4.7 HYDROLOGY/WATER QUALITY

The purpose of this section is to describe stormwater drainage impacts associated with construction and operation of the proposed project, including effects on surface water and groundwater quantity and quality, flooding, and groundwater recharge. For purposes of this discussion, stormwater includes rainwater that is captured into the storm drain system and eventually conveyed to the Santa Ana River. Impacts to the sanitary sewer system, which is the system that collects sewage and conveys it directly to the water reclamation plant (e.g., treatment facility), are addressed in Section 4.12 (Utilities/Service Systems) of this document.

This section is based in part on the *Preliminary Geotechnical Investigation Proposed 682K Distribution Building Southeast Corner Palm Avenue and Industrial Parkway San Bernardino, CA* (LOR Geotechnical Group 2007 [Geotechnical Report]) (available as Appendix G); *Hydrology and Hydraulics Study, City of San Bernardino DRC/ERC Case: Review No. 05-23 A.P.N. 266-041-62, County of San Bernardino* (Stantec Consulting, Inc. 2007 [Hydrology Study]) (available as Appendix I); *2005 Urban Water Master Plan* (San Bernardino Municipal Water Department 2005 [UWMP]); *Water Quality Management Plan for HURD Trust Distribution Center, City of San Bernardino CRC/ERC Case: Pre-Application Review No. 05-23 APN 266-041-62* (Stantec Consulting, Inc. 2007 [project WQMP]) (available as Appendix M); *Newmark Groundwater Contamination Superfund Project, City of San Bernardino* (EPA Region 9, March 1993); *EPA Groundwater Cleanup Studies in the San Bernardino Valley Basin* (EPA Autumn 1990); *Water Quality Control Plan Santa Ana River Region* (RWQCB 1995 [Basin Plan]); and other available references. Full bibliographic entries for all referenced materials and communication are provided in Section 4.7.5 (References).

No comment letters related to hydrology/water quality were received in response to the notice of preparation (NOP) circulated on August 3, 2007, for the proposed project.

4.7.1 Environmental Setting

General

The project site is located at southeast intersection of Palm Avenue and Industrial Parkway in the City of San Bernardino; Interstate 215 (I-215) forms the northeast and east border, Palm Avenue forms the northwest border, Industrial Parkway forms the southwest and most of south border, with undeveloped county lands also along part of the south border of the project site. The 38.4-acre site is currently undeveloped land in the City of San Bernardino Industrial Light land use district with soils that are poorly graded, silty sand, gravel, boulder deposits and fill materials (Geotechnical Report).

The topography of the site is dominated by two, relatively small, roughly northwest-to-southeast trending hills, separated by infill valleys (see Section 4.5 [Geology/Soils and Mineral Resources] of this EIR for more details) with a gentle overall fall from about 1680 feet above mean sea level (AMSL) in the northwest to 1640 feet AMSL to the southeast.[2] The smaller of the on-site hills is in the northwestern

[2] U.S. Geological Survey. San Bernardino, California United States Topomap. Revised July 1, 1988.

portion of the site; the larger hill comprises nearly half of the site in the east-southeast portion and at its peak is about 1805 feet AMSL.[3]

The project area climate is a Mediterranean-type climate regime with hot, dry summers and cooler, wetter winters. Mean annual precipitation is about 16.4 inches per year (WRCC n.d.). The minimum monthly precipitation normally occurs during July (0.04 inches) and the maximum normally occurs during February (3.70 inches) (WRCC n.d.). Over 92 percent of the precipitation in the area falls from October through April. Mean annual temperature is 65.9 degrees Fahrenheit (°F) with the lowest mean monthly temperature in January (54.4°F) and the highest in August (80.1°F) (WRCC n.d.).

Hydrology and Drainage

Regional

The project site is located within the Santa Ana River Hydrologic Unit, Upper Santa Ana River Watershed. The entire Santa Ana River watershed covers approximately 2,650 square miles of mountains, foothills, and valleys and includes parts of San Bernardino, Riverside, and Orange Counties (CSCC 2001). The headwaters of the Santa Ana River watershed are in the San Gabriel and San Bernardino mountains on the north and the San Gorgonio and San Jacinto Mountains to the east. From these mountains, the Santa Ana River flows through the Santa Ana Valley through the Prado Basin, a flood control facility, and a narrow pass through the Santa Ana Mountains. From the Santa Ana Mountains, flow continues in a southwesterly direction to the Pacific Ocean between Newport Beach and Huntington Beach. The San Jacinto River system is also considered part of the Santa Ana River Basin; however, during normal years, the San Jacinto River terminates at Lake Elsinore and does not connect to the Santa Ana River.

Most of the precipitation within the Santa Ana River watershed occurs from October through April in the form of rain with variable amounts of snow at the higher elevations. The climatological cycle of the region results in high surface water flows in the spring and early summer followed by low flows during the dry season (CSCC 2001). Winter and spring floods generated by storms can cause torrential floods in local streams (CSCC 2001).

In the upper valley of the Santa Ana River watershed, flow from the Seven Oaks dam to the City of San Bernardino consists mainly of storm flows from the San Timoteo Creek system, and groundwater that is rising because of local geological conditions (CSCC 2001). From the City of San Bernardino to the City of Riverside, the river flows perennially, and it includes treated discharge from wastewater treatment plants (CSCC 2001). From the City of Riverside, the river flow consists of highly treated wastewater discharges, urban runoff, irrigation runoff, and groundwater forced to the surface by shallowing/rising bedrock (CSCC 2001). Near Corona, the river cuts through the Santa Ana Mountains and the Puente-Chino Hills (CSCC 2001).

[3] U.S. Geological Survey. San Bernardino, California United States Topomap. Revised July 1, 1988.

Project Site

Drainage within the project area is generally from northwest to southwest via overland flow, street flow, and storm drain systems. I-215 and Palm Avenue effectively act as drainage barriers to stormwater run-on to the project site from off-site properties to the north, except for a portion on the north side of the project site that receives runoff from the intersection of Palm Avenue and I-215 (Hydrology Study). An off-site lot at the northeast corner of the project site is currently developed and also contributes to stormwater run-on to the project site (Hydrology Study).

The project site drains to a drainage channel that flows to Cable Creek. Cable Creek connects to the Devils Creek Diversion Channel, which outlets to the Cajon Wash. Further downstream, the Cajon Wash/Creek discharges to the Lytle Creek Wash and Channel system that ultimately discharge to the Santa Ana River Reach 4 (Parker 2008).

The infiltration rate of on-site soils is a major factor in the overall drainage characteristics of a site. The soils at the project site are poorly graded, silty sand, gravel, boulder deposits and fill materials. Details on soil types are discussed in Section 4.5 (Geology/Soils and Mineral Resources) of this EIR.

The Natural Resource Conservation Service (NRCS) classifies soils into four runoff potential categories, based on their infiltration and drainage characteristics (NRCS 2007):

- Group A soils are generally deep, well drained sands or gravelly sands with a high infiltration rate and low runoff potential.
- Group B soils are moderately deep, moderately well drained soils with a medium texture. These soils drain well, though not as well as Group A soils.
- Group C soils have a slow infiltration rate when wet. They often have a semi-impermeable layer that impedes percolation, and tend to be fine in texture.
- Group D soils have a very slow infiltration rate. They generally consist of clays with high shrink-swell potential, soils with a high water table, soils with a claypan layer near the surface, or shallow soils over bedrock.

Most of the soils on the project site are Hydrologic Group D (50 to 75 percent) with a mix of Hydrologic Group A (25 to 50 percent) (Hydrology Study). As a result of the large amount of Hydrologic Group D soils and the steep topography associated with the hills, the overall runoff potential for of soils on the project site is relatively high.

Another major factor in on-site drainage character is the type of land use. The ratio of pervious to impervious surfaces is a principal characteristic of land use that can affect drainage. The amount of directly connected impervious area (as opposed to just the total amount of impervious area) and the drainage network density (e.g., presence of drainage channels or a storm drain system) are also important components of on-site drainage. Existing land uses on the project site and within most of the project area is vacant lands. As such, the site is almost entirely composed of pervious surfaces that sheet flow to the off-site drainage network.

Land development and modification of natural drainages can alter infiltration and runoff rates, changing the timing, distribution, and magnitude of surface water and groundwater flow. Urbanization increases stormwater runoff by the development of impervious surfaces, surface soil compaction, grassland conversion, dewatering of stream valleys, and the degradation of natural riparian communities. Both the peak flow rate and volume of storm flows typically increase with increased urbanization (and increased impervious surfaces), and the delivery of runoff to streams after the beginning of rainfall becomes "flashier," thereby reducing the lag time between the rainfall and the peak of a stream's flood stage.[4] Increased imperviousness can greatly alter runoff from small, frequent flood events by up to a ten-times increase in flow rate.[5]

The Hydrology Study for the proposed project modeled stormwater runoff from the project site for the 10-year and 100-year storm events.[6] Peak flow rates from the southwestern portion of the project site, which discharge to Industrial Parkway, were determined to be 37.3 cubic feet per second (cfs) for the 10-year storm event and 77.0 cfs for the 100-year storm event. Peak flow rates from the northeastern portion of the project site, which discharge to a drainage channel to Cable Creek, were determined to be 20.1 cfs for the 10-year storm event and 37.5 cfs for the 100-year storm event.

Water Quality

Surface water quality is highly dependent on the natural and human-influenced nature of the drainage area and shallow groundwater characteristics (where shallow groundwater contributes to stream or lake flow). As runoff water flows over the landscape, it picks up dissolved chemicals, particulate material, and gross debris from the surface it flows over, prior to discharge into a water body. The effects of this runoff water on surface water quality depend upon the amount and type of material being picked up and transported, as well as the amount of water or flow rate in the receiving water. Where shallow groundwater interacts with surface waters, the quality of groundwater will affect the surface water, and the quality of surface water will also affect groundwater. As infiltrating water moves through the soil to groundwater, it also picks up chemicals, including natural chemicals dissolved from soil and mineral materials, and other chemicals can also be filtered out. Consequently, the surface water quality will reflect the water quality of runoff, precipitation, and shallow groundwater. In developed areas, dry weather flows (e.g., lawn watering, car washing, and others) and irrigation flow can also affect surface water quality.

Constituents and concentrations within runoff water vary according to land cover, land use, topography, and the amount of impervious cover, as well as the intensity and frequency of irrigation or rainfall. Runoff in developed areas may typically contain oil, grease, and metals accumulated in streets, driveways, parking lots, and rooftops, as well as pesticides, herbicides, particulate matter, nutrients, animal waste, and other oxygen-demanding substances from landscaped areas.

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[4] Santa Clara Basin Watershed Management Initiative. Watershed Management Plan: Volume One Watershed Characteristics Report Unabridged 2003 Revision. Revised August 2003. p. 4-2.
[5] Santa Clara Basin Watershed Management Initiative. Watershed Management Plan: Volume One Watershed Characteristics Report Unabridged 2003 Revision. Revised August 2003. p. 4-10.
[6] The 10-year storm event is a storm event with a 10 percent chance of occurring in any given year. The 100-year storm event is a storm event with a 1 percent chance of occurring in any given year.

Surface water quality in developed areas is affected by various point-source and nonpoint-source pollutants. Point-source pollutants are those emitted at a specific point, such as a pipe, while nonpoint-source pollutants are those typically generated by surface runoff from a diffuse area and sheet flows into surface waters. Urban runoff flows over diffuse source areas such as streets, paved areas, or landscaped areas, but because it is ultimately conveyed in storm drainage systems that discharge to surface waters at discrete locations, it is regulated as a point source under the National Pollutant Discharge Elimination System (NPDES) Program.

As a general rule, point-source pollutants are more easily monitored; thus, point-source pollutant discharge standards are more easily enforced through Waste Discharge Requirements, while nonpoint-source and diffuse-source pollutants, such as those found in stormwater runoff, are more difficult to monitor and enforce. Even though nonpoint-source and diffuse-source pollutants are difficult to monitor, they are important contributors to surface water quality, especially in developed areas.

In developed areas, the highest pollutant concentrations in stormwater runoff are usually generated at the beginning of the wet season, during the "first-flush." Approximately 80 percent of total accumulated pollutants are removed within the first 0.5 inch of rainfall when the percent of impervious surfaces is 70 to 90 percent, with street surfaces as the primary source of pollutants in urban areas (Schueler 2000). There are currently no numeric effluent discharge limitations for stormwater runoff; however, routine monitoring is required for compliance with the federal Clean Water Act.[7]

Regional

Water quality degradation because of high concentrations of nitrogen and total dissolved substances (TDS) is considered among the most significant regional water quality problem in the Santa Ana River Watershed (SARWQCB 2004b). Historically, the Santa Ana River and its major tributaries likely flowed during most of the year, recharging deep alluvial groundwater basins in the inland valleys and the coastal plain. However, irrigation eventually led to the diversion of most of the streams tributary to the river, and the quantity of groundwater recharge diminished greatly. Diverted stream flows were used to support extensive irrigated agriculture operations, principally citrus orchards that relied on the use of nitrogen fertilizers to sustain crop yields. As a consequence of these historic practices, water quality issues in the Santa Ana River Watershed have often revolved around elevated concentrations of TDS and total inorganic nitrogen (TIN).

The 1975, 1983, and 1995 Water Quality Control Plans, prepared by the Santa Ana Regional Water Quality Control Board (SARWQCB) (refer to Section 4.7.2 [Regulatory Framework] for more details) reported that the most serious problem in the Santa Ana River Basin is the buildup of dissolved minerals, or salts, in the ground and surface waters. Sampling and computer modeling of groundwaters showed that the levels of dissolved minerals (TDS) were exceeding water quality objectives or would do so in the future unless appropriate controls were implemented (SARWQCB 2004b). Nitrogen levels in the Santa Ana River, largely in the form of nitrate, were also projected to exceed objectives. These high levels of TDS and nitrate adversely affect the beneficial uses of ground and surface waters.

[7] Although there are no numeric effluent discharge limitations for stormwater runoff, there are numeric criteria for nonstormwater discharges.

Water from the Santa Ana River is used multiple times as it moves downstream through the watershed. Each cycle of use adds an increment of salt, whether through addition of soluble materials as a result of consumptive use, or though evaporation and evapotranspiration. Typically, each use adds 200 to 300 parts per million (ppm) or milligrams per liter (mg/L) of TDS (SARWQCB 2004b). Major efforts to address the salt balance problem include the SARWQCB's program of regulating TDS levels in waste discharges; import and recharge of large volumes of low-TDS water from the State Water Project (SWP); construction of the Santa Ana River Interceptor (SARI) Line to export high TDS wastes from the upper Santa Ana River Basin; operation of groundwater desalting facilities that extract high-TDS groundwater; removal of excessive TDS; and export of any resulting brine via the SARI Line. All of these efforts provide water supplies with lowered TDS levels.

Project Site

The project site is currently vacant and receives some runoff from I-215 and a developed property on the northwest corner of the intersection of Palm Avenue and Industrial Parkway. Consequently, stormwater runoff quality characteristics can be expected to be typical of runoff from these types of land uses: light industrial, transportation, and vacant lands. The City of San Bernardino has measured pollutants in stormwater runoff from a couple of land use categories; however, it has not measured the runoff pollutant characteristics from vacant lands or transportation. Therefore, for comparison purposes of the relative effective difference between land use and stormwater pollutant characteristics, the City of Los Angeles data, supplemented with national stormwater characteristics, where necessary, can be used. Table 4.7-1 (Typical Pollutant Concentrations in Stormwater) lists the concentrations of pollutants in stormwater runoff from vacant, light industrial, and transportation land uses.

