



Section 5.8

Hydrology, Drainage, and Water Quality



HYDROLOGY, DRAINAGE, AND WATER QUALITY

This section describes the existing hydrological and water quality conditions within the City of Buena Park. The potential impacts that could result from implementation of the proposed General Plan Update are analyzed, and where significant impacts are identified, mitigation measures are recommended to avoid or reduce these impacts to a less than significant level. This section includes information contained in the *Hydrology Impact and Water Quality Assessment* prepared by RBF Consulting (February 2010) ([Appendix F](#)).

5.8.1 EXISTING SETTING

GROUNDWATER

The City relies on two major water supply sources, which include imported water from the Metropolitan Water District (MWD) and local groundwater from the Orange County Groundwater Basin, managed by the Orange County Water District (OCWD). The groundwater basin receives water via the Santa Ana River. Each year OCWD sets a basin production percentage (BPP) for the agencies that pump from the basin. The BPP is the ratio of water produced from the groundwater to all water produced by the agency. The BPP provides a limit on how much each agency can pump from the Orange County Groundwater Basin without paying a penalty. According to the *City of Buena Park 2005 Water Master Plan Study Final Report* (Water Master Plan) (February 2007), the City's basin pumping percentage is 66 percent and is anticipated to increase to the historical value of 75 percent. However, water supply conditions have changed over recent years and according to the City's Public Works Department, the current BPP is 62 percent and the BPP is not anticipated to rise above the current rate for a number of years. Further, it is not anticipated to reach the historical value of 75 percent in the next 10 years.¹

Groundwater wells in the City include the Ball Well, Boisseranc Well, Linden Well, Cabellero Well, Freeway Well, Holder Well, Knott Well, and Smith Murphy Well. Linden Well is the newest well constructed in Buena Park and was completed in 2008. Currently, the City's water system capacity is approximately 36,450 gallons per minute (gpm), of which 16,800 gpm are from groundwater wells; also refer to [Section 5.11, Water Supply](#).

MASTER PLAN OF DRAINAGE

A Master Drainage Study was completed in 1967; however, according to the City's Public Works Department the study needs to be updated in the near future. Since the document was written, the County of Orange has thoroughly revised the methodology of calculating hydrology. A 1967 10-year storm is not comparable to a 2010 10-year storm.² The study presents eight separate and distinct drainage area within the City and adjacent tributary areas. [Exhibit 5.8-1, Existing Drainage Facilities](#), identifies flood control facilities within the City. The Master Drainage Study

¹ Written correspondence: Nabil S. Henein, Deputy City Engineer, City of Buena Park, March 22, 2010

² Ibid.

facilities, including storm drains, are planned for 10-year storm events while major channels are designed for 25-year storm events.

Based on field inspections conducted by the City, the following locations are found to be inundated during high flow and in need of a storm drain system.³

- Westbound Cerritos Avenue service road west of Holder Street
- Eastbound Cerritos Avenue service road east of Lorinda Avenue
- Westbound San Diego Drive west of Holder Street
- Eastbound San Diego Drive east of San Marino Drive
- North bound Camellia Drive north of Canna Circle
- Northbound Western Avenue north of 91-Freeway
- Northbound Western Avenue north of Orangethorpe Avenue
- Northbound Valley View Street north of Orangethorpe Avenue
- Northbound Valley View Street north of Caballero Boulevard
- Northbound Stanton Avenue north of Orangethorpe Avenue
- Eastbound 4th Street east of Indiana Avenue
- Intersection of Orange Avenue and Holder Street

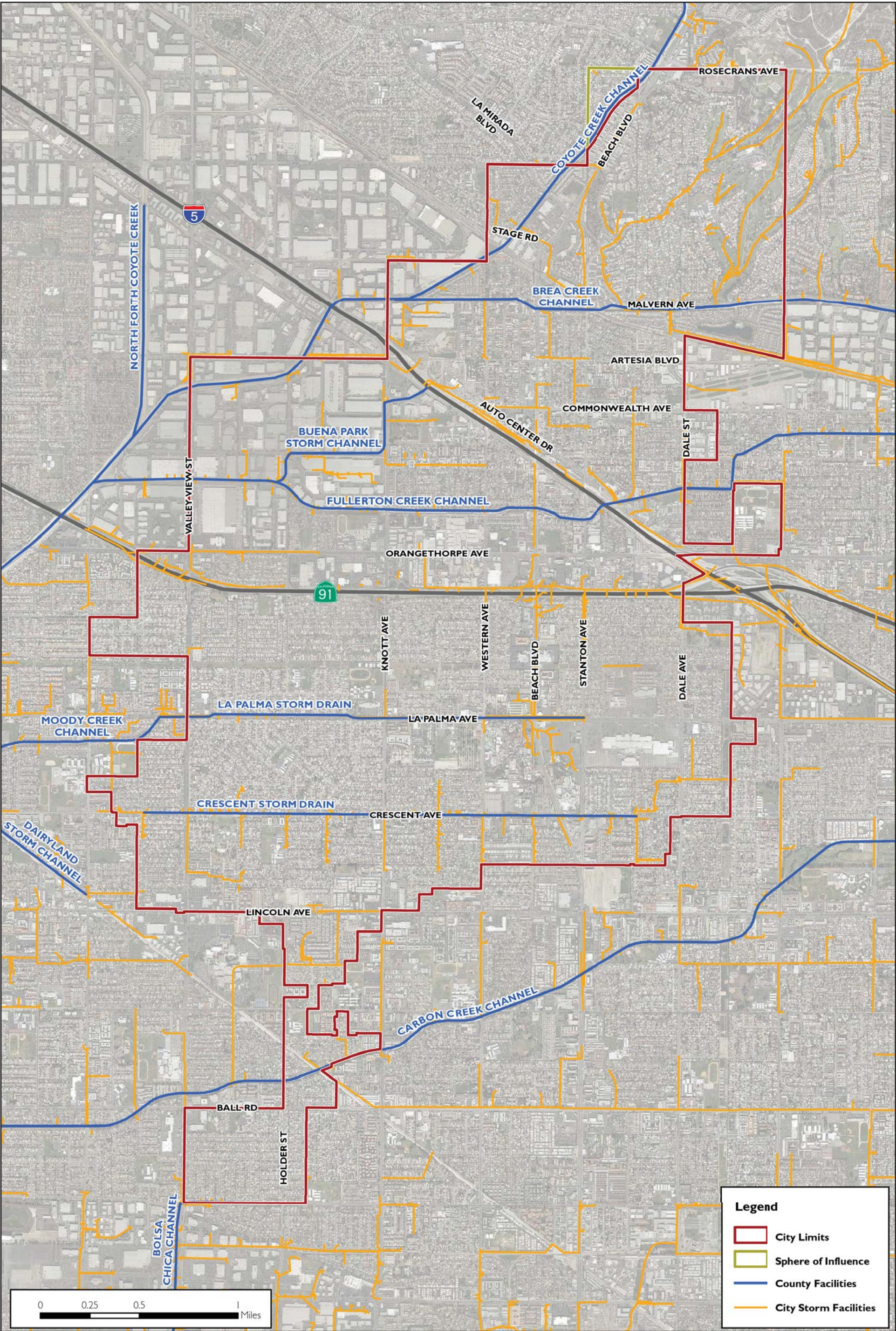
Furthermore, the Master Drainage Study calls for the storm drain system at the following locations; however, to date these improvements have not been built. The necessity of these storm drain systems will need to be re-evaluated when the Master Drainage Study is updated.

