4.4 Hydrology and Water Quality

4.4.1 Introduction

This analysis addresses the potential for the proposed Project to result in significant hydrology (drainage, groundwater) and water quality impacts. The analysis of potential drainage impacts in this section is based in part on the *West Maintenance Area, Los Angeles International Airport, Engineer's Design Report: Appendix F, Drainage Design Report* prepared by Atkins in August 2013.

Prior to the preparation of this Environmental Impact Report (EIR), an Initial Study (IS – in Appendix A of this EIR) was prepared using the California Environmental Quality Act (CEQA) Environmental Checklist Form to assess potential environmental impacts associated with hydrology and water quality. For several issues related to hydrology and water quality, the IS found that the proposed Project would result in "no impact", and thus, no further analysis of these topics in an EIR was required. Refinements have been made to the proposed Project to reflect additional information and coordination with the public and the FAA. The refinements do not represent a material change to the proposed Project that was described in the IS/NOP and do not change any of the conclusions in the IS. The thresholds not addressed further include:

- Potential Impacts related to placing housing or structures within a 100-year flood plain were evaluated and determined to have "No Impact" in the IS because the proposed Project would not include the development of housing or other uses within a 100-year flood plain.
- Potential impacts related to exposing people or structures to a significant loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam, were evaluated and determined to have "No Impact" in the IS because the Project site is not located within a boundary of an inundation area from a flood control basin. Further, the Project site is not located within the downstream influence of any levee or dam.
- Potential impacts related to inundation by seiche, tsunami, or mudflow were evaluated and determined to have "No Impact" in the IS because the Project site is located approximately 0.5-mile east of the Pacific Ocean and is not delineated as a potential inundation or tsunami impacted area in the City of Los Angeles Inundation and Tsunami Hazard Areas map. Further, the Project vicinity is relatively flat and developed, and not subject to mudflows.

Accordingly, no further analysis of these issues is provided in this section.

4.4.2 Methodology

4.4.2.1 Hydrology

4.4.2.1.1 Drainage

The objective of the drainage analysis is to assess the potential for localized flooding and substantial erosion/siltation to occur under the proposed Project. Specifically, the drainage analysis first evaluates the existing drainage patterns, stormwater peaks, volumes, and capacity of the existing storm drainage systems. The analysis then estimates the stormwater peak, volume and flow direction resulting from the proposed Project and describes the proposed

improvements under the proposed Project. Finally, the analysis evaluates whether the proposed drainage systems have adequate capacity to accommodate the proposed Project's stormwater runoff so that flooding and/or substantial erosion/siltation does not result.

Although the Project site is located within the City of Los Angeles (City), the Los Angeles County Department of Public Works (LACDPW) Modified Rational Method (MODRAT) analysis methodology was utilized for the purposes of this analysis because it allows for the calculation of peak volumes and because the receiving stormwater drainage system is under LACDPW jurisdiction.[1] Two separate storm events are utilized in this section to evaluate whether stormwater drainage systems are adequate to accommodate stormwater flows. Specifically, the LACDPW Urban Flood event is used to assess the adequacy of proposed on-site storm drains, while the LACDPW Capital Flood event is used to evaluate the adequacy of proposed detention/infiltration basins and downstream stormwater drainage systems.[2]

Peak flows are estimated using the MODRAT as defined by the LACDPW Hydrology Manual and United States (U.S.) Department of Transportation Federal Aviation Administration (FAA) Surface Drainage Manual design requirements, and take into account precipitation levels during the Urban Flood and Capital Flood events, soil type(s), acreage, and percentage of impervious surfaces at the 84-acre Project site and greater Pershing Sub-basin. Both existing and existing with proposed Project conditions are modeled.

4.4.2.1.2 Groundwater

The groundwater analysis examines the potential for the proposed Project to interfere substantially with groundwater recharge by estimating both the groundwater recharge that occurs at the Project site under existing conditions and the groundwater recharge that would occur at the Project site under the proposed Project. The analysis then compares the change in groundwater recharge resulting from the proposed Project to the overall annual groundwater recharge within the basin to determine if a substantial reduction in groundwater level would occur. Conclusions as to the significance of changes in groundwater recharge under the proposed Project are informed by the conclusions regarding groundwater impacts in the Los Angeles International Airport (LAX) Master Plan EIR and other relevant studies.

4.4.2.2 Water Quality

Potential pollutant loads can be associated with two types of surface water runoff; wet weather flows (e.g., flows from stormwater runoff flowing over impervious urban uses) and dry weather flows (e.g., flows associated with non-stormwater surface runoff from areas treated with fertilizers and herbicides, potential spills of hazardous materials, and the outdoor washing of motor vehicles, aircraft, etc.). Within this section, potential pollutant loads associated with surface water flows are addressed qualitatively by characterizing the practices that can contribute to these flows and describing measures proposed to reduce pollutants in such flows.

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1 City of Los Angeles, West Maintenance Area, Los Angeles International Airport, Engineer's Design Report: Appendix F, Drainage Design Report, prepared for Los Angeles World Airports by Atkins, August 9, 2013.

2 The LACDPW 2006 Hydrology Manual defines an Urban Flood event as runoff from a 25-year frequency design storm falling on a saturated watershed (soil moisture at field capacity). A Capital Flood event is defined as the runoff produced by a 50-year frequency design storm falling on a saturated watershed.

The pollutants of concern associated with wet weather flow (i.e., stormwater runoff) are evaluated and based upon studies of the Santa Monica Bay, the primary receiving water body for runoff from LAX, including the *Characterization Study of the Santa Monica Bay Restoration Plan - State of the Bay 1993*,[3] and the Santa Monica Bay Restoration Commission's (SMBRC)[4] Santa Monica Bay Restoration Plan in 2008.[5] These studies identified 19 pollutants of concern for the Santa Monica Bay. Thirteen of these pollutants were selected for analysis based on the reasonable likelihood that they would be present in stormwater runoff from LAX and the Project site, including total suspended solids, phosphorus, total Kjeldahl nitrogen, copper, lead, zinc, oil and grease, biochemical oxygen demand, chemical oxygen demand, ammonia, coliform bacteria, fecal coliform bacteria, and fecal enterococcus.[6]

The analysis of dry weather flows (i.e., non-stormwater surface water runoff) is limited to the identification of factors that are likely to increase or decrease the potential for pollutants to enter dry weather flows originating from the Project site. Sources of dry weather flows at airports may include outdoor maintenance of planes and vehicles; building and ground maintenance; irrigation; aircraft and ground vehicle fueling, painting, stripping, and washing; chemical and fuel transport and storage; and any hazardous materials spilled on-site. For the purposes of this analysis, the pollutants of concern for the receiving water body (i.e., the Santa Monica Bay) are the same as those identified above for wet weather flows. Potential water quality impacts from dry weather flows were evaluated by identifying potential sources of dry weather flows at the Project site and evaluating whether the proposed Project would introduce pollutants of concern into these flows. The analysis of potential impacts takes into account Project-specific design features, regulatory requirements, and applicable LAX Master Plan commitments and mitigation measures.

4.4.3 Existing Conditions

4.4.3.1 Regulatory Context

4.4.3.1.1 Hydrology

Hydraulics and Surface Drainage Manuals

Both the LACDPW Hydraulics Manual and FAA Surface Drainage Manual (AC 150/5320-5C) set forth methodologies and design standards to be used in hydraulic analyses and drainage improvements for development projects at LAX. The drainage design for the proposed Project has been prepared in accordance with the methodologies included in these manuals. Some of the key methodologies and standards include:

- Drainage design is an integral part of the proposed Project. Projects shall maintain compatibility and minimize interference with existing drainage patterns.

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3 Santa Monica Bay Restoration Project, Characterization Study of the Santa Monica Bay Restoration Plan - State of the Bay 1993, January 1994.

4 In 2003, the Santa Monica Bay Restoration Project formally became the Santa Monica Bay Restoration Commission (SMBRC). The commission is an independent non-regulatory state agency consisting of a coalition of governments, scientists, industry, and the public.

5 Santa Monica Bay Restoration Commission, Santa Monica Bay Restoration Plan, 2008.

6 City of Los Angeles, Final EIR for the LAX Bradley West Project, Section 5.3, May 2009.

- All existing pipe and other conveyance elements shall be investigated in accordance with acceptable hydraulic performance criteria including, but not necessarily limited to, Manning's equation for open channel and full flows. The Water Surface Pressure Gradient program shall be utilized for hydraulics of the pipes and channels.
- The Capital Flood event is defined as the runoff produced by a 50-year frequency design storm.
- Proposed on-site detention/infiltrations basins should be designed to accommodate the Capital Flood event.
- The Urban Flood event is defined as the runoff produced by a 25-year frequency design storm. Proposed on-site storm drains should be designed to accommodate runoff flows from the Urban Flood event.
- Investigation for hydraulic capacity of conduits shall be completed using the water surface pressure gradient program and verification of inlet capacity calculations shall be accomplished by utilizing the Federal Highway Administration HEC-22 Urban Drainage Manual and culvert charts.
- Inlets are spaced based on longitudinal slopes and design spread.
- All inlets shall be checked for a minimum freeboard of 0.75 foot. Energy loss due to entrance loss (calculated as 1.2 times the velocity head) would be included at the upstream inlet.
- Maximum permissible velocity for reinforced concrete pipe (RCP) should be 45 feet per second.

