny Doon Village Airport and Monterey Bay Academy Airport). WMP implementation would not result in aircraft-related safety hazards. Thus, significance criteria related to airport land use plans and airstrips are not relevant to the WMP and are not discussed further.

Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Although project construction activities could impede access for emergency response vehicles and therefore interfere with an emergency response plan or emergency evacuation plan, an evaluation of potential impacts to emergency response plans and access routes is provided under the discussion of Impact 3.9-5 in Section 3.9, Traffic and Circulation, and are not discussed further below.

Emit or handle hazardous materials within 1/4-mile of a school. Two well sites are located within 1/4-mile of existing schools, however, the use of small quantities of hazardous materials (such as fuels and lubricants) during construction and the use of sodium hypochlorite (bleach) for water treatment would not cause hazardous emissions or exposures at nearby schools. Thus, potential impacts related to hazardous emission or the handling of hazardous materials or acutely hazardous materials within 1/4-mile of a school are not discussed further.

Approach to the Analysis

This analysis evaluates the potential to encounter contaminated soil and groundwater during project construction activities, based on site visits by ESA staff and review of regulatory agencies lists of identified environmental cases in the vicinity of the proposed well sites. The potential for hazardous construction chemicals to be released into the environment during construction and operation is also evaluated.

The evaluation of the potential for future pumping under the WMP to affect groundwater gradients and the direction of groundwater flow, interfere with groundwater remediation activities, and affect the migration of contaminated groundwater is based on the *Hydrologic Effects of Well Master Plan* (HydroMetrics, 2009). HydroMetrics' report evaluates the anticipated drawdown and well yield effects that would result from WMP implementation in the vicinity of the proposed well sites, including the potential for future pumping to interfere with groundwater remediation activities. HydroMetrics' letter report is provided as **Appendix C** of this EIR.

Impact Summary

TABLE 3.10.1
SUMMARY OF IMPACTS – HAZARDOUS MATERIALS

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way – Aptos Village Well Site	Polo Grounds Well Site
Impact 3.10-1: Construction of project components could expose construction workers, the public, or the environment to contaminated soil or groundwater.	PSM	PSM	PSM	PSM	PSM
Impact 3.10-2: Hazardous materials could be accidentally released into the soil, groundwater, and/or a nearby surface water body during construction.	PSM	PSM	PSM	PSM	LS
Impact 3.10-3: Well pumping in the vicinity of known groundwater contamination sites could potentially interfere with remediation activities.	LS	PSM	N/A	N/A	N/A
Impact 3.10-4: Well and treatment plant operations would include storage and use of hazardous materials and petroleum hydrocarbons. Improper handling or accidental release could result in adverse effects to human health and/or the environment.	LS	LS	LS	N/A	LS
Impact 3.10-5: Project construction and operation could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LS	LS	LS	LS	LS
Impact 3.10-6: Implementation of the WMP could increase the risk of wildland fires in high fire hazard areas.	LS	LS	LS	LS	LS

LS = Less than Significant impact, no mitigation required
 PSM = Potentially Significant impact, can be Mitigated to less than significant
 N/A = Not Applicable or no impact

Impact Discussion

Impact 3.10-1: Construction of project components could expose construction workers, the public, or the environment to contaminated soil or groundwater.

The project components are located within a range of land uses, including residential, commercial, and light industrial. The regulatory agency list review of known hazardous materials sites did not identify the proposed well sites on any regulatory agency lists. Several LUST sites were identified within ¼-mile of various project components, however, these sites were considered to have a low potential to impact soil and groundwater at project sites because these sites were either closed (cleanup completed) or located downgradient with respect to the groundwater flow direction. Regardless, areas of unknown contamination could be encountered during excavation and grading activities, or during well drilling, potentially exposing construction workers and the public to contaminated soil and possibly chemical vapors. Excavated soil could also require handling, transport, and disposal as a hazardous waste.

O'Neill Ranch Well Site

The O'Neill Ranch Well site is the closest of the five project sites to any known use of hazardous materials. The two auto repair shops located west of the proposed well site handle and store limited quantities of hazardous materials. Two facilities within ¼-mile have permitted USTs. Three LUST sites within ¼-mile have been cleaned up and closed by the regulatory agency. Based on the status, distance, and groundwater flow direction, the listed sites are considered to have a low potential to impact subsurface conditions at the O'Neill Ranch Well site. Although the potential for encountering hazardous materials is low, the possibility exists for unknown contamination to be encountered during construction, a potentially significant impact. Implementation of **Mitigation Measure 3.10-1 (Hazardous Materials Handling and Disposal)**, would reduce this impact to a less-than-significant level by requiring appropriate handling and disposal of any materials encountered during excavation that are suspected of being contaminated by hazardous materials.

Cunnison Lane Well Site

The Cunnison Lane Well site is located within a residential area. This type of land use is not typically associated with hazardous materials use. One LUST site undergoing active remediation was identified 800 feet south of the proposed well site. Review of site information indicates that groundwater impacts do not extend off-site in a northerly direction (towards the well site). Given the distance of this facility and the groundwater flow direction, the potential for encountering hazardous materials in soil or shallow groundwater during construction is low. However, the possibility exists for unknown contamination to be encountered during construction, a potentially significant impact. However, implementation of **Mitigation Measure 3.10-1 (Hazardous Materials Handling and Disposal)** would reduce this impact to a less-than-significant level.

Austrian Way Well Site

The Austrian Way Well site is located in a residential area that borders state park lands. No sites with known hazardous materials impacts were identified in the site vicinity. Although the potential for encountering hazardous materials is low, the possibility exists for unknown contamination to

be encountered during construction, a potentially significant impact. Implementation of **Mitigation Measure 3.10-1 (Hazardous Materials Handling and Disposal)** would reduce this impact to a less-than-significant level.

Granite Way–Aptos Village Well Site

The Granite Way-Aptos Village Well site is located in a commercial area and has possibly been used in the past as a mill or lumber storage area. It is possible that historical uses of the site involved hazardous materials storage and handling. The regulatory agency list search identified several closed LUST sites within ¼-mile of the Granite Way-Aptos Village Well site. The potential for encountering hazardous materials during construction is low to moderate due to historical uses and represents a potentially significant impact. Implementation of **Mitigation Measure 3.10-1 (Hazardous Materials Handling and Disposal)** would reduce this impact to a less-than-significant level.

Polo Grounds Well Site

There are no known hazardous materials sites either on or in the vicinity of the Polo Grounds Well site. Although the potential for encountering hazardous materials is low, the possibility exists for unknown contamination to be encountered during construction, a potentially significant impact. In the event that unanticipated contamination is encountered during construction, implementation of **Mitigation Measure 3.10-1 (Hazardous Materials Handling and Disposal)** would reduce this impact to a less-than-significant level.

Mitigation Measures

Measure 3.10-1: Hazardous Materials Handling and Disposal (applies to all sites).

Contractor specifications shall include procedures for handling and disposal of suspected contaminated soils. In the event that suspected contaminated soils are observed during construction, the contractor shall segregate these materials from other soils and notify SCCEHS. The suspected soils shall be placed on visqueen or equivalent impervious material and covered for protection. The contractor shall then coordinate with the SCCEHS for the safe handling, sampling, and disposal of the suspected materials in accordance with state regulations.

Significance after Mitigation: Less than Significant.

Impact 3.10-2: Hazardous materials could be accidentally released into the soil, groundwater, and/or a nearby surface water body during construction.

Construction activities at individual well sites would require the use of certain potentially hazardous materials such as fuels, oils, solvents, lead solder, and glues. These materials would generally be used on excavation and drilling equipment, generators, and other construction equipment and would be stored within appropriate storage containers. Storage and use of hazardous materials at construction sites and staging areas could result in the accidental release of small quantities of

hazardous materials which could degrade soil and groundwater quality, and/or surface water quality in nearby creeks or downstream water bodies.

O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well Sites

As discussed under Impact 3.4-1 in Section 3.4, Surface Water Hydrology and Water Quality, because construction activities at each of these well sites would affect less than one acre, an NPDES General Construction Permit that requires construction water quality best management practices (BMPs) would not be necessary. Therefore, the potential for an accidental hazardous materials release during construction to affect the public or the environment represents a potentially significant impact. **Mitigation Measure 3.4-1b (Construction Best Management Practices)**, described in Section 3.4, Surface Water Hydrology and Water Quality, requires the implementation of construction BMPs at these well sites to minimize the potential for accidental release of hazardous construction chemicals. The BMPs would include protection measures for the temporary onsite storage of diesel fuels or other hazardous materials used during construction, including requirements for secondary containment of hazardous chemicals to contain a potential release and to prevent any such release from reaching an adjacent waterway or stormwater collection system. All equipment and materials storage areas would need to be routinely inspected for leaks, and records maintained for documenting compliance with the storage and handling requirements for hazardous materials. With implementation of **Mitigation Measure 3.4-1b (Construction Best Management Practices)**, the potential impact of an accidental hazardous materials release during construction to affect the public or the environment would be reduced to less than significant.

Polo Grounds Well Site

Construction activities at the Polo Grounds Well site would require compliance with the NPDES Construction General Permit because construction would result in more than one acre of disturbance. To obtain coverage under the permit, the SqCWD or its contractor(s) would be required to submit permit registration documents and prepare a Storm Water Pollution Prevention Plan (SWPPP) that prescribes erosion control measures and water quality BMPs to minimize pollutant loads, including hazardous construction chemicals, in stormwater discharges and protect receiving waters. The type of BMPs that would be required to prevent the accidental release of hazardous construction chemicals are similar to the BMPs prescribed in Mitigation Measure 3.4-1b (Construction Best Management Practices). With compliance with applicable laws and regulations, the potential for an accidental hazardous materials release during construction to create a significant hazard the public or the environment is considered less than significant.

Mitigation Measures

Measure 3.4-1b: Construction Best Management Practices (applies to O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites). Refer to Section 3.4, Surface Water Hydrology and Water Quality, for description.

Significance after Mitigation: Less than Significant.

Impact 3.10-3: Well pumping in the vicinity of known groundwater contamination sites could potentially interfere with nearby groundwater remediation activities.

Groundwater pumping from active water wells can alter groundwater movement and direction of flow at wells in the vicinity. The likelihood and the extent of these effects is dependent upon several factors, including the type of aquifer (confined or unconfined), aquifer material (porous materials or fractured rock), pathways of contamination (i.e. presence of abandoned or improperly destroyed wells), static groundwater conditions (depth), and well operations. Alterations of groundwater flow and gradients could interfere with groundwater remediation activities at nearby contaminated sites that are currently undergoing groundwater cleanup, thereby limiting the effectiveness of remedial systems to reduce or contain contaminant plumes.

O'Neill Ranch Well Site

As discussed above in Section 3.10.1, Setting, five facilities with known, ongoing post-remediation monitoring of groundwater contaminant levels are located within 2/3-mile of the O'Neill Ranch Well site. According to the analysis performed by HydroMetrics, the effects of pumping the O'Neill Ranch Well would not substantially affect groundwater flow gradients or groundwater flow direction at the facilities with known groundwater contamination. Because cleanup at these facilities has been completed and pumping would have a negligible effect on groundwater gradient and flow, this impact is considered less than significant, and no mitigation is required.

Cunnison Lane Well Site

As discussed in Section 3.10.1, Setting, the regulatory agency list review identified an active LUST facility, Quik Stop, located approximately 800 feet south of the Cunnison Lane Well site. Groundwater at this facility is contaminated by MTBE and TBA. Groundwater remediation of the shallow aquifer (17 to 24 feet below ground surface) is ongoing at this site. Remedial activities include the extraction and treatment of groundwater from three monitoring wells and quarterly groundwater monitoring. The proposed Cunnison Lane Well would have an estimated well depth of 400 to 500 feet. Cunnison Lane Well pumping could interfere with groundwater remediation at the Quik Stop facility and affect the ability of the remedial system to contain and reduce contaminants. The calculated drawdown from pumping the Cunnison Lane Well would dewater the remediation well screens at the Quik Stop facility, thus rendering the current remedial system ineffective. However, with the redistribution of pumping under a likely redistribution scenario of the WMP, the overall water supply pumping would not lower water levels at the Quik Stop remediation wells and consequently would not adversely affect the operation of the remediation system (HydroMetrics, 2009).

In the event this redistribution scenario is not effective at preventing a drawdown of groundwater levels in the Quik Stop remediation wells, the ability of the remediation system to contain contaminants would be impaired and could possibly result in migration of contaminants. This would be a potentially significant impact. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.3-3 (Operating Restrictions for Cunnison Lane Well)**, described under Impact 3.3-3 in Section 3.3, Groundwater Resources, which restricts the District from operating the Cunnison Lane Well until after groundwater

remediation activities at the Quik Stop facility are terminated by the responsible agency. As stated in the discussion of Impact 3.3-3, because the identified impacts to groundwater quality in the vicinity of the Cunnison Lane Well are based on the potential for pumping to adversely affect the effectiveness of the remediation wells, this impact could not occur after the groundwater remedial pumping is terminated.

Austrian Way Well Site

The regulatory agency list review did not identify any active contaminated groundwater facilities within 2/3-mile of the Austrian Way Well site. Therefore, there would be no impact on remedial activities from pumping of the Austrian Way Well. No mitigation is necessary.

Granite Way-Aptos Village Well Site

The regulatory agency list review identified three LUST facilities within 1/4-mile of the Granite Way-Aptos Village Well site that are listed as “cleanup completed/case closed”, indicating that remediation activities have been completed and these sites pose a low risk to human health or the environment. No facilities with recent detections of groundwater contamination were identified within 2/3-mile of the Granite Way-Aptos Village Well site, therefore, pumping of the Granite Way-Aptos Village Well would have no impact on remediation of contaminated sites in the vicinity of the well. No mitigation is necessary.

Polo Grounds Well Site

No facilities with recent detections of groundwater contamination were identified within 2/3-mile of the existing Polo Grounds Well, therefore, no impact would occur and no mitigation is necessary.

Mitigation Measures

Measure 3.3-3: Operating Restrictions for Cunnison Lane Well (applies only to Cunnison Lane Well site). Refer to Section 3.3, Groundwater Resources, for description.

Significance after Mitigation: Less than Significant.

Impact 3.10-4: Well and treatment plant operations would include storage and use of hazardous materials and petroleum hydrocarbons. Improper handling or accidental release could result in adverse effects to human health and/or the environment.

Treatment plants are proposed at all well sites except for the Granite Way-Aptos Village Well, which would be connected to the T. Hopkins Treatment Plant for disinfection and treatment. All proposed treatment plants would include a chlorine disinfection system, an iron and manganese removal filter, a reaction vessel, and a washwater reservoir. The principal chemical used for both water disinfection and iron & manganese removal is a 12.5 percent sodium hypochlorite solution (also known as bleach). Sodium hypochlorite is a colorless, transparent liquid; it is also a strong oxidizer and the products of oxidation reactions are corrosive. Acute exposure would strongly irritate the eyes,

skin and respiratory tract, especially when used in concentrated forms. Sodium hypochlorite storage would be situated within secondary containment inside the pump and chemical building; approximately 200-700 gallons per month would be used at each well site. In addition, with the exception of the Granite Way-Aptos Village Well site, all other well sites would include an emergency generator with an ancillary aboveground diesel storage tank.

The storage and handling of hazardous materials, mainly sodium hypochlorite and diesel fuel, used for well and treatment plant operations is subject to laws and regulations overseen by SCCEHS. Hazardous materials regulations require preparation of a Hazardous Materials Business Plan and site inspections by the regulatory agency to ensure compliance with regulations for chemical use, storage, and disposal. Approximately 3,000 gallons per week of wastewater containing iron and manganese sludge generated by the water treatment system would be disposed to the sanitary sewer, subject to the terms of the wastewater discharge limits of the Santa Cruz County Sanitation District.

The chemical storage and handling systems would be designed and constructed in accordance with specific requirements for the safe storage and handling of hazardous materials set forth in the Uniform Fire Code, Article 80. These requirements reduce the potential for a release of hazardous materials and for mixing of incompatible materials that could pose a public health hazard or water quality risk. The following specific design features would reduce the potential for a release of hazardous materials that could affect public health or the environment:

- Separation of incompatible materials with a noncombustible partition.
- Spill control in all storage, handling, and dispensing areas.
- Separate secondary containment for each chemical storage system. The secondary containment would hold the entire contents of the tank, plus the volume of water needed to supply the fire suppression system for a period of 20 minutes in the event of a catastrophic spill.

With compliance with existing state and federal regulations regarding hazardous materials storage and management, the potential for environmental impacts due to improper handling or accidental release of hazardous materials associated with project operations is considered less than significant, and no mitigation is required.

Granite Way-Aptos Village Well Site

Proposed improvements at the Granite Way-Aptos Village Well site do not include treatment facilities or emergency generators. Therefore, no impact related to the storage and use of hazardous materials would result and no mitigation is necessary.

Mitigation: None required.

Impact 3.10-5: Project construction and operation could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Project construction could require the use of hazardous materials such as fuels, lubricants, paints, and solvents. Project operation would require the use and transport of sodium hypochlorite for water treatment, as well as diesel fuel for emergency backup generators. Sodium hypochlorite would be distributed to the well sites from the District's main storage tank through use of small trucks certified for this purpose. Numerous laws and regulations ensure the safe transportation, use, storage and disposal of hazardous materials. Routine transport of hazardous materials to and from well sites could indirectly result in an incremental increase in the potential for accidents; however, Caltrans and the CHP regulate the transportation of hazardous materials and wastes, including container types and packaging requirements as well as licensing and training for truck operators, chemical handlers, and hazardous waste haulers. Worker safety regulations cover hazards related to exposure to hazardous materials, while BMPs required by construction stormwater regulations are designed, among other things, to prevent a release to the environment from hazardous materials use. Regulations and criteria for the disposal of hazardous materials mandates disposal at an appropriate landfill. Because the District and all service providers would be required to comply with existing and future hazardous materials laws and regulations for the transport, use and disposal of hazardous materials, the potential for a significant hazard to the public or the environment would be less than significant, and no mitigation is necessary.

Mitigation: None required.

Impact 3.10-6: Implementation of the WMP could increase the risk of wildland fires in high fire hazard areas.**All Sites**

The use of construction equipment and temporary onsite storage of fuel and lubricants could pose a wildland fire risk. The time of the greatest fire danger is during the clearing phase, when people and machines are working among vegetative fuels that can be highly flammable; if piled onsite, the cleared vegetative materials could also become a fire fuel. Potential sources of ignition include equipment with internal combustion engines, gasoline-powered tools, and equipment or tools that produce a spark, fire, or flame. Such sources include sparks from blades or other metal parts scraping against rock, overheated brakes on wheeled equipment, friction from worn or unaligned belts and drive chains, and burned-out bearings or bushings. Smoking by onsite construction personnel is also a source of ignition during construction.

The proposed well locations are consistent with Santa Cruz General Plan Policy 6.5.8, which discourages location of public facilities and critical utilities in high fire hazard areas. As none of the proposed well sites are within a designated CAL FIRE Very High Fire Hazard Severity Zone

(CAL FIRE, 2005), potential impacts associated with wildland fire hazards would be less than significant, and no mitigation is necessary.

Mitigation: None required.

3.10.5 References – Hazardous Materials

CAL FIRE, Very High Fire Hazard Severity Zones for Santa Cruz County [Map]. Fire and Resource Assessment Program (FRAP), California Department of Forestry and Fire Protection. December 5, 2005.

California Health and Safety Code, Section 25501(o), available online at <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=25001-26000&file=25500-25520>, accessed February 1, 2010.

Compliance & Closure, Inc., *First Quarter 2009 Groundwater Monitoring Report, Quik Stop Market No. 78, 5505 Soquel Drive, Soquel, California*, March 25, 2009a.

Compliance & Closure, Inc., *July 2009 Status Report, Quik Stop Market No. 78, 5505 Soquel Drive, Soquel, California*, July 21, 2009b.

Department of Toxic Substances Control (DTSC), *EnviroStor Data Management System*, <http://www.envirostor.dtsc.ca.gov/public/>, site search results. Accessed online on February 1, 2010. http://www.envirostor.dtsc.ca.gov/public/map.asp?global_id=&x=-119.1357421875&y=37.82280243352756&zl=5&ms=640,480&mt=m&findaddress=True&city=SOQUEL&zip=&county=SANTA%20CRUZ&federal_superfund=true&state_response=true&voluntary_cleanup=true&school_cleanup=true&permit_site=true&ca_site=true&permit_and_ca_site=true

Environmental Data Resources, Inc. (EDR), *Sanborn Map Report, Granite Way Site*, July 14, 2006.

HydroMetrics LLC, *Hydrologic Effects of Well Master Plan*, November 2009.

Santa Cruz County Environmental Health Services (SCCEHS), Santa Cruz County Site Mitigation List, http://sccounty01.co.santa-cruz.ca.us/eh/hazardous_materials/scc_site_mitigation_list.pdf. Accessed online October 15, 2008.

State Water Resources Control Board (SWRCB), *GeoTracker database*, <http://geotracker.swrcb.ca.gov/>, site search results, Accessed online October 15, 2008.

O'Neill Ranch

http://geotracker.swrcb.ca.gov/map/default.asp?global_id=&senate=&assembly=&x=-121.96339130401611&y=36.98774548156735&zl=15&ms=640,480&mt=m&geotracker_luft=true&geotracker_slic=true&geotracker_landfill=true&geotracker_dod=true&geotracker_r_ust=true&showdist=false&searchdist=1000&searchaddr=Soquel%20Dr,%20Santa%20Cruz%20CA

Cunnison Lane

http://geotracker.swrcb.ca.gov/map/default.asp?global_id=&senate=&assembly=&x=-121.94197654724121&y=36.99103621751952&z1=15&ms=640,480&mt=m&geotracker_luft=true&geotracker_slic=true&geotracker_landfill=true&geotracker_dod=true&geotracker_ust=true&showdist=false&searchdist=1000&searchaddr=Cunnison%20Lane,%20Soquel

Austrian Way

http://geotracker.swrcb.ca.gov/map/default.asp?global_id=&senate=&assembly=&x=-121.912356&y=36.992005&z1=15&ms=640,480&mt=m&geotracker_luft=true&geotracker_slic=true&geotracker_landfill=true&geotracker_dod=true&geotracker_ust=false&showdist=false&searchdist=1000&searchaddr=Austrian%20Way,%20Soquel,%20CA

Granite Way

http://geotracker.swrcb.ca.gov/map/default.asp?global_id=&senate=&assembly=&x=-121.90018&y=36.979047&z1=15&ms=640,480&mt=m&geotracker_luft=true&geotracker_slic=true&geotracker_landfill=true&geotracker_dod=true&geotracker_ust=true&showdist=false&searchdist=1000&searchaddr=Granite%20Way,%20Soquel

Polo Grounds

http://geotracker.swrcb.ca.gov/map/default.asp?global_id=&senate=&assembly=&x=-121.88112258911133&y=36.98037508772982&z1=15&ms=640,480&mt=m&geotracker_luft=true&geotracker_slic=true&geotracker_landfill=true&geotracker_dod=true&geotracker_ust=false&showdist=false&searchdist=1000&searchaddr=Huntington%20Dr,%20Soquel,%20CA

3.11 Utilities and Service Systems

3.11.1 Introduction

This section provides an assessment of potential impacts on utilities and service systems that could result from implementation of the WMP. Utilities and service systems discussed in this section include natural gas, electricity, telecommunications, stormwater drainage, water supply distribution systems, wastewater collection and treatment systems, and solid waste disposal. This section also evaluates the potential impacts associated with increased energy consumption. Mitigation measures to reduce potentially significant impacts to a less-than-significant level are identified. Impacts related to public services are discussed in Section 3.1.1, Scope of Analysis.

3.11.2 Setting

The proposed wells and treatment facilities would be constructed in unincorporated Santa Cruz County.

Water Supply Distribution Systems

Soquel Creek Water District

The SqCWD provides potable water service and groundwater resource management within its service area. The District serves a population of about 50,000 through approximately 15,300 connections in four service subareas within Santa Cruz County. Ninety percent of the SqCWD's customers are residential; the remaining 10 percent are primarily commercial and institutional. There are no agricultural connections to the system. The city of Capitola is the only incorporated area within the District. Unincorporated communities include Aptos, La Selva Beach, Rio Del Mar, Seascapes, Seaclyff Beach, and Soquel. As described in Chapter 2, Project Description, the District currently relies entirely on groundwater for its water supplies.

Wastewater

The Santa Cruz County Sanitation District (SCCSD) is a non-profit public agency providing sewage collection, treatment, and disposal services to the unincorporated areas of Santa Cruz County including the Live Oak, Soquel, and Aptos areas, as well as the city of Capitola. The SCCSD's customers generate approximately 5 to 6 million gallons of sewage a day. The SCCSD has no wastewater treatment plant of its own so sewage is transported from its Lode Street facility to the City of Santa Cruz Wastewater Treatment Plant at Neary Lagoon. The SCCSD has treatment capacity rights of 8 million gallons per day at Neary Lagoon (SCCDPW, 2010a). The wastewater treatment plant can provide a high level of treatment for up to 17 million gallons per day (mgd) of wastewater to a quality level that meets the standards of the United States Environmental Protection Agency (U.S. EPA) and California Environmental Protection Agency (Cal EPA) prior to discharging into the Monterey Bay through an ocean outfall located over a mile offshore (City of Santa Cruz, 2010).

Stormwater

The Santa Cruz County Flood Control and Water Conservation District (SCCFCWCD) is responsible for flood protection and stormwater drainage planning and infrastructure in unincorporated areas of Santa Cruz County. The SCCFCWCD, which is operated through the Santa Cruz County Public Works, Planning, and Environmental Health Departments, is divided into eight flood control zones. Zones 1, 2, and 3 are inactive while Zone 4 performs watershed enhancement activities countywide, such as review of timber harvest plans, log-jam removal from streams, and conjunctive water use studies. The other four zones actively maintain and operate the flood control and stormwater drainage infrastructure for the County (Santa Cruz County LAFCO, 2005).

The proposed well sites reside in Zones 5 and 6. Stormwater drainage and flood control facilities within these zones include underground stormwater drainage systems and above ground ditches and natural watercourses. The SCCFCWCD has experienced numerous flooding events of varying magnitudes in each zone. Severe flooding in creeks can occur when debris collects in the channel and blocks the downstream flow of water. In urban areas, overflowing ditches and plugged drop inlet grates are the primary concern. The SCCFCWCD has developed a Capital Improvement Plan that addresses the most urgent infrastructure needs within each zone. Capital improvement projects are implemented as funding becomes available. The Capital Improvement Plan covers the period of 2004-2009 and includes \$4 million in projects for Zone 5 (Mid-County) and \$1.25 million for Zone 6 (Aptos) (Santa Cruz County LAFCO, 2005).

Electricity and Gas

Electrical and natural gas services in Santa Cruz County are provided by Pacific Gas & Electric (PG&E). In the project area, overhead power lines, underground electrical lines, and gas pipelines are located adjacent to or in the road rights-of-way.

Telecommunications

The Soquel-Aptos area is served by several telecommunications companies including Pacific Bell and AT&T. Some of the telecommunications lines in the project area share poles with overhead power lines.

Solid Waste Management

Santa Cruz County Recycling and Solid Waste Services (SCCRSWS) is responsible for the operation and administration of solid waste diversion and disposal in unincorporated areas of the County and the city of Scotts Valley. The County of Santa Cruz accepts over 450 tons of refuse on a daily basis. There are two solid waste facilities within the County's jurisdiction - the Buena Vista Landfill and the Ben Lomond Transfer Station. The SCCRSWS is responsible for operation of the landfill and transfer station; household hazardous waste collection; the development of programs designed to meet Assembly Bill (AB) 939 diversion goals (50 percent of generated waste) as well as the County's enhanced goal (75 percent reduction in landfill disposal by year 2010); liaison and reporting to a variety of state and federal agencies regarding solid waste facilities compliance and pollution

control programs; and administration of garbage and recycling collection franchise services (SCCDPW, 2010b).

The Buena Vista Landfill accepts an average of 350 tons of refuse daily. The Buena Vista Landfill is a Class III landfill operating under State of California Solid Waste Facilities Permit from the CIWMB. Materials accepted at the Buena Vista Landfill are Class III non-hazardous residential, commercial, and industrial waste; dewatered sewage sludge; and low-level petroleum-contaminated soils (SCCDPW, 2010b). The facility is permitted to accept a maximum throughput of 838 tons per day and has an estimated remaining capacity of approximately 4 million cubic yards. The landfill is scheduled to close in 2019 (CIWMB, 2010a).

The Ben Lomond Transfer Station accepts 100 tons of refuse daily which is trucked to the Monterey Peninsula Landfill and Recycling Facility (Marina Landfill) in northern Monterey County for burial. Materials accepted at the Ben Lomond Transfer Station are Class III non-hazardous residential, commercial, and industrial waste. The Ben Lomond Transfer Station operates under a State of California Solid Waste Facilities Permit from the California Integrated Waste Management Board (CIWMB) (SCCDPW, 2010b). The Marina Landfill, operated by the Monterey Regional Waste Management District (MRWMD), is permitted to accept a maximum throughput of 3,500 tons per day and has a remaining capacity of approximately 48 million cubic yards. The Marina Landfill is anticipated to remain open through the year 2107 (CIWMB, 2010c).

3.11.3 Regulatory Framework

State Regulations

California Public Utilities Commission

The California Constitution vests in the California Public Utilities Commission (CPUC) exclusive power and sole authority with respect to the regulation of privately-owned and investor-owned public utilities. This exclusive power extends to all aspects of the location, design, construction, maintenance, and operation of regulated utility facilities. The CPUC has provisions for regulated utilities to work closely with local governments and give due consideration to their concerns. The CPUC does not regulate publicly owned utilities such as the SqCWD.

