Appendix IS-6

Water Resources Report

5420 Sunset Boulevard Mixed-Use Project

5420 Sunset Boulevard
Los Angeles, CA 90027

Water Resources Technical Report
November 8, 2016

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1. INTRODUCTION

1.1. PROJECT DESCRIPTION

This project consists of the development of a new mixed-use project located in the East Hollywood neighborhood of the City of Los Angeles. The project site is located at 5420 Sunset Boulevard and bounded by Sunset Boulevard on the north, Western Avenue on the west, Serrano Avenue on the east, and neighboring private lots to the south. The site area is approximately 293,000 square feet or 6.73 acres.

The project consists of approximately 730,000 square feet of residential uses (including 735 residential units), 93,500 square feet of ground floor retail, and two levels of subterranean parking for up to 1,658 parking stalls.

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. In addition, the report includes an analysis of 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's Special Order No. 007-1299, December 3, 1999, the City has adopted the Los Angeles County Department of Public Works Hydrology Manual as its basis of design for storm drainage facilities. The Los Angeles County Department of Public Works' 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 system (MS4) Permit and 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 requires the approval/review from the County Flood Control District department.

[1] Los Angeles County Department of Public Works Hydrology Manual, January 2006, http://ladpw.org/wrd/publication/index.cfm, accessed on November 14, 2016.

Los Angeles Municipal Code (LAMC)

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-permit (Section 62.105, 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. 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 the City of Los Angeles Department of Public Works, Bureau of Engineering.

2.2. SURFACE WATER QUALITY

Clean Water Act

The Clean Water Act was first introduced in 1948 as the Water Pollution Control Act. The Clean Water Act 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 Clean Water Act 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 Clean Water Act forms the basic national framework for the management of water quality and the control of pollutant discharges. The Clean Water Act 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 Clean Water Act 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 Clean Water Act and as part of Phase I of its NPDES permit program, the USEPA began requiring NPDES permits for: (1) MS4s 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

[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.

of the USEPA's NPDES permit program, which went into effect in early 2003, extended the requirements for NPDES permits to: (1) numerous small municipal separate storm sewer systems,[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. The joint authority of 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 authorizes the SWRCB to implement the provisions of the Clean Water Act, 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 municipal separate storm sewer system (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. http://www.epa.gov/lawsregs/laws/cwa.html accessed on November 14, 2016.

As discussed above, under the California Water Code (CWC), the State of California 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 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 Antidegradation 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 Antidegradation Policy, the California Antidegradation 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 EPA promulgated the California Toxics Rule, which establishes water quality criteria for certain toxic substances to be applied to waters in the State. The EPA promulgated this rule based on the EPA'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 Regional Water Quality Control Board (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 groundwaters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's antidegradation 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]

[5] Los Angeles Regional Water Quality Control Board. LARWQCB Basin Plan http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/ accessed on November 14, 2016.

The Basin Plan is a resource for the RWQCB 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 Clean Water Act 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.

Construction General Permit

SWRCB Order No. 2009-0009-DWQ known as the "Construction General Permit" was adopted on September 2, 2009. 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 Construction 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 management responsibilities. A construction site subject to the Construction General Permit must prepare and implement a SWPPP that meets the requirements of the Construction General Permit.[6] [7]

Los Angeles County Municipal Storm Water System (MS4) Permit

[6] State Water Resources Control Board. http://www.swrcb.ca.gov/water_issues/programs/npdes/aceesed on November 14, 2016.

[7] USEPA. U.S. Environmental Protection Agency - NPDES. http://cfpub.epa.gov/npdes/ aceesed on November 14, 2016.

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 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 Permittees.

Stormwater Quality Management Program (SQMP)

In compliance with the Los Angeles County MS4 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 SWMP 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
- Implement a program to document, track, and report illicit connections and discharges to the storm drain system.

The MS4 Permit contains the following provisions for implementation of the SQMP by the Co-Permittees:

1. General Requirements:

- Each permit is required to implement the SQMP in order to comply with applicable stormwater program requirements.

- The SQMP shall be implemented and east 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 stormwater 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 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-Permittee:

   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 Budge Summary of expenditures for the stormwater 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).

    - 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-stormwater discharges to the storm drain system including discharge to the MS4 from various development types.

Standard Urban Stormwater Mitigation Plan (SUSMP)

Under the Los Angeles County Municipal NPDES Permit, permittees are required to implement a development planning program to address storm water pollution. These programs require project applicants for certain types of projects to implement Standard Urban Stormwater Mitigation Plans (SUSMP) throughout the operational life of their projects. The purpose of SUSMP is to reduce the discharge of pollutants in storm water by outlining BMPs which must be incorporated into the design plans of new development and redevelopment. A project is subject to SUSMP if it falls under one of the categories listed below:

1. Single-family hillside homes
2. Ten or more unit homes (including single family homes, multifamily homes, condominiums, and apartments).
3. Automotive service facilities
4. Restaurants
5. 100,000 or more square-feet of impervious surface in industrial/commercial development.
6. Retail gasoline outlet
7. Parking lots with 5,000 square feet or more of surface area or with 25 or more parking spaces
8. Redevelopment projects in subject categories that meet redevelopment thresholds
9. Location within or directly adjacent to or discharging directly to an environmentally sensitive area if the discharge is likely to impact a sensitive biological species or habitat and the development creates 2,500 square feet or more of impervious surface.

Low Impact Development – LA County

In October 2008, the County adopted a Low Impact Development (LID) Ordinance into the Los Angeles County Code Title 12, Chapter 84 to require the use of LID principles in all development projects except road and flood infrastructure projects. With the 2012 MS4 Permit, it became necessary for the County to modify this ordinance to reflect the new stormwater runoff water quality and hydromodification requirements for new development and redevelopment projects. In November 2013, the County amended the Los Angeles County Code Title 12, Chapter 84 to incorporate the requirements of the 2012 MS4 Permit. The November 2013 LID Ordinance became effective December 5, 2013, and requires that all Designated, Non-Designated, street and road construction, and single-family hillside home projects comply with Los Angeles County Code Title 12, Chapter 84. The 2014 LID Standards Manual was prepared to complement and be consistent with the November 2013 LID Ordinance requirements.

Ultimately, a project applicant must submit a comprehensive LID Plan and analysis demonstrating compliance with the LID Standards Manual (which also constitutes compliance with the November 2013 LID Ordinance) for review and approval by the Director of Public Works. [8]

Low Impact Development – City of Los Angeles

[8] Los Angeles County. "Low Impact Development Standards Manual." February, 2014

In October 2011, the City of Los Angeles passed an ordinance (Ordinance No. 181899) amending City of Los Angeles Municipal Code Chapter VI, Article 4.4, Sections 64.70.01 and 64.72 to expand the applicability of the existing SUSMP requirements by imposing rainwater 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.

The City of Los Angeles Bureau of Sanitation, Watershed Protection Division will adopt the LID standards as issued by the LARWQCB and the City of Los Angeles Department of Public Works. The LID Ordinance will conform 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 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 groundwaters, sets narrative and

[9] City of Los Angeles. "Low Impact Development Best Management Practices Handbook." June, 2011

numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's antidegradation 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 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, as set forth in the CFR, 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 CCR, Title 22, Division 4, Chapter 15, that are at least as stringent as those developed by the USEPA, as required by the federal Safe Drinking Water Act.

California Water Plan

The California Water Plan provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The California Water 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 California Water 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 greater Los Angeles area within the Ballona Creek Watershed. Ballona Creek is a 9 mile long flood protection channel that drains the Los Angeles basin, from the Santa Monica Mountains on the north, the Harbor Freeway (110) on the east, and the Baldwin Hills on the south. The Ballona Creek Watershed totals approximately 130 square miles. It borders the crest of the Santa Monica Mountains on the north, the Ventura-Los Angeles County line, and extends to downtown Los Angeles. To the south, The Watershed extends to the south across the Los Angeles plain to include the area north of Baldwin Hills. The major tributaries to the Ballona Creek include Centinela Creek, Sepulveda Canyon Channel, Benedict Canyon Channel, and numerous storm drains. Refer to Figure 8 for Ballona Creek Watershed Map.

