5.9 Hydrology and Water Quality

5.9 HYDROLOGY AND WATER QUALITY

5.9.1 PURPOSE

This section describes the existing conditions related to hydrology, drainage, and water quality within the Study Area and provides an analysis of potential impacts associated with implementation of the General Plan Update. Potential impacts are identified and mitigation measures to address potentially significant impacts are recommended, as necessary.

5.9.2 EXISTING REGULATORY SETTING

FEDERAL REGULATIONS

Clean Water Act

The principal law governing pollution of the nation's surface waters is the Federal Water Pollution Control Act (Clean Water Act [CWA]). Originally enacted in 1948, it was amended in 1972 and has remained substantially the same since. The CWA consists of two major parts: provisions that authorize Federal financial assistance for municipal sewage treatment plant construction and regulatory requirements that apply to industrial and municipal dischargers. The CWA authorizes the establishment of effluent standards on an industry basis. The CWA also requires States to adopt water quality standards that "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses."

The CWA forms the basic national framework for the management of water quality and the control of pollution discharges; it provides the legal framework for several water quality regulations, including the National Pollutant Discharge Elimination System, effluent limitations, water quality standards, pretreatment standards, antidegradation policy, nonpoint- source discharge programs, and wetlands protection. The U.S. Environmental Protection Agency (EPA) has delegated the responsibility for administration of portions of the CWA to State and regional agencies.

Impaired Water Bodies

CWA Section 303(d) and California's Porter-Cologne Water Quality Control Act (described below) require that the State establish the beneficial uses of its State waters and to adopt water quality standards to protect those beneficial uses. Section 303(d) establishes a Total Maximum Daily Load (TMDL), which is the maximum quantity of a contaminant that a water body can maintain without experiencing adverse effects to guide the application of State water quality standards. Section 303(d) also requires the State to identify "impaired" streams (water bodies affected by the presence of pollutants or contaminants) and to establish the TMDL for each stream.

National Pollutant Discharge Elimination System

To achieve its objectives, the CWA is based on the concept that all discharges into the nation's waters are unlawful, unless specifically authorized by a permit. The National Pollutant Discharge Elimination System (NPDES) is the permitting program for discharge of pollutants into surface waters of the United States under CWA Section 402. Thus, industrial and municipal dischargers (point source discharges) must obtain NPDES permits from the appropriate Regional Water Quality Control Board (RWQCB) (i.e., the San Diego region). The existing NPDES (Phase I) stormwater program requires municipalities serving more than 1,000,000 persons to obtain a NPDES stormwater permit for any construction project larger than five acres. Proposed NPDES stormwater regulations (Phase II) expand this existing national program to smaller municipalities with populations of 10,000 persons or more and construction sites that disturb more than one acre. For other dischargers, such as those affecting groundwater or from non-point sources, a Report of Waste Discharge must be filed with the RWQCB. For specified situations, some permits may be waived, and some discharge activities may be handled through being included in an existing general permit.

Federal Emergency Management Agency

On March 1, 2003, the Federal Emergency Management Agency (FEMA) became part of the U.S. Department of Homeland Security. FEMA's primary mission is to reduce the loss of life and property and protect the Nation from all hazards, including flooding, among others. FEMA advises on building codes and flood plain management; teaches people how to get through a disaster; helps equip local and State emergency preparedness; coordinates the Federal response to a disaster; makes disaster assistance available to states, communities, businesses and individuals; trains emergency managers; supports the nation's fire service; and administers the national flood and crime insurance programs.

Flood is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties. The term "100-year flood" is defined by FEMA, as the flood elevation that has a one percent chance of being equaled or exceeded each year. A "500-year flood" is one which has a 0.2 percent chance of occurring each year. A 500-year flood event would be slightly deeper and cover a greater area than a 100-year flood event.

Flood zones are geographic areas that FEMA defines, based on studies of flood risk. The zone boundaries are shown on flood hazard maps, also called Flood Insurance Rate Maps (FIRM). High Risk Zones or Special Flood Hazard Areas (SFHA or Zone A) are high-risk flood areas where special flood, mudflow, or flood-related erosion hazards exist, and flood insurance is mandatory. SFHAs are those areas subject to inundation by a 100-year flood. Low-to-Moderate Risk Zones or Non-Special Flood Hazard Areas (Zones B, C, X) are areas that are not in any immediate danger from flooding caused by overflowing rivers or hard rains. Insurance purchase is not required in these zones.

FEMA is responsible for administering the National Flood Insurance Program (NFIP), which enables property owners in participating communities to purchase insurance as protection against flood losses in exchange for State and community floodplain

management regulations that reduce future flood damages. In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all Zones A, which are communities subject to a 100-year flood event. In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the nation's floodplains on FIRMs.

FEMA is mandated by the Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 to evaluate flood hazards and provide FIRMs for local and regional planners to further promote safe floodplain development. Flood risk data presented on FIRMs are based on historic, hydrologic, hydraulic, and meteorological data, as well as flood control works, open-space conditions, and development. To prepare a FIRM that illustrates the extent of flood hazards in flood-prone communities, FEMA conducts an engineering study referred to as Flood Insurance Study. Using information collected in these studies, FEMA engineers and cartographers delineate SFHAs on FIRMs.

STATE/REGIONAL REGULATIONS

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act works in cooperation with the CWA to establish the State Water Resources Control Board (SWRCB). The SWRCB is divided into nine regions, each overseen by a RWQCB. The SWRCB, and thus each RWQCB, is responsible for protecting California's surface waters and groundwater supplies. The City of Rancho Santa Margarita falls within the San Diego RWQCB region.

The Porter-Cologne Water Quality Control Act develops Basin Plans that designate the beneficial uses of California's rivers and groundwater basins. The Basin Plans also establish narrative and numerical water quality objectives for those waters. Basin Plans are updated every three years and provide the basis of determining waste discharge requirements, taking enforcement actions, and evaluating clean water grant proposals. The Porter-Cologne Water Quality Control Act is also responsible for implementing CWA Sections 401-402 and 303(d) to SWRCB and RWQCBs.

State Water Resources Control Board and Regional Water Quality Control Board

The SWRCB administers water rights, water pollution control, and water quality functions throughout the State, while the RWQCB conduct planning, permitting and enforcement activities.

While the EPA allows two permitting options to meet NPDES requirements (individual permits and general permits), the SWRCB has elected to adopt one Statewide General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ) for California that applies to all construction-related stormwater discharges, except for those on tribal lands in the Lake Tahoe Hydrologic Unit and those performed by the California Department of Transportation.

State Water Quality Control Board Stormwater Construction General Permit

In 1999, the SWRCB adopted Order No. 99-08-DWQ, NPDES General Permit No. CAS000002, Waste Discharge Requirements (WDR) for Discharges of Stormwater Runoff Associated with Construction Activity. This Construction General Permit was subsequently amended to include smaller construction sites. The Construction General Permit requires that construction sites with 1.0 acre or greater of soil disturbance or less than 1.0 acre, but part of a greater common plan of development, apply for coverage for discharges under the Construction General Permit by submitting a Notice of Intent (NOI) for coverage, developing a Stormwater Pollution Prevention Plan (SWPPP), and implementing best management practices (BMPs) to address construction site pollutants.

Groundwater Management Act

In 1992, the State Legislature provided for more formal groundwater management with the passage of Assembly Bill (AB) 3030, the Groundwater Management Act (Water Code Section 10750, et seq.). Groundwater management, as defined in DWR's Bulletin 118 Update 2003, is the planned and coordinated monitoring, operation, and administration of a groundwater basin, or portion of a basin, with the goal of long-term groundwater resource sustainability. Groundwater management needs are generally identified and addressed at the local level in the form of Groundwater Management Plans (GMP). The Groundwater Management Act provides local water agencies with procedures to develop a GMP to enable those agencies to manage their groundwater resources efficiently and safely while protecting the quality of water supplies. Under the Groundwater Management Act, development of a GMP by a local water agency is voluntary.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) established a framework for sustainable, local groundwater management. SGMA requires groundwater-dependent regions to halt overdraft and bring basins into balanced levels of pumping and recharge. With passage of the SGMA, the Department of Water Resources launched the Sustainable Groundwater Management Program to implement the law and provide ongoing support to local agencies around the State. The SGMA:

- Establishes a definition of "sustainable groundwater management;"
- Requires that a Groundwater Sustainability Plan be adopted for the most important groundwater basins in California;
- Establishes a timetable for adoption of Groundwater Sustainability Plans;
- Empowers local agencies to manage basins sustainably;
- Establishes basic requirements for Groundwater Sustainability Plans; and
- Provides for a limited State role.

