Appendix H

Water Resources Technical Report
(Hydrology Report)

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2159 BAY STREET
TECHNICAL REPORT: WATER RESOURCES
MAY 23, 2022

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Table of Contents

Appendix

1. INTRODUCTION

1.1. PROJECT DESCRIPTION

The Project would include the development of a creative office campus that would be comprised of a 10-story commercial high-rise building, a two-story commercial building, a one-story commercial building, and a one-story electrical enclosure. The Project would include a total of approximately 217,189 square feet of creative office space and 5,000 square feet of retail and restaurant space. The Project would provide a total of 711 vehicle parking spaces within up to four levels of subterranean parking levels and one ground floor parking level.

1.2. SCOPE OF WORK

This report provides a description of the existing surface water hydrology, surface water quality, groundwater level, and groundwater quality at the Project Site. It also analyzes the Project's potential impacts related to surface water hydrology, surface water quality, groundwater level, and groundwater quality.

2. REGULATORY FRAMEWORK

2.1. SURFACE WATER HYDROLOGY

County of Los Angeles Hydrology Manual

Per the City of Los Angeles (City) Special Order No. 007-1299, December 3, 1999, the City has adopted the Los Angeles County (County) Department of Public Works Hydrology Manual as its basis of design for storm drainage facilities. The Hydrology Manual requires that a storm drain conveyance system be designed for a 25-year storm event and that the combined capacity of a storm drain and street flow system accommodate flow from a 50-year storm event. Areas with sump conditions are required to have a storm drain conveyance system capable of conveying flow from a 50-year storm event.[1] The County also limits the allowable discharge into existing storm drain facilities based on the municipal separate storm sewer systems (MS4) Permit, which is enforced on all new developments that discharge directly into the County's storm drain system. Any proposed drainage improvements of County owned storm drain facilities such as catch basins and storm drain lines require approval/review from the County Flood Control District department.

Los Angeles Municipal Code

Any proposed drainage improvements within the street right of way or any other property owned by, to be owned by, or under the control of the City requires the approval of a B-

[1] Los Angeles County Department of Public Works Hydrology Manual, January 2006, http://ladpw.org/wrd/publication/index.cfm, accessed August 10, 2017.

permit (Section 62.105, Los Angeles Municipal Code (LAMC)). Under the B-permit process, storm drain installation plans are subject to review and approval by the City of Los Angeles Department of Public Works, Bureau of Engineering (BOE). Additionally, any connections to the City's storm drain system from a property line to a catch basin or a storm drain pipe requires a storm drain permit from BOE.

2.2. SURFACE WATER QUALITY

Clean Water Act

The Clean Water Act (CWA) was first introduced in 1948 as the Water Pollution Control Act. The CWA authorizes Federal, state, and local entities to cooperatively create comprehensive programs for eliminating or reducing the pollution of state waters and tributaries. The primary goals of the CWA are to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to make all surface waters fishable and swimmable. As such, the CWA forms the national framework for the management of water quality and the control of pollutant discharges. The CWA also sets forth a number of objectives in order to achieve the above-mentioned goals. These objectives include regulating pollutant and toxic pollutant discharges; providing for water quality that protects and fosters the propagation of fish, shellfish and wildlife; developing waste treatment management plans; and developing and implementing programs for the control of non-point sources of pollution.[2]

Since its introduction, major amendments to the CWA have been enacted (e.g., 1961, 1966, 1970, 1972, 1977, and 1987). Amendments enacted in 1970 created the U.S. Environmental Protection Agency (USEPA), while amendments enacted in 1972 deemed the discharge of pollutants into waters of the United States from any point source unlawful unless authorized by a USEPA National Pollutant Discharge Elimination System (NPDES) permit. Amendments enacted in 1977 mandated development of a "Best Management Practices" Program at the state level and provided the Water Pollution Control Act with the common name of "Clean Water Act," which is universally used today. Amendments enacted in 1987 required the USEPA to create specific requirements for discharges.

In response to the 1987 amendments to the CWA and as part of Phase I of its NPDES permit program, the USEPA began requiring NPDES permits for: (1) municipal separate storm sewer systems (MS4) generally serving, or located in, incorporated cities with 100,000 or more people (referred to as municipal permits); (2) 11 specific categories of industrial activity (including landfills); and (3) construction activity that disturbs five acres or more of land. Phase II of the USEPA's NPDES permit program, which went into effect in early 2003, extended the requirements for NPDES permits to: (1) numerous small

[2] Non-point sources of pollution are carried through the environment via elements such as wind, rain, or stormwater and are generated by diffuse land use activities (such as runoff from streets and sidewalks or agricultural activities) rather than from an identifiable or discrete facility.

MS4s[3]; (2) construction sites of one to five acres, and (3) industrial facilities owned or operated by small municipal separate storm sewer systems. The NPDES permit program is typically administered by individual authorized states.

In 2008, the USEPA published draft Effluent Limitation Guidelines (ELGs) for the construction and development industry. On December 1, 2009 the EPA finalized its 2008 Effluent Guidelines Program Plan.

In California, the NPDES stormwater permitting program is administered by the State Water Resources Control Board (SWRCB). The SWRCB was created by the Legislature in 1967. Its joint authority over water distribution and water quality protection allows the Board to provide protection for the State's waters, through its nine Regional Water Quality Control Boards (RWQCBs). The RWQCBs develop and enforce water quality objectives and implement plans that will best protect California's waters, acknowledging areas of different climate, topography, geology, and hydrology. The RWQCBs develop "basin plans" for their hydrologic areas, issue waste discharge requirements, enforce action against stormwater discharge violators, and monitor water quality.[4]

Federal Anti-Degradation Policy

The Federal Anti-Degradation Policy (40 Code of Federal Regulations 131.12) requires states to develop statewide anti-degradation policies and identify methods for implementing them. Pursuant to the Code of Federal Regulations (CFR), state anti-degradation policies and implementation methods shall, at a minimum, protect and maintain (1) existing in-stream water uses; (2) existing water quality, where the quality of the waters exceeds levels necessary to support existing beneficial uses, unless the state finds that allowing lower water quality is necessary to accommodate economic and social development in the area; and (3) water quality in waters considered an outstanding national resource.

California Porter-Cologne Act

The Porter-Cologne Water Quality Control Act established the legal and regulatory framework for California's water quality control. The California Water Code (CWC) authorizes the SWRCB to implement the provisions of the CWA, including the authority to regulate waste disposal and require cleanup of discharges of hazardous materials and other pollutants.

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[3] A small MS4 is any MS4 not already covered by the Phase I program as a medium or large MS4. The Phase II Rule automatically covers on a nationwide basis all small MS4s located in "urbanized areas" as defined by the Bureau of the Census (unless waived by the NPDES permitting authority), and on a case-by-case basis those small MS4s located outside of urbanized areas that the NPDES permitting authority designates.

[4] USEPA. U.S. Environmental Protection Agency - Clean Water Act. July 2011. <http://www.epa.gov/lawsregs/laws/cwa.html>.

As discussed above, under the CWC, the SWRCB is divided into nine RWQCBs, governing the implementation and enforcement of the CWC and CWA. The Project Site is located within Region 4, also known as the Los Angeles Region. Each RWQCB is required to formulate and adopt a Basin Plan for its region. This Basin Plan must adhere to the policies set forth in the CWC and established by the SWRCB. The RWQCB is also given authority to include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

California Anti-Degradation Policy

The California Anti-Degradation Policy, otherwise known as the *Statement of Policy with Respect to Maintaining High Quality Water in California* was adopted by the SWRCB (State Board Resolution No. 68-16) in 1968. Unlike the Federal Anti-Degradation Policy, the California Anti-Degradation Policy applies to all waters of the State, not just surface waters. The policy states that whenever the existing quality of a water body is better than the quality established in individual Basin Plans, such high quality shall be maintained and discharges to that water body shall not unreasonably affect present or anticipated beneficial use of such water resource.

California Toxics Rule

In 2000, the USEPA promulgated the California Toxics Rule, which establishes water quality criteria for certain toxic substances to be applied to waters in the State. The USEPA promulgated this rule based on the USEPA's determination that the numeric criteria are necessary in the State to protect human health and the environment. The California Toxics Rule establishes acute (i.e., short-term) and chronic (i.e., long-term) standards for bodies of water such as inland surface waters and enclosed bays and estuaries that are designated by the Los Angeles RWQCB (LARWQCB) as having beneficial uses protective of aquatic life or human health.

Board Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

As required by the California Water Code, the LARWQCB has adopted a plan entitled "Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties" (Basin Plan). Specifically, the Basin Plan designates beneficial uses for surface and groundwater, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality

policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.[5]

The Basin Plan is a resource for the LARWQCB and others who use water and/or discharge wastewater in the Los Angeles Region. Other agencies and organizations involved in environmental permitting and resource management activities also use the Basin Plan. Finally, the Basin Plan provides valuable information to the public about local water quality issues.

NPDES Permit Program

The NPDES permit program was first established under authority of the CWA to control the discharge of pollutants from any point source into the waters of the United States. As indicated above, in California, the NPDES stormwater permitting program is administered by the SWRCB through its nine RWQCBs.

The General Permit

SWRCB Order No. 2012-0006-DWQ known as "The General Permit" was adopted on July 17, 2012. This NPDES permit establishes a risk-based approach to stormwater control requirements for construction projects by identifying three project risk levels. The main objectives of the General Permit are to:

1. Reduce erosion;
2. Minimize or eliminate sediment in stormwater discharges;
3. Prevent materials used at a construction site from contacting stormwater;
4. Implement a sampling and analysis program;
5. Eliminate unauthorized non-stormwater discharges from construction sites;
6. Implement appropriate measures to reduce potential impacts on waterways both during and after construction of projects;
7. Establish maintenance commitments on post-construction pollution control measures.

California mandates requirements for all construction activities disturbing more than one acre of land to develop and implement Stormwater Pollution Prevention Plans (SWPPP). The SWPPP documents the selection and implementation of Best Management Practices (BMPs) for a specific construction project, charging owners with stormwater quality

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[5] Los Angeles Regional Water Quality Control Board. LARWQCB Basin Plan. <http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/> accessed August 10, 2017.

management responsibilities. A construction site subject to the General Permit must prepare and implement a SWPPP that meets the requirements of the General Permit.[6, 7]

Los Angeles County Municipal Storm Water System (MS4) Permit

As described above, USEPA regulations require that MS4 permittees implement a program to monitor and control pollutants being discharged to the municipal system from both industrial and commercial projects that contribute a substantial pollutant load to the MS4.

On November 8, 2012, the LARWQCB adopted Order No. R4-2012-0175 under the CWA and the Porter-Cologne Act. This Order is the NPDES permit or MS4 permit for municipal stormwater and urban runoff discharges within Los Angeles County. The requirements of this Order (the Permit) cover 84 cities and most of the unincorporated areas of Los Angeles County. Under the Permit, the Los Angeles County Flood Control District (LACFCD) is designated as the Principal Permittee. The other permittees are the 84 Los Angeles County cities (including the City of Los Angeles) and Los Angeles County. Collectively, these are the "Co-Permittees". The Principal Permittee helps to facilitate activities necessary to comply with the requirements outlined in the Permit but is not responsible for ensuring compliance of any of the Co-Permittees.

Stormwater Quality Management Program (SQMP)

In compliance with the Permit, the Co-Permittees are required to implement a stormwater quality management program (SQMP) with the goal of accomplishing the requirements of the Permit and reducing the amount of pollutants in stormwater runoff. The SQMP requires the County of Los Angeles and the 84 incorporated cities to:

- Implement a public information and participation program to conduct outreach on storm water pollution;
- Control discharges at commercial/industrial facilities through tracking, inspecting, and ensuring compliance at facilities that are critical sources of pollutants;
- Implement a development planning program for specified development projects;
- Implement a program to control construction runoff from construction activity at all construction sites within the relevant jurisdictions;
- Implement a public agency activities program to minimize storm water pollution impacts from public agency activities; and

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[6] State Water Resources Control Board. State Water Resources Control Board. July 2012, http://www.swrcb.ca.gov/water_issues/programs/npdes/.

[7] USEPA. U.S. Environmental Protection Agency - NPDES. July 2012, https://www.epa.gov/npdes.

- Implement a program to document, track, and report illicit connections and discharges to the storm drain system.

The Permit contains the following provisions for implementation of the SQMP by the Co-Permittees:

1. General Requirements:

    - Each permittee is required to implement the SQMP in order to comply with applicable stormwater program requirements; and

    - The SQMP shall be implemented and each permittee shall implement additional controls so that discharge of pollutants is reduced.

2. Best Management Practice Implementation:

    - Permittees are required to implement the most effective combination of BMPs for stormwater/urban runoff pollution control. This should result in the reduction of storm water runoff.

3. Revision of the SQMP:

    - Permittees are required to revise the SQMP in order to comply with requirements of the RWQCB while complying with regional watershed requirements and/or waste load allocations for implementation of Total Maximum Daily Loads (TMDLs) for impaired waterbodies.

4. Designation and Responsibilities of the Principal Permittee:

    The Los Angeles County Flood Control District is designated as the Principal Permittee who is responsible for:

    - Coordinating activities that comply with requirements outlined in the NPDES Permit;

    - Coordinating activities among Permittees;

    - Providing personnel and fiscal resources for necessary updates to the SQMP;

    - Providing technical support for committees required to implement the SQMP; and

    - Implementing the Countywide Monitoring Program required under this Order and assessing the results of the monitoring program.

5. Responsibilities of Co-Permittees:

Each Co-Permittee is required to comply with the requirements of the SQMP as applicable to the discharges within its geographical boundaries. These requirements include:

- Coordinating among internal departments to facilitate the implementation of the SQMP requirements in an efficient way;

- Participating in coordination with other internal agencies as necessary to successfully implement the requirements of the SQMP; and

- Preparing an annual Budget Summary of expenditures for the storm water management program by providing an estimated breakdown of expenditures for different areas of concern, including budget projections for the following year.

6. Watershed Management Committees (WMCs):

    - Each WMC shall be comprised of a voting representative from each Permittee in the Watershed Management Area (WMA); and

    - Each WMC is required to facilitate exchange of information between co-permittees, establish goals and deadlines for WMAs, prioritize pollution control measures, develop and update adequate information, and recommend appropriate revisions to the SQMP.

7. Legal Authority:

    - Co-Permittees are granted the legal authority to prohibit non-storm water discharges to the storm drain system including discharge to the MS4 from various development types.

City of Los Angeles Water Quality Compliance Master Plan for Urban Runoff

On March 2, 2007, a motion was introduced by the City of Los Angeles City Council to develop a water quality master plan with strategic directions for planning, budgeting and funding to reduce pollution from urban runoff in the City of Los Angeles (City Council File 07-0663). The Water Quality Compliance Master Plan for Urban Runoff (Master Plan) was developed by the Bureau of Sanitation, Watershed Protection Division in collaboration with stakeholders to address the requirements of this Council motion. The primary goal of the Master Plan is to help meet water quality regulations. Implementation of the Master Plan is intended over the next 20 to 30 years to result in cleaner neighborhoods, rivers, lakes and bays, augmented local water supply, reduced flood risk, more open space, and beaches that are safe for swimming. The Master Plan also supports the Mayor and Council's efforts to make Los Angeles the greenest major city in the nation.

The Master Plan identifies and describes the various watersheds in the City, summarizes the water quality conditions of the City's waters, identifies known sources of pollutants,

describes the governing regulations for water quality, describes the BMPs that are being implemented by the City, discusses existing TMDL Implementation Plans and Watershed Management Plans. Additionally, the Master Plan provides an implementation strategy that includes the following three initiatives to achieve water quality goals:

- Water Quality Management Initiative, which describes how Water Quality Management Plans for each of the City's watershed and TMDL-specific Implementation Plans will be developed to ensure compliance with water quality regulations.

- The Citywide Collaboration Initiative, which recognizes that urban runoff management and urban (re)development are closely linked, requiring collaborations of many City agencies. This initiative requires the development of City policies, guidelines, and ordinances for green and sustainable approaches for urban runoff management.

- The Outreach Initiative, which promotes public education and community engagement with a focus on preventing urban runoff pollution.

The Master Plan includes a financial plan that provides a review of current sources of revenue, estimates costs for water quality compliance, and identifies new potential sources of revenue.

City of Los Angeles Stormwater Program

The City of Los Angeles supports the policies of the Construction General Permit and the Los Angeles County NPDES permit through the *Development Best Management Practices Handbook. Part A Construction Activities,* 3rd Edition (Handbook), and associated ordinances were adopted in September 2004. *Part B Planning Activities*, 4th Edition was adopted in June 2011. The Handbook provides guidance for developers in complying with the requirements of the Development Planning Program regulations of the City's Stormwater Program. Compliance with the requirements of this Handbook is required by City of Los Angeles Ordinance No. 173,494. The Handbook and ordinances also have specific minimum BMP requirements for all construction activities and require dischargers whose construction projects disturb one acre or more of soil to prepare a SWPPP and file a Notice of Intent (NOI) with the SWRCB. The NOI informs the SWRCB of a particular project and results in the issuance of a Waste Discharger Identification (WDID) number, which is needed to demonstrate compliance with the General Permit.

The City of Los Angeles implements the requirement to incorporate stormwater BMPs through the City's plan review and approval process. During the review process, project plans are reviewed for compliance with the City's General Plan, zoning ordinances, and other applicable local ordinances and codes, including storm water requirements. Plans and specifications are reviewed to ensure that the appropriate BMPs are incorporated to address storm water pollution prevention goals. The Standard Urban Stormwater Mitigation Plan

(SUSMP) provisions that are applicable to new residential and commercial developments include, but are not limited to, the following:[8]

- Peak Storm Water Runoff Discharge Rate: Post-development peak storm water runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak storm water discharge rate will result in increased potential for downstream erosion;

- Provide storm drain system Stenciling and Signage (only applicable if a catch basin is built on-site);

- Properly design outdoor material storage areas to provide secondary containment to prevent spills;

- Properly design trash storage areas to prevent off-site transport of trash;

- Provide proof of ongoing BMP Maintenance of any structural BMPs installed;

Design Standards for Structural or Treatment control BMPs:

- Conserve natural and landscaped areas;

- Provide planter boxes and/or landscaped areas in yard/courtyard spaces;

- Properly design trash storage areas to provide screens or walls to prevent off-site transport of trash; and

- Provide proof on ongoing BMP maintenance of any structural BMPs installed;

Design Standards for Structural or Treatment Control BMPs:

- Post-construction treatment control BMPs are required to incorporate, at minimum, either a volumetric or flow based treatment control design or both, to mitigate (infiltrate, filter or treat) storm water runoff.

In addition, project applicants subject to the SUSMP requirements must select source control and, in most cases, treatment control BMPs from the list approved by the RWQCB. The BMPs must control peak flow discharge to provide stream channel and over bank flood protection, based on flow design criteria selected by the local agency. Further, the source and treatment control BMPs must be sufficiently designed and constructed to collectively treat, infiltrate, or filter stormwater runoff from one of the following:

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[8] City of Los Angeles Stormwater Program website, http://www.lastormwater.org/green-la/standard-urban-stormwater-mitigation-plan/; accessed August 10, 2017.

- The 85th percentile 24-hour runoff event determined as the maximized capture stormwater volume for the area, from the formula recommended in *Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998)*;

- The volume of annual runoff based on unit basin storage water quality volume, to achieve 80 percent or more volume treatment by the method recommended in *California Stormwater Best Management Practices Handbook—Industrial/ Commercial, (1993)*;

- The volume of runoff produced from a 0.75-inch storm event, prior to its discharge to a stormwater conveyance system; or

- The volume of runoff produced from a historical-record based reference 24-hour rainfall criterion for "treatment" (0.75-inch average for the Los Angeles County area) that achieves approximately the same reduction in pollutant loads achieved by the 85th percentile 24-hour runoff event.

Los Angeles Municipal Code

Section 64.70 of the LAMC sets forth the City's Stormwater and Urban Runoff Pollution Control Ordinance. The ordinance prohibits the discharge of the following into any storm drain system:

- Any liquids, solids, or gases which by reason of their nature or quantity are flammable, reactive, explosive, corrosive, or radioactive, or by interaction with other materials could result in fire, explosion, or injury;

- Any solid or viscous materials, which could cause obstruction to the flow or operation of the storm drain system;

- Any pollutant that injures or constitutes a hazard to human, animal, plant, or fish life, or creates a public nuisance.

- Any noxious or malodorous liquid, gas, or solid in sufficient quantity, either singly or by interaction with other materials, which creates a public nuisance, hazard to life, or inhibits authorized entry of any person into the storm drain system; and

- Any medical, infectious, toxic, or hazardous material or waste.

Additionally, unless otherwise permitted by a NPDES permit, the ordinance prohibits industrial and commercial developments from discharging untreated wastewater or untreated runoff into the storm drain system. Furthermore, the ordinance prohibits trash or any other abandoned objects/materials from being deposited such that they could be carried into the storm drains. Lastly, the ordinance not only makes it a crime to discharge pollutants into the storm drain system and imposes fines on violators, but also gives City public

officers the authority to issue citations or arrest business owners or residents who deliberately and knowingly dump or discharge hazardous chemicals or debris into the storm drain system.

Earthwork activities, including grading, are governed by the Los Angeles Building Code, which is contained in LAMC, Chapter IX, Article 1. Specifically, Section 91.7013 includes regulations pertaining to erosion control and drainage devices, and Section 91.7014 includes general construction requirements, as well as requirements regarding flood and mudflow protection.

Low Impact Development (LID)

In October 2011, the City of Los Angeles passed an ordinance (Ordinance No. 181,899) amending LAMC Chapter VI, Article 4.4, Sections 64.70.01 and 64.72 to expand the applicability of the existing SUSMP requirements by imposing rainwater Low Impact Development (LID) strategies on projects that require building permits. The LID ordinance became effective on May 12, 2012.