3.1.2. LOCAL

Underground storm drainage facilities along Sunset Boulevard and Western Avenue are owned and maintained by City of Los Angeles. Based on City of Los Angeles record data, there is an existing 30-inch Reinforced Concrete Pipe (RCP) on Sunset Boulevard and a 60-inch RCP on Western Avenue. The existing site with approximately 95-percent impervious area has a 50-year storm flow rate of 22.48 cubic feet per second (cfs). See Figure 3 for calculation results. Stormwater runoff enters off-site catch basins and underground storm drainage pipes which convey stormwater through underground pipe networks into Ballona Creek. Ballona Creek flows generally southwest, ultimately discharging into the Pacific Ocean at the Santa Monica Bay. Ballona Creek is designed to discharge to Santa Monica Bay approximately 71,400 cubic feet per second from a 50-year frequency storm event.

3.1.3. ON SITE

The existing Project Site is approximately 95-percent impervious. The Project Site is not crossed by any water courses or rivers. The existing site currently serves as an at-grade asphalt parking lot and two existing buildings. As shown in Figure 1, stormwater from the Project Site is conveyed by sheet flow in southwest and southeast directions. A portion of the flow is directed towards four existing on-site catch basins and further discharged to the curb faces of Sunset Boulevard and Western Avenue via curb drains. The remaining stormwater runoff flows towards either the public right-of-way or the trench drains in the grocery store basement garage. All the stormwater runoff eventually drains to the City storm drain system on Western Avenue. The result of existing Q_{50} was presented in Table 1 below. The calculations are performed in HydroCalc in Figure 3.

Table 1- Existing Drainage Stormwater Runoff Calculations		
Drainage Area	Area (Acres)	Q50 (cfs) (volumetric flow rate measured in cubic feet per second)
Total	6.75	22.48

3.2. SURFACE WATER QUALITY

3.2.1. REGIONAL

As stated above, the Project Site lies within the Ballona Creek Watershed. Constituents of concern listed for Ballona Creek under California's Clean Water Act Section 303(d) List include Cadmium (sediment), Chlordane (Tissue & Sediment), Coliform Bacteria, Copper (Dissolved), Cyanide, DDT, Lead, PAHs, PCBs, Selenium, Sediment Toxicity, Shellfish Harvesting Advisory, Silver, Toxicity, Trash, Viruses (Enteric), and Zinc.

3.2.2. LOCAL

In general, urban stormwater runoff occurs following precipitation events with the volume of runoff flowing into the drainage system depends 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 it falls through. Contaminants on surfaces such as roads, maintenance areas, parking lots, and buildings, which are usually contained in dry weather conditions, may be carried by rainfall runoff into drainage systems. The City has installed 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

While the Project Site currently does not have structural BMPs for the treatment of stormwater runoff from existing impervious surfaces such as building roof areas and pavements, there are a range of non-structural BMPs that are currently utilized at the Project Site to minimize the impact of pollutant sources. These include general housekeeping practices such as regular trash collection, spill prevention and response activities, proper storage of hazardous materials and wastes; and substituting environmentally friendly products for environmentally hazardous products, such as soaps, solvents, and pesticides. In addition, stormwater runoff from existing pervious surfaces such as island landscaped areas and planting areas is naturally treated to some extent by existing vegetation and the absorptive properties of the existing soils. Based on the existing operations within the Project Site, the on-site runoff likely contains the

following pollutants of concern: sediment, nutrients, pesticides, metals, pathogens, and oil and grease.

3.3. GROUNDWATER LEVEL

3.3.1. REGIONAL

Groundwater use for domestic water supply is a beneficial use of groundwater basins in Los Angeles County. The City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin. The Los Angeles Coastal Plain Basin is comprised of the Hollywood, Santa Monica, Central, and West Coast Subbasins. Groundwater flow in the Los Angeles Coastal Plain Groundwater 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

Within the Los Angeles Coastal Plain Groundwater Basin, the Project Site specifically overlies the Hollywood Subbasin. The Hollywood Subbasin underlies the northeastern part of the Coastal Plain of Los Angeles Groundwater Basin. The subbasin is bounded on the north Santa Monica Mountains and the Hollywood fault, on the east by the Elysian Hills, on the west by the Inglewood fault zone, and on the south by the La Brea High, formed by an anticline that brings impermeable rocks close to the surface. Surface drainage flows southward to join Ballona Creek, then westward to the Pacific Ocean. Average annual precipitation ranges from 12 to 14 inches.[10]

Groundwater in the Hollywood Subbasin is mainly produced from Pleistocene age alluvial sands and gravels (DWR 1961). Semi-perched water may exist in the Holocene alluvium that forms a thin cover over about half of the subbasin (DWR 1961). The remainder of the subbasin has silt and clay deposits of the Bellflower aquiclude of the Lakewood Formation cropping out at the surface (DWR 1961). Historical production has come from deeper aquifers of the Lakewood and San Pedro Formations (DWR 1961). These aquifers are widespread throughout the Coastal Plain of Los Angeles. Unconfined groundwater conditions exist in the shallow aquifer in the northern and eastern portion of the subbasin. In the deeper aquifers and in the remainder of the subbasin, groundwater is confined, and clay members separate the aquifers over much of this subbasin. Specific yield of the sediments in this subbasin ranges up to 26 percent (DWR 1961).

[10] California Groundwater Bulletin 118: Coastal Plain of Los Angeles Groundwater Basin, Hollywood Subbasin. http://www.water.ca.gov/groundwater/bulletin118/basindescriptions/4-11.02.pdf accessed on November 14, 2016.

The Hollywood fault forms a restrictive subsurface boundary along the northern part of the subbasin by placing the alluvial materials against basement rocks of the Santa Monica Mountains. The Inglewood fault forms an effective barrier to groundwater flow at the southern end of the subbasin boundary, but a less effective barrier at the northern end. The Hollywood syncline plunges westward and contains thicker, more transmissive aquifer deposits that help direct subsurface flow westward. The La Brea High is formed by an anticline where most of the San Pedro Formation was eroded prior to deposition of the Lakewood Formation. Groundwater flow is restricted because of the lack of the San Pedro Formation aquifers across the high. Groundwater moves around the structure at the western end where the San Pedro Formation remains (DWR 1961).

Groundwater in the Subbasin is replenished by percolation of precipitation and stream flow from the Santa Monica Mountains to the north. Urbanization in this area has decreased the amount of pervious surface area allowing direct percolation. Therefore, natural recharge is somewhat limited. The natural safe yield of the Subbasin is estimated to be approximately 3,000 acre-feet per year (AFY).

The primary producer from the Subbasin is the City of Beverly Hills, which currently owns and operates 4 groundwater production wells in the Subbasin. These wells have a combined capacity of 2,083 gallons per minute (gpm) and are treated by a reverse osmosis desalter.[11] Groundwater flow within the Subbasin generally flows east to west.

3.3.3. ON-SITE

As previously discussed, the Project Site is located above the Hollywood Subbasin of the Coastal Plain of the Los Angeles Groundwater Basin. The Project Site slopes generally to the southeast and southwest at varying gradients with an elevation of approximately 364 feet above mean sea level on the northeastern corner of the Project Site to approximately 354 feet above mean sea level on the southwestern corner.

Based on on-site explorations conducted as part of the Geotechnical Engineering Investigation for the Project Site, encountered fill materials varied between three and six feet in depth. Fill materials consisted of clayey silts, and sandy silts to silty clays which are dark brown, moist, and stiff. The upper native soils underlying the site consist of clayey silts, silty clays, sandy silts, with depth the native soils grade to silty sands and sands. The native soils are dark brown, medium dense to stiff, and fine grained.

