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4.4 HYDROLOGY AND WATER QUALITY

4.4.1 INTRODUCTION

This section addresses potential impacts to hydrology and water quality resulting from implementation of the proposed project. This project is required to meet drainage and water quality requirements for dry and storm water runoff. Documents reviewed and incorporated as part of this analysis include the *Onsite Hydrology Report for Long Beach Sports Park* (PBS&J Engineering, Inc. 2004) (Appendix C) and the Geotechnical Evaluation for the Sports Park (AMEC Earth and Environmental, Inc. 2003) (available for review at the City of Long Beach, Community Development Department).

4.4.2 EXISTING ENVIRONMENTAL SETTING

Surface Water

In the existing condition, the site consists of 14 drainage subareas that collect surface runoff and discharge it to one point in the drainage area (Figure 4.4.1). The site drains, primarily by surface flow, to seven separate sump areas (none of which are picked up by a storm drain) and an existing concrete-lined detention basin located on site. A portion of the eastern part of the site drains to Orange Avenue (Subareas 10A and 14A), while a portion of the western part of the site drains to California Avenue (Subareas 6A and 11A). A 78-inch storm drain and a 69-inch storm drain gather storm flows from 207 acres off site and convey the total 50-year storm flow of 460 cubic feet per second (cfs) to an existing 108-inch storm drain that runs through the northern half of the site and discharges into the detention basin. All flows up to 100 cfs drain out of the detention basin through an existing 54-inch storm drain. The remaining flows, combined with direct rainfall over the detention basin (Subarea 8A) and flows from the east (Subarea 9A), total 473 cfs (equivalent storage volume of 36.07 acre-feet). All flows in excess of 100 cfs are stored in the detention basin and on site (via overflow) until capacity in the downstream storm drain is available. Surface water runoff from the site eventually discharges into the Los Angeles River.

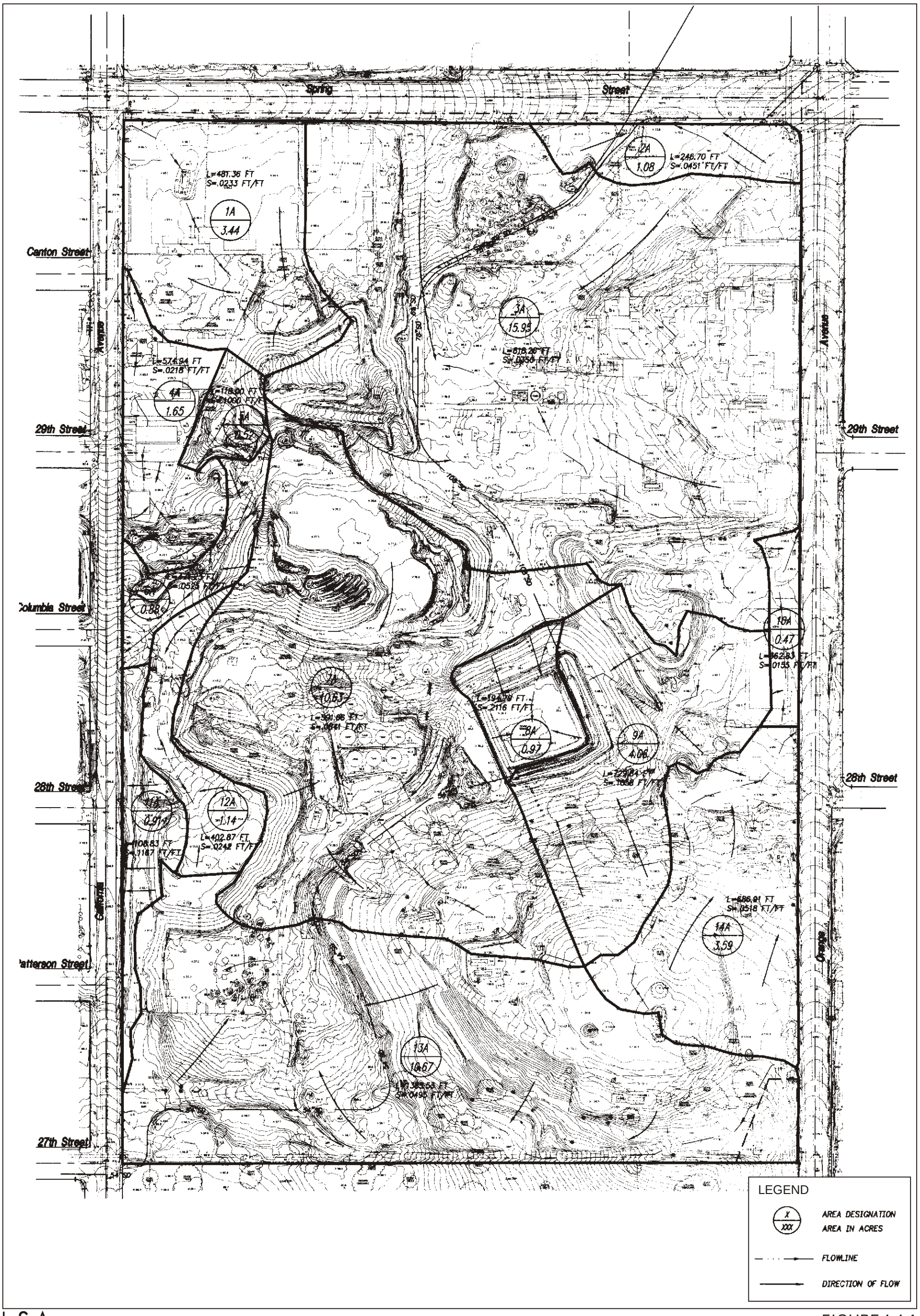
Several pollutants are commonly associated with storm water runoff, including sediment, nutrients, bacteria, oxygen-demanding substances, petroleum products, heavy metals, toxic chemicals, and floatables. The concentration of these pollutants in water is measured by the water quality parameters listed above. The anticipated and potential pollutants in storm water or urban runoff for various land uses are reflected in Table 4.4.A. The proposed project would be considered a commercial development with respect to this table. These pollutants and their impacts on water quality and aquatic habitat are described in more detail below.