- Indiana Avenue north of Artesia Boulevard
- Eighth Street east of Knott Avenue
- Patton Way east of Valley View Street
- Valley View Street south of La Palma Avenue
- San Rafael south of La Palma Avenue
- Holder Street west of Knott Avenue
- Knott Avenue north of La Palma Avenue
- El Monte Drive north of La Palma Avenue
- Dale Street south of 91-Freeway
- San Pablo Drive north of Crescent Avenue

HYDROLOGIC PARAMETERS

An existing conditions qualitative analysis was prepared for the project area. Hydrologic parameter calculations were evaluated based on a comparison of tributary area and proposed change in percent impervious. The types of land use and vegetation or ground cover affect the infiltration rate. Impervious values were determined using Orange County Hydrology Manual. Table 5.8-1, Existing Percent Impervious Values, provides a summary of the existing land uses and the corresponding impervious values used for the analysis.

³ Written correspondence: Nabil S. Henein, Deputy City Engineer, City of Buena Park, July 23, 2009.



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**Table 5.8-1
Existing Percent Impervious Values**

General Plan Land Use Designation	Orange County Hydrology Manual Land Use	Impervious Cover (%)
Single-Family Residential	5-7 dwellings/acre	0.50
Multi-Family Residential	Apartments	0.80
Commercial Retail	Commercial	0.96
Commercial Hotel/Motel	Commercial	0.96
Commercial Restaurant	Commercial	0.90
Office	Commercial	0.90
Amusement Park	Commercial	0.90
Public Use	Commercial	0.90
School	School	0.40
Flood Control	Commercial	0.90
Industrial	Industrial	0.90
Light Industrial	Industrial	0.85
Lake	Commercial	1.00
Open Space	Public Park	0.10
Railroad	Commercial	0.90
Roadway	Commercial	0.90
Parking Lot	Commercial	0.90
Utility	Commercial	0.90
Vacant	Commercial	0.02

EXISTING WATERSHED DESCRIPTION

The City of Buena Park storm drain system is comprised of the Orange County Flood Control District (OCFCD) regional channels and pipelines, and the City's local drainage facilities that connect to the OCFCD facilities.

The City of Buena Park drainage patterns are generally towards the west or southwest and are tributary to existing flood control facilities. These facilities include Coyote Creek (A01), Brea Creek (A02), Fullerton Creek Channel (A03), Buena Park Storm Drain (A03S01), Carbon Creek Channel (B01), Bolsa Chica Channel (C02), and Moody Creek (B02). The two major flood control systems in the City of Buena Park are Coyote and Carbon Canyon Creek.

Coyote Creek Channel (A01) is a major tributary of the San Gabriel River. At its confluence with the San Gabriel River, its tributary area is approximately 100,000 acres. Tributaries of Coyote Creek include its North Fork, Brea Creek Channel, Fullerton Creek Channel, Moody Creek Channel, and Carbon Creek Channel. Three existing dams, Brea, Fullerton, and Arnold detain and control mountain storm flows upstream from the City of Buena Park.

Fullerton Creek Channel (A03), below Fullerton Dam, drains approximately 10,000 acres and is highly urbanized. The watershed includes parts of the cities of Fullerton, Anaheim, Buena Park, and La Palma. Buena Park Storm Channel (A03S01) confluences with Fullerton Creek within the City limits. Fullerton Creek Channel is tributary to Coyote Creek.

Carbon Creek Channel (B01) is a regional flood control facility that drains approximately 20 square miles of urbanized watershed in the northwest part of Orange County. Carbon Creek passes through the Cities of Los Alamitos, Cypress, Buena Park, Anaheim, and Fullerton. Major flows that reach Carbon Creek are delivered through the local systems which the City of Buena Park owns and maintains.

Table 5.8-2, *MPD Drainage Area Facilities*, identifies the flood control facilities within the City's eight drainage areas.

Table 5.8-2
MPD Drainage Area Facilities

Drainage Areas	Flood Facilities	Land Use/Impervious Value (%)
Drainage Area 1	Fullerton Creek	0.715 – 0.881
	Buena Park Storm Drain	
	Brea Creek	
	Coyote Creek	
Drainage Area 2	Fullerton Creek	0.715 – 0.872
	Buena Park Storm Drain	
	Coyote Creek	
Drainage Area 3	Fullerton Creek	0.616 – 0.784
	Coyote Creek	
Drainage Area 4	Moody Creek	0.535 – 0.90
Drainage Area 5	Moody Creek	0.575 – 0.734
Drainage Area 6	Carbon Creek	0.565 – 0.688
Drainage Area 7	Bolsa Chica	0.603 - 0.769
	Carbon Creek	
Drainage Area 8	Coyote Creek	0.745 - 0.852
	Brea Creek	

Percent Impervious based on 1967 Master Drainage Study.

Table 5.8-3, *Existing Conditions Percent Impervious*, identifies the existing General Plan area characteristics.

FLOODPLAIN MAPPING

The City of Buena Park is a participant in the National Flood Insurance Program (NFIP). Communities participating in the NFIP must adopt and enforce minimum floodplain management standards, including identification of flood hazards and flooding risks. Participation in the NFIP allows communities to purchase low cost insurance protection against losses from flooding.

The term “100-year flood” is defined by the Federal Emergency Management Agency (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.

**Table 5.8-3
Existing Conditions Percent Impervious**

Focus Areas	Area (acres)	Impervious, C (%)
Central Buena Park	100.26	0.6546
Civic Center	58.22	0.7449
Commonwealth Corridor	48.92	0.7331
Entertainment Corridor	380.43	0.8928
Entertainment Corridor North	67.95	0.7343
Fillmore / Jackson Area	13.81	0.7931
North Beach Commercial Area	50.78	0.7950
NW Area (JC Penney's)	144.63	0.9070
Orangethorpe Corridor East	81.68	0.6976
Orangethorpe Corridor West	140.98	0.8603
Other Areas	4220.57	0.5699
Percent impervious based on area average. C = runoff coefficient.		

FEMA designates flood zones based on flood risk in the area. Land areas that are at high risk, within one percent annual chance of flooding are called Special Flood Hazard Areas, or floodplains. These areas are indicated on Flood Insurance Rate Maps (FIRMs). In communities that participate in the National Flood Insurance Program, mandatory flood insurance purchase requirements apply to all A Zones, which are communities subject to a 100-year flood event.

The majority of the City is located outside the one percent chance (100-year) flooding; refer to Exhibit 5.8-2, *FEMA Flood Zones*. However, certain portions of the City lie in Zone AO, identified as having a 100-year shallow flooding with average depths between 1.0 and 3.0 feet.

DAM INUNDATION

According to the City's Emergency Operations Plan (November 2007), there are four dams located upstream of Buena Park, including Prado Dam, Fullerton Dam, Brea Dam, and Carbon Canyon Dam.

A majority of the City is located within the dam inundation area of Prado Dam. Prado Dam is a flood control and water conservation project constructed and operated by the U.S. Army Corps of Engineers (USACE) Los Angeles District. The dam provides flood control and water conservation storage for Orange County. The dam is located approximately 22 miles northeast of the City, on the Santa Ana River, west of the City of Corona. According to USACE dam inundation maps, in the event of dam failure, the flood wave would reach Buena Park in approximately 3.25 hours and would be approximately four feet deep.

A small area of the City located northeast of Auto Center Drive, west of Dale Street and just north of Whitaker Avenue is located within the dam inundation area of Fullerton Dam. Fullerton Dam may release excess waters into the Fullerton Creek Flood Control Channel and result in inundation in the surrounding area.

The north/central portion of the City between the SR-91 Freeway and Malvern Avenue is located within the inundation areas of Brea and Carbon Canyon Dams. Excess storm flows from Brea Dam would be diverted to the Brea Creek Flood Control Channel, which merges with the Coyote Creek Channel. Carbon Canyon Dam provides flood control in and around the drainage basin. Carbon Canyon Dam is located approximately 12 miles from Buena Park. According to USACE dam inundation maps, in the event of dam failure, the flood wave would reach the City in approximately 4.25 hours and would be approximately two feet deep.