Table 4.7-1 Typical Pollutant Concentrations in Stormwater

		Land Use		
Pollutant	*Units*	*Vacant*	*Light Industrial*	*Transportation*
Suspended Solids	mg/L	164.7	229.4	75.4
Total Phosphorous	mg/L	0.11	0.44	0.44
Dissolved phosphorous	mg/L	0.06	0.28	0.36
Total Nitrogen	mg/L	1.97	4.02	2.65
Inorganic-Nitrogen	mg/L	1.16	0.95	0.84
Total Copper	μg/L	9.12	31.0	51.9
Total Lead	μg/L	7.4 a	14.9	9.1
Total Zinc	μg/L	38.8	565.6	279.5
Oil and Grease	mg/L	0.73a	1.87	3.19
Fecal Coliforms	MPN/100mL	2.18E+03	6.53E+05	1.34E+06

SOURCE: LA County 2001

a. Estimated from Pitt et al., 2005

Soil testing near the I-215 stormwater runoff discharge locations measured only non-detectable to low concentrations of total petroleum hydrocarbons (up to 103 mg/kg as oil) and metals (up to 79 mg/kg of zinc and up to 15 mg/kg of copper) (Ardent 2007). Overall stormwater runoff quality from the project site can be expected to be similar to 'vacant' land use category in Table 4.7-1.

Santa Ana Reach 4 and Lytle Creek, two of the project site receiving waters, are listed as water quality impaired by pathogens.[8] Total Maximum Daily Loads (TMDLs) to address this pathogen impairment are scheduled for completion by 2019.

Groundwater

The project site is located above the Upper Santa Ana Valley Groundwater Basin, Bunker Hill Subbasin (Basin Number 8-2.06) (California Department of Water Resources 2004). The SARWQCB further delineates the groundwater basin area below the project site as the Bunker Hill-A Groundwater Management Zone (SARWQCB 1995). The Bunker Hill-A Groundwater Management Zone is listed as having the following designated beneficial uses: municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

Bunker Hill Subbasin Characteristics

The Bunker Hill Subbasin has a surface area of about 120 square miles (CDWR 2004). It consists of the alluvial materials that underlie the San Bernardino Valley. This subbasin is bounded by contact with the consolidated rocks of the San Gabriel Mountains, San Bernardino Mountains, and Crafton Hills, and by several faults. The southern boundary is the Banning fault, the east boundary is the Redlands fault, the northern boundary is roughly the San Andreas fault, the Glen Helen fault abuts the northwest boundary, and the southwest boundary is the San Jacinto fault. The Santa Ana River, Mill Creek, and Lytle Creek are the main tributary streams in the subbasin.

Recharge to the Bunker Hill Subbasin historically has been from infiltration of runoff from the San Gabriel and San Bernardino Mountains. Santa Ana River, Mill Creek, and Lytle Creek contribute more than 60 percent of the total recharge to the groundwater system (CDWR 2004). Lesser contributors include Cajon Creek, San Timoteo Creek, and most of the creeks flowing southward out of the San Bernardino Mountains (CDWR 2004). The subbasin is also replenished by deep percolation of water from precipitation and resulting runoff, percolation from delivered water, and water spread in streambeds and spreading grounds. On average, approximately 65,000 AF of water is captured annually from local sources, such as the Santa Ana River and Mill Creek, for spreading to recharge the Bunker Hill Subbasin (UWMP 2005).

Recharge also occurs from local runoff generated from precipitation falling on the Bunker Hill and Lytle Creek groundwater subbasins (Danskin 2006). It is likely that much of the recharge from direct precipitation, estimated by the California Department of Water Resources (1986) to average about 8,400 AFY, is actually recharge from local runoff resulting from direct precipitation (Danskin 2006). As

[8] Santa Ana Regional Water Quality Control Board. 2006 CWA Section 303(d) List of Water Quality Limited Segments Requiring TMDLS. USEPA Approval Date June 28, 2007

urbanization of the San Bernardino area continues, the quantity of local runoff is estimated to double as a result of the associated increase in impervious surfaces, but the quantity of recharge from local runoff is expected to remain relatively constant (Danskin 2006).

For the time period from 1945 to 1998, recharge from local runoff averaged about 5,000 AFY (Danskin 2006); annual values ranged from a minimum of about 2,000 AF in 1947 to a maximum of about 12,000 AF in 1983. Based on these estimates, total recharge from precipitation during 1945–98 averaged about 6,000 AFY, including 1,000 AFY of direct recharge from precipitation and 5,000 AFY of recharge from local runoff (Danskin 2006). The annual safe yield[9] of the subbasin is 232,100 AF per year (UWMP 2005). Therefore, total direct precipitation recharge, including local runoff, only accounts for about 2.6 percent of total recharge.

Basin Management and Water Supply

Management of this groundwater basin is coordinated through the San Bernardino Valley Municipal Water District (Muni) and is based primarily on the maintenance of groundwater levels in the pressure zone, which is located in downtown San Bernardino City (CDWR 2004). Inflows and outflows are monitored and adjusted so as not to allow water levels to rise to the ground surface in downtown San Bernardino City.

Groundwater management issues in the Bunker Hill Subbasin are primarily governed by the judgment in Western Municipal Water District et al. v. East San Bernardino County Water District et al., entered on April 17, 1969 (Western Judgment). Under the Western Judgment, Muni has the responsibility to ensure that adequate quantities of water are available for extractions above the basin safe yield of 232,100 AF/Y (UWMP 2005). If pumping by water agencies within Muni's service area exceeds the safe yield, Muni is required to augment the supply sources by spreading imported water from the SWP or by water obtained from other sources. The Western Judgment also sets the maximum amount of water that can be exported from the Bunker Hill Subbasin.

The proposed project would be served by water supplies from the San Bernardino Municipal Water Department (SBMWD), which obtains 100 percent of its water from the Bunker Hill Subbasin (UWMP 2005). The SBMWD coordinates with the City and County of San Bernardino as a condition of development in the Department's service area. Confirmation of water availability is required by the City, for development within the City limits through its Environmental Review and Development Review processes for new development (UWMP 2005).

Water Quality

Groundwater within the subbasin is predominately of a calcium-bicarbonate type, which is the type of mineral/material that predominates in the groundwater and is used to classify the groundwater basin water, and has TDS[10] range of 150 mg/L to 550 mg/L (CDWR 2004). The California Department of

[9] Safe yield is determined based the amount of groundwater that can be extracted over a period of time which is balanced by long-term recharge and does not measurably affect the basin's physical or chemical characteristics.
[10] TDS is a measure of salinity.

Health Services data for 204 public supply wells in the groundwater subbasin show an average TDS content of 324 mg/L, with a range of 155 to 1,140 mg/L.

The Bunker Hill Subbasin contains several contamination plumes (UWMP 2005). The Redlands plume, located between Judson Street and Mountain Avenue in Redlands, is primarily composed of TCE (trichloroethylene) with lower levels of PCE (tetrachloroethylene; perchloroethylene) and DBCP (1,2 Dibromo-3-chloropropane) that contaminate approximately 150,000 AF of groundwater (SBVWDC 2000 as reported in CDWR 2004). The Norton Air Force Base plume consists of TCE and PCE. This plume stretches 2.5 miles, and contaminates 100,000 AF of groundwater. The Newark and Muscoy plumes are spread around the east and west sides of the Shandon Hills in northern San Bernardino City. These plumes consist of TCE and PCE and are designated Superfund sites. The Santa Fe plume consists primarily of petroleum-based contaminates.

SBMWD takes numerous actions to maintain water quality within its service area at both the local and regional level. SBMWD along with other City departments are tasked with environmental oversight to ensure that potential industrial and commercial sources of contaminants are minimized or completely eliminated. The City also conducts educational programs to inform residents about water quality and how their actions can potentially impact water quality.

More than 25 percent of SBMWD's water supply has been impacted by historic contamination by volatile organic compounds (VOCs) (UWMP 2005). In 1991, completed groundwater contamination remediation wellhead treatment plants restored 37.6 mgd of groundwater production from 13 SBMWD wells that had been removed from service because of TCE/PCE concentrations in excess of the Maximum Contaminant Levels[11] (MCLs) for drinking water. In addition, the SBMWD has constructed seven groundwater extraction barrier wells to halt the further migration of groundwater contaminants towards additional domestic water wells.

Every year SBMWD is required to provide consumers a Consumer Confidence Report stating whether or not SBMWD has met all drinking water quality standards during the previous year. As reported in the most recent published Consumer Confidence Report, SBMWD has met all of the maximum contaminant levels (MCLs) for domestic drinking water (UWMP 2005). Water quality extracted from the Bunker Hill Subbasin by SBMWD is of excellent mineral quality with TDS averaging less than 350 mg/L. However, portions of the Bunker Hill Subbasin are still impaired by one or more of the following contaminants: TCE, PCE, DBCP, perchlorate, nitrates, and fluoride. Drinking water standards are met via a combination of management strategies that involve treatment of the contaminants, blending of water to reduce contaminant levels, and pumping in non-contaminated areas.

[11] MCLs are a regulatory maximum allowable concentration of contaminants in dinking water considered to provide a minimal risk to human health.

Project Site

During the geotechnical survey, no groundwater was encountered in any of the borings or trenches to depth up to 50 feet below ground surface (bgs).[12] Historical (1973–1979) groundwater records indicate that the depth to groundwater beneath the project site was about 100 feet bgs.[13] Groundwater flow is in a southerly direction (Professional Property Inspections, LLC. 2007).

The project site is located near the Newark and Muscoy plumes. The site was reported to have been open land until the construction of Camp Ono, an Army installation that operated during the World War II era. A review of historical documents prepared by consultants retained by the Army indicated that the project site was located at the extreme northern portion of Camp Ono and was not used during occupation of the surrounding area by the San Bernardino Engineering Depot (Ardent 2007). Most of the activities conducted at Camp Ono that could have resulted in contamination were completed on the topographically flat areas located further southeast of the site. Groundwater wells located immediately southeast of and downgradient from the site have indicated no detectable to low concentrations of TCE (up to 1 microgram per liter [μg/L]) and PCE (up to 7 μg/L) (Ardent 2007). The Maximum Contaminant Level (MCL) for drinking water is 5 μg/L for TCE and PCE. Furthermore, the EPA has reviewed the project site and concluded that there are no known potential TCE or PCE sources of soil contamination at the project site and in their best professional opinion of the hydrogeology in the area of the project site it is unlikely that there is contaminated groundwater underneath any portion of the subject property (EPA Region 9, 2000).

4.7.2 Regulatory Framework

Federal

Clean Water Act (CWA)

The federal CWA was enacted with the primary purpose of restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters. The CWA also directs states to establish water quality standards for all "waters of the United States" and to review and update such standards on a triennial basis. Other provisions of the CWA related to basin planning include Section 208, which authorizes the preparation of waste treatment management plans, and Section 319, which mandates specific actions for the control of pollution from nonpoint sources. The United States Environmental Protection Agency (USEPA) has delegated responsibility for implementation of portions of the CWA, including water quality control planning and control programs, such as the National Pollutant Discharge Elimination System (NPDES) Program, to the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB).

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[12] LOR Geotechnical Group. Preliminary Geotechnical Investigation Proposed 682K Distribution Building Southeast Corner Palm Avenue and Industrial Parkway, San Bernardino, California. Prepared for IDS Real Estate. August 13, 2007.

[13] LOR Geotechnical Group. Preliminary Geotechnical Investigation Proposed 682K Distribution Building Southeast Corner Palm Avenue and Industrial Parkway, San Bernardino, California. p. 9. Prepared for IDS Real Estate. August 13, 2007.

Section 303(c)(2)(b) of the CWA requires states to adopt water quality standards for all surface waters of the United States. Section 304(a) requires the EPA to publish water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards are typically numeric, although narrative criteria based upon biomonitoring methods may be employed where numerical standards cannot be established or where they are needed to supplement numerical standards. Applicable water quality standards for proposed project drainages are listed in the Santa Ana Regional Water Quality Control Plan described below in the state and regional regulations. All discharges from the proposed project to surface or ground waters are regulated under the CWA.

On May 18, 2000, the EPA promulgated the California Toxics Rule based on the Administrator's determination that numeric criteria are necessary in the state of California to protect human health and the environment. These federal criteria are numeric water quality criteria for priority toxic pollutants and other provisions for water quality standards legally applicable in the state of California for inland surface waters, enclosed bays, and estuaries for all purposes and programs under the CWA.

Section 303(d) and Total Maximum Daily Loads (TMDLs). The CWA contains two strategies for managing water quality. One is a technology-based approach that includes requirements to maintain a minimum level of pollutant management using the best available technology. The other is a water quality-based approach that relies on evaluating the condition of surface waters and setting limitations on the amount of pollution that the water can be exposed to without adversely affecting the beneficial uses of those waters. Section 303(d) of the CWA bridges these two strategies. Section 303(d) requires that states make a list of waters that are not attaining standards after the technology-based limits are put into place. For waters on this list (and where the USEPA administrator deems they are appropriate) the states are to develop total maximum daily loads or TMDLs. TMDLs are established at the level necessary to implement the applicable water quality standards. TMDLs must account for all sources of the pollutants that caused the water to be listed. Federal regulations require that the TMDLs, at a minimum, account for contributions from point sources (federally permitted discharges that are discrete conveyances) and contributions from nonpoint sources (everything other than point sources).

Section 303(d), Section 303(e), and their implementing regulations require that approved TMDLs be incorporated into water quality control plans. The USEPA has also established regulations at 40 CFR 12 requiring that National Pollutant Discharge Elimination System (NPDES) permits be revised to be consistent with any approved TMDL. State implementation of the TMDL program as it relates to the proposed project is discussed below under state and regional regulations.

National Pollutant Discharge Elimination System (NPDES). National Pollutant Discharge Elimination System (NPDES). The goal of the NPDES non-point source regulations is to improve the quality of stormwater discharged to receiving waters to the "maximum extent practicable" through the use of best management practices (BMPs). The NPDES permit system was established in the CWA to regulate point source discharges (a municipal or industrial discharge at a specific location or pipe) and certain types of diffuse dischargers. As defined in the federal regulations, non-point sources are generally exempt from federal NPDES permit program requirements.

Non-point pollution sources are diffuse and originate over a wide area rather than from a definable point. Non-point pollution often enters receiving water in the form of surface runoff and is not conveyed by way of pipelines or discrete conveyances. Urban stormwater runoff and construction site runoff, however, are diffuse-sources regulated under the NPDES permit program because they discharge to receiving waters at discrete locations. Section 401 and Section 402 of the CWA contain general requirements regarding NPDES permits. Section 307 of the CWA describes the factors that the U.S. Environmental Protection Agency (EPA) must consider in setting effluent limits for priority pollutants.

For diffuse-source discharges (e.g., municipal stormwater and construction runoff), the NPDES program establishes a comprehensive stormwater quality program to manage urban stormwater and minimize pollution of the environment to the maximum extent practicable. The NPDES program consists of (1) characterizing receiving water quality, (2) identifying harmful constituents, (3) targeting potential sources of pollutants, and (4) implementing a Comprehensive Stormwater Management Program. The NPDES program was implemented in two phases: Phase I applied to cities with populations of 100,000 or greater and construction activities that disturb 5 or more acres of land surface where as Phase II applies to smaller cities and urban areas and construction activities that disturb 1 or more acre of land surface. State implementation of the NPDES program as it relates to the proposed project is discussed below under state and regional regulations.

Floodplain Development

The Federal Emergency Management Agency (FEMA) is responsible for determining flood elevations and floodplain boundaries based on studies performed by the U.S. Army Corps of Engineers (USACE). FEMA is also responsible for distributing the Flood Insurance Rate Maps (FIRMS), which are used in the National Flood Insurance Program (NFIP). These maps identify the locations of Special Flood hazard Areas (SFHA), including the 100-year floodplain. FEMA floodplain standards are implemented at the local level through construction codes and local ordinances that apply to residential and nonresidential structure improvements.

The project site is not located in a FEMA defined SFHA[14]; the project site is located in FEMA defined "Other Flood Areas," Zone X.[15]

State and Regional

Responsibility for the protection of water quality in California rests with the SWRCB and nine RWQCBs. The SWRCB establishes statewide policies and regulations for the implementation of water quality control programs mandated by federal and state water quality statutes and regulations. The RWQCBs develop and implement Water Quality Control Plans (Basin Plans) that consider regional beneficial uses, water quality characteristics, and water quality problems. The Santa Ana Regional Water Quality Control

[14] Federal Emergency Management Agency, National Flood Insurance Program. FIRM Flood Insurance Rate Map, San Bernardino County California and Incorporated Areas: Panel 7930 and 7940 of 9400, Map Numbers 06071C7930 F and 06071C7940 F. Effective date March 18, 1996.