Table 4.4.A: Anticipated and Potential Pollutants Generated by Land Use Type

	General Pollutant Categories								
Priority Project Categories	**Sediments**	**Nutrients**	**Heavy Metals**	**Organic Compounds**	**Trash and Debris**	**Oxygen-Demanding Substances**	**Oil and Grease**	**Bacteria and Viruses**	**Pesticides**
Detached Residential Development	A	A			A	A	A	A	A
Attached Residential Development	A	A			A	P[1]	P[2]	P	A
Commercial/ Industrial Development > 100,000 ft.[2]	P[1]	P[1]		P[2]	A	P[5]	A	P[3]	P[5]
Automotive Repair Shops			A	A[4,5]	A		A		
Restaurants					A	A	A	A	
Hillside Development > 5,000 ft.[2]	A	A			A	A	A		A
Parking Lots	P[1]	P[1]	A		A	P[1, 5]	A		P[1]
Streets, Highways & Freeways	A	P[1]	A	A[4]	A	P[5]	A		

Source: *California Stormwater BMP Handbook—New Development and Redevelopment* (2003).
http://www.cabmphandbooks.com

A = Anticipated
P = Potential
1 A potential pollutant if landscaping exists on site.
2 A potential pollutant if the project includes uncovered parking areas.
3 A potential pollutant if land use involves food or animal waste products.
4 Including petroleum hydrocarbons.
5 Including solvents.



LSA

FIGURE 4.4.1

N

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FEET

SOURCE: PBS&J

Long Beach Sports Park

Existing Hydrology

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Sediments. Natural sediment loads are important to downstream environments by providing habitat, substrate, and nutrition; however, increased sediment loads can result in several negative effects to downstream environments. Excessive sediment can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth, and reproduction. In addition, pollutants that adhere to sediment, such as nutrients, trace metals, and hydrocarbons, can have other harmful effects on the aquatic environment when they occur in elevated levels.

Nutrients. Nutrients are typically composed of phosphorus and/or nitrogen. Elevated levels in surface waters cause algal blooms and excessive vegetative growth. As nutrients are absorbed, the vegetative growth decomposes, utilizing oxygen in the process and reducing dissolved oxygen levels. Dissolved oxygen is critical for support of aquatic life. The ammonium form of nitrogen (found in wastewater discharges) converts to nitrite and nitrate in the presence of oxygen, which further reduces the dissolved oxygen levels in water.

Heavy Metals. Bioavailable forms of trace metals are toxic to aquatic life. The most common metals found in urban runoff are lead, zinc, and copper. Sources of heavy metals in surface waters include emissions and deposits from automobiles, industrial wastewater, and common household chemicals.

Organic Compounds. Organic compounds are carbon based and are found in pesticides, solvents, and hydrocarbons. Elevated levels can indirectly or directly constitute a hazard to life or health. During cleaning activities, these compounds can be washed off into storm drains. Dirt, grease, and grime may adsorb concentrations that are harmful or hazardous to aquatic life.

Trash and Debris. Trash and debris can have a significant effect on the recreational value of a water body and aquatic habitat. It also can interfere with aquatic life respiration and can be harmful or hazardous to aquatic animals that mistakenly ingest floating debris.

Oxygen-Demanding Substances. Oxygen-demanding substances include plant debris (such as leaves and lawn clippings), animal wastes, and other organic matter. Microorganisms utilize dissolved oxygen during consumption of these substances, which reduces a water body's capacity to support aquatic life.

Oil and Grease. Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, fats, and waxes. Elevated oil and grease concentrations can affect the aesthetic value of the water body and can create a harmful environment for aquatic life.

Bacteria and Viruses. Bacterial levels in urban runoff can exceed public health standards for water contact recreation, creating a harmful environment. The source is animal or human fecal wastes. Bacteria and viruses thrive under certain conditions and can alter the aquatic habitat and create a harmful environment for aquatic life.

Other Toxic Chemicals. Other toxic chemicals are generally related to hazardous wastes or industrial by-products and can sometimes be detected in storm water, but they are typically rare. The other toxic chemicals that do occur in measurable levels in tested storm water include phthalate (plasticizer compound), phenols and creosols (wood preservatives), pesticides and herbicides, and fuel additives such as methyl tertiary-butyl ether (MTBE).

Groundwater

The Long Beach Water Department supplies drinking water to the project site. Approximately 46 percent of the City of Long Beach's drinking water is derived from Central Basin groundwater, which is replenished by the San Gabriel Watershed, with the remaining 54 percent purchased from the Metropolitan Water District. The Central Basin extends over most of the Coastal Plain of Los Angeles County; it is bounded on the north by a series of low hills extending from the Elysian Hills to the Puente Hills. It is bounded on the west and south by the Newport-Inglewood uplift and on the southeast by the Los Angeles-Orange County line.[1] The purchased water is derived from the Colorado River and from Lake Oroville in Northern California.[2]

The project site is located at the boundary of two groundwater basins, the Central Basin and the West Coast Basin. The Newport-Inglewood Fault Zone divides the two basins. Previous investigations reported that groundwater is expected at 50 to 80 feet below sea level at the project site (AMEC 2003). During the geotechnical investigation conducted for the project, AMEC encountered perched groundwater in six exploratory borings; groundwater was encountered as shallow as 16 to 20 feet below ground surface. There are no groundwater production wells in the vicinity of the project site.[3] Oil resources and active oil drilling operations preclude use of the site for groundwater recharge.

Environmental Science & Engineering, Inc. (ESE) drilled five monitoring wells at the project site in August 1999 as part of an Environmental Protection Agency (EPA) contract. Water was collected from these wells in October 1999. Groundwater was found to be unconfined at depths between 126 and 163.5 feet below ground surface. The analytical results indicated that Total Petroleum Hydrocarbons (EPA Method 418.1), Volatile Fuel Hydrocarbons (EPA Method 8015m), Extractable Fuel Hydrocarbons (EPA Method 8015m), and Priority Pollutants (EPA Method 601/602) were either "Not Detected" or below agency thresholds. These wells were closed per Los Angeles Regional Water Quality Control Board (RWQCB) standards with a City permit on October 7 and 8, 2002.[4]

Refer to Section 4.13 (Public Health and Safety) for a complete discussion of groundwater analysis.

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1 State of California Department of Water Resources Southern District. 1961. *Bulletin No. 104 Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County Appendix A Ground Water Geology*. June.

2 Long Beach Water Department, 2002, Water Quality Report.

3 Water Replenishment District of Southern California Web site, www.wrd.org.

4 City of Long Beach. 2003. *Brownfields Grant Quarterly Report: April 1, 2002–June 30, 2003*. June.

4.4.3 REGULATORY REQUIREMENTS

Water Quality Control Plan, Los Angeles Basin (Basin Plan)

The RWQCB has adopted a Basin Plan for its region of responsibility, which includes the City of Long Beach. The agency has delineated water resource area boundaries based on hydrological features. For purposes of achieving and maintaining water quality protection, specific beneficial uses have been identified for each of the hydrologic areas described in the Basin Plan. The Basin Plan also establishes implementation programs to achieve water quality objectives to protect beneficial uses and requires monitoring to evaluate the effectiveness of the programs. These objectives must comply with the State antidegradation policy (State Board Resolution No. 68-16), which is designed to maintain high-quality waters while allowing some flexibility if beneficial uses are not unreasonably affected.