Orange County Stormwater Program

The Orange County Stormwater Program was initiated in 1990 as a cooperative local government response to the 1987 Amendment to the CWA. This amendment extended the provisions of the CWA Section 402 NPDES, issuing a permit to the municipal storm drain system operators, also known as the Municipal Separate Storm Sewer Systems (MS4s), thereby making local governments responsible for the quality of their stormwater discharges.

In compliance with the NPDES MS4 Permit, the City of Rancho Santa Margarita has developed a comprehensive Stormwater Program that exemplifies the high value that is placed on clean water and improving water quality. This program includes a Local Implementation Plan (LIP) that regulates urban water runoff in and around the City. As a co-permittee of Orange County's NPDES MS4 Permit, the City dedicates a significant amount of staff time and funding annually to implement and maintain multiple Countywide programs, such as the *South Orange County Integrated Regional Water Management Plan* and the *South Orange County (San Juan Hydrologic Unit) Water Quality Improvement Plan*.

LOCAL

Orange County Drainage Area Management Plan

The main objective of OC Public Works' *Drainage Area Management Plan* (DAMP) is to fulfill the commitment of permittees to present a plan that satisfies NPDES permit requirements and to evaluate the impacts of urban stormwater discharges on receiving waters. The most recent update to the DAMP occurred in 2003 and redesigned the plan to serve as a foundation for a series of model programs, local implementation plans, and watershed implementation plans.

City of Rancho Santa Margarita Municipal Code

Rancho Santa Margarita Municipal Code (Municipal Code) Chapter 5.10, *Water Quality Control*, prescribes regulations as mandated by the CWA to prohibit non-stormwater discharges into the storm sewers and to reduce the discharge of pollutants. This Chapter controls the pollutants that enter the network of storm drains throughout the City and establishes legal authority to establish and enforce BMPs to ensure the health, safety, and general welfare of citizens, and protect and enhance the water quality of watercourses and water bodies in a manner pursuant to and consistent with the CWA.

Municipal Code Section 5.10.040, *Prohibition on Illicit Connections and Prohibited Discharges*, prohibits illicit connections and discharges into the City's stormwater system, and Municipal Code Section 5.10.050, *Control of Discharges*, requires all new development and significant redevelopment projects to comply with the DAMP, minimum BMPs as determined by the City, the NPDES permit, and any conditions required by the City to reduce or eliminate pollutants in stormwater runoff from the project site. Prior to the issuance by the City of a grading permit, building permit or nonresidential plumbing permit for any new development or significant redevelopment, the City would

review the project plans and impose terms, conditions and requirements on the project in accordance with the Ordinance.

5.9.3 EXISTING ENVIRONMENTAL SETTING

REGIONAL WATERSHED AND DRAINAGE

The City of Rancho Santa Margarita is located in the San Juan Creek Watershed under the Mission Viejo subunit of the San Juan Hydrologic Basin (designated Hydrologic Sub Area 1.21-1.28).1 The San Juan Creek Watershed covers approximately 160 square miles and includes portions of the cities of Dana Point, Laguna Hills, Laguna Niguel, Mission Viejo, Rancho Santa Margarita, and San Juan Capistrano.

The main tributary of the San Juan Creek Watershed is the San Juan Creek, which originates in the Santa Ana Mountains district of the Cleveland National Forest in eastern Orange County.2 The Arroyo Trabuco and Oso Creeks are smaller tributaries.

Regional Drainage Facilities

Three main draining stream systems running north to south drain the City's Study Area. Arroyo Trabuco Creek (or Trabuco Creek) and Tijeras Canyon Creek drain the northern and western areas of the City, while Bell Canyon Creek drains the southeastern side of the City.

Trabuco Creek is the larger water course and drains from Cleveland National Forest through unincorporated County land and through O'Neill Regional Park. The ultimate receiving water body of Trabuco Creek is San Juan Creek in the City of San Juan Capistrano.

Tijeras Canyon Creek drains from the open space area east of the Antonio Parkway/ Foothill Transportation Corridor State Route 241 (SR-241) intersection to Trabuco Creek south of Rancho Santa Margarita.

Bell Canyon Creek drains from the Cleveland National Forest along the eastern City limits of Rancho Santa Margarita.

Other surface water bodies in the project area include the Upper Oso Reservoir just west of the City's most western boundary near Los Alisos Boulevard and SR-241; Upper Chiquita Reservoir located just north of the Oso Parkway and Los Patrones Parkway intersection along the western slope of Chiquita Canyon; Trabuco Water Treatment Plant located in the eastern portion of the City; Dove Lake located north of Dove Canyon Drive; and Lake Rancho Santa Margarita in the northern portion of the City near the intersection of Santa Margarita Parkway and Antonio Parkway.

1 County of Orange, *South Orange County Watershed Management Area Integrated Regional Watershed Management Plan*, Chapter 3, Regional Description, July 2013.

2 OC Public Works, *San Juan Creek Watershed*, http://www.ocwatersheds.com/programs/ourws/sanjuancreek, accessed on May 14, 2018.

Local Drainage Facilities

The Orange County Flood Control District (OCFCD) is the agency responsible for regional flood control, while the City is responsible for storm drain systems within the City boundaries. The local storm drain facilities (storm drain pipes and catch basins) were developed in coordination with the planned communities and were interspersed through residential, commercial, industrial, municipal, and school uses within the City. It is noted that the County of Orange is currently in the process of updating its Master Plan of Drainage.

FLOODING

Major Sources of Flooding

The unpredictable seasonal range in rainfall that is typical of coastal southern California, coupled with geographic and geologic conditions, makes Orange County extremely vulnerable to flooding during the winter storm season.

The City of Rancho Santa Margarita is subject to atmospheric events and severe weather conditions that could threaten public safety, including weather patterns leading to flooding and other storm damage. Flooding is a natural attribute of any stream and is influenced by the intensity and distribution of rainfall. According to the latest FIRMs prepared by FEMA, there are areas within the City that are subject to a 100-year flood and a 500-year flood; refer to Exhibit 5.9-1, *Flood Hazard Map*.

As shown on Exhibit 5.9-1, potential flooding could occur along the Trabuco Creek and Tijeras Canyon Creek areas. Along Trabuco Creek, a dense growth of trees and brush are present in the main channel, which may raise flood levels considerably. If flooding were to occur, it would be difficult to predict and plan for because rainfall in the area is extremely variable. Floods that would impact the City would typically be of short duration, with high peak volumes and high velocity. This is due to the arid to semi-arid nature of the area. When a major storm moves in, water collects rapidly and runs off quickly due to the rapid descent of the mountains into Trabuco Creek, Tijeras Canyon Creek, and Dove Canyon. Consequently, resultant flows are of the flash-flood type, generally having sharp peaks and short durations. Although some severe floods have impacted the area in the past, flooding damage in this area has generally been lower than in other areas of Orange County because of its relatively undeveloped state in the upper watershed areas. No homes or structures are located within the 100-year or 500-year flood zones within the City.

