4.10 HYDROLOGY AND WATER QUALITY

This section describes existing hydrology and water quality conditions, identifies associated regulatory requirements, evaluates potential project and cumulative impacts, and identifies mitigation measures for any significant or potentially significant impacts related to implementation of the Sustainability Policy and Regulatory Update of the County of Santa Cruz (County) General Plan and Local Coastal Program (LCP) and County Code (Sustainability Update or project). The analysis is based on review of existing studies and reports, including, but not limited to, Groundwater Sustainability Plans (GSPs) of the Santa Cruz Mid-County Groundwater Agency (MGA) (2019), Santa Margarita Groundwater Agency (SMGA) (2021), and Pajaro Valley Water Management Agency (PV Water) (2021); as well as the Central Coast Regional Water Quality Control Board (RWQCB) Basin Plan (Central Coast RWQCB) (2017); and other relevant documents regarding hydrology and water quality conditions in the county.

4.10.1 Environmental Setting

4.10.1.1 Surface Water Resources and Watersheds

Santa Cruz County is located on the central coast of California, along Monterey Bay. There are numerous streams throughout the county, and the San Lorenzo River and Pajaro River are the two rivers in the county, which with numerous streams that traverse the county, total over 850 miles (County of Santa Cruz Health Services Agency 2014). Figure 4.10-1 illustrates major streams within the county. With the exception of the Pajaro River, which originates in San Benito County, streams in the county originate within the county and all drain to Monterey Bay,

The mountainous topography of the county encompasses 15 principal watersheds, which can be grouped and generally characterized as: North Coast streams that drain the western slope of Ben Lomond Mountain; the San Lorenzo River and its tributaries; Soquel and Aptos Creeks; and the Watsonville Sloughs, which discharge to the Pajaro River mouth. These watersheds are comprised of 58 smaller drainage basins or subwatersheds, each having unique characteristics based on variations in size, aspect, elevational gradient, precipitation, geology, and soils (County of Santa Cruz Health Services Agency 2014).

Within the county, there are seven major drainages (defined as watersheds with a drainage area of more than 20 square miles) including the San Lorenzo River, Pajaro River, Soquel Creek, Scott Creek, Waddell Creek, Aptos Creek, and Baldwin Wilder watersheds, all of which flow to the Pacific Ocean. Smaller watersheds with drainage areas of 3 to 15 square miles include the Ano Nuevo, Arana Gulch, Swanton Bluffs, Davenport, San Vicente, Liddell, Laguna, Sand Hill Bluff, Majors, Santa Cruz, San Andreas, and Watsonville Slough watersheds. Figure 4.10-2 shows watersheds in the county. Key features of the major watersheds are summarized below.

San Lorenzo River Watershed

The San Lorenzo River drains a 138-square mile watershed located in northern Santa Cruz County and flows through the Santa Cruz Mountains to the coast. It is the largest watershed lying completely within Santa Cruz County. Originating in the Santa Cruz Mountains, the watershed consists of a 25-mile-long main stem, nine principal tributaries, and numerous smaller creeks and waterways, many of them unnamed. The nine principal tributaries include Branciforte, Carbonera, Zayante, Bean, Fall, Newell, Bear, Boulder, and Kings Creeks (County of Santa Cruz Health Services Agency 2014).

The watershed is comprised predominantly of open space lands (41%) in the northern portion and residential neighborhoods (26%) and paved roads (13%) as the river flows south through the City of Santa Cruz to the Monterey Bay (County of Santa Cruz Health Services Agency 2014). Surface water flows within tributary creeks in the watershed are characterized as flashy with periodic high flow events that coincide with winter storms and low summer baseflows. This results in high-energy systems that have the potential to move a significant quantity of sediment. Stream base flow levels, sustained by groundwater flow, rise in the winter, and decline steadily through the spring and early summer months. The lowest flows occur in the late summer and fall months before winter rains.

The watershed provides surface water supplies for the San Lorenzo Valley Water District and City of Santa Cruz Water Department. Surface water from the San Lorenzo River watershed provides 50% of the water supply for the San Lorenzo Valley Water District, while the river itself provides 47% of the water supply for the City of Santa Cruz and; water is stored at the 2.8-billion-gallon Loch Lomond Reservoir. The Scotts Valley Water District is located within the watershed and obtains its water supply from groundwater sources. See Section 4.16, Utilities, for further discussion of local water supplies.

Pajaro River Watershed

The Pajaro River watershed covers approximately 1,300 square miles and spans across four different counties—Monterey, San Benito, Santa Clara and Santa Cruz counties. Approximately 15%, or 200 square miles, of the Pajaro River Basin lies within Santa Cruz County through which the Pajaro River extends approximately 19 miles to the Monterey Bay. The watershed is bound by the Santa Cruz Mountains to the north, and the Gabilan Range to the south. Its main tributaries are Corralitos, Uvas, Llagas, San Benito, Pacheco, and Santa Ana Creeks. These tributaries and many others converge and provide water to the Pajaro River, which drains into Monterey Bay. In Santa Cruz County, the Pajaro River watershed is comprised of the Watsonville Slough System (fed by Gallighan Slough, Harkins Slough, and Struve Slough), Corralitos Creek, and Salsipuedes Creek. Predominant land uses in the Lower Pajaro and its tributaries include irrigated croplands, rangelands, timberlands, urbanization (City of Watsonville), and rural residential development (County of Santa Cruz Health Services Agency 2014).

Soquel Creek Watershed

Located between the cities of Santa Cruz and Watsonville, the Soquel Creek watershed drains an area of approximately 42 square miles and flows to Monterey Bay. The watershed has two major tributaries, the

East and West Branches, and Main Stem Creeks, and four secondary tributaries. Principal land uses in the watershed includes urban development, rural residential development, agriculture, parks and recreation, and mining and timber harvesting. The unincorporated community of Soquel and the City of Capitola are both located in the lower reaches of the watershed (County of Santa Cruz Health Services Agency 2014). Also located within the mapped Soquel Creek watershed is the Rodeo Gulch watershed (County of Santa Cruz Health Services Agency 2014).

Aptos Creek Watershed

The Aptos Creek watershed drains an area of approximately 25 square miles in southern Santa Cruz County and its main tributaries are Aptos Creek and Valencia Creek. Land uses in this watershed are comprised of forested lands, state parks and some rural residential and urban areas. More than half of the Aptos Creek portion of the watershed is forested, with much of the creek running through the southern portion of the Nisene Marks State Park. Land use in the Valencia Creek portion of the watershed is primarily rural residential and urban development with historical and modern-day logging land uses in both subwatersheds (County of Santa Cruz Health Services Agency 2014).

North Coast Watersheds

Scott Creek Watershed

The 39-square mile Scott Creek watershed is located in the northern part of the county. Scott Creek is fed by two major tributaries, Big Creek and Little Creek. Principal land uses in the watershed include agriculture and timber, industrial use (particularly near lands held by Lockheed Martin), residential use, and recreation. (County of Santa Cruz Health Services Agency 2014).

Waddell Creek Watershed

The Waddell Creek watershed drains an area of approximately 27 square miles and is comprised by Last Chance Creek, two major tributaries of Waddell Creek, and numerous unnamed tributaries. Big Basin State Park constitutes the majority of land cover in the watershed with small pockets of rural residential and agricultural use near the coast (County of Santa Cruz Health Services Agency 2014).

Baldwin Wilder Watershed

The Baldwin Wilder watershed is located between Majors Creek and Santa Cruz watersheds and south of the San Lorenzo River watershed. It drains an area of approximately 20 square miles, is comprised of numerous tributaries, and the majority of the watershed is comprised of Wilder Ranch State Park with some agriculture land uses along the coast and a quarry along Old Dairy Gulch (County of Santa Cruz Health Services Agency 2014).

4.10.1.2 Monterey Bay and Pacific Ocean

All watersheds in Santa Cruz County drain to the Monterey Bay and Pacific Ocean. Monterey Bay is part of the Monterey Bay National Marine Sanctuary (MBNMS), which was established and designated in 1992 for the purpose of resource protection, research, education and public use. The MBNMS is the largest of thirteen marine sanctuaries administered by the United States Department of Commerce National Oceanic and Atmospheric Administration (NOAA) and it extends from Marin County to Cambria, encompassing nearly 300 miles of shoreline and 5,322 square miles of ocean, extending an average distance of twenty-five miles from shore. At its deepest point the MBNMS reaches down 10,663 feet (more than two miles) (Monterey Bay National Marine Sanctuary, 2008).

4.10.1.3 Groundwater Resources

Santa Cruz County overlies three different groundwater basins including the Santa Margarita Groundwater Basin. the Santa Cruz Mid-County Groundwater Basin (Mid-County Basin), and the Pajaro Valley Groundwater Subbasin, which are all used as a primary source of water for urban and agricultural land uses within the county. Figure 4.10-3 shows the location of these groundwater basins. According to the basin prioritization in accordance with the Sustainable Groundwater Management Act (SGMA), Santa Cruz Mid-County Basin and Pajaro Valley Subbasin are considered high priority basins, and Santa Margarita is a medium priority basin (California Department of Water Resources [DWR] 2021). Both high and medium priority basins are required to adhere to the requirements of SGMA by preparing and implementing a groundwater sustainability plan (GSP) (see further discussion in Section 4.10.2.2, State Regulations, below). None of these three groundwater basins, however, are adjudicated but all three are in some level of overdraft where more water has been extracted from the aquifers than is naturally recharged through the soils and stream valleys. The Santa Cruz Mid-County Basin and Pajaro Valley Subbasin are both designated as "critically overdrafted," resulting in an accelerated timeline for SGMA implementation.

The County designates the areas where major groundwater recharge or infiltration is known to occur as Primary Groundwater Recharge areas on General Plan/LCP Resource Constraints Maps and County GIS system. These areas are locations where local soil conditions and underlying geologic formations allow for infiltration and percolation of rainfall and runoff into groundwater basins. Land divisions and density are regulated by County policy in primary groundwater recharge areas.

Santa Margarita Groundwater Basin

The Santa Margarita Groundwater Basin is a primary source of water supply for Scotts Valley and the San Lorenzo Valley. It covers approximately 35 square miles in the Santa Cruz Mountains foothills, forming a triangular area that extends from Scotts Valley to the east, Boulder Creek to the northwest, and Felton to the southwest. The Basin is bounded on the north by the Zayante trace of the active, strike-slip Zayante-Vergeles fault zone, on the east by a buried granitic high that separates the Basin from Santa Cruz Mid-County Basin, and on the west by the Ben Lomond fault, except where areas of alluvium lie west of the fault (SMGWA 2021).

The major water purveyors that directly rely on the supply from Santa Margarita Groundwater Basin are Scotts Valley Water District (SVWD), San Lorenzo Valley Water District (SLVWD), and Mount Hermon Association. The Santa Margarita Groundwater Basin is also the sole supply source for 13 small water systems and over 775 private wells (SVWD 2021).

Groundwater Conditions

The Santa Margarita Basin is a geologically complex area that was formed by the same tectonic forces that created the Santa Cruz Mountains (Kennedy/Jenks Consultants 2016). The Basin consists of sandstone, siltstone, mudstone, and shale overlying granitic and metamorphic rocks, all of which have been folded into a geologic trough called the Scotts Valley Syncline. The sandstone units in the geologic sequence are the principal aquifers that supply much of the groundwater produced for local water supply. The Basin's principal aquifers are the Santa Margarita, Lompico, and Butano Sandstones. The Monterey Formation is an aquitard between the Santa Margarita and Lompico Sandstones (SMGWA 2021).

Precipitation is the primary source of groundwater recharge in the Basin in the form of direct percolation of precipitation through the soil to groundwater, as well as infiltration from streams. The major groundwater outflows include discharge to streams and springs and groundwater pumping (Kennedy/Jenks Consultants 2016). The decline of groundwater levels in many parts of the Basin occurred between 1985 and 2004, representing a loss in groundwater storage in Santa Margarita Groundwater Basin by an estimated 28,000 acre-feet. This loss in groundwater storage resulted in diminished local water supply and reduced sustaining baseflows to local streams that support fishery habitats. As a result of conservation and other management efforts at local water agencies, the total pumping from Santa Margarita Groundwater Basin has decreased by 45% since 1997 (SVWD 2021).

Groundwater conditions in the Basin are generally sustainable, with the exception of the Mount Hermon / South Scotts Valley area where there are lowered groundwater levels in two of the Basin's primary aquifers. In this area, a portion of the Santa Margarita aquifer is dewatered due to a 30- to 40-foot drop in groundwater level, and the Lompico aquifer has had a 150- to 200-foot groundwater level decline (SMGWA 2021). Even though the Santa Margarita aquifer recharges quickly when there is average or better rainfall, its groundwater levels in the Mount Hermon / South Scotts Valley area have not recovered much from the initial decline that ended in 1994.

Groundwater Management

Since the early 1980s, SVWD has actively managed groundwater resources, and in 1994, the agency formally adopted a Groundwater Management Plan in accordance with the Groundwater Management Act, AB 3030 (Kennedy/Jenks Consultants 2016). The SMGWA is the groundwater sustainability agency that was formed as a Joint Powers Authority in 2017 to comply with SGMA. The SMGWA has three member agencies—SVWD, SLVWD, and the County of Santa Cruz—and is governed by a Board of Directors comprising two representatives from each member agency, one representative from the City of Scotts Valley, one from the City of Santa Cruz, one from Mount Hermon Association, and two private well owner representatives (SMGWA 2020).

The SMGWA completed preparation of the Santa Margarita GSP in November 2021, which was submitted the DWR in January 2022. The groundwater basin is identified in the medium priority category and is not subject to critical conditions of overdraft. The SMGWA drafted three key Basin management goals: (1) ensure water supply reliability for current and future beneficial uses, (2) maintain water quality to meet current and future beneficial uses, and (3) prevent adverse environmental impacts.

The GSP identifies sustainable yield of the Basin by aquifer, which is an estimated volume of groundwater that can be pumped on a long-term average annual basis without causing undesirable results. The projected sustainable yield compared to past use is summarized in Table 4.10-1. According to the SMGWA GSP, groundwater conditions in the Basin are generally sustainable, with the exception of the Mount Hermon / South Scotts Valley area as indicated above.

The GSP identifies existing and other projects and management actions to reach sustainability. Measures that the SMGWA member agencies will take to achieve Basin sustainability are focused on increasing Lompico aquifer groundwater levels in the Mount Hermon/South Scotts Valley area. The most immediate action will be to expand conjunctive use of surface water and groundwater using existing infrastructure. It is likely that this measure will be followed by development of infrastructure to gain access to SLVWD's entitlement of 313 AFY of Loch Lomond water for further conjunctive use opportunities. Combining the two projects would potentially provide for a long-term average of 540 AFY of in-lieu recharge by SLVWD and SVWD resting their extraction wells during the wet seasons when surface water is available for conjunctive use. Groundwater modeling has demonstrated the combined projects will raise Mount Hermon/South Scotts Valley area Lompico aquifer groundwater levels by 20 to 50 feet. The anticipated increases in groundwater levels from 540 AFY of conjunctive use enables the SMGWA to meet its long-term measurable objectives for chronic lowering of groundwater levels (SMGWA 2021),

Table 4.10-1. Santa Margarita Basin Sustainable Yield

Aquifer Formation	Historical Pumping 1985-2018 (AFY)	Current Pumping 2010-2018 (AFY)	Sustainable Yield (AFY)
Santa Margarita	1,070	770	850
Monterey Formation	320	180	140
Lompico	1,770	1,520	1,290
Butano	530	480	540

Source: SMGA 2021

Santa Cruz Mid-County Groundwater Basin

The Santa Cruz Mid-County Groundwater Basin (Mid-County Basin) was formed as part of a consolidation from all or part of four previously existing basins that were combined for groundwater management purposes. The four previous basins included the Soquel Valley, West Santa Cruz Terrace, Santa Cruz Purisima Formation, and Pajaro Valley Basins as originally identified by DWR in the Groundwater Bulletin 118 Update in 2016 (MGA 2019). The Basin is located at the northern end of the Central Coast hydrologic region, extending from the Santa Cruz Mountains to the Pacific Ocean, and from Live Oak to La Selva Beach along the Pacific coast. The Basin includes a portion of the City of Santa Cruz, all of the City of Capitola, and

unincorporated areas of Santa Cruz County (MGA 2019). The Basin is generally bounded by Branciforte Creek on the west, the unincorporated communities of Aptos and La Selva Beach on the east, the Zayante Fault (below Summit Road) on the north, and the Pacific Ocean on the south.

Groundwater Conditions

The consolidated Mid-County Basin boundary is intended to include all areas where the stacked aquifer system of the Purisima Formation, Aromas Red Sands, and certain other Tertiary-age aquifer units underlying the Purisima Formation constitute the shared groundwater resource to be managed by the Santa Cruz Mid-County Groundwater Agency (MGA). Previous basin boundary definitions were based on surficial alluvium, and did not accurately represent the extent of the deeper aquifer units from which most groundwater is produced.

There are two primary water-bearing geologic formations within the Mid-County Basin: the Purisima Formation and the Aromas Red Sands. The Mid-County Basin is dominated by the Purisima Formation, which extends throughout the Basin and overlies granitic basement rock that outcrops in the west of the Basin. In the southeastern portion of the Basin, east of Valencia Creek, the Purisima Formation is overlain by unconfined Aromas Red Sands. Since the Purisima Formation dips to the southeast and the Aromas Red Sands are assumed to be flat lying, groundwater flows by gravity following the local topography but also follows the orientation of local geologic stratigraphy.

The Purisima Formation aquifer units and the Aromas Red Sands aquifer are the primary aquifers pumped throughout the Mid-County Basin by all extractors (i.e., non-municipal domestic, non-municipal institutions, municipal, and agricultural). Non-municipal domestic and small scale agriculture users of groundwater generally complete their wells in the shallowest productive aquifers, while municipal extractors complete their wells in specific aquifer units that may be much deeper than domestic wells. Essentially, groundwater flows from the local mountains toward the ocean, but where present, also follows preferred pathways through the subsurface based on the local geology. Both the Purisima and Aromas aquifers are hydrologically connected to the Pacific Ocean. This connection creates a seawater intrusion threat to the freshwater aquifers when groundwater pumping from the Basin exceeds natural and artificial groundwater recharge into the Basin.