The RWQCB has designated narrative or numerical water quality objectives for all of its inland surface waters for the following parameters: ammonia; bacteria (coliform); bioaccumulation; biochemical oxygen demand (BOD_5); biostimulatory substances; chemical constituents; chlorine; color; exotic vegetation; floating material; methylene blue activated substances; mineral quality; nitrogen (nitrate, nitrite); oil and grease; dissolved oxygen; pesticides; pH; polychlorinated biphenyls (PCBs); radioactive substances; solid; suspended or settable solids; taste and odor; temperature; toxicity; and turbidity. If these objectives are exceeded, the RWQCB can use its regulatory authority to require municipalities to reduce pollutant loads to the affected receiving waters. The RWQCB utilizes water quality criteria, in the form of "scientific information developed by the USEPA regarding the effect a constituent concentration has on human health, aquatic life, or other uses of water," to develop its water quality objectives (RWQCB 1995).

Beneficial uses of water are defined in the Basin Plan as those necessary for the survival or well-being of humans, plants, and wildlife. Examples of beneficial uses include drinking water supplies, swimming, industrial and agricultural water supply, and the support of freshwater and marine habitats and their organisms.

The existing beneficial uses for the portion of the Los Angeles River that receives runoff from the project site as designated by the RWQCB are listed below.

- Groundwater Recharge (GWR): Includes uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
- Contact Water Recreation (REC-1): Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, waterskiing, skin diving, scuba diving, surfing, white water activities, fishing, and use of natural hot springs.
- Noncontact Water Recreation (REC-2): Includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.

- Warm Freshwater Habitat (WARM): Includes uses of water that support warm water ecosystems. These uses include, but are not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

It should be noted that in this area of the Los Angeles River, access for water recreation is prohibited by the Los Angeles County Department of Public Works (RWQCB 1995). In addition, REC-1 and REC-2 uses are suspended in engineered channels (including this portion of the Los Angeles River) during unsafe wet weather conditions (RWQCB Resolution 2003-010).

The potential beneficial uses designated by the RWQCB for this segment of the Los Angeles River are as follows:

- Municipal (MUN): Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- Industrial Service Supply (IND): Includes uses of water for industrial activities that do not depend primarily on water quality. These uses include, but are not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.
- Wildlife Habitat (WILD): Includes uses of water that support terrestrial ecosystems, including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), and wildlife water and food sources.

Clean Water Act, Section 402, National Pollutant Discharge Elimination System

Direct discharges of pollutants into waters of the United States are not allowed, except in accordance with the National Pollutant Discharge Elimination System (NPDES) program established in Section 402 of the Clean Water Act (CWA). The major purpose of the NPDES program is to protect human health and the environment by protecting the quality of water that will eventually end up in drinking water, recreational contact waters, aquatic habitat, etc.

Waters of the United States is defined in 33 CFR 328.3:

> "The term waters of the United States means:
>
> (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce . . . ;
>
> (2) All interstate waters including interstate wetlands;
>
> (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams) . . . the use, degradation or destruction of which could affect interstate or foreign commerce . . . ;
>
> (4) All impoundments of waters otherwise defined as waters of the United States under the definition; and
>
> (5) Tributaries of waters defined in paragraphs (a) (1)–(4) of this section."

Pursuant to the NPDES program, permits that apply to storm water discharges from municipal storm drain systems, specific industrial activities, and construction activities that disturb one acre or more

have been issued. NPDES permits may establish enforceable effluent limitations on discharges, require monitoring of discharges, designate reporting requirements, and require the permittee to perform best management practices (BMPs). Industrial (point source) storm water permits may be required to meet effluent limitations; municipal permits are governed by the maximum extent practicable (MEP) application of BMPs.

Construction BMPs, as well as operational BMPs for different development categories were developed by the California Storm Water Quality Association, an advisory body of municipal agencies, and are presented in four handbooks: *California Storm Water BMP Handbooks—Construction Activity, California Storm Water BMP Handbooks—New Development and Redevelopment, California Storm Water BMP Handbooks—Municipal,* and *California Storm Water BMP Handbooks—Industrial/Commercial (2003).*

State General Permit for Storm Water Discharges Associated with Construction Activity (General Construction Permit). In accordance with NPDES regulations, the State of California requires that any construction activity disturbing one acre or more of soil comply with the General Construction Activity Storm Water Permit (Water Quality Order 99-08-DWQ). To obtain authorization for proposed storm water discharges pursuant to this permit, the landowner (discharger) is required to submit a Notice of Intent (NOI) to the State Water Resources Control Board (SWRCB), prepare a Storm Water Pollution Prevention Plan (SWPPP), and implement BMPs detailed in the SWPPP during construction activities. Dischargers are required to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate storm water pollution. The purpose of the SWPPP is to prevent all construction pollutants from contacting storm water and to keep all products of erosion from moving off site into receiving waters. Certain discharges of nonstorm water, such as irrigation, pipe flushing and testing, and dewatering, are permitted as long as they do not cause or contribute to a violation of any water quality standard, violate any provision of the General Permit, require a nonstorm water permit (such as that issued by RWQCB), or violate provisions of the Basin Plan. A general description of typical construction BMPs is provided in Table 4.4.B.

SWRCB Resolution 2001-046 modified the General Construction Permit to require preparation of a sampling plan for sampling runoff and conducting laboratory analysis of the runoff under certain conditions. That is, sampling is required where runoff from a construction site directly discharges into impaired waters (pursuant to CWA Section 303[d]; refer to this section, below) due to sediment/siltation or turbidity, if there is exposure of a pollutant source to storm water that enters a storm drain or surface water (i.e., BMP failure) or where a previous corrective action has been issued. The project will not discharge directly to water impaired due to sediment/siltation or turbidity because it will discharge into the City storm drain system.

The proposed project is subject to the General Construction Permit because it will disturb one acre or more of soil during the construction phase.