[15] Zone X refers to areas of 500-year flooding; areas of 100-year flooding with average depths less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from the 100-year flood event.

Board implements a number of federal and state laws, the most important of which are the state Porter-Cologne Water Quality Control Act and the federal CWA.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act authorizes the SWRCB to adopt, review, and revise policies for all waters of the state (including both surface and groundwaters) and directs the RWQCB to develop regional Basin Plans. Section 13170 of the California Water Code also authorizes the SWRCB to adopt Basin Plans on its own initiative.

The Basin Plan specifically (1) designates beneficial uses for surface and ground waters; (2) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy; and (3) describes implementation programs to protect all waters in the region. In cases where the Basin Plan does not contain a standard for a particular pollutant, other criteria are used to establish a standard. Other criteria may be applied from SWRCB documents (e.g., the Inland Surface Waters Plan and the Pollutant Policy Document) or from water quality criteria developed under Section 304(a) of the CWA. In instances where water quality is better than that prescribed by the objectives, the state Antidegradation Policy applies (State Board Resolution 68-16: Statement of Policy with Respect to Maintaining High Quality of Waters in California). This policy is aimed at protecting relatively uncontaminated aquatic systems where they exist and preventing further degradation and is consistent with the federal Antidegradation Policy. The water quality objectives are achieved primarily through the establishment and enforcement of waste discharge requirements. Because the project site is located within the SARWQCB's jurisdiction, all discharges to surface water or groundwater are subject to the Basin Plan requirements.

Water Quality Control Plan Santa Ana River Basin (Basin Plan). The Basin Plan (1995, and as updated February 2008) was prepared by the SARWQCB in compliance with the federal CWA and the state Porter-Cologne Water Quality Control Act. The Basin Plan establishes water quality objectives, and implementation programs to meet stated objectives and to protect the beneficial uses of water in the Santa Ana River Basin.

The designated beneficial uses of Reach 4 of the Santa Ana River include: groundwater recharge; water contact and noncontact water recreation; warm freshwater aquatic life support; wildlife habitat; and, spawning, reproduction, and development. This reach of the Santa Ana River Basin is excepted from the municipal and domestic supply beneficial use. Cajon Creek designated beneficial uses are: municipal and domestic supply; groundwater recharge; water contact and noncontact water recreation; cold freshwater aquatic life support; wildlife habitat; and rare, threatened, or endangered species. Lytle Creek designated beneficial uses are: municipal and domestic water supply; agricultural supply; industrial service supply; industrial process supply; groundwater recharge; hydropower generation; water contact and noncontact water recreation; cold freshwater aquatic life support; wildlife habitat; and, rare, threatened, or endangered species. The Bunker Hill-A Groundwater Management Zone designated beneficial uses are: municipal and domestic water supply; agricultural supply; industrial service supply; and, industrial process supply. Water quality objectives, both narrative and numeric, are listed in the Basin Plan, depending upon the designated beneficial uses and surface water body. Based on the water quality objectives and ambient

conditions, the Basin Plan designates no assimilative capacity[16] for the Bunker Hill-A Groundwater Management Zone for total dissolved solids and nitrate nitrogen.

Waste Discharge Requirements. The Porter-Cologne Water Quality Control Act provides that "All discharges of waste into the waters of the state are privileges, not rights." Furthermore, all dischargers are subject to regulation under the Porter-Cologne Water Quality Control Act, including both point and nonpoint source dischargers. All projects resulting in discharges, whether to land or water, are subject to Section 13263 of the California Water Code and are required to obtain approval of Waste Discharge Requirements (WDRs) by the RWQCBs. Land and groundwater-related WDRs (i.e., non-NPDES WDRs) regulate discharges of privately or publicly treated domestic wastewater and process and wash-down wastewater. WDRs for discharges to surface waters also serve as NPDES permits, which are further described below.

TMDLs. States are required to assess waters for impairment every two years and develop Total Maximum Daily Loads (TMDLs) for waterbodies listed as impaired on the 303(d) list as approved by the USEPA. The current approved 303(d) list is the 2006 list, approved by the USEPA in June, 2007. The 303(d) list includes the pollutant(s) contributing to impairment, sources of impairment, and a completion date for development of TMDLs. In California, the SWRCB has interpreted state law (Porter-Cologne Water Quality Control Act, California Water Code Sections 13000 et seq.) to require that implementation be addressed when TMDLs are incorporated into Basin Plans (water quality control plans). There are currently no TMDLs the proposed project would be required to comply with. However, TMDLs for pathogens for Lytle Creek and the Santa Ana River Reach 4 are scheduled for completion in 2019 and pathogen TMDL and nitrate TMDL for the downstream Santa Ana River Reach 3 is being implemented.

Statewide NPDES General Construction Activity Stormwater Permit (Construction General Permit)

Pursuant to the CWA Section 402(p) and as related to the goals of the PCWQCA, the SWRCB has issued a statewide NPDES General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit) (Order No. 2009-0009-DWQ, NPDES No. CAR000002), adopted September 2, 2009. Every construction project that disturbs 1 acre or more of land surface or that are part of a common plan of development or sale that disturbs more than 1 acre of land surface would require coverage under the Construction General Permit. Construction activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as stockpiling or excavation, that result in soil disturbances of at least 1 acre of total land area. To obtain coverage under the Construction General Permit, the landowner or other applicable entity must file Permit Registration Documents (PRDs) prior to the commencement of construction activity, which include a Notice of Intent (NOI), Stormwater Pollution Prevention Plan (SWPPP), and other documents required by the Construction General Permit and SWRCB. Because the Proposed Project would disturb more than 1 acre, construction of the proposed project would be subject to the Construction General Permit requirements.

[16] Assimilative capacity refers to the amount of additional pollutant that could be discharged to the water body without exceeding water quality objectives.

The SWPPP has two major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of stormwater discharges; and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater as well as nonstormwater discharges. The SWPPP must include specific minimum best management practices (BMPs) for stormwater quality depending upon the project's sediment risk to receiving waters. BMPs are intended to reduce impacts to the Maximum Extent Practicable (MEP), a standard created by Congress to allow regulators the flexibility necessary to tailor programs to the site-specific nature of municipal stormwater discharges. Reducing impacts to the MEP generally relies on BMPs that emphasize pollution prevention and source control, with additional structural controls as needed. However, depending upon the project's sediment risk, stormwater runoff Numeric Action Level or Numeric Effluent Levels are required for pH and turbidity. Minimum SWPPP requirements include:

- **Technology-Based Numeric Action Levels (NALs)** for pH and turbidity (Risk Level 2)
- **Technology-Based Numeric Effluent Limitations (NELs)** for pH and turbidity during any construction phase where there is a high risk of pH discharge and turbidity for all discharges in Risk Level 3; the daily average NEL for turbidity is set at 500 NTU to represent the minimum technology that sites need to employ (to meet the traditional Best Available Technology Economically Achievable (BAT)/Best Conventional Pollutant Control Technology (BCT) standard and the traditional, numeric receiving water limitations for turbidity
- **Risk-Based Permitting Approach** establishes three levels of risk possible for a construction site; risk is calculated in two parts: (1) Project Sediment Risk and (2) Receiving Water Risk. There are three levels of risk; Risk Level 1 projects are subject to minimum BMP and visual monitoring requirements; Risk Level 2 projects are subject to NALs and some additional monitoring requirements; and Risk Level 3 projects are subject to NELs and more rigorous monitoring requirements, such as receiving water monitoring and in some cases bioassessment; discharge to a sediment-sensitive waterbody is automatically a Risk Level 2 or greater
- **Minimum Requirements Specified** for BMPs
- **Project Site Soil Characteristics Monitoring and Reporting**
- **Effluent Monitoring and Reporting** for Risk Levels 2 and 3 projects
- **Receiving Water Monitoring and Reporting** for some Risk Level 3 dischargers to monitor receiving waters and conduct bioassessments
- **Post-Construction Stormwater Performance Standards** specifications for runoff reduction requirements for all sites not covered by a Municipal General NPDES permit, to avoid, minimize, and/or mitigate post-construction stormwater runoff impacts
- **Rain Event Action Plan** development and implementation of a Rain Event Action Plan (REAP) that must be designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event for certain projects
- **Annual Reporting** required for all projects that are enrolled for more than one continuous three-month period to submit information and annually certify that their site is in compliance with these requirements
- **Certification/Training Requirements for Key Project Personnel** required for key personnel (e.g., SWPPP preparers, inspectors, etc.) to ensure their level of knowledge and skills are adequate

to ensure their ability to design and evaluate project specifications that will comply with the Construction General NPDES Permit requirements

- **Linear Underground/Overhead Projects** requirements for all Linear Underground/Overhead Projects (LUPs)

Risk levels are based on a matrix of project sediment risk and receiving water risk. Sediment risk is based on estimated soil loss, as calculated by the Revised Universal Soil Loss Equation (RUSLE) where: soil loss of less than 15 tons/acre is considered low risk; soil loss between 15 and 75 is medium risk; and, soil loss over 75 acres is considered high risk. Receiving water risk is based on whether a project drains to a sediment-sensitive waterbody. A sediment-sensitive waterbody is either on the most recent 303(d) list for waterbodies impaired for sediment; has an USEPA-approved TMDL implementation plan for sediment; or has the beneficial uses of cold freshwater habitat, fish spawning, and fish migration.

The proposed project site would not discharge to a sediment-sensitive waterbody; Cajon Creek, Lytle Creek, and the Santa Ana River Reach 4 and downstream are not listed as impaired by sediment or have all the beneficial uses of cold freshwater habitat, fish spawning, and fish migration. Therefore, it would not automatically be categorized as a Risk Level 3 project. Depending upon the erosivity of proposed project site soils, the proposed project would be categorized as a Risk Level 1 or 2.

Municipal Stormwater NPDES Permit (Municipal NPDES Permit)

Waste Discharge Requirements for the San Bernardino County Flood Control and Transportation District, the County of San Bernardino and the Incorporated Cities of San Bernardino County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618036 (Regional Board Order No. R8-2010-0036).

Basic requirements of the Municipal NPDES Permit for new development and significant redevelopment include the following:

- Each Permittee (e.g., the City of San Bernardino) shall continue to ensure (prior to issuance of any local permits or other approvals) that project sites that disturb one acre or greater, and sites less than one acre if part of a common plan of development have obtained coverage under the Construction General Permit and been issued a valid Waste Discharge Identi'fication (WOlD) number.
- Each Permittee shall ensure that the erosion and sediment control plans it approves include appropriate erosion and sediment control BMPs (e.g., erosion control measures for sloped or hill-side developments, ingress/egress controls, perimeter controls, run-on diversion, etc.) such that an effective combination of BMPs consistent with site risk is implemented through all phases of construction.
- Each Permittee shall ensure, consistent with the maximum extent practicable standard, that runoff from development projects it approves, does not cause nuisance to adjoining or downstream properties and stream channels.
- Each Permittee shall ensure, to the MEP, that urban runoff conveyance systems created resulting from development projects it approves are appropriately maintained consistent with Section XIII of this Order or are adequately maintained by a legally responsible party.

- Each Permittee shall ensure that appropriate control measures to reduce erosion and maintain stream geomorphology (e.g., hydrograph modification effects) are included in the design for replacement of existing culverts or construction of new culverts and/or bridge crossings.
- Each Permittee shall minimize the short and long-tem adverse impacts on receiving water quality from public and private new development and significant re-development projects, as required in Section XI.D (Water Quality Management Plan), by continuing to review, approve, and verify implementation of project-specific WQMPs, emphasizing implementation of Low Impact Development (LID) principles, where feasible, and addressing hydrologic conditions of concern, and long-term operation and maintenance mechanisms prior to project closure or issuance of certificates of occupancy.
- Municipal Inspection Programs for industrial and commercial facilities and construction sites,
- Within 18 months of adoption of this Order, each Co-Permittee shall develop and implement an Local Implementation Plan (LIP) for its jurisdiction, incorporating requirements of this Municipal NPDES Permit.

Within 18 months of adoption of this Municipal NPDES Permit (by July 2011), the San Bernardino County Flood Control District must develop a model LIP and coordinate the revision of the WQMP Guidance and Template to include new elements required under this permit. It is expected that compliance with receiving water limitations will be achieved through an iterative process and the application of increasingly more effective BMPs. The co-permittees shall reduce pollutants in urban stormwater runoff in accordance with the MSWMP and its components and other requirements of the Municipal NPDES Permit, including any modifications, through timely implementation of control measures and other actions. Minimum structural BMPs must either be sized to comply with either volume or flow-based numeric sizing criteria or be deemed by the County of San Bernardino to provide equivalent or superior treatment.

San Bernardino County Stormwater Program Model Water Quality Management Plan (SBC WQMP). The County of San Bernardino completed the San Bernardino County Stormwater Program Model Water Quality Management Plan (June 9 2005), in compliance with the Municipal NPDES Permit, with components that are designed to achieve compliance with receiving water limitations. It is expected that compliance with receiving water limitations will be achieved through an iterative process and the application of increasingly more effective BMPs.

Each Agency, which is defined as a Municipal NPDES Permit co-permittee, such as the City of San Bernardino, is individually responsible for compliance with the Permit. Each Agency with land use planning and development authority is responsible for implementing a program in their jurisdiction that requires the development and implementation of a WQMP for all covered projects, reviewing and approving WQMPs submitted by project sponsors, and verifying that WQMPs are implemented in conjunction with covered projects.[17] Local agencies are also required to periodically update the WQMP guidance to reflect changes in the 303(d) impaired waterbody list.

[17]The San Bernardino County Flood Control District is the only Permittee without land use planning and development authority.

Implementation of the SBC WQMP will occur through the review and approval by the City of San Bernardino of a project-specific WQMP (project WQMP) prepared by the developer. The primary objective of the SBC WQMP is to ensure that the land use approval and permitting process of City of San Bernardino will minimize the impact of urban runoff.

Under the SBC WQMP, prior to the issuance of a building or grading permit, the City of San Bernardino must use the following conditions of approval for projects:

- The project developer shall submit to the Co-Permittee, for review and approval, a project WQMP that includes water quality BMPs, long-term maintenance requirements, and funding mechanisms for the long-term operations and maintenance of BMPs. The proposed project would be required to submit a project WQMP because it is a light industrial development of more than 100,000 square feet. The proposed project has already developed a WQMP in compliance with the Municipal NPDES Permit.
- The property owner shall record a "Covenant and Agreement" with the County-Clerk Recorder or other instrument acceptable to the Co-permittee on a form provided by the Co-permittee to inform future property owners of the requirement to implement the approved project WQMP.
- If the project will cause land disturbance of one acre or more, it must comply with the statewide General Permit for Storm Water Discharges Associated with Construction Activity (or the Santa Ana River Watershed General Permit for Storm Water Discharges Associated with Construction Activity).

Local

City of San Bernardino General Plan

The City of San Bernardino General Plan, adopted November 2005, serves as the principal land use planning document-guiding development within San Bernardino. The General Plan contains several goals and policies that are relevant to hydrology/water quality.

Goal 9.4 Provide appropriate storm drain and flood control facilities where necessary.

Policy 9.4.1 Ensure that adequate storm drain and flood control facilities are provided in a timely manner to protect life and property from flood hazards.

Policy 9.4.4 Require that adequate storm drain and flood control facilities be in place prior to the issuance of certificates of occupancy.

Policy 9.4.5 Implement flood control improvements that maintain the integrity of significant riparian and other environmental habitats.

Policy 9.4.6 Minimize the disturbance of natural water bodies and natural drainage systems.

Policy 9.4.8 Minimize the amount of impervious surfaces in conjunction with new development.

Policy 9.4.10 Ensure compliance with the Federal Clean Water Act requirements for National Pollutant Discharge Elimination System (NPDES) permits, including requiring the development of Water Quality Management Plans, Erosion and Sediment Control Plans, and Storm Water Pollution Prevention Plans for all qualifying public and private development and significant redevelopment in the City.