DWR classified the Basin as in critical overdraft because seawater intrusion is actively occurring (MGA 2019). Groundwater extractions in the Basin peaked between the mid-1980s and mid-1990s, causing groundwater overdraft. Over-pumping of Basin aquifers lowered groundwater elevations in the coastal portions of the Basin where the majority of municipal pumping takes place. Lowered groundwater levels allowed seawater intrusion into portions of the aquifer and posed a threat of more widespread seawater intrusion. Since 1995, extensive and effective water conservation efforts have reduced water demand and total Basin groundwater pumping, but modeling conducted as part of GSP development indicates that additional supplemental water is needed to achieve groundwater sustainability (MGA 2019). DWR's recent update to its Bulletin 118 also identifies the Basin being "subject to critical conditions of overdraft" (DWR 2021). The Basin is identified as "high priority" pursuant to requirements of SGMA (DWR 2021).

Seawater intrusion occurs primarily from a lowering of groundwater due to extraction and was first identified in the Mid-County Groundwater Basin in the 1980s. The historical groundwater budget (1985 – 2015) consisted of inflows from surface recharge (60% of inflows) and subsurface inflows from the neighboring Purisima Highlands Subbasin (40% of inflows) (MGA 2019). Outflows are primarily by groundwater extraction (59% of outflows) and to the Corralitos-Pajaro Valley (32% of outflows), with only 3% of outflows going to the Santa Margarita Basin. Overall, groundwater flows to and from the ocean are net outflows to the ocean (6% of outflows). However, net flows from offshore occur in the deeper Purisima aquifers where seawater intrusion is already observed. The historical change of groundwater in storage during this time period has been an annual increase of 480 acre-feet[1] per year which reflects recovery from historic low Basin groundwater levels in the 1990s and early 2000s that has been achieved through water conservation efforts and redistributed pumping. However, as a result of drier climate, groundwater inflow volumes for current and projected conditions are now less than historical inflows. The main changes over this recent period are a decrease in recharge due to reduced rainfall but also a decrease in municipal pumping due to water conservation. The net result was that the Basin experienced only a relatively small decrease of 160 acre-feet per year of groundwater in storage (MGA 2019).

Groundwater Management

With identification of seawater intrusion going back several decades, local agencies developed an extensive monitoring network of wells to better understand the Basin groundwater and monitor trends, as well as implement water conservation and groundwater management strategies to balance groundwater demand with the Basin groundwater budget. This was originally mandated under Assembly Bill 3030, also known as the Groundwater Management Act in 1992. To comply with Assembly Bill (AB) 3030, the major agencies overseeing groundwater—the City of Santa Cruz, Central Water District, County of Santa Cruz, and Soquel Creek Water District (SqCWD)—began collaborating on monitoring and management and developed a Groundwater Management Plan. Groundwater management collaboration was further cemented when the MGA was formed as a Joint Powers Authority between those four agencies in 2016 in response to SGMA. The MGA further expanded Basin representation by including three private well owner representatives on the Board.

The Groundwater Management Plan has been replaced by the GSP, which currently serves as the groundwater management planning document for the Basin (MGA 2019). The GSP was completed and adopted by the MGA in November 2019, and it was approved by DWR on June 3, 2021 as being found to satisfy the requirements of SGMA (DWR 2021). The GSP is a collaborative effort between local water agencies, technical experts, land use agencies, environmental managers, and community members to manage the groundwater basin sustainably.

The intent of the GSP is to guide long-term management of the shared groundwater resources in the Santa Cruz Mid-County Groundwater Basin to ensure a future stable groundwater Basin and therefore a reliable water supply to meet community needs now and into the future. The GSP estimates the sustainable yield in the Basin, which is the amount of net Basin pumping that can occur while avoiding

[1] One acre-foot equals 325,851 gallons.

undesirable results for the Basin's applicable sustainability indicators. Net pumping is pumping minus volume of managed aquifer recharge (MGA 2019). The sustainable yield of the Basin is estimated as 4,870 acre-feet per year (AFY) as summarized on Table 4.10-2.

Table 4.10-2. Mid-County Groundwater Basin Projected Sustainable Yield

Aquifer Group	Sustainable Yield (AFY)
Aromas Red Sands and Purisima F	1,650
Purisima DEF, D, BC, A, and AA	2,290
Marine Sedimentary Rock Unit TU	930
Total	**4,870**

Notes: Aquifer groups are created according to how production wells are typically screened.
Source: MGA 2019

The GSP sets sustainability management criteria for each of the five sustainability indicators applicable to the Santa Cruz Mid-County Groundwater Basin and identifies projects and management actions to achieve and maintain Basin sustainability. Baseline projects and management actions (Group 1), in conjunction with other projects and management actions planned to reach sustainability (Group 2), include:

- Group 1 - Water conservation and demand management and installation and redistribution of municipal groundwater pumping
- Group 2 - Near-term implementation, including: the Pure Water Soquel Project, aquifer storage and recovery (ASR) in the City of Santa Cruz Beltz well system (Beltz ASR) and elsewhere, water transfers/in lieu groundwater recharge, and distributed stormwater managed aquifer recharge.

MGA's analysis indicates the Group 1 activities and Group 2 projects and management actions will bring the Basin into sustainability. However, if one of the projects and management actions required for sustainability in Group 2 either fails to take place or does not have the expected results, additional potential projects and management actions may be evaluated in the future (Group 3), which include recycled water reuse, desalination, water use curtailment or other projects that may become possible through emerging technology.

The GSP will guide ongoing management of the groundwater basin with a goal to achieve and maintain the Basin's sustainability goal within 20 years and over a 50-year planning and implementation horizon (MGA 2019). Basin management has and will continue to focus on controlling seawater intrusion. MGA member agencies have successfully developed water conservation and pumping management plans optimized to keep groundwater elevations high enough at the coast to prevent further onshore movement of seawater into the Basin's freshwater aquifers. These management efforts have resulted in some of the lowest per capita municipal water demand in the state and reduced municipal groundwater pumping from approximately 7,000 acre-feet per year in the late 1980s to approximately 4,000 acre-feet per year in Water Year 2017 (MGA 2019).

Pajaro Valley Groundwater SubBasin

Groundwater Conditions

The Pajaro Valley Subbasin is located at the end of the Pajaro River Watershed, which as previously mentioned, drains approximately 1,300 square miles of Monterey, Santa Cruz, Santa Clara, and San Benito Counties. The Pajaro Valley Subbasin is bordered by the Monterey Bay to the west and the San Andreas Fault to the east. It is adjacent to the Santa Cruz Mid-County Basin and Purisima Highlands Subbasin to the northwest, and the Salinas Valley 180/400-Foot Aquifer and Langley Area Subbasins to the south. The Pajaro Valley Subbasin is a critically overdrafted, high priority basin as defined by the DWR. Nearly 95% of water supplies for agricultural and municipal use within the Pajaro Valley come from groundwater sources (County of Santa Cruz 2020), with the remaining coming from the use of recycled water used for irrigation.

Pajaro Valley is underlain by a basement of granitic rocks over which are a series of unconsolidated water bearing units including the Purisima Formation and the Aromas Red Sands Formation. The Purisima Formation underlies the valley at depths ranging from at or near land surface along the northern and eastern boundaries, to as much as 900 feet below the land surface near the mouth of the Pajaro River (PV Water 2014). The Purisima Formation consists of layered sandy silts and silts deposited in nearshore and far shore marine environments. The Purisima Formation is generally penetrated only by a few deeper wells in the Pajaro Valley area and provides limited amounts of water supply. The Aromas Red Sands overlies the Purisima Formation and is a major aquifer within the Pajaro Valley with an average thickness of 500 feet and a maximum thickness of about 1,000 feet. The Aromas Red Sands aquifer provides most of the groundwater pumped by wells in Pajaro Valley. All the water bearing units of the Pajaro Basin extend offshore and are in hydrologic connection with Monterey Bay (County of Santa Cruz Health Services Agency 2014).

Seawater intrusion in the Pajaro Valley Subbasin, a result of groundwater overdraft, was first documented in 1953. Since then, the problem has become more severe. The overdraft conditions have caused groundwater elevations to drop below sea level leading to seawater intrusion. Seawater intrusion has caused chloride contamination of groundwater wells up to three miles inland. The elevated chloride concentrations make the groundwater unusable for irrigation of the agricultural lands in the coastal region of the Pajaro Valley (PV Water 2014). Groundwater use in the Subbasin is estimated as ranging between 55,000 to 60,000 AFY, and sustainable yield is estimated to be between 30,000 and 50,000 AFY (County of Santa Cruz Health Services Agency 2014). The five-year average from 2009-2013 for total water use, including delivered water and City of Watsonville surface water use, is approximately 55,000 AFY, of which agricultural water use represents approximately 90% of the total (PV Water 2014).

Groundwater Management

The PV Water has worked to achieve a goal of sustainable groundwater management since its formation in 1984. PV Water was identified to be the GSA for the Corralitos - Pajaro Valley Subbasin in August 2015. As the GSA, PV Water is responsible for achieving groundwater sustainability for the Subbasin by 2040. PV Water submitted an Alternative to a GSP for the Pajaro Valley Subbasin on December 31, 2016, which was

approved by the DWR in 2019; they prepared the Groundwater Sustainability Update 2022 (GSU22) in September 2021 to meet the 5-year update GSP requirement for SGMA (PV Water 2021).

The GSU22 evaluates the status of projects and management actions for achieving sustainability based on current information, and a formal review and assessment of the PV Water's projects and management actions will take place by 2025. Annual average project yields are currently below planned averages, yet analysis of Basin groundwater conditions indicates that projects and management actions are having the intended effects of reducing groundwater extraction and raising groundwater elevations (PV Water 2021). In general, observed groundwater quality data appear to indicate that implementation of the PV Water's 2014 Basin Plan is decreasing the rate of seawater intrusion, especially within the DWZ (recycled water delivered water zone); additional monitoring wells are likely needed to assess extent of seawater intrusion outside the DWZ (PV Water 2021).

According to the GSU22 analysis of groundwater conditions, average annual change in storage over the last 5 years, which included multiple wet years resulting in above-average precipitation (17% above normal), was approximately an increase of 5,460 AFY (PV Water 2021). All years, except water year 2018, had increased storage. Therefore, not only has the measurable objective of 100% reduction of the rate of groundwater in storage depletion been achieved during implementation of the 2014 Basin Management Plan, but there has been an increase of groundwater in storage during this time. The GSU22 also reports that PV Water projects and management actions have helped improve Basin groundwater elevations to make progress towards increasing the frequency and duration of interconnected surface water with the Aromas aquifer (PV Water 2021).

The PV Water continues to implement conservation and recycled water programs, and a number of other projects are pending or proposed. The following two projects are in the process of being implemented, but are not yet operational: College Lake with Inland Pipeline to Coastal Distribution System (College Lake Integrated Resources Management Project) and Harkins Slough Recharge Facilities Upgrades & Watsonville Slough with Recharge Basins (Watsonville Slough System Managed Aquifer Recharge and Recovery Projects). The GSU22 evaluates the status of projects and management actions for achieving sustainability based on current information, but a formal review and assessment of the projects and management actions will take place by 2025. Annual average project yields are currently below planned averages. However, analysis of Basin groundwater conditions indicates that projects and management actions are having the intended effects of reducing groundwater extraction and raising groundwater elevations (PV Water 2021), although PV Water continues with modeling efforts to forecast conditions with climate change and sea level rise.

4.10.1.4 Water Quality

Surface Water Quality

Surface water quality can be affected by pollution from point sources, such as discharge from industrial facilities, or from nonpoint sources, such as pollutants or contaminants that are carried by stormwater runoff as further explained below. Within the county, water quality degradation also can result from erosion,

which leads to sedimentation, as well as from urban contaminants in urban stormwater runoff, pesticides and fertilizers in runoff from agricultural lands, and infiltration from faulty septic systems. Stormwater pollutants present in the watersheds of the county include metals, solvents, paint, concrete, masonry products, detergents, vehicle fuels and fluids, oil and grease, pesticides and herbicides (organic compounds and nutrients), debris and litter, bacteria, pathogens and oxygen demanding compounds, and sediment and silt.

The Porter-Cologne Water Quality Control Act of 1969 is California's statutory authority for the protection of water quality. Under the Act, the State must adopt water quality policies, plans, and objectives that protect the State's waters for the use and enjoyment of the people. The Act sets forth the obligations of the State Water Resources Control Board (SWRCB) and RWQCBs to adopt and periodically update water quality control plans for all the waters of an area. The water quality control plan is defined as having three components: beneficial uses which are to be protected, water quality objectives which protect those uses, and an implementation plan which accomplishes those objectives. (See Section 4.10.2.2, State Regulations, for additional information about the Porter-Cologne Water Quality Control Act.)

The RWQCB establishes beneficial uses and characterizes the water quality of surface water bodies based on watershed boundaries. A watershed identifies an area of land that contains a common set of streams and rivers that all drain into a single larger body of water, such as a larger creek, river, lake, or an ocean. Beneficial uses for surface water and groundwater are divided into 23 standard categories to facilitate establishment of both qualitative and numerical water quality objectives that will be compatible on a statewide basis (Central Coast RWQCB 2019). The June 2019 Water Quality Control Plan for the Central Coastal Basin (Basin Plan) is the Central Coast RWQCB's current master water quality control planning document (Central Coast RWQCB 2019). The Basin Plan includes numerous water quality objectives that apply to all inland surface waters. The Basin Plan establishes beneficial uses for each of the water bodies in the Central Coast Region as summarized on Table 4.10-3 for major watercourses in the county.

While the Porter-Cologne Water Quality Control Act requires the state to adopt water quality policies, plans, and objectives that protect the State's waters, the federal Clean Water Act (CWA) establishes basic guidelines for regulating discharges of both point and non-point sources of pollutants into the waters of the United States.[2] The CWA requires that states adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the CWA. CWA section 303(d) requires states to identify and prepare a list of water bodies that do not meet water quality objectives and to establish Total Maximum Daily Loads (TMDLs) for each water body to ensure attainment of water quality objectives. These TMDLs are updated every two years in the SWRCB Integrated Report, also known as the section 305(b) report, which assigns an Integrated Report Condition Category to all assessed water body segments. Water body segments that exceed protective water quality standards are placed on the 303(d) list of impaired waters. The 2020-2022 California Integrated Report was adopted by the SWRCB in January 2022 and is expected to be submitted to the U.S Environmental Protection Agency (EPA) in April 2022.

[2] Point-source discharges are those emanating from a pipe or discrete location/process, such as an industrial process or wastewater discharge. Non-point source pollutants are those that originate from numerous diffuse sources and land uses, and which can accumulate in stormwater runoff or in groundwater.

Table 4.10-3. Central Coast Basin Plan Beneficial Uses

Beneficial Use Designation	Water Bodies						
	San Lorenzo River	*Pajaro River*	*Soquel Creek*	*Aptos Creek*	*Scott Creek*	*Waddell Creek*	*Baldwin Wilder Creek*
Municipal and Domestic Supply (MUN)	E	E	E	E	E	E	E
Agricultural Supply (AGR)	E	E	E	E	E	E	E
Industrial Process Supply (PROC)	—	—	—	—	—	—	—
Industrial Service Supply (IND)	E	E	E	E	E	E	—
Groundwater Recharge (GWR)	E	E	E	E	E	E	E
Water Contact Recreation (REC-1)	E	E	E	E	E	E	E
Non-contact Water Recreation (REC-2)	E	E	E	E	E	E	E
Wildlife Habitat (WILD)	E	E	E	E	E	E	E
Cold Freshwater Habitat (COLD)	E	E	E	E	E	E	E [1]
Warm Freshwater Habitat (WARM)	—	E	E	—	E	—	E
Migration of Aquatic Organisms (MIGR)	E	E	E	E	E	E	E
Spawning, Reproduction, and/or Early Development (SPWN)	E	E	E	E	E	E	E
Preservation of Biological Habitats of Special Significance (BIOL)	E	—	E	E	—	E	E
Rare, Threatened, or Endangered Species (RARE)	E	—	—	—	E	E	E [2]
Estuarine Habitat (EST)	—	—	—	E	—	C	—
Fresh Water Replenishment (FRSH)	E	E	E	E	E	E	E
Navigation (NAV)	—	—	—	—	—	—	—
Hydropower Generation (POW)	—	—	—	—	—	—	—
Commercial and Sport Fishing (COMM)	E	E	E	E	E	E	E
Aquaculture (AQUA)	—	—	—	—	—	—	—
Inland Saline Water Habitat (SAL)	—	—	—	—	—	—	—
Shellfish Harvesting (SHELL)	—	—	—	—	—	—	—

Source: Central Coast RWQCB 2019
Notes: E = Existing Beneficial Uses.
[1] Only at Wilder Creek; [2] Only at Baldwin Creek

Water quality impairments for the major surface water bodies in the county are identified in Table 4.10-4. These impaired bodies are listed as Category 5 in the SWRCB Integrated Report, which includes waters where at least one beneficial use is not supported, and a TMDL is required.