Groundwater was encountered at depth of 52-1/2 feet below ambient site grade in geotechnical excavation located close to the center of the Project Site. The historic high groundwater level was established by review of California Geological Survey Seismic Hazard Evaluation Report 026 Plate 1.2 entitled "Historically Highest Ground Water Contours". Review of this plate indicates that the historically highest groundwater level

11 http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Beverly%20Hills,%20City%20of/Beverly%20Hills%202010%20UWMP_August%202011.pdf accessed on November 14, 2016.

is on the order of 42 feet below grade. Fluctuations on the level of groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported in the project geotechnical report dated August 16, 2016. Fluctuations also may occur across the site. High groundwater levels can result in changed condition. Furthermore there are no groundwater production wells or public water supply wells within one mile of the Project Site.[12]

3.4. GROUNDWATER QUALITY

3.4.1. REGIONAL

As stated above, the City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin. This basin falls under the jurisdiction of the LARWQCB. According to LARWQCB's Basin Plan, objectives applying to all ground waters of the Region include Bacteria, Chemical Constituents and Radioactivity, Mineral Quality, Nitrogen (Nitrate, Nitrite), and Taste and Odor.[13]

3.4.2. LOCAL

As stated above, the Project Site specifically overlies the Hollywood Basin. Based upon LARWQCB's Basin Plan, constituents of concern listed for the Hollywood Basin include Boron, Chloride, Sulfate, TDS, and Nitrate.[13]

3.4.3. ON-SITE

Though it is possible for surface water borne contaminants to percolate into groundwater and affect groundwater quality, as the Project Site is primarily impervious in the existing condition, no appreciable infiltration of potential contaminants described above is expected to occur. Additionally, the combination of good housekeeping practices described above, compliance with all existing hazardous waste regulations, and compliance with the City of Los Angeles LID Ordinance further reduce this potential. Therefore, groundwater quality is not impacted by existing activities at the Project Site.

Other types of risk such as underground storage tanks have a greater potential to impact groundwater. It appears no underground storage tanks currently exist on the Project Site.

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[12] State Water Resources Control Board Groundwater Ambient Monitoring & Assessment GeoTracker , available at http://geotracker.waterboards.ca.gov/gama/gamamap/public/?CMD=runreport&myaddress=11725+los+angeles%2C+ca; accessed on November 14, 2016.

[13] http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/electronics_documents/Final%20Chapter%203%20Text.pdf; accessed on November 14, 2016.

4. SIGNIFICANCE THRESHOLDS

In accordance with the significance thresholds described by CEQA, the Project has been analyzed for potential impacts on hydrology, water quality, and groundwater. This report includes an analysis of the Project with respect to the CEQA thresholds as described below.

4.1. SURFACE WATER HYDROLOGY

With respect to surface water hydrology, the CEQA Guidelines inquire whether the Project would:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems, or provide substantial additional sources of polluted runoff;

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

- Place within a 100-year flood hazard area structures, which would impede or redirect flood flows;

- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as result of the failure of levee or dam;

- Would the project result in the construction of new water or wastewater treatment facilities, the construction of which could cause significant environmental effects; or

- Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

4.2. SURFACE WATER QUALITY

With respect to water quality, the CEQA Guidelines inquire whether the Project would:

- Violate any water quality standard or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume of a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site; or
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

4.3. GROUNDWATER LEVEL

With respect to groundwater level, the CEQA Guidelines inquire whether the Project would:

- Substantially deplete groundwater supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume of a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Inundation by seiche, tsunami, or mudflow.

4.4. GROUNDWATER QUALITY

With respect to groundwater quality, the CEQA Guidelines inquire whether the Project would:

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map; or

- Place within a 100-year flood hazard area structures, which would impede or redirect flood flows.

5. METHODOLOGY

5.1. SURFACE WATER HYDROLOGY

The Project Site is located in the Hollywood area under the jurisdiction of the City of Los Angeles Department of Public Works Bureau of Engineering. 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 also 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 City's CEQA Threshold 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. This is in part because the City of Los Angeles uses the 50-year storm event to plan the existing and planned storm water drainage systems. Consequently, the use of the 50-year frequency design storm event in this analysis is in line with the CEQA threshold to determine if the project "[exceeds] the capacity of existing or planned storm water drainage systems or provide[s] additional sources of polluted runoff."

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.

The LACDPW 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 3 for the Hydrocalc Calculator results and Figure 5 for 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 SWPPP in compliance with the Construction General Permit. The SWPPP shall begin when construction commences and before any site clearing or demolition activity. During construction, the SWPPP will be referred to regularly and amended as changes occur throughout the construction process. The Notice of Intent (NOI), Amendments to the SWPPP, Annual Reports, Rain Event Action Plans (REAPs), and Non-Compliance Reporting are posted to the State's SMARTS website in compliance with the requirements of the Construction General Permit. In addition, as part of the NOI application a risk level evaluation will be performed to determine the risk level category (risk level 1, 2, or 3) for the Project based on a detailed construction schedule, soil type, site slope, and location. Each of the three risk level categories establishes specific monitoring and testing requirements.

5.2.2. OPERATION

The Project is committed to meet all applicable stormwater management requirements through compliance with City of Los Angeles' LID standards. LID standards are used to analyze the stormwater peak mitigated flow rate and volume. LID standards are also required that projects select source control and treatment control BMPs from a priority list approved by the RWQCB. The selected BMPs must control peak flow discharge to provide stream channel and over bank flood protection, based on LID flow design criteria. Furthermore, the source and treatment control BMPs will be sufficiently designed and constructed to collectively treat, infiltrate, capture and use, or filter stormwater runoff to meet or exceed the requirements of the City Watershed Protection Division and the LACDPW Watershed Division.

As discussed above, the Project will implement infiltration BMPs as the proposed means of stormwater management this report analyzes the feasibility of proposed infiltration systems at the Project site. According to the City's LID standards, the infiltration systems shall be sized to capture the runoff generated from the greater of the 85th percentile storm and the 0.75-inch storm event at a minimum:

$$V_{design}\ (\text{gallons}) = (85^{th}\ \text{percentile} * 7.48\ \text{gallons/cubic foot}) * \text{Catchment Area (sq. ft.)}$$

Where:

$$\text{Catchment Area} = (\text{Impervious Area} \times 0.9) + [(\text{Pervious Area} + \text{Undeveloped Area}) \times 0.1]$$

For catchment areas given in acres, multiply the above equation by 43,560 sq. ft./acre. [14]

According to the LA County LID Standards Manual, the design storm, from which the Stormwater Quality Design Volume (SWQDv) is calculated, is defined as the greater of:

- The 0.75-inch, 24-hour rain event; or
- The 85th percentile, 24-hour rain event as determined from the Los Angeles County 85th percentile precipitation isoheytal map.

The volume of stormwater runoff that must be retained at a project site is calculated using MODRAT developed by County of Los Angeles. MODRAT uses the design storm and a time of concentration to calculate the stormwater runoff at different times during a storm. By calculating the stormwater runoff flows based on the rainfall distribution, a hydrograph can be developed. The area under the hydrograph curve is the volume of stormwater runoff. The procedure for calculating the stormwater runoff using the MODRAT is an iterative process. LACDPW has developed a regression equation to calculate the time of concentration. The procedures for calculating the time of concentration and SWQDv using MODRAT is described below[15]:

Step 1: Assume Initial Time of Concentration

Assume an initial time of concentration (T_C).

Step 2: Calculate Rainfall Intensity

Calculate the rainfall intensity using the assumed initial time of concentration as the duration from the following equation:

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[14] Planning and Land Development Handbook for Low Impact Development (LID), 5th Edition dated May 9, 2016, http://www.lastormwater.org/wp-content/files_mf/lidmanualfinal.pdf accessed on November 14, 2016.