Policy 9.4.11 Implement an urban runoff reduction program consistent with regional and federal requirements, which includes requiring and encouraging the following examples of Best Management Practices (BMPs) in all developments:

- Increase permeable areas, utilize pervious materials, install filtration controls (including grass lined swales and gravel beds), and divert flow to these permeable areas to allow more percolation of runoff into the ground;
- Replanting and hydroseeding of native vegetation to reduce slope erosion, filter runoff, and provide habitat;
- Use of porous pavement systems with an underlying stone reservoir in parking areas;
- Use natural drainage, detention ponds, or infiltration pits to collect and filter runoff;
- Prevent rainfall from entering material and waste storage areas and pollution laden surfaces; and
- Require new development and significant redevelopment to utilize site preparation, grading, and other BMPs that provide erosion and sediment control to prevent construction-related contaminants from leaving the site and polluting waterways.

Goal 10.4 Minimize the threat of surface and subsurface water contamination and promote restoration of healthful groundwater resources.

Policy 10.4.2 Protect surface water and groundwater from contamination.

Goal 10.5 Reduce urban run-off from new and existing development.

Policy 10.5.1 Ensure compliance with the Federal Clean Water Act requirements for National Pollutant Discharge Elimination System (NPDES) permits, including developing and requiring the development of Water Quality Management Plans for all new development and significant redevelopment in the City.

Policy 10.5.2 Continue to implement an urban runoff reduction program consistent with regional and federal requirements, which includes requiring and encouraging the following:

- Increase permeable areas to allow more percolation of runoff into the ground;
- Use natural drainage, detention ponds or infiltration pits to collect runoff;
- Divert and catch runoff using swales, berms, green strip filters, gravel beds and French drains;
- Install rain gutters and orient them towards permeable surfaces;
- Construct property grades to divert flow to permeable areas;
- Use subsurface areas for storm runoff either for reuse or to enable release of runoff at predetermined times or rates to minimize peak discharge into storm drains;
- Use porous materials, wherever possible, for construction of driveways, walkways and parking lots; and
- Divert runoff away from material and waste storage areas and pollution-laden surfaces such as parking lots.

Policy 10.5.4 Require new development and significant redevelopment to utilize site preparation, grading and foundation designs that provide erosion control to prevent sedimentation and contamination of waterways.

Policy 10.5.5 Ensure compliance with the requirements for Storm Water Pollution Prevention Plans or Water Quality Management Plans for all new development or construction activities.

Policy 10.5.6 Coordinate with appropriate federal, state, and local resource agencies on development projects and construction activities affecting waterways and drainages.

Goal 10.6 Protect the lives and properties of residents and visitors of the City from flood hazards.

Policy 10.6.1 Maintain flood control systems and restrict development to minimize hazards due to flooding.

Policy 10.6.4 Evaluate all development proposals located in areas that are subject to flooding to minimize the exposure of life and property to potential flood risks.

Policy 10.6.5 Prohibit land use development and/or the construction of any structure intended for human occupancy within the 100-year flood plain as mapped by the Federal Emergency Management Agency (FEMA) unless adequate mitigation is provided against flood hazards.

Policy 10.6.6 Encourage new development to utilize and enhance existing natural streams, as feasible.

Policy 10.6.7 Utilize flood control methods that are consistent with Regional Water Quality Control Board Policies and Best Management Practices (BMPs).

Goal 13.2 Manage and protect the quality of the City's surface waters and ground water basins.

Policy 13.2.2 Require that development not degrade surface or groundwater, especially in watersheds, or areas with high groundwater tables or highly permeable soils.

Policy 13.2.4 Require the use of reclaimed water for landscape irrigation and other non-contact uses for industrial projects, golf courses, and freeways.

Policy 13.2.7 Require that new development incorporate improvements to channel storm runoff to public storm drainage systems and prevent discharge of pollutants into the groundwater basins and waterways.

Policy 13.2.8 Require that Best Management Practices (BMPs) are implemented for each project to control the discharge of point source and non-point source pollutants both during construction and for the life of the projects to protect the City's water quality.

Policy 13.2.9 Require that new construction on a site that is at least one acre comply with the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit 99-08-DWQ).

Policy 13.2.10 Require that development in the City's watersheds incorporate adequate landscape and groundcover to prevent slope erosion and significant sedimentation of canyon drainages.

Consistency Analysis

Goals 9.4 and 10.6 address the need to protect property, people, and the environment from flooding and impacts associated with alterations in site drainage. The proposed project would substantially alter project site drainage by leveling hills on the project site and create about 40 acres of new impervious surfaces. However, this increase in impervious surfaces would no substantially contribute to on- or off-site flooding potential. Additionally, the proposed project has already prepared a project WQMP for compliance with the CWA and NPDES permit and would have to developed and implement a SWPPP before construction in accordance with municipal code Section 8.80.502. No natural water bodies or drainage systems would be disturbed and, in accordance with the project WQMP, the amount of impervious surface would be minimized. Furthermore, the project site is not located within a 100-year

flood hazard area. Therefore, the development of the proposed project would be consistent with Goal 9.4 and Goal 10.6 and associated policies.

Goals 10.5 and 13.2 address the need to reduce urban runoff from new and existing development and to protect surface and groundwater from water quality degradation. The proposed project has already developed a project WQMP for compliance with the Municipal NPDES Permit. Implementation of mitigation measure MM4.7-1 would ensure implementation of sufficient stormwater quality BMPs to prevent increased pollutant loads from the project site and potential water quality degradation. Municipal code Section 8.80.502 requires preparation and implementation of a SWPPP prior to the beginning of construction. Therefore, the proposed project would not conflict with Goals 10.5 and 13.2 and associated policies.

Goals 10.4 and 13.2 address the need to manage and protect groundwater resources. The project site is more than 50 feet above the groundwater table, therefore, it is unlikely that infiltrating groundwater would contaminate groundwater resources. Mitigation measure MM4.7-1 contains additional water quality protection requirements, including limitations on infiltration BMPs that would further protect any direct impacts on surface water or groundwater resources. Therefore, the proposed project would not conflict with Goals 10.4 and 13.2 and associated policies.

City of San Bernardino Municipal Code and Development Standards

The City of San Bernardino Municipal Code address the requirements for development that relate, serve to, avoid, and/or minimize potential hydrology/water quality impacts. These are contained in Chapter 8.80 (Storm Water Drainage System), Chapter 15.04 (Building Codes), Chapter 15.28 (Dangerous Buildings), Chapter 19.20 (General Standards), and Chapter 19.28 (Landscaping Standards).

4.7.3 Project Impacts and Mitigation Measures

Analytic Method

As described in Section 3.3 (Project Description: Project Characteristics), light industrial uses would occur within the project site. Detailed conceptual plans are available for the proposed project, which includes a preliminary Hydrology Study and project WQMP. Accordingly, the impact analysis for the project employs a project-specific analysis

Storm Flow

The proposed project development would substantially increase the amount of impervious area on the project site and level the existing grade. Construction of the proposed project would involve the grading of all on-site hills, including earth moving of slopes of 15 percent or greater, which would greatly alter the project site drainage characteristics. Additionally, development of the proposed project would necessitate the construction of on-site and off-site storm drain systems. The north and northeastern portion would continue to discharge to the southeastern drainage channel and outlet through a storm drain pipe to the Cajon Wash via the Devil Creek Diversion. The south and southwestern portion would

continue to discharge to Industrial Parkway at several locations. Run-on from the area receiving runoff from the I-215 interchange ramp area, northwest of the project site, would be conveyed southwestwardly through the project site through an underground storm drain that discharges to the Industrial Parkway storm drain system. Run-on from the developed property on the northwest and adjacent vacant lot would be routed to Industrial Parkway and would no longer flow across the project site. All project site runoff would be routed to grass lined swales for water quality treatment prior to off-site discharge.

The Hydrology Study, prepared by Stantec Consulting, Inc. (November 2, 2007), modeled the effect of development on the project site for the 10-year, 50-year, and 100-year storm events[18] flow rates. The Hydrology Study was based upon the San Bernardino County Hydrology Manual (1986) methods using the Rational Hydrology Method (County of San Bernardino 2004) for determining peak flow rates, and the Unit Hydrograph Method for determining the 100-year storm flow volume for sizing volume-based best management practices (BMPs). The San Bernardino County Hydrology Manual methods have been incorporated into a CivilCADD/CivilDesign Engineering Software package that was used to model the runoff characteristics. Runoff is modeled based on catchment area characteristics, such as soil hydrologic group, area, slope, vegetation, and development characteristics, the model computes runoff, expected pervious fraction,[19] time of concentration,[20] and area averaged SCS curve number.[21] Rainfall data were interpolated from rainfall intensity isohyetals[22] in the San Bernardino County Hydrology Manual.

Table 4.7-2 (Estimated Peak Runoff Rates) lists the modeled estimated peak runoff rates for existing and proposed project conditions at the final off-site discharge location, for the 10-year and 100-year storm events.

Table 4.7-2 Estimated Peak Runoff Rates

Drainage Area	10-Year Storm Event			100-Year Storm Event		
	Existing (cfs)	Proposed Project (cfs)	Difference (cfs)	Existing (cfs)	Proposed Project (cfs)	Difference (cfs)
North and Northeastern Portion[a]	20.1	27.7	7.6	37.5	43.0	5.5
South and Southwestern Portion[b]	37.3	60.9	23.6	76.9	96.5	19.6
Off-site Run-on Bypassing Project Site 1		20.6			31.8	
Total	***57.4***	***88.6***	***31.2***	***114.4***	***139.5***	***25.1***

SOURCES: [a] Hydrology Study 2007
[b] Included in the total for the south and southwestern portion of the project site. Called out for informative purposes only.

[18] Storm events are defined by their frequency of occurrence. A 10-year storm event has a 10 percent chance of occurring and a 100-year storm event has a 1 percent chance of occurring.
[19] The impervious fraction is the amount of the total area that is covered by materials/surfaces impervious to water infiltration; whereas, the pervious fraction is the amount of the total area where water can infiltrate to some degree.
[20] Time of concentration is the time it takes a drop of water to travel from the upper most part of the catchment to its outlet.
[21] The SCS curve number is a number related to runoff characteristics developed by the Natural Resources Conservation Service, formerly, the Soil Conservation Service. It is commonly used in a number of models and calculations to estimate runoff from various land uses.
[22] Lines of equal rainfall rate.

Grass-Lined Swale Design

The Hydrology Study also determined the required size and length of the project WQMP water quality swales, in accordance with the flow rate design criteria specified in the Municipal NPDES Permit. Grass-lined swales used in the project WQMP were designed according to the WQMP Template Attachment D for flow-based BMP designs (San Bernardino County Stormwater Program Model Water Quality Management Plan Guidance, 2005), trapezoidal channel flow calculations (Haestead Methods, Inc. FlowMaster v. 7.0), and channel geometry configurations to achieve a 7 minute residence time.[23]

Stream Flow Estimates

To determine the effect of proposed project discharges on downstream flooding potential, the peak flows during the 10-year and 100-year storm event bypassing the project discharge locations, at the time project site discharges are released into the streams, are necessary. This information is not available and has not been modeled. However, relative effects can be estimated using the 90th and 99th percentile[24] maximum yearly stream flows for approximating the 10-year and 100-year storm events, respectively, and assuming that the project site peak flow would add to this peak stream flow. This is only a rough estimate of in-stream flows for both storm events and the potential effect of the proposed project on flood flows, but it can be used for approximating the relative 'worst-case' conditions.

Stream flows were estimated using USGS stream flow gauges that include all contributing areas to the location of the gauge station. There was no separation of the Caltrans proportion of flow within the gauged streams because the proposed project would not alter these flows. As noted, above, "run-on from the area receiving runoff from the I-215 interchange ramp area, northwest of the project site, would be conveyed southwesterly through the project site through an underground storm drain that discharges to the Industrial Parkway storm drain system." Currently, run-on from the Caltrans right of way (ramp area) passes through the project site and drains to Industrial Parkway. Therefore, the proposed project would only pass this Caltrans drainage through the project site. Additionally, the proposed project would construct a drainage swale along the southeast side of the property (adjacent to I-215) to convey project site runoff to the wash south of the project site. Caltrans runoff from this area would continue unmodified within its current drainage system. In both cases, the proposed project separates project site flows from Caltrans flows and allows Caltrans flows to continue towards its existing drainage system. The proposed project would not drain to the Caltrans right of way or Caltrans drainage features. Therefore, estimating Caltrans runoff for the stream flow estimates is not a factor in analyzing the proposed project's potential effects.

USGS gages with long term records located on Warm Creek near San Bernardino (station 11090400), Cajon Creek below Lone Pine Creek near Keenbrook (station 11063510), Lytle Creek near Fontana (station 1106200), and the Santa Ana River at E. Street near San Bernardino (station 11059300) provided

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[23] Residence time refers to the amount of time it takes water to travel through the channel from the inlet to the outlet.
[24] The 90th percentile flow represents the peak yearly flow where 9 years in 10 peak flows are less than this value. This value was used to represent potential flow during the 10-year storm event: the storm event with only a 10 percent chance of occurring in any given year. The 99th percentile flow represents the peak yearly flow where 99 years in 100, peak flows are less than this value. This value was used to represent potential flow during the 100-year storm event.

yearly peak stream flow data used in the analysis (USGS 2007a, 2007b, 2007c, 2007d). No other stations were located on project site receiving waters with long term records. Table 4.7-3 (Estimated Existing In-Stream Storm Flows) lists the 90th and 99th percentile yearly maximum flows in these streams.

Table 4.7-3 Estimated Existing In-Stream Storm Flows

Stream	*90th Percentile Flow (cfs)*	*99th Percentile Flow (cfs)*
Cajon Creek	5,078	6,535
Lytle Creek	4,850	14,940
Warm Creek	1,894	7,045
Santa Ana River near San Bernardino	13,380	31,696

SOURCE: USGS 2007 and PBS&J 2007

Water Quality

Potential effects of the project on water quality was evaluated qualitatively based on the project WQMP for the proposed project and the Simple Method,[25] which was developed by the Center for Watershed Protection (2004), to estimate annual pollutant loads for chemical constituents as a product of annual runoff volume and typical values for pollutant concentrations in stormwater, depending on land use. The Simple Method (Center for Watershed Protection 2004) estimates the mean annual pollutant load based on the mean annual rainfall, the runoff coefficient[26], the pollutant concentration in runoff, and the land area. This calculation of pollutant load provides an estimate of the total amount (e.g., pounds) of pollutant that would enter the receiving water during an average year.

Mean annual pollutant load is a function of both the concentration of pollutants in stormwater runoff and the total amount of runoff from an area. Thus, even if land use changes such that the concentration of a pollutant in stormwater is lower than existing conditions, the load might be higher if the amount of runoff is higher. The converse is also true; if the concentration of pollutants is higher, but the runoff is lower, the total load may be lower.

[25] The Simple Method estimates stormwater runoff pollutant loads for urban areas. The technique requires a modest amount of information, including the sub watershed drainage area and impervious cover, stormwater runoff pollutant concentrations, and annual precipitation. With the Simple Method, the investigator can either break up land use into specific areas such as residential, commercial, industrial, and roadways and calculate annual pollutant loads for each type of land, or use more generalized pollutant values for land uses such as new suburban areas, older urban areas, central business districts, and highways. For the Redlands Commons development, we used specific areas with stormwater pollutant concentrations from the Los Angeles County data as described in subsequent paragraphs.

[26] The runoff coefficient is the fraction of precipitation falling on the site that would runoff; the rest would infiltrate or be stored in small depressions on site. As such, the runoff coefficient is a function of soil type, landscape conditions, land cover, slope/steepness, and existing moisture content. High infiltration rate soils (e.g., Hydrologic Groups A and B) will have a lower runoff and therefore, lower runoff coefficients. Presence of vegetation and surface roughness can increase infiltration and storage of precipitation compared to smooth, bare surfaces. The amount of impervious surface is directly related to the amount of runoff: more impervious surface increases the runoff potential, and hence, the runoff coefficient. Steeper slopes are also more prone to runoff and therefore, runoff coefficients would be higher. Additionally, higher moisture content soils will not infiltrate as readily as dry soils and runoff coefficients would therefore be higher.

