Section 5.13:

Hydrology, Drainage, and Water Quality

5.13 HYDROLOGY, DRAINAGE, AND WATER QUALITY

This section describes the existing conditions related to hydrology, drainage, and water quality within the City of Murrieta. Hydrologic and drainage impacts that could result from implementation of the proposed General Plan 2035 are identified.

5.13.1 REGULATORY SETTING

FEDERAL

Clean Water Act

The Clean Water Act (CWA) is a Federal law intended to protect surface waters of the United States (U.S.), which include lakes, rivers, coastal wetlands, and "waters of the U.S." The CWA regulates all discharges to waters, which are considered illegal unless authorized by an appropriate permit. Discharge of dredged and fill materials, construction-related storm water discharges, and other activities that may result in discharges of pollutants to waters of the U.S. are regulated by the permit. If waters of the U.S. are located on a project site, the project is likely to discharge to them, due to site topography and/or drainage characteristics. Potential discharges to such waters would be considered an impact, and the applicant would be required to obtain a CWA Section 401 Water Quality Certification from the appropriate Regional Water Quality Control Board (RWQCB).

The CWA specifies that discharges to waters are illegal, unless authorized by an appropriate permit. The permits regulate the discharge of dredged and fill materials, construction-related storm water discharges, and activities that may result in discharges of pollutants to "waters of the U.S.". Section 404 of the CWA establishes a permit program for the discharge of dredge or fill materials into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE). If waters of the U.S. are located on or downstream of a project site, the project may discharge to them, and if impacts on them are anticipated, the project must obtain a CWA Section 401 Water Quality Certification from the appropriate RWQCB. Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the U.S. This permitting program is administered by the RWQCBs. In addition, Section 303 and 304 of the CWA provide for water quality standards, criteria, and guidelines.

National Pollutant Discharge Elimination System (NPDES)

The National Pollutant Discharge Elimination System (NPDES) program is administered by the Environmental Protection Agency (U.S. EPA), which provides oversight in California to the Regional Water Quality Control Boards. The CWA established the NPDES permit system to regulate discharges to surface waters of the U.S. from municipal and industrial sources. The NPDES permit is required to identify limits on allowable concentrations and mass emissions of pollutants contained in discharges. General requirements regarding NPDES permits are given in Sections 401 and 402 of the CWA. Section 307 identifies certain criteria that the EPA must consider in establishing effluent limits for priority pollutants.

In 1987, the CWA was amended to require NPDES permits for non-point sources (i.e., stormwater) pollutants in discharges. The NPDES regulations are intended to improve stormwater quality discharged to receiving waters to the "maximum extent practicable" (MEP) through the implementation of structural and non-structural Best Management Practices (BMPs). BMPs may range from regulatory measures (local design requirements for drainage facilities); public policy measures (labeling of storm drain inlets to notify public of potential impacts on receiving waters caused by dumping); public education (educational campaigns or posted signage); and/or, structural measures (installation of grass swales or detention ponds).

The two basic types of NPDES permits issued are individual and general permits. An individual permit is a permit specifically tailored to an individual facility. Once a facility submits the appropriate application(s), the permitting authority develops a permit for that particular facility based on the information contained in the permit application (e.g., type of activity, nature of discharge, receiving water quality). The authority issues the permit to the facility for a specific time period (not to exceed five years) with a requirement that the facility reapply prior to the expiration date.

A general permit covers multiple facilities within a specific category. General permits may offer a cost-effective option for permitting agencies because of the large number of facilities that can be covered under a single permit. General permits may be written to cover categories of point sources having common elements, such as: 1) storm water point sources; 2) facilities that involve the same or substantially similar types of operations;, 3) facilities that discharge the same types of wastes or engage in the same types of sludge use or disposal practices; 4) facilities that require the same effluent limits, operating conditions, or standards for sewage sludge use or disposal; and 5) facilities that require the same or similar monitoring.

General permits, however, may only be issued to dischargers within a specific geographical area such as city, county, or state political boundaries; designated planning areas; sewer districts or sewer authorities; state highway systems; standard metropolitan statistical areas; or urbanized areas. By issuing general permits, the permitting authority allocates resources in a more efficient manner to provide more timely permit coverage. For example, a large number of facilities that have certain elements in common may be covered under a general permit without expending the

time and money necessary to issue an individual permit to each of these facilities. In addition, using a general permit ensures consistency of permit conditions for similar facilities.

Federal Emergency Management Agency (FEMA)

On March 1, 2003, the Federal Emergency Management Agency (FEMA) became part of the U.S. Department of Homeland Security (DHS). FEMA's primary mission is to reduce the loss of life and property and protect the Nation from all hazards, including flooding, among others. The Federal Emergency Management Agency (FEMA) performs the following: 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.[1]

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 (Zone A) are high-risk flood areas where special flood, mudflow, or flood-related erosion hazards exist and flood insurance is mandatory. 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 Flood Insurance Rate Maps (FIRM).

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,

[1] FEMA website, http://www.fema.gov/about/what.shtm, accessed November 17, 2009.

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 (FIS). Using information collected in these studies, FEMA engineers and cartographers delineate Special Flood Hazard Areas (SFHAs) on FIRMs. SFHAs are those areas subject to inundation by a flood that has a 1-percent or greater change of being equaled or exceeded during any given year, referred to as a base or 100-year flood.[2]

STATE

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act acts 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 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 State Water Resource Control Board (SWRCB) administers water rights, water pollution control, and water quality functions throughout the State, while the Regional Water Quality Control Boards (RWQCB) conduct planning, permitting and enforcement activities.

While the U.S. 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 storm water discharges, except for those on tribal lands in the Lake Tahoe Hydrologic Unit and those performed by the Department of Transportation (Caltrans).

[2] *Natural Hazard Mapping, Analysis, and Mitigation: a Technical Background Report in Support of the Safety Element of the New Riverside County 2000 General Plan*, Earth Consultants International, August 1, 2000.

Portions of the City of Murrieta are located within the jurisdiction of the San Diego RWQCB (Region 9) and the Santa Ana RWQCB (Region 8).

The Municipal Storm Water Permitting Program regulates storm water discharges from municipal separate storm sewer systems (MS4s). MS4 permits were issued in two phases: Under Phase I, for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities, and Phase II, for smaller municipalities. Under Phase I, the RWQCB have adopted NPDES storm water permits for medium and large municipalities, most of which are issued to a group of co-permitees encompassing an entire metropolitan area. The MS4 permits require the discharger to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Section 402(p) of the Clean Water Act. The management programs specify what BMPs would be used to address certain program areas.

On January 29, 2010, the Santa Ana RWQCB adopted Order No. R8-2010-0333, which is the forth iteration of the storm water permit for municipal separate storm municipal separate storm sewer systems (MS4s) in the Riverside County portion of the San Ana Region. Murrieta is a co-permittee under Order No. R8-2010-0333. The permit is good until January 29, 2015. The first permit was adopted in 1990. In 1996, the Santa Ana RWQCB adopted the second term MS4 permit. In 2002, the Santa Ana RWQCB adopted the third term MS4 permit.

On September 28, 2010, the Santa Ana RWQCB issued a revision to Order No. R8-2010-0033 for the Cities of Murrieta, Menifee, and Wildomar. The Santa Ana RWQCB provided written agreement pursuant to California Water Code Section 13223(a) to designate the San Diego RWQCB as the regulator of the Cities of Murrieta and Wildomar, including those portions of each city that fall within Region 8's geographic jurisdiction, for municipal separate storm sewer system (MS4) permit purposes, and to further constitute the Santa Ana RWQCB's written agreement to accept designation from the San Diego RWQCB to regulate the City of Menifee within Region 9's geographic jurisdiction for MS4 permit purposes under Order No. R8-2010-0033.

On November 10, 2010, the San Diego RWQCB adopted Order No. R9-2010-0016, which is the fourth iteration of the storm water permit for the municipal separate storm sewer systems (MS4s) in the Riverside County portion of the San Diego Region. The first permit was adopted in 1990. The San Diego Water Board adopted the second iteration of the permit in 1998. The U.S.EPA objected to the 1998 permit and reissued the permit in 1999. In 2000, the San Diego Water Board issued an addendum to the 1998 permit and incorporated the U.S. EPA's permit by reference. The San Diego RWQCB reissued the third iteration of the permit in 2004.

The City of Murrieta implements MS4 permits in Region 9 and Total Daily Maximum Loads (TDML) in Region 8.

State Regional Water Quality Control Board Stormwater General Construction 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 (General Construction Permit). This permit was subsequently amended to include smaller construction sites. The General Construction 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 General Construction 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.