[15] County of Los Angeles Department of Public Works Low Impact Development https://dpw.lacounty.gov/ldd/lib/fp/Hydrology/Low%20Impact%20Development%20Standards%20Manual.pdf accessed on November 14, 2016.

$$I_t = I_{1440} * (\frac{1440}{t})^{0.47}$$

Where:

t = Duration = Assumed initial time of concentration [min];

I_t = Rainfall intensity for the duration [in/hr];

and I_{1440} = 24-hour rainfall intensity [in/hr].

Step 3: Calculate Impervious Area and Stormwater Runoff Coefficient

Determine the impervious area of the project site from the following equation or from Appendix D of the 2006 Hydrology Manual:

$$IMP = \frac{\sum_{i=1}^{n}(IMP_i * A_i)}{A_T}$$

Where:

IMP = Project site-specific percent impervious;

IMP_i = Impervious area, i;

A_i = Area, i [ft^2];

and A_T = Total project site area [ft^2]

Determine the undeveloped stormwater runoff coefficient, Cu, using the soil curve data from Appendix C and the rainfall intensity calculated in Step 2. Calculate the developed stormwater runoff coefficient using the following equation:

$$C_d = (0.9 * IMP) + (1.0 - IMP) * C_u$$

Where:

C_d = Developed project site stormwater runoff coefficient;

IMP = Site-specific percent impervious for project site;

and C_u = Undeveloped project site stormwater runoff coefficient.

Step 4: Calculate the Time of Concentration (T_C)

Calculate the time of concentration using the following equation:

$$T_C = \frac{0.31 * L^{0.483}}{(C_d * I_t)^{0.519} * S^{0.135}}$$

Where:

T_C = Time of concentration [min];

L = Longest flow path length from watershed boundary to outlet [ft];

C_d = Developed project site stormwater runoff coefficient;

I_t = Rainfall intensity for the duration [in/hr];

and S = Slope of longest flow path [ft/ft].

Step 5: Compare Initial Assumption with Tc

If the calculated time of concentration (Step 4) is within 0.5 minutes of the assumed time of concentration (Step 1), then the value is sufficient. If the calculated and estimated times of concentration differ by more than 0.5 minutes, round the calculated time of concentration (Step 4) to the nearest minute and use that value as the assumed time of concentration (Step 1) and restart the calculation again from Step 2.

Step 6: Calculate Peak Flow Rate

Round the calculated time of concentration to the nearest minute and recalculate the rainfall intensity and developed project site stormwater runoff coefficient. Calculate the peak flow rate using the rational equation:

$$Q = \frac{C_d * I * A}{43{,}560}$$

Where:

Q = Peak flow rate [cfs];

C_d = Developed project site stormwater runoff coefficient;

I = Rainfall intensity [in/hr];

and A = Project area [ft^2].

Step 7: Calculate SWQDv

MODRAT relies on temporal rainfall distribution and the time of concentration to generate hydrographs. The steps for calculating stormwater runoff are presented in the 2006 Hydrology Manual. Manual calculations for generating hydrographs require a lot of time and careful organization. The calculations are ideally suited for a computer program, and have been included in the HydroCalc program discussed below. Use of this program is encouraged to reduce the time required to reach a solution.

HydroCalc Program

HydroCalc, which is available at http://dpw.lacounty.gov/wrd/publication/, completes the full MODRAT calculation process and produces the peak stormwater runoff flow rates and volumes for single subareas. Because HydroCalc does not have reach routing capabilities, it is limited to watersheds and project areas up to 40 acres.

5.3. GROUNDWATER LEVEL

The State's CEQA Guidelines require a review of the Project, environmental setting, significance thresholds, and comparison with the screening criteria as stated above.

5.4. GROUNDWATER QUALITY

The State's CEQA Guidelines require a review of the Project, environmental setting, significance thresholds, and comparison with the screening criteria as stated above.

6. PROJECT IMPACT ANALYSIS

6.1. CONSTRUCTION

6.1.1. SURFACE WATER HYDROLOGY

Construction activities for the Project would include excavating down approximately 25 feet for two-level subterranean parking garage, building up the structure, and hardscape and landscape around the structure. It is anticipated that grading activities of approximately 330,000 net cubic yards of soil with 25% contingency would be exported in construction of the Project. Construction activities would have the potential to temporarily alter existing drainage patterns and flows within the Project Site by exposing the underlying soils and making the Project Site temporarily more permeable. Exposed and stockpiled soils could be subject to erosion and conveyance into nearby storm drains during storm events. In addition, construction activities such as earth moving, maintenance/operation of construction equipment, and handling/storage/disposal of materials could contribute to pollutant loading in stormwater runoff.

However, as the construction site would be greater than one acre, the Project would be required to obtain coverage under the NPDES General Construction Permit. In accordance with the requirements of this permit, the Project would implement a SWPPP 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 NPDES and SWPPP 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.

The Project would not substantially alter the Project Site drainage patterns in a manner that would result in substantial erosion, siltation, flooding on- or off-site. Similarly, adherence to standard compliance measurements in construction activities that 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. As such, construction-related impacts to hydrology would be less than significant. 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, expected dewatering, and handling/storage/disposal of materials could contribute to pollutant loading in stormwater runoff. However, as previously discussed, construction contractors disturbing greater than one acre of soil would be required to obtain coverage under the NPDES General Construction Permit (order No. 2012-0006-DWQ). In accordance with the requirements of the permit, the Project Applicants would prepare and implement a site-specific SWPPP adhering to the California Stormwater Quality Association (CASQA) BMP Handbook. The SWPPP would specify BMPs to be used during construction. BMPs would include but not be limited to: erosion control, sediment control, non-stormwater management, and materials management BMPs. Refer to Exhibit 2 for typical SWPPP BMPs to be implemented during construction of the Project.

With the implementation of site-specific BMPs included as part of the SWPPP, the Project would reduce or eliminate the discharge of potential pollutants from the stormwater runoff. In addition, the Project Applicant would be required to comply with City of Los Angeles grading permit regulations, which require necessary measures, plans (including a wet weather erosion control plan if construction occurs during the rainy season), and inspection to reduce sedimentation and erosion. Therefore, with compliance with City of Los Angeles grading permit regulations, construction of the Project would not result in discharge that would violate any water quality standard or waste discharge requirements, or otherwise substantially degrade water quality. Furthermore, construction of the Project would not result in discharges that would cause regulatory standards to be violated in Ballona Creek. Therefore, temporary construction-related impacts on surface water quality would be less than significant.

6.1.3. GROUNDWATER LEVEL

As stated above, construction activities for the Project would include excavation to a depth of approximately 25 feet for two-level subterranean parking garage, building up the structure, and hardscape and landscape around the structure. The groundwater was encountered at a depth of 52-1/2 feet below ambient site grade and the historically highest groundwater level is on the order of 42 feet below grade as stated in the Project geotechnical report dated on August 16, 2016. As both the measured and historic groundwater levels are lower than the planned excavation, the Project would result in less than significant impacts related to groundwater level 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 to a maximum depth of approximately 25 feet below ground surface. 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.

Since construction activities for the Project would include excavation to depths of approximately 25 feet for two-level subterranean parking garage and the groundwater was encountered at a depth of 52-1/2 deep below ambient site grade, the Project would not encounter groundwater during excavation. Provided the adherence to the appropriate compliance and containment measures, the Project would result in less than significant impacts related to groundwater quality.

6.2. OPERATION

6.2.1. SURFACE WATER HYDROLOGY

As previously discussed, the entire project site is approximately 95-percent impervious including two buildings and an at-grade surface parking lot. The remaining 5-percent of the existing Project Site is pervious surfaces consisting of landscape areas and planters. The Project would include development of new buildings, paved areas, and landscaped areas. With implementation of the Project, the amount of impervious area is not expected to exceed 95-percent of the entire site area; therefore, the result of existing Q_{50} presented in Table 1 in Section 3.1.3. is considered to be closed to the proposed condition.

