IV. ENVIRONMENTAL IMPACT ANALYSIS
C. WATER RESOURCES
(1) HYDROLOGY

1.0 INTRODUCTION

This section addresses the potential impacts of the Proposed Project with regard to surface water and groundwater hydrology. The surface water hydrology analysis identifies surface water runoff and drainage characteristics, as well as drainage and flood control improvements. The groundwater hydrology analysis identifies subsurface stratigraphy, groundwater depth and direction of flow. The analysis addresses the impacts that would occur for the Project as Proposed, for the Project's Equivalency Program, and for the Project's secondary impacts that would occur from the implementation of the Project's off-site mitigation measures.

This section summarizes information derived from the *Water Resources Technical Report for the Village at Playa Vista Project*, Volumes I-III, finalized in August 2003 by Camp Dresser & McKee, Inc.; Psomas; and GeoSyntec Consultants. The subject technical report is included as Appendix F-1 to this EIR.

2.0 ENVIRONMENTAL SETTING

2.1 Regulatory Framework

2.1.1 Surface Water Hydrology

2.1.1.1 Federal Level

National Flood Insurance Act

The National Flood Insurance Act established the National Flood Insurance Program, which is based on the minimal requirements for flood plain management and is designed to minimize flood damage within Special Flood Hazard Areas. According to the Flood Insurance Rate Map (FIRM) from the Federal Emergency Management Agency (FEMA), the Project site falls into two different flood zones. The bluff portion of the Habitat Creation/Restoration Component is classified as Zone C – areas of minimal flooding, not requiring flood insurance. The remaining portions of the Proposed Project (Urban Development Component and the

Riparian Corridor portion of the Habitat Creation/Restoration Component) are in Zone B – areas between the limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with an average depth of less than one foot; or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. No areas of the Proposed Project site are located within Zone A (100-year flood zone) as determined by FEMA. The FIRM flood zones for the Proposed Project are shown on Figure 25 on page 347.

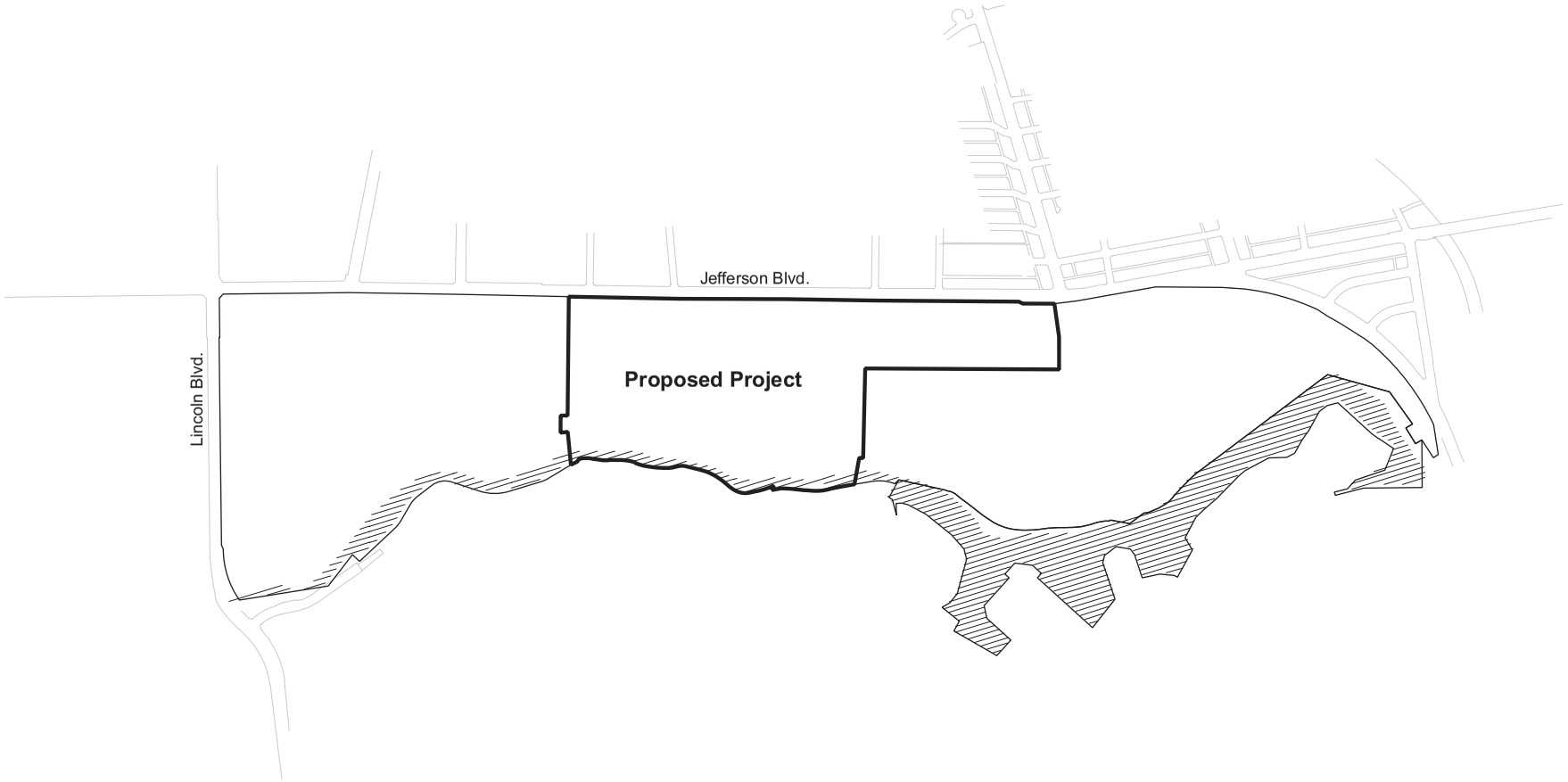
2.1.1.2 Local Level

Drainage and flood control structures and improvements in the City of Los Angeles are subject to review and approval by the City of Los Angeles, Bureau of Engineering. The City utilizes a 50-year design storm for flood control design purposes, which is a predicted storm event estimated using the City's methodology and assumptions, which are considered to be conservative.

The County of Los Angeles and the City of Los Angeles are co-permittees under the municipal stormwater National Pollution Discharge Elimination System (NPDES) permit for Los Angeles County. As part of the NPDES program, the Standard Urban Stormwater Mitigation Plan (SUSMP) was developed to address stormwater pollution from new construction and redevelopment projects. Although most of the BMPs identified in the SUSMP are focused on water quality issues such as the infiltration or treatment of stormwater runoff and reduction of the post-project discharge of pollutants from stormwater conveyance systems (addressed in Section IV.C.(2), Water Quality), one structural BMP requires that a project control peak flow discharge to provide stream channel and over bank flood protection. The Proposed Project is required to incorporate appropriate SUSMP requirements into project plans as part of the development plan approval process for building and grading permits.

2.1.2 Groundwater Hydrology

California water law governs pumping of percolating groundwater in California. Landowners overlying a groundwater basin can pump their share of groundwater utilizing their overlying rights so long as these rights have not been legally severed from the land and the groundwater pumping is limited to the landowners' correlative share, which represents the portion of the water they can pump without adversely impacting other overlying right holders. Usage of groundwater can also be controlled through a judicial adjudication, wherein water rights are partitioned out to the full potential of the basin. The Proposed Project lies within the Santa Monica Hydrologic Basin, which has not yet been adjudicated. There is no basin-wide groundwater management program within the Santa Monica Basin.



SOURCE: PSOMAS

Figure 25
Flood Insurance Rate Map
Flood Zones

CDM

2.2 Existing Conditions

The drainage system that would serve the Project site was designed to serve both the adjacent Playa Vista First Phase Project and the Proposed Project; therefore, to accurately describe the drainage setting for the Proposed Project, it is important to present the conditions of the hydrologic study area prior to the development of the adjacent Playa Vista First Phase Project ("pre-First Project").

2.2.1 Surface Water Hydrology

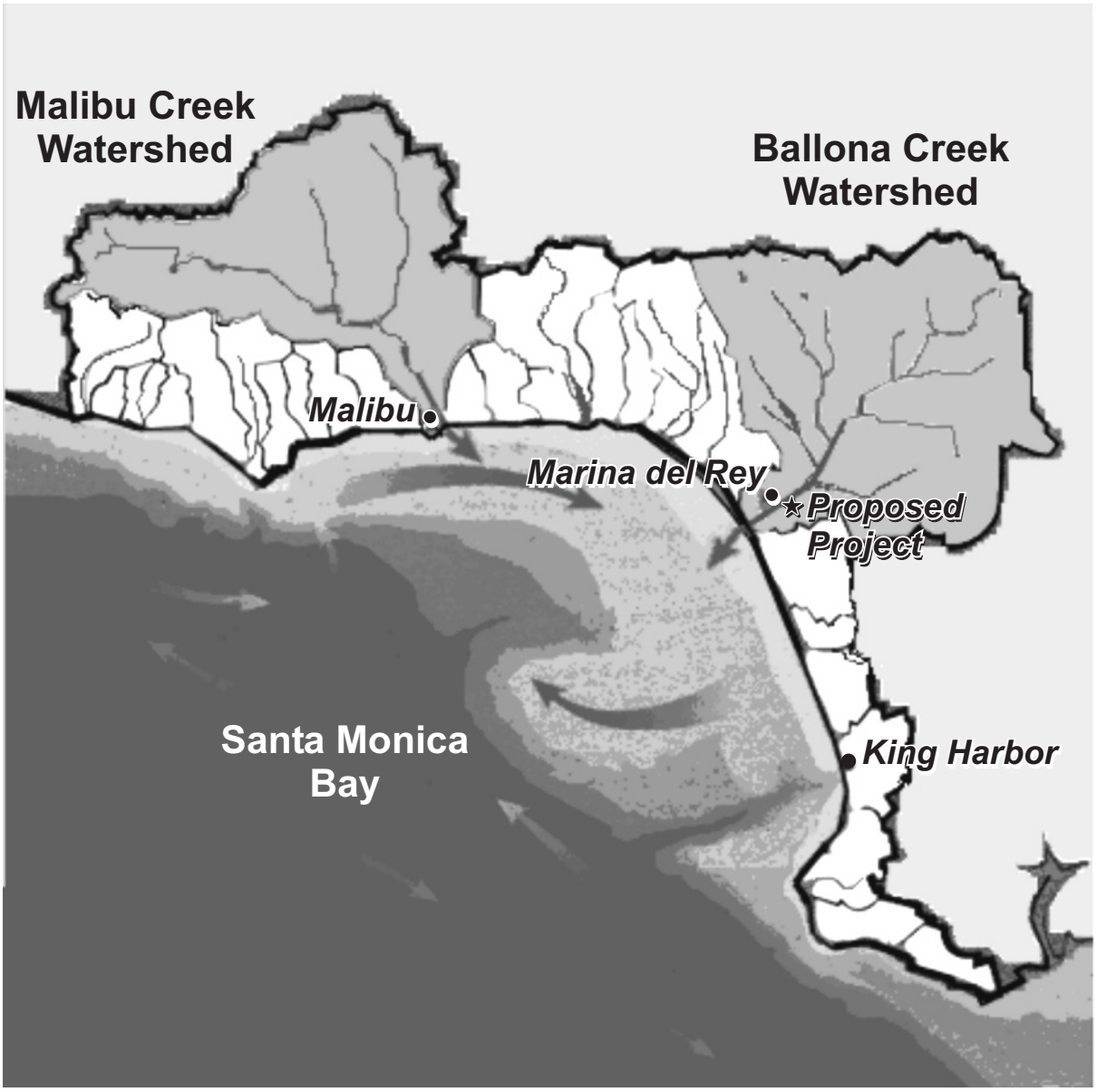
The existing surface water hydrology characteristics associated with the Proposed Project consist of, and are influenced by, a variety of watershed areas, drainage systems, and land uses. The most notable features related to the Proposed Project include: Santa Monica Bay, which receives much of the surface runoff from metropolitan Los Angeles; the Ballona Creek Watershed, including the Ballona Channel, into which the adjacent Playa Vista First Phase Project and the Proposed Project drain; and the local watersheds and drainage facilities. Figure 26 on page 349 depicts the regional relationship between Santa Monica Bay, the Ballona Creek Watershed, and the Proposed Project. The following sections describe the relevant characteristics of each.

2.2.1.1 Santa Monica Bay

Santa Monica Bay is an open embayment with a designated surface area of approximately 266 square miles. It is bordered by Point Dume to the northwest, the Palos Verdes Peninsula to the south, and the deep Santa Monica Basin offshore. Uses of Santa Monica Bay include recreational, commercial, and industrial uses. Activities include boating, swimming, fishing, power generation and runoff, and stormwater, wastewater and waste discharge. Relative to the Proposed Project, Santa Monica Bay lies approximately 2 miles west. The Proposed Project site has no direct connection to Santa Monica Bay, although all of its surface runoff drains eventually into Santa Monica Bay via the Ballona Channel.

2.2.1.2 Ballona Creek Watershed

The Ballona Channel is the major drainage channel in the vicinity of the Proposed Project site, and the majority of the runoff from the Proposed Project eventually reaches the Ballona Channel. The overall Ballona Creek Watershed, as shown in Figure 27 on page 350, drains approximately 78,000 acres. The adjacent Playa Vista First Phase Project and the Proposed Project comprise 0.5 percent of this watershed. The watershed includes portions of the Santa Monica Mountains to the north, an area west of Beverly Hills and the higher elevations of Culver City, an area extending easterly to within approximately two blocks of the Los Angeles

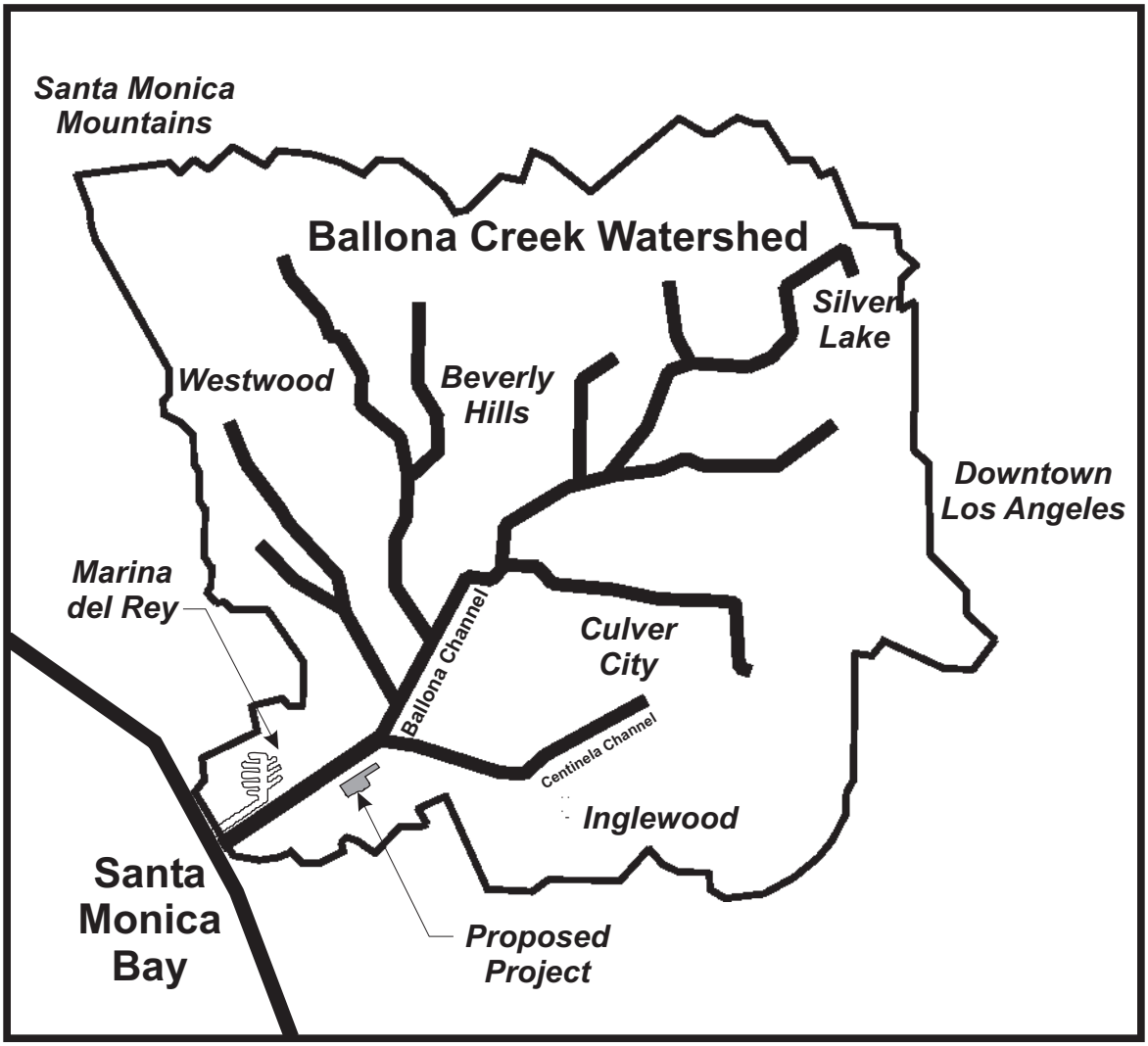


Scale: NTS

SOURCE: PSOMAS

Figure 26
Regional Hydrological Setting

CDM



SOURCE: PSOMAS

Figure 27
Ballona Creek Watershed

CDM

Coliseum, and the Ballona Escarpment (Westchester and Playa del Rey Bluffs) to the south. Approximately 76 percent of the Ballona Creek Watershed consists of highly urbanized land.[103] None of the watercourses within the watershed flow perennially from natural sources.[104] Other than urban runoff and industrial discharges, runoff into the Ballona Channel occurs only during and immediately following precipitation events.