LID is a stormwater management strategy with goals to mitigate the impacts of increased runoff and stormwater pollution as close to its source as possible. LID promotes the use of natural infiltration systems, evapotranspiration, and the reuse of stormwater. The goal of these LID practices is to remove nutrients, bacteria, and metals from stormwater while also reducing the quantity and intensity of stormwater flows. Through the use of various infiltration strategies, LID is aimed at minimizing impervious surface area. Where infiltration is not feasible, the use of bioretention, rain gardens, green roofs, and rain barrels that will store, evaporate, detain, and/or treat runoff may be used.[9]

The intent of the City of Los Angeles LID standards is to:

- Require the use of LID practices in future developments and redevelopments to encourage the beneficial use of rainwater and urban runoff;
- Reduce stormwater/urban runoff while improving water quality;
- Promote rainwater harvesting;
- Reduce offsite runoff and provide increased groundwater recharge;
- Reduce erosion and hydrologic impacts downstream; and
- Enhance the recreational and aesthetic values in our communities.

[9] LASAN, Watershed Protection Division, City of Los Angeles Low Impact Development Best Management Practices Handbook, May 2016: https://www.lastormwater.org/wp-content/files_mf/lidmanualfinal.pdf

The City of Los Angeles Bureau of Sanitation, Watershed Protection Division has adopted the LID standards as issued by the LARWQCB and the City of Los Angeles Department of Public Works. The LID Ordinance conforms to the regulations outlined in the NPDES Permit and SUSMP.

2.3. GROUNDWATER

Board Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

As noted above, and as required by the CWC, the LARWQCB has adopted the Basin Plan. Specifically, the Basin Plan designates beneficial uses for surface and groundwaters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.

The Basin Plan is a resource for the Regional Board and others who use water and/or discharge wastewater in the Los Angeles Region. Other agencies and organizations involved in environmental permitting and resource management activities also use the Basin Plan. Finally, the Basin Plan provides valuable information to the public about local water quality issues.

Safe Drinking Water Act (SDWA)

The Federal Safe Drinking Water Act, established in 1974, sets drinking water standards throughout the country and is administered by the USEPA. The drinking water standards established in the SDWA are referred to as the National Primary Drinking Water Regulations (Primary Standards, Title 40, CFR Part 141) and the National Secondary Drinking Water Regulations (Second Standards, 40 CFR Part 143). California passed its own Safe Drinking Water Act in 1986 that authorizes the State's Department of Health Services (DHS) to protect the public from contaminants in drinking water by establishing maximum contaminants levels (MCLs), as set forth in the California Code of Regulations (CCR), Title 22, Division 4, Chapter 15, that are at least as stringent as those developed by the USEPA, as required by the federal SDWA.

California Water Plan

The California Water Plan (the Plan) provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs.

The goal for the California Water Plan Update is to meet Water Code requirements, receive broad support among those participating in California's water planning, and be a useful document for the public, water planners throughout the state, legislators and other decision-makers.

3. ENVIRONMENTAL SETTING

3.1. SURFACE WATER HYDROLOGY

3.1.1. REGIONAL

The Project Site is located within the Los Angeles River Watershed in the Los Angeles Central Basin. Groundwater within Los Angeles County is stored in ground water basins underlying five major geographic areas. The Los Angeles River traverses over two of these geographic areas; San Fernando Valley and Coastal Plain. These areas contain three ground water Basins which underlay the river for its entire length; San Fernando Main Basin, Central Basin, and West Coast Basin. The largest basin is the San Fernando Main Basin. The Watershed encompasses a land area of approximately 834 square miles. The eastern portion spans from the Santa Monica Mountains to Simi Hills and in the west from the Santa Susana Mountains to the San Gabriel Mountains. The watershed is shaped by the path of the Los Angeles River, which flows from its headwaters in the mountains eastward toward the northern corner of Griffith Park. There the channel turns southward through Glendale Narrows before it flows across the coastal plan and into San Pedro Bay at Long Beach. The Los Angeles River has evolved from an uncontrolled, meandering river providing a valuable source of water for early inhabitants to a major flood protection waterway. The City of Los Angeles River Watershed Section is tasked with finding ways to restore or revitalize the channels within the watershed and thereby provide significant opportunities for recreation and aesthetic improvement for the Los Angeles metropolitan area while protecting the Los Angeles Basin from major flooding. Refer to Figure 1 for Los Angeles River Watershed Map.

3.1.2. LOCAL

Underground storm drainage facilities are located off-site along Bay Street and Sacramento Street and are owned and maintained by the City of Los Angeles. Stormwater runoff from the Project Site discharges into the curb and gutter which conveys stormwater to nearby street storm inlets. The storm inlets collect the stormwater into the underground storm drain system before discharge to the Los Angeles River. The Los Angeles River flows generally south, ultimately discharging into the Pacific Ocean at San Pedro Bay, near Long Beach. The Los Angeles River has evolved from an uncontrolled, meandering river providing a valuable source of water for early inhabitants to a major flood protection waterway.[10]

[10] https://www.ladpw.org/wmd/watershed/LA/; accessed August 2, 2019

3.1.3. ON SITE

The existing Project Site is currently occupied by three existing buildings, a paved parking lot, and paved courtyards. About a third of the Project Site sheet flows to the northwest into the Bay Street street gutter. The remaining two thirds of the Project Site flow to the south and discharge into the Sacramento Street street gutter through a combination of curb drain/weep holes. Refer to Figure 2 for existing on-site drainage pattern.

Figure 2 shows all the input parameters used for analyzing the existing site. Table 1 shows the existing volumetric flow rate generated by a 50-year storm event.

Table 1- Existing Drainage Stormwater Runoff Calculations		
Drainage Area	Area (Acres)	Q50 (cfs) (volumetric flow rate measured in cubic feet per second)
Sub-Area A1 (Drains to Bay)	0.21	0.66
Sub-Area A2 (Drains to Bay)	0.42	1.32
BAY STREET TOTAL	**0.63**	**1.98**
Sub-Area B1 (Drains to Sacramento)	0.56	1.76
Sub-Area B2 (Drains to Sacramento)	0.51	1.60
SACRAMENTO STREET TOTAL	**1.07**	**3.36**
SITE TOTAL	**1.70**	**5.34**

3.2. SURFACE WATER QUALITY

3.2.1. REGIONAL

As stated above, the Project Site lies within the Los Angeles River Watershed. Constituents of concern listed for Los Angeles River under California's Clean Water Act Section 303(d) List for Reach 3 include ammonia, Trash, indicator bacteria, copper, toxicity, and nutrients (algae). No TMDL data have been recorded by EPA for this waterbody.[11]

3.2.2. LOCAL

In general, urban stormwater runoff occurs following precipitation events, with the volume of runoff flowing into the drainage system depending on the intensity and duration of the rain event. Contaminants that may be found in stormwater from developed areas include sediments, trash, bacteria, metals, nutrients, organics and pesticides. The source of contaminants includes surface areas where precipitation falls, as well as the air through which it falls. Contaminants on surfaces such as roads, maintenance areas, parking lots,

[11] https://www.waterboards.ca.gov/losangeles/water_issues/programs/303d/2016/Revised%20Appendix_B.shtml; accessed August 27, 2019.

and buildings, which are usually contained in dry weather conditions, may be carried by rainfall runoff into drainage systems. The City typically installs catch basins with screens to capture debris before entering the storm drain system. In addition, the City conducts routine street cleaning operations, as well as periodic cleaning and maintenance of catch basins, to reduce stormwater pollution within the City.

3.2.3. ON SITE

A site investigation of the Project Site did not disclose any Best Management Practices (BMPs). The Project Site apparently has no means of treatment for stormwater runoff. Refer to Figure 2 for the existing on-site drainage pattern.

3.3. GROUNDWATER HYDROLOGY

3.3.1. REGIONAL

Groundwater use for domestic water supply is a major beneficial use of groundwater basins in Los Angeles County. The City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin (Basin). The Basin is comprised of the Hollywood, Santa Monica, Central, and West Coast Subbasins. Groundwater flow in the Basin is generally south-southwesterly and may be restricted by natural geological features. Replenishment of groundwater basins occurs mainly by percolation of precipitation throughout the region via permeable surfaces, spreading grounds, and groundwater migration from adjacent basins, as well as injection wells designed to pump freshwater along specific seawater barriers to prevent the intrusion of salt water.

3.3.2. LOCAL

The Project Site specifically overlies northeastern portion of the Central Subbasin. The Central Subbasin is bounded on the north by a surface divide called the La Brea high, and on the northeast and east by emergent less permeable Tertiary rocks of the Elysian, Repetto, Merced and Puente Hills. The southeast boundary between Central Basin and Orange County Groundwater Basin roughly follows Coyote Creek, which is a regional drainage province boundary. The southwest boundary is formed by the Newport Inglewood fault system and the associated folded rocks of the Newport Inglewood uplift..[12]

Groundwater in the Subbasin is replenished by percolation of precipitation and stream flow from the Santa Monica Mountains to the north. Over time, urbanization has decreased the amount of pervious surfaces limiting natural recharge through direct percolation. The natural safe yield of the Subbasin is estimated to be approximately 3,000 acre-feet per year (AFY).

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[12] http://www.water.ca.gov/groundwater/bulletin118/basindescriptions/4-11.04.pdf

3.3.3. ON-SITE

The existing Project Site is improved with three existing buildings, and existing paved areas used for industrial activities and storage, and therefore, does not contribute to groundwater recharge.

The Seismic Hazard Report for the Los Angeles 7-1/2 Minute Quadrangle indicated the historic-high groundwater level for the Project Site is in the order of 170 feet below the ground surface Groundwater was not encountered above 80 feet during explorations performed in the vicinity of the Project Site.[13]

3.4. GROUNDWATER QUALITY

3.4.1. REGIONAL

As stated above, the City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin, which falls under the jurisdiction of the LARWQCB. According to LARWQCB's Basin Plan, water quality objectives applying to all ground waters of the region include bacteria, chemical constituents and radioactivity, mineral quality, nitrogen (nitrate, nitrite), and taste and odor.[14]

3.4.2. LOCAL

As stated above, the Project Site specifically overlies the Central Subbasin. Based upon LARWQCB's Basin Plan, constituents of concern listed for the Central Subbasin include boron, chloride, sulfate, and Total Dissolved Solids (TDS).

3.4.3. ON-SITE

The existing Project Site is fully improved with existing buildings, an existing paved parking lot and paved courtyards, and therefore, does not contribute to groundwater recharge. Therefore, the existing Project Site does not contribute to groundwater pollution or otherwise adversely impact groundwater quality.

Other types of risk such as underground storage tanks have a greater potential to impact groundwater. Ramboll Environ recently prepared a Phase I Environment Site Assessment Report (Phase I ESA). In the report, it was noted that previous land uses included chemical manufacturing and storage, automotive repair operations and storage, insulation and waterproofing fabrication, battery manufacturing, floor cement manufacturing, and laundry-related operations. All these uses indicate the potential presence of historical

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[13] Preliminary Geotechnical Assessment – Proposed Commercial Development; 2159 Bay Street, Los Angeles, November 21, 2017

[14] Los Angeles Regional Water Quality Control Board, Basin Plan, March 2013, http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/electronics_documents/Final%20Chapter%203%20Text.pdf accessed August 10, 2017

underground storage tanks. At least one UST for diesel storage was identified and removed in or about 1990.[15]

Ramboll subsequently performed a Limited Phase II Subsurface Investigation that included a limited geophysical survey and 19 borings for collection of soils samples. Five of these borings were performed in the vicinity of the former UST as well as groundwater sampling. The report concluded that the results of the sampling performed did not indicate that significant subsurface impacts exist beneath the existing building footprints. Given the low concentrations of VOCs and TPH reported in the groundwater, no active remediation is warranted although limited monitoring may be required by the appropriate regulatory agency.[16]

4. SIGNIFICANCE THRESHOLDS

4.1. SURFACE WATER HYDROLOGY

Appendix G of the State of California's CEQA Guidelines provides a set of sample questions that address impacts with regard to surface water hydrology. These questions are as follows:

Would the project:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

  i. result in substantial erosion or siltation on- or off-site;

  ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

  iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

  iv. impede or redirect flood flows;

- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.

[15] Phase I Environmental Site Assessment Report, 2145-2161 Sacramento Street, 2136 & 2159 Bay Street, Los Angeles, California 90021, April 22, 2016

[16] Limited Phase II Subsurface Investigation, 2145-2161 Sacramento Street, 2136 & 2159 Bay Street, Los Angeles, California 90021, October 5, 2016

In the context of these questions from Appendix G of the CEQA Guidelines, the City of Los Angeles CEQA Thresholds Guide (*L.A. CEQA Thresholds Guide*) states that a project would normally have a significant impact on surface water hydrology if it would:

- Cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources;
- Substantially reduce or increase the amount of surface water in a water body; or
- Result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow.

4.2. SURFACE WATER QUALITY

Appendix G of the CEQA Guidelines provides a set of sample questions that address impacts with regard to surface water quality. These questions are as follows:

Would the project:

- Violate any water quality standard or waste discharge requirements or otherwise substantially degrade surface or ground water quality; or
- Conflict with or obstruct implementation of a water quality control plan or .

In the context of the above questions from Appendix G, the *L.A. CEQA Thresholds Guide* states that a project would normally have a significant impact on surface water quality if it would result in discharges that would create pollution, contamination or nuisance, as defined in Section 13050 of the 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 CWC includes the following definitions:

- "Pollution" means an alteration of the quality of the waters of the state to a degree which unreasonably affects either of the following: 1) the waters for beneficial uses or 2) facilities which serve these beneficial uses. "Pollution" may include "Contamination".
- "Contamination" means an impairment of the quality of the waters of the state by waste to a degree, which creates a hazard to the public health through poisoning or though the spread of disease. "Contamination" includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected.
- "Nuisance" means anything which meets all of the following requirements: 1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; 2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage

inflicted upon individuals may be unequal; and 3) occurs during, or as a result of, the treatment or disposal of wastes.[17]

4.3. GROUNDWATER HYDROLOGY

Appendix G of the CEQA Guidelines provides sample questions that addresses impacts with regard to groundwater. The questions are as follows:

Would the project:

- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;

- Conflict with or obstruct implementation of a sustainable groundwater management plan.

In the context of the above question from Appendix G, the *L.A. CEQA Thresholds Guide* states that a project would normally have a significant impact on groundwater if it would:

- Change potable water levels sufficiently to:

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

    - Reduce yields of adjacent wells or well fields (public or private); or

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

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

4.4. GROUNDWATER QUALITY

With respect to groundwater quality, and in the context of the above questions from Appendix G pertaining to groundwater, the *L.A. CEQA Thresholds Guide* states that a project would normally have a significant impact on groundwater quality if it would:

- Affect the rate or change the direction of movement of existing contaminants;

- Expand the area affected by contaminants;

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[17] City of Los Angeles.LA. CEQA Thresholds Guide. 2006 http://www.environmentla.org/programs/Thresholds/Complete%20Threshold%20Guide%202006.pdf

- Result in an increased level of groundwater contamination (including that from direct percolation, injection or salt water intrusion); or

- Cause regulatory water quality standards at an existing production well to be violated, as defined in the California Code of Regulations (CCR), Title 22, Division 4, and Chapter 15 and in the Safe Drinking Water Act.

5. METHODOLOGY

5.1. SURFACE WATER HYDROLOGY

The Project Site is located within the City of Los Angeles, and drainage collection, treatment and conveyance are regulated by the City. Per the City's Special Order No. 007-1299, December 3, 1999, the City has adopted the Los Angeles County Department of Public Works (LACDPW) Hydrology Manual as its basis of design for storm drainage facilities. The LACDPW Hydrology Manual requires projects to have drainage facilities that meet the Urban Flood level of protection. The Urban Flood is runoff from a 25-year frequency design storm falling on a saturated watershed. A 25-year frequency design storm has a probability of 1/25 of being equaled or exceeded in any year. The *L.A. CEQA Thresholds Guide*, however, establishes the 50-year frequency design storm event as the threshold to analyze potential impacts on surface water hydrology as a result of development. To provide a more conservative analysis, this report analyzes the larger storm event threshold, i.e., the 50-year frequency design storm event.

The Modified Rational Method was used to calculate storm water runoff. The "peak" (maximum value) runoff for a drainage area is calculated using the formula, **Q = CIA**

Where,

Q = Volumetric flow rate (cfs)

C = Runoff coefficient (dimensionless)

I = Rainfall Intensity at a given point in time (in/hr)

A = Basin area (acres)

The Modified Rational Method assumes that a steady, uniform rainfall rate will produce maximum runoff when all parts of the basin area are contributing to outflow. This occurs when the storm event lasts longer than the time of concentration. The time of concentration (Tc) is the time it takes for rain in the most hydrologically remote part of the basin area to reach the outlet.

The method assumes that the runoff coefficient (C) remains constant during a storm. The runoff coefficient is a function of both the soil characteristics and the percentage of impervious surfaces in the drainage area.

LACDPW has developed a time of concentration calculator, Hydrocalc, to automate time of concentration calculations as well as the peak runoff rates and volumes using the Modified Rational Method design criteria as outlined in the Hydrology Manual. The data input requirements include: sub-area size, soil type, land use, flow path length, flow path slope and rainfall isohyet. The Hydrocalc Calculator was used to calculate the storm water peak runoff flow rate for the Project conditions by evaluating an individual sub-area independent of all adjacent subareas. See Figure 4 for the Hydrocalc Calculator results and Figure 7 for the Isohyet Map.

5.2. SURFACE WATER QUALITY

5.2.1. CONSTRUCTION

Construction BMPs will be designed and maintained as part of the implementation of the local SWPPP (Erosion Control Plan) in compliance with the General Permit. The Erosion Control Plan shall be implemented when construction commences and, before any site clearing or demolition activity. During construction, the Erosion Control Plan will be referred to regularly and amended as changes occur throughout the construction process.

5.2.2. OPERATION

The Project would meet the requirements of the City's LID standards.[18] Under section 3.1.3. of the LID Manual, post-construction stormwater runoff from a new development must be infiltrated, evapotranspirated, captured and used, and/or treated through high efficiency BMPs onsite for at least the volume of water produced by the greater of the 85th percentile storm or the 0.75 inch storm event. The LID Manual prioritizes the selection of BMPs used to comply with stormwater mitigation requirement. The order of priority is:

1. Infiltration Systems:
2. Stormwater Capture and Use:
3. High Efficient Biofiltration/Bioretention Systems;
4. Combination of Any of the Above.

Feasibility screening delineated in the LID manual is applied to determine which BMP will best suit the Project. Specifically, LID guidelines require that infiltration systems maintain at least 10 feet of clearance to the groundwater, property line, and any building structure. Per the Project Geotechnical Report, groundwater was not encountered during Site investigation.

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[18] The Development Best Management Practices Handbook, Part B Planning Activities, 5th edition was adopted by the City of Los Angeles, Board of Public Works on May 9, 2016 to reflect Low Impact Development (LID) requirements that took effect May 12, 2012.

The groundwater level is at least 80 feet below the ground surface.[19] The Project's planned depth of approximately 42 feet below the ground surface. Infiltration is considered feasible only if infiltration disposal is located at least 10 feet below the bottom of the proposed foundation system. Therefore, infiltration could potentially occur within a 28-foot zone under the proposed building.

Based on the size of the Project Site, the LID system implemented would be required to mitigate 41,549 gallons of stormwater runoff generated by the design storm event. If infiltration is infeasible, stormwater capture and use will likely be required. Approximately 6,200 square feet of landscaping would be required to justify the feasibility of a stormwater Capture and Use system per LID guidelines. However, if capture and use is not feasible, the Project would then be required to implement High Efficiency Biofiltration/Bioretention Systems. In that case, 5,127 square feet of Biofiltration Planter would be required on the structure. See Figure 6 for LID calculations.

According to the City's LID Handbook, the mitigated volume generated from the greater of the 85th percentile storm and the 0.75-inch storm event at a minimum is captured as follows:

Vdesign (gallons) = (85th percentile or 0.75 inch * 7.48 gallons/cubic foot) * Catchment Area (sq. ft.)

Where:

Catchment Area = (Impervious Area x 0.9) + [(Pervious Area + Undeveloped Area) x 0.1]

For catchment areas given in acres, multiply the above equation by 43,560 sq. ft./acre.

5.3. GROUNDWATER

The significance of this Project as it relates to the level of the underlying groundwater table of the Central Subbasin Groundwater Basin included a review of the following considerations:

Analysis and Description of the Project's Existing Condition

- Identification of the Central Subbasin as the underlying groundwater basin, and description of the level, quality, direction of flow, and existing uses for the water;
- Description of the location, existing uses, production capacity, quality, and other pertinent data for spreading grounds and potable water wells in the vicinity (usually within a one-mile radius), and;

[19] Preliminary Geotechnical Assessment – Proposed Commercial Development; 2159 Bay Street, Los Angeles, November 21, 2017

- Area and degree of permeability of soils on the Project Site; and

Analysis of the Proposed Project Impact on Groundwater Level

- Description of the rate, duration, location and quantity of extraction, dewatering, spreading, injection, or other activities;

- The projected reduction in groundwater resources and any existing wells in the vicinity (usually within a one-mile radius); and

- The projected change in local or regional groundwater flow patterns.

In addition, this report discusses the impact of both existing and proposed activities at the Project Site on the groundwater quality of the underlying Central Subbasin.

Short-term groundwater quality impacts could potentially occur during construction of the Project as a result of soil being exposed to construction materials, wastes, and spilled materials. These potential impacts are qualitatively assessed.

6. PROJECT IMPACT ANALYSIS

6.1. CONSTRUCTION

6.1.1. SURFACE WATER HYDROLOGY

Construction activities for the Project would include demolition of the existing parking lot, excavating down approximately 42 feet for subterranean parking, building the high-rise building, and constructing hardscape and landscape around the building. These activities have the potential to temporarily alter existing drainage patterns and flows on the Project Site by exposing the underlying soils, modifying flow direction, and making the Project Site temporarily more permeable. Also, exposed and stockpiled soils could be subject to erosion and conveyance into nearby storm drains during storm events. In addition, on-site watering activities to reduce airborne dust could contribute to pollutant loading in runoff.