Table 4.10-4. Water Quality Impairments

Water Body	2018 303(d) List of Water Quality Impairments (Included under SWRCB Integrated Report Category 5)
Aptos Creek	Indicator bacteria and sedimentation
Arana Gulch	Chlorpyrifos, escherichia coli (E. coli), and fecal coliform
Beach Road Ditch	Nitrate, oxygen, dissolved, pH, turbidity, and sedimentation
Bean Creek	Sedimentation
Bear Creek	Sedimentation
Boulder Creek	Sedimentation
Branciforte Creek	Chlorpyrifos, enterococcus, E. Coli, fecal coliform, and sedimentation
Camp Evers Creek	pH and E. Coli
Carbonera Creek	Indicator bacteria, nutrients, and sedimentation
Cocoran Lagoon	pH. total coliform
Corralitos Creek	Fecal coliform, E. Coli, pH, and turbidity
Fall Creek	Sedimentation
Gallighan Slough	Indicator bacteria
Hanson Slough	Indicator bacteria
Harkins Slough	Indicator bacteria, chlorophyll-a, and oxygen, dissolved
Kings Creek	Sedimentation
Lockhart Gulch	Oxygen, dissolved and pH
Lompico Creek	Fecal coliform, nitrate, and sedimentation
Love Creek	Sedimentation
McEnery Spring	pH
Mountain Charlie Gulch	Sedimentation
Newell Creek	pH (Lower Newell Creek) and sedimentation (Upper Newell Creek)
Pajaro River	Boron, chlordane, chloride, chlorpyrifos, chromium, DDD, DDE, DDT, diazinon, dieldrin, E. Coli, fecal coliform, nitrate, oxygen, dissolved, PCBs, pH, sedimentation, sodium, toxicity, and turbidity
Pajaro River Estuary	DDE, diazinon, malathion, oxygen, dissolved, pH, temperature, and toxicity
Pescadero Creek	Sedimentation
Pinto Lake	Ammonia, Cyanobacteria hepatotoxic microcystins, chlorophyll-a, DDT, and oxygen, dissolved
Porter Gulch Creek	E. Coli and enterococcus
Rider Creek	Sedimentation
Rodeo Creek Gulch	pH and turbidity
Salsipuedes Creek	E. Coli, fecal coliform, oxygen, dissolved, pH, nitrate, toxicity, and turbidity
San Lorenzo River	Chlordane, chloride, chlorpyrifos, enterococcus, *Escherichia coli (E. Coli)*, fecal coliform, nitrate, polychlorinated biphenyls (PCBs), sedimentation/siltation, sodium, and water temperature
Schwann Lake	E. Coli, fecal coliform, total coliform, and nutrients
Scott Creek Lagoon	Chloride and sodium
Shingle Mill Creek	Nitrate and sedimentation
Soquel Creek	E. Coli, enterococcus, and fecal coliform
Struve Slough	Chlorophyll-a, E. coli, fecal coliform, oxygen, dissolved pH, toxicity, and turbidity
Trout Creek Gulch	Fecal coliform
Valencia Creek	E. Coli, fecal coliform, and sedimentation

Table 4.10-4. Water Quality Impairments

Water Body	2018 303(d) List of Water Quality Impairments (Included under SWRCB Integrated Report Category 5)
Waddell Creek Lagoon	Chloride, sodium, and pH
Watsonville Sough	E. coli, fecal coliform, DDE, malathion, nitrate, oxygen, dissolved, toxicity, and turbidity
Zayante Creek	Chlorpyrifos, fecal coliform, and sedimentation/siltation

Source: Central Coast RWQCB 2018.
Notes: PCBs = polychlorinated biphenyls; SWRCB = State Water Resources Control Board. Only the associated lagoons for Scott Creek and Waddell Creek were listed with impairments.

The primary constituents that impair local surface waters in the Santa Cruz County are sediment, pathogens, and nitrate. TMDLs have been adopted by the RWQCB for the following water bodies and constituents within the unincorporated area of the county:

- San Lorenzo River Watershed (including San Lorenzo River, Branciforte Creek, and Zayante Creeks): chlorpyrifos, nitrate, pathogens, sediment
- Soquel Creek Lagoon: pathogens
- Aptos Creek/Valencia Creek: pathogens
- Pajaro River: sediment, clorpyrifos and diazinon, fecal coliform, nitrate, nutrients, and sediment
- Watsonville Slough: pathogens Pinto Lake catchment: cyanobacterial blooms (California Water Boards 2022).

With regards to sediment, the natural processes of erosion and sedimentation in the Aptos, San Lorenzo River and Pajaro River watershed have been accelerated due to anthropogenic watershed disturbances. Erosion rates in the San Lorenzo River were found to be two to four times natural rates. Excessive sedimentation has interfered with the beneficial uses of these waterbodies, including fish and wildlife (Central Coast RWQCB 2019). Turbidity, a measure of the ability of light to pass through water, which is affected by the amount of fine sediment suspended within the water column, is high during peak flow events for streams in the Santa Cruz Mountains, even in areas that have not been affected by development and ground disturbance. Existing and new development activity occurring in steep and remote areas of the watersheds increase runoff and erosion, leading to increases in sedimentation and persistent turbidity in water supply streams. Turbidity can also have an impact on the availability and treatment cost of municipal water.

Pathogens/fecal coliform/E. coli has impaired waters in the San Lorenzo River, Soquel Creek, Aptos Creek, and Pajaro River watersheds, including Corralitos and Salsipuedes Creeks and Watsonville Slough (Pajaro River watershed). Controllable sources within the unincorporated areas of the county include: onsite wastewater treatment system (OWTS) discharges, storm drain discharges required to be covered by a National Pollutant Discharge Elimination System (NPDES) permit, pet waste, sanitary sewer collection system spills and leaks, homeless encampment discharges, and farm animal and livestock discharges (Central Coast RWQCB 2019). Controllable sources of fecal coliform bacteria in Watsonville Slough and its

tributaries include humans, pets, livestock, and land-applied non-sterile manure in irrigated agriculture, and from natural avian populations (Central Coast RWQCB 2019).

In addition, in the San Lorenzo River and Pajaro River watersheds, discharges of nitrogen compounds and orthophosphate are occurring in surface waters at levels which are impairing a spectrum of beneficial uses and, therefore, constitute a serious water quality problem (Central Coast RWQCB 2019). The municipal and domestic drinking water supply (MUN, GWR) beneficial uses and the range of aquatic habitat beneficial uses are not protected. Discharges of un-ionized ammonia, nitrate, and orthophosphate originating from irrigated agriculture, municipal NPDES-permitted stormwater system discharges, industrial and construction NPDES-permitted stormwater sources, livestock waste associated with grazing lands and rural residential areas, golf courses, and natural sources are contributing loads to receiving waters. Irrigated agriculture is the largest source of controllable water column nutrient loads in the Pajaro River watershed, and this source category is not currently meeting its proposed load allocation. Municipal NPDES-permitted stormwater sources are a relatively minor source of nitrogen compounds and orthophosphate, but can be locally significant. Livestock waste sources associated with grazing lands and rural residential areas are currently meeting proposed load allocations, as are sources associated with industrial and construction NPDES-permitted sources and golf courses (Central Coast RWQCB 2019).

Groundwater Quality

Santa Cruz Mid-County Groundwater Basin

As noted above, the primary groundwater bearing units in the Mid-County Basin are within the Purisima and the Aromas Sands formations. Groundwater in the Purisima Formation regularly has iron and/or manganese concentrations above the secondary drinking water standards, 300 micrograms per liter (µg/L) and 50 µg/L, respectively. Production wells in the formation with elevated iron concentrations can reach 3,000 µg/L, and manganese can reach up to 600 µg/L. Both iron and manganese occur naturally in the Purisima Formation because of the dissolution of metals within the aquifer. Concentrations within a well can fluctuate greatly and may range by two orders of magnitude. Neither constituent poses a major health concern at the levels found within the Basin; however, the SWRCB Drinking Water Division maintains a health-based Notification Level for manganese of 500 µg/L, based on neurotoxic risk. Because iron and manganese are naturally occurring, increasing concentration trends have not been observed. Groundwater pumped from the Purisima Formation for municipal purposes is treated to reduce iron and manganese levels prior to distribution (MGA 2019).

Currently, groundwater quality issues in the Santa Cruz Mid-County Groundwater Basin include one location with 1,2,3-trichloropropane (1,2,3-TCP) concentrations in groundwater, widespread nitrate in parts of the Aromas Red Sands aquifers, elevated ammonia concentrations in the western portion of the Basin, and saline water associated with seawater intrusion in two areas along the coast. Otherwise, Santa Cruz Mid-County Groundwater Basin groundwater quality is good, with no poor groundwater quality present within productive aquifers. The 1,2,3-TCP concentrations have been detected in the SqCWD Country Club well, which is screened in Aromas Red Sands and Purisima F aquifers (MGA 2019). These concentrations of 1,2,3-TCP, nitrates, and chloride have either been detected in monitoring wells or in production wells prior to being

treated to drinking water standards. Elevated concentrations (i.e., above drinking water standards) of these contaminants are not present in potable water supplies.

As previously discussed, seawater intrusion has been of great concern for the Santa Cruz Mid-County Groundwater Basin for many years. At times, groundwater elevations have been at −30 ft below mean sea level creating a gradient for seawater to intrude from Monterey Bay into coastal aquifers. In 2017, the MGA contracted the firms SkyTEM and Ramboll to conduct a geophysical survey of the coast and 1 mile offshore to accurately characterize the risk of seawater intrusion in the Basin. The survey revealed that the Purisima A/AA subaquifer is at high risk for seawater intrusion. In addition, high chloride concentrations have been detected in two City of Santa Cruz monitoring wells along the coast. Although measured chloride levels in the existing Beltz facilities have been within standard range for the Basin (10 to 100 milligrams per liter [mg/L]) and below the action threshold (700 mg/L), Beltz 8, 9, and 10 receive water from the Purisima A/AA formation, thus making seawater intrusion a concern (MGA 2019).

Santa Margarita Groundwater Basin

Groundwater in the Santa Margarita Groundwater Basin is generally of good quality and does not regularly exceed primary drinking water standards prior to treatment. However, both naturally occurring and anthropogenic constituents are present in some aquifers and areas (SMGWA 2021). The main naturally occurring groundwater quality concerns in the Basin are salinity (measured as total dissolved solids and chloride), iron, manganese, and arsenic. The main anthropogenic groundwater quality concerns are nitrate and contaminants of emerging concern, which are mainly from septic and sewer discharges together with organic compounds from environmental cleanup sites or other unidentified local releases (SMGWA 2021). SVWD and SLVWD monitor production wells throughout the Basin for constituents with a frequency that complies with the Safe Drinking Water Act requirements as outlined in the California Code of Regulations, Title 22 requirements. The water quality testing results are reported to the California SWRCB Division of Drinking Water.

Pajaro Valley Groundwater Subbasin

Previous studies and surveys have identified the following constituents of concern for water quality in the Basin:

- Nitrates
- Salinity
- Sodium
- Toxicity from Chloride and Sodium
- Pathogens
- Hexavalent Chromium

Nitrate contamination is a major concern in drinking water in the Pajaro Valley Groundwater Subbasin. Water high in nitrates is a threat to human health, particularly for infants and because nitrates are contained in fertilizers in relatively high quantities, they are routinely added to the Basin soils in agricultural

areas. Nitrates are highly soluble and can easily leach into groundwater. They may also be found in surface waters due to agricultural runoff. The transport of nitrates in groundwater is generally limited by aquitards that separate the various aquifers.

Salinity is a concern in both from seawater intrusion and in agricultural areas where salt cycling on irrigated lands leads to increased soil adsorption that then leach into the aquifer. Chloride is one of the primary constituents used to track seawater intrusion. Chloride frequently occurs in nature as a salt, such as sodium chloride (NaCl), which happens to be the most common salt in seawater. A significant source of salts in the Pajaro Valley Groundwater Subbasin is due to seawater intrusion, a result of long-term groundwater overdraft. Total Dissolved Solids, or TDS, is another water quality parameter commonly tracked as a cost-effective way to represent salinity. TDS is defined as the combined content of organic and inorganic constituents that remain in a water sample following filtration through a 2-micron sieve. TDS is composed of the following primary constituents, making it a simple and universal proxy for the bulk salt content of water: calcium, phosphates, nitrates, chloride, sodium, and potassium.

Irrigation water supplied with high levels of chloride and sodium can cause root and foliage absorption. Crop yield can be impacted from root absorption when higher chloride concentrations are experienced. The toxic effects from these constituents usually occur on woody perennial plants.

Crop pathogens are associated with irrigation water for agricultural land uses and can include bacteria, viruses and parasites. Human pathogens, including strains of E. coli or salmonella, are important for areas where food crops are grown, especially foods typically eaten raw. Current agricultural practices in the Pajaro Valley include the use of the soil fumigant methyl bromide to control weeds and pathogens, including phytophthora (PV Water 2014).

Chromium 6 (Hexavalent chromium) is naturally occurring consistent in the Aromas aquifer in both Pajaro Valley Groundwater Subbasin and Mid-County Basin. It occurs at levels exceeding proposed drinking water standards and will likely require treatment for municipal use in the future.

4.10.1.5 Flood and Coastal Hazards

Flood Hazards

Flooding can occur when stormwater runoff exceeds the conveyance capacity of existing drainages or control systems, dam or levee failures, high tides/storm surges, tsunamis, sea level rise, or other causes. Floods usually occur in relation to precipitation. Flood severity is determined by the quantity and rate at which water enters the waterway, increasing volume and velocity of water flow. The rate of surface runoff, the major component to flood severity, is influenced by the topography of the region as well as the extent to which ground soil allows for infiltration in addition to the percent of impervious surfaces (County of Santa Cruz 2021c).

Within Santa Cruz County there are numerous areas subject to flooding due to rivers, creeks, or coastal storms. The two main rivers in the county that are subject to flooding are the Pajaro River and the San

Lorenzo River. The Pajaro River and its floodplain runs through agricultural lands within the Pajaro Valley and, downstream, through downtown Watsonville. Flood control and management options for Pajaro River and its primary tributaries have been developed by the U.S. Army Corps of Engineers (USACE) in conjunction with the County of Santa Cruz, City of Watsonville, and other local agencies (USACE 2019).

The San Lorenzo River runs through the heavily populated San Lorenzo Valley and into downtown Santa Cruz, where a 2002 levee project has significantly reduced the flood risk for downtown residents, merchants, and landowners in this area, while other areas along the river are still subject to flooding. . Other major creeks in Santa Cruz County adjacent to rural and urban development that are subject to flooding include Aptos Creek, Trout Creek, Valencia Creek, Salsipuedes Creek, Corralitos Creek, Soquel Creek, and their tributaries. Areas subject to repetitive flooding include Paradise Park, Felton Grove, Soquel, and Beach Drive in Aptos. The steepness of many of these creek canyons and the surrounding mountain areas contribute to the speed that flood water can accumulate and move resulting in relatively short warning times, increasing the hazard for those at risk. There are also many smaller creeks and tributaries throughout the county that are subject to flooding due to development and impervious area coverage that increases the volume, rate and duration of runoff while decreases groundwater recharge and encroaches or alters natural floodplains and drainage patterns. Most of these are tributaries to the major creeks and rivers noted above (County of Santa Cruz 2021c).

The Federal Emergency Management Agency (FEMA) identifies areas along major channels throughout the United States that are at risk for flooding. FEMA Flood Insurance Rate Maps (FIRMs) show areas that have a 0.2% risk (500-year event) or a 1% risk (100-year event) of being inundated by a flood event in a given year. According to the FEMA FIRM data for the county, there are a total of 6,646 parcels, 4,061 structures, two schools, and three fire stations that are located within Zone A (areas of 100-year flood), Zone X (areas between the limits of 100-year and 500-year floods), and Zone V (areas of 100-year coastal flood with velocity [wave action]) (County of Santa Cruz 2021a). Flood hazard areas are shown on Figure 4.10-1.

Coastal flooding along the heavily developed Monterey Bay coastline of Santa Cruz County may occur with the simultaneous occurrence of large waves and storm swells during the winter. Storm centers from the southwest direction produce the type of storm pattern most commonly responsible for the majority of severe coastline flooding. The strong winds combined with high tides that create storm surges are usually accompanied by heavy rains. When storms occur simultaneously with high tides, flood conditions, particularly flooding at the mouth of the Pajaro River and Aptos Creek, are exacerbated (County of Santa Cruz 2021c).

Tsunami Flood Hazards

Coastal areas all along the California coast are susceptible to tsunami inundation which could occur from various nearby or faraway sources. A tsunami is a very large wave or series of waves that can be caused by an earthquake, an underwater landslide, or volcanic eruption. On shore run-up of a tsunami can cause substantial damage and property loss. According to modeling conducted by the University of Southern California Tsunami Research Center, there are inundation areas located along the county coastline that

include 2,826 parcels, 2,205 structures, no schools, and one fire station (County of Santa Cruz, 2021b). Areas potentially subject to inundation by a tsunami are shown on Figure 4.10-4.

Tsunamis have affected Santa Cruz County several times in recorded history. The first recorded tsunami was a tele-tsunami that initiated from an earthquake near Japan on June 15, 1896. In Japan, the death toll was approximately 20,000 people, but in Santa Cruz the tsunami was only a meter and a half high, and there is little record of damage. A more significant tsunami occurred on April 1, 1946 when a magnitude 7.8 earthquake in the Aleutian Islands produced a wave that was observed all along the west coast. In Santa Cruz County, a man drowned, and minor damage was done by 10-foot waves. Santa Cruz County was hit by a similar sized tsunami generated by the Good Friday Earthquake of March 27, 1964. Reports vary indicating heights between 1.5 meters and 3.3 meters. Recent tsunamis occurred as a result of the magnitude 9.0 earthquake in Japan on March 11, 2011 that hit the Santa Cruz Harbor with waves estimated to be several feet high that caused substantive damage (County of Santa Cruz 2021c) and in 2022 as a result of an underwater volcano in the Pacific Ocean, which also affected the Santa Cruz Harbor.

Climate Change and Sea Level Rise

The term climate change refers to any significant change in measures of climate (precipitation, temperature, winds), though the term is generally associated with an average increase in temperature and referred to as global warming. There is scientific consensus that the temperature of the earth's climate has been increasing more than natural climatic cycles can explain and that this warming is due to human activities. The range of possible hydrologically related hazards as a result of climate change includes: sea level rise; flooding; extreme storm events; coastal storm damage; prolonged droughts; and increased wildfires (County of Santa Cruz 2021c).

Estimates of sea level rise can be used to evaluate potential future flooding conditions. A 2012 study prepared by the National Academy of Sciences projects that sea level will rise 1.6–11.8 inches by 2030 relative to 2000, 4.7–24.0 inches by 2050, and 16.5–65.7 inches by 2100 (County of Santa Cruz 2021c). In 2017, a Working Group of the California Ocean Protection Council (OPC) released a report, "Rising Seas in California: An Update on Sea-Level Rise," which synthesized the current state of sea-level rise science, including revisions to previous global sea-level rise projections. This report was subsequently updated in 2018 in the State of California Sea-Level Rise Guidance document (OPC 2018). The guidance document provides a range of sea-level rise projections for a subset of the active tide gauges in California based on emission trajectories, acknowledging that projected sea level rise has a significant range of variation as a result of uncertainty in future greenhouse gas emissions and their geophysical effects, such as the rate of land ice melt.