Municipal NPDES Permit. The City of Long Beach has its own municipal NPDES Permit, *Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the City of Long Beach*, Order No. 99-060 (NPDES No. CAS004003). This permit specifies that all new

Table 4.4.B: Typical Construction BMPs

Construction BMPs for Incorporation, Where Applicable, into the SWPPP	Sediment	Nutrients	Pathogens	Pesticides	Metals	Other
Soil and slope stabilization utilizing the appropriate combination of natural and synthetic mattings, geotextiles, mulches, and temporary and permanent seeding.	X	X			X	
Temporary desilting basins constructed where necessary and consisting of ponds with outflow pipes designed to retain or detain runoff sufficiently to allow sediment to settle.	X	X			X	
Storm drain inlet protection utilizing an appropriate combination of barrier devices such as sandbags, straw rolls, hay bales, fiber rolls, gravel, silt fencing, screens, and temporary drain signs (raising awareness and limiting construction wastes from entering the storm drain system).	X	X			X	Trash
Energy dissipation devices installed where necessary and consisting of physical devices such as rock, riprap, and concrete rubble intended to prevent scour of downstream areas.	X	X			X	
On-site dust control and street sweeping employed when and where necessary, paying close attention to paved areas and areas susceptible to wind erosion (such as soil stockpiles).	X	X			X	Trash
Stabilized construction entrance consisting of pads of aggregate and located where traffic enters public rights-of-way; when and where necessary, wash racks or tire rinsing may be employed (tire rinse waters being directed through on-site sediment control devices).	X				X	
Diversion structures consisting of devices such as silt fencing, temporary or permanent channels, V ditches, earthen dikes, downdrains, straw bales, and sandbag check dams should be utilized where necessary to divert storm water flows from disturbed areas.	X				X	Trash
Adherence to Groundwater Extraction Permit conducting the required testing, monitoring, and discharge provisions for activities, including dewatering and foundation dewatering.	X				X	
Construction housekeeping practices consisting of practices such as barricading catch basins and manholes during paving activities; utilizing plastic sheeting, secondary containment, or bermed areas for construction materials when necessary; removing construction debris in a timely fashion; designating and lining concrete wash out areas; and berming or locating sanitary facilities away from paved areas.	X		X		X	Trash
Fertilizer, pesticide, and soil amendment management, including not overapplying such materials.		X		X		

Source: *California Stormwater BMP Handbook—Construction Activity* (2003).

development and redevelopment projects that fall under specific priority project categories must comply with the *Los Angeles County Standard Urban Storm Water Mitigation Plan* (SUSMP) (March 2000). The following projects are subject to SUSMP requirements: hillside projects; home subdivisions of 10 units or more; commercial developments of 100,000 square feet or more; and projects located adjacent to or discharging in to environmentally sensitive areas. These categories of development are considered "priority" because it has been determined by the RWQCB that they have the greatest potential to degrade water quality.

The SUSMP includes requirements for Site Design BMPs, Source Control BMPs, and Treatment Control BMPs. As labeled, Site Design BMPs are BMPs that are incorporated into the design of the project such as conserving natural areas and properly designing trash storage areas. Source Control BMPs are pollution prevention BMPs that can be structural or nonstructural practices. Examples include good housekeeping, stenciling of catch basins, protecting slopes from erosion, and maintenance of BMPs. Treatment Control BMPs are physical devices that remove pollutants from storm water and include biofilters, water quality inlet devices, detention basins, etc.

The specific SUSMP requirements are as follows:

- Postdevelopment peak storm water runoff discharge rates shall not exceed the estimated predevelopment rate for developments where the increased peak storm water discharge rate will result in increased potential for downstream erosion.
- Conserve natural areas.
- Minimize storm water pollutants of concern. This requires the incorporation of a BMP or combination of BMPs best suited to maximize the reduction of pollutant loadings in that runoff to the maximum extent practicable.
- Properly design outdoor material and trash storage areas.
- Properly design trash storage areas.
- Provide proof of ongoing BMP maintenance.
- Protect slopes and channels from erosion.
- Provide storm drain stenciling and signage.
- Design postconstruction structural or Treatment Control BMPs (unless specifically exempted) to mitigate (infiltrate or treat) a set volume of runoff using any of four methods (in general, the 85th percentile storm in a 24-hour period).

The project is subject to the SUSMP requirements because it is a commercial development that will create at least 100,000 square feet of impermeable area, including parking areas (City of Long Beach Municipal Code, Chapter 18.95[1]).

Clean Water Act, Section 303(D)

Section 303 of the CWA requires that the State adopt water quality standards for surface waters. The Basin Plan contains water quality objectives considered necessary to protect the specific beneficial

[1] http://www.longbeach.gov/apps/cityclerk/lbmc/title-18/frame.htm

uses it identifies. Section 303(d) specifically requires the State to develop a list of impaired water bodies and subsequent numeric Total Maximum Daily Loads (TMDLs) for whichever constituents impair a particular water body. These constituents include inorganic and organic chemical compounds, metals, sediment, and biological agents.

A revised list of impaired waters pursuant to Section 303(d) was approved by the EPA in July 2003. Reach 1 of the Los Angeles River, which receives surface water runoff from the project site, is listed as impaired by excessive concentrations of aluminum, ammonia, dissolved cadmium, dissolved copper, coliforms, lead, nutrients (algae), pH, scum/foam-unnatural, and dissolved zinc.

The TMDL is the total amount of a constituent that can be discharged while meeting water quality objectives and protecting beneficial uses. It is the sum of the individual load allocations for point source inputs (e.g., an industrial plant), load allocations for nonpoint source inputs (e.g., runoff from urban areas), and natural background, with a margin of safety (RWQCB 2001). The RWQCB has issued a TMDL for trash for the Los Angeles River (RWQCB Resolution No. 01-013). This TMDL requires that "zero" trash be deposited in the Los Angeles River by 2012. The trash TMDL required baseline monitoring by the permittees during the first two years and then a 10 percent reduction in trash loading each successive year until 0 percent of the baseline load has been achieved. The RWQCB has also issued a TMDL to reduce nitrogen compounds in the Los Angeles Region including the Los Angeles River (RWQCB Resolution No. 03-009). This TMDL details waste load allocations for point sources such as water treatment plants that discharge to the river.

City of Long Beach

NPDES and SUSMP regulations are set forth in Chapter 18.95 of the City of Long Beach Municipal Code. The Long Beach Storm Water Management Plan provides the methods for implementing the requirements of the City's Municipal NPDES Permit. Table 4.4.C lists source control BMPs for priority development projects and the pollutants they target.