As noted above, the Project would implement an Erosion Control Plan that specifies BMPs and erosion control measures to be used during construction to manage runoff flows and prevent pollution. BMPs would be designed to reduce runoff and pollutant levels in runoff during construction. The Erosion Control Plan measures are designed to (and would in fact) contain and treat, as necessary, stormwater or construction watering on the Project Site so runoff does not impact off-site drainage facilities or receiving waters. Construction activities are temporary and flow directions and runoff volumes during construction will be controlled.

In addition, the Project would be required to comply with all applicable City grading permit regulations that require necessary measures, plans, and inspections to reduce sedimentation and erosion. Thus, through compliance with all NPDES General Construction Permit requirements, implementation of BMPs, and compliance with applicable City grading regulations, the Project would not substantially alter the Project Site drainage patterns in a manner that would result in substantial erosion, siltation, or flooding on- or off-site. Similarly, adherence to standard compliance measurements in construction activities would ensure that construction of the Project would not cause flooding, substantially increase or decrease the amount of surface water flow from the Project Site into a water body, or result in a permanent, adverse change to the movement of surface water. Therefore, construction-related impacts to surface water hydrology would be less than significant.

6.1.2. SURFACE WATER QUALITY

Construction activities such as earth-moving, maintenance/operation of construction equipment, potential dewatering, and handling/storage/disposal of materials could contribute to pollutant loading in stormwater runoff.

As discussed below, the Project is not expected to require dewatering during construction. Dewatering operations are practices that discharge non-stormwater, such as groundwater, that must be removed from a work location to proceed with construction into the drainage system. Discharges from dewatering operations can contain high levels of fine sediments, which if not properly treated, could lead to exceedance of the NPDES requirements. If groundwater is encountered during construction, temporary pumps and filtration would be utilized in compliance with the NPDES permit. Any such temporary system would comply with all relevant NPDES requirements related to construction and discharges from dewatering operations.

With implementation of the Erosion Control Plan, site-specific BMPs would reduce or eliminate the discharge of potential pollutants from stormwater runoff. In addition, the Project Applicant would be required to comply with City grading permit regulations and inspections to reduce sedimentation and erosion. Construction of the Project would not result in discharge that would cause: (1) pollution which would alter the quality of the water of the State (i.e., Los Angeles River) to a degree which unreasonably affects beneficial uses of the waters; (2) contamination of the quality of the water of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of diseases; or (3) nuisance that would be injurious to health; affect an entire community or neighborhood, or any considerable number of persons; and occurs during or as a result of the treatment or disposal of wastes. Furthermore, construction of the Project would not result in discharges that would cause regulatory standards to be violated in the Los Angeles River Watershed. Therefore, temporary construction-related impacts on surface water quality would be less than significant.

6.1.3. GROUNDWATER HYDROLOGY

As stated above, construction activities for the Project would include excavating down for subterranean parking, building up the structure, and hardscape and landscape around the structure. The highest groundwater level in the vicinity of the Project site was at least 80 feet below grade. The Project's proposed excavation would not reach either this depth, and it is therefore not expected that groundwater would be encountered during construction that would require either temporary or permanent dewatering operations. If groundwater is encountered during construction, temporary pumps and filtration would be utilized in compliance all applicable regulations and requirements, including with all relevant NPDES requirements related to construction and discharges from dewatering operations. Therefore, the Project would result in less than significant impacts related to groundwater and would not substantially deplete groundwater supplies in a manner that would result in a net deficit in aquifer volume or lowering of the local groundwater table.

6.1.4. GROUNDWATER QUALITY

As discussed above, the Project would include excavations for subterranean parking. The Project would also result in a net export of existing soil material. Although not anticipated at the Project Site, any contaminated soils found would be captured within that volume of excavated material, removed from the Project Site, and remediated at an approved disposal facility in accordance with regulatory requirements.

During on-site grading and building construction, hazardous materials, such as fuels, paints, solvents, and concrete additives, could be used and would therefore require proper management and, in some cases, disposal. The management of any resultant hazardous wastes could increase the opportunity for hazardous materials releases into groundwater. Compliance with all applicable federal, state, and local requirements concerning the handling, storage and disposal of hazardous waste, would reduce the potential for the construction of the Project to release contaminants into groundwater that could affect existing contaminants, expand the area or increase the level of groundwater contamination, or cause a violation of regulatory water quality standards at an existing production well. In addition, as there are no groundwater production wells or public water supply wells within one mile of the Project Site, construction activities would not be anticipated to affect existing wells. Therefore, the Project would not result in any substantial increase in groundwater contamination through hazardous materials releases and impacts on groundwater quality would be less than significant.

6.2. OPERATION

6.2.1. SURFACE WATER HYDROLOGY

In the existing condition, based upon a site visit, the Project Site is approximately 100% impervious. The site visit did not disclose any filtration system for the surface waters discharged from the Project Site. Considering the Project will develop a building and paved areas that cover virtually the entire surface area of the Project Site, the post-project

condition will also be approximately 100% impervious. Though the proposed landscaping/planters will technically reduce the imperviousness of the Project Site, a more conservative analysis assumes 100% imperviousness in the proposed condition. Accordingly, there is virtually no incremental increase or decrease in the imperviousness of the Project Site that would substantially increase runoff volumes into the existing storm drain system. Therefore, peak flow rates would not change.

Table 2 shows the proposed 50-year frequency design storm event peak flow rate within the Project Site. Table 3 shows a comparison of the pre- and post-peak flow rates, and indicates the changes in stormwater runoff flow rates in Sacramento Street and Bay Street.

Table 2- Proposed Drainage Stormwater Runoff Calculations (Without Stormwater Detention)

Drainage Area	Area (Acres)	Q50 (cfs) (volumetric flow rate measured in cubic feet per second)
Sub-Area F1 (Drains to Bay)	0	0
Sub-Area F2 (Drains to Sacramento)	1.70	5.34
TOTAL	**1.70**	**5.34**

Table 3 – Existing and Proposed Drainage Stormwater Runoff Comparison (Without Stormwater detention)

Drainage Area	Pre-Project Q_{50} (cfs) (volumetric flow rate measured in cubic feet per second)	Post-Project Q_{50} (cfs) (volumetric flow rate measured in cubic feet per second) Without detention	Incremental Increase from Existing to Proposed Condition
BAY STREET TOTAL	1.98	0	(-100%)
SACRAMENTO STREET TOTAL	3.36	5.34	+59%
TOTAL	**5.34**	**5.34**	**+0%**

In the existing condition, hardscape sheet flows into offsite catch basins and is discharged into the public storm drain system. The post-Project condition will manage stormwater flow to discharge points at the curb face which will discharge the stormwater to the public storm drain system. Therefore, the Project would not cause flooding during a 50-year storm event or result in an adverse change to the movement of surface water on the Project Site.

As noted above, the Project would not increase the total rate or total volume of stormwater runoff. Though the distribution of stormwater discharge between Bay Street and Sacramento Street has changed, both streets drainage is connected to the same 28-inch storm drain pipe located in the public alley East of Santa Fe Avenue. There is no net change to the amount of water entering the public storm drain system. However, the storm drain in Sacramento Street collecting runoff is 15" in diameter, its discharge capacity is insufficient to drain the existing runoff flow (estimated at 11.6 cubic feet per second). To avoid increasing the runoff flow directed by the Project to the Sacramento street drain, the Project will include as a Project design feature an on-site storm runoff detention system sized to hold flow rates in excess of 3.36 cfs for the 50-year storm event. Table 4 shows a comparison of the pre- and post-peak flow rates and indicates that with on-site storm water detention, there would be no increase in stormwater runoff.

Table 4– Existing and Proposed Drainage Stormwater Runoff Comparison (With Stormwater Detention)

Drainage Area	Pre-Project Q_{50} (cfs) (volumetric flow rate measured in cubic feet per second)	Post-Project Q_{50} (cfs) (volumetric flow rate measured in cubic feet per second) <u>With detention</u>	Incremental Increase from Existing to Proposed Condition
BAY STREET TOTAL	1.98	0	(-100%)
SACRAMENTO STREET TOTAL	3.36	3.36	+0%
TOTAL	**5.34**	**3.36**	**-37%**

In other words, the Project would not substantially reduce or increase the amount of surface water discharged into the existing infrastructure or any waterbody. Therefore, impacts related to stormwater infrastructure improvements would be less than significant.

A portion of the Project Site would be allocated for stormwater BMPs intended to control and treat stormwater runoff in compliance with LID requirements. The Project would implement infiltration, capture and use, and/or high-efficiency biofiltration/bioretention systems. The Project BMPs will control stormwater runoff with no increase in runoff resulting from the Project. Refer to Exhibit 2 for typical LID BMPs. The Project would not impact existing storm drain infrastructure serving the Project Site. Runoff discharge to Bay Street would be eliminated. All project runoff directed to Sacramento Street would continue to follow the same discharge path and drain to the same stormwater system.

Consequently, the Project would not cause flooding during the 50-year developed storm event, would not create runoff which would exceed the capacity of existing or planned

drainage systems, would not require construction of new stormwater drainage facilities or expansion of existing facilities, would not substantially reduce or increase the amount of surface water in a water body, or result in a permanent adverse change to the movement of surface water. Therefore, potential operational impacts to site surface water hydrology would be less than significant.

The project is not located within an area that could be impacted by a seiche, tsunami or mudflow. A seiche is an oscillation of a body of water in an enclosed or semi-enclosed basin, such as a reservoir, harbor, lake, or storage tank. A tsunami is a great sea wave, commonly referred to as a tidal wave, produced by a significant undersea disturbance such as tectonic displacement associated with large, shallow earthquakes. Mudflows result from the downslope movement of soil and/or rock under the influence of gravity.

The Project Site is located approximately 14 miles east of the Pacific Ocean. In addition, the Safety Element of the General Plan does not map the Project Site as being located within an area potentially affected by a tsunami. The Los Angeles River is located approximately 250- feet to the east, but includes a sunken concrete lined channel and there are no major water-retaining structures are located immediately up-gradient from the Project Site. Thus, inundation as a result of seiche is considered unlikely. As discussed above, the Project Site and surrounding area are fully developed and generally characterized by flat topography. Given the fact that the Project Site is not mapped by either the State or the City as being located in an area prone to landslides, the potential for the Project Site to be inundated by mudflows is low. Therefore, no seiche, tsunami, or mudflow events would be expected to impact the Project Site. Impacts would be less than significant and no mitigation measures would be required.

FIMA FIRM map indicates (Figure 8) the Project Site is not located within a 100-year flood plain. However according to the "Los Angeles County Drainage Area Review Final Feasibility Report" dated February 1992 by the U.S. Army Corps of Engineers, the project site may be subject to a 100-year flood due to a limitation in the capacity of the Los Angeles River channel**.**

The nearest levee is along the Los Angeles River located approximately 250 feet east of the Project Site. The US Army Corps of Engineers operates and maintains the 22.5 mile stretch of the Los Angeles River between Lankershim Boulevard in Hollywood and Stuart and Grey Road in Downey, which includes the portion adjacent to the project site. Their maintenance activities include inspection and cleaning of the channel walls and removing vegetation growing in cracks and joints. In 2017 they awarded a contract for the repair of a damage embankment in Reach 4D of the Los Angeles River Flood Control Channel. Previously, HESCO barriers were installed in parts of the Channel identified as at greatest risk of flood waters during the 2015/2016 El Nino storm season. Given that the Army Corps of Engineers is taking an active role in identifying areas in need of repair and flood mitigation and that the area nearest the Project Site has not been identified in need of improvement, as well as the fact that active improvements are taking place upstream of the Project Site, the risk to the proposed development related to inundation or due to levee

failure is less than significant[20]. Nonetheless, as a Project design feature, to provide additional protection against flooding, the building finish floor will be raised two feet above the existing grade on Bay Street, and approximately 4 feet above existing grade on Sacramento Street.

6.2.2. SURFACE WATER QUALITY

The Project Site will not increase concentrations of the items listed as constituents of concern for the Los Angeles River Watershed.

Due to the incorporation of the required LID BMP(s), operation of the Project would not result in discharges that would cause: (1) pollution which would alter the quality of the waters of the State (i.e., Los Angeles River) to a degree which unreasonably affects beneficial uses of the waters; (2) contamination of the quality of the waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of diseases; or (3) nuisance that would be injurious to health; affect an entire community or neighborhood, or any considerable number of persons; and occurs during or as a result of the treatment or disposal of wastes.

As is typical of most urban developments, stormwater runoff from the Project Site has the potential to introduce pollutants into the stormwater system. Anticipated and potential pollutants generated by the Project are sediment, nutrients, pesticides, metals, pathogens, and oil and grease. The pollutants listed above are expected to, and would in fact, be mitigated through the implementation of approved LID BMPs.

Furthermore, operation of the Project would not result in discharges that would cause regulatory standards to be violated. The existing Project Site is approximately 100% impervious. The Project will maintain the same percentage of impervious surface. However, a portion of the Project Site will be allocated for stormwater BMPs specifically intended to control and treat stormwater runoff in compliance with LID requirements. As stated above, a site investigation of the existing conditions did not disclose any means of treatment for the discharges of the stormwater runoff. However, the Project would include the installation of LID BMPs, which would mitigate at minimum the first flush or the equivalent of the greater between the 85th percentile storm and first 0.75-inch of rainfall for any storm event. The installed BMP systems will be designed with an internal bypass or overflow system to prevent upstream flooding due to large storm events. The stormwater which bypasses the BMP systems would discharge to Sacramento Street, at an approved discharge point in the public right-of-way.

As a result of the implementation of the LID BMPs, the operational impacts on surface water quality would be less than significant.

[20] US Army Corps of Engineers, http://www.spl.usace.army.mil/Missions/Asset-Management/Los-Angeles-River/

6.2.3. GROUNDWATER HYDROLOGY

Regarding groundwater recharge, the entire Project Site is virtually impervious in the existing condition, and there is minimal groundwater recharge potential. The Project will develop hardscape and structures that cover virtually the entire Project Site with impervious surfaces, and therefore the groundwater recharge potential will remain minimal. As stated above, the stormwater which bypasses the BMP systems would discharge to an approved discharge point in the public right-of-way and not result in infiltration of a large amount of rainfall that would affect groundwater hydrology, including the direction of groundwater flow. Therefore, the Project's potential impact on groundwater recharge is less than significant.

As discussed above, Project development would require excavations for the subterranean parking. As described in the Preliminary Geotechnological Assessment by Geotechnologies, Inc. for the Project Site, the historic high groundwater level in the vicinity of the Project site was at least 170 feet below grade, and the highest groundwater level encountered in the vicinity of the Project site was at least 80 feet below grade.[21] Due to the fact that the Project's excavation would not reach this depth, it is not expected that groundwater would be encountered during construction that would require either temporary or permanent dewatering operations. However, if groundwater is encountered during construction, temporary pumps and filtration would be utilized in compliance with the NPDES permit. The temporary system would comply with all relevant NPDES requirements related to construction and discharges from dewatering operations. Furthermore, there are no existing wells or spreading grounds within one mile of the Project Site and the Project would not include new injection or supply wells. Based on the above, operation of the Project would result in a less than significant impact on groundwater hydrology, including groundwater levels.

6.2.4. GROUNDWATER QUALITY

The Project does not include the installation or operation of water wells, or any extraction or recharge system that is in the vicinity of the coast, an area of known groundwater contamination or seawater intrusion, a municipal supply well or spreading ground facility.

Operational activities which could affect groundwater quality include spills of hazardous materials and leaking underground storage tanks. No underground storage tanks are currently operated or will be operated by the Project. In addition, while the development of new building facilities would slightly increase the use of on-site hazardous materials as described above, compliance with all applicable existing regulations at the Project Site regarding the handling and potentially required cleanup of hazardous materials would prevent the Project from affecting or expanding any potential areas of contamination, increasing the level of contamination, or causing regulatory water quality standards at an existing production well to be violated, as defined in the California Code of Regulations, Title 22, Division 4, Chapter 15 and the Safe Drinking Water Act. Furthermore, as

[21] Preliminary Geotechnical Assessment – Proposed Commercial Development; 2159 Bay Street, Los Angeles, November 21, 2017

described above, operation of the Project would not require extraction from the groundwater supply based on the depth of excavation for the proposed uses and the depth of groundwater below the Project Site.

The Project is not anticipated to result in releases or spills of contaminants that could reach a groundwater recharge area or spreading ground or otherwise reach groundwater through percolation. The Project does not involve drilling to or through a clean or contaminated aquifer. Therefore, the Project's potential impact on groundwater recharge is less than significant.

6.3. Cumulative Impact Analysis

6.3.1. Surface Water Hydrology

The geographic context for the cumulative impact analysis on surface water hydrology is the Los Angeles River Watershed. The Project in conjunction with forecasted growth in the Los Angeles River Watershed could cumulatively increase stormwater runoff flows. Without detailed drainage plans it is not possible to determine whether any of the related projects would discharge stormwater into the same storm drainage facilities as the Project. However, in accordance with City requirements, the Project and related projects would be required to implement BMPs to manage stormwater runoff in accordance with LID guidelines. Furthermore, the City of Los Angeles Department of Public Works reviews projects on a case-by-case basis to ensure sufficient local and regional infrastructure is available to accommodate stormwater runoff. Moreover, the Project would result in reduced stormwater runoff as compared to existing conditions. Therefore, potential cumulative impacts associated with the Project on surface water hydrology would be less than significant and the Project's contribution would not be considerable.

6.3.2. Surface Water Quality

Future growth in the Los Angeles River Watershed would be subject to NPDES requirements relating to water quality for both construction and operation. In addition, since the Project Site is located in a highly urbanized area, future land use changes or development are not likely to cause substantial changes in regional surface water quality. As noted above, the Project does not have an adverse impact on water quality, and would in fact improve the quality of on-site flows due to the introduction of new BMPs that would collect, treat, and discharge flows from the Project Site (which are not being treated under existing conditions). Also, it is anticipated that the Project and other future development projects would also be subject to LID requirements and implementation of measures to comply with total maximum daily loads. Increases in regional controls associated with other elements of the MS4 Permit would improve regional water quality over time. Therefore, based on the fact that the Project would not have an adverse impact, and given compliance with all applicable laws, rules and regulations, cumulative impacts to surface water quality would be less than significant.

6.3.3. GROUNDWATER HYDROLOGY

The geographic context for the cumulative impact analysis on groundwater level is the Central Subbasin. No water supply wells, spreading grounds, or injection wells are located within a one mile radius of the Project Site and the Project would not have an adverse impact on groundwater levels. The Projects is located in a highly urbanized area so any potential reduction or increase in groundwater would be minimal in the context of the regional groundwater basin. Therefore, cumulative impacts to groundwater hydrology would be less than significant.

Furthermore, as previously discussed, implementation of the Project would result in negligible change in impervious surface area. Development of the related projects could result in changes in impervious surface area within their respective project sites. While any calculation of the extent to which the related projects would increase or decrease impervious or pervious surfaces that might affect groundwater hydrology would be speculative, the development of such related projects would be subject to review and approval pursuant to all applicable regulatory requirements, including any required mitigation of potential groundwater hydrology impacts. In addition, as the related projects are located in a highly urbanized area, any potential reduction in groundwater recharge due to the overall net change in impervious area within the area encompassed by the related project sites would be minimal in the context of the regional groundwater basin, and would thus not result in a significant cumulative effect to groundwater hydrology.

Based on the above, cumulative impacts to groundwater hydrology would be less than significant.

6.3.4. GROUNDWATER QUALITY

Future growth in the Central Subbasin would be subject to LARWQCB requirements relating to groundwater quality. The Project would not expand any potential areas of contamination, increasing the level of contamination, or cause regulatory water quality standard violations, as defined in the California Code of Regulations, Title 22, Division 4, Chapter 15 and the Safe Drinking Water Act. The Project would comply with all applicable laws, rules and regulations, so cumulative impacts to surface water quality would be less than significant.