In addition, as described above, as part of LID compliance for the Project to manage post-construction stormwater runoff, the Project would include the installation of catch basins, planter drains, and building roof drain downspouts throughout the Project Site to collect roof and site runoff and direct stormwater away from structures through a series of underground storm drain pipes. This on-site stormwater conveyance system would serve to prevent onsite flooding and nuisance water on the Project Site. In addition, with implementation of the proposed BMPs, the volume of water leaving the Project Site

would be further reduced compared to existing conditions. Additionally, as stated above, the Project Site is not located within a FEMA or City of Los Angeles designated 100-year flood plain. In addition, the Project is not located within a potential inundation area as designed by the City of Los Angeles General Plan Safety Element.

Based on the above, the Project would not result in an incremental impact on either on-site or off-site flooding during a 50-year storm event, 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 that would result in an incremental effect on the capacity of the existing storm drain system. As such, operation of the Project would result in a less than significant impact on surface water hydrology.

6.2.2. SURFACE WATER QUALITY

The Project Site will not increase concentrations of the items listed as constituents of concern for the Ballona Creek Watershed.

The Project will implement BMPs for managing stormwater runoff in accordance with the current City of Los Angeles LID Ordinance LID requirements. Since it appears there are no existing onsite BMPs, stormwater run-off from the Project will result in improved surface water quality.

The LID requirements for the Project Site would outline the stormwater treatment post-construction BMPs required to control pollutants associated with storm events up to the 85^{th} percentile storm event, per the County of Los Angeles LID Standards Manual and City of Los Angeles LID Ordinance. The Project BMPs will control stormwater runoff with no increase in runoff resulting from the Project.

According to City of Los Angeles LID Ordinance LID Requirements, the order of priority for selected BMPs is infiltration systems, stormwater capture and use, high efficiency biofiltration/bioretention systems, and any combination of any of the above. Based on the project geotechnical report dated August 16, 2016, it is assumed that the site soils are not suitable for infiltration; therefore, either capture and use or biofiltration (i.e., flow-through planters) will be implemented in this report. . The proposed site drainage is divided into four subareas based on the layout of proposed buildings. See Figure 2 for proposed drainage areas. Calculations associated with Capture and Use and Biofiltration options are conducted in Figure 4 and Exhibit 1 shows conceptually designed Post-Construction BMPs. Tables 2 and 3 below are the summaries for both approaches.

Table 2 - Capture and Use Summary (See Figure 4 for details)				
Drainage Area	Tributary Area (ft^2)	Pervious Ratio	V_{design} (Gal.)*	Required Planting Area (ft^2)
1	76,100	5.00%	40,800	6,070
2	76,100	5.00%	40,800	6,070
3	67,180	5.00%	36,013	5,360
4	67,180	5.00%	36,013	5,360

* V_{design} under Capture and Use approach is the stormwater storage volume which is required to be stored on site. It can be a combination of planters and tanks.

Table 3 – Biofiltration (Flow-through Planter) Summary (See Figure 4 for details)				
Drainage Area	Tributary Area (ft^2)	Pervious Ratio	V_{design} (ft^3)**	Required Planting Area (ft^2)
1	76,100	5.00%	8,182	5,035
2	76,100	5.00%	8,182	5,035
3	67,180	5.00%	7,222	4,444
4	67,180	5.00%	7,222	4,444

*

** V_{design} under Biofiltration (Flow-through Planter) approach is the stormwater storage volume stored in proposed flow-through planters.

As a result of the implementation of stormwater treatment post-construction BMPs, operational impacts on surface water quality would be less than significant.

6.2.3. GROUNDWATER LEVEL

The Project will develop hardscape and structures that cover the majority of the project footprint with impervious surfaces. However, the Project would include the installation of SUSMP and 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 an approved discharge point in the public right-of-way and not result in infiltration of a large amount of rainfall, which would affect groundwater hydrology, including the direction of groundwater flow.

As discussed above, Project development would require excavations with a maximum depth of approximately 25 feet below grade. As described in the Geologic/ Geotechnical/ Soil Evaluation prepared for the Project Site, the historic high groundwater level in the vicinity of the Project site was on the order of 42 feet below grade and the groundwater was encountered at a depth of 52-1/2 feet below ambient site grade.

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

Operational activities which could affect groundwater quality include spills of hazardous materials and leaking underground storage tanks. Surface spills from the handling of hazardous materials most often involve small quantities and are cleaned up in a timely manner, thereby resulting in little threat to groundwater. Other types of risks such as leaking underground storage tanks have a greater potential to affect groundwater. No underground storage tanks are currently operated or will be operated. In addition, while the development of new project would compliance with all applicable existing regulations at the Project Site 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 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. Additionally, the Project would include the installation of SUSMP and 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.

Based on the above, operation of the Project would result in a less than significant impact on groundwater quality.

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 Ballona Creek Watershed. The Project in conjunction with forecasted growth in the Ballona Creek Watershed could cumulatively increase stormwater runoff flows. However, as noted above, the Project does not have an adverse impact on stormwater flows. Also, in accordance with City of Los Angeles, related projects and other future development projects would be required to implement BMPs to manage stormwater in accordance with LID guidelines. Furthermore, the City of Los Angeles Department of Public Works would review each future development project on a case-by-case basis to ensure sufficient local and regional infrastructure is available to accommodate stormwater runoff. Therefore, potential cumulative impacts associated with Project on surface water hydrology would be less than significant.

6.3.2. SURFACE WATER QUALITY

Future growth in the Ballona Creek 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 runoff from the Project Site (most of which is not treated before being discharged 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 does not have an adverse impact and through compliance with all applicable laws, rules and regulations, cumulative impacts to surface water quality would be less than significant.

6.3.3. GROUNDWATER LEVEL

Cumulative groundwater hydrology impacts could result from the overall utilization of groundwater basins located in proximity to the Project Site and the related projects. In addition, interruptions to existing injection or supply wells or designated spreading grounds would have the potential to affect groundwater levels. Any calculation of the extent to which the related projects would extract or otherwise directly utilize groundwater would be speculative. Nonetheless, to the extent existing injection or supply wells or designated spreading grounds are located within or near the related project sites, could adversely affect local and regional groundwater hydrology, including groundwater levels. In addition, the cumulative utilization of groundwater in the region, either as a result of water extraction under the related project sites or extraction from local basins by the local water supply agency to accommodate the related projects could also adversely affect local and regional groundwater hydrology. However, as described above, no water

supply wells, spreading grounds, or injection wells are located within a one mile radius of the Project Site. In addition, Project development would not involve the temporary or permanent extraction of groundwater from the Project Site or otherwise utilize the groundwater.

Furthermore, as previously discussed, implementation of the Project would result in no or minimal increase in impervious surface area. 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. In addition, as the related projects are located in a highly urbanized area, any reduction in groundwater recharge due to the overall net change in impervious area within the related project sites would be minimal in the context of the regional groundwater basin. Additionally, the Project would include the installation of SUSMP and 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 proposed SUSMP and LID BMPs as a means of stormwater treatment and management within the Project Site and related project sites would not result in a 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 Los Angeles Coastal Plain Hollywood Subbasin would be subject to LARWQCB requirements relating to groundwater quality. 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 groundwater quality. As noted above, the Project does not have an adverse impact on groundwater quality. Also, it is anticipated that the Project and other future development projects would also be subject to LARWQCB requirements and implementation of measures to comply with total maximum daily loads. Therefore, based on the fact that the Project does not have an adverse impact and through compliance with all applicable laws, rules and regulations, cumulative impacts to groundwater 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 level, or groundwater quality for this Project.