4.4.3.1.2 Water Quality

Water Quality Control Plan

The agency with jurisdiction over water quality at LAX is the Los Angeles Regional Water Quality Control Board (LARWQCB). The LARWQCB developed the Water Quality Control Plan Basin Plan for the Los Angeles Region (Basin Plan),[7] which guides conservation and enhancement of water resources and establishes beneficial uses for inland surface waters, tidal prisms, harbors, and groundwater basins within the region. Beneficial uses are designated so that water quality objectives can be established and programs that enhance or maintain water quality can be implemented. The Basin Plan was amended in December 2002 to incorporate implementation provisions for the region's bacteria objectives and to incorporate a wet weather Total Maximum Daily Load[8] (TMDL) and dry weather TMDL[9] for bacteria at Santa Monica beaches. In the future, the Basin Plan will be further amended after the U.S. Environmental Protection Agency (USEPA) approves recently adopted TMDLs, such as the debris TMDL for Santa Monica Bay nearshore.

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7 California Regional Water Quality Control Board, Los Angeles Region 4, Water Quality Control Plan, Los Angeles Region - Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, June 13, 1994.

8 State of California, California Regional Water Quality Control Board, Los Angeles Region, Resolution No. 2002-022, December 12, 2002.

9 State of California, California Regional Water Quality Control Board, Los Angeles Region, Resolution No. 02-004, January 24, 2002.

The Basin Plan also incorporates State Water Resources Control Board (SWRCB) statewide Water Quality Control Plans. The only applicable statewide plan at this time is the California Ocean Plan. Like the Basin Plan, the California Ocean Plan was created to establish beneficial uses and associated water quality objectives for California's ocean waters and to provide a basis for regulation of wastes discharged to coastal waters by point and non-point source discharges. In December 2009, the SWRCB adopted amendments to the plan and is currently in the process of considering additional amendments related to desalination facilities, trash, and fecal coliform.

National Pollutant Discharge Elimination System Program

The Clean Water Act (CWA) prohibits the discharge of pollutants to waters of the United States from any point source unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. In accordance with the CWA, the USEPA promulgated regulations for permitting stormwater discharges by municipal and industrial facilities and construction activities through the NPDES program. The Phase I NPDES municipal stormwater program applies to urban areas with a population greater than 100,000 while the industrial program applies to specific types of industry, including airports. The NPDES program for construction applies to activities that involve ground disturbance over an area of one acre or more. The NPDES permits for municipal, industrial, and construction activities are described below.

NPDES - Municipal Permit

In accordance with the CWA, a Phase I NPDES permit is required for certain municipal storm sewer system (MS4) discharges to surface waters. LAX is within the region covered by NPDES Permit No. CAS004001 (MS4 stormwater permit). The permit is a joint permit, with the County of Los Angeles as the "Principal Permittee" and 84 incorporated cities within the County of Los Angeles, including the City, as "Permittees." The objective of the permit, and the associated stormwater management program, is to effectively prohibit non-stormwater discharges and to reduce pollutants in urban stormwater discharges to the "maximum extent practicable" in order to attain water quality objectives and to protect the beneficial uses of receiving waters in the County of Los Angeles.

As part of the municipal stormwater program associated with the NPDES Phase 1 Permit, LARWQCB adopted the Standard Urban Stormwater Mitigation Plan (SUSMP) to address stormwater pollution from new development and redevelopment projects. The SUSMP is a model guidance document for use by permittees to select post-construction Best Management Practices (BMPs). BMPs are defined in the SUSMP as any program, technology, process, siting criteria, operational methods or measures, or engineered systems, which, when implemented, prevent, control, remove or reduce pollution.[10] The general requirements of the SUSMP include:

- Controlling peak stormwater runoff discharge rates

[10] Regional Board Executive Officer, Standard Urban Storm Water Mitigation Plan for Los Angeles County and Cities in Los Angeles County, March 8, 2000. Subsequently, the City of Los Angeles adopted an ordinance authorizing implementation of the SUSMP for public and private development projects in the City (Ordinance No. 173494, passed by the Council of the City of Los Angeles on September 6, 2000).

- Conserving natural areas
- Minimizing stormwater pollutants of concern
- Protecting slopes and channels
- Properly designing outdoor material storage areas
- Properly designing trash storage areas
- Providing proof of ongoing BMP maintenance

Three types of BMPs are described in the SUSMP: source control, structural, and treatment control BMPs. The SUSMP also specifies design standards for structural or treatment control BMPs to either infiltrate or treat stormwater runoff and to control peak flow discharge.

The NPDES Phase 1 Permit has been amended a number of times since 2001 to incorporate requirements of approved TMDLs and address other issues. The LARWQCB adopted major revision and updates to the MS4 Permit on November 9, 2012. One of the major changes in the New Development and Significant Redevelopment section of the Permit which puts primary emphasis on Low Impact Development (LID) practices over treatment control BMPs. LID practices place a priority on preserving the pre-development hydrology of a project site by using BMPs that store, infiltrate, evaporate, and detain runoff. Revision of the MS4 Permit will bring the Los Angeles County Permit into consistency with other MS4 Permits that have been adopted in the past several years. Further, in May 2012, the City implemented its LID Ordinance with the intent of ensuring that development and redevelopment projects mitigate runoff in a manner that captures rainwater at its source, while utilizing natural resources. Specifically, the City's ordinance requires that the volume of stormwater runoff produced by a 0.75-inch storm event be infiltrated, evapotranspired, captured and used, treated through high removal efficiency BMPs, onsite, through stormwater management techniques that comply with the provisions of the City's *Low Impact Development Best Management Practices Handbook*. To the maximum extent feasible, onsite stormwater management techniques must be properly sized, at a minimum, to treat the volume of stormwater runoff produced by a 0.75-inch storm without any stormwater runoff leaving a project site. In accordance with *Low Impact Development Best Management Practices Handbook*, the City Watershed Protection Division has established infiltration systems as the first priority type of BMP as they provide reduction in stormwater runoff and, in some cases, provide groundwater recharge.

NPDES - Industrial Permit

The SWRCB issued a statewide Industrial Activities Storm Water General Permit (Industrial Permit) that applies to all industrial facilities (including airside operations at airports) that discharge stormwater and require a NPDES permit. This Permit requires that Permittees eliminate or reduce non-stormwater discharges, develop and implement a Storm Water Pollution Prevention Plan (SWPPP), and perform monitoring of discharges to the stormwater system from their facilities. Los Angeles World Airports (LAWA) has prepared a SWPPP to address the permitting of stormwater discharges associated with industrial activities at LAX. Numerous tenants, who conduct a variety of airport-related support functions, occupy leaseholds, and also perform these activities, are included as co-Permittees under LAWA's SWPPP program. The LAX SWPPP contains general information, such as drainage system layout and tenant and site activities; describes past and present potential sources of pollutants in stormwater; designates programs to identify and eliminate non-stormwater discharges; and

describes the stormwater management controls being implemented at LAX and the ongoing stormwater monitoring program.

NPDES - Construction Permit

In addition to the municipal and industrial permits, the SWRCB issued a statewide NPDES general permit for stormwater discharges associated with construction activities (Construction Permit), in accordance with federal stormwater regulations. The most recent update to the Construction Permit adopted by the SWRCB became effective July 2012. Project proponents planning construction activities that disturb an area greater than one acre are required to file a Notice of Intent (NOI) to discharge under the Construction Permit. After a NOI has been submitted, the discharger is authorized by the SWRCB to discharge stormwater under the terms and conditions of the general permit.

Total Maximum Daily Load (TMDL) Program

Under Section 303(d) of the CWA, states are required to identify the water bodies that do not meet water quality objectives through control of point source discharges under NPDES permits. For these water bodies, states are required to develop appropriate TMDLs. TMDLs are the sum of the individual pollutant load allocations for point sources, nonpoint sources,[11] and natural background conditions, with an appropriate margin of safety for a designated water body. The TMDLs are established based on a quantitative assessment of water quality problems, the contributing sources, and load reductions or control actions needed to restore and protect an individual water body. TMDLs provide an analytical basis for planning and implementing pollution controls, land management practices, and restoration projects needed to protect water quality. When TMDLs are adopted, particularly in California, they contain implementation requirements for permitted dischargers that are intended to meet the load reductions identified in the TMDL. In the case of LAX, TMDL requirements may be implemented through the MS4 Permit, the Industrial Permit, and the Construction Permit.

A list indicating which pollutants are priorities for each water body, called a 303(d) list, has been developed by the State of California, and is updated and re-adopted on a regular basis. The 303(d) list, as it has been updated over the years, indicates that both non-point and point sources of pollution degrade the water quality of the receiving water body of stormwater flows from the Project site, the Santa Monica Bay.[12] Once a TMDL is completed and approved for a particular water body and pollutant, it is taken off of the list at the next listing period since the implementation of the TMDL is expected to bring the water body back into compliance with the Water Quality Objectives. The TMDLs that have been completed by the LARWQCB for Santa Monica Bay are shown in **Table 4.4-1** below.

[11] Discharges originating from single sources, like power and wastewater treatment plants, are referred to as point source discharges, while storm water and/or urban runoff are non-point sources of water pollution since their origins cannot be attributed to a single identifiable source.

[12] California State Water Resources Control Board, 2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report) – Statewide, 2010 California 303(d) List of Water Quality Limited Segments, 2010, Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml, accessed March 7, 2013.

Table 4.4-1

Adopted TMDLs for Santa Monica Bay

Water Body	Pollutant(s)
Santa Monica Bay	Dry Weather Bacteria Wet Weather Bacteria Debris

Source: City of Los Angeles, Hydrology and Water Quality Report for the LAX Specific Plan Amendment Study, prepared by CDM Smith for LAWA, March 2012.

A revised 2010 303(d) list (the most recent available) was approved by the USEPA in November 2011. On this list, pollutants and TMDL priority schedules have been assigned that differ from the previous 303(d) list developed by the SWRCB in February 2003. The pollutants and expected TMDL completion date for Santa Monica Bay Offshore and Nearshore are shown in **Table 4.4-2** below. Expected completion schedule dates were established by the SWRCB based on a combination of factors that include the degree of nonattainment/complexity of the problem, the relative importance of the watershed, and the resources available at the LARWQCB to complete the TMDL. While the 2009 303(d) list included debris for Santa Monica Bay, this is not shown in the table as the TMDLs have been adopted since the listing.