STORMWATER QUALITY

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

Point Source Pollutants

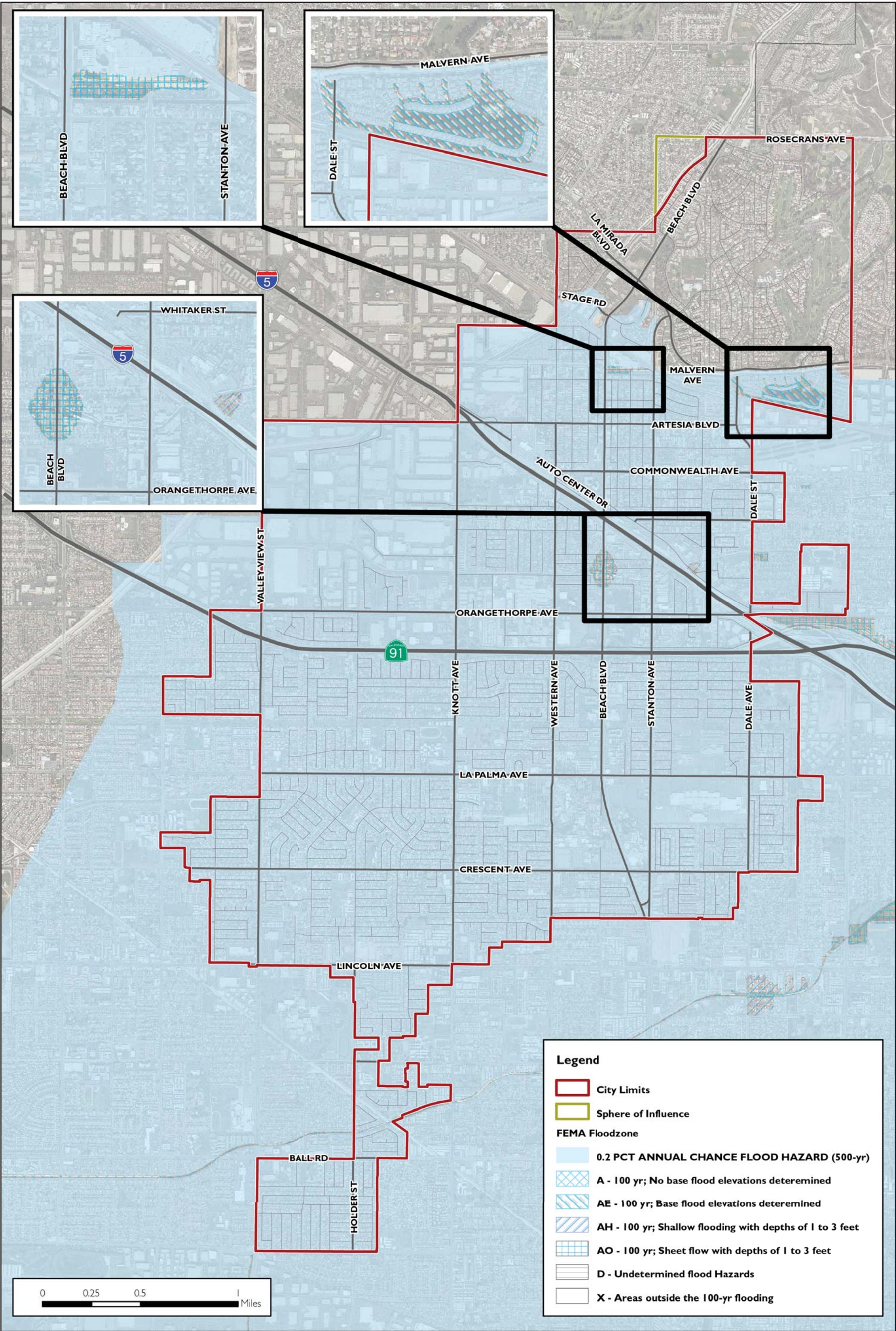
Historically, point-source pollutants have consisted of industrial operations with discrete discharges to receiving waters. Over the past several decades, many industrial operations have been identified as potential sources of pollutant discharges. For this reason, many types of industrial operations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

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.



Source: Federal Emergency Management Agency, DFIRM Data, Effective December 3, 2009.

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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.

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:

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 20°C, 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, 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 water 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.

EXISTING STORMWATER QUALITY

The City of Buena Park lacks any measured data on storm water runoff quality. In the absence of site-specific data, expected storm water quality can be qualitatively discussed by relating typical pollutants to specific land uses. Existing development within the City includes residential, commercial, office, industrial, school/civic/institutional, public facilities uses, as well as vacant land.

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

- Impervious surfaces associated with development increase the rate and volume of storm water runoff, which increase downstream erosion potential;

- Urban activities generate dry-weather (“nuisance”) flows, which may contain pollutants and/or may change the ephemeral nature of streams and the degradation of certain habitats; and
- Impervious surfaces increase the concentration of pollutants during wet weather flows.

The potential for negative water quality effects is generally correlated to the density of development and the amount of impervious area associated with the development. Detached residential development has the potential to generate sediments such as nutrients and organic substances (including fertilizers), pesticides (from landscape application), trash and debris (including household hazardous waste), oxygen demand, oil and grease (from driveways and roads), and bacteria and viruses.

Municipal Activities and Development

Infrastructure and facilities (roads, streets, highways, parking facilities, storm drains and flood management facilities) present a threat to water quality. Other facilities such as parks, airfields, water treatment plants, wastewater reclamation plants, landfills and transfer centers, and corporate yards also present water quality issues. Municipalities may also own and administer areas and activities tributary to impaired water bodies and/or water quality sensitive areas that might be harmful to water quality.

Commercial, Civic, and Industrial Activities and Development

Certain commercial activities have the potential to generate pollutants that can negatively affect storm water quality. Auto repair shops in particular have the potential to generate heavy metals, oils, toxic chemicals, and other oxygen-demanding substances. In addition, restaurants have the potential to generate pollutants such as grease, trash, and other oxygen-demanding substances.

Industrial activities can significantly affect water quality, depending on the type of pollutants and activity. In general, industrial activity is associated with effects on ambient water temperature, alkalinity levels of total suspended solids and oxygen demand. Certain industrial uses may entail the generation of heavy metals, nutrients, toxic chemicals, and other pollutants. Industrial uses that take place indoors do not have storm water pollutant exposure and present little threat to storm water quality.

The City of Buena Park’s primary receiving waters are Coyote and Carbon Creeks. These creeks are tributary to San Gabriel River Reach 1. This reach has been listed on the 2006 Clean Water Act Section 303(d) list with the main pollutant being Coliform Bacteria and pH. Portion of Coyote Creek within the Los Angeles Regional Water Quality Control Board (RWQCB) is also listed on the 303(d) list with the main pollutant being Ammonia.

5.8.2 REGULATORY FRAMEWORK

Applicable Federal, State, and local regulatory policies and law that apply to hydrology, drainage, and water quality are discussed below. Surface water quality is subject to Federal, State, and local water quality requirements administered and enforced by the U.S. Environmental Protection Agency (U.S. EPA), the State Water Resources Control Board (SWRCB), and the Regional Water Quality Control Boards (RWQCBs) with cooperation from each county.

CLEAN WATER ACT

The principal law governing pollution of the nation's surface waters is the Clean Water Act (CWA), formerly known as the Federal Water Pollution Control Act (FWPCA). Originally enacted in 1948, it has been amended several times since. As amended in 1977, the law became commonly known as the CWA. The CWA is a Federal law that protects the nation's surface waters, including lakes, rivers, coastal wetlands, and "waters of the United States." The CWA includes provisions that authorize Federal financial assistance for municipal sewage treatment plants and the regulatory requirements that apply to industrial and municipal dischargers. The law authorized states to set effluent standards on an industry basis. In addition, the CWA requires states to adopt water quality standards that "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses."