FIGURE 1
EXISTING ON-SITE DRAINAGE

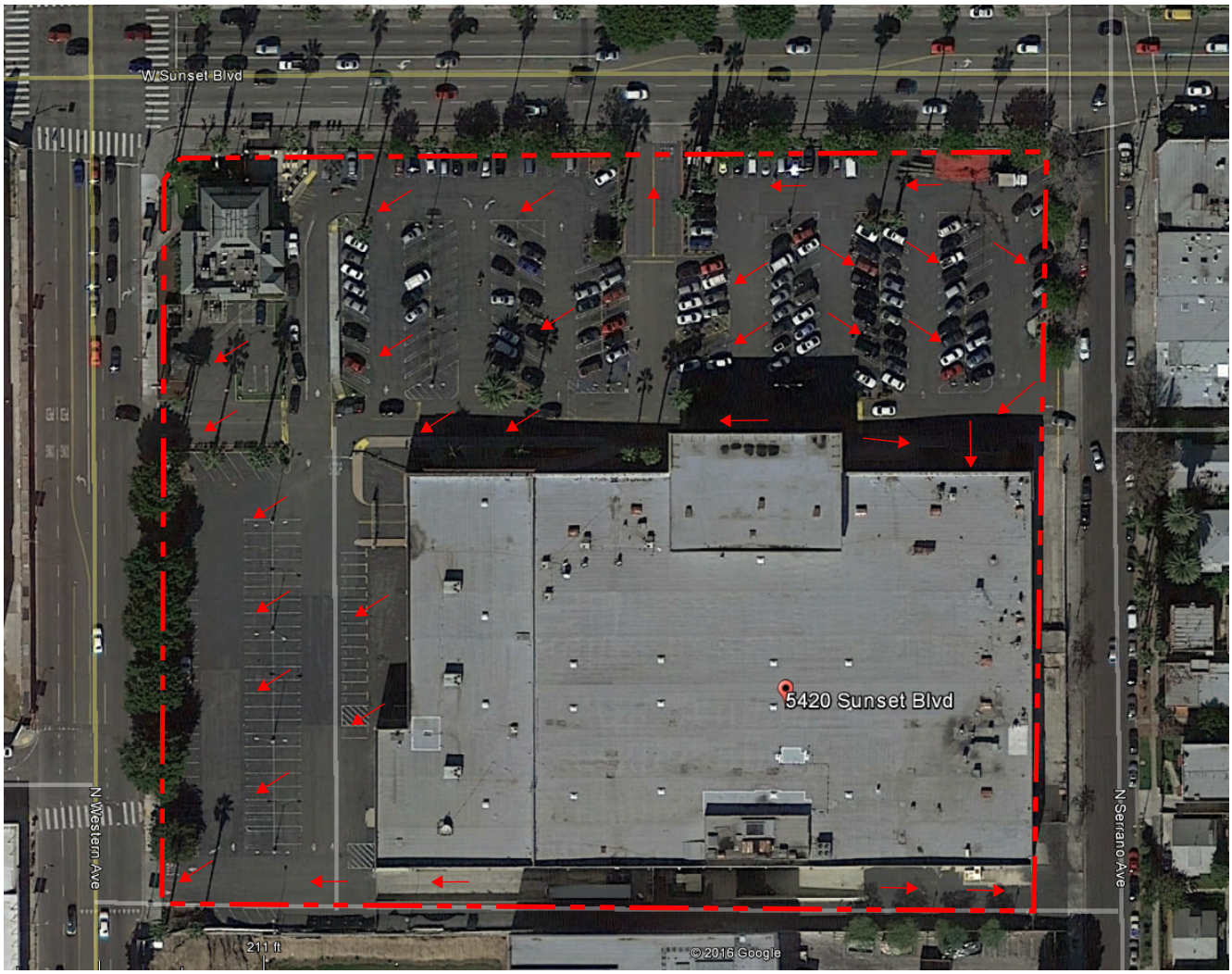


FIGURE 2
PROPOSED ON-SITE DRAINAGE

DRAINAGE AREA 3

DRAINAGE AREA 4

DRAINAGE AREA 2

DRAINAGE AREA 1

BLDG.3
COURTYARD +21'
67,177.34sf

BLDG.4
COURTYARD +21'
67,177.34sf

BLDG.2
COURTYARD +31'
76,105.56 sf

BLDG.1
COURTYARD +31'
76,105.53 sf

POOL
65'x25'

REC FACILITIES

LOBBY 3

LOBBY 2

LOBBY

DE LONGPRE AVENUE

SERRANO AVENUE

WESTERN AVENUE

SUNSET BOULEVARD

IT IS ASSUMED THAT THE PROPOSED SITE DRAINAGE IS DIVIDED INTO FOUR SUBAREAS BASED ON THE LAYOUT OF PROPOSED BUILDINGS. EACH DRAINAGE AREA WILL PROVIDE ITS OWN BMP SYSTEM. SEE SECTION 6.2.2. FOR LID ANALYSIS AND DETAILS.

4 STORY RESIDENTIAL
5 STORY RESIDENTIAL
RESIDENTIAL COMMON AREA
LANDSCAPE

A04
PODIUM FLOOR PLAN

0 30 60 120

SUNSET/ WESTERN Mixed-Use Project | for 5420 Sunset Boulevard LP, LLC

VAN TILBURG, BANVARD & SODERBERGH, AIA | 16011 | 08.23.2016

FIGURE 3
HYDROCALC RESULTS
FOR EXISTING AND PROPOSED SITE CONDITIONS

Peak Flow Hydrologic Analysis

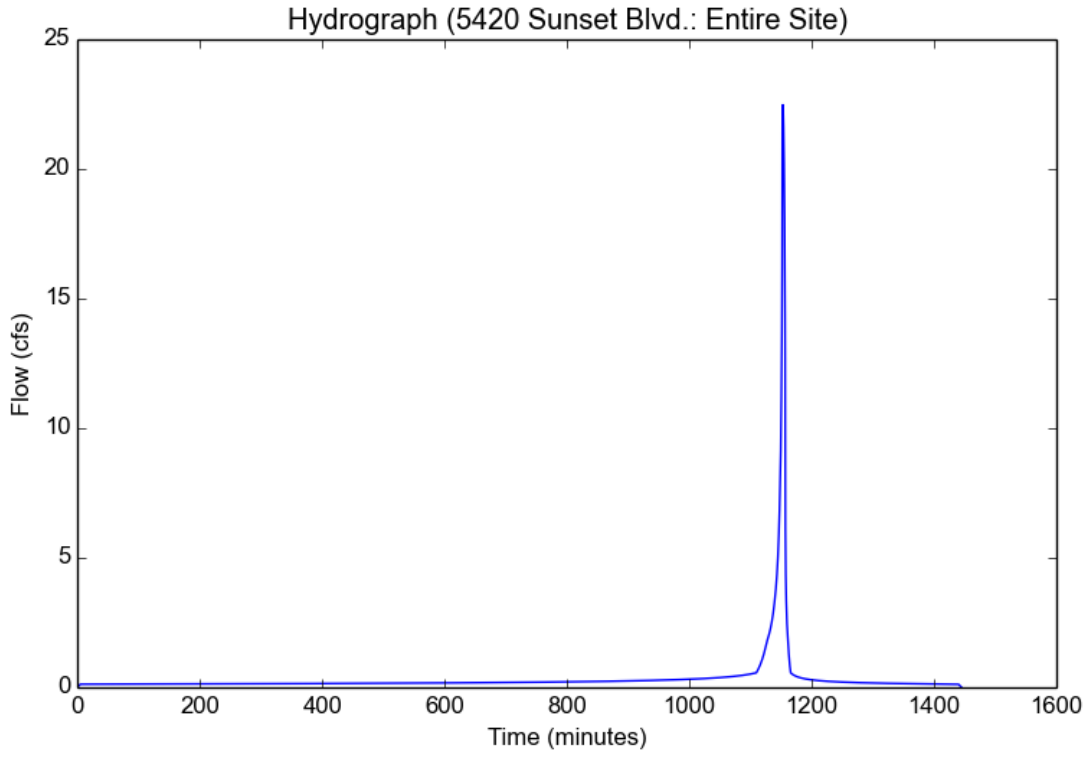
File location: C:/Users/ssu/Desktop/5420 Sunset Blvd_HydroCalc_Existing.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	5420 Sunset Blvd.
Subarea ID	Entire Site
Area (ac)	6.751
Flow Path Length (ft)	290.0
Flow Path Slope (vft/hft)	0.015
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.0492
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.9482
Developed Runoff Coefficient (Cd)	0.9458
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	22.4766
Burned Peak Flow Rate (cfs)	22.4766
24-Hr Clear Runoff Volume (ac-ft)	0.7196
24-Hr Clear Runoff Volume (cu-ft)	31343.6259