Table 4.4-2

Future TMDL Completion Schedule for Santa Monica Bay Offshore and Nearshore

Pollutant/Stressor	Expected Completion
Dichlorodiphenyltrichloroethane (i.e., DDT) (tissue and sediment)	01/01/2019
Fish Consumption Advisory	01/01/2019
Polychlorinated Biphenyls (i.e., PCBs) (tissue and sediment)	01/01/2019
Sediment Toxicity	01/01/2019

Source: State of California, State Water Resources Control Board, August 4, 2010.

4.4.3.2 Setting

4.4.3.2.1 Hydrology

Drainage

At LAX, surface water runoff is discharged to both Los Angeles County Flood Control District (LACFCD) and City drainage structures. LACFCD facilities include the Dominquez Channel, which discharges areas east of Sepulveda Boulevard to San Pedro Bay, as well as some of the individual drains that discharge into Santa Monica Bay. The City is the owner and operator of all drainage structures at the airport. Within the City, stormwater drainage, sanitary wastewater, and industrial wastewater are handled by three separate systems. All stormwater drainage infrastructure operated by the City at LAX ultimately discharges to the Santa Monica Bay.

The existing stormwater drainage system at LAX consists of catch basins, subsurface storm drains and open channels and outfalls. The principal stormwater outfalls for surface runoff at the airport are the Dominguez Channel and the Argo, Imperial and Culver Drains. The service boundaries for each of these outfalls form distinct sub-basins that collect surface water runoff. Some of these sub-basins extend off the airport property and collect surface water runoff from surrounding communities. Surface water runoff from the Argo, Imperial and Pershing Sub-basins is collected in stormwater drainage facilities owned by the City and contributes to the total surface water flow in the Santa Monica Watershed and flow to Santa Monica Bay, while surface flow from the Dominguez Channel Sub-basin discharges to San Pedro Bay. The average annual precipitation at LAX is 12 to 15 inches per year,[13] and the total amount of existing impervious area within the main drainage areas at LAX, including the Argo, Imperial, Pershing, and Dominguez Channel Sub-Basins at airport, is approximately 3,510 acres.[14] Based on LACDPW isohyets, the Capital Flood event (i.e., a 50-year frequency design storm) would result from 5.0 inches of rainfall over a 24-hour period, while the Urban Flood event (i.e., a 25-year frequency design storm) would result from 4.39 inches of rain over a 24-hour period.

Surface water runoff from portions of the airport west of Sepulveda Boulevard (including the Project site) flows to the Santa Monica Bay. Conversely, surface water runoff from portions of the airport east of Sepulveda Boulevard flows to the Dominguez Channel, and ultimately to the San Pedro Bay. As the proposed Project would only affect airport areas west of Sepulveda Boulevard, surface water runoff to the Dominguez Channel is not considered in this analysis. **Figure 4.4-1** delineates the boundaries of the drainage sub-basins at LAX west of Sepulveda Boulevard and indicates the location of the Project site relative to these sub-basins. As indicated, the 84-acre Project site is located within the western portion of the Pershing Sub-basin. The Pershing Sub-basin includes approximately 700[15] acres of airport property which contains, in addition to the Project site, the Tom Bradley International Terminal (TBIT), maintenance hangars between the TBIT and the Project site, remote aircraft gates, Taxiway AA,

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13 City of Los Angeles, West Maintenance Area, Los Angeles International Airport, Engineer's Design Report Appendix F: Drainage Design Report, prepared for Los Angeles World Airports by Atkins, August 9, 2013.

14 City of Los Angeles, Final EIR for the LAX Bradley West Project, Section 5.3, May 2009. Acreage indicated in statement does not include the Vista Del Mar Sub-Basin and the small portion of the Culver Sub-Basin that extends onto airport property, given that these sub-basins are peripheral to, and generally unaffected by, airport operations.

15 Ibid.

portions of Taxiways B and C, World Way West, area south of the Project site and west of the South Airfield Complex (containing vacant area, parking lot, stormwater quality retention basin, and other small miscellaneous airport uses), and a portion of the Los Angeles/El Segundo Dunes (dunes). The Pershing Sub-basin also contains a portion of Pershing Drive and the Pershing Drive/World West Way intersection. The total existing impervious area within the Pershing Sub-basin is approximately 665 acres,[16] of which approximately 12 acres currently occur on the Project site.[17]

Surface water runoff from the Pershing Sub-basin generally flows, via a network of storm drains, north or south to World Way West; the existing storm drain infrastructure system proximate to the Project site is shown in **Figure 4.4-2**. The main drainage collection trunk line in World Way West, a 7'-1"x 8' reinforced concrete box (RCB) drains westward to an RCB in Pershing Drive which measures 9'-2"x11' for the segment extending north of World Way West and 8'-6"'x10' extending south of World Way West.[18] The Pershing RCB, in turn, flows south and combines with the 9' diameter Imperial Sub-basin drainage pipe along the north side of Imperial Highway. From there, the Imperial Sub-basin drainage pipe flows to Santa Monica Bay via the Imperial Outfall located near the west end of Imperial Highway.[19] Wet-weather flows (i.e., stormwater runoff) from the Project site currently sheet flows to the north, south, and west. The majority of this sheet flow is from northeast and drains towards the southwest, consistent with the prevailing topography of the Project site, which ranges from approximately 105 feet above mean sea level (msl) in the northeast to approximately 80 feet msl in the southwest. This results in the majority of Project site runoff flowing directly to the Pershing RCB. Stormwater runoff from a 6-acre portion of the Project site flows northward to the World Way West RCB, and a small portion of the Project site adjacent to the west side of Taxiway AA flows eastward to a small drainage channel running along the east side of Taxiway AA, which in turn drains to the World Way West RCB. No drainage from the Project site is collected in the 54-inch RCP that bisects the southern portion of Project site, as shown in **Figure 4.4-2**.[20] This 54-inch RCP, constructed in 1991 as part of the Taxiway 75 improvements, originates at Taxiway C and conveys surface water runoff flows from this area across the Project site to the existing RCB in Pershing Drive. Dry weather flows (i.e., non-stormwater runoff) follow the same pattern as wet-weather flows, but rarely occur in flow volumes that result in sheet flow.

The Pershing Sub-basin includes an existing water quality basin located in the southwest corner of the airport property, east of Pershing Drive and south of the Project site, and a stormwater detention basin located in the southeastern-most corner of the Dunes, along the west side of Pershing Drive. Although the water quality basin east of Pershing Drive is located in the Pershing Sub-basin, its primary purpose is to provide collection and treatment of all dry weather flows and a portion of wet weather flows that are diverted from the Imperial Sub-basin. Dry weather flows from this water quality basin are discharged to the Hyperion Wastewater

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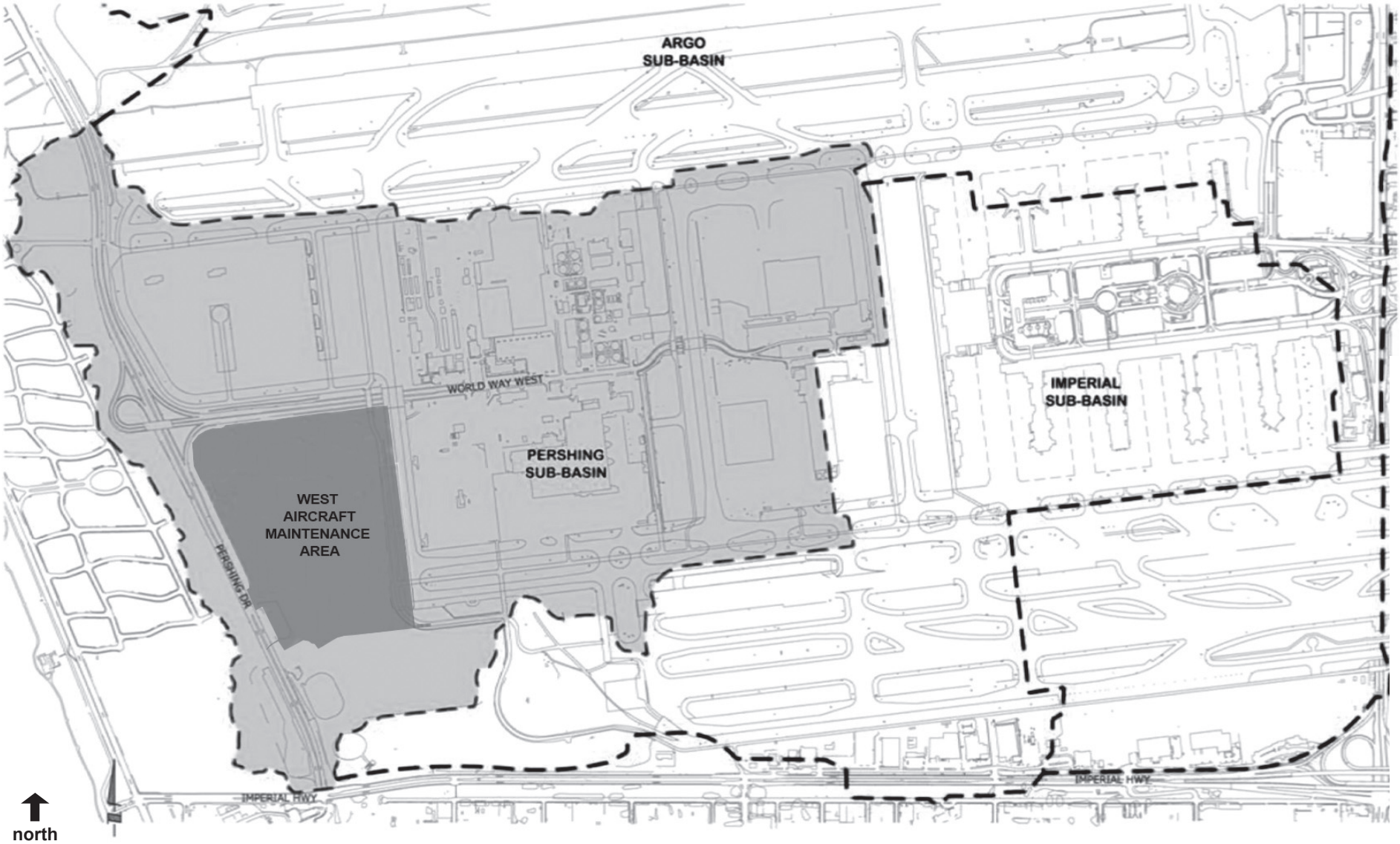
16 Ibid.

