SEPTEMBER 2016

Draft Environmental Impact Report

(DRAFT EIR)

[STATE CLEARINGHOUSE NO. 2015021014]

for Los Angeles International Airport (LAX) Landside Access Modernization Program

City of Los Angeles
Los Angeles World Airports

Appendix L

Los Angeles World Airports

Appendix L

Hydrology and Water Quality Technical Report

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LAWA Technical Appendix to the EIR for LAMP Development

Prepared for:

Los Angeles World Airports

Environmental and Land Use Planning

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Acronyms List

APM	Automated People Mover
BMP	Best Management Practices
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
CIP	capital improvement projects
ConRAC	Consolidated Rental Car Facility
CTA	Central Terminal Area
CWA	Clean Water Act
EIR	Environmental Impact Review
EPA	Environmental Protection Agency
ESA	Environmentally Sensitive Areas
HTP	Hyperion Wastewater Treatment Plant
IGP	Industrial General Permit
ITF	Intermodal Transportation Facility
LAMP	Landside Access Modernization Program
LA SAN	Los Angeles Department of Public Works Bureau of Sanitation
LACDPW	Los Angeles County Department of Public Works
LAR-IAC	Los Angeles Region Imagery Acquisition Consortium
LARWQCB	Los Angeles Regional Water Quality Control Board
LAWA	Los Angeles Department of Airports
LAX	Los Angeles International Airport
LID	Low Impact Development
NAD	National American Datum
NAVD	North American Vertical Datum 1988
NEPA	National Environmental Policy Act
NCOS	North Central Outfall System
NDPES	National Pollutant Discharge Elimination System
SWMM	Stormwater Management Model
SMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load

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Section 1

Introduction and Project Overview

1.1 Purpose

This appendix presents the hydrology and water quality technical analysis in support of the Draft Environmental Impact Report (DEIR) for the Landside Access Modernization Program (proposed Project) to be undertaken by Los Angeles World Airports (LAWA) at Los Angeles International Airport (LAX). This Project will help relieve traffic congestion, improve access options to the airport and provide a connection from LAX to the Los Angeles County Metropolitan Transportation Agency (Metro) rail system.

In addition to supporting the preparation of the DEIR, the technical analysis completed for the Project will also be used in conjunction with a larger hydrology and water quality planning program for LAX. LAWA has initiated development of a campus airport-wide Stormwater Management Plan (SMP) for LAX in order to support ongoing and future capital improvement projects, such as the Landside Access Modernization Program. The hydrology and water quality analysis presented herein will be incorporated into that SMP.

1.2 Project Overview

The proposed Project area is located on the east side of LAX and is bounded by the Tom Bradley International Terminal (TBIT) on the west, I-405 on the east, Westchester Parkway and West Arbor Vitae Street on the north, and I-105 on the south. The proposed Project would connect the Central Terminal Area (CTA) of LAX with a proposed consolidated rental car facility and intermodal transportation facilities. Table 1-1 describes each component of the proposed Project and indicates the approximate size of each component's footprint. This analysis uses the proposed building area and adjacent associated land to evaluate water quality impacts. The approximate size of the drainage area for each component, which is used in this analysis to evaluate hydrology impacts, is also shown in Table 1-1. Figure 1-1 illustrates the proposed Project area and delineates the locations of the individual components described in Table 1-1.

The proposed Project also includes potential future related development. The EIR evaluates hydrology and water quality impacts of future related development at a programmatic level. This appendix does not provide additional information on those impacts.

Table 1-1: LAMP Project Components

Project Component	Description	Location	Building Area (acres)	Drainage Area (acres)
Automated People Mover (APM) system	An elevated guideway connecting the CTA to proposed ground transportation facilities. Six stations would be located along the alignment at designated facilities and are included in the water quality analysis for the guideway discussed in this appendix.	The alignment generally extends from the western end of the CTA along World Way to Sepulveda Boulevard and then onto Century Boulevard. At Vicksburg Avenue the guideway turns north and then east along West 96th until it terminates east of Aviation Boulevard.	19.8	
APM Maintenance and Storage Facility	Supports the operations and maintenance of the APM operating system.	The southeast corner of West Arbor Vitae Street and Airport Boulevard.	2.18	20
Passenger Walkway system	Connects the APM stations to passenger terminals, parking garages, and ground transportation facilities.	Along the APM track.	N/A (included in track footprint)	
Modifications to existing terminals	Support the APM walkway system.	In the CTA.	N/A	
West Intermodal Transportation Facility (ITF)	Provide parking and pick-up/drop-off areas outside the CTA.	Bounded by West 98th street to the south, Airport Boulevard to the east, Westchester Parkway to the north, and extends just past Jenny Avenue to the west.	14	71
East Intermodal Transportation Facility (ITF)	Provide parking and pick-up/drop-off areas outside the CTA.	Situated east of Aviation Boulevard between West 96th and West 98th Streets.	11.71 (21 with adjacent land)	32
Consolidated Rental Car Facility (ConRAC)	A facility designed to meet the needs of future car rental operations. Facility users would access the CTA via the APM.	The facility would generally be located west of I-405, north of Century Boulevard., south of West Arbor Vitae Street, and east of Aviation Boulevard.	36.73 (67 with adjacent land)	75
Roadway Improvements	Improve access to the proposed facilities and the CTA.	A series of roadway improvements would occur generally in the areas of: • S. Sepulveda Boulevard and W. Century Boulevard, just east of the CTA; • East of the CTA, bound generally by W. Century Boulevard to the south, S. Sepulveda Boulevard to the west, the I-405 to the east and Westchester Parkway/W. Arbor Vitae Street to the north; and • South of W. Century Boulevard along Aviation Boulevard south to I-105 as well as areas along 111th Street between Aviation	N/A (May include space within the CONRAC and ITF areas)	

Project Component	Description	Location	Building Area (acres)	Drainage Area (acres)
		Boulevard and S. La Cienega Boulevard.		
Utilities infrastructure	Both new and modified to support the proposed project.	As needed	N/A (May include space within the CONRAC and ITF areas)	

Source: Name, description, location, and size of LAMP components - Ricondo and Associates Inc., 2015; Drainage area sizes – CDM Smith, 2015

1.3 Geographic Scope of Analysis

Figure 1-2 delineates the geographic relationship between the proposed Project area and the drainage watersheds at and around LAX. As shown, the Project area is located mostly within the North Dominguez Channel watershed. A small portion of the Project area is situated to the west of the Dominguez Channel watershed, extending into the Argo watershed and the Imperial watershed. The technical analysis presented herein focuses on the Project's potential drainage and water quality impacts occurring within the Dominguez Channel watershed, as that is the only watershed that would be materially affected by implementation of the Project.

As further described in Section 4, impacts to hydrology are primarily a function of project-related changes with respect to existing pervious and impervious areas; changes in surface flow patterns; and changes to the storm drain system. Impacts to water quality are primarily a function of changes in existing land use types. While those types of project-related changes would occur within the North Dominguez Channel watershed, as described in detail in Section 5, such changes would not occur within the Argo and Imperial watersheds with respect to implementation and operation of the proposed Project. As shown in Figure 1-2, the Project components occurring outside the North Dominguez Channel watershed would include the elevated APM alignment that crosses above Sepulveda Boulevard into the CTA and associated APM stations and pedestrian walkways. With the exception of limited areas of ornamental landscaping, the project-related improvement areas within the Argo and Imperial watersheds are 100 percent impervious surfaces, with stormwater draining into the existing storm drain system in and near the CTA. The development of the elevated APM system and associated improvements would not substantially affect the existing surface characteristics or drainage system (i.e., would not impact existing hydrology) within the Argo and Imperial watersheds. From a water quality perspective, development of the APM system and associated improvements would not change the existing types of land uses in or near the CTA; therefore, no significant change in existing water quality pollutant loads associated with specific land use types would occur within the Argo and Imperial watersheds as a result of the proposed Project. However, construction of the Project components within the Argo and Imperial watersheds may cause temporary construction-related impacts to water quality: these impacts are addressed in Section 5. Based on the discussion above, the hydrology and water quality analyses included herein are focused on impacts to the North Dominguez Channel watershed.

The proposed Project facilities constitute a small fraction (<1%) of the Dominguez Channel subarea. The entire Dominguez Channel drainage area occupies approximately 133 square miles in the southern portion of Los Angeles County. The Dominguez Channel drainage area is further divided into several watersheds, including: the Dominguez Channel watershed (consisting of approximately 58 square miles, 44% of the entire drainage area); the Machado Lake watershed; the Wilmington Drain watershed; and the Los Angeles/Long Beach Harbor watersheds, as shown in Figure 1-3. The Dominguez Channel itself begins approximately two miles east of LAX and extends south to, and through, the Dominguez Estuary, where it drains to the Los Angeles (San Pedro) Harbor. The Channel carries dry and wet weather urban runoff from approximately 72 square miles of urban area within Los Angeles County. The uppermost 6.7 miles of the Channel is concrete-lined and travels from West 116th street near I-105 to Vermont Avenue near I-110. The proposed Project would not physically impact or alter the Dominguez Channel.

1.4 Analysis Framework

The technical analysis presented in this report describes the existing hydrology and water quality characteristics associated with the Project study area; evaluates the potential hydrology and water quality effects associated with implementation of the proposed Project; and identifies best management practices (BMPs) to reduce or avoid those potential effects. Given that the components of the Project are only in the preliminary design stage, the BMPs identified herein may be refined during more detailed engineering and design of the Project.

Moreover, LAWA is currently developing an SMP for all of LAX property. The SMP will update and build upon the earlier Conceptual Drainage Plan (CDP) that was prepared in 2005 to support the LAX Master Plan and Master Plan EIR/EIS. When completed, the SMP will provide detailed recommendations for new or upgraded drainage and water quality facilities to address existing deficiencies, as well as needs identified as a result of planning and environmental compliance actions associated with specific improvements, such as the proposed Project. Any new stormwater facilities or other actions that may be needed to address potential Project impacts will be incorporated into the SMP in detail. In some cases, the DEIR may identify more than one option to address specific impacts, and the SMP will provide the final specific recommendations consistent with the EIR findings.

LAWA used the following methods to identify potential impacts and measures to address the impacts of the proposed Project development for drainage and water quality.

1.4.1 Drainage

Project-related impacts to drainage were evaluated using industry-accepted methodologies as described in Section 4. Drainage capacity was assessed using the LA County Modified Rational Method. LAWA can reduce the risk of peak flows exceeding drainage system capacity by either reducing peak flow rates or increasing system capacity.

Methods to reduce peak flow of surface water include:

- Decreasing impervious area and diverting runoff to pervious areas or outfalls (storm drain inflows) with greater capacity;
- Redirecting storm flows to increase the time of concentration from upstream tributary areas to reduce potential for runoff peaks from multiple areas to coincide with one another, thereby reducing downstream peak flows; and
- Constructing replacement or parallel storm drains to avoid localized flooding where existing infrastructure does not have sufficient capacity.

1.4.2 Water Quality

LAWA will comply with existing water quality regulations, which require it to prepare a Low Impact Development (LID) Plan and/or Standard Urban Stormwater Mitigation Plan (SUSMP), which will identify BMPs to be incorporated into the planning and design of the Project facilities, to address impacts pertaining to water quality, and to comply with regulatory requirements. The LID Plan or SUSMP would identify best management practices to mitigate impacts of the proposed facilities. The LID Plan and/or SUSMP would identify any increase in contaminant loads and propose BMPs to mitigate these impacts. BMPs would be established with the goal of reducing contaminant loading to surface water bodies and complying with the LID Ordinance and National Pollutant Discharge Elimination System (NPDES) permit. LID BMPs include a wide range of BMPs that promote infiltration, reuse, or bioretention. BMPs would be sized in accordance with the LID Manual and may include:

- Oil/water separators
- Clarifiers, media filtration
- Catch basin inserts and screens
- Continuous flow deflective systems
- Detention basins
- Manufactured treatment units
- Hydrodynamic devices

In addition to structural BMPs, non-structural and source control BMPs can help to mitigate pollutant runoff. New non-structural and source control BMPs would be incorporated into the LAX Storm Water Pollution Prevention Plan (SWPPP) at acquisition areas where industrial activities would potentially impact water quality.