7. LEVEL OF SIGNIFICANCE

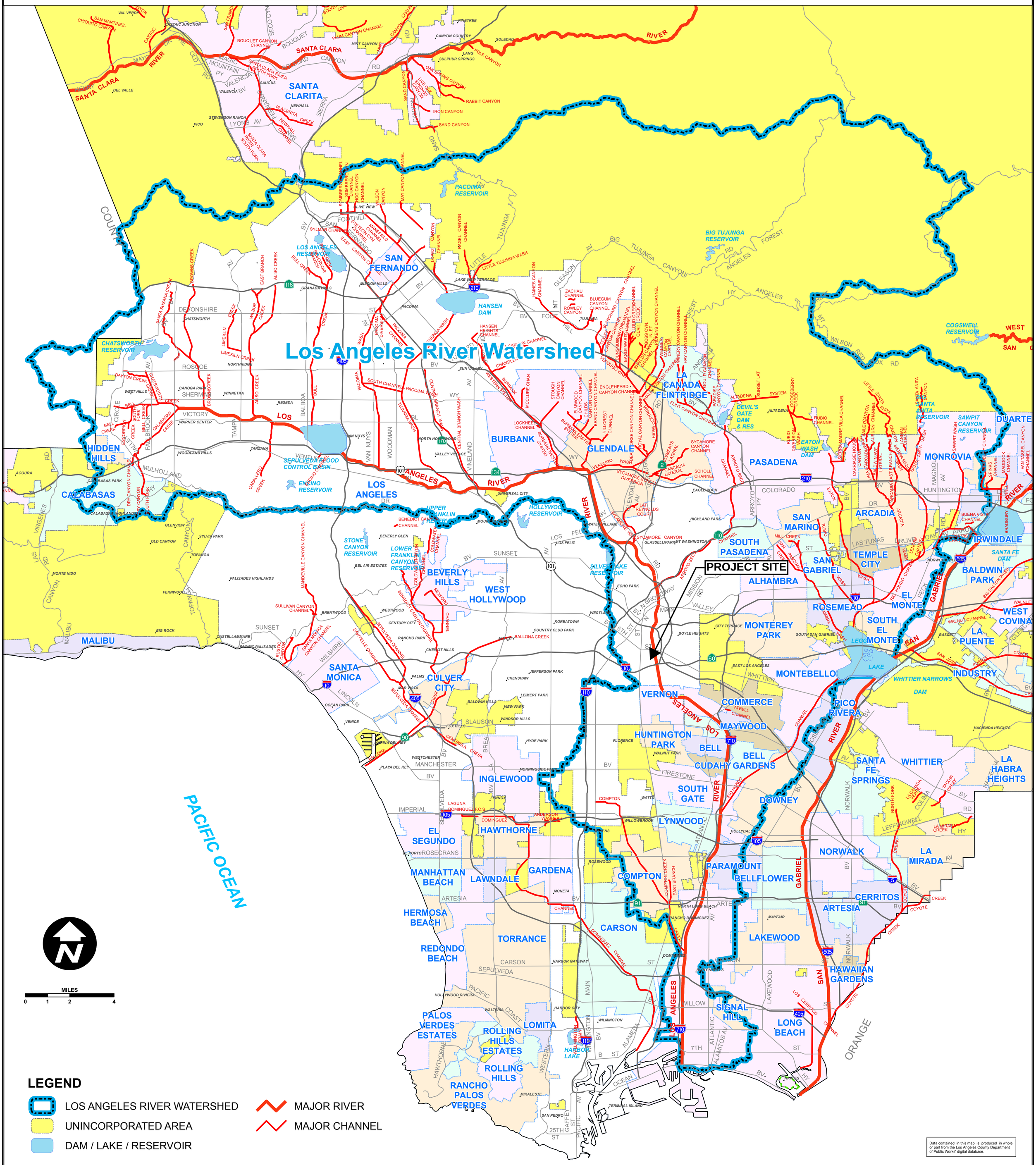
Based on the analysis contained in this report, no significant impacts have been identified for surface water hydrology, surface water quality, groundwater hydrology or groundwater quality for this Project.

APPENDIX

COUNTY OF LOS ANGELES

LOS ANGELES RIVER WATERSHED

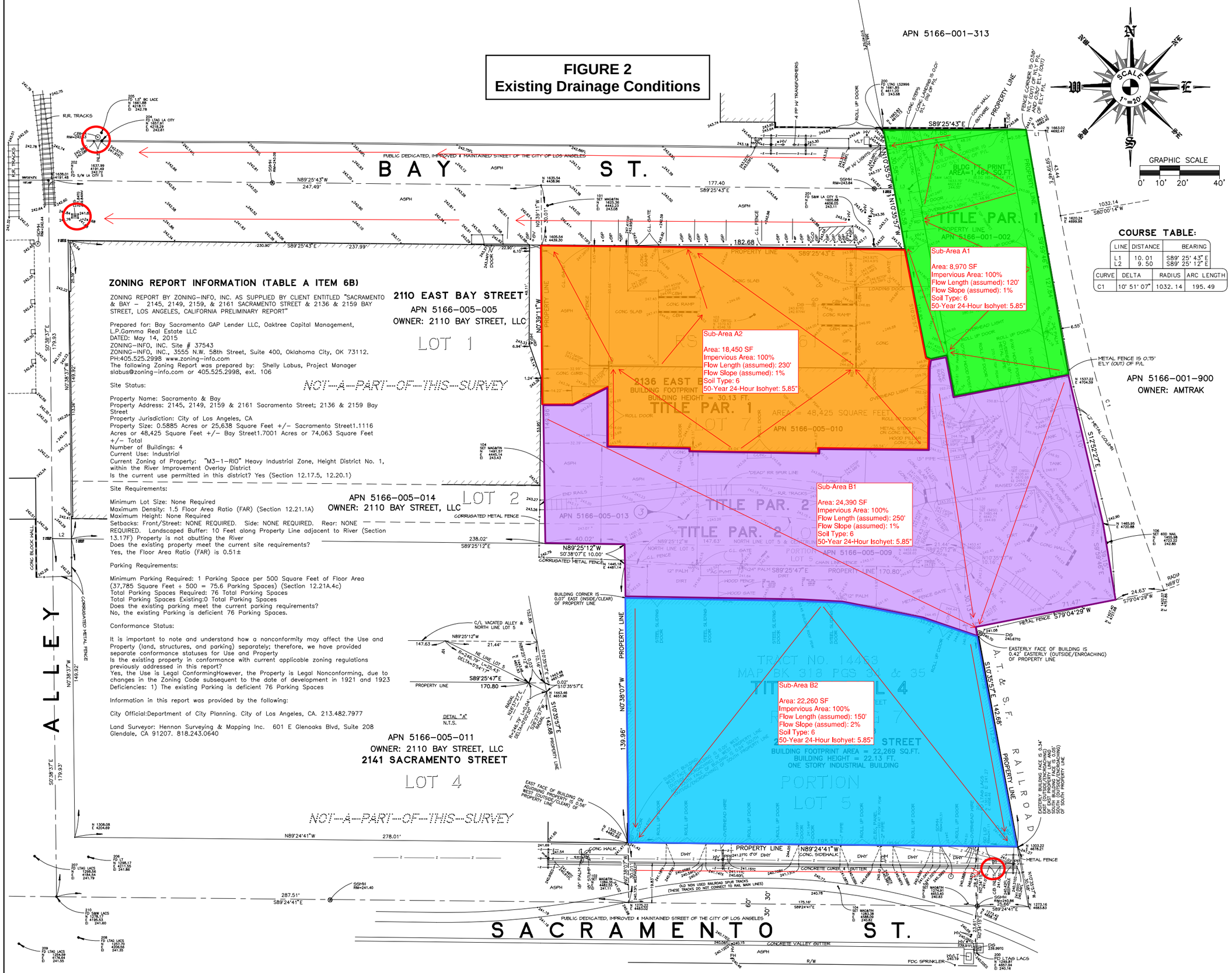
Figure 1: Los Angeles River Watershed Map



REF: \\pwgis02\mpmgis$\MPMGIS\projects\mpm\gismaps\wk_2627\lariver_wtrsheds.mxd DATE: 08/22/07

Mapping & Property Management Division, Mapping & GIS Services Section

FIGURE 2
Existing Drainage Conditions



ZONING REPORT INFORMATION (TABLE A ITEM 6B)

ZONING REPORT BY ZONING-INFO, INC. AS SUPPLIED BY CLIENT ENTITLED "SACRAMENTO & BAY – 2145, 2149, 2159, & 2161 SACRAMENTO STREET & 2136 & 2159 BAY STREET, LOS ANGELES, CALIFORNIA PRELIMINARY REPORT"

Prepared for: Bay Sacramento GAP Lender LLC, Oaktree Capital Management, L.P.Gamma Real Estate LLC
DATED: May 14, 2015
ZONING-INFO, INC. Site # 37543
ZONING-INFO, INC., 3555 N.W. 58th Street, Suite 400, Oklahoma City, OK 73112.
PH:405.525.2998 www.zoning-info.com
The following Zoning Report was prepared by: Shelly Labus, Project Manager
slabus@zoning-info.com or 405.525.2998, ext. 106

Site Status:

Property Name: Sacramento & Bay
Property Address: 2145, 2149, 2159 & 2161 Sacramento Street; 2136 & 2159 Bay Street
Property Jurisdiction: City of Los Angeles, CA
Property Size: 0.5885 Acres or 25,638 Square Feet +/- Sacramento Street1.1116 Acres or 48,425 Square Feet +/- Bay Street1.7001 Acres or 74,063 Square Feet +/- Total
Number of Buildings: 4
Current Use: Industrial
Current Zoning of Property: "M3-1-RIO" Heavy Industrial Zone, Height District No. 1, within the River Improvement Overlay District
Is the current use permitted in this district? Yes (Section 12.17.5, 12.20.1)

Site Requirements:

Minimum Lot Size: None Required
Maximum Density: 1.5 Floor Area Ratio (FAR) (Section 12.21.1A)
Maximum Height: None Required
Setbacks: Front/Street: NONE REQUIRED. Side: NONE REQUIRED. Rear: NONE REQUIRED. Landscaped Buffer: 10 Feet along Property Line adjacent to River (Section 13.17F) Property is not abutting the River
Does the existing property meet the current site requirements?
Yes, the Floor Area Ratio (FAR) is 0.51±

Parking Requirements:

Minimum Parking Required: 1 Parking Space per 500 Square Feet of Floor Area (37,785 Square Feet ÷ 500 = 75.6 Parking Spaces) (Section 12.21A.4c)
Total Parking Spaces Required: 76 Total Parking Spaces
Total Parking Spaces Existing:0 Total Parking Spaces
Does the existing parking meet the current parking requirements?
No, the existing Parking is deficient 76 Parking Spaces.

Conformance Status:

It is important to note and understand how a nonconformity may affect the Use and Property (land, structures, and parking) separately; therefore, we have provided separate conformance statuses for Use and Property
Is the existing property in conformance with current applicable zoning regulations previously addressed in this report?
Yes, the Use is Legal ConformingHowever, the Property is Legal Nonconforming, due to changes in the Zoning Code subsequent to the date of development in 1921 and 1923
Deficiencies: 1) The existing Parking is deficient 76 Parking Spaces

Information in this report was provided by the following:

City Official:Department of City Planning. City of Los Angeles, CA. 213.482.7977

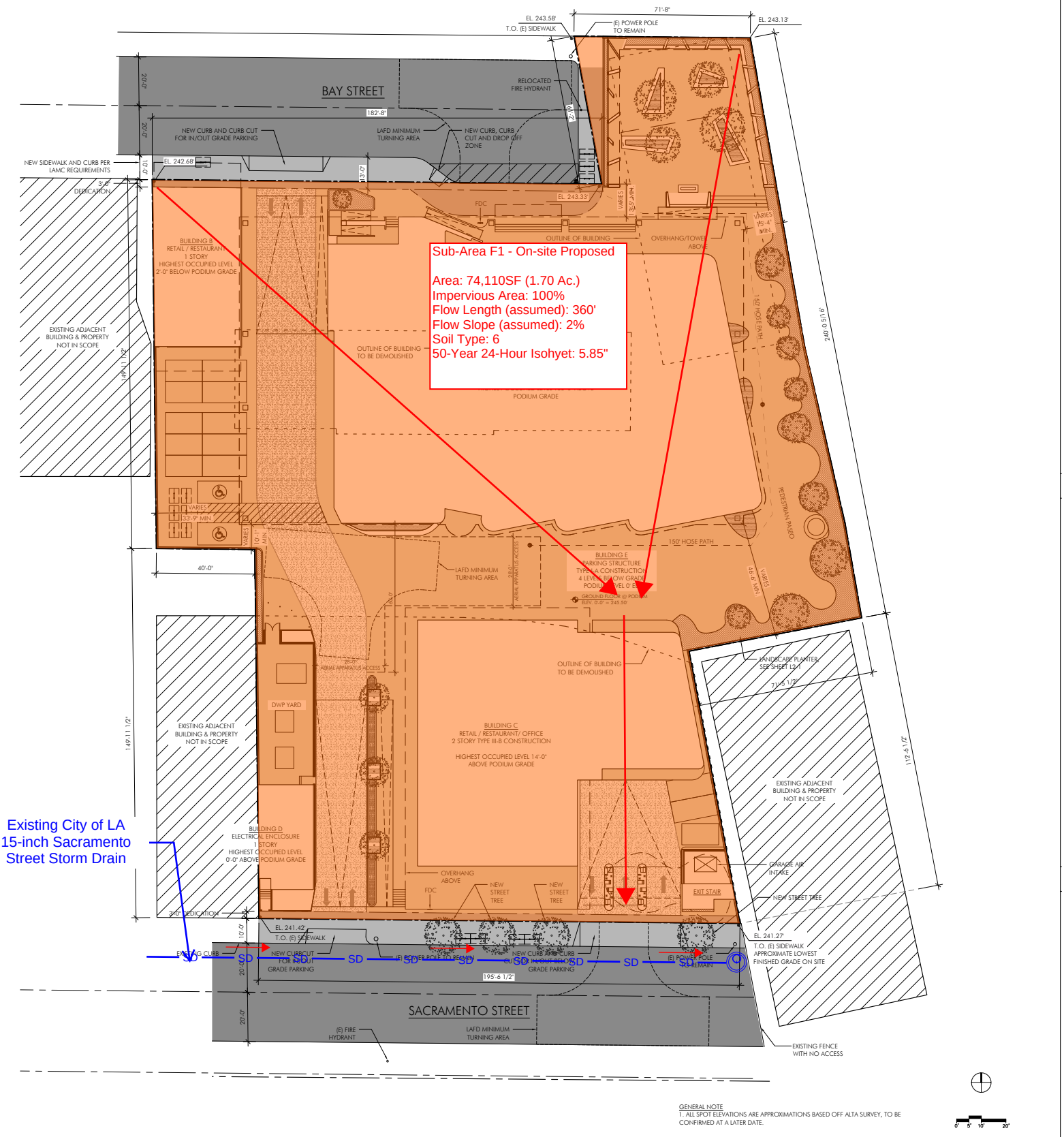
Land Surveyor: Hennon Surveying & Mapping Inc. 601 E Glenoaks Blvd, Suite 208 Glendale, CA 91207. 818.243.0640

COURSE TABLE:

LINE	DISTANCE	BEARING
L1	10.01	S89° 25' 43" E
L2	9.50	S89° 25' 12" E

CURVE	DELTA	RADIUS	ARC LENGTH
C1	10° 51' 07"	1032.14	195.49

FIGURE 3
Proposed Drainage Conditions



PLOT PLAN | SCALE 1" = 20'-0" | A3

FIGURE 4

Peak Flow Hydrologic Analysis

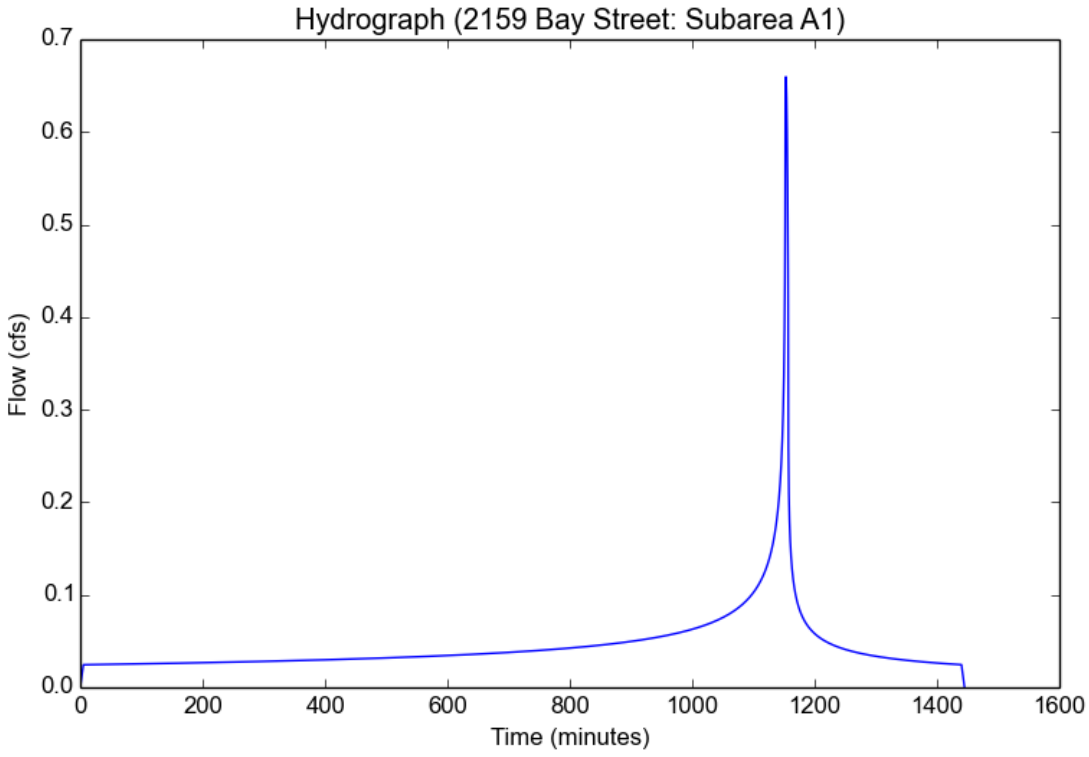
File location: P:/2016/1600625 Hyperloop 2145 Sacramento Street/ENGR/EIR/Technical Reports/Water Resources/Appendices/2159 Bay Street - Subar
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	2159 Bay Street
Subarea ID	Subarea A1
Area (ac)	0.21
Flow Path Length (ft)	120.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.85
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.85
Peak Intensity (in/hr)	3.4903
Undeveloped Runoff Coefficient (Cu)	0.8567
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6597
Burned Peak Flow Rate (cfs)	0.6597
24-Hr Clear Runoff Volume (ac-ft)	0.0914
24-Hr Clear Runoff Volume (cu-ft)	3980.3412



Peak Flow Hydrologic Analysis

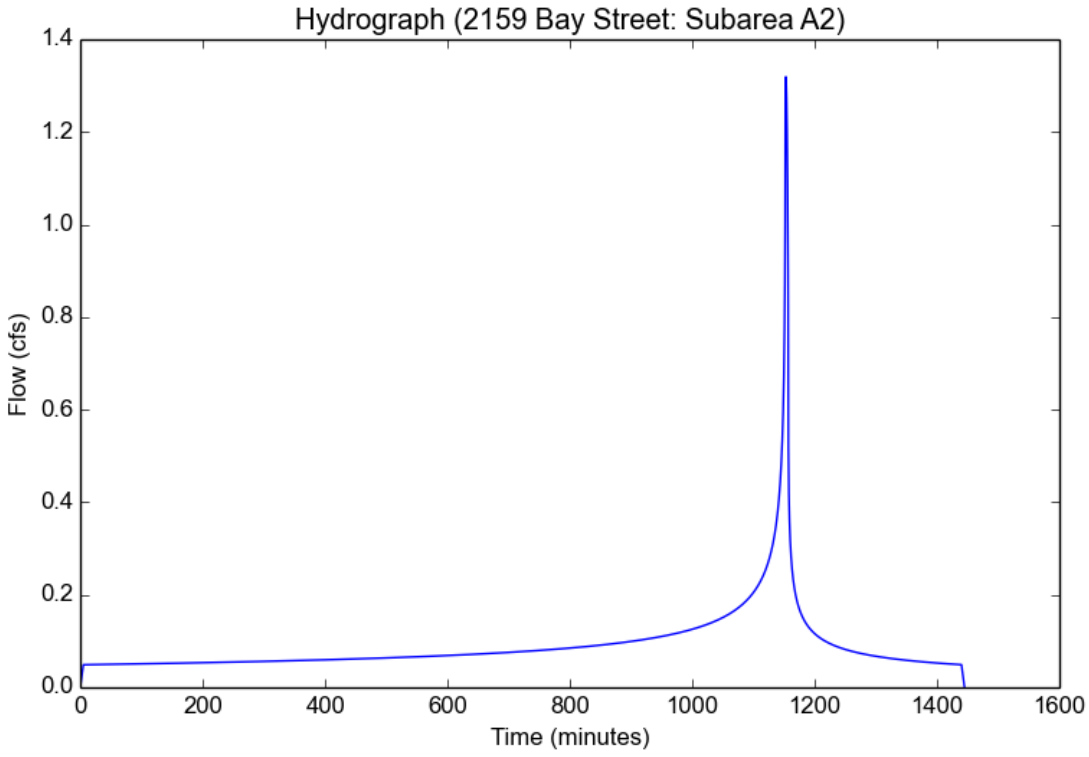
File location: P:/2016/1600625 Hyperloop 2145 Sacramento Street/ENGR/EIR/Technical Reports/Water Resources/Appendices/2159 Bay Street - Subar
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	2159 Bay Street
Subarea ID	Subarea A2
Area (ac)	0.42
Flow Path Length (ft)	230.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.85
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.85
Peak Intensity (in/hr)	3.4903
Undeveloped Runoff Coefficient (Cu)	0.8567
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.3193
Burned Peak Flow Rate (cfs)	1.3193
24-Hr Clear Runoff Volume (ac-ft)	0.1828
24-Hr Clear Runoff Volume (cu-ft)	7960.6825