17 In addition to containing 12 acres of impervious surface area (i.e., paved area), the Project site also currently contains 72 acres of pervious surface area (i.e., unpaved areas) that have been compacted to an imperviousness of 60 percent by on-site staging/stockpiling operations.

18 City of Los Angeles, West Maintenance Area, Los Angeles International Airport, Engineer's Design Report – Appendix F - Drainage Design Report, prepared for Los Angeles World Airports by Atkins, August 9, 2013.

19 City of Los Angeles, Final EIR for the LAX Master Plan, Technical Report 6, Hydrology and Water Quality Technical Report, page 7, prepared for LAWA by CDM, January 2001.

20 The 54-inch RCP was constructed in 1991 as part of the Taxiway 75 improvements, and supplements the World Way West RCB.



Source: LAWA, 2012.
Prepared by: Atkins, 2012; PCR Services Corporation, 2012.

West Aircraft Maintenance Area Project Draft EIR	**Drainage Sub-basins**	Figure **4.4-1**

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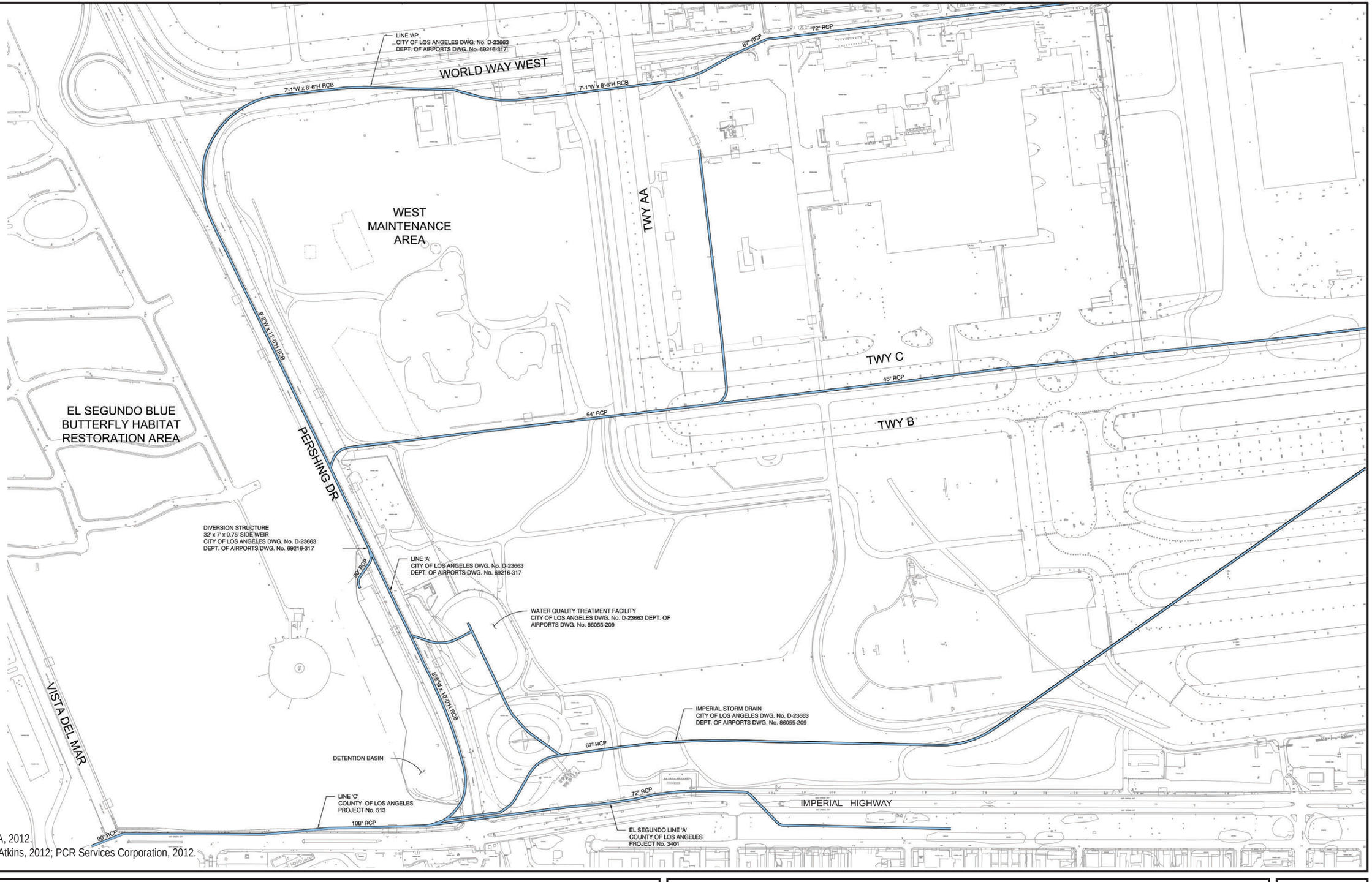

Source: LAWA, 2012.
Prepared by: Atkins, 2012; PCR Services Corporation, 2012.

West Aircraft Maintenance Area Project
Draft EIR

Existing Drainage Facilities

Figure
4.4-2

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Treatment Plant under an existing industrial waste permit from the City's Industrial Waste Division, rather than to Santa Monica Bay. The purpose of the stormwater detention basin west of Pershing Drive is to retain and slow peak flows coming from the RCB in Pershing Drive during storm events before discharging to the 108-inch diameter drainage pipeline along the north side of Imperial Highway. Downstream of these two basins, two storm drain trunk lines from outside the Pershing Sub-basin join the Imperial drainage pipe near Pershing Drive, including an 87-inch RCP that conveys flows from the airport's Imperial Sub-basin and a 72-inch RCP identified by LACFCD as El Segundo Drain Line A. The Imperial drainage pipe outfalls at the Santa Monica Bay. The location of this infrastructure is shown in **Figure 4.4-2**.

Table 4.4-3 identifies the estimated existing peak flows in the Pershing Drive RCB, 54-inch RCP, and World Way West RCB during a Capital Flood event. The modeling indicates that there are existing peak flow deficiencies in all four conveyance structures during the Capital Flood event.[21] Deficiency is when the hydraulic grade line exceeds the set elevation along the storm drain conduit. Typically, this elevation is determined with the depth from the finish surface to allow all inlets and laterals to work properly (assumed to be three feet below the finish surface per the Drainage Report). When this occurs, flooding can result, and ponding has been documented during heavy storm events at the World Way West RCB where it dips under Taxiway AA.[22]

The Project site does not contain streams, rivers or water bodies, and is not located in a floodplain mapped under the National Flood Insurance Program of the Federal Emergency Management Agency.[23]

Groundwater

Surface recharge of groundwater occurs when precipitation or surface water runoff contacts pervious surfaces and infiltrates through the subsurface to replenish groundwater in aquifers below. The Natural Resources Conservation Service (NRCS, formerly Soil Conservation Services) of the U.S. Department of Agriculture has investigated the hydrologic characteristics of soils as related to runoff potential, and has developed a system to classify soils into four hydrologic soils groups: Group A through D. Group A has the lowest runoff potential and a high infiltration rate and Group D has the highest runoff potential and a low infiltration rate. In the Los Angeles County, this investigation was further detailed with field testing in the early 1960s to determine the actual infiltration capacities. The project area is generally comprised of Soil Type 010, Oakley Fine Sand, and Soil Type 014, Ramona Sandy Loam. These types of soil have moderate to high infiltration rates when thoroughly wetted, and moderate and high rate of water transmission.

Groundwater occurs beneath LAX, at approximately 100 feet below the ground surface, within what is known as the West Coast Groundwater Basin.[24] Perched groundwater also occurs beneath LAX in pockets ranging from 20 to 60 feet below the ground surface.[25]

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21 City of Los Angeles, West Maintenance Area, Los Angeles International Airport, Engineer's Design Report: Appendix F , Drainage Design Report, prepared for Los Angeles World Airports by Atkins, August 9, 2013..

22 Ibid.

23 Ibid.

24 City of Los Angeles, Final EIR for the LAX Master Plan, Technical Report 6, Hydrology and Water Quality Technical Report, page 7, prepared for LAWA by CDM, January 2001.