Utility Notification Requirements

Title 8, Section 1541 of the California Code of Regulations requires excavators to determine the approximate locations of subsurface installations such as sewer, telephone, fuel, electric, and water lines (or any other subsurface installations that may reasonably be encountered during excavation work) prior to opening an excavation.

California law (California Government Code Section 4216 et seq.) requires owners and operators of underground utilities to become members of and participate in a regional notification center, such as Underground Service Alert—Northern California (USA North). USA North receives planned excavation reports from public and private excavators, and transmits that information to all participating members of USA North who may have underground facilities at the location of an

excavation. Members of the regional notification center will mark or stake their facilities, provide information, or give clearance to dig (USA North, 2010).

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Act of 1989 (Public Resources Code [PRC], Division 30), enacted through AB 939 and modified by subsequent legislation, requires all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of wastes (PRC Section 41780). A jurisdiction's diversion rate is the percentage of total waste that it diverts from disposal through reduction, reuse, and recycling programs. The state determines compliance with this mandate to divert 50 percent of generated waste (which includes both disposed and diverted waste) through a complex formula. This formula requires cities and counties to conduct empirical studies to establish a "base-year" waste generation rate against which future diversion is measured. The actual determination of the diversion rate in subsequent years is arrived at through deduction instead of direct measurement. Rather than counting the amount of material recycled and composted, the city or county tracks the amount of material disposed of at landfills and then subtracts that amount from the base-year amount; the difference is assumed to be diverted (PRC Section 41780.2). As of 2006, the most recent year for which jurisdiction summary information is available, unincorporated Santa Cruz County had a reported diversion rate of 65 percent and is in compliance with AB 939 (CIWMB, 2010b).

Waterworks Standards

The California Department of Public Health (CDPH) is responsible for the enforcement of the Waterworks Standards contained in the California Code of Regulations (Title 22, Chapter 16, Section 64572). The Waterworks Standards provide separation criteria for the construction of water and sanitary sewer mains to prevent the entry of contaminants into the water main. The regulations require a 10-foot horizontal separation between parallel potable water and wastewater effluent lines, and a one-foot vertical separation for crossing potable water and wastewater effluent lines.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed improvements evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the city of Capitola or the Local Coastal Zone, therefore, ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.

However, although the SqCWD is not legally bound to the building and zoning ordinances of Santa Cruz County, relevant ordinances are discussed in this section with respect to the sixth significance criterion in Section 3.11.4, below, which indicates a project would have a significant effect on the environment if it were to "fail to comply with federal, state, and local statutes and regulations related to solid waste."

Santa Cruz County Landfill Ban

On June 21, 2005 the Santa Cruz County Board of Supervisors voted to ban the disposal of recyclable materials in the Buena Vista Landfill and created new requirements for County residents and businesses to recycle. The landfill ban and list of recyclable materials prohibited are provided in the Santa Cruz County Code, Title 7, Health and Safety, Chapter 7.20.

Section 7.20.145: Disposal of Recyclable Materials Prohibited

- A. No person shall dispose of any of the following recyclable materials at any county disposal facility:
1. Newspaper;
 2. Cardboard;
 3. Office paper;
 4. Mixed waste paper (including junk mail, catalogues, craft bags and craft paper, paperboard, egg cartons, phone books, brown paper, grocery bags, colored paper, construction paper, envelopes, legal pad backings, shoe boxes, cereal and similar food boxes);
 5. Computer paper;
 6. Magazines;
 7. Aseptic packaging;
 8. Milk and juice cartons;
 9. Container glass;
 10. Aluminum cans, trays and foil;
 11. Tin cans;
 12. Steel cans;
 13. Scrap metal (including white goods and appliances);
 14. Polyethylene terephthalate (No. 1), high-density polyethylene (No. 2) and mixed plastic containers (all types Nos. 3 through 7);
 15. Used motor oil and used automotive oil filters;
 16. Dry cell and lead acid batteries;
 17. Yard waste and wood waste;
 18. Tires;
 19. Mattresses;
 20. Electronic waste (including monitors, televisions, cathode ray tubes);
 21. Concrete, asphalt, tile and porcelain; and
 22. Gypsum board.
- B. If the director of SCCDPW determines that a particular recyclable material cannot be recycled for a specific time period, then the director may permit the disposal of said recyclable material at any county disposal facility for that time period. (Ord. 4796 § 7)

Santa Cruz County Enhanced Diversion Goals

The County's solid waste diversion goals aim to achieve a 75 percent reduction in landfill disposal by 2010 (SCCDPW, 2010b).

3.11.4 Impacts and Mitigation Measures

Significance Criteria

The following significance criteria are adapted from Appendix G of the CEQA Guidelines. The project would have a significant impact on utilities and service systems if it were to result in one or more of the following:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board (RWQCB);
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have insufficient water supplies available to serve the project from existing entitlements and resources, or if new or expanded entitlements are needed;
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs;
- Fail to comply with federal, state, and local statutes and regulations related to solid waste; or
- Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these resources in a wasteful manner.

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

Insufficient water supply. The proposed project would not construct new housing, nor would it increase the number of new workers in the area. No changes in water demand or water distribution would result. Thus, the proposed project would not require additional water supply or require new or expanded water supply resources or entitlements. Therefore, impacts related to insufficient water supplies are not applicable and are not discussed further.

Construction of new water treatment facilities. The WMP proposes new water treatment facilities at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Polo Grounds Well sites. The water treatment facilities are key components of the WMP, and the potential impacts associated with the key components of the WMP, namely the proposed groundwater

production wells and water treatment facilities, are evaluated throughout this Environmental Impact Report (EIR). Therefore, this criterion is addressed throughout this document and is not applicable in this section.

Approach to Analysis

This section specifically addresses impacts on public utilities, landfills, and energy consumption. Stormwater drainage issues as they relate to effects on hydrology are addressed in Section 3.4, Surface Water Hydrology and Water Quality. This analysis of impacts on public utilities and services systems encompasses temporary construction-related impacts, as well as potential long-term impacts on utilities associated with future operations. During construction, short-term temporary disruptions of service could occur if existing utility lines were accidentally damaged during excavation, relocation, or other project-related construction activities. Long-term impacts on utilities and service systems could result if the wastewater treatment provider had insufficient capacity to handle the project's wastewater flows.

This analysis evaluates potential impacts related to landfill capacity and compliance with solid waste statutes and regulations based on the estimated construction waste that would be generated at each of the proposed well sites, and the current estimate of available capacity at the Buena Vista Landfill.

In addition, potential impacts associated with short-term increases in energy consumption during project construction activities, and long-term increases in energy consumption during project operations, are analyzed.

Impact Summary

**TABLE 3.11-1
SUMMARY OF IMPACTS – UTILITIES AND SERVICE SYSTEMS**

Impact	O'Neill Ranch Well Site	Cunison Lane Well Site	Austrian Way Well Site	Granite Way – Aptos Village Well Site	Polo Grounds Well Site
Impact 3.11-1: Construction activities could potentially result in utility conflicts, disrupt or require relocation of existing utility lines, or temporarily interrupt utility services.	PSM	PSM	PSM	PSM	PSM
Impact 3.11-2: Disposal of project-related construction waste could have adverse effects on landfill capacity and conflict with solid waste statutes and regulations.	PSM	PSM	PSM	PSM	PSM
Impact 3.11-3: Implementation of the WMP could result in adverse effects on wastewater treatment facilities.	PSM	PSM	PSM	PSM	PSM
Impact 3.11-4: Project construction activities would result in a short-term increase in energy use.	LS	LS	LS	LS	LS
Impact 3.11-5: Operation of wells and treatment facilities could increase operational energy demand.	LS	LS	LS	LS	LS

LS = Less than Significant impact, no mitigation required

PSM = Potentially Significant impact, can be Mitigated to less than significant

Impact Discussion

Impact 3.11-1: Construction activities could potentially result in utility conflicts, disrupt or require relocation of existing utility lines, or temporarily interrupt utility services.

Numerous overhead and underground water, sewer, stormwater, natural gas, electric, and telecommunication lines of various sizes exist throughout the Soquel-Aptos area and along the roadways that border and provide access to the proposed well sites. Project-related construction activities could result in damage to or interference with existing utility lines and, in some cases, could require that existing lines be permanently relocated, potentially causing interruption in service. These risks can be greatly reduced by identifying the specific location, type, and size of the utilities, and utilizing special construction techniques to minimize interference.

O'Neill Ranch Well Site

The O'Neill Ranch Well site is located within a highly urbanized area. Soquel Drive is a major roadway and numerous buried utility lines and cables are likely to exist along the road right-of-way. Installation of a new production well at the O'Neill Ranch Well site would require approximately 1,750 feet of potable water pipeline to tie into the SqCWD's existing distribution system at Soquel Drive and Daubenbiss Avenue, 370 feet of new storm drain pipeline to connect to the existing stormwater drainage system along Soquel Drive, and a sanitary sewer lateral to connect to the sanitary sewer system in front of the property on Soquel Drive (see Figure 2-3). Construction activities associated with pipeline installation could potentially result in planned or accidental service interruptions and/or damage to underground utilities. Project implementation may require relocation of existing subsurface and aboveground utility lines and cables along Soquel Drive. Damage and service disruptions to these utilities would be a potentially significant impact. However, implementation of **Mitigation Measure 3.11-1 (Measures to Minimize Impacts to Affected Utilities)** would reduce the potential for damage and service disruptions by requiring the following: the precise location of underground utilities to be identified; coordination with the affected service providers prior to construction; protection of utilities during construction; and advance notification to businesses and residents of any planned service disruptions. With implementation of these measures, impacts related to damage to utilities and interruption of services would be reduced to a less-than-significant level.

Cunnison Lane Well Site

The Cunnison Lane Well site is located in a suburban neighborhood. Proposed improvements to the site include lateral connections to existing potable water, stormwater drainage, and sanitary sewer mains along Cunnison Lane (see Figure 2-4). Although smaller roadways like Cunnison Lane, when compared to major arterials like Soquel Drive, generally have fewer utilities, the possibility exists for installation of the pipeline connections to the existing utility infrastructure within the Cunnison Lane right-of-way to cause damage to existing utilities or disrupt services. This is considered a potentially significant impact, but would be mitigated to a less-than-significant level with implementation of **Mitigation Measure 3.11-1 (Measures to Minimize Impacts to Affected Utilities)**.

Austrian Way Well Site

The Austrian Way Well site is located in a suburban neighborhood. Proposed improvements to the site include a 200-foot-long lateral connection to the existing sanitary sewer main at the intersection of Austrian Way and Jennifer Drive, and a lateral connection the SqCWD's existing water distribution system located in front of the site along Austrian Way. In addition, 600 feet of new raw water pipeline would be routed from the new facilities to the existing stormwater drainage system at Austrian Way and Vienna Drive. Similar to the Cunnison Lane Well site, installation of pipelines could cause damage to existing utilities or disrupt services, a potentially significant impact. However, the impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.11-1 (Measures to Minimize Impacts to Affected Utilities)**.

Granite Way–Aptos Village Well Site

The Granite Way–Aptos Village Well site is located within the Aptos Village Plan project area. Before the Aptos Village Project is constructed, the proposed well site would be transferred to the District. Approximately 520 feet of new raw water pipeline would be needed to convey water produced at the proposed well to an existing raw water pipeline at Aptos Creek Road for subsequent treatment at the T. Hopkins Treatment Plant. The proposed raw water pipeline would be installed across a future parking lot that will be constructed as part of the approved Aptos Village Plan project, and would be connected to the existing raw water pipeline within the Aptos Creek Road right-of-way. Although the SqCWD would coordinate pipeline installation with the developer of the Aptos Village Plan project, damage to existing utilities or disrupt services could result. This impact is considered potentially significant, but would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.11-1 (Measures to Minimize Impacts to Affected Utilities)**.

Polo Grounds Well Site

Conversion of the existing irrigation well to a municipal well at the Polo Grounds Well site would include construction of an iron and manganese removal plant (i.e. treatment plant), requiring connection to the County's sanitary sewer system for sludge discharge. Proposed improvements at this site include a 2,690-foot-long sanitary sewer lateral to connect to a sewer main at North Polo Drive, a 2,680-foot-long potable water pipeline to connect to the District's existing water distribution system at the east end of North Polo Drive, and an additional 560 feet of potable water pipeline to connect to the water distribution system at the east end of South Polo Drive. Underground utility lines (i.e., natural gas, electrical, and sanitary sewer) along South Polo Drive, North Polo Drive, and along the access driveway to the Polo Grounds Regional Park, could be damaged and service disrupted as a result of project-related construction activities, a potentially significant impact. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.11-1 (Measures to Minimize Impacts to Affected Utilities)**.

Mitigation Measures

Measure 3.11-1: Measures to Minimize Impacts to Affected Utilities (applies to all sites). The SqCWD shall adhere to the following measures to address potential impacts related to damage and disruption of utilities, and interruption of services:

- Utility and excavation permits shall be obtained from the appropriate agencies for construction work within road rights-of-way and relocation of non-District utilities. These permits include provisions to minimize utility disruption. SqCWD and its contractor(s) shall comply with the permit conditions, and such conditions shall be included in construction contract specifications.
- Prior to construction activities, the SqCWD or its contractor(s) shall locate overhead and underground utility lines that may be encountered during excavation work. Pursuant to state law, the SqCWD or its contractor(s) shall notify USA North. Information regarding the exact location of existing utilities shall be confirmed before by field surveys (potholing) before construction activities begin.
- In advance of finalizing the project construction plans and schedule, any necessary relocation of utility lines shall be coordinated with the local agencies or service providers responsible for managing the affected utilities.
- Detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and fill of areas around utility cables and pipelines. All potentially affected utility providers shall be notified of the SqCWD's construction plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary relocation of services.
- Special construction techniques shall be employed in areas with crossing pipelines. Excavation around utilities shall be done by hand, as necessary, to avoid damage and minimize interference with safe operation and use.
- Residences and businesses adjacent to construction zones shall be notified about the timing and duration of potential utility service disruptions at least two to four days in advance.

Significance after Mitigation: Less than Significant.

Impact 3.11-2: Disposal of project-related construction waste could result in adverse effects on landfill capacity and conflict with solid waste statutes and regulations.

All Sites

Sources of solid waste from project construction activities would include excavated concrete, asphalt, rock, soil, and miscellaneous construction debris. Clean soil that is excavated during construction would be stockpiled and used as backfill; however, it is anticipated that the majority of the excavated soil would not be of suitable quality and would require offsite disposal. The estimated volumes of excavated materials that would result from construction activities at the individual well sites are provided in Table 2-5 in Chapter 2, Project Description. The specific quantity of excavated

materials that would be generated during project construction would be dependent on the final design of the individual facilities and the quality of the excavated soils and materials.

Implementation of the WMP would likely occur over a five-year period, with one new well constructed each year. Construction waste for the Polo Grounds Well site, estimated at 4,345 cubic yards (or 5,866 tons), represents the greatest quantity of construction waste that would be generated at any individual well site. Construction waste generated at the Polo Grounds Well site would be disposed of Mondays through Fridays over the 12-month construction period, resulting in an average daily disposal rate of 22.6 tons during weekdays that would be attributable to the proposed project. When compared to the Buena Vista Landfill's permitted maximum disposal of up to 838 tons per day, as well as the landfill's average daily acceptance of 350 tons daily, the landfill could accept substantial loads for disposal without exceeding its permitted daily tonnage. Because the construction waste estimates for the other four well sites are lower than those of the Polo Grounds Well site, daily tonnage would also not be an issue for the other sites.

Construction of the project facilities at all five well sites would generate a total of approximately 7,690 cubic yards of excavated material requiring offsite disposal over a five year period. If the full 7,690 cubic yards were disposed of at the Buena Vista Landfill, the remaining capacity of the landfill (currently less than 4,000,000 cubic yards) would be depleted by approximately 0.2 percent. This could accelerate the depletion of the landfill's long-term capacity, a potentially significant impact.

The construction contractor(s) would be required to dispose of solid waste in accordance with all applicable laws. Landfills are required to comply with state-mandated reductions in solid waste generation under AB 939, which requires all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of generated waste. The Buena Vista Landfill and Ben Lomond Transfer Station are also required to enforce the programs that support the County's more stringent goal of achieving a 75 percent reduction in landfill disposal by 2010. Further, the Santa Cruz County landfill ban (County Code, Title 7, Health and Safety, Chapter 7.20) prohibits the disposal of recyclable materials, including construction wastes such as concrete and asphalt, in the County's solid waste facilities unless it is determined that a particular recyclable material cannot be recycled for a specific time period, in which case the disposal of said recyclable material would be permitted for that time period.

Given the uncertainty regarding the quality of excavated materials and limited opportunities for reusing these types materials as part of project implementation, the disposal of project-related construction waste could conflict with state and local solid waste statutes, a potentially significant impact. However, implementation of **Mitigation Measure 3.11-2 (Waste Management Plan)**, which would require preparation of a waste management plan that emphasizes source reduction measures and recycling to reduce the amount of waste being disposed of in landfills, would reduce this impact to a less-than-significant level.

Mitigation Measures

Mitigation Measure 3.11-2: Waste Management Plan (applies to all sites). SqCWD shall require its construction contractor(s) to prepare a waste management plan identifying the types of construction wastes that would be generated by the project and how all waste streams would be handled. In accordance with the priorities of AB 939, the plan shall emphasize source reduction measures followed by recycling to reduce the amount of waste being disposed of in landfills.

Significance after Mitigation: Less than Significant.

Impact 3.11-3: Project implementation could result in adverse effects on wastewater treatment facilities.

Increased wastewater flows to the sanitary sewer system would result in a potentially significant impact if the SCCSD had limited conveyance capacity available to serve the increased flow. Implementation of the WMP would not involve the construction of onsite restroom facilities at any of the five well sites. However, the treatment of groundwater for potable use would generate iron and manganese concentrate (i.e. treatment sludge) that would be discharged to the County's sanitary sewer system. The total volume of treatment sludge discharged under the WMP would be similar to existing discharges, but could be slightly greater if pumping under the WMP were to offset current pumping from the Aromas aquifer, which does not require treatment. The type and concentration of the discharges would also be similar to sludge produced from existing wells that are screened in the Purisima Formation. Treatment plants associated with the new wells would require lateral connections to the sanitary sewer system.

In addition, with the exception of the Granite Way-Aptos Village Well site, raw groundwater produced during periodic maintenance activities (i.e., flushing of the well and treatment facilities) and well pump tests would either be discharged to the local sanitary sewer system in coordination with the Santa Cruz County Sanitation District (SCCSD) or discharged to the local stormwater drainage system. Periodic flushing, which is needed to wash debris out of the well and treatment facilities, would occur roughly once per year. Well pump testing would be performed approximately once every two years to evaluate the capacity and efficiency of the wells and check for equipment problems. If these discharges were to be routed to the sanitary sewer system, wastewater flows would be temporarily increased.

Granite Way–Aptos Village Well Site

Water produced at the proposed Granite Way-Aptos Village Well would be conveyed to the existing T. Hopkins Treatment Plant for treatment prior to delivery to customers. The T. Hopkins Treatment Plant currently removes iron, manganese, and arsenic from water produced by the T. Hopkins and Aptos Creek Wells. Once the Granite Way-Aptos Village Well comes online, the WMP proposes to remove either the T. Hopkins or the Aptos Creek Well from production. Raw groundwater produced during periodic flushing and well pump testing at the Granite Way-Aptos Village Well site would be discharged via the existing raw groundwater discharge pipeline that

conveys discharges from the T. Hopkins Treatment Plant to Aptos Creek. These discharges or raw groundwater would not affect sanitary sewer capacity.

However, depending on the total water volume produced from the two remaining active wells, a greater volume of raw groundwater may be treated at the T. Hopkins Treatment Plant. This would generate additional treatment sludge, thereby increasing wastewater flows to the sanitary sewer system. Increased wastewater flows to the sanitary sewer system would result in a potentially significant impact if the SCCSD had limited conveyance capacity available to serve the increased flow. However, with implementation of **Mitigation Measure 3.11-3 (Assess Sewer Service Availability)**, the SqCWD would be required to coordinate with the SCCSD regarding discharge volumes, locations and flow rates to ensure that adequate capacity exists to serve any potential flow increases. With implementation of this measure, the potential impact related to insufficient wastewater capacities would be reduced to a less-than-significant level.

All Other Sites

Proposed improvements at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Polo Grounds Well sites include the construction of new treatment plants and sewer laterals to discharge treatment sludge to the sanitary sewer system. It is anticipated that in the vicinity of most proposed wells, the treatment plant discharges would meet SCCSD criteria for acceptable waste streams because the discharges would be similar to the sludge discharged by other District-owned treatment facilities. However, future pumping from the Purisima Formation that would be used to offset pumping from the Aromas aquifer, such as pumping from the Polo Grounds Well, would result in an overall increase in sludge and wastewater flows. Each new treatment plant would generate up to 3,000 gallons per week of iron and manganese concentrate depending on the capacity of the well, and would therefore increase wastewater flows in the local sanitary sewer system pipelines.

In addition, if raw groundwater discharges produced during periodic flushing and well pump testing were discharged to the sanitary sewer system and not the stormwater drainage system, there would be a temporary increase in wastewater flows from the new well and treatment facilities. Increased wastewater flows in the local conveyance facilities would result in a potentially significant impact if the SCCSD had limited capacity available to serve new connections in the area. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.11-3 (Assess Sewer Service Availability)**.

Mitigation Measures

Measure 3.11-3: Assess Sewer Service Availability (applies to all sites). The SqCWD shall provide the Santa Cruz County Sanitation District (SCCSD) with information regarding the proposed discharge location, volumes, flow rates, and quality at each of the proposed treatment facilities. The sanitation district will then use this information to determine whether adequate capacity exists to serve proposed flows. If deemed necessary by the SCCSD, the SqCWD shall contribute funds towards improvements to the sanitary sewer system to accommodate increased wastewater flows. Funding for sanitary sewer

improvements by the SqCWD, if needed, shall be determined based on established funding mechanisms of the SCCSD.

Impact 3.11-4: Project construction activities would result in a short-term increase in energy use.

All Sites

Construction of the proposed project components would require the use of fuels (primarily gasoline, diesel, and electricity) for a variety of construction activities, including excavation, grading, and vehicle travel. Although the precise amount of construction-related energy consumption is uncertain, based on the short-term nature of construction activities and relative size of the improvements, fuel and energy for construction worker commute trips and for use by construction equipment is assumed to be negligible. Therefore, short-term impacts related to energy consumption during construction would be less than significant.

Mitigation: None required.

Impact 3.11-5: Operation of wells and treatment facilities could increase operational energy demand.

All Sites

New well pumps and treatment facilities proposed under the WMP would be electrically driven, and electrical power provided by PG&E. A backup generator at each site would ensure continuous power supply in the event of a power outage. Overhead and underground transmission power lines owned and operated by PG&E are located throughout the project area and would deliver electricity to the well sites. The operational energy demand of the SqCWD's water production and distribution system with implementation of WMP would be similar, and possibly less than, the current energy demand of the existing system without the WMP. Implementation of the WMP would not translate to an increase in pumping by the District and overall groundwater production by the District would be about the same as existing conditions, so there would be no increase from additional pumping. In addition, the newer well pumps and treatment facilities could possibly have a higher energy efficiency than the older equipment at older wells and treatment facilities. In the event that WMP implementation did result in increased energy demand, PG&E could readily supply the small increase in energy demand that would result from implementation of the WMP. Thus, impacts related to increased energy use would be less than significant.

Mitigation: None required.

3.11.5 References – Utilities and Service Systems

California Integrated Waste Management Board (CIWMB), Active Landfills Profile for Buena Vista Drive Sanitary Landfill (44-AA-004). Available online: <http://www.calrecycle.ca.gov/Profiles/Facility/Landfill/LFProfile1.asp?COID=44&FACID=44-AA-0004>, accessed January 29, 2010a.

California Integrated Waste Management Board (CIWMB), Diversion / Disposal Rate Report for Unincorporated Santa Cruz County - Reporting Year 2006. Available online: <http://www.calrecycle.ca.gov/LGCentral/Tools/MARS/JurDrDtl.asp?Flag=1&Ju=471&Yr=2006>, accessed January 29, 2010b.

California Integrated Waste Management Board (CIWMB), Active Landfills Profile for Monterey Regional Wst Mgmt DSt/Marina LF (27-AA-0010). Available online: <http://www.calrecycle.ca.gov/profiles/Facility/Landfill/LFProfile1.asp?COID=27&FACID=27-AA-0010>, accessed August 26, 2010c.

City of Santa Cruz, *Integrated Water Plan Draft Program Environmental Impact Report*. June 2006.

City of Santa Cruz, City of Santa Cruz Wastewater Treatment Facility Brochure. Available online: <http://www.cityofsantacruz.com/index.aspx?page=148>, accessed January 29, 2010.

Santa Cruz County Local Agency Formation Commission (LAFCO). *Countywide Service Review, Section 5: Flood Protection and Stormwater Services*, June 2005, accepted August 2005.

Santa Cruz County Department of Public Works (SCCDPW), Sanitation Engineering/ Water and Wastewater Operations. Available online: <http://www.dpw.co.santa-cruz.ca.us/sanitation.htm>, accessed January 29, 2010a.

Santa Cruz County Department of Public Works (SCCDPW), Santa Cruz County Recycles.org. Online: <http://www.santacruzcountyrecycles.org/>, accessed January 29, 2010b.

Underground Service Alert – Northern California (USA North), “About USA North”. Available online: <http://www.usanorth.org/about.php?user=excavators>, accessed January 30, 2010.

3.12 Cultural Resources

3.12.1 Introduction

Cultural resources include, but are not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural records of California. This section presents data on the previously recorded cultural resources in the vicinity of the proposed well sites and identifies the potential impacts that could result from WMP implementation. Mitigation measures to reduce or eliminate significant impacts to cultural resources are prescribed, as appropriate.

3.12.2 Regional Setting

Archaeological and Historic Resources

The following summary of the cultural history for the Monterey Bay region provides a context for discussing the known cultural resources in the Soquel-Aptos area. As a point of clarification, efforts to reconstruct the prehistoric period into broad cultural stages (e.g., Early Period, Middle Period) allows researchers to describe a wide number of sites with similar cultural patterns and components during a given period of time, thereby creating a regional chronology.

Prehistoric Setting

Archaeological data for central California indicates that the earliest people to occupy this region preferred estuaries and inland lacustrine¹ environments to the open coast (Jones, 1992). Many sites in Santa Cruz County exhibit evidence of prehistoric human occupation of lacustrine settings and the initial colonization of the foothills, inland valleys, and the rocky coast, which is commonly associated with the advent of millingstones² into the archaeological record (beginning around 6000 BC). Heavy use of estuarine shellfish, especially at Elkhorn Slough, is also seen. High residential mobility among terrestrial and marine habitats is considered the norm for this period.

Heavy occupation of the open coast appears to begin around 3500 BC, with a large number of sites identified along the open coast of Santa Cruz and Monterey Counties (Moratto, 1984). However, these coastal sites were not inhabited on a long-term basis and suggest that mobility to inland residential bases was still the norm. Research at Elkhorn Slough has traced many dietary fluctuations during the millennia and suggests that the slough was exploited for subsistence resources. Some researchers have postulated that a freshwater intrusion between 4000 and 1000 BC caused a suspension in the use of Elkhorn Slough in favor of rocky coastal resources (Jones, 1992).

¹ Areas near lakes.

² Millingstones are large, heavy, ground-stone milling tools and large core/cobble tools that typify the Millingstone Period. The Millingstone Period (8000 BC to 3500 BC) represents the period of initial settlement of the Monterey Bay area.

Monterey Bay Region

All proposed wells and associated infrastructure reviewed in this EIR are located in the Monterey Bay region. Although early studies revealed many long-term shellfish processing sites along the Monterey coast, no clear chronology of cultural change was developed from these highly stratified sites (Moratto, 1984). However, the littoral settlement³ and economic focus of the inhabitants was clearly derived from these sites. Ultimately, the results of the early excavations were distilled into two patterns that designate the archaeological manifestations of the Monterey/Carmel area: the Sur Pattern and the Monterey Pattern (Moratto, 1984).

The Sur Pattern (approximately 3500 BC to 500 BC) represents more permanent settlements on the coast combined with inland sites, both site types exhibiting a strong reliance on local resources. This pattern is associated with the ancestors of the Esselen, a tribal group that inhabited a small region south of the Monterey Peninsula (Hester, 1978).

The Monterey Pattern (ca. 500 BC), on the other hand, is characterized by large midden sites (shell refuse accumulations) that suggest more food processing along the coast, rather than by the sedentary coastal village sites seen in the Sur Pattern. Instead, the Monterey Pattern emphasized inland village sites and temporary, seasonal sites designed for specific activities. The evidence from the Monterey Pattern sites indicates connections to the Costanoans, who, ethnographically speaking, held much of the Monterey Bay and San Francisco Bay areas (Levy, 1978). Some sites began to show a replacement of the Esselen by the Costanoans by 500 BC. As a result, it seems tenable that the Esselen were driven from their territories soon after 500 BC. The two opposing adaptive strategies, foraging-dominated (Esselen) versus collection-dominated (Costanoan), seemed to favor the latter, which emphasized food storage, logistically organized across the landscape.

Ethnographic Setting

At the time of historical contact (ca. 1775), the Monterey Bay area was inhabited by Ohlone populations, known to the Spanish as “Costeños,” meaning “coast people.” Ethnographic accounts defined the Ohlone territory from the southern coastal region of San Francisco Bay to Monterey (Levy, 1978; Margolin, 1978). The Ohlone of the San Francisco and Monterey Bay regions were not a homogenous tribe or a single nation; rather, the ethnic groups recognized within the overarching Ohlone culture were sets of independent tribelets that spoke a common language and lived in a circumscribed, contiguous area. Slight variations in dialect exhibited by each village further distinguished tribelet membership. Despite having a common language base, the various tribelets were not bound together in any political sense. Instead, the tribelet served as the basis of sociopolitical organization and kinship reckoning.