Based on ocean tide elevations, the downstream portion of the Ballona Channel is tidally influenced to a point approximately 3,000 feet east of Lincoln Boulevard (near the confluence with Centinela Channel). However, the saltwater portion of the Ballona Channel has been determined to be approximately downstream of the channel's intersection with Culver Boulevard. The portion of the Ballona Channel between these two points is referred to as the saltwater wedge.[105]

2.2.1.3 Adjacent Playa Vista First Phase Project and the Proposed Project

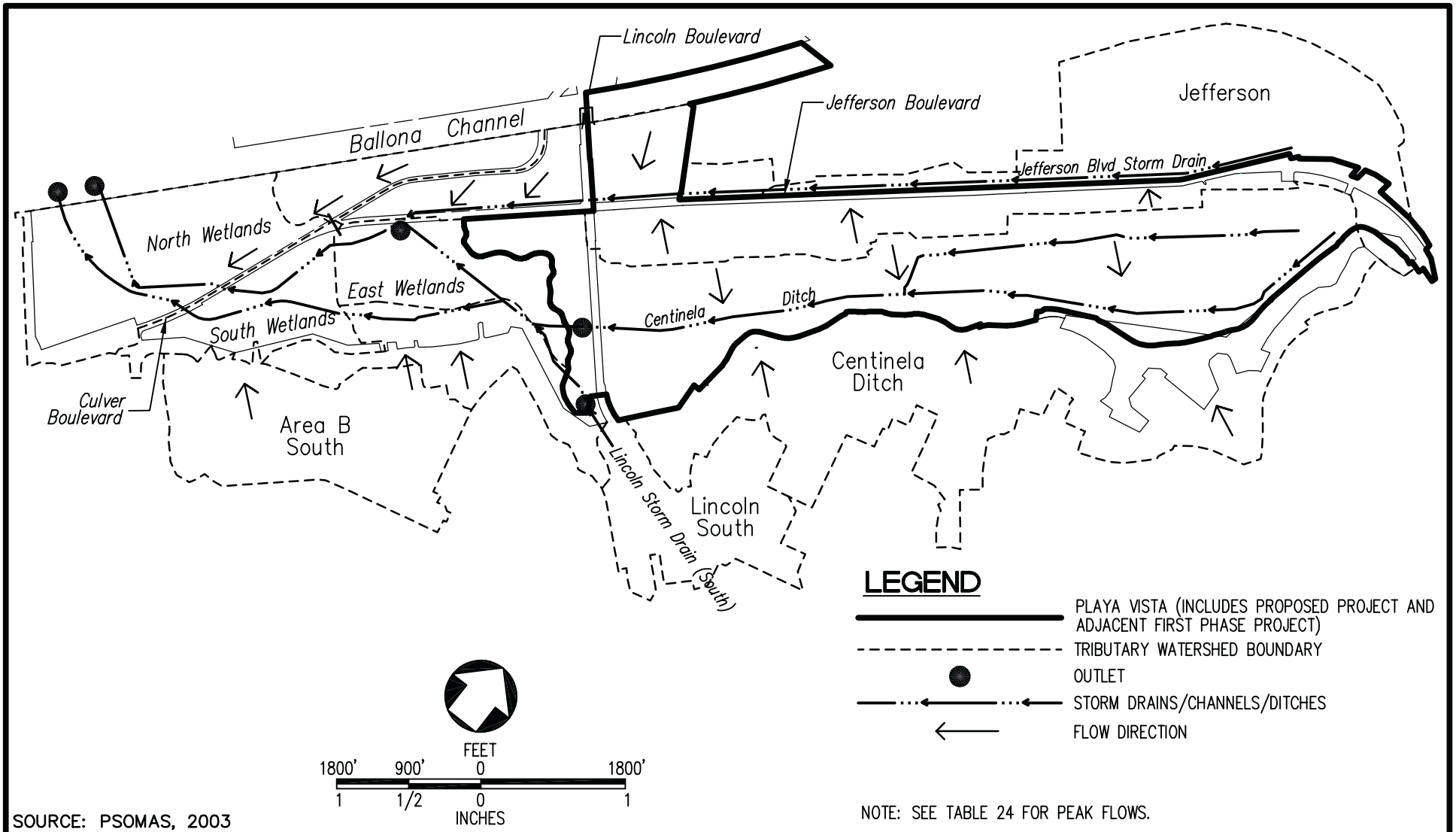
2.2.1.3.1 Local Watersheds and Drainage Areas

The total tributary area of the adjacent Playa Vista First Phase Project and the Proposed Project, which includes the upstream areas that drain to the Property, encompasses approximately 1,056 acres. Figure 28 on page 352 shows the tributary watersheds and drainage areas associated with the adjacent Playa Vista First Phase Project and the Proposed Project sites. Off-site stormwater that flows onto the adjacent Playa Vista First Phase Project and the Proposed Project sites originates from storm drains, highways, natural drainage ways, and overland flow. The off-site tributary area north of the adjacent Playa Vista First Phase Project and the Proposed Project sites is highly urbanized with relatively little pervious surface area. The off-site tributary area south of the adjacent Playa Vista First Phase Project and the Proposed Project sites includes a portion of the Ballona Escarpment (Westchester Bluffs), Loyola Marymount University, and commercial uses along Lincoln Boulevard. Due to the existing urban nature of lands to the north, and the permanent open space (bluffs) and institutional use to the south (Loyola

[103] *Los Angeles County Department of Public Works, Watershed Management. April 4, 2003 [Online] http://ladpw.org/wmd/watershed/bc/index.cfm.*

[104] *U.S. Army Corps of Engineers – Los Angeles District, "Hydrology for Feasibility Report, Ballona Channel and Sawtelle-Westwood Channel, California – Los Angeles Drainage Area," February 1979.*

[105] *The tidal prism is the intersection of freshwater and saltwater near where the Ballona Channel empties into Santa Monica Bay. It is created in the channel by the daily tidal fluctuations in the Bay as the saltwater from the Bay advances and retreats in the Channel. The water column of the tidal prism is a mixture primarily of Santa Monica Bay and, to limited extent, Marina del Rey saltwater, with freshwater from upstream flows in the Ballona Channel. Typically, the denser saltwater intruding from the Bay will become overlain by less dense freshwater flowing down Ballona Channel with some mixing and diffusion. This phenomenon is also referred to as a saltwater wedge. (Camp Dresser & McKee Inc. Ballona Creek Salinity Monitoring and Water Quality Sampling Results. August 14, 1996.)*



CDM

Figure 28
Pre-First Phase
Drainage System and Hydrology

Marymount University), no notable changes in hydrology are expected to occur for baseline conditions in those areas upstream/upgradient of the adjacent Playa Vista First Phase Project and the Proposed Project. Within the adjacent Playa Vista First Phase Project and the Proposed Project sites, the existing undeveloped areas provide substantial surface detention for runoff generated by most storms. However, during exceptionally wet weather, such as multiple-day storms, the soil becomes saturated, surface depressions are filled, and a relatively high volume of runoff occurs (see additional discussion below regarding drainage facilities), causing wide areas of temporary ponding.

The drainage area studied is located south of the Ballona Channel and encompasses approximately 1,555 acres. Of this, approximately 614 acres are upstream of the adjacent Playa Vista First Phase Project (not including the Freshwater Marsh) and Proposed Project sites; approximately 442 acres are associated with the adjacent Playa Vista First Phase Project and Proposed Project sites; and, approximately 499 acres (including the Freshwater Marsh) are downstream of the adjacent Playa Vista First Phase Project and the Proposed Project sites. The general drainage pattern in areas south of Ballona Channel is south-to-north and east-to-west. The majority of runoff is discharged to Ballona Channel through the Freshwater Marsh outlet constructed as part of the adjacent Playa Vista First Phase Project and to the Ballona Wetlands (during storm events larger than a 1-year storm only) and existing flap-gated culverts within the wetlands, located approximately 1.25 miles west of the Proposed Project.

The drainage system that serves the Project site was designed to serve both the adjacent Playa Vista First Phase Project and the Proposed Project, as well as adjacent upstream areas; therefore, to accurately describe the drainage setting for the Proposed Project, it is important to present the conditions of the hydrologic study area prior to the development of the adjacent Playa Vista First Phase Project ("pre-First Phase Project). Figure 28 on page 352 illustrates the pre-First Phase hydrology in terms of tributary areas and related storm drains. The following describes the drainage facilities related to the pre-First Phase Project hydrology of the site.

2.2.1.3.2 Drainage Facilities

Ballona Channel

In the vicinity of the adjacent Playa Vista First Phase Project and the Proposed Project, the Ballona Channel is trapezoidal, with bottom widths varying from 80 to 200 feet and depths varying from 19 to 23 feet from the top of the levee. The side slopes are lined with concrete, paving stones, and riprap (i.e., rocks with boulders); the channel bottom is unpaved. The maximum flood capacity (with no freeboard[106]) of Ballona Channel in the vicinity of the adjacent Playa Vista First Phase Project and the Proposed Project is estimated to be about 72,000 cubic

[106] *Freeboard is the distance between the waterline and the upper edge of a structure.*

feet per second (cfs).[107] The Ballona Channel falls within the jurisdictions of the County of Los Angeles and U.S. Army Corps of Engineers (USACE). The County utilizes a hypothetical 50-year storm for flood control design purposes. This design storm is substantially larger than the USACE design storms. As a comparison, for the Ballona Creek Watershed, the USACE 100-year flood has a peak flow of 56,000 cubic feet per second (cfs) and the USACE Standard Project Flood has a peak flow of 68,000 cfs. Both the USACE 100-year flood and the Standard Project Flood are less than the County's 50-year design flood of 69,800 cfs. Additionally, the County and USACE standards are less than the maximum capacity (with no freeboard) of the Channel.

The design storm data for Ballona Channel has been compared against actual stream gauge data taken at the nearest stream gauge with historical data, F38C-R, located on Ballona Channel just above Sawtelle Boulevard (upstream of the Centinela Channel). Based upon the stream gauge data from the 1940s to 1990s, 10 floods above 18,000 cfs (equivalent to approximately 24,000 cfs at the site) have occurred. The largest storm on record during this period of 32,500 cfs (estimated 40,000 cfs at the site) occurred on November 21, 1967. The largest recent storm occurred on March 10, 1995 – a peak flow of 24,000 cfs was measured (estimated 30,000 cfs at the site). Maximum stage was 5.3 feet above mean sea level (AMSL) at the site, and remained above 5 feet AMSL for an hour. By comparison, the design storm (a hypothetical 50-year storm assumed for the sizing and design of flood control facilities, as described above) stays above 5 feet AMSL for 4 hours. Accounting for peak and duration, the storm gauge data is well within the parameters of the design storm.

Due to the highly urbanized nature of the Ballona Creek Watershed, and debris control structures in undeveloped upstream areas, bedload (coarse natural materials including gravel and rocks) in the Ballona Channel is negligible. During large storms, manmade debris is often present in the runoff, collecting at bridge piers. Under pre-First Phase conditions, runoff from the site collected in low-lying areas adjacent to the Ballona Channel, where sediment in the runoff settles.

Pre-First Phase Drainage Facilities

Table 23 on page 355 compares the pre-First Phase drainage system capacities with the 50-year storm event runoff. The major drainage facilities under pre-First Phase conditions are described below**.**

Centinela Ditch – During pre-First Phase conditions, Centinela Ditch ran east-to-west along Teale Street (subsequently realigned and renamed Bluff Creek Drive). The upstream end

[107] *U.S. Army Corps of Engineers – Los Angeles District, "Hydrology for Feasibility Report, Ballona Channel and Sawtelle-Westwood Channel, California – Los Angeles Drainage Area," February 1979.*

Table 23

PRE-FIRST PHASE DRAINAGE SYSTEM CAPACITY

Drainage System	Pre-First Phase Capacity (cfs)	Total Tributary Area (acre)	50-Year Storm Event Runoff (cfs)
Centinela Ditch	210	570	629
Jefferson Storm Drain	380 [a]	395 [b]	457
Lincoln Storm Drain South	210	91	209
Playa Vista Tributary Total	N/A	1056	1,295
Ballona Wetlands Tributary Total	N/A	499	914
Total		1,555	2,209

cfs = cubic feet per second
N/A = Not Applicable

[a] *This is the estimated capacity of Jefferson Storm Drain at the pre-First Phase outlet to the Ballona Wetlands. Runoff flows indicated in this table and in Table 24 on page 375 refer to flows through Jefferson Storm Drain at the outlet.*

[b] *Acreage is totaled at the former outlet west of the Freshwater Marsh and includes the area between Culver and Jefferson Boulevards, west of Lincoln Boulevard.*

Source: Psomas.

of the ditch was near the east end of the former Howard Hughes Plant Site (Plant Site). It was an unlined, earthen, trapezoidal open channel from near the west end of the Plant Site to Lincoln Boulevard, and a variable-sized closed-conduit storm drain through the most of Plant Site. The ditch collected stormwater from existing developments on the Westchester Bluffs through several major and minor storm drain systems. It also drained the south portion of the adjacent Playa Vista First Phase Project and the Proposed Project sites and discharged into the East Wetland portion of the Ballona Wetlands (see Figure 28 on page 352).

Jefferson Boulevard Storm Drain – During pre-First Phase conditions, the Jefferson Boulevard Storm Drain ran along the centerline of Jefferson Boulevard from Randall Street to the East Wetland portion of the Ballona Wetlands. The upstream end of the drain was at the intersection of Centinela Avenue and Major Street. The storm drain was a variable-sized reinforced concrete box that was 8.5 feet wide by 5.75 feet high at Randall Street and 12 feet wide by 7.25 feet high at the outlet. During pre-First Phase conditions, the capacity of the Jefferson Boulevard storm drain at the pre-First Phase outlet to the Ballona Wetlands was estimated at 380 cfs. It is estimated that 50-year storm events would generate 457 cfs in the drain, which is greater than the capacity of the drain. Historically, this drain has been observed to flood in the vicinity of the intersection of Jefferson Boulevard and Centinela Avenue.

During pre-First Phase conditions, the Jefferson Boulevard Storm Drain collected stormwater from off-site developments north of Jefferson Boulevard, portions of the adjacent

Playa Vista First Phase Project and the Proposed Project immediately adjacent to Jefferson Boulevard, and the area between Culver and Jefferson Boulevards, west of Lincoln Boulevard.

Lincoln Drain South – Under pre-First Phase conditions, the outlet of the Lincoln Drain South discharged into the area where the Freshwater Marsh has been constructed on the west side of Lincoln Boulevard near Teale Street. The drain carried off-site flows from developments south of the adjacent Playa Vista First Phase Project and the Proposed Project and to the east and west of Lincoln Boulevard.

Ballona Wetlands – Under pre-First Phase conditions, runoff originating from within the wetland and upland areas located south of Ballona Channel and west of Lincoln Boulevard, portions of the Playa del Rey Bluffs, and the Playa del Rey area, was conveyed to the degraded Ballona Wetlands system. Once runoff reached the Ballona Wetlands, the runoff flowed to two channels that discharged into the Ballona Channel through flap-gate systems.

Within the Ballona Wetlands, limited-capacity (i.e., relatively shallow and/or narrow) channels carried low-flows through the three areas of the Ballona Wetlands. The three areas included the East Wetland, the South Wetland, and the North Wetland (see Figure 28 on page 352). During pre-First Phase conditions, the East Wetlands was primarily a freshwater system with ponding due to low points, while the North and South Wetlands were saltwater wetlands with well-defined channels. Low-flows passed through the areas of the Ballona Wetlands in an east-to-west direction through the East Wetland to the flap-gated outlets to Ballona Channel in the North Wetland. The capacity of existing culverts under a bermed Southern California Gas Company (SCGC) access road, which is the boundary between the East and South Wetlands, and under Culver Boulevard, which is the boundary between the South and North Wetlands, was limited. As such, under pre-First Phase conditions, the wetland areas acted like detention/filtration basins and the linear drainage pattern associated with the existing channels became undefined during flood events.

In addition, during the 50-year storm event, development along the west end of Culver Boulevard and the SCGC facilities at the toe of the Playa del Rey Bluffs were susceptible to flooding. Culver Boulevard was below the flood level of Ballona Channel. During high water stages in Ballona Channel, all stormwater runoff from the subject study area flowed into the Ballona Wetlands. Under the 50-year storm, portions of Culver Boulevard and possibly areas in adjacent Playa del Rey would be flooded because of their low elevation and insufficient stormwater detention capacity in the Ballona Wetlands. Similarly, Lincoln Boulevard at the Centinela Ditch was subject to flooding during major storm events when there was insufficient stormwater detention capacity in the Centinela Ditch culvert and area east of Lincoln Boulevard.

Existing Drainage Facilities

Since the adjacent Playa Vista First Phase Project has not been completed, the existing conditions represent an intermediate phase. Implementation of the adjacent Playa Vista First Phase Project, which includes completion of the Freshwater Marsh and the first phase of the Riparian Corridor, is altering the baseline conditions for land uses to the east and west of the Proposed Project site and the related drainage system. This subsection provides a comparison of the existing drainage facilities and pre-First Phase conditions. Portions of the adjacent Playa Vista First Phase Project remaining to be constructed are also described.