The 2018 OPC Sea Level Rise Guidance is considered the best available science and provides sea level rise projections that have been refined for 12 tide gauges throughout California. The report provides projections for planning purposes based on probability of occurrence and the level of risk aversion. Low risk aversion means a high risk of occurrence, and extreme risk aversion means an extremely low risk of occurrence. (County of Santa Cruz 2021c). Projections over different time frames and emission scenarios are included for locations throughout the state. The closest to Santa Cruz County is the Monterey tide gauge.

The 2040 sea level rise estimates reflect the range in greenhouse gas emission scenarios, with low risk aversion estimates of 0.8 feet, medium-high risk aversion of 1.2 feet, and extreme risk aversion of 1.7 feet of sea level rise all under a high emissions rate scenario (OPC, 2018).

4.10.1.6 Stormwater Drainage and Management

Precipitation that falls within the county and is not absorbed and infiltrated by the land, transpired by vegetation or evaporated generates stormwater runoff that is conveyed in a number of man-made and natural runoff conveyance systems discharging to various drainages. These drainages contribute to groundwater recharge, water supply, support environmental and biological uses, and ultimately discharge to Monterey Bay. For the most part, stormwater runoff discharges to creeks, wetlands, and the Bay without any type of water quality treatment. In the county, stormwater runoff flows overland via sheet flow and channels and in developed areas via streets, gutters and storm drain pipes. In some locations, runoff travels relatively long distances before reaching an inlet or receiving water and can form small ponds that either infiltrate, transpire evaporate over time. The storm drain inlet types range from older inlets to more modern gutter grates (Schaaf & Wheeler 2013).

The County has established four flood control zones in the unincorporated urban areas of the county based on defined watershed boundaries. Zone 5, established in 1969, generally covers the Live Oak and Soquel areas. Zone 6, established in 1986, generally covers the urban area of Aptos and La Selva Beach. Zone 7A, established in 2005, covers the Pajaro River watershed within the County of Santa Cruz with the exception of the City of Watsonville, and Zone 8, established in 1977, covers the San Lorenzo Valley.

A Storm Drain Master Plan for Zones 5 and 6 was prepared in 2013. The basic objectives of the master plan were to evaluate existing storm drainage conveyance and identify recommended improvements needed to provide a 10-year level of runoff conveyance in the public portions of the storm drain system, which is consistent with many communities in California. Over the life of a 30- year mortgage, there is a 96% chance of experiencing a 10-year storm event (Schaaf & Wheeler 2013). Runoff generated within the boundary of Zones 5 and 6 is conveyed through storm drain systems that outfall to creeks and ultimately Monterey Bay. Conveyance capacity deficiencies within the storm drainage network can contribute to surface ponding, which is defined as the surcharge of water above ground surface at a drainage inlet or manhole. The primary objective of the Storm Drain Master Plan is to address the likelihood of the occurrence of surface ponding. The study found that areas in Zones 5 and 6 that have a high likelihood of notable ponding or have experienced ponding in the past include Rio Del Mar Flats and Soquel Village. (Schaaf & Wheeler 2013).

The Storm Drain Master Plan identifies locations where storm drainage improvement and/or replacement is recommended with a high-, medium-, or low-priority ranking. Proposed improvements in the Live Oak planning area are generally ranked as low or medium priority and consist of scattered short storm drain segments, except for longer, medium-priority recommended improvements along 17th Avenue and Brommer Street. A series of low- and medium-priority recommendations are included in the Soquel planning area, and one high priority recommendation along Porter Street. There are limited recommendations in the Aptos area, except for a high-priority recommendation in Rio Del Mar Flats. Both Soquel Village and Rio Del

Mar Flats have a high-priority recommendation (Schaaf & Wheeler 2013). The County is preparing an update to the Zone 5 Master Plan, expected to be complete in late 2022.

4.10.1.7 Parcels with Proposed Land Use and Zone Map Amendments

As indicated in Section 3.5.5 of the Project Description, the proposed project includes General Plan/LCP Land Use Map and/or Zoning Map amendments on 23 parcels. The parcels include key opportunity sites and key parcels along transportation corridors, including sites along the Portola Drive corridor and the property located at the northeast corner of Thurber Lane and Soquel Drive. The proposed project also includes General Plan redesignation and/or rezoning of some parcels to eliminate inconsistencies between General Plan/LCP land use designations and zone districts associated with mapping errors in the 1994 General Plan (or before). Table 3-11 in Section 3.5.5 identifies specific properties and proposed changes that are further described below.

Four of the parcels proposed for redesignation and/or rezoning are identified as being partially located in a groundwater recharge area in the County's GIS data base (County of Santa Cruz 2021); see Appendix D, which presents a summary table of potential resources for each parcel based on the County's GIS data base. These properties are located in Pajaro Valley, Aptos Hills and Summit planning areas. Eight parcels are identified as being located in flood hazard (one percent chance of flood) in the Live Oak and Soquel planning areas.

Thurber Lane / Soquel Drive Property

The vacant, approximately 6-acre parcel at the northeastern corner of Soquel Drive and Thurber Lane is not designated as being in a groundwater recharge area or within a flood hazard area in the County GIS data base. However, an approximate 1,000-foot long, unnamed ephemeral stream runs through the eastern portion of the site, which is connected to a piped drainage system immediately north and south of the site. This channel Is not identified as a steam or mapped as riparian habitat in the County's GIS data base (County of Santa Cruz 2021) nor is it identified as a perennial or intermittent stream on U.S. Geological Survey (USGS) topographical maps. However, the County considers this drainage to be an ephemeral stream based on reviews conducted for the County Planning Department in 2010 (EcoSystems West Consulting Group. 2010). Section 16.30.030 of the SCCC defines an ephemeral stream as "a natural watercourse or portion thereof which flows only in direct response to precipitation, as identified through field investigations."

The existing earthen channel varies in width. A former study conducted for the property found an average channel top width of 18 feet, a bottom width of 6 feet and an average depth of 5.5 feet (CFS Engineering 2010). An existing 27-inch diameter culvert is located at the northern boundary of the Thurber Lane property and carries drainage from developed residential areas to the north through the Thurber Lane parcel. At the southern end of the property, drainage flows into a 12-inch culvert that that connects with a 54-inch pipe that connects to a downstream drainage system consisting of piped and open channel sections that drain to Leona Creek, Schwann Lagoon and, ultimately, Monterey Bay (Schaaf & Wheeler

2013). Former studies of the property reported evidence of channel erosion and sediment transport from incoming channel flows (CFS Engineering 2010).

The Thurber Lane parcel is located within the Santa Cruz Zone 5 West Subbasin in the County's Storm Drain Master Plan. The Zone 5 West modeled drainage area is approximately 2.5 square miles, and is bounded by the Monterey Bay on the south, the City of Santa Cruz on the west, Capitola and Zone 5 East on the east, and the Santa Cruz Mountains on the north. The modeled Zone 5 West collection system consists of 1,397 nodes, 158 outlets and no pump stations. The Zone 5 West area has a total (including lateral lines) of 141,171 linear feet (26.7 miles) of modeled storm drain pipes equal or greater than one foot in diameter. In general, the Zone 5 West area drains southward, with most of the runoff being conveyed to Monterey Bay by Rodeo Gulch, Leona Creek and Arana Gulch (Schaaf & Wheeler 2013).

The County's Storm Drain Master Plan identifies ponding at existing storm drains both upstream and downstream of the Thurber parcel. The Plan recommends storm drain improvements for a short drain pipe segment north of the Thurber site and for two drain segments further downstream in the Jose Park and Eddy Lane areas; these improvements are ranked as low priority (Schaaf & Wheeler 2013). It is also noted that Storm Drain Master Plan indicated that sections of open channel were only included in the model if a storm drain network flows into an open channel and back into another storm drain system, which would appear to include the channel on the Thurber Lane site.

4.10.2 Regulatory Framework

4.10.2.1 Federal Regulations

Clean Water Act

The CWA, as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality (33 United States Code section 1251 et seq.). The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA establishes basic guidelines for regulating discharges of both point and non-point sources of pollutants into the waters of the United States.[3] The CWA requires that states adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the CWA. Commonly relevant sections of the act are as follows:

- **Sections 303 and 304** provide for water quality standards, criteria, and guidelines. Under section 303(d) of the CWA, the State of California is required to develop a list of impaired water bodies that do not meet water quality standards and objectives. California is required to establish TMDLs for each pollutant/stressor. A TMDL defines how much of a specific pollutant/stressor a given water body can tolerate and still meet relevant water quality standards. Once a water body is placed on the section 303(d) List of Water Quality Limited Segments, it remains on the list until a TMDL is

[3] Point-source discharges are those emanating from a pipe or discrete location/process, such as an industrial process or wastewater discharge. Non-point source pollutants are those that originate from numerous diffuse sources and land uses, and which can accumulate in stormwater runoff or in groundwater.

adopted and the water quality standards are attained, or there is sufficient data to demonstrate that water quality standards have been met and delisting from the section 303(d) list should take place. Many of the county's waterbodies are included in the 303(d) list (see discussion on Water Quality in 4.10.1.4 above).

- **Section 401 (Water Quality Certification)** indicates that a federal agency may not issue a permit or license to conduct any activity that may result in any discharge into waters of the United States unless a section 401 water quality certification is issued, verifying compliance with water quality requirements, or waiving such a certification. States where the discharge would originate are generally responsible for issuing water quality certifications. CWA section 404 permits (see description below) are subject to section 401 certification.
- **Section 402 (National Pollutant Discharge Elimination System)** establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredged or fill material) into waters of the United States. This permit program is administered by the SWRCB and the nine RWQCBs, who have several programs that implement individual and general permits related to construction activities, stormwater runoff quality, and various kinds of non-stormwater discharges. In general, in California, a NDPES permit also provides waste discharge requirements, although waste discharge requirements can be issued for discharges that are not within the coverage of the section 402 NPDES program.

  The Municipal Stormwater Permitting Program under CWA section 402 regulates stormwater discharges from municipal separate storm sewer systems (MS4s). MS4 permits are issued in two phases: Phase I, for medium and large municipalities, and Phase II for small municipalities. The Phase II Small MS4 General Permit requires the discharger to develop and implement best management practices (BMPs) through a coordinated storm water program with the goal of reducing the discharge of pollutants to the maximum extent practicable, which is the performance standard specified in section 402(p) of the CWA. The County of Santa Cruz is a Phase II municipality and implements these permit requirements through various management practices by each County department via stormwater regulations in the SCCC as described below in Section 4.10.2.2 and 4.10.2.3. In addition, the cities of Capitola, Santa Cruz, Scotts Valley, and Watsonville are also regulated Phase II municipalities with their own permit requirements.
- **Section 404** (**Discharge of Dredged or Fill Material into Waters of the United States)** establishes a permit program for the discharge of dredged or fill material into waters of the United States. This permit program is jointly administered by the U.S. Army Corps of Engineers (USACE) and EPA. Section 4.4, Biological Resources, addresses this requirement in greater detail. A section 401 water quality certification generally is necessary for a section 404 permit.

Numerous agencies have responsibilities for administration and enforcement of the CWA. At the federal level, this includes the EPA, USACE, and the major federal land management agencies such as the U.S. Forest Service and Bureau of Land Management. At the state level, with the exception of tribal lands, the California Environmental Protection Agency (CalEPA) and its sub-agencies, including the SWRCB and the nine RWQCBs, have been delegated primary responsibility for administering and enforcing certain provisions of

the CWA. At the local level, the Central Coast RWQCB and the County both have enforcement and implementation responsibilities under the CWA.

Federal Antidegradation Policy

The federal Antidegradation Policy (40 Code of Federal Regulations 131.12), first included in EPA's regulations in 1983, is designed to protect water quality and water resources. The policy requires states to develop statewide antidegradation policies and identify methods for implementing those policies. State antidegradation policies and implementation measures must include the following provisions: (1) existing instream uses and the water quality necessary to protect those uses shall be maintained and protected; (2) where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development; and (3) where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. State permitting actions must be consistent with the federal Antidegradation Policy.

4.10.2.2 State Regulations

Porter–Cologne Water Quality Control Act

The Porter–Cologne Water Quality Control Act (first codified in the California Water Code section 13000 et seq. in 1969) is the primary water quality control law for California. Whereas the CWA applies to all waters of the United States, the Porter–Cologne Act applies to waters of the state, which includes isolated wetlands and groundwater in addition to federal waters.[4] The act requires a Report of Waste Discharge for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. For discharges directly to surface water (waters of the United States) from a point source, an NPDES permit is required, which is issued under both state and federal law; for other types of discharges, such as waste discharges to land (e.g., spoils disposal and storage), erosion from soil disturbance, or discharges to waters of the state (e.g., groundwater and isolated wetlands), waste discharge requirements are required and are issued exclusively under state law. Waste discharge requirements typically require many of the same BMPs and pollution control technologies as NPDES permits.

California Antidegradation Policy

The California Antidegradation Policy, otherwise known as the Statement of Policy with Respect to Maintaining High Quality Water in California, was adopted by the SWRCB (State Board Resolution No. 68-16) in 1968. Unlike the federal Antidegradation Policy, the California Antidegradation Policy applies to all waters of the state, not just surface waters. The policy requires that, with limited exceptions, whenever the existing quality of a water body is better than the quality established in individual basin plans, such high-

[4] "Waters of the state" are defined in the Porter–Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code Section 13050[e]).

quality water must be maintained and discharges to that water body must not unreasonably affect any present or anticipated beneficial use of the water resource. As stated in the Central Coast RWQCB Basin Plan, "discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State."

Water Quality Control Plan for the Central Coastal Basin

The Porter–Cologne Water Quality Control Act sets forth the obligations of the SWRCB and RWQCBs to adopt and periodically update water quality control plans (Basin Plans), in which beneficial uses and water quality objectives are established, and which include implementation programs and policies to achieve those objectives (California Water Code sections 13240 through 13247). Beneficial uses applicable to the proposed project are listed in Table 4.10-3. Of particular importance to the proposed project is the Basin Plan's water quality objective for turbidity, which states that an "increase in turbidity attributable to controllable water quality factors shall not exceed the following limits:

1. Where natural turbidity is between 0 and 50 nephelometric turbidity units (NTU), increases shall not exceed 20%.
2. Where natural turbidity is between 50 and 100 NTU, increases shall not exceed 10 NTU.
3. Where natural turbidity is greater than 100 NTU, increases shall not exceed 10%" (Central Coast RWQCB 2019).

Construction General Permit (SWRCB Order No. 2009-0009-DWQ, as Amended)

For stormwater discharges associated with construction activity in the State of California, the SWRCB has adopted and administers the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) to avoid and minimize water quality impacts attributable to such activities. The Construction General Permit applies to all projects in which construction activity disturbs 1 acre or more of soil. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling and excavation. The Construction General Permit requires development and implementation of a stormwater pollution prevention plan (SWPPP), which would specify water quality BMPs designed to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site. Routine inspection of all BMPs is required under the provisions of the Construction General Permit, and the SWPPP must be prepared and implemented by qualified individuals as defined by the SWRCB.

To receive coverage under the Construction General Permit, the project proponent must submit a Notice of Intent and permit registration documents to the SWRCB and applicable RWQCB. Permit registration documents include completing a construction site risk assessment to determine appropriate coverage level; detailed site maps showing disturbance area, drainage area, and BMP types/locations; the SWPPP; and, where applicable, post-construction water balance calculations and active treatment systems design documentation.

Post-Construction Stormwater Management Requirements

The Central Coast RWCQB adopted Resolution No. R3-2013-0032, which approved post-construction stormwater management requirements for development projects in the Central Coast region. The requirements apply to small MS4s subject to post-construction requirements of the Phase II Municipal General Permits and are intended to apply to development projects, in order to protect watershed processes so that beneficial uses of receiving waters affected by stormwater management are maintained and, where applicable, restored. The requirements focus on Low Impact Development (LID) and other types of control measures. LID treatment systems implement harvesting and use, infiltration, and evapotranspiration. LID is an effective approach to managing stormwater to minimize the adverse effects of urbanization and development on watershed processes and beneficial uses resulting from changes in stormwater runoff conditions. LID strategies can achieve significant reductions in pollutant loading and runoff volumes as well as greatly enhanced groundwater recharge rates. The proper implementation of LID techniques results in greater benefits than single purpose stormwater and flood control infrastructure.

Sustainable Groundwater Management Act

In 2014, California enacted the "Sustainable Groundwater Management Act" (California Water Code sections 10720-10737.8 et seq.) to bring the state's groundwater basins into a more sustainable regime of pumping and recharge. The legislation provides for the sustainable management of groundwater through the formation of local groundwater sustainability agencies and the development and implementation of GSPs. GSPs were required to be submitted to the DWR by January 31, 2020 for all basins subject to critical conditions of overdraft. GSPs were required to be submitted to the DWR by January 31, 2022 for all other high- or medium-priority basins. GSPs are also encouraged for basins designated as low- and very low priority basins by the SWRCB. The GSPs are required to set objectives and implement projects and programs to achieve sustainability within 20 years of plan implementation, report data to DWR, mitigate overdraft, and address groundwater dependent ecosystems. The approved and pending GSPs for the watersheds in the county are described above in Section 4.10.1.3, Groundwater Resources.

Aquifer Storage and Recovery General Order

On September 19, 2012, the SWRCB adopted Water Quality Order 2012-0010, which includes waste discharge requirements for ASR projects that recharge groundwater with treated drinking water (General Order). The purpose of the General Order is to streamline the permitting process and to ensure consistent requirements for these projects.

Onsite Wastewater Treatment System Policy

On June 19, 2012, the SWRCB adopted the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems, which specifies requirements for new and replacement OWTS to provide for increased protection of water quality. New and reconstructed development served by OWTS must comply with this policy. Local agencies may adopt a Local Agency OWTS Management Program that provides more specific local policies consistent with the state OWTS Policy.