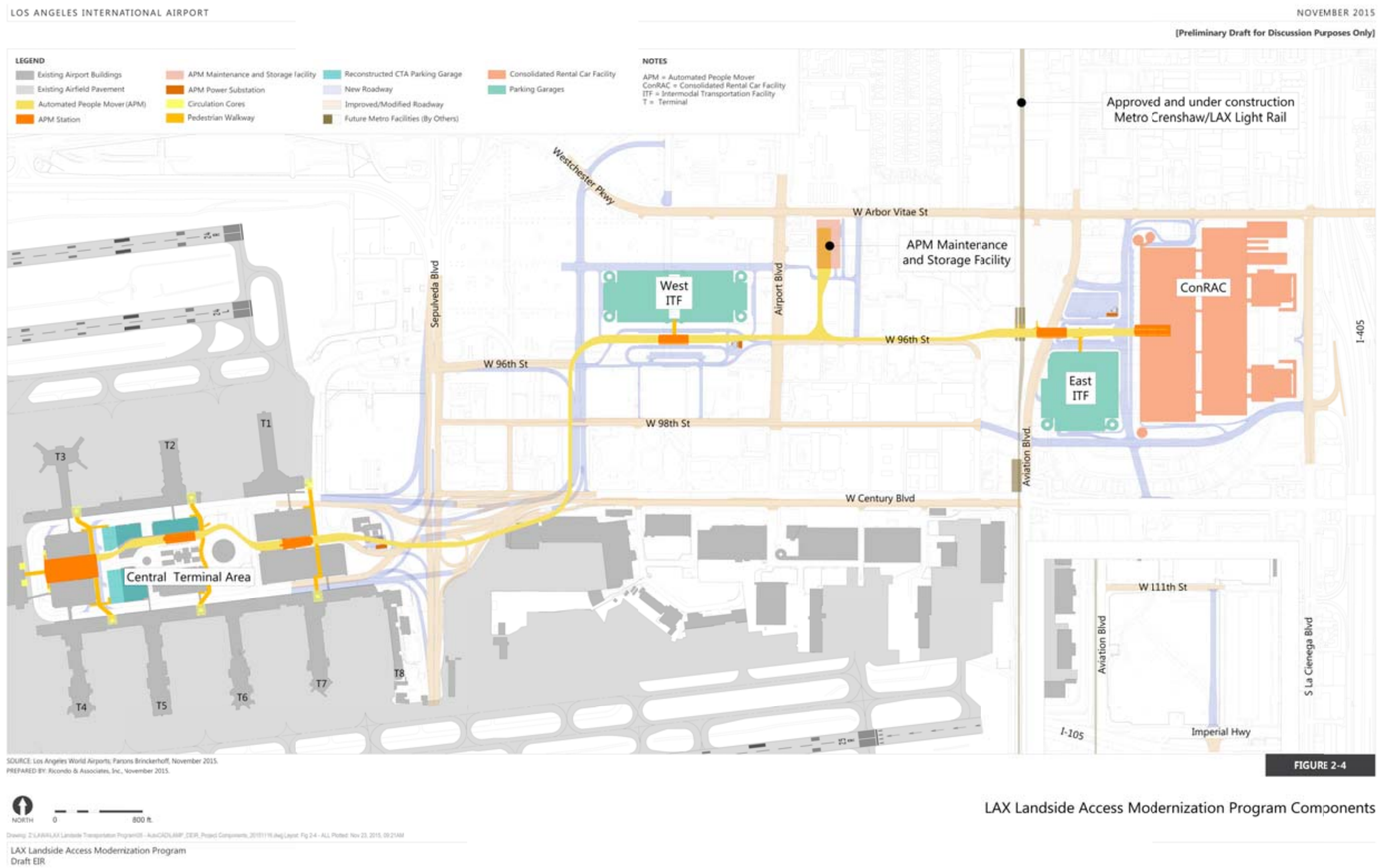

Figure 1-1: LAMP Component Footprint

CDM Smith

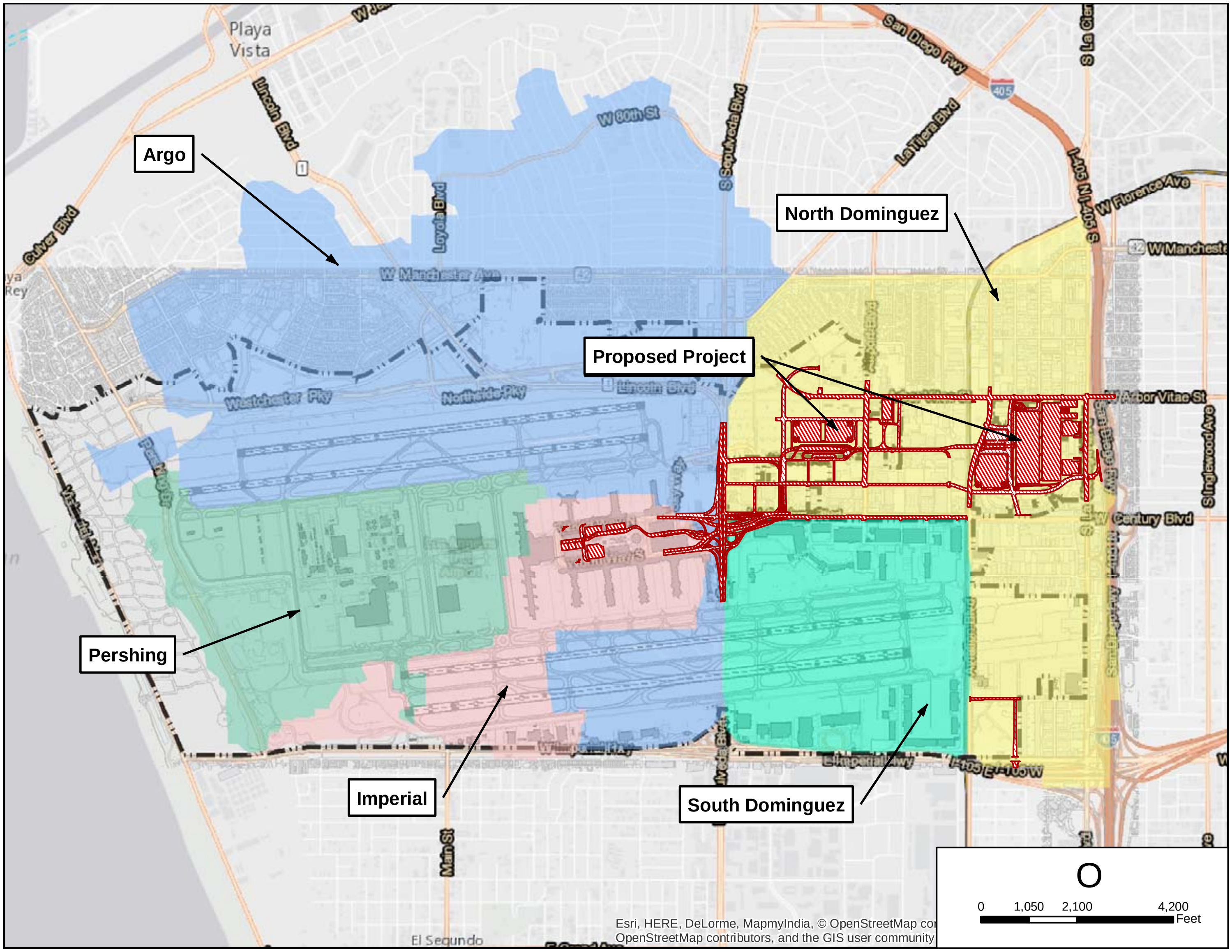

Figure 1-2: Drainage Area Subbasins

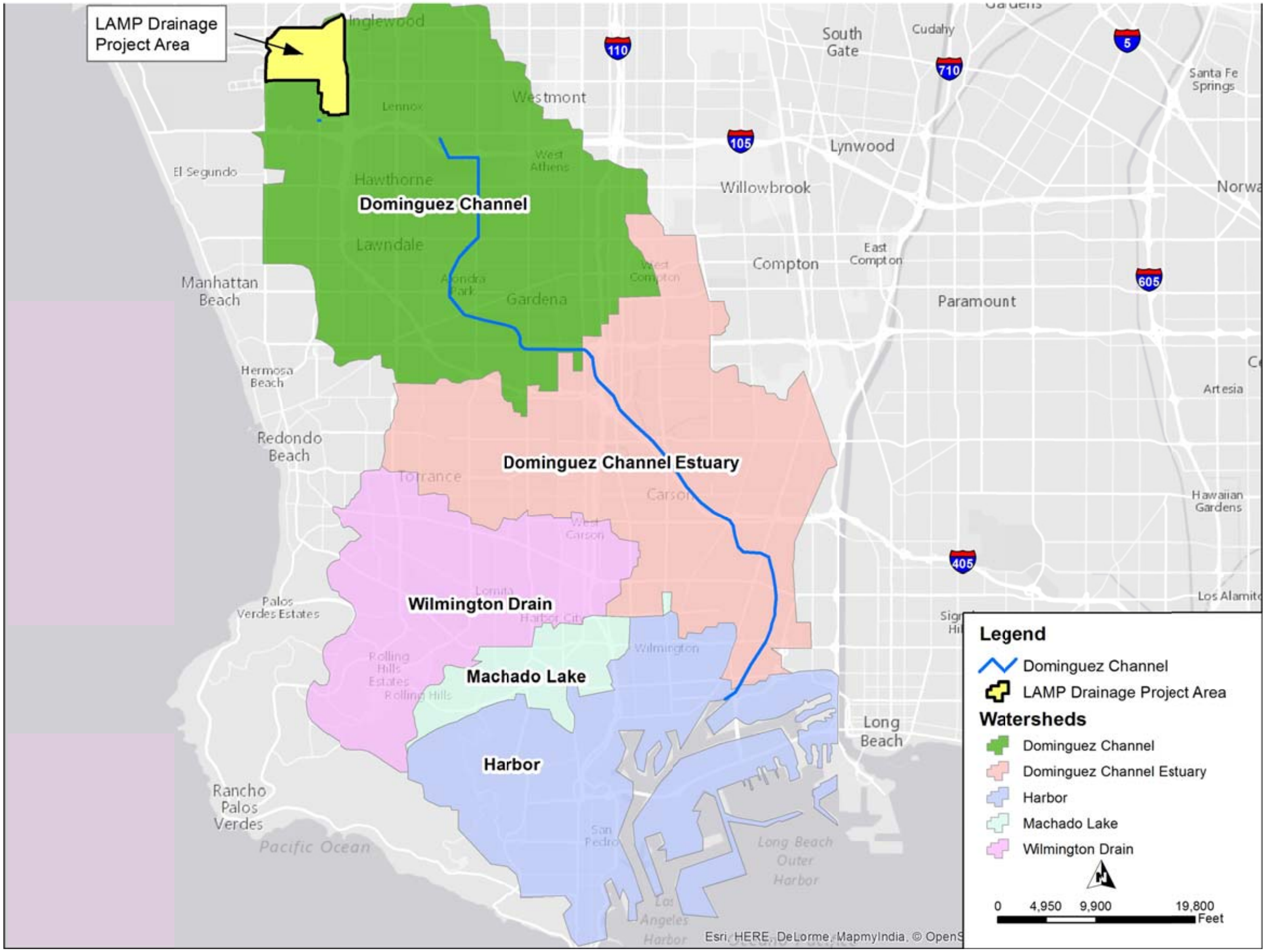

Figure 1-3: Dominguez Drainage Area

1.1 Document Organization

In addition to this Introduction, this technical appendix includes the following sections:

- Section 2 describes regulations that govern drainage and water quality standards for new and existing development, with which the Project components need to comply.
- Section 3 presents existing site drainage conditions based on available information regarding limiting stormwater conveyance structures in the Dominguez Channel area. Water quality conditions at and near the Project area as well as at the discharge location are also noted, including past spill locations and contaminants of concern.
- Section 4 addresses the methodology used to identify the significance thresholds for impacts of the new proposed facilities.
- Section 5 describes and quantifies the potential Project impacts on drainage and water quality and identifies drainage and water quality Project Design Features that LAWA may incorporate into the project to minimize or avoid adverse impacts from the proposed development.
- Section 6 presents potential mitigation measures.

Section 2

Regulatory Framework

Stormwater management at LAX is subject to many federal, state, and local regulations and design standards with the purpose of providing flood protection and mitigating water quality impacts before being discharged into downstream flood control facilities and receiving waters, such as Dominguez Channel. This section summarizes the relevant federal, regional, and local regulations regarding flood control and stormwater quality, including current Federal Aviation Administration (FAA) drainage design criteria and NPDES general industrial, municipal, and construction permit requirements.

2.1 Drainage Regulations and Standards

Drainage systems within LAX are owned and maintained by LAWA; these systems discharge to facilities owned and operated by the City of Los Angeles and Los Angeles County Flood Control District (LACFCD). Each agency has its own drainage regulations and design standards, which are summarized in the following sections. In addition, drainage facilities at LAX must be designed and constructed in accordance to guidelines issued by the FAA. The regulations and guidance established by each agency are summarized below.

2.1.1 Federal

Federal Aviation Administration

The FAA Advisory Circular (AC) 150/5320-5D establishes guidance for engineers, airport managers and the public in the design and maintenance of airport surface drainage systems and subsurface drainage systems for paved runways, taxiways, and aprons. The FAA guidance includes minimum design storm frequencies for three categories:

1. 2-year storm event for Department of Defense (DOD) airfields and heliports
2. 5-year storm event for FAA facilities
3. 10-year storm event for areas other than airfields

However, the design frequency may be higher to protect important facilities. The AC states that, "the degree of protection to be provided by the drain system depends largely on the importance of the facility as determined by the type and volume of traffic to be accommodated, the necessity for uninterrupted service, and similar factors." In addition, the AC requires surface runoff to be disposed of properly to avoid damaging facilities, saturating the subsoil, and interrupting traffic.

2.1.2 Regional

City of Los Angeles

Per the City of Los Angeles Bureau of Engineering Storm Drain Design Manual - Part G (1973), design frequencies are as follows:

- 10-year storm frequency for areas without sumps.
- 50-year storm frequency for sump areas.
- 10-year storm frequency for closed conduits in natural watercourses if the watercourse is maintained in place. The combined capacity of watercourse and conduit must contain a storm of 50-year frequency.
- 10-year storm frequency for open channels in natural watercourses with freeboard to contain a storm of 50-year frequency.
- 50-year storm frequency for any storm drain in a natural watercourse if the watercourse is eliminated.

The sump condition refers to inlets that are located at a low point and to which water enters from both directions. Sump conditions exist at these inlets whenever water ponds. Within LAX, the only area that has a sump condition is the area west of the Tom Bradley International Terminal; however this sump condition would be removed upon construction of the new Midfield Satellite Concourse and is not addressed in further discussion of the proposed Project facilities.

Regarding outfall capacity limits, design frequencies may be modified if the receiving system's capacity is limited. New drains discharging into existing drainage systems must have a proposed capacity that meets the receiving drainage system's capacity. However, if the existing drainage system is planned to be replaced to accommodate the capacity of the new drain, the new drain should be sized to the appropriate capacity per the design frequencies indicated above. Under circumstances where level of protection standards may be changed, the City of Los Angeles Bureau of Engineering should be consulted.

Los Angeles County Flood Control District

The Los Angeles County Department of Public Works (LACDPW) established their policy on levels of flood protection for use within the County of Los Angeles in a memorandum dated March 31, 1986 titled General Files No. 2-15.3621; this memorandum was incorporated into the 2006 Los Angeles County Department of Public Works Hydrology Manual (Manual). The three levels of protection included in the Manual are capital flood protection, urban flood protection, and probable maximum flood protection. The first two policies may be applicable to the Los Angeles Flood Control District (LACFCD)-owned or maintained storm drains in the vicinity of LAX. Probable maximum flood protection is not applicable for the proposed facilities, as flood protection is only required for "dams and debris basins that hold 1,000 acre-feet, are 50 feet or higher, would require at least 1,000 people to be evacuated, and have a damage potential of $25,000,000 or more." LAX does not include any dams or debris basins.