The CWA 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

As discussed above, the NPDES is the permitting program for discharge of pollutants into waters of the U.S. under Section 402 of the CWA. Thus, dischargers must obtain permits from the appropriate RWQCB. The NPDES program is administered by the U.S. EPA, which delegates oversight in California to the RWQCBs. The NPDES program provides general permits and individual permits. The general permits include requirements for construction projects that disturb more than one acre of land. The general permit requires the applicant to file a public notice of intent to discharge storm water and to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP includes a site map, description of proposed activities, demonstration of compliance with applicable ordinances and regulations, and a description of Best Management Practices (BMPs) that would be implemented to reduce erosion and discharge of construction-related pollutants.

Point source dischargers of pollutants into surface waters are required to obtain an NPDES permit. The Municipal Storm Water Permitting Program regulates storm water discharges from municipal separate storm sewer systems (MS4s). MS4 permits are issued through two phases. The NPDES Phase I storm water program requires municipalities serving greater than 100,000 persons to obtain a NPDES storm water permit for construction projects greater than five acres in size. NPDES Phase II storm water regulations expanded this existing national program to smaller municipalities with populations of 10,000 persons or more and construction sites that disturb one to five acres. Other dischargers, such as those affecting groundwater or from non-point sources are required to file a Report of Waste Discharge with the appropriate RWQCB. For

specified situations, some permits may be waived and some discharge activities may be handled through enrollment in an existing general permit.

Impaired Waterbodies

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

PORTER-COLOGNE WATER QUALITY CONTROL ACT

The Porter-Cologne Water Quality Control Act acts in cooperation with the CWA to establish the SWRCB. The SWRCB and nine RWQCB, overseen by the SWRCB, are responsible for protecting California's surface waters and groundwater supplies.

The Porter-Cologne Water Quality Control Act establishes Basin Plans for each of the nine regions overseen by the RWQCB. The City of Buena Park is located within the jurisdiction of the Santa Ana RWQCB (Region 8). 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 QUALITY CONTROL BOARD AND REGIONAL WATER QUALITY CONTROL BOARD

The SWQRCB administers water rights, water pollution control, and water quality functions throughout the State, while the RWQCBs 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). The new Construction General Permit will be in effect July 1, 2010.

The City of Buena Park is located within the jurisdiction of the Santa Ana RWQCB (Region 8). Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Construction activity subject to this permit includes clearing, grading, and disturbances to the

ground such as stockpiling, or excavation. The General Permit requires all dischargers whose construction activity disturbs one-acre or more to:

- Prepare Storm Water Pollution Prevention Plans (SWPPP) before construction begins;
- File a Notice of Intent (NOI) with the State Board before construction begins; and
- File a Notice of Termination with the State Board once construction is complete.

Storm Water Pollution Prevention Plan. The SWPPP is directed toward construction staff and describes the erosion and runoff control measures to be used during and after construction, and provides a plan to inspect and maintain these control measures. The SWPPP may be revised during construction in response to changed conditions, or if the properly installed BMPs are ineffective in preventing sediment transport off the site. Revisions to the SWPPP are also required if there are changes in activities which could result in a significant amount of pollutants discharged in storm water.

Notice of Intent. The NOI certifies that the applicant will comply with conditions in the statewide general NPDES permit. It is not a permit application and does not require approval, although an annual fee must be submitted with the NOI.

Notice of Termination. The State Board must be notified (via a Notice of Termination form) once construction is complete. It must also be notified if a change of ownership occurs during construction. In this case, a revised NOI must be submitted, and the SWPPP must be revised by the new owner to reflect any changes in construction conditions.

The general construction permit requires that the project owner arrange for maintenance of drainage/storm water control facilities after project completion; maintenance may be done by private parties or by a public agency such as a community service district. Municipalities may require maintenance agreements. Construction project proponents may request to be placed under individual NPDES permits rather than the general permit. The Regional Board may issue individual storm water NPDES permits to construction projects when more stringent controls are necessary to protect water quality. Individual construction projects may also be regulated under a municipality's NPDES management program.

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-permittees 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.

The Santa Ana RWQCB is currently operating under MS4 permit, Order No. R8-2009-0030, NPDES Permit No. CAS618030, adopted in May 2009. This permit requires the creation of a Drainage Area Management Plan (DAMP) that reduces the pollution content of stormwater to the Maximum Extent Practicable (MEP). The purpose of the Orange County Drainage Area Management Plan (DAMP) is to satisfy NPDES permit conditions for creating and implementing

a Storm Water Management Plan/Program to reduce pollutant discharges to the MEP. The DAMP contains guidelines on structural and nonstructural BMPs for meeting the NPDES goals. The DAMP identifies activities required to implement the minimum control measures required under the Municipal Permit. In order to ensure that construction sites implement the appropriate pollution control measures, the 2003 DAMP details recommended BMPs to be applied to new development and significant redevelopment in Orange County. Projects are identified as either priority projects or non-priority projects.

The City of Buena Park, as a Co-Permittee, participates in the implementation of the DAMP, by requiring a WQMP. Buena Park has adopted a WQMP, dated May 2005, which consists of variety of measures. The City's current WQMP is based on the previous Order No. R8-2002-0010 and therefore will be required to comply with the new permit (Order No. R8-2009-0030).

The City currently requires:

- A National Pollution Discharge Elimination System (NPDES) General Construction Permit must be obtained from the Santa Ana RWQCB for construction projects involving a ground disturbance of at least 1.0 acre.
- Applicants shall prepare and submit a Notice of Intent (NOI) to comply with the Construction General Permit to the California State Water Resources Board.
- All dischargers must prepare, retain at the construction site, and implement a Storm Water Pollution Prevention Plan (SWPPP) prior to issuance of a grading permit.
- A WQMP must be approved prior to any issuance of building permits. The WQMP specifies the Best Management Practices (BMPs) to be incorporated into the project design, in accordance with the County DAMP or local city WQMP guidance.

The City may require development of a WQMP for any projects other than the requirement listed above.

BUENA PARK MUNICIPAL CODE

Title 18 – Subdivisions and Floodplain Management

Buena Park Municipal Code (Municipal Code) Title 18, *Subdivisions and Floodplain Management*, identifies regulations to promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas of the City of Buena Park. Specifically, Chapter 18.216, *Review of Development within Flood Hazard Area*, requires any development within a special flood hazards zone to be reviewed and approved by the City Engineer, or designee. Chapter 18.220.010, *Construction, elevation and anchoring standards*, mandates specific siting, design, and construction requirements for development within a flood zone.

Chapter 13.32 - Stormwater Drainage

Municipal Code Section 13.32.030, *Control of urban runoff*, requires all new development and significant redevelopment within the City comply with the DAMP and any conditions and

requirements established by the City, which are reasonably related to the reduction or elimination of pollutants in stormwater runoff from the project site.

Section 13.32.060, *Permit Requirements for Industrial/Commercial and Construction Activities*, specifies that each discharger associated with construction activity shall comply with all requirements of such permit. Each discharger identified in an individual NPDES permit issued by the U.S. Environmental Protection Agency, the State Water Resources Control Board, or any regional water quality control board shall comply with and undertake all activities required by such permit. Proof of compliance with any such permit may be required in a form acceptable to the director, or his/her designated representative, prior to the issuance of any Grading, Building or Occupancy Permits, or any other type of permit or license issued by the City.