In addition to maintaining a diverse spectrum of dietary staples through hunting and gathering, the Ohlone conducted other techniques of land management. For instance, controlled burning of extensive areas was conducted each fall to promote the growth of seed-bearing annuals (Margolin, 1978). The frequent use of fires encourages the growth of certain types of grasses that are quick

³ Refers to human settlement on or near the shore.

to grow back, as well as for fire-retardant bushes and shrubs. As the frequency of fires increases, the overall composition of the plant and animal communities changes. The amount of land available for grazing animals such as deer, elk, and antelope thus increases, as do species populations.

The Ohlone also crafted tule balsa, basketry, lithics⁴ such as mortars and pestles, and household utensils. Riverine and littoral resources were also exploited when available or economically suitable.

Although the Monterey Bay region contains a singular archaeological record, as well as a rich historical legacy, the area was less populated prehistorically than other regions of California. The Central Coast and South Coast Ranges as a whole contain a wide diversity of habitats for wildlife and vegetal species, ranging from littoral and marine to coastal scrub and redwood groves, along with upland grassland. However, unlike the prolific acorn-producing oaks of the Sierra Foothills and Central Valley, the South Coast Ranges are dominated by coast live oak (*Quercus agrifolia*), an inferior nut-producing species. In addition, the high bluffs along the coast made shellfish gathering more difficult and time consuming than in the San Francisco Bay area. As a result, the Monterey Bay region had smaller populations of prehistoric inhabitants compared to other regions of California.

Historic Setting

Spanish exploration of California began in 1542 with the expedition led by Juan Rodriguez Cabrillo. In 1579, Sir Francis Drake claimed California for England, calling it “Nova Albion.” In 1602, the expedition of Sebastian Vizcaino followed the route of Cabrillo along the California coast, and, like the Cabrillo expedition, did not venture inland.

In 1769, Gaspar de Portola’s expedition founded Monterey with the landing of the San Antonio to initiate the colonization and mission building process. Junipero Serra was on board to assist with the building of the mission and presidio of San Carlos de Borromeo de Monterey. Throughout the early to mid-19th century, the presidio housed much of the population of Monterey. These expeditions were followed by Pedro Fages in 1770 and 1772, Fernando Javier de Rivera in 1774, and Juan Bautista de Anza in 1776. Except for Portola’s, these expeditions traveled on the east side of the Santa Cruz Mountains, along a route later to become known as El Camino Real. Soon after the first of these expeditions, the Santa Clara (1777) and Santa Cruz (1791) missions were founded.

As the Mexican Period (approximately 1822 to 1846) began in California, the Spanish influence on sociopolitical development ended and changed California into a nearly independent, self-sufficient state with an economic focus on cattle ranching and foreign trade. With the decline of the missions, some Ohlone who were missionized returned to their pre-Spanish hunter-gatherer lifeways. However, growing secularization and the sale of ranchos to non-Hispanics for the first time brought an influx of Anglo-American settlers; this next stage in California’s history ushered in statehood by 1850—just four years after the territory was wrested from the Mexican government. As increasing settlement and competition for land increased, many of the vestiges of the Indian communities were lost.

⁴ Lithics are stone-based tool kits.

The latter half of the 19th century saw a continued Anglo-American immigration into the Monterey Bay area, and consequent changes in the culture and economy of the area. Anglo-American culture steadily became the predominant culture in California, though the Hispanic culture continued to exist. Dispersed farmsteads slowly replaced the immense Mexican ranchos. The farming of wheat, sugar beets, and other specialized crops slowly replaced cattle ranching as the primary economic activity in the Monterey Bay area.

Paleontological Resources

Paleontological resources are the fossilized evidence of past life found in the geologic record. Despite the prodigious volume of sedimentary rock deposits preserved worldwide and the enormous number of organisms that have lived through time, preservation of plant or animal remains as fossils is an extremely rare occurrence. Because of the infrequency of fossil preservation, fossils—particularly vertebrate fossils—are considered to be nonrenewable resources. Because of their rarity and the scientific information they can provide, fossils are highly significant records of ancient life. Paleontologic localities are those sites where the fossilized remains of extinct animals and/or plants have been preserved.

Rock formations that are considered of paleontologic sensitivity are those rock units that have yielded significant vertebrate or invertebrate fossil remains. This includes, but is not limited to, sedimentary rock units that contain significant paleontological resources anywhere within their geographic extent.

Existing Conditions at Individual Well Sites

Cultural Resources Records Search

Existing conditions at individual well sites were evaluated based on: a site reconnaissance conducted at each of the proposed well sites by one of ESA's registered professional archaeologists on June 15, 2006; the results of online database searches for paleontologic localities within Santa Cruz County and in the vicinity of the proposed well sites (UCMP, 2010); and the results of a cultural resources records search of all pertinent survey and site data located within a one-quarter-mile radius of the proposed well sites (conducted at the Northwest Information Center, Sonoma State University, on June 14, 2006 [File No. 05-1216]). Other sources of information include the Directory of Properties in the Historic Property Data File for Santa Cruz County, the National Register of Historic Places, the California Register of Historical Resources, the California Inventory of Historic Resources, the California Historical Landmarks, and the California Points of Historical Interest. Applicable information contained in the *O'Neill Ranch Well Initial Study/Mitigated Negative Declaration* (SqCWD, 2001) was also reviewed.

The Soquel-Aptos area is a diverse region that varies in terms of the ecological settings desirable for human settlement; as a result, the region also varies in terms of the potential to yield significant cultural resources. Several paleontologic localities have been identified north of the city of Santa Cruz along the San Lorenzo River and along the coastal margin from Capitola to Manresa. Many sites of cultural significance identified in the Monterey Bay area were documented prior to the

1960s. No comprehensive inventory of culturally significant sites has been conducted for Santa Cruz County. Previously recorded cultural resources in the vicinity of the proposed well sites are described below.

The Native American Heritage Commission (NAHC) was contacted by an ESA archaeologist on July 24, 2006 to request information regarding sites of importance to Native Americans in the Santa Cruz area. The NAHC sent a response on August 4, 2006 and provided a list of Native American organizations that should be contacted concerning locations of importance to Native Americans in the project area. ESA sent a letter on November 25, 2008 to each organization on the NAHC list, providing information about the proposed project and requesting information on locations of importance to Native Americans. No responses were received.

O'Neill Ranch Well Site

The O'Neill Ranch Well site is an undeveloped site that slopes steeply north toward an unnamed tributary to Soquel Creek. In 2001, Pacific Legacy conducted a cultural resources survey of the O'Neill Ranch Well site (APN 030-341-03) for archaeological resources. The results of the survey, which included systematic shovel-probe testing throughout the parcel, did not indicate any evidence of cultural resources (Pacific Legacy, 2001). In addition, the site reconnaissance conducted by ESA's professional archaeologist on June 15, 2006 did not reveal any artifacts or cultural features on the parcel. Furthermore, the results of the cultural records search conducted by ESA in 2006 did not reveal any recorded cultural resources within one-quarter mile of the site.

Cunnison Lane Well Site

The Cunnison Lane Well site is an undeveloped parcel located next to an unnamed tributary to Noble Gulch. The site reconnaissance conducted by ESA's professional archaeologist on June 15, 2006 did not reveal any artifacts or cultural features on the parcel. No cultural resources have been identified within one-quarter mile radius of the Cunnison Lane Well site. A survey of parcels just south of the proposed Cunnison Lane Well site did not indicate any evidence of cultural resources (Edwards, 1987). Furthermore, the records search conducted by ESA in 2006 did not reveal any recorded cultural resources within one-quarter mile of the site.

Austrian Way Well Site

The Austrian Way Well site is approximately 1,140 feet west and 350 feet upslope of Aptos Creek on a relatively flat, wooded area. The site reconnaissance conducted by ESA's professional archaeologist on June 15, 2006 did not identify any artifacts or cultural features on the parcel. Given the distance downslope to water and the previous level of disturbance, the Austrian Way Well site appears to be of low sensitivity for cultural resources. Furthermore, the records search conducted by ESA in 2006 did not reveal any recorded cultural resources within one-quarter mile of the site.

Granite Way–Aptos Village Well Site

The Granite Way–Aptos Village Well project area is located in the northern section of a larger vacant parcel (APN-041-011-20). Nearby creeks are Aptos Creek (900 feet west), Trout Gulch (1,200 feet southeast), and Valencia Creek (1,200 feet south). Several concrete foundations associated with past land uses are evident on the greater parcel. The installation of the well and pipeline, however, would not require the modification or demolition of the concrete foundations. The land surface in the project vicinity has been highly disturbed by previous development and demolition; as a result, there is little native topography. The Aptos Village Historic District is located approximately 200 feet to the south of the project area.

The results of the cultural resources records search identified one prehistoric archaeological site immediately adjacent to the project area and five additional prehistoric sites within a one-quarter-mile radius. Located within the greater 4-acre Granite Way–Aptos Village Well site parcel, CA-SCR-222 is the potential location of the ethnographic village of Aptos (Morris, 1979). The proposed well location and pipeline alignment are outside the known site boundaries; determined from both surface and subsurface investigations. The original site record from 1979 described surface deposits of fire-cracked rock, large mammal bone, and shellfish remains. The survey conducted by ESA's professional archaeologist on June 15, 2006 did not identify any artifacts or cultural features on the surface at the immediate project area. Heavy disturbance associated with previous development and demolition has likely destroyed surface prehistoric remains at the location.

A subsurface investigation conducted by Breschini & Haversat (1979) determined that the area was significantly disturbed and that intact archaeological materials may exist to a limited extent only. Seven test units and feature probing was conducted throughout the Granite Way–Aptos Village parcel. While both prehistoric and historic-period artifacts and remnant features were uncovered, all were found to be destroyed from demolition rubble associated with the early 1960s demolition of section houses that existed at the location. The area determined to have the most potential to contain intact archaeological deposits is the eastern side of the parcel near the Bay View Hotel and on the western side along and beneath Aptos Creek Road near Soquel Drive.

Polo Grounds Well Site

The Polo Grounds Well site is located within a grassland area at the eastern end of Polo Grounds Regional Park. No cultural resources have been previously recorded within one-quarter mile of the Polo Grounds Well site. The site reconnaissance conducted by ESA's professional archaeologist in June 2006 did not identify any artifacts or cultural features within the park boundaries.

3.12.3 Regulatory Framework

Federal and State Regulations

National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires federal agencies with jurisdiction over a federally funded, federally assisted, or federally licensed undertaking to consider the effects of the agency's undertaking on properties listed or eligible for listing in the National Register of Historic Places (16 United States Code 470 et seq.). For compliance with Section 106, the federal agency (e.g., the Corps) is required to consult with the State Historic Preservation Officer (SHPO) before granting permits, funding, or other authorization for the undertaking. The Section 106 review process is implemented using a five-step procedure:

- Identification and evaluation of historic properties
- Assessment of the effects of the undertaking on properties that are eligible for listing in the National Register
- Consultation with the SHPO and other agencies for the development of an agreement that addresses the treatment of historic properties
- Receipt of Advisory Council on Historic Preservation comments on the agreement or the results of consultation with SHPO
- Implementation of the project according to the conditions of the agreement

To determine whether the proposed projects could affect properties eligible for inclusion in the National Register, cultural sites (including archaeological, historical, and architectural properties) must be inventoried and evaluated for eligibility. If no properties determined to be eligible for listing in the National Register would be affected by the project, the federal lead agency need not consult with the SHPO. However, if the project has the potential to result in an effect, the SHPO review is typically completed within 30 days from receipt of the inventory documentation.

The Section 106 process could apply if, for example, future projects implemented under the WMP require a Corps Section 404 permit for river and stream crossings or other waterways under the Corps' jurisdiction, in which case the Area of Potential Effect would be delineated (i.e., the area that could be indirectly or directly affected by installation of pipelines, pump station improvements, and the use of staging areas). A Section 106 determination would be made once specific project sites and routes have been finalized.

Criteria for determining adverse effects are provided in the Code of Federal Regulations (CFR), Section 36, Part 800.5(a)(1):

An undertaking has an adverse effect when it may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Examples of adverse effects, as listed in 36 CFR 800.5(a)(2), are as follows:

- Physical destruction of or damage to all or part of the property
- Alteration, isolation, removal of the property, or change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance
- Introduction of visual, audible, or atmospheric elements that diminish the integrity of the property's significant historic characteristics
- Neglect of a property that causes its deterioration, unless such deterioration is consistent with cultural values
- Transfer, lease, or sale of property out of federal ownership

California Environmental Quality Act

CEQA requires that lead agencies determine whether projects may have a significant effect on archaeological and historical resources. This determination applies to resources that meet significance criteria qualifying them as "unique" or "important," or to resources that are listed in or are considered eligible for listing in the California Register of Historical Resources.

Section 15063.12 of the California Public Resources Code states that: "A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." Substantial adverse change is further defined as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially changed." If the CEQA lead agency determines that a project may result in a substantial adverse change in a historical resource, the project is determined to have a significant effect on the environment, and the effects and measures to minimize the effects must be addressed in the appropriate CEQA document. If a historical resource is found not to be significant under the qualifying criteria, it need not be considered further in the planning process.

CEQA emphasizes avoidance of archaeological and historical resources as the preferred means of reducing potential significant effects. If avoidance is not feasible, an excavation program or some other form of mitigation must be developed to mitigate the impacts.

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the City of Capitola or the Local Coastal Zone; therefore, ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.

3.12.4 Impacts and Mitigation Measures

Significance Criteria

In accordance with Appendix G of the CEQA Guidelines, implementation of the WMP would result in a significant impact to cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the CEQA Guidelines;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the CEQA Guidelines;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;
- Disturb any human remains, including those interred outside of formal cemeteries.

Per Section 15064.5 of the CEQA Guidelines, a “historical resource” is defined as any site that:

- Is listed in or determined to be eligible by the State Historical Resources Commission for listing in the California Register, or is determined to be significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, or cultural annals of California; and
- Meets any of the following criteria:
 - Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
 - Is associated with the lives of persons important in our past;
 - Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
 - Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 states that an archaeological site that does not meet the criteria for “historical resources” described above, but does meet the definition of a unique archaeological resource in Section 21083.2 of the Public Resources Code or is identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, will be presumed to be historically or culturally significant.

When a project would adversely affect an archaeological site, a lead agency must first determine whether the site is a historical resource, as defined above. If it is determined that the archaeological site is a historical resource, the provisions of Public Resources Code Section 21084.1 (Historical Resources) apply. If an archaeological site does not meet the criteria, but does meet the definition of a “unique archaeological resource” in Public Resources Code Section 21083.2 (Archaeological

Resources), the site must be treated in accordance with the provisions of Section 21083.2. Public Resources Code Section 21083.2, subdivision (g), defines “unique archaeological resource” as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information
- Has a special and particular quality such as being the oldest of its type or the best available example of its type
- Is directly associated with a scientifically recognized important prehistoric or historic event or person

CEQA Guidelines Section 15063.12 provides that, in general, a resource not listed on state or local registers of historical resources must be considered by the lead agency to be historically significant if the resource meets the criteria for listing in the California Register. Section 15064.5 provides standards for determining what constitutes a “substantial adverse change” that must be considered a significant impact on archaeological or historical resources. A “substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.”

Approach to Analysis

As previously discussed, cultural resources located at and in the vicinity of the proposed well sites were identified based on a site reconnaissance conducted by one of ESA’s registered professional archaeologist; an online database search of paleontologic localities within Santa Cruz County; and a cultural resources records search conducted at the Northwest Information Center of all pertinent survey and site data. Other sources reviewed include the Directory of Properties in the Historic Property Data File for Santa Cruz County, the National Register, the California Register, the California Inventory of Historic Resources, the California Historical Landmarks, and the California Points of Historical Interest.

In general, typical ground-disturbing construction activities such as grading and excavation have the potential to affect historic and prehistoric archaeological resources. As the intensity of construction impacts increases, the potential to affect cultural resources also increases. The following analysis identifies the type and magnitude of impacts that could result at individual well sites, as well as the overall collective impact to cultural resources that would result from implementation of the WMP.

Impact Summary

**TABLE 3.12-1
SUMMARY OF IMPACTS – CULTURAL RESOURCES**

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.12-1: Implementation of the WMP could result in impacts to historical resources or unique archaeological resources, including those that have not been previously identified.	PSM	PSM	PSM	PSM	PSM
Impact 3.12-2: Implementation of the WMP could result in adverse effects on paleontological resources.	PSM	PSM	PSM	PSM	PSM

PSM = Potentially Significant impact, can be Mitigated to less than significant

Impact Discussion

Impact 3.12-1: Implementation of the WMP could result in impacts to historical resources or unique archaeological resources, including those that have not been previously identified.

Cultural resources, whether prehistoric or historic-period, are physical manifestations of cultural activity. As such, they constitute an important nonrenewable resource that has the potential to increase our understanding of history and prehistory. Archaeological sites can consist of both surface and subsurface components—often with more extensive evidence beneath the surface than at the surface. Archaeological sites tend to recur in settings desirable for human settlement, such as historic waterways and flat areas outside of flood zones, and the Soquel-Aptos area encompasses numerous environments that would have been favorable for prehistoric human settlement.

Previously unknown and buried (or otherwise obscured) prehistoric or historic-period cultural resources may be present almost anywhere in the construction zones identified for the proposed well sites. Sediment removal and other forms of excavation activities associated with a pipeline extension and installation could result in a significant impact to unknown or poorly recorded cultural resources. As a result, there is a potential for construction activities associated with proposed well sites, including excavation, grading, and the movement of heavy construction equipment, to degrade and/or destroy unrecorded cultural resources.

O'Neill Ranch Well Site

No cultural resources were identified in the vicinity of the O'Neill Ranch Well site. While it is unlikely that previously unrecorded and buried (or otherwise obscured) historical resources or unique archaeological resources would be discovered during project construction, the possibility exists for construction of a well and treatment plant at this site to expose and cause impacts on unrecorded cultural resources. This impact is considered potentially significant. However, with

implementation of **Mitigation Measure 3.12-1a (Accidental Discovery Measures)**, which outlines procedures to be followed in the event of accidental discovery of a buried cultural resource during construction activities, this impact would be reduced to a less-than-significant level.

Cunnison Lane Well Site

No cultural resources were identified in the vicinity of the Cunnison Lane Well site. However, unrecorded cultural resources could exist within the construction zone. Although unlikely, the possibility exists for construction of a well and treatment plant at this site to expose and cause impacts on previously unrecorded and buried cultural resources. This impact is considered potentially significant. However, with implementation of **Mitigation Measure 3.12-1a (Accidental Discovery Measures)**, this impact would be reduced to a less-than-significant level.

Austrian Way Well Site

No cultural resources were identified in the vicinity of the Austrian Way Well site. However, unrecorded cultural resources could exist within the construction zone. Although unlikely, the possibility exists for construction of a well and treatment plant at this site to expose and cause impacts on previously unrecorded and buried cultural resources. This impact is considered potentially significant. However, with implementation of **Mitigation Measure 3.12-1a (Accidental Discovery Measures)**, this impact would be reduced to a less-than-significant level.

Granite Way–Aptos Village Well Site

One previously recorded prehistoric archaeological site is located immediately adjacent to the project area. Based on both surface and subsurface investigations of the Granite Way-Aptos Village Well site it appears that the proposed well and pipeline are not within the boundaries of the documented prehistoric archaeological site. However, given the presence of a documented prehistoric resource in the site vicinity, there is a potential for construction activities associated with the proposed well to inadvertently expose and cause impacts to unknown portions of CA-SCR-222, as well as to other undocumented or unrecorded archaeological resources that may be present, resulting in a potentially significant impact. However, with implementation of **Mitigation Measure 3.12-1a (Accidental Discovery Measures)**, which outlines procedures to be followed in the event of accidental discovery of a buried cultural resource during construction activities, and **Mitigation Measure 3.12-1b (Archaeological Monitor During Construction)**, which requires a qualified archaeological and Native American monitor during construction, this impact would be reduced to a less-than-significant level.

Polo Grounds Well Site

While no cultural resources were identified in the vicinity of the Polo Grounds Well site, unrecorded cultural resources could exist within the construction zone. Although unlikely, the possibility exists for project construction activities at this site to expose and cause impacts on unrecorded cultural resources. This impact is considered potentially significant. However, with implementation of **Mitigation Measure 3.12-1a (Accidental Discovery Measures)**, this impact would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.12-1a: Accidental Discovery Measures (applies to all sites). The SqCWD shall incorporate the following into the contract specifications for ground-disturbing activities, including excavation and grading:

In the event that any prehistoric or historic subsurface cultural resources are discovered during ground-disturbing activities, such as structural features or unusual amounts of bone or shell, artifacts, human remains, architectural remains (such as bricks or other foundation elements), or historic archaeological artifacts (such as antique glass bottles, ceramics, etc.), all work within 100 feet of the resources shall be halted and the SqCWD shall consult with a qualified archaeologist or paleontologist to assess the significance of the find. If any find is determined to be significant, representatives of the SqCWD and the archaeologist and/or paleontologist would meet to determine the appropriate avoidance measures or other mitigation, with the ultimate determination to be made by the County. If recommended by the consulting archaeologist, all significant cultural materials recovered will be subject to scientific analysis and professional museum curation, and a report shall be prepared by the archaeologist according to current professional standards.

In considering any suggested mitigation proposed by the consulting archaeologist to mitigate impacts to historical resources or unique archaeological resources, County Planning Staff will determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is unnecessary or infeasible, other appropriate measures (e.g., data recovery) shall be instituted. Work may proceed on other parts of the project site while mitigation for historical resources or unique archaeological resources is carried out.

If the discovery includes human remains, CEQA Guidelines Section 15063.12(e)(1) shall be followed, which prescribes the following:

- (e) In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps shall be taken:
 - (1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:
 - (A) The coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required, and
 - (B) If the coroner determines the remains to be Native American:
 - 1. The coroner shall contact the Native American Heritage Commission within 24 hours.
 - 2. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descendent from the deceased Native American.
 - 3. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human

remains and any associated grave goods as provided in Public Resources Code Section 5097.98, or

- (2) Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.
 - (A) The Native American Heritage Commission is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission.
 - (B) The descendant identified fails to make a recommendation; or
 - (C) The landowner or his authorized representative rejects the recommendation of the descendant, and mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

Measure 3.12-1b: Archaeological Monitor During Construction (applies only to the Granite Way–Aptos Well site). The SqCWD shall retain the services of a qualified archaeological consultant that has expertise in California prehistory and a Native American monitor to monitor ground-disturbing or vegetation removal activity within the Granite Way-Aptos Village Well project area. If an intact archaeological deposit is encountered, all soil-disturbing activities in the vicinity of the site shall cease. The archaeological monitor shall be empowered to temporarily redirect crews and heavy equipment until the resource is evaluated. The monitor shall immediately notify the SqCWD of the encountered archaeological deposit. The monitor shall, after making a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, present the findings of this assessment to the SqCWD. If the archaeological monitor determines that the area being excavated does not contain archaeological materials, the monitor shall modify the level of monitoring as needed.

If the SqCWD, in consultation with the archaeological monitor, determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, SqCWD shall:

- Redesign the project to avoid any adverse effects on the significant archaeological resource; or
- Implement an archaeological data recovery program (ADRP) (unless the archaeologist determines that the resource is of greater interpretive than research significance and that interpretive use of the resource is feasible). If the circumstances warrant data recovery, an ADRP will be conducted. The project archaeologist and the SqCWD shall meet and consult to determine the scope of the ADRP. The archaeologist shall prepare a draft ADRP that shall be submitted to the SqCWD for review and approval. The ADRP shall identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain (i.e., the ADRP shall identify the scientific/historical research questions that are applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions). Data recovery, in general, shall be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data

recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practical.

Significance after Mitigation: Less than Significant.

Impact 3.12-2: Implementation of the WMP could result in adverse effects on paleontological resources.

All Sites

The proposed well sites are located in marine terrace deposits and sedimentary rock formations, which tend to have a low to moderate potential for harboring paleontological resources that would qualify as significant. However, significant discoveries have been made in creek beds and along beaches in Santa Cruz County; therefore, the possibility of identifying such resources is slightly greater during excavation activities in creek beds or adjacent to creeks.

Because significant fossil discoveries can be made even in areas designated as having a low potential for such resources, such discoveries could occur during excavation activities related to well and treatment plant construction and pipeline installation. Excavation activities can have a deleterious effect on such resources. Thus, potential impacts on paleontological resources are considered potentially significant. However, implementation of **Mitigation Measure 3.12-2 (Paleontological Discovery Measures)**, which requires that the SqCWD and its contractor(s) follow appropriate actions in the event of any paleontological discoveries, would reduce potential impacts to paleontological resources to a less-than-significant level.

Mitigation Measures

Measure 3.12-2 Paleontological Discovery Measures (applies to all sites): The SqCWD shall incorporate paleontological discovery measures into the contract specifications for ground-disturbing activities, including excavation and grading. In the event of any paleontological discoveries, the SqCWD or its contractor(s) shall notify a qualified paleontologist who, in turn, will document the discovery as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in Section 15063.12 of the CEQA Guidelines. In the event a fossil is discovered during construction, excavations within 50 feet of the find shall be temporarily halted or diverted until the discovery is examined by a qualified paleontologist, in accordance with Society of Vertebrate Paleontology standards (SVP, 1995). The paleontologist shall notify the SqCWD of necessary procedures to be followed before construction is allowed to resume at the location of the find. If the SqCWD determines that avoidance is not feasible, the paleontologist shall prepare an excavation plan for mitigating the effect of the project on the qualities that make the resource important, and the plan shall be implemented.

Significance after Mitigation: Less than Significant.

3.12.5 References – Cultural Resources

- Breschini, G. S. and T. Haversat, *Preliminary Archaeological Mitigation Plan for the Aptos Station Development, Aptos, Santa Cruz County, California*, on file at the Northwest Information Center, Sonoma State University, File No. S-4057, 1979.
- Edwards, R., *Archaeological Records Search for Cunnison Lane and Main Street Sites*, on file at the Northwest Information Center, Rohnert Park, CA, File No. 9491, 1987.
- Hester, T.R., *Esselen*. In: Handbook of North American Indians, Vol. 8, R.F. Heizer (Ed.), 1978.
- Hoover, M.B., H.E. Rensch, E.G. Rensch, and W.N. Abeloe, *Historic Spots in California*, Stanford University Press, Stanford, CA, 1990.
- Jones, T. L., *Marine-Resource Value and the Priority of Coastal Settlement: A California Perspective*, American Antiquity Vol. 56., *Settlement Trends along the California Coast*. In: Essays on the Prehistory of Maritime California, Center for Archaeological Research at Davis, Vol. 10, Jones, T. L. (ed.), University of California, Davis, CA, 1992.
- King, T.F. and P.P. Hickman, *The Southern Santa Clara Valley: A General Plan for Archaeology, San Felipe Division, Central Valley Project*, Report S-5222, on file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA, 1973.
- Levy, R., *Costanoan*. In: Handbook of North American Indians, Vol. 8, R.F. Heizer (Ed.), Smithsonian Institute, Washington, D.C., 1978.
- Margolan, M., *The Ohlone Way: Indian Life in the San Francisco-Monterey Bay Area*, Heyday Books, Berkeley, CA, 1978.
- Moratto, M.J., *California Archaeology*, Smithsonian Press, San Diego, CA, 1984.
- Morris, J.W., Archaeological Site Survey Record, CA-SCR-222, on file at the Northwest Information Center, Rohnert Park, CA, 1979.
- National Park Service, *Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation*, Federal Register, Vol. 68, No. 139, July 21, 2003.
- Pacific Legacy, Inc., *Cultural Resources Inventory of Assessor's Parcel 030-341-03, Near 41st Avenue and Soquel Drive, Soquel, Santa Cruz County, California*, prepared for ESA, San Francisco, 2001.
- Riddell, F. and A. Pilling, Archaeological Site Survey Record, CA-SCR-2. on file at the Northwest Information Center, Rohnert Park, CA, 1949.
- Society of Vertebrate Paleontology (SVP), Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: standard guidelines, Society of Vertebrate Paleontology News Bulletin, Vol. 163, p. 22-27. 1995
- Soquel Creek Water District (SqCWD), *O'Neill Ranch Well and Treatment Plant Project Final Initial Study/Mitigated Negative Declaration*, December 2001.
- University of California Museum of Paleontology (UCMP), *Locality Catalog*, available online at <http://ucmpdb.berkeley.edu/loc.html>, accessed February 1, 2010.

3.13 Aesthetics

3.13.1 Introduction

This section discusses the potential impacts of the WMP project on aesthetics or visual resources. Visual resources are generally defined as the natural and built features of the landscape environment that can be seen from public views. The combinations of landform, topography, water, and vegetation patterns constitute natural landscape features that define an area's visual character. Built or man-made features, such as buildings, roads, and other structures can also shape and influence visual character. Combined, these natural and built features contribute to the public's experience and appreciation of the visual character, quality, and scenic resources of the environment.

This section describes the existing visual resources of the proposed well sites and immediate vicinities, and the regulatory requirements aimed at protection or conservation of these resources. The section also analyzes the potential impacts on visual resources that could result from project construction, siting, and design. Mitigation measures to reduce or avoid adverse impacts are identified, where necessary. Visual impacts were evaluated based on field observations of the proposed well sites and vicinities, review of U.S. Geological Survey topographic maps and aerial photographs, and review of existing policy documents (e.g., *1994 Santa Cruz County General Plan* and *California Department of Transportation [Caltrans] Scenic Highway Program*).

3.13.2 Regional Setting

Santa Cruz County is located along the coast between the San Francisco Bay Area and the Monterey Peninsula. The visual landscape comprises the rugged Santa Cruz Mountains, the Monterey Bay coastline, the urbanized cities of Santa Cruz, Soquel, Capitola, and Aptos, and the fertile coastal lowlands at the county's northern and southern ends. Most of the coastline is flanked by cliffs. The diversity of the terrain provides a variety of high-quality views from numerous vantage points (roadways, parks, residential areas, etc.) at varying elevations.