4.10.2.3 Local Regulations

County of Santa Cruz Plans

General Plan/Local Coastal Program

The County of Santa Cruz General Plan/LCP is a comprehensive, long-term planning document for the unincorporated areas of the county and includes the County's LCP, which was certified by the CCC in 1994. The County General Plan/LCP provides policies and programs to establish guidelines for future growth and all types of physical developments. The Public Safety Element of the County's General Plan, includes objectives and policies that address flood hazards, tsunami hazards, and climate change. The revisions (all except sections related to coastal bluffs and beaches) were approved by the California Coastal Commission in February 2022 subject to County acceptance of modifications. The existing Conservation and Open Space Element of the General Plan/LCP includes goals, objectives, and policies related to groundwater and other hydrological resources. These policies are retained or modified as necessary in the new Agriculture, Natural Resources + Conservation Element that replaces the existing element, with amendments to existing goals, policies and implementation strategies as described in Chapter 3 of this environmental impact report (EIR) and further reviewed in Section 4.10.3.3 below.

Local Hazard Mitigation Plan

The County of Santa Cruz Local Hazard Mitigation Plan (LHMP) 2021-2026 was prepared in accordance with FEMA requirements. FEMA reviews and approves LHMPs and requires an update on a five-year cycle. The County LHMP identifies potential hazards in the county, including floods and coastal storms, earthquake and liquefaction, wildfires, drought, tsunami, coastal erosion, dam failure, landslide, expansive soils, and climate change. The plan describes the potential hazards within the county and provides hazard mitigation strategies that serve as guidelines to reduce loss of assets. The LHMP proposes high, medium and low hazard mitigation action items to reduce vulnerability and risk from hazards or reduce the severity of the effects of hazards on people and property. Mitigation actions include both short-term and long-term activities that reduce the impacts of hazards, reduce exposure to hazards, or reduce effects of hazards through various means, including preparedness, response and recovery measures. Effective mitigation actions also reduce the adverse impacts and cost of future disasters.

Local Area Management Plan

The Local Area Management Program (LAMP) for the County of Santa Cruz describes permitting and oversight of OWTS, also known as septic systems. The LAMP is produced in accordance with requirements set forth by the SWRCB in the State OWTS Policy (2013) for County permitting of OWTS. The purpose of the LAMP is to provide for the continued use of OWTS in Santa Cruz County while providing protection of water quality and public health. Due to historical development patterns, local climate, geology and soils, a majority of the 27,700 existing OWTS cannot meet the state's Tier 1 standards for low-risk systems. However, with appropriate standards and management approaches, systems can be upgraded and utilized to continue to meet housing needs, recharge groundwater basins, and protect water quality. The LAMP updates and

expands the successful wastewater management approaches conducted by Santa Cruz County since 1985.The LAMP provides a summary of standards for the installation, upgrade, and maintenance of septic systems, as well as data on monitoring, and was approved by the Central Coast RWQCB in October 2021.

Santa Cruz County Code

Chapter 7.38, Sewage Disposal

Chapter 7.38 of the SCCC regulates OWTS, e.g., septic systems. The purpose and intent is to provide an orderly means of preventing environmental degradation and unsanitary conditions from occurring, and to ensure that a safe and sanitary means of sewage disposal must be provided in connection with any new development or expansion of existing development. The regulations are required for the control of OWTS in the county to adequately protect the public health, safety and welfare of the inhabitants thereof, and to implement the General/LCP and the LAMP. The regulations require a permit for the construction, reconstruction, repair, addition, or upgrade of any OWTS or any portion thereof on any property within the unincorporated area of the county. The regulations also set forth certain prohibitions and lot size requirements for OWTS, as well as specific requirements for system design.

Chapter 7.79, Runoff and Pollution Control

Chapter 7.79 of the SCCC addresses runoff and pollution control to protect the health, safety, and welfare of the public by protecting the surface and groundwater quality, groundwater recharge, beneficial uses, marine habitats, watershed health, and ecosystems of the receiving waters of the county, including the Monterey Bay, from discharge of pollutants and the adverse effects of hydromodification, and to comply with Federal and State laws concerning stormwater. This chapter requires compliance with industrial and construction NPDES discharge permits, where relevant. Additionally, prior to issuing a County permit under Title 16, Environmental and Resource Protection, a stormwater pollution control plan must be prepared addressing the use of BMPs during construction, including appropriate BMPs from the County Construction Site Stormwater Pollution Control BMP Manual. New development and redevelopment shall also mitigate impacts due to development and implement BMPs per the County Design Criteria. These BMPs include measures to control the volume, runoff rate, and potential pollutant load of stormwater runoff from new development and redevelopment projects; to minimize the generation, transport, and discharge of pollutants; to prevent runoff in excess of predevelopment conditions; and to maintain predevelopment groundwater recharge.

Chapter 16.10, Geologic Hazards

The Geologic Hazards Ordinance (SCCC Chapter 16.10) (effective inside the coastal zone) and the Floodplain Management Regulations (SCCC Chapter16.13) (effective outside the coastal zone) provide the policies to implement the National Flood Insurance Program for the Federal Insurance Administration in order to minimize injury, loss of life, and damage to public and private property caused by natural physical hazards including floods and coastal processes. They also include standards for development and building activities that will ensure appropriate and safe land use and minimize risk to development in areas where

natural dynamic processes are present at a level considered a potential threat to public health, safety, welfare, as well as property. Methods of reducing flood losses include restricting or prohibiting developments in high-risk areas, primarily the designated floodway, and requiring flood protections such as elevation of structures above the base flood elevation and flood venting for new and substantially improved structures. The ordinances limit alterations to natural floodplains and require review and approval for the placement fill, grading, and dredging that could affect flood flows, and regulate barriers that might divert floodwaters to other areas.

Chapter 16.20, Grading and 16.22, Erosion Control

The County Grading Ordinance, adopted as Chapter 16.20 of the SCCC, sets forth rules and regulations to control all grading, including excavations, earthwork, road construction, dredging, diking, fills, and embankments. It also establishes administrative procedures for issuance of permits and provides for approval of grading plans and inspections. Grading permits require Planning Commission approval for grading in excess of 8,000 cubic yards, or for which an EIR was prepared, or for grading in excess of 1,000 cubic yards which is visible from a scenic corridor roadway. All other grading permits, including those for agricultural grading, must be approved by the Planning Director, pursuant to section 16.20.040 and section 16.20.195 of the SCCC, through a staff-level administrative process. Agricultural grading is defined as any grading which takes place on land designated for commercial agricultural use, as specified in section 16.50.040; provided, however, that agricultural grading does not include any grading on such lands connected with the construction of access roads or building sites, except greenhouse sites.

It is noted that agricultural grading on less than 20% slopes, as well as vineyards and associated terracing (regardless of slope), does not require a regular grading permit and is instead subject to agricultural grading regulations. However, defined "specialized agricultural activities" such as greenhouses, indoor growing, aquaculture and any cannabis cultivation activities involving more than 100 cubic yards is not considered agricultural grading and requires a regular grading permit, and grading on 20% slopes or more also requires a regular grading permit (August 2018). Specialized agricultural activities also require a regular grading permit rather than a less-specific agricultural grading permit.

A proposed grading plan must be accompanied by an erosion control plan and erosion preventative measures, in accordance with the requirements of the County Erosion Control Ordinance of SCCC Chapter 16.22.

Integrated Regional Water Management Program

The Santa Cruz Integrated Regional Water Management (IRWM) program provides a framework for local stakeholders to manage water and water-related resources in the Santa Cruz IRWM region, which includes all areas of the county outside of the Pajaro River watershed. The Santa Cruz IRWM Plan was developed in response to California's IRWM planning initiative to promote an informed, locally driven, and consensus-based approach to water resources management. The IRWM Plan includes strategies for developing and implementing policies and projects to ensure sustainable water use, reliable water supply, better water quality, improved flood protection and stormwater management, and environmental stewardship (Santa Cruz IRWM 2021). The Regional Water Management Group consists of the agencies active in the planning

and implementation of the IRWM Plan and consists of 12 local agencies with authority over water supply, water quality, watershed stewardship, and flood and stormwater management.

In October 2004, PV Water, San Benito County Water District, and Santa Clara Valley Water District (Valley Water) entered into a Memorandum of Understanding for the purpose of coordinating water resources and watershed planning for the Pajaro River watershed. The three agencies, now collectively known as the Pajaro River Watershed Regional Water Management Group, have led the development and implementation of the Pajaro River Watershed IRWM Plan and subsequent updates. The top regional IRWM planning priorities are to: 1) preserve the economic and environmental health and well-being of the Pajaro River watershed; 2) perform watershed stewardship and comprehensive management of water resources in a practical, cost effective, and responsible manner; and 3) provide multiple benefits such as water supply, groundwater management, flood management, and water quality (Pajaro River Watershed Flood Protection Authority 2021).

The Pajaro River Watershed IRWM region and the Santa Cruz IRWM region share an overlap area in the Watsonville Sloughs. Within this area, the Pajaro River Watershed IRWM effort addresses water supply; water quality related to groundwater, drinking water, and recycled water; and flood management. The Santa Cruz County IRWM effort addresses surface water quality and environmental enhancement (Pajaro River Watershed IRWM 2019).

4.10.3 Impacts and Mitigation Measures

4.10.3.1 Thresholds of Significance

The thresholds of significance used to evaluate the impacts of the proposed project related to hydrology and water quality are based on Appendix G of the CEQA Guidelines and, if applicable, other agency standards, as listed below. A significant impact would occur if the project would:

HYD-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.

HYD-2 Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

HYD-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. Result in substantial erosion or siltation on or off site.

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site.

iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

iv. Impede or redirect flood flows.

HYD-4 In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.

HYD-5 Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

HYD-6 Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems for the disposal of wastewater where sewers are not available that could lead to water quality impacts.

4.10.3.2 Analytical Methods

The following analysis of potential hydrology and water quality impacts includes a review of the existing hydrology and water quality conditions to determine whether the proposed project has the potential to cause impacts related to hydrology and water quality. The analysis takes into consideration the existing regulatory requirements related to hydrology and water quality that seek to protect surface water and groundwater resources, prohibit the contamination of receiving water bodies, and manage stormwater facilities.

Potential Growth Assumptions

Adoption and implementation of the proposed Sustainability Update would not directly result in new development or growth. However, the proposed General Plan/LCP amendments could lead to future development, indirectly resulting in potential impacts related to hydrology and water quality. The proposed project includes the following components that could lead to development; the proposed County Design Guidelines component of the proposed project does not include guidelines related to transportation:

- Amendments to the General Plan/LCP include policies that support new development, mixed-use development, and potential intensified development, primarily within the Urban Services Line (USL).
- Amendments to the SCCC that include changes to permitted/allowed uses in some zone districts, including encouraging opportunities for higher density residential development and allowing new agricultural tourism, education, and homestay uses in agricultural zones.
- Amendments to General Plan/LCP land use and/or zone district maps for 23 specified parcels as summarized in Table 3-11 in Chapter 3, Project Description.

As described in Section 4.0, Introduction to Analyses, this EIR estimates that the proposed project has the potential to accommodate approximately 4,500 housing units throughout the county over existing conditions as shown in Table 4.0-2, with approximately 75% projected to occur within urban areas. This EIR also estimates the potential to accommodate approximately 6,210,000 square feet of non-residential uses, as shown in Table 4.0-3, with approximately 60% expected to occur within urban areas. These forecasts provide an estimate of potential growth that could occur as a result of adoption and implementation of the proposed Sustainability Update for the purpose of evaluation in this EIR. This estimate of growth may or

may not occur, and this estimate does not establish a limit to development. Annual limits for residential units are set annually by the County pursuant to Measure J and SCCC provisions as explained in Section 4.13 of this EIR, Population and Housing. Additionally, some of this projected development and growth would occur under the existing General Plan/LCP without the proposed project.

EIR Notice of Preparation Comments

Public and agency comments were received during the public scoping period in response to the Notice of Preparation (NOP), which is included in Appendix A. A summary of the comments received during the scoping period for this EIR, as well as written comments received, are included in Appendix B. Comments related to hydrology and water quality included the following:

- The EIR should analyze the impacts of increased stormwater runoff due to increased build-out of undeveloped parcels in the unincorporated areas of the county.
- The EIR should identify and analyze prime groundwater recharge areas of the county as identified by the Recharge Initiative to create groundwater recharge and stormwater runoff remediation areas throughout the county.
- If sea levels rise by six feet this century, local rivers will become contaminated with salt and California's main freshwater source will be lost.
- 12,000 acres of agricultural land between Elkhorn Slough and Manresa State Beach should be purchased and left fallow to stop agricultural pumping and protect Pajaro Valley from seawater intrusion.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR. The Recharge Initiative is being undertaken at the University of Santa Cruz (UCSC) and consists of groundwater systems mapping and modeling. Regarding the comment above that suggests removing lands from agricultural production that are partially located in Monterey County in order to reduce groundwater pumping, this type of measure is outside the scope of the proposed Sustainability Update. However, this measure was considered by PV Water in their Basin Management Plant that also serves as the Groundwater Sustainability Plan Alternative, and is included as an option considered in that plan (D-3 in Appendix B [PV Water 2014]). Therefore, this comment is acknowledged but is not further considered in this section.

4.10.3.3 Project Impact Analysis

Impact HYD-1: Water Quality (Significance Threshold HYD-1). Adoption and implementation of the proposed Sustainability Update would not directly or indirectly violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. (***Less than Significant***)

The proposed project would not directly result in new development but could indirectly lead to future development and redevelopment throughout the county, primarily within urban areas within the County's

USL. Future development that could be accommodated by the proposed Sustainability Update could result in potential water quality degradation due to increased stormwater runoff with associated urban contaminants and potential erosion due to grading and construction disturbances. Water quality degradation can also occur as a result of runoff from agricultural lands and faulty or leaking septic systems. However, the proposed Sustainability Update does not include General Plan/LCP or SCCC amendments that affect agricultural operations or OWTS requirements. In addition, the County's existing sewage disposal regulations (SCCC Chapter 7.38) would remain in effect and include requirements for siting, design, and permitting of new OWTS associated with future development in the county's rural areas. Therefore, no impacts are anticipated related to potential increased contaminants in agricultural runoff or potential faulty OWTS as the proposed project does not include any changes to existing regulations governing agricultural production or use of OWTS.

Future development could result in increased impervious surfaces and stormwater runoff. This could lead to pollutants or contaminants entering the storm drain system and/or water bodies. Urban development often results in the degradation of water quality due to the introduction of pollutants and erosion due to construction and development. Development and impervious pavement can result in increased runoff and higher velocities in creeks and streams, which can, in turn, cause erosion. Storm water runoff from lands modified by human activities can harm surface water resources and in turn, cause or contribute to an exceedance of water quality standards by changing natural hydrologic patterns, accelerating stream flows, degrading aquatic habitat, and elevating pollutant concentrations. Such runoff may contain or mobilize high levels of contaminants, such as sediment, suspended solids, nutrients (phosphorous and nitrogen), heavy metals and other toxic pollutants, pathogens, and oxygen demanding substances. After a rain event, storm water runoff carries these pollutants into nearby streams, rivers, lakes, estuaries, and wetlands as well as the ocean. The highest concentrations of these contaminants often are contained in ''first flush'' discharges, which occur during the first major storm after an extended dry period. Individually and combined, these pollutants impair water quality, threatening designated beneficial uses and causing habitat alteration or degradation.

If stormwater controls are not designed or managed properly, runoff from urban development could contain contaminants such as oil, grease, metals, and landscaping chemicals (pesticides, herbicides, fertilizers, etc.) that could degrade surface water and groundwater quality. However, all future development projects are required to adhere to the Central Coast RWQCB Resolution No. R3-2013-0032, which commits development in the region to comply with the NPDES statewide Phase II Municipal General Permit, Order No. 2003-0005-DWQ as enforced by the County. Future development projects would be required to prepare and submit stormwater drainage plans that show compliance with the County's stormwater and water quality control requirements established in Chapter 7.79 of the SCCC. These regulations in part are intended to comply with federal and state NPDES permit program requirements that address water pollution by regulating point sources (discrete conveyances such as pipes or man-made ditches) that discharge pollutants to the waters of the United States. An NPDES permit contains limits on what can be discharged, monitoring and reporting requirements, and other provisions to ensure that the discharge does not harm water quality or people's health. Per SCCC Chapter 7.79, the County is required to comply with federal and state laws concerning stormwater.

All new developments are required to follow design requirements as outlined in the County of Santa Cruz Design Criteria. A Conceptual Stormwater Management Plan is required for any development over 5,000 square feet in size that identifies BMPs, and the drainage system design section 7.79.110 of the SCCC requires all new development to implement BMPs to prevent, control, and reduce stormwater volume, runoff rate and pollutant load and to minimize contribution to pollution or contamination of the storm drain system, receiving waters, groundwater or a body of standing water. This section further states that all new development and redevelopment shall mitigate impacts due to development and implement BMPs per the County of Santa Cruz Design Criteria and Chapters 16.20 and 16.22 SCCC to control the volume, runoff rate, and potential pollutant load of stormwater runoff from new development and redevelopment projects to minimize the generation, transport, and discharge of pollutants, prevent runoff in excess of predevelopment conditions, and maintain predevelopment groundwater recharge.

Compliance includes incorporating stormwater design controls that prioritize low-impact development (LID) treatment systems that harvest, use, infiltrate, and encourage evapotranspiration in order to manage stormwater runoff and protect water quality. LID controls are a proven effective approach to managing stormwater to minimize the adverse effects of urbanization and development on watershed processes and beneficial uses resulting from changes in stormwater runoff conditions. LID strategies can achieve significant reductions in pollutant loading and runoff volumes as well as greatly enhanced groundwater recharge rates. Post-construction measures may also include source control measures, site design measures, stormwater treatment measures, and BMPs to control runoff and stormwater pollution. BMPs also are specified for different categories of land uses in the County of Santa Cruz Design Criteria, and this section of the SCCC indicates that these land uses are subject to BMPs in accordance with the SWRCB General Permit for the Discharge of Storm Water from Small MS4s (WQ Order No. 2003-0005-DWQ). These categories include single-family development on slopes exceeding 30%; commercial developments disturbing 10,000 square feet or more; automotive repair shops; retail gasoline outlets; restaurants; subdivisions with 10 or more housing units; and parking lots 5,000 square feet or more or with 25 or more parking spaces.