Capital flood protection applies to natural watercourses, which include channels and closed conduits, floodways, natural depressions or sumps, culverts under major and secondary highways, and tributary areas subject to burning. The capital flood protection level requires that drainage systems have the capacity to convey runoff from a 50-year storm frequency. This criterion applies to a portion of the LACFCD-owned Dominguez Channel, which begins offsite of LAX property and is the water body to which the proposed Project facilities drain.

Urban flood protection applies to all developed areas not covered under the capital flood protection level. However, since all on-site areas and drainage systems within the boundaries of LAX are also within the City of Los Angeles, the City's design standards apply.

Similar to the City of Los Angeles guidelines on outfalls, Los Angeles County outfalls may be modified due to outlet conditions. If the existing outfall cannot handle the capacity from the proposed drain, the Design Division of LACDPW should be consulted to determine a compatible level of protection, or the LACFCD will make plans to provide future relief to the existing drainage system.

2.1.3 Summary of Drainage Requirements at LAX

Based on the requirements of the three agencies described above, LAX storm drain design in the Project drainage area must meet the follow requirements:

- On-site storm drain facilities shall be sized to a minimum 10-year storm event per the City of Los Angeles criteria, which is stricter than the FAA design criteria.
- Outfalls to City of Los Angeles drainage systems and Los Angeles County drainage systems must comply with the agency's criteria regarding cumulative capacity impacts on the existing City or County of Los Angeles drain. If an existing drain does not have the capacity to receive the flow from a proposed drain, the appropriate jurisdiction would decide if the existing drain will be replaced or relieved. If the existing drain will not be changed, a compatible level of drainage/flooding protection could be determined in consultation and coordination with the agency having jurisdiction over the subject drain.

2.2 Water Quality Regulations

LAX is subject to many federal, state, and regional water quality regulations to maintain adequate water quality to downstream water bodies that receive airport surface stormwater discharges. The main objective of these programs is to protect water bodies and mitigate water quality impacts from development and modernization taking place at the airport, as well as to meet water quality standards and waste discharge requirements.

2.2.1 Federal

Clean Water Act

The Clean Water Act (CWA) of 1972 is the principal statute that governs water quality in the U.S.; it provides legal framework to several state and local regulations. The objective of this act is to protect and restore the nation's water by monitoring the water quality and controlling discharge from point sources. This act designated the U.S. Environmental Protection Agency (EPA) as the agency to establish federal guidelines, objectives, and limits. The CWA is administered at the state level by the State Water Resources Control Board (SWRCB), and enforced at the local level by nine Regional Water Quality Control Boards (RWQCB).

Through their delegated authority under the CWA, the SWRCB and the RWQCB in Los Angeles (LARWQCB) have adopted and enforced various permits and other regulatory actions that affect local permitted entities, including the City of Los Angeles and LAWA.

National Pollutant Discharge Elimination System Program

The CWA prohibits the discharge of any pollutant from a point source into waters of the United States, unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NDPES) permit. Point sources are defined as discrete conveyances such as pipes or man-made ditches. Industrial and municipal facilities that discharge directly to surface waters must also obtain NPDES permits.

To comply with section 402(p) of the CWA, the EPA developed a two phase NPDES storm water program to address stormwater discharges from industrial sources and municipalities. Phase I began in 1990 and was applied to large and medium municipal storm sewer systems (MS4). MS4s are described as storm drain systems and include streets, gutters, conduits, natural or artificial drains, channels and water courses, or other facilities that are owned, operated, maintained, or controlled by permittees (cities and counties) for the purpose of collecting, storing, transporting, or disposing storm water. The CWA requires that permits for storm drain systems: (i) be issued on a system or jurisdiction wide basis, (ii) include a requirement to effectively prohibit non-stormwater discharges into the storm sewers, (iii) require controls to reduce the discharge of pollutants to the maximum extent practical (MEP), including management practices, control techniques and system, design, and engineering methods.

The EPA Phase I storm water regulations were directed at MS4s serving a population of 100,000 or more, and construction projects that disturb an area of five acres or more. The Los Angeles metropolitan area and LAX are currently regulated under Phase I of the NPDES Storm Water Program. Smaller sources came under regulation under Phase II of the program. Phase II automatically regulated all owners and operators of small MS4 and construction activities that are less than five acres, but equal to or greater than one. The NDPES permit system for municipal, industrial, and construction activities is discussed further in Sections 2.2.2 and 2.2.3.

2.2.2 State

Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Act (Act) is the primary law for the regulation of water quality in California. The Act applies to surface waters, wetlands, and groundwater, and to both point and nonpoint sources of pollution. The Act contains provisions that protect water quality and designated beneficial uses of water, including implementation of the NPDES program, dredge and fill programs, and civil and administrative penalties. The Act requires projects that could affect the quality of the State's water through discharge to file a Report of Waste Discharge (ROWD) with the SWRCB or the appropriate RWQCB to receive Waste Discharge Requirements (WDR). When a project discharges to a designated waters of the U.S., such as Santa Monica Bay, Dominguez Channel and the Los Angeles Harbor, a joint NPDES Permit and ROWD is issued, which incorporates requirements consistent with both the CWA and this Act.

Also under this Act, the SWRCB is authorized to establish statewide policies and regulations for the implementation of water quality control programs, while the RWQCB implement such policy programs, develop regional basin plans, and issue NPDES permits. Together, the SWRCB and the nine RWQCB protect water quality and allocate surface water rights.

Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

Under the Porter-Cologne Water Quality Act, the State of California is divided into nine regional water quality control boards for individual permitting, inspection, and enforcement actions. Each RWQCB is required to prepare and periodically update a Water Quality Control Plan (Basin Plan) that identifies existing and potential beneficial uses for specific water bodies. Basin Plans are the master policy documents that contain descriptions of the legal, technical, and programmatic basis for water quality regulation in each region.

While the original Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura (which includes the City of Los Angeles and LAX) was prepared and adopted by the LARWQCB (Region 4) in 1976, a new plan was adopted on February 23, 1995. Since that time, the LARWQCB Basin Plan has been amended numerous times.

The LARWQCB Basin Plan gives direction on the beneficial uses of State waters (both surface waters and groundwater), provides water quality objectives and policies, and includes implementation plans and monitoring programs to control nonpoint and point sources of pollutants to the State's waters. All discretionary projects requiring permits from the RWQCB (i.e., waste discharge requirements and NPDES permits) must implement Basin Plan requirements (i.e., water quality standards), taking into consideration the beneficial uses to be protected. The LARWQCB has developed the Water Quality Control Plan for the Los Angeles Region which identifies the beneficial uses of Dominguez Channel and Santa Monica Bay (Table 2-1).

Table 2-1: Beneficial Uses of State Waters in the Dominguez Channel Basin and Santa Monica Bay

Beneficial Use	Abbreviation	Dominguez Channel	Santa Monica Bay
Industrial Service Supply	IND	N/A	Existing
Navigation	NAV	N/A	Existing
Municipal and Domestic Supply	MUN	Existing	N/A
Contact Recreation	REC-1	Potential	Existing
Non-Contact Recreation	Rec-2	Existing	Existing
Commercial and Sport Fishing	COMM	N/A	Existing
Marine Habitat	MAR	N/A	Existing
Warm Freshwater Habitat	WARM	Potential	N/A
Wildlife Habitat	Wild	Existing	Existing
Preservation of Biological Habitat	BIOL	N/A	Existing
Rare, Threatened or Endanger Species	RARE	Existing	Existing
Migration of Aquatic Organisms	MIGR	N/A	Existing
Spawning, Reproduction, and/or Early Development	SPWN	N/A	Existing
Shellfish Harvesting	SHELL	N/A	Existing

Source: California Regional Water Quality Control Board Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (1994)

NPDES Construction General Permit

Pursuant to the CWA, the SWRCB issued a statewide General Construction Activity Permit[1] (Construction General Permit) for stormwater discharges associated with construction activities (NPDES No. CAS000002). Under this permit, construction activities that result in soil disturbances of at least one acre are required to obtain an individual NPDES permit or be covered by a Construction General Permit. This requirement applies to both private and public agency construction projects, including projects undertaken at LAX.

Coverage by the Construction General Permit is accomplished by filing a Permit Registration Document (PRD) online with the SWRCB. PRDs consist of:

a. Notice of Intent

b. Risk Assessment

c. Site Map

d. Storm Water Pollution Prevention Plan

e. Annual Fee

f. Signed Certification Statement

PRDs include specific information on the types of construction activities that would occur at construction sites (i.e., ground disturbance). In addition, the PRDs must include a site-specific plan called the Storm Water Pollution Prevention Plan (SWPPP) to help minimize pollution from construction activities. The SWPPP includes BMPs to eliminate or reduce stormwater pollutants from leaving the construction site. The Construction General Permit contains receiving water limits to prevent violations of water quality standards. The permit also requires implementation of programs for visual inspections and sampling for specified constituents (e.g., non-visible pollutants).

NPDES Industrial General Permit

Pursuant to CWA, the SWRCB re-issued a statewide Industrial Stormwater General Permit (Industrial General Permit or IGP) (SWRCB Order No. 2014-057-DWQ) in 2014, which became effective on July 1, 2015. The IGP regulates the discharge of 10 categories of industrial activity, including transportation facilities, which denote portions of LAX. Industrial activity at a transportation facility, as defined by the federal regulations, consists of "those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or which are otherwise identified in the regulations."

Certain facilities proposed as part of the Project would be subject to the NPDES Industrial General Permit. The APM maintenance facility, as well as vehicle repair and refueling areas within the ConRAC, require coverage under the industrial permit because activities from these facilities

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[1] SWRCB Order No. 2009-0009-DWQ was adopted in 2009 and became effective July 1, 2010; amended thereafter by 2010-0014-DWQ and 2012-0006-DWQ.

contribute to the discharge of industrial pollutants (EPA, 2014). Depending on the use of the various proposed parking areas, the Industrial General Permit may apply. Under the IGP, employee parking lots are considered non-industrial areas; however, if stormwater runoff from this area commingles with runoff from a regulated industrial area, the combined discharge would require permit coverage. In addition, parking lots used to store vehicles awaiting maintenance also require permit coverage (NPDES, 1993).

The Industrial General Permit requires the implementation of the Best Available Technology Economically Achievable (BAT), the Best Conventional Pollution Control Technology (BCT), and the development of an Industrial SWPPP and monitoring plan. Through the Industrial SWPPP, sources of pollutants are to be identified and the means to manage the sources in order to reduce stormwater pollution are described. The Industrial General Permit also requires implementation of minimum control measures in seven categories, listed below.

- Good Housekeeping
- Preventative Maintenance
- Spill and Leak Prevention Response
- Material Handling and Waste Management
- Erosion and Sediment Control
- Employee Training Program
- Quality Assurance and Record Keeping

The IGP also includes a requirement for advanced structural BMPs (i.e., related to exposure minimization, stormwater reduction and discharge reduction, and treatment control) if Numeric Action Levels (NALs) are exceeded. NALs are concentrations for a number of constituents established in the IGP. After July 1, 2015, if stormwater monitoring results during the rainy season show an exceedance of one or more NALs, the Discharger enters a Level 1 status requiring an evaluation, implementation action, and reporting on measures taken to avoid future exceedances. If an exceedance of the same parameter(s) occurs in a subsequent year, the Discharger enters Level 2 status requiring additional evaluation, BMP implementation, and reporting.

2.2.3 Regional

NPDES Municipal Separate Storm Sewer (MS4) Permit

Since 1990, operators of large municipal separate storm sewer systems (MS4s) have been regulated under NPDES permits. MS4 Permits require each regulated entity to develop a stormwater management program designed to prevent harmful pollutants from impacting water quality via stormwater runoff. The storm sewer systems regulated under MS4s include curbs and gutters, man-made channels, catch basins, and storm drains throughout the Los Angeles region. The purpose of the MS4 Permit is to ensure Permittees are not causing or contributing to exceedances of water quality objectives or impairments of beneficial uses in the receiving waters of the Los Angeles region. The LACFCD, the County of Los Angeles, and 85 incorporated cities therein, including the City of Los Angeles, (collectively referred to as Permittees) are jointly covered under a single MS4 Permit (Order No. R4-2012-0175; NPDES Permit No. CAS004001) for the discharge of urban runoff to waters of the U.S.

The MS4 Permit establishes the waste discharge requirement for stormwater and non-stormwater discharges within the watersheds of Los Angeles County. The MS4 Permit identifies conditions, requirements, and programs that municipalities must comply with to protect regional water resources from adverse impacts associated with pollutants in stormwater and urban runoff. Under the MS4 Permit, permittees are required to reduce pollutants in stormwater discharges to the maximum extent practicable (MEP). The MS4 Permit contains effluent limitations, water quality-based effluent limitations (WQBELS), receiving water limits (RWLs), Minimum Control Measures (MCMs), TMDL provisions, as well as three categories that classify water body pollutant priorities (Table 2-2).

Table 2-2: MS4 Permit Defined Categories

Category 1	Highest Priority	Water body-pollutant combinations for which TMDLs are established in Attachment N of the MS4 Permit.
Category 2	High Priority	Pollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's CWA Section 303(d) List (State Listing Policy) and for which MS4 discharges could potentially be contributing to the impairment.
Category 3	Medium Priority	Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which have exceeded applicable receiving water limitations contained in the MS4 Permit and for which MS4 discharges could potentially be contributing to the exceedance.

The MS4 Permit also includes provisions that allow Permittees to voluntarily implement an Enhanced Watershed Management Program (EWMP) to achieve permit compliance with RWLs. The intent of the EWMP is to comprehensively evaluate opportunities, within the participating Permittees' collective jurisdictional boundaries, for collaboration among Permittees and other partners on multi-benefit regional projects that, wherever feasible, retain non-stormwater runoff and also address flood control and/or water supply. Twelve EWMP groups have formed to implement a collaborative approach to meet the requirements of the MS4 Permit. LAX and surrounding portions of the City of Los Angeles are part of the Santa Monica Bay Jurisdictions 2 and 3 Watershed Management Group.