BUENA PARK WATER QUALITY MANAGEMENT PLAN

The *City of Buena Park Water Quality Management Plan for New Development and Significant Redevelopments* (WQMP) outlines steps to reduce stormwater pollution at project sites.⁴ The WQMP addresses the relevant pollution issues at the site, how they will be addressed in the site design, and how the Best Management Practices (BMPs) implemented at the site will be maintained in perpetuity. Although, the WQMP briefly addresses stormwater issues associated with construction, its main purpose is to assure that the right structural and non-structural BMPs have been designed into the project plans and to assign long-term responsibility for those BMPs.

5.8.3 SIGNIFICANCE THRESHOLD CRITERIA

Appendix G of the *CEQA Guidelines* contains the Initial Study Environmental Checklist, which was included with the Notice of Preparation to show the areas being analyzed within the EIR; refer to Appendix A of this EIR. The Initial Study includes questions relating to hydrology, drainage, and water quality. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this Section. Accordingly, hydrology, drainage, and water quality impacts resulting from the implementation of the proposed General Plan Update 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 on the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

⁴ *City of Buena Park Water Quality Management Plan for New Development and Significant Redevelopments*, prepared by the City of Buena Park Public Works Department Stormwater Division, May 2005.

- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; and/or
- Inundation by seiche, tsunami, or mudflow (refer to Section 8.0, Effects Found Not To Be Significant).

Based on these standards, the effects of the proposed project have been characterized as either 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 impact level through the application of mitigation, it is categorized as a significant unavoidable impact.

5.8.4 IMPACTS AND MITIGATION MEASURES

SHORT-TERM CONSTRUCTION WATER QUALITY IMPACTS

- **GRADING, EXCAVATION, AND CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE PROPOSED GENERAL PLAN UPDATE COULD SIGNIFICANTLY IMPACT WATER QUALITY DUE TO EROSION AND TRANSPORT OF EXPOSED SOILS.**

Impact Analysis: Construction controls are separated from other water quality management, because the measures are temporary and specific to the type of construction. Construction of future development projects has the potential to produce typical pollutants such as nutrients, heavy metals, pesticides and herbicides, toxic chemicals related to construction and cleaning, waste materials including wash water, paints, wood, paper, concrete, food containers and sanitary wastes, fuel, and lubricants. Generally, standard safety precautions for handling and storing construction materials can adequately reduce the potential pollution of stormwater by these materials. These types of standard procedures can be extended to non-hazardous stormwater pollutants such as sawdust, concrete washout, and other wastes.

In addition, grading activities can greatly increase erosion processes, leading to impacts on storm drains and sediment loading to storm runoff flows. Two general strategies are recommended to prevent soil materials from entering local storm drains. First, erosion control procedures should be implemented for those areas that must be exposed, and secondly, any development site should be secured to control off-site transport of pollutants.

Future development under the proposed General Plan Update would be required to comply with Municipal Code Section 13.32.060, which requires that construction activities comply with the NPDES permit program. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Dischargers whose projects disturb 1.0 or more acres of soil or whose projects disturb less than 1.0 acre but are part of a larger common plan of development that in total disturbs 1.0 or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation. The Construction General Permit requires development and implementation of a SWPPP. The SWPPP should contain a site map(s), which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the proposed project. The SWPPP must list BMPs the discharger would use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain:

- A visual monitoring program;
- A chemical monitoring program for “non-visible” pollutants to be implemented if there is a failure of BMPs; and
- A sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

Section A of the Construction General Permit describes the elements that must be contained in a SWPPP. The Construction General Permit requirements must be satisfied prior to beginning construction.

As part of its compliance the NPDES requirements, a Notice of Intent (NOI) would need to be prepared and submitted to the SWRCB providing notification and intent to comply with the State of California general permit. Prior to construction, a SWPPP would be required for the construction activities onsite. A copy of the SWPPP must be available and implemented at the construction site at all times. The SWPPP would outline the source control and/or treatment control BMPs that would avoid or mitigate runoff pollutants at the construction site to the “maximum extent practicable.”

The proposed General Plan Update contains policies and implementation measures that include continued participation in the NPDES permit program (Policy CF-6.5) and require new development and redevelopment to utilize site preparation, grading, and best management practices to control erosion and sediment in order to prevent construction-related contaminants from leaving the site and polluting waterways (Policy CF-7.6).

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 and with the policies and implementation measures of the proposed General Plan Update would reduce water quality impacts to less than significant.

Proposed General Plan Update Policies and Implementation Measures:

Policies

- CF-6.5: Continue to participate in the National Pollutant Discharge Elimination System (NPDES) permit program.
- CF-7.1: Cooperate in regional programs to implement the National Pollutant Discharge Elimination System (NPDES) program.
- CF-7.6: Require new development and significant redevelopment to utilize site preparation, grading and best management practices that provide erosion and sediment control to prevent construction-related contaminants from leaving the site and polluting waterways.
- CF-7.7: Coordinate with appropriate Federal, State, and County resource agencies on development projects and construction activities affecting waterways and drainages.
- CF-7.8: Increase public education and awareness regarding stormwater quality and projects implemented to improve the flood control systems.

Implementation Measures

- CF-32 Continue to require the implementation of adequate erosion control measures for development or redevelopment of projects in order to minimize sedimentation damage to drainage facilities.
- CF-35 Create public education information and outreach materials regarding proper materials handling practices to assist residents and businesses in complying with surface water quality regulations and to increase awareness of potential impacts to the environment resulting from improper containment or disposal practices.

Mitigation Measures: No further mitigation is required beyond compliance with the proposed General Plan Update Policies and Implementation Measures.

Level of Significance: Less Than Significant Impact.

LONG-TERM WATER QUALITY IMPACTS

- IMPLEMENTATION OF THE PROPOSED GENERAL PLAN UPDATE COULD RESULT IN SIGNIFICANT LONG-TERM IMPACTS ON THE QUALITY OF STORMWATER AND URBAN RUNOFF, SUBSEQUENTLY IMPACTING WATER QUALITY.

Impact Analysis: Implementation of the proposed General Plan Update would increase impervious areas, resulting in potential impacts to storm water quality. Development associated with the proposed General Plan Update could affect pollutant loading within the Coyote Creek and Carbon Creek Channel, which are tributary to San Gabriel River Reach 1. This reach has been listed on the 2006 CWA Section 303(d) list with the main pollutant being Coliform Bacteria

and pH. Additionally, Coyote Creek is also impacted for wet weather TMDLs for copper, lead, and zinc.

As stated, the City of Buena Park participates in implementation of the DAMP by requiring a WQMP. The City would be required to update its WQMP to comply with the new permit (order no. R8-2009-0030). Additionally, future development associated with implementation of the proposed General Plan Update would be required to comply with Municipal Code Section 13.32.030, which requires new development and significant redevelopment within the City comply with the DAMP. Furthermore, the proposed General Plan Update contains goals, policies, and implementation measures to reduce water quality impacts. Policies CF-6.5 and CF-6.6 in the Community Facilities Element requires the City to continue to participate in the NPDES permit program and to require a WQMP consistent with the RWQCB requirements for new development or redevelopment projects.

The use of BMPs is recommended to reduce water quality impacts to a less than significant level. Potential source control BMPs for stormwater include control of air pollutants, enforcement of anti-litter ordinances, education programs (to limit fertilizer and pesticide use by home gardeners and dumping of waste motor oil in storm drains), street and storm drain maintenance practices, spill prevention and cleanup, and BMPs for erosion control. Potential treatment control BMPs for stormwater include infiltration, wet ponds, extended detention basins, biofilters (such as grassy swales), media filtration (i.e., a settling basin followed by a sand filter), oil/water separators and constructed wetlands.

Future development would require a Water Quality Management Plan (WQMP) to conform to comply with the DAMP and NPDES permit. Compliance with the City's Municipal Code and with the policies, and implementation measures of the proposed General Plan Update, would reduce potential water quality impacts to less than significant.