Construction activities associated with future development could include earthwork activities that disturb site soils such that they become susceptible to wind and water erosion. Earth-moving activities could include excavation and trenching for foundations and utilities, soil compaction and moving, cut and fill activities, and grading. If not managed properly, disturbed soils would be susceptible to high rates of erosion from wind and rain, resulting in sediment transport via stormwater runoff from the construction sites. Use of construction equipment could also include the use and disposal of hazardous materials, which if not managed appropriately could become a source of stormwater runoff pollution. Water quality degradation from construction would be specific to each construction site. The topography of the site, the amount of soil disturbance, the duration that disturbed soil would be exposed, the amount of rainfall and wind that would occur during construction, and the proximity of the nearest waterbody would all be factors that could affect the potential for water quality degradation during construction.

Projects that might result from the proposed project that would disturb more than one acre, would be subject to compliance with the NPDES Construction General Permit, the County's Runoff and Pollution Control Ordinance, and other state and local regulations. Contractors would be required to implement

erosion and stormwater control BMPs that are contained within a required Stormwater Pollution Prevention Plan (SWPPP) that may include scheduling and timing of grading activities, timely revegetation of graded areas, the use of hydroseed and hydraulic mulches, and installation of erosion control blankets. Pollution prevention practices may include designated washout areas or facilities, control of trash and recycled materials, tarping of stockpiled materials on site, and proper location of and maintenance of temporary sanitary facilities. The combination of BMPs used must be customized to the site using up-to-date standards and practices that would be effective in minimizing the potential for offsite transportation of stormwater runoff pollutants.

In addition, the County's grading regulations (SCCC Chapter 16.20), and stormwater requirements (SCCC Chapter 7.79) prohibit the deposit of fill, debris, or other material in the storm drain system, a drainage channel, or on the banks of a drainage channel, and set forth BMPs to prevent, control, and reduce storm water volume, runoff rate, and pollutant load. SCCC section 79.100 also requires a stormwater pollution control plan that address use of BMPs during construction as part of any project approval. The plan shall focus on measures to be installed while the project is under construction and include appropriate BMPs from the County Construction Site Stormwater Pollution Control BMP Manual. Permits that do not involve ground disturbance shall only be required to include notes per the Housekeeping Requirements section in Section E of the Construction Site Stormwater Pollution Control BMP Manual.

Construction activities may also encounter shallow groundwater that require temporary dewatering in order to complete installation of below grade improvements. If improperly managed, these dewatering activities could result in discharge of contaminated groundwater. However, the Central Coast RWQCB requires contaminated groundwater to be treated prior to discharge or disposed of at an appropriate disposal facility or wastewater treatment plant. Therefore, compliance with existing applicable regulations and policies would reduce the risk of water degradation from soil erosion and other pollutants related to construction activities.

Implementation of existing and proposed General Plan/LCP policies summarized in Table 4.10-5 also would serve to avoid and/or minimize potential impacts of future development related to water quality degradation, including potential impacts to waters of the Monterey Bay. In particular, the proposed Agriculture, Natural Resources + Conservation (ARC) Element includes a policy that requires development to be designed to minimize water pollution from urban runoff (ARC-4.1.14). The proposed Parks, Recreation + Public Facilities (PPF) Element addresses stormwater management, and in particular, Policy PPF-4.4.5 requires new development and redevelopment to reduce the discharge of stormwater pollutants to the maximum extent practicable in order to protect surface and groundwater quality and watersheds.

Therefore, with implementation of proposed and existing County policies and compliance with state regulations and local regulations, including the post-construction requirements of Central Coast RWQCB Resolution No. R3-2013-0032 and County stormwater regulations, future development accommodated by the proposed project would avoid or minimize adverse water quality effects associated with stormwater runoff, erosion, and discharges, resulting in *a-less-than-significant impact*.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Table 4.10-5. Proposed and Retained Policies that Avoid/Minimize Impacts Related to Water Quality Degradation

Potential Impact	Policies and Implementation Strategies
Water quality degradation	• Encourage use of design elements such as permeable pavers or bioswales to reduce and preteat stormwater flowing off site or infiltrating into groundwater supply. (Built Environment [BE]-4.2.5) • Protect the Monterey Bay National Marine Sanctuary from adverse impacts, including wastewater and runoff. (ARC-4.1.1) • Require review of any new or increased wastewater discharge into the Monterey Bay or any coastal waters. (ARC-4.1.3) • Require development to be designed to minimize water pollution from urban runoff; including minimization of impervious areas, pollution prevention strategies, retention and percolation of stormwater, filtratoin or treatment of stormwater, or other stormwater BMPs. (ARC-4.1.14) • Require minimum lot size for parcels in water quality constraint areas. (ARC-4.2.4) • Do not approve new development adjacent to water boides that would result in adverse impacts on water quality that cannot be mitigated. (ARC-4.4.1) • Require minimum 100-foot setbacks of septic tanks or leach fields from natural waterways. (ARC-4.4.2) • Develop a program for control of non-point source pollution from agricultural activities. (ARC-4.4c) • Prohibit uses in Primary Groundwater Recharge Areas that would allow percolation of pollutants into groundwater system. (ARC-4.5.30) • Prohibit nonstormwater discharge from entering the storm system or receiving waters. (PPF-4.4.2) • Require new devleopment to minimize water pollution from urban runoff. (PPF-4.4.5) • Implement the Stormwater Management Plan programs and BMPs and maintain compliance with the NPDES General Permit. (PPF-4.4h) • Continue to support and participate in the Integrated Regional Water Management and related efforts. (PPF-4.4.6)
Soil erosion	• Use sediment basins or other erosion control measures to prevent siltation of water bodies. (ARC-4.4.3) • Require grading and building in certain watersheds to meet standards for erosion control and water quality protection. (ARC-4.2.9)

Table 4.10-5. Proposed and Retained Policies that Avoid/Minimize Impacts Related to Water Quality Degradation

Potential Impact	Policies and Implementation Strategies
	• Require abatement of any grading or drainage condition which may increase existing or potential erosion problems. (Public Safety Policy 6.3.3/6.5.3*)Require erosion control plan for all development, as specified in the Erosion Control Ordinance. (Public Safety Policy 6.3.4/6.5.4*) • Erosion control plan required for winter grading. (Public Safety Policy 6.5.5*)Prohibit earthmoving operations in areas of very high or high erosion hazard potential and in Least Disturbed or Water-Supply Watersheds between October 15 and April 15. (Public Safety Policy 6.3.6/6.5.6*) • Require site design in all areas to minimize grading activities and reduce vegetation removal. (Public Safety Policy 6.3.8/6.5/9*) • Permits required for land clearing. (Public Safety Policy 6.3.10/6.5.10*) • Avoid excessive grading with cannabis cultivation. (Public Safety Policy 6.3.12/6.5.12*) • Require a minimum 20-foot distance between any hazardous waste facility and the highest anticipated elevation of the underlying groundwater. (Public Safety Policy 6.7.6/6.10.6*)

Note: * In September 2020, the County Board of Supervisors adopted revisions to the General Plan Public Safety Element. The revisions (all except sections related to coastal bluffs and beaches) were approved by the Coastal Commission in February 2022 subject to County acceptance of modifications.

Impact HYD-2: Groundwater (Significance Threshold HYD-2). Adoption and implementation of the proposed Sustainability Update would not directly or indirectly substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin. (***Less than Significant***)

The proposed project would not directly result in new development but could indirectly lead to future development and redevelopment throughout the county, primarily within urban areas within the County USL. Future development that could be accommodated by the proposed Sustainability Update would result in additional demands for potable water supplies that are provided by groundwater resources in three groundwater basins in the county, two of which are experiencing seawater intrusion (Mid-County Basin and Pajaro Subbasin), and the Pajaro Valley Subbasin also is in an overdraft condition. As discussed in Section 4.10.3.2, projected development potentially accommodated by the Sustainability Update would primarily occur within the county's urbanized areas. The net increase in residential growth associated with the project by 2040 was estimated to be approximately 4,450 housing units and a total of 6,209,500 square feet in non-residential growth, although some of this potential development would occur under the existing General Plan/LCP without the proposed project.

This estimated growth would have an associated increase in potable water demand, some of which would be within the three groundwater basins located in the county. Future water demand is analyzed in Section 4.16, Utilities, of this EIR. Further analysis of project impacts on groundwater supplies and groundwater recharge are presented below. In addition, implementation of General Plan/LCP policies summarized in Table 4.10-6 also would serve to avoid and/or minimize potential impacts related to groundwater supplies or recharge.

Table 4.10-6. Proposed and Retained Policies that Avoid/Minimize Impacts Related to Groundwater Resources

Potential Impact	Policies and Implementation Strategies
Groundwater Resources	• Encourage water districts, resource management agencies, and agricultural users to implement water conservation measures, especially in areas subject to overdraft; support water conservation assistance to growers. (ARC-1.5.3) • Encourage land disposal of wastewater after treatment to assist in recharging groundwater aquifers. (ARC-4.1.11) • Require minimum parcel sizes for lots in Water Supply Watersheds. (ARC-4.2.5 and ARC-4.2.6) • Land division and desnity requirments for devleopment in Least Distrubed Watersheds. (ARC-4.2.7) • Implement watershed management plans. (ARC-4.2a) • Maintain sustainable yield of groundwater basins. (ARC-4.5.5) • Encourage building designs to conserve water. (Objective BE-4.2) • Encourage development projects to conserve water with efficient fixtures indoors and sustainable site elements outdoors, such as drought-tolerant plants, rainwater catchment systems, graywater irrigation systems. (BE-4.2.6) • Support the completion and implementation of groundwater management plans. (PPF-4.1.5) • Monitor available water supplies to support projected development while protecting groundwater supplies. (PPF-4.1c) • Participate in the development of groundwater management programs. (PPF-4.1d) • Coordinate monitoring efforts to provide data on surface and groundwater resources. (PPF-4.1l) • Provide edication regarding the need for groundwater management. (PPF-4.1m) • Prohibit nonstormwater discharge from percolating into groundwater. (PPF-4.4.2) • Require development to limit discharge of stormwater pollutants to protect groundwater. (PPF-4.4.5) • Require animal-keeping operations to be managed to prevent discharge of nutrients and contaminants to groundwater. (PPF-4.4f) • Ensure protection of groundwater through proper landfill design. (PPF-4.5.20)

Table 4.10-6. Proposed and Retained Policies that Avoid/Minimize Impacts Related to Groundwater Resources

Potential Impact	Policies and Implementation Strategies
Groundwater recharge	• Land division and density requirements in Primary Groundwater Recharge Areas (ARC-4.5.2) • Limit lot coverage to maintain groundwater recharge rates (PPF-4.4.3)

Groundwater Supplies

As noted above, the project area overlies three groundwater basins/subbasins, two of which are considered by DWR under SGMA to be high priority basins (Santa Cruz Mid-County Basin and Pajaro Valley Subbasin) and the other a medium priority (Santa Margarita Basin). The GSAs set up for each basin pursuant to state law are implementing plans to reach sustainable groundwater levels in the next 20 years and have made progress in meeting sustainable groundwater management goals as summarized below for each basin.

Santa Margarita Basin

Portions of the Carbonera and San Lorenzo Valley planning areas are located within the Santa Margarita Basin. It is estimated that the potential future development over the Year 2040 baseline condition could result in the approximately 494,500 square feet of non-residential uses within this Basin. There are no additional housing units forecast for these planning areas over what could otherwise occur under the existing General Plan/LCP. Future development in these areas would be served by one of two water agencies that utilize groundwater resources in the Basin or from private wells permitted by the County. As discussed, in Section 4.16, Utilities and Service Systems, the increased demand would generally be within growth projections of the water agencies and the increase would not be considered substantial compared the current and sustainable pumping goal of 480 and 540 AFY, respectively.

The Basin is not currently subject to critical conditions of overdraft. Precipitation is the primary source of groundwater recharge in addition to infiltration from streams. The historic decline of groundwater levels in many parts of the Basin that occurred during 1985 to 2004, represented a loss in groundwater storage but conservation and other management efforts at local water agencies, have decreased outflows of the Basin by 45% since 1997 (SVWD 2020). Implementation of the GSP is designed to ensure that the basin can be sustainably managed through a combination of supply management and conservation measures in order to meet projected growth. Therefore, considering that the amount of growth attributed to the project is relatively modest and only a portion of which would be located in this Basin, combined with the implementation of the GSP and adherence to existing regulatory requirements that include conservation measures for new construction, the amount of increased demand would likely not result in a significant decline of groundwater supplies.

Santa Cruz Mid-County Basin

The majority of the urbanized unincorporated county within the USL is located within the Santa Cruz Mid-County Basin, including the urbanized areas of the Live Oak, Soquel, and Aptos planning areas and a portion of the La Selva planning area. It is estimated that the potential future development over the Year 2040 baseline condition could result in the approximately 1,590 new residential units and 1,930,300 square feet of non-residential uses within this basin. As discussed in Section 4.16, Utilities, development in this area would be served by one of three water agencies that derive at least a portion of their supply from groundwater resources in the Basin. The increased demand indirectly resulting from the proposed project would generally be within growth projections of the water agencies, except within the City of Santa Cruz and SqCWD service areas, where demand may approach or exceed growth projections depending on timing and extent of development in the county and City of Capitola. These increases in demand, however, would not be considered substantial.

As discussed in Section 4.10.1.3, groundwater pumping has decreased since the late 1980s, and the historical change of groundwater in storage has been an annual increase of 480 AFY, which reflects recovery from historic low Basin groundwater levels in the 1990s and early 2000s. Recent conditions have seen groundwater inflow volumes for current and projected conditions less than historical inflows. This reduction has largely been balanced by conservation measures that resulted in a net decrease of only 160 acre-feet per year of groundwater in storage (MGA 2019).

In accordance with the GSP for the Basin, basin management has and will continue to focus on controlling seawater intrusion as well as continued water conservation and pumping management plans that can optimize basin management and keep groundwater elevations high enough at the coast to prevent further seawater intrusion as well as water demands. The GSP existing and planned management actions and projects would bring the Basin into sustainability. With implementation of the Basin's GSP and adherence to existing regulatory requirements that include conservation measures for new construction, the amount of increased demand would not be substantial.

Pajaro Valley Subbasin

Portions of the Pajaro Valley, San Andreas, and Salsipuedes planning areas are located within the Pajaro Valley Subbasin. It is estimated that the potential future development over the Year 2040 baseline condition could result in the approximately 251,700 square feet of non-residential uses within this Subbasin. There are no additional housing units forecast for these planning areas over what could otherwise occur under the existing General Plan/LCP. Future development in these areas would be served by either the City of Watsonville, which derives part of its water supply from groundwater resources or from private wells permitted by the County. As discussed in Section 4.16, Utilities, the increased demand would generally be within growth projections prepared by the City of Watsonville, and the increase would not be considered substantial, especially compared current demand within the Basin, which is estimated to be between 30,000 and 50,000 AFY.

PV Water is the Groundwater Sustainability Agency (GSA) for the Subbasin and responsible for achieving groundwater sustainability for the Subbasin by 2040. According to the GSU22 analysis of groundwater conditions, average annual change in storage over the last 5 years, which included multiple wet years resulting in above average precipitation (17% above normal), was approximately an increase of 5,460 AFY (PV Water 2021). All years, except water year 2018, had increased storage. Therefore, not only has the measurable objective of 100% reduction of the rate of groundwater in storage depletion been achieved during implementation of the 2014 Basin Management Plan, but there has been an increase of groundwater in storage during this time. The continued implementation of sustainable groundwater management measures in accordance with the GSU22, subsequent updates to that plan, and regulatory requirements would ensure that the potential increased demands resulting from the proposed project would be *less than significant* for the Subbasin.

Groundwater Recharge

Outside of direct water demands, increases to the amount of impervious surfaces associated with development could reduce the amount of groundwater infiltration to the underlying groundwater basins. However, parcels located within County-designated Primary Groundwater Recharge areas would be subject to existing limitations regarding land divisions and potential density in order to protect groundwater recharge areas. Additionally, potential future development in rural areas of the county is not expected to be substantially higher than could occur under the existing General Plan/LCP. In addition, as discussed above in Impact HYD-1, new development and redevelopment in urban areas would be required to adhere to the Central Coast RWQCB Resolution No. R3-2013-0032, which commits development to incorporate stormwater design controls that prioritize LID treatment systems that include features such as bio-swales and retention/detention basins to facilitate onsite infiltration. LID controls are a proven effective approach to managing stormwater and also enhancing groundwater recharge rates. In addition, some of the future development projects would consist of redevelopment of existing developed parcels, some of which would not increase impervious surfaces over existing conditions. Therefore, considering the minimal potential development indirectly resulting from the proposed Sustainability Update, adherence to drainage control requirements, and type of development that would align with the goals of the proposed project, there would be a *less-than-significant impact* related to reductions in groundwater recharge.

Conclusion

The project area overlies three different groundwater basins/subbasins that include basins considered to be a high priority and in critical overdraft due to seawater intrusion. All the basins are subject to implementation of sustainable groundwater management requirements of SGMA and either have completed or are in the midst of completing GSPs (or alternative). Current trends have shown that improvements have been made in management of the basins even during extended drought periods. The increased demands indirectly resulting from the project are relatively modest. The proposed ARC Element includes revised goals and policies that include long-term sustainable management and conservation of water and groundwater resources. Considering the long-term planning measures that are required by SGMA and implementation of the GSPs, combined with the sustainable policies of the proposed project, the increased demands from the project would be less than significant. Thus, the proposed project would

not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project would impede sustainable groundwater management of the basin, resulting in a *less-than-significant impact*.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Impact HYD-3A: Stormwater Drainage (Significance Threshold HYD-3). Adoption and implementation of the proposed Sustainability Update would not directly or indirectly substantially alter drainage patterns, including through alteration of the course of a stream or river or through addition of impervious surfaces in a manner that would result in substantial erosion or siltation, increase the rate or amount of surface runoff, which could result in flooding, create or contribute runoff water that would exceed the capacity of existing or planned drainage systems, or impede or redirect flood flows. (***Less than Significant***)

The proposed project would not directly result in new development but could indirectly lead to future development and redevelopment throughout the county, primarily within urban areas within the County's USL. Future development that could be accommodated by the proposed Sustainability Update could result in increased stormwater runoff associated with new impervious surfaces. The proposed project would not directly or indirectly result in development that would result in a substantial alteration of existing drainage patterns, either through alteration of a stream or through introduction of impervious surfaces that would lead to erosion, flooding or drainage issues. There are several parcels on Portola Drive that include open channels and piped channels that may be undersized, and future development in these areas would need to provide adequate capacity and safe overflow while enhancing water quality and resource protection for the channel and downstream receiving water, i.e., Moran Lagoon. Similarly, the Thurber/Soquel channel drains to Leona Creek and Schwan Lake; potential future development at that site is addressed in Impact HYD-3B below.