Stormwater pollutant concentrations are estimated using Los Angeles County [1994 to 2000 storm season averages] (Los Angeles County Department of Public Works 2001) for most pollutants, and the National Stormwater Quality Database[27] (NSQD) v. 1.1 (Pitt 2005), where data were not available in the Los Angeles County dataset. Los Angeles County data were used because they have measured pollutant concentrations in stormwater for both vacant and industrial land uses and are regionally similar to the project site. No stormwater pollutant concentration data for vacant lands were available for either the City of San Bernardino or San Bernardino County. Using the Los Angeles County data provides for a reasonable estimate of the relative change in pollutant loads from the project site with implementation of the proposed project. Values used for pollutant concentrations are listed in Table 4.7-1 (Typical Pollutant Concentrations in Stormwater).

The Simple Method uses the project site runoff coefficient in its calculations. In order to be reasonably consistent with the Hydrology Study, the Hydrology Study 10-year storm event runoff coefficients were also used in estimating the potential pollutant load. Table 4.7-4 (Mean Annual Runoff Characteristics) lists the area-averaged runoff coefficients used for determining pollutant loads and the resulting mean annual runoff.

Table 4.7-4 Mean Annual Runoff Characteristics

Area	*Runoff Coefficient*	*Area (acres)*	*Mean Annual Runoff (inches)*
Existing			
North and Northeastern Portion	0.69	17.3	10.2
South and Southwestern Portion[a]	0.62	28	9.2
Overall	***0.65***	***45.3***	***9.6***
Proposed Project			
North and Northeastern Portion	0.86	18.3	12.7
South and Southwestern Portion[a]	0.82	27	12.1
Overall	***0.84***	***45.3***	***12.4***

SOURCE: PBS&J 2007 based on the Hydrology Study 2007 data

a. Estimated run-on contributions removed from analysis

For proposed project conditions, the potential pollutant and sediment loads evaluated using the Simple Method[28] included the proposed project grassy swales pollutant treatment capabilities. As such, the Simple Method estimated annual pollutant loads were reduced based on the literature values for pollutant removals efficiencies listed in Table 4.7-5 (Grassed Swale/Channel Pollutant Removal Efficiency).

[27] The NSQD is a national database with stormwater data from the National Urban Runoff Program at locations around the United States.

[28] The Simple Method estimates stormwater runoff pollutant loads for urban areas. The technique requires a modest amount of information, including the subwatershed drainage area and impervious cover, stormwater runoff pollutant concentrations, and annual precipitation. With the Simple Method, the investigator can either break up land use into specific areas, such as residential, commercial, industrial, and roadways and calculate annual pollutant loads for each type of land, or utilize more generalized pollutant values for land uses such as new suburban areas, older urban areas, central business districts, and highways.

It should be noted that these stormwater pollutant calculations are used to estimate only the relative effect of a change in land use and should be used for planning purposes only.

Table 4.7-5 Grassed Swale/Channel Pollutant Removal Efficiency

Pollutant	*Units*	*Removal Efficiency (%)*
Suspended Solids	mg/L	70
Total Phosphorous	mg/L	26
Dissolved phosphorous	mg/L	NA[a]
Total Nitrogen	mg/L	14[b]
Inorganic-Nitrogen	mg/L	-6.2
Total Copper	μg/L	40[c]
Total Lead	μg/L	40[c]
Total Zinc	μg/L	40[c]
Oil and Grease	mg/L	NA[a]
Fecal Coliforms	MPN/100mL	-50

SOURCE: CASQA 2003, average of grassed channel removal efficiencies

a. No data available; assume 0 for calculations for 'worst case' conditions

b. No values for grassed swales; averaged value from U.S. DOT FHWA 2002 reported

c. Average for heavy metals, range from 2 to 73 percent removal efficiency

Thresholds of Significance

The following thresholds of significance are based on Appendix G of the 2011 CEQA Guidelines and City-specific thresholds, where applicable. For purposes of this EIR, implementation of the proposed project may have a significant adverse impact on hydrology/water quality if it would:

- Violate any water quality standards or waste discharge requirements
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)
- Substantially alter the existing drainage pattern of 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 site or off site during construction
- Have the potential for significant changes in the flow velocity or volume of stormwater runoff to cause environmental harm
- 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 site 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 post-construction polluted runoff, such as from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks, or other outdoor areas
- Otherwise substantially degrade water quality or beneficial uses

Effects related to the following thresholds were found to have "no impact," and are discussed in Section 4.14 (Effects Not Found to Be Significant). Would the project:

- 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 that 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
- Expose people or structures to inundation by seiche, tsunami, or mudflow

Less-Than-Significant Impacts

Threshold	Would the project violate any water quality standards or waste discharge requirements?

The proposed project sanitary waste would be treated at the San Bernardino Water Reclamation Plant (WRP) or the Rapid Infiltration Extraction (RIX) Tertiary Treatment Facility. Both of these facilities operate under individual WDRs based on their design capacity and receiving water characteristics. Because these facilities have sufficient capacity for the proposed project, the proposed project would not contribute to violation of the WTF NPDES permit (WDR) (refer to Section 4.12 [Utilities/Service Systems] for details). Furthermore, groundwater at the project site is located more than 50 feet below ground surface, and likely, more than 100 feet below ground surface (LOR Geotechnical 2007); therefore, construction dewatering is not likely and no WDR for construction dewatering would be required.

While the proposed project would not result in any point-source discharge subject to an individual NPDES permit, it would be subject to the Construction General Permit and the Municipal NPDES Permit.

Pollutants in urban runoff, during both construction and operation of land uses, can impact the beneficial uses of receiving waters and cause or threaten to cause a condition of pollution or nuisance. Potential impacts associated with both the construction and operational phase of the proposed project are discussed in the impact analyses below.

Impact 4.7-1 **Construction of the proposed project could increase stormwater pollutant loads or concentrations, but would not result in a violation of water quality standards or a substantial degradation of water quality. Compliance with the identified project requirements PR4.7A through PR4.7D would ensure that this impact would remain *less than significant*.**

The proposed project would include construction activities, such as excavation and trenching for foundations and utilities, soil compaction, cut and fill activities, and grading, all of which would temporarily disturb soils. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport from the site. The exposed and graded native soils, as well as any fill slopes constructed with native soils, would have a moderate to high susceptibility to erosion, especially during heavy rains.

Erosion and sedimentation affects water quality through interference with photosynthesis, oxygen exchange, and the respiration, growth, and reproduction of aquatic species. Additionally, other pollutants, such as nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported downstream, which could contribute to degradation of water quality.

The delivery, handling, and storage of construction materials and wastes, as well as the use of construction equipment, could also introduce a risk for stormwater contamination that could impact water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination, and some hydrocarbon compound pollution associated with oil and grease can be toxic to aquatic organisms at low concentrations. Staging areas or building sites can also be the source of pollution due to the use of paints, solvents, cleaning agents, and metals during construction. Impacts associated with metals in stormwater include toxicity to aquatic organisms, such as bioaccumulation, and the potential contamination of drinking supplies. Pesticide use (including herbicides, fungicides) associated with site preparation work (as opposed to pesticide use for landscaping) is another potential source of stormwater contamination. Pesticide impacts to water quality include toxicity to aquatic species and bioaccumulation in larger species. Larger pollutants, such as trash, debris, and organic matter, are additional pollutants that could be associated with construction activities. Impacts include health hazards and aquatic ecosystem damage associated with bacteria, viruses, and vectors.

All of these activities could lead to pollutants in stormwater runoff that might cause or contribute to exceedance of water quality standards or criteria. However, all construction activities would be subject to existing regulatory requirements including the City of San Bernardino Public Works Grading Policies and Procedures and City of San Bernardino Municipal Code Chapter 8.80 (Storm Water Drainage System), Chapter 15.04 (Building Codes), Chapter 15.28 (Dangerous Buildings), Chapter 19.20 (General Standards), and Chapter 19.28 (Landscaping Standards). The proposed project would also adhere to all state and federal laws related to water quality, such as the requirements of the NPDES Program. The City has codified this requirement into part of the San Bernardino Municipal Code.

The following project requirements shall be implemented, as required by federal, state, or local statute or code:

PR4.7A Compliance with the City of San Bernardino Department of Public Works Grading Policies and Procedures. *Title 15 of the City of San Bernardino Municipal Code governs grading and on-site improvement plans, requirements, and processes; Chapter A33 of the Uniform Building Code is included by reference and amended as noted. Grading policies and procedures include several requirements such as:*

- *On-site inspections (Section 15.04.175) and notification to the City of San Bernardino when the grading operation is ready for each inspection including initial inspection, after natural ground or bedrock is exposed and prepared to receive fill, after excavations have started, after fill placement has started, after drainage devices are places, when all rough grading has been completed, and a final inspection*
- *Slope planting of cut and fill slopes and review by the City Building Division (Section 15.04.200)—the faces at all cut and fill slopes shall be planted with a ground cover approved by the City Building Division. This planting shall be done as soon as practicable and prior to final inspection.*
- *Control of earth, debris, water, or other materials from affecting adjacent streets or property (Section 15.04.210)—the Permittee shall take reasonable preventative measures, as directed by the City Building Division, to avoid earth or other materials from the Premises being deposited on adjacent streets or properties by action of stormwaters or wind, by spillage from conveyance vehicles, or by other causes. Earth and other materials which are deposited on adjacent streets or properties shall be completely removed as soon as practicable, but within 24 hours after receipt of notification from the City Building Division.*
- *Review of all grading projects by the Environmental Review Committee where existing grade is 15 percent or greater, or more than 10,000 cubic yards, or material is to be moved.*
- *Guidelines for grading plan preparation including hydrology and hydraulics calculations, minimal grades allowed, set backs from top and toe of slopes, irrigation/landscaping information, and others.*
- *If any development is scheduled to be done between October 15 and April 15, the Engineer shall submit a detailed erosion control plan including desilting basins or other temporary drainage or control measures, or both, as may be necessary to protect adjoining public and private property from damage by erosion, flooding, or the deposition of mud or debris which may originate from the site or result from such development.*
- *The permittee shall comply with the Grading Code Requirements when an excess of 1000 cubic yards is moved on public roadways from the site of an earth grading operation (Sections 15.04.210, 15.04.545, 15.38)*
- *The Soils Engineer shall be responsible for the professional inspection and approval concerning the preparation of ground to receive fills, testing for required compaction, stability of all finish slopes, and design of buttress fills, where required.*

PR4.7B *Compliance with the City of San Bernardino Department Municipal Code Chapter 8.80—Storm Water Drainage System.*

- *A Storm Water Quality Management Plan (project WQMP) is required of new and redevelopment projects outlining the appropriate non-structural and structural BMPs that will be implemented and installed to prevent pollutants from being discharged into the City's storm drainage system both during and after construction (Section 8.80.103).*

- *Prohibition of discharges to the City's stormwater drainage system including stormwater containing pollutants that have not been reduced to the maximum extent practicable, non-stormwater discharges; stormwater runoff from material or waste storage areas containing chemicals, fuels, grease, oil, or other hazardous materials; surface cleaning wash water; and others (Section 8.80.206).*
- *Compliance with all applicable BMPs as listed in the California Storm Water Best Management Practices Handbooks or the current San Bernardino County Storm Water Program's "Report of Waste Discharge" (Section 8.80.208).*
- *Spill containment requirements (Section 8.80.211)*
- *Installation/implementation of construction and post-construction stormwater quality BMPs as listed in the SWQMP or the California Storm Water Best Management Practices Handbook to reduce pollutants to the maximum extent practicable.*

PR4.7C *As required by the City of San Bernardino Development Code (revised 2011) Chapter 19.20 (General Standards) and Chapter 19.28 (Landscaping Standards), the project developer shall do the following:*

- *In addition to the provisions of Section 19.30.040 (Grading), all land use activities (e.g. construction, grading, and agriculture) shall be conducted so as not to create any measurable amount of dust or dirt emission beyond any boundary line of the parcel. To ensure a dust free environment, appropriate grading procedures shall include, but are not limited to, the following (Chapter 19.20.30 Section 5—Dust and Dirt):*
  - *Schedule all grading activities to ensure that repeated grading will not be required, and that implementation of the desired land use (e.g. planting, paving or construction) will occur as soon as possible after grading*
  - *Water graded areas as often as necessary to prevent blowing dust or dirt, hydroseeding with temporary irrigation, adding a dust pallative, and/or building wind fences*
  - *Revegetate graded areas as soon as possible*
  - *Construct appropriate walls or fences to contain the dust and dirt within the parcel subject to the approval of the City Building Division*
- *Landscaping for the purpose of erosion control shall be in compliance with the standards outlined in City's Municipal Code Chapter 15 (Section 19.28.100—Erosion Control Landscaping)*

PR4.7D *As required by the Municipal Code (Section 8.80.502), prior to obtaining any City-issued grading and/or construction permits, the developer/owner shall provide evidence of compliance with the Construction General Permit by providing a copy of the Waste Discharger's Identification Number (WDID) to the City's Community Development Department the project developer shall file an NOI with the State of California to comply with the requirements of the National Pollution Discharge Elimination System Construction General Permit. This will include the preparation of an SWPPP incorporating BMPs for construction-related control of erosion and sedimentation contained in stormwater runoff. Specific minimum SWPPP requirements include submission of an NOI, SWPPP, and any other required Project Registration Documents (PRDs). Inclusion in the SWPPP and implementation of specific minimum BMPs are required. Specific minimum BMPs depend on the Proposed Project sediment risk level. These include:*

- *Technology-based Numeric Action Levels (NALs) for pH and turbidity for Risk Level 2 projects*

- *Certification/Training Requirements for Key Project Personnel (e.g., SWPPP preparers, inspectors, etc.) must have specific training or certifications to ensure their level of knowledge and skills are adequate to ensure their ability to design and evaluate project specifications that will comply with General Permit requirements. (This includes Registered Geologist, Professional Engineer, Licensed Landscape Architect, Certified Professional in Stormwater Quality, Certified Erosion Control Specialist, and a few other professional registrations.)*
- *For all projects, the SWPPP must contain specific minimum BMPs to minimize or prevent pollutants in stormwater discharges and authorized nonstormwater discharges through the use of controls, structures, and management practices that achieve best available technologies for toxic and nonconventional pollutants and best conventional technologies for conventional pollutants including:*
  - *Good site management (i.e., "housekeeping") measures for construction materials that could potentially be a threat to water quality if discharged, including:*
    - *Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced*
    - *Cover and berm loose stockpiled construction materials that are not actively being used (e.g., soil, spoils, aggregate, fly ash, stucco, hydrated lime, etc.)*
    - *Store chemicals in watertight containers or in a storage shed (completely enclosed), with appropriate secondary containment to prevent any spillage or leakage*
    - *Minimize exposure of construction materials to precipitation*
    - *Implement BMPs to prevent the off-site tracking of loose construction and landscape materials*
  - *Good housekeeping measures for waste management, which, at a minimum, shall consist of the following:*
    - *Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system*
    - *Ensure the containment of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the stormwater drainage system or receiving water*
    - *Clean or replace sanitation facilities and inspect them regularly for leaks and spills*
    - *Cover waste disposal containers at the end of every business day and during a rain event*
    - *Prevent discharges from waste disposal containers to the stormwater drainage system or receiving water*
    - *Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used*
    - *Implement procedures that effectively address hazardous and nonhazardous spills*
    - *Develop a spill response and implementation element of the SWPPP prior to commencement of construction activities. The SWPPP shall require that:*
      - *Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly*
      - *Appropriate spill response personnel are assigned and trained*