Peak Flow Hydrologic Analysis

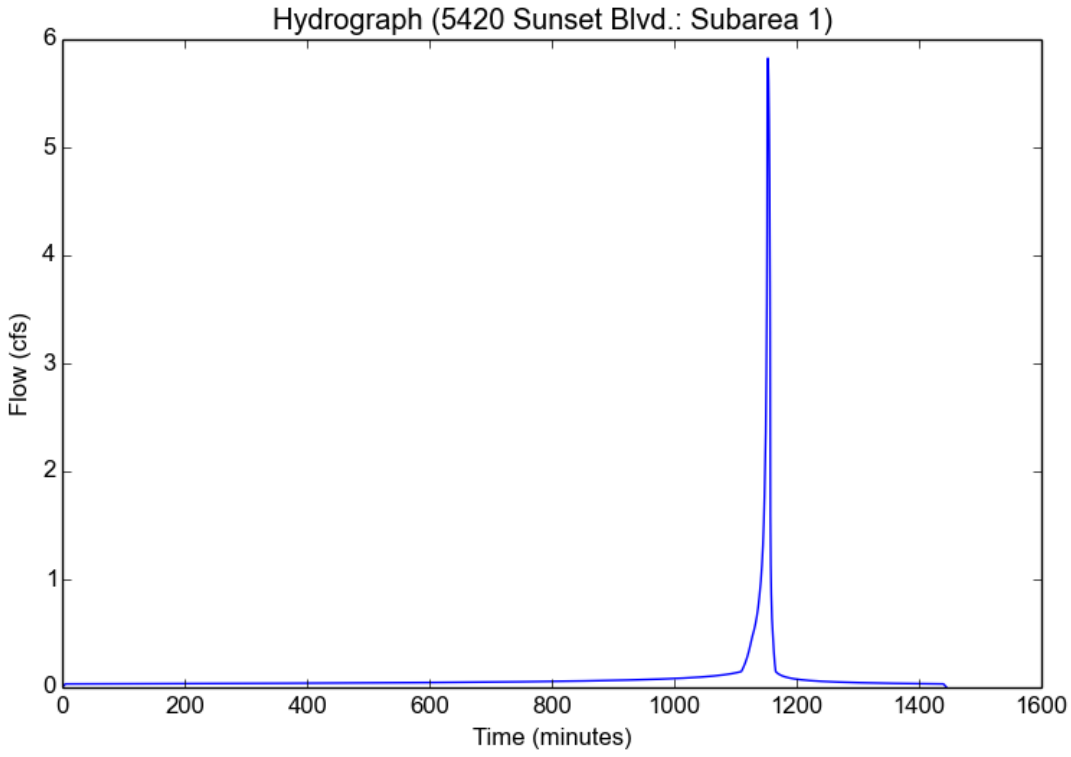
File location: C:/Users/ssu/Desktop/5420 Sunset Blvd. - Subarea 1.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	5420 Sunset Blvd.
Subarea ID	Subarea 1
Area (ac)	1.75
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.05
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.9482
Developed Runoff Coefficient (Cd)	0.9458
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.8262
Burned Peak Flow Rate (cfs)	5.8262
24-Hr Clear Runoff Volume (ac-ft)	0.187
24-Hr Clear Runoff Volume (cu-ft)	8146.2325



Peak Flow Hydrologic Analysis

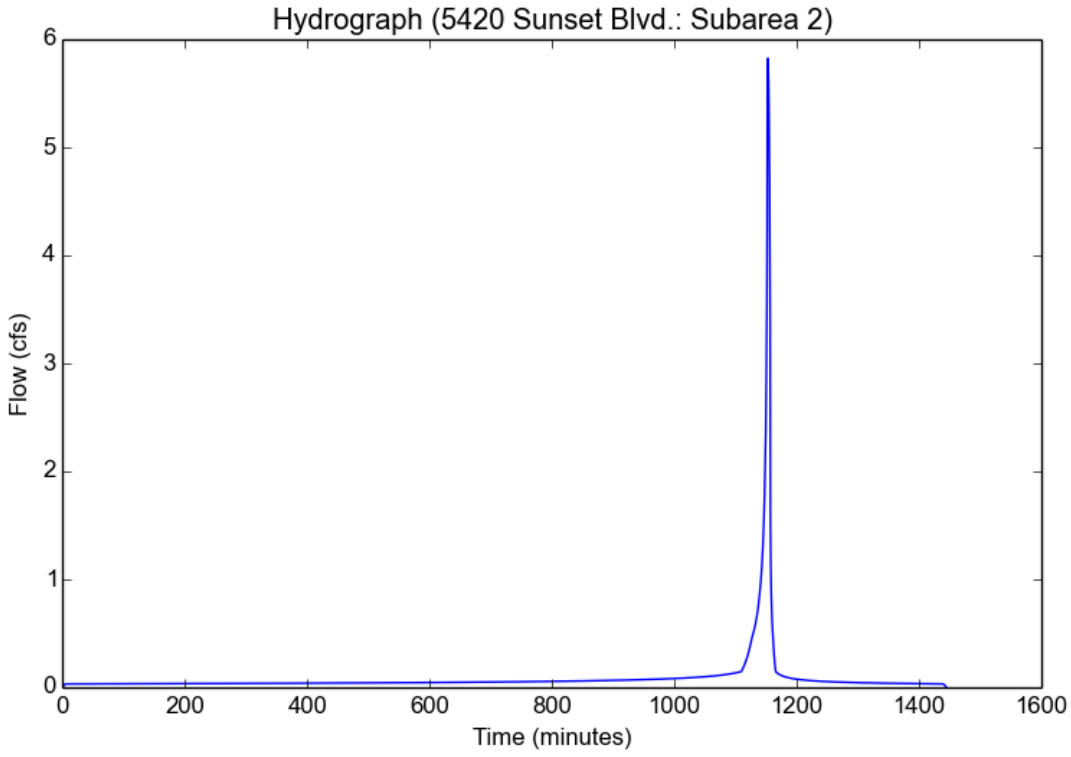
File location: C:/Users/ssu/Desktop/5420 Sunset Blvd. - Subarea 2.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	5420 Sunset Blvd.
Subarea ID	Subarea 2
Area (ac)	1.75
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.05
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.9482
Developed Runoff Coefficient (Cd)	0.9458
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.8262
Burned Peak Flow Rate (cfs)	5.8262
24-Hr Clear Runoff Volume (ac-ft)	0.187
24-Hr Clear Runoff Volume (cu-ft)	8146.2325