The aesthetic character of the proposed well sites and vicinities is defined by a combination of neighboring land uses and natural features. Existing land uses in the vicinity of the proposed well sites include light-industrial, commercial, institutional, and residential development. The well sites are all located within one to three miles of the Monterey Bay coastline, with the Santa Cruz Mountains forming the backdrop to the north. The coastline, nearby uplands (hillsides and ridgelines), and local creeks and streams provide unique scenic qualities. While large parts of the county are undeveloped, the well sites are either surrounded by or within close proximity to developed areas. Prominent urban features include Soquel Drive, Highway 1, and other road networks, as well as various light-industrial, commercial, institutional, and residential clusters.

3.13.3 Existing Conditions at Individual Well Sites

O'Neill Ranch Well Site

Visual Character

The O'Neill Ranch Well site, located at Soquel Drive near 41st Avenue, is an undeveloped lot surrounded by a chain link fence. The site is currently owned by the Santa Cruz County Redevelopment Agency, which has jurisdiction over the parcel. The proposed lot split would result in the dedication of a portion of the southern half of the parcel for the development of the proposed well and treatment plant. The northern portion of the parcel slopes steeply toward a large ravine and an unnamed tributary to Soquel Creek that runs west-to-east along the northern parcel boundary. Several large oak trees line the steep creek banks. The flatter, southernmost portion of the site is covered mostly with grass and weeds. Surrounding land uses consist of retail/commercial to the south and west, high-density residential to the east, and wooded open space to the north.

Views of the Site

The O'Neill Ranch Well site is visible from a number of public roads and nearby land uses. Unobstructed northerly views of the site are available from Soquel Drive, from the commercial shopping center located across Soquel Drive and south of the proposed well site, and from Cotton Lane, a smaller street that runs perpendicular to Soquel Drive. These views of the site include the chain-link fence around the lot perimeter and dense vegetation, including large oak trees and grasses (see **Figure 3.13-1**). Views of the O'Neill Ranch Well site from properties on the north side of the ravine are obstructed by the dense vegetation along the site's northern boundary.

Westerly and easterly static and dynamic¹ views of the O'Neill Ranch Well site are available from sections of Soquel Drive further east and west; partial northeasterly views are also available from 41st Avenue, which is perpendicular to Soquel Drive and several hundred feet west of the proposed well site. These views consist of the fence and vegetation.

While long-range views of the O'Neill Ranch Well site may be available from higher elevations, most long-range views are obstructed by the dense vegetation that surrounds the proposed well site on three sides (north, east, and west). Highway 1, a designated County scenic road and eligible State scenic highway, is located approximately 1,800 feet south of the site, but the O'Neill Ranch Well site is not visible from Highway 1. There are no scenic views or vistas in the immediate vicinity of the site.

¹ Dynamic views are those observed from moving vehicles.



O'Neill Ranch Well Site – View to the east across well site from western property boundary. Soquel Drive is present along the southern side of the parcel.



O'Neill Ranch Well Site – View to the North from Soquel Drive.

SOURCE: ESA, 2009.

SqCWD Well Master Plan EIR . 205491

Figure 3.13-1
O'Neill Ranch Well Site – Views of the Project Site

Cunnison Lane Well Site

Visual Character

The Cunnison Lane Well site is an undeveloped 0.4-acre parcel located on Cunnison Lane, off of Soquel Drive, about three-quarters of a mile inland from the coast. The parcel is relatively level and is bounded on the west by an unnamed tributary to Noble Gulch. A wooden ranch-style fence marks the perimeter of the property. Large oak and eucalyptus trees line the western site boundary along the banks of the tributary. The remainder of the ground surface is covered by non-native annual grass and ruderal plant species. Surrounding land uses include low- and medium-density urban residential uses to the north and south, open space and parkland to the west, and open space across Cunnison Lane to the east.

Views of the Site

The Cunnison Lane Well site is visible from Cunnison Lane, a public road that runs north-to-south; from adjacent and nearby residences on Cunnison Lane to the north and south; and from the open space area across Cunnison Lane. Because the Cunnison Lane Well site is surrounded by dense vegetation and residential developments, it is not easily visible from long-range vantage points.

Northerly, southerly, and westerly short-range views of the Cunnison Lane Well site include the approximately 3-foot wooden fence that surrounds the site on three sides (north, east, and south), an open grassy area just beyond the fence, and large oak and eucalyptus trees that form the backdrop of these views. The wooden fence does not obstruct these views, and the natural features of the site can be easily discerned. **Figure 3.13-2** shows images of the Cunnison Lane Well site from two different viewpoints. Easterly views of and across the site are obstructed by the dense vegetation along the site's western boundary. Therefore, the site is not easily seen from the residences located along Hardin Way and further west. Furthermore, because the stretch of Cunnison Lane south of the site that connects to Soquel Drive is slightly curved, the site is not visible from Soquel Drive, which is several hundred feet to the south.

While long-range views of the site may be available from higher elevations, most long-range views are obstructed by residences and open space areas, as well as by the dense vegetation that borders the western edge of the site. Highway 1, a designated County scenic road and eligible State scenic highway, is located approximately ½-mile south of the site, but the Cunnison Lane Well site is not visible from Highway 1. There are no designated scenic views or vistas in the immediate vicinity of the site.

Austrian Way Well Site

Visual Character

The Austrian Way Well site is a relatively flat, 3.18-acre parcel located at Austrian Way and Jennifer Drive. Existing structures on the site include the Austrian Tank and a paved access road. Surrounding land uses include single-family residential to the west, undeveloped land immediately to the north and south, and the Forest of Nisene Marks State Park to the east. Existing vegetation in unpaved



Looking north across Cunnison Lane Well site from southern parcel boundary



Looking southwest toward Cunnison Lane Well site from east side of Cunnison Lane

SOURCE: ESA, 2009.

SqCWD Well Master Plan EIR . 205491

Figure 3.13-2
Cunnison Lane Well Site - Views of the Project Site

portions of the site consists of interior live oak woodland, mixed grassland, and ornamental landscaping. Overall, the unpaved areas of the proposed well site maintain the continuity and character of the Forest of Nisene Marks State Park, although the Austrian Tank itself and the structures associated with it are visually disruptive as compared to the natural features surrounding the site.

Views of the Site

The proposed well site is partially visible from Austrian Way and Jennifer Drive, two of the smaller public roads that are part of the local residential road network. It may also be visible from the single-family residences that line these streets, although these views are considered to be private.

The Austrian Way Well site is not located near any major public roads. Furthermore, it is obstructed on three sides (north, east, and south) by dense vegetation and on the fourth side (west) by residential development. As such, it is visible primarily in short-range views and is not easily visible in long-range views (one-half mile or farther from the site).

Southerly, westerly, and northerly short-range views from the state park consist of varied vegetation, including trees, shrubs and grasses, the green, one-story-tall Austrian Tank and associated structures adjacent to the tank (including a wooden shed), and a chain-link fence that surrounds the tank and associated structures. In addition, a PG&E tower with electrical transformers is located on the site, next to the paved access road.

Easterly short-range views from Austrian Way and Jennifer Drive, and from the private homes located along Jennifer Drive, immediately adjacent to the proposed well and treatment facility, consist of the site vegetation and portions of the Austrian Tank and associated structures. However, tall trees in the western portion of the site largely obstruct views of the tank. **Figure 3.13-3** shows images of the Austrian Way Well site from two different viewpoints.

The Austrian Way Well site is not visible from Highway 1, a designated County scenic road and eligible State scenic highway. There are no designated scenic views or vistas in the immediate vicinity of the site.

Granite Way–Aptos Village Well Site

Visual Character

The Granite Way–Aptos Village Well site is located at the end of Granite Way within the boundaries of the Aptos Village Plan project (Santa Cruz County Planning Department, 2010). The well would be placed on a small portion of a vacant parcel located off Cathedral Drive next to Village Drive. The proposed well site is located within a dirt and gravel area that contains remnant slabs of concrete from previous development and is vegetated with ruderal plant species. Portions of the parcel contain ornamental landscaping, coast live oaks, and other native tree species. Surrounding land uses are residential to the north and commercial and light industrial to the south and southeast.



Looking west towards Austrian Way Well site from paved access road



Looking north towards Austrian Way Tank from paved access road

SOURCE: ESA, 2009.

SqCWD Well Master Plan EIR . 205491

Figure 3.13-3
Austrian Way Well Site - Views of the Project Site

Views of the Site

The Granite Way-Aptos Village Well site is visible at short range from local roads (Granite Way, Trout Gulch Road, and Aptos Creek Road), from nearby residences to the north, from light-industrial and commercial properties to the south and southeast, and from the surrounding parcels, many of which are currently vacant and therefore not frequented by the public. Currently, views of the site are somewhat obstructed by the scattered clusters of trees and shrubs and building remnants, but can still be observed. Such views include the dirt and gravel road, old concrete foundations, low-lying vegetation, and debris. In general, the Granite Way-Aptos Village Well site has the characteristics of an abandoned, vacant lot. **Figure 3.13-4** shows images of the Granite Way-Aptos Village site from two different viewpoints.

Although long-range views of the Granite Way-Aptos Village Well site may be available from higher elevations in the site vicinity, these views are likely obstructed by vegetation as well as by the varying topography of the surrounding area and intervening development. The Granite Way-Aptos Village Well site is not visible from Highway 1, a designated County scenic road and eligible State scenic highway. There are no designated scenic views or vistas in the immediate vicinity of the site.

Polo Grounds Well Site

Visual Character

The existing irrigation well is situated within Polo Grounds Regional Park, a 62-acre park located in Aptos between North Polo Drive and South Polo Drive and north of Rio del Mar Boulevard. Park facilities include three soccer fields, three baseball diamonds, a dog park, paved parking areas, and undeveloped area known as the “great meadow.” Much of the park is covered by non-native grassland and turf grass. Tall trees line the outer park boundary to the north, east, and south. The riparian corridor along Valencia Creek, which flows southwest along the northwestern park boundary, includes redwood trees and associated understory shrubs and grasses. The irrigation well is located at the east end of the great meadow in an area that is relatively flat.

Overall, the areas surrounding the Polo Grounds Well site are of high visual quality, as they contain large areas of natural vegetation and serve as a place of rest and recreation for County residents. The irrigation well and the fence surrounding the site detract somewhat from the natural character of the great meadow, although the well is a minor structure in the context of the park as a whole.

Views of the Site

The Polo Grounds Well site is visible primarily from areas within the park. Even though some views of this site span several hundred feet, they are considered to be short-range views in this analysis. Additional short-range views are available from residences along South Polo Drive and North Polo Drive. Partial short-range views from Huntington Drive are largely obstructed by the surrounding greenery. Easterly views across the park in the direction of the irrigation well consist of turf grass and meadow grasslands associated with the ball fields and dog park. Dense trees and shrubbery along the perimeter of the park and the riparian corridor along Valencia Creek form the



Looking south at Granite Way-Aptos Village Well site from Village Drive



Looking southwest at Granite Way-Aptos Village Well site from Village Drive

SOURCE: ESA, 2009.

SqCWD Well Master Plan EIR . 205491

Figure 3.13-4
Granite Way-Aptos Village Well Site - Views of the Project Site

backdrop. The existing irrigation well and its auxiliary facilities, which are painted bright blue, contrast with the surrounding green areas and thus detract somewhat from this view. **Figure 3.13-5** shows existing images of the Polo Grounds Well site from two different viewpoints.

While long-range views of the site may be available from higher elevations throughout the site vicinity, dense vegetation obstructs most of these views. The Polo Grounds Well site is not visible from Highway 1, the closest designated scenic road and eligible State scenic highway. There are no designated scenic views or vistas in the immediate vicinity of the site.

3.13.4 Regulatory Framework

State of California

California Scenic Highway Program

In 1963, the California legislature established the Scenic Highway Program to preserve and protect scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to highways. The state laws governing the Scenic Highway Program are found in the Streets and Highways Code Sections 260 et seq. Relevant aspects of this program are described below.

A scenic corridor includes the land adjacent to and visible from the highway and is identified based on a motorist's line of vision. When the limit of visibility extends to the distant horizon, a reasonable boundary for the scenic corridor is selected. Jurisdictional boundaries of the nominating agency are also considered.

Official designation of a scenic corridor does not preclude development within the corridor, although the Scenic Highway Program seeks to encourage quality development that does not compromise the scenic value of the corridor. The agency with jurisdiction must adopt ordinances to preserve the scenic quality of the corridor or document that such regulations already exist in various portions of local codes.

There are no officially designated scenic highways in Santa Cruz County, although parts of Highway 1 and Highway 17 are eligible scenic highways (Caltrans, 2010). According to the Santa Cruz County General Plan and Local Coastal Program, Highway 1, from San Mateo County to Monterey County, is considered a scenic road (see the discussion of general plan policies, below).

Santa Cruz County Policies and Ordinances

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local (i.e. city and county) building and zoning ordinances. The proposed improvements evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Santa Cruz County building and zoning ordinances. This includes the 1994 Santa Cruz County General Plan. None of the proposed well sites are within the incorporated limits of the City of Capitola or the Local Coastal Zone, therefore, ordinances applicable to these areas do not apply, including the Santa Cruz County Local Coastal Program.



Looking northwest at existing irrigation well from Great Meadow



Looking northwest across Great Meadow towards existing irrigation well

SOURCE: ESA, 2009.

SqCWD Well Master Plan EIR . 205491

Figure 3.13-5
Polo Grounds Well Site - Views of the Project Site

However, although the SqCWD is not legally bound to the land use plans and policies of Santa Cruz County, designated scenic resources identified in the Santa Cruz County General Plan are discussed in this section with respect to the second significance criterion in Section 3.13.5, below, which indicates a project would have a significant effect on the environment if it were to “substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state or locally designated scenic highway.”

1994 Santa Cruz County General Plan

The Conservation and Open Space Element (Chapter 5.0) of the Santa Cruz County General Plan (Santa Cruz County, 1994) designates scenic highways within the county:

Policy 5.10.10: Designation of Scenic Roads. Highway 1 is listed amongst the roads and highways designated as a scenic road in the General Plan and Local Coastal Program.

3.13.5 Impacts and Mitigation Measures

Significance Criteria

In accordance with Appendix G of the CEQA Guidelines, a project would have a significant impact related to aesthetic quality if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state or locally designated scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would substantially and adversely affect day or nighttime views in the area.

Due to the nature of the proposed project, there would be no impacts related to the following criteria; therefore, no impact discussion is provided for these topics for the reasons described below:

Have a substantial adverse effect on a scenic vista or substantially damage scenic resources. There are no designated scenic views or vistas in the vicinity of the proposed well sites. Also, the proposed well sites are not within the designated scenic corridor of Highway 1, which is the closest roadway designated by the County as a scenic road and considered an eligible scenic highway by the State. Therefore, impacts on scenic vistas and scenic resources are not applicable to the proposed project and these criteria are not discussed further.

Approach to Analysis

Potential WMP impacts on the existing visual character of the proposed well sites and their surroundings were analyzed based on the visual character of the proposed well sites and the visual characteristics of other typical SqCWD wells and treatment facilities. Photographs, site visits, and

preliminary site plans (provided by the District) were used to determine whether WMP implementation would result in adverse impacts to visual quality.

Impact Summary

**TABLE 3.13-1
SUMMARY OF IMPACTS – AESTHETICS**

Impact	O'Neill Ranch Well Site	Cunnison Lane Well Site	Austrian Way Well Site	Granite Way– Aptos Village Well Site	Polo Grounds Well Site
Impact 3.13-1: Project construction activities could temporarily degrade the visual character of the sites and their surroundings.	PSM	PSM	PSM	PSM	PSM
Impact 3.13-2: The proposed wells and treatment facilities could result in permanent adverse impacts on the visual character of the sites and their surroundings.	PSM	PSM	PSM	PSM	PSM
Impact 3.13-3: Implementation of the proposed wells and treatment facilities would introduce new permanent sources of light and glare.	LS	LS	LS	LS	LS

LS = Less than Significant impact, no mitigation required

PSM = Potentially Significant impact, can be mitigated to less than significant

Impact Discussion

Impact 3.13-1: Project construction activities could temporarily degrade the visual character of the sites and their surroundings.

All Sites

Construction activities would include vegetation removal, grading and excavation, well drilling, and possibly concrete removal and would involve the on-site storage of construction materials and equipment. The duration of construction activities is estimated at approximately 12 months at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Polo Grounds Well sites, and one month at the Granite Way-Aptos Village Well site. Construction activities would not occur within scenic corridors, or within viewing distance of designated scenic routes or locally recognized visual landmarks, however, project construction would be visible from nearby roadways and public viewsheds. As a result, project construction activities could temporarily degrade the visual character of the proposed well sites and vicinities, a potentially significant impact. However, with implementation of **Mitigation Measure 3.13-1 (Maintain Clean and Orderly Construction Sites)**, which would require that the construction contractor(s) regularly maintain the sites to minimize unsightly equipment and construction debris, this impact would be reduced to a less-than-significant level.

Mitigation Measures

Measure 3.13-1: Maintain Clean and Orderly Construction Sites (applies to all sites).

As part of contractor specifications, the District shall require that construction contractor(s) maintain the project site in a clean and orderly fashion, including cleaning up the site at the end of each work day, removing trash and construction debris at regular intervals, stockpiling materials neatly, and organizing equipment and material storage areas. To the extent feasible, construction equipment and materials shall be stored away from public views. Equipment and materials shall be removed and the sites shall be regraded and revegetated to original conditions promptly following completion of construction activities.

Significance after Mitigation: Less than Significant.

Impact 3.13-2. The proposed wells and treatment facilities could result in permanent adverse impacts on the existing visual character of the sites and their surroundings.

Visible aboveground facilities at each site would include the pump and chemical building, and the various treatment components. The typical pump and chemical building would be an approximately 30-foot-long by 20-foot-wide single-story building constructed of split face concrete masonry block with a gable roof. The proposed treatment facilities at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Polo Grounds Well sites would include a chemical reaction vessel, iron and manganese removal filtration tanks, a backwash reservoir, and an emergency generator. The chemical reaction vessel would be contained within an approximately 30-foot-long by 10-foot diameter aboveground metal cylinder. The iron and manganese removal filters would be within four to six vertical tanks approximately 8 feet in diameter and 8 feet tall, or within one horizontal tank of comparable volume. The backwash reservoir would be approximately 30 feet long and 20 feet wide and would extend about 3 feet above the ground surface. Emergency generators, where proposed, would also have a small fuel storage tank. In addition, each well site would include a directional antenna, approximately 20 feet in height, to allow for remote operation via the radio-based SCADA system. All aboveground components would be fenced off with security fencing topped with barbed wire and equipped with security lighting, in compliance with Department of Homeland Security requirements. Typically, fencing would be obscured with slats and landscaping.

Implementation of the proposed well and treatment facilities would permanently alter the visual character of each site. While no visual simulations are provided as part of this EIR, representative views of an existing SqCWD facility that would be similar to those proposed under the WMP are provided in **Figures 3.13-6** and **3.13-7**. However, as discussed in Chapter 2, Project Description, the actual facilities may differ slightly in design, materials, and colors to be more compatible with the surrounding land uses.

O'Neill Ranch Well Site

As previously described, this site is currently an undeveloped parcel covered by grass and dense vegetation. Proposed facilities on the O'Neill Ranch Well site include a pump and chemical building, treatment components, an emergency stationary generator, security fencing, and a



SOURCE: ESA, 2010.

SqCWD Well Master Plan EIR . 205491

Figure 3.13-6
Typical Well Site Facilities



SOURCE: ESA, 2010.

SqCWD Well Master Plan EIR . 205491

Figure 3.13-7
Typical Street Views

paved parking area. The height and scale of the aboveground improvements would be similar to those of the adjacent properties (retail/commercial developments to the south, and high-density residential to the east).

Construction of the proposed facilities at this site may also require removal of several oak trees. Although tree removal would not be readily discernible against the backdrop of dense vegetation, trees removed for the project would be replaced in accordance with Mitigation Measures 3.5-2a through 3.5-2d (see Section 3.5, Biological Resources).

The proposed facilities at the O'Neill Ranch Well site, particularly the aboveground components of the treatment plant, have the potential to detract from the visual context of the surrounding commercial and residential character. These permanent changes to the visual character of the site and vicinity would result in a potentially significant impact. However, with implementation of **Mitigation Measure 3.13-2a (Compatible Facility Design)**, which would require design measures to lessen the visual contrast between the proposed facilities and the immediate surroundings at the site, this impact would be reduced to a less-than-significant level.

Cunnison Lane Well Site

The Cunnison Lane Well site consists of an open landscaped area, surrounded by a wooden fence with dense vegetation along the western portion of the site. Aboveground structures at the Cunnison Lane Well site would include a pump and chemical building, treatment components, an emergency stationary generator, security fencing, and a paved parking area. These structures would be visually disruptive to the residential character of the surroundings, a potentially significant impact. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.13-2a (Compatible Facility Design)**.

Austrian Way Well Site

The Austrian Way Well site is located in a residential neighborhood and bordered by the natural backdrop of the Forest of Nisene Marks State Park. Proposed infrastructure improvements at the Austrian Way Well site would include a pump and chemical building, treatment components, emergency stationary generator, and security fencing. Although the scenic character of the site has already been altered by the existing water storage tank, the aboveground components of the proposed well and treatment plant would degrade the visual character of the site as seen from private residences located approximately 50 feet to the west, a potentially significant impact. However, implementation of **Mitigation Measure 3.13-2a (Compatible Facility Design)** would reduce this permanent impact to a less-than-significant level.

Granite Way–Aptos Village Well Site

The Granite Way–Aptos Village Well site is currently undeveloped, with remnant pieces of concrete from previous development, gravel roads, and ruderal vegetation. The site is located within the Aptos Village Plan project area. The adopted Aptos Village Plan (Santa Cruz County Planning Department, 2010) contains a framework to guide land use, circulation, and design elements of redevelopment within the plan area. The Aptos Village Plan identifies design goals and objectives to ensure that all structures within the plan area contribute to its cohesive and identifiable character.

The site would be located within the 15-acre Village Core Area that includes mixed use development, open space areas, a new east-west street, and a pedestrian-friendly environment. The Aptos Village Plan provides guidelines for design elements, including signage, sign lighting, street lighting, cohesive landscape design, and architectural design within the plan area.

Because no treatment facilities would be constructed at this site, the only aboveground structures that would be constructed as part of the WMP are the well and pump building and security fencing. These structures have the potential to degrade the visual character of the Aptos Village Plan project, which would be a potentially significant impact. However, implementation of **Mitigation Measures 3.13-2a (Compatible Facility Design)** and **3.13-2b (Aptos Village Design Elements)** would ensure that these structures would be designed to be compatible with the surrounding area and the design elements of the Aptos Village Plan. With implementation of these measures, the permanent impacts to visual character at this site would be reduced to a less-than-significant level.

Polo Grounds Well Site

The Polo Grounds Well site, located inside of the Polo Grounds Regional Park, consists of the existing irrigation well and adjacent areas, on the “great meadow,” a large grassy area in the park’s eastern side. Because the Polo Grounds Well is an existing irrigation well that would be converted to a municipal production well, the only new aboveground structures would be the treatment plant, a backup generator, a chemical and control building, and security fencing. While the existing irrigation well, blue tanks, and fencing detract somewhat from the surrounding natural characteristics of the area, the addition of the treatment facility on the site has the potential to negatively impact the visual character of the site, particularly because it is within a public recreation space. This impact would be potentially significant. However, this impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 3.13-2a (Compatible Facility Design)**.

Mitigation Measures

Measure 3.13-2a: Compatible Facility Design (applies to all sites). The SqCWD shall consider the existing visual character of the site and surrounding area in the design of new permanent, aboveground facilities. As appropriate, the SqCWD shall implement the following design elements to ensure the aboveground facilities are compatible with the surrounding areas:

- Fencing materials shall be constructed in color and texture similar to the surrounding environment and screen project facilities from public views to the extent feasible. Fencing materials and gates shall include coated or screened chain-link fencing with security slats.
- The SqCWD shall plant trees, shrubs, and other ornamental landscaping around the proposed facilities to screen the facilities from both public and private views and improve the visual quality of the site. As part of this design measure, the SqCWD shall consult with a licensed landscape architect to determine the appropriate types of trees, shrubs, and grasses that would be planted. All landscaping must be designed in accordance with security standards (DoD, 2002) for maintenance of clear zones for intrusion detection.

Measure 3.13-2b: Aptos Village Design Elements (applies only to Granite Way-Aptos Village Well site). The proposed well and associated structures shall be constructed in accordance with the Aptos Village Plan guidelines for architectural design, lighting, and landscaping in the design of new permanent facilities, as appropriate and feasible, to ensure that the facility is compatible with the proposed redevelopment area.

Significance after Mitigation: Less than Significant.

Impact 3.13-3. Implementation of the proposed wells and treatment facilities would introduce new permanent sources of light and glare.

All Sites

The proposed well sites are located in fully or partially developed areas or areas that are planned for development. These surrounding areas have existing sources of light and glare associated with such developments. The closest sources of light include: street lighting along adjacent and nearby roadways; outdoor lighting at adjacent commercial facilities; residences; and recreational facilities; and light from vehicular traffic.

Implementation of the WMP would introduce minimal sources of night lighting and glare at each well site. Exterior security lighting would be on a motion-activated sensor to illuminate exterior door areas and general outdoor areas, following guidelines for security of water utilities. Lighting generated at each well site would be of similar or lesser intensity than that of the surrounding areas. For example, exterior lighting would be designed to shield light sources with side shield deflectors and visors that aim the light downward to illuminate the area around the fixture and minimize light spillage offsite. While the proposed improvements would generate an incremental increase in light generated on each site compared to existing conditions, the project would not create a substantial new source of light and glare that would adversely affect day or nighttime views in the area. Thus, potential impacts related to new permanent sources of light or glare would be less than significant, and no mitigation is necessary.

Mitigation: None required.

3.13.6 References – Aesthetics

California Department of Transportation (Caltrans), California Scenic Highway Program.
Available online: www.dot.ca.gov/hq/LandArch/scenic-highways/scenic_hwy.htm.
Accessed February 1, 2010.

County of Santa Cruz, *General Plan and Local Coastal Program Land Use Plan*, May 24, 1994.

Department of Defense (DoD), Minimum Antiterrorism Standards for Buildings, Unified Facilities Criteria UFC 4-010-01, 2002.

Santa Cruz County Planning Department, *Final Aptos Village Plan*, adopted February 23, 2010.

CHAPTER 4

Other CEQA Issues

Sections	Figures	Tables
4.1 Growth-Inducing Potential	4-1 Cumulative Projects	4-1 Cumulative Projects and Impacts in Santa Cruz County
4.2 Cumulative Impacts		4-2 Summary of Cumulative Impacts
4.3 Impacts Associated with Implementation of Improvement Measure HYD-2		
4.4 Significant and Unavoidable Impacts		
4.5 Significant Irreversible Environmental Changes		
4.6 References		

This chapter addresses the growth-inducement potential, cumulative impacts, significant environmental effects that cannot be avoided if the project is implemented, and significant irreversible environmental changes of the Soquel Creek Water District (SqCWD or District) Well Master Plan (WMP or proposed project).

4.1 Growth-Inducing Potential

4.1.1 CEQA Requirements

The California Environmental Quality Act (CEQA) Guidelines require that an environmental impact report (EIR) evaluate the growth-inducing impacts of a proposed action. A growth-inducing impact is defined as follows:

[T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.¹

¹ CEQA Guidelines Section 15126.2(d).

4.1.2 Supply Planning Context of the WMP

The purpose of the WMP, as discussed in Chapter 2, Project Description, is to (1) safeguard existing groundwater supplies by redistributing pumping away from coastal areas, thereby reducing the potential for seawater intrusion; (2) stabilize groundwater levels through system improvements that allow reductions in pumping duration at any given well; and (3) improve system redundancy and reliability. It is generally accepted that the Soquel-Aptos Groundwater Basin area, from which the SqCWD derives 100 percent of its water supplies, is experiencing overdraft conditions and cannot sustain increased groundwater production. For the estimated life of the WMP project (i.e., to approximately 2050), the WMP would improve the District's ability to manage the groundwater basin. While the WMP would improve the management of groundwater resources, it would not increase the availability of existing supplies or create a new water supply.

As discussed in Section 2.2.5, Groundwater Management, the District has developed and implemented several water conservation and demand offset programs, which have thus far been successful in reducing water demand and have prevented new development from exacerbating groundwater overdraft conditions.² For example, the District's water demand offset policy, effective since 2003, requires all new development to retrofit existing plumbing fixtures to achieve a savings equal to 120 percent of the proposed new water demand as a condition of receiving service from the District. The District's standard "will serve" letter is not only conditioned by the requirement to comply with the water demand offset policy but also does not make any guarantee of service should the District determine that there is insufficient sustainable water supply.

As described in Section 2.2.5, Groundwater Management, it is the District's policy to limit groundwater pumping to no more than 4,800 ac-ft/y in order to maintain the pumping goal established for the District in the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area* (SqCWD and CWD, 2007). The pumping goal is based on an estimation of the long-term sustainable yield³ of the Soquel-Aptos Groundwater Basin. In recognition of the limitations of the groundwater basin, the SqCWD has adopted the 2006 Integrated Resources Plan, which calls for securing a supplemental source of supply for use in conjunction with its groundwater resources. The supplemental supply would have two purposes: (1) a portion of the new supply would be used to meet the demands of projected growth in the SqCWD service area until buildout (estimated to occur in 2050); and (2) a portion could be used to increase groundwater levels through in-lieu recharge, thereby correcting the existing overdraft problem. SqCWD is actively pursuing these supplemental supply options, specifically the SCWD² Seawater Reverse Osmosis Cooperative Desalination Program with the Santa Cruz Water Department (SCWD), to meet the projected future demand in the SqCWD service area. If the regional desalination project progresses as planned, the SqCWD will have secured access to a minimum of 1,158 ac-ft/yr of

² Current production is approximately 4,830 acre-feet per year (ac-ft/yr) based on the average for water years 2005 to 2008. This is a 540 ac-ft/yr reduction from the average of 5,270 ac-ft/yr for water years 2001 to 2005.