4.4.4 METHODOLOGY

Project impacts to hydrology and water quality were evaluated based on the project's adherence to local, State, and federal standards; proposed land use; site design; and proposed BMPs for control of surface runoff and reduction of pollutants in runoff. The proposed project will maintain a large percentage of pervious area by way of fields and a detention basin that will allow substantial natural treatment of storm water runoff via filtration and infiltration processes. It is not anticipated that the project will introduce a new source of pollutants (refer to Table 4.4.A, industrial versus commercial land use), although nutrient sources may increase due to the extensive landscaping. For these reasons, a qualitative assessment of the project impacts was completed with associated mitigation to comply with numeric design standards for structural BMPs.

Table 4.4.C: Priority Development Project Categories—Required Source Control BMPs

	Sediments	Nutrients	Pathogens	Pesticides	Metals	Other
Xeriscape. Twenty-five percent of required landscape areas shall be vegetated with xeriscape (Long Beach Municipal Code Section 18.95).		X	X	X		
Residential Subdivisions. Development shall be concentrated or clustered to leave remaining land in a natural undisturbed condition. Clearing and grading of native vegetation shall be limited to the minimum needed. Trees and other vegetation shall be maximized (Long Beach Municipal Code Section 18.95; SUSMP).	X	X	X	X	X	
Erosion. Vegetate slopes with native or drought-tolerant vegetation; stabilize permanent channel crossings; and install energy dissipaters at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels (SUSMP; Long Beach Municipal Code Section 18.95)	X	X	X	X		
Parking Lots. Parking areas shall be designed to reduce impervious land coverage, to infiltrate runoff to the maximum extent practicable before it reaches the storm drain system, and to treat the remaining runoff before it reaches the storm drain system. Landscaped islands shall be incorporated (SUSMP; Long Beach Municipal Code Section 18.95).					X	Hydrocarbons; Trash
Stenciling and Signage. All storm drain inlets and catch basins within the project area shall be stenciled to prohibit dumping. Signs prohibiting dumping shall be posted at public access points along channels and creeks within the project area. Legibility of stenciling and signs shall be maintained (SUSMP; Long Beach Municipal Code Section 18.95).	X	X	X	X	X	Hydrocarbons; Trash
Trash Areas. Trash container areas in other than single-family residences shall be screened or walled to prevent off-site transport of trash. Drainage from adjoining roofs and pavement shall be diverted around trash areas (SUSMP; Long Beach Municipal Code Section 18.95).	X	X	X	X	X	Hydrocarbons; Trash
Requirement to Record. The applicant shall provide proof to the satisfaction of the superintendent of building and safety that the maintenance requirements for BMPs applicable to a parcel have been recorded against the title of the property in the office of the Los Angeles County Recorder as part of the conditions of ownership of said property (Long Beach Municipal Code Section 18.95).						

	Sediments	Nutrients	Pathogens	Pesticides	Metals	Other
BMP Maintenance. The applicant shall provide a plan to ensure ongoing maintenance for permanent BMPs. This shall include the developer's signed statement accepting responsibility for all structural and Treatment Control BMP maintenance until the time the property is transferred. All future transfers of the property to a private or public owner shall have conditions requiring the receipt to assume responsibility for the maintenance of any structural or Treatment Control BMP. The condition of transfer shall include a provision requiring the property owner to conduct maintenance inspection at least once a year and retain proof of inspection. In addition, educational materials indicating locations of storm water facilities and how maintenance can be performed shall accompany first deed transfers. For residential properties where the BMPs are located within a common area to be maintained by the homeowners' association, the project's conditions, covenants and restrictions (CC&Rs) shall include the maintenance requirements (Long Beach Municipal Code Section 18.95; SUSMP)	X	X	X	X	X	Hydrocarbons; Trash
Structural BMPs. Structural BMPs shall be designed to mitigate (infiltrate or treat) a set volume of runoff using any of four methods in the SUSMP (in general, the 85th percentile storm in a 24-hour period).	X	X	X	X	X	Hydrocarbons; Trash

Sources: Los Angeles County SUSMP (2000); City of Long Beach Municipal Code; *California Stormwater BMP Handbook—New Development and Redevelopment* (2003); *California Stormwater BMP Handbook—Construction Activity* (2003).

4.4.5 THRESHOLDS OF SIGNIFICANCE

In accordance with the California Environmental Quality Act (CEQA), the effects of the proposed project are evaluated to determine whether they will result in a significant adverse impact on the environment. The effects of the proposed project on hydrology and water quality are considered to be significant if the project will

- 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 level (e.g., the production rate of preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);
- place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality;
- 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, siltation, or flooding on or off site; and
- create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

4.4.6 IMPACTS AND MITIGATION MEASURES

In the developed condition, the project site will be divided into 11 drainage areas (Figure 4.4.2). The existing storm drain system including the detention basin will be removed. A new 108-inch reinforced concrete pipe (RCP) will be constructed downstream of Spring Street and will carry and discharge the existing pipe flow of 460 cfs (from properties north of the project site) through an energy dissipator and into a proposed 0.08-acre desilting basin. The desilting basin will connect to a new 51-inch RCP, which will run below the soccer fields and will connect to the existing 54-inch RCP at the southwest corner of the site. Because the 50-year combined off- and on-site storm flows will exceed the capacity of the downstream storm drain system, only the first 100 cfs of flow will discharge from the desilting basin into the 51-inch RCP. Flows in excess of 100 cfs will spill out of the desilting basin and into the soccer fields that act as a detention basin. The soccer field detention basin will have a total volume of 42.5 acre-feet in order to contain the 50-year storm flows beyond 100 cfs. The soccer fields will slowly drain to the 54-inch RCP as capacity allows over a 72-hour period.

The energy dissipator will prevent erosion of the desilting basin walls during major storms. The desilting basin will be designed to capture most of the sediment in the runoff and will be accessible for routine maintenance. The total storage volume of the desilting basin up to the access road will be 1.66 acre-feet.

Subareas 1A through 9A will drain to the new 108-inch RCP and will discharge to the proposed desilting basin. Subareas 10A and 11A will be collected into the 51-inch storm drain downstream of the desilting basin.

Project-produced dry weather flow (surface water runoff from nonstorm events such as excess landscape irrigation, sidewalk and driveway washing, street cleaning activities, etc.) are expected to be contained on site. Dry weather runoff from all large hardscape areas will be picked up by the proposed on-site storm drain system and discharged into the 108-inch RCP upstream of the desilting basin. The desilting basin has a capacity of 0.52 acre-foot below the outlet elevation. This capacity will allow the dry weather flows to be contained on site and percolate into the ground. Site areas downstream of the desilting basin are predominately pervious surfaces. By controlling irrigation activities in the landscaped areas, dry weather flows will be eliminated.