The Enhanced Water Management Program for the Dominguez Channel Watershed Management Area (EWMP, 2015) was developed by the Dominguez Channel Water Management Area Group (DCWMG) to conform to requirements issued by the NPDES regarding the MS4. The EWMP addresses the regulatory requirements enforced by the MS4 permit as well as existing contaminant conditions in the Dominguez Channel watershed. The data from prior reports allowed the EWMP to sort the contaminants into one of three MS4 permit categories (Table 2-3).

Table 2-3: MS4 Categories for Potential Dominguez Channel Constituents

Waterway	Category 1 (TMDL)	Category 2 (303(d) List)	Category 3 (Other)
Dominguez Channel (lined portion above Vermont Avenue)	Copper, Lead, Zinc, Toxicity	Indicator Bacteria, Ammonia, Diazonin	Cadmium, Chromium, Mercury, Thallium, Bis (2-Ethylhexl) phthalate, pH, Dissolved Oxygen

Permittees must implement minimum control measures that identify potential modifications that address watershed priorities, including: (i) Development Construction Program, (ii) Industrial/Commercial Facilities Program, (iii) Illicit Connection and Illicit Discharges Detection and Elimination Program, (iv) Public Agency Activities Program, and (v) Public Information and Participation Program. Runoff from the proposed Project facilities would be treated on-site, and as a result, the benchmark pollutant values developed for projects approved for offsite mitigation do not apply.

Total Maximum Daily Load Program

Pursuant to the CWA, states are required to identify the water bodies that do not meet water quality standards despite control of point source discharges under NPDES permits (33 U.S.C. § 1313). The 303(d) list indicates which pollutants and stressors are priorities for each water-quality limited or "impaired" water body. Priorities (i.e., high, medium, low) were established by the SWRCB based on a combination of factors that included the degree of nonattainment/complexity of the problem and the relative importance of the watershed.

For these water bodies, states are required to develop appropriate Total Maximum Daily Loads (TMDLs) for the pollutants or flows causing the impairment. TMDLs are the sum of the individual waste load allocations (WLAs) for point sources, nonpoint sources, and natural background conditions, with an appropriate margin of safety for a designated water body (40 CFR 130.2). A TMDL represents an amount of pollution that can be released into a specific water body without causing a decline in water quality and impairment of beneficial uses. 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. As opposed to the NPDES programs, which focuses on reducing or eliminating non-stormwater discharges and reducing the discharge of pollutants to the maximum extent practicable, TMDLs provide an analytical basis for planning and implementing pollution controls, land management practices, and restoration projects needed to protect water quality. Once established, the TMDL allocates the pollutant loads among current and future pollutant sources to the water body. In general, the implementation of and compliance with the TMDL requirements is necessary where urban runoff is identified as a significant source of pollutants causing impairments.

TMDLs have now been adopted for all of the major impairments identified for Dominguez Channel above the estuary, and the Los Angeles Harbor, to which the Dominguez Channel is tributary, and are shown in Table 2-4.

Table 2-4: TMDLs for Receiving Water Bodies

Waterway	Pollutant	Effective Date
Dominguez Channel	Nutrients	July 31, 2013
Dominguez Channel	Toxics	March 21, 2012
Dominguez Channel	Metals	August 31, 2011
Dominguez Channel	Trash	March 18, 2008
Los Angeles Harbor	Bacteria	March 10, 2005

Source: State of California, State Water Resources Control Board, October 29, 2015.

Table 2-5 lists the TMDL constituents under review and their estimated completion date, which indicates the date that TMDLs must be established for each pollutant.

Table 2-5: Future TMDL Completion Schedule for Dominguez Channel (Estuary to Vermont Avenue)

Pollutant/Stressor	Expected Completion
Ammonia	01/01/2019
Benthic Community Effects	01/01/2019
Benzo[a]pyrene (3,4-Benzopyrene -7-d)	01/01/2019
Benzo[a]anthracene	01/01/2019
Chlordane (tissue)	01/01/2019
Chrysene (C1-C4)	01/01/2019
Coliform Bacteria	01/01/2019
DDT (tissue and sediment)	01/01/2019
Dieldrin (tissue)	01/01/2019
Lead (tissue)	01/01/2019
PCBs	01/01/2019
Phenanthrene	01/01/2019
Pyrene	01/01/2019
Sediment Toxicity	01/01/2019
Zinc (sediment)	01/01/2019

Source: State of California, State Water Resources Control Board, July 19, 2009.

2.2.4 Local

Low Impact Development Ordinance

In 2011, the City of Los Angeles Board of Public Works approved the Stormwater LID Ordinance (Ordinance) to impose rainwater LID strategies on projects requiring building permits.[2] Unlike traditional stormwater management, which collects and conveys stormwater runoff through storm drains, pipes, or other conveyances to a centralized stormwater facility, LID uses site design and stormwater BMPs to maintain the site's pre-development runoff rates and volumes. The following Ordinance categories may be applicable to the Project Area:

- Industrial/Commercial developments with one acre or more of impervious surface area
- Automotive service facilities
- Parking lots of 5,000 square feet or more of surface area or with 25 or more parking spaces

The Stormwater LID Ordinance calls for development and redevelopment projects to mitigate runoff through rainwater capture methods and BMPs (e.g., rain barrels, permeable pavements, rainwater storage tanks, or infiltration swales). The Stormwater LID Ordinance requires 100 percent of rainwater from a three-quarter inch rainstorm to be completely captured, infiltrated, and/or used on site. If site constraints do not allow for LID strategies to be implemented, off-site mitigation or fee payment for off-site mitigation is allowed. Compliance with this ordinance satisfies the Planning and Land Development requirements of the MS4 Permit.

The City's Development Best Management Practices Handbook[3] (Handbook), and the Low Impact Development Standards Manual[4] were developed to assist developers, as well as City departments for public works projects such as those at LAX, in complying with the Ordinance. The Handbook provides the necessary steps required for the project review and permitting process for obtaining approval of a LID Plan in compliance with the Ordinance.

Projects must meet one or more criteria before the requirements of the Ordinance are satisfied. All development and redevelopment projects that fall into one of the applicable project categories would be required to comply with the Ordinance and the Handbook. However, the extent of compliance is governed by the following:

- If development or redevelopment results in an alteration of at least 50% or more of impervious surfaces on an existing developed site, then the entire site must comply;
- If development or redevelopment results in an alteration of less than 50% of the impervious surfaces of an existing developed site, then only the incremental development surfaces of the site must comply; and

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[2] City of Los Angeles, City of Los Angeles Municipal Code, Chapter IV Article 4.4 Section 64.70.01 and Section 64.72 as amended by Ordinance No. 181899, 2011. Accessible online at: www.lastormwater.org/wpcontent/files_mf/finallidordinance181899.pdf.

[3] City of Los Angeles, Development Best Management Practices Handbook, Low Impact Development Manual, Part B, 4th Edition, June 2011.

[4] County of Los Angeles, Department of Public Works, Low Impact Development Standards Manual, February 2014.

- If development or redevelopment of any size that would create 2,500 square feet or more of impervious surface area and is located wholly or partly in an environmentally sensitive area, then the entire site must comply.

The City's Ordinance stipulates the volume of stormwater runoff that must be treated for development projects. Onsite stormwater management measures must be sized to prevent any stormwater runoff from leaving the site based on the following types of events:

- 85th percentile 24-hour runoff event determined as the maximized capture stormwater volume for the area using a 48- to 72-hour draw down time based on the formula recommended in Urban Runoff Quality Management[5]; or
- Volume of annual runoff based on a unit basin storage water quality volume by the method recommended in the California Stormwater Best Management Practices Handbook – Industrial/Commercial[6]; or
- Volume of runoff from a 0.75-inch storm event.

The Ordinance and Handbook specify that stormwater management techniques be implemented in the following order of priority:

1. Infiltration systems
2. Evapotranspiration
3. Capture and use
4. Treatment through high removal efficiency biofiltration/biotreatment

The Handbook provides specific performance standards and requirements for high removal efficiency biofiltration/biotreatment systems. Any water leaving the site from high removal efficiency biofiltration/biotreatment systems is allowable as they are deemed in compliance with the requirement that the full design capture volume be retained on site.

LID Plans are required to be completed and submitted for approval for all projects that fall into the categories covered by the Ordinance. These plans must demonstrate how compliance with the Ordinance and Handbook would be achieved. If implementation of LID requirements is deemed technically infeasible, then infeasibility must be demonstrated in the LID Plans. However, all SUSMP requirements must be met and for any runoff that cannot be managed onsite, offsite mitigation must be implemented within the same watershed (e.g. Dominguez, Santa Monica Bay) on public or private land. There are a number of conditions or circumstances that may result in the infeasibility of installation of LID stormwater management techniques. Examples include:

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[5] Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, 1998

[6] California Stormwater Quality Association, Industrial and Commercial Best Management Practices Online Handbook, September 2014.

- Locations where seasonal groundwater is below 5 feet of the surface grade;
- Sites with soil and/or groundwater contamination;
- Locations within 100 feet of a groundwater drinking well;
- Sites on brownfields or locations where pollutant mobilization is a documented concern;
- Locations with potential geotechnical hazards; and
- Locations with impermeable soil types as indicated in applicable soils and geotechnical reports.

The Handbook should be consulted for details regarding all of the potential conditions that may result in a finding of infeasibility for various types of LID BMPs.

Standard Urban Stormwater Mitigation Plan

Of particular importance to LAWA are the requirements of the SUSMP Planning and Land Development Program for all new development and redevelopment projects within the MS4 Permit. Any project that cannot comply with the LID requirements must, at minimum, fulfill the SUSMP criteria. SUSMP is applicable to projects including single-family hillside residences, 100,000-square foot commercial developments, automotive repair shops, restaurants, and home subdivisions with 10 or more housing units. Additional types of projects that are subject to SUSMP requirements are listed in Table 2-6. The SUSMP requires that redevelopment projects that create, add, or replace 5,000 square feet or more of impervious area on an already developed site are subjected to the same conditions as new development projects.

Table 2-6. SUSMP Project Types

Development Project	Area of disturbed area
All development projects	1 acre or greater and adding more than 10,000 square feet of impervious surface area
Retail gasoline outlets	5,000 square feet or more of surface area
Parking lots	5,000 square feet or more of impervious surface area or with 25 or more parking spaces
Street and road construction	10,000 square feet or more of impervious surface area
Automotive service facilities	5,000 square feet or more of surface area
Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area where the development would discharge stormwater runoff that is likely to impact a sensitive biological species or habitat	2,500 square feet or more of impervious surface area

Source: Standard Urban Storm Water Mitigation Plan for Los Angeles County and Cities in Los Angeles County (2000.)

Development projects within the listed categories are required to incorporate the following SUSMP requirements into their design plans:

1. Control peak stormwater runoff discharge rates
2. Conserve natural areas

3. Minimize stormwater pollutants of concern
4. Protect slopes and channels
5. Provide storm drain system stenciling and signage
6. Properly design outdoor materials storage areas
7. Properly design trash storage areas
8. Provide proof of ongoing BMP maintenance
9. Design standards for structural and treatment control BMPs

Relevant to LAWA, the SUSMP includes specific requirements for project categories such as commercial development, retail gasoline outlets, and automotive repair shops that address stormwater issues, such as the proper design of parking lots to limit oil contamination and easily perform maintenance.

Similar to the LID requirements described above, SUSMP BMP design criteria require a retention volume equal to the 0.75-inch, 24-hour rain event or the 85th percentile, 24-hour rain event. To assist with the selection and design of BMPs, the SUSMP provides a list of example BMPs that can be used to reduce pollutants generated from site runoff to the stormwater conveyance systems. Since stormwater has the potential to contaminate groundwater, infiltration BMPs are not recommended for industrial areas or areas subject to high vehicular traffic unless proper pretreatment is provided. Retention and infiltration BMPs can be implemented for controlling runoff from impervious surfaces.

Section 3

Existing Conditions

Existing conditions in the Dominguez Channel North drainage area were assessed as they pertain to potential flood zones, stormwater drain capacity restrictions, and existing water quality impacts. As discussed below, the Dominguez Channel area is not located within a Federal Emergency Management Agency (FEMA) flood zone. Existing drainage patterns are discussed based on prior reports for the Dominguez Channel area relative to the 10-year storm conveyance requirement for conduits and the 50-year storm capacity for flood evaluation in Dominguez Channel. Descriptions of current land use and water quality conditions are also described. These descriptions provide a basis with which to assess the impacts of the proposed Project at LAX.

3.1 Dominguez North Flood Zones

The 100-year floodplain is the area near a waterway defined by a 1 percent chance of annual flood, while the 500-year floodplain experiences a 0.2 percent chance of flood. The Best Available Maps from the California Department of Water Resources (DWR, 2015) indicates that the Dominguez North study area is not located in a 100-year floodplain. The FEMA Flood Map Service Center (MSC) was accessed to view available information on floodplains in the study area, which indicate that the study area is also located outside the 500-year floodplain.

3.2 Stormwater Drainage

Two separate drainage systems convey water from the east side of the LAX property to Dominguez Channel (Parsons Brinckerhoff, 2002 and LAWA, 2005); these structures include the "Project No. 13" storm drain and the Dominguez Channel Concrete Conduit, which divide the Project Area into northern and southern drainage areas, respectively. Some of the proposed Project facilities in the Dominguez Channel North Subbasin would be located near the Project No. 13 storm drain, which is shown in green in Figure 3-1. The Project No. 13 storm drain captures runoff from the northern portions of the Dominguez Channel drainage basin, and conveys the runoff parallel to the concrete conduit under 116th Street until the two storm drains intersect (and Project No. 13 ends) at Inglewood. The Dominguez Channel Concrete Conduit continues east to Kornblum Avenue where it flows into an open channel.

Drainage system segments with flow restrictions upstream of and along the Project No. 13 storm drain are identified in the red boxes depicted in Figure 3-1, and are discussed in Section 3.2.2.