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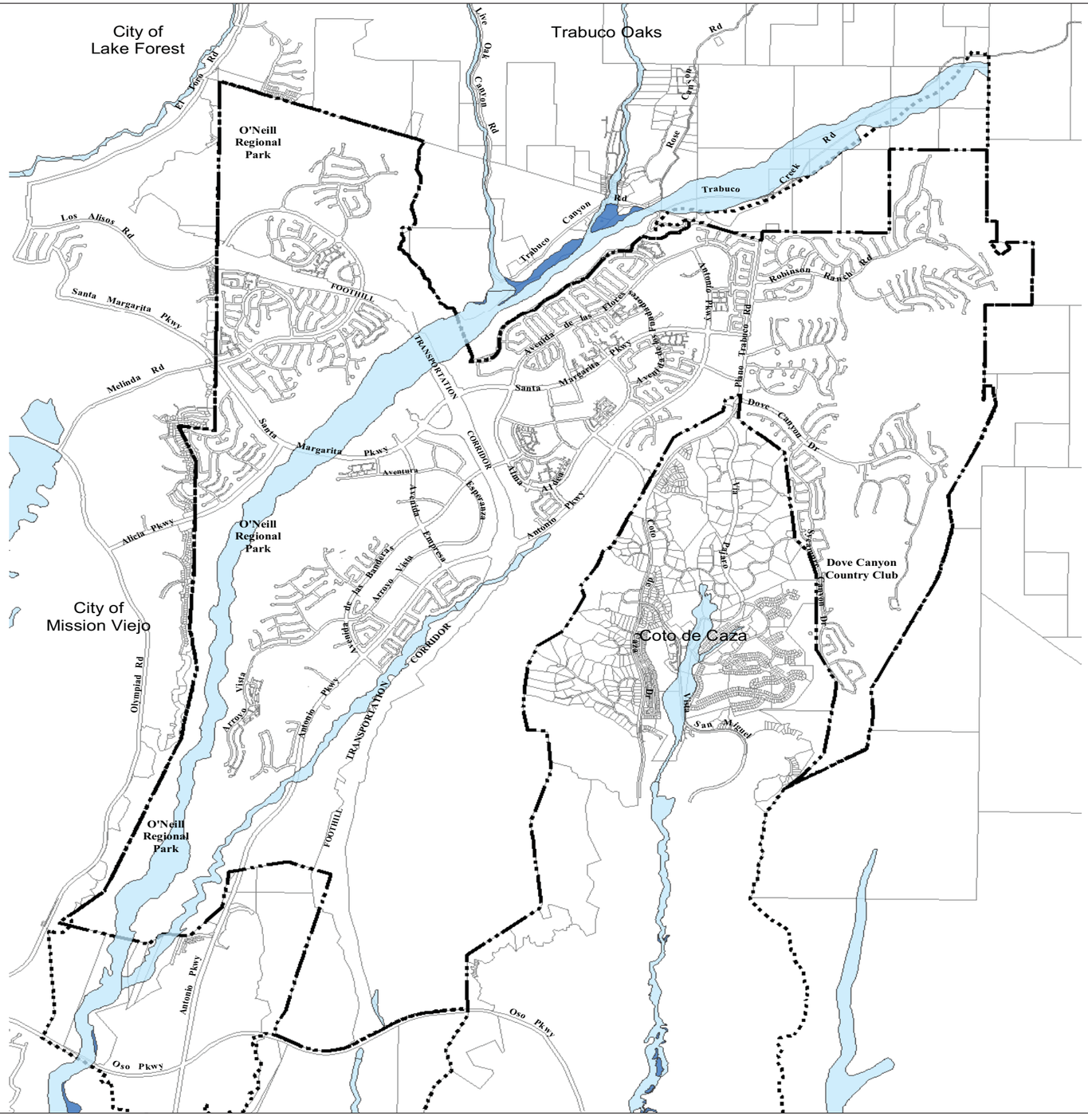

RANCHO SANTA MARGARITA
January 1, 2000

LEGEND

- 100-Year Flood
- 500-Year Flood
- City Boundary
- Sphere of Influence

0 2,400 4,800 Feet

Source: Orange County Local Area Formation Commission, 2013 and Federal Emergency Management Agency, Flood Insurance Rate Maps, December 2009.

Michael Baker INTERNATIONAL

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Flood Hazard Map

Exhibit 5.9-1

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Dam Inundation

No major dam is located upstream from the City's Study Area. However, Rancho Santa Margarita has three reservoirs (Upper Oso Reservoir, Upper Chiquita Reservoir, and Trabuco Water Treatment Plant) located within the City. The Upper Oso reservoir is located near the Foothill Transportation Corridor SR-241 in the northwestern portion of the City and extends into Mission Viejo. The reservoir has been in use since 1979 and holds 1.3 billion gallons of water. The Upper Chiquita Reservoir was built in 2011 on the western slope of Chiquita Canyon and holds 244 million gallons of water. The Trabuco Water Treatment Plant is located on the eastern portion of the City and provides water at peak demand periods to augment water supply. Inundation hazards due to seismic activity can occur at these reservoirs.

Seismically induced inundation can also occur if strong ground shaking causes structural damage to aboveground water tanks. Several reservoir sites are within the Study Area. Most of these are owned and operated by either the Trabuco Canyon or Santa Margarita Water Districts.

Additionally, Lake Mission Viejo is located near the City to the west. Other smaller flood control improvements, such as canals, culverts, levees, and retention basins may crack and suffer some structural damage during an earthquake, especially in areas prone to ground failure. These facilities could pose an inundation hazard if they contain water at the time of the seismic event, or if they are not repaired soon after an earthquake and prior to the next winter storm season.

REGIONAL GROUNDWATER

The San Juan Valley Groundwater Basin (SJVGB) underlies the San Juan Creek Watershed and several tributary valleys in South Orange County. SJVGB encompasses 16,700 acres, or 26 square miles, and is bounded on the west by the Pacific Ocean.3 The total water storage capacity is estimated at 90,000 acre-feet. The groundwater basin is subdivided into three sub-basins: the upper, middle, and lower subbasins. San Juan Creek drains the San Juan Valley and several other creeks drain valleys tributary to the San Juan Creek. Average annual precipitation ranges from 11 to 15 inches. Recharge of the SJVGB is provided by flows in the San Juan Creek, Oso Creek, and Trabuco Creek and precipitation to the valley floor. Water from springs flows directly from Hot Spring Canyon into San Juan Creek, adding to recharge.4

The SJVGB is managed by the San Juan Basin Authority. The San Juan Basin Authority's *San Juan Basin Groundwater and Facilities Management Plan* (2013) describes the existing water resources within the SJVGB; historical and projected water demand; management goals and impediments; strategies and actions to achieve management

3 California Water Resources Control Board, *Hydrologic Region South Coast, San Juan Valley Groundwater Basin*, https://www.water.ca.gov/LegacyFiles/pubs/groundwater/bulletin_118/basin descriptions/9-1.pdf, accessed on May 15, 2018.

4 County of Orange, *South Orange County Watershed Management Area Integrated Regional Watershed Management Plan*, Chapter 3, Regional Description, July 2013.

objectives; alternative management plans; and implementation and monitoring plans.[5] Additionally, the San Juan Basin Authority recently adopted the concept of "adaptive management" to vary pumping from year to year based on actual conditions derived from monitoring efforts.

Regional Groundwater Quality

Groundwater mineral content is variable in the SJVGB; the SJVGB's groundwater typically has calcium bicarbonate or bicarbonate-sulfate character below the upper reaches of the valleys, and calcium-sodium sulfate or sulfate-chloride near the coast. In general, total dissolved solids (TDS) content in groundwater increases from below 500 milligrams per liter (mg/L) in the upper reaches of the valleys to near 2,000 mg/L near the coast. TDS content of water from three public supply wells within the SJVGB average approximately 760 mg/L and ranges from 430 mg/L to 1,250 mg/L.

Groundwater in the western part of the SJVGB has high TDS content, and water coming from springs in Thermal Canyon has high fluorine content.[6]

STORMWATER QUALITY

Stormwater quality is a significant concern in southern California as storm water runoff is a significant contributor to local and regional pollution and the largest source of unregulated pollution to the waterway and coastal areas of the United States. Federal, State, regional, and local regulations require the City to control the discharge of pollutants to the storm drain system, including the discharge of pollutants from construction sites and areas of new development or significant development. The following discusses typical pollutants found in storm water runoff.