Furthermore, section 7.79.070 of the SCCC prohibits unpermitted alterations to drainage patterns or modifications to the storm drain system or any channel that is part of receiving waters of the county without approval of an exception as specified in the regulations. A Stormwater Management Plan is required for any new developments larger than 5,000 square feet in size. Per the County's requirements, the plan must show how stormwater overflow will be conveyed and controlled and that runoff shall not negatively impact neighboring properties or stormwater (drainage) pathways, The stormwater plan must also accommodate existing upstream runoff in the project design without impact to upstream properties. A site assessment performed by the project Engineer, Architect, or Designer is also required to determine whether there are any existing stormwater (drainage) issues on or near the site and if any stormwater (drainage) issues or impacts are anticipated resulting from the proposed improvements. If downstream restrictions are/have been identified, additional analysis and improvements may be required (County of Santa Cruz 2021d),

All future development projects would be subject to the County's stormwater regulations that require preparation of stormwater management plans to meet County standards. Furthermore, existing and proposed General Plan policies would serve to avoid or minimize impacts related to stormwater drainage

resulting from future development projects; these policies are summarized in Table 4.10-7. In particular, Policy PPF-4.4.1 requires that runoff levels with new development or redevelopment be maintained at predevelopment rates for a minimum design storm as determined by County Design Criteria by requiring projects to provide both on and off-site improvements, including on-site percolation methods. The policy further indicates that on-site detention methods should be used only where percolation methods are not feasible. When on-site detention is used, development projects shall be conditioned to ensure ongoing operation and maintenance of the detention facilities. Policy PPF-4.4.3 requires new development to limit coverage of lots by parking areas and other impervious surfaces, in order to minimize the amount of post-development surface runoff and maintain groundwater recharge rates. Policy PPF-4.4.4 requires preparation of a downstream impact assessment for any new proposed development or redevelopment and to analyze the design of any improvements needed to upgrade the storm drain system such that local flooding due to insufficient capacities would be eliminated for the appropriate design rainstorm. These policies and required compliance with County stormwater regulations would ensure that increased stormwater runoff resulting from future development would be designed to prevent offsite impacts.

Table 4.10-7. Proposed and Retained Policies that Avoid/Minimize Impacts Related to Stormwater Drainage

Potential Impact	Policies
Alteration of drainage patterns	• Require retention/infiltration of stormwater runoff for agricultural structures so runoff rates are not exceeded. (ARC-2.1.2) • Require retention of stormwater runoff from impervious surfaces for all new devleopment and redevelopment. (ARC-4.2.12) • Maintain pre-development runoff levels with new devleopment. (PPF-4.4.1) • Minimize impervious surfaces (PPF-4.4.3) • Require proposed developments to provide stormwater management plan and downsteam impact assessment to elimiate downstream local flooding. (PPF-4.4.4) • Support implementation and update of the Santa Cruz Storm Water Resource Plan to promote stormwater recharge projects. (PPF-4.6.7) • Require drainage plans that direct runoff and drainage away from unstable slopes. (Public Safety Policy 6.2.6/6.3.6*) • Require abatement of any grading or drainage condition that may increase existing or potential erosion problems as a condition of approval. (Public Safety Policy 6.3.3/6.5.3*) • Require containment of all sediment on site during construction and require drainage improvements for the completed development that will provide runoff control, including onsite retention or detention where downstream drainage facilities have limited capacity. (Public Safety Policy 6.3.8/6.5.8*)

Note: * In September 2020, the County Board of Supervisors adopted revisions to the General Plan Public Safety Element. The revisions (all except sections related to coastal bluffs and beaches) were approved by the Coastal Commission in February 2022 subject to County acceptance of modifications.

Erosion or Siltation

Changes in the amount of impervious surfaces or otherwise concentrate runoff flows towards exposed soils can lead to erosion and offsite transportation of siltation which can adversely affect receiving waters. However, as discussed above in Impact HYD-1, all proposed improvements associated with the project would be required to adhere to the Santa Cruz County Grading Ordinance (Chapter 16.20 of the SCCC) as well as the NPDES statewide Phase II Municipal General Permit, Order No. 2003-0005-DWQ which include requirements to ensure that construction and post-construction drainage control measures are implemented that reduce the potential for erosion and siltation. Adherence with these existing regulatory requirements would ensure that construction and operation of projects associated with the proposed project would reduce potential impacts related to erosion or siltation to less than significant levels.

Flooding or Exceed Capacity of Drainage Systems

Future development and redevelopment projects accommodated by the proposed project could include projects that would increase the amount of impervious surfaces compared with existing conditions. If not designed appropriately, increasing impervious surfaces can produce increases in stormwater runoff that can result in flooding issues on- or off-site. However, as described above, implementation adherence to the requirements of the NPDES statewide Phase II Municipal General Permit would maximize the on-site infiltration capacity for projects with use of LID stormwater features such as bioswales, retention/detention basins, and downspout planter boxes which would minimize the amount of runoff discharged from the site. For redevelopment sites, adherence to current drainage control requirements is often an improvement for sites that were originally constructed under less stringent drainage control requirements and the construction of LID design features actually end up reducing the amount of off-site discharge volumes. Furthermore, the proposed project requires that pre-development runoff rates be maintained. Therefore, with adherence to drainage control requirements that would maximize onsite infiltration and/or detention of stormwater runoff and limit runoff to pre-development levels, the potential impact related to increased runoff potentially causing flooding or exceedance of capacity of drainage systems would be less than significant.

Impede or Redirect Flood Flows

The construction of new improvements within flood zone areas could potentially impede or redirect flood flows that adversely affect other areas that would not otherwise be inundated. However, all future development potentially accommodated by the proposed project would be required to adhere to SCCC sections 16.10 (in effect for areas inside the coastal zone) and 16.13 (areas outside the coastal zone) which contains the policies that are designed to minimize injury, loss of life, and damage to public and private property floods and coastal processes. These County regulations also include standards for development and building activities that prohibit inappropriate land uses and development in flood areas and require flood protections during initial construction. Limits on alterations to natural floodplains, controls on fills, grading, and dredging that could affect flood flows are also regulated to prevent the diversion of floodwaters to other areas. Therefore, with adherence to the County Code sections 16.10 and 16.13, the potential impact would be less than significant.

Therefore, compliance with existing regulatory requirements would ensure that stormwater generated by construction and operation of potential future development projects accommodated by the proposed project would not substantially change existing drainage patterns or result in adverse erosion/siltation, flooding, or storm drain capacity issues, resulting in a *less-than-significant impact*.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Impact HYD-3B: Stormwater Drainage-Thurber Lane Site (Significance Threshold HYD-3). Adoption and implementation of the proposed Sustainability Update would not directly or indirectly substantially alter drainage patterns at the Thurber Lane/Soquel Drive property, including through alteration of the course of a stream or river or through addition of impervious surfaces in a manner that would result in substantial erosion or siltation, increase the rate or amount of surface runoff, which could result in flooding, create or contribute runoff water that would exceed the capacity of existing or planned drainage systems, or impede or redirect flood flows. (***Less than Significant***)

The proposed project would not directly result in new development but could indirectly lead to future development on the vacant Thurber Lane/Soquel Drive property. The approximate 6-acre parcel is located at the northeast intersection of Soquel drive and Thurber Lane and has an approximate 1,000-foot long unnamed ephemeral stream on the eastern side of the property with a vegetated corridor of mostly non-native species. Potential future development of this site would result in a mix of residential and commercial development. As indicated in Section 3.5.5.2, potential impacts resulting from land use and zoning map amendments and future development are reviewed under two sets of development assumptions for this property: one with the existing stream and related buffer area remaining intact, and the other with the stream piped into a drainage system that would connect to the existing downstream piped drainage system.

Under the first option, the existing drainage channel would be maintained, and future development would be required to maintain required riparian setbacks set forth in the SCCC, which could limit the net area of development. A future development project would be required to develop a stormwater management plan that complies with County stormwater regulations. A stormwater assessment would be required pursuant to proposed Sustainability Update policies summarized in Table 4.10-7 to ensure that the onsite drainage system is capable of maintaining pre-development runoff levels with future development and does not result in downstream impacts, including sediment transport and erosion. This could require onsite detention and/or modifying the onsite channel to control flow and/or detention capacity. The existing channel and required riparian buffer would be incorporated in the project drainage system and could serve as a bio-remediation feature for water quality controls. Compliance with state and local regulations would ensure that offsite erosion, siltation, or flooding would be prevented and downstream storm drain capacities would not be exceeded.

Under the second scenario, the existing drainage channel would be filled and placed in an underground pipe, connecting to the existing underground piped system that exist off-site at both the northern and southern ends of the property. Under this scenario, more area would become available for development,

potentially resulting in increased amount of impervious surface and stormwater runoff. The filling of the existing channel may be considered alteration of a drainage pattern, although the channel does not directly flow into any water body, but runoff from the site enters a piped drainage system at the southern property boundary, and stormwater runoff from the north also flows through a piped system before entering the property. Converting the channel to an underground storm drain could potentially increase flow velocity and downstream volume, which could potentially result in localized flooding, depending on the ultimate stormwater system design, size, and capacity of downstream, off-site drainage facilities. This would be considered a potentially significant impact. However, as with the first option, future development would be subject to County policies and regulations that require stormwater management plans to ensure that the onsite system is designed to handle runoff from future development so that pre-development runoff levels are maintained, and there would be no resulting offsite impacts due to storm drain capacity issues or localized sedimentation/erosion or flooding. With compliance with County regulations and policies, this option would include an engineered system designed to avoid downstream impacts, and therefore would not result in a significant impact related to stormwater runoff volumes, off-site impacts or water quality degradation.

Pursuant to section 7.79.070 of the SCCC, alteration to the drainage channel would require approval by the County. It is also noted this second scenario may require permits from other federal and state agencies, such as the USACE, RWQCB, and California Department of Fish and Wildlife if the onsite stream is considered to be under the jurisdiction of any of these agencies. See Section 4.4, Biological Resources, for further discussion. As indicated, compensatory mitigation also would be required by state and federal agencies for permanent loss of wetland and riparian resources if the channel is deemed to be within any of these agencies' jurisdiction.

Therefore, compliance with existing regulatory requirements would ensure that stormwater generated by future development on the Thurber Lane/Soquel Drive property accommodated by the proposed project would not substantially change existing drainage patterns or result in adverse erosion/siltation, flooding, or storm drain capacity issues under either channel option. While the channel could be filled under the second option reviewed above, this would not result in a substantial change to the overall drainage pattern as neither upstream nor downstream drainage patterns would be altered. Therefore, either channel option would result in a *less-than-significant impact*.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Impact HYD-4: Release of Pollutants from Flooding (Significance Threshold HYD-4). Adoption and implementation of the proposed Sustainability Update would not directly or indirectly risk release of pollutants due to project inundation from a flood, tsunami, or seiche hazard zone. (***Less than Significant***)

The proposed project would not directly result in new development but could indirectly lead to future development and redevelopment throughout the county, primarily within urban areas within the USL. Future development that could be accommodated by the proposed Sustainability Update could include industrial

uses that could require the use and storage of hazardous materials or otherwise involve sources of pollutants that adversely affect waters in the event of inundation due to flooding. Some of these projects could be located within flood prone, tsunami, or seiche hazard areas. As noted above, future development and redevelopment projects would be required to adhere to SCCC sections 16.10 and 16.13, which include requirements to avoid inappropriate land uses in flood zones and could include industrial land uses that handle and store hazardous materials. However, any commercial or industrial land uses would be required to adhere to existing regulatory requirements for storage of hazardous materials, as discussed in Section 4.9, Hazards and Hazardous Materials. State and local regulations require all businesses that store or handle specified quantities of hazardous materials to prepare and implement a Hazardous Materials Business Plan (HMBP) and obtain a Hazardous Materials Permit. The purpose of the HMBP is to prevent or minimize damage to public health, safety, and the environment from a release of hazardous materials such as in the event of inundation from a flood, tsunami, or seiche wave. In general, the storage of hazardous materials in appropriate containers that in some cases include secondary containment measures protect from inadvertent releases. In addition, initial construction in a flood-prone area would also require flood protection measures incorporated into the project design to avoid inundation. Therefore, with required compliance to existing regulatory requirements related to development in a flood zone and related to the storage and handling of hazardous materials and wastes would reduce the potential impact from release of pollutants from inundation to *a less-than-significant* level.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Impact HYD-5: Conflict with Water Quality or Sustainable Groundwater Management Plan (Significance Threshold HYD-5). Adoption and implementation of the proposed Sustainability Update would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. (***No Impact***)

The proposed project would not directly result in new development but could indirectly lead to future development and redevelopment throughout the county, primarily within urban areas within the USL. Future development and redevelopment projects potentially accommodated by the proposed Sustainability Update would be required to adhere to any applicable waste discharge requirements that are administered by the RWQCB as well as NPDES statewide Phase II Municipal General Permit requirements and county drainage control requirements. All of these discharge and drainage control requirements are consistent with the policies and objectives of the RWQCB Basin Plan for the Central Coast region. As discussed in Impact HYD-1 and summarized in Table 4.10-5, the proposed project includes policies that would be applied to future development to protect water quality, and thus, these policies would be consistent with goals of the Central Coast Basin Plan for water quality. Therefore, the proposed project would not conflict or obstruct implementation of the water quality control plan for the region.

As discussed above, the unincorporated county area overlies three different groundwater basins and subbasins, which are all being managed by existing or developing groundwater management plans. As

discussed in Impact HYD-2, potential future development and redevelopment projects indirectly resulting from the proposed project would represent an increase in water demands. However, projected water demand increases alone are not necessarily a conflict with the three different groundwater sustainability plans that are or will be implemented within the three underlying groundwater basins/subbasins. SGMA requires that the GSPs identify mechanisms to achieve a sustainable yield by 2040. Future development would occur in accordance with the proposed policies of the ARC Element, which have long-term sustainable management and water conservation policies that would be consistent with the groundwater sustainability plans in the county, as well as existing county codes. The proposed project includes policies regarding protection of groundwater resources, which would be consistent with directives in the GSPs. Therefore, the proposed project would not conflict with or obstruct implementation of a GSP, resulting in *no impact*.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Impact HYD-6: Inadequate Soils for Septic or Alternative Wastewater Systems (Significance Threshold HYD-6). Adoption and implementation of the proposed Sustainability Update would indirectly lead to development that may use septic or alternative wastewater systems that could lead to water quality impacts if soils are not adequate to support such systems. (***Less than Significant***)

The proposed project would not directly result in new development but could indirectly lead to future development and redevelopment throughout the county, primarily within urban areas within the County's USL. Areas not served by wastewater disposal service providers outside of the USL typically have septic systems, also referred to OWTS as previously described. Potential future development in planning areas outside of the USL is not expected to increase beyond what could occur under the existing General Plan/LCP. New residential and non-residential uses in rural areas would utilize OWTS for wastewater treatment and disposal. Some areas of the county may have geologic features or soils that are incapable of adequately supporting, or are incompatible with, the installation of OWTS, thereby potentially leading to adverse groundwater quality impacts if OWTS are not properly sited, designed, or maintained. Constraints include areas with noted high groundwater conditions, areas with clay soil conditions, areas with sandy soils or areas in proximity to streams or water supply sources.

Future development and redevelopment projects potentially accommodated by the proposed Sustainability Update would be required to adhere County regulations set forth in Chapter 7.38 of the SCCC, which regulates OWTS. The regulations require a permit for the construction, reconstruction, repair, addition, or upgrade of any individual sewage disposal system or any portion thereof on any property within the unincorporated area of the county. The regulations also set forth certain prohibitions and lot size requirements for OWTS. Future development also would be subject to requirements of the LAMP, which was prepared by the County to meet requirements set forth by the SWRCB in the State OWTS Policy (2013). In addition, the General Plan/LCP PPF Element includes policies that requirement adequate provision of OWTS as summarized in Table 4.10-8. With required compliance with these regulations, potential impacts

to groundwater quality due to OWTS that are installed to support future development would be *less than significant*.

Table 4.10-8. Proposed and Retained General Plan/LCP Policies that Avoid/Minimize Impacts Related to Wastewater Treatment

Potential Impact	Policies
Wastewater Treatment Capacity	• Allow new development at designated urban densities where it can be served by community sewage disposal systems. (PPF-4.2.2) • Plan for intensity of development outside of urban and rural service lines to be supported by individual sewage disposal systems. (PPF-4.2.3) • Require minimum parcel sizes and maximum densities with individual sewage disposal systems. (PPF-4.2.4) • Allow alternative treatment disposal systems, where environmentally acceptable, as approved by the County and the RWQCB. (PPF-4.2.9)

4.10.3.4 Cumulative Impact Analysis

The geographic scope of the cumulative analysis for hydrology and water quality generally considers the area within Santa Cruz County, including the unincorporated area of the county that is covered in this EIR and the four incorporated cities within the county. However, the geographic area for groundwater impacts extends into the northern portion of Monterey County, which is within the boundaries of PV Water. Cumulative development includes specific projects and growth in cities within the county as outlined on Table 4.0-1 in Section 4.0, Introduction to Analyses. Generally, cumulative impacts include specific identified major projects, as well as continued growth and development pursuant to adopted General Plans, in the cities of Capitola, Santa Cruz, Scotts Valley, and Watsonville, and growth and development at the University of California Santa Cruz. In addition, there are several pending development projects in northern Monterey County that would result in development within the boundaries of PV Water, including an approximate 180,000 square feet commercial project and a farmworker housing project in the unincorporated area of Pajaro immediately south of the Santa Cruz-Monterey county line.