25 Ibid.

Table 4.4-3

Existing Peak Stormwater Runoff Flows

Storm Drain	Storm Drain Size	Node	Jurisdiction	Existing Flow (cfs) Q50 [a,b]
Pershing Dr. RCB (downstream [south] of confluence with 54-inch RCP)[c]	8'-6"x10'	280A	City of Los Angeles	687
54-inch RCP (upstream [east] of confluence with Pershing Dr. RCB)	54"	250B	City of Los Angeles	104
Pershing Dr. RCB (at confluence with 54-inch RCP)[c]	9'-2"x11'	225AB	City of Los Angeles	573
World Way West RCB (at confluence with Pershing Dr. RCB)	7'-1"x8'	205A	City of Los Angeles	512
World Way West RCB (upstream [east] of confluence with Pershing Dr. RCB)	7'-1"x 8'	155A	City of Los Angeles	305

[a] The stormwater flow volume that would be conveyed during a 50-year design storm (i.e. a LACDPW Capital Flood event).
[b] This calculation is conservative in that it does not consider the stormwater detention basin adjacent to the west side of Pershing Drive. More detailed analysis is required to determine the capacity of this detention basin.
[c] At (and subsequently downstream of) the confluence of the Pershing Drive RCB and the 54-inch RCP, all stormwater from the Project site is being conveyed through the Pershing Drive RCB, having either been directly conveyed to the Pershing Drive RCB or having been conveyed by the World Way West RCB to the Pershing Drive RCB.

Source: City of Los Angeles, West Maintenance Area, Los Angeles International Airport, Engineer's Design Report: Appendix F, Drainage Design Report, prepared for Los Angeles World Airports by Atkins, August 9, 2013.

Groundwater in the Project vicinity generally flows to the west at an approximate gradient of 0.0006 to 0.0008 feet per foot. Historically, groundwater flows to the northwest, west, and southwest at the Project site, and has generally risen over 3 feet since 1994. A groundwater divide, created by the West Coast Basin Barrier,[26] is located approximately 0.5 mile east of the Project site beneath LAX, near Sepulveda Boulevard. East of Sepulveda Boulevard, groundwater is observed to flow to the east.

Designated beneficial uses for groundwater in the Los Angeles Region, as defined by the LARWQCB Basin Plan, include municipal, industrial process, and agricultural use.[27] However, groundwater beneath LAX is not used for municipal or agricultural purposes, and industrial and process uses are limited to the removal of small amounts of groundwater extracted incidental to a vacuum-enhanced free product recovery (VEFPR) system operating throughout portions of LAX to remediate a jet fuel leak that occurred east of the Project site.[28] Please refer to Section 4.3, *Hazards and Hazardous Materials*, for a detailed description of the VEFPR system.

[26] The West Coast Basin Barrier consists of injection wells that inject fresh water into aquifers along the Santa Monica Bay to build up a line of pressure and thereby block saltwater intrusion into the aquifers from occurring.
[27] California Regional Water Quality Control Board, Los Angeles Region 4, Water Quality Control Plan, Los Angeles Region – Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, June 13, 1994.
[28] City of Los Angeles, Final EIR for the LAX Bradley West Project, Section 5.3, May 2009.

To characterize the components that contribute to the groundwater supplies in the West Coast Groundwater Basin, a water budget was developed as part of a water management study of the West Coast Groundwater Basin Barrier Project by the West Basin Municipal Water District. Based on this water budget, 6,700 acre-feet/year (AFY) of groundwater inflows to the West Coast Groundwater Basin are attributed to surface recharge, which represents approximately 13 percent of the total estimated inflows.[29] Sources for surface recharge include precipitation, surface water streams, irrigation water from fields and lawns, industrial and commercial wastes, and other applied surface waters. Within the LAX area, there are no surface water streams and industrial and commercial waste discharges are prohibited on the airport. Sources for recharge at the airport property itself include precipitation and its associated runoff, and applied irrigation.[30]

The estimated surface recharge volume within the West Coast Groundwater Basin is approximately 6,700 AFY, and the total pervious area within the Basin is estimated at 28,271 acres.[31] Using these figures, the estimated recharge rate through the pervious surfaces of the Basin is approximately 0.24 AFY per pervious acre.[32] Within the airport's overall hydrology and water quality study area, pervious surfaces are estimated to provide 171 AFY of surface recharge, or approximately 0.3 percent of the total inflows estimated for the West Coast Groundwater Basin.[33] As discussed previously, approximately 12 acres of the 84-acre Project site is currently comprised of impervious surface area, leaving 72 acres of the Project site covered with pervious surface area. Based on the above figures, existing recharge associated with the Project site is currently approximately 17.76 AFY, or approximately 0.27 percent, of total annual West Coast Groundwater Basin inflows. This estimate is conservative in that the existing 72 acres of pervious surface area on the Project site are compacted to an imperviousness of approximately 60 percent from staging and stockpiling efforts currently ongoing at the Project site, and thus, the Project site may not infiltrate groundwater at the same rate as the remainder of the West Coast Groundwater Basin.

4.4.3.2.2 Water Quality

The water quality of surface water runoff is a function of pollutants carried in both wet weather flows (e.g., flows from stormwater runoff flowing over impervious urban uses) and dry weather flows (e.g., flows primarily associated with non-stormwater runoff from areas treated with fertilizers and herbicides, potential spills of hazardous materials, and the outdoor washing of motor vehicles, aircraft, etc.). Existing land uses at LAX and the Project site generate both types of flows.

The 84-acre Project site is currently used as a construction staging area for airport construction and maintenance projects. Existing uses on the Project site include aggregate and soil stockpiles, modular construction trailers/offices, an airfield access security post, several paved/unpaved roads leading to paved/unpaved truck loading/unloading areas, and several paved/unpaved outdoor storage areas. The Project site is also the location where portable

29 Ibid.
30 City of Los Angeles, Final EIR for Los Angeles International Airport (LAX) Proposed Master Plan Improvements, April 2004, Section 4.7, page 4-759.
31 City of Los Angeles, Final EIR for the LAX Bradley West Project, Section 5.3, May 2009.
32 Ibid.
33 City of Los Angeles, Final EIR for Los Angeles International Airport (LAX) Proposed Master Plan Improvements, April 2004, Section 4.7, page 4-759.

concrete batch plant and rock crushing facilities periodically operate in conjunction with LAX improvement projects involving large quantities of concrete production. Surface water quality BMPs at the Project site are currently administered through the construction SWPPP(s) associated with NOIs under the state's NPDES – General Construction Permit and include, but are not limited to, erosion/sedimentation control measures, protection of storm drain inlets, and good housekeeping practices. The existing potential for pollutants of concern in wet and dry weather flows from the Project site is considered low.

Existing surface water runoff from the Project site and greater airport property are discharged to the local stormwater drain system under NPDES Permit No. CAS004001 consistent with the BMP requirements set forth in the County's SUSMP. The existing water quality basin south of the Project site and east of Pershing Drive is the primary structural BMP for dry weather flows diverted from the Imperial Sub-basin. As mentioned above, dry weather flows from this detention basin are discharged into the sanitary sewer system under an industrial waste permit from the City's Industrial Waste Division, to the Hyperion Wastewater Treatment Plant for treatment rather than directly to Santa Monica Bay.

4.4.4 Thresholds of Significance

Based on thresholds of significance established by the LAX Master Plan EIS/EIR, which are consistent with those found in the *L.A. CEQA Thresholds Guide*, a significant hydrology or water quality impact would occur if the direct and indirect changes in the environment that may be caused by the proposed Project would potentially result in one or more of the following future conditions:

- An increase in runoff that would cause or exacerbate flooding with the potential to harm people or damage property.
- Substantial interference with groundwater recharge such that there would be a net decrease in the aquifer volume or a change in groundwater storage that would adversely affect the quantity, water level, or flow of the underlying groundwater relative to beneficial uses of the basin.
- Substantial alteration of the existing drainage pattern of the site in a manner which would result in substantial erosion or siltation on- or off-site.
- An increased load of a pollutant of concern delivered to a receiving water body by surface water runoff.

Therefore, the thresholds of significance evaluated are based on whether a significant hydrology and water quality impact would occur if the direct and indirect changes in the environment that may be caused by the proposed Project would potentially result in one or more of the future conditions described below.

4.4.4.1 Hydrology

4.4.4.1.1 Drainage

A significant drainage impact would occur if the proposed Project would:

- Result in an increase in runoff that would cause or exacerbate flooding with the potential to harm people or damage property.
- Substantially alter the existing drainage pattern of the site in a manner which would result in substantial erosion or siltation on- or off-site.

4.4.4.1.2 Groundwater

A significant groundwater impact would occur if the proposed Project would:

- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing or planned land uses for which permits have been granted).

4.4.4.2 Water Quality

A significant water quality impact would occur if the proposed Project would:

- Result in an increased load of pollutants of concern delivered to a 303(d)-listed receiving water body by surface water runoff.

4.4.5 Applicable LAX Master Plan Commitments and Mitigation Measures

As part of the LAX Master Plan, one commitment and one mitigation measure pertaining to hydrology and water quality (denoted by "HWQ" and “MM-HWQ”, respectively) were adopted by the LAX Master Plan’s Mitigation Monitoring and Reporting Program (MMRP). The commitment and the mitigation measure are identified below.