4.4.6.1 Less Than Significant Impacts

Groundwater Supply

As discussed in Section 4.4.1, the project site is not located within an area that is used for groundwater production. Due to the oil resources and active operations at the site, the site has not been utilized for groundwater recharge, and there are no groundwater production wells in the vicinity of the project site. The Long Beach Water Department has determined that the increased demand for potable water will not result in a significant impact (Section 4.7, Public Services and Utilities). Therefore, impacts to groundwater supply are not considered significant.

Flooding

The project site is not located within a 100-year flood hazard area,[1] and no impacts will occur.

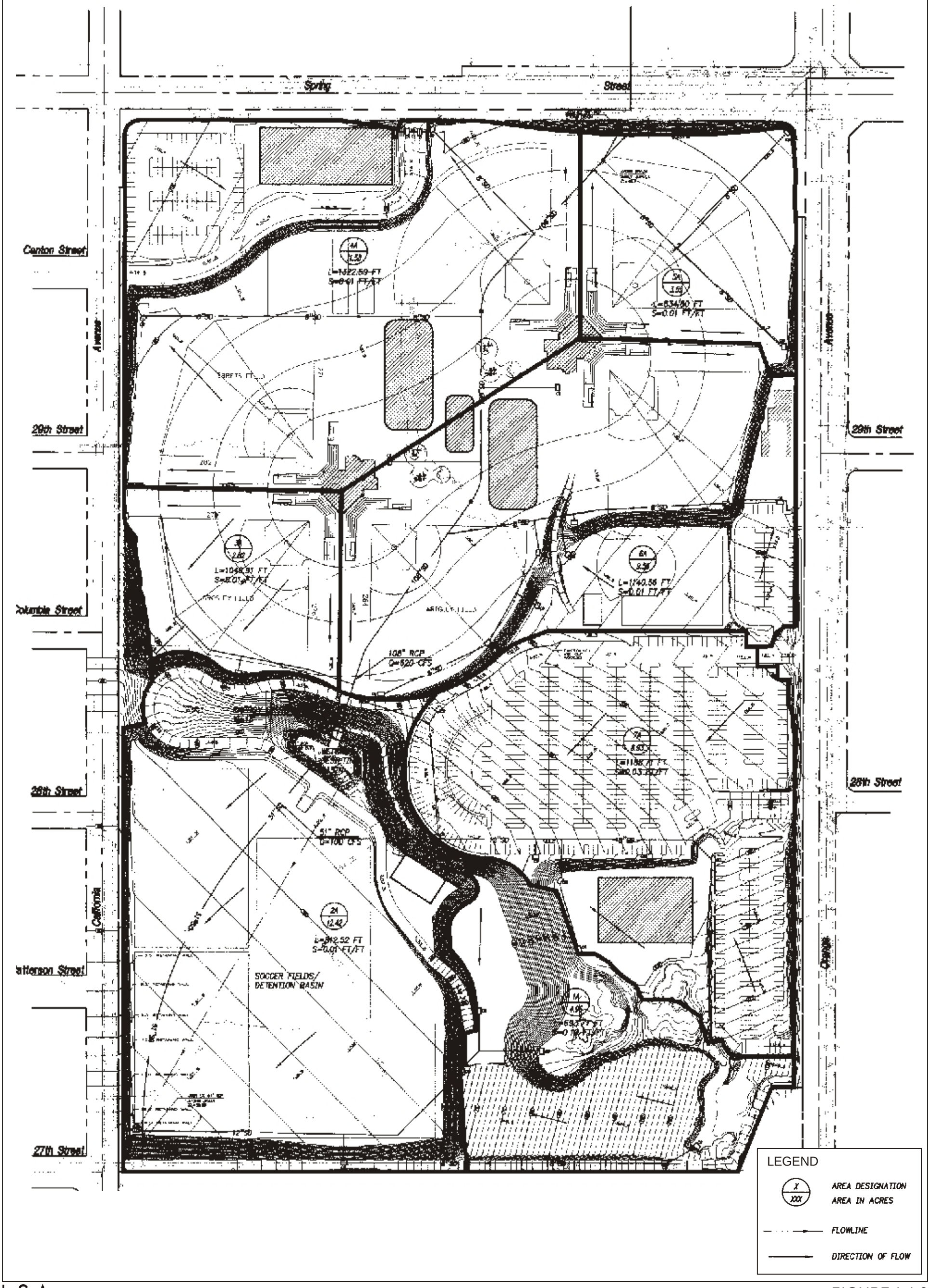
4.4.6.2 Significant Impacts

Water Quality

Construction. During construction, the City will adhere to the General Construction Permit and will utilize typical BMPs (Table 4.4.B) specifically identified in the SWPPP for the project in order to prevent construction pollutants from contacting storm water and to keep all products of erosion from moving off site into receiving waters.

The site is subject to inspection by the RWQCB during construction (General Construction Activity Permit). The General Construction Activity Permit requires the discharger (City) to inspect the site prior to an anticipated storm, during extended storm events, and after actual storm events to ensure that BMPs are functioning properly. Corrective measures are to be implemented immediately, and the RWQCB must be notified within 48 hours. Construction BMPs act as physical barriers to prevent sediment and other construction-related pollutants from leaving a construction site. By adopting this permit, the SWRCB has determined that adherence to the provisions of the General Construction Activity Permit will prevent significant impacts to water quality during project construction. As stated in Section 4.4.2, water quality monitoring is required at construction sites that directly discharge into an impaired water body or if BMPs were observed not to be effective. In this manner, the SWRCB and the RWQCB can ensure that any immediate impacts due to a failure of a BMP will not yield significant impacts to a receiving water.

[1] Flood Insurance Rate Map No. 0601360010C, July 6, 1998.



LSA

FIGURE 4.4.2

0 85 170
FEET

SOURCE: PBS&J

Long Beach Sports Park
Proposed Hydrology

I:\CLB231\G\Hydro-Prop.cdr (10/11/04)

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Because shallow groundwater has been encountered at the site during geotechnical investigations (refer to Section 4.4.2, Groundwater), it is possible that groundwater may need to be removed during construction. Discharge of groundwater into storm drains and receiving waters has the potential to significantly impact water quality. Dewatered groundwater from the site may need to be filtered prior to discharge into the storm drain system. To prevent significant impacts from dewatered groundwater, the City will comply with the RWQCB's NPDES permit requirements for this issue (Mitigation Measure 4.4.3).