    - ◊ *Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soil and onto the surrounding areas*
- *Good housekeeping for vehicle storage and maintenance, which, at a minimum, shall consist of the following:*
    - *Prevent oil, grease, or fuel to leak into the ground, storm drains, or surface waters*
    - *Place all equipment or vehicles that are to be fueled, maintained, and stored in a designated area fitted with appropriate BMPs*
    - *Clean leaks immediately, and dispose of leaked materials properly*
- *Good housekeeping for landscape materials, which, at a minimum, shall consist of the following:*
    - *Contain stockpiled materials such as mulches and topsoil when they are not actively being used*
    - *Contain all fertilizers and other landscape materials when they are not actively being used*
    - *Discontinue the application of any erodible landscape material within 2 days before a forecasted rain event or during periods of precipitation*
    - *Apply erodible landscape material at quantities and application rates according to manufacture recommendations or based on written specifications by knowledgeable and experienced field personnel*
    - *Stack erodible landscape material on pallets, and cover or store such materials when not being used or applied*
- *An assessment and list of potential pollutant sources and identification of any areas of the site where additional BMPs are necessary to reduce or prevent pollutants in stormwater discharges and authorized nonstormwater discharges*
- *Good housekeeping measures on the construction site to control the air deposition of site materials and from site operations. Such particulates can include, but are not limited to, sediment, nutrients, trash, metals, bacteria, oil and grease, and organics*
- *Nonstormwater Management BMPs including:*
    - *Measures to control all nonstormwater discharges during construction*
    - *Vehicle washing in such a manner as to prevent nonstormwater discharges to surface waters or storm drainage systems*
    - *Street cleaning in such a manner as to prevent nonstormwater discharges from reaching surface water or storm drainage systems*
- *Erosion Control including:*
    - *Effective wind erosion control*
    - *Effective soil cover for inactive areas and all finished slopes, open space, utility backfill, and completed lots*
    - *Limitations on the use of plastic materials when more-sustainable, environmentally friendly alternatives exist. Where plastic materials are deemed necessary, the discharger shall consider the use of plastic materials resistant to solar degradation*

> *Sediment Controls including:*
  - *Effective perimeter controls and stabilized construction entrances and exits to sufficiently control erosion and sediment discharges from the site*
  - *Where sediment basins are to be used, at minimum, design sediment basins according to the method provided in Appendix 2 of the Construction General Permit*

> *Run-on and Runoff Controls including:*
  - *An evaluation of the quantity and quality of run-on and runoff through observation and sampling*
  - *Effective management of all run-on, all runoff within the site, and all runoff that discharges off the site*
  - *Run-on from offsite shall be directed away from all disturbed areas or shall collectively be in compliance with the effluent limitations in the General Permit*
  - *Inspection, Maintenance, and Repair of BMPs, performed by a Qualified SWPPP Practitioner*

- *Monitoring and Reporting Requirements including development and implementation of a written site-specific Construction Site Monitoring Program (CSMP) in accordance with the requirements of the Construction General Permit. The CSMP shall include all monitoring procedures and instructions, location maps, forms, and checklists as required in this section. The CSMP shall be developed prior to the commencement of construction activities and revised as necessary to reflect project revisions. The CSMP shall be a part of the SWPPP, included as an appendix or separate SWPPP chapter.*

Compliance with the Construction General Permit, including preparation of a SWPPP, is considered protective of water quality during construction by the SARWQCB. Monitoring and reporting requirements associated with these permits further ensure that water quality is protected and water quality standards are not violated. The City is also required to review the SWPPP before any permits are issued. [29]

Adherence to the City of San Bernardino Municipal Code as required by project requirements PR4.7A through PR4.7D would ensure the proposed project's compliance with waste discharge requirements, and water quality impacts associated with construction activities would not be substantial. Potential impacts associated with violation of waste discharge requirements or water quality standards during construction would be ***less than significant***.

[29] Lancaster, M. Deputy Director/Civil Engineer. National Pollutant Discharge Elimination System (NPDES) Requirements. City of San Bernardino Development Services Department-Public Works Division Memorandum. July 16, 2004.

Impact 4.7-2 **Operation of the proposed project could increase stormwater pollutant loads or concentrations, but would not result in a violation of water quality standards or a substantial degradation of water quality. Compliance with the identified project requirements PR4.7A through PR4.7C and PR4.7E and mitigation measure MM4.7 1 would ensure that this impact would remain *less than significant*.**

Operation of the proposed project would result in a significant change in land use and the potential for increased site runoff. The project site would change from a vacant lot to developed light industrial (warehouse) land uses. During the operational phase of the proposed project, the major source of pollution in stormwater runoff would be contaminants that have accumulated on rooftops and other impervious surfaces, such as parking lots, pedestrian walkways, and off-site road improvements prior to connecting to the storm drain system. Pollutants associated with the operational phase of the proposed project include nutrients, oil and grease, metals, organics, pesticides, and gross pollutants (including pathogens). Nutrients that may be present in post-construction stormwater include nitrogen and phosphorous resulting from fertilizers applied to landscaping, atmospheric deposition, and sediment. Excess nutrients can impact water quality by promoting excessive and/or a rapid growth of aquatic vegetation, which reduces water clarity and results in oxygen depletion. Pesticides can also enter stormwater after application on landscaping areas of the proposed project. Oil and grease can enter stormwater from vehicle leaks, traffic, and maintenance activities. Metals may enter stormwater as surfaces corrode, decay, or leach. Potential gross pollutants associated with operational activities include clippings associated with landscape maintenance, street litter, and pathogens (bacteria). Pathogens, that are deposited on impervious surfaces by pets and wildlife can readily wash off into surface waters during storm events and can impact water contact recreation, noncontact water recreation, and shellfish harvesting. Two of the proposed project downstream receiving waters (Santa Ana River Reach 4 and Lytle Creek) are currently listed as impaired by pathogens and the Santa Ana River Watershed, in general, is considered impaired by nitrogen and total dissolved solids (salts).

The proposed project would result in greater runoff compared to existing conditions (Table 4.7-2 [Estimated Peak Runoff Rates]) and a change in land use and associated pollutants in stormwater runoff (Table 4.7-1 [Typical Pollutant Concentrations in Stormwater]). To protect water quality and mitigate potential effects of the proposed project on stormwater runoff, a project WQMP has been prepared in compliance with the requirements of the Municipal NPDES Permit and City of San Bernardino Municipal Code and includes incorporation of grass-lined swales for water quality treatment around the project site perimeter.

Table 4.7-6 (Estimated Pollutant Loads and Required Removal Rates) lists the estimated pollutant loads under existing conditions and with implementation of the proposed project without any stormwater quality BMPs implemented and with removal credits for the project WQMP grass-lined swales. The "Targeted Reduction" column lists the percent of the post-project pollutant loads that must be removed in order to reduce proposed project pollutant loads to existing conditions levels. The "Remaining Required Removal" column lists the targeted percent reduction not met by implementation of the project WQMP swales.

Table 4.7-6 Estimated Pollutant Loads and Required Removal Rates

Pollutant	Pollutant Load		Targeted Reduction (percent)[a]	Swale Removal (percent)[b]	Remaining Required Removal (percent)[c]	Significance[d]
	Existing (lbs)	Proposed Project (lbs)				
Suspended Solids	16,157	28,987	44.3	70	0.0	NI
Total Phosphorous	10.8	55.6	80.6	26	54.6	PS
Dissolved phosphorous	5.89	35.4	83.4	0[e]	83.4	S
Total Nitrogen	193	508	62.0	14	48.0	S
Inorganic-Nitrogen	114	120	5.2	-6.2	11.4	S
Total Copper	0.89	3.92	77.2	40	37.2	PS
Total Lead	0.73	1.88	61.4	40	21.4	PS
Total Zinc	3.81	71.5	94.7	40	54.7	PS
Oil and Grease	0.072	0.236	69.7	0[e]	69.7	PS
	Billions of Colonies					
Fecal Coliforms	97.5	37,605	99.7	-50	149.7	S

SOURCE: PBS&J 2007

a. Percent load reduction required for proposed project load to be the same as the existing load

b. Values from Table 4.7-5

c. Targeted load reduction not met by project WQMP swales

d. Impact significance where: NI = no impact; LTS = less than significant; PS = potentially significant; S = significant

e. No value for swale removal efficiency; 0 used as a conservative estimate

The City of San Bernardino also requires a project WQMP as part of the conditions of approval for the proposed project[30] and for compliance with the Municipal NPDES Permit. The proposed project has prepared a project WQMP incorporating grass lined channels/vegetated swales, minimizing impervious surfaces, and operation and maintenance water quality BMPs.

In general, project requirements incorporated into the project WQMP include the following:

PR4.7E *The following water quality best management practice (BMPs), shall be implemented in accordance with the project WQMP, include but are not limited to the following:*

- *Swales and filter areas:*
  - *Landscape buffers between Industrial Parkway and parking lots*
  - *Rooftops will discharge to landscaped area through the parking lots and not directly to a storm drain system*
  - *Landscaping around the perimeter of the site will receive discharge from the entire site*
  - *Grass lined channels/vegetated swales will be used for water quality treatment*
- *Water conservation practices:*

[30] Lancaster, M. Deputy Director/Civil Engineer. National Pollutant Discharge Elimination System (NPDES) Requirements. City of San Bernardino Development Services Department-Public Works Division Memorandum. July 16, 2004.

- > *Landscaping will incorporate native and drought tolerant plants, trees, and shrubs*
- > *Use of efficient irrigation*

- *Minimize impervious surfaces:*
  - > *Overflow parking lots on the northeast corner will be built using permeable unit pavers*
  - > *Parking lot aisles are of minimum width*
- *Non-structural BMPs:*
  - > *Property owner and employee training/education*
  - > *Activity restrictions*
  - > *Parking lot sweeping*
  - > *Storm drain signage*
  - > *Trash storage areas and litter control*
- *Operations and maintenance of grass lined channels/vegetated swales:*
  - > *The property owner or designee shall provide ongoing funding and maintenance of vegetated swales.*
  - > *A landscape maintenance company shall be retained by the property owner or designee that will inspect swales and, as needed, remove waste to an appropriate site as buildup requires. Swale grass will be trimmed to maintain a height of 4 to 6 inches as necessary*
  - > *The property owner or designee shall require the landscape maintenance company to report their on their swale maintenance activities on a quarterly basis. Maintenance records will be made available to the City's Inspector upon request and will be kept for a period of 5 years*

Overall, the project WQMP is in compliance with the Municipal NPDES Permit requirements for source control BMPs and LID principles.

The Permittees shall promote green infrastructure/LID BMP implementation and identify the applicable LID principles in the project-specific WQMP:

- Municipal NPDES Permit Source Control BMPs incorporated into the project WQMP:
  - > Minimize contaminated runoff, including irrigation runoff, from entering the MS4s.
  - > Provide appropriate secondary containment and/or proper covers or lids for materials storage, trash bins, and outdoor processing and work areas.
  - > Minimize storm water contact with pollutant sources.
  - > Minimize trash and debris in storm water runoff through regular street sweeping and through litter control ordinances.
  - > The pollutants in post-development runoff shall be reduced using controls that use best management practices, as described in the California Storm Water Quality Handbooks, Caltrans Storm Water Quality Handbook or other reliable sources.

- Municipal NPDES Permit LID principles incorporated into the project WQMP:
  - > Landscape designs that promote water retention and evapotranspiration such as 1 foot depth of compost/top soil in commercial and residential areas on top of 1 foot of decompacted subsoil, concave landscape grading to allow runoff from impervious surfaces, and water conservation by selecting native plants, weather-based irrigation controllers, etc.
  - > Allow permeable surface designs in low traffic roads and parking lots, where feasible. This may require land use/building code amendment.
  - > Allow natural drainage systems for street construction and catchments (with no drainage pipes), and allow grassy swales and ditches where feasible.
  - > Require parking lots to drain to landscaped areas to provide treatment, retention, or infiltration, where feasible.
  - > Reduce curb requirements, where feasible, where adequate drainage, conveyance, treatment and storage are available.
  - > Consider vegetated landscape as an integral element of streets, parking lots, playground and buildings as a storm water treatment and retention system.
  - > Consider and facilitate application of landform grading techniques and revegetation as an alternative to traditional approaches, particularly in areas susceptible to erosion and sediment loss such as hillside development projects.

Even with implementation of the project WQMP, the proposed project would increase pollutant loads substantially and might cause or contribute to water quality degradation. Additionally, the proposed project WQMP water quality swales were not designed according the CASQA (2003) design and sizing guidelines.[31] Therefore, the treatment effectiveness of these swales may be lower than identified in Table 4.7-4.[32]

The potentially substantial increase in pollutant load caused by development of the proposed project, even with implementation of the project WQMP vegetated swales, means that pollutant loads from the project site could still potentially cause or contribute to surface water quality degradation of the Santa Ana River Watershed. Some BMPs are more effective at reducing certain types of pollutants in stormwater runoff and the selected grass swales are only partially effective at reducing potential pollutant loads (see Table 4.7-5).

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[31] The project WQMP grass lined channels/vegetated swales were designed with a 7-minute residence time and manning's roughness coefficient of 0.20. CASQA (2003) design guidelines for swales include a 10-minute residence time and manning's roughness coefficient of 0.25; the longer residence time ensures the swale pollutant removal efficiencies.
[32] If the manning's roughness coefficient was increased to 0.25 in the calculations, it may show that the designed swales residence time does meet CASQA design for 10 minutes, because the greater channel roughness would slow the water velocity down. If changing the manning's roughness coefficient does not sufficiently increase the stormwater residence time in the designed swales, the treatment effectiveness of these swales can be expected to be lower than identified in Table 4.7-4 (Grassed Swale/Channel Pollutant Removal Efficiency).

To reduce potential pollutants loads from the proposed project to non-substantial levels, the following mitigation measure shall be implemented to reduce potential pollutants loads and corresponding risks to water quality and to clarify the management strategies in project WQMP.

MM4.7-1 *Additional Water Quality Protection. In addition to the existing project WQMP grass lined channels/vegetated swales (implemented where site conditions do not violate CASQA 2003 design and sizing guidelines), a suite of BMPs shall be selected and implemented such that the combined expected removal rates of all BMPs result in at least the percent removals listed in the "Targeted Reduction" column of Table 4.7-6 (Estimated Pollutant Loads and Required Removal Rates). It is not expected that one single BMP will be sufficient; however, a series of BMPs can effectively reduce potential pollutant loads. Any BMP or combination of BMPs that achieve the performance standard for reducing pollutants to the "Targeted Reduction" column in Table 4.7-6 could be used, provided that the removal efficiency is demonstrated and documented to the SARWQCB and that site characteristics do not limit the BMPs implementation.*

- *All BMPs shall be designed and sited in accordance with CASQA 2003, FHWA 2002(c), or other accepted and applicable design and sizing guidelines. If proprietary devices are used, they shall be designed and implemented in accordance with the manufacturer's recommended design criteria and used only for removal of pollutants they have been designed for. Accompanying documentation shall include expected pollutant removal rates and design criteria for the system implemented.*
- *Grass lined channels shall be implemented in accordance with CASQA 2003 design criteria guidelines and shall not be located in fill areas, which are subject to erosion.*
- *The project WQMP shall include a model operations and maintenance plan for the grass lined channels, irrigation system, and any other structural BMPs implemented as part of the project WQMP in accordance with standard BMP guidelines and criteria such as those in the CASQA 2003 and include inspection and repair, as necessary, after major storm events.*
- *The project site plans shall include a WQMP plan showing all structural BMPs; stormwater routing to and through the BMPs; stormwater BMP inlet, outlet, and contributing area; applicable design characteristics; BMP details, as necessary; and BMP schematics showing a typical form in both plan view and cross-section; the existing project WQMP site plan shall be used as a basis and amended accordingly.*
- *Other BMP design requirements and considerations:*
  - *No BMPs shall be implemented that leave standing water on the surface for a period exceeding 48 hours unless approved by the San Bernardino County Vector Control Program*
  - *If deemed acceptable by the San Bernardino County Vector Control Program, underground cisterns should be considered for stormwater detention and subsequent landscape irrigation.*
  - *Consider the use of dry swales, as identified in CASQA 2003, and/or bioretention BMPs instead of grass lined channels for more effective pollutant removal efficiencies*
  - *Street and parking lot sweeping shall be conducted quarterly during the dry season, once before the beginning of the rainy season, and every week during the rainy season and as defined by the SWPPP.*
  - *Concrete swales and v-ditches shall not be installed and used to convey stormwater or nuisance runoff unless used to direct runoff to an appropriate stormwater pre-treatment BMP that incorporates appropriate energy dissipation. Concrete swales and v-ditches would bypass*

any potential treatment through soils or buffer areas prior to discharge and increase the potential for concentrated flows and associated erosion at the outlet. Furthermore, concrete ditches would reduce the potential for groundwater recharge and water conservation

> *Limitations on Infiltration BMPs:*
  - *Infiltration rate tests of the top 5 feet of soil below the bottom of the infiltration BMP shall be conducted for all areas selected for Infiltration BMPs. Infiltration BMPs shall not be located in soils where the infiltration rate exceeds 10 inches per hour, unless suitable augmentation is incorporated into the design to effectively remove pollutants from the infiltrating stormwater. See PDEP 2006, VDCR n.d., and CASQA 2002 for potential augmentation practices.*
  - *The bottom of the infiltration BMP shall be at least 10 feet above the local shallow groundwater table. For the project site, it is not expected that any location would result in an infiltration BMP within 10 feet of a local shallow groundwater table.*
  - *All infiltration BMPs shall incorporate pretreatment, preferably in the form of swales, vegetated buffers, or bioretention areas.*
  - *Infiltration facilities are subject to clogging and, therefore, are not recommended for areas where sediment, grease, or oil loadings may be high. Such areas include roadways, parking lots, and car service facilities, etc. To increase the life expectancy of an infiltration facility, a pretreatment facility, such as a settling basin or "cell," or additional BMP in a series should be used to remove sediments or other substances from the stormwater runoff before it enters the infiltration facility.*
  - *Any pretreatment facility design should be included in the design of the infiltration basin/trench, complete with maintenance and inspection requirements.*
  - *For infiltration trenches, a grass strip or other type of vegetated buffer at least 20 feet wide shall be maintained around the trench, to the maximum extent practicable, in order to accept surface runoff as sheet flow.*
  - *Infiltration BMPs shall not be installed until the drainage area has been stabilized.*

> *To reduce pollutants in urban runoff, address hydromodification, and manage storm water as a resource to the maximum extent practicable, the project WQMP shall specify preferential use of site design BMPs that incorporate mitigative LID techniques in the following manner (from highest to the lowest priority):*
  - *Infiltration BMPs (examples include permeable pavement with infiltration beds, dry wells, infiltration trenches, surface and sub-surface infiltration basins subject to Limitations on Infiltration BMPs, above*
  - *BMPs that harvest and use (e.g., cisterns and rain barrels); and*
  - *Vegetated BMPs that promote evapotranspiration including bioretention, biofiltration and bio-treatment.*

Construction of facilities incorporated into mitigation measure MM4.7-1 and project requirement PR4.7E would be subject to the same project requirements identified in Impact 4.7-1 and would therefore not result in significant impacts. Implementation of mitigation measure MM4.7-1 would ensure further protection of water quality and that implementation of project requirements PR4.7E does not contribute to degradation of water quality or contribute to other potential environmental effects, such as vector control issues.