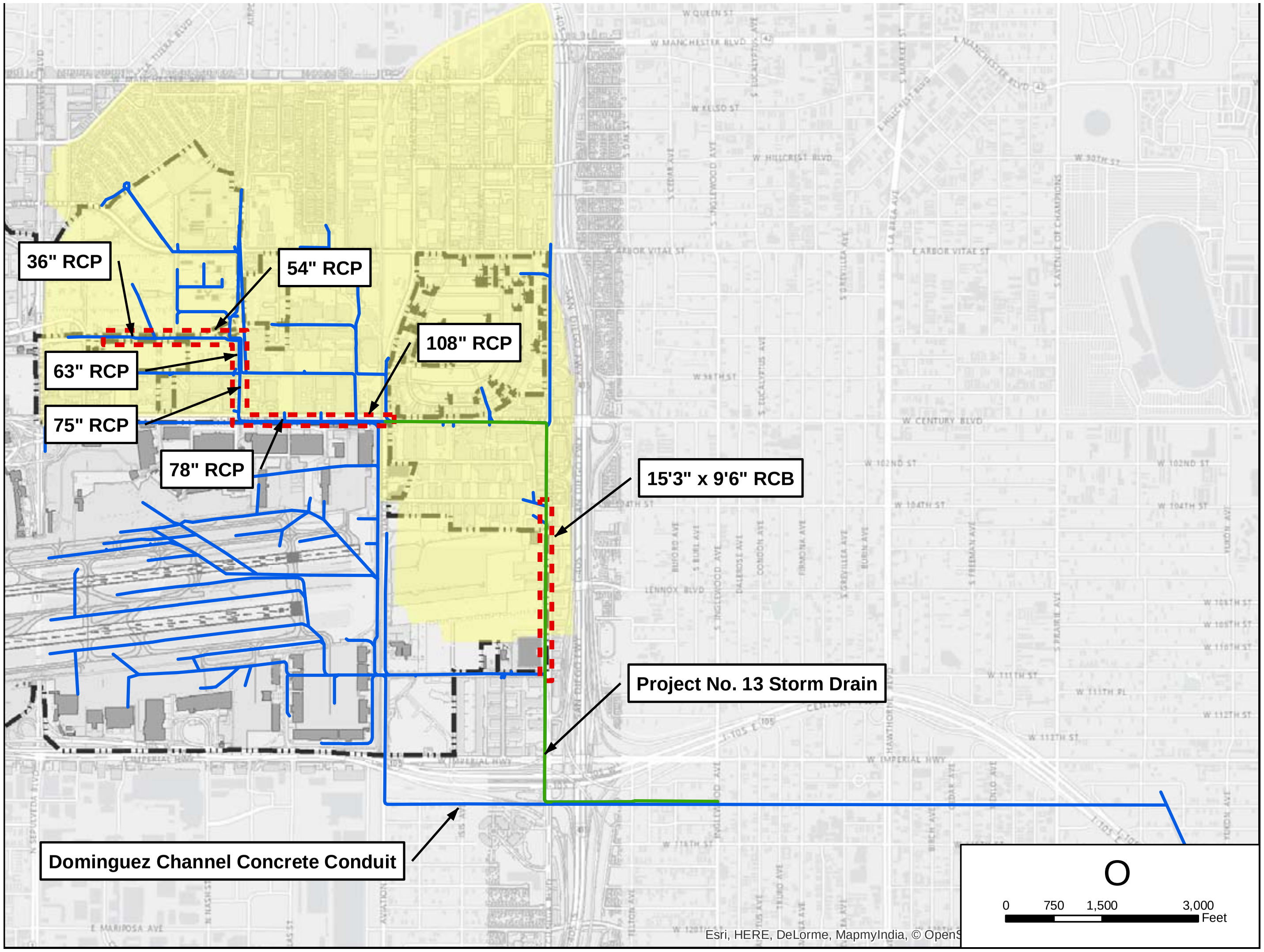

Figure 3-1: Primary Storm Drains in Dominguez Channel Area

3.2.1 Existing Infrastructure

The Project No. 13 storm drain collects runoff from the northern subbasin in a 10'x11'6" reinforced concrete box (RCB) that begins at the intersection of Century and Aviation Boulevards. The storm drain flows along Century Boulevard, changes dimensions to 11'6"x10' and then turns south on La Cienega where it starts at dimensions 11'9"x10' and gradually reaches 13'x11'. At La Cienega and 116th Street, the storm drain dimensions change to 13'6"x10'6"; these dimensions increase to 14'9"x14' as the Project No. 13 storm drain flows to a junction with the Dominguez Channel concrete conduit at Inglewood Avenue on 116th street. The original design calculated water surface profiles for the upstream portion of the 10'x11'6" RCB resulted in a design flow capacity of 730 cubic feet per second (cfs) while the 14'9"x14' Reinforced Concrete Pipe (RCP) outlet at Inglewood Avenue provided design flow capacity of 1,230 cfs. No records were found that identify the design storm for which these conduits were sized (Parsons Brinckerhoff, 2002). Table 3-1 summarizes the Project No. 13 storm drain contributing area design flow.

Table 3-1: Existing Characteristics Dominguez Channel North Sub-Area

Parameter	Description
Drainage Area	1,100 acres
Drainage Boundaries	Manchester Boulevard to midway between Airport and Aviation, cross-country to Arbor Vitae Street, easterly to La Cienega Boulevard, South to I-105, west to Aviation Boulevard, north to Aviation Boulevard/Century Boulevard intersection, west to Century Boulevard/Sepulveda Boulevard Intersection, north to Manchester Boulevard/La Tijera Boulevard intersection.
Drainage Pattern	East and South
Outfall	Dominguez Channel (Los Angeles Harbor)
Existing Capacities	Century Boulevard: 730 cfs South of 104th Street (under La Cienega between 104th and 111th): 1080 cfs Outlet at Inglewood Avenue into Dominguez Channel: 1230 cfs
Downstream Control	14'-9"Wx14'H RCB outlet into Dominguez Channel Concrete Conduit at Inglewood Avenue

Source: LAX Master Plan Draft EIR, 2005

Drainage deficiencies upstream of and along the Project No. 13 storm drain are discussed in the following sub-section as they pertain to the future proposed facilities.

3.2.2 Existing Drainage Deficiencies

Drainage downstream of the future Project facilities must have ample conveyance for the 10-year storm event. The 10-year storm is currently constrained by storm drains that drain west on 96th street, south on Airport Boulevard, and west on Century Boulevard (LAWA, 2015 and PB, 2002).

Several studies acknowledge that the section of the Project No. 13 storm drain along La Cienega Boulevard between 104th street and 111th street is inadequately sized to convey the LADPW 50-year design storm.

Capital flood protection for the 50-year event for Dominguez Channel is currently being investigated by the US Army Corps of Engineers (2015). Additionally, LAWA efforts may help reduce flood risks for the 50-year event along Dominguez Channel, as further discussed in Section 5.

3.3 Runoff Water Quality

This section addresses pollutants of concern that are generated in the Dominguez Channel subarea, as well as water quality concerns observed in the downstream receiving waters.

3.3.1 Pollutants of Concern

TMDLs for toxics, metals, nutrients, PCBs, pesticides, and trash have been developed for Dominguez Channel (CA SWRCB). Twenty five pollutants that have shown recent exceedances in Dominguez Channel and its tributaries, or that are classified in the 2015 EWMP as Water Body-Pollutant Combinations (WBPCs) are presented in Table 3-2. Several of these constituents have a reasonable likelihood to be present in stormwater runoff from the proposed Project facilities. Because proposed rental car and APM car maintenance areas would be located within the Dominguez Channel sub-basin, oil and grease may be present in runoff entering the stormwater conveyance system from LAWA properties (Camp Dresser & McKee Inc., 2001).

Table 3-2: Pollutants of Concern

Pollutant of Concern	Description	Reasonable Likelihood to be Present
Ammonia	Fertilizer Component	
Arsenic	Used in pesticides, herbicides, and insecticides	
Bis (2-Ethylhexl) phthalate	Plasticizer	
Cadmium	Heavy metal	
Chlordane	Insecticide, banned in 1988	
Chromium	Heavy metal	
Coliform Bacteria	Plastic Component	
Copper	Heavy metal	Yes. Weathered soils, atmospheric deposition, automobile emissions and residuals (brake pad and tire wear), applied chemicals, and industrial and other sources can contribute to this contaminant
Cyanide	Used in processes such as rubber and plastic production	
Dichloro-diphenyl-trichloroethane (DDT)	Pesticide, not been manufactured since 1985	
Diazinon	Insecticide	
Dieldrin	Insecticide	
Dissolved Oxygen	Oxygen dissolved/carried in water	
E. coli	Bacteria	
Fecal Coliform	Bacteria	
Indicator Bacteria	Disease-causing organisms	
Lead	Heavy metal	Yes. Weathered soils, atmospheric deposition, automobile emissions and residuals (brake pad and tire wear), applied chemicals, and industrial and other sources can contribute to this contaminant
Mercury	Used for manufacture of chemicals	

Nickel	Metal plating material	
Polycyclic Aromatic Hydrocarbon (PAHs)	Component of fossil fuels	
Polychlorinated Biphenyl (PCBs)	Component of coolants, banned since 1976	
Selenium	Refining element for heavy metals	
Silver	Heavy metal	
Thallium	Byproduct of metal refining	
Zinc	Heavy metal	Yes. Weathered soils, atmospheric deposition, automobile emissions and residuals (brake pad and tire wear), applied chemicals, and industrial and other sources can contribute to this contaminant

Source: Pollutants of Concern from 2015 EWMP, likelihood to be present from Camp Dresser & McKee Inc., 2001 (EIS-EIR Tech Report 6)

Best management practices recommended for the proposed Project facilities in order to address the pollutants of concern that may be present in stormwater runoff are described in Section 5.

3.3.2 Existing Water Quality Conditions

Water quality in the Dominguez Channel is affected by several point and nonpoint sources of contamination. Water quality data collected from 1993 to 2013 in the Dominguez Channel (CDM Smith, 2015) show that aluminum, zinc, and copper concentrations were found to be approximately 25 times the annual average Numeric Action Level (NAL) in the IGP (as introduced in Section 2). This corresponds to 0.75 mg/l for aluminum, 0.16 mg/l for zinc and 0.0189 mg/l for copper (CA Water Board). Maximum total coliform and fecal coliform concentrations were about 15 times the TMDL targets, whereas maximum enterococcus concentrations were more than 50 times the TMDL targets. The maximum observed concentrations of oil and grease, BOD, and COD also exceeded NALs and may be a pollutant of concern in certain years.

A final report by the Enhanced Watershed Management Program for the Dominguez Channel Watershed Group also reported exceedances in dissolved metals from water quality assessments during the period of 2002 to 2013. The EWMP report also noted exceedances in dissolved metals hardness-adjusted California Toxics Rule (CTR) criteria for copper, lead, and zinc in wet weather samples. High levels of bacteria concentrations and pH values above the Basin Plan objectives were also observed. The estuarine portion of Dominguez Channel showed adverse impacts to benthic communities with 3 of 5 stations classified as being in poor condition.

3.3.3 Potential Source Areas

Existing activities at LAX and surrounding areas generate pollutants that runoff to Dominguez Channel, which can contribute to exceedances in water quality standards. It should be noted, however, that not all of these activities occur within the Project Area. Runoff is characterized into two major sources of water, dry weather flows or wet weather flows. Dry weather flows at the airport likely originate from outdoor maintenance of aircrafts and vehicles, building and grounds maintenance, aircraft and ground vehicle fueling, painting, stripping, washing, and chemical and fuel transport and storage. Wet weather flows at the airport occurs when there is precipitation that flows across the ground before and after a rain event.

In addition to being components of dry weather flows, heavy metals, such as copper, zinc, and lead may exist in wet weather flows that drain to Dominguez Channel. Construction activities at the airport may also generate pollutant sources that adversely affect water quality, including erosion-induced sediments, nutrients, trace metals, toxic chemicals, and construction waste.

Existing (pre-project conditions) impervious and pervious areas were identified based on aerial photographs taken in October 2015 for the region and are shown in Figure 3-2. Streets, parking lots, and buildings are considered 100 percent impervious while street medians and areas of grass or vegetation are considered pervious. Low density housing is located in the northwest corner of the Dominguez North Drainage Area and the Manchester Square area; Manchester Square refers to the area bounded by W. Century Blvd to the south, Aviation Blvd. to the west, W. Arbor Vitae St. to the north, and S. La Cienega Blvd. to the east. Low density residential areas are assumed to have an existing impervious value of 25 percent. Residential communities only account for a small percentage of land use in Manchester Square and most of the existing land use in the area is categorized as open space, leading to existing runoff conditions comprised mainly of total suspended solids (TSS) such as dirt and gravel associated with open space.

Figure 3-2: Exisiting (Pre-Project) Imperviousness Values in the Dominguez North SubBasin

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Section 4
Methodology

This section describes the methodology used to assess potentially significant hydrologic and water quality impacts for the proposed Project. The impact analyses are based on available information.

4.1 Hydrology

4.1.1 Thresholds of Significance

Impacts to drainage and hydrology are evaluated for significance relative to identified significance thresholds. This appendix presents thresholds used in previous LAX reports to assess the significance of hydrology impacts that are relevant to this analysis. A significant hydrology impact would occur of the Project would either:

- Increase runoff that would cause or exacerbate flooding with the potential to harm people, damage property, damage sensitive biological resources, or would exceed the capacity of existing or planned stormwater drainage systems
- Cause 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.

The impact analysis presented in this technical appendix utilizes the quantitative classification of a significant hydrologic impact as described in Section 4.1.2 below (i.e., flood protection for a 10-year design storm and for a 50-year design storm). Specific design storms are analyzed for pre- and post-development conditions for potential exceedance of existing drainage system capacity.

4.1.2 Impact Analysis Methodology

As described in Section 2, storm sizes are used by agencies and engineers as standards to dictate conveyance designs to attenuate flooding and hydrologic impacts. The FAA, LACDPW, and the City of Los Angeles design criteria state that the design and improvements of storm drains should provide flood protection capacity for a minimum of a 10-year storm event. For open channels and other regional facilities such as Dominguez Channel, the LACDPW Hydrology Manual requires protection from the Capital Flood which is defined as the 50-year design storm. As a result, the significance of increases in runoff due to development of the proposed Project is evaluated for the impact on storm drains from a 10-year design storm, and on Dominguez Channel from the 50-year design storm. Existing site runoff rates and volumes were compared to site runoff under developed conditions. Peak runoff flowrates from the developed conditions that would exceed drainage system capacity for either of these design storms, depending upon the design storm frequency for specific drainage facilities, is considered a significant impact as it may cause upstream surface flooding. Storm drainage systems that cannot achieve 10-year capacity are considered deficient.