Peak Flow Hydrologic Analysis

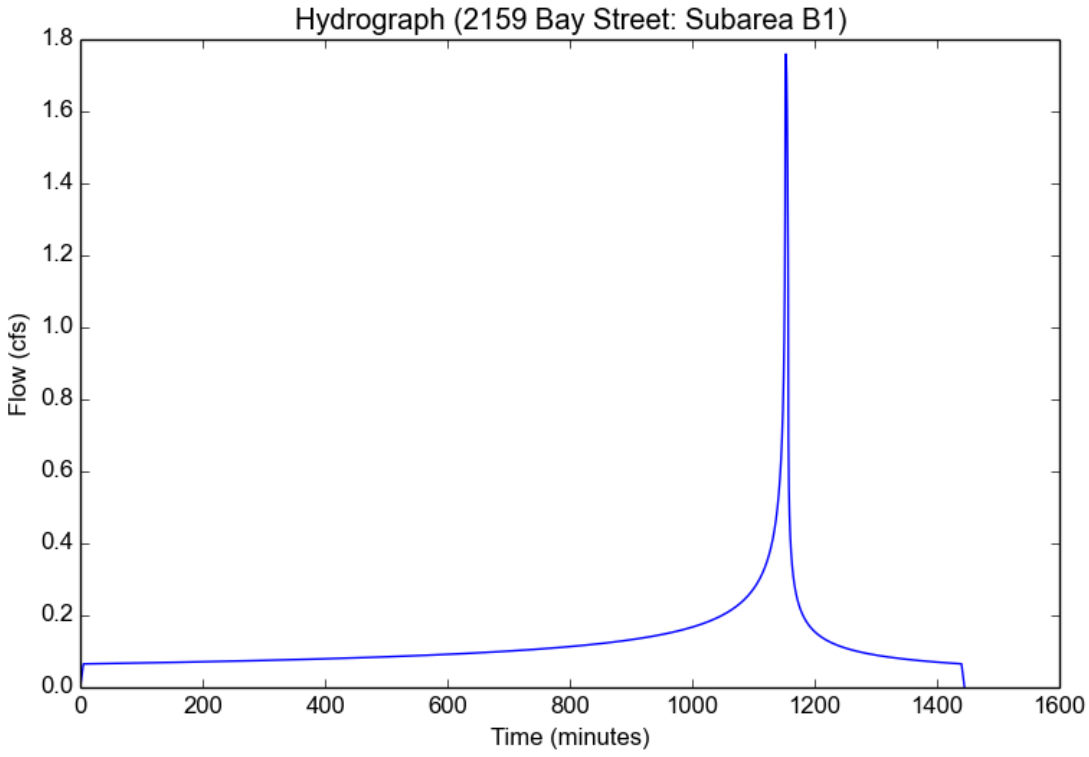
File location: P:/2016/1600625 Hyperloop 2145 Sacramento Street/ENGR/EIR/Technical Reports/Water Resources/Appendices/2159 Bay Street - Subar
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	2159 Bay Street
Subarea ID	Subarea B1
Area (ac)	0.56
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.85
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.85
Peak Intensity (in/hr)	3.4903
Undeveloped Runoff Coefficient (Cu)	0.8567
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.7591
Burned Peak Flow Rate (cfs)	1.7591
24-Hr Clear Runoff Volume (ac-ft)	0.2437
24-Hr Clear Runoff Volume (cu-ft)	10614.2433



Peak Flow Hydrologic Analysis

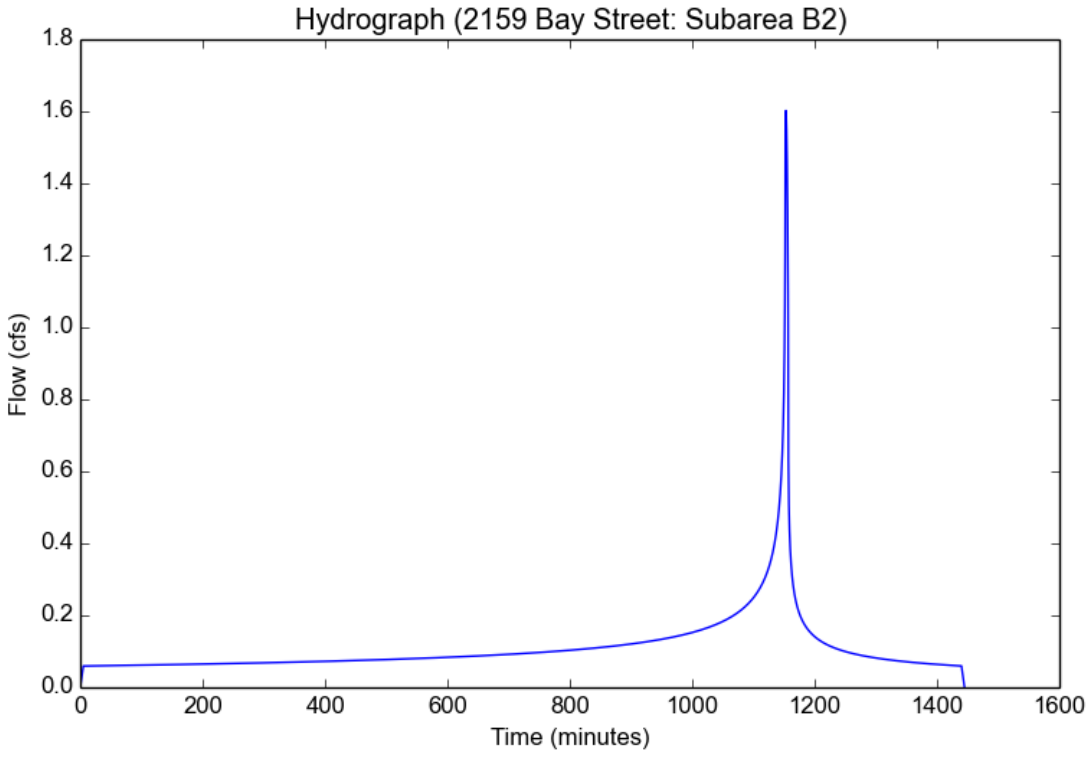
File location: P:/2016/1600625 Hyperloop 2145 Sacramento Street/ENGR/EIR/Technical Reports/Water Resources/Appendices/2159 Bay Street - Subar
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	2159 Bay Street
Subarea ID	Subarea B2
Area (ac)	0.51
Flow Path Length (ft)	150.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.85
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.85
Peak Intensity (in/hr)	3.4903
Undeveloped Runoff Coefficient (Cu)	0.8567
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.602
Burned Peak Flow Rate (cfs)	1.602
24-Hr Clear Runoff Volume (ac-ft)	0.2219
24-Hr Clear Runoff Volume (cu-ft)	9666.543



Peak Flow Hydrologic Analysis

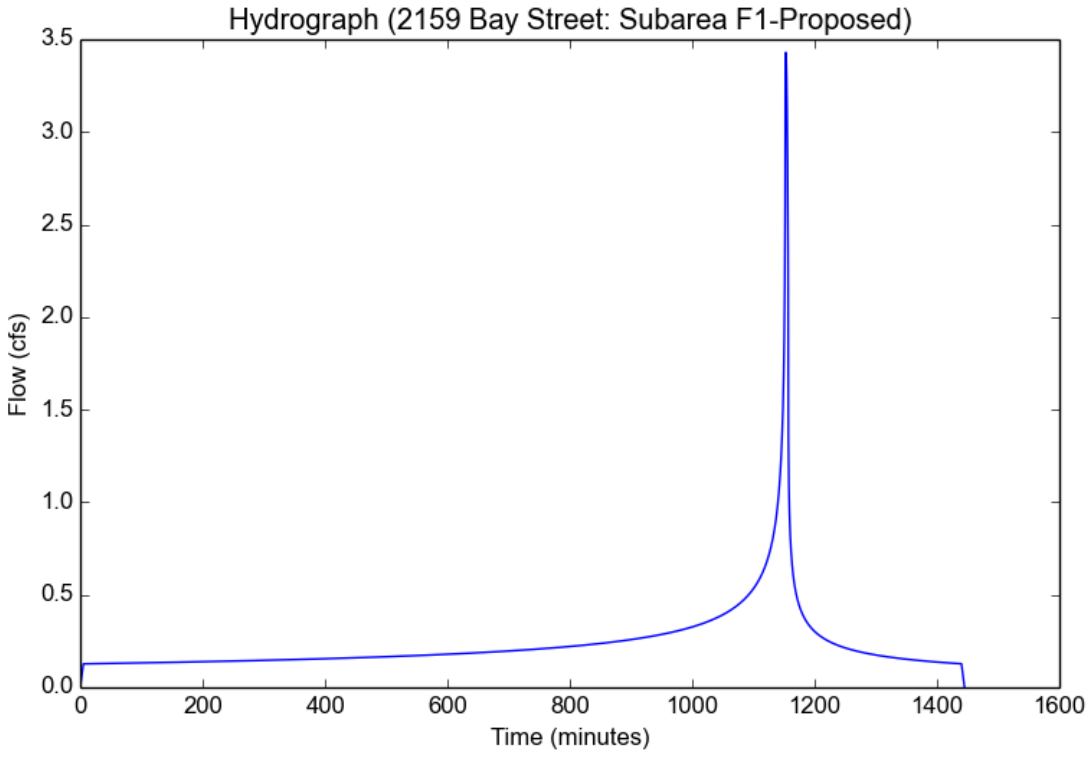
File location: P:/2016/1600625 Hyperloop 2145 Sacramento Street/ENGR/EIR/Technical Reports/Water Resources/Appendices/2159 Bay Street - Subar
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	2159 Bay Street
Subarea ID	Subarea F1-Proposed
Area (ac)	1.09
Flow Path Length (ft)	300.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.86
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.86
Peak Intensity (in/hr)	3.4962
Undeveloped Runoff Coefficient (Cu)	0.8571
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.4298
Burned Peak Flow Rate (cfs)	3.4298
24-Hr Clear Runoff Volume (ac-ft)	0.4751
24-Hr Clear Runoff Volume (cu-ft)	20695.1825



Peak Flow Hydrologic Analysis

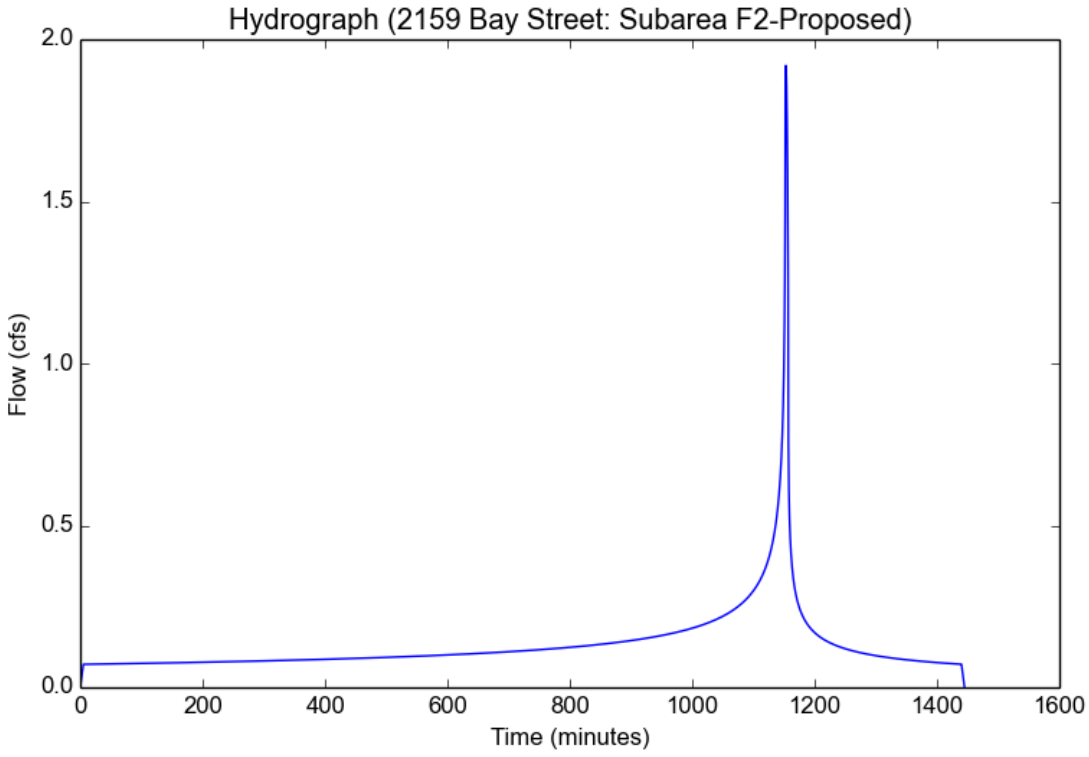
File location: P:/2016/1600625 Hyperloop 2145 Sacramento Street/ENGR/EIR/Technical Reports/Water Resources/Appendices/2159 Bay Street - Subar
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	2159 Bay Street
Subarea ID	Subarea F2-Proposed
Area (ac)	0.61
Flow Path Length (ft)	230.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.86
Percent Impervious	1.0
Soil Type	6
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.86
Peak Intensity (in/hr)	3.4962
Undeveloped Runoff Coefficient (Cu)	0.8571
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.9194
Burned Peak Flow Rate (cfs)	1.9194
24-Hr Clear Runoff Volume (ac-ft)	0.2659
24-Hr Clear Runoff Volume (cu-ft)	11581.7076



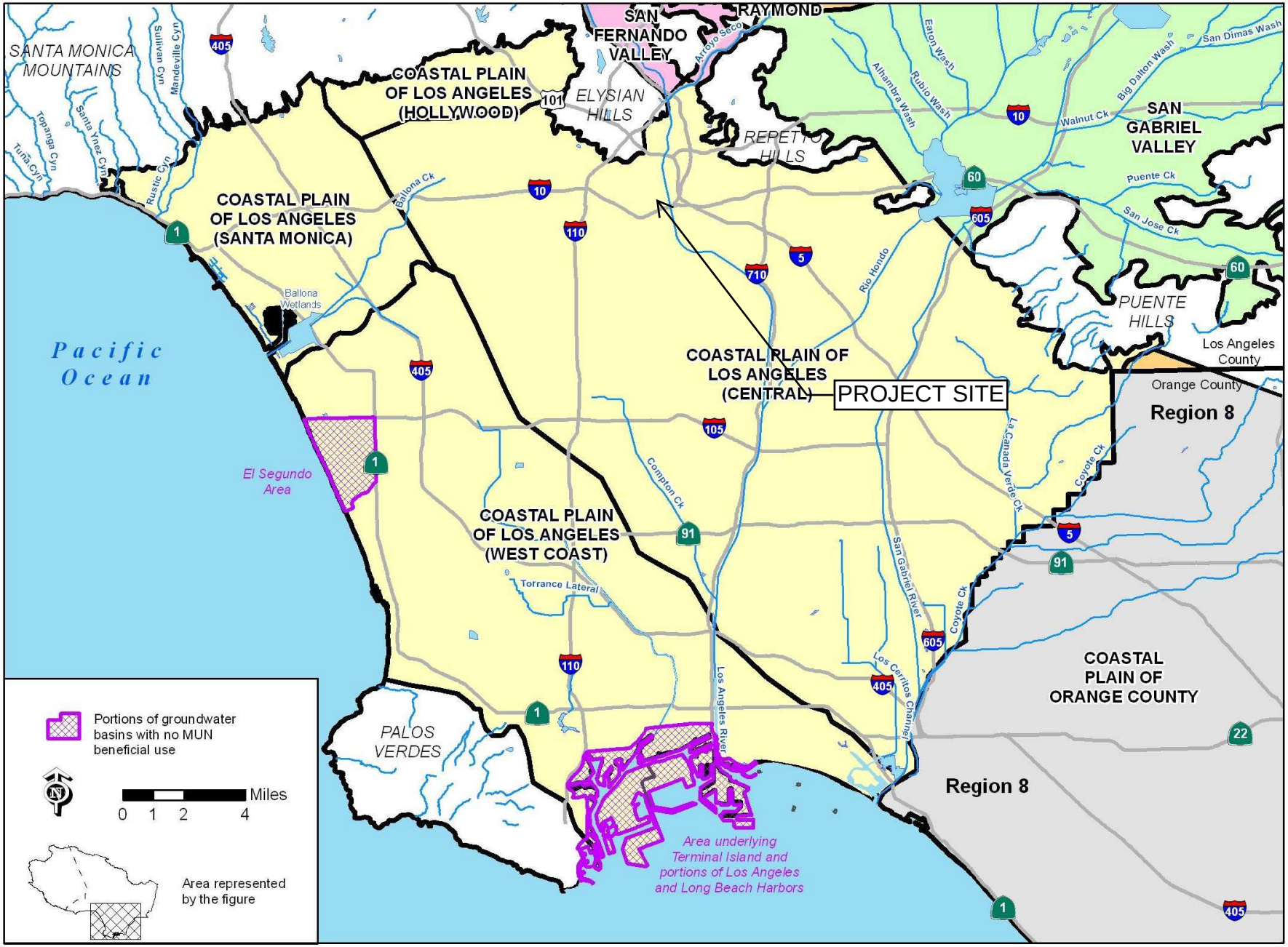


Figure 5: Coastal Plain of Los Angeles Groundwater Basin

FIGURE 6

Bioinfiltration Sizing

Note:
Red values to be changed by user.
Black values are automatically calculated.

[1]	Total Area (SF)		74063
[2]	Impervious Area (SF)		74063
[3]	Pervious Area (SF)	**[1]-[2] =**	0
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	66657
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.0
[6]	V_{design} (CF)	**1.5*[5]/12*[4] =**	8332
[7]	$K_{sat,media}$ (in/hr)		5.0
[8]	FS	**Use 6 if no geotech investigation**	2.0
[9]	$K_{sat,design}$ (in/hr)	**[7]/[8] =**	2.5
[10]	d_{p_max}, Max. Ponding Depth (ft)	**MIN(1.5, [9]*48/12) =**	1.5
[11]	d_p, Ponding Depth (ft)	**1.5' max.**	1.0
[12]	T_{fill} (hr)		3
[13]	**A_{min} (sq. ft)**	**[6]/([9]*[12]/12 + [11])**	**5127**

NOTE: "The calculated BMP surface area only considers the surface area of the BMP where infiltration through amended media can occur. The total footprint of the BMP should include a buffer for sideslopes and freeboard."

Source: LID Handbook, City of LA (May 2012)

Capture & Use Sizing

Note:	Red values to be changed by user.
	Black values are automatically calculated.

[1]	Total Area (SF)		74063
[2]	Impervious Area (SF)		74063
[3]	Pervious Area (SF)	**[1]-[2] =**	0
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	66657
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.00
[6]	V_{design} (gal)	**[5]/12*7.48*[4] =**	**41549**
[7]	Planting Area (SF)		6200
[8]	Plant Factor*		0.5
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	41707
[10]	Is $V_{design} \leq ETWU_{(7\text{-month})}$?		**YES**

*The plant factor used shall be from WUCOLS. The plant factor ranges from 0 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

Source: LID Handbook, City of LA (May 2012)

Figure 7

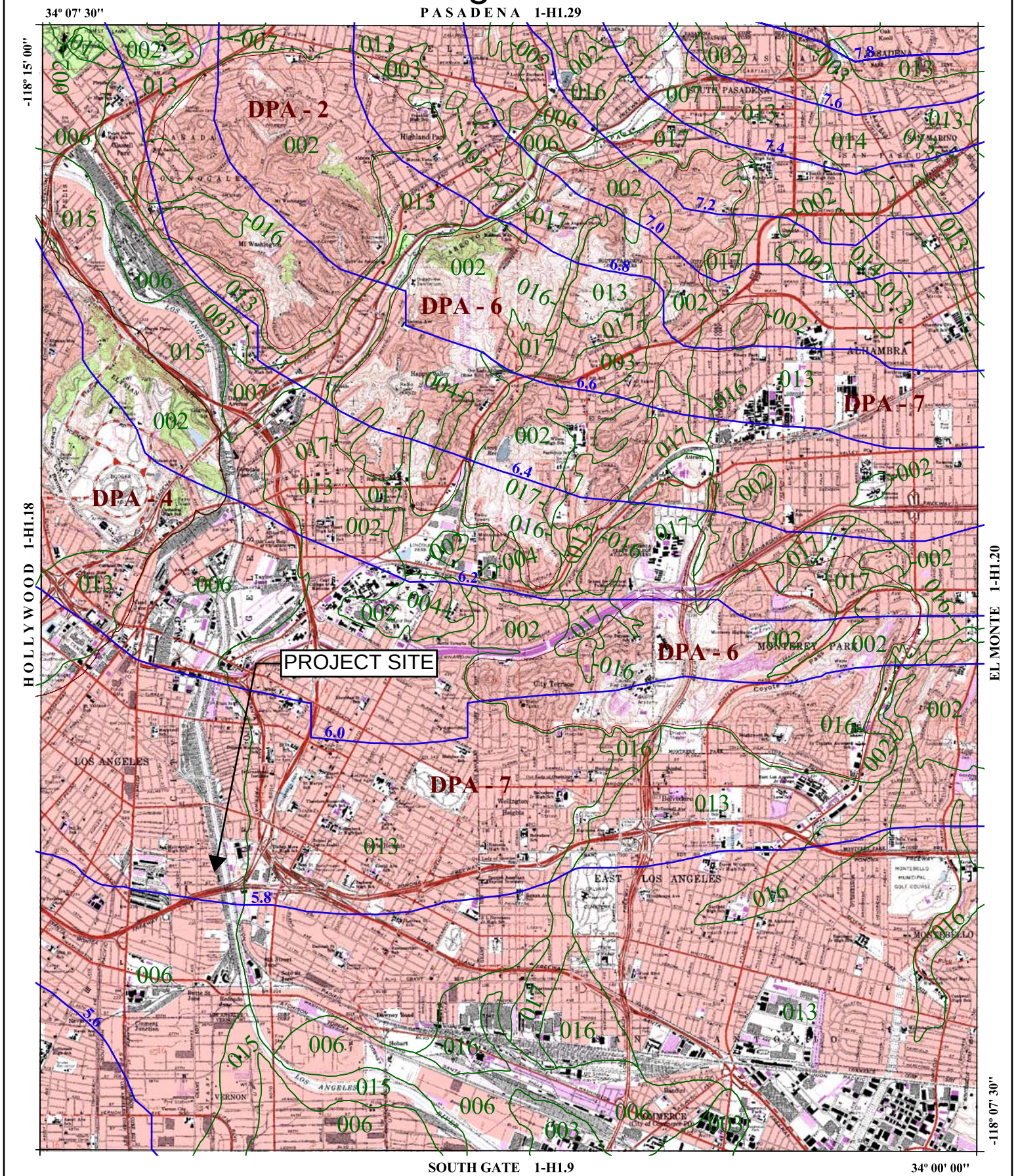

34° 07' 30"
PASADENA 1-H1.29
-118° 15' 00"
HOLLYWOOD 1-H1.18
EL MONTE 1-H1.20
-118° 07' 30"
SOUTH GATE 1-H1.9
34° 00' 00"
DPA - 2
DPA - 4
DPA - 6
DPA - 7
PROJECT SITE
LOS ANGELES
EAST LOS ANGELES
ALHAMBRA
SOUTH PASADENA
MONTEREY PARK
MONTEBELLO
COMMERCE
VERNON
016
SOIL CLASSIFICATION AREA
7.2
INCHES OF RAINFALL
DPA - 6
DEBRIS POTENTIAL AREA
N
S
E
W
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
LOS ANGELES
50-YEAR 24-HOUR ISOHYET
1-H1.19
LOS ANGELES COUNTY
PUBLIC WORKS
Public Service That Works

FIGURE 8 - FEMA FIRM MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC–3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later and from National Geospatial Intelligence Agency imagery produced at a scale of 1:4,000 from photography dated 2003 or later.