Implementation of project requirements PR4.7A and PR4.7C would include slope stabilization and permanent erosion control BMPs that would reduce the potential for water quality degradation through sediment transport. Project requirement PR4.7B would ensure that stormwater pollutants are reduced to the maximum extent practicable.

The co-permittees included as part of the areawide Municipal Stormwater Permit, which would include the City of San Bernardino, are required to do the following:

- Enforce their ordinances and permits at all construction sites as necessary to maintain compliance with this Order. Sanctions for noncompliance must include: monetary penalties, bonding requirements and/or permit denial or revocation
- Enforce their ordinances and permits at commercial facilities

For the City of San Bernardino, the Public Works department is assigned the primary responsibility in implementing and/or administering the SBC WQMP requirements, while the City Building Division is assigned secondary responsibility. Additionally, prior to building or grading permit close-out or the issuance of a certificate of occupancy or certificate of use, the project developer must demonstrate that all structural BMPs described in the project WQMP have been constructed and installed in conformance with approved plans and specifications and that the project developer is prepared to implement all nonstructural BMPs described in the approved project WQMP.

These requirements would further ensure compliance with the Municipal NPDES Permit. Implementation of project requirements PR4.7A through PR4.7C, PR4.7E, and implementation of mitigation measure MM4.7-1 would ensure proposed project compliance with waste discharge requirement and water quality impacts associated with operational activities would not be substantial and potential impacts associated with violation of waste discharge requirements or water quality standards during proposed project operation would be ***less than significant***.

Threshold	Would the proposed project 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)?

Impact 4.7-3 **Construction of the proposed project would increase the amount of impervious surfaces on the project site. This is a potentially significant impact. Implementation of project requirements PR4.7E through PR4.7G and mitigation measure MM4.7-1 would reduce this impact to *less than significant*.**

Direct Effects

No new wells would be constructed or water supplies developed for implementation of the proposed project (refer to Section 4.12 [Utilities/Service Systems]). Therefore, there would be no direct effect of the proposed project on groundwater levels.

The proposed project would be supplied with water through the SBMWD. Most of the City's water supplies are from local groundwater from wells in the Bunker Hill Subbasin. Management of groundwater in this subbasin is conducted by Muni and under the Western Judgment. The Western Judgment requires that withdrawals cannot exceed the safe yield unless otherwise augmented through additional recharge. Additionally, existing regulatory mechanisms and require water conservation activities to reduce potential demand on potable water resources.

The following project requirements shall be implemented, as required by federal, state, or local statute or code:

PR4.7F *As required by the City of San Bernardino Development Standards (revised February 2007) Chapter 19.28 (Landscaping Standards), the project developer shall do the following:*

- *All new development shall be in compliance with the provisions of this section and must have a minimum of 75 points each, based on the Landscape and Irrigation Assessment Criteria contained in Section G19.28.130(5) (Section 19.28.100—Water Conservation Requirements). Each project shall be in compliance with the Water Conservation in Landscape Ordinance. A project must receive a minimum of 75 points in the landscape category(G19.28.130-Landscape Design Guidelines, Water Conservation Criteria).*
- *All landscape plans shall be subject to the applicable regulations of the Development Code (Section 19.28.120—Applicable Regulations).*

PR4.7G *As required by the City of San Bernardino General Plan Policy 13.2.4, the proposed project shall use reclaimed water for landscape irrigation.*

Project requirement PR4.7E (project WQMP) already includes the use of water efficient irrigation and drought-tolerant landscape plants, which would minimize water demands for landscaped areas, and mitigation measure MM4.7-1 requires an operations and maintenance plan for the water efficient irrigation system to ensure long-term irrigation efficiency.

Because the Bunker Hill Basin is an adjudicated basin where recharge must balance extractions over a five-year average, the water demand (refer to Section 4.12 [Utilities/Service Systems]) created by implementation of the proposed project would not substantially affect the groundwater such that there would be a lowering of the local groundwater table or reduction in groundwater supplies. Furthermore, implementation of project requirements PR4.7E through PR4.7G would reduce potential groundwater use. Therefore, the potential increased water demand associated with the proposed project would not cause a lowering of the local groundwater table or a reduction in groundwater supplies and impacts would be ***less than significant***.

Recharge Effects

The project site is located above the Bunker Hill Basin. As noted in the Environmental Settings of this section, recharge into the Bunker Hill Basin has historically resulted from infiltration of runoff from the San Gabriel and San Bernardino Mountains. The Santa Ana River, Mill Creek, and Lytle Creek contribute more than 60 percent of the total recharge to the groundwater system. Lesser contributors include Cajon Creek, San Timoteo Creek, and most of the creeks flowing southward out of the San Bernardino

Mountains. The basin is also replenished by deep percolation of water from precipitation and resulting runoff, percolation from delivered water, and water spread in streambeds and spreading grounds. The proposed project would not have an effect on percolation of delivered water or water spread in streambeds and spreading grounds because it is not located in a managed recharge area. Additionally, it is likely that much of the recharge from direct precipitation, estimated by the California Department of Water Resources (1986) to average 8,400 AFY, actually is recharge from local runoff resulting from direct precipitation (Danskin 2006). As urbanization of the San Bernardino area continues, the quantity of local runoff is estimated to double as a result of an increase in impervious surfaces, but the quantity of recharge from local runoff is expected to remain relatively constant (Danskin 2006).

The depth to groundwater is over 50 to100 feet below ground surface and the project site is not located near any significant recharge areas; any recharge would have to occur through percolation of direct rainfall or local runoff in excess of evapotranspiration[33]. The addition of impervious surfaces on the project site, without implementation of sufficient infiltration BMPs, would increase the local runoff and decrease the amount of precipitation percolating through the soil that may ultimately contribute to a small amount of groundwater recharge. However, the potential increase in runoff because of new impervious surfaces on the project site would ultimately discharge to the Santa Ana River and contribute to groundwater recharge through the Santa Ana River system.

The proposed project additional potential annual runoff of 5.9 acre feet[34] would discharge to the Cajon/Lytle Creek system and Santa Ana River. Furthermore, about 4.7 acre feet of additional proposed project potential annual runoff would discharge to Warm Creek and the Santa Ana River. As mentioned before, this system is a major recharge area for the Bunker Hill Subbasin and therefore, a substantial amount of potential groundwater recharge would not be lost with implementation of the proposed project. Because much of precipitation that would not runoff under existing conditions would still be lost to evaporation and not contribute to groundwater recharge[35], the effect of increased imperviousness on reduced groundwater recharge is even less substantial and potential proposed project effects on groundwater recharge would be ***less than significant***.

Therefore, overall, implementation of the proposed project would not substantially interfere with groundwater recharge or groundwater supplies and impacts would be ***less than significant***.

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[33] Evapotranspiration refers to the sum of evaporation and plant uses (transpiration). On the project site, plant use is expected to be small because of minimal vegetation.

[34] From Table 4.7-4 (Mean Annual Runoff Characteristics), the amount of runoff from the south and southwestern portion of the project site that would continue to discharge to the Cajon Wash and Lytle Creek system is 12.1inches or 27.2 acre-feet (12.1 inches/12 inches per foot * 27 acre-feet). The existing amount of runoff is 9.2 inches or 21.4 acre-feet per year. The increase in runoff to the Cajon Creek/Lytle Creek is therefore 27.2-21.3 or 5.9 acre-feet per year.

[35] The reference evapotranspiration from a standardized grass surface is 4.75 feet per year (UWMP, 2005).

Threshold	Would the proposed project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on-or off-site during construction?

Impact 4.7-4 **Construction of the proposed project would substantially alter the existing site drainage pattern but would not result in substantial on-site or off-site erosion. Compliance with the identified project requirements P.R. 4-7A through P.R. 4-7E would ensure that this impact would remain *less than significant*.**

During construction, project site drainage patterns would be substantially altered and surface soils would be exposed and susceptible to erosion. The proposed plan would include grading and removal of the on-site hills. As a consequence of excavation, exposed soil may be susceptible to soil erosion. Eroded sediments could cause or contribute to siltation in the down-gradient storm drain system and Santa Ana River system. Implementation of existing project requirements would require preparation of a SWPPP, including construction erosion and sediment control BMPs. Adherence to these requirements would be mandatory under project requirement PR4.7D prior to obtaining any City-issued grading or construction permit. Additionally, mandatory adherence to project requirement PR4.7C would ensure management of graded areas during construction to minimize wind and water erosion potential.

Following construction, most of the project site would be covered with structures and pavement and therefore, not susceptible to erosion. Additionally, project requirements PR4.7A through PR4.7C, and PR4.7E would ensure slope stability, revegetation of exposed soil as soon as possible following grading, and landscaping.

The City of San Bernardino is a co-permittee for the Municipal NPDES Permit. The required review and approval of the grading plan and landscape plan, in addition to construction and post-construction inspections, would ensure that the City of San Bernardino can enforce requirements to minimize erosion and sediment transport for compliance with the NPDES permit. Compliance with the identified project requirements PR4.7A through PR4.7E would ensure that potential proposed project effects on erosion and siltation would remain ***less than significant***.

Threshold	Would the proposed project 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 site or off site?
Threshold	Would the proposed project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of post-construction polluted runoff, such as from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks, or other outdoor areas?

Impact 4.7-5 **The proposed project would substantially alter the existing site drainage pattern and increase the rate of stormwater runoff, but would not significantly contribute to off-site flooding or exceed stormwater conveyance capacity. The impact would be *less than significant*.**

Alteration in site slope, drainage pathways, and perviousness can all contribute to changes in project site runoff. The proposed project would grade and level the project site; reduce the site pervious area from 100 percent to about 10 percent; result in sheet flow from rooftops, parking lots and paved areas; and site drainage channeled to a new on-site drainage system composed of grass lined swales discharging to either a storm drain pipe or Industrial Parkway. These alterations would substantially change the amount and rate of runoff from the project site. Although the proposed project would alter the internal drainage patterns of the project site, the proposed project would not substantially alter the external pattern of drainage, except for increasing storm flow rate and volume.

The project site will be graded with a finished surface at least 5 feet above the existing low levels and sloped to direct all drainage to the perimeter vegetated swales/grass-lined channels. Therefore, there would be ***no impact*** on on-site flooding associated with implementation of the proposed project.

Increased imperviousness can greatly alter runoff from small, frequent flood events by up to a ten times an increase in flow rate.[36] However, increased imperviousness often has less of an effect on flows during extreme events (e.g., 100-year flood flow events) because during these events, rainfall saturates even natural soils, rendering them effectively impervious.[37],[38] Overall site runoff increases by about 31.2 cfs (54 percent increase) for the 10-year storm event and 25.1 cfs (22 percent increase) for the 100-year storm event with implementation of the proposed project (Table 4.7-3 [Estimated Peak Runoff Rates]). Table 4.7-7 (Estimated Maximum Increase in Existing In-Stream Storm Flows) lists the potential effect increased peak flows might have on storm flows within the overall drainage system channels.

Table 4.7-7 Estimated Maximum Increase in Existing In-Stream Storm Flows

Channel	*10-year Event[a] (percent)*	*100-year Event[a] (percent)*
Cajon Creek	0.15	>0.1
Lytle Creek	0.15	>0.1
Warm Creek	1.2	0.3
Santa Ana River near San Bernardino	0.2	>0.1

SOURCE: PBS&J 2007

a. The estimated maximum increase was determined based on the modeled increase in peak flow rates from Table 4.7-2 (Estimated Peak Runoff Rates) and the estimated 90th and 99th percentile storm flows within each channel from Table 4.7-3 (Estimated Existing In-Stream Storm Flows)

[36] Santa Clara Basin Watershed Management Initiative. Watershed Management Plan: Volume One Watershed Characteristics Report Unabridged 2003 Revision. Revised August 2003. p. 4-10.
[37] Santa Clara Basin Watershed Management Initiative. Watershed Management Plan: Volume One Watershed Characteristics Report Unabridged 2003 Revision. Revised August 2003. p. 4-10.
[38] San Francisquito Creek Coordinated Resource Management and Planning Flood and Erosion Control Task Force. Reconnaissance Investigation Report of San Francisquito Creek. San Francisquito Creek Coordinated Resource Management and Planning. December, 1997. p. 17.

The potential increase in storm flow rates is not substantial (generally 0.2 percent or less). The likelihood that the timing of peak flow rates discharged from the developed project site would result in peak flow rates entering any of these systems when they are flowing at their peak flow rates is small. Peak flow rate is a function of the amount of runoff and the time it takes runoff to reach a point in the system. The drainage pathways (e.g., streets, storm drains, drainage channels, overland flow, how far upstream or downstream the site is in the watershed, and others) and drainage path characteristics (e.g., slope, volume, roughness, and others) all modify the time it takes stormwater runoff to reach a point in the system. Furthermore, the project site discharges to the Cajon Wash/Lytle Creek system would flow into the Lytle/Cajon Basin prior to discharge into the Lytle Channel and eventually the Santa Ana River. Peak flows into the Cajon Wash would be attenuated by the large floodplain area and basin. Therefore, the potential proposed project contributions to increased flood flows in these downstream drainages would not be substantial and would not cause or contribute to flooding or exceedance of storm drain conveyance capacities.

The City of San Bernardino Department of Public Works storm drain policy requires that the 100-year storm flows will be contained in the street right-of-way and the 50-year storm flows will be contained between the curbs. The existing Industrial Parkway has more capacity than the 100-year flows generated from the south and southeast portion of the project site (Hydrology Study 2007); therefore, increased flow to Industrial Parkway by 19.6 cfs would not exceed storm conveyance capacities and contribute to off-site flooding of Industrial Parkway. The storm drain pipe receiving runoff from the north and east portion of the project site has also been sized to convey the 100-year storm event flows from its drainage area.