The Los Angeles County Hydrology Manual (2006) defines the 50-year, 24 hour design storm depth over the area, and the appropriate coefficients by which to multiply this depth to downscale to the 10-year storm intensity. A hyetograph (i.e., graph indicating distribution of rainfall events over time) for the Venice Beach area indicates that the Manchester Square and Dominguez Channel areas have a 50-year, 24-hour design storm value between 5.0 and 5.2 inches (Los Angeles County Department of Public Works Hydrology Manual, 2006). An average 50-year rainfall of 5.1 inches is utilized for this analysis. A multiplicative coefficient of 0.714 yields the 10-year storm, as specified in the Los Angeles County Hydrology Manual.

To assess the potential of flooding and hydrology impact, the peak flow rate for the proposed Project area was calculated and compared to the design capacity of the existing drainage system using an EPA SWMM model to assess any potential increases in downstream storm drain water surface elevations. This approach compares two drainage areas based on the amount of impervious area and associated land use. A change in land use with all other parameters held constant would produce a change in the amount of impervious area and a corresponding change in stormwater peak flow rates. The increase in peak flow runoff rate from the increase in percentage of impervious area may exceed the design capacity for the drainage structure, and thus, increase the likelihood of flooding.

4.2 Water Quality

4.2.1 Thresholds of Significance

Surface water flows that are generated within the Project Area boundaries ultimately drain to the Dominguez channel. The quality of the runoff can impact the water quality of the receiving water bodies. The L.A. CEQA Thresholds Guide (2006) define a significant water quality impact as direct and indirect changes to the environment that may be caused by the Project. More specifically, the Project would cause a significant impact if discharges associated with the Project would create pollution, contamination, or nuisance as defined in Section 13050 of the Clean Water Code (CWC) or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control plan for the receiving water body. The impact analysis in this technical appendix recognizes NPDES LID specifications as the applicable regulatory standard by which to determine significant water quality impacts (i.e., would the project provide for water quality BMPs sufficient to capture and treat runoff from the 85th percentile design storm).

4.2.2 Water Quality Impact Analysis Methodology

The event mean concentration (EMC) is used to estimate Project pollutant loadings. Since land use can be quantified by amount and type, the EMCs have been used to characterize pollutant concentrations in urban runoff. The EMC represents the average concentration of a pollutant during a storm event. It does not, however, consider fluctuations of loads within storm events. Local EMC data for land use categories have been compiled by the several municipalities that participated in an extensive stormwater monitoring program to support stormwater quality management in Los Angeles County. EMCs for all the land use categories, with the exception of airport operations and airport open space, is based on data collected between 1994 and 2000 by the Los Angeles County Department of Public Works, as shown in Table 4-1.

Table 4-1: EMC Values

Pollutant	EMC for Industrial (mg/l)	EMC for Commercial (mg/l)	EMC for Open Space (mg/l)	EMC for Mixed Residential (mg/l)	EMC for Transportation (mg/l)
Total Suspended Solids (TSS)	240	66	186	63	78
Total Phosphorus	0.41	0.39	0.16	0.26	0.44
Total Kjeldahl Nitrogen (TKN)	3.00	3.40	0.79	2.50	1.90
Total Copper	0.03	0.04	0.02	0.02	0.06
Total Lead	0.02	0.02	0	0.01	0.01
Total Zinc	0.64	0.24	0.05	0.20	0.29
Oil and Grease	1.70	3.30	0	0	3.10
Biological Oxygen Demand (BOD)	20	27	12	18	21
Chemical Oxygen Demand (COD)	80	98	17	64	50
Ammonia	0.59	1.26	0.13	0.67	0.29
Fecal Coliform (MPN/100ml)	338,220	528,750	1,397	100	328,750
Fecal Enterococcus (MPN/100ml)	98,200	86,250	679	0	32,000

Source: LACDPW (http://ladpw.org/wmd/npdes/9400_wq_tbl/Table_4-12.pdf)

Development or redevelopment projects that, as required by the SUSMP, create, add, or replace 5,000 square feet or more of impervious area on an already developed site, shall prepare an LID plan to reduce stormwater and pollutant runoff from 100 percent of the site area. Based on the LID plan, BMPs should be adopted to infiltrate, evapotranspirate, capture, and treat stormwater runoff. The volume of runoff produced from the 85th percentile, 24-hour storm event can be used to specify the design of volumetric-based stormwater quality BMPs.

The modified rational method (City of LA, 2011) was used to determine the volume required for treatment. This method requires that a unit hyetograph for the design storm be established before runoff computations can take place. Assumptions regarding the hyetograph timing and highest intensity were made in accordance with the Los Angeles County Hydrology manual. The maximum intensity for a specified duration was found using the Los Angeles County specified Intensity-Duration-Frequency (IDF) equation that relates the storm intensity, duration, and frequency (Equation 4-3). The total storm volume is computed as the sum of the runoff volume under the hydrograph generated from the design hyetograph.

Equation 4-1 was implemented at each time step and summed to determine the runoff volume. The design storm intensity (I_t) is multiplied by a developed runoff coefficient (C_d) and the subbasin area (A) to yield a peak flow (Q, in cfs) that must be mitigated due to development (City of LA Appendix F, 2011).

Equation 4-1: $Q = C_d \times I_t \times A$

The variable C_d is the developed runoff coefficient for the basin and represents the ratio of runoff rate to rainfall intensity per Equation 4-2.

Equation 4-2: $C_d = (0.9 \times Imp) + (1.0 - Imp) \times C_u$

The percent of the impervious area, *Imp*, is specified as 0 to 1 and C_u, the undeveloped runoff coefficient, is a function of soil type and rainfall intensity. Soil type 20, and the related C_u as a function of rainfall intensity from Los Angeles County, was used for the Manchester Square area.

The rainfall intensity for the sub-area in Equation 4-1 is computed in Equation 4-3.

Equation 4-3: $\frac{I_t}{I_{1440}} = \left(\frac{1440}{t}\right)^{0.47}$

The variable t represents the duration in minutes; this is specified as the time of concentration for a sub-basin. The rainfall intensity for the duration (in inches per hour), I_t, is divided by the 24-hour rainfall intensity I_{1440} to yield a dimensionless ratio. The time of concentration substituted for t in this equation is computed for as shown in Equation 4-4.

Equation 4-4: $T_c = \frac{0.31 \times L^{0.483}}{(C_d \times I_t)^{0.519} \times S^{0.135}}$

The longest flow path length from the watershed boundary to the outlet is given as L, the slope of this flow path is S, and I_t represents the rainfall intensity as expressed in Equation 4-3. Note that an initial approximation for the time of concentration must be given in Equation 4-3 in order to determine a rainfall intensity that is used in Equation 4-4. The time of concentration for these areas in the Dominguez Channel North Subbasin was calculated by partitioning development into subareas to yield an existing and developed percent imperviousness caused by each Project component. The slope was determined by subtracting the elevation of the most remote point in the subarea to the subarea outlet and dividing the result by the length between the two points.

The runoff coefficient in Equation 4-2 was developed assuming that each Project component would add an area that is 100% impervious to the site. The most conservative way to ensure the 85th percentile requirement is addressed was to address the flow from the 100% impervious new footprint, assuming no runoff from pre-developed conditions. This analysis provides conservative high peak flowrate calculations.

Section 5

Potential Project Impacts and Project Design Features

Potential impacts of the proposed Project relative to existing conditions were addressed as changes in peak flow rates for drainage, and changes in the discharge of pollutants of concern for water quality. Hydrologic impacts were assessed by combining Project elements with neighboring roadways and APM Guideway. Hydrologic impacts for the following drainage areas are described in this section.

- ConRAC and adjacent roadways and APM Guideway
- ITF East and adjacent roadways and APM Guideway
- APM Storage and Maintenance Facility and adjacent roadways and APM Guideway
- ITF West and adjacent roadways and APM Guideway
- Approximately 1.7 acres of proposed roadway near the intersection of 111^{th} St. and Aviation Blvd.

Water quality impacts were assessed for the separate footprint of each Project component. Methods used to examine hydrology and water quality were discussed in the previous section; this chapter presents details for and the results of the analysis.

5.1 Drainage

5.1.1 Potential Project Impacts

Drainage impacts were determined based on changes in land use and site grading as opposed to building footprint; drainage basins were defined for each Project component as shown in Figure 5-1. An EPA SWMM model was used to assess any potential increases in downstream storm drain water surface elevations that would result from development.

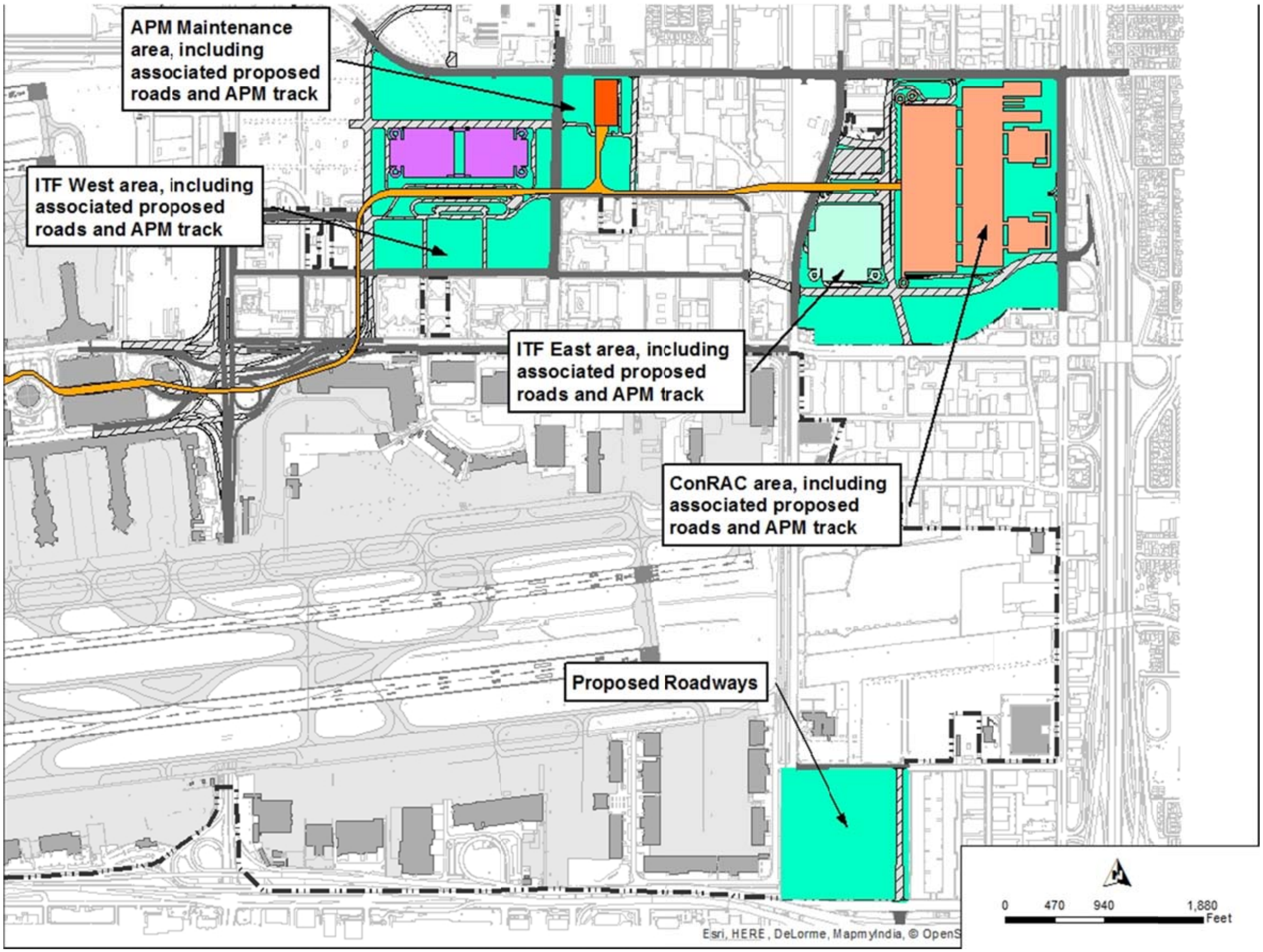

Figure 5-1: Drainage Areas for LAMP Components

The change in impervious surfaces are shown in Table 5-1 for drainage areas defined in Figure 5-1. Section 4 indicates that pervious areas are assigned the undeveloped land use runoff coefficient based on area soil type. The *Pre-Project Conditions* rows in the table constitutes the drainage areas with varying percent imperviousness before the proposed Project development.

Table 5-1: Composite Percent Impervious Values

Project Component	Project Condition	Total Drainage Area (Acres)	Area 100% Impervious (Acres)	Area 25% Impervious (Acres)	Area Pervious (Acres)	Composite Percent Impervious[1]
ConRAC	Pre-Project	75	22	3	50	30%
	Proposed Project	75	72	0	3	96%
East ITF	Pre-Project	32	14	4	14	47%
	Proposed Project	32	27	0	5	84%
West ITF	Pre-Project	71	69	0	2	97%
	Proposed Project	71	70	0	1	99%
APM Maintenance Facility	Pre-Project	20	7	0	13	35%
	Proposed Project	20	11	0	9	55%
Roadways near South Airfield	Pre-Project	34	5	0	29	15%
	Proposed Project	34	7	0	27	20%

[1]Composite Percent imperviousness = $\frac{(1 \times A_{100\%}) + (0.25 \times A_{25\%}) + (0 \times A_{0\%})}{A_{Total}}$

Parking lots currently cover the West ITF development area, and addition of a new structure would have minimal impact on the percent of impervious surface. The APM maintenance facility would be constructed on a mostly empty lot with multi-family and commercial land use in the northwest corner. Existing (pre-project) conditions in Manchester Square include open space, roads, and existing low density residential development.