HWQ-1. Conceptual Drainage Plan

- Once a Master Plan alternative is selected, and in conjunction with its design, LAWA will develop a Conceptual Drainage Plan (CDP) of the area within the boundaries of the Master Plan (in accordance with FAA guidelines and to the satisfaction of the City of Los Angeles Department of Public Works [LADPW], Bureau of Engineering). The purpose of the drainage plan will be to assess area-wide drainage flows as related to the Master Plan area, and at a level of detail sufficient to identify the overall improvements necessary to provide adequate drainage capacity to prevent flooding. The CDP will provide the basis and specifications from which detailed drainage improvement plans will be designed in conjunction with site engineering specific to each Master Plan. BMPs will be incorporated to minimize the effect of airport operations on surface water quality and to prevent a net increase in pollutant loads to surface water resulting from the selected Master Plan alternative.
- To evaluate drainage capacity, LAWA will use either the Peak Rate Method specified in Part G - Storm Drain Design of the City of Los Angeles' Bureau of Engineering Manual or the Los Angeles County Modified Rational Method, both of which are acceptable to the LADPW and the City of Los Angeles Bureau of Engineering. In areas within the boundary of the selected alternative where the surface water runoff rates are found to exceed the capacity of the

storm water conveyance infrastructure with the potential to cause flooding, LAWA will take measures to either reduce peak flow rates or increase the structure's capacity. These drainage facilities will be designed to ensure that they adequately convey storm water runoff and prevent flooding by adhering to the procedures set forth by the Peak Rate Method/Los Angeles County Modified Rational Method. Methods to reduce the peak flow could include:

  - Decreasing impervious area by removing unnecessary pavement or utilizing porous concrete or modular pavement
  - Building storm water detention structures
  - Diverting runoff to pervious areas (reducing directly-connected impervious areas)
  - Diverting runoff to outfalls with additional capacity
  - Redirecting storm water flows to increase the time of concentration
  - Measures to increase drainage capacity could include:
    - Increasing the capacity of storm water conveyance structures
    - Increasing the number of storm water conveyance structures and/or outfalls

- To evaluate the effect of the selected Master Plan alternative on surface water quality, LAWA will prepare a specific Standard SUSMP for the selected alternative, as required by the LARWQCB. The SUSMP addresses water quality and drainage issues by specifying source control, structural, and treatment control BMPs with the objective of reducing the discharge of pollutants from the storm water conveyance system to the maximum extent practicable. Once BMPs are identified, an updated pollutant load estimate will be calculated that takes into account reductions from treatment control BMPs.
- These BMPs will be applied to both existing and future sources with the goal of achieving no net increase in loadings of pollutants of concern to receiving water bodies. LAWA will therefore address water quality issues, including erosion and sedimentation, and comply with the SUSMP requirements, by incorporation of the BMPs specified in the SUSMP, including:
  - Vegetated swales and strips
  - Oil/Water separators, clarifiers and Media filtration
  - Detention basins, and catch basin inserts and screens
  - Continuous flow deflective systems
  - Bioretention and infiltration
  - Manufactured treatment units and hydrodynamic devices
- Other structural BMPs may also be selected from the literature and the many federal, state and local guidance documents available. Performance of structural BMPs varies considerably based on their design. USEPA has published estimated ranges of pollutant removal efficiencies for structural BMPs based on substantial document review.
- In addition to the structural BMP types that will be used, non-structural/source control BMPs will continue to be a part of the LAX program to reduce pollutant loadings. Existing practices and potentially new ones will be extended to acquisition areas and to the areas where airport operations will increase in frequency or duration.

- These source control BMPs will be incorporated into the SWPPP and will consequently be required of LAWA and all airport tenants at all locations where industrial activities occur that have the potential to impact water quality.

  The overall result of LAX Master Plan Commitment HWQ-1 will be drainage infrastructure that provides adequate drainage capacity to prevent flooding and control peak flow discharges, that incorporates BMPs to minimize the effect of airport operations on surface water quality, and that prevents a net increase of pollutant loads to receiving waters.

  Note: Subsequent to approval of the LAX Master Plan, LAWA prepared the CDP (2005) for the LAX Master Plan in accordance with the provisions of LAX Master Plan Commitment HWQ-1. The CDP is anticipated to be revised to incorporate current project, such as the proposed Project. The proposed Project would incorporate the recommendations of the LAX Master Plan CDP and SWPPP, as specified in HWQ-1, into a site-specific Drainage Design Report and SUSMP. The analysis in this EIR section is based, in part, on the findings of the site-specific Drainage Design Report and requirement of a SUSMP.

MM-HWQ-1. Update Regional Drainage Facilities.

- Regional drainage facilities should be upgraded, as necessary, in order to accommodate current and projected future flows within the watershed of each storm water outfall resulting from cumulative development. This could include upgrading the existing outfalls, or building new ones. The responsibility for implementing this mitigation measure lies with the LACDPW and/or LADPW, Bureau of Engineering. A portion of the increased costs for the upgraded flood control and drainage facilities would be paid by LAX tenants and users in accordance with the possessory interest tax laws and other legal assessments, consistent with federal airport revenue diversion laws and regulations and in compliance with state, county and city laws. New facilities should be designed in accordance with the drainage design standards of each agency.

4.4.6 Impacts Analysis

The proposed Project includes development of approximately 68 acres of the Project site with taxiways and aircraft parking apron areas, maintenance hangars, employee parking, and related storage, equipment and facilities. The remaining 16 acres of the Project site would be graded but would remain undeveloped. The proposed Project would involve relocation of existing on-site construction staging uses and activities, removal of approximately 12 acres of on-site paving, mass grading of the 84-acre Project site, trenching of the Project site for utility lines, and development of the Project site with approximately 68 acres of impervious area to support aircraft circulation and parking, maintenance uses, and employee parking. The proposed Project would also include development of stormwater drainage/water quality improvements, and implementation of the water quality BMPs, listed below. Preliminary design layouts for the drainage improvements are provided in the Drainage Design Report.

- Drainage Improvements
  - Construct a system of series trench and slotted drains to capture surface water runoff from the proposed Project. Surface water runoff collected in these features would then be conveyed through a series of proposed on-site 18-inch, 24-inch, 36-inch, and 42-inch RCPs to the proposed detention/infiltration basin (described further below).

  - Impacts to the World Way West RCB and Pershing Drive RCB are minimized by draining 78 acres of the Project site to a proposed detention/infiltration facility prior to discharge to the Pershing Drive RCB. Because of existing drainage patterns in the Pershing Sub-basin, the proposed detention/infiltration basin would also receive surface water runoff from 14 acres of off-site area. Therefore, the study area analyzed (related to drainage to the detention/infiltration basin) is approximately 92 acres. Of the 84-acre Project site, six acres along the northern border of the Project site (i.e., proposed employee parking lot and northerly portion of the service road) would drain to the World Way West RCB.
  - Hangar roof drains would be designed to drain to the proposed detention/infiltration basin through the proposed drainage system.
  - The proposed detention/infiltration basin would have a capacity of approximately 1.6 acre-feet and would be located in the northern portion of the existing airport surface parking lot located immediately south of the Project site. A pipeline from the basin to the Pershing Drive RCB would also be constructed to drain the basin during non-peak periods. The functions of the detention/infiltration basin would be to shave peak stormwater runoff flows from the Project site to the 54-inch RCP and Pershing Drive RCB, provide some groundwater recharge, and remove contaminants from proposed Project surface water flows before discharging to the Pershing RCB.

- Water Quality BMPs (e.g., SUSMP/LID Measures consistent with LADPW and FAA Surface Drainage Manual AC 150/5320-5C requirements):
  - Construct a detention/infiltration basin as described above using a pre-screening unit, hydrodynamic separators, and StormTrap as the primarily infiltration mechanism. An infiltration system would be the priority BMP type in the basin as it would be the preferred treatment option (per the BOS Watershed Protection Division).[34]
  - Construct a water recycling system that utilizes recycled water and a portion of the first-flush stormwater runoff (from approximately 15 acres along the western and northern airside portion of the Project site) for operation of the proposed aircraft wash rack, with non-returnable product to be conveyed to the sanitary sewer system for disposal (under an industrial waste permit from the City's Industrial Waste Division).
  - Divert returnable wash water from the wash-rack and the portion of the first-flush stormwater runoff that exceeds the holding capacity of the recycling system into an oil-water separator prior to either re-use or discharge to the sanitary sewer system.
  - For areas of the Project site that cannot drain to the new detention/infiltration basin (e.g., northerly six acres), use porous pavement, media filters, hydrodynamic separators or a combination of these treatment systems.
  - Periodically street-sweep the on-site aircraft apron, streets and employee parking areas.

All proposed storm drainage facilities would be designed in accordance with FAA Surface Drainage Manual AC 150/5320-5C (Surface Drainage Design), City of Los Angeles requirements, and LAWA direction. In addition, because the proposed storm drain system would have a connection point to the existing storm drain system, a connection permit would be obtained from the City. Pershing Drive is located within the Coastal Zone. In conjunction with the design process for to the proposed Project, the Coastal Commission was consulted regarding the potential for the proposed improvements to impact the Coastal Zone/Pershing

[34] City of Los Angeles, Final EIR for the LAX Bradley West Project, Section 5.3, May 2009.

Drive. Although no further coordination with the Coastal Commission is anticipated, should additional coordination be necessary it would be expected to be minimal because improvements to the eastern portion of Pershing Drive are minimal (i.e., a stormwater pipe extending from the proposed detention/infiltration basin to the Pershing Drive RCB) and the work would likely qualify for permit exemption.

The potential for hydrology and water quality impacts associated with construction and operation of the proposed Project with consideration of the above proposed storm drain system and water quality BMPs are evaluated below.

4.4.6.1 Hydrology

4.4.6.1.1 Drainage

The Project site currently contains approximately 12 acres of impervious surface area. Under the proposed Project, the existing 12 acres of on-site impervious surface area would be removed and replaced with approximately 68 acres of impervious surface area consisting of aircraft parking apron, aircraft hangars, service roads, and employee parking lots. As discussed above, the total tributary area to the proposed detention/infiltration basin is 92 acres, which includes 78 acres of the Project site and 14 acres of off-site area south of the Project Site. Upon completion of the proposed Project, the total impervious area in the tributary area for the proposed detention/infiltration basin would be 82 acres, of which 68 acres of impervious surface area would occur on the Project site and 14 acres would occur at the off-site area south of the Project site.