Proposed General Plan Update Policies and Implementation Measures:

Policies

- CF-6.5: Continue to participate in the National Pollutant Discharge Elimination System (NPDES) permit program.
- CF-6.6: Require new development or redevelopment projects to provide a Water Quality Management Plan in compliance with the Regional Water Quality Control Board requirements.
- CF-6.7: Include in the flood control system natural features such as bioswales, wildlife ponds, and wetlands for flood control and water quality treatment, when feasible.
- CF-7.1: Cooperate in regional programs to implement the National Pollutant Discharge Elimination System (NPDES) program.
- CF-7.2: Conduct routine preventative maintenance activities related to municipal activities that are considered effective Best Management Practices (BMP) for pollutant control.

- CF-7.3: Perform drainage facility and infrastructure maintenance activities to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) program.
- CF-7.4: Provide structural measures or source control programs that would provide enhanced water quality benefits through routine measures employed to meet National Pollutant Discharge Elimination System (NPDES) permit requirements.
- CF-7.8: Increase public education and awareness regarding stormwater quality.

Implementation Measures

- CF-27 Prepare an updated Master Plan of Drainage.
- CF-28 Update the City's current Local Implementation Plan to be consistent with the most recent NPDES Permit requirements.
- CF-29 Continue to require new and redevelopment projects to comply with the County's Drainage Area Management Plan.
- CF-30 Continue to require new development and redevelopment projects to comply with the City's Local Implementation Plan for New Development and Significant Redevelopments.
- CF-31 Consider incentives for developers to incorporate features into new development or redevelopment projects that will reduce urban run-off and improve water quality. These features could address both project specific and other local impacts.
- CF-35 Create public education information and outreach materials regarding proper materials handling practices to assist residents and businesses in complying with surface water quality regulations and to increase awareness of potential impacts to the environment resulting from improper containment or disposal practices.

Mitigation Measures: No further mitigation is required beyond compliance with the proposed General Plan Update Policies and Implementation Measures.

Level of Significance: Less Than Significant Impact.

GROUNDWATER DEPLETION

- DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN UPDATE COULD SIGNIFICANTLY DEplete GROUNDWATER SUPPLIES AND INTERFERE WITH GROUNDWATER RECHARGE.

Impact Analysis: The City relies on two major water supply sources, which include imported water from the Metropolitan Water District (MWD) and local groundwater from the Orange County Groundwater Basin. Development associated with implementation of the proposed General Plan Update may contribute to the depletion of groundwater. Implementation of the proposed General Plan Update would result in an additional 1,517 residential dwelling units, 5.4

million square feet of commercial uses, and 2.9 million square feet of industrial/office/manufacturing uses, resulting in an increase in the City's population by 5,231 persons. Projected development and increased population would result in an ultimate increase in the demand for water supplies.

The City is expected to continue utilizing local groundwater sources as the primary source of water supply. The *Water Master Plan* projects the City will meet its 2030 water demand through the use of 15,510 acre feet per year (AFY) of groundwater and 5,170 AFY of imported water. The *Water Master Plan* estimates water demand based upon a 2030 population of 92,481 persons. The proposed General Plan Update estimates a population of 88,616 persons in 2035. The population growth assumed under the proposed General Plan Update is less than the population projections used to determine the availability of adequate water supply for the City within the *Water Master Plan*. Also, refer to Section 5.11, Water Supply. However, it should be noted that water sources identified as available in the *Water Master Plan*, are not the same water sources that are available currently, or anticipated to be available in the future. As a result of the drought (both actual and regulatory), the groundwater basin is in overdraft. The State is mandating a 20 percent reduction in water use by 2020. Buena Park is currently in a stage 1 water shortage.

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 Update goals, policies, and implementation measures. Policies in the proposed General Plan Update require the provision of adequate water supply (Policies CF-4.2 and CF4.4) and encourage conservation measures, including examining the use of alternative water supplies, such as grey water and reclaimed water, where appropriate and feasible (Policy CF-4.10) and implementing green building techniques (Policies CS-23.2 through 23.5). Conservation measures would help to reduce the amount of water used, resulting in a reduction in the need for groundwater supplies. Compliance with Federal and State requirements, the City's Municipal Code, and the policies, and implementation measures included in the proposed General Plan Update would reduce impacts to groundwater resources to a less than significant level.

Proposed General Plan Update Policies and Implementation Measures:

Policies

- CF-4.2: Provide for the efficient and economic distribution of adequate water supply and pressure to all residential, commercial, industrial, and public areas served by the Public Works Department.
- CF-4.4: Provide sufficient capacity to serve existing and planned uses and identify, manage, and monitor, when appropriate, large water users.
- CF-4.7: Ensure the City's Water Master Plan is updated as necessary to serve as an effective tool in the adequate provision of water supply to the community.
- CF-4.8: Continue to inspect, maintain, and enhance City facilities relative to their water use.
- CF-4.10: Examine the use of alternative water supplies, such as grey water and reclaimed water, where appropriate and feasible.

- CF-4.11: Continue to sponsor and provide water conservation and education programs.
- CF-4.12: Continue to enforce the Permanent, Year Round Water Conservation Measures and Prohibitions against Water Waste established by the Water Conservation and Emergency Water Shortage Supply Ordinance.
- CF-4.13: Continue to enforce enacted Phases 1-4 established by the City Council under the Water Conservation and Emergency Water Shortage Supply Ordinance.
- CF-4.14: Continue to enforce the Water Efficient Landscape Ordinance through Planning Department procedures in compliance with AB 1881.
- CS-4.8: Design new development and redevelopment projects in a manner that avoids adverse environmental effects to the maximum extent feasible, considering the following environmental factors:
- Natural topography
 - Wildlife habitat and linkages
 - Erosion protection and sedimentation
 - Drainage patterns
 - Groundwater recharge capability
- CS-23.2: Encourage green building techniques efforts in single-family homes as well as in municipal, commercial, mixed-use, or multi-family residential projects.
- CS-23.3: Encourage and create incentives for green building techniques in existing building retrofits as well as new buildings.
- CS-23.4: Emphasize design for water conservation as part of a project's green building efforts.
- CS-23.5: Utilize Low Impact Design (LID) features, including infiltration of stormwater. The Use of LID should not interfere with the City's goals of infill development and appropriate densities.

Implementation Measures

- CF-16 Update the City's Water Master Plan.
- CF-17 Continue capital improvements indicated in the City's Water Master Plan to improve the ability of the City's water system to provide adequate fire flows and to maintain optimum operation standards.
- CF-18 Implement a development monitoring system to evaluate the individual and cumulative impact of proposed development on the service capacity of water facilities. Use this system in the review of development projects and to require mitigation and/or necessary improvements.

CF-19	Utilize, where appropriate, public financing mechanisms, such as special assessment or community facilities districts to fund water improvement and service costs.
CF-20	Review and revise planning and building codes to provide for new technologies that will improve water service delivery and allow for the incorporation of alternative water sources.
CF-21	Continue to implement the City's Water Conservation and Water Supply Shortage Program to reduce water consumption within the City through conservation, enable effective water supply planning, assure reasonable and beneficial use of water, prevent waste of water, and maximize the efficient use of water within the City.
CF-22	Explore the feasibility of a recycled water system within the City to reduce the demand for potable water in the future by supplying water for irrigation and other non-potable water uses.
CS-52	Review and determine appropriate incentives regarding the installation of water efficient or energy efficient fixtures.

Mitigation Measures: No further mitigation is required beyond compliance with the proposed General Plan Update Policies and Implementation Measures.

Level of Significance: Less Than Significant Impact.

DRAINAGE AND RUNOFF

- DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED GENERAL PLAN UPDATE COULD ALTER EXISTING DRAINAGE PATTERNS, INCREASING THE AMOUNT OF RUNOFF WHICH WOULD EXCEED THE CAPACITY OF EXISTING OR PLANNED STORM DRAINAGE SYSTEMS.