REGIONAL

Water Quality Control Plan

The City and the Sphere of Influence are located within the San Diego Basin (Region 9) and the Santa Ana Region (Region 8), which is governed by the California Water Quality Control Board.

Both the San Diego and the Santa Ana RWQCBs' Basin Plans are designed to preserve and enhance water quality within the Basin and to protect the beneficial uses of all regional waters. The Basin Plan: (1) designates beneficial uses for surface and ground waters; (2) establishes narrative and numerical objectives to be achieved and/or maintained in order to protect designated beneficial uses and to conform to California's anti-degradation policy; (3) describes implementation measures for the protection of the beneficial uses of all waters in the region; and, (4) identifies surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan [*California Water Code* Sections 13240 thru 13244, and Section 13050(j)]. The Basin Plan is consistent with all applicable State and Regional Board plans and policies.

The goal for both the San Diego and Santa Ana RWQCB is to balance water demand for water of varying quality within the Basin by competing uses of surface and ground waters. The Basin Plan establishes or designates beneficial uses and water quality objectives for all groundwater and surface waters within the Region. Beneficial uses are "the uses of water necessary for the survival and well being of man, plants and wildlife," and "serve to promote the tangible and intangible economic, social, and environmental goals of mankind."[3] The Basin Plan establishes a program to identify measures for implementation by the Regional Board and others, as appropriate, in order to achieve and maintain the designated beneficial uses and water quality objectives of the Region's ground and surface waters.

[3] *Water Quality Control Plan for the San Diego Basin (9)*. September 8, 1994, with amendments effective prior to April 25, 2007.

Riverside County Drainage Area Master Plan (DAMP)

The purpose of the Riverside County Drainage Area Management Plan (DAMP) or Water Quality Master Plan (WQMP) has been developed to further address post-construction Urban Runoff from new development and significant redevelopment projects under the jurisdiction of the co-permitees. The DAMP is intended to provide guidelines for project-specific post-construction Best Management Practices (BMPs) and for regional and sub-regional Source Control BMPs and Structural BMPs to address management of Urban Runoff quantity and quality to protect Receiving Waters. The WQMP identifies the BMPs, including design criteria for Treatment Control BMPs that may be applicable when considering any map or permit for which discretionary approval is sought. Examples may include tentative tract maps, parcel maps with land disturbing activity, discretionary grading permits where the project is not part of a master plan of development and conditional use permits[4].

The Riverside County Water Quality Management Plan (WQMP) for Urban Runoff addresses post-construction urban runoff from new development and redevelopment projects within the Santa Margarita River Region. The WQMP provides guidelines for the management of urban runoff quantity and quality and the protection of receiving waters through identification and implementation of source control and structural BMPs on a regional and subregional level. Design criteria for treatment control BMPs are also given for application on a project-level basis to minimize potential impacts of urban runoff.

Final Integrated Regional Water Management Plan for the Upper Santa Margarita Watershed Planning Region

The Final Integrated Regional Water Management Plan (IRWMP) for the Upper Santa Margarita Planning Region is a planning and management tool to facilitate efficient use of water resources and to develop effective water conservation measures, using a regional and watershed based approach. The intent of the IRWMP is to enable greater watershed-wide coordination and management of water resources within the Santa Margarita Watershed as a whole, as well as adjoining watershed and regional planning and funding efforts. Through the IRWMP, regional water agencies, flood control districts, counties, cities, Federal, State and local agencies, and other stakeholder groups actively collaborate across jurisdictional boundaries to implement water resource management projects. The IRWMP also provides opportunities to identify and evaluate information on present and future needs within the watershed for consideration in the California Water Plan.

Development of the IRWMP for the Upper Santa Margarita Watershed represents a cooperative effort on the part of three agencies that have authority for planning and implementation of water management strategies within the watershed:

[4] Riverside County WQMP, Santa Ana River Region, Santa Margarita River Region, July 24, 2006, errata corrected January 22, 2009.

- Rancho California Water District (RCWD)
- Riverside County Flood Control and Water Conservation District (RCFC)
- County of Riverside

Riverside County Flood Control and Water Conservation District

The Riverside County Flood Control and Water Conservation District (RCFCWCD) was created on July 7, 1945 by an Act of the California State Legislature to control the flooding in Riverside County. The District is located in the western portion of Riverside County and extends easterly to the Palm Springs and Desert Hot Springs area. By establishing the District, the Legislature created an entity charged with keeping County residents safe from flood hazards and established an independent funding source for the projects needing funding. Before the District's inception, severe flooding occurred throughout the County during winter rains and monsoon seasons. Today, through effective engineering, channel and dam construction, regulation, and public education, massive flooding is less common.

LOCAL

City of Murrieta Stormwater Management Plan (SWMP)

The City of Murrieta Storm Water Management Plan (SWMP) describes urban runoff management programs and activities to be implemented in order to ensure compliance with requirements of the municipal separate storm sewer system (MS4) Permit issued to the Riverside County Permittees by the San Diego RWQCB (Region 9) in 2010. The SWMP describes measures to be implemented to achieve compliance with the MS4 Permit and to reduce pollutants in urban runoff to the maximum extent practicable. The SWMP provides details of the programs described in the Riverside County Drainage Area Management Plan (DAMP), which identifies the overall urban runoff management strategies being implemented, or planned to be implemented, by the Permittees in the Santa Ana and Santa Margarita Regions of Riverside County.

Urban storm water runoff is defined in the Permit as including storm water runoff, dry weather surface runoff, wash water related to street cleaning or maintenance, infiltration, and drainage related to storm events. The Permit regulates the discharge of all wet and dry weather urban storm water runoff and requires the City to implement BMPs to reduce pollutants in storm water. The BMPs may include, but are not limited to: (1) public educational programs on the impacts of potentially harmful chemicals dumped into storm water drainage systems; (2) implementing landscape maintenance measures including minimization of the use of fertilizers and pesticides and training of personnel to properly implement BMPs and recognize prohibited discharges into the storm drain system; and (3) implementing good housekeeping principles for the clean up and proper handling and storage of potential contaminants in the maintenance and repair of vehicles and equipment.

Murrieta Municipal Code – Construction Dewatering

Section 8.36.230B, NPDES Permit for Industrial, Construction, and Dewatering Activities, of the *Municipal Code* states that "Any person associated with industrial, construction, dewatering or other activities and discharges subject to any NPDES permit issued by the U.S. EPA, the SWRCB, or the San Diego RWQCB, shall comply with all requirements of such permits. Such dischargers shall specifically comply with the requirements outlined in the respective State General Permits. Proof of compliance with said NPDES general permits may be required in a form acceptable to the City Engineer, prior to issuance of any City grading, building, or occupancy permits

Murrieta Municipal Code – Landscaping Standards and Water Efficient Landscaping

Chapter 16.28 of the *Municipal Code* identifies nine objectives related to developing landscape standards and the installation of water efficient landscaping. Four of those objectives include: 1) promote water efficient landscaping, water use management, and water conservation through the use of water efficient landscaping, wise use of turf areas and appropriate use of irrigation technology and management; 2) eliminate water waste from overspray and/or runoff, 3) achieve water conservation by raising the public awareness of the need for an effective management program through education and incentives, and 4) assure the attainment of water-efficient landscape goals by requiring that landscapes not exceed a maximum water demand of seventy percent (70%) of its reference evapotranspiration (ETo).

Murrieta Municipal Code – Flood Damage Prevention Regulations

The City of Murrieta's regulations with respect to flood damage prevention are included in Chapter 15.56, Flood Damage Prevention Regulations of the *Municipal Code*. The purpose of this chapter is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas.

Section 15.56.040, *Methods of reducing flood losses*, includes the following provisions:

A. Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;

B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

C. Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood water;

D. Controlling fill, grading, dredging, and other development which may increase flood damage; and

E. Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

Section 15.56.070, *General provisions – Basis for establishing the areas of special flood hazard,* states the following:

The areas of special flood hazard identified by the Federal Insurance Administration (FIA) of the Federal Emergency Management Agency (FEMA) in the flood insurance rate maps (FIRM), dated September 30, 1988, and all subsequent amendments and/or revisions, are hereby adopted by reference and declared to be a part of this chapter. This Flood Insurance Study (FIS) and attendant mapping is the minimum area of applicability of this chapter and may be supplemented by studies for other areas which allow implementation of this chapter and which are recommended to the city by the Floodplain Administrator. The study and Flood Insurance Rate Maps (FIRM) are on file at Murrieta City Hall.