Potential impacts related to hydrology and water quality are project- and site-specific, and can be avoided with required compliance with federal, state, and local laws and regulations as discussed in the preceding impact analyses. Cumulative development projects in other jurisdictions in the county would also be subject to local regulations regarding grading, erosion control, stormwater management, and flood hazards. Project-specific development would also be subject to CEQA review and implementation of mitigation measures if significant impacts related to hydrology or water quality are identified and are not mitigated by compliance with jurisdictional codes and regulations. Cumulative development projects would be required to comply with applicable local, state and federal regulations regarding the protection of water quality, groundwater resource management, stormwater management and avoidance of flood and coastal hazards, which would avoid the aggregation of individual effects into a significant cumulative impact. Adherence to

these regulations would reduce the potential for sediment and pollutants to enter receiving water bodies, ensure ongoing groundwater recharge, and avoid impacts associated with flood and inundation.

Further, the implementation of the required GSPs by SGMA and adherence to the policies and regulations associated with the proposed project are intended to improve protection and sustainable use of water resources. Therefore, since the proposed project combined with cumulative growth and development would not result in a significant cumulative impact related to hydrology and water quality. However, due to concerns with effects of climate change and sea level rise on groundwater supplies, especially near the coast, in the Pajaro Valley Subbasin, coupled with the fact that the Subbasin is in a critically overdrafted condition, any additional increase in groundwater use within the Subbasin could be considered potentially significant cumulative impact to groundwater resources until implementation of the GSP has achieved sustainability. Additionally, agricultural operations utilize groundwater in this area, and if any changes or increases in pumping occur, these could also contribute to this cumulative impact. As discussed in Impact HYD-2, the potential indirect contribution of the project to future groundwater demand would not be substantial. Furthermore, implementation of General Plan/LCP policies summarized in Table 4.10-6 also would serve to avoid and/or minimize potential impacts related to groundwater supplies or recharge indirectly resulting from the proposed Sustainability Update. Therefore, the project's contribution to a significant cumulative impact would not be cumulatively considerable.

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4.10.5 Figures

Figure 4.10-1. Major Streams and Flood Hazard Locations in Santa Cruz County

Figure 4.10-2. Watersheds in Santa Cruz County

Figure 4.10-3. Groundwater Basins in Santa Cruz County

Figure 4.10-4. Tsunami Inundation Areas in Santa Cruz County

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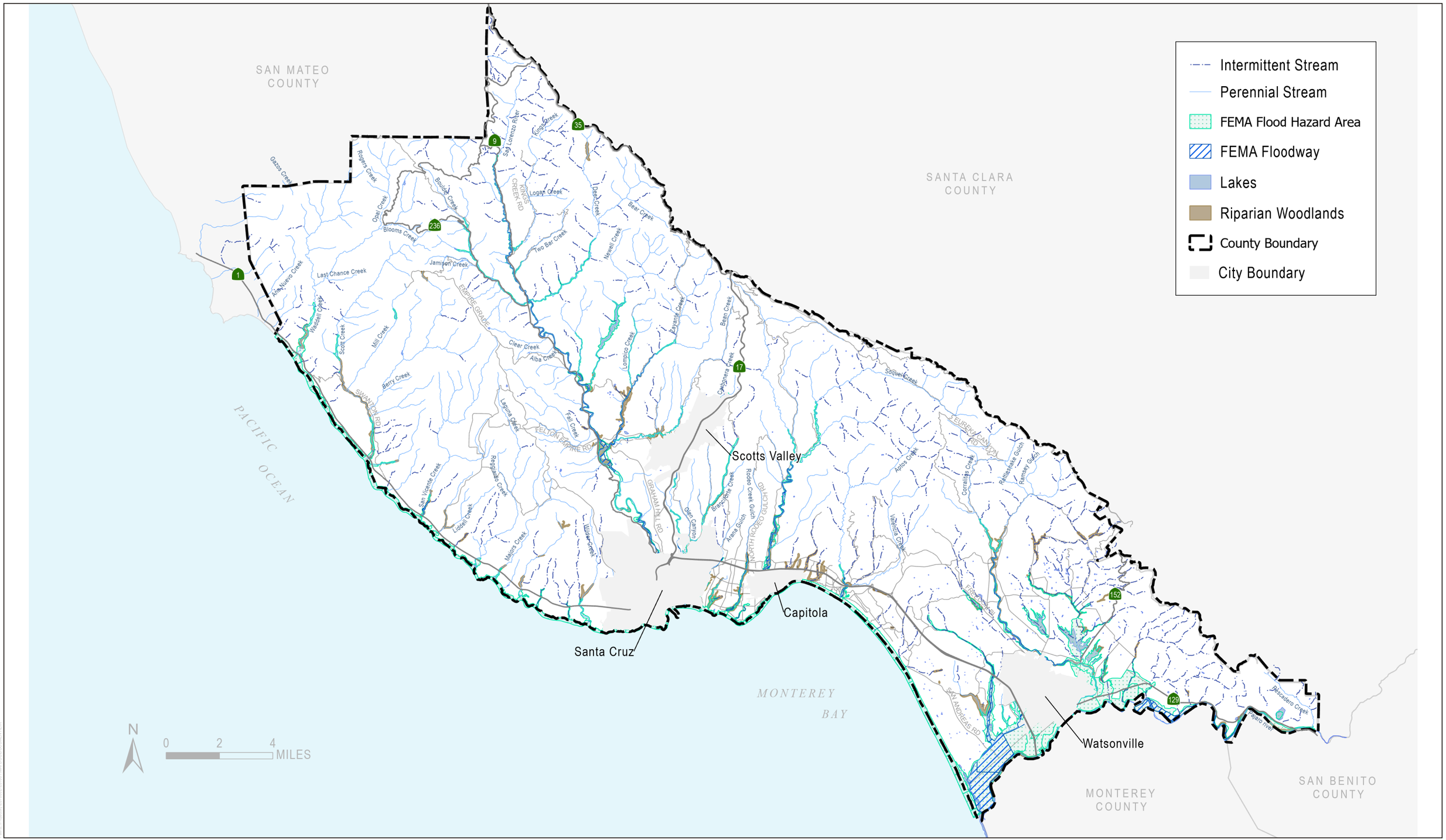


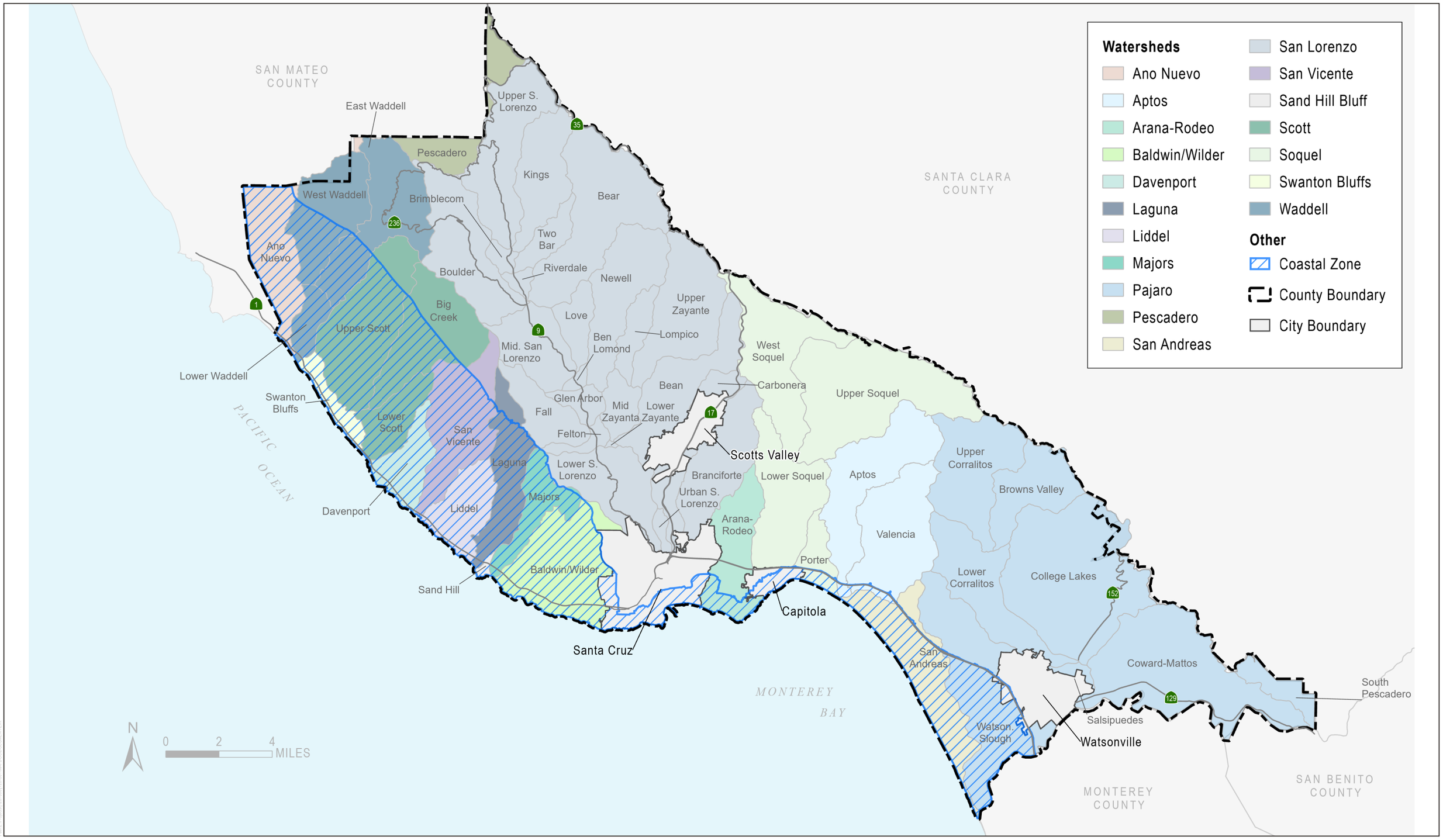
SOURCE: County of Santa Cruz 2021

FIGURE 4.10-1

Streams and Flood Hazard Locations in Santa Cruz County

County of Santa Cruz Sustainability Policy and Regulatory Update

DUDEK



SOURCE: County of Santa Cruz 2021

FIGURE 4.10-2

Watersheds in Santa Cruz County

County of Santa Cruz Sustainability Policy and Regulatory Update

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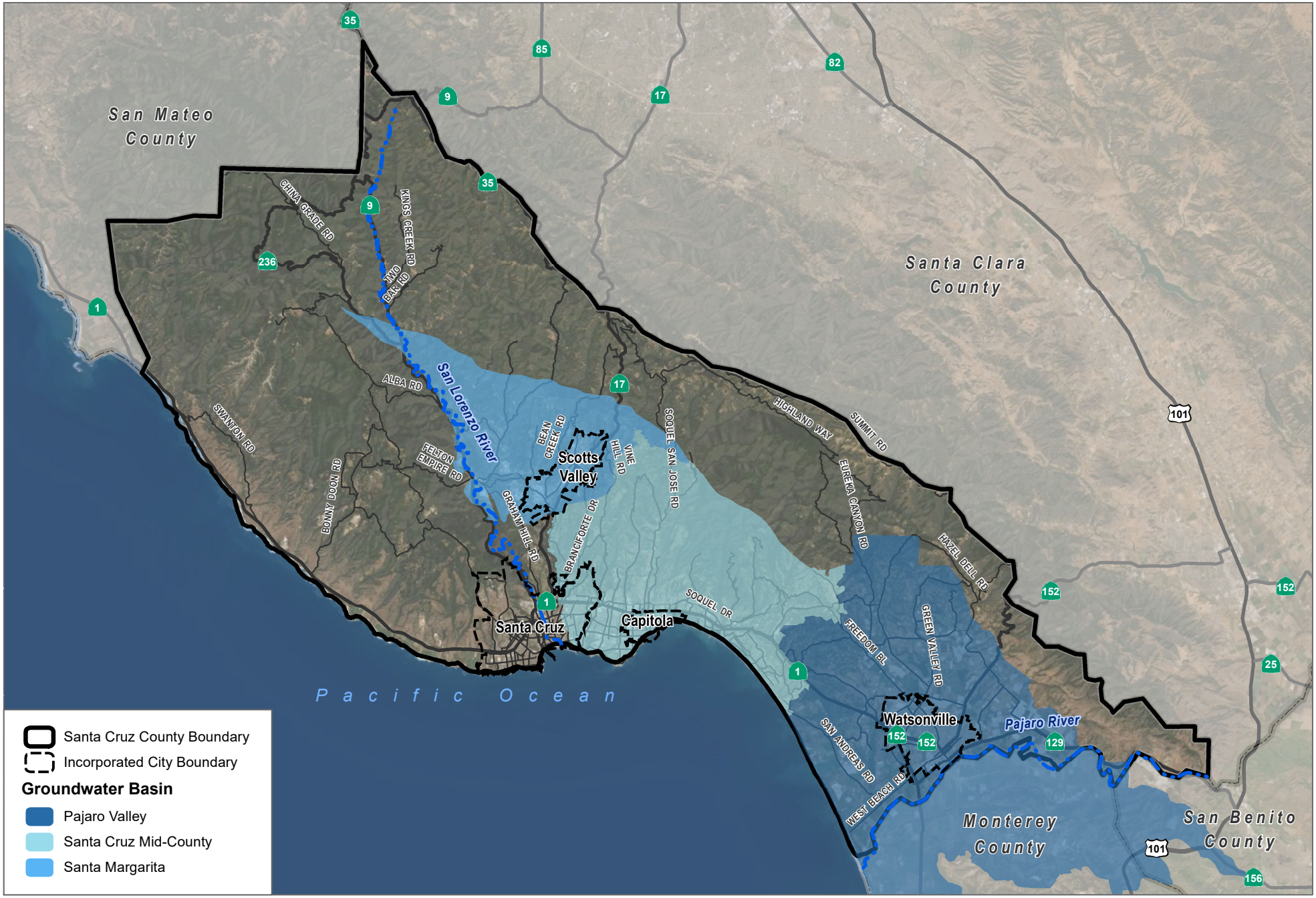

SOURCE: ESRI 2021, County of Santa Cruz 2020

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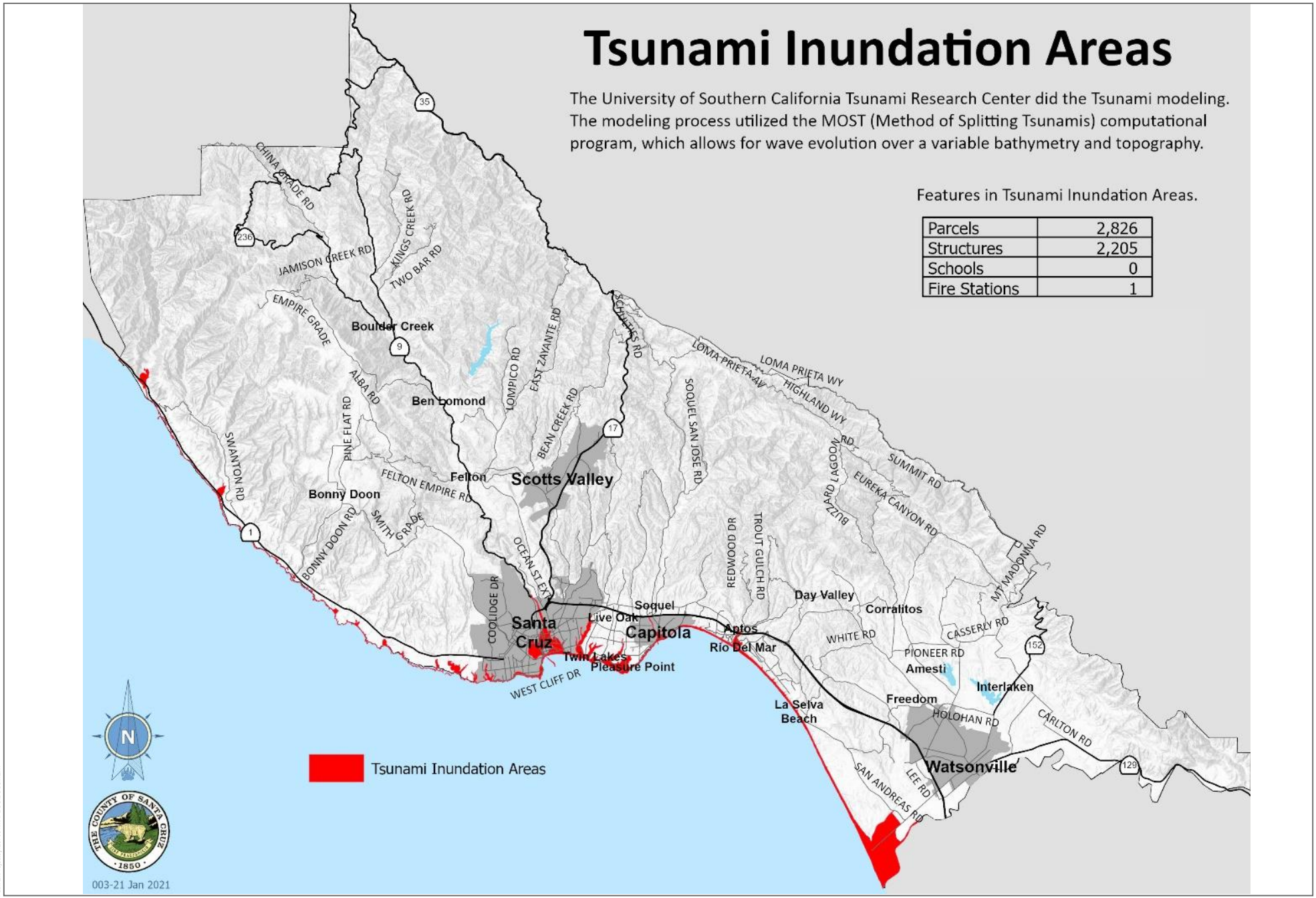
FIGURE 4.10-3

Groundwater Basins in Santa Cruz County

County of Santa Cruz Sustainability Policy and Regulatory Update



SOURCE: County of Santa Cruz 2021

FIGURE 4.10-4

Tsunami Inundation Areas in Santa Cruz County