Mitigation Measures 4.4.1, 4.4.2, and 4.4.3 will reduce potential waste discharge and water quality violations related to runoff during construction to less than significant levels.

Operation. Table 4.4.C lists the operational BMPs required by the City of Long Beach under the Municipal NPDES Permit for priority development projects, including the proposed project. As seen in this table, the project will be required to implement several Site Design, Source Control, and Treatment Control BMPs in order to reduce the discharge of pollutants to the maximum extent practical. As stated in the *Onsite Hydrology Report* (PBS&J 2003), Treatment Control BMPs will be incorporated into the design of the on-site storm drain system to treat project runoff in accordance with the SUSMP standards. The devices used will be selected from the list of approved devices at the time of development and may include pervious pavement (infiltration), media filters, hydrodynamic separators, vegetated swales, drain inserts, a combination of several BMPs, or any other methodology approved at the time of development. The project soccer fields are proposed to be used for extended detention. Infiltration BMPs are not allowed if the water table is less than ten feet below the system (Municipal Code Chapter 18.95).

Table 4.4.C provides a list of the BMPs that are required to be incorporated into the project as applicable under the City Municipal Code. The *California Stormwater BMP Handbook—New Development and Redevelopment* (2003) lists the Site Design and Treatment Control BMPs that should be reviewed for application to new development and redevelopment projects. Source Control BMPs that are applicable to the project are provided in Table 4.4.D, below. Table 4.4.E shows a comparison of the Treatment Control BMPs to be considered for the project, and Table 4.4.F shows the effectiveness of listed Treatment Control BMPs to remove pollutants of concern.

In order to comply with waste discharge requirements, the project SUSMP shall target control of pollutants in runoff typically produced by that land use (e.g., bacteria and viruses; nutrients; trash; oil and grease: Table 4.4.A). In order to comply with water quality standards and prevent further degradation of water quality, the project SUSMP shall address pollutants that have impaired receiving waters for the project as applicable (i.e., trash, aluminum, ammonia, dissolved cadmium, dissolved copper, coliforms, lead, nutrients [algae], pH, scum/foam-unnatural, and dissolved zinc: Section 4.4.2). Implementation of a project SUSMP that addresses these pollutants of concern to the maximum extent practicable is required to reduce potential water quality impacts to a less than significant level.

Mitigation Measure 4.4.3 will reduce potential violations of waste discharge requirements and water quality standards during operation of the project to less than significant levels, and substantial additional sources of polluted runoff will not be created.

Table 4.4.D: New Development/Redevelopment Project Site Design BMPs

Identifier	Name	Check One		Comment
		Applicable	Not Applicable	
SD-10	Site Design and Landscape Planning	√		
SD-11	Roof Runoff Controls	√		
SD-12	Efficient Irrigation	√		
SD-13	Storm Drain Signage	√		
SD-20	Pervious Pavements	√		
SD-21	Alternative Building Materials	√		
SD-30	Fueling Areas		√	No on-site fueling areas
SD-31	Maintenance Bays and Docks		√	No on-site equipment maintenance
SD-32	Trash Storage Areas	√		
SD-33	Vehicle Wash Areas		√	No on-site wash areas
SD-34	Outdoor Material Storage Areas	√		
SD-35	Outdoor Work Areas	√		
SD-36	Outdoor Processing Areas		√	No outdoor processing areas

Source: *California Stormwater BMP Handbook—New Development and Redevelopment* (2003).
SD = Site Design

Table 4.4.E: Treatment Control BMPs Considered for the Project

Identifier	Name	Check One		Comment
		To Be Considered	**Not Considered**	
TC-10	Infiltration Trench			Low soil permeability, high groundwater
TC-11	Infiltration Basin			Low soil permeability, high groundwater space constraints. Will be considered during final design
TC-12	Retention/Irrigation	√		
TC-20	Wet Pond	√		
TC-21	Constructed Wetland			Space constraints. Will be considered during final design.
TC-22	Extended Detention Basin	√		Soccer fields. Will be evaluated during final design
TC-30	Vegetated Swale	√		Considered for parking areas
TC-31	Vegetated Buffer Strip	√		Considered for parking areas
TC-32	Bioretention	√		Considered for parking areas
TC-40	Media Filter	√		
TC-50	Water Quality Inlet	√		
TC-60	Multiple Systems	√		
MP-50	Wet Vault	√		
MP-51	Vortex Separator	√		
MP-52	Drain Insert	√		

Source: *California Stormwater BMP Handbook—New Development and Redevelopment* (2003).
TC = Treatment Control
MP = Manufactured Product

Table 4.4.F: Treatment Control BMPs Selection Matrix[1]

Pollutant of Concern	Treatment Control BMP Categories							
	Water Quality Inlets	**Drain Insert[2]**	**Biofilters**	**Detention Basins[3]**	**Infiltration Basins[4]**	**Wet Ponds or Wetlands**	**Filtration**	**Hydrodynamic Separator Systems[5]**
Sediment (commercial use)	L	V	H/M	M	H/M	H/M	H/M	H/M
Nutrients (commercial use and impairment)	L	V	L	M	H/M	H/M	LM	L
Organic Compounds (commercial use)	L	V	U	U	U	U	H/M	L
Trash (commercial use and impairment)	M	V	L	M	U	U	H/M	H/M
Oxygen-Demanding Substances (commercial use)	U	U	L	M	H/M	H/M	H/M	L
Bacteria and Viruses (commercial use and impairment)	L	V	U	U	H/M	U	H/M	L
Oil and Grease (commercial use)	M	V	H/M	M	U	U	H/M	L
Metals (commercial use and impairment)	L	V						
Pesticides (nonsoil bound)	U	U	U	U	U	U	U	L

(1) Cooperative periodic performance assessment may be necessary.
(2) Removal efficiency depends on type of product. Few products have performance data collected under field conditions.
(3) For detention basins with minimum 36- to 48-hour drawdown time.
(4) Including trenches and porous pavement.
(5) Also known as hydrodynamic devices and baffle boxes.

L: Low removal efficiency
H/M: High or medium removal efficiency
U: Unknown removal efficiency
V = Variable removal efficiency

Biofilters include:
• Grass swales
• Grass strips
• Wetland vegetation swales
• Bioretention

Detention Basins include:
• Extended/dry detention basins with grass lining
• Extended/dry detention basins with impervious lining

Wet Ponds and Wetlands include:
• Wet ponds (permanent pool)
• Constructed wetlands

Filtration Systems include:
• Media filtration
• Sand filtration

Infiltration Basins include:
• Infiltration basins
• Infiltration trenches

Hydrodynamic Separation Systems include:
• Swirl Concentrators
• Cyclone Separators

Sources: Orange County DAMP, Exhibit 7.II: Model Water Quality Management Plan; *California Stormwater BMP Handbook—New Development and Redevelopment* (2003).