Centinela Ditch – All of the Centinela Ditch within the adjacent Playa Vista First Phase Project has been removed as a result of site preparation and construction activities in compliance with construction plans and permits approved by the USACE, California Department of Fish and Game (CDFG) and City of Los Angeles. These permits include USACE Permit No. 90-426-EV, CDFG 1603 Streambed Alteration Agreement No. 5-693-93, and applicable grading/stockpiling permits within the adjacent Playa Vista First Phase Project area. In addition, within the Proposed Project site, most of the ditch has been removed as part of the Erosion Control Plan approved by the City of Los Angeles, Department of Public Works, for the adjacent Playa Vista First Phase project. As under pre-First Phase conditions, the remainder of the ditch collects stormwater from existing developments on the Westchester Bluffs through several major and minor storm drain systems. Under existing conditions, it also drains the south portion of the site and discharges through a temporary detention basin (discussed below) into the Central Storm Drain (approved and constructed as part of the adjacent Playa Vista First Phase Project) under Lincoln Boulevard and into the Freshwater Marsh.

As part of the adjacent Playa Vista First Phase Project's Stormwater Pollution Prevention Plan (SWPPP) and Erosion Control Plan, the City of Los Angeles Department of Public Works has approved the excavation and maintenance of these temporary detention basins have been created in the Proposed Project site (located south of Runway Road and generally west of Building 45). Temporary detention basins provide temporary storm drainage and control sediments for the adjacent Playa Vista First Phase areas currently under construction, west of the Proposed Project site, that will ultimately drain into the Riparian Corridor, as well as portions of the eastern portion of the adjacent Playa Vista First Phase Project site, which will ultimately drain to the Central Storm Drain or the Riparian Corridor. It is expected that the temporary drainage facilities will remain on the Proposed Project site pursuant to the SWPPP as may be modified from time to time. At completion of the adjacent Playa Vista First Phase Project, the eastern and western portion of the Riparian Corridor will have been constructed to replace the Centinela Ditch.

Central Storm Drain (approved as a part of the adjacent Playa Vista First Phase Project) – The entire tributary area of the Central Storm Drain is within the boundaries of the

adjacent Playa Vista First Phase Project and the Proposed Project. The upstream terminus of the drain is at the intersection of Artisans Way and Waterfront Drive in the eastern portion of the adjacent Playa Vista First Phase Project site. It drains east to west, extending along Waterfront Drive, Millennium Street, Runway Road, Pacific Promenade, and Playa Vista Drive and discharges into the Freshwater Marsh. The circular pipe ranges in diameter from 42 inches to 96 inches, with equivalent hydraulic capacity rectangular boxes used in some sections to provide utility clearances as necessary. The Central Storm Drain is in operation in the western portion of the adjacent Playa Vista First Phase Project area and is largely completed within the eastern portion of the adjacent Playa Vista First Phase Project site. The remaining (central) portion of the Central Storm Drain (under Runway Road), as approved as part of the adjacent Playa Vista First Phase Project, will be constructed as necessary for stormwater management.

Jefferson Boulevard Storm Drain – As part of the adjacent Playa Vista First Phase Project, the Jefferson Boulevard Storm Drain west of Lincoln Boulevard was abandoned and a new section was built to divert the Jefferson Boulevard Storm Drain runoff into the Freshwater Marsh (instead of the Ballona Wetlands). The northeast corner of the Lincoln and Jefferson Boulevard intersection constructed with the adjacent Playa Vista First Phase Project also drains into the Jefferson Boulevard Storm Drain. These changes will not result in any increased flows (i.e., additional backup of water) in the Jefferson Boulevard Storm Drain. It is estimated that 50-year storm events with the adjacent Playa Vista First Phase Project and the Proposed Project would generate 404 cfs in the drain, which is less than the estimated 457 cfs generated under a 50-year storm event with the pre-First Phase Project. With these modifications, all runoff from new development within the adjacent Playa Vista First Phase Project and the Proposed Project will be routed through the Freshwater Marsh. All approved modifications to the Jefferson Boulevard Storm Drain have been completed.

Lincoln Drain South – The Lincoln Drain South is the same under existing conditions as it was under pre-First Phase conditions, except a concrete swale[108] drains the flow northerly along Lincoln Boulevard and outlets into the Freshwater Marsh. Once the western portion of the Riparian Corridor has been completed, as approved for the adjacent Playa Vista First Phase Project, the Lincoln Drain South will be rerouted to drain into the Freshwater Marsh via the Riparian Corridor culvert under Lincoln Boulevard, thus completing the approved modifications.

Freshwater Marsh (approved as part of the adjacent Playa Vista First Phase Project) – Prior to construction of the Freshwater Marsh, 100 percent of untreated runoff flows from the 1,555-acre tributary watershed drained directly into the Ballona Wetlands and then into the Ballona Channel. The Freshwater Marsh is one of two major components of the overall Freshwater Wetlands System that was designed and subsequently permitted by the relevant governing agencies as a comprehensive system to enable the adjacent Playa Vista First Phase

[108] *A concrete swale is a shallow trough-like depression that carries water.*

Project and the Proposed Project, at buildout, to: (1) control the amount of freshwater flowing to the Ballona Wetlands and Ballona Channel; (2) substantially reduce the amount of surface water pollutant loads to the Ballona Wetlands; and (3) achieve a no net increase in pollutant loads to the Ballona Channel and Santa Monica Bay (see Section IV.C.(2), Water Quality, for a discussion of the last two points). The Freshwater Marsh has been designed to receive stormwater and dry weather runoff from the Jefferson Boulevard Storm Drain, the Central Storm Drain, the Riparian Corridor, and the Lincoln Drain South. These drainage systems outlet into the Freshwater Marsh at pre-treatment catchment areas (i.e., primary management areas).

The Freshwater Marsh serves as a means to divert freshwater flows from existing and new development away from the existing Ballona Wetlands salt marsh. During most runoff events, the Freshwater Marsh will discharge into Ballona Channel directly through flap-gated culverts; however, an overflow spillway is provided into the Ballona Wetlands to divert major storm flows (over 1-year storm levels). The Freshwater Marsh is divided from the Ballona Wetlands by a berm. The slopes of the berm vary from 10:1 to 5:1 horizontal-to-vertical in order to promote the establishment of wetland vegetation and provide biological protection against erosion of the berm. A design feature of the Freshwater Marsh allows flexibility to release freshwater to the Ballona Wetlands through a gated valve should it be necessary in conjunction with the design or maintenance of the salt marsh. Under normal conditions, storm flows greater than a 1-year storm will flow over the overflow spillway into the existing Ballona Wetlands. The storm overflow drains through the East, South, and North Wetland portions of the Ballona Wetlands and outlets into Ballona Channel. Only the southern portion of the Freshwater Marsh (approximately 8 acres) currently remains to be constructed. Completion of the Freshwater Marsh, as approved for the adjacent Playa Vista First Phase Project, is expected in 2004.

Area Northwest of Lincoln/Jefferson Intersection – The area between Culver and Jefferson Boulevards, west of Lincoln Boulevard, which use to drain into the Jefferson Boulevard Storm Drain, now drains directly into the Freshwater Marsh outlet when the flapgates at Ballona Channel are open. The flapgates remain open as long as the Freshwater Marsh is hydraulically higher than the Ballona Channel. When the flapgates close (normally this would occur during major storm events) temporary ponding in the area would occur until the flapgates reopen. All modifications to this area have been completed.

Ballona Wetlands – The Ballona Wetlands are very similar under existing conditions compared to pre-First Phase conditions except that the Freshwater Marsh regulates upstream flows entering the wetlands. The capacities of existing culverts under a bermed SCGC access road, which is the boundary between the East and South Wetlands, and under Culver Boulevard, which is the boundary between the South and North Wetlands, are limited. As a result, the wetlands act like detention/filtration basins and the linear drainage pattern associated with the existing channels becomes undefined during flood events. The East Wetlands are primarily a freshwater system, subject to long-term ponding due to low points within the wetland areas. The

North and South Wetlands are saltwater wetlands, with well-defined channels. A USACE Section 1135 Project was recently constructed to modify the existing flap-gated culverts between Ballona Channel and the North Wetlands to allow increased tidal exchange within the existing tidal channels of the Ballona Wetlands. Tidal flow is maintained within the existing tidal channels, and the Section 1135 Project does not substantially affect the flood hydrology.[109]

2.2.2 Groundwater Hydrology

2.2.2.1 Regional Groundwater System

The Proposed Project is located on the Ballona Gap, a subunit at the southern edge of the Santa Monica hydrologic basin of the Coastal Plain of Los Angeles (see Figure 29 on page 361). The Ballona Gap is a younger alluvial plain that was initially formed by headward erosion from the ocean, capturing drainage from the Sawtelle Plain and the Hollywood Piedmont Slope.[110]

Resultant deposits within the Ballona Gap form the Ballona Aquifer and include coarse sand, gravel, and cobbles. The Ballona Aquifer varies in thickness from less than 10 feet at the coast to 40 feet near Beverly Hills, and generally occurs at the Proposed Project site at a depth of approximately 50 feet below native grade.[111] Relative to the adjacent Playa Vista First Phase Project and the Proposed Project, the San Pedro Formation underlies the alluvial deposits. The Silverado Aquifer occurs as a member of the San Pedro Formation. Figure 30 on page 362 presents a general cross-section through the aquifer system under the adjacent Playa Vista First Phase Project and the Proposed Project, which roughly follows the alignment of the Ballona Channel, indicating the approximate elevations and relationships of the Bellflower, Ballona and Silverado Aquifers.

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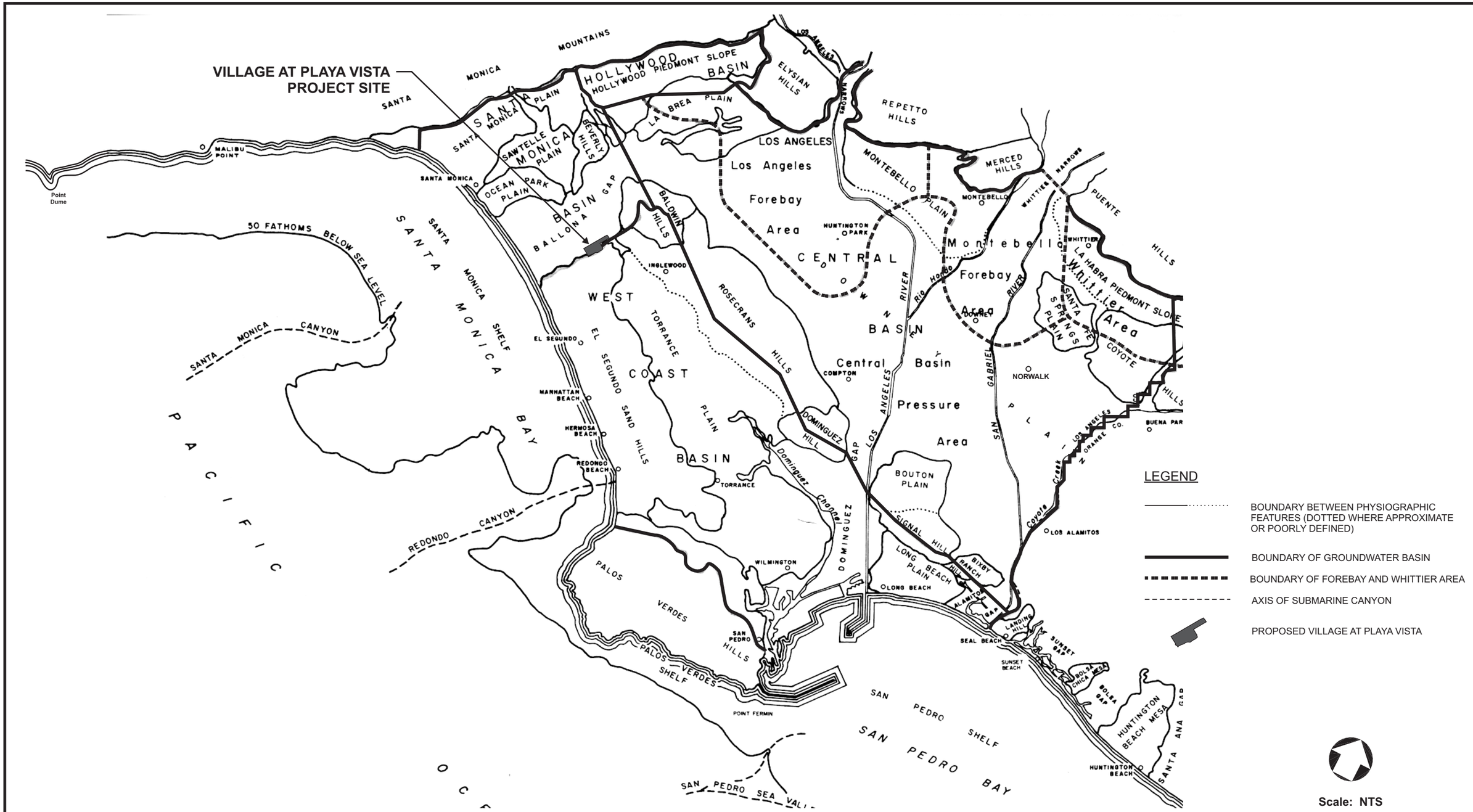
[109] *The USACE recently completed construction of a project within the northerly area of the Ballona Wetlands known as "The Ballona Wetlands Section 1135 Ecosystem Restoration Project" (Section 1135 Project). The Section 1135 Project included the retrofitting of two of three existing 60-inch corrugated metal pipe culverts located on the south levee of the Ballona Creek Flood Control Channel (Ballona Channel). The culvert retrofit consisted of the attachment of two self-regulating tide-gates (mechanical devices that automatically open and close based on tidal water levels) to the existing culverts at the eastern drainage channel from the Ballona Wetlands (North Wetlands). The water surface elevation in the tidal channels will range from 0.8 feet AMSL to 1.2 feet AMSL. During flood conditions, the tidal gates will close, preventing storm flows from entering the Ballona Wetlands from Ballona Channel.*

[110] *California Department of Water Resources, Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County, Bulletin 104, 1961, page 35.*

[111] *California Department of Water Resources, Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County, Bulletin 104, 1961, page 52.*



SOURCE: CALIFORNIA DEPARTMENT OF WATER RESOURCES, GROUNDWATER GEOLOGY OF THE COASTAL PLAIN OF LOS ANGELES COUNTY, PHYSIOGRAPIC FEATURES AND GROUNDWATER BASINS.

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Figure 29
Regional Groundwater Hydrologic Basins

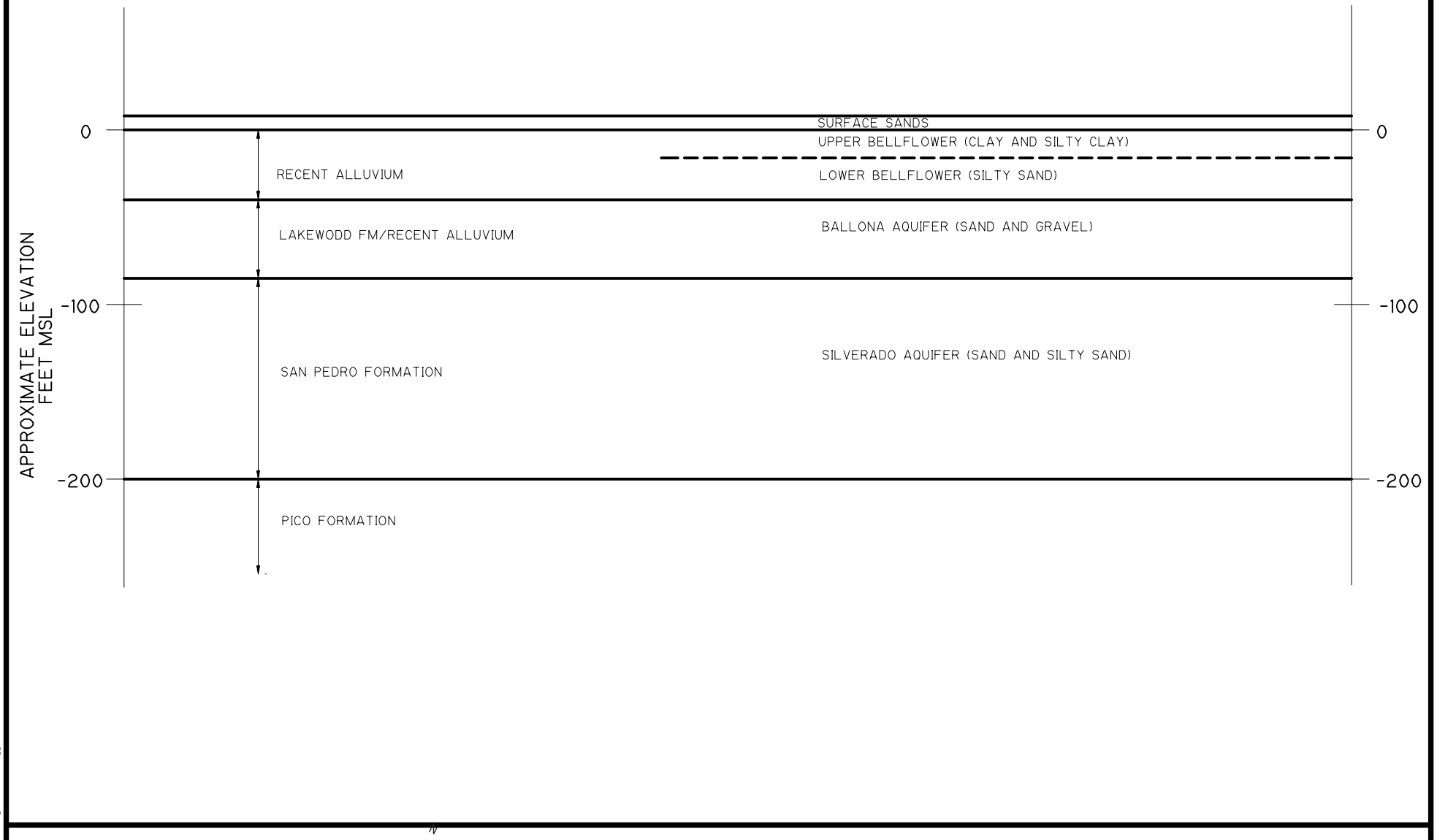

Figure 30

Generalized Aquifer Cross-Section

The Silverado Aquifer extends throughout most of the Coastal Plain of Los Angeles County and into Orange County.[112] The thickness of the Silverado Aquifer varies throughout the Coastal Plain and reaches a maximum thickness of approximately 500 feet near Lakewood. The maximum depth of the aquifer is approximately 1,200 feet below sea level at a location about three miles southeast of Norwalk.[113] Beneath and near the adjacent Playa Vista First Phase Project and the Proposed Project, the Silverado Aquifer occurs within the San Pedro formation, which is composed of sand, gravel, and a small amount of clay.[114] The Silverado Aquifer is estimated to range in depth from about 100 to 200 feet beneath the adjacent Playa Vista First Phase Project and the Proposed Project sites. Several distinct sand/gravel zones exist in the Silverado, which are separated by finer-grained units. The uppermost coarse-grained unit appears to be in contact with the Ballona Aquifer.[115] Regional water level contours suggest that groundwater in the Silverado Aquifer flows in an east to northeast direction.[116] An artificial recharge area, the West Coast Basin Barrier Project (WCBBP), is located about 5.5 miles south of the site. The WCBBP is an injection project to prevent seawater intrusion in the area. Groundwater flows out radially from this area for a few miles, but the general trend is away from this recharge area in an east to northeast flow.[117] Both the WCBBP and groundwater extraction in the Inglewood/Hawthorne area influence the regional groundwater flow direction.