Section 15.56.120, *Administration – Establishment of development permit*, states the following:

A. A development permit shall be obtained before any construction or other development begins within any area of special flood hazard, areas of flood-related erosion hazard or areas of mudslide (i.e., mudflow) established in Section 15.56.070. Application for a development permit shall be made on forms furnished by the city and may include, but not be limited to: plans in duplicate drawn to scale showing the nature, location, dimensions, and elevation of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities; and the location of the foregoing.

Murrieta Capital Improvements Plan

The City of Murrieta annually adopts a Capital Improvement Plan (CIP) through the City budget planning process for each fiscal year. The CIP details those projects and their funding sources that guide the infrastructure, parks, and buildings development for the City of Murrieta. The CIP is a five-year plan and many of the larger projects take multiple years to accomplish. In response to changes in need, safety and traffic concerns, as well as new development, the CIP is a dynamic document and is revised each year to address the current needs and concerns. A portion of the CIP budget is dedicated to storm drain improvements within the City. The City's annual budget includes expenses to maintain drainage facilities.

5.13.2 ENVIRONMENTAL SETTING

HYDROLOGY

Watershed

The City and the Sphere of Influence are located within the inland portion of the Santa Margarita River Basin, which is comprised of approximately 750 square miles. Murrieta Creek and Temecula Creek collect water from the upper watershed and represent the main tributaries to the Santa Margarita River. Western portions of the City are within the southern portion of the Santa Ana River Basin. The regional boundary for the two basins divides the Santa Margarita River drainage area from that of the San Jacinto River, which normally terminates in Lake Elsinore.

Within the Santa Margarita Watershed, constituents of concern include nitrate (surface and groundwater), sediment, indicator bacteria, and total dissolved solids (TDS) in groundwater. Specific activities or uses affecting the quality of surface water include agricultural activities, orchards, livestock, domestic animals, septic systems, use of recycled water, and urban runoff.

Murrieta Creek generally runs through the Murrieta Valley, slowing southwesterly through the older areas of the City between Interstate 15 and the base of the Santa Rosa Plateau. Murrieta Creek generally runs from the northern limits of Murrieta to the southern City limit near Cherry Street, along the Rancho Temecula Line. Murrieta Creek joins with Temecula Creek near Temecula Canyon, southwest of Temecula, to form the Santa Margarita River. From this point, the Santa Margarita River flows to the Pacific Ocean.

Murrieta Creek extends approximately 14 miles and drains an area approximately 220 square miles, or 37 percent of the upper watershed.[5] Stream courses occur intermittently throughout the area and transport seasonal runoff from area slopes and valleys to the Creek. Major tributaries to the Creek include Santa Getrudis Creek, Tucalota Creek, and Warm Springs Creek. Storm water runoff represents the primary source of surface water within the Murrieta Creek Basin. Additional sources of surface water include groundwater from springs, runoff from agricultural uses, and snowmelt. Streamflow within the Murrieta Creek Basin is generally ephemeral, although various sections occur where streamflow is perennial flow with visible standing or flowing waters; however, stream flow within the Creek is highly variable, both on a seasonal and annual basis.

Surface water quality within Murrieta Creek is generally good; however, high concentrations of TDS occur intermittently during times of low flow. Occasional exceedances of nitrate and phosphate levels also occur. Murrieta Creek is also listed as impaired under the 303(d) list for iron, manganese, nitrogen, and phosphorous. Beneficial uses for Murrieta Creek and Warm

[5] City of Murrieta 1994 General Plan Technical Reports – Chapter V. Conservation/Open Space.

Springs Creek are identified as agricultural supply, industrial process and service supply, recreation, warm freshwater habitat, and wildlife habitat.

Warm Springs Creek extends approximately 21 miles and drains extensive valley and upland areas. The Creek generally flows southwest from its headwaters in the Domenigoni Valley, through the Murrieta Hot Springs area, to its confluence with Murrieta Creek in the southern portion of the City. The Creek is generally without improvements, with exception of the Warm Springs Channel which runs from Murrieta Creek to Interstate 15 (I-15).

In addition, Diamond Valley Lake, operated by the Metropolitan Water District of Southern California (MWD), is a reservoir located at the northernmost portion of the Santa Margarita Watershed. The MWD also operates a reservoir located at Lake Skinner, located approximately seven miles to the northeast of Murrieta. Lake Skinner Reservoir provides storage for imported water at a capacity of approximately 44,000 acre-feet. The Diamond Valley Lake, constructed in the Domenigoni Valley approximately four miles southwest of the City of Hemet, provides an additional 810,000 acre-feet of water storage.[6]

Physical 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:

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[6] Metropolitan Water District of Southern California. http://www.mwdh2o.com/index.htm. Accessed January 8, 2010.

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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. Dissolved oxygen is a transient property that can fluctuate rapidly in time and space. Dissolved oxygen 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 (BOD) or Chemical Oxygen Demand (COD).

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 20oC, 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 100-200mg/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 (µohms/cm) 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 the 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 (P) 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 (P)

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.

Groundwater

BASINS

Major groundwater basins underlying the City and the Sphere of Influence include the Murrieta-Temecula Basin and the French Basin. The Murrieta-Temecula Basin is the largest groundwater basin in the hydrologic unit assigned to the area drained by the Santa Margarita River. The Murrieta-Temecula Basin underlies approximately 60,000 acres and has an estimated storage capacity of 1.2 million acre-feet.[7] The Basin extends from the Murrieta graben in the north to the base of the Aqua Tibia Mountains in the south, and east from the Santa Rosa Plateau to the mesa and valley areas. The Basin underlies all of portions of the Murrieta Creek channel, Warm Springs Creek, Pechanga, and Temecula Creeks, which serve as important sources of groundwater recharge for the underlying aquifers. Water flows from the Basin to the Lake Elsinore area in the northwest and to the Santa Margarita River to the southwest. Many wells extracting groundwater from this Basin are present within the Murrieta area.

In addition, from the northeast, the French Basin extends into the City and the Sphere of Influence, and is recharged by underflow from Auld Basin and other surface streams. The Basin underlies approximately 3,500 acres and discharges to Warm Springs Creek.

Groundwater quality varies within the Murrieta and French Basins. In general, water that is extracted at higher elevations and from deeper unconfined aquifers is typically of higher quality.

Quaternary alluvium is estimated to exceed 2,500 feet in thickness and is the water-bearing material within the Basin. Groundwater is generally unconfined. In addition, Holocene alluvial deposits consist of unconsolidated gravel, sand, silt, and clay that generally range from 100 to

[7] City of Murrieta 1994 General Plan Technical Reports – Chapter V. Conservation/Open Space.

125 feet in thickness (DWR 1956), but reach up to 200 feet in thickness in some areas (DWR 1967). The Pleistocene age Temecula Arkose, an alluvial deposit composed of arkosic sand with some marl, tuff, and silt, is present and is at least 1,400 feet thick (DWR 1967). Groundwater is also extracted from residuum and fractured rocks that occur within the underlying aquifer.

LEVELS

Groundwater within the City and the Sphere of Influence generally flows to the southeast under Murrieta and Temecula Valleys to the southwestern part of the Basin. In the central portion, measurements have indicated that the water level in one well rose approximately 12 feet from 1990 through 1993. In the southwestern portion, the water level in one well was recorded to have declined approximately 60 feet from 1980 to 1993, recovered approximately 50 feet during 1993, and then declined again approximately 15 feet from 1994 through 2000. The hydrograph of a third measured well in the southwestern portion has also indicated varied seasonal variations in water levels.[8] In the southwestern portion of the City and the Sphere of Influence, areas of shallow groundwater occur, where levels have historically reached between 10 to 30 feet below the ground surface (bgs).

RECHARGE

Groundwater recharge generally occurs via natural percolation from rainfall or surface water bodies, or from the application of reclaimed, imported, and flood waters to recharge areas. Recharge of the local aquifer system generally occurs along active river and stream channels where sand and gravel deposits exist. Sources of recharge within the General Plan Planning Area include inflow of groundwater generally from the northeast; subsurface recharge from fractured geologic formations to the east; deep percolation from applied surface water; precipitation on open space areas; and, small streams. Natural recharge of the underlying alluvium occurs from direct precipitation and percolation in the Warm Springs, Tucalota, Santa Gertrudis, Murrieta, and Pechanga Creeks, as well as the Temecula River.[9]

Groundwater surface elevations may change with groundwater recharge, discharge, and/or extraction rates. Natural recharge may occur at locations where a hydraulic connection occurs between existing surface rivers or streams and the underlying aquifer. As such, the slope or gradient of the groundwater surface may be influenced where a hydraulic connection exists. A higher recharge rate from surface water into the aquifer would result where a steeper gradient away from the stream occurs.