Drainage and Erosion

As described above, the drainage pattern in the developed condition will be similar to the existing condition. Runoff from the site will be collected in a series of catch basins and will be eventually discharged to the 54-inch RCP along with the off-site runoff. The site will be landscaped and hardscaped to prevent soil erosion and siltation, and no stream or river course will be altered.

After build out of the project, approximately 35 percent of the site will be covered with impervious surfaces (a 5 percent increase from the existing condition), including sports facilities, a commercial area, a golf center, and paved parking. This increase in impervious area will result in a corresponding increase in the total volume of water draining from the site. However, the project design incorporates a larger detention basin (in the form of soccer fields); 50-year storm flows exiting the site will be the same as in the existing condition and will not contribute to downstream flooding**.** Mitigation measures are required to ensure that project hydrology will meet drainage system standards and to ensure that BMPs, including the detention basin, are maintained.

The proposed storm drain system including the desilting basin and detention basin will be designed to accommodate off-site flows currently directed onto the site and increased flows due to the small increase in impervious area. The desilting basin and detention basin will also provide some storm water treatment benefits. Mitigation measures are required to ensure that project hydrology will meet drainage system standards and that pollutants of concern will be controlled through implementation of structural and nonstructural BMPs. With implementation of Mitigation Measures 4.4.1 through 4.4.5, the storm drain system capacity will not be exceeded, and potential erosion and siltation impacts will be reduced to less than significant levels.

Mitigation Measures.

4.4.1 The City of Long Beach shall ensure that construction plans for the project shall include features meeting the applicable construction activity BMPs and erosion and sediment control BMPs published in the *California Stormwater BMP Handbook—Construction Activity.* The construction contractor shall submit a Storm Water Pollution Prevention Plan (SWPPP) to the City that includes the BMP types listed in the handbook. The SWPPP shall be prepared by a civil or environmental engineer and will be reviewed and approved by the City Building Official prior to the issuance of any grading or building permits. The plan shall reduce the discharge of pollutants to the maximum extent practicable using management practices, control techniques and systems, design and engineering methods, and such other provisions as are appropriate. A copy of the SWPPP shall be kept at the project site.

The construction contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. The construction contractor shall inspect BMP facilities before and after every rainfall event predicted to produce observable runoff and at 24-hour intervals during extended rainfall events, except on days when no ongoing site activity takes place. Prestorm activities will include inspection of the major storm drain grate inlets and examination of other on-site surface flow channels and swales, including the removal of any debris that blocks the flow path. Poststorm activities will include inspection of the grate inlets, looking for evidence of unpermitted discharges. The construction contractor shall implement corrective actions specified by the City of Long Beach Building

Official, as necessary, at the direction of the Director of Public Works. Inspection records and compliance certification reports shall be submitted to the Director of Public Works on a monthly basis and shall be maintained for a period of three years. Inspections shall be scheduled monthly during the dry season and weekly during the wet season for the duration of project construction or until all lots and common areas are landscaped.

4.4.2 The City of Long Beach shall ensure that the project complies with the requirements of the State General Construction Activity NPDES Permit. The construction contractor shall demonstrate to the City that coverage has been obtained under the State General Construction Activity NPDES Permit by providing a copy of the NOI submitted to the SWRCB and a copy of the subsequent notification of the issuance of a Waste Discharge Identification (WDID) number or other proof of filing to the City of Long Beach Building Official.

4.4.3 The City of Long Beach shall ensure that a project SUSMP is prepared for the project in accordance with the Los Angeles County SUSMP and the Municipal NPDES Permit. The project SUSMP shall identify all of the nonstructural and structural BMPs that will be implemented as part of the project in order to reduce impacts to water quality to the maximum extent practicable by addressing typical land use pollutants and pollutants that have impaired the Los Angeles River. The SUSMP shall be reviewed and approved by the Building Official prior to issuance of a grading permit.

4.4.4 Prior to approval of a Final Parcel Map, the City of Long Beach Director of Public Works/City Engineer shall review and approve a final hydrology plan. The hydrology plan shall include any on-site structures or modifications of existing drainage facilities necessary to accommodate increased runoff resulting from the proposed project and shall indicate project contributions to the regional storm water drainage system.

4.4.5 Prior to approval of a Final Parcel Map, the City of Long Beach shall, under the direction of the Director of Public Works, design a plan to ensure ongoing maintenance for permanent BMPs. This plan shall include a statement from the Director of Parks, Recreation, and Marine indicating the City's acceptance of responsibility for all structural and Treatment Control BMP maintenance until the time the property is transferred. All future transfers of the property to a private or public owner shall have conditions requiring the recipient to assume responsibility for the maintenance of any structural or Treatment Control BMP. The condition of transfer shall include a provision requiring the property owner to conduct a maintenance inspection at least once a year and retain proof of inspection. In addition, educational materials indicating locations of storm water facilities and how maintenance can be performed shall accompany first deed transfers.

4.4.7 CUMULATIVE IMPACTS

Cumulative development in the project area is a continuation of the existing urban pattern of development that has already resulted in extensive modifications to watercourses in the area. The area's watercourses have been channelized, and drainage systems have been put into place to respond to the urbanization that has occurred in this area over the past 80 to 90 years. For all cumulative analysis related to hydrology and water quality, the cumulative projects being considered include all potential projected development discharging to Reach 1 of the Los Angeles River. Because

cumulative hydrology and water quality impacts are caused by build out of properties that increase impervious area and pollutant loads, cumulative development is considered to be the build out of the Los Angeles River Reach 1 watershed over an extended time period, resulting in complete available parcel build out.

The development of vacant lands in areas already committed to urban uses can result in increased urban pollutants in dry weather and storm water runoff from project sites. Each project must comply with NPDES permitting requirements and include BMPs to avoid impacts to water quality. The proposed project entails a conversion of land use from mostly industrial to recreational uses. The increase in impervious area with development of the project is 5 percent; 65 percent of the project site will remain pervious area. In addition, the project will incorporate Treatment Control BMPs not currently being conducted for impervious areas of the site. Therefore, the project's contribution to cumulative hydrology and water quality impacts is not considered significant.

4.4.8 SIGNIFICANCE AFTER MITIGATION

Implementation of the mitigation measures described above will reduce potential project-related hydrology and water quality impacts to less than significant levels.

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