Point Source Pollutants

Historically, point-source pollutants have consisted of industrial operations with discrete discharges to receiving waters. Over the past several decades, many industrial operations have been identified as potential sources of pollutant discharges. For this reason, many types of industrial operations require coverage under the State of California's General Industrial Permit. This permit regulates the operation of industrial facilities and monitors and reports mechanisms to ensure compliance with water quality objectives. State regulations require industrial operations to comply with California's General Industrial Permit, which significantly lessens impacts on the quality of receiving waters. However, industrial operations that are not covered under the General Industrial Permit's jurisdiction may still have the potential to affect the water quality of receiving waters. These industrial operations would be considered non-point-source pollutants.

5 San Juan Basin Authority, *San Juan Basin Groundwater and Facilities Management Plan*, November 2013, http://sjbauthority.com/assets/downloads/20131126%20FINAL%20SJBA%20SJBGFMP.pdf, accessed May 15, 2018.

6 California Water Resources Control Board, *Hydrologic Region South Coast, San Juan Valley Groundwater Basin*, https://www.water.ca.gov/LegacyFiles/pubs/groundwater/bulletin_118/basin descriptions/9-1.pdf, accessed on May 15, 2018.

Non-Point Source Pollutants

Effects of urbanization most often result in an increase in pollutant export from the urban area. An important consideration in evaluating storm water quality within a city is to evaluate whether it impairs the beneficial use to the receiving waters. Non-point source pollutants have been characterized by the following major parameters to assist in determining and using the pertinent data. Receiving waters can assimilate a limited quantity of various constituent elements; however, there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable impact. The following background information on these standard water quality parameters provides an understanding of typical urbanization impacts.

SEDIMENT

Sediment is made up of tiny soil particles that are washed or blown into surface waters. It is the major pollutant by volume in surface water. Suspended soil particles can cause the water to look cloudy or turbid. The fine sediment particles also act as a vehicle to transport other pollutants including nutrients, trace metals, and hydrocarbons. Construction sites are the largest source of sediment for urban areas under development. Another major source of sediment is stream bank erosion, which may be accelerated by increases in peak rates and volumes of runoff due to urbanization.

NUTRIENTS

Nutrients are a major concern for surface water quality, especially phosphorous and nitrogen. The orthophosphorous form of phosphorus is readily available for plant growth. The ammonium form of nitrogen can also have severe effects on surface water quality. The ammonium is converted to nitrate and nitrite forms of nitrogen in a process called nitrification. This process consumes large amounts of oxygen, which can impair the dissolved oxygen levels in water. The nitrate form of nitrogen is very soluble and is found naturally at low levels in water. When nitrogen fertilizer is applied to lawns or other areas in excess of plant needs, nitrates can leach below the root zone, eventually reaching groundwater. Orthophosphate from auto emissions also contributes phosphorus in areas with heavy automobile traffic. As a general rule of thumb, nutrient export is greatest from development sites with the most impervious areas. Other problems resulting from excess nutrients are: 1) surface algal scums; 2) water discolorations; 3) odors; 4) toxic releases; and, 5) overgrowth of plants. Common nutrient indicators are total nitrogen, organic nitrogen, total Kjeldahl nitrogen, nitrate, ammonia, total phosphate, and total organic carbon.

TRACE METALS

Trace metals are primarily a concern because of their toxic effects on aquatic life and their potential to contaminate drinking water supplies. The most common trace metals found in urban runoff are lead, zinc, and copper. Fallout from automobile emissions is also a major source of lead in urban areas. A large fraction of the trace metals in urban runoff are attached to sediment and this effectively reduces the level, which is immediately available for biological uptake and subsequent bioaccumulation. Metals associated with the sediment settle out rapidly and accumulate in the soils. Also, urban

runoff events typically occur over a shorter duration, which reduces the amount of exposure that could pollute the aquatic environment. The toxicity of trace metals in runoff varies with the hardness of the receiving water. As total hardness of the water increases, the threshold concentration levels for adverse effects increases.

OXYGEN-DEMANDING SUBSTANCES

Aquatic life is dependent on the level of dissolved oxygen in water. When organic matter is consumed by microorganisms, dissolved oxygen is consumed in the process. A rainfall event can deposit large quantities of oxygen-demanding substances in lakes and streams. The biochemical oxygen demand of typical urban runoff is on the same order of magnitude as the effluent from an effective secondary wastewater treatment plant. A dissolved oxygen problem arises when the rate of oxygen-demanding material exceeds the rate of replenishment. Oxygen demand is estimated by the direct measure of dissolved oxygen and indirect measures such as biochemical oxygen demand, chemical oxygen demand, oils and greases, and total organic carbon.

BACTERIA

Bacteria levels in undiluted urban runoff usually exceed public health standards for recreational water contact. Studies have found that total coliform counts exceeded EPA water quality criteria at most urban sites and generally when it rains. The coliform bacteria that are detected may not be a health risk in themselves but are often associated with human pathogens.

OIL AND GREASE

Oil and grease contain a wide variety of hydrocarbons some of which could be toxic to aquatic life in low concentrations. These materials initially float on water and create the familiar rainbow-colored film. Hydrocarbons have a strong affinity for sediment and quickly become attached to it. The major source of hydrocarbons in urban runoff is through leakage of crankcase oil and other lubricating agents from automobiles. Hydrocarbon levels are highest in the runoff from parking lots, roads, and service stations. Residential land uses generate less hydrocarbons export, although illegal disposal of waste oil into storm water can be a local problem.

OTHER TOXIC CHEMICALS

Priority pollutants are generally related to hazardous wastes or toxic chemicals and can be sometimes detected in storm water. Priority pollutant scans have been conducted in previous studies of urban runoff, which evaluated the presence of over 120 toxic chemicals and compounds. The scans rarely revealed toxins that exceeded the current safety criteria. The urban runoff scans were primarily conducted in suburban areas not expected to have many sources of toxic pollutants (with the exception of illegally disposed or applied household hazardous wastes). Measures of priority pollutants in storm water include - 1) phthalate (plasticizer compound); 2) phenols and creosols (wood preservatives); 3) pesticides and herbicides; 4) oils and greases; and 5) metals.

CHARACTERISTICS OF SURFACE WATER QUALITY

The amount of pollutants in surface runoff is determined by the quantity of a material in the environment and its characteristics. In an urban environment, the quantity of certain pollutants in storm water systems is generally associated with the intensity of the land use. For instance, a high volume of automobile traffic makes a number of potential pollutants (such as lead and hydrocarbons) more available. The availability of a material, such as a fertilizer, is a function of the quantity and the manner in which it is applied. Applying fertilizer in quantities that exceed plant needs leaves the excess nutrients available for loss to surface or groundwater.

The physical properties and chemical constituents of water have traditionally served as the means for monitoring and evaluating water quality. Evaluating the condition of water through a water quality standard refers to its physical, chemical, or biological characteristics. Water quality parameters for storm water make up a long list and are classified in many ways. In many cases, the concentration of an urban pollutant, rather than the annual load of that pollutant, is needed to assess a water quality problem. Some of the physical, chemical or biological characteristics that evaluate the quality of the surface runoff are outlined below.

Dissolved Oxygen (DO)

DO in the water has a pronounced effect on the aquatic organisms and the chemical reactions that occur. It is one of the most important biological water quality characteristics in the aquatic environment. The DO concentration of a water body is determined by the solubility of oxygen, which is inversely related to water temperature, pressure, and biological activity. DO is a transient property that can fluctuate rapidly in time and space. DO represents the status of the water system at a particular point and time of sampling. The decomposition of organic debris in water is a slow process and the resulting changes in oxygen status respond slowly also. The oxygen demand is an indication of the pollutant load and includes measurements of Biochemical Oxygen Demand or Chemical Oxygen Demand.

Biochemical Oxygen Demand (BOD)

The BOD is an index of the oxygen-demanding properties of the biodegradable material in the water. Samples are taken from the field and incubated in the laboratory at 20 degrees Celsius, after which the residual DO is measured. The BOD value commonly referenced is the standard five-day values. These values are useful in assessing stream pollution loads and for comparison purposes.