³ Sustainable yield refers to the amount of groundwater that can be pumped from an aquifer on a long-term basis without negative impacts to groundwater quantity or quality, and without creating an undesired effect such as subsidence or reduced baseflow in nearby streams.

supplemental supplies by 2015. (The growth-inducement potential of this supplemental supply will be evaluated in the project-level EIR for the regional desalination project.) Implementation of the WMP would not affect or reduce the need for the District's current demand management programs, reduce the need for a supplemental supply to both address the existing overdraft problem and meet the demands of projected growth, or reduce the District's efforts in pursuit of a supplemental supply.

4.1.3 Conclusion: Growth Inducement Potential of the WMP

The proposed WMP would not directly induce growth, as it would not involve the development of new housing to attract additional population, nor would it indirectly induce growth by establishing substantial permanent or even short-term construction employment opportunities; construction workers for the proposed project are expected to be drawn from the local labor pool. Finally, because the WMP also would not increase the quantity of water supply available to meet additional demands, it would not indirectly induce growth by removing insufficient water supply as an obstacle to growth. Therefore, the project would not be growth inducing by the CEQA definition.

4.2 Cumulative Impacts

4.2.1 CEQA Analysis Requirements

Cumulative impacts, as defined in Section 15355 of the CEQA Guidelines, refer to the residual effects of two or more individual projects that, when taken together, are "considerable" or that compound or increase other environmental impacts. A cumulative impact is the change in the environment that would result from the incremental impact of a project when added to those of other closely related past, present, or reasonably foreseeable future projects. Pertinent guidance for cumulative impact analysis is provided in Section 15130 of the CEQA Guidelines:

- An EIR shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (e.g., the incremental effects of an individual project are considerable when viewed in connection with the effects of past, current, and probable future projects, including those outside the control of the agency, if necessary).
- An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR.
- A project's contribution is less than cumulatively considerable, and thus not significant, if the project is required to implement or fund its fair share of a mitigation measure or implement measures designed to alleviate the cumulative impact.
- The discussion of impact severity and likelihood of occurrence need not be as detailed as for effects attributable to the project alone.
- The focus of analysis should be on the cumulative impact to which the identified other projects contribute, rather than on attributes of the other projects that do not contribute to the cumulative impact.

4.2.2 Approach to Cumulative Impact Analysis

In accordance with Section 15130(b)(1) of the CEQA Guidelines, the cumulative impact analysis presented below is based on a list of past, present, and reasonably foreseeable future projects producing related cumulative effects. The analysis considers the following factors:

- *Similar Environmental Effects.* The effects of relevant projects on a particular resource must be similar to those of the proposed project.
- *Geographic Scope.* Relevant projects are located within the defined geographic scope for the cumulative effect.
- *Timing and Duration of Implementation.* Effects associated with activities for a relevant project (e.g., short-term construction or demolition, or long-term operations) would likely coincide in timing with the effects of the proposed project.

The projects that were considered in the evaluation of cumulative impacts are listed in **Table 4-1** and their locations are shown in **Figure 4-1**. These cumulative projects were identified by the planning, community development, and public works/engineering departments of Santa Cruz County, the City of Santa Cruz, the City of Capitola, and SqCWD. Projects include residential, commercial, water supply, and capital improvement projects. The name of the applicant, the project name, a brief project description, the relevant cumulative impact topics, the estimated construction schedule, and the potentially affected well site(s) are provided.

Other Projects with Similar Environmental Effects

Projects that are relevant to the cumulative analysis are those that could contribute incremental effects on the same environmental resources and would have similar environmental impacts as those discussed in this EIR for the WMP. To determine if the WMP's impacts on a particular resource would be cumulatively considerable, the residual effects of the WMP *after* implementation of the mitigation measures prescribed in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures, are considered in combination with the effects of other past, present, and reasonably foreseeable future projects.

Geographic Scope

The geographic scope of cumulative impacts is dependent upon the resource topic affected and is identified at the beginning of each cumulative impact discussion. In general, the geographic scope includes the areas adjacent to the proposed well sites. However, for some resource topics, the geographic scope can extend farther; for example, to the Soquel Creek and Aptos Creek watersheds, the regional roadway network, or the regional air basin.

**TABLE 4-1
CUMULATIVE PROJECTS IN THE WMP AREA**

ID	Project Applicant	Project Name	Project Location	Project Description	Relevant Cumulative Impact Topics	Construction Schedule	Nearest Proposed Well Site(s)
CP-1	Aspromonte Inns LLC	Apromonte Inn	1255 41st Avenue, Capitola	1255 41st Avenue, Capitola. Design phase. 82-unit, 3-story hotel with associated facilities.	Traffic, Noise	2010	O'Neill Ranch
CP-2 ^a	City of Capitola Public Works Department	Pavement Management Program	Various	Pavement rehabilitation efforts throughout the City.	Traffic	Completed in 2010	O'Neill Ranch
CP-3	<i>City of Capitola Public Works Department</i>	Capitola Road Traffic Calming Improvements	Capitola Road, between 45 th Avenue and 41 st Avenue.	Traffic calming improvements between, including new crosswalks at 42nd Avenue.	Traffic	Completed in 2008	O'Neill Ranch
CP-4	<i>City of Capitola Public Works Department</i>	Clares Street Traffic Calming Improvements	Clares Street from 41st Avenue to Wharf Road	Traffic calming and pedestrian improvements along Clares Street from 41st Avenue to Wharf Road to be completed in conjunction with the Rispin project. Project includes pedestrian crossings at 42nd Avenue and 46th Avenue.	Traffic	Completed in 2009	O'Neill Ranch
CP-5	<i>City of Capitola Public Works Department</i>	Jewel Box Traffic Calming Improvements	Crystal Street South to Topaz Street, between 45th Avenue and 49th Avenue	Consideration of various traffic diverting methods to reduce the level of cut through traffic on the Jewel Box streets.	Traffic	Unknown	O'Neill Ranch
CP-6 ^a	<i>City of Capitola Public Works Department</i>	<i>Annual Cape Seal Projects</i>	<i>Various</i>	<i>Each year the city of Capitola selects a subset of their streets to undergo cape sealing. This is an ongoing project.</i>	<i>Traffic</i>	<i>Throughout each year on various city streets</i>	<i>O'Neill Ranch, Cunnison Lane</i>
CP-7	Barry Swenson Builders	The Rispin Mansion	2200 Wharf Road, Capitola	Rebuild boutique hotel at the location of the former Rispin Mansion.	Traffic, Noise	Unknown	O'Neill Ranch
CP-8	Santa Cruz County Redevelopment Agency	East Cliff Drive Bluff Stabilization	East Cliff Drive from 33rd Avenue to 36th Avenue	Cliff stabilization, construct new bike and pedestrian paths, drainage improvements, and relocation of AT&T telephone lines.	Traffic, Noise, Utilities	Summer 2010	O'Neill Ranch
CP-9	Santa Cruz County Sanitation District	Aptos Transmission Line Relocation	McGregor Drive from State Park to Park Avenue	Sanitary sewer relocation.	Traffic, Noise, Utilities	Construction began Spring 2010	Granite Way-Aptos Village
CP-10	Santa Cruz County Sanitation District	North Polo Drive Sewer Main Extension	Polo Drive to North Polo Drive	Extension of sanitary sewer main.	Water Quality, Noise, Traffic	Spring 2010	Polo Grounds
CP-11	Santa Cruz County Sanitation District	Polo Drive Sewer Main Replacement	Polo Drive	Replace sanitary sewer main.	Water Quality, Noise, Traffic	Spring 2009 – Summer 2009	Polo Grounds
CP-12	Santa Cruz County Sanitation District	Aptos Village Sewer Replacement	Aptos Village Commercial Center: Aptos Creek Drive, Trout Gulch Road, Soquel Drive, Granite Way	Replacement of sanitary sewer mains in the Aptos Village Plan project area.	Water Quality, Noise, Traffic	On Hold	Granite Way-Aptos Village

TABLE 4-1 (Continued)
CUMULATIVE PROJECTS IN THE WMP AREA

ID	Project Applicant	Project Name	Project Location	Project Description	Relevant Cumulative Impact Topics	Construction Schedule	Nearest Proposed Well Site(s)
CP-13	Santa Cruz County Sanitation District	Valencia Creek – Pump Station and Sewer Relocation	Carrera Court to Aptos Beach Drive and Soquel Avenue	Relocation of sanitary sewer pump station from Carrera Court to Aptos Beach Drive and Soquel Avenue from Valencia Creek crossing to Spreckels Drive.	Traffic, Hydrology, Noise, Air Quality, Utilities	Fall 2009	Granite Way-Aptos Village
CP-14	Santa Cruz County Sanitation District	Noble Gulch Sanitary Sewer Relocation	Monterey Avenue and Rosedale Avenue	Relocation of sanitary sewer mains to be located on portions of Monterey Avenue and Rosedale Avenue.	Traffic, Hydrology, Noise, Air Quality, Utilities	Fall 2009	O'Neill Ranch, Cunnison Lane
CP-15	Santa Cruz County Department of Public Works	Shulties Road Drainage Repairs	Shulties Road at PM 1.14	Repairs to a 120 lineal foot road slipout. Project included slope stabilization, road drainage facilities, and erosion control measures.	Traffic, Hydrology, Noise, Air Quality, Utilities	Summer 2009	Polo Grounds
CP-16	Santa Cruz County Department of Public Works	Aptos Esplanade Area Drainage Improvements	Winfield Way from Treasure Island to Aptos Creek	Road drainage improvements: a. Winfield Way – Treasure Island to Aptos Creek b. Aptos Beach Drive – Treasure Island to 300 ft+/- east of Spreckles Drive c. Esplanade – Aptos Beach to Aptos Creek d. Rio Del Mar – Aptos Beach Drive to 1,000 ft+/- easterly	Traffic, Hydrology, Noise, Air Quality, Utilities	Unknown	Granite Way-Aptos Village
CP-17	Santa Cruz County Department of Public Works	Harper Street Drainage Improvements	Harper Street	Road drainage improvements.	Traffic, Hydrology, Noise, Air Quality, Utilities	Fall 2009 – Spring 2010	O'Neill Ranch
CP-18	Santa Cruz County Department of Public Works	38th Avenue and Floral Avenue to Bluff Cliff Drainage Improvements	38th Avenue and Floral Avenue to Bluff Cliff	Road drainage improvements.	Traffic, Hydrology, Noise, Air Quality, Utilities	Summer 2010	O'Neill Ranch
CP-19	First Community Housing Construction	Silvercrest Apartments	750 Bay Avenue, Capitola	Rehabilitation of apartments that increased total units from 96 units to 109 units.	Traffic, Noise	December 2008	O'Neill Ranch, Cunnison Lane
CP-20	Mark DeMattei	1911 42 nd Avenue Residential Development	1911 42nd Avenue, Capitola	12-unit residential planned development.	Traffic, Noise	Unknown	O'Neill Ranch
CP-21	Whole Foods Market	Whole Foods Market	1710 41st Avenue, Capitola	Whole Foods Market	Traffic, Noise	Completed in July 2009	O'Neill Ranch
CP-22	<i>Village of Aptos</i>	<i>Aptos Village Plan</i>	<i>Aptos Creek Drive, Trout Gulch Road, Soquel Drive, Granite Way, Aptos</i>	<i>Mixed-use commercial and residential development with community open space. Includes a new east-west street, rezoning and design elements.</i>	<i>Traffic, Noise, Land Use</i>	<i>Construction to occur in phases 2011 – 2021</i>	<i>Granite Way-Aptos Village</i>

TABLE 4-1 (Continued)
CUMULATIVE PROJECTS IN THE WMP AREA

ID	Project Applicant	Project Name	Project Location	Project Description	Relevant Cumulative Impact Topics	Construction Schedule	Nearest Proposed Well Site(s)
CP-23	SqCWD	Aptos Pump Station	9033 Soquel Drive, Aptos	Construction of new pump station and pipelines.	Traffic, Noise	2010 – 2011	Granite Way-Aptos Village
CP-24	SqCWD	Cathedral Area Main Replacement	Upper Cathedral Drive, Aptos	Replacement of approximately 3,200 feet of water pipeline.	Traffic, Noise, Air Quality, Utilities	Construction completed in 2010	Austrian Way, Granite Way-Aptos Village
CP-25	SqCWD	Depot Hill Area Main Replacement	Depot Hill Area in Capitola	Approximately 3,000 lineal feet of water main replacement.	Traffic, Noise, Air Quality, Utilities	Summer 2010	O'Neill Ranch, Cunnison Lane
CP-26	SqCWD	Townsend Drive Main Replacement	Rio Del Mar Cliffs Area in Aptos	Replacement of approximately 6,400 feet of water main.	Traffic, Noise, Air Quality, Utilities	Fall 2010	Granite Way-Aptos Village
CP-27	SqCWD	Moosehead Drive and Winfield Way Main Replacement	Moosehead Drive and Winfield Way, Aptos	Replacement of approximately 2,700 feet of water main.	Traffic, Noise, Air Quality, Utilities	Summer 2010	Granite Way-Aptos Village
CP-28	SqCWD	Oakhill Drive and Poplar Street Main Replacement	Oakhill Drive and Poplar Street, Aptos	Replacement of approximately 3,200 feet of water main.	Traffic, Noise, Air Quality, Utilities	Summer 2011	Austrian Way, Granite Way-Aptos Village
CP-29	SqCWD	Quail Run Tank Transmission Main	Quail Run Road and Trout Gulch Road, Aptos	Construction of 850 lineal feet of new water main.	Traffic, Noise, Air Quality, Utilities	Spring 2012	Granite Way – Aptos Village
CP-30	SqCWD	Aptos Village Improvements Under Railroad Line	Soquel Drive and Trout Gulch Road, Aptos Village	Installation of 100 feet of water pipeline under Union Pacific Railroad Tracks using jack-and-bore methods.	Traffic, Noise, Air Quality, Utilities	Fall 2011	Granite Way-Aptos Village
CP-31	SqCWD	9000 Block Soquel Drive Main Replacement	Soquel Drive between Aptos Village and Rio Del Mar Boulevard.	Replacement of approximately 1,200 feet of water main.	Traffic, Noise, Air Quality, Utilities	Spring 2011	Granite Way – Aptos Village, Polo Grounds
CP-32	SqCWD	Quail Run Buried Concrete Tank Construction	Quail Run Road and Hawks Peak Road, Aptos	Construction of new concrete water storage tank.	Traffic, Noise, Air Quality, Utilities	Summer 2011	Granite Way – Aptos Village
CP-33	SqCWD	McGregor Drive Pump Station	McGregor Drive, Capitola	Construction of new pump station and pipelines.	Traffic, Noise	2010 – 2011	Cunnison Lane
CP-34	SqCWD	Soquel Drive Cast Iron Main Replacement	Soquel Drive, between Daubenbiss Avenue and Cabrillo College Drive, Soquel & Aptos	Investigation and replacement of defective and corroding 12-inch cast iron water main.	Traffic, Noise, Air Quality, Utilities	2010 – 2011	O'Neil Ranch, Cunnison Lane
CP-35	SqCWD	Water Main Improvements from Soquel Drive at Daubenbiss Avenue	Daubenbiss Avenue and West Walnut Street	Transmission water main upgrades. Installation of 12-inch water main from Soquel Drive on Daubenbiss Avenue and West Walnut Street to Porter Street.	Traffic, Noise, Air Quality, Utilities	2013 – 2014	O'Neil Ranch

TABLE 4-1 (Continued)
CUMULATIVE PROJECTS IN THE WMP AREA

ID	Project Applicant	Project Name	Project Location	Project Description	Relevant Cumulative Impact Topics	Construction Schedule	Nearest Proposed Well Site(s)
CP-36	SqCWD	La Selva Beach Main Replacement Phase IV	La Selva Beach Area	Replacement of miscellaneous undersized steel pipe in various areas of La Selva including along Anita Drive, Margarita Drive, Arbolado Drive, and El Pinar Drive.	Traffic, Noise, Air Quality, Utilities	2013 – 2014	Polo Grounds
CP-37	SqCWD	Huntington Court Main Replacement	Huntington Court, Rio Del Mar	Replacement of undersized steel pipe.	Traffic, Noise, Air Quality, Utilities	2013 – 2014	Polo Grounds
CP-38	SqCWD	Capitola Beach to Depot Hill Main Extension	El Camino Medio to Cliff Drive, Capitola	Replacement of undersized steel main on beach bluff.	Traffic, Noise, Air Quality, Utilities	2010 – 2011	O'Neill Ranch, Cunnison Lane
CP-39	SqCWD	Steel Saddle Replacement Project, Phase I, II, & III	District wide	Replacement of old steel water service saddles at various locations within district.	Traffic, Noise, Air Quality, Utilities	Begin construction fiscal year 2010/11 and finish 2012/13	Polo Ground, Austrian Way
CP-40	CalTrans & Santa Cruz Regional Transportation Commission	Highway 1 HOV Lane Project	Morrissey Boulevard in Santa Cruz to Larkin Valley/San Andreas Road in Aptos	Addition of a High Occupancy Vehicle (HOV) lane in each direction to alleviate traffic congestion.	Traffic, Noise, Air Quality, Utilities, Biology, Hydrology	2014 – 2017	O'Neill Ranch, Cunnison Lane, Granite Way-Aptos Village
CP-41	City of Santa Cruz Water Department (SCWD) and Soquel Creek Water District (SqCWD)	SCWD ² Regional Desalination Project	Santa Cruz	Construction of a regional desalination plant to provide needed water supply during droughts, protect groundwater aquifers, and improve water supply reliability for SCWD and SqCWD water users. New pipelines would be constructed to convey desalinated water supplies to SqCWD's distribution system.	Groundwater, Hydrology	Estimated completion in 2015	O'Neill Ranch
CP-42	SCWD	Beltz Well #12	Research Park Drive & Cory Street, Soquel	Construction of a new municipal production well to augment drought year supplies.	Groundwater, Hydrology	2012	O'Neill Ranch
CP-43	SCWD	Beltz Well #11	Auto Plaza Drive, Soquel	Construction of a new municipal production well to augment drought year supplies.	Groundwater, Hydrology	2012	O'Neill Ranch

NOTES:

^a Project has various locations and is not shown on Figure 4-1.

KEY: Projects that are italicized have construction schedules that could overlap with construction of the WMP components; Projects in grey are located within ½ mile of a proposed well site.

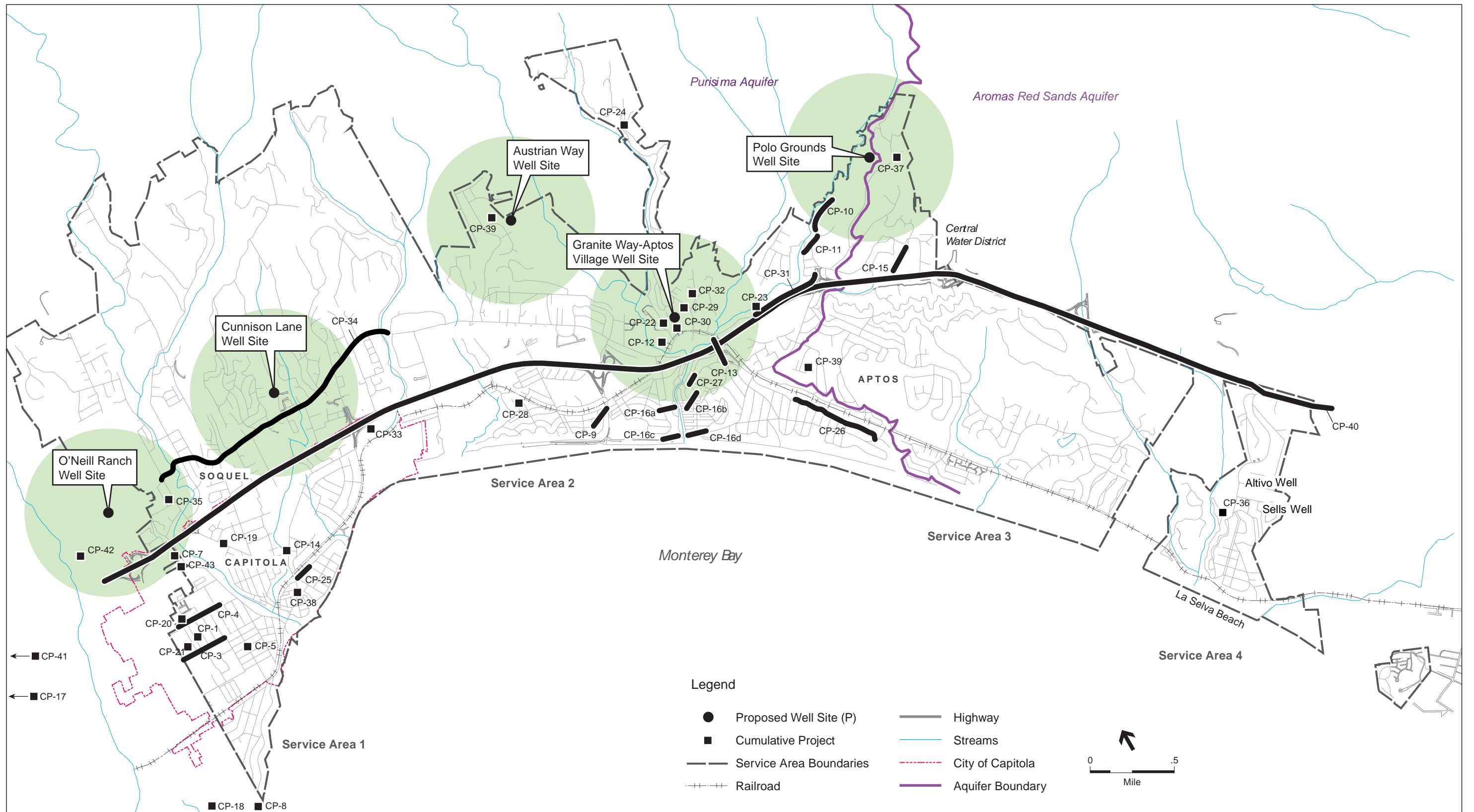
SOURCES: County of Santa Cruz, EIS/EIR East Cliff Drive Bluff Protection and Parkway, May 2006.

<http://www.sccoplanning.com/pdf/env/eirecliffseawallbackup/default.htm>, accessed December 3, 2008.Department of Transportation District 5, Highway 1 and 17 Interchange Project, http://www.dot.ca.gov/dist05/projects/scr_1_17/, accessed December 4, 2008.City of Capitola, Public Works Department, <http://www.ci.capitola.ca.us/capcity.nsf/PubWProj.html>, accessed December 4, 2008.City of Santa Cruz, Public Works Department, <http://www.ci.santa-cruz.ca.us/pw/>, accessed June 18, 2010.County of Santa Cruz, Public Works Department, <http://www.dpw.co.santa-cruz.ca.us/roaddesign.htm>, accessed December 4, 2008

City of Capitola Planning Department, Danielle U. Harriet personal communication, December 2008

SqCWD, Jeff Gailey personal communication, October 2009.

SCWD, Linette Almond P.E., Deputy Water Director/Engineering Manager, personal email communication with Laura Brown, General Manager of SqCWD, May 18, 2010.



SOURCE: SqCWD, 2006 and 2009; ESA, 2009

SqCWD Well Master Plan EIR.205491

Figure 4-1
Cumulative Projects

THIS PAGE INTENTIONALLY LEFT BLANK

Project Timing

Construction of the WMP would likely occur over a five-year period, with the construction of one new well per year. Assuming EIR certification in early 2011, all five wells could be online by 2015. Construction activities at the Granite Way-Aptos Village Well site would last approximately one month; at all other well sites the duration of construction activities is estimated to be approximately 12 months. 24-hour construction activities would be required for up to four days at sites where new wells are proposed during drilling and well installation. Pipeline installation is estimated to progress at 100 feet per day.

In addition to geographic scope, cumulative impacts are determined by timing of the other cumulative projects relative to the proposed project. Schedule is particularly important for construction-related impacts. For two or more projects to generate cumulative construction impacts, they would generally have overlapping or sequential construction schedules and be located in the same geographic area. However, construction of the future cumulative projects presented in Table 4-1 would not necessarily be concurrent with construction of the proposed well and treatment facilities since the implementation schedule of future projects are subject to change.

The projects in Table 4-1 that are shaded in grey are those located within ½-mile of a proposed well site and whose construction activities could contribute directly to physical environmental effects due to their proximity. Projects in *italics* are those with tentative construction schedules that could potentially overlap with construction activities associated with the proposed well sites. Therefore, direct cumulative construction impacts could result from those that are shaded and *italicized*, while indirect cumulative construction impacts in the project region could result from those that are just *italicized*. Cumulative impacts could also result during project operations if the effects of cumulative projects coincide in timing with the effects of the WMP.

4.2.3 Cumulative Impact Analysis

This section discusses potential cumulative impacts of the WMP by environmental resource topic, and describes the geographic scope of the impact, which can vary by topic. Each impact discussion assesses the potential for the WMP to contribute to significant cumulative impacts, when considered in combination with the effects of the cumulative projects listed in Table 4-1. Cumulative impacts of the WMP project are summarized in **Table 4-2**. Cumulative impact numbering begins with Impact 4-2 to correspond with the section numbering in Chapter 3.

Geology, Soils, and Seismicity

Impact 4-2: Cumulative impacts on geology, soils, and seismicity.

With the exception of land subsidence impacts, the geographic scope of potential cumulative geologic, soils, and seismic impacts encompasses the proposed well sites and immediate vicinities because these types of impacts are generally site-specific and depend on local conditions. As discussed in Section 3.2, Geology, Soils, and Seismicity, potential geologic impacts associated with implementation of the proposed project include slope instability and erosion of topsoil. These impacts would be site-specific and would not be additive with impacts of other projects.

**TABLE 4-2
SUMMARY OF CUMULATIVE IMPACTS**

Cumulative Impact	Significance Determination
Impact 4-2: Geology, Soils, and Seismicity	LS
Impact 4-3: Groundwater Resources	LS
Impact 4-4: Surface Water Hydrology and Water Quality	LS
Impact 4-5: Biological Resources	LS
Impact 4-6: Land Use Planning and Recreation	LS
Impact 4-7: Air Quality and Greenhouse Gases	LS
Impact 4-8: Noise and Vibration	LS
Impact 4-9: Traffic and Circulation	LS
Impact 4-10: Hazardous Materials	LS
Impact 4-11: Public Services and Utilities	LS
Impact 4-12: Cultural Resources	LS
Impact 4-13: Aesthetics	LS

NOTE: The significance determinations presented in this table assume implementation of all pertinent federal and state regulations and mitigation measures identified in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures.

LS = Less than Significant impact, no mitigation required

The geographic scope of potential land subsidence impacts is the Soquel-Aptos Groundwater Basin because these impacts are regional and cumulative in nature. Cumulative land subsidence impacts could occur if future pumping by the SqCWD under the WMP, in combination with future pumping by SCWD associated with the Beltz Well #12 and #11 projects (CP-42 and CP-43 on Figure 4-1), were to result in an increase in overall pumping from the basin and exacerbate groundwater overdraft conditions. As discussed in Impact 3.2-6, since implementation of the WMP would not exacerbate current groundwater overdraft conditions, no cumulative impacts associated with land subsidence would occur.

Therefore, the project's contribution to potential cumulative impacts related to geology, soils, and seismicity would not be cumulatively considerable (less than significant).

Mitigation Measures

None required.

Groundwater Resources

Impact 4-3: Cumulative impacts related to exacerbated groundwater overdraft conditions, and damage to or loss of yield at non-District wells.

The geographic scope of potential cumulative groundwater impacts encompasses the Soquel-Aptos Groundwater Basin, as well as an area of influence around each proposed well where groundwater elevations could be affected by localized pumping. Section 3.3, Groundwater Resources, discusses

the potential impacts on regional groundwater conditions and analyzes the potential for localized drawdown at non-District wells based on the proposed redistribution of pumping.

As discussed under Impact 3.3-1, implementation of the WMP would not lead to an increase in groundwater pumping. Further, because implementation the WMP would provide the SqCWD with the redundancy and flexibility needed to modify pumping in response to short-term and long-term hydrologic conditions, the WMP would have a beneficial impact on groundwater conditions in the Soquel-Aptos Groundwater Basin. Thus, no cumulative impacts associated with groundwater overdraft conditions would result. However, cumulative impacts associated with localized drawdown could occur if increased pumping by SqCWD in the O'Neill Ranch Well site vicinity were to coincide with increased pumping by the SCWD from Beltz Wells #12 and #11 in the same area (see CP-42 and CP-43 on Figure 4-1).

SCWD's Beltz Wells #12 and #11 projects are located approximately 1,500 feet southwest and 2,250 feet southeast of the proposed O'Neill Ranch Well, respectively. Future SqCWD pumping at the O'Neill Ranch Well during drought years, in combination with future SCWD pumping from Beltz Wells #12 and #11, could potentially result in cumulative impacts to private wells in the vicinity of the O'Neill Ranch Well by increasing drawdown effects such that the private wells are physically damaged or lose yield. The SCWD plans to pump a combined total of up to 1,290 ac-ft from the Beltz Wells #12 and #11 during the six-month peak season of drought years, compared to SqCWD's pumping of up to 369 ac-ft from the O'Neill Ranch Well during the same period. This increased drawdown resulting from the Beltz Wells #12 and #11 would exacerbate drawdown effects at private wells near the O'Neill Ranch Well. However, as described under Impact 3.3-2, implementation of Mitigation Measure 3.3-2a (Voluntary Monitoring and Mitigation Program for Private Wells) would require that the SqCWD monitor any adverse effects on private wells resulting from future District pumping in the vicinity of the O'Neill Ranch Well site, and take mitigatory actions if it is determined that District pumping causes a restrictive effect on participating private wells. With implementation of this mitigation, the WMP's contribution to this cumulative effect is less than cumulatively considerable (less than significant).