Where no hydraulic connection occurs between a stream and the groundwater surface, the rate of recharge from streams is generally unaffected by changes in groundwater elevations or gradients, particularly in smaller streams where the groundwater surface is located far below the streambed

[8] California Department of Water Resources, *California's Groundwater Bulletin 118, Temecula Valley Groundwater Basin*, Updated February 27, 2004.

[9] California Department of Water Resources, *California's Groundwater Bulletin 118, Temecula Valley Groundwater Basin*, Updated February 27, 2004.

and surface water instead percolates through the unsaturated zone to the groundwater. Percolation is influenced by the aquifer materials underlying the streambed, as well as water level in the surface stream. Infiltration rates under such conditions are not controlled or influenced by elevation changes in the underlying groundwater.

QUALITY

Groundwater in the basins of the San Diego subregion has mainly calcium and sodium cations and bicarbonate and sulfate anions. Local impairments by nitrate, sulfate, and TDS are present.[10] Groundwater in the City and the Sphere of Influence is largely sodium bicarbonate in character. Sodium-calcium bicarbonate, sodium-calcium sulfate, calcium bicarbonate, and sodium chloride waters are also present. TDS concentration ranged from 220 to 984 milligrams per liter (mg/L) in 1956; however, water samples taken from 50 public supply wells indicated a range from 240 to 1,500 mg/L (average of 476 mg/L). Such groundwater supplies are largely suitable for domestic and irrigation uses; however, groundwater is generally rated inferior for domestic use locally near Murrieta and Murrieta Hot Springs, due to high nitrate or fluoride content. In addition, groundwater is rated marginal to inferior for irrigation use locally near Murrieta Hot Springs, because of chloride content and percent sodium. Sulfate, chloride, magnesium, and nitrate concentrations are locally high for domestic use; TDS content is also locally high for domestic and irrigation use.[11]

Urban Runoff

A number of physical conditions may influence the overall quantity and quality of storm water runoff in urban areas, including the amount and frequency of rainfall, underlying surface features (i.e., paved vs. natural or pervious surfaces), land use (i.e., residential vs. industrial), and vehicular travel.

Precipitation within the City and the Sphere of Influence generally occurs in the form of rain, with some low-lying areas experiencing occasional frost in the winter and rare occurrences of snow or hail. The majority of rainfall typically occurs during the months of December through March, averaging approximately 2.22 inches, with an average of 0.3 inches falling over the drier months of April through November. Data collected for the year 2009 indicate a low of 0.04 inches of rainfall during the months of both June and July; with a high of approximately 2.86 inches during the month of February (Sun City Weather Station located approximately 11.1 miles from Murrieta Hot Springs).

Stormwater drainage infrastructure within the City of Murrieta consists of a network of natural and improved streams, storm channels, storm drains, and catch basins. These facilities and their

[10] California Department of Water Resources, *California's Groundwater Bulletin 118*, October 2003, page 150.

[11] California Department of Water Resources, *California's Groundwater Bulletin 118, Temecula Valley Groundwater Basin*, Updated February 27, 2004.

necessary maintenance are provided by the Riverside County Flood Control and Water Conservation District (RCFCWCD) and the City. Regional master planned facilities (over 36 inches in diameter) are owned and maintained by the RCFCWCD, and all non-master planned facilities smaller than 36 inches in diameter are maintained by the City.

The following facilities have been constructed pursuant to the Murrieta Creek Area Drainage Plan.

- Line G is constructed as a concrete lined trapezoidal channel and has adequate capacity to convey a 100-year flood. The line extends from Interstate 15 to Murrieta Creek.

- Line F is designed to help relieve flooding in Old Town Murrieta. Line F follows an alignment roughly parallel to Ivy Street between Interstate 15 and Murrieta Creek.

- Lines E and E-2 were constructed to intercept flows from Ivy street and discharge into Murrieta Creek.

- Line F-1 is designed to help relieve flooding in the floodplain area upstream of Kalmia Street. Line F-1 follows an alignment parallel to Adams Avenue, curving through the intersection of Magnolia and Jefferson Avenue finally terminating at Interstate 15. Line F-1 adequately conveys the 100-year storm flows from Interstate 15 to Jefferson Avenue.

- Line F-3 is designed to help relieve flooding along Washington Avenue upstream to Kalmia Street. Line F-3 consists of reinforced concrete pipe ranging in size from 42-inces to 54 inches.

- Clay Street channel is constructed as an unlined earthen channel that runs from Kalmia Street to Ivy Street then to Murrieta Creek. As an unlined channel, the channel is not able to convey a 100-year storm.

- The Western Historic Murrieta Storm Drain System was completed by the City in 2006. This storm drain was constructed to relieve flooding in the western area of Historic Murrieta, the portion west of Washington Avenue.

Additional local facilities will be constructed by developers or the City as they become necessary. During the development approval process, developers are "conditioned" to construct necessary storm drain facilities. In addition, projects in close proximity to master drainage facilities are conditioned to contribute a fair-share cost towards the design and construction of regional drainage facilities. A map of the existing storm drain network is shown in *Exhibit 5.13-1, Storm Drain Map*.

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To minimize the potential effects of storm water runoff, the City of Murrieta implements its Storm Water Management Plan (SWMP) to reduce pollutants in urban runoff to the Maximum Extent Practicable. The SWMP identifies methods to reduce potential storm water runoff and contribution of pollutants to the storm drain system. Best Management Practices (BMPs) for industrial and commercial, as well as residential sources, are identified for consideration and implementation to reduce potential discharges to the MEP. Construction activities, including grading, clearing, and excavation, as well as other activities, are likely to increase the potential for pollutants to enter the storm water system. Landowners proposing construction activities within the General Plan Planning Area are required to file a NOI and to pay appropriate fees for to the State Water Resources Control Board. Such development projects require preparation of a SWPPP to identify potential pollutant sources that may affect the quality of discharges of storm water associated with construction activity. Land owners are required to identify, construct, and implement storm water pollution prevention measures (i.e., BMPs) in order to reduce such pollutants. As part of the SWPPP, an Erosion and Sediment Control Plan is also required. Proper inspection of proposed storm water pollution prevention measures is mandatory, along with development and implementation of a monitoring plan.

Flooding

The City of Murrieta is located within Flood Control District Zone 7,[12] which also includes the cities of Temecula and Wildomar. RCFCWCD Facilities within the City of Murrieta are shown in *Exhibit 5.13-1*, *Storm Drain Map*.

FLOOD HISTORY

The largest known flood in the Santa Margarita Watershed was in January 1862, and the second greatest was in February 1884. Other major floods occurred in years 1916, 1938, 1943, 1969, 1978, 1980, 1991, 1992, 1993, 1995, and 1998. In both January and February 1993, Riverside County was hit by severe storms resulting in a Presidential Disaster Proclamation. These large flood events resulted in two to six feet of sediment deposited in the Murrieta Creek streambed from Winchester Road south into Old Town Temecula. Breakouts of floodwaters were caused largely by the magnitude of the event, vegetation density, and the sediment accumulations within the channel that severely reduced flow-carrying capacity. The storm caused over $10 million in damage to public facilities along Murrieta Creek. Additionally, the Riverside County Flood Control and Water Conservation District incurred approximately $450,000. According to "The Californian" website, the most recent Murrieta floods in the years 1980, 1993, 1995, and 1998 were declared federal disasters. The 1993 flood was the most ruinous on record, causing $12 million worth of damage in Temecula and $88 million in damage to Camp Pendleton.[13]

[12] Riverside County Flood Control & Water Conservation District website, http://www.floodcontrol.co.riverside.ca.us/, accessed November 17, 2009.

[13] "The Californian" website, article "Murrieta: Leaders looking for alternative creek funding", http://www.nctimes.com/californian/article_69ecef2d-bda0-561f-9a03-a08d6a474999.html, posted August, 20, 2009.