Impact Analysis: It is assumed that the proposed watershed would remain unchanged from the existing condition. The drainage pattern for the area flows generally to the west and southwest towards major channels (Coyote Creek and Carbon Canyon Creek). The analysis evaluates net changes resulting from the proposed General Plan Update. A more detailed analysis would be required to assess exact facility impacts at the time in which specific properties are developed. The areas and the composite impervious values for the proposed condition were compared to existing and Master Plan condition to identify any impacts on the drainage facilities resulting from the proposed General Plan Update.

Table 5.8-4, *Area Characteristics Comparison*, shows the average imperviousness for each condition and the percent increase for the existing and proposed land uses.

The overall increase in imperviousness would result in an increase in runoff within the City. The following Focus Areas have been identified as areas of concern:

- *Commonwealth Corridor.* The Commonwealth Corridor Focus Area is within Area 1 of the Master Plan Study. There is an approximately 11.04 percent increase in

imperviousness compared to the existing condition. The 0.8240 imperviousness in the proposed condition would be consistent with the range (0.715 to 0.881) identified in the Master Plan Study. The increase would not affect the major flood channels, but could impact local storm drains.

**Table 5.8-4
Area Characteristics Comparison**

Focus Areas	Area (acres)	Existing Impervious, C (%)	Proposed Impervious, C (%)	Master Plan, C (%)	Percent Increase (Existing vs Proposed)
Central Buena Park	100.26	0.6546	0.6476	0.715 - 0.881	-1.08
Civic Center	58.22	0.7449	0.7369	0.715 - 0.872	-1.09
Commonwealth Corridor	48.92	0.7331	0.8240	0.715 - 0.881	11.04
Entertainment Corridor	380.43	0.8928	0.8571	0.535 - 0.900	-4.17
Entertainment Corridor North	67.95	0.7343	0.8644	0.616 - 0.784	15.06
Fillmore / Jackson	13.81	0.7931	0.6000	0.575 - 0.734	-32.18
North Beach Commercial Area	50.78	0.7950	0.8653	0.745 - 0.852	8.13
Northwest Area	144.63	0.9070	0.9057	0.616 - 0.784	-0.14
Orangethorpe Corridor East	81.68	0.6976	0.7812	0.616 - 0.784	10.70
Orangethorpe Corridor West	140.98	0.8603	0.9008	0.616 - 0.784	4.49
Other Areas	4220.57	0.5699	0.5061	-	-12.62
(-) indicates a decrease in imperviousness. C = runoff coefficient					

- Entertainment Corridor North. The Entertainment Corridor North Focus Area is within Area 3 of the Master Plan Study. There is an approximately 15.06 percent increase in imperviousness compared to the existing condition. The increase is considered significant, as the Master Plan Study used a range of 0.616 to 0.784 in imperviousness, compared to the 0.8644 imperviousness in the proposed condition.
- North Beach Commercial Area. The North Beach Commercial Focus Area is within Area 8 of the Master Plan Study. There is an approximately 8.13 percent increase in imperviousness compared to the existing condition. The increase is considered significant, as the Master Plan Study used a range of 0.745 to 0.852 in imperviousness, compared to the 0.8653 imperviousness in the proposed condition.
- Orangethorpe Corridor East. The Orangethorpe Corridor East Focus Area is within Area 3 of the Master Plan Study. There is an approximately 10.7 percent increase in imperviousness compared to the existing condition. The 0.7812 imperviousness in the proposed condition would be consistent with the range (0.616 to 0.784) identified in the Master Plan Study.
- Orangethorpe Corridor West. The Orangethorpe Corridor West Focus Area is within Area 3 of the Master Plan Study. The existing condition imperviousness currently exceeds the range of 0.616 to 0.784 identified in the Master Plan Study. The proposed condition

would further increase the imperviousness beyond the range identified by the Master Plan Study (0.616 to 0.784), which would be significant.

The increase in imperviousness would impact existing storm drain and flood control facilities. Detailed analysis would be required on a project-by-project basis to determine site specific impacts and the need for mitigation. Mitigation measures may include detention or retention basins and additional storm drains within existing streets. The basins can be designed on either a local or regional basis to control peak flows depending on the capacity of the existing flood facilities. Additionally, a comprehensive update to the City's Master Plan of Drainage is needed to address the proposed land use changes, assess facility impacts, and update the drainage fee schedule. The proposed General Plan Update acknowledges the need to update the City's Master Plan of Drainage (Policy CF-6.8 and Implementation Measure CF-27). Compliance with the City's Municipal Code, policies and implementation measures identified in the proposed General Plan Update, and mitigation requiring site-specific analysis and implementation of mitigation measures, if necessary, would reduce potential impacts to a less than significant level.

Proposed General Plan Update Policies and Implementation Measures:

Policies

- CF-6.1: Cooperate with County, State, and Federal flood control agencies to reduce the potential for flood damage in the City.
- CF-6.2: Continue to maintain and replace aging storm drain systems to ensure the provision of these services to all areas of the community.
- CF-6.3: Minimize the adverse effects of urbanization upon drainage and flood control facilities.
- CF-6.4: Improve the storm drain system in a way that respects the environment.
- CF-6.7: Include in the flood control system natural features such as bioswales, wildlife ponds, and wetlands for flood control and water quality treatment, when feasible.
- CF-6.8: Ensure the City's Master Plan of Drainage is updated as necessary to serve as an effective tool in the adequate provision and improvement of drainage facilities.
- CF-6.9: Improve the City's storm drain system to address current deficiencies as well as long-term needs associated with future development to minimize flood damage and adequately convey rainfall and subsequent runoff from a 25-year frequency storm.
- CF-6.10: Develop the flood control system for multi-purpose uses whenever practical and financially feasible (i.e., recreational, water quality/treatment, infiltration, etc.).
- CF-6.11: Minimize the amount of impervious surfaces in conjunction with new development or redevelopment.
- CF-6.12: Minimize the disturbance of natural drainage systems, where feasible, resulting from development including roads, highways, and bridges.

- CF-7.5: Cooperate with surrounding jurisdictions and the County of Orange to provide adequate storm drainage facilities.

Implementation Measures

- CF-27 Prepare an updated Master Plan of Drainage.
- CF-31 Consider incentives for developers to incorporate features into new development or redevelopment projects that will reduce urban run-off and improve water quality. These features could address both project specific and other local impacts.
- CF-33 Utilize development fees, redevelopment funds, drainage fees and other funding sources to assure that development of drainage facilities corresponds with development within the City.
- CF-34 Identify and improve areas experiencing localized storm drainage problems for storm drain improvements.

Mitigation Measures:

- 5.8-1 Prior to approval of project tract maps, the project owner/developer(s) shall be required to coordinate with the City of Buena Park Public Works Department to determine requirements necessary to mitigate impacts to drainage improvements required to accommodate storage volumes and flood protection for existing and future runoff. Proposed projects shall implement mitigation measures, if required, to the satisfaction of the City of Buena Park Public Works Director.

Level of Significance: Less Than Significant Impact With Mitigation Incorporated.

RISK INVOLVING FLOODING

- FUTURE DEVELOPMENT RESULTING FROM IMPLEMENTATION OF THE GENERAL PLAN UPDATE COULD PLACE HOUSING OR STRUCTURES WITHIN A 100-YEAR FLOOD HAZARD AND/OR EXPOSE PEOPLE OR STRUCTURES TO A SIGNIFICANT RISK INVOLVING FLOODING AS A RESULT OF THE FAILURE OF A LEVEE OR DAM.