Mitigation Measures

No additional measures beyond those identified in Section 3.3, Groundwater Resources, are required.

Significance after Mitigation: Less than Significant.

Surface Water Hydrology and Water Quality

Impact 4-4: Cumulative impacts related to the degradation of water quality, alteration of drainage patterns, increased surface runoff, and flooding hazards.

The geographic scope of potential cumulative hydrology and water quality impacts encompasses the creeks and drainages adjacent to and downstream of the proposed well sites that could be

affected by project construction and operations. The creeks within the planning area (such as the Soquel, Aptos and Valencia Creeks) are described in Section 3.4, Surface Water Hydrology and Water Quality. The past, present, and future projects in Table 4-1 could result in adverse cumulative effects from construction-related soil erosion, increased sedimentation, and degradation of water quality in receiving waterbodies.

As described in Section 3.4, Surface Water Hydrology and Water Quality, project construction and earthmoving activities could result in increased soil erosion and sediment load in downstream water bodies, and result in the discharge of hazardous construction chemicals into site runoff, thereby adversely affecting surface water quality. Similarly, the past, present, and future projects in Table 4-1 could contribute to construction-related degradation of water quality, resulting in cumulative impacts. However, the project's contribution to cumulative surface water quality impacts from construction activities would be less than significant with mandatory adherence to the National Pollutant Discharge Elimination System (NPDES) General Construction Permit Requirements at the Polo Grounds Well site, as well as with implementation of Mitigation Measures 3.4-1a (Erosion Control Plan) and 3.4-1b (Construction Best Management Practices) at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites. Therefore, the project's residual contribution on surface water quality impacts due to construction would not be cumulatively considerable (less than significant).

Operation of the WMP project could require discharges of raw groundwater produced during periodic maintenance and well pump testing to the stormwater drainage system. These discharges could cause scouring and erosion along receiving creek banks and channels, adversely affecting surface water quality. Other projects listed in Table 4-1 that result in a substantial increase in impervious surfaces could also result in scouring and erosion along creek banks by increasing the volume and rate of stormwater runoff. However, with implementation of Mitigation Measure 3.4-2 (Coordinate Raw Groundwater Discharges with SCCDPW), the proposed project's residual contribution to erosion from water discharges would not be cumulatively considerable (less than significant).

As discussed under Impact 3.4-3, in general, groundwater pumping can deplete baseflow in streams by intercepting groundwater that would otherwise seep into the stream. Future pumping by the SqCWD in the vicinity of the O'Neill Ranch Well site could affect stream baseflow in Soquel Creek. The SCWD's Beltz Wells #12 and #11 projects (CP-42 and CP-43 on Figure 4-1), would also increase groundwater pumping in this area during drought periods. The SCWD plans to pump a combined total of up to 1,290 ac-ft from the Beltz Wells #12 and #11 during the six-month peak season of drought years, compared to SqCWD's pumping of up to 369 ac-ft from the O'Neill Ranch Well during the same period. The stream baseflow analysis conducted for the WMP indicated that increased groundwater pumping in the vicinity of the O'Neill Ranch Well could result in a 0.04- to 0.14-cubic-feet-per-second reduction in stream baseflow in Soquel Creek. Although this estimated depletion was determined to be less than significant, due to the designation of Soquel Creek as critical steelhead habitat, the SqCWD is committed to implementing Improvement Measure HYD-1 (Monitor Streamflow Along Soquel Creek and Modify Pumping if Baseflow Depletion is Detected). With implementation of this improvement

measure, the SqCWD's contribution to stream baseflow depletion in Soquel Creek during drought years would not be cumulatively considerable (less than significant). Since none of the projects in Table 4-1 would increase pumping near the Austrian Way Well, no cumulative stream baseflow impacts to Aptos Creek would occur.

Mitigation Measures

No additional measures beyond those identified in Section 3.3, Groundwater Resources, are required.

Significance after Mitigation: Less than Significant.

Biological Resources

Impact 4-5: Cumulative impacts to biological resources.

The geographic scope of potential biological resources impacts encompasses the jurisdictional waters, sensitive habitats, riparian habitat, and common habitat within the Soquel-Aptos area, and biologically linked areas in the Santa Cruz region. As discussed in Section 5.5, Biological Resources, construction of the WMP project would have the potential to affect the following species: Santa Cruz tarplant, California red-legged frog, foothill yellow-legged frog, southwestern pond turtle, dusky footed woodrat, and special-status bird and bat species. In addition, project construction activities at some well sites could require removal of or damage to oak and riparian trees. Cumulative impacts on sensitive biological resources could result from the construction impacts of the WMP in combination with the construction impacts of cumulative projects in the vicinity.

Implementation of Mitigation Measures 3.4-1a (Erosion Control Plan), 3.4-1b (Construction Best Management Practices), 3.4-2 (Coordinate Raw Groundwater Discharges with SCCDPW), 3.5-1a (Botanical Surveys for Santa Cruz Tarplant), 3.5-1b (Avoidance Measures for Santa Cruz Tarplant), 3.5-2a (Tree Survey), 3.5-2b (Protective Measures for Mature Trees), 3.5-2c (Tree Replacement), and 3.5-2d (Monitoring for Replacement Plantings), 3.5-4a (Biological Monitor and Biological Resources Education Program), 3.5-4b (Avoidance Measures for Special-Status Aquatic Species), 3.5-4c (Construction Monitoring), 3.5-5 (Protective Measures for Special-Status Birds), 3.5-6 (Bat Avoidance Measures), and 3.5-7 (Avoidance Measures for San Francisco Dusky-Footed Woodrat), as well as Improvement Measures HYD-1 (Monitor Streamflow along Soquel Creek and Modify Pumping if Stream Baseflow Depletion is Detected) and HYD-2 (Monitor Streamflow along Aptos Creek and Modify Pumping if Stream Baseflow Depletion is Detected) would ensure the WMP's contribution to cumulative construction effects on biological resources are less than cumulatively considerable (less than significant).

Mitigation Measures

No additional measures beyond those identified in Section 3.4, Surface Water Hydrology and Water Quality, and Section 3.5, Biological Resources, are required.

Significance after Mitigation: Less than Significant.

Land Use Planning and Recreation**Impact 4-6: Cumulative land use planning and recreation impacts.**

Potential conflicts with the land use goals, policies, and programs of affected jurisdictions are site-specific; therefore, this impact is not evaluated on a cumulative basis. With respect to potential cumulative recreation impacts, the geographic scope encompasses the proposed well sites and immediate vicinities.

As discussed in Impact 3.6-1, implementation of the WMP could result in impacts to established recreational uses and activities at the Polo Grounds Well site during construction. The North Polo Drive Sewer Main Extension project (CP-10) is also located in this vicinity but this cumulative project would not be expected to disrupt established recreational uses and activities because although North Polo Drive borders the Polo Grounds Regional Park, pipeline installations associated with this cumulative project would not be expected to directly interfere with the park facilities since North Polo Drive does not provide vehicular access to the park. In addition, with implementation of Mitigation Measure 3.6-1 (Construction Notification and Event Scheduling at Polo Grounds Regional Park), any contribution of the WMP to cumulative recreation impacts would not be cumulatively considerable (less than significant).

Mitigation Measures

No additional measures beyond those identified in Section 3.6, Land Use Planning and Recreation, and Section 3.9, Traffic and Circulation, are required.

Significance after Mitigation: Less than Significant.

Air Quality and Greenhouse Gases**Impact 4-7: Cumulative construction emissions of criteria pollutants and greenhouse gas emissions.**

Cumulative emissions from construction and operation of the project are discussed in Impact 3.7-3, in Section 3.7, Air Quality and Greenhouse Gases. As discussed, according to the Monterey Bay Unified Air Pollution Control District (MBUAPCD) *CEQA Air Quality Guidelines*, projects that are consistent with the Air Quality Management Plan (AQMP) would not result in cumulative

impacts related to ozone, as regional emissions have been factored into the AQMP. Therefore, the WMP project's contribution to cumulative ozone impacts would not be cumulatively considerable (less than significant).

The project's greenhouse gas (GHG) emissions would contribute to cumulative climate change effects (see Impact 3.7-4, Section 3.7, Air Quality and Greenhouse Gases). However, the project's GHG emissions were determined to be less than significant when compared to regional and statewide GHG emissions, as well as proposed California Air Resources Control Board significance thresholds for GHGs. Cumulative GHG emissions would not be more than under current SqCWD operations because there would not be an increase in overall pumping and new well pumps and motors would be expected to have greater energy efficiency. Therefore, the project's contribution to cumulative GHG emissions and associated climate change impacts would not be cumulatively considerable (less than significant).

Mitigation Measures

None required.

Noise and Vibration

Impact 4-8: Cumulative increases in construction noise in the project vicinity.

The geographic scope of potential cumulative noise impacts encompasses the project facility sites and their immediate vicinities, as well as areas adjacent to access and haul routes to the well sites.

The potential for cumulative noise increases during construction would be greatest at proposed well sites where cumulative projects are located in the immediate vicinity. Construction of the Granite Way-Aptos Village well site is estimated to occur in 2012 or later. As previously described, the future baseline conditions evaluated for the Granite Way-Aptos Village Well site in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures, considers future development under the Aptos Village Plan. Thus cumulative impacts associated with impacts to future land uses in this area are already addressed in the project-level analysis. However, the proposed SqCWD Aptos Pump Station project is also located in the vicinity of the Granite Way-Aptos Village Well site and could contribute to cumulative noise impacts during construction if the schedules of these two projects were to overlap. However, with implementation of Mitigation Measures 3.8-2a (Nighttime Noise Controls During Daytime Construction) and 3.8-2b (Construction Notification), the WMP's contribution to these impacts would not be cumulatively considerable (less than significant).

There are no other cumulative projects in the immediate vicinities of the other proposed well sites that would result in cumulative noise impacts.

Mitigation Measures

No additional measures beyond those identified in Section 3.8, Noise and Vibration, are required.

Significance after Mitigation: Less than Significant.

Traffic and Circulation

Impact 4-9: Cumulative traffic increases on local and regional roads.

The geographic scope of cumulative traffic impacts includes the local and regional roadways and highways that would be used for WMP construction activities and for access by construction workers and construction vehicles.

As discussed in Section 3.9, Traffic and Circulation, vehicle trips generated during operation and maintenance activities under the WMP would not have significant impacts on traffic, and therefore, the project's contribution to long-term cumulative traffic increases would not be cumulatively considerable. Construction of the WMP project is projected to begin in 2011 and end in 2015 or later. As indicated in Figure 4-1, few of the identified cumulative projects listed in Table 4-1 are located in close proximity to the proposed well sites. Roadway disruptions would be greatest during open trench portions of the pipeline construction. In addition, some of the projects likely would share some of the same construction access routes with the WMP. Consequently, cumulative traffic and roadway disruptions could occur. However, implementation of the mitigation measures described in Section 3.9, Traffic and Circulation, including Mitigation Measure 3.9-3b (Traffic Management Plan), would reduce the project's incremental contribution to cumulative traffic impacts to a less-than-significant level.

Mitigation Measures

No additional measures beyond those identified in Section 3.9, Traffic and Circulation, are required.

Significance after Mitigation: Less than Significant.

Hazardous Materials

Impact 4-10: Cumulative impacts related to hazards and exposure to or release of hazardous materials.

The geographic scope of potential cumulative hazards impacts encompasses the well site vicinities. These types of impacts are generally site specific and depend on past, present and future industrial uses and existing soil, sediment, and groundwater conditions.

During the excavation and grading phases of construction, the project has the potential to expose people or the environment to hazardous materials encountered in soil or groundwater; these materials may be present in subsurface materials due to spills and leaks in the site vicinity (most

commonly related to leaking underground fuel tanks). In addition, accidental spills of small quantities of hazardous materials used during construction (i.e., motor fuels, oils, solvents, lubricants) could also result in exposures. Similar types of effects could occur under other cumulative projects, and these projects also would need to comply with all applicable regulations and would conduct site-specific investigations for the presence of hazardous material and/or conditions. Due to the site-specific nature of identifying and evaluating hazardous materials and conditions, the potential impact of exposing people or the environment to hazards resulting from the WMP project in combination with the other projects would not be cumulatively considerable (less than significant).

Operation of the project would include the use, storage, and transport of hazardous materials such as sodium hypochlorite and diesel fuel. The cumulative projects listed in Table 4-1 do not appear to be industrial in nature or involve significant hazardous materials usage. As discussed above, the WMP and other cumulative projects must comply with laws and regulations regarding hazardous materials storage and stormwater protection. Implementation of applicable regulations, as well as mitigation measures described in Section 3.10, Hazards and Hazardous Materials, would ensure that the project's contribution to the cumulative impact of hazardous materials use would not be cumulatively considerable (less than significant).

WMP operation has the potential to affect groundwater remediation activities at a facility located near the Cunnison Lane Well site. Because no other cumulative projects would involve actions that could affect groundwater gradients and elevations in the vicinity of the Cunnison Lane Well site, there would be no cumulative impact related to disruption of remediation activities.

As discussed in Section 3.10, Hazards and Hazardous Materials, well sites are not located within high fire hazard areas and few cumulative projects have been identified within ½-mile of the WMP sites. Although construction of cumulative developments could result in a cumulative increase in wildland fire risk, compliance with fire prevention regulations related to the use of construction equipment in fire-prone areas would ensure that localized cumulative wildfire impacts as a result of the proposed project and other cumulative development would not be cumulatively considerable (less than significant).

Mitigation Measures

No additional measures beyond those identified in Section 3.10, Hazardous Materials, are required.

Significance after Mitigation: Less than Significant.

Utilities and Service Systems

Impact 4-11: Cumulative impacts related to public services, disruption of utility service, and increased energy use.

The geographic scope of potential cumulative utilities impacts encompasses the portions of the project area and its immediate vicinities that are within the service areas of regional service/utility providers.

Construction of the WMP project could disrupt existing utility services or require temporary or permanent relocation of utilities. Construction of other cumulative projects in the Soquel-Aptos area could also increase the potential for such utility impacts. However, these potential impacts would be site-specific rather than additive because of the localized nature of utilities and services within the specific construction sites and the limited extent of area served by those utilities or services. Implementation of utility identification, protection and notification measures prescribed in Section 3.11, Utilities and Service Systems, would reduce damage to and disruption of utilities attributable to the WMP. These measures, combined with the temporary nature of potential utility disruptions, would reduce the project's impact to less than significant. Therefore, the project's residual contribution to any cumulative impacts on utilities would not be cumulatively considerable (less than significant).

WMP implementation would result in potentially significant impact on landfill capacity, solid waste statutes and regulations, and wastewater treatment capacity. Even with cumulative increases in demand for each of these services as a result of other cumulative projects listed in Table 4-1, the project's contribution to this cumulative impact would be reduced through implementation of mitigation measures identified in Section 3.11, Utilities and Service Systems. Thus, the WMP's contribution to this impact would not be cumulatively considerable (less than significant).

Mitigation Measures

No additional measures beyond those identified in Section 3.11, Utilities and Service Systems, are required.

Significance after Mitigation: Less than Significant.

Cultural Resources

Impact 4-12: Cumulative increase in impacts on archaeological, paleontological, and historical resources.

The geographic scope of potential cumulative impacts on cultural resources encompasses the archaeological and architectural study areas of the WMP project facility sites and immediate vicinities.

As described in Section 3.12, Cultural Resources, there is a potential to encounter previously unidentified cultural resources, including archaeological and paleontological resources, during construction of the project; however, implementation of Mitigation Measures 3.12-1a (Accidental Discovery Measures, 3.12-1b (Archaeological Monitoring) and 3.12-2 (Paleontological Discovery Measures) described in Section 3.12 would reduce these potential impacts to less than significant. The potential to encounter cultural resources associated with the other cumulative projects listed in Table 4-1 is unknown, but does exist. However, since the WMP project's impacts on archaeological and paleontological resources would be site-specific and mitigated to a less-than-significant level with implementation of mitigation measures, the project's contribution to any such impacts would not be cumulatively considerable (less than significant).

Mitigation Measures

No additional measures beyond those identified in Section 3.12, Cultural Resources, are required.

Significance after Mitigation: Less than Significant.

Aesthetics

Impact 4-13: Cumulative impacts on visual character.

With respect to visual impacts, the geographic scope of potential cumulative impacts encompasses the project facility sites and immediate vicinities, as well as the viewsheds that could be affected by project implementation

Potential cumulative impacts on aesthetic resources could occur where cumulative projects would be located adjacent to or near project sites. Aesthetic-related impacts from project construction would only occur if construction activities occur during the same time period. The cumulative projects listed in Table 4-1 include a number of roadway projects and several small development projects located greater than ½-mile from well sites, and one major development (Aptos Village Plan) in the project vicinity that could substantially alter the visual character of the project area, particularly near the Granite Way-Aptos Village Well site. Although specific projects and schedules for this proposed development have not been identified, it is possible that construction activities could overlap at this site. Implementation of mitigation measures described in Section 3.13, Aesthetics, including maintaining clean and orderly construction sites, would ensure that potential cumulative aesthetic impacts associated with construction and grading activities from the WMP would be less than significant.

In general, the project's incremental contribution to impacts on the visual character in the vicinity of proposed well sites would be less than significant due to the limited size of these facilities and design features that would be incorporated to integrate facilities with the existing neighborhoods and landscapes. At the Granite Way-Aptos Village Well site, cumulative projects would have a

far greater impact on the visual character of the site vicinity than the proposed WMP project. At the Polo Grounds Well site, the proposed improvements would not substantially alter the existing character of the site because of the existing irrigation well and pump facility. In addition, the project would not obstruct views or introduce new sources of light and glare because all lighting would be motion-sensored. Therefore, the project's contribution to long-term changes in the visual character would not be cumulatively considerable (less than significant).

Mitigation Measures

No additional measures beyond those identified in Section 3.13, Aesthetics, are required.

Significance after Mitigation: Less than Significant.

4.3 Impacts Associated with Implementation of Improvement Measure HYD-2

This section identifies the potential effects associated with installation of the new stream gauge on Aptos Creek described in Improvement Measure HYD-2 (Monitor Streamflow along Aptos Creek and Modify Pumping if Baseflow Depletion is Detected) (see Impact 3.4-3 in Section 3.4, Surface Water Hydrology and Water Quality, and Impact 3.5-9 in Section 3.5, Biological Resources). Despite the fact that mitigation is not required for Impacts 3.4-3 and 3.5-9 (i.e., stream baseflow depletion effects were determined to be less than significant), the SqCWD is committed to implementing Improvement Measure HYD-2 to address public concerns regarding the potential for stream baseflow depletion from groundwater pumping in the Soquel-Aptos Groundwater Basin.⁴ Although not an official mitigation measure, Improvement Measure HYD-2 is similar to a mitigation measure in that it would be implemented to address the potential effects of the proposed project. CEQA Section 15126.4 states that “if a mitigation measure would cause one or more significant effects in addition to those that would be caused by the project as proposed, the effects of the mitigation measure shall be discussed but in less detail than the significant effects of the project as proposed.” To ensure proper coverage under CEQA, the potential effects of stream gauge installation associated with implementation of Improvement Measure HYD-2 are discussed below.

The SqCWD would select a suitable site along Aptos Creek downstream of the area of potential effect⁵ and construct a stream gauge house on the creek bank to hold the equipment, typically a

⁴ Per CEQA Guidelines Section 15306, if a new stream gauge were installed as an independent project for the purposes of basic data collection, experimental management, and resource evaluation activities which would not result in a serious or major disturbance to an environmental resource, the project would qualify for a Class 6 Categorical Exemption.

⁵ For the purposes of this improvement measure, the area of potential effect is conservatively defined as an approximately 8,000-foot reach of Aptos Creek in the vicinity of the proposed Austrian Way Well.

stilling well⁶ or a bubble system,⁷ that measures and records the height of the water surface (gauge height or stage). Subsurface piping would be installed through the creek bank to Aptos Creek to detect changes in creek levels. An outside reference gauge, typically a vertical graduated ruler called a staff gauge, would also be installed in the creek bed to verify that the recorded gauge heights in the measuring apparatus are the same as the water levels in the stream. Unless a bridge is located nearby, a current meter would be hung on a cable over the creek to measure the velocity of water flowing in the creek. Construction activities associated with installation of the stream gauge could require permits or regulatory approvals from the U.S. Army Corps of Engineers (Corps), California Department of Fish and Game (CDFG), Regional Water Quality Control Board (RWQCB), and U.S. Fish and Wildlife Service (USFWS). The SqCWD would consult with regulatory agencies to determine the appropriate seasonal conditions for stream gauge installation such that potential impacts to steelhead and other aquatic life are minimized.

The SqCWD would install the new stream gauge on Aptos Creek to monitor potential stream baseflow effects from future pumping in the vicinity of the proposed Austrian Way Well. There is not an existing stream gauge on Aptos Creek that would be appropriate for this purpose. Although the intent of Improvement Measure HYD-2 and installation of the stream gauge is to protect biological resources (i.e. critical steelhead habitat) by analyzing groundwater and stream flow monitoring data, and modifying pumping if baseflow depletion along Aptos Creek from pumping at the Austrian Way Well is detected, construction activities associated with installation of the stream gauge could have short-term but potentially significant impacts on environmental resources.

For example, installation of a stream gauge on Aptos Creek could result in temporary, construction-related impacts on water quality from erosion and hazardous construction materials, biological resources and aquatic habitat, and sensitive noise receptors if any are located nearby. However, implementation of the following project mitigation measures would generally reduce these impacts to *less than significant*.

- **Mitigation Measure 3.4-1a:** Erosion Control Plan (see Section 3.4, Surface Water Hydrology and Water Quality, for description).
- **Mitigation Measure 3.4-1b:** Construction Best Management Practices (see Section 3.4, Surface Water Hydrology and Water Quality, for description).
- **Mitigation Measure 3.5-2a:** Tree Survey (See Section 3.5, Biological Resources, for description).
- **Mitigation Measure 3.5-2b:** Protective Measures for Mature Trees (see Section 3.5, Biological Resources, for description).

⁶ Stilling wells are used when the gauge house can be built immediately adjacent to the stream or river. The well is connected to the stream with pipes so that when the water level in the stream changes, the water level in the well also changes.

⁷ Bubble systems have a long-ended pipe that extends from the gauge house to the river and uses pressurized gas to measure water depth. Bubble systems are used when it is not feasible to construct a gauge house immediately adjacent to the stream or river.

- **Mitigation Measure 3.5-2c:** Tree Replacement (see Section 3.5, Biological Resources, for description).
- **Mitigation Measure 3.5-4b:** Avoidance Measures for Special-Status Aquatic Species (see Section 3.5, Biological Resources, for description).
- **Mitigation Measure 3.5-4c:** Construction Monitoring (see Section 3.5, Biological Resources, for description).
- **Mitigation Measure 3.8-2b:** Construction Notification (see Section 3.8, Noise and Vibration, for description).

These measures, as well as any conditions of permit approval deemed necessary by regulatory agencies, would avoid or mitigate potential temporary, construction-related impacts on water quality, biological resources and aquatic habitat, and sensitive noise receptors. Operation of the stream gauge is a passive activity and, as such, would not result in any adverse environmental impacts.

4.4 Significant and Unavoidable Impacts

In accordance with Section 21067 of CEQA, and with Sections 15126(b) and 15126.2(b) of the CEQA Guidelines, the purpose of this section is to identify project-related environmental impacts that could not be eliminated or reduced to a less-than-significant level with implementation of all identified mitigation measures. The findings in this section are subject to final determination by the SqCWD as part of its certification of this EIR.

With the exception of the significant and unavoidable impacts described below, all other impacts identified in this EIR would be reduced to less-than-significant levels by implementation of the identified mitigation measures.

- **Noise Impacts during Well Drilling.** While the majority of construction activities would be limited to daytime hours, the necessity to drill consistently over 24-hour periods for up to four consecutive days would result in temporary, yet significant, noise impacts at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites. Even with implementation of noise controls (Mitigation Measures 3.8-1a through -1c) which would reduce the intensity of this impact, this impact would remain significant. Consequently, this impact, while temporary, is considered significant and unavoidable.

4.5 Significant Irreversible Environmental Changes

In accordance with CEQA Section 21100(b)(2)(B) and CEQA Guidelines Sections 15126(c) and 15126.2(c), the purpose of this section is to identify significant irreversible environmental changes that would be caused by the proposed project. Construction activities associated with the facilities proposed under the WMP would result in an irretrievable and irreversible commitment of natural resources through the use of power supply and construction materials.

The proposed facilities under the WMP would require the commitment of energy resources to fuel and maintain construction equipment (such as gasoline, diesel, and oil) during the construction period. Project construction would commit resources, such as concrete and steel, to be used for the proposed wells, treatment facilities, and new pipelines. The WMP would also commit asphalt materials for the repaving of roadways and other paved surfaces disturbed during project construction. However, as described in Section 2.11, Utilities and Service Systems, the Santa Cruz County Landfill Ban will require that the District reuse or recycle as much of the construction debris generated during project construction activities as possible.

The proposed project would not result in a significant increase demand for energy during project operation; thus, no significant irreversible changes associated with long-term energy use would result.

4.6 References – Other CEQA Issues

- City of Capitola, Public Works Department,
<http://www.ci.capitola.ca.us/capcity.nsf/PubWProj.html>, accessed February 1, 2010.
- City of Santa Cruz, Public Works Department, <http://www.ci.santa-cruz.ca.us/pw/>, accessed February 1, 2010.
- County of Santa Cruz, EIS/EIR East Cliff Drive Bluff Protection and Parkway, May 2006,
<http://www.sccoplanning.com/pdf/env/eirecliffseawallbackup/default.htm>, accessed February 1, 2010.
- County of Santa Cruz, Planning Department, <http://www.sccoplanning.com/>, accessed February 1, 2010.
- County of Santa Cruz Planning Department, Final Aptos Village Plan, adopted February 23, 2010.
- County of Santa Cruz, Public Works Department, <http://www.dpw.co.santa-cruz.ca.us/roaddesign.htm>, accessed February 1, 2010.
- Department of Transportation District 5, Highway 1 and 17 Interchange Project,
http://www.dot.ca.gov/dist05/projects/scr_1_17/, accessed February 1, 2010.
- ESA, *Soquel Creek Water District Integrated Resources Plan*, Soquel Creek Water District, March 10, 2006.
- ESA, *Aptos Pump Station Project IS/MND*, Soquel Creek Water District, July 9, 2009.
- HydroMetrics LLC. 2009. *Hydrologic Effects of Well Master Plan*, letter report to Laura Brown, Soquel Creek Water District, June 29, 2009.

CHAPTER 5

Alternatives

Sections	Figures	Tables
5.1 Introduction	5-1 Potential Well Site Locations	5-1 Selected Alternatives for CEQA Analysis
5.2 CEQA Requirements		
5.3 Alternatives Analysis		5-2 Comparison of CEQA Alternatives with the Proposed Project
5.4 Comparison of Alternatives		
5.5 Project Background		5-3 Preliminary Site Screening
5.6 Alternatives Considered but Rejected		
5.7 References		

5.1 Introduction

This chapter discusses alternatives to the Well Master Plan (WMP) project. Section 5.2 discusses the requirements of the California Environmental Quality Act (CEQA) for evaluating project alternatives and Section 5.3 presents the process for development of project alternatives. Section 5.4 analyzes and compares the selected alternatives against the proposed project, and identifies the environmentally superior alternative. Section 5.5 provides background information on the preliminary site screening process, and Section 5.6 discusses specific alternatives that were considered but rejected from further consideration.

5.2 CEQA Requirements

The CEQA Guidelines, Section 15126.6(a), state that an environmental impact report (EIR) must describe and evaluate a reasonable range of alternatives to the proposed project that would feasibly attain most of the project's basic objectives, but that would avoid or substantially lessen any significant adverse environmental effects of the project. An EIR need not consider every conceivable alternative to a proposed project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. The EIR must evaluate the comparative merits of project alternatives and include sufficient information about the alternatives to allow meaningful evaluation, analysis, and comparison with the proposed project. Specifically, the CEQA guidelines set forth the following criteria for selecting alternatives:

- The discussion of alternatives should focus on alternatives to the project or its location that are capable of avoiding or substantially lessening the significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly (Section 15126.6[b]).
- The range of potential alternatives should include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects (Section 15126.6[c]).
- The specific alternative of “No Project” (referred to as the No Project Alternative) should also be evaluated along with its impacts (Section 15126.6[e] [1]).
- The alternatives should be limited to ones that would avoid or substantially lessen the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives should be selected and discussed so as to foster meaningful public participation and informed decision making (Section 15126.6[f]).

5.3 Alternatives Analysis

In accordance with CEQA, a project alternative must meet the following three criteria: (1) the alternative would attain *most* of a project’s basic objectives; (2) the alternative would *avoid or substantially lessen* the significant environmental impacts of the proposed project; and (3) the alternative must be *feasible*. An EIR need not consider an alternative whose impact cannot be reasonably ascertained and whose implementation is remote and speculative. Furthermore, an EIR need not consider every conceivable alternative, but must consider a reasonable range of alternatives that will foster informed decision-making and public participation.

This section first presents the project objectives (from Chapter 2, Project Description) and then summarizes the significant environmental impacts of the WMP that were identified in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures. Section 5.4 describes the project alternatives that were selected for detailed analysis and evaluates the comparative merits of the selected alternatives relative to the proposed project. The alternative strategies and concepts that were considered but rejected are identified in Section 5.6.