MAJOR SOURCES OF FLOODING

Flooding problems in the Murrieta Creek Watershed are related to inadequate capacity of the existing drainage network. Much of the Murrieta Creek area and sections along Warm Springs Creek are currently without formal flood control systems and as a result drainage, even with moderate rain, is haphazard in the less developed areas of the City. The problem manifests itself as frequent overtopping of the Murrieta Creek channel by floodwaters in a number of channel reaches, flood inundation of structures with attendant damages, and other water-related problems caused by these events including emergency costs, traffic disruption, and automobile damage.[14]

100-YEAR FLOODS

One-hundred-year floods are those that have a 1/100 or one percent chance of occurring in any given year. Flood insurance rates are based on FEMA designations of flood zones. The practice is to avoid or restrict construction within the 100-year flood zones, or to engage in flood proofing techniques such as elevating building pads or by construction floods walls and levees. The 100-year flood is a regulatory standard used by Federal agencies and most states, to administer floodplain management programs, and is also used by the National Flood Insurance Program (NFIP) as the basis for insurance requirements nationwide. A total of 1,021.2 acres in the City of Murrieta are within the 100-year flood zone. Flood zones are primarily located between Jefferson and Hayes Avenues along the Murrieta Creek, and along the lower portions of Warm Springs Creek near the City's southern boundary; refer to *Exhibit 5.13-2, FEMA Flood Zones*.

Dam Inundation

In addition to the flood hazard currently posed by the Murrieta Creek, the City of Murrieta is also subject to potential flooding in the event of dam failure. Portions of the City of Murrieta are subject to potential dam inundation zones associated with Lake Skinner and Diamond Valley Lake (previously known as the Eastside Reservoir Project); refer to *Exhibit 5.13-3, Dam Inundation*. Inundation from Lake Skinner would cause flooding in the extreme southern portion of Murrieta. Diamond Valley Lake was completed in 1999 and the process of filling the 4,500-acre reservoir site was completed in 2003. The reservoir doubles the storage capacity for the Metropolitan Water District of Southern California (MWD) with a reservoir capacity of 987 million cubic meters. Statistical risk analysis performed as part of the Eastside Reservoir Project Environmental Impact Report (EIR) indicated the potential of dam failure to be less than one chance in one hundred million under the worst foreseeable earthquake event. Dam failure is considered an extremely remote possibility as dams are designed at strength much stronger than necessary to survive the largest magnitude possible earthquake without affecting the dam structure; however, it must be considered and recognized within the planning process.

[14] Murrieta Creek Flood Control Environmental Restoration and Recreation Project website, Riverside County Flood Control Water Conservation District, http://www.floodcontrol.co.riverside.ca.us/content/MChistory.asp, accessed November 17, 2009.

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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 receiving waters' water quality. 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.

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 measures for nutrients are total nitrogen, organic nitrogen, total Kjeldahl nitrogen (TKN), nitrate, ammonia, total phosphate, and total organic carbon (TOC).

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 (DO) in water. When organic matter is consumed by microorganisms, DO 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 DO problem arises when the rate of oxygen-demanding material exceeds the rate of replenishment. Oxygen demand is estimated by the direct measure of DO and indirect measures such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), oils and greases, and total organic carbon (TOC).

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 almost every site and almost every time it rained. 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 possible 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.

5.13.3 SIGNIFICANCE THRESHOLD CRITERIA

The issues presented in the Initial Study Environmental Checklist (Appendix G of the *CEQA Guidelines*) have been utilized as thresholds of significance in this Section. Accordingly, hydrology and water quality impacts resulting from the implementation of the proposed General Plan 2035 may be considered significant if they would result in the following:

- 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 of the site or area, including through the alteration of the course of 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 stormwater drainage systems or provide substantial additional sources of polluted runoff.

- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other 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.
- Inundation by seiche, tsunami, or mudflow.

Based on these significance thresholds and criteria, the proposed General Plan 2035's effects have been categorized as either "no impact," a "less than significant impact," or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant unavoidable impact.

5.13.4 PROJECT IMPACTS AND MITIGATION MEASURES

WATER QUALITY

■ IMPLEMENTATION OF THE PROPOSED GENERAL PLAN 2035 COULD VIOLATE WATER QUALITY STANDARDS AND WASTE DISCHARGE REQUIREMENTS.

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: Future development associated with implementation of the proposed General Plan 2035 may contribute to water quality degradation in the City, especially within the five Focus Areas targeted for land use change in the proposed General Plan 2035. Runoff from disturbed areas would likely contain silt and debris, resulting in a long-term increase in the sediment load of the stormdrain 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, and increased sedimentation of drainage systems within the area.

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 *Title 15* of the City's *Municipal Code*, which contains regulations to meet Federal and State water quality requirements related to storm water runoff. Furthermore, the proposed General Plan 2035 Infrastructure and Conservation Elements contains goals and policies to reduce water quality impacts. The proposed General Plan 2035 requires the continued compliance with Federal, State, and regional governments and agencies to protect and improve the quality of local and regional groundwater resources available to the City. New development projects would be required to meet Federal, State, and local water quality standards and implement mitigation (if necessary) to reduce impacts to less than significant. Compliance with the City's *Municipal Code Title 15*, *Riverside County DAMP*, *City of Murrieta WQMP*, Riverside County MS4 permit, goals, and policies of the proposed General Plan 2035, and Mitigation Measures HYD-1 and HYD-2 would reduce water quality and waste discharge impacts to a less than significant level.

Goals and Policies in the Proposed General Plan 2035:

INFRASTRUCTURE ELEMENT

Goal INF-1 New development and redevelopment is coordinated with the provision of adequate infrastructure for water, sewer, storm water, and energy.

Policies

INF-1.1 Encourage future development to occur in areas where infrastructure for water, sewer, and storm water can most efficiently be provided.

INF-1.2 Discourage development in areas without connections to existing infrastructure, unless infrastructure is being provided.

INF-1.4 Ensure that new development and redevelopment provides infrastructure for water, sewer, and storm water that adequately serves the proposed uses, and that has been coordinated with affected infrastructure providers.

INF-1.6 Provide information to water districts, Riverside County Flood Control and Water Conservation District (RCFCWCD), and energy utilities in their planning efforts to ensure adequate infrastructure is available for anticipated development.

INF-1.7 Encourage the preparation and updates of master plans by the appropriate providers or agencies to conduct detailed long-range planning to ensure the efficient provision of public services, infrastructure, and/or utilities.

INF-1.8 Consult with water districts and Riverside County Flood Control and Water Conservation District (RCFCWCD) to ensure that fee structures are sufficient for new development and redevelopment to pay its fair share of the cost of infrastructure improvements for water, sewer, and storm water.

INF-1.9 Encourage the water districts to proactively manage their assets through the maintenance, improvement, and replacement of aging water and wastewater systems to ensure the provision of these services to all areas of the community.

INF-1.10 Encourage the water districts to improve water and wastewater services in a way that respects the natural environment.

INF-1.11 Ensure sufficient levels of storm drainage service are provided to protect the community from flood hazards and minimize the discharge of materials into the storm drain system that are toxic or which would obstruct flows.

INF-1.12 When managed by the City, continue to maintain and replace aging storm drain systems to ensure the provision of these services to all areas of the community.

INF-1.13 Cooperate in regional programs to implement the National Pollutant Discharge Elimination System program.

INF-1.14 Continue to participate with other agencies on public education and outreach materials for countywide distribution to focus on public education and business activities with the potential to pollute. Distribute Best Management Practices (BMP) guidance for business activities, including but not limited to, mobile detailing, pool maintenance, restaurant cleaning operations, and automotive service centers.

INF-1.15 Continue to implement the City's residential informational and outreach program by providing homeowners with Best Management Practices (BMP) for activities such as, but not limited to:

- Disposal of fats, oils, and grease
- Disposal of garden waste
- Disposal of household hazardous waste
- Disposal of pet waste
- Garden care and maintenance
- Vehicular repair and maintenance
- Vehicular washing

INF-1.16 Continue to annually report the City's activities as part of its submittal to the San Diego Region Water Quality Control Board. Activities the City should report on include, but are not limited to:

- Litter Control
- Solid Waste Collection/Recycling
- Drainage Facility Maintenance
- Catch Basin Stenciling
- Street Sweeping

INF-1.18 Minimize the adverse effects of urbanization upon drainage and flood control facilities.

INF-1.19 Encourage the City and the Riverside County Flood Control and Water Conservation District improve the storm drain system in a way that respects the environment.

CONSERVATION ELEMENT

Goal CSV-3 A community that participates in a multi-jurisdictional approach to protecting, maintaining, and improving water quality and the overall health of the watershed.

Policies

CSV-3.1 Collaborate with partner agencies and other communities to conserve and properly manage surface waters within the City and Sphere of Influence through protection of the watershed and natural drainage system.

CSV-3.2 Promote storm water management techniques that minimize surface water runoff in public and private developments.

CSV-3.3 Utilize low-impact development (LID) techniques to manage storm water through conservation, on-site filtration, and water recycling, and continue to ensure compliance with the NPDES permit.

CSV-3.4 Encourage the creation of a network of "green" streets that minimize stormwater runoff, using techniques such as on-street bio-swales, bio-retention, permeable pavement or other innovative approaches, as feasible.