2.2.2.2 Local Groundwater System

Hydrogeology/Stratigraphy

Recent (Holocene) deposits underlying the adjacent Playa Vista First Phase Project and the Proposed Project sites extend to depths ranging from approximately 40 to 120 feet. The Bellflower Aquitard, which consists of clay, silty and sandy clay, clayey silt, and fine sand, is found at depths near the surface to about 35 feet below the surface at the site.[118] The Basal unit (or lowermost unit) of the recent sediments consists of medium to coarse sand and gravel, which ranges from approximately 10 to 40 feet thick, and is known as the Ballona Aquifer. Between

[112] *California Department of Water Resources, Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County, Bulletin 104, 1961, page 73.*

[113] *California Department of Water Resources, Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County, Bulletin 104, 1961, page 75.*

[114] *Converse Consultants, Comprehensive Geotechnical Report, May 29, 1981, page 10.*

[115] *Hargis and Associates, "Summary of Hydrogeologic Conditions, Summa Corporation Facility, Culver City," December 8, 1986, pages 3 and 7.*

[116] *County of Los Angeles Department of Public Works, Coastal Plain Deep Aquifer Groundwater Contour Map for Fall, 1994.*

[117] *County of Los Angeles Department of Public Works, Coastal Plain Deep Aquifer Groundwater Contour Map for Fall, 1994.*

[118] *McLaren Environmental Engineering, Site Investigation and Evaluation of Remedial Measures, Howard Hughes Property Plant Site, May 8, 1987, pages II-5 and Figure II-2.*

the Bellflower Aquitard and Ballona Aquifer are transitional deposits (See Figure 31 on page 365). Regionally, the Ballona Aquifer occurs at a depth of 35 to 50 feet and readily transmits water.[119] Locally, these recent sediments appear to terminate at the south end of the adjacent Playa Vista First Phase Project and the Proposed Project sites, at an erosional nonconformity along the Ballona Escarpment.

The lower sand and silty sand sediments of the Bellflower Aquitard are in direct contact with the underlying Ballona Aquifer sands and gravel. Although these two units are indicated to be distinctly different hydrogeologic units in some areas, beneath some areas of the adjacent Playa Vista First Phase and Proposed Project, the lower, more permeable portion of the Bellflower Aquitard and the Ballona Aquifer together compose a single hydraulically connected hydrogeologic unit, which is referred to as the Merged Bellflower/Ballona Aquifer, or simply the Bellflower/Ballona Aquifer.[120, 121] The extent of hydraulic connection between the Bellflower and Ballona units is uncertain.[122] Groundwater flow within the shallow groundwater units is generally to the north.[123]

Groundwater levels are relatively shallow beneath the site. While there is an overall trend of lower water levels on the eastern end of the Proposed Project site, reflecting the regional inland gradients in the main Aquifer units, local differences in shallow water levels and gradients are observed within different areas of the site. Such differences can result from several factors such as: varying stratigraphy (e.g., discontinuous levels of varying permeability); localized topographic differences; variable sources of shallow recharge including surface flow and subsurface recharge from the bluffs to the south; seepage from the ocean and possibly Ballona Channel, which is tidally influenced; uneven surface recharge from runoff infiltration due to varying soil conditions; and seasonal variations in precipitation. Groundwater flow beneath the site within the deep aquifer system (Silverado) is generally to the northeast.[124]

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[119] *Hargis and Associates, "Summary of Hydrogeologic Conditions, Summa Corporation Facility, Culver City," December 8, 1986, page 6.*

[120] *California Department of Water Resources, Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County, Bulletin 104, 1961, pages 47, 48, 51, and 52.*

[121] *Hargis and Associates, "Summary of Hydrogeologic Conditions, Summar Corporation Facility, Culver City," December 8, 1986, page 6.*

[122] *Mr. Steve McArdle, Project Geologist, Law/Crandall, Inc., Telephone Communication, March 7, 1996.*

[123] *Camp Dresser & McKee, Inc., "Third Quarter 2002 Groundwater Monitoring and Progress Report," October 15, 2002. (Appendix D-3 of this EIR.)*

[124] *Camp Dresser & McKee, Inc., "Third Quarter 2002 Groundwater Monitoring and Progress Report," October 15, 2002.*

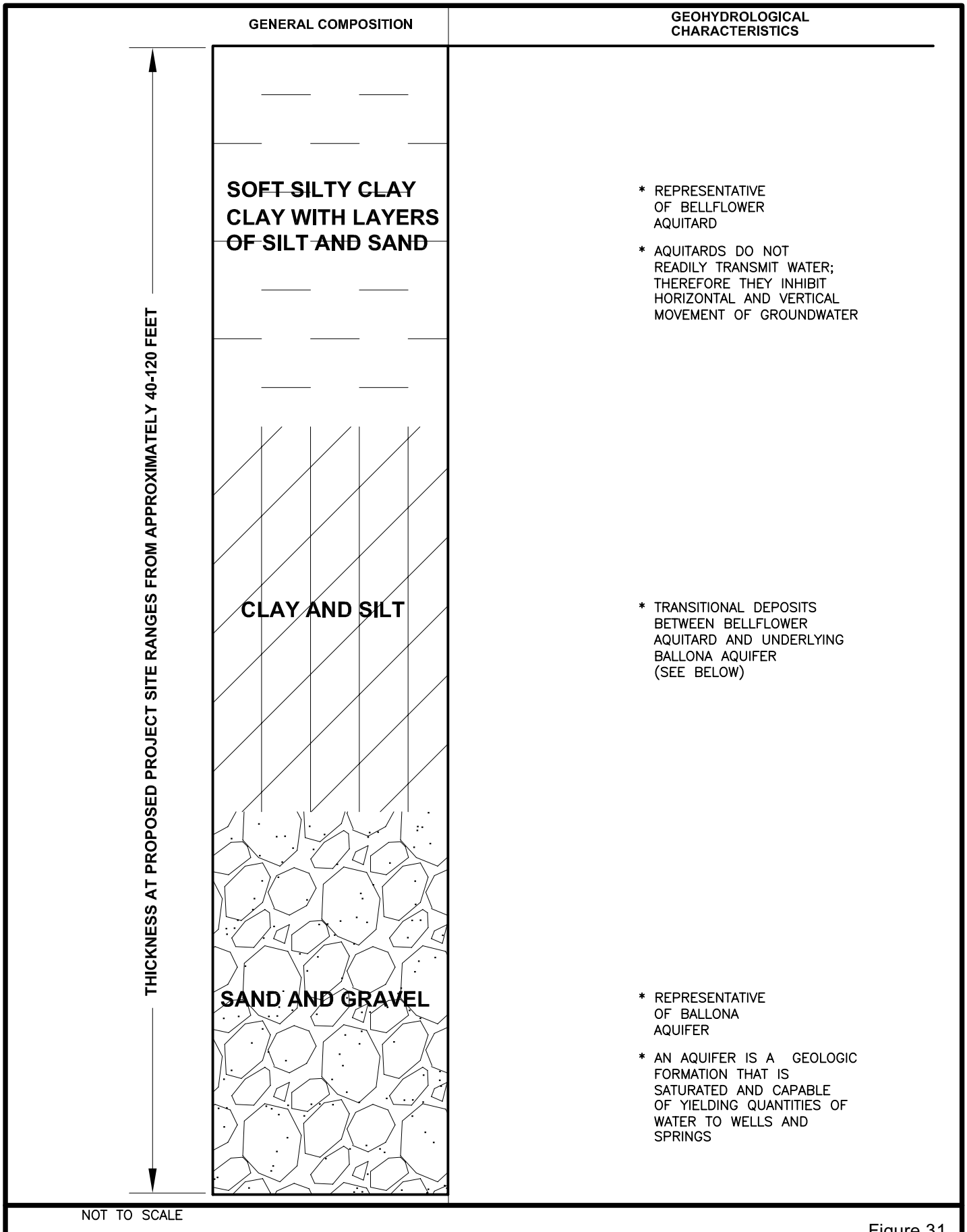

Figure 31

General Stratigraphic Column of Alluvium Typical of the Proposed Project Site

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Site-Wide Groundwater Flow

The direction of groundwater flow varies throughout the adjacent Playa Vista First Phase Project and the Proposed Project sites, but under the Proposed Project the groundwater flow is generally to the north or northeast, away from the ocean. Throughout the site, several factors control groundwater elevation and gradient. Seasonal variations in climatic conditions, daily tidal fluctuations, and subsurface stratigraphy all influence local groundwater conditions.[125]

Based on the groundwater elevations, a substantial amount of recharge is being introduced to the aquifer located south of the adjacent Playa Vista First Phase Project and the Proposed Project sites. The recharge flows into the adjacent Playa Vista First Phase Project and the Proposed Project sites from the Ballona Escarpment through the alluvial soils located at the base of the Westchester Bluffs. Alluvial fans (which consist of alluvial soils/deposits) are generally areas of groundwater recharge due to the porous, sandy subsurface layers of the fan.[126]

Groundwater Extraction

The Silverado Aquifer is used for beneficial uses off-site, including municipal and domestic drinking water supply, industrial process and service supply, and agricultural supply. Currently, there is no groundwater extraction in the vicinity of the Proposed Project site for beneficial uses.[127] However, groundwater extraction for remedial purposes previously occurred at the groundwater treatment facility (GWTF) located in the eastern portion of the adjacent Playa Vista First Phase Project site. This system included two groundwater extraction wells in the Proposed Project and several other extraction wells in the adjacent Playa Vista First Phase Project site. In June 2000, operation of the groundwater extraction system was suspended with Regional Water Quality Control Board (RWQCB) approval due to grading and construction of the adjacent Playa Vista First Phase Project and the groundwater treatment facility was temporarily decommissioned. Since September 2000, a new and more efficient groundwater treatment system, designed to treat a wider range of contaminants, was installed for remediation-related activities and construction dewatering in conjunction with the adjacent Playa Vista First Phase Project construction. This facility is located on the north side of Building 2 within the adjacent Playa Vista First Phase Project, east of the Proposed Project site, and operates under NPDES Permit #CAG914001. Currently, one other temporary portable groundwater treatment facility serves the adjacent Playa Vista First Phase Project and the Proposed Project. The facility

[125] *Law/Crandall, Inc., Report of Groundwater Monitoring, Playa Vista Project, March 14, 1996, page 4.*

[126] *American Geological Institute, Dictionary of Geologic Terms, Third Edition, 1984.*

[127] *The nearest public water supply well is located at Venice Polytechnic High School, approximately 2 miles northwest of the Proposed Project. The subject well was capped in 1960 and is not active. The next closest public supply wells are located approximately 3.5 miles northwest of the Proposed Project in the City of Santa Monica. The nearest irrigation well is located approximately 2 miles southeast of the Proposed Project at the Hillside Memorial Park Cemetery.*

is currently located within the western portion of the adjacent Playa Vista First Phase Project site, east of Lincoln Boulevard and south of Jefferson Boulevard, near Runway Road. This facility is presently in operation for treatment of construction dewatering effluent and operates under NPDES Permit #CAG994002. As construction of the adjacent Playa Vista First Phase Project progresses, additional treatment facilities will be added as deemed necessary, and with the approval of the RWQCB for specific construction dewatering and remediation efforts. A permanent groundwater treatment program for the adjacent Playa Vista First Phase Project and the Proposed Project will be implemented, as necessary, in accordance with RWQCB requirements and Cleanup and Abatement Order No. 98-125. As an alternative to treatment on-site and discharge of construction dewatering under an existing NPDES permit, an Industrial Waste Discharge Permit (W-502105) has been obtained from the City of Los Angeles, Bureau of Sanitation, which allows construction dewatering to be discharged to the sanitary sewer. The existing extraction wells will be abandoned or relocated in accordance with RWQCB requirements. For a discussion of this remediation program, refer to Section IV.I, Safety/Risk of Upset, Subsection 2.2.3.

Dewatering activities associated with the development of the adjacent Playa Vista First Phase Project (including dewatering of excavations, code-required foundation dewatering, etc.) have the potential to cause minor changes in groundwater flow direction and depth. These changes, should they occur, are expected to be localized and are not expected to adversely affect regional groundwater.

3.0 IMPACT ANALYSIS

3.1 Methodology

3.1.1 Surface Water Hydrology

The City of Los Angeles Standard Peak Rate Method is the conservative prediction methodology used for the computation of stormwater runoff from the Proposed Project site and from areas that are tributary to the site.

For the purpose of this EIR, the impacts analysis considers as a whole the pre-First Phase condition against the Proposed Project condition. The analysis also indicates the incremental changes between the adjacent Playa Vista First Phase Project conditions and Proposed Project conditions. As a part of the stormwater system designed and approved as part of the adjacent Playa Vista First Phase Project, the Freshwater Wetlands System was designed to convey and detain the flow from both the adjacent Playa Vista First Phase Project and the Proposed Project without adversely impacting existing facilities upstream and downstream. Hence, for the overall

Proposed Project impacts analysis, the Freshwater Wetlands System is utilized as a Project Design Feature for the adjacent Playa Vista First Phase Project and the Proposed Project.

Calculations for sizing the storm drains were performed as required by the City of Los Angeles, Bureau of Engineering. The peak 50-year runoff rate was used to approximate higher frequency events (i.e., 1-, 2-, 5-, 10-, 20-, and 25-year events) for comparison. The SWMM-XP (Storm Water Management Model) computer program, originally developed by the EPA, was used to model flood and tidal flow in the Ballona Channel and Ballona Wetlands, as well as storm flow in the Freshwater Marsh.

3.1.2 Groundwater Hydrology

Short-term (construction) impacts could result from subsurface dewatering activities. Because the amount of dewatering required would be based on conditions encountered during construction and would not be determined until actual construction, these potential impacts are qualitatively assessed.

Long-term (operational) groundwater hydrology impacts resulting from changes in groundwater recharge due to development were estimated by evaluating changes in recharge based on the proposed land use changes, hydrology, and infiltration capacity of the underlying soil; and comparing the change in recharge to existing groundwater conditions.

Other potential sources of long-term impacts to groundwater hydrology include permanent groundwater dewatering and continuing remediation dewatering systems. Such impacts were evaluated based on anticipated site/structure design concepts and anticipated remediation activities.

The potential for the Proposed Project to result in the movement or expansion of existing contaminated groundwater is analyzed in Section IV.I, Safety/Risk of Upset.

3.2 Significance Thresholds

3.2.1 Surface Water Hydrology

The Draft Los Angeles CEQA Thresholds Guide (p. D.1-3) states that a project would normally have a significant impact on surface water hydrology if it would:

- Cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources;

- Substantially reduce or increase the amount of surface water in a waterbody; or

- Result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow.

These thresholds are applicable to the Proposed Project and as such are used to determine if the Project would have significant surface water hydrology impacts.

3.2.2 Groundwater Hydrology

The Draft Los Angeles CEQA Thresholds Guide (p. D.3-4) states that a project would normally have a significant impact on groundwater level if it would:

- Change potable water level sufficiently to:

  – Reduce the ability of the water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported water, summer/winter peaking, or respond to emergencies and drought;

  – Reduce yields of adjacent wells or wellfields (public or private); or

  – Adversely change the rate or direction of flow of groundwater; or

- Result in demonstrable and sustained reductions of groundwater recharge capacity.

These thresholds are applicable to the Proposed Project and as such are used to determine if the Project would have significant groundwater hydrology impacts.

3.3 Project Design Features

3.3.1 Surface Water Hydrology

Development of the adjacent Playa Vista First Phase Project and the Proposed Project includes numerous improvements to the existing storm drain system and other design features (i.e., Freshwater Wetlands System) intended to address potential hydrology impacts. The Freshwater Wetlands System (the majority of which was approved and permitted in conjunction with the adjacent Playa Vista First Phase Project) is a Project Design Feature that was intended

as a comprehensive system to manage the stormwater flows and water quality requirements for both the adjacent Playa Vista First Phase Project and the Proposed Project. Some of the existing off-site drainage facilities, such as the Lincoln Drain South and connecting systems, have been designed to standards that are larger than the 50-year storm. To assure new improvements do not adversely impact existing facilities, the proposed drainage facilities improvements have been designed to handle the expected future on- and off-site stormwater flows and avoid adverse impacts to existing facilities. The following describes the most notable improvements that occur as Project Design Features. An overview of the proposed hydrology for the adjacent Playa Vista First Phase Project and the Proposed Project is shown on Figure 32 on page 371.