Impact Analysis: Portions of the City are located within zones identified as having a 100-year shallow flooding with average depths between 1.0 and 3.0 feet. Therefore, future development associated with implementation of the proposed General Plan Update, could involve the development of new housing and/or structures within an identified 100-year flood hazard. Encroachments, including fill, new construction, substantial improvements, and other new development within a floodway are prohibited. Development proposed within a floodplain would be required to obtain a Conditional Letter of Map Revision (CLOMR) to be filed with the Federal Insurance Administrator. Upon completion of the encroachments, FEMA would issue a Letter of Map Revision (LOMR). Further, development associated with implementation of the proposed General Plan Update would be subject to the City's Municipal Code. Development within a FEMA Flood Zone would be required to meet FEMA standards referenced in the Title 18, Subdivisions and Floodplain Management of the Municipal Code. The Municipal Code

requires any development within a special flood hazards zone to be reviewed and approved by the City Engineer, or designee and mandates specific siting, design, and construction requirements for development within a flood zone. Compliance with the City's Municipal Code and the policies and implementation measures included in the proposed General Plan Update would reduce impacts associated with a 100-year flood hazard to a less than significant level.

As noted, the City's Master Drainage Study is currently outdated and needs to be updated in the near future. The City has identified several areas within the City that are inundated during high flow and in need of a storm drain system. Furthermore, the Master Drainage Study calls for storm drain systems at several locations; however, to date these improvements have not been built. The City has identified the need to reevaluate the necessity of these storm drain systems when the Master Drainage Study is updated. The General Plan Update identifies the need to update the Master Drainage Study (Policy CF-6.8) and includes policies to address current deficiencies as well as long-term needs associated with aging storm drain systems (Policies CF-6.2 and CF-6.9).

The policies and implementation measures recognize the need to monitor and improve, as necessary the City's storm drain system to adequately accommodate future development associated with implementation of the proposed General Plan Update. Further, Mitigation Measure 5.8-1 is required to ensure new development projects are designed to have adequate drainage improvements to accommodate associated on- and off-site drainage impacts. Updating and complying with the City's Master Drainage Study, compliance with the City's Municipal Code, and mitigation measure 5.8-1 would minimize potential flooding related to inadequate storm drain systems to a less than significant level.

The City is subject to inundation in the event of failure of the Prado, Fullerton, Brea, and/or Carbon Canyon Dams. Failure of the Prado Dam would result in a majority of the City being flooded, generally south of Malvern Avenue. Waters would reach the City in approximately 3.25 hours and would be approximately four feet deep. Failure of the Fullerton Dam would involve a small area in the eastern portion of the City, south of Whitaker Avenue, between Auto Center Drive and Dale Street. Failure of the Carbon Canyon and/or Brea Dams would involve inundation of the portion of the City generally located between the SR-91 Freeway and Malvern Avenue. Waters from Carbon Canyon Dam would reach the City in approximately 4.25 hours and would be approximately two feet deep.

Buildout under the General Plan Update is anticipated to involve increased development in areas of the City that could be inundated in the event of dam failure. The City's Emergency Operations Plan identifies the procedures that would be implemented in the event of dam failure or other emergencies that may affect the City. Further, the proposed General Plan Update includes policies and implementation measures to reduce potential impacts related to flooding. The policies and implementation measures of the proposed General Plan Update and compliance with the procedures identified in the Emergency Operations Plan would reduce potential impacts involving dam inundation to a less than significant level.

Proposed General Plan Update Policies and Implementation Measures:

Policies

CF-6.1: Cooperate with County, State, and Federal flood control agencies to reduce the potential for flood damage in the City.

- CF-6.2: Continue to maintain and replace aging storm drain systems to ensure the provision of these services to all areas of the community.
- CF-6.3: Minimize the adverse effects of urbanization upon drainage and flood control facilities.
- CF-6.8: Ensure the City's Master Plan of Drainage is updated as necessary to serve as an effective tool in the adequate provision and improvement of drainage facilities.
- CF-6.9: Improve the City's storm drain system to address current deficiencies as well as long-term needs associated with future development to minimize flood damage and adequately convey rainfall and subsequent runoff from a 25-year frequency storm.
- CF-6.10: Develop the flood control system for multi-purpose uses whenever practical and financially feasible (i.e., recreational, water quality/treatment, infiltration, etc.).
- SAF-2.1: Seek to provide adequate flood protection from 100-year, or other State-defined scenario, flood frequency storms.
- SAF-2.2: Improve defensive measures against 100-year, or other State-defined scenario, flood conditions through land use and design, such as increased pervious surfaces, on-site water capture and re-use, minimized building footprints, etc.
- SAF-2.3: Require that new development or redevelopment located within areas identified within the 100-year flood plain meet the requirements of the current building code and the National Flood Insurance Protection Program.
- SAF-2.4: Work with the Orange County Flood Control District and the U.S. Army Corps of Engineers, Los Angeles District to ensure future flood control plans incorporate adequate seismic safety measures.
- SAF-2.5: Continue to implement adopted flood control programs and regulations.
- SAF-2.6: Continue to monitor regional flood hazard improvements in the Santa Ana River Basin area to understand impacts of 100-year storms within the City.

Mitigation Measures: Refer to Mitigation Measure 5.8-1.

Level of Significance: Less Than Significant Impact With Mitigation Incorporated.

5.8.5 CUMULATIVE IMPACTS

- **DEVELOPMENT ASSOCIATED WITH THE PROPOSED GENERAL PLAN UPDATE AND CUMULATIVE PROJECTS COULD RESULT IN CUMULATIVE IMPACTS RELATED TO HYDROLOGY AND WATER QUALITY.**

Impact Analysis: Cumulative impacts are analyzed in terms of impacts within the City of Buena Park, along with impacts to the regional drainage facilities under the jurisdiction of the Santa Ana RWQCB and Orange County Flood Control District. Implementation of the proposed

General Plan Update would involve increased development, and as a result, increased drainage and runoff into the storm drain system. Future development projects in the General Plan study area would be required to mitigate specific hydrologic impacts on a project-by-project basis, reducing potential cumulative hydrologic impacts to a less than significant level.

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 project development in the City would be addressed at a site-specific level to ensure their cumulative impact would be less than significant. Therefore, implementation of the proposed General Plan Update would not result in cumulatively considerable water quality impacts.

Implementation of the proposed General Plan Update is not anticipated to result in cumulatively considerable impacts resulting from depletion of the groundwater basin. Although implementation of the proposed General Plan Update would allow for increased development and population within the City, the City has identified the protection and conservation of its existing and future water resources within the proposed General Plan Update goals, policies, and implementation measures. Policies in the proposed General Plan Update require the provision of adequate water supply (Policies CF-4.2 and CF 4.4) and encourage conservation measures, including examining the use of alternative water supplies, such as grey water and reclaimed water, where appropriate and feasible (Policy CF-4.10) and implementing green building techniques (Policies CS-23.2 through CS-23.5). Conservation measures would help to reduce the amount of water used, resulting in a reduction in the need for groundwater supplies. Compliance with Federal and State requirements, the City's Municipal Code, and the policies, and implementation measures included in the proposed General Plan Update would reduce impacts to groundwater resources to a less than significant level.

Proposed General Plan Update Policies and Implementation Measures: Refer to the policies and implementation measures identified above.

Mitigation Measures: Refer to Mitigation Measure 5.8-1. No additional mitigation measures are required.

Level of Significance: Less Than Significant Impact With Mitigation Incorporated.

5.8.6 SIGNIFICANT UNAVOIDABLE IMPACTS

All impacts related to potential hydrology, drainage, and water quality associated with implementation of the proposed General Plan Update for the City of Buena Park would be less than significant by adherence to and/or compliance with the existing regulatory framework, proposed General Plan Update Policies and Implementation Measures, and recommended mitigation measures. No significant unavoidable hydrology, drainage, and water quality impacts would occur as a result of buildout of the proposed General Plan Update.