CSV-3.5 Seek opportunities to restore natural watershed function as an added benefit while mitigating environmental impacts.

Goal CSV-4 Restoration of the natural function and aesthetic value of creeks, while providing flood control measures and opportunities for recreation.

Policies

CSV-4.1 Prioritize creek preservation, restoration and/or mitigation banking along creeks as mitigation for environmental impacts.

CSV-4.2 Consider alternatives to hardlined bottoms and side slopes within flood control facilities, where technically feasible.

CSV-4.3 Preserve Warm Springs Creek and Cole Creek as a wildlife corridor, while accommodating flood control measures and passive recreation.

CSV-4.4 Retain and restore natural drainage courses and their function where health and safety are not jeopardized.

CSV-4.5 Support efforts for restoration, flood control, and recreation along Murrieta Creek, in coordination with regional and federal plans.

CSV-4.6 Seek funds and provide support for creek restoration, maintenance and protection through grant and mitigation programs, development entitlements, and non-profit organizations.

Mitigation Measures:

HYD-1 Prior to issuance of any Grading or Building Permit, and as part of the future development's compliance with the NPDES requirements, a Notice of Intent shall be prepared and submitted to the San Diego RWQCB providing notification and intent to comply with the State of California General Construction Permit. Also, a Stormwater Pollution Prevention Plan (SWPPP) shall be reviewed and approved by the Director of Public Works and the City Engineer for water quality construction activities on-site. A copy of the SWPPP shall be available and implemented at the construction site at all times. The SWPPP shall outline the source control and/or treatment control BMPs to avoid or mitigate runoff pollutants at the construction site to the "maximum extent practicable." All recommendations in the Plan shall be implemented during area preparation, grading, and construction. The project applicant shall comply with each of the recommendations detailed in the Study, and other such measure(s) as the City deems necessary to mitigate potential stormwater runoff impacts.

HYD-2 Prior to issuance of any Grading Permit, future development projects shall prepare, to the satisfaction of the Director of Public Works and the City Engineer, a Water Quality Management Plan or Stormwater Mitigation Plan, which includes Best Management Practices (BMPs), in accordance with the Riverside County DAMP and the Murrieta WQMP. All recommendations in the Plan shall be implemented during post construction/operation phase. The project applicant

shall comply with each of the recommendations detailed in the Study, and other such measure(s) as the City deems necessary to mitigate potential water quality impacts.

Level of Significance After Mitigation: Less Than Significant Impact.

GROUNDWATER DEPLETION

- **DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN 2035 COULD DEPLETE GROUNDWATER SUPPLIES.**

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The City of Murrieta receives water from the Eastern Municipal Water District (EWMD), the Elsinore Valley Municipal Water District (EVMWD), the Rancho California Water District (RCWD), and the Western Municipal Water District (WMWD).

EMWD[15]

EMWD relies on MWD for 80 percent of its potable water supply. The rest of the water distributed by EMWD comes from local groundwater production, and recycled water. Major groundwater sources consist of the San Jacinto Watershed. In 2010, EMWD produced a total of 18,800 acre-feet per year from the San Jacinto Basin. Recharge of the basin is governed by an agreement between EMWD, Lake Hemet Municipal Water District (LHMWD) and the Cities of Hemet and San Jacinto. The plan calls for 100 acres of ponds, eight recovery wells, and a 60-inch diameter pipeline from EMWD's EM-14 connection to the ponds. The objectives of the plan are to provide Tribal Settlement Water, eliminate groundwater overdraft, create additional long-term water supply, and create water storage for drought years. The plan was underway as of 2005.

As a whole, EWMD anticipated a total water use of 115,200 acre-feet per year of potable water in 2010. A total of 53,600 Acre-Feet/Year (AF/Y) of non-potable water was also anticipated in 2010, for a total District use of 168,800 AF/Y of water in 2010. In 2030, EMWD anticipates a total potable water use of 172,000 AF/Y and a total non-potable water use of 73,000 AF/Y, for a total water usage of 245,200 AF/Y.

[15] EMWD 2005 Urban Water Management Plan

EVMWD[16]

EVMWD obtains its potable water supplies from local groundwater, local surface water from Canyon Lake, and imported water from MWD. From 1992 to 2004, total production from all sources averaged about 28,500 AF/Y. Groundwater production has been relatively stable, averaging about 14,000 AF/Y. The Elsinore Groundwater Basin is the major source of potable groundwater supply for EVMWD.

EVMWD prepared a groundwater management plan (GWMP) for the Elsinore Basin pursuant to the *California Water Code* Section 10750 et seq. The GWMP was adopted by the EVMWD Board of Directors on March 24, 2005, and presents detailed information on the Elsinore Basin including a plan to reduce the overdraft and improve groundwater supply reliability. The main objective of the GWMP is to provide a guideline that resolves the overdraft problem in the Elsinore Basin. The GWMP concluded that the current sustainable yield of the Elsinore Basin is 5,500 AF/Y.

EVMWD has nine operating potable groundwater wells with a total capacity of 13.7 million gallons per day (mgd). As of 2005, groundwater supplied 35 to 45 percent of EVMWD demands in the past five years. According to the GWMP, approximately 94 percent of the groundwater produced by the basin is pumped by EVMWD. Local pumpers with private wells only account for about one percent of the basin production.

As a whole, the EVMWD anticipates that it supplies a total of 17,802 AF/Y of groundwater pumped from the Elsinore Basin, as well as the San Bernardino Bunker Hill Basin, the Rialto-Colton and Riverside North Basins, and the Coldwater Basin. In 2010, EVMWD anticipated a total water supply of 66,590 AF/Y and in 2030, projects a total water supply of 77,919AF/Y.

RCWD[17]

RCWD's current water supply sources include local groundwater, imported water from MWD, and recycled water. Historically, groundwater has supplied between 25 to 40 percent of total water supply. RCWD overlies the Temecula and Pauba groundwater basins. Additionally, RCWD relies on eight groundwater basins for its local water supply. Total natural yield to RCWD is approximately 29,500 AF/Y. RCWD has three production wells in northern Murrieta, and two production wells in south Murrieta, all within the 1305 pressure zone.

RCWD recharges the Pauba Valley Basin with untreated imported water for enhanced groundwater production. RCWD purchases imported water from MWD; in the past, recharge has been provided up to 16,000 AF/Y. RCWD also has a surface water storage permit in Vail Lake for up to 40,000 AF from November 1 to April 30. During these months, RCWD releases available water for groundwater recharge.

[16] EVMWD 2005 Urban Water Management Plan
[17] RCWD 2005 Urban Water Management Plan

As a whole, RCWD anticipated a total of 38,000 AF/Y of water was pumped from the Pauba, South Murrieta, Lower Mesa, North Murrieta, Wolf Valley, San Gertrudis, Upper Mesa, and Palomar Sub-Basins. RCWD anticipates that in the year 2030, approximately 56,000 AF/Y will be pumped from these basins. Furthermore, RCWD anticipated that approximately overall water supply totaled 100,700 AF/Y to its customers in 2010. In 2030, RCWD anticipates that all water supplied to its customers will total 140,400 AF/Y.

WMWD[18]

WMWD obtains its water from MWD, as well as supplemental water from the City of Riverside. This District does not extract any groundwater for retail supply. Supplemental water is also purchased from the City of Riverside. In 2010, WMWD anticipated that its water supply totaled 128,589 AF/Y. In 2030, WMWD projects that its water supply will total 241,649 AF/Y.

Proposed Project Impacts

Development associated with implementation of the proposed General Plan 2035 may contribute to the depletion of groundwater. Implementation of the proposed General Plan 2035 would result in an additional 10,734 residential dwelling units and 36,210,757 square feet of nonresidential development. Projected development and increased population would result in an ultimate increase in the demand for water supplies. The City currently uses approximately 39,179 AF/Y of water resources to meet all constituent demands. It is anticipated that water demand would gradually decrease with implementation of the proposed General Plan 2035 to approximately 15,632 AF/Y in the year 2035. Refer to Section 5.10, Water Supply.

The four water districts that serve Murrieta have separate UWMPs. According to the UWMPs for each water district, a combined water supply of 705,168 AF/Y is anticipated. Murrieta would only use 0.0712 percent of the anticipated water from these four districts. As discussed above, not all districts obtain 100 percent of their water from groundwater basins, and multiple districts have recharge plans in place. Additionally, the proposed General Plan 2035 Conservation Element includes the following goals and policies. Also, refer to the goals and policies listed above.