The hydraulic capacity of the Jefferson Boulevard Storm Drain is not considered to meet the City of Los Angeles' current design standards. The proposed grading, including that which has already been completed as part of the adjacent Playa Vista First Phase Project, has been designed to minimize on-site drainage to the adjacent vegetated slope areas of Jefferson Boulevard, thereby reducing stormwater runoff towards the limited-capacity Jefferson Boulevard Storm Drain. Additional storm drain capacity would be provided on-site. In addition to the existing Jefferson Boulevard Storm Drain, two new major stormwater management facilities (both approved as part of the adjacent Playa Vista First Phase Project) – the Riparian Corridor and the Central Storm Drain – would provide drainage for the adjacent Playa Vista First Phase Project and the Proposed Project. A portion of the Riparian Corridor within the Proposed Project would be constructed as a part of the Proposed Project. All three major storm drains would discharge into the Freshwater Marsh located at the easterly boundary of the Ballona Wetlands. The following describes more specifically the drainage system improvements that would serve as Project Design Features for the Proposed Project:

Lincoln Drain South (approved as a part of the adjacent Playa Vista First Phase) – As a part of the adjacent Playa Vista First Phase Project, the outlet of the existing Lincoln Drain South will be relocated to the Freshwater Marsh. The drain will intercept off-site flow from the existing developments south of the adjacent Playa Vista First Phase Project and the Proposed Project, and to the east and west of Lincoln Boulevard.

Freshwater Marsh (approved as part of the adjacent Playa Vista First Phase) –The stormwater system associated with the previously approved Playa Vista First Phase Project was designed, sized, permitted, and constructed to serve both the adjacent Playa Vista First Phase Project and the Proposed Project. A key component of the stormwater system is the Freshwater Marsh located southwest of the intersection of Lincoln and Jefferson Boulevards. As such, it is included as a Project Design Feature related to the Proposed Project. The Freshwater Marsh has been designed to receive stormwater runoff from the Jefferson Boulevard Storm Drain, the Central Storm Drain, the Lincoln Drain South, and Riparian Corridor. These drains outlet into the Freshwater Marsh at primary management areas. Normally the Freshwater Marsh discharges into Ballona Channel through flap-gated culverts; however, an overflow spillway is

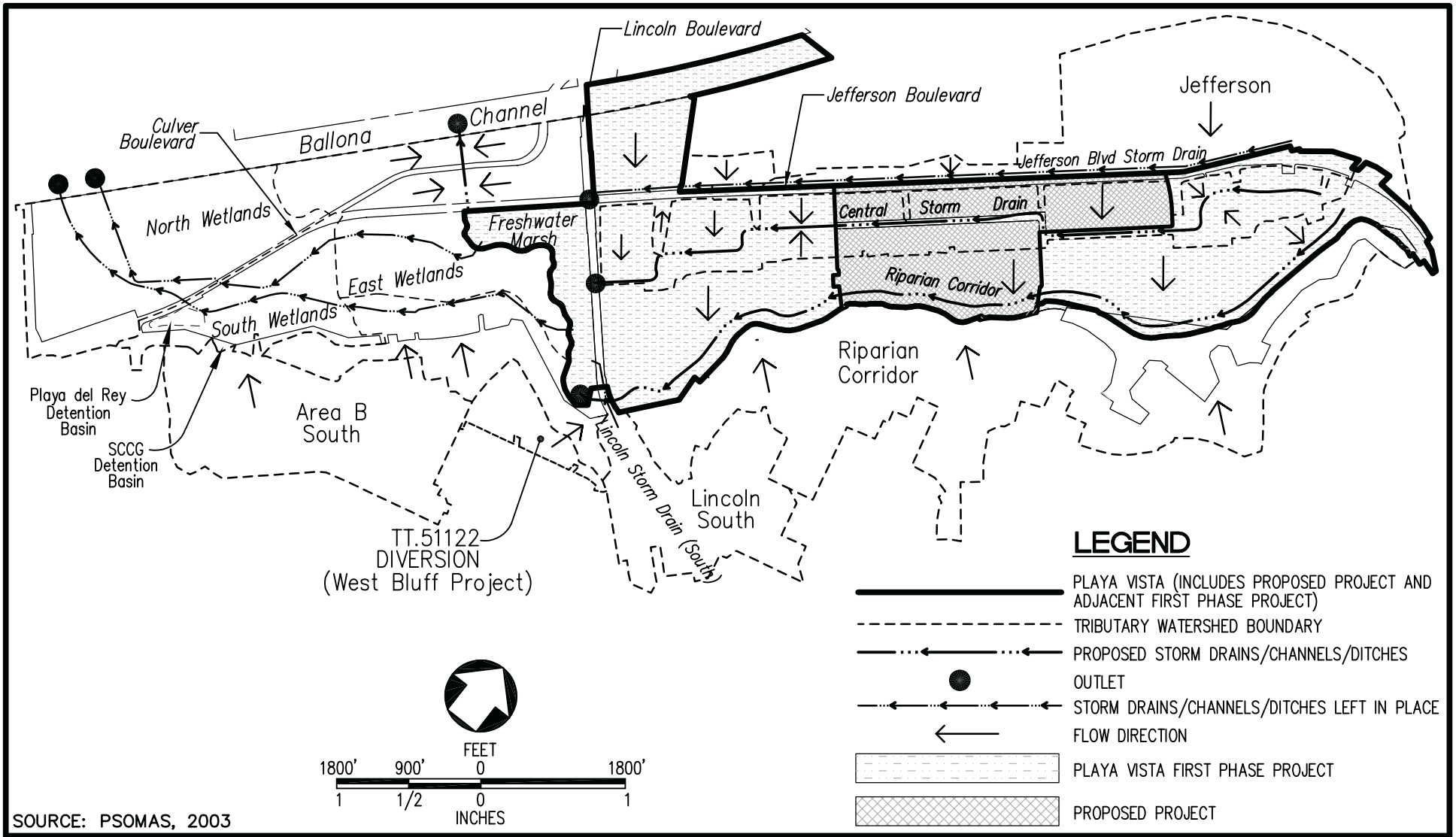

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Figure 32
Drainage System and Associated Hydrology with Adjacent Playa Vista First Phase Project and Proposed Project

provided into the Ballona Wetlands to divert portions of storm flows greater than the l-year storm. Maximum water level during a 50-year return-frequency storm in the Freshwater Marsh is limited to about 8 feet AMSL in order to eliminate adverse backwater effects in the existing Jefferson Boulevard Storm Drain. The Freshwater Marsh is divided from the Ballona Wetlands by a berm. The slopes of the berm vary from 10:1 to 5:1 horizontal-to-vertical in order to promote the establishment of wetland vegetation and provide biological protection against erosion of the berm. The Freshwater Marsh is designed to contain and convey to the Ballona Channel all storms up to approximately a one-year storm[128] and has the flexibility to release freshwater to the Ballona Wetlands through a gated valve should it be necessary in conjunction with any future salt marsh restoration. This aspect of the Freshwater Marsh serves as a means to divert uncontrolled freshwater flows away from the adjacent salt marsh area, preventing the continued degradation of the salt marsh habitat that resulted from the uncontrolled freshwater inflows, and enabling future restoration of the salt marsh area.

Riparian Corridor (east and west portions approved as a part of the adjacent Playa Vista First Phase Project – central portion proposed as part of the Proposed Project) – The approximately 25-acre Riparian Corridor, including the 18.3 acres approved as part of the adjacent Playa Vista First Phase Project, will drain east to west and collect water from the south part of the adjacent Playa Vista First Phase Project and the Proposed Project sites and from existing developments on the Westchester Bluffs east of Lincoln Boulevard. In essence, the Riparian Corridor will be a relocated and greatly enhanced replacement of the Centinela Ditch. It is planned to be a wide, open channel in a naturalized setting between the toe of the Westchester Bluffs and proposed Bluff Creek Drive. The design of the typical section of the channel is trapezoidal, with 3:1 horizontal-to-vertical side slopes up to the 50-year design water level, and 2:1 slopes above. The bottom width varies from approximately 5 to 90 feet, while maximum water depth varies from approximately 3 to 7 feet. Cattails or other suitable vegetation will be established in the bottom of the channel and willow shrub will be planted on the side slopes. The eastern and western portions of the Riparian Corridor were approved, and will be constructed, as part of the adjacent Playa Vista First Phase Project.

Although the Riparian Corridor will be vegetated as described above, the Corridor has been designed to provide sufficient hydraulic capacity to accommodate the runoff from the adjacent Playa Vista First Phase Project and Proposed Project. A program will be implemented in order to maintain the required hydraulic capacity of the channel (e.g., limit large trees from establishing within the channel and removing vegetation selectively).

Central Storm Drain (approved as a part of the adjacent Playa Vista First Phase Project) – The entire tributary area of the Central Storm Drain is within the boundaries of the adjacent Playa Vista First Phase Project and the Proposed Project development. The upstream

[128] *The one-year storm is estimated to be 723 cfs and the 50 year storm is approximately 1,690 cfs.*

terminus of the drain will be at the intersection of Artisans Way and Waterfront Drive in the eastern portion of the adjacent Playa Vista First Phase Project. The Central Storm Drain will drain east to west, extending along Waterfront Drive, Millennium Street, Runway Road, Pacific Promenade, and Playa Vista Drive and will discharge into the Freshwater Marsh. The planned circular pipe conduit will range in diameter from 42 inches to 96 inches, with equivalent hydraulic capacity rectangular boxes used in some sections to provide utility clearances as necessary. Portions of the Central Storm Drain are currently being constructed as part of the adjacent Playa Vista First Phase Project.

Jefferson Boulevard Storm Drain – The Jefferson Boulevard Storm Drain is an existing system as it was modified as part of the adjacent Playa Vista First Phase Project and will not be modified east of Lincoln Boulevard under the Proposed Project.

Area Northwest of Lincoln/Jefferson Intersection – The area located between Culver and Jefferson Boulevards, west of Lincoln Boulevard, that previously drained into the Jefferson Boulevard Storm Drain was modified as part of the Playa Vista First Phase Project to drain into the Freshwater Marsh outlet through flap-gated culverts, thereby relieving the existing Jefferson Boulevard Storm Drain. During periods of high flow within Ballona Channel, the flap gates at Ballona Channel will close, causing flow to pond within the Freshwater Marsh and its outlet. Separate flap gates within the Freshwater Marsh outlet prevent flow from the Freshwater Marsh from discharging in the adjacent wetlands area. For short periods, runoff will pond in the area located between Culver and Jefferson Boulevards, west of Lincoln Boulevard, as with pre-First Phase and existing conditions.

3.3.2 Groundwater Hydrology

There are no Project Design Features related to groundwater hydrology, although the irrigation of landscaped areas and introduction or expansion of water surface area within the site through the implementation of the Freshwater Wetlands System will help offset reductions in groundwater recharge due to increased impervious area (see impacts discussion below).

3.4 Project Impacts

3.4.1 Surface Water Hydrology

Both the Urban Development and Habitat Creation/Restoration Components of the Proposed Project include activities that would affect surface water hydrology. As such the following discussion pertains to the potential impacts of each component. Though each component is addressed separately, both were considered when designing the drainage facilities for the adjacent Playa Vista First Phase Project and Proposed Project. Implementation of the

Habitat Creation/Restoration Component would involve the construction of a major flood control facility, the Riparian Corridor, which was designed to serve the Proposed Project by conveying increases in peak runoff rates or volumes caused by the Urban Development Component.

3.4.1.1 Urban Development Component

3.4.1.1.1 Potential for Flooding

Development within the Urban Development area would increase the amount of impervious surface area on-site, consequently increasing total peak runoff rates and volumes. The following subsections describe the potential of the Urban Development Component of the Proposed Project to cause flooding during a projected 50-year storm event, which would have the potential to harm people or damage property. The impacts on sensitive biological resources are discussed in Section IV.D, Biotic Resources, in this EIR.

Drainage facilities constructed as part of the adjacent Playa Vista First Phase Project have been sized for the full buildout of the adjacent Playa Vista First Phase Project and the Proposed Project. Since the drainage facilities have been designed based upon the installation of paved and impervious surfaces, portions of the site which are pervious during construction of the Urban Development Component would not increase stormwater runoff flows above the ultimate design flows. The construction of new drainage structures would be required in a manner and sequence, which would preclude flooding. During construction of the Proposed Project, a Stormwater Pollution Prevention Plan and Erosion Control Plan would be implemented to provide for temporary Stormwater management. These plans would prevent construction from adversely affecting the amount of surface water in a waterbody. Therefore, construction activities for the Urban Development Component would not cause flooding during a projected 50-year developed storm event, which would have the potential to harm people or damage property.

Table 24 on page 375 provides a comparison of 1-, 2-, 5-, 10-, 25-, and 50-year stormwater runoff volumes for pre-First Phase conditions, Playa Vista First Phase conditions, and future conditions with completion of the Proposed Project (i.e., with buildout of the adjacent Playa Vista First Phase Project and the Proposed Project). As shown in the table, the future runoff to existing drainage systems, such as the Centinela Ditch, which is replaced by the Riparian Corridor and Central Storm Drain, would be reduced from that of pre-First Phase Project conditions. Such reductions to existing drainage systems are enabled through the rerouting of existing flows and the addition of new drainage systems (i.e., Central Storm Drain) as part of the adjacent Playa Vista First Phase Project and the Proposed Project. Table 25 on page 376 provides a comparison of the 50-year storm peak runoff rates for pre-First Phase, with Playa Vista First Phase Project conditions and with Playa Vista First Phase Project and Proposed Project. With the completion of storm drains and facilities designed and built to accommodate

Table 24

STORMWATER FLOWS TO THE FRESHWATER MARSH AND BALLONA WETLANDS

	Amount of Total Runoff Flow (in acre-feet)					
	50-Year Storm	25-Year Storm	10-Year Storm	5-Year Storm	2-Year Storm	1-Year Storm
Pre-First Phase[a]						
Jefferson Storm Drain[b,c]	399	358	304	263	195	171
Centinela Ditch at Boundary of Proposed Project[d]	461	414	351	304	225	197
Centinela Ditch at Lincoln Boulevard	550	494	419	362	268	235
Lincoln Drain South[b]	90	81	69	59	44	39
Total of Above Drains/Ditch Flowing to Ballona Wetlands	1039	933	792	685	507	445
Total Other Tributary to Ballona Wetlands[e,f]	636	571	485	419	310	272
Total to Ballona Channel	1,675	1,504	1,276	1,104	817	717
With Playa Vista First Phase Project						
Jefferson Storm Drain[b]	293	263	223	193	143	125
Central Storm Drain[g]	201	180	153	132	98	86
Riparian Corridor at Boundary of Proposed Project[d,g]	464	417	354	306	226	199
Riparian Corridor at Lincoln Boulevard[g]	546	490	416	360	266	234
Lincoln Drain South[b]	90	81	69	59	44	39
Freshwater Marsh Direct Flow[g]	41	37	31	27	20	18
Total Tributary Flowing into Freshwater Marsh to Ballona Channel[h]	1,171 (139)	1,051 (104)	892 (61)	771 (32)	571 (5)	502 (0)
Total Tributary to Ballona Wetlands[e,i]	618	555	471	407	302	265
Total to Ballona Channel	1,789	1,606	1,363	1,178	873	767
With Playa Vista First Phase Project and Proposed Project						
Jefferson Storm Drain[b]	293	263	223	193	143	125
Central Storm Drain[g]	221	198	168	146	108	95
Riparian Corridor at West Boundary of Proposed Project[d,g]	417	374	318	275	203	178
Riparian Corridor at Lincoln Boulevard[g]	531	477	405	350	259	227
Lincoln Drain South[b]	90	81	69	59	44	39
Freshwater Marsh Direct Flow[g]	41	37	31	27	20	18
Total Tributary Flowing into Freshwater Marsh to Ballona Channel[h]	1,176 (149)	1,056 (122)	896 (77)	775 (48)	574 (11)	504 (0)
Total Tributary to Ballona Wetlands[e,i]	618	555	471	407	302	265
Total to Ballona Channel	1,794	1,611	1,367	1,182	876	769

[a] *Pre-First Phase conditions represent runoff characteristics prior to construction of the stormwater system that is designed to serve both the First and the Proposed Projects.*

[b] *Existing storm drain to remain.*

[c] *Outlet is located in the area near the intersection of Culver and Jefferson Boulevards, west of Lincoln Boulevard. The area located between Culver and Jefferson Boulevards, west of Lincoln Boulevard, drains into the Jefferson Storm Drain.*

[d] *Drain not included in tributary total because runoff flow indicates flow at an intermediate point. These flows are cumulative with the flows at the Centinela Ditch/Riparian Corridor at Lincoln Boulevard.*

[e] *Not including Freshwater Marsh flows over weir to Ballona Wetlands.*

[f] *Includes the Freshwater Marsh area.*

[g] *Storm drain facility to be improved, modified, or constructed as part of the adjacent Playa Vista First Phase Project and the Proposed Project.*

[h] *Portion of the peak runoff from the all storm events over 1-year in the Freshwater Marsh flows over weir to Ballona Wetlands then out to Ballona Channel are shown in parenthesis. These numbers represent the "Overflow from the Freshwater Marsh to Ballona Wetlands" portion of the calculations in Table 26 on page 378.*

[i] *This includes the area located between Culver and Jefferson Boulevards, west of Lincoln Boulevard, which drains directly to the Freshwater Marsh outlet to Ballona Channel.*

Source: Psomas.