5.3.1 Project Objectives

The specific objectives of the WMP are to:

- Meet the basin management objectives of uniform drawdown of the aquifers and redistribution of pumping away from coastal areas to reduce susceptibility to seawater intrusion;
- Limit the typical pumping duration of any given well to less than 12 hours per day in order to maintain sufficient local groundwater levels for effective well operation and to manage the depth and radius of residual pumping depressions;
- Ensure a reliable water supply when individual wells are out of service due to maintenance, mechanical failure, or damage; and,

- Have adequate system capacity and flexibility to respond to peak, maximum-day demand in all four service areas.

The WMP project objectives support the management goals and basin management objectives of the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area* (SqCWD and CWD, 2007) and are consistent with Element 8 of the plan, which calls for redistributing pumping both vertically and horizontally to achieve more uniform drawdown, reducing susceptibility to seawater intrusion, and minimizing localized pumping depressions. The proposed project was designed to protect groundwater supplies by improving redundancy and flexibility in the District's well fields and redistributing pumping away from the coastal area, thereby providing a more uniform drawdown of the groundwater basin.

5.3.2 Significant Environmental Impacts

Alternatives to a project must substantially lessen or avoid one or more of the identified physical environmental impacts associated with the project. The physical environmental impacts that would result from WMP implementation are presented in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures. The following section summarizes the significant impacts of the WMP, organized by category of impact (i.e., construction and operational impacts).

Construction-Related Impacts

Implementation of the proposed project would result in significant and unavoidable (SU) 24-hour well drilling and land use disturbance impacts at the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Well sites during construction. Potentially significant but mitigable (PSM) construction impacts could occur at all of the proposed well sites, including soil erosion, water quality impacts from increased sediment loads and accidental releases of hazardous construction chemicals, daytime noise increases, short-term lessening of roadway capacities, traffic safety hazards, accidental disruption or damage to existing utilities, solid waste disposal impacts, and temporary degradation of the visual character of the proposed well sites and vicinities during construction.

Operational Impacts

Impacts related to project operations would occur for the life of the project as opposed to the relatively short duration of project construction. As such, the potential environmental consequences of these impacts are often considered to be greater than temporary construction impacts, especially if permanent and irreversible.

Project implementation would result in potentially significant but mitigable (PSM) long-term operational impacts at the proposed well sites, including impacts to nearby private wells, elevated ambient noise levels during operation of well pumps and weekly testing of emergency generators, land use disturbance due to operational noise, and adverse effects on the visual character of the sites and their surroundings. Well pumping by the District in the vicinity of the Cunnison Lane Well could result in potentially significant but mitigable (PSM) impacts from possible interference with

groundwater remediation activities at the Quik Stop environmental cleanup site. Potentially significant but mitigable (PSM) impacts could occur at wells owned by the Santa Cruz Water Department (SCWD) as a result of future pumping by the SqCWD in the vicinity of the O'Neill Ranch Well, and on wells owned by Central Water District (CWD) as a result of future pumping by the SqCWD in the vicinity of the Polo Grounds Well. In addition, potentially significant but mitigable (PSM) impacts could result from increased pumping in the vicinities of the O'Neill Ranch and Austrian Way Well sites and associated depletion of stream baseflow in Soquel Creek and Aptos Creeks, respectively, both of which are designated critical habitat for California coast steelhead.

5.3.3 Process for Development of Alternatives

The methodology used to develop and identify potential alternatives to the WMP is as follows:

1. Review potentially significant and significant impacts identified in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures, and identify strategies and concepts to lessen or avoid them.
2. Conduct preliminary screening of identified strategies and concepts by determining if the strategy/concept meets the following criteria:
 - Is the strategy or concept feasible?
 - Does it meet any of the basic WMP goals and objectives?
 - Could it substantially lessen or reduce one or more of the identified potentially significant or significant impacts?

If the answer to any of the above questions was “no,” the strategy or concept was eliminated from further consideration. If the answer to all questions was “yes,” the strategy or concept was retained for further consideration.

5.4 Comparison of Alternatives

This section describes the project-specific alternatives that were selected and analyzed in detail according to the CEQA Guidelines Section 51526.6(a). The alternatives selected for detailed analysis are those that would avoid or substantially lessen project impacts, would meet most or all of the project objectives, and that were determined to have minimal feasibility and constructability issues. The selection process was guided, in part, by the magnitude and severity of impacts identified, and the limited opportunities for substantially lessening the overall impacts of the proposed project while still meeting the basic project objectives. The alternatives analysis considers three alternatives: the No Project Alternative; the Reduced Project Alternative; and the Suncatcher Court Site in Lieu of the O'Neill Ranch Site Alternative. These alternatives represent the range of feasible alternatives required by CEQA. The following analysis assumes the two action alternatives (Reduced Project Alternative and the Suncatcher Court Site in Lieu of the O'Neill Ranch Site Alternative) would require mitigation measures similar or equal to those identified in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures. **Table 5-1** summarizes the project alternatives, how they differ from the proposed project, and the impacts that they aim to reduce.

**TABLE 5-1
SELECTED ALTERNATIVES FOR CEQA ANALYSIS**

Alternative / Description	How does the Alternative differ from the Proposed Project?	What project impact is the Alternative intended to address/ minimize?
Alternative 1: No Project – No improvements would be constructed.	There would be no new well construction and SqCWD would not have the ability to redistribute groundwater pumping and reduce the potential for seawater intrusion.	Construction and operation impacts, including impacts to geology, hydrology, biological resources, traffic and circulation, noise, air quality, utilities, aesthetics, hazards, and cultural resources.
Alternative 2: Reduced Project – Four wells would be developed (or converted for Polo Grounds Well) as proposed under the WMP.	This alternative eliminates either the Cunnison Lane or Austrian Way Well site, but the other four sites would be developed as proposed.	All construction and operational impacts at either the Cunnison Lane or Austrian Way Well site.
Alternative 3: Suncatcher Court Site in Lieu of the O'Neill Ranch Site – The Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds Wells would be constructed as proposed. A new well and treatment plant will be constructed at the Suncatcher Court site as an alternative to the O'Neill Ranch site.	The O'Neill Ranch Well and treatment plant would not be constructed, and instead a new well and treatment plant would be constructed at the Suncatcher Court site.	Construction and operational impacts at the O'Neill Ranch Well site.

The comparative merits of the selected alternatives relative to the proposed project are evaluated below. Since the selected alternatives are conceptual, the evaluation is based on reasonable assumptions regarding implementation and the potential implications for future pumping redistribution. For each alternative, this section presents the following:

- Description of the alternative, including associated facility improvements and operational changes. Each description includes assumptions regarding the construction methods that would be used and a review of potential feasibility issues as well.
- Analysis of the environmental impacts of each alternative compared to those of the proposed project.
- Ability of the alternative to meet project goals and objectives.

5.4.1 Alternative 1: No Project

As required by CEQA Guidelines Section 15126.6(e), the No Project Alternative must be evaluated along with its impacts to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving it. The No Project Alternative represents what would be reasonably expected to occur in the foreseeable future if the project were not approved.

Description of the No Project Alternative

The No Project Alternative includes those activities that would reasonably be expected to occur in the foreseeable future if the proposed project were not approved. In the event the SqCWD does

not approve the WMP project, the SqCWD would not construct any of the new well and treatment facilities proposed under the WMP, and would continue extracting groundwater using existing SqCWD production wells, several of which are located in close proximity to the coast and are fast approaching their operational lifespan. The SqCWD's current well configuration would remain unchanged, as would its limited ability to redistribute pumping away from coastal areas to protect the groundwater basin from seawater intrusion, and to address localized pumping troughs by distributing pumping areally.

SqCWD would continue its conservation efforts, and the long-term average amount of water pumped by the SqCWD would be maintained within the District's pumping goal established in the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area*, which is currently no more than 4,800 ac-ft/yr, both with and without implementation of the WMP. Although the existing source capacity in each service area is adequate if all wells remain in service and are pumped for extended durations, the District's existing production wells are deteriorating and will become increasingly unreliable over time. In addition, because the District's ability to move water between service areas is limited, the failure of one or more of the District's most productive wells could jeopardize the ability of the District to meet the maximum day demand in individual service areas.

Ability of the No Project Alternative to Meet Project Objectives

The No Project Alternative would fail to meet all of the WMP project objectives. The existing well configuration and deteriorating condition of the District's production wells would significantly limit the ability of the SqCWD to meet the first objective of redistributing pumping so as to achieve a more uniform drawdown of the basin and reduce susceptibility to seawater intrusion. The District would not have sufficient redundancy and flexibility to achieve the second objective of limiting the typical pumping duration of any given well to less than 12 hours a day. The third objective of ensuring a reliable water supply when individual wells are out of service would be compromised. In the event of failure of one or more of the District's existing production wells, the District may not be capable of achieving the fourth objective of responding to peak, maximum-day demand in all four service areas. Furthermore, the No Project Alternative would jeopardize the SqCWD's ability to meet (if not completely preventing it from meeting) the adopted goals and objectives of the *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area* associated with the WMP.

Impacts of the No Project Alternative

Direct Impacts

The No Project Alternative would eliminate the need for construction activities at the five proposed well sites, thereby avoiding all construction impacts identified for the proposed project, including the significant unavoidable (SU) impacts associated with nighttime noise and disturbance to residential land uses. All construction impacts related to soil erosion, slope instability, water quality, special-status plant species, mature trees, special-status animal species, daytime noise, increased traffic and parking demand, damage to public roadways, traffic safety

hazards, emergency access, alternative transportation, hazardous materials, utilities, solid waste disposal, cultural resources, and aesthetics would be completely avoided.

Potentially significant mitigable (PSM) operational impacts specific to the proposed well sites would also be eliminated, including impacts to non-District wells, groundwater quality in the vicinity of the Cunnison Lane Well site, stream baseflow effects from groundwater pumping in the vicinity of the O'Neill Ranch and Austrian Way Well sites, impacts to critical steelhead habitat, operational noise, land use disturbance, interference with groundwater remediation activities, sanitary sewer capacity, and visual effects.

Indirect or Secondary Impacts

If implemented, the No Project Alternative would exacerbate adverse groundwater conditions associated with seawater intrusion and localized pumping troughs due to the secondary effects of continued pumping in coastal areas and prolonged pumping of individual wells. The stress of prolonged pumping would further deteriorate existing wells, and the production capacity of individual wells would be gradually reduced such that the reliability of the District's water supply would be severely compromised.

No Project Alternative – Conclusions

The No Project Alternative would meet none of the project objectives, would exacerbate adverse groundwater conditions, would imperil the SqCWD water supply reliability, and could preclude the SqCWD from meeting peak, maximum-day demand in all four service areas.

5.4.2 Alternative 2: Reduced Project

Description of the Reduced Project Alternative

The Reduced Project Alternative would focus on the minimum number of wells needed to meet the basic project objectives. This alternative would implement improvements at only four of the well sites, as opposed to the five well sites envisioned under the proposed project. Based on the existing conditions of individual wells, the source capacity of each service area, and the estimated production capacity of the five proposed wells, the sites that could potentially be eliminated without compromising the ability of the District to meet the basic project objectives are the Cunnison Lane or Austrian Way Well sites. Implementation of the Reduced Project Alternative would not change the timing of the first four wells that would be constructed under the WMP.

Under this alternative, future groundwater extractions by the District would be the same as the proposed project (approximately 4,800 ac-ft/yr), which is similar to existing conditions. A plausible scenario for redistribution of pumping without the Cunnison Lane Well was developed by HydroMetrics and is represented as Redistribution Scenario 2; a plausible scenario for pumping redistribution without the Austrian Way Well is represented as Redistribution Scenario 3 (see Section 3.3, Groundwater Resources). These redistribution scenarios would result in a less even redistribution of pumping than Redistribution Scenario 1, which assumes all five wells and is considered the most likely scenario if the WMP is implemented as proposed.

Ability of the Reduced Project Alternative to Meet Project Objectives

The Reduced Project Alternative could meet all of the project objectives. However, since it would provide less flexibility to redistribute pumping when compared to the proposed project, it would impede fully attaining the project objectives of achieving uniform drawdown of the aquifers and limiting typical pumping at any given well to less than 12 hours per day.

Impacts of the Reduced Project Alternative

Under this alternative, all construction and operational impacts associated with the O'Neill Ranch, Granite Way-Aptos Village, and Polo Grounds Well sites would be equal to those of the proposed project. Since either the Cunnison Lane or Austrian Way Well sites would be eliminated, the construction and operational impacts associated with the eliminated site would be avoided. Since this alternative would provide new wells to facilitate the redistribution of pumping by the District, secondary impacts to groundwater resources would not result, although the extent by which groundwater conditions would be improved could be less when compared to the proposed project.

Reduced Project Alternative – Conclusions

The Reduced Project Alternative could meet all of the project objectives, although it would impede to some degree the attainment of the project objectives. This alternative would avoid all construction and operational impacts associated with either the Cunnison Lane or Austrian Way Well sites; therefore, the site specific environmental impacts of the WMP would be reduced, but the benefits to the groundwater basin would also be reduced.

5.4.3 Alternative 3: Suncatcher Court Site in Lieu of O'Neill Ranch Site

Description of the Suncatcher Court Site in Lieu of O'Neill Ranch Site Alternative

This alternative would implement all improvements at the Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds Well sites as proposed under the preferred project. However, unlike the preferred project, no improvements would be made to the O'Neill Ranch Well site and the District's priority to construct a replacement well in the western portion of Service Area I would be achieved by a new well and treatment facility at the District-owned Suncatcher Court site.

The Suncatcher Court site is a 0.22-acre parcel located at the western end of Suncatcher Court in Soquel, approximately 1/2-mile southeast of the O'Neill Ranch Well site and 700 feet northwest of Soquel Creek. Adjacent land uses consist of private residences to the west, north, and east, and Highway 1 to the south. There is an existing 6- to 8-foot-high solid wood fence along the western, northern, and eastern property boundaries, and a 5-foot-high masonry fence along the southern boundary.

The general design of the well and treatment facilities at the Suncatcher Court site would be similar to those proposed at the O'Neill Ranch Well site. The new well, pump motor, electrical

control panels, and the chemical disinfection system would be housed in an approximately 30-foot-long by 20-foot-wide single-story building. The treatment facility components would include an iron and manganese removal filter comprised of a cluster of four or six vertical cylinders approximately 8 feet in diameter and 8 feet high; a 30-foot-long by 10-foot-diameter aboveground chemical reaction vessel; and a 30-foot-long by 20-foot-wide by 3-foot-tall backwash reservoir. The perimeter of the site would be extensively landscaped to improve the overall aesthetics of the project and provide screening from adjacent residences. In addition, the existing solid wood fence along the eastern boundary would be extended southward down the property to provide further screening from the east.

Ability of the Suncatcher Court Site in Lieu of O'Neill Ranch Site Alternative to Meet Project Objectives

Like the proposed project, under this alternative, the District would develop up to five municipal production wells. Substituting the Suncatcher Court site for the O'Neill Ranch Well site would not affect the overall ability of the WMP to meet the project goals and objectives. All of the project objectives would be met by this alternative.

Impacts of the Suncatcher Court Site in Lieu of O'Neill Ranch Site Alternative

Under this alternative, all construction and operational impacts associated with the Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds Well sites would be the same as those of the proposed project. Since the O'Neill Ranch Well site would be replaced by the Suncatcher Court site, all site-specific construction and operational impacts associated with the O'Neill Ranch Well site would be avoided. Although similar construction and operational impacts would be expected to result at the Suncatcher Court site, impacts related to land use disruption would be greater due to the closer proximity to residences. Pumping from a well at this site could also result in a greater potential for stream baseflow depletion effects in Soquel Creek, which is located 700 feet away and is designated critical habitat for California coast steelhead. However, similar to the proposed project, these impacts could be reduced to less than significant levels with implementation of the mitigation measures identified in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures.

Overall, the impacts of the Suncatcher Court Site in Lieu of O'Neill Ranch Site Alternative would be slightly greater, but similar to those of the proposed project.

5.4.4 Comparison of Alternatives

Comparison of Environmental Impacts

The CEQA Guidelines require the identification of an environmentally superior alternative to the proposed project (Section 15126.6[e]). If it is determined that the "no project" alternative would be the environmentally superior alternative, then the EIR shall also identify an environmentally superior alternative among the other project alternatives (Section 15126.6[3]).

Table 5-2 presents a comparison of each alternative to the WMP project relative to environmental impacts for each resource category. While the No Project Alternative would avoid all of the construction and operational impacts of the proposed project, impacts on groundwater resources would be significantly greater due to the inability of the District to effectively manage District pumping in the Soquel-Aptos Groundwater Basin. The Reduced Project Alternative would avoid all impacts at either the Cunnison Lane or Austrian Way Well sites, but would result in the same impacts at the remaining four well sites. The Suncatcher Court Site in Lieu of O'Neill Ranch Site Alternative would avoid all impacts at the O'Neill Ranch Well site but would result in the same impacts at the Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds Well sites. The Suncatcher Court Site in Lieu of O'Neill Ranch Site Alternative would also result in general construction and operational impacts at the Suncatcher Court site.

5.4.5 Environmentally Superior Alternative

Based on the above analysis, the Reduced Project Alternative is considered the environmentally superior alternative because it would lessen the overall construction and operational impacts of the WMP. However, it would not be as effective as the proposed project in meeting all project goals and objectives and, given that the same quantity of pumping would be more concentrated at the other wells, the environmental benefits to the groundwater basin would be less.

5.5 Project Background

5.5.1 Site Screening Criteria

In determining the number of production wells needed and the preferred locations for new wells, the SqCWD and its consulting hydrologist, HydroMetrics LLC (HydroMetrics), considered the existing source capacity in each service area, the hydrogeological conditions of the underlying aquifers, the need for siting wells inland and away from the coast, and the need for spatial distribution of the wells so as to minimize interference between wells. Based on an assessment of existing conditions, it was determined that four to five new wells, appropriately spaced across the SqCWD service area, are needed to provide the District with the operational flexibility to effectively manage its ongoing groundwater pumping.

District-owned parcels, as well as other non-District properties that could potentially be acquired by the District, located north of Highway 1 and roughly bordered by 41st Avenue to the west and Aptos Creek to the east were considered as potential sites for the new wells. This area is located sufficiently inland from the coast and generally overlies productive aquifers of the Purisima Formation. Sites overlying the Aromas Red Sands (Aromas) aquifer were not considered because coastal monitoring wells suggest ongoing seawater intrusion in the Aromas aquifer in the vicinity of Seascape, which could be exacerbated if pumping from this aquifer were to increase. Furthermore, naturally occurring hexavalent chromium is generally present throughout the Aromas aquifer. While no state or federal drinking water standards currently exist for hexavalent chromium, the California Department of Public Health (CDPH) is expected to establish a primary drinking water standard for this contaminant, which could require expensive treatment facilities

**TABLE 5-2
COMPARISON OF CEQA ALTERNATIVES WITH THE PROPOSED PROJECT**

Resource Category	Proposed Project	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Suncatcher Court Site in Lieu of O'Neill Ranch Site
Geology, Soils, and Seismicity	PSM impacts related to slope instability at O'Neill Ranch. PSM impacts to soil erosion at O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village.	No impacts.	Similar to proposed project except soil erosion impacts would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except slope instability and soil erosion impacts would be avoided at O'Neill Ranch. Similar soil erosion impacts would be expected to occur at Suncatcher Court.
Groundwater Resources	Beneficial impacts on groundwater conditions in the Soquel-Aptos Groundwater Basin. PSM impacts to private wells at all sites. PSM impacts to SCWD wells from pumping at O'Neill Ranch, and PSM impacts to CWD wells from pumping at Polo Grounds. PSM impacts to groundwater quality at Cunnison Lane. Beneficial impacts associated with adaptation to climate change.	Greater impacts to groundwater conditions in the Soquel-Aptos Groundwater Basin and climate change. Impacts to non-District wells would be avoided. Impacts to groundwater quality at Cunnison Lane would be avoided.	Similar to proposed project except impacts to non-District wells would be avoided at either Cunnison Lane or Austrian Way; however, this alternative would limit pumping redistribution with consequently less beneficial impacts to the groundwater basin.	Similar to proposed project except potential drawdown impacts to non-District wells near O'Neill Ranch would occur at Suncatcher Court instead.
Surface Water Hydrology and Water Quality	PSM impacts to water quality during construction at Cunnison Lane, Austrian Way, and Granite Way-Aptos Village. PSM impacts to creek erosion and localized flooding from raw groundwater discharges during operations.	No impacts.	Similar to proposed project except soil erosion impacts would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except impacts at O'Neill Ranch would occur at the Suncatcher Court instead.
Biological Resources	PSM impacts to Santa Cruz Tarplant at Cunnison Lane and Austrian Way. PSM impacts to special-status bird and bat species at all sites. PSM impacts to San Francisco dusky-footed woodrat at O'Neill Ranch, Cunnison Lane, Austrian Way, and Polo Grounds. PSM impacts to special-status fish species at O'Neill Ranch and Austrian Way.	No impacts.	Similar to proposed project except all biological impacts would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except biological impacts would be avoided at O'Neill Ranch but similar impacts would be expected to occur at Suncatcher Court.
Land Use and Recreation	SU land use disturbance impacts at O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village during 24-hour well drilling. PSM recreational impacts at Polo Grounds during construction. PSM impacts to land uses during operations at all sites. PSM impacts to conflicts with plans and policies of local jurisdictions at all sites.	No impacts.	Similar to proposed project except all land use impacts would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except impacts to land use disturbance would be greater due to the proximity of residences to the Suncatcher Court.
Air Quality	Air quality impacts from construction and operations would be LTS at all sites.	Construction-related air quality impacts would not occur. Operational air quality impacts would be similar to the proposed project.	Similar to proposed project except LTS air quality impacts would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except LTS air quality impacts would be avoided at O'Neill Ranch but similar impacts would be expected to occur at Suncatcher Court.

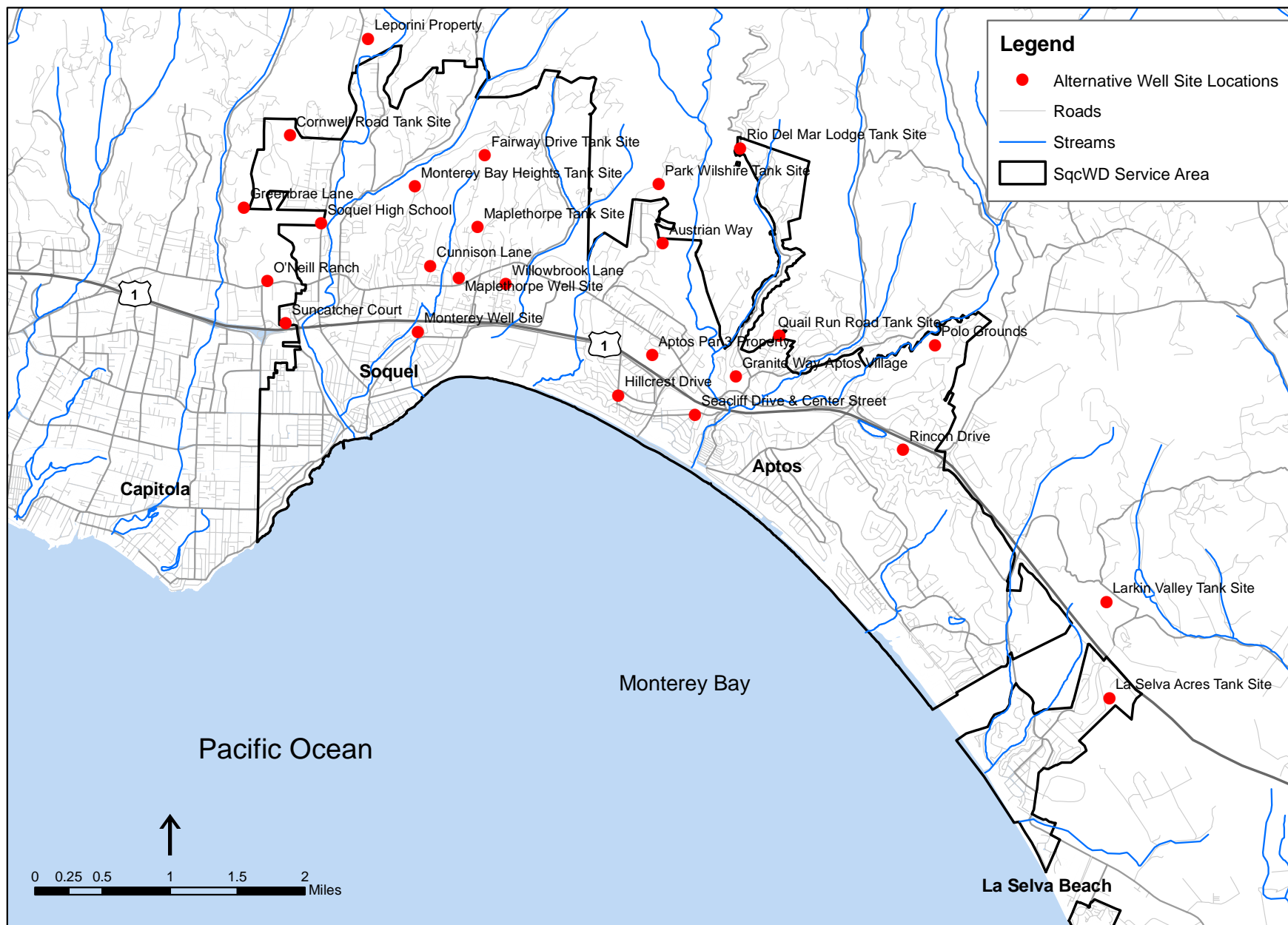
TABLE 5-2 (Continued)
COMPARISON OF CEQA ALTERNATIVES WITH THE PROPOSED PROJECT

Resource Category	Proposed Project	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Suncatcher Court Site in Lieu of O'Neill Ranch Site
Noise and Vibration	SU noise impacts at O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village from nighttime construction. PSM noise impacts at O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village from daytime construction. PSM noise impacts at Cunnison Lane, Austrian Way, and Granite Way-Aptos Village during operations and maintenance.	No impacts.	Similar to proposed project except noise impacts would be avoided at either Cunnison Lane or Austrian Way.	Same as proposed project at Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds. All noise impacts would be avoided at O'Neill Ranch but both construction and operational noise impacts would be greater at Suncatcher Court due to proximity to residences.
Traffic and Circulation	Temporary PSM impacts related to increased traffic and safety hazards, wear-and-tear along haul routes, and disruption of emergency access at all sites. PSM impacts to public transit, bicycle, and pedestrian facilities at all sites.	No impacts.	Similar to proposed project except traffic and circulation impacts would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except all traffic and circulations impacts would be avoided at O'Neill Ranch but similar impacts would be expected to occur at Suncatcher Court.
Hazardous Materials	PSM impacts from encountering contaminated soil or groundwater during construction at all sites. PSM impacts related to accidental releases of hazardous chemicals during construction at O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village. PSM impacts to remediation activities at Quik Stop facility near Cunnison Lane.	No impacts.	Similar to proposed project except hazardous materials impacts would be avoided at either Cunnison Lane or Austrian Way. If Cunnison Lane is eliminated, potential impacts related to interference with remediation activities at the Quik Stop facility would be avoided.	Similar to proposed project except all hazardous materials impacts would be avoided at O'Neill Ranch but similar impacts would be expected to occur at Suncatcher Court.
Utilities and Service Systems	PSM impacts from construction-related disruption of local utilities, disposal of construction debris, and operational impacts on wastewater service providers at all sites.	No impacts.	Similar to proposed project except all biological impacts would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except all utilities impacts would be avoided at O'Neill Ranch but similar impacts would be expected to occur at Suncatcher Court.
Cultural Resources	PSM impacts to unknown archaeological and paleontological resources during construction at all sites.	No impacts.	Similar to proposed project except potential impacts related to accidental discovery of unrecorded archaeological resources and fossils would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except all potential cultural resources impacts would be avoided at O'Neill Ranch but similar impacts would be expected to occur at Suncatcher Court.
Aesthetics	PSM aesthetics impacts during construction at all sites. PSM impacts from permanent changes to visual character of vicinity at all sites.	No impacts.	Similar to proposed project except all visual impacts would be avoided at either Cunnison Lane or Austrian Way.	Similar to proposed project except all visual impacts would be avoided at O'Neill Ranch but similar impacts would be expected to occur at Suncatcher Court.

to meet future drinking water standards. These constraints, as well as other factors described below, limit the number of well locations that would meet the WMP's needs and objectives.

The SqCWD conducted a preliminary screening evaluation of 25 potential well sites within the four service areas. These potential well site locations are shown on **Figure 5-1**. Potential well sites were evaluated based on the following site selection criteria:

- *Site Location – Inland of Highway 1:* Suitable well sites must be located outside of coastal areas and at least ½ mile inland in order to allow groundwater levels along the coast to recover and protect the basin from seawater intrusion.
- *Groundwater Conditions:* Would the well be located in an area with normal or above-normal (i.e. not depressed) groundwater levels? Would a well at this site have access to a productive aquifer providing adequate well yields to support District pumping?
- *Well Separation – Proximity to Existing Municipal Wells:* To minimize well interference issues, wells must be sufficiently spaced so as to prevent well interference. Sites located at distances of ½ mile or more from other existing municipal wells were considered to have more than sufficient well separation; sites located between ¼ and ½ mile of other municipal wells were considered to have sufficient spacing; sites located within ¼ mile of other municipal wells could be suitable provided overall District pumping in the vicinity is not increased.
- *Proximity to Private Well Users:* Are there known private well users in the surrounding area, which are more likely to be screened at shallower depths and therefore, could be adversely affected by future pumping from the new well?
- *Water Quality – Septic System Concerns:* The presence of septic systems in the surrounding area could potentially compromise groundwater quality.
- *Water Quality – Groundwater Contamination Concerns:* Groundwater quality could be compromised at sites located in areas associated with heavy hazardous materials use or storage, or surrounded by land uses associated with underground fuel tanks, livestock, fertilizers, pesticides, or industrial activities. This criterion also considers distance from known groundwater contamination sites and characterizes sites that are located at least ¼-mile from known contaminated sites as favorable.
- *Proximity to Residential Land Uses:* Would the well be located close to residential land uses that could be subject to increased noise levels during project construction and operations? Sites located at least 200 feet from residential receptors are considered most favorable.
- *Minimum Lot Size:* Sites must be sufficiently sized to accommodate the production well, treatment facility, and auxiliary structures.
- *Site Accessibility:* Suitable sites must have adequate access for drilling equipment and maintenance vehicles.
- *Access to Water Distribution System:* Once the well water is treated at the on-site treatment plant, could potable water easily be routed to the existing water distribution system? Sites located within ½ mile of the SqCWD's water distribution system were characterized as suitable.