Chemical Oxygen Demand (COD)

The COD is a measure of the pollutant loading in terms of complete chemical oxidation using strong oxidizing agents. It can be determined quickly because it does not rely on bacteriological actions as with BOD. COD does not necessarily provide a good index of oxygen demanding properties in natural waters.

Total Dissolved Solids (TDS)

TDS concentration is determined by evaporation of a filtered sample to obtain residue whose weight is divided by the sample volume. The TDS of natural waters varies widely. There are several reasons why TDS are an important indicator of water quality. Dissolved solids affect the ionic bonding strength related to other pollutants such as metals in the water. TDS are also a major determinant of aquatic habitat. TDS affects saturation concentration of dissolved oxygen and influence the ability of a water body to assimilate wastes.

pH

The pH of water is the negative log, base 10, 10, of the hydrogen ion (H+) activity. A pH of seven is neutral; a pH greater than seven indicates alkaline water; a pH less than seven represents acidic water. In natural water, carbon dioxide reactions are some of the most important in establishing pH. The pH at any one time is an indication of the balance of chemical equilibrium in water and affects the availability of certain chemicals or nutrients in water for uptake by plants. The pH of water directly affects fish and other aquatic life and generally toxic limits are pH values less than 4.8 and greater than 9.2.

Alkalinity

Alkalinity is the opposite of acidity, representing the capacity of water to neutralize acid. Alkalinity is also linked to pH and is caused by the presence of carbonate, bicarbonate, and hydroxide, which are formed when carbon dioxide is dissolved. A high alkalinity is associated with a high pH and excessive solids. Most streams have alkalinities less than 200 mg/l and ranges of alkalinity of 100-200 mg/l seem to support well-diversified aquatic life.

Specific Conductance

The specific conductivity of water, or its ability to conduct an electric current, is related to the total dissolved ionic solids. Long-term monitoring of a project's waters can develop a relationship between specific conductivity and TDS. Its measurement is quick and inexpensive and can be used to approximate TDS. Specific conductivities in excess of 2,000 micro-ohms per centimeter indicate a TDS level too high for most freshwater fish.

Turbidity

The clarity of water is an important indicator of water quality that relates to the ability of photosynthetic light to penetrate. Turbidity is an indicator of the property of water that causes light to become scattered or absorbed. Turbidity is caused by suspended clays and other organic particles. It can be used as an indicator of certain water quality constituents such as predicting sediment concentrations.

Nitrogen (N)

Sources of nitrogen in storm water are from the additions of organic matter or chemical additions to water bodies. Ammonia and nitrate are important nutrients for the growth of

algae and other plants. Excessive nitrogen can lead to eutrophication since nitrification consumes DO in the water. Organic nitrogen breaks down into ammonia, which eventually becomes oxidized to nitrate-nitrogen (N/N), a form available for plants. High concentrations of N/N in water can stimulate growth of algae and other aquatic plants, but if phosphorus is present, only about 0.30 mg/L of N/N is needed for algal blooms. Some fish life can be affected when N/N exceeds 4.2 mg/L. There are a number of ways to measure the various forms of aquatic nitrogen. Typical measurements of nitrogen include Kjeldahl nitrogen (organic nitrogen plus ammonia); ammonia; nitrite plus nitrate; nitrite; and, nitrogen in plants. The principal water quality criteria for nitrogen focuses on nitrate and ammonia.

Phosphorus

Phosphorus is an important component of organic matter. In many water bodies, phosphorus is the limiting nutrient that prevents additional biological activity from occurring. The origin of this constituent in urban storm water discharge is generally from fertilizers and other industrial products. Orthophosphate is soluble and is considered to be the only biologically available form of phosphorus. Since phosphorus strongly associates with solid particles and is a significant part of organic material, sediments influence concentration in water and are an important component of the phosphorus cycle in streams. The primary methods of measurement include detecting orthophosphate and total phosphorus.

REGIONAL SURFACE WATER QUALITY

The RWQCB's Basin Plan designates "beneficial uses" for lakes, rivers, streams, and other surface waters. There are a total of 24 different categories that can apply, ranging from groundwater recharge to municipal and domestic water supply to water contact recreation. The following is a list of the San Juan Creek Watershed's known beneficial uses, which may be existing, potential, and intermittent and not necessarily applicable to all reaches of the San Juan Creek watershed:[7,8]

- *Agricultural Supply:* Waters are used for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

- *Cold Freshwater Habitat:* Waters support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

- *Industrial Process Supply:* Waters are used for industrial activities that depend primarily on water quality.

7 County of Orange, *South Orange County Watershed Management Area Integrated Regional Watershed Management Plan*, Chapter 3, Regional Description, July 2013.

8 California Regional Water Quality Control Board San Diego Region, *Water Quality Control Plan for the San Diego Basin, Chapter 2, Beneficial Uses*, 2016, https://www.waterboards.ca.gov/rwqcb9/water_issues/programs/basin_plan/docs/update082812/Chpt_2_2012.pdf, accessed on May 15, 2018.

- *Contact Water Recreation:* Waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and use of natural hot springs.

- *Non-Contact Water Recreation:* Waters are used for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

- *Spawning, Reproduction, and/or Early Development:* Waters support high quality aquatic habitats necessary for reproduction, early development, and sustenance of marine fish and/or cold freshwater fish.

- *Warm Freshwater Habitat:* Waters support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

- *Wildlife Habitat:* Waters support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

The following additional designations apply to the mouth of San Juan Creek:

- *Rare, Threatened, or Endangered Species:* Waters that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under State or Federal law as rare, threatened, or endangered.

- *Marine Habitat:* Waters that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

- *Migration of Aquatic Organisms:* Waters that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.

- *Shellfish Harvesting:* Waters that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sport purposes.

LOCAL STORMWATER QUALITY

The City of Rancho Santa Margarita lacks any measured data on storm water runoff quality. In the absence of site-specific data, expected storm water quality can be qualitatively discussed by relating typical pollutants to specific land uses. Existing

development within the City includes residential, commercial, business park/community facility, open space/parks/recreation, water, and rights-of-way.

Residential and urban development is often a significant source of storm water pollution. Development and redevelopment activities have two primary effects on water quality; they are sources of erosion and sedimentation during the construction phase and they have long-term effects on runoff once the development is complete. Residential and urban development can affect water quality in three ways:

- Impervious surfaces associated with development increase the rate and volume of storm water runoff, which increase downstream erosion potential;
- Urban activities generate dry-weather ("nuisance") flows, which may contain pollutants and/or may change the ephemeral nature of streams and the degradation of certain habitats; and
- Impervious surfaces increase the concentration of pollutants during wet weather flows.

The potential for negative water quality effects is generally correlated to the density of development and the amount of impervious area associated with the development.

5.9.4 SIGNIFICANCE THRESHOLDS AND CRITERIA

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains the Initial Study Environmental Checklist, which includes questions relating to hydrology and water quality. The issues presented in the Initial Study Environmental Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant environmental impact if it would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Substantially alter the existing drainage pattern on the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on-or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;

- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; and/or
- Inundation by seiche, tsunami, or mudflow.

5.9.5 PROJECT IMPACTS AND MITIGATION MEASURES

WATER QUALITY

- **IMPLEMENTATION OF THE GENERAL PLAN UPDATE WOULD NOT VIOLATE ANY WATER QUALITY STANDARDS OR WASTE DISCHARGE REQUIREMENTS, OR OTHERWISE SUBSTANTIALLY DEGRADE WATER QUALITY.**

Impact Analysis: Future development projected in the General Plan Update may contribute to water quality degradation in the City. Runoff from disturbed areas could likely contain silt and debris, which might result in a long-term increase in the sediment load of the storm drain system serving the City. There is also the possibility for chemical releases at future construction sites. Substances such as oils, fuels, paints, and solvents may be transported to nearby drainages, watersheds, and groundwater in storm water runoff, wash water, and dust control water. The significance of these water quality impacts would vary depending upon the level of construction activity, weather conditions, soil conditions, increased sedimentation of drainage systems within the area, compliance with NPDES permit requirements, and proper installation of BMPs.