Table 25

50-YEAR PEAK RUNOFF

Drainage System	Design Capacity (cfs)[a]			50-Year Storm Event Peak Runoff (cfs)		
	Pre-First Phase*	With Play Vista First Phase Project	With Playa Vista First Phase and Proposed Project	Pre-First Phase*	With Playa Vista First Phase Project	With Playa Vista First Phase Project and Proposed Project
Jefferson Storm Drain [b,c]	380	380	380	457	403.6	403.6
Centinela Ditch	210	N/A	N/A	629	—	—
Centinela Ditch at Lincoln Boulevard	210	N/A	N/A	528	—	—
Lincoln Storm Drain South [b]	210	210	210	209	209	209
Central Storm Drain [d]	N/A	328	328	—	237	312
Riparian Corridor at West Boundary of Proposed Project [d]	N/A	625	625	—	625	608
Riparian Corridor at Lincoln Boulevard [d]	N/A	625	625	—	549	549
Freshwater Marsh [d]	N/A[e]	N/A[e]	N/A[e]	—	103.7	103.7
Overflow from Freshwater Marsh to Ballona Wetlands [f]				—	1,036	1,066
Ballona Wetlands [g]				914	916.9	916.9
Total Peak Runoff to the Ballona Wetlands				**2,209**	**1,953**	**1,983**

cfs = cubic feet per second
N/A = Not Applicable

* *Pre-First Phase conditions represent runoff characteristics prior to construction of the stormwater system that is designed to serve both the adjacent Playa Vista First Phase and the Proposed Project development projects.*

[a] *The design capacity is based on the total peak runoff generated by the adjacent Playa Vista First Phase Project or with the Playa Vista First Phase and Proposed Project, whichever is greater. Should additional capacity by necessary, during final design and engineering, the design capacity of the drainage system, as determined and approved by the City, may vary from that shown in this table.*

[b] *Existing storm drain to remain*

[c] *During pre-First Phase, the outlet to the Jefferson Storm Drain is located near the intersection of Culver and Jefferson Boulevards, but will drain at Lincoln/Jefferson Boulevards into the Freshwater Marsh (as part of the adjacent Playa Vista First Phase Project). The area located between Culver and Jefferson Boulevards, west of Lincoln Boulevard, drains into Jefferson Storm Drain during pre-First Phase.*

[d] *New storm drains or facilities that were designed and built to accommodate runoff from the adjacent Playa Vista First Phase Project and Proposed Project.*

[e] *The Freshwater Marsh is an open waterbody that has a volume capacity, not a design capacity.*

[f] *Portion of the peak runoff that flows from the Freshwater Marsh over weir to the Ballona Wetlands.*

[g] *Portion of the peak runoff from the 50-year storm event in the Freshwater Marsh overflows over weir to Ballona Wetlands then out to Ballona Channel (not included in this number, but separately under footnote "d").*

Source: Psomas.

the adjacent Playa Vista First Phase Project and Proposed Project, the existing local storm drains would not be significantly impacted by changes in surface runoff flows due to implementation of the Urban Development Component because the Proposed Project would not cause flooding of the existing local storm drains during the projected 50-year developed storm event, which would have the potential to harm people or damage property. Therefore, no adverse impacts to the existing storm drain systems (e.g., Jefferson Storm Drain) would occur because the existing drainage system controls would be maintained or improved to be at or better than pre-First Phase conditions. For example, because the Freshwater Marsh will be maintained below 8 feet AMSL, it will also serve as detention. Downstream hydraulic controls (outlet water surface elevations) would be maintained at or below existing levels. Peak runoff to the systems would be maintained at or below existing levels by detention or reduction of the area tributary to the drain.

As described in Subsection 2.1.1.1 above, no development portion of the Proposed Project is within the FEMA 100-Year Floodplain. The proposed drainage system for the Urban Development Component has been designed to convey increases in total peak runoff rates and volumes caused by the Proposed Project and provide an appropriate level of on-site flood protection, detention, and drainage. The major flood control facilities that would serve the Urban Development Component include the Freshwater Wetlands System (Freshwater Marsh and Riparian Corridor), Central Storm Drain, and local drainage systems. As such, the Urban Development Component partially depends on the Riparian Corridor constructed as part of the Habitat Creation/Restoration Component to provide adequate drainage. Therefore, construction of the proposed drainage system would be phased to adequately receive any increase in peak runoff rates or volumes that could adversely affect any existing or planned development. During final design and engineering, the proposed drainage system for the Proposed Project will be sized to provide adequate flow capacity, as determined by the City. The proposed drainage system would be designed and sized such that the Project-generated runoff would not exceed the maximum capacity of the existing system. With the construction and operation of the proposed drainage systems, the Urban Development Component would not cause flooding on-site during the projected 50-year developed storm event, which would have the potential to harm people or damage property, and therefore no, significant impacts are expected to occur relative to flooding of new or existing development.

The Urban Development Component would also not cause flooding during the projected 50-year developed storm event to the off-site existing tributary area. As discussed above, the proposed drainage system for the Urban Development Component has been designed to convey increases in total peak runoff rates and volumes caused by the Proposed Project. As also generally seen in Table 24, Table 25, Table 26 on pages 375, 376, and 378, respectively, the Proposed Project would add a minimal amount of total peak runoff and volumes above that of the adjacent Playa Vista First Phase Project. Although during major storm events there is some overflow from the Freshwater Marsh into the Ballona Wetlands, the total runoff actually reaching the Ballona Wetlands decreases from the pre-First Phase condition as shown in Table 26 on page 378. For a discussion on the potential impacts due to this decrease in runoff to the Ballona Wetlands, see Section IV.D, Biotic Resources.

Table 26

TOTAL PEAK 50-YEAR RUNOFF RATES AND VOLUMES OF TOTAL FLOWS TO THE BALLONA WETLANDS

Phase	Peak 50-year Peak Runoff Rates to the Ballona Wetlands (cfs) [a]	Peak 50-Year Peak Runoff Volumes to the Ballona Wetlands (acre-feet) [b]
Pre-First Phase	2,209	1,675
With Playa Vista First Phase	1,953	757
With Playa Vista First Phase and Proposed Project	1,983	767

cfs = cubic feet per second

[a] *Ballona Wetlands + Overflow from Freshwater Marsh to Ballona Wetlands (see Table 25 on page 376).*

[b] *Total Tributary to Ballona Wetlands + Overflow from Freshwater Marsh to Ballona Wetlands (see Table 24 on page 375, footnote "h").*

Source: Psomas.

One SUSMP structural BMP requirement requires that a project "control peak flow discharge to provide stream channel and over bank flood protection, based on flow design criteria selected by the local agency." The City of Los Angeles' storm drain design criteria require any storm drain in a natural drainage course to be designed to control the 50-year storm event. This structural BMP requirement refers to the Proposed Project's potential to flood or cause erosion to the Riparian Corridor or the Ballona Channel. As part of the adjacent Playa Vista First Phase Project, the Riparian Corridor is a new channel designed to convey the 50-year storm event and the 50-year flow rate is predicted to remain at 549 cfs after completion of the Proposed Project (see Table 25 on page 376). Therefore, the Riparian Corridor would meet the SUSMP requirement of no increase in peak stormwater discharge rate after development. Runoff from the Proposed Project is detained in the Freshwater Marsh prior to draining to the Ballona Channel or being diverted to the wetlands during peak storm events, thus providing flood protection to the Ballona Channel. The Ballona Channel invert is below mean sea level and the channel banks are approximately 16 feet AMSL at the lowest level at Playa del Rey and 20 feet AMSL at the Freshwater Marsh outlet. The maximum water surface elevation in the Freshwater Marsh is 8 AMSL. Therefore, flow from the Proposed Project does not cause the Ballona Channel to overtop its banks. In addition, the Ballona Channel is an improved and lined channel; therefore, erosion is not a major concern. In fact, the hydraulic cross-section of Ballona Channel is dependent upon the high storm flows removing the sediment and silt that settle above the channel invert due to interaction with Santa Monica Bay. All other SUSMP requirements primarily refer to water quality issues and are discussed in Section IV.C.(2), Water Quality.

Although the development of the Urban Development Component would result in an increase in peak runoff rates and volumes on-site, no observable increase in peak flood flows in Ballona Channel during the projected 50-year developed storm event would occur due to detention facilities and rerouting of flows within the adjacent Playa Vista First Phase Project and the Proposed Project. The Freshwater Wetlands System (Freshwater Marsh and Riparian Corridor) would serve as the primary detention facility for the adjacent Playa Vista First Phase Project and the Proposed Project. During storms greater than a 1-year design storm event, the eastern portion of the Ballona Wetlands would serve as an overflow area for the Freshwater Marsh. As part of the adjacent Playa Vista First Phase Project, flap-gated culverts at the Freshwater Marsh outlet would prevent flows from the Ballona Channel from backflowing into the Freshwater Wetlands System. Increased runoff from the Proposed Project during peak storm events would be discharged to the Freshwater Wetlands System and would not be discharged to the Ballona Channel until such time as the water elevation within the Ballona Channel drops to a level where on-site runoff can be discharged with no adverse impact to channel flows. Portions of the runoff from peak storm events greater than 1-year would flow over the overflow spillway into the existing Ballona Wetlands. However, the Proposed Project would not significantly change the amount of peak stormwater runoff flowing into the Ballona Wetlands. The proposed stormwater management facilities (e.g., flap-gates, on-site detention or other City approved methods of flood control) are expected to keep the adjacent Playa Vista First Phase Project and the Proposed Project peak flows at pre-First Phase levels. Because the Proposed Project peak flows would be retained within the Freshwater Wetlands System and Ballona Wetlands, peak flood flows in the Ballona Channel during the 50-year design storm event would not be increased; hence, the Urban Development Component would not cause flooding off-site during the projected 50-year developed storm event, which would have the potential to harm people or damage property, and a less-than-significant impact would occur.

In addition to the proposed stormwater management facilities, during pre-First Phase, most of the adjacent Playa Vista First Phase Project and the Urban Development Component areas were at elevations lower than the maximum predicted flood flow heights in the Ballona Channel. Upon completion of the adjacent Playa Vista First Phase Project and the Urban Development Component, the building pads within the proposed development areas would all be at elevations higher than the maximum surface water elevation in the Ballona Channel. Therefore, during the projected 50-year developed storm event, there would not be any increased risk of flooding to harm people or damage property.

Lincoln Boulevard adjacent to the Proposed Project site has historically been subject to flooding under storms smaller than the City's 50-year design storm. Construction of the Freshwater Marsh as part of the adjacent Playa Vista First Phase Project has reduced flooding at Lincoln Boulevard. Also, as part of Caltrans' Lincoln Boulevard widening project, the proposed raising of Lincoln Boulevard (from Jefferson Boulevard south to the toe of the bluffs) to 11 to 14 feet AMSL (current elevation of this section of Lincoln Boulevard is about 6 to 11 feet

AMSL) would eliminate such localized flooding. In addition, the maximum water surface elevation in the Freshwater Marsh would be 8 feet AMSL. All other existing streets would be maintained at current levels of protection by maintaining existing peak runoff rates at current levels. New streets would be protected per current City requirements by new storm drain systems. Therefore, the projected 50-year developed storm event would not increase risk of flooding to harm people or damage property, and no significant impacts are expected.

3.4.1.1.2 Potential to Reduce or Increase the Amount of Surface Water in a Waterbody

The Urban Development Component of the Proposed Project has the potential to affect the amount of surface water in waterbodies adjacent to the Project site. The waterbodies of concern are the Ballona Channel, Ballona Wetlands, Freshwater Marsh, and Riparian Corridor.

During construction of the Urban Development Component, a Stormwater Pollution Prevention Plan and Erosion Control Plan would be implemented to provide temporary stormwater management for areas under construction to prevent the stormwater from adversely affecting waterbodies adjacent to the Project site. These stormwater management measures would be kept in place until the on-site stormwater drainage facilities designed to accommodate these flows were constructed. Therefore, the construction of the Urban Development Component would not substantially reduce or increase the amount of surface water in a waterbody and a less-than-significant impact would occur.

Although the development of the Urban Development Component would result in increased amounts of impervious surface consequently increasing the volume and velocity of stormwater runoff, it would not significantly change the amount of peak storm surface runoff flowing into the existing Ballona Channel. As indicated in Table 27 on page 381, the increase in amount of runoff flowing to the Ballona Channel due to development of the Proposed Project (compared to with Playa Vista First Phase Project conditions) is estimated to be approximately 0.3 percent. This increase is not considered to be significant. Increased runoff from the Proposed Project would be detained in the Riparian Corridor and Freshwater Marsh, which were designed to accommodate these flows, prior to discharging to the Ballona Channel. Therefore, the Urban Development Component would not substantially reduce or increase the amount of surface water in the Ballona Channel and a less-than-significant impact would occur.

Development of the Urban Development Component would result in increased amounts of impervious surface consequently increasing the volume and velocity of stormwater runoff.

Table 27

TOTAL STORMWATER RUNOFF AND PERCENTAGE OF TOTAL FLOWS TO THE BALLONA CHANNEL

	Amount of Total Runoff to Ballona Channel (in acre-feet)					
	50-Year Storm	25-Year Storm	10-Year Storm	5-Year Storm	2-Year Storm	1-Year Storm
Pre-First Phase Project						
Flow to Ballona Channel	1,675	1,504	1,276	1,104	817	717
With Playa Vista First Phase Project						
Flow to Ballona Channel	1,789	1,606	1,363	1,178	873	767
With Playa Vista First Phase Project and Proposed Project						
Flow to Ballona Channel	1,794	1,611	1,367	1,182	876	769
Percent of Total Flow to Ballona Channel Due to Project Buildout Compared to Pre-First Phase	7.1%	7.1%	7.1%	7.1%	7.2%	7.3%
Percent of Total Flow to Ballona Channel Due to Proposed Project (Compared to Playa Vista First Phase Project)	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%

Source: Psomas.

However, it would not significantly change the amount of peak storm surface runoff flowing into the existing Ballona Wetlands. During the majority of storm events (i.e., storms of magnitude less than the 1-year design storm, which constitute approximately 92 percent of the estimated average annual flows), runoff from the adjacent Playa Vista First Phase Project, the Proposed Project, and other tributary drainage would flow through the Freshwater Marsh prior to discharge into the Ballona Channel. The Freshwater Marsh, which was designed to accommodate the total Playa Vista First Phase Project and the Proposed Project, thereby reduces the amount of freshwater flowing to the Ballona Wetlands (Table 28 on page 382). For a discussion on the potential impacts related to freshwater inflows to the Ballona Wetlands, see Section IV.D, Biotic Resources.

The only runoff tributary to the Ballona Wetlands would be generated from precipitation falling directly on the wetlands and adjacent bluff areas and any overflow from the Freshwater Marsh over the Marsh's eastern berm and weir gate during storms of magnitude greater than a 1-year storm, which constitutes approximately 8 percent of the estimated average annual flows. The Freshwater Marsh was designed with an adjustable weir and low-flow diversion sluice and culvert that can be adjusted to allow more or less low-flow into the Ballona Wetlands if/as desired. See the Section IV.D, Biotic Resources, for a discussion of impacts on biological resources as they relate to the adjustable weir overflow. The increased runoff due to development of the Proposed Project would represent a very minor portion of the total flows into

Table 28

TOTAL STORMWATER RUNOFF AND PERCENTAGE OF TOTAL FLOWS TO THE FRESHWATER MARSH AND BALLONA WETLANDS

	50-Year Storm	25-Year Storm	10-Year Storm	5-Year Storm	2-Year Storm	1-Year Storm
	Amount of Total Runoff to Freshwater Marsh (in acre-feet)[a]					
With Playa Vista First Phase Project						
Flow to Freshwater Marsh	1,171	1,051	892	771	571	502
With Playa Vista First Phase Project and Proposed Project						
Flow to Freshwater Marsh	1,176	1,056	896	775	574	504
Percent of Total Flow to Freshwater Marsh Due to Proposed Project	0.4%	0.5%	0.5%	0.5%	0.4%	0.4%
	Amount of Total Runoff to Ballona Wetlands (in acre-feet)					
Pre-First Phase Project						
Flow from Drains	1,039	933	792	685	507	445
Flow from Other Sources[b]	636	571	485	419	310	272
With Playa Vista First Phase Project						
Flow from Freshwater Marsh over Weir	139	104	61	32	5	0
Flow from Other Sources[b]	618	555	471	407	302	265
With Playa Vista First Phase Project and Proposed Project						
Flow from Freshwater Marsh over Weir	149	122	77	48	11	0
Flow from Other Sources[b]	618	555	471	407	302	265
Percent of Total Flow to Ballona Wetlands Due to Project Buildout Compared to Pre-First Phase	-54%	-55%	-57%	-59%	-62%	-63%
Percent of Total Flow to Ballona Wetlands Due to Proposed Project (Compared to Playa Vista First Phase Project)	1.3%	2.7%	3.0%	3.6%	2.0%	0.0%

[a] *Freshwater Marsh did not exist during pre-First Phase conditions.*

[b] *Flows in this table summarize flows to the Ballona Wetlands which are not the same as flows from other sources indicated in Table 24 because modeled peak flows over the weir do not necessarily occur at the same time as the peak flows to the Freshwater Marsh and the Ballona Wetlands. Variances may be caused by storm intensities and time of concentrations in the SWMM model.*

Source: Psomas.

the existing Ballona Wetlands. Table 28 provides a breakdown of stormwater flows to the Ballona Wetlands calculated for various size storm events.

As indicated in Table 28, the increase in amount of runoff flowing to the Ballona Wetlands due to development of the Proposed Project compared to with Playa Vista First Phase is estimated to range from 0 percent to 3.6 percent, depending on the size of the storm event.