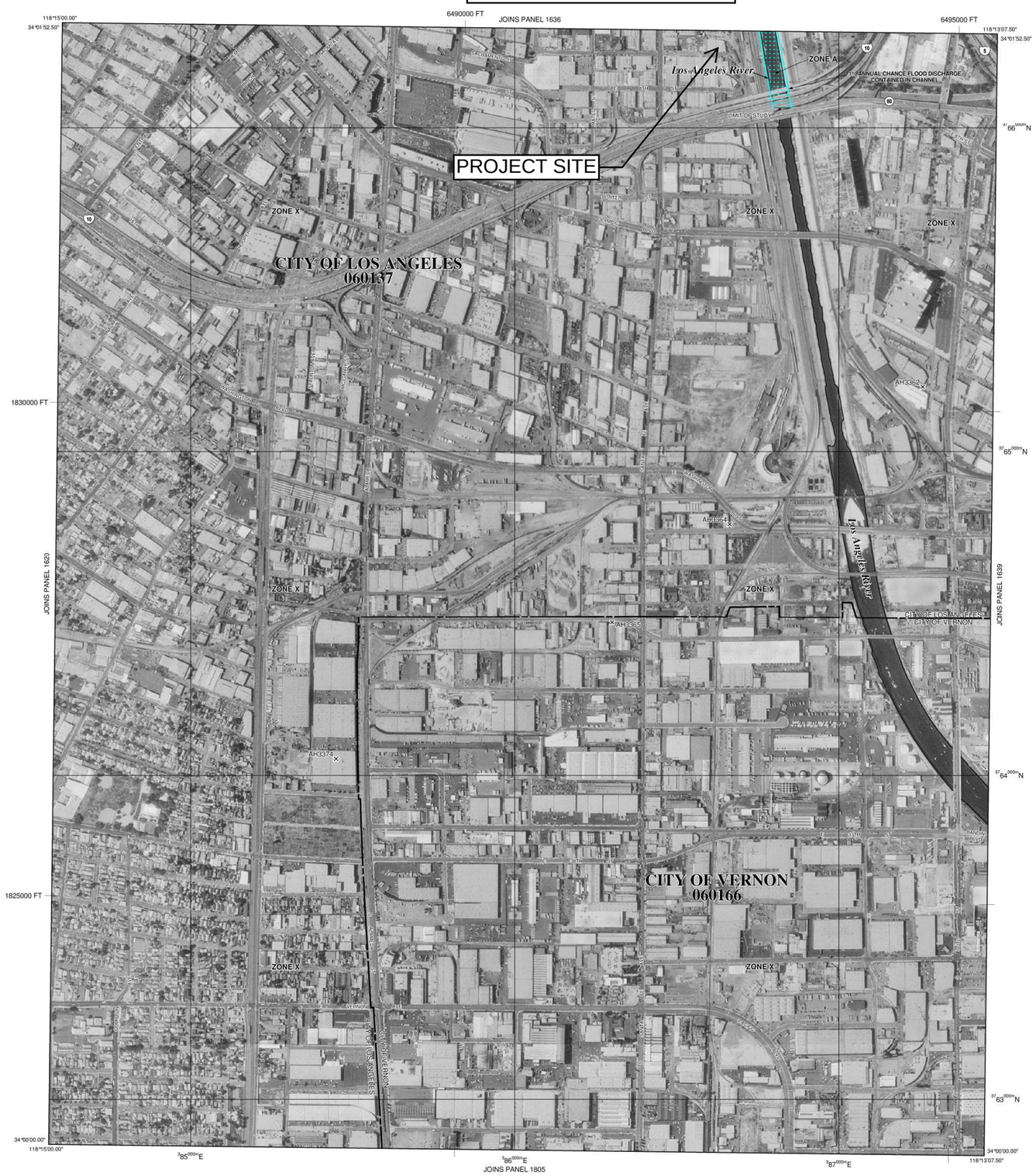
This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de–annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1–877–FEMA MAP** (1–877–336–2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000mN — 1000-meter Universal Transverse Mercator grid values, zone 11
- 6000000 FT — 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1–800–638–6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1638F

FIRM
FLOOD INSURANCE RATE MAP
LOS ANGELES COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 1638 OF 2350
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES, CITY OF	060137	1638	F
VERNON, CITY OF	060166	1638	F

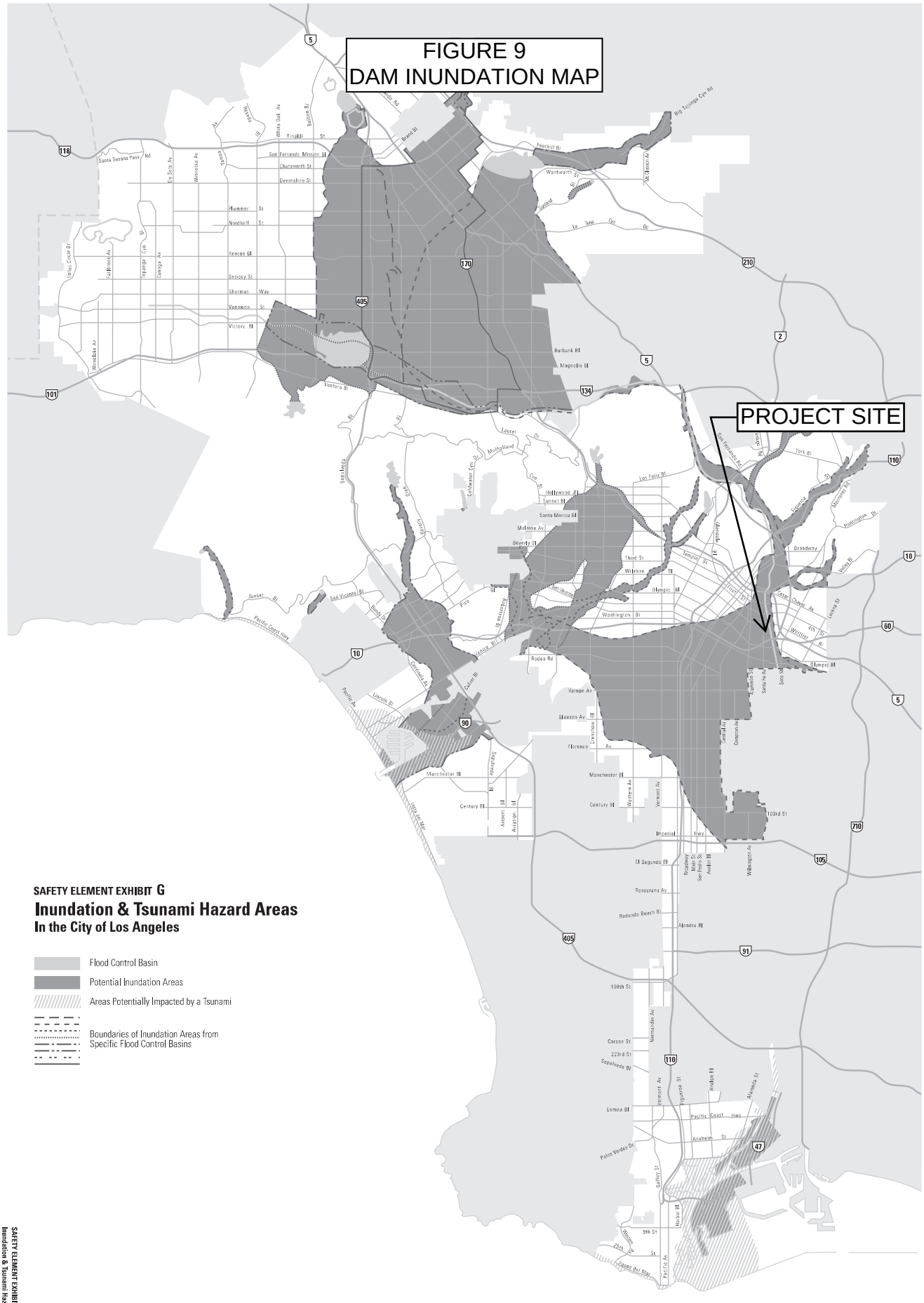
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C1638F

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

FIGURE 9
DAM INUNDATION MAP



SAFETY ELEMENT EXHIBIT G

Inundation & Tsunami Hazard Areas
In the City of Los Angeles

- Flood Control Basin
- Potential Inundation Areas
- Areas Potentially Impacted by a Tsunami
- Boundaries of Inundation Areas from Specific Flood Control Basins

N

1 1/2 0 1 2 3 4 5 KILOMETERS

1 1/2 1/4 0 1 2 3 4 MILES

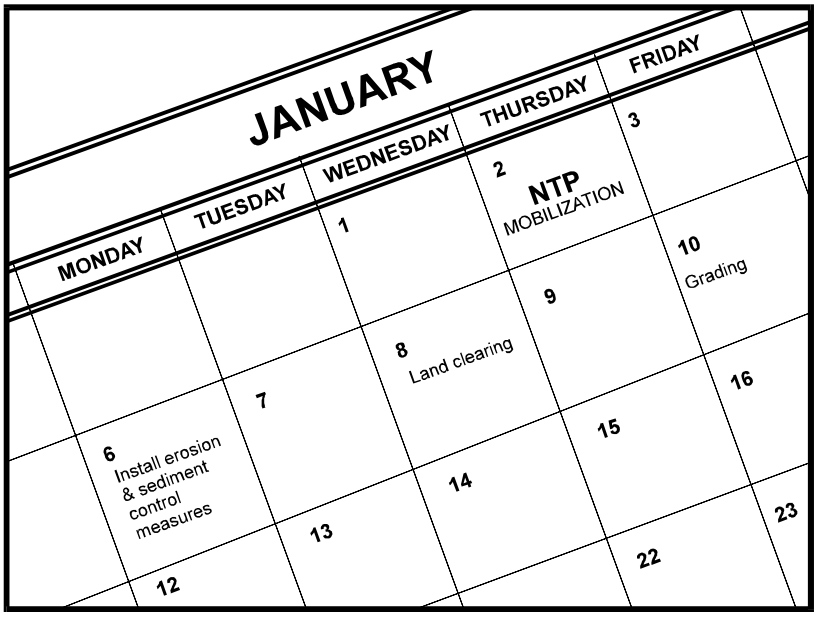
Sources: Environmental Impact Report, Framework Element, Los Angeles City General Plan, May 1995; Technical Appendix to the Safety Element of the Los Angeles County General Plan Hazard Reducation in Los Angeles County, Volume 2, Plate 6, "Flood and Inundation Hazards" January 1990; California Environmental Quality Act of 1970 (CEQA), Public Resources Code Section 21000 *et. seq*, with guidelines as amended, 1992; California Government Code Title 7 chapter 3, article 5 section 66302(g), as amended 1993.

Prepared by the General Plan Framework Section • City of Los Angeles Planning Department • Citywide Graphics • March, 1994 • Council File No. 89-2104

EXHIBIT 1: TYPICAL SWPPP BMPS

Scheduling

EC-1



Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

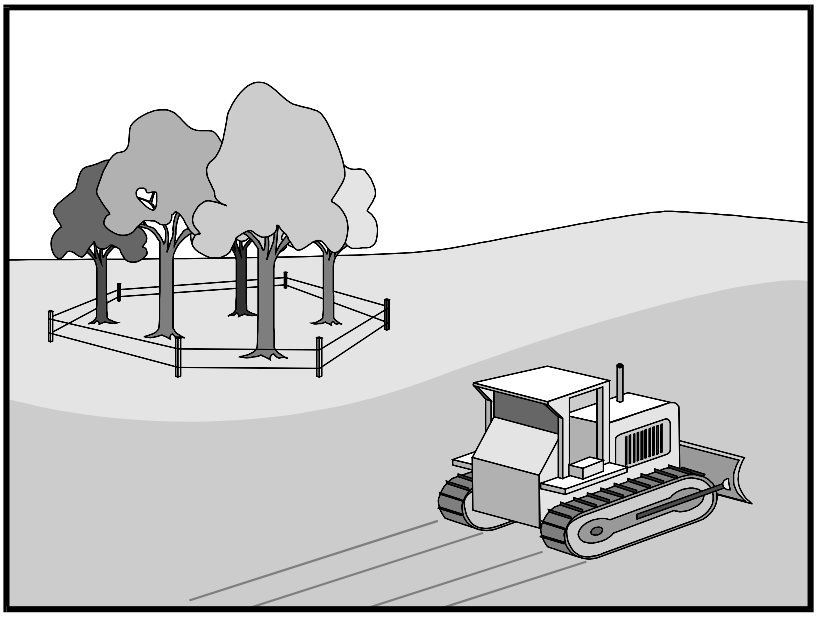
Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Preservation Of Existing Vegetation EC-2



Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

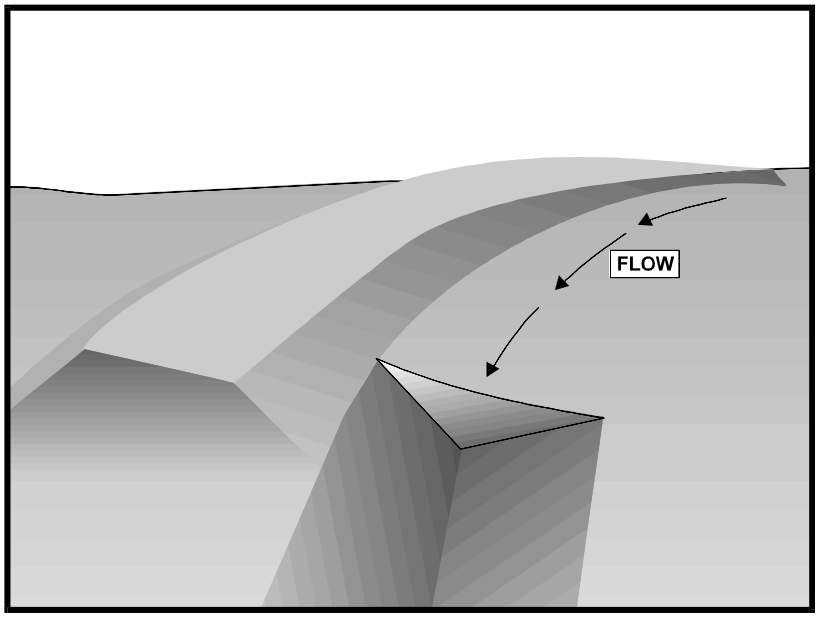
Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Earth Dikes and Drainage Swales EC-9



Description and Purpose

An earth dike is a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Suitable Applications

Earth dikes and drainage swales are suitable for use, individually or together, where runoff needs to be diverted from one area and conveyed to another.

- Earth dikes and drainage swales may be used:
  - To convey surface runoff down sloping land
  - To intercept and divert runoff to avoid sheet flow over sloped surfaces
  - To divert and direct runoff towards a stabilized watercourse, drainage pipe or channel
  - To intercept runoff from paved surfaces
  - Below steep grades where runoff begins to concentrate
  - Along roadways and facility improvements subject to flood drainage

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

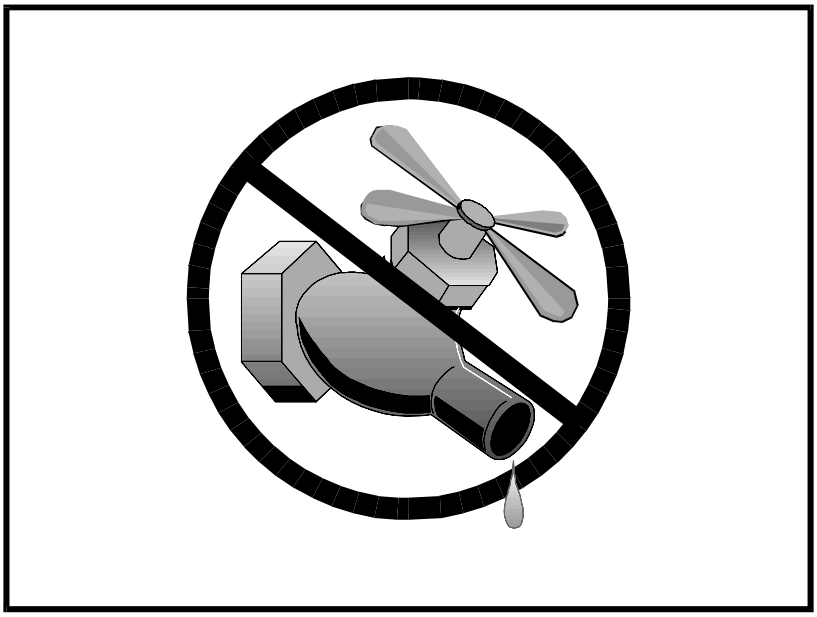
Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Water Conservation Practices NS-1



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

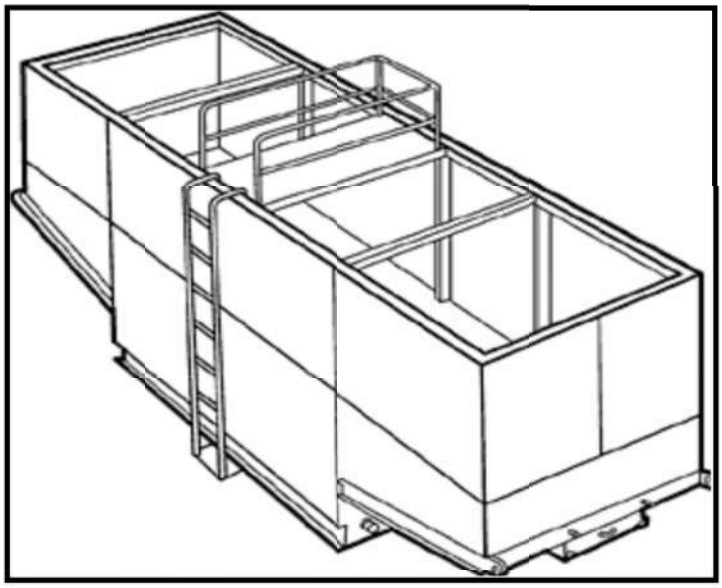
- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Dewatering Operations NS-2



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

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Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedances of the General Permit requirements or Basin Plan standards.

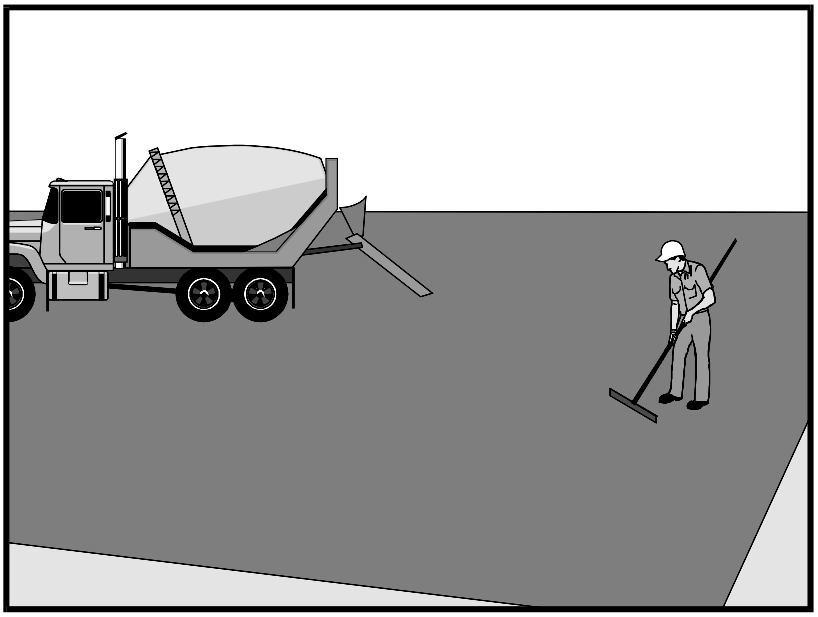
The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated

Paving and Grinding Operations NS-3



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☒

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

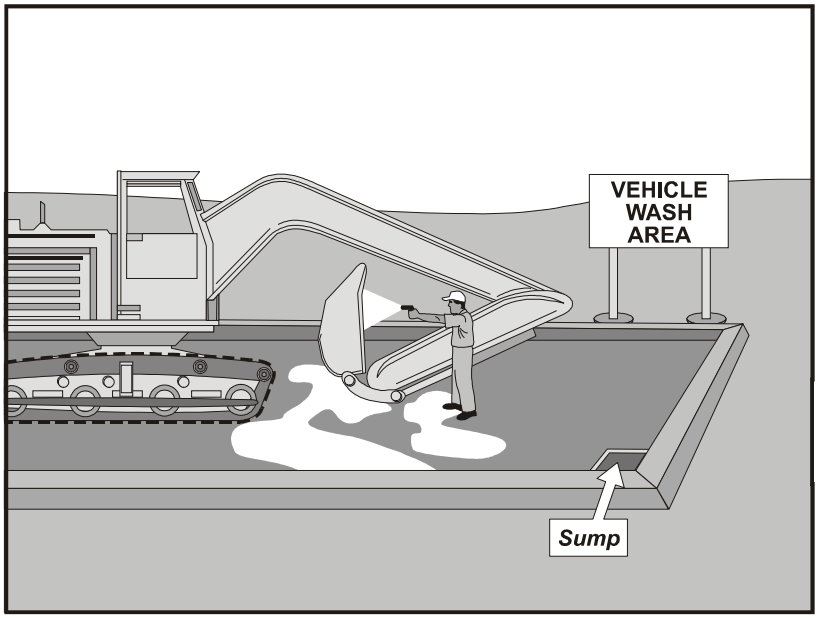
These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.

  Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

Vehicle and Equipment Cleaning NS-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

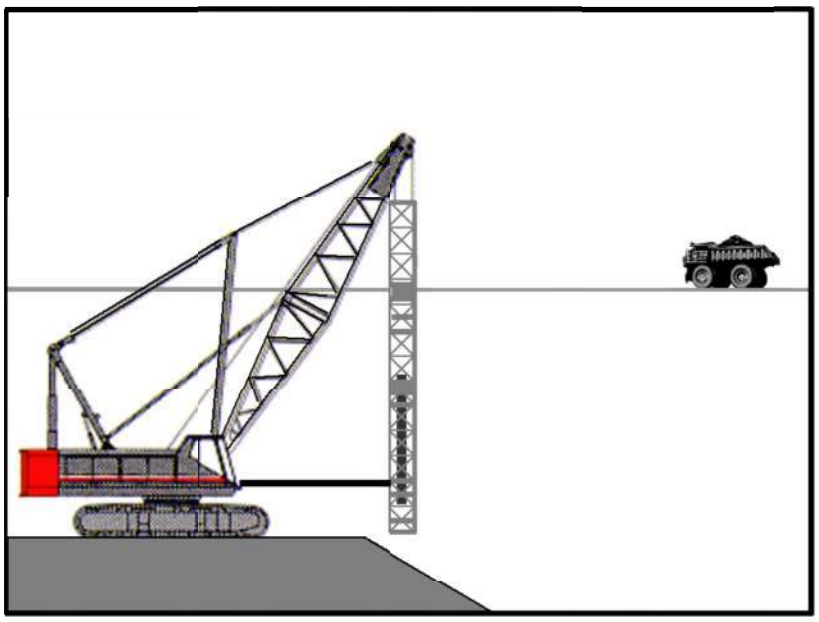
Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

If washing operations are to take place onsite, then:

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Pile Driving Operations NS-11



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

Description and Purpose

The construction and retrofit of bridges and retaining walls often include driving piles for foundation support and shoring operations. Driven piles are typically constructed of precast concrete, steel, or timber. Driven sheet piles are also used for shoring and cofferdam construction. Proper control and use of equipment, materials, and waste products from pile driving operations will reduce or eliminate the discharge of potential pollutants to the storm drain system, watercourses, and waters of the United States.

Suitable Applications

These procedures apply to all construction sites near or adjacent to a watercourse or groundwater where permanent and temporary pile driving (impact and vibratory) takes place, including operations using pile shells as well as construction of cast-in-steel-shell and cast-in-drilled-hole piles.

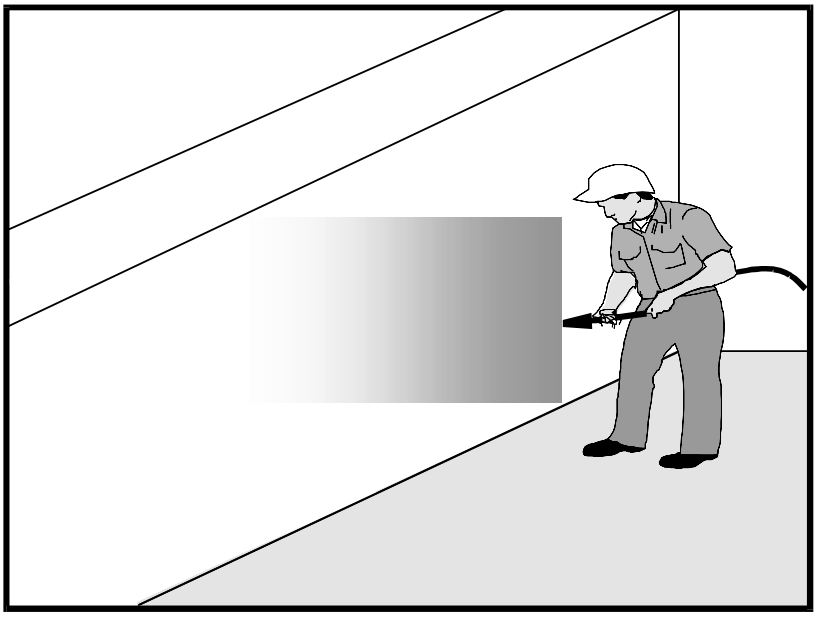
Limitations

None identified.

Implementation

- Use drip pans or absorbent pads during vehicle and equipment operation, maintenance, cleaning, fueling, and storage. Refer to NS-8, Vehicle and Equipment Cleaning, NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance.

Concrete Curing NS-12



Categories		
EC	Erosion Control	
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NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:
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☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

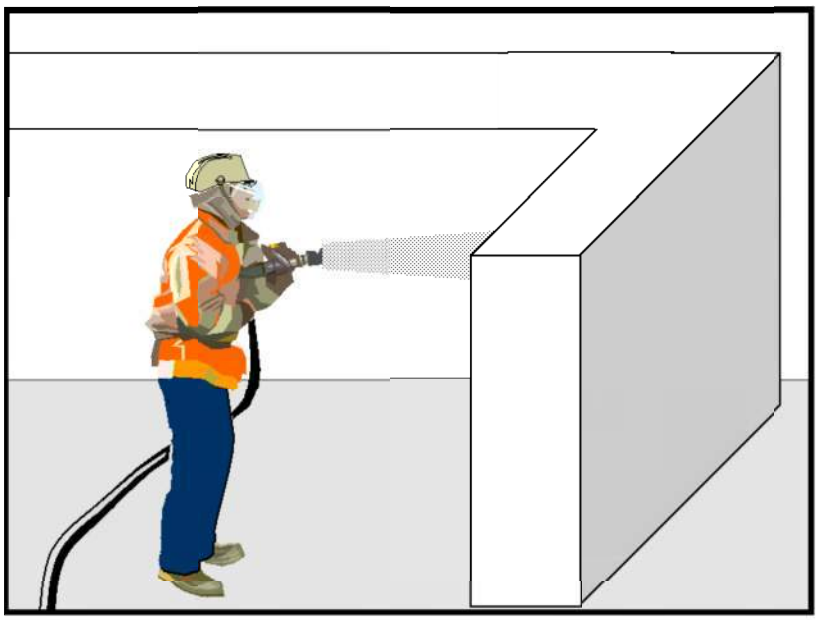
Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Concrete Finishing NS-13



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

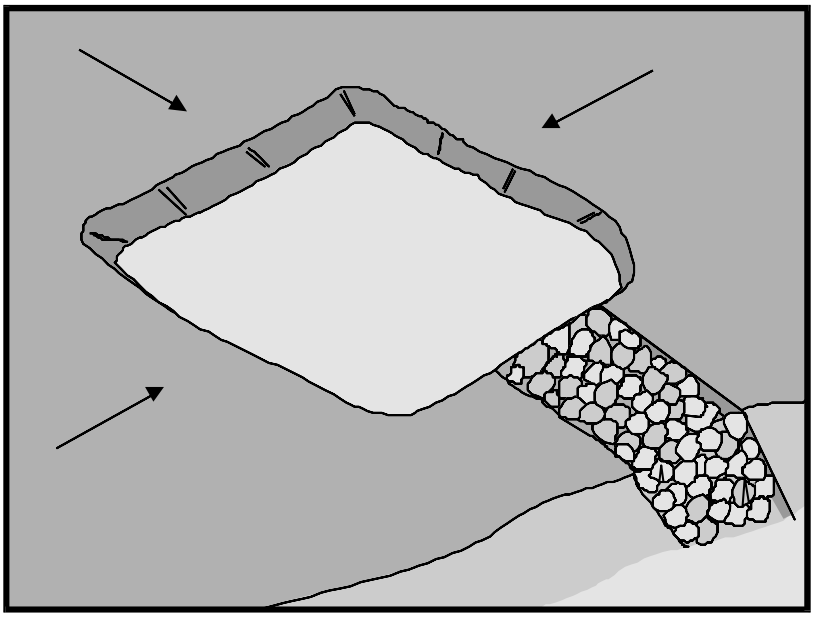
The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

Sediment Trap SE-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-2 Sediment Basin (for larger areas)

Description and Purpose

A sediment trap is a containment area where sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out or before the runoff is discharged by gravity flow. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area.

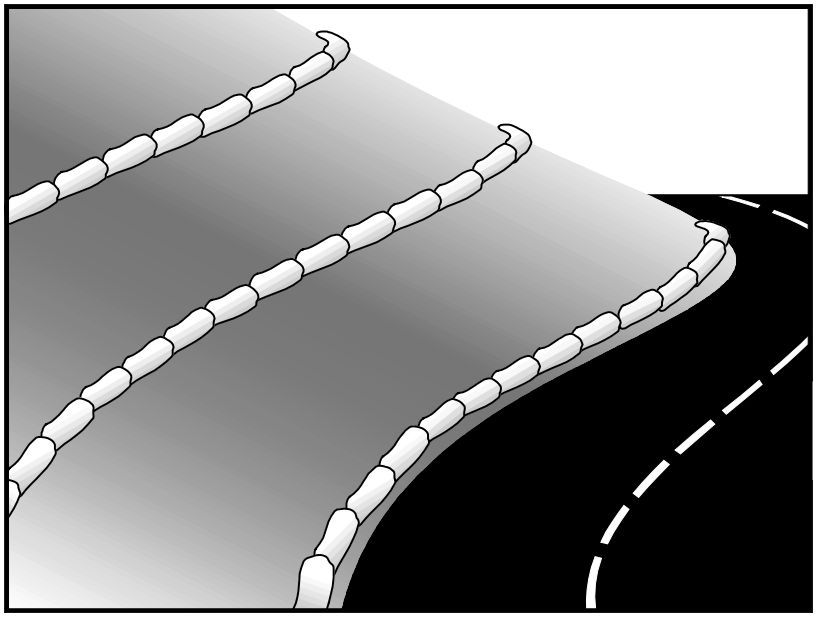
Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. Therefore, optimally designed and maintained sediment traps should be used in conjunction with a comprehensive system of BMPs.

Suitable Applications

Sediment traps should be considered for use:

- At the perimeter of the site at locations where sediment-laden runoff is discharged offsite.
- At multiple locations within the project site where sediment control is needed.
- Around or upslope from storm drain inlet protection measures.
- Sediment traps may be used on construction projects where the drainage area is less than 5 acres. Traps would be

Gravel Bag Berm SE-6



Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Roll

SE-8 Sandbag Barrier

SE-12 Temporary Silt Dike

SE-14 Biofilter Bags

Street Sweeping and Vacuuming SE-7

Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

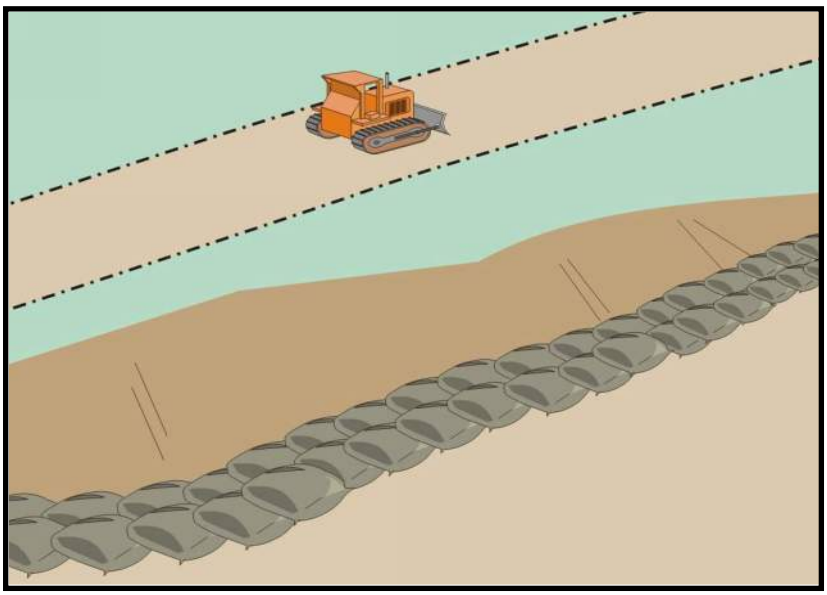
Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.

Sandbag Barrier SE-8



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept or to divert sheet flows. Sandbag barriers placed on a level contour pond sheet flow runoff, allowing sediment to settle out.

Suitable Applications

Sandbag barriers may be a suitable control measure for the applications described below. It is important to consider that sand bags are less porous than gravel bags and ponding or flooding can occur behind the barrier. Also, sand is easily transported by runoff if bags are damaged or ruptured. The SWPPP Preparer should select the location of a sandbag barrier with respect to the potential for flooding, damage, and the ability to maintain the BMP.

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes.
  - As sediment traps at culvert/pipe outlets.
  - Below other small cleared areas.
  - Along the perimeter of a site.
  - Down slope of exposed soil areas.
  - Around temporary stockpiles and spoil areas.
  - Parallel to a roadway to keep sediment off paved areas.
  - Along streams and channels.

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

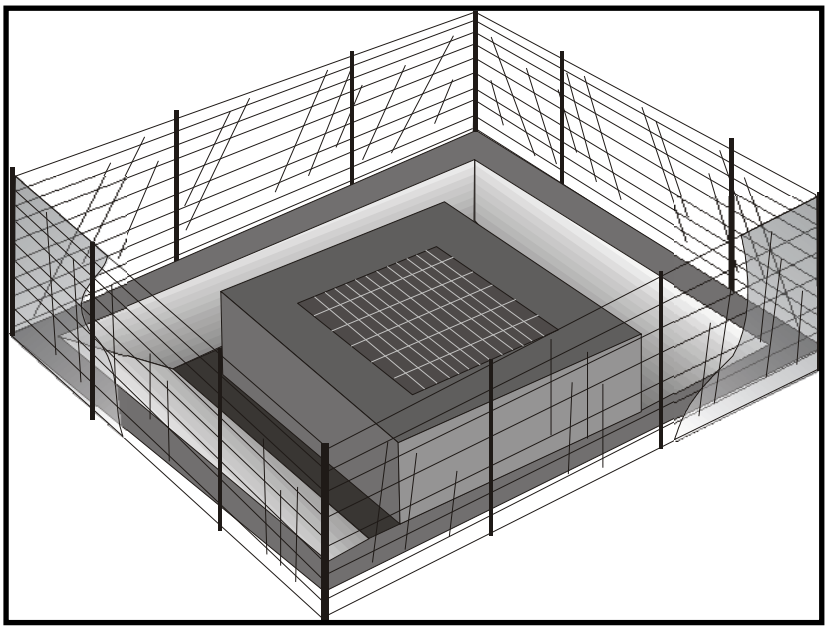
SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

Storm Drain Inlet Protection SE-10



Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

- Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.
- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use

Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☒
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

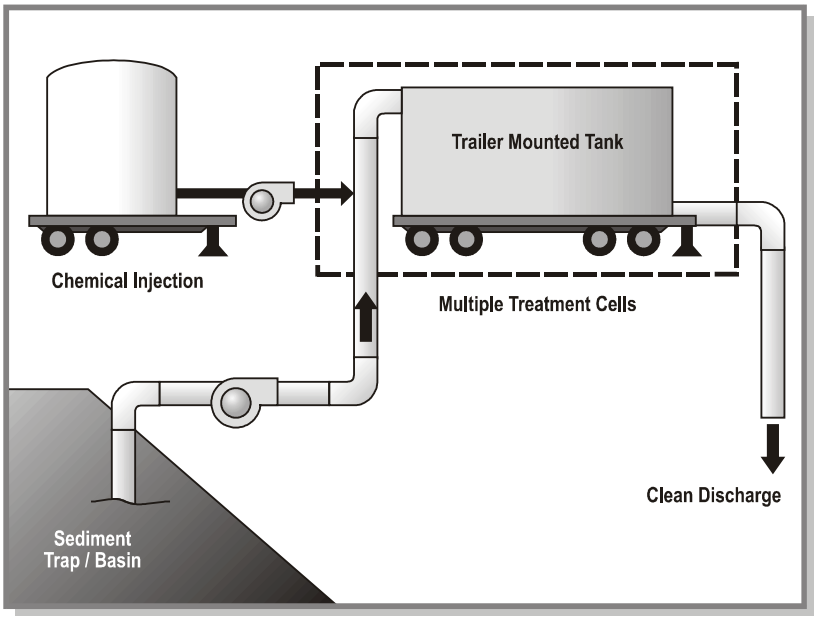
SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

SE-13 Compost Socks and Berms

Active Treatment Systems SE-11



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Active Treatment Systems (ATS) reduce turbidity of construction site runoff by introducing chemicals to stormwater through direct dosing or an electrical current to enhance flocculation, coagulation, and settling of the suspended sediment. Coagulants and flocculants are used to enhance settling and removal of suspended sediments and generally include inorganic salts and polymers (USACE, 2001). The increased flocculation aids in sedimentation and ability to remove fine suspended sediments, thus reducing stormwater runoff turbidity and improving water quality.

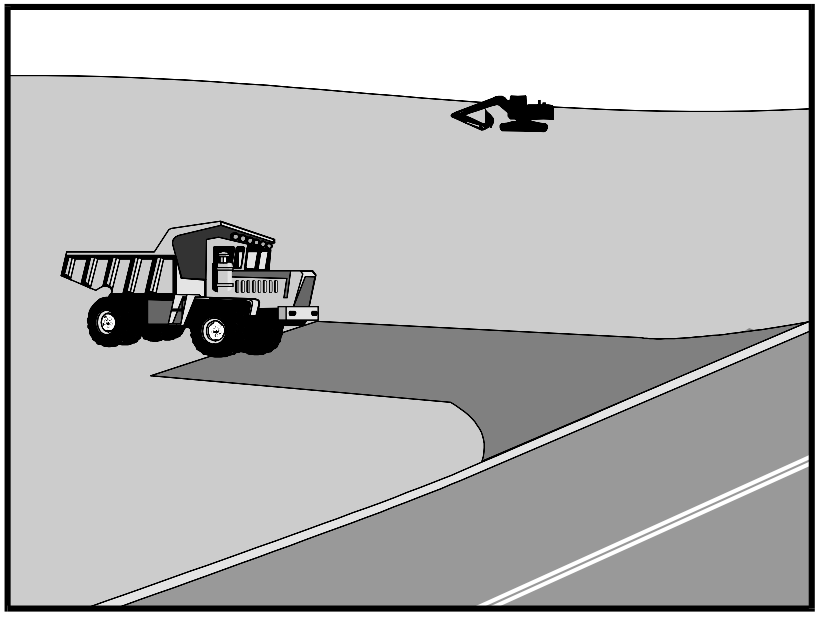
Suitable Applications

ATS can reliably provide exceptional reductions of turbidity and associated pollutants and should be considered where turbid discharges to sediment and turbidity sensitive waters cannot be avoided using traditional BMPs. Additionally, it may be appropriate to use an ATS when site constraints inhibit the ability to construct a correctly sized sediment basin, when clay and/or highly erosive soils are present, or when the site has very steep or long slope lengths.

Limitations

Dischargers choosing to utilize chemical treatment in an ATS must follow all guidelines of the Construction General Permit Attachment F – Active Treatment System Requirements. General limitations are as follows:

Stabilized Construction Entrance/Exit TC-1



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

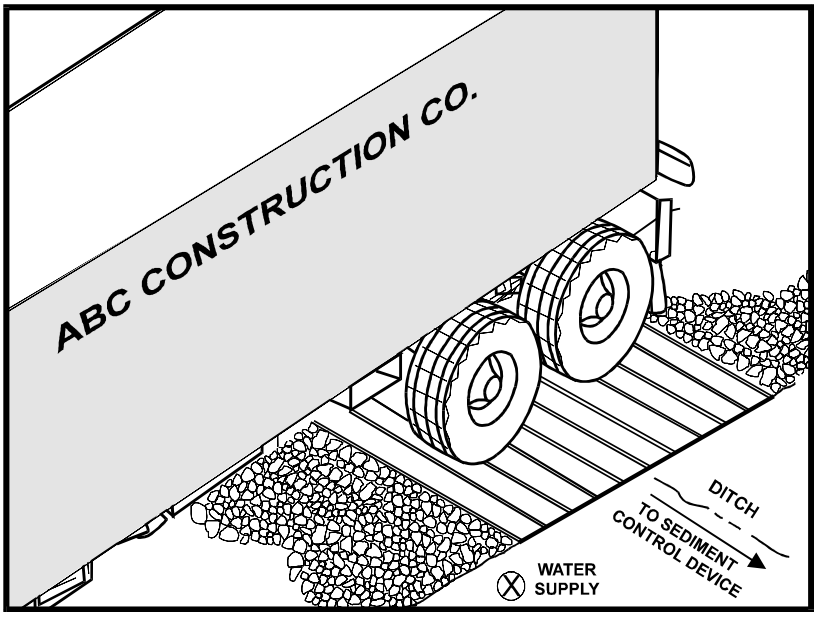
- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Entrance/Outlet Tire Wash TC-3



Description and Purpose

A tire wash is an area located at stabilized construction access points to remove sediment from tires and under carriages and to prevent sediment from being transported onto public roadways.

Suitable Applications

Tire washes may be used on construction sites where dirt and mud tracking onto public roads by construction vehicles may occur.

Limitations

- The tire wash requires a supply of wash water.
- A turnout or doublewide exit is required to avoid having entering vehicles drive through the wash area.
- Do not use where wet tire trucks leaving the site leave the road dangerously slick.

Implementation

- Incorporate with a stabilized construction entrance/exit. See TC-1, Stabilized Construction Entrance/Exit.
- Construct on level ground when possible, on a pad of coarse aggregate greater than 3 in. but smaller than 6 in. A geotextile fabric should be placed below the aggregate.
- Wash rack should be designed and constructed/manufactured for anticipated traffic loads.

Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

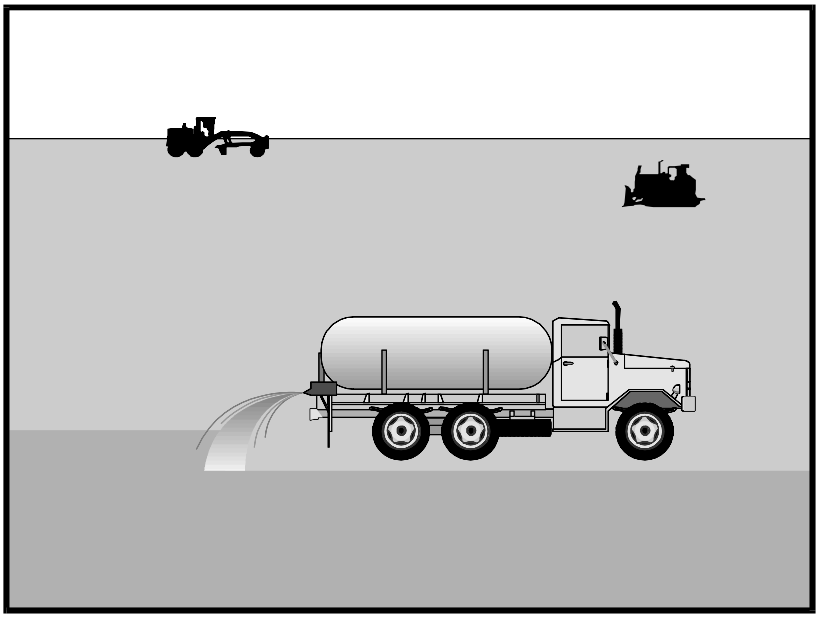
Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

TC-1 Stabilized Construction Entrance/Exit

Wind Erosion Control WE-1



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

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Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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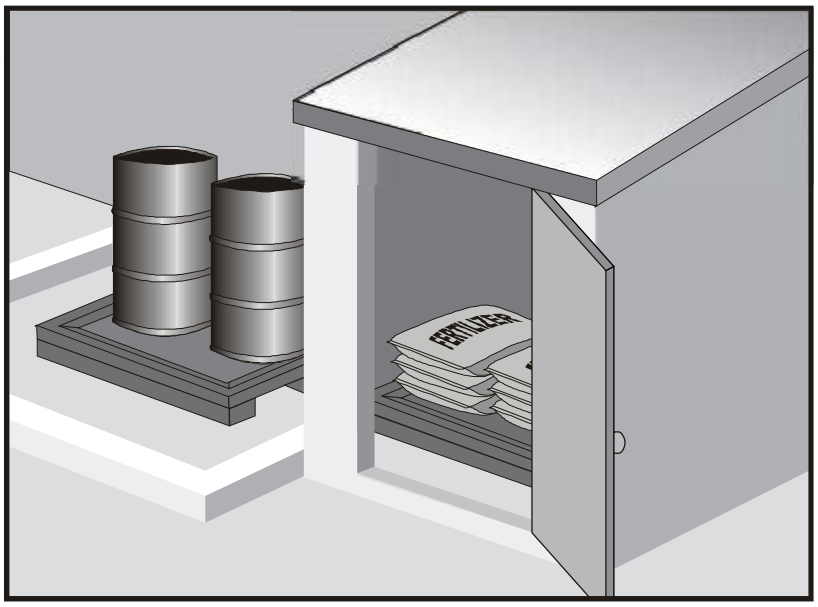
Material Delivery and Storage WM-1



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

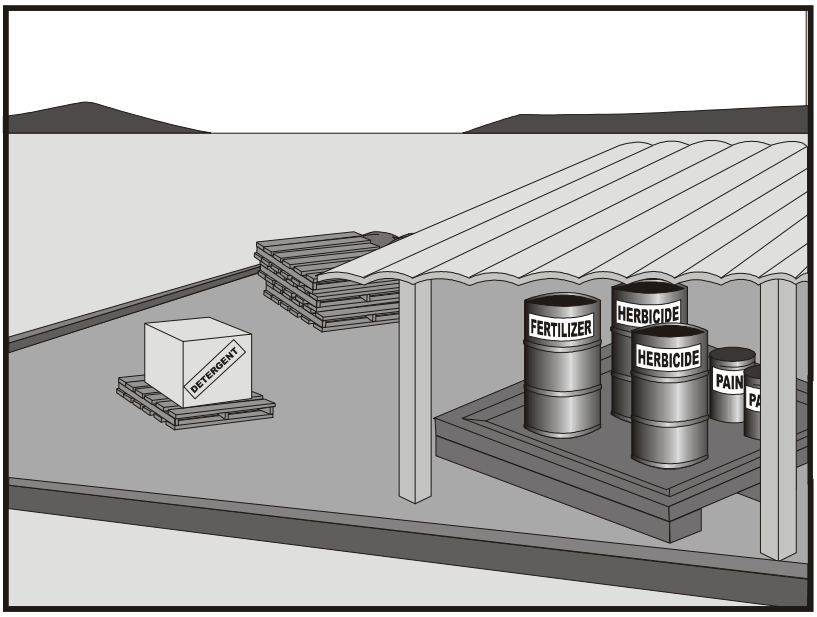
- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

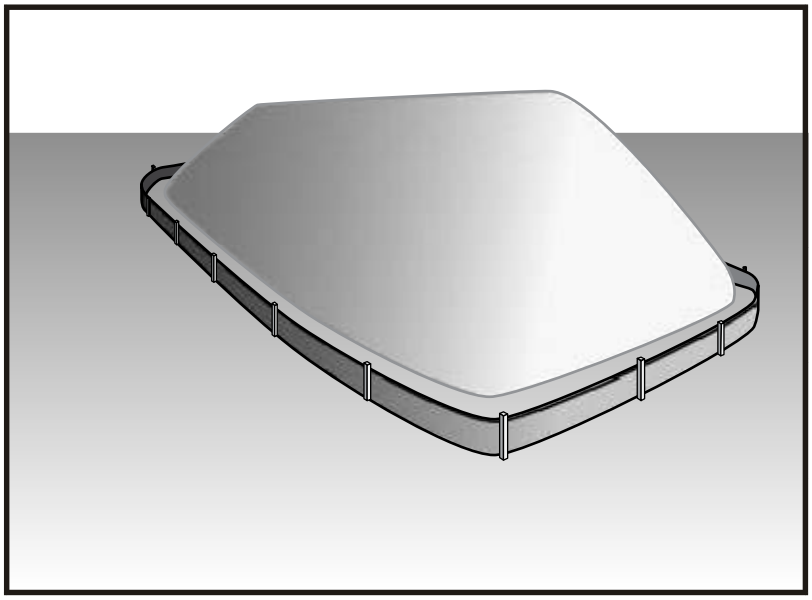
Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

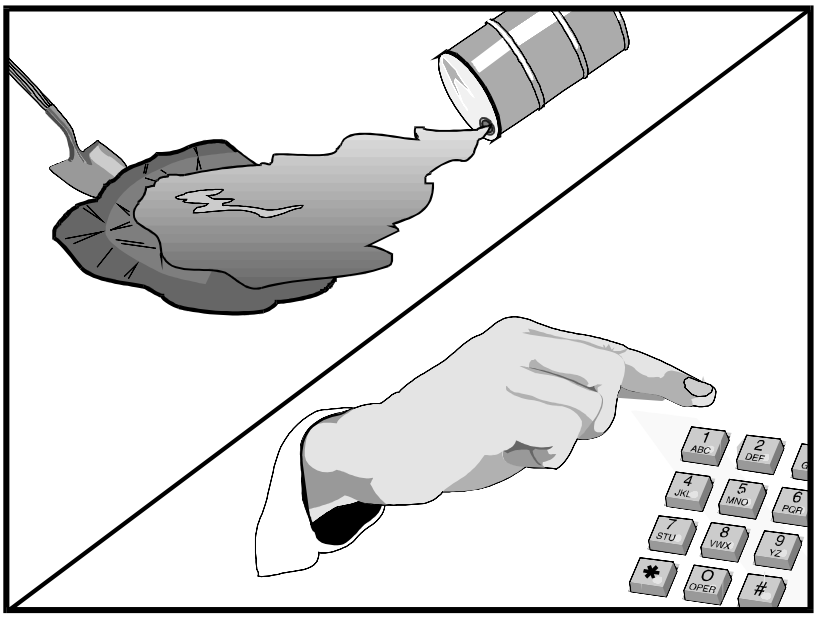
Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Spill Prevention and Control WM-4



Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

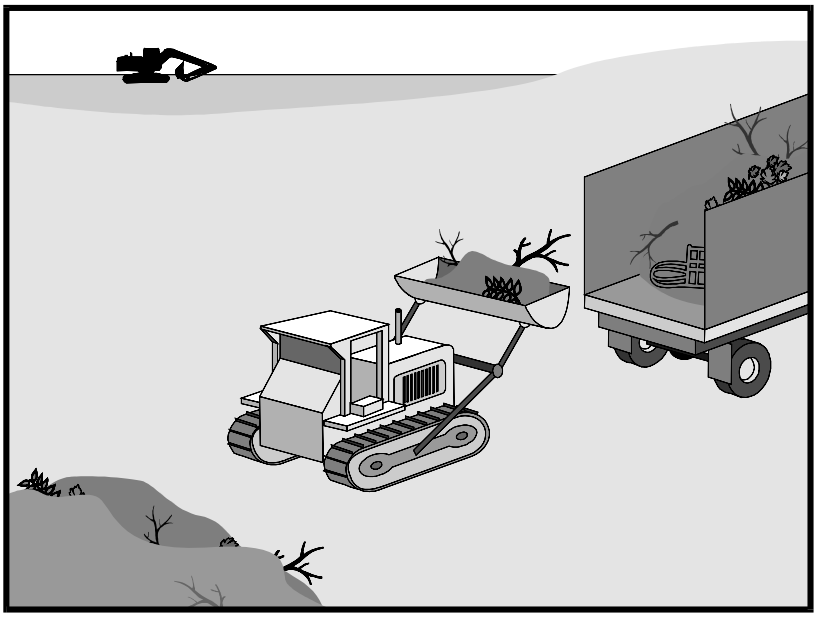
Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Solid Waste Management WM-5



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials

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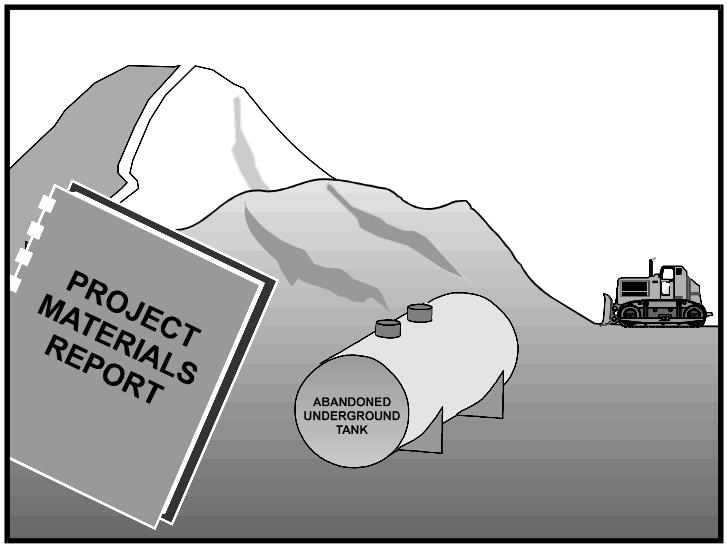
Contaminated Soil Management WM-7



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

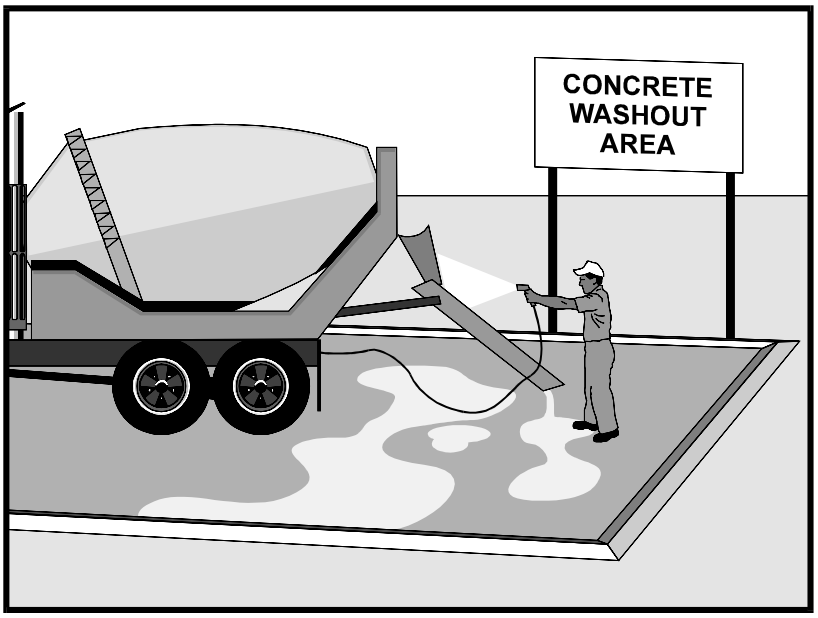
Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

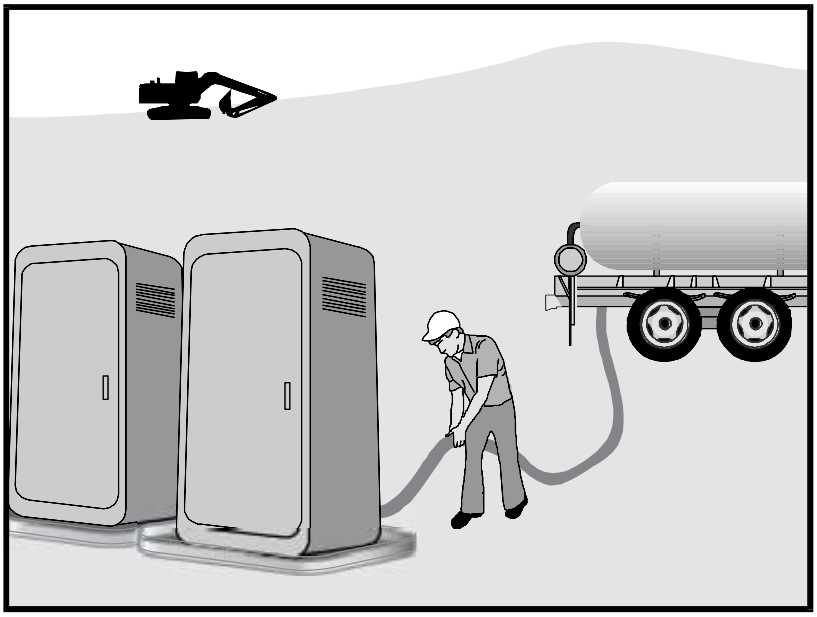
Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.
- Concrete trucks and other concrete-coated equipment are washed onsite.

Sanitary/Septic Waste Management WM-9



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

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Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

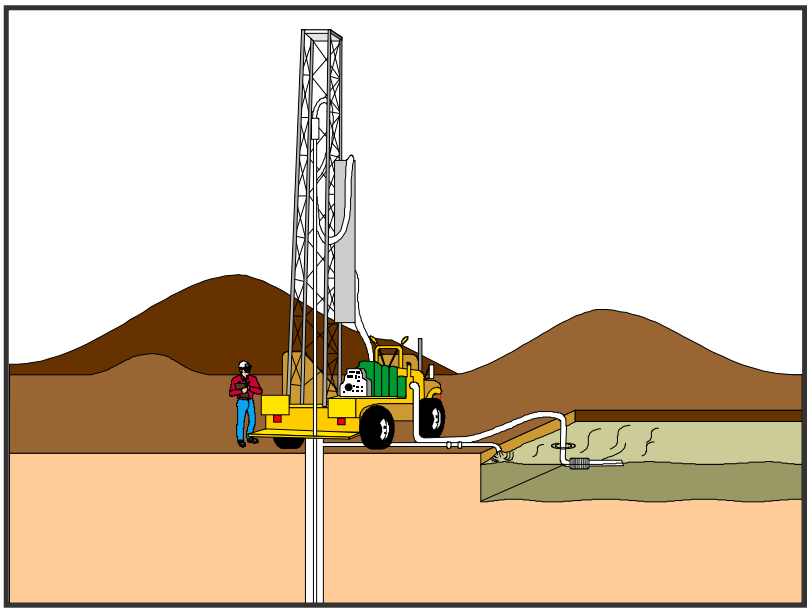
Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

Liquid Waste Management WM-10



Description and Purpose

Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.

Suitable Applications

Liquid waste management is applicable to construction projects that generate any of the following non-hazardous by-products, residuals, or wastes:

- Drilling slurries and drilling fluids
- Grease-free and oil-free wastewater and rinse water
- Dredgings
- Other non-stormwater liquid discharges not permitted by separate permits

Limitations

- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).
- Liquid waste management does not apply to dewatering operations (NS-2 Dewatering Operations), solid waste management (WM-5, Solid Waste Management), hazardous wastes (WM-6, Hazardous Waste Management), or

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

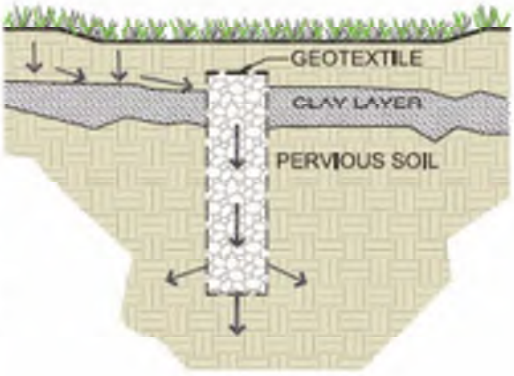
None

EXHIBIT 2

TYPICAL LID BMPs

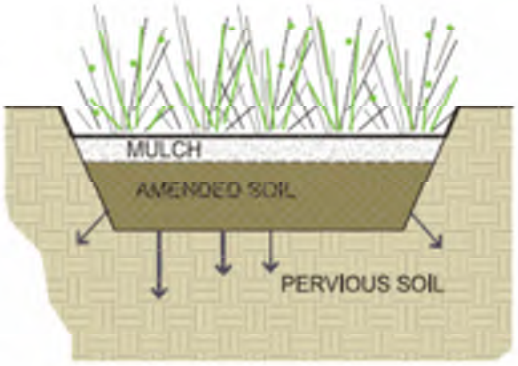
Dry Wells

A dry well is defined as an excavated, bored, drilled, or driven shaft or hole whose depth is greater than its width. Drywells are similar to infiltration trenches in their design and function, as they are designed to temporarily store and infiltrate runoff, primarily from rooftops or other impervious areas with low pollutant loading. A dry well may be either a drilled borehole filled with aggregate or a prefabricated storage chamber or pipe segment.



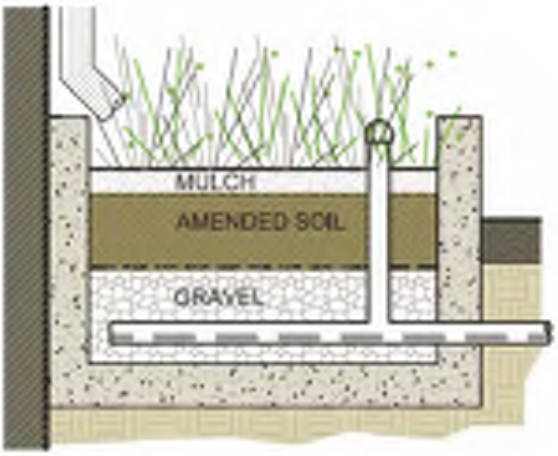
Bioretention

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, planting soils, plantings, and, optionally, a subsurface gravel reservoir layer.



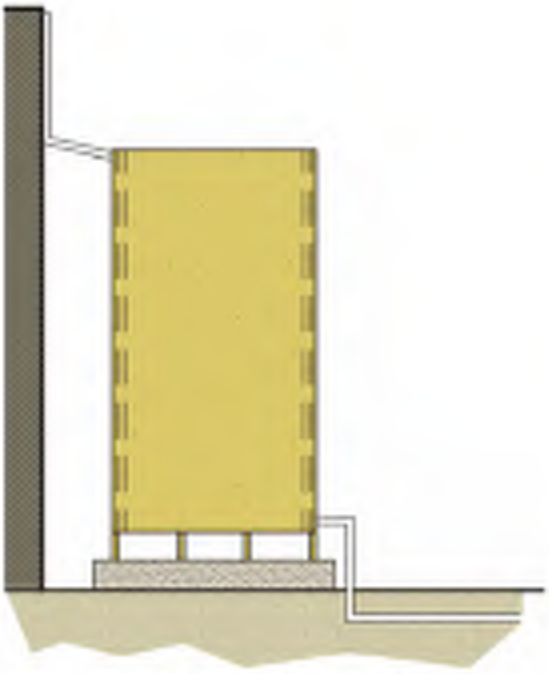
Planter Boxes

Planter boxes are bioretention treatment control measures that are completely contained within an impermeable structure with an underdrain (they do not infiltrate). They are similar to bioretention facilities with underdrains except they are situated at or above ground and are bound by impermeable walls. Planter boxes may be placed adjacent to or near buildings, other structures, or sidewalks.



4.5 CAPTURE AND USE BMPS

Capture and Use refers to a specific type of BMP that operates by capturing stormwater runoff and holding it for efficient use at a later time. On a commercial or industrial scale, capture and use BMPs are typically synonomous with cisterns, which can be implemented both above and below ground. Cisterns are sized to store a specified volume of water with no surface discharge until this volume is exceeded. The primary use of captured runoff is for subsurface drip irrigation purposes. The temporary storage of roof runoff reduces the runoff volume from a property and may reduce the peak runoff velocity for small, frequently occurring storms. In addition, by reducing the amount of stormwater runoff that flows overland into a stormwater conveyance system, less pollutants are transported through the conveyance system into local streams and the ocean. The onsite use of the harvested water for non-potable domestic purposes conserves City-supplied potable water and, where directed to unpaved surfaces, can recharge groundwater in local aquifers.



Cistern Example