Maintaining and improving water quality is essential to protect public health, wildlife, and the local watershed. Water conservation and pollution prevention can be dramatically improved through proactive efforts of residents and through City policies. New development and significant reconstruction projects within the City would be required to comply with Municipal Code Chapter 5.10, *Water Quality Control*, which requires compliance with the DAMP, NPDES permit, and any BMP conditions and requirements established by the City in order to meet Federal and State water quality requirements related to storm water runoff.

All new development over an acre in size is also required to obtain coverage under the Construction General Permit through the San Diego RWQCB NPDES program. The permit requires development and implementation of a SWPPP, which would identify point and nonpoint sources of pollutant discharge that could adversely affect water quality in the City. The SWPPP would also designate project-specific BMPs that would be appropriate for achieving minimal pollutant discharge during construction and operations. Each Applicant under the Construction General Permit must ensure that a SWPPP is prepared

prior to grading and is implemented during construction. The SWPPP must list BMPs implemented on the construction site to reduce stormwater runoff and must contain a visual monitoring program; a chemical monitoring program for "nonvisible" pollutants to be implemented if there is a failure of BMPs; and a monitoring plan if the site discharges directly to a water body listed on the State's 303(d) list of impaired waters. Examples of construction BMPs include soil and wind erosion controls, sediment controls, tracking controls, non-stormwater management controls; and waste management controls. Compliance with the Construction General Permit requirements would minimize construction water quality impacts.

To ensure the City's municipal storm drain system complies with the San Diego RWQCB MS4 permit requirements, the City developed its comprehensive Stormwater Program LIP, which guides development in a manner that regulates urban water runoff in and around the City. Each project would be reviewed to determine compliance with the MS4 permit and LIP requirements to ensure future operational activities do not degrade the City's water quality.

Additionally, depending on the project type, a Water Quality Management Plan (WQMP) may be required under the San Diego RWQCB's NPDES permit. The WQMP would identify the sources of potential pollutants, describe practices to reduce or eliminate the potential pollutants, discuss downstream facilities and potential impairments, and address the responsibility, frequency, and cost to maintain BMPs utilized as part of the WQMP for the project.

The General Plan Update also includes goals and policies to reduce water quality impacts. Conservation/Open Space Element Policy 1.4 encourages the review of development projects through land use planning, environmental reviews, and conditions to reduce the impact of urban development on important ecological resources, including the beneficial uses of receiving waters. Conservation/Open Space Element Policies 3.1 and 3.2 of the Conservation/Open Space Element protect the beneficial uses of ground and surface waters by encouraging the adoption and enforcement of water quality regulations, support of water quality educational efforts, and the preservation, creation, and/or restoration of important riparian corridors, wetlands, and buffer zones.

The Land Use Element includes policies related to compliance with the RWQCB regulations, such as Policy 3.1, which requires property owners or developers to implement BMPs to minimize pollutant loading and flow velocity from new development projects and redevelopment/revitalization projects during and after construction. Policy 3.2 limits development that disturbs natural water bodies and drainage systems, and Policy 3.3 encourages providing educational information and resources to the community that describe how to minimize activities that pollute urban runoff. Land Use Element Policy 2.8 also encourages evaluating impacts of new development and land uses on the watershed in accordance with current watershed planning tools.

Overall, development in accordance with the General Plan Update would be required to comply with a number of local, State, and Federal regulations that ensure pollutant runoff generated by future projects do not exceed water quality standards and the City continues to comply with waste discharge requirements.

Proposed General Plan Update Goals and Policies:

CONSERVATION/OPEN SPACE ELEMENT

Goal 1: Protect and enhance the ecological and biological resources within and surrounding the community.

Policy 1.4: Through land use planning, environmental review, and conditions placed on development projects, reduce the impact of urban development on important ecological and biological resources, including the beneficial uses of receiving waters.

Goal 3: Protect the beneficial uses of ground and surface waters.

Policy 3.1: Adopt and enforce water quality regulations and support water quality educational efforts to eliminate pollution from urban runoff.

Policy 3.2: Preserve, and where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands, and buffer zones.

LAND USE ELEMENT

Goal 2: Control and direct future land use so that the community is protected and enhanced.

Policy 2.8: Evaluate impacts of proposed new development and land uses on the watershed in accordance with current watershed planning tools.

Goal 3: Reduce the discharge of pollutants and runoff flow from urban development consistent with Regional Water Quality Control Board (RWQCB) regulations.

Policy 3.1: Require property owners or developers to use best available practice and techniques to minimize pollutant loading and flow velocity from new development projects and redevelopment/revitalization projects during and after construction.

Policy 3.2: Limit development that disturbs natural water bodies and natural drainage systems consistent with the RWQCB regulations.

Policy 3.3: Provide information and resources to the community that describes how to minimize activities that pollute urban runoff.

Mitigation Measures: No mitigation is required.

Level of Significance: Less Than Significant Impact.

GROUNDWATER RECHARGE

- **DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE GENERAL PLAN UPDATE WOULD NOT SUBSTANTIALLY DEPLETE GROUNDWATER SUPPLIES OR INTERFERE SUBSTANTIALLY WITH GROUNDWATER RECHARGE SUCH THAT THERE WOULD BE A NET DEFICIT IN AQUIFER VOLUME OR A LOWERING OF THE LOCAL GROUNDWATER TABLE LEVEL.**

Impact Analysis: Refer to Section 5.17, *Water Supplies*, for a discussion concerning the project's water demand and supplies. Implementation of the proposed project would allow for additional development, potentially resulting in an increase in hardscapes, and thus, interfering with groundwater recharge. The City of Rancho Santa Margarita is served by two water districts, Trabuco Canyon Water District (TCWD) and Santa Margarita Water District (SMWD). TCWD and SMWD water sources include groundwater supplies that are withdrawn from the San Juan Groundwater Basin. According to SMWD's 2015 Urban Water Management Plan, the San Juan Groundwater Basin is recharged by: 1) streambed infiltration in the San Juan Creek, Horno Creek, Oso Creek, and Arroyo Trabuco; 2) subsurface inflows along boundaries at the head of tributaries upstream and other minor subsurface flows from other boundaries; 3) precipitation and applied water; and 4) flows from fractures and springs. Development of such areas could substantially interfere with the process of groundwater recharge; however, at this time, the majority of the City of Rancho Santa Margarita has been built out (with the exception of Chiquita Ridge and the Northeast Future Planned Community), leaving little opportunity for significant new development which could interfere substantially with groundwater recharge. In addition, the proposed land use plan does not allow any development within the floodplains of San Juan Creek, Horno Creek, Oso Creek, and Arroyo Trabuco, and project implementation would not result in any groundwater extraction. Thus, the General Plan Update would not substantially impact groundwater recharge and impacts would be less than significant.

Proposed General Plan Update Goals and Policies: No goals or policies within the General Plan Update pertain specifically to groundwater recharge.

Mitigation Measures: No mitigation is required.

Level of Significance: Less Than Significant Impact.

DRAINAGE SYSTEM CAPACITY

- **DEVELOPMENT IN ACCORDANCE WITH THE GENERAL PLAN UPDATE WOULD NOT CREATE OR CONTRIBUTE RUNOFF WATER WHICH COULD EXCEED THE CAPACITY OF EXISTING OR PLANNED STORMWATER DRAINAGE SYSTEMS OR PROVIDE SUBSTANTIAL ADDITIONAL SOURCES OF POLLUTED RUNOFF.**

Impact Analysis: Implementation of the General Plan Update would allow for additional development of both residential and non-residential uses. Development associated with the proposed project may contribute to runoff, which could exceed the capacity of the existing drainage system.

A storm drain and/or stormwater conveyance system are private and public drainage facilities, other than sanitary sewers, through which surface water runoff (typically in urban areas) is transported to another location where the water is discharged to a natural drainage or water course (most likely) or to a treatment facility. The main purpose of the storm drain system is to properly convey and route stormwater to specially designated areas to capture and treat stormwater and reduce localized flooding.