Therefore, with implementation of project requirement PR4.7E and mitigation measure MM4.7-1, the proposed project would have ***less-than-significant*** stormwater and flooding impacts.

Impact 4.7-6 **The proposed project could increase stormwater runoff and increase pollutant loads in stormwater runoff. This is a potentially significant impact. Compliance with the identified project requirements PR4.7A through PR4.7E and mitigation measure MM4.7-1 would ensure that this impact would remain *less than significant*.**

The proposed project potential effects on additional sources of polluted runoff are fully discussed under Impact 4.7-2 and Impact 4.7-4. Compliance with project requirements PR4.7A through PR4.7E, and implementation of mitigation measure MM4.7-1, would reduce potential project pollutant loads and ensure that the proposed project would not provide substantial additional sources of post-construction polluted runoff and impacts would be ***less than significant***.

Threshold	Would the proposed project have the potential for significant changes in the flow velocity or volume of stormwater runoff to cause environmental harm?

Impact 4.7-7 **Operation of the proposed project would substantially alter the existing site drainage pattern and increase peak runoff rates and total storm flow volumes, but would not result in downstream bed or bank erosion. The impact would be *less than significant*.**

The proposed project would increase the peak stormwater runoff for both the 10-year and 100-year storm events by 31.2 cfs and 25.1 cfs, respectively (see Table 4.7-2 [Estimated Peak Runoff Rates]). However, the project site discharges would be to lined channels or surface streets in the entire system, except for where the Devil Creek Diversion discharges to the Cajon Wash. There would be no impact on bed or bank erosion to the lined channels or surface streets. As mentioned in the discussion for Impact 4.7-5, discharges to the Cajon Wash could only increase potential in-channel peak flow rates by 0.15 percent or less during 'worst case' conditions. Additionally, discharges to the Cajon Wash would quickly disperse and lose energy as it spreads out over the large, wide, wash area. Furthermore, as discussed in Impact 4.7-5, the likelihood of peak flows from the project site combining with peak flow within these larger drainages is small. Therefore, the potential proposed project would not contribute substantially to increased bed or bank erosion in the drainage system and impacts of peak runoff rates or storm flow volumes would be ***less than significant***.

Threshold	Would the proposed project otherwise substantially degrade water quality or beneficial uses?

Impact 4.7-8 **The proposed project would not substantially otherwise degrade water quality or beneficial uses. Compliance with the identified project requirements PR4.7A through PR4.7G and mitigation measure MM4.7-1 would ensure that this impact would remain *less than significant*.**

Potential proposed project impacts on water quality and beneficial uses are fully discussed under Impact 4.7-1 and Impact 4.7-7. The proposed project would not otherwise degrade water quality or beneficial uses and compliance with project requirements PR4.7A through PR4.7G and implementation of mitigation measure MM4.7-1 would reduce potential proposed project impacts to the ***less-than-significant*** level.

4.7.4 Cumulative Impacts

The geographic context for the hydrology/water quality cumulative impact analysis is the Middle Santa Ana River Watershed for water quality impacts, and the limits of the Bunker Hill Groundwater Subbasin with regard to groundwater quality and recharge impacts.

Cumulative impacts are only addressed for those thresholds that have a project-related impact, whether it is less than significant, potentially significant, or significant and unavoidable. If "no impact" occurs, no cumulative analysis is provided for that threshold.

Threshold	Would the proposed project violate any water quality standards or waste discharge requirements?

During construction activities, all projects within the Middle Santa Ana River Watershed Management Area would be subject to the requirements of an NPDES Permit: the Statewide General Construction Permit, and the Municipal NPDES Permit. The General Construction Permit requires that an SWPPP be prepared for any construction project that would disturb more than 1 acre of land surface and for significant redevelopment projects. Municipal NPDES Permit conditions are required to be codified in the local agency/municipality codes and ordinances. Potential construction dewatering would be subject or either a General Permit of discharge of low-threat waters or and individual Waste Discharge Requirement.

Compliance with the requirements of the NPDES permits would necessitate the use of erosion control measures and stormwater pollution prevention BMPS during both construction and operational phases of development projects. These include erosion and sediment control practices, waste management practices, spill containment and clean up, water conservation, and other BMPs to reduce potential pollutants in stormwater runoff to the maximum extent practicable. Furthermore, for any pollutant identified as causing or contributing to impairment of the Santa Ana River watershed, TMDLs are or will be developed, further restricting the potential for discharge of pollutants in such a manner that would cause or contribute to violation of water quality standards or waste discharge requirements.

Monitoring and reporting programs explicitly required in the area-wide Municipal Stormwater Permit would ensure that the stormwater management program is adequately protecting water quality or would be adjusted to meet water quality protection goals.

Additionally, all projects would be subject to the environmental review process that would identify project-specific required mitigation, as necessary, to ensure protection of water quality standards.

Therefore, cumulative impacts associated with the violation of water quality standards and/or waste discharge requirements would be less than significant. The proposed project would comply with all the relevant regulatory requirements that serve to protect water quality such as project requirements PR4.8A through PR4.8E. Furthermore, the proposed project would implement additional water quality protection measures mitigation measures MM4.7-1. Therefore, the proposed project would not contribute considerably to cumulative impacts, and cumulative impacts on water quality standards or waste discharge requirements would be ***less than significant***.

Threshold	Would the proposed project 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)?

Bunker Hill Basin

The Bunker Hill Basin underlying the project site is currently operated under an adjudicated agreement (the Western Judgment) that requires extractions to be balanced with recharge over a five-year period. Therefore, under the Western Judgment, cumulative impacts on Bunker Hill Subbasin groundwater supplies and water table levels would be less than significant.

Groundwater recharge in the Bunker Hill Subbasin occurs primarily from stream and tributary recharge, spreading basin recharge, and upland runoff recharge. Direct precipitation recharge is not a significant component of groundwater recharge (Danskin 2006). Consequently, increased development and the resulting increase in impervious surfaces in the surface of the Bunker Hill Subbasin would not be expected to substantially affect groundwater recharge. Furthermore, local runoff contributes to more groundwater recharge than direct precipitation percolation (Danskin 2006). Potential losses because of reductions in direct percolation recharge in the basin could be offset by increases in local runoff recharge and management of the groundwater subbasin under the Western Judgment; development within the basin is not expected to substantially affect groundwater recharge.

SBMWD is currently in the process of completing a Water Master Plan (UWMP 2005). The purpose of the Water Master Plan is to develop a long-range water supply plan and capital improvement plan to reliably meet the needs of SBMWD's service area from now until 2035. The existing planned groundwater supply is reliable for build out until 2022 for an average year, single dry-year, and multiple dry years (UWMP 2005).

As with all development using subbasin groundwater, the proposed project would be subject to the Western Judgment. As detailed in the impacts analysis, the proposed project would not have a substantial effect on recharge of the Bunker Hill Subbasin. Furthermore, the proposed project would comply with all relevant regulatory requirements to protect groundwater resources such as project requirements PR4.7A through PR4.7G and mitigation measure MM4.7-1. Therefore, the proposed project would not contribute considerably to cumulative impacts and cumulative impacts on groundwater recharge would ***less than significant***.

Threshold	Would the proposed project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off site?

During construction of cumulative development, conversion of vacant land or agricultural land or redevelopment of underutilized land would result in grading that would alter surface drainage characteristics that may increase erosion and sediment transport. All construction would be regulated by

the NPDES General Construction Permit which requires preparation of an SWPPP with construction BMPs to reduce erosion and sediment transport for projects that cumulatively disturb more than 1 acre. All construction projects that disturb more than 1 acre of land surface would be required to comply with the NPDES General Construction Permit. Implementation, monitoring, and enforcement of the General Construction Permit conditions, as required by the area-wide Municipal Stormwater Permit, would ensure that potential cumulative construction impacts on erosion or siltation are ***less than significant***.

All development projects within the jurisdiction of the area-wide Municipal NPDES Permit would have to comply with the SBC WQMP including preparation of a site-specific WQMP, which incorporates stormwater quality BMPs for sediment and erosion control. Additionally, development within the area would have to comply with local Municipal Codes, the Basin Plan, any TMDLs, and undergo the environmental review process. Permittees (agencies) of the Municipal NPDES Permit are required to inspect and enforce permit requirements. Additionally, the Municipal NPDES Permit requires mitigation of flow alterations that could cause a hydrologic condition of concern (HCOC)[39] including siltation, bed or bank erosion, and/or degradation of aquatic habitat in downstream drainages. Therefore, potential cumulative impacts associated with development that might cause or contribute to erosion and siltation within the watershed would be ***less than significant***.

The proposed project would expose soils to increased erosion potential during construction. Compliance with the identified project requirements PR4.7A through PR4.7E would ensure that potential proposed project effects on erosion and siltation during construction and operation would not be substantial. Therefore, the proposed project would not contribute considerably to cumulative impacts and cumulative impacts would be ***less than significant***.

Threshold	Would the proposed project 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 that would result in flooding on or off site?

Local Municipal Codes incorporate design review requirements that would likely prevent substantial on-site flood effects. However, increased impervious surfaces as a result of cumulative development within the watershed could increase the amount and rate of stormwater runoff that may cause or contribute to downstream flooding. Planned drainage capacities have been determined assuming a full build-out scenario. All development within the Middle Santa Ana River Watershed Management Area must comply with the requirements of the Municipal NPDES permit and other pertinent local drainage and conveyance ordinances. Related projects are also required to adhere to WQMP BMPs that are aimed at increasing the retention of water on-site and minimizing runoff. The WQMP for all projects and development would include BMPs, landscaping, and drainage requirements similar to the proposed project. The San Bernardino County Flood Control District (SBCFCD) is responsible for operating and maintaining the area's major flood control channels and drainage system, including required improvements. Individual municipalities are often charged with maintaining local and tributary flood control systems. The principal functions of the SBCFCD are: flood protection on major streams, water

conservation, and storm drain construction. The Flood Control Permit Section provides relevant permit information and processes encroachment permit applications for work within the San Bernardino County Flood Control District's right-of-way. The Section coordinates Departmental reviews and issues permits for activities such as construction projects, land use permits, and general encroachment within District right-of-way. This process allows the SBCFCD oversight over drainage and flood control issues within San Bernardino County. Therefore, the cumulative impacts on flooding would be ***less than significant***.

Potential proposed project effects on off-site flooding would not be substantial because it would, at most, contribute only up to 0.2 percent increased flow in the drainage system. Therefore, the proposed project would not contribute considerably to cumulative impacts and cumulative impacts would be ***less than significant***.

Threshold	Would the proposed project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of post-construction polluted runoff, such as from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks, or other outdoor areas?

Storm Drain Systems

Cumulative growth within the Middle Santa Ana River Watershed Management Area could cumulatively increase flood flows as more impervious surfaces are created within the watershed. Alterations in area drainage patterns could also alter flood conveyance capacity of existing drainages. This could create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of contaminated runoff. All major development within the area would be subject to environmental review, the SBCFCD permits, the NPDES Program permits, as well as local Municipal Codes and plans. Additionally, the Master Drainage Plan for the Middle Santa Ana River Watershed Management Area was prepared to define full build-out capacities within the Master Drainage Plan area as required by the NPDES Municipal Stormwater Permit. Therefore, cumulative impacts on runoff would be ***less than significant***.

Potential proposed project effects on exceedance of storm system capacities would not be substantial because it would, at most, contribute only up to 0.2 percent increased flow in the drainage system. Therefore, the proposed project would not contribute considerably to cumulative impacts and cumulative impacts would be ***less than significant***.

Polluted Runoff

During construction activities, all projects within the Middle Santa Ana River Watershed Management Area would be subject to the requirements of an NPDES Permit: the Statewide General Construction

[39] Condition when a proposed hydrologic change is deemed to have the potential to cause significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects.

Permit and the Municipal Stormwater Permit. The General Construction Permit requires that an SWPPP be prepared for any construction project that would disturb more than 1 acre of land surface and for significant redevelopment projects. Municipal Stormwater Permit conditions are required to be codified in the local agency/municipality codes and ordinances. Potential construction dewatering would be subject to either a General Permit of discharge of low-threat waters or and individual Waste Discharge Requirement.

Compliance with the requirements of the NPDES permits would necessitate the use of erosion control measures and stormwater pollution prevention BMPS during both construction and operational phases of development projects. These include erosion and sediment control practices, waste management practices, spill containment and clean up, water conservation, and other BMPs to reduce potential pollutants in stormwater runoff to the maximum extent practicable. Furthermore, for any pollutant identified as causing or contributing to impairment of the Santa Ana River watershed, TMDLs are or will be developed, further restricting the potential for discharge of pollutants in such a manner that would cause or contribute to violation of water quality standards or waste discharge requirements.

Monitoring and reporting programs explicitly required in the area-wide Municipal Stormwater Permit would ensure that the stormwater management program is adequately protecting water quality or would be adjusted to meet water quality protection goals.

Therefore, cumulative impacts associated with polluted stormwater runoff would be ***less than significant***.

The proposed project would increase the amount of pollutants in stormwater runoff. Compliance with project requirements PR4.7A through PR4.7E, and implementation of mitigation measure MM4.7-1, would reduce potential project pollutant loads and ensure that the proposed project would not provide substantial additional sources of post-construction polluted runoff. Therefore, the proposed project would not contribute considerably to cumulative impacts and cumulative impacts would be ***less than significant***.

Threshold	Would the proposed project otherwise substantially degrade water quality?

Growth within the area could result in addition of potentially polluting industry, new or expanded wastewater treatment facilities, and increased use of recycled water. Other potential contributors to water quality degradation are discussed above.

Development of certain industries within the area could potentially contribute additional pollutants to ground or surface water that may cause or contribute to water quality impacts. However, the types of industries with the potential to cause or contribute to surface or groundwater pollution would have to comply with the General Industrial Permit (Order No. NO. 97-03-DWQ NPDES No.CAS000001), which includes preparation of an SWPPP and associated monitoring and reporting program, Spill Prevention and Control Plan, and effluent limitations for some industries. These regulatory requirements would minimize the potential for pollutant transport in stormwater or to groundwater. If monitoring indicates exceedance of effluent limitations or non-compliance with other permit conditions, the SWRCB

or RWRCB can issue a cease and desist order to prevent potential water quality degradation. Development of industrial uses within the watershed would therefore not substantially degrade water quality.

New or expanded wastewater treatment facilities would have to undergo the environmental review process prior to development. Each facility is regulated under individual NPDES permits that specify the effluent limitations protective of water quality. Effluent limitations are based typically based on technology-based standards. However, where constituents may cause or contribute to impairment of water quality, water quality objectives-based effluent limits are imposed. Furthermore, the water quality assessment process (305(b)) would continue to monitor and assess if water bodies are impaired (303(d) list). Impaired water bodies, as listed on the 303(d) list, would requirement development of TMDLs including waste load allocations that are protective of water quality. Consequently, new or expanded wastewater treatment facilities would not substantially degrade water quality.

Expanded use of recycled water could increase TDS and nitrate-nitrogen loads to surface and groundwater. The TDS/Nitrogen Task force has identified the amounts of additional load areas within the Middle Santa Ana River Watershed Management Area can be contributed to surface water and groundwater that would not cause or contribute to water quality degradation. Additionally, use of recycled water would be subject to a Master Reclamation Permit or individual WDR. These mechanisms would set operational performance standards and criteria protective of surface water and groundwater quality.

Furthermore, as mentioned above, the TMDL process would continue to provide a mechanism to determine whether water bodies become impaired and devise an implementation plan to prevent water quality degradation, and cumulative impacts or recycled water use on salt and nitrogen loads would be not be substantial.

Therefore, overall, cumulative impacts on water quality would be ***less than significant***.

The proposed project would not include industrial uses subject to the Industrial General Permit because potential effects on water quality from a warehouse land use would not be substantial. Additionally, the proposed project would not require construction or expansion of new waste water treatment facilities. The proposed project would be required to use recycled water that is currently subject to a Master Reclamation Permit or individual WDR. Therefore, the proposed project would not otherwise degrade water quality or beneficial uses through compliance with project requirements PR4.7A through PR4.7G and implementation of mitigation measure MM4.7-1. Therefore, the proposed project would not contribute considerably to cumulative water quality degradation and cumulative impacts would be ***less than significant***.

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