Table 5-2 delineates, for each of the Project's main components:

- The existing (i.e., pre-project) downstream drainage system peak depths for the 10-year design storm, the future downstream peak depths that would occur with implementation of the proposed Project (i.e., estimated increase in downstream flows resulting from the Project)
- The estimated volume of stormwater detention that would be required for each project component in order to maintain the existing/pre-project downstream peak depths for the 10-year design storm.

Table 5-2: 10-year storm Peak Depths

Component	Existing Downstream Peak Depth (ft)	Future Downstream Peak Depth (ft)	Detention Volume Required (ft^3)
ConRAC	4.44 (to the north)	6.28 (to the north)	571,000

	12.81 (to the south)	15.13 (to the south)	
East ITF	9.57	12.04	200,000
West ITF	12.41 (to the south) 12.45 (to the east)	12.80 (to the south) 12.87 (to the east)	94,000
APM Maintenance Facility	5.21	7.67	23,000
Roadways near South Airfield	1.39	1.39	0

It should be noted that although the West ITF is being constructed on an existing parking areas and there would be a negligible increase in impervious surface area and associated runoff associated with that component of the Project, rerouted drainage patterns in the area would require detention volume above that which is currently available.

It should also be noted that the increased stormwater flow attributable to the proposed Project would add to an already surcharged condition (i.e., the existing drainage deficiencies described above in Section 3.3.3), which is the result of both LAWA existing flows (i.e., runoff from LAWA properties) and non-LAWA existing flows (runoff from properties owned/controlled by others) reaching the downstream drainage system. As such, the proposed Project may be only partially responsible for future drainage system improvements necessary to address such drainage deficiencies, as further described below.

5.1.2 Project Design Features

Underground cisterns with a total volume of 500,000 ft^3 are included in the proposed Project design for stormwater capture beneath the ConRAC facility as shown in Figure 5-2. Although the cisterns are proposed and sized primarily to address potential water quality impacts, as further discussed in Section 5.2 below, their function in storing/retaining stormwater would also serve to reduce hydrology impacts, specifically as related to reducing Project-related peak flows.

Figure 5-2: Proposed Cisterns for ConRAC

Distribution of the proposed cisterns shown in Figure 5-2 assumes approximately 25% of the ConRAC runoff is directed to the northern portion, while 75% flows south; hence, the planned cisterns would retain 111,000 ft^3 of runoff in the northern drainage area of the facility, and would retain 389,000 ft^3 in the south for a total detention volume of 500,000 ft^3 . As such, this project design feature would accommodate approximately 88% of the 571,000 ft^3 detention volume required for the proposed ConRAC drainage area in order for the future with-Project downstream peak depth to not exceed the existing downstream peak depth for the 10-year storm.

The other LAMP facilities, as currently proposed, do not yet have specified detention measures. While runoff detention measures would likely be formulated and incorporated into the more detailed planning and design of those facilities, as well as additional measures for the ConRAC, mainly in response to meeting LID requirements (see discussion in Section 5.2 below), such measures are not currently defined. Implementation of the Project, as currently proposed, would result in significant hydrology impacts by causing increased peak flows within a drainage system that has existing downstream deficiencies. The proposed Project would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, so the impact would be significant. This impact would also be significant because the proposed Project would cause or exacerbate flooding with the potential to harm people or damage property, Section 6 addresses potential mitigation measures to address significant hydrology impacts.

5.2 Water Quality

Assessment of pollutant runoff utilizes the drainage areas and impervious values discussed in Section 5.1; the water quality impact for the 85th percentile storm is conservatively calculated assuming the Project component footprints are 100% impervious; potential small pervious areas including courtyards, grass between sidewalks, and planters are ignored

5.2.1 Wet Weather Runoff

5.2.1.1 Potential Project Impacts

Wet weather runoff from the proposed development areas would result in some increased pollutant loads that would be discharged to the Dominguez Channel North subbasin and eventually to the Dominguez Channel and downstream receiving waters. Event mean concentrations, listed in Table 4-1, together with total runoff volumes were used to calculate pre- and post-Project pollutant loads in the absence of any project-specific measures to reduce loads. Five types of land use for which EMC values are available were assumed to represent different portions of existing and/or future land uses in the Project Area: industrial, commercial, open space, transportation, and mixed residential.

Changes to the land cover as a result of the development (proposed Project conditions) of the ConRAC and East ITF facilities would reduce open space area by 56 acres and reduce mixed residential by 7 acres. The facilities would increase commercial area by 27 acres and increase land devoted to transportation by 36 acres. The reduction in open space land use would result in a net increase in impervious area and an associated decrease in infiltration volume within the Manchester Square area. This change in total impervious surface area would increase contaminant load in surface water runoff. The annual total pollutant load in stormwater runoff to Dominguez Channel for bacteria, oil and grease, total lead, and ammonia would increase due to additional impervious surfaces such as roads and parking facilities.

Similarly, conversion of open space area to transportation area for the development of the West ITF and APM facilities would increase impervious surfaces and decrease infiltration in the project area. The conversion of open space to transportation land use for the development of the West ITF would increase contaminant loads for all constituents except for total suspended solids (TSS) compared to existing conditions. Development of the APM maintenance facility would also convert open space to industrial and transportation land use, impacting surface runoff and water quality. Greater estimated loads are predicted for bacteria, lead, zinc, and oil and grease as a result of increased impervious surfaces.

Table 5-4 categorizes the land use types for pre- and proposed project conditions based on the drainage areas depicted in Figure 5-1. Table 5-4 areas were used to assess contaminant volumes in runoff, percent impervious is derived from these land use types by denoting open space as 0% impervious, mixed residential as 25% impervious, and all other land use types as 100% impervious. The total percent impervious is a composited percent impervious for the total project component drainage area.

Table 5-4: Land Use Areas and Types

Project	Land Use	Pre-Project Conditions	Proposed Project Conditions

Component		Area (Acre)	Percent of Total Area	Area (Acre)	Percent of Total Area
ConRAC	commercial	1	1%	37	49%
	transportation	21	28%	35	47%
	mixed residential	3	4%	0	0%
	open space	50	67%	3	4%
	total	**75**	**30%**	**75**	**96%**
ITF East	commercial	9	28%	0	0%
	transportation	5	16%	27	84%
	mixed residential	4	13%	0	0%
	open space	14	44%	5	16%
	total	**32**	**47%**	**32**	**84%**
APM Maintenance and Storage Facility	commercial	3	15%	0	0%
	transportation	4	20%	8	40%
	open space	13	65%	9	45%
	industrial	0	0%	3	15%
	total	**20**	**35%**	**20**	**55%**
ITF West	commercial	0	0%	0	0%
	transportation	69	97%	70.2	99%
	open space	2	3%	0.8	1%
	industrial	0	0%	0	0%
	total	**71**	**97%**	**71**	**99%**

Source: Ricondo facility map and ArcGIS aerial imagery (accessed 2015)

Under the proposed Project, the estimated annual total pollutant load generated within the project area would increase for all constituents evaluated compared to existing pre-project conditions. The APM maintenance facility is considered an industrial building being placed on open space; with a commercial area adjacent to the proposed facility. The ConRAC and East ITF, to be developed in the Manchester Square area, were considered to be constructed on open space with a portion of mixed residential and transportation land uses to determine the maximum load volume. Development of the Manchester Square area would increase the overall percent of impervious surfaces by converting open space and residential land use to predominantly commercial and transportation land uses. Portions of the APM Maintenance and Storage Facility and ConRAC may be covered by a roof, and any potential industrial activities within these facilities would be unlikely to contribute to this increase due to roof runoff control.

Pollutant loads discharged to Dominguez Channel by surface water runoff would increase in the absence of any control measures. The largest percentile increases due to Project construction are for oil and grease, lead, zinc, and ammonia as shown in Table 5-5.

Table 5-5: Pollutant Runoff Concentrations (lb/yr) or Most Probable Number (MPN)

Drainage Area	TSS	Total Phosphorus	TKN	Total Copper	Total Lead	Total Zinc	Oil and Grease	BOD	COD	Ammonia	Fecal Coliform (MPN)	Fecal Enterococcus (MPN)
ConRAC												
Pre-Project	9,503	16	77	1.94	0.22	8	58	953	1,859	13	2.90E+13	3.06E+12
Proposed Project	12,025	64	409	7	2.29	40	484	3,715	11,388	120	2.96E+14	4.11E+13
Percent Change from Pre-Project	26.5%	306.9%	432.9%	279.2%	934.6%	401.8%	733.3%	289.9%	512.7%	791.0%	923.7%	1245.8%
ITF East												
Pre-Project	4,469	10	71	1	0	6	53	685	1,892	20	3.40E+13	5.00E+12
Proposed Project	5,700	24	104	3	1	15	157	1,177	2,694	16	7.58E+13	7.40E+12
Percent Change from Pre-Project	27.5%	127.6%	45.7%	161.3%	57.0%	154.9%	198.7%	71.9%	42.4%	-20.9%	123.1%	47.9%
APM Maintenance Facility												
Pre-Project	2,746	5	26	1	0	2	21	301	670	6	1.24E+13	1.69E+12
Proposed Project	3,979	8	41	1	0	6	39	443	1,045	7	2.19E+13	3.34E+12
Percent Change from Pre-Project	44.9%	73.7%	56.8%	67.1%	96.2%	160.5%	88.5%	47.1%	55.9%	11.5%	76.1%	97.8%
ITF West												
Pre-Project	12,205	65	281	8	1	43	454	3,124	7,389	43	2.19E+14	2.13E+13
Proposed Project	12,111	67	289	9	1	44	469	3,195	7,587	44	2.26E+14	2.20E+13
Percent Change from Pre-Project	-0.8%	2.6%	2.5%	2.6%	3.3%	3.0%	3.3%	2.3%	2.7%	2.5%	3.3%	3.2%
All Drainage Facilities												
Pre-Project	28,923	96	456	12	2	59	585	5,063	11,810	83	2.94E+14	3.10E+13
Proposed Project	33,815	162	842	20	4	106	1,149	8,530	22,714	187	6.20E+14	7.39E+13
Percent Change from Pre-Project	16.9%	69.4%	84.8%	65.9%	114.7%	78.8%	96.3%	68.5%	92.3%	125.7%	110.8%	137.9%

In Table 5-5, the specific land use types factor into the EMC calculations as the runoff volume of each contaminant is weighted per the appropriate boundaries of each land use in the drainage area. The total annual rainfall in the LAX area is recorded by the Western Regional Climate Center (WRCC, 2015). The average rainfall between the years 1936 to 2015 is 12.02 inches; this value was multiplied by the Project area and EMC values to determine pollutant loading. Multiplying the annual rainfall by the mean concentrations yields a contaminant runoff volume.

Increases in estimated loads would range from 96 percent for oil and grease to 17 percent for TSS. Although EMC values for TSS under transportation land use are less than open space, conversion from open space to transportation would result in greater estimated TSS loads as a result of increases in impervious area, which would generate larger runoff coefficients and more average annual runoffs. Similarly, changes to land use with the addition of an APM maintenance facility, West ITF, and other Project components are predicted to produce greater estimated loads for all constituents. TSS, however, is reduced as a result of the proposed West ITF development. This development would decrease TSS by 0.8 percent. Since modernization in the western portions of the Project area would be on previously existing impervious surface, development in this region would result in smaller increases in the percent of impervious surfaces.

Overall, the proposed Project would increase pollutant loading due to the effects of land use intensification and changes in impervious area, and relative increases and percentage changes in contaminant loading.

BMPs to address stormwater quantity and quality associated with development of the proposed Project would be defined in conjunction with meeting LID Ordinance requirements. The overall BMP program for the Project would be sized to meet the LID specifications relative to addressing runoff volumes for the 85th percentile storm event, which is approximately 1-inch in 24-hours. Table 5-6 delineates the runoff volume associated with the 85th percentile storm event that would need to be addressed in the BMP program for each Project component. As noted above in Section 2.2.4, the SUSMP requires that redevelopment projects that create, add, or replace 5,000 square feet or more of impervious area on an already developed site are subject to the same conditions as new development projects. As such, the water quality volumes presented in Table 5-6 are determined by assuming all new development is 100% impervious and the entire footprint must be accounted for; new roadways and APM guideway areas are broken out from aggregated drainage areas and included separately in this calculation.

Table 5-6: Runoff Volume for the 85th Percentile Storm

Project Component	Total Area (acres)	Volume to be Mitigated (ft^3)
ConRAC	67	220,000
ITF East	21	70,000
ITF West	14	45,000
APM Maintenance and Storage Facility	2.2	7,000
Roads	39	130,000
APM Guideway	16.5	54,000
Roads near South Airfield	1.7	5,600

5.2.1.2 Project Design Features

The proposed underground cisterns beneath the ConRAC facility, introduced in Section 5.1.2, are sized to hold 500,000 ft^3, a volume more than twice the amount needed to address the water quality treatment volume of 220,000 ft^3 associated with that Project component. Cistern water would be treated and used for car washing on-site; such reuse of stormwater is consistent with good water quality management practices and would meet LID requirements.

5.2.2 Stormwater Flows

As described above in Section 5.2.1, implementation of the proposed Project would result in increased pollutant flows in stormwater runoff. The design of the proposed ConRAC facility includes the use of underground cisterns that collect, store, and support on-site reuse of stormwater, which would meet LID requirements and fully address the stormwater quality impacts associated with that Project component. The water quality impacts of the ConRAC would be less than significant because pollution, contamination or nuisance as defined in Section 13050 of the CWC or violation of regulatory standards as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for receiving water body would be minimized..

Specific water quality BMPs would be identified during more detailed project planning and design for the other components, in conjunction with meeting LID requirements; however, in the current absence of such design features for those other components, the stormwater quality impacts associated with those aspects of the Project are considered to be significant. Section 6 below identifies mitigation measures for those impacts.