Growth and urbanization place increased pressure on storm drain capacities. In general, increased urbanization increases the amount of impervious (paved) surfaces, thus reducing the amount of water that would normally infiltrate into the soil. Rainfall, irrigation runoff, and nuisance flows accumulate on impervious surfaces and flow downstream via the storm drain system to various outfalls that ultimately drain to local tributaries. Without proper stormwater BMPs, urban runoff is not filtered to remove trash, cleaned, or otherwise treated before it is discharged to the local tributaries. As a result, storm drains have become an increasingly important component in managing water quality impacts in addition to reducing flooding.

The City is primarily developed; however, the General Plan Update anticipates future growth which may result in an increased amount of impervious surface, potentially impacting existing storm drain and flood control facilities. New development projects would be required to provide adequate stormwater drainage system improvements and/or connections to ensure the Citywide drainage system has adequate capacity to accommodate existing and future uses. Additionally, the County of Orange and City of Rancho Santa Margarita require individual development projects to prepare drainage and hydrology analyses that ensure on- and off-site drainage facilities can accommodate any increases in stormwater flows. Implementation of these provisions, which may include low impact development design, BMPs, and possibly on-site retention techniques, would minimize increases in peak flow rates or runoff volumes.

Land Use Element Policy 8.1 encourages cooperation with OC Flood Control District and homeowners' associations to ensure adequate level of drainage and flood control facilities are provided and maintained within the community. Overall, future construction in accordance with the General Plan Update would be required to meet all applicable regional and local drainage standards, as discussed above. Impacts on drainage systems within the City would be less than significant.

Proposed General Plan Update Goals and Policies:

LAND USE ELEMENT

Goal 8: **Coordinate with the Orange County Flood Control District (OC Flood) to provide a level of flood control protection that meets the needs of the community.**

Policy 8.1: Cooperate with OC Flood and homeowners' associations to ensure an adequate level of drainage and flood control facilities and programs are provided and maintained within the community.

Mitigation Measures: No mitigation is required.

Level of Significance: Less Than Significant Impact.

DRAINAGE PATTERNS

- **DEVELOPMENT ASSOCIATED WITH THE GENERAL PLAN UPDATE WOULD NOT SUBSTANTIALLY ALTER THE EXISTING DRAINAGE PATTERNS ON THE SITE OR AREA, INCLUDING THROUGH THE ALTERATION OF THE COURSE OF A STREAM OR RIVER, OR SUBSTANTIALLY INCREASE THE RATE OR AMOUNT OF SURFACE RUNOFF IN A MANNER WHICH WOULD RESULT IN SUBSTANTIAL EROSION, SILTATION, OR FLOODING ON- OR OFF-SITE.**

Impact Analysis: The General Plan Update does not propose any site-specific development potentially altering existing drainage patterns. Depending on the project type, hydrology and drainage studies may also be required per County and City regulations, which would include an analysis of pre- and post-development hydrology conditions for the project site. Changes in drainage flow paths, percent imperviousness, and flowrate comparisons would be identified in these studies to ensure a project does not substantially alter a site's drainage pattern, resulting in substantial erosion, flooding, or significant risk of loss. As stated above, the County and City require individual development projects to prepare drainage and hydrology analyses that ensure on- and off-site drainage facilities can accommodate any increases in stormwater flows. Implementation of these provisions, which may include low impact development design, BMPs, and possibly on-site retention techniques, would minimize increases in peak flow rates or runoff volumes. Compliance with the Municipal Code would ensure impacts on drainage patterns within the City and runoff volumes are reduced to less than significant levels. Refer also to the flooding and dam inundation impact discussions below.

Proposed General Plan Update Goals and Policies: Refer to the General Plan Update goals and policies cited above.

Mitigation Measures: No mitigation is required.

Level of Significance: Less Than Significant Impact.

FLOOD HAZARD

- **DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE GENERAL PLAN UPDATE WOULD NOT PLACE HOUSING WITHIN A 100-YEAR FLOOD HAZARD AREA AS MAPPED ON A FEDERAL FLOOD HAZARD BOUNDARY OR FLOOD INSURANCE RATE MAP OR OTHER FLOOD HAZARD DELINEATION MAP, NOR WOULD IT PLACE WITHIN A 100-YEAR FLOOD HAZARD AREA STRUCTURES WHICH WOULD IMPEDE OR REDIRECT FLOOD FLOWS.**

Impact Analysis: As indicated on Exhibit 5.9-1, portions of the City are located within 100-year flood zones, as mapped by FEMA, including areas along Trabuco Creek and Tijeras Canyon Creek. However, no existing homes or structures are located within these100-year flood zones and the General Plan Update does not propose any changes to the existing land use plan.

Further, the General Plan Update includes a number of goals and policies in the Land Use Element and Safety Element related to flood control protection and flood hazard reduction to protect the community. Land Use Element Policy 8.1 and Safety Element Policy 2.3 encourages cooperation with the OC Flood Control District and homeowners' associations to ensure adequate levels of drainage and flood control facilities are provided and maintained in the City and that development is limited within any floodplain. Safety Element Policies 3.1 through 3.4 of the proposed Safety Element, further recommend the City coordinate with OC Flood Control District and State and Federal agencies to maintain the most current flood hazard and floodplain information and require evaluation of potential flood hazards and identify methods to minimize flood risk and damage associated with new redevelopment/revitalization projects located in flood hazard zones. Additionally, Safety Element Policy 3.4 requires essential public facilities to be located and designed to minimize potential flood risk. As such, development in accordance with the General Plan Update would have a less than significant impact related to placing housing or structures within a 100-year flood hazard area.

Proposed General Plan Update Goals and Policies: Refer to the General Plan Update goals and policies cited above in addition to those listed below.

SAFETY ELEMENT

Goal 2: Reduce the risk to the community from hazards related to geologic conditions and seismic activity.

Policy 2.3: Protect the community from flooding hazards by providing and maintaining flood control facilities and limiting development within the floodplain.

Goal 3: Protect the community from injury or loss of life and damage due to flooding hazards.

Policy 3.1: Work with OC Flood Control District to ensure flood control facilities are provided and maintained.

Policy 3.2: Work with local, State, and Federal agencies to update, monitor, and maintain the most current flood hazard and floodplain information.

Policy 3.3: Require evaluation of potential flood hazards and identify methods to minimize flood risk and damage associated with new redevelopment/ revitalization projects located in flood hazard zones.

Policy 3.4: Require essential public facilities to be located and designed to minimize potential flood risk.

Mitigation Measures: No mitigation is required.

Level of Significance: Less Than Significant Impact.

DAM INUNDATION

- **FUTURE DEVELOPMENT ASSOCIATED WITH THE GENERAL PLAN UPDATE WOULD NOT EXPOSE PEOPLE OR STRUCTURES TO A SIGNIFICANT RISK OF LOSS, INJURY, OR DEATH INVOLVING FLOODING, INCLUDING FLOODING AS A RESULT OF THE FAILURE OF A LEVEE OR DAM.**

Impact Analysis: There are no major dams located upstream from the City. However, three reservoirs (Upper Oso Reservoir, Upper Chiquita Reservoir, and Trabuco Water Treatment Plant) are located within the City. The Upper Oso reservoir is located near the Foothill Transportation Corridor SR-241 in the northwestern portion of the City, the Upper Chiquita Reservoir is located on the western slope of Chiquita Canyon, and the Trabuco Water Treatment Plant is in the eastern portion of the City.