The proposed Project would result in minor modifications to the on-site drainage pattern. Under existing conditions, the majority of surface water runoff from the Project site flows south and west to the 8'-6" x10' RCB along Pershing Drive. The remainder of surface water runoff flows north to the 7'-1" x 8' RCB along World Way West, which ultimately drains to the RCB along Pershing Drive. Under the proposed Project, on-site surface runoff flows from 78 acres of the Project Site would be conveyed through a new 24-inch RCP along Pershing Drive directly to the proposed detention/infiltration basin, rather than through the existing RCB in Pershing Drive. The proposed 24-inch RCP would be fed by a curb and cutter with catch basins spaced at approximately every 16 feet parallel to the western side of the Project site. The northern 6 acres of the Project site would continue to flow northward towards World Way West, which ultimately drains to the existing RCB in Pershing Drive, as under existing conditions. The proposed Project's conveyance infrastructure would outfall to the existing RCB in Pershing Drive through a proposed pipe connecting the proposed detention/infiltration basin to the existing RCB. Therefore, the proposed Project would result in only minor changes to the existing drainage pattern and would continue to ultimately flow to the existing RCB along Pershing Drive.

Table 4.4-4 identifies the Capital Flood event stormwater runoff flows expected in the storm drains serving the Project site under the proposed Project. As indicated, with the development of the proposed detention/infiltration basin and other proposed drainage improvements (e.g., system of on-site trench or slotted drains serving 18-inch, 24-inch, 36-inch, and 42-inch RCPs; draining hangar roofs directly to the proposed 24-inch RCP along the western border of the Project site, approximately 20 cubic feet per second (cfs) of additional runoff would be routed to

Table 4.4-4

Peak Stormwater Runoff Flows Under the Proposed Project

Storm Drain	Node	Existing Flow (cfs)	Existing + Project Flow (cfs)	Existing + Project Flow with Detention/Infiltration Basin (cfs)
		Q50[a,b]	Q50[a,b]	Q50[a,b]
Pershing Dr. RCB (downstream [south] of confluence with 54-inch RCP)[c]	280A	687	712	682
54-inch RCP (upstream [east] of confluence with Pershing Dr. RCB)	250B	104	95	95
Pershing Dr. RCB (at confluence with 54-inch RCP)[c]	225AB	573	555	555
World Way West RCB (at confluence with Pershing Dr. RCB)	205A	512	495	495
World Way West RCB (upstream [east] of confluence with Pershing Dr. RCB)	155A	305	305	305

[a] The stormwater flow volume that would be conveyed during a 50-year design storm (i.e. a LACDPW Capital Flood event).
[b] This calculation is conservative in that it does not consider the stormwater detention basin adjacent to the west side of Pershing Drive. More detailed analysis is required to determine the capacity of this detention basin.
[c] At (and subsequently downstream of) the confluence of the Pershing Drive RCB and the 54-inch RCP, all stormwater from the Project site is being conveyed through the Pershing Drive RCB, having either been directly conveyed to the Pershing Drive RCB or having been conveyed by the World Way West RCB to the Pershing Drive RCB.

Source: City of Los Angeles, West Maintenance Area, Los Angeles International Airport, - Drainage Design Report, 100% Design Submittal, prepared for Los Angeles World Airports by Atkins, August 2013.

the Pershing Drive RCB, which would be offset by the proposed 1.6 acre-foot detention/infiltration basin.

In addition, the proposed Project would reduce existing peak flows in three of the four storm drains that serve the Project site. It is important to note that the design features will not fully relieve the existing storm drain capacity issues upstream of the Project site; however, there will be no increase in flow to the Pershing Drive RCB and a decrease in flow to the World Way West RCB and 54-inch RCP. Thus, with the implementation of design features, the proposed Project would not increase flows to the drainage system over existing conditions such that existing upstream capacity issues would be exacerbated during the Capital Flood event. Further, flows to the Pershing Drive RCB, World Way West RCB, and 54-inch RCP would be reduced during the Capital Flood event through the implementation of minor changes to on-site drainage patterns and the proposed 1.6 acre-foot capacity detention/infiltration basin. Additionally, because the majority of stormwater would flow across impervious surfaces, the only exceptions being the unpaved ovals between the extensions of Taxiways B and C (as Taxilane C) at the south end of the Project site, and all conveyance infrastructure serving the Project site is concrete lined, the proposed Project would not result in substantial erosion or siltation. Therefore, the proposed Project would not result in an increase in runoff that would cause or

exacerbate flooding or result in erosion/siltation, and impacts on drainage would be less than significant.

4.4.6.1.2 Groundwater

The proposed Project would not include new water production wells which could impact groundwater supply.

The proposed Project would increase the amount of impervious surface area at the 84-acre Project site by replacing the existing 12 acres of paved area under existing conditions with 68 acres of taxiways and aircraft parking apron areas, maintenance hangars, employee parking areas, and related storage facilities. As such, the pervious surface area at the Project site would be reduced from 72 acres under existing conditions to 16 acres under the proposed Project. This would result in a corresponding decrease in the on-site volume of surface recharge to groundwater, from an estimated 17.76 AFY under existing conditions to 3.84 AFY under the proposed Project. Although this reduction would account for a 78.4 percent reduction in on-site groundwater inflows when compared to existing conditions, this reduction in surface recharge would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge as the Project site only represents a negligible contribution (0.2 percent) to groundwater inflows under existing conditions and the reduction would represent a 0.21 percent reduction in the total average annual inflows (6,700 AFY) to the West Coast Groundwater Basin. It is important to note that this estimated reduction does not take into account the proposed Project's detention/infiltration basin, which would infiltrate a portion of the stormwater that currently infiltrates to the groundwater table at the Project site. Moreover, this estimate is conservative in that it does not take into account that the existing 72 acres of pervious surface area on the Project site are compacted to an imperviousness of 60 percent from staging and stockpiling efforts currently ongoing at the Project site. Thus, the negligible reduction in groundwater recharge that would occur under the proposed Project would not interfere with the productivity of pre-existing water wells as no water production wells occur in the vicinity and groundwater under LAX is not utilized for the identified beneficial uses of the West Coast Groundwater Basin (i.e., municipal, agricultural, industrial).[35]

Based on the above, the proposed Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. In addition, as mentioned above, there are no water production wells in the vicinity and planned uses in the West Coast Groundwater Basin rely on the Los Angeles municipal water system for water supply. Lastly, as mentioned above, groundwater in the Project vicinity has generally been rising since the mid-1990s, due in part to groundwater introduced to the area by the West Coast Basin Barrier to prevent salt water intrusion. Hence, the proposed Project's impacts on groundwater supply and recharge would be less than significant.

[35] Several groundwater quality monitoring wells operate throughout LAX in association with a jet fuel free product recovery system, but these wells do not provide water for existing or planned land uses.

4.4.6.2 Water Quality

4.4.6.2.1 Construction

Construction of the proposed Project could include sources of pollution that could potentially affect the quality of the receiving water (e.g., Santa Monica Bay) during the construction period. Potential sources of pollutants would include sediment, spills or leaks of fuels or hazardous materials, and contaminants associated with construction materials.

Construction of the proposed Project would require mass grading, fine grading, and other earthmoving activities on the 84-acre Project site. The proposed Project would also require the export from the Project site of approximately 295,000 cubic yards of material. These activities would expose soils to erosion and present the potential for sedimentation of the receiving water. Project construction would also require the on-site use and maintenance of construction vehicles that use fuels and oils, the on-site use of construction materials such as asphalt, concrete, paints and strippers that contain hazardous or toxic materials, and the washing of construction equipment with soaps and solvents, and these substances could either flow or be carried by stormwater runoff to the receiving water.

Because proposed Project construction activities would affect an area of greater than one acre, development and implementation of a Project-specific construction SWPPP would be required in order to meet the requirements of the statewide General Permit for Construction. BMPs within the construction SWPPP are anticipated to include, but not be limited to, the following:

- Sediment control methods such as sand/gravel bags, silt fences, and dust control;
- Construction training programs;
- Material transfer practices (e.g., covering of soil loads, watering of exposed soil, etc.);
- Waste management practices such as providing designated storage areas and containers for specific wastes for regular collection;
- Roadway cleaning/tracking control practices;
- Vehicle and equipment cleaning and maintenance practices; and
- Fueling practices.
- Inlet protection

With implementation of the required Project-specific SWPPP, the proposed Project construction-related hydrology and water quality impacts would be less than significant.

4.4.6.2.2 Operation – Wet Weather Pollutant Loads

Under the proposed Project, the impervious surface area at the Project site would increase from 12 to 68 acres, resulting in an increase in stormwater runoff from the Project site. Under the proposed Project, aircraft maintenance, washing and parking activities would replace the existing staging activities. The proposed Project's uses have the potential to increase pollutant concentrations in on-site stormwater flows. However, as discussed above, the proposed Project would be developed in accordance with LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, which requires that a range of BMPs should be incorporated into development projects at LAX to reduce pollutant concentrations in on-site stormwater flows. The nature,

types, and design of such BMPs are identified and implemented through compliance with SUSMP requirements, as further described below.

In accordance with LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, and applicable regulations, the proposed Project would incorporate site-specific BMPs into a Project-specific SUSMP during the design phase of the proposed Project. The SUSMP would require approval by the City of Los Angeles Bureau of Sanitation – Watershed Protection Division prior to the start of construction. As discussed above, preliminary site-specific BMPs identified in the proposed Project's Drainage Design Report include a detention/infiltration basin, oil-water separators, media filters, a water recycling system, porous pavement, and hangar roof drains. For the proposed Project, BMPs also include dedicated connections to the sanitary sewer system at the proposed wash rack. Additional measures may also include but are not necessarily limited to drain inserts/water quality inlets in combination with the media filters, or other equivalent measures, as determined adequate by the Los Angeles Bureau of Sanitation in the final SUSMP. All BMPs would be required to be designed in accordance with the LAWA Design and Construction Handbook, which requires projects to be in compliance with the City's LID Ordinance and includes technical approaches and BMPs to reduce stormwater pollutants in first-flush flows.