Due to the low magnitude of this increase and considering that the amount of runoff flowing to the Ballona Wetlands due to development of the adjacent Playa Vista First Phase and Proposed Project decreases when compared to pre-First Phase conditions by 54 percent to 63 percent, the 0 percent to 3.6 percent increase is not considered to be significant. Also, the additional amount of runoff to the Ballona Wetlands would only be a short-term temporary condition that dissipates as the stormwater within the Ballona Wetlands drains to the Ballona Channel. Therefore, the Urban Development Component would not substantially reduce or increase the amount of surface water in either the Ballona Wetlands or the Freshwater Marsh and a less-than-significant impact would occur.

Beyond not having a significant hydrological impact on the existing Ballona Wetlands, implementation of the Proposed Project would not preclude, limit, or otherwise prejudice the range of potential options for any future restoration of the Ballona Wetlands. The relationship of the adjacent Playa Vista First Phase Project and the Proposed Project to the Ballona Wetlands is controlled primarily through the operation of the Freshwater Marsh. The operational flexibility designed into the Freshwater Marsh through the adjustable weir and low-flow diversion sluice and culvert can adapt to a wide range of restoration options. The role of the Freshwater Marsh to divert flows from the Ballona Wetlands can be minimized, if desired, by keeping the adjustable weir at a lower spillover height.

As discussed above, the increased amounts of impervious surface due to the Urban Development Component would increase the volume and velocity of stormwater runoff into the Riparian Corridor. However, the Riparian Corridor, partially constructed as part of the adjacent Playa Vista First Phase Project, was designed to accommodate this increase in flows. Table 29 on page 384 provides a breakdown of stormwater flows to the Riparian Corridor for various size storm events at two locations. The amount of runoff flowing to the Riparian Corridor at the two locations due to development of the Proposed Project would decrease by 2.6 percent to 10.6 percent compared to Playa Vista First Phase conditions and by 3.3 percent to 9.8 percent when Project buildout is compared to pre-First Phase conditions, depending on the location and size of the storm event. The decrease would be caused by the grading of the Proposed Project area that would direct surface water runoff from the Riparian Corridor to the Central Storm Drain. The Riparian Corridor, with completion of the adjacent Playa Vista First Phase, is currently in its interim condition; and it was planned in its initial design that a portion of the runoff would be directed to the Central Storm Drain once the construction of the Riparian Corridor was completed as part of the Proposed Project. As such, this decrease is not considered to be significant. Therefore, the Urban Development Component would not substantially reduce or increase the amount of surface water in the Riparian Corridor and a less-than-significant impact would occur.

Table 29

TOTAL STORMWATER RUNOFF AND PERCENTAGE OF TOTAL FLOWS TO THE RIPARIAN CORRIDOR

	Amount of Total Runoff to Riparian Corridor (in acre-feet)					
	50-Year Storm	25-Year Storm	10-Year Storm	5-Year Storm	2-Year Storm	1-Year Storm
Pre-First Phase Project						
Flow to Centinela Ditch at Boundary of Proposed Project	461	414	351	304	225	197
Flow to Centinela Ditch at Lincoln Boulevard	550	494	419	362	268	235
With Playa Vista First Phase Project						
Flow to Riparian Corridor at Boundary of Proposed Project	464	417	354	306	226	199
Flow to Riparian Corridor at Lincoln Boulevard	546	490	416	360	266	234
With Playa Vista First Phase Project and Proposed Project						
Flow to Riparian Corridor at Boundary of Proposed Project	417	374	318	275	203	178
Flow to Riparian Corridor at Lincoln Boulevard	531	477	405	350	259	227
Percent of Total Flow to Riparian Corridor at Boundary of Proposed Project Due to Project Buildout Compared to Pre-First Phase Project	-9.5%	-9.7%	-9.4%	-9.5%	-9.8%	-9.6%
Percent of Total Flow to Riparian Corridor at Lincoln Boulevard Due to Project Buildout Compared to Pre-First Phase Project	-3.5%	-3.4%	-3.3%	-3.3%	-3.4%	-3.4%
Percent of Total Flow to Riparian Corridor at Boundary of Proposed Project Due to Proposed Project (Compared to Playa Vista First Phase Project)	-10.1%	-10.3%	-10.2%	-10.1%	-10.2%	-10.6%
Percent of Total Flow to Riparian Corridor at Lincoln Boulevard Due to Proposed Project (Compared to Playa Vista First Phase Project)	-2.8%	-2.7%	-2.6%	-2.8%	-2.6%	-3.0%

Source: Psomas.

3.4.1.1.3 Potential For Adverse Change to the Movement of Surface Water

During construction of the Urban Development Component, a Stormwater Pollution Prevention Plan and Erosion Control Plan would be implemented to provide temporary stormwater management for areas under construction to prevent the stormwater from adversely affecting waterbodies adjacent to the Project site. These stormwater management measures would be kept in place until the permanent on-site stormwater drainage facilities designed to

accommodate these flows were constructed. Therefore, the construction of the Urban Development Component would not result in permanent adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow and a less-than-significant impact would occur.

As described in the Project Design Features, the Urban Development Component of the Proposed Project would result in regrading of the Project site, which would, by design, modify the surface runoff patterns and redirect flows from the Jefferson Storm Drain into the Central Storm Drain (constructed under the adjacent Playa Vista First Phase Project) and the Riparian Corridor. This redirection of stormwater runoff away from the Jefferson Storm Drain is considered beneficial since the hydraulic capacity of the Jefferson Storm Drain does not meet City of Los Angeles design standards (i.e., the change to the movement of surface water would, by intent, enable surface flows to be directed to a new storm drain that is designed to current City standards). The Urban Development Component would not result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow and a less-than-significant impact would occur.

3.4.1.2 Habitat Creation/Restoration Component

3.4.1.2.1 Potential for Flooding

Development of the Project's Habitat Creation/Restoration Component would not create additional impervious surface area on-site; therefore, it would not increase peak runoff rates or volumes during its construction or operation. Therefore, the construction and operation of the Habitat Creation/Restoration Component would not cause flooding (which would have the potential to harm people or damage property) during the projected 50-year developed storm event and a less-than-significant impact would occur.

Implementation of the Habitat Creation/Restoration Component would involve the construction of a major stormwater management facility, the Riparian Corridor, which (with the Central Drain) would serve as a replacement of the Centinela Ditch. The Riparian Corridor has been designed to serve the Proposed Project by conveying increases in peak runoff rates or volumes caused by the construction of the Urban Development Component and provide an appropriate level of on-site flood protection, detention, and drainage. Construction of the Riparian Corridor would be timed to adequately receive any increase in peak runoff rates or volumes that could adversely affect any existing or planned development. As shown in Table 24 on page 375, the future runoff to the Centinela Ditch replaced by the Riparian Corridor and Central Storm Drain would be reduced from that of pre-First Phase and with Playa Vista First Phase Project conditions. Such reductions to existing drainage systems are enabled through the rerouting of existing flows and the addition of new drainage systems (i.e., Central Storm Drain) as part of the adjacent Playa Vista First Phase Project and the Proposed Project. During final

engineering design, calculations will be provided to substantiate that no flooding would occur under the City's 50-year design storm.

As discussed in Subsection 3.3.1, the Freshwater Marsh would serve as the primary detention facility for the adjacent Playa Vista First Phase Project and the Proposed Project. Runoff from the Habitat Creation/Restoration Component during peak storm events would be discharged to the Freshwater Marsh and Ballona Wetlands[129], where it would remain until such time as the water elevation within the Ballona Channel drops to a level where on-site runoff can be discharged with no adverse impact to channel flows. Therefore, the construction and operation of the Habitat Creation/Restoration Component would not cause flooding (which would have the potential to harm people or damage property) during the projected 50-year developed storm event and a less-than-significant impact would occur.

3.4.1.2.2 Potential to Reduce or Increase the Amount of Surface Water in a Waterbody

The construction and operation of the Project's Habitat Creation/Restoration Component would not create additional impervious surface area on-site; therefore, it would not increase peak runoff rates or total volumes of flow. However, the Habitat Creation/Restoration Component would receive stormwater runoff from the Urban Development Component, which would increase stormwater runoff compared to what was formerly received by the Centinela Ditch in this location. Potential impacts of the Urban Development Component are discussed in Subsection 3.1.4.1.2. Because the Habitat Creation/Restoration Component was designed to receive and convey this increased stormwater flow, this increase is not considered to be significant. Therefore, the construction and operation of the Habitat Creation/Restoration Component would not significantly reduce or increase the amount of surface water in the Ballona Channel, Ballona Wetlands, Freshwater Marsh, and Riparian Corridor and a less-than-significant impact would occur.

3.4.1.2.3 Potential for Adverse Change to the Movement of Surface Water

The construction and operation of the Habitat Creation/Restoration Component of the Proposed Project would not, in general, change the direction of surface water flow. Although the Habitat Creation/Restoration Component would receive increased stormwater runoff from the Urban Development Component, the Habitat Creation/Restoration Component was designed to receive and convey this increased stormwater flow, and this increase is not considered to be adverse. Therefore, the construction and operation of the Habitat Creation/Restoration Component would not result in a permanent, adverse change to the movement of surface water

[129] *Only during storms greater than a 1-year design storm.*

sufficient to produce a substantial change in the current or direction of water flow and a less-than-significant impact would occur.

3.4.1.3 Summary of Potential Surface Water Hydrology Impacts

No development portion of the Proposed Project site (i.e., the Urban Development Component) is within the FEMA 100-Year Floodplain. The proposed drainage system for the Proposed Project (inclusive of the Urban Development drainage system, and the Riparian Corridor as part of the Habitat Creation/Restoration Component) has been designed to convey increases in total peak runoff rates and volumes and provide an appropriate level of on-site flood protection, detention and drainage. Therefore, the Project would not cause flooding of the existing local storm drains during the projected 50-year developed storm event, which would have the potential to harm people or damage property.

During construction of the Proposed Project, a Stormwater Pollution Prevention Plan and Erosion Control Plan would be implemented to provide for temporary stormwater management. These plans would prevent construction from adversely affecting the amount of surface water in a waterbody. Additionally, these stormwater management measures would be temporary; hence, the construction of the Proposed Project would not result in a permanent adverse change to the movement of surface water.

Although the development of the Urban Development area would result in increased amounts of impervious surface that consequently would increase stormwater runoff flowing into adjacent waterbodies, the increase is not significant because the runoff would be detained in the Freshwater Wetlands System (the Riparian Corridor, a portion of which would be constructed as part of the Habitat Creation/Restoration Component and the Freshwater Marsh), which would be designed specifically for stormwater management. Therefore, the Proposed Project (inclusive of both Components) would not significantly reduce or increase the amount of surface water in a waterbody.

As a Project Design Feature, the Proposed Project would result in grading of the Project area, which would, by design, modify the surface runoff patterns during Proposed Project construction and operation. Stormwater runoff during Proposed Project operation would also be redirected from the Jefferson Storm Drain into the Central Storm Drain and Riparian Corridor (a portion of which would be constructed as part of the Habitat Creation/Restoration Component). This redirection of runoff from the Jefferson Storm Drain is considered beneficial since it would result in a decrease of runoff in the Jefferson Storm Drain, which does not meet City design standards for hydraulic capacity. Because the Proposed Project would result in a beneficial impact on the constrained Jefferson Storm Drain, and would not adversely impact any other

stormwater drainage facilities, operation of the Proposed Project would not result in a permanent adverse change in the movement of surface water.

3.4.2 Groundwater Hydrology

Construction and operation of the Project's Habitat Creation/Restoration Component would complete the Riparian Corridor portion of the Freshwater Wetlands System. Since existing pervious surfaces would remain as pervious surfaces after the habitat creation/restoration and no groundwater wells would be installed as part of the Habitat Creation/Restoration Component, groundwater recharge and thus potable water levels from groundwater sources would not be affected. As such, the Proposed Project's impacts result primarily from the implementation of the Urban Development Component, as discussed below.

3.4.2.1 Urban Development Component

3.4.2.1.1 Potential for Change in Potable Water Level

Groundwater in the area of the Project's Urban Development Component is not currently pumped for beneficial uses (i.e., drinking water, industrial or agricultural supply). The nearest public water supply well located at Venice Polytechnic High School, approximately 2 miles northwest of the Proposed Project site, was capped in 1960 and is not active. The next closest public supply wells are located approximately 3.5 miles northwest of the Proposed Project in the City of Santa Monica. The nearest irrigation well is located approximately 2 miles southeast of the Proposed Project at the Hillside Memorial Park Cemetery.

Due to the distance to these wells, and the fact that drinking water, industrial or agricultural supply wells would not be constructed as part of the Urban Development Component, construction of the Urban Development Component is not expected to change potable water levels that reduce yields of adjacent wells or wellfields (public or private). Construction and operation of the Urban Development Component also is not expected to change potable water levels that reduce the ability of the water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported water, summer/winter peaking, or respond to emergencies and drought.

However, the Urban Development Component does include plans for construction of temporary and permanent dewatering wells. Temporary dewatering is likely to be required in certain areas of the Urban Development Component requiring remediation (in connection to the RWQCB's Cleanup and Abatement Order No. 98-125) and subsurface excavation (which is dependent upon the actual construction techniques). This may cause short-term localized changes in the flow direction of shallow groundwater towards the areas of dewatering. Due to

the short-term duration of the dewatering and the fact that no wells being used for beneficial purposes would be affected, no significant short-term impacts to groundwater hydrology due to remediation and/or construction-related dewatering for the Proposed Project is indicated. Additional potential impacts to groundwater due to remediation are discussed further in Section IV.C.(2), Water Quality, and Section IV.I, Safety/Risk of Upset.

Permanent dewatering systems may be required for the methane safety system and dewatering of two-level subterranean (underground) parking garages in the Urban Development Component. (It would not be necessary for one-level subterranean garages.) This dewatering system would be a "contingent" system and would operate only if/as groundwater elevations occur at the level of the dewatering pipes. In case groundwater is present or in the future rises to an elevation above the elevation of the groundwater pipes, the water is conveyed to a sump where it is removed by automatic pumps. The dewatering system does not include dewatering by pumping from deep wells or any specific well points.[130] Adverse impacts are not anticipated relative to the rate or change in the direction or movement of shallow groundwater because the maximum flow of the dewatering pipes is very low and their radius of influence on groundwater is limited. Therefore, the dewatering system is not anticipated to draw water across any substantial distance; hence, impacts are considered negligible from a local and regional basin perspective. Since no wells being used for beneficial purposes would be affected, no significant impacts to groundwater hydrology due to permanent dewatering related to the underground parking lots is indicated. Construction of the Urban Development Component is not expected to change potable water levels that adversely change the rate or direction of flow of groundwater.

3.4.2.1.2 Potential to Reduce Groundwater Recharge Capacity

Implementation of the Project's Urban Development Component would include the addition of impervious surfaces throughout much of the site. During construction grading, the existing pervious surfaces would still be pervious and would not reduce groundwater recharge. However, as construction progresses and during operation of the Urban Development Component, the conversion of existing pervious surfaces to impervious surfaces poses the potential to reduce groundwater recharge. The operation of the Urban Development Component also includes, however, the introduction of additional landscape irrigation, which could minimally increase groundwater recharge.

Percolation of precipitation occurs when rain falls on pervious surfaces. Depending upon the conditions, some rain will run off, and some will infiltrate the soil. The pollutant loading model (discussed in Section IV.C.(2), Water Quality) evaluates the runoff using varying runoff coefficients for the pervious and impervious surfaces. Overall, the model estimates that

[130] *Group Delta Consultants, "Evaluation of Subsidence Due to Lowering of Groundwater in Village at Playa Vista, Playa Vista Development, Los Angeles, California," April 15, 2003.*

30 percent of the average annual rainfall infiltrates the soil while the remaining 70 percent becomes runoff with the full development (buildout) of the adjacent Playa Vista First Phase Project and Proposed Project. Of the 30 percent of average annual rainfall that infiltrates into the soil, some will be either taken up in evapotranspiration or result in deep percolation and recharge of the groundwater. The fraction that percolates is highly dependent upon soil types and conditions, vegetative cover and other factors. It is assumed that 30 percent of the water that infiltrates (equivalent to 9 percent of the average annual rainfall) would result in deep percolation across the site. Table 30 on page 391 provides an estimate of the reduction in recharge resulting from reduced percolation of rainfall as a result of development. As shown in Table 30 on page 391, there could be a reduction in groundwater recharge of approximately 12 acre-ft/year due to the incremental amount of development of the Proposed Project. The Urban Development Component (i.e., impervious area) is set back away from the base of the Ballona Escarpment (Westchester Bluffs). This would allow for runoff flowing directly off the Escarpment to continue to recharge the underlying aquifer.

The Proposed Project would include landscaped area and open space, which would be irrigated, thereby offsetting the reduction in recharge area. While the majority of the applied water would be used to satisfy evapotranspiration, a fraction would typically percolate. The irrigation demand for the Urban Development Component is estimated to be approximately 61 acre-ft/year as described in Section IV.N.(1), Water Consumption. Assuming that 30 percent of the applied water results in deep percolation, the estimated increase in groundwater recharge from applied water would be approximately 18 acre-ft per year (as described in detail in Section IV.I.(1), Water Consumption).

The combination of reduced discharge from impervious surfaces and increased recharge from irrigation return flow results in a net increase of approximately 6 acre-ft/year. This increase is considered positive, but negligible from a regional basin perspective, and is not expected to result in any measurable increase in local groundwater levels.

Thus, from a hydrologic perspective, the small loss in groundwater recharge resulting from the increase in impervious surfaces as a result of development would be more than offset by potential increase in recharge from returns from irrigation application. The construction and operation of the Urban Development Component would not result in demonstrable and sustained reductions of groundwater recharge capacity. A less-than-significant hydrologic impact to groundwater recharge would occur.