The General Plan Update anticipates additional development of both residential and non-residential uses. Development could potentially expose people or structures to flooding associated with the failure of those reservoirs. Flooding would vary in the City depending on the location of a potential breach or failure. However, the General Plan Update includes policies and actions intended to minimize the potential for flooding to impact property and human life. In the Safety Element, Policy 1.1 supports the development of local preparedness plans and multi-jurisdictional cooperation and communication for emergency situations; Safety Element Policy 1.2 recommends maintaining and updating the City's *Emergency Operations Plan*; Safety Element Policy 1.3 encourages updating the City's *Local Hazard Mitigation Plan*; and Safety Element Policy 1.4 supports educating City staff, residents, and businesses regarding appropriate actions to safeguard life and property before, during, and immediately following emergency situations. Further, inundation risks would be reduced by applying and enforcing development standards and building construction codes to meet minimum State standards for seismic safety (Safety Element Policy 2.1) and providing and maintaining flood control facilities in the City (Safety Element Policy 2.3). Working with OC Flood Control District and other Federal and State agencies to ensure flood control facilities are adequate and the City has the most current flood hazard information would further reduce the potential for inundation to substantially impact the community (Safety Element Policies 3.1 through 3.4). Overall, compliance with the procedures identified in the City's *Emergency Operations Plan* and *Local Hazard Mitigation Plan* would reduce potential impacts involving inundation to a less than significant level.

Proposed General Plan Update Goals and Policies: Refer to the General Plan Update goals and policies cited above in addition to those listed below.

SAFETY ELEMENT

Goal 1: Protect and prepare the community for natural and man-made hazards.

Policy 1.1: Support the development of local preparedness plans and multi-jurisdictional cooperation and communication for emergency situations consistent with the National Incident Management System (NIMS) and Standardized Emergency Management System (SEMS).

Policy 1.2: Maintain and update the City's Emergency Operations Plan to ensure consistency and relevancy of conditions and issues within the City.

Policy 1.3: Update the City's Local Hazard Mitigation Plan in conjunction with the General Plan Safety Element every five years, to ensure consistency and relevancy of hazards and issues within the City.

Policy 1.4: Educate City staff, residents, and businesses regarding appropriate actions to safeguard life and property before, during, and immediately following emergencies.

Goal 2: Reduce the risk to the community from hazards related to geologic conditions and seismic activity.

Policy 2.1: Reduce the risk of impacts from geologic and seismic hazards by applying and enforcing development standards and building construction codes to meet minimum State standards for seismic safety.

Mitigation Measures: No mitigation is required.

Level of Significance: Less Than Significant Impact.

INUNDATION BY SEICHE, TSUNAMI, OR MUDFLOW

- **DEVELOPMENT IN ACCORDANCE WITH THE GENERAL PLAN UPDATE WOULD NOT RESULT IN INUNDATION BY SEICHE, TSUNAMI, OR MUDFLOW.**

Impact Analysis: Seiches involve an enclosed body of water oscillating due to ground shaking, usually following an earthquake. Lakes and reservoirs are typical bodies of water affected by seiches. Rancho Santa Margarita Lake is located north of Santa Margarita Parkway and west of Antonio Parkway. Lake Mission Viejo is located approximately one mile southwest from the City. Three reservoirs are also located in the City, Upper Oso Reservoir and Upper Chiquita Reservoir, which are owned and operated by the SMWD and the Trabuco Water Treatment Plant owned and operated by the TCWD. These areas of the City may be vulnerable to seiches that may occur from seismic activities.

Municipal Code Chapter 10.02, *Codes Adopted by Reference*, adopts the California Building Code (CBC), which requires future buildings and structures to be designed in compliance with CBC standards to reduce geologic hazards and potential damage from seismic activities and related hazards, including seiches. The most recent State seismic and geologic hazards guidelines are required to be implemented for structural design of future projects. Additionally, flood control standards required by the City, State, and Federal agencies would ensure design measures are implemented to minimize damage and risk of loss of life during potential seiche events. The probability of seiches is low and the reservoirs are continually monitored by the SMWD and TCWD to identify and repair structural issues. Thus, impacts would be less than significant in this regard.

Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Due to the City's inland location within Orange County (more than

nine miles from the Pacific Ocean) and elevation above sea level, the potential for a tsunami to impact the City is low. The City also is not identified on any Orange County tsunami inundation maps as an affected coastal city or community.9 Thus, impacts would be less than significant in this regard.

There is the potential for mudflow to occur with flood events. Future construction in accordance with the General Plan Update would be required to meet all applicable Federal, State, and local building, seismic, water quality, flood, and drainage standards, as previously discussed above. Additionally, the General Plan Update includes goals and policies to address flooding and flood hazards within the City. It is anticipated that compliance with the Municipal Code would reduce mudflow hazards within the City to less than significant levels.

Proposed General Plan Update Goals and Policies: The General Plan Update does not include goals or policies regarding seiche, tsunami, or mudflow. Refer to the goals and policies cited above for flooding.

Mitigation Measures: No mitigation is required.

Level of Significance: Less Than Significant Impact.

5.9.6 CUMULATIVE IMPACTS

- **FUTURE DEVELOPMENT ASSOCIATED WITH THE GENERAL PLAN UPDATE AND CUMULATIVE DEVELOPMENT WOULD NOT RESULT IN CUMULATIVELY CONSIDERABLE IMPACTS RELATED TO HYDROLOGY, DRAINAGE, AND WATER QUALITY.**

Impact Analysis: Cumulative hydrology and water quality impacts associated with implementation of the General Plan Update are analyzed based on development within the Study Area and associated impacts to the regional drainage facilities under the jurisdiction of the San Diego RWQCB. The General Plan Update does not propose site-specific development and would not significantly impact drainage courses and hydrologic flows throughout the City.

Future development projects would be required to mitigate specific hydrologic impacts on a project-by-project basis pursuant to all applicable Federal, State, and local stormwater regulations and requirements. Additionally, the Municipal Code incorporates Federal and State regulations and guidelines pertaining to stormwater runoff to reduce or eliminate regional water quality impacts. Impacts associated with future development in the Study Area and the region would be addressed at a site-specific level to ensure their cumulative impact would be less than significant.

Additional local drainage facilities would be constructed by developers or the City as they become necessary. During the development approval process, developers are required to construct necessary storm drain facilities. In addition, projects may be conditioned to contribute a fair-share cost towards the design and construction of

9 California Department of Conservation, *Tsunami Inundation Maps*, 2018, http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Orange, accessed May 16, 2018.

regional drainage facilities. Thus, implementation of the proposed project would not result in cumulatively considerable hydrology, drainage, or water quality impacts.

Proposed General Plan Update Goals and Policies: Refer to the General Plan Update goals and policies cited above.

Mitigation Measures: No mitigation is required.

Level of Significance: Less Than Significant Impact.

5.9.7 SIGNIFICANT UNAVOIDABLE IMPACTS

Hydrology and water quality impacts associated with implementation of the General Plan Update would be less than significant. No significant unavoidable hydrology and water quality impacts would occur as a result of the General Plan Update.

5.9.8 SOURCES CITED

California Department of Conservation, *Tsunami Inundation Maps*, 2018, http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Orange, accessed May 16, 2018.

California Regional Water Quality Control Board San Diego Region, *Water Quality Control Plan for the San Diego Basin, Chapter 2, Beneficial Uses*, 2016, https://www.waterboards.ca.gov/rwqcb9/water_issues/programs/basin_plan/docs/update082812/Chpt_2_2012.pdf, accessed on May 15, 2018.

California Water Resources Control Board, *Hydrologic Region South Coast, San Juan Valley Groundwater Basin*, https://www.water.ca.gov/LegacyFiles/pubs/groundwater/bulletin_118/basindescriptions/9-1.pdf, accessed on May 15, 2018.

City of Rancho Santa Margarita, *City of Rancho Santa Margarita Municipal Code*.

County of Orange, *South Orange County Watershed Management Area Integrated Regional Watershed Management Plan*, Chapter 3, Regional Description, July 2013.

OC Public Works, *San Juan Creek Watershed*, http://www.ocwatersheds.com/programs/ourws/sanjuancreek, accessed on May 14, 2018.

San Juan Basin Authority, *San Juan Basin Groundwater and Facilities Management Plan*, November 2013, http://sjbauthority.com/assets/downloads/20131126%20FINAL%20SJBA%20SJBGFMP.pdf, accessed May 15, 2018.