5.2.3 Dry Weather Flows

Projected sources of dry weather flows within the Project area are associated with activities that include outdoor cleaning and maintenance of rental vehicles; maintenance of the APM system and equipment; and building and grounds maintenance. These activities could potentially result in release of spills and leaks of hazardous materials to the Dominguez Channel watersheds. Compliance with existing regulations and airport procedures, particularly the LAX SWPPP which would be updated to include the new facilities, would reduce the likelihood of any dry weather discharges and the potential impacts associated with hazardous materials spills. With such continued compliance, the pollutant load generated from dry weather flows would not increase and the associated impacts would be less than significant because pollution, contamination or nuisance as defined in Section 13050 of the CWC or violation of regulatory standards as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for receiving water body would be minimized..

5.2.4 Construction Runoff

Construction of the proposed Project facilities may generate pollutant sources that adversely affect water quality, including erosion-induced sediments, nutrients, trace metals, toxic chemicals, and construction waste. Because improvements under the proposed Project would affect an area greater than one-acre, LAWA's existing construction policy would require the development of project-specific construction SWPPPs in compliance with the State's General Construction Permit. Temporary construction BMPs that would likely be considered and incorporated into each project-specific SWPPP, as appropriate, would include:

- Soil stabilization (erosion control) techniques such as seeding and planting, mulching, and check dams
- Sediment control methods such as detention basins, silt fences, and dust control
- Contractor training programs
- Material transfer practices
- Waste management practices such as providing designated storage areas and containers for specific waste for regular collection
- Roadway cleaning/tracking control practices
- Vehicle and equipment cleaning and maintenance practices
- Fueling practices

By following the procedures outlined in the SWPPP and employing the appropriate BMPs from the list above and any additional BMPs required in project-specific construction SWPPPs, impacts to water quality associated with construction activities would be less than significant because pollution, contamination or nuisance as defined in Section 13050 of the CWC or violation of regulatory standards as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for receiving water body would be minimized..

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Section 6
Mitigation Measures and Design Features

Project impacts and proposed design features were discussed in Section 5. Design features have not been proposed for all project elements, and mitigation measures discussed in this section provide a basis for reducing the hydrology impacts to levels that are less than significant.

6.1 Drainage Mitigation Measures

Potential drainage (flooding) impacts during the 10-year storm that result from the proposed Project would be mitigated in one of following three ways, or some combination thereof:

1. Detain or reduce onsite Project-related flows in order to maintain existing (pre-Project) downstream peak depths;

2. Re-route flows through a bypass drain, or connect a new storm drain to the larger storm drain; or

3. Construct improvements to the existing stormwater drainage system segments/facilities where deficiencies exist.

The following identifies potential options for each of these three ways to reduce impacts, recognizing that the selection and refinement of a particular option for implementation would be determined in conjunction with the more detailed planning, design, and permitting of each Project component.

6.1.1 Detain/Reduce Project-Related Stormwater Flows

The storage volumes needed to maintain pre-project downstream peak depths for the 10-year storm are portrayed in Table 6-1. Project design feature volumes associated with each facility are shown, and Table 6-1 indicates that the ConRAC cisterns reduce the amount of remaining 10-year storm volume to be mitigated.

Table 6-1: 10-year Storm Mitigation Volumes

Component	Detention Volume Required (ft^3)	Project Design Feature Volume (ft^3)	Remaining Volume to be Mitigated (ft^3)
Manchester Square	571,000	500,000	71,000
East ITF	200,000	0	200,000
West ITF	94,000	0	94,000
APM Maintenance Facility	23,000	0	23,000
Roads near South Airfield	0	0	0

A total volume of 571,000 ft^3 is required to fully mitigate impacts for the 10-year storm for the ConRAC. The 500,000 ft^3 cistern storage incorporated into the facility design alleviates some of the impacts, but an additional 40,000 ft^3 of detention in the north and 31,000 ft^3 in the south is needed.

In addition to the option of on-site detention of stormwater, above-grade measures to reduce drainage impacts include decreasing the impervious area of a development and/or diverting runoff water to pervious areas. As further described below in Section 6.2, potential options for water quality BMPs include, but are not limited to, biofiltration, infiltration, evapotransporation, and various water quality structural treatment systems, all of which can also service to reduce peak flows from the Project and mitigate drainage/flooding impacts.

6.1.2 Reroute Stormwater Flows

In conjunction with more detailed engineering and design of drainage infrastructure improvements associated with the Project components, more detailed evaluations of the runoff characteristics of each component relative to the receiving storm drain lines can be conducted to assess the potential for rerouting flows, either by modifying existing or proposed surface elevations and directions of flow or by installation of new storm drain lines onsite to carry runoff to existing storm drain that have sufficient downstream capacity.

6.1.3 Construct Improvements to Existing Stormwater Drainage System

As part of the detailed planning and design of the proposed facilities, LAWA would evaluate and identify improvements to segments of local storm drain systems having existing or future peak flows that exceed the design capacity of the facilities. As a part of the proposed Project, LAWA would construct, or support on a fair-share basis, improvements needed to address existing or future deficiencies and accommodate stormwater attributable to the Project.

In addressing the existing downstream drainage deficiencies at the Dominguez Channel outlet, which is a County regional facility, LAWA would work in coordination with the County and other affected jurisdictions in the development of a comprehensive solution to that deficiency, understanding that LAWA's participation in implementing such a solution would need to be on a fair-share basis in light of the Project's contribution to increased flows.Table 6-2 outlines measures that LAWA could implement to mitigate the significant impacts of the proposed Project on existing drainage deficiencies identified in Section 3.3.3.

Table 6-2: Potential Drainage Improvement Options

Capacity Restriction	Design Storm for which Restriction Occurs	Proposed Solution
Section along 96th street and Airport Boulevard, and Century Boulevard storm drain[1]	10-yr	Approximately 6,100 LF of replacement storm drains would be coordinated with roadway improvements for the proposed Project facilities. These upgraded storm drains are recommended along Westchester Pkwy., Airport Blvd., and 96th Street.
La Cienega between 104th and 111th street for the Project 13 conduit[2]	50-yr	FAA, LACDPW, and City of Los Angeles design criteria require that storm drains provide flood protection capacity for the 10-year storm event. Table 5-2 lists the volume of stormwater detention that would be required in order to maintain the pre-project downstream peak depths for the 10-year design storm. By installing these detention volumes on-site, the proposed Project components are not expected to increase flooding along the Project 13 Conduit. The capital flood protection level requires that Dominguez Channel has the capacity to convey runoff from a 50-year storm frequency, proposed Project facilities are not expected to increase peak flows in to Dominguez Channel. However, LAWA would support any additional detention or additional storm drain installation on a fair-share basis.

Source: [1]CDP, 2005; [2]PB, 2002

Through implementation of one or more of the above options for addressing increased flows associated with the proposed Project, with the result being to avoid an increase in runoff that would cause or exacerbate flooding with the potential to harm people, damage property, or exceed the capacity of existing or planned stormwater drainage systems, the hydrology impacts of the project would be reduced to less than significant.

6.2 Water Quality Design Features

As part of the proposed Project during the planning and design of the proposed Project facilities, LAWA would select and size water quality protection features that meet the requirements of the LID Ordinance and the NPDES Permit. Priority will be given to LID BMPs. The Los Angeles LID Manual provides requirements and guidance for the selection and sizing of BMP's for a given storm volume given user input parameters such as soil porosity, depth of infiltration allowed, and the ponding time. These sizing methods are combined with research done to establish the pollutant removal efficacy of many BMP types. Over the past 10 years, low impact development BMPs have been implemented for stormwater management and water pollution control. LID consists of best management practices that aim to reduce the impacts of increases in stormwater runoff through the use of natural and structural systems for infiltration, evapotranspiration, and retention. Several BMPs are listed in Table 6-3 along with pollutant removal efficiencies based on scientific reports from federal and local agencies (EWMP, 2015). Infiltration-based BMPs and evapotranspiration (or other reuse) BMPs, for an event equivalent to the 85th percentile storm, would remove 100 percent of all pollutants in the fraction of runoff detained. For other LID-based BMPs and other BMPs, less than 100 percent of pollutants are removed. However, the values in

Table 6-3 show that over time for a variety of storm events, the percent removed can fall below 100 percent.

Table 6-3: Typical Pollutant Removal for BMPs (percent)

BMP Category	BMP Type	Total Suspended Solids		Nitrogen		Phosphorus		Total Cu		Total Zn		Total PB	Oil and Grease
Source of Data[1]		*A*	*B*	*A*	*B*	*A*	*B*	*A*	*B*	*A*	*B*	*A*	*A*
LID Biofiltration BMPs	Bioswales	49		30		-106		63		77		68	
	Biofiltration Strip	69		-10		-46		85		72		88	
	Bioretention		59		46		5		81		79		
	Wetlands		72		24		48		47		42		
LID Infiltration BMPs	Infiltration		89		42		65		86		66		
	Surface Sand Filters	81-90		9-32		39-44		50-66		80-92		85-87	
LID Evapotranspiration BMPs	Extended Detention Basins (Unlined)	72		14		39		58		73		72	
	Extended Detention Basins (Lined)	40		14		15		27		54		30	
	Wet Basin Storm (Wet Weather)	94		51		5		89		91		98	
	Wet Basin Base Flow (Wet Weather)	21		43		49		54		62		62	
	Wet Pond		80		31		52		57		64		
	Dry Pond		49		24		20		29		29		
Other BMPs	Multi-Chambered Treatment Train	75		0		18		35		75		74	
	Inlet Insert	3-14						0-2		1-2		1-7	
	Continuous Deflective Separators (CDS)	0		5		15		8		17		11	
	Oil Water Separator	49						2		2		7	89

[1]Data source *A* was extracted from the Caltrans BMP Retrofit Pilot Program; *B* refers to data from the Center for Watershed Protection
Source: EWMP (2015).

The selection and design of BMPs would determine the percent pollutant removal, which in turn affects the pollutant load discharged to the receiving water bodies. Various studies have proposed different types of BMP's for the proposed Project area. High concentrations of zinc are affiliated with stormwater runoff in the Dominguez Channel area, and green streets were proposed, in the 2015 EWMP, in the general area of the proposed Project facilities. In addition, the Conceptual Design Plan (CDP; LAWA, 2005) prepared for LAWA to support the original Master Plan identified several BMP options for the Dominguez Channel North drainage area based on site-specific watershed characteristics including vegetated swales and bioretention for area parking lots and ITF areas.

Table 6-4 presents the water quality volume requirements.. For all Project components, LID BMPs of adequate size, or capture and reuse alternatives, would be incorporated to address the volumes shown in Table 6-4.

Table 6-4 Volume Requirements for On-site Alternatives

LAMP Component	Water Quality Requirement (ft^3)	Project Design Feature Volume (ft^3)	Remaining Volume (ft^3)
CONRAC	220,000	500,000	0
ITF East	70,000	0	70,000
ITF West	45,000	0	45,000
APM Maintenance Facility	7,000	0	7,000
APM Track (entire length)	54,000	0	54,000
New Roadways	130,000	0	130,000

APM track and proposed roadways are being designed with new storm-drains to sufficiently attenuate flows in order to maintain peak flow depths further downstream. However, both the track and roads would also include water quality measures as listed in Table 6-4.

To capture and infiltrate, reuse or biotreat the remaining volume for the Manchester Square area, additional LID BMPs would be required. For all other Project components, LID BMPs would be incorporated of sufficient size to address the volumes shown in Table 6-4. BMPs would be evaluated and selected from those identified in the LID Manual or other equivalent BMPs. The list of BMPs may include:

- Infiltration basins
- Infiltration trenches
- Permeable pavements with an underdrain
- Permeable pavements without an underdrain
- Bioretention
- Bioretention with underdrain
- Dry wells

- Planter boxes
- Bioinfiltration
- Vegetated swales and strips
- Wet ponds
- Constructed wetlands
- Sand filters
- Extended detention basins

Implementing BMPs as set forth in the LID Ordinance, with the specifics of the BMPs associated with each Project component to be defined in conjunction with the detailed planning, design, engineering, and permitting, particularly the LID/SUSMP compliance process, would assure the potential water quality impacts associated with development of proposed Project would be less than significant because pollution, contamination or nuisance as defined in Section 13050 of the CWC or violation of regulatory standards as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for receiving water body would be minimized.

It should be noted that while the above discussion pertains to the mitigation needs and potential options associated with the proposed LAMP facilities, as may occur in conjunction with development of each of those facilities, LAWA has initiated development of a campus-wide (i.e., LAX and associated LAWA-owned properties) Stormwater Management Plan, as indicated above in Section 1.1. That Stormwater Management Plan will take into account the proposed LAMP Project facilities and infrastructure. While certain BMPs are conceptually identified in the framework of the campus-wide Stormwater Management Plan, they are not formally located or defined yet, as a more detailed analysis will be completed during facility planning and design in concert with the development of the campus-wide Stormwater Management Plan. As such, other potential options for addressing the hydrology and water quality impacts associated with the LAMP Project may be identified as part of a larger, more comprehensive drainage and water quality management program, beyond those presented above.

6.3 Summary of Volume Requirements for On-Site Mitigation

Table 6-5 summarizes the volume of stormwater that would require management in order to meet the water quality treatment requirement for each LAMP facility, as well as the additional on-site runoff storage/detention that would be needed as a mitigation measure in order to fully mitigate peak runoff depth downstream for the 10-year storm event. As described above in Section 6.1, it is also possible that mitigation of hydrology impacts can occur through other options that may occur offsite.

Table 6-5 Volume Requirements for On-site Alternatives

LAMP Component	Water Quality Requirement	Additional Drainage Requirement	Total
CONRAC	220,000 ft^3	351,000 ft^3	571,000 ft^3
ITF East	70,000 ft^3	130,000 ft^3	200,000 ft^3
ITF West	45,000 ft^3	49,000 ft^3	94,000 ft^3
APM Maintenance Facility	7,000 ft^3	16,000 ft^3	23,000 ft^3
APM Track (entire length)	54,000 ft^3	New Storm Drains	54,000 ft^3
New Roadways	130,000 ft^3	New Storm Drains	130,000 ft^3

LAWA could complete a campus-wide Stormwater Management Plan that incorporates the proposed Project facilities and infrastructure. While certain BMPs are conceptually identified in this document, they are not formally located as a more detailed analysis will be completed during facility planning and design in concert with the development of the campus-wide SMP.

Section 7
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