Table 30

ESTIMATED GROUNDWATER RECHARGE FROM PRECIPITATION [a]

	Pre-First Phase Project [a]	With Playa Vista First Phase Project [a]	With Playa Vista First Phase Project and Proposed Project [a]
Total Runoff (ft^3/yr) [b]	6,928,209	11,265,504	13,042,729
Total Runoff (ac-ft/yr)	159	259	299
Total Rainfall (ac-ft/yr) [c]	429	429	429
Total Infiltration (ac-ft/yr) [d]	270	171	130
Groundwater Recharge [e]	135	51	39
Loss in Recharge (ac-ft/yr) [f]			12

Average Annual Rainfall Depth: *11.66 in/yr*
Total Rainfall Volume per Year: *429 ac-ft/yr*
Total Project Area: *442 ac (The acreage's used for the recharge calculations do not include the acreage of the Ballona Channel.)*

[a] *Values include adjacent Playa Vista First Phase Project and Proposed Project areas. Off-site runoff is not included.*
[b] *From runoff estimates in pollutant loading model Volume III, Appendix F of the Water Resources Technical Report (Appendix F-1 of this EIR).*
[c] *Based on average rainfall depth of 11.66 in/yr, and total project area of 442 acres.*
[d] *(Total rainfall) - (Total runoff)*
[e] *Assumes 50 percent infiltration becomes deep percolation prior to development (i.e., pre-First Phase) and 30 percent of infiltration becomes deep percolation after development (i.e., with Playa Vista First Phase and with Playa Vista First Phase and Proposed Project).*
[f] *(Pre-First Phase recharge) - (Playa Vista First Phase and Proposed Project recharge)*

Source: Camp Dresser & McKee Inc.

3.4.2.2 Summary of Potential Groundwater Hydrology Impacts

Because construction and operation of the Project's Habitat Creation/Restoration Component is expected to allow that portion of the Project site to remain as pervious surfaces, it is not expected to change potable water level sufficiently or result in demonstrable and sustained reductions of groundwater recharge capacity. As such, a less-than-significant impact would occur. Construction of the Project's Urban Development Component includes construction of temporary and permanent dewatering systems. Furthermore, groundwater in the area of the Proposed Project site is not pumped for potable water. Although dewatering may cause local changes in the flow direction of shallow groundwater, this change in flow would be localized and, therefore, considered negligible from a regional basin perspective. Therefore, the Proposed Project is not anticipated to change potable water level to sufficiently reduce the ability of the water utility to use groundwater for public water supplies, conjunctive uses purposes, storage of imported water, summer/winter peaking, or to respond to emergencies and drought, reduce yield of adjacent wells/well fields, or adversely change the rate or direction of flow of groundwater. Accordingly, a less-than-significant impact would occur. Implementation of the Project's Urban

Development Component would include the addition of impervious surfaces. The conversion of surfaces from pervious to impervious due to development of the Proposed Project has the potential to reduce groundwater recharge by approximately 12 acre-ft/year. The introduction of additional landscape irrigation is estimated to produce approximately 18 acre-ft/year of groundwater recharge. Therefore, the net increase of approximately 6 acre-ft/year of increased recharge due the Proposed Project is considered positive, but negligible from a regional basin perspective; hence, the Project would not result in a demonstrable and sustained reduction of groundwater recharge capacity, and no significant impact would occur.

3.4.3 Equivalency Program Impacts

The preceding hydrology analysis addressed impacts associated with construction and operation of the Proposed Project relative to the surface water and groundwater hydrology. The proposed Equivalency Program allows for specific limited exchanges in the types of land uses occurring within the Project's Urban Development Component. No changes are proposed under the Equivalency Program to the Project's Habitat Creation/Restoration Component.

The exchange of office uses for retail and/or assisted living units would be accomplished within the same building parameters, and would occur at relatively limited locations within the Project site. Furthermore, under the Equivalency Program, there would be no substantial variation in the Project's street configurations, building pad elevations, or the depth of excavation. Potential changes in land use under the Equivalency Program would therefore have no substantial effect on the proposed drainage system or groundwater use and their associated impacts because only the use is changing. Specifically, surface water and groundwater hydrology requirements, as well as the on-site exposure to hydrologic hazards, for Project development would be the same under the Equivalency Program. Very minor variations regarding foundation types or in the preparation of landscaping areas could occur, however such variation would be within the range of construction procedures anticipated to occur with the Proposed Project. In addition, development under the Equivalency Program would not exacerbate any impacts that would occur under the Proposed Project.

All Project Design Features (as discussed in Subsection 3.3 above) and/or recommended mitigation measures (discussed in Subsection 4.0, Mitigation Measures, below) to minimize hydrology impacts under the Proposed Project would be implemented, as appropriate, under the Equivalency Program. Implementation of the Equivalency Program would therefore not cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources; substantially reduce or increase the amount of surface water in a waterbody; result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow; change potable water level sufficiently to: 1) reduce the ability of the water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of

imported water, summer/winter peaking, or respond to emergencies and drought, 2) reduce yields of adjacent groundwater wells or wellfields (public or private), or 3) adversely change the rate or direction of flow of groundwater; or result in demonstrable and sustained reductions of groundwater recharge capacity. Consequently, with implementation of applicable mitigation measures (discussed below), hydrology impacts attributable to the Equivalency Program, as is the case with the Proposed Project, would be less than significant.

3.4.4 Impacts of Off-Site Improvements

Proposed Project development could result in secondary impacts arising from implementation of the Project's mitigation measures, as well as the direct impacts described above. Mitigation measures within Section IV.K.(1), Traffic and Circulation, require physical improvements in transportation facilities at numerous locations including roadway widening at seven locations, as described in Subsection 5.8 of that Section. In addition, as discussed in Section IV.N.(1), Water Consumption, the Proposed Project would require the construction of a water regulator station in the vicinity of Jefferson Boulevard and Mesmer Avenue. These off-site improvements are all located in developed urban areas. All of the off-site improvements, with the exception of the water regulator station, would occur within, or adjacent to, existing roadways. The water regulator station includes a small amount of above-ground piping equipment, a common element of the urban environment. Implementation of the Project's mitigation measures does not involve the construction of any buildings.

The excavation required for the off-site improvements may encounter groundwater and may require temporary dewatering during construction, although it is not anticipated given that improvements would occur at grade or slightly below existing grade. However, any dewatering which becomes necessary for construction excavation would be done in accordance with a General Dewatering Permit. The requirements of the General Dewatering Permit include monitoring and reporting of the quantity and quality of dewatering discharge. With the implementation of proposed mitigation, which includes procedures to control runoff, erosion and sedimentation (Best Management Practices), impacts would be less than significant. Additionally, such encounters are not expected to alter the direction or rate of flow of ground waters. Impacts would be less than significant, and no mitigation measures would be required.

The roadway widenings would maintain all of the existing ground elevations and general drainage patterns. However, the proposed improvements, including intersection and Centinela corridor widenings, would slightly increase the amount of impervious surfaces in some areas. This potentially could alter the course of flow and/or increase the volume of surface runoff, but would not substantially alter absorption rates, drainage patterns, or water runoff, and would not be sufficient enough to substantially change the amount of runoff such that there would be an increase in flooding.

According to the City of Los Angeles General Plan Safety Element, none of the proposed improvements are located within a 100-year flood zone. Furthermore, the proposed intersection and corridor improvements would occur on existing roadways, which have adequately sized storm drain infrastructure. The minor addition of impervious surface associated with the proposed corridor and intersection widenings would not be substantial enough to cause flood flows to be impeded or redirected, and any new gutters or other storm drain infrastructure associated with the proposed improvements would be designed and constructed to accommodate projected flood flows. As such, with construction of adequate drainage facilities associated with the proposed improvements, which are designed to accommodate a 100-year storm event, on- and off-site flooding would be avoided.

The off-site improvements would not result in an increase in daytime or permanent population. The improvements are limited to roadway widenings, and as such do not involve the construction of new buildings. Therefore, they would not expose people or structures to water-related hazards. Also, due to the fact that the off-site traffic mitigation program involves improvements to existing transportation corridors, existing utility lines would require only minor relocation for some improvements (i.e., footings, catch basins for roadway and/or intersection widening).

In summary, the off-site improvements would not result in significant surface and groundwater hydrology impacts, because construction and operation of the improvements would not cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources; substantially reduce or increase the amount of surface water in a waterbody; result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow; change potable water level sufficiently to: (1) reduce the ability of the water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported water, summer/winter peaking, or respond to emergencies and drought; (2) reduce yields of adjacent wells or well fields (public or private); or (3) adversely change the rate or direction of flow of groundwater; or result in demonstrable and sustained reductions of groundwater recharge capacity.

4.0 MITIGATION MEASURES

Mitigation Measures for the Proposed Project and the Equivalency Program

- Prior to issuance of any building permit, the Applicant shall be required to complete or otherwise guarantee completion of the Freshwater Marsh, Riparian Corridor and other structural/treatment control BMPs (e.g., Best Management Practice catchbasins,

etc.), satisfactory to the City's Department of Public Works and/or other responsible agencies (e.g., U.S. Army Corps of Engineers in conformance with Permit No. 90-426-EV).

- Prior to recordation of the tentative tract map, a covenant and agreement shall be prepared and recorded satisfactory to the Department of Public Works, Bureau of Sanitation, Stormwater Management Division and the City Attorney, as appropriate, which shall include the following:

  – Properties within the Proposed Project shall be encumbered with an obligation to perpetually fund the operation and maintenance of the appropriate structural/treatment control BMPs, such as the Freshwater Marsh and Riparian Corridor and Best Management Practices catchbasins, satisfactory to the Department of Public Works. Properties dedicated to a public entity or owned by the property owners' association (i.e., parks, community-serving parcels, etc.) shall not be subject to this funding obligation.

  – The Proposed Project shall implement and perform the requirements set forth in the Operations, Maintenance and Monitoring Manual for the Freshwater Wetland System, in accordance with all permit requirements to monitor and evaluate the hydrologic and water quality performance of the Freshwater Marsh and Riparian Corridor. Information obtained from the monitoring program shall be translated into corrective action and system modifications if necessary, in accordance with the U.S. Army Corps of Engineers (USACE) requirements and satisfactory to the City of Los Angeles Department of Public Works.

  – A monitoring report shall be prepared as required by applicable permits[131] which addresses water sampling locations, frequency of sampling, pollutants of concern to be tested, testing methods, corrective measures if necessary, etc. for the Freshwater Marsh and Riparian Corridor. The report shall be submitted to the USACE, Regional Water Quality Control Board, and the City of Los Angeles Department of Public Works, Bureau of Sanitation.

  – Maintenance records for the structural/treatment control BMPs shall be maintained and submitted to the City of Los Angeles Department of Public Works, Bureau of Sanitation.

- Prior to issuance of any building permit, the Applicant shall encumber the parcel for which the permit is sought with a covenant to fund the Playa Vista Community Service Organization or other funding mechanism, satisfactory to the Advisory Agency and the City Engineer, for the purpose of funding the operation and

[131] *Applicable permits include USACE Permit No. 90-426-EV and corresponding Section 401 certification, California Department of Fish and Game 1603 Streambed Alteration Agreement No. 5-639-93, and Coastal Development Permit No. 5-91-463.*

maintenance of the Freshwater Marsh and Riparian Corridor and other structural/treatment control BMPs. The covenant shall obligate future owners within the parcel to fund the Community Service Organization or other funding mechanism, and shall contain provisions detailing the timing and mechanism for such funding, satisfactory to the Department of Public Works. Properties dedicated to a public entity or owned by the property owners' association (i.e., parks community-serving parcels, etc.) shall not be subject to this funding obligation.

- Prior to issuance of any building permit, the Applicant or the Playa Vista Community Service Organization shall establish and enter into an agreement with the Ballona Wetlands Conservancy or other responsible entity, which shall address the responsibility for funding, coordination, and oversight of all operations and maintenance procedures for the Freshwater Marsh and Riparian Corridor. Maintenance shall be conducted, and maintenance reports submitted periodically and after each storm event to prevent trash, debris, and sediments from clogging the system, in accordance with the U.S. Army Corps of Engineers (USACE) requirements and satisfactory to the City of Los Angeles Department of Public Works.

5.0 UNAVOIDABLE ADVERSE IMPACTS

Impacts to surface water hydrology would be less than significant, as the Proposed Project, inclusive of the Project's Equivalency Program and off-site improvements, is not anticipated to cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property; substantially reduce or increase the amount of surface water in a waterbody; or result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow.

Impacts to groundwater hydrology would be less than significant, as the Proposed Project, Equivalency Program, and off-site improvements are not anticipated to change potable water levels sufficiently to reduce the ability of the water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported water, summer/winter peaking, or respond to emergencies and drought; reduce yields of adjacent wells or well fields (public or private); or adversely change the rate or direction of flow of groundwater; or result in demonstrable and sustained reductions of groundwater recharge capacity.

6.0 CUMULATIVE IMPACTS

The majority of the off-site areas tributary to the adjacent Playa Vista First Phase Project and the Proposed Project consist of highly urbanized development. As a result, substantial additional changes in off-site hydrologic factors affecting runoff rates (i.e., increases in impervious surface area, changes in drainage routes, etc.) are unlikely to occur. Changes in topography and developed acreage should be minimal within the entire developed watershed. While land uses may change, the total impervious area, and therefore runoff rates, should remain relatively constant. For instance, the West Bluff project (Tentative Tract 51122), [132] a 38-acre residential development located south of the Freshwater Marsh (see Figure 28 on page 352) has been approved since the adjacent Playa Vista First Phase Project was approved. The hydrology for Tentative Tract 51122 includes the diversion of 27 acres of area currently draining south to Manchester Boulevard and eventually to the Freshwater Marsh. Based upon the hydrology prepared by Robert Bein, William Frost and Associates, the total 50-year peak runoff generated by the 38 acres of residential tributary area (on-site and off-site to Tract 51122) is 124 cfs with a total storm volume of 49 acre-feet, and the total 50-year peak flow rate generated by the 27 acres of diverted area is 88 cfs with a total storm volume of 35 acre-feet.[133] Per City of Los Angeles requirements, the analysis of future conditions with the addition of Proposed Project assumes that all off-site areas within the local watershed have been built out to the current zoning designations. It is not anticipated that the cumulative flows with the Tentative Tract 51122 diversion would affect the Freshwater Marsh's ability to contain the 1-year storm event. The adjustable weir that manages the overflow into the salt marsh (Ballona Wetlands) could be raised, if necessary, to contain the desired storm flows. This was envisioned at the time of design of the Freshwater Marsh and is the reason why the adjustable weir was included in the design of the Marsh. Cumulative flows during storm events greater than the 1-year storm would incrementally add to the Stormwater overflow going into the Ballona Wetlands. However, the increase is not considered significant since it represents such a small amount of the total Stormwater flowing into the wetland area (less than 1 percent associated with the diversion, between 1.3 percent and 3.6 percent for the Proposed Project, depending on the size of the storm) and the total storm flow compared to conditions before the Marsh was built is reduced by over 50 percent for all storm events. Therefore, the potential for cumulative impacts, including Tentative Tract 51122, has already been accounted for in the Project Design Features for the Proposed Project, including the Project's Equivalency Program. As such, cumulative impacts to surface water hydrology from implementation of the Proposed Project, related projects, and other background growth would be less than significant, as the Proposed Project and related growth is not anticipated to cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property; substantially reduce or increase the

[132] *West Bluffs Project (Tract 51122), City of Los Angeles EIR No 91-0675, State Clearinghouse No. 92041046.*

[133] *The storm volume was estimated by Psomas based upon the prorated drainage area, time of concentration, and peak runoff rate in the Robert Bein, William Frost and Associates report.*

amount of surface water in a waterbody; or result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow.

The Project's off-site improvements would require the widening and resignalization of several intersections and other roadway improvements and construction of a water regulator station. Implementation of such improvements would result in temporary surface water quality impacts during construction activities. Long-term impacts would be very limited. Approximately 0.9 acres of impervious surface would be added with an expected increase in average annual runoff volume of approximately 0.5 acre-feet per year. This would represent an increase of approximately 0.2% of the average annual runoff from the adjacent Playa Vista First Phase Project and Proposed Project combined, and would not significantly impact any storm drainage facility.

Cumulative groundwater hydrology impacts could result from the overall utilization of respective groundwater basins located in proximity to the Proposed Project and related project sites. To the extent that it is possible that public supply wells are located within or near the related project sites, and the related projects could extract water from local basins, such cumulative utilization of groundwater in the region could adversely affect local and regional groundwater hydrology. However, the extent to which the related projects would extract or otherwise directly utilize groundwater is not possible to assess. However, the potential for impacts to groundwater hydrology from the related projects in conjunction with the Proposed Project, inclusive of the Project's Equivalency Program and off-site improvements, is not anticipated to be adverse inasmuch as the related projects would be expected to utilize water supplies from the respective public water suppliers (e.g., LADWP), including possible use of groundwater as a supply source. Such groundwater consumption would be regulated by the respective public water supply agencies, for which groundwater utilization is limited by entitlements to maintain the integrity and productivity of groundwater basins.

The Project's off-site improvements would convert approximately 0.9 acres of pervious surface to impervious. As with surface water hydrology, the potential for the construction and operation of off-site improvements to impact groundwater is minimal because the loss of 0.9 acres of pervious surface would not sufficiently reduce the ability of the water utilities to use the groundwater basin: or adversely change the rate or direction of flow of groundwater, or result in demonstrable and sustained reductions of groundwater recharge capacity.

Consequently, no significant cumulative impacts to groundwater hydrology are expected, as the Proposed Project, related growth and off-site improvements are not anticipated to change potable water level sufficiently to reduce the ability of the water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported water, summer/winter peaking, or respond to emergencies and drought; reduce yields of adjacent wells

or wellfields (public or private); or adversely change the rate or direction of flow of groundwater; or result in demonstrable and sustained reductions of groundwater recharge capacity. As such, no significant cumulative impacts are anticipated.