Water conservation in Southern California became increasingly important in the 1980s and early 1990s, when the entire region suffered a severe drought. Drought conditions in southern California directly affect groundwater recharge and groundwater supplies. The City has identified the protection and conservation of its existing and future water resources within the proposed General Plan 2035 goals and policies, shown below.

In conclusion, compliance with the goals and policies in the proposed General Plan 2035 Conservation Element would ensure impacts are at less than significant levels.

[18] WMWD 2005 Urban Water Management Plan

Goals and Policies in the Proposed General Plan 2035:

CONSERVATION ELEMENT

Goal CSV-1 A community that conserves, protects, and manages water resources to meet long-term community needs, including surface waters, groundwater, imported water supplies, storm water, and waste water.

Policies

CSV-1.1 Encourage the provision of a safe and sufficient water supply and distribution system.

CSV-1.2 Promote the maximization of water supplies through conservation, water recycling, and groundwater recharge.

CSV-1.3 Promote the protection of groundwater supplies from contamination.

CSV-1.4 Support water purveyors in promoting a City-wide recycled water system through project review and coordination with water districts.

CSV-1.5 Encourage the owners of hot springs to protect and enhance them

CSV-1.6 Coordinate water resource management with water districts and regional, state, and federal agencies.

Mitigation Measures: No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.

Level of Significance After Mitigation: Not Applicable.

DRAINAGE SYSTEM CAPACITY

- **DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN 2035 COULD CREATE OR CONTRIBUTE TO RUNOFF WATER WHICH COULD EXCEED THE CAPACITY OF EXISTING OR PLANNED STORM WATER DRAINAGE SYSTEMS FOR PROVIDE SUBSTANTIAL ADDITIONAL SOURCES OF POLLUTED RUNOFF.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: Implementation of the proposed General Plan 2035 could potentially result in the additional 10,734 residential dwelling units and 36,210,757 square feet of

nonresidential development. Subsequent development associated with implementation of the proposed General Plan 2035 may contribute to the runoff, which may exceed the capacity of the existing drainage system.

A storm drain 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 prevent flooding by transporting water away from developed areas. Storm drain systems are most common within the more urbanized areas of the City and are likely to have a range of storm drain facilities. In more rural areas of the City, developed land does not support or require storm drain facilities.

Over recent decades, rapid growth and urbanization have placed increased pressure on storm drain capacity. 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 surface waters. The storm drain system is not connected with the sanitary sewer system; therefore, urban runoff is not filtered to remove trash, cleaned, or otherwise treated before it is discharged to surface waters. As a result storm drains have become increasingly important component in managing water quality impacts in addition to reducing flooding.

Storm water from the City of Murrieta drains to two watersheds: the Santa Ana Watershed and the Santa Margarita Watershed. Two major tributaries, Murrieta Creek and Warm Springs Creek, run through the City. Murrieta Creek runs from the northern City limit, along the Rancho Temecula line, to the southern City limit at Cherry Street. In its unimproved state, Murrieta Creek lacks the capacity to convey 100-year storm flows through the City. A Master Drainage Plan was prepared by RCFCWCD, which identifies improvements that would provide flood protection for both existing and future development within the City. The improvements, identified as the Murrieta Creek improvement project, include 11 miles of earthen channel of the Murrieta Creek from Rancho California Road in Temecula to Clinton Keith Road and a network of underground storm drains to provide 100-year flood protection.

The following facilities have been constructed pursuant to the Murrieta Creek Area Drainage Plan:

- Line G is constructed as a concrete lined trapezoidal channel and has adequate capacity to convey a 100-year flood. The line extends from Interstate 15 to Murrieta Creek.

- Line F is designed to help relieve flooding in Old Town Murrieta. Line F follows an alignment roughly parallel to Ivy Street between Interstate 15 and Murrieta Creek.

- Lines E and E-2 were constructed to intercept flows from Ivy street and discharge into Murrieta Creek.

- Line F-1 is designed to help relieve flooding in the floodplain area upstream of Kalmia Street. Line F-1 follows an alignment parallel to Adams Avenue, curving through the intersection of Magnolia and Jefferson Avenue finally terminating at Interstate 15. Line F-1 adequately conveys the 100-year storm flows from Interstate 15 to Jefferson Avenue.

- Line F-3 is designed to help relieve flooding along Washington Avenue upstream to Kalmia Street. Line F-3 consists of reinforced concrete pipe ranging in size from 42-inces to 54 inches.

- Clay Street channel is constructed as an unlined earthen channel that runs from Kalmia Street to Ivy Street then to Murrieta Creek. As an unlined channel, the channel is not able to convey a 100-year storm.

- The Western Historic Murrieta Storm Drain System was completed by the City in 2006. This storm drain was constructed to relieve flooding in the western area of Historic Murrieta, the portion west of Washington Avenue.

Additionally, the City is planning drainage improvements in two locations: Line D and D1 from Madison to Jefferson is slated to have drainage channel improvements done, and Murrieta Creek will have improvements made from Vineyard Parkway to the southern City limits. Infrastructure will be maintained by RCFCWCD. Additionally, RCFCWCD's existing infrastructure is shown in *Exhibit 5.13-1*.

New development projects associated with implementation of the proposed General Plan 2035 would be required to ensure project-specific and citywide drainage systems have adequate capacity to accommodate new development. The City has recognized the need to monitor and improve the storm drain system in order to ensure it is adequately accommodating future development. The City's annual CIP, as well as goals and policies to ensure that project-related storm water mitigation techniques are employed and monitored, are proposed in the General Plan 2035. Furthermore, implementation of the required mitigation measures would ensure new development projects are designed to result in less than significant impacts related to the drainage system capacity. Compliance with the City's *Municipal Code*, the goals and policies included in the proposed General Plan 2035 Conservation Element, and Mitigation Measures HYD-1 and HYD-2 would ensure drainage system capacity impacts are reduced to a less than significant level.

Goals and Policies in the Proposed General Plan 2035: Refer to the goals and policies referenced above in this Section 5.13.

Mitigation Measures: Refer to Mitigation Measures HYD-1 and HYD-2. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

DRAINAGE PATTERNS

- **DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN 2035 COULD RESULT IN ALTERATION OF DRAINAGE PATTERNS OF THE SITE OR AREA, INCLUDING ALTERATION OF A STREAM OR RIVER, RESULTING IN SUBSTANTIAL EROSION, FLOODING, OR SIGNIFICANT RISK OF LOSS.**

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The proposed General Plan 2035 does not propose altering any drainage patterns. All applicable standards would be applied to future development projects to ensure that they are not constructed in a way that would alter a stream or river, or result in substantial erosion or flooding. Therefore, less than significant impacts would occur in this regard. Also, refer to flooding and dam inundation impacts discussions below.

Goals and Policies in the Proposed General Plan 2035: Refer to the goals and policies referenced above and below in this Section 5.13.

Mitigation Measures: No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.

Level of Significance After Mitigation: Not Applicable.

FLOODING

- **DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN 2035 COULD RESULT IN IMPACTS RELATED TO A 100-YEAR FLOOD EVENT.**

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The City of Murrieta lies within the inland portion of the Santa Margarita River (SMR) Basin, which encompasses approximately 750 square miles. The major tributaries within the General Plan Planning Area (City of Murrieta corporate boundaries and sphere of

influence) are Murrieta Creek and Warm Springs Creek. Murrieta Creek runs from the northern City limit, along the Rancho Temecula Line, to the southern City limit at Cherry Street. Warm Springs Creek forms a portion of the southern City limit and separates the City from the community of Murrieta Hot Springs. The SMR has a rich ecosystem providing habitat to several listed species. It supports extensive coastal wetlands and is home to one of the last free flowing rivers in Southern California of which the Bureau of Land Management (BLM) has determined qualifies for National Wild & Scenic River status.

As previously discussed, the largest known flood in the Santa Margarita Watershed was in January 1862, and the second greatest was in February 1884. Other major floods occurred in years 1916, 1938, 1943, 1969, 1978, 1980, 1991, 1992, 1993, 1995, and 1998. In both January and February 1993, Riverside County was hit by severe storms resulting in a Presidential Disaster Proclamation. These large flood events resulted in two to six feet of sediment deposited in the Murrieta Creek streambed from Winchester Road south into Old Town Temecula. Breakouts of floodwaters were caused largely by the magnitude of the event, vegetation density, and the sediment accumulations within the channel that severely reduced flow-carrying capacity. The storm caused over $10 million in damage to public facilities along Murrieta Creek. Additionally, the Riverside County Flood Control and Water Conservation District incurred approximately $450,000 in damage. According to "The Californian" website, the most recent Murrieta floods in the years 1980, 1993, 1995, and 1998 were declared federal disasters. The 1993 flood was the most ruinous on record, causing $12 million worth of damage in Temecula and $88 million in damage to Camp Pendleton.[19]

A total of 1,021.2 acres in the City of Murrieta are within the 100-year flood zone. Flood zones are primarily located between Jefferson and Hayes Avenues along the Murrieta Creek, and along the lower portions of Warm Springs Creek near the City's southern boundary; as shown in *Exhibit 5.13-2*.