Since the proposed Project would be required to comply with the MS4 Permit (through identification of Project-specific BMPs in a SUSMP that serve to avoid a net increase in pollutant loading), it is not anticipated that the proposed Project would result in additional wet-weather pollutant loading of 303(d)-listed water bodies and associated impacts would be less than significant. With respect to debris (e.g., trash) in wet weather flows from the proposed Project, activities associated with aircraft maintenance, as well as aircraft operations in general, require tight controls (i.e., to minimize potential for foreign objects and debris to enter jet engine intakes) and do not generate notable debris.[36] Therefore, water quality impacts associated with the proposed Project related to wet weather debris loads would be less than significant.

4.4.6.2.3 Operation - Dry Weather Pollutant Loads

Operation of the proposed Project could result in some minor pollutant loading associated with dry weather "non-stormwater" flows from uses identified in the LAX Master Plan, such as the outdoor washing of aircraft, minimal irrigation runoff from small landscaped areas of the Project site that may be treated with fertilizers and herbicides, and potential spills of fuels, oils, and hazardous materials.

The proposed washing of aircraft would occur within a proposed wash rack on the Project site. Although wash water could potentially contain fuels, oils, cleaning solvents, and/or pollutants for which Santa Monica Bay is 303(d)-listed (i.e., heavy metals, oil and grease), the proposed wash rack would be designed to discharge nonreturnable wash water to the sanitary sewer system for treatment at the Hyperion Wastewater Treatment Plant and any pollutants in nonreturnable wash water would be treated through oil-water separators prior to being discharged to the sanitary sewer system and would not enter dry water flows from the Project site. In addition, a water recycling system is proposed that would utilize recycled water for operation of the proposed aircraft wash rack. The recycling system would process returnable product through

[36] City of Los Angeles, Hydrology and Water Quality Report for the LAX Specific Plan Amendment Study, prepared by CDM Smith for LAWA, March 2012.

oil-water separators for re-use as wash water. An oil-water separator is designed to physically separate captured solids (e.g., trash, debris, suspended solids) and floatables (e.g., oil, grease) from surface runoff flows. These pollutants would be contained within the separator and the resulting filtered stormwater would be allowed to pass through the separator, whether being reused as wash water or disposed of in the sanitary sewer system. The separator would be routinely inspected during operation, and would be cleaned and maintained as required in accordance with manufacturer recommendations. Operation, cleaning, and maintenance of the wash rack and separator unit would only occur during dry weather conditions; cleaning of the separator unit would only occur when the wash rack is not in use. Only when recycled wash water becomes non-returnable would it be conveyed to the sanitary sewer system (under an industrial waste permit from the City's Industrial Waste Division) for treatment and disposal at the Hyperion Wastewater Treatment Plant, rather than to the storm drain system. Because wash water would be treated with an oil/water separator and be disposed of in the sanitary sewer for treatment at the Hyperion Wastewater Treatment Plan when non-returnable, the wash rack would not result in an increase in pollutants to dry weather flows and impacts would be less than significant.

Irrigation of the minimal on-site landscaping associated with the proposed Project could potentially wash over areas to be treated with pesticides or herbicides, and associated runoff could potentially enter the local storm drain system that discharges to Santa Monica Bay. However, any on-site landscaping, and thus any on-site use of pesticides and herbicides, would be minimal. Furthermore, the Project site would be graded so that only the northern 6 acres of the Project site would drain to the World Way West RCB. All remaining dry weather flows, including landscape runoff, would be diverted to the identified on-site BMPs, including the on-site detention/infiltration basin, before being discharged to the local storm drain system. Finally, in the event herbicides and pesticides are used for landscaped areas, their application would occur in accordance with applicable LAWA regulations and with the application directions on the packaging, which have been developed to avoid over-application of the materials, thus reducing their potential to enter dry weather flows. Therefore, dry weather flows associated with the potential on-site use of pesticides and herbicides would be less than significant.

The proposed Project would include the on-site use of lubricating oils and grease, hydraulic oil, degreasers and other cleaning products, and paint and painting-related materials (e.g., thinners, solvents), and chemicals. As such, it is possible that an accidental spill of these materials could occur on the Project site during operation. The transport, use, storage, disposal, and required cleanup of these materials is highly regulated, and these regulations have been formulated to avoid significant impacts associated with hazardous materials. In addition, all dry weather flows would be subject to the BMPs discussed above, which would be included in a Project-specific SUSMP designed in accordance with applicable regulations. Because the use of these materials would comply with these regulations and any pollutants entering dry weather flows would be treated by Project-specific BMPs prior to entering the storm drain system, the potential for any such spills (and for any related dry weather flow impacts) would be less than significant. Please see Section 4.3, *Hazards and Hazardous Materials,* for further discussion of hazardous materials.

4.4.7 Cumulative Impacts

As identified in Chapter 3**,** *Overview of Project Setting,* of this EIR, there are 13 related projects within the vicinity of the proposed Project. Most of those related projects are located within the same watershed as the proposed Project that drains to Santa Monica Bay, which could potentially increase the volume of stormwater runoff and contribute to pollutant loading of the stormwater runoff, resulting in cumulative hydrology and water quality impacts. The majority of those related projects are, however, located on developed land with impervious surface area and pollutant loading of an urban nature. Such related projects include the remaining work on the Bradley West Project, the Terminal 3 Connector, the major renovations at the north and south terminals within the CTA, the Midfield Satellite Concourse-Phase I: North Concourse Project, the remaining work on the Central Utility Plant Replacement Project, the vast majority of the Miscellaneous Projects/Improvements, and the Metro Crenshaw/LAX Transit Corridor and Station. It is anticipated that implementation of those projects would have negligible, if any, contribution to cumulative hydrology and water quality impacts. Related projects draining to Santa Monica Bay that may, in conjunction with the proposed Project, result in cumulative hydrology and water quality impacts include the Runway Safety Area (RSA) Improvements, the LAX Northside Area Development, and the LAX Master Plan Alternative D/SPAS Alternative 3. In particular, the LAX Northside Project is one of the few sizeable projects in the vicinity proposed on undeveloped land with little impervious surfaces.[37] As indicated in Table F4.7-5 of the LAX Master Plan Final EIR, implementation of Alternative D would increase the amount of impervious area within LAX that drains to Santa Monica Bay to 2,174 acres compared to the Master Plan 1996 Baseline Conditions of 2,050 acres, with the majority of that increase being attributable to development of the LAX Northside area. The subsequent completion of the LAX CDP required by LAX Master Plan Commitment HWQ-1 identified drainage system improvements and water quality BMPs to address the hydrology and water quality impacts associated with that increase in impervious area draining to Santa Monica Bay.[38] Implementation of the RSA – South Improvements project is anticipated to convert 8.3 acres of permeable area to impermeable/paved surface, which will result in an increase in surface runoff within that project area; however, the stormdrain system improvements recommended for that project include a combination of an underground infiltration basin, which would reduce hydrology impacts to the existing drainage system, as well as address potential surface water quality impacts, and stormwater treatment filters, which would further address and reduce the water quality impacts of that project. Relative to the RSA-North Improvements project, the design engineering for that project has not yet been finalized; however, the proposed realignment of the existing vehicle service road is not expected to materially change existing hydrology or water quality characteristics of the affected area, and the proposed reconfiguration of a 516 foot-long segment of the Argo Drainage Channel for placement of a box culvert (i.e., cover the open channel segment within the RSA area) is also not expected to substantially change the local hydrology and water quality characteristics of the area (i.e., the project would add approximately 1.3 acres of impervious area within the 2,300+ acre Argo Sub-basin). While it is not anticipated that implementation of the related projects described above would result in

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[37] City of Los Angeles, LAX Specific Plan Amendment Study Draft EIR, prepared by CDM Smith for LAWA, July 2012.

[38] The LAX Conceptual Drainage Plan also addresses LAX Master Plan-related hydrology and water quality impacts to Dominguez Channel; however, such impacts are not related to cumulative impacts associated with the West Aircraft Maintenance Area given that the proposed Project does not drain to that channel.

significant cumulative hydrology or water quality impacts, it should be noted that, for hydrology, the related projects would be reviewed by the lead agencies for those projects (e.g., the applicable departments of LAWA, City of Los Angeles, and Los Angeles County) on a case-by-case basis to ensure that sufficient local and regional drainage capacity is available. For water quality, as with the proposed Project, the related projects would be subject to State NPDES permit requirements for both construction and operation which have been formulated to avoid significant water quality impacts. Each project greater than one-acre in size would also be required to develop a SWPPP/SUSMP plan and would be evaluated individually to determine appropriate BMPs and treatment measures to avoid impacts to water quality. Moreover, with adherence to applicable regulations and the implementation of LAX Master Plan Commitment HWQ-1, Conceptual Drainage Plan, and LAX Master Plan Mitigation Measure MM-HWQ-1, Update Regional Drainage Facilities, the proposed Project would not generate an incremental increase in either peak stormwater runoff or pollutants of concern in 303(d)-listed receiving waters, and thus would not contribute to any potential hydrology and water quality impacts of the related projects if such impacts were to occur. Finally, groundwater in the Project vicinity is not utilized as a domestic water supply and the proposed Project would only negligibly reduce groundwater recharge within the West Coast Groundwater Basin. For all these reasons, cumulative hydrology and water quality impacts would be less than significant.

4.4.8 Mitigation Measures

With compliance with regulatory requirements pertaining to the design of drainage facilities and the provision of short-term and permanent water quality BMPs, and preparation of a site-specific Drainage Design Report, SWPPP, and SUSMP, no significant impacts on hydrology or water quality would occur with implementation of the proposed Project. Therefore, no mitigation measures other than those required by the LAX Master Plan MMRP, which are discussed in Section 4.4.5 above and included as project design features under the proposed Project, are required.

4.4.9 Level of Significance After Mitigation

Not applicable. Impacts are less than significant, as indicated above; therefore, no additional mitigation measures are required.