SOURCE: SqCWD, 2006

SqCWD Well Master Plan EIR . 205491

Figure 5-1
Potential Well Site Locations

- *Proximity to Storm Drain System:* Water produced during periodic well maintenance and repairs would be required to discharge to the storm drain system. Does the site have access to the storm drain system for these discharges?
- *Access to Sanitary Sewer System:* At sites where a treatment plant would be required, access to the sanitary sewer system would be needed for discharges of treatment sludge. Lack of sanitary sewer access is a potential fatal flaw in that it is dependent upon County approval of a sanitary sewer main extension. Sites located within ½ mile of the sanitary sewer system were characterized as suitable.

Some of the criteria pointed out fatal flaws in the potential well locations, while others served to evaluate the relative merits of the individual locations. Certain criteria – site location relative to the coast, inadequate separation from existing municipal wells, undesirable groundwater conditions, and/or lack of access to the sanitary sewer system for sludge disposal – excluded some potential well locations from further consideration. The results of the preliminary screening analysis are described below and summarized in **Table 5-3**.

5.5.2 Preliminary Site Screening Analysis

Service Area I

O'Neill Ranch

Approximately two-thirds of the SqCWD's service area is served by groundwater production wells in Service Areas I and II. As shown in Table 2-1 in Chapter 2, Project Description, after multiple unsuccessful attempts to rehabilitate the wells, two of the six existing production wells in Service Area I were taken out of service due to increased sand production and decreased water production (i.e. well breaks suction during periods of prolonged pumping). As a result of the removal of two wells from production and increased concerns regarding the reliability of the existing active wells, replacement wells in Service Area I is considered a priority.

Test hole drilling conducted by the District at the O'Neill Ranch site indicated a well developed in the Purisima Formation at this site would have a suitable yield to meet the District's needs. Due to its optimal location relative to other SqCWD production wells and highly favorable groundwater conditions, the O'Neill Ranch site was determined by the District to be one of the most desirable sites for a replacement well and was selected as one of the proposed well sites under the WMP. In addition to agreeable groundwater conditions and an ideal location relative to the District's water production system, the results of the preliminary site screening analysis indicate the O'Neill Ranch site would provide adequate access for drilling equipment and maintenance vehicles; has no known groundwater contamination issues; has adequate access to the sanitary sewer, storm drain, and water distribution systems; and is located at a sufficient distance from residential land uses such that land use disruptions should not be an issue. The District has worked with the Santa Cruz County Redevelopment Agency to alleviate potential concerns regarding the agency's vision of future development at this site. Thus, the proposed well and treatment facilities at the O'Neill Ranch site are considered key components of the WMP.

**TABLE 5-3
PRELIMINARY SITE SCREENING**

Service Area	Potential Well Site	Site Location – Inland or In Coastal Area	Groundwater Conditions	Well Separation – Proximity to Existing Municipal Wells	Proximity to Private Well Users	Water Quality - Septic System Concerns	Water Quality – Groundwater Contamination Concerns	Proximity to Residential Land uses	Minimum Lot Size	Site Accessibility	Access to Water Distribution System	Access to Storm Drain System	Access to Sanitary Sewer
I	O'Neill Ranch	+	+	+	-	+	+	+	+	+	+	+	+
	Soquel High School	+	+	-	-	+	+	+	+	+	+	+	+
	Cunnison Lane	+	+	+	-	+	-	-	+	+	+	+	+
	Suncatcher Court	+	+	+	+	+	+	-	+	-	+	+	+
	Maplethorpe Tank Site	+	+	+	-	-	+	-	+	-	+	+	-
	Monterey Well Site	-	-	+	+	+	+	-	-	-	+	+	+
	Cornwell Road Tank Site	+	+	+	-	-	+	-	-	+	+	+	+
	Fairway Drive Tank Site	+	?	+	-	-	+	-	+	-	+	-	-
	Maplethorpe Well Site	+	-	-	-	+	+	-	-	+	+	+	+
	Monterey Bay Heights Tank Site	+	?	+	-	+	+	+	-	+	+	-	+
	Leporini Property	+	+	+	-	-	+	-	+	+	+	-	-
	Greenbrae Lane	+	+	+	-	+	-	-	+	-	-	-	-
II	Granite Way-Aptos Village	+	+	-	+	+	+	+	+	+	+	+	+
	Austrian Way	+	+	+	+	+	+	-	+	+	+	-	+
	Willowbrook Lane	+	-	-	-	+	+	-	+	+	+	-	+
	Aptos Par 3 Property	+	-	-	+	+	+	-	+	+	-	+	+
	Park Wilshire Tank Site	+	?	+	+	+	+	-	+	-	+	-	-
	Hillcrest Drive	-	-	-	-	+	+	-	-	-	+	-	+
	Seacliff Drive & Center Street	-	+	+	?	+	?	?	-	-	?	?	+
III	Polo Grounds	+	+	+	+	-	+	+	+	+	+	+	+
	Quail Run Road Tank Site	+	+	+	-	-	+	-	+	-	+	-	-
	Rincon Drive	-	-	+	-	-	+	-	+	+	+	-	N/A
	Rio Del Mar Lodge Tank Site	+	+	+	?	-	?	?	-	?	+	?	-
IV	Larkin Valley Tank Site	+	-	+	-	-	+	-	+	+	+	-	+
	La Selva Acres Tank Site	-	-	-	?	-	?	-	-	-	+	?	-

KEY: + = favorable or suitable site conditions; - = unfavorable or unsuitable site conditions; ? = conditions unknown; N/A = not applicable

Soquel High School

This vacant corner lot is located on Soquel High School property at the northwest corner of Soquel-San Jose Road and the Anna Jean Cummings Park access road. This site could be feasible for a well and treatment plant since it has easy access for equipment and is in close proximity to sanitary sewer, storm drain and PG&E power; however, the site is only 1,100 feet from the District's Main Street well, and therefore was not selected due to inadequate spacing between wells to avoid interference.

Cunnison Lane

Factors that contributed to the selection of the Cunnison Lane site, a District-owned parcel located in Service Area I, as one of the proposed well sites under the WMP include: adequate separation from existing municipal production wells (1,500 feet from the Tannery II Well); suitable access for drilling equipment and maintenance vehicles; and proximity to the sanitary sewer, storm drain, and water distribution systems (located immediately in front of the parcel). Groundwater levels in the area are fair, but are likely susceptible to peak pumping season depressions, and there are numerous shallow private wells located nearby. However, because the Cunnison Lane site is located further inland than the Rosedale and Tannery II Wells, a new well at this site would allow for a portion of pumping at the Rosedale and Tannery II Wells to be redistributed inland and away from coastal areas. Groundwater contamination and remediation activities at the Quik Stop facility approximately 800 feet to the south of the site could present groundwater quality concerns.

Suncatcher Court

The Suncatcher Court site is favorably located away from the coastal area and 3,500 feet from the Main Street Well, the closest municipal production well to the site. Prior test hole drilling performed by the District indicated this site has desirable groundwater conditions. There are no water quality concerns related to septic systems, hazardous materials, or other contaminants at this site. Residences border the parcel to the west, north, and east. The existing water distribution, sanitary sewer, and storm drain systems are immediately accessible. Due to previous opposition and lawsuits by adjacent property owners during prior attempts by the District to construct a well and treatment facility at this site (discussed in Section 2.2.6 in Chapter 2, Project Description), as well as the site's proximity to Soquel Creek (and the increased potential for a well at this site to deplete stream baseflow), this site is less favorable than the O'Neill Ranch site; however, it was retained as an alternative to the O'Neill Ranch site and is further discussed in Section 5.3, above.

Maplethorpe Tank Site

This remote inland site is spaced approximately 2,730 feet north of the existing Tannery II and Maplethorpe Well sites and has suitable groundwater conditions. The closest residential land uses are less than 200 feet away along the southern property boundary and across Maplethorpe Lane to the west. Although the Maplethorpe Tank site is adequately sized for a well and treatment facility, access to the site for drilling equipment could require an easement across a neighboring property. Because the site is steeply sloped and covered with trees, extensive clearing and grading would be required. Since the surrounding area is served by septic systems, a sanitary sewer lateral would be required to connect to the sanitary sewer system for treatment sludge disposal.

However, the Maplethorpe Tank site is located just outside of the Urban Services Line and would require approval from the Santa Cruz County Sanitation District for a sanitary sewer extension to the site. This site was eliminated from consideration due to access restrictions for drilling equipment and lack of sanitary sewer access.

Monterey Well Site

The existing Monterey Well site was eliminated from further consideration due to space constraints and its location near the coast.

Cornwell Road Tank Site

Located over two miles inland, the Cornwell Road Tank site has good spacing from the Main Street Well, the closest municipal production well to the site, and is considered to have suitable groundwater conditions. Due to size limitations, adjacent properties would need to be acquired to accommodate a treatment plant. This site was eliminated due to space constraints and potential groundwater quality issues associated with septic systems located upgradient of the site.

Fairway Drive Tank Site

Groundwater conditions in the vicinity of the Fairway Drive Tank site are unknown. Similar to the Cornwell Road Tank site, septic systems in the area surrounding the Fairway Drive Tank site could compromise groundwater quality. In addition, pipeline connections to the sanitary sewer system for treatment sludge disposal would require over ½-mile of new pipeline. Residential land uses are located less than 200 feet away, which presents the potential for noise disturbance. The parcel is fairly small for construction and installation of a well and treatment facility. The site also does not have access to the storm drain system for periodic discharges of raw groundwater during well maintenance and repairs. Due to these unfavorable site conditions, this site was not selected.

Maplethorpe Well Site

The existing Maplethorpe Well site is suitably located inland but is too close to the Tannery II Well, which is located immediately across the street and presents well interference issues. In addition to insufficient well separation, this site is not considered a viable well location because the site is too small to re-drill another municipal production well.

Monterey Bay Heights Tank Site

The Monterey Bay Heights Tank site is located inland and has sufficient well separation as the site is located at least 3,000 feet away from other municipal production wells. The site would be accessible by drilling equipment and maintenance vehicles but is too small to accommodate a treatment plant. The sanitary sewer and water distribution systems are located within 200 feet of the site; however, access to the storm drain system is not readily available. The nearest residential receptors are 100 to 150 feet away. Although horses, cattle, and goats are located at nearby properties, these were not considered to present groundwater quality issues because there are only a small number of animals. Groundwater conditions at this site are unknown. However, this site

was eliminated from consideration because treatment facilities could not be accommodated on the small parcel.

Leporini Property

The preliminary site screening analysis for the Leporini Property indicated the site's inland location, distance from other municipal production wells, and groundwater conditions are acceptable. Approximately 1,000 feet of sanitary sewer, potable water, and power lines would be required to connect to existing infrastructure. However, because the site is located outside of the Urban Services Line and would require approval from the Santa Cruz County Sanitation District to extend sanitary sewer services to the site, this site was eliminated from further consideration.

Greenbrae Lane

The Greenbrae Lane site is located inland of Highway 1 and at a sufficient distance from municipal production wells. The site could be accessible by drilling rigs and maintenance equipment. Although groundwater levels at this site are considered favorable, surrounding land uses associated with hazardous materials could pose potential groundwater quality issues. In addition, like the Leporini Property, because this site is located outside of the Urban Services Line, approval from the Santa Cruz County Sanitation District would be required for a sanitary sewer extension. For the reasons stated above, this site was eliminated from further consideration.

Service Area II

Granite Way-Aptos Village

The Granite Way-Aptos Village site is located within 1,000 feet of the existing Aptos Creek and T. Hopkins Wells. However, this is not considered a fatal flaw because the results of the preliminary site screening analysis indicate the Granite Way-Aptos Village site would be a good location for a replacement well for either the existing Aptos Creek or T. Hopkins Wells, both of which are no longer considered reliable due to age and structural issues and declining production capacity. Because the Granite Way-Aptos Village site is located approximately 600 feet east of the T. Hopkins Treatment Plant, water produced from a replacement well at this site could be treated at the existing treatment facility, thereby eliminating the impacts associated with the construction of a new treatment facility. Aside from the T. Hopkins and Aptos Creek Wells, a well at this site would be located at a sufficient distance from all other SqCWD wells in the area. No water quality concerns associated with septic systems or groundwater contamination issues were identified. Further, a well at this site could easily be connected to the water supply distribution system, and to storm drain facilities for discharges of raw groundwater during periodic well maintenance and repair. Due to the favorable site conditions, groundwater conditions, and ability to utilize the existing T. Hopkins Treatment Plant for treatment, the Granite Way-Aptos Village site was selected as one of the proposed well sites under the WMP.

Austrian Way

The Austrian Way site is a District-owned site located inland and away from other municipal production wells. Existing structures and improvements include a paved access road, a SqCWD

water storage tank, and auxiliary water supply facilities. The construction of a new well and treatment facility at this site would have the advantage of concentrating new facilities at an existing site, as opposed to constructing new facilities at a site that is currently undeveloped or used for other purposes. Based on test hole drilling, groundwater conditions at this site are favorable. Site accessibility and topography are agreeable, but tree removal would likely be necessary. The site has an existing connection to the water distribution system, and the sanitary sewer and storm drain systems are available nearby. Another benefit to this site is that facilities would be set back behind residences and screened from public views. One of the disadvantages of the site is the proximity to residences, which are located within 50 feet of the site. However, when compared to all other factors, this site was determined to be one of the most desirable sites in Service Area II and was selected as one of the proposed well sites under the WMP.

Willowbrook Lane

The results of the preliminary site screening analysis indicate the Willowbrook Lane site is not suitable for a production well and treatment facility due to depressed groundwater levels and insufficient spacing from existing municipal production wells, namely the Estates and Tannery II Wells.

Aptos Par 3 Property

The Aptos Par 3 Property is located just inland of Highway 1, approximately 1,000 feet from the Ledyard Well, the closest municipal production well to the site. Due to depressed groundwater levels and well separation issues, this site was determined to be unsuitable for a production well and was eliminated from consideration.

Park Wilshire Tank Site

Groundwater elevations at the Park Wilshire Tank site are unknown but would likely require a deep well. This site is situated inland and away from other municipal production wells. The site has an existing SqCWD water storage tank and is located on the top of the hill. Although located at least 1,500 feet away from the closest residences, neighbors in the area have filed complaints during storage tank repairs, indicating that sound carries well from this hilltop location. Site access for drilling equipment would be difficult. Connections to the sanitary sewer system would require approximately 2,000 feet of new pipelines, and access to the storm drain system is not readily available. Due to the combination of these unfavorable site conditions, this site was eliminated from further consideration.

Hillcrest Drive

The Hillcrest Drive site was eliminated from further consideration due to its location near the coast, proximity to existing municipal production wells, and depressed groundwater levels in the vicinity.

Seacliff Drive and Center Street

Similar to the Hillcrest Drive site, this site was eliminated from further consideration due to its location near the coast, proximity to existing municipal production wells, and depressed groundwater levels in the vicinity.

Service Area III

Polo Grounds

The existing irrigation well at the Polo Grounds Regional Park is located inland and meets the minimum requirements for distance from other municipal production wells. Favorable groundwater conditions in the area and the pumping capacity of the irrigation well indicate the conversion of the irrigation well to a municipal production well would provide the District with a reliable production well and adequate yield. Due to distance and groundwater gradients, the septic systems located approximately 2,500 feet to the southwest do not compromise groundwater quality. Although the well is existing, a treatment facility is required, as well as connections to the sanitary sewer and water supply distribution systems at North Polo Drive and South Polo Drive. Site access and size are ample for a treatment plant. The closest residences are located 500 feet away, which eliminates concerns of disturbance to residential land uses from operational noise. The results of the preliminary site screening analysis indicate the Polo Grounds site is highly suitable and desirable for a municipal production well and treatment facilities. As a result, this site was selected as one of the proposed well sites under the WMP.

Quail Run Road Tank Site

The Quail Run Road Tank site is located inland, at a sufficient distance from municipal production wells, and in an area with suitable groundwater levels. Several factors eliminated this site from being selected as one of the proposed well sites under the WMP: because this site is located on a hillside, extensive grading and a retaining wall would be required; septic systems in the surrounding area could compromise groundwater quality; access for a drill rig would be difficult; multiple residences surrounding the parcel could be adversely affected by operational noise; and connections to the sanitary sewer and storm drain systems would require extensive pipeline connections.

Rincon Drive

During two previous evaluations of this site by the SqCWD for the construction of a new well, the California Department of Public Health rejected the site due to potential groundwater quality issues from septic systems. In addition, because the Rincon Drive site is near the coast, a well at this site would not assist the District in redistributing pumping inland to protect groundwater levels at the coast.

Rio del Mar Lodge Tank Site

The Rio del Mar Lodge Tank site was eliminated from further consideration because the site is too small to accommodate a well, treatment plant, and auxiliary structures.

Service Area IV

Larkin Valley Tank Site

The Larkin Valley Tank site is located inland and away from other municipal production wells. A well at this site would be screened in the Aromas aquifer in an area with elevated levels of hexavalent chromium. Since increased pumping in the Aromas aquifer is not recommended due to seawater intrusion concerns and groundwater quality issues, this site was eliminated from further consideration.

La Selva Acres Tank Site

This site was determined to be unsuitable due to site access, space constraints, groundwater conditions (a well at this site would be screened in Aromas aquifer which has seawater intrusion and groundwater quality issue), well interference issues, and the presence of septic systems in the surrounding area.

Conclusions

The preliminary site screening analysis highlights the constraints of well site selection for project constructability and conformance with project goals and objectives. Of the 25 potential well sites evaluated, 19 were rejected due to proximity to coastal areas, unfavorable groundwater conditions, insufficient spacing from other municipal wells, inadequate site access or lot size, and/or lack of access to the sanitary sewer system. Of the six remaining sites, five were selected as the proposed well sites under the WMP and the Suncatcher Court site was retained as an alternative to the O'Neill Ranch Well site (see Section 5.4). Although the five sites selected as proposed well sites under the WMP are not flawless, the positive attributes of these sites were determined to outweigh the negative attributes, and no fatal flaws were identified.

5.6 Alternatives Considered but Rejected

This section describes the preliminary alternatives that were eliminated from further consideration.

5.6.1 Locational Alternatives for Cunnison Lane, Austrian Way, Granite Way-Aptos Village, and Polo Grounds Well Sites

Alternative site locations must meet the minimum siting criteria and be capable of avoiding or lessening the overall environmental impacts of the proposed project while achieving most of the project objectives. Two factors have paramount importance in achieving the project objectives: (1) wells need to be located inland to reduce susceptibility to seawater intrusion, and (2) wells must be adequately spaced from other production wells to minimize well interference and achieve uniform drawdown of the aquifer. As described in Section 5.2, above, the Suncatcher Court site was selected as a locational alternative to the O'Neill Ranch site. However, no other locational alternatives were selected for the reasons described below.

In most cases, the physical effects of construction and project operations would be similar regardless of well site location, although tradeoffs involving reduced impacts to a particular resource and increased impacts to another resource could occur. While it is possible that locational alternatives could reduce a specific impact at a particular site, they would generally be expected to result in similar impacts, and possibly greater impacts, at the alternate location. This would result in a tradeoff of environmental impacts, but would not *lessen* the overall environmental impact of the proposed project. The following discussion provides examples of the typical issues and tradeoffs that would be expected to occur.

Noise level increases from well construction and operations would result at any site where a new well is developed, although the secondary effects of noise on residential land uses would depend on the distance to residential receptors. Relocating well and treatment facilities to more rural, less developed areas where residences are located further away could minimize or avoid significant and unavoidable (SU) well drilling noise and land use disturbance impacts during construction, as well as potentially significant mitigable (PSM) noise and land use impacts during project operations. However, alternate site locations in less urbanized areas have a greater potential to impact more “pristine” biological resources and habitats. In particular, the longer pipelines that would be needed to connect to existing infrastructure would result in an increased area of surface disturbance and a greater potential for construction-related impacts to soil erosion, water quality, air quality, biological resources, traffic, and utilities. In addition, sites located outside of the Urban Services Line do not have sanitary sewer services, which would be required for disposal of treatment sludge, and it is questionable whether the Santa Cruz County Sanitation District would approve sanitary sewer extensions to these sites. Thus, relocating wells to less developed areas would not reduce the overall impacts of the proposed project, and could result in greater impacts than the proposed project.

Relocating wells at a greater distance from municipal production wells would result in tradeoffs of environmental impacts and could restrict the ability of the SqCWD to manage pumping and protect the groundwater basin. The preliminary site screening analysis described in Section 5.5, above, illustrates the difficulties in identifying suitable well sites and the constraints for feasibility and constructability. None of the 25 sites evaluated in the preliminary screening analysis were determined to be “perfect”; the proposed well sites were selected based on the balance of the positive and negative attributes identified, with the overall goal of improved management of the Soquel-Aptos Groundwater Basin as a whole. With the exception of the Granite Way-Aptos Village site that would be a replacement well for either the nearby Aptos Creek Well or T. Hopkins Well, the preliminary screening analysis eliminated sites that were less than ¼ mile from a municipal production well due to well interference issues; sites located more than ¼ mile from a municipal production well were considered to have reduced well interference issues. The O’Neill Ranch site is located between 7,700 and 9,700 feet away from the SCWD’s Live Oak Wellfield, and the existing Polo Grounds Well is located between 2,800 and 7,500 feet from the CWD’s wellfields. At these distances, drawdown effects could be appropriately addressed through ongoing monitoring of groundwater levels, redistributing pumping if substantial adverse drawdown effects are detected, and establishing cooperative agreements with SCWD and CWD that include provisions for management of groundwater resources such that substantial adverse effects on neighboring water purveyors are prevented. Like the other locational alternatives

described above, relocating wells further away from SCWD's and CWD's wellfields could result in a trade off of environmental impacts, but would not reduce the overall impacts of the proposed project and could further restrict the sites available to the SqCWD for installation of replacement wells, thereby restricting the ability of the SqCWD to redistribute pumping and protect groundwater resources.

In conclusion, the existing source capacity in each service area, the hydrogeological conditions of the underlying aquifers in each service area, the need for siting wells inland and away from the coastal area, the need for spatial distribution of wells so as to minimize interference between other municipal production wells, and the minimum site requirements greatly limit the number of well locations that would meet the WMP goals and objectives. The five proposed well sites were selected from a total of 25 potential sites that were considered during initial project development. While relocating wells to different sites might avoid or reduce a specific impact that was identified for a proposed well site, alternative locations would not necessarily avoid or lessen the overall identified impacts of the WMP project and could even result in an increase in overall project impacts. Further, alternative locations may not provide the flexibility and redundancy needed by the SqCWD to redistribute pumping away from the coast and better balance groundwater levels throughout the SqCWD service area and could compromise the ability of the WMP to achieve the basic project objectives. Thus, this preliminary strategy was eliminated from further consideration.

5.6.2 Water Transfer from CWD to Replace Polo Grounds Well

This preliminary alternative involves purchasing raw groundwater from Central Water District (CWD). CWD's Cox Road Wells Nos. 2, 3, and 5 are located roughly 2 miles north of the Polo Grounds Well and are currently under utilized by CWD for potable water production. These wells are completed in the Purisima Formation and therefore would require treatment for iron and manganese at a new treatment facility, and conveying the purchased water to the existing SqCWD water distribution system. The condition of the Cox Road Wells is a potential issue, as the age of each well is 57, 50, and 43 years old, respectively. When drilled, the yield of each well was estimated at 300 gpm; however, because of their close geographic proximity, only one well at a time would be operated to avoid well interference. The combined estimated maximum annual production capacity of the three Cox Road wells is 60 acre-feet per year. This capacity is much less than the anticipated yield at Polo Grounds Well of 400 acre-feet per year. Some water from the CWD's Rob Roy wells, completed in the Aromas aquifer, could also potentially be available to the SqCWD to replace the Polo Grounds Well, but hexavalent chromium is present in the water from these wells, which could require treatment in the future, and the combined yield from both well fields would remain less than anticipated from the Polo Grounds Well.

The Cox Road Wells are located inland and the Rob Roy Wells are inland of Highway 1. Water produced from these wells, in combination with the O'Neill Ranch, Cunnison Lane, Austrian Way, and Granite Way-Aptos Village Wells, could help the District achieve the project objectives of redistributing pumping away from the coastal areas. However, because the Cox Road Wells are screened in the Purisima Formation, water produced at these wells that is used for potable purposes would require treatment to remove iron and manganese. The CWD does not currently

have treatment facilities for the Cox Road Wells due to the lack of sanitary sewer in the area, which is needed for sludge disposal. Thus, this alternative would require that the SqCWD construct treatment facilities for these wells at an offsite location with sanitary sewer access, and a water pipeline to connect to the District's existing potable water distribution system. Combined, this alternative would require roughly 2.6 miles of new pipelines. Onsite treatment could be achieved; however, large drying beds would be required for the removed iron and manganese. These beds would need to be maintained by hauling off the dried sludge to an appropriate waste disposal site. Operations would be limited by the effectiveness of the drying beds. Onsite treatment would still require a potable waterline of approximately 2.6 miles from the treatment plant to a SqCWD point of connection.

An additional issue with this alternative is that CDPH would require CWD to obtain Grade 4 Distribution Certification as well as Grade 3 Treatment Certification in order to serve SqCWD. This increase in certification requirements would change the water quality sampling requirements, introducing added burden for CWD staff.

This alternative concept could potentially meet the project goals and objectives, although the reduced capacity would provide less ability to redistribute pumping away from the coast. but the treatment issues and extensive pipeline requirements would create overall impacts greater than those of the proposed project. Thus, this project was eliminated from additional consideration and is not discussed further.

5.6.3 Alternative Concepts Raised During EIR Scoping

Comments received during the public scoping process for this EIR are presented in **Appendix B**. The following suggestions for possible alternatives to the WMP were raised by the Santa Cruz County Redevelopment Agency during the scoping process:

- Relocate the O'Neill Ranch Well site in order to avoid potential conflicts with future land uses at this site (O'Neill Ranch Well site is owned by Santa Cruz County Redevelopment Agency).
- Refine preliminary site plan for the O'Neill Ranch Well site such as to minimize potential conflicts with future land uses at this site, and minimize impacts to the riparian corridor, oak trees, noise, site access, hazardous materials storage, and aesthetics.

The following suggestion for possible alternatives to the WMP was raised by the Santa Cruz County Planning Department during the scoping process:

- Refine preliminary site plan for the O'Neill Ranch Well site to the western portion of the parcel in order to minimize adverse effects related to riparian resources, tree removal, and grading on steep slopes.

Subsequent to the EIR scoping period, the SqCWD has engaged in ongoing coordination and communication with the Santa Cruz County Redevelopment Agency and Santa Cruz County Planning Department regarding the proposed facilities at the O'Neill Ranch Well site. The proposed site configuration was developed in coordination with the Redevelopment Agency in order to accommodate the future uses of the site under consideration by the County. As a result,

the preliminary site plan presented in this EIR (see Figure 2-3) concentrates the well and treatment facilities in the eastern portion of the parcel, with the intent of leaving adequate space in the western portion of the parcel available in the event the Redevelopment Agency needs a portion of the site for other uses in the future.

5.7 References – Alternatives

Black & Veatch, *Water Recycling Facilities Planning Study Final Report*, June 2009.

Soquel Creek Water District (SqCWD), *Memo to the Board of Directors, Subject: Agenda Item No. 5.2 (a), Approve Well Master Plan Preferred Alternative for Evaluation in an Environmental Impact Report (EIR)*, March 21, 2006a.

Soquel Creek Water District (SqCWD), *Integrated Resources Plan*, 2006b.

Soquel Creek Water District (SqCWD) and Central Water District (CWD), *AB 3030 Groundwater Management Plan for the Soquel-Aptos Area, Santa Cruz County, California*, February 2007.

scwd², Seawater Reverse Osmosis Cooperative Desalination Program Website. Available online: www.scwd2desal.org. Accessed February 1, 2010.

CHAPTER 6

Report Preparers

Lead Agency

Soquel Creek Water District
5180 Soquel Drive
Soquel, CA 95073

- Laura D. Brown, General Manager
- Jeff Gailey, P.E.
- Mike Wilson, P.E.
- Taj Dufour, P.E.
- Ron Duncan

EIR Authors and Consultants

Environmental Science Associates
225 Bush Street, Suite 1700
San Francisco, CA 94104

- | | |
|--------------------------------|--------------------|
| • Eric Zigas, Project Director | • Jack Hutchison |
| • Kelly White, Project Manager | • Erika Kalve |
| • Leslie Moulton | • Heidi Koenig |
| • Cherie Kolin | • Dean Martorana |
| • Julie Moore | • Linda Uehara |
| • Peter Hudson | • Ron Teitel |
| • Chris Sanchez | • Lisa Bautista |
| • Martha Lowe | • Anthony Padilla |
| • Leslie Lowe | • Matthew Fagundes |
| • Allison Chan | • Ricardo Ramirez |
| • Perry Jung | • Kirstin Conti |

HydroMetrics Water Resources Inc. (formerly HydroMetrics LLC)
519 17th Street, Suite 500
Oakland, CA 94612

- Derrik Williams, P.G., C. Hg.
- Cameron Tana, P.E.

Bosso Williams

P.O. Box 1822

Santa Cruz, CA 95061-1822

- Robert E. Bosso, Legal Counsel