Development associated with implementation of the proposed General Plan 2035 would be subject to the City's *Municipal Code*. Chapter 15.56.040, Methods of Reducing Flood Loss, establishes provisions to ensure damage from floods within the City is minimized. Chapter 15.16.070, General Provisions, and Chapter 15.56.120, Administration, establishes flood zones in accordance with FEMA, and administrative procedures regarding development within or around flood zones.

Additionally, the proposed General Plan 2035 Safety Element includes the following goals and policies to address flooding and flood hazards within the City. It is anticipated that with implementation of these goals and policies and the City's *Municipal Code*, flood hazards within the City would be reduced to a less than significant level.

[19] "The Californian" website, article "Murrieta: Leaders looking for alternative creek funding", http://www.nctimes.com/californian/article_69ecef2d-bda0-561f-9a03-a08d6a474999.html, posted August, 20, 2009.

Goals and Policies in the Proposed General Plan 2035:

SAFETY ELEMENT

Goal SAF-3 Damage from flood and inundation hazards is minimized by improving flood control systems and providing adequate safety protections in areas of the City subject to inundation.

Policies

SAF-3.1 Cooperate with the Riverside County Flood Control and Water Conservation District to evaluate the effectiveness of existing flood control systems and improve these systems as necessary to meet capacity demands.

SAF-3.2 Actively participate in and strongly promote timely completion of regional drainage plans and improvement projects which affect the City.

SAF-3.3 Identify natural drainage courses and designate drainage easements to allow for their preservation, or for the construction of drainage facilities if needed to protect the health, safety, and welfare of the community.

SAF-3.4 Require new construction within the 100 year floodplain to meet National Flood Insurance Program standards.

SAF-3.5 Develop and maintain floodplain inundation evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and the Murrieta Fire Department.

SAF-3.6 Maintain an active swift water rescue response in the Murrieta Fire Department.

Mitigation Measures: No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.

Level of Significance After Mitigation: Not Applicable.

DAM INUNDATION

- **FUTURE DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN 2035 COULD RESULT IN URBAN USES BEING LOCATED IN DAM INUNDATION AREAS OF THE CITY.**

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The City of Murrieta is subject to potential flooding in the event of dam failure. Portions of the City of Murrieta are subject to potential dam inundation zones associated with Lake Skinner and Diamond Valley Lake (previously known as the Eastside Reservoir Project); as shown in *Exhibit 5.13-3*. Inundation from Lake Skinner would cause flooding in the extreme southern portion of Murrieta. Diamond Valley Lake was completed in 1999 and the process of filling the 4,500-acre reservoir site was completed in 2003. The reservoir doubles the storage capacity for the Metropolitan Water District of Southern California (MWD) with a reservoir capacity of 987 million cubic meters. Statistical risk analysis performed as part of the Eastside Reservoir Project Environmental Impact Report (EIR) indicated the potential of dam failure to be less than one chance in one hundred million under the worst foreseeable earthquake event. Dam failure is considered an extremely remote possibility as dams are designed at strength much stronger than necessary to survive the largest magnitude possible earthquake without affecting the dam structure; however, it must be considered and recognized within the planning process.

The South Murrieta Business Corridor Focus Area is within the inundation zone for Lake Skinner, Vail Lake, Diamond Saddle, and Diamond West Dam. Portions of the Multiple Use 3 Focus Area are within the inundation zone for Diamond Saddle and Diamond West Dam.

Implementation of the proposed General Plan 2035 would result in an anticipated the additional 10,734 residential dwelling units and 36,210,757 square feet of nonresidential development. Development associated with implementation of the proposed General Plan 2035 would be subject to the provisions of Chapter 15 of the City's *Municipal Code*, which provides development provisions to reduce flooding. The proposed General Plan 2035 Safety Element includes policies that would minimize the potential for flooding to impact property and human life. Thus, less than significant impacts are anticipated in this regard. The goals and policies in the proposed General Plan 2035 serve to reduce potential impacts related to flooding. Furthermore, flooding risk for Murrieta is addressed in the City's Emergency Management Plan. Compliance with the City's *Municipal Code*, the goals and policies included in the proposed General Plan 2035 Safety Element, and the City's *Emergency Management Plan* would result in flood impacts being reduced to a less than significant level.

Goals and Policies in the Proposed General Plan 2035:

SAFETY ELEMENT

Goal SAF-4 Land use regulations and emergency response plans reduce potential damage resulting from dam failure.

Policies

SAF-4.1 Maintain and update mapping of dam inundation areas within the City as new studies and projects are completed.

SAF-4.2 Develop dam failure evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and the Murrieta Fire Department.

SAF-4.3 Discourage critical and essential uses as well as high-occupant-load building uses within designated dam inundation areas.

Mitigation Measures: No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.

Level of Significance After Mitigation: Not Applicable.

INUNDATION BY SEICHE, TSUNAMI, OR MUDFLOW

■ DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN 2035 COULD RESULT IN PROJECT INUNDATION BY SEICHE, TSUNAMI, OR MUDFLOW.

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: As discussed in Section 5.8, Geology and Seismic Hazards, the possibility of seiches and tsunamis impacting the City is considered remote due to the great distance to large bodies of water. The nearest large body of water is Lake Elsinore, located approximately 6¼ miles northwest. Therefore, no impacts are anticipated to occur in this regard.

As discussed above for flooding, there is the potential for mudflow to occur with flood events. All future construction associated with the implementation of the proposed General Plan 2035 would meet all applicable Federal, State, and local building, seismic, water quality, flood, and drainage standards, as previously discussed above. Additionally, the proposed General Plan 2035 Safety Element includes goals and policies to address flooding and flood hazards within the City. It is anticipated that with implementation of these goals and policies and the City's *Municipal Code*, mudflow hazards within the City would be reduced to a less than significant level.

Goals and Policies in the Proposed General Plan 2035: There are no goals or policies that pertain specifically to seiche or tsunami. Refer to the goals and policies referenced above for flooding.

Mitigation Measures: No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.

Level of Significance After Mitigation: Not Applicable.

5.13.5 CUMULATIVE IMPACTS AND MITIGATION MEASURES

■ DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN 2035 AND CUMULATIVE DEVELOPMENT COULD RESULT IN CUMULATIVELY CONSIDERABLE IMPACTS RELATED TO HYDROLOGY, DRAINAGE, AND WATER QUALITY.

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: Cumulative hydrology, drainage, and water quality impacts associated with implementation of the proposed General Plan 2035 are analyzed based on development within the City of Murrieta and associated impacts to the regional drainage facilities under the jurisdiction of the San Diego RWQCB. The proposed General Plan 2035, as mitigated, would not significantly impact drainage courses and hydrologic flows throughout the City.

Future development projects located in or using facilities associated with the EMWD, EVMWD, RCWD, and WMWD service areas would be required to mitigate specific hydrologic impacts on a project-by-project basis. Additionally, the City's *Municipal Code* incorporates Federal and State regulations and guidelines pertaining to storm water runoff to reduce or eliminate regional water quality impacts. Impacts associated with future development in the City and the region would be addressed at a site-specific level to ensure their cumulative impact would be less than significant.

Additional local facilities would be constructed by developers or the City as they become necessary. During the development approval process, developers are "conditioned" to construct necessary storm drain facilities. In addition, projects in close proximity to master drainage facilities are conditioned to contribute a fair-share cost towards the design and construction of regional drainage facilities. Thus, implementation of the proposed General Plan 2035 would not result in cumulatively considerable hydrology, drainage, or water quality impacts.

Goals and Policies in the Proposed General Plan 2035: Refer to goals and policies referenced above in this Section 5.13.

Mitigation Measures: Refer to Mitigation Measure HYD-1 and HYD-2. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

5.13.6 SIGNIFICANT UNAVOIDABLE IMPACTS

Impacts related to hydrology, drainage, and water quality associated with implementation of the proposed General Plan 2035 would be less than significant by adherence to and/or compliance with goals and policies in the proposed General Plan 2035 and the recommended mitigation measures. No significant unavoidable hydrology, drainage, and water quality impacts would occur as a result of buildout of the proposed General Plan 2035.

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