Peak Flow Hydrologic Analysis

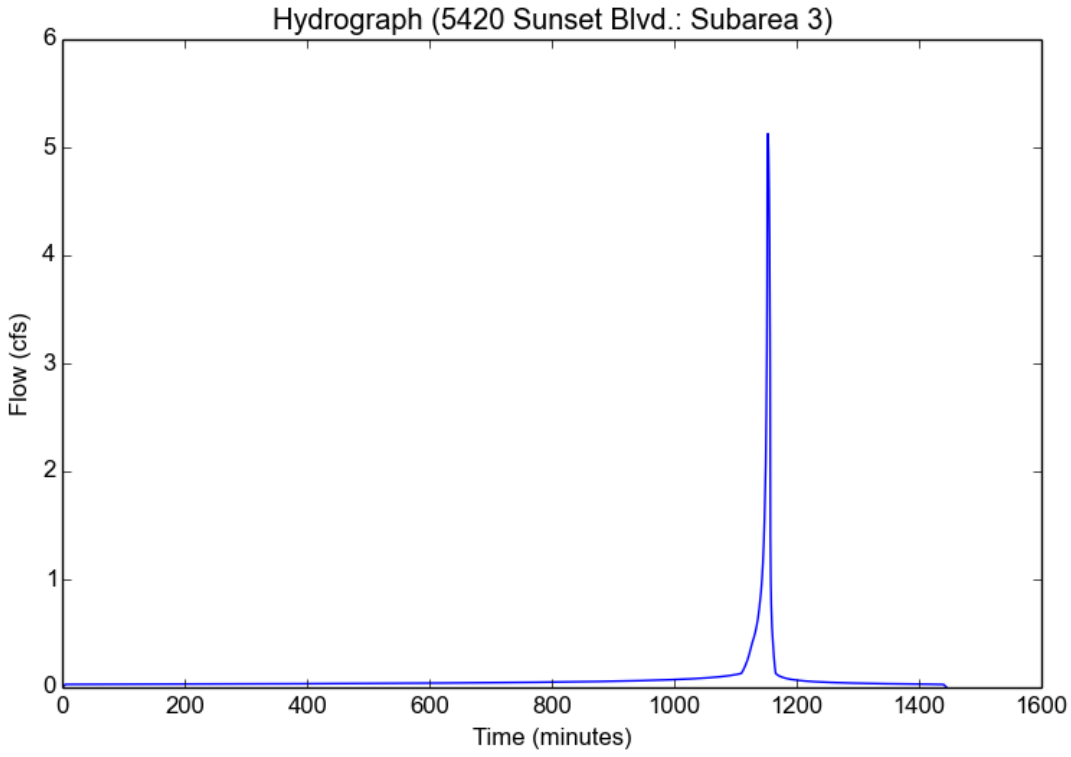
File location: C:/Users/ssu/Desktop/5420 Sunset Blvd. - Subarea 3.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	5420 Sunset Blvd.
Subarea ID	Subarea 3
Area (ac)	1.54
Flow Path Length (ft)	200.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.05
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.9482
Developed Runoff Coefficient (Cd)	0.9458
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.127
Burned Peak Flow Rate (cfs)	5.127
24-Hr Clear Runoff Volume (ac-ft)	0.1646
24-Hr Clear Runoff Volume (cu-ft)	7168.6846



Peak Flow Hydrologic Analysis

File location: C:/Users/ssu/Desktop/5420 Sunset Blvd. - Subarea 4.pdf
Version: HydroCalc 0.3.0-beta

Input Parameters

Project Name	5420 Sunset Blvd.
Subarea ID	Subarea 4
Area (ac)	1.54
Flow Path Length (ft)	200.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.9
Percent Impervious	0.05
Soil Type	13
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.9
Peak Intensity (in/hr)	3.5201
Undeveloped Runoff Coefficient (Cu)	0.9482
Developed Runoff Coefficient (Cd)	0.9458
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	5.127
Burned Peak Flow Rate (cfs)	5.127
24-Hr Clear Runoff Volume (ac-ft)	0.1646
24-Hr Clear Runoff Volume (cu-ft)	7168.6846

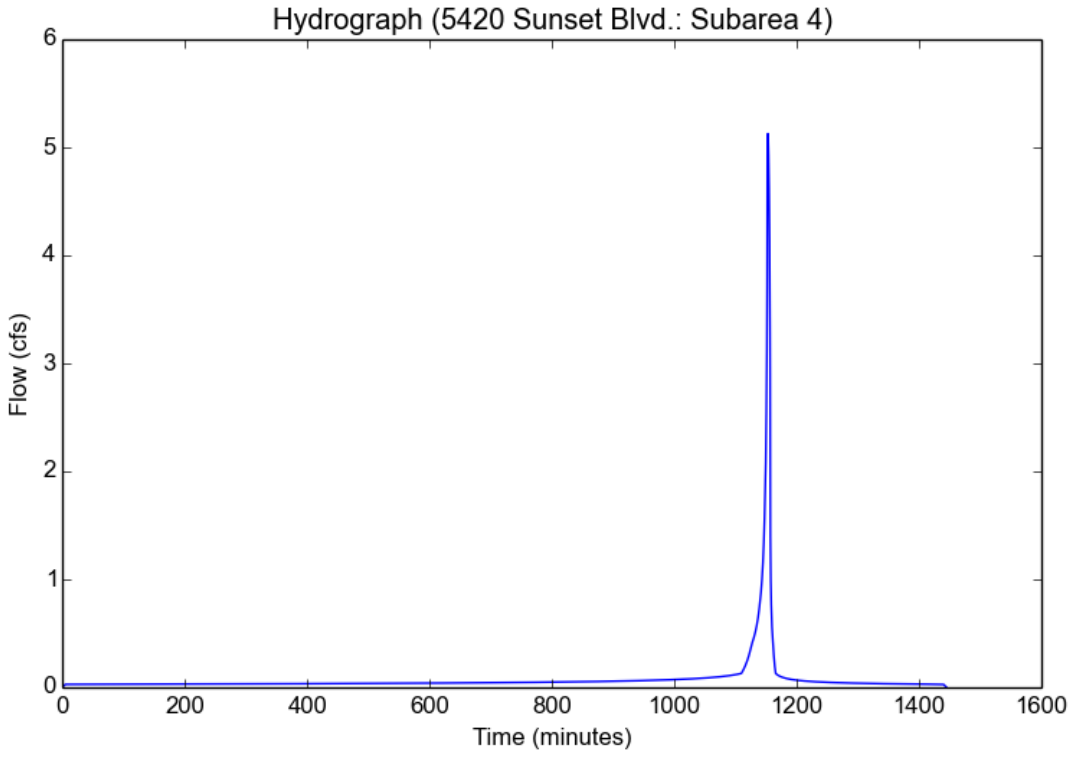


FIGURE 4
LID CALCULATIONS FOR PROPOSED SITE CONDITIONS

Project: 5420 Sunset Blvd.
Drainage Area: 1 and 2
Capture & Use Sizing

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

[1]	Total Area (SF)		76110
[2]	Impervious Area (SF)		72305
[3]	Pervious Area (SF)	**[1]-[2] =**	3806
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	65455
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.00
[6]	V_{design} (gal)	**[5]/12*7.48*[4] =**	**40800**
[7]	Planting Area (SF)		6070
[8]	Plant Factor*		0.5
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	40833
[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)

Project: 5420 Sunset Blvd.
Drainage Area: 3 and 4
Capture & Use Sizing

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

[1]	Total Area (SF)		67180
[2]	Impervious Area (SF)		63821
[3]	Pervious Area (SF)	**[1]-[2] =**	3359
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	57775
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.00
[6]	V_{design} (gal)	**[5]/12*7.48*[4] =**	**36013**
[7]	Planting Area (SF)		5360
[8]	Plant Factor*		0.5
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	36057
[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)

Project: 5420 Sunset Blvd.
Drainage Area: 1 and 2
Planter Box Sizing

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

[1]	Total Area (SF)		76110
[2]	Impervious Area (SF)		72305
[3]	Pervious Area (SF)	**[1]-[2] =**	3806
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	65455
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.0
[6]	V_{design} (CF)	**1.5*[5]/12*[4] =**	8182
[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, [9]*48/12) =**	1.0
[11]	d_p, Ponding Depth (ft)	**1' max.**	1.0
[12]	T_{fill} (hr)		3
[13]	**A_{min} (sq. ft)**	**[6]/([9]*[12]/12 + [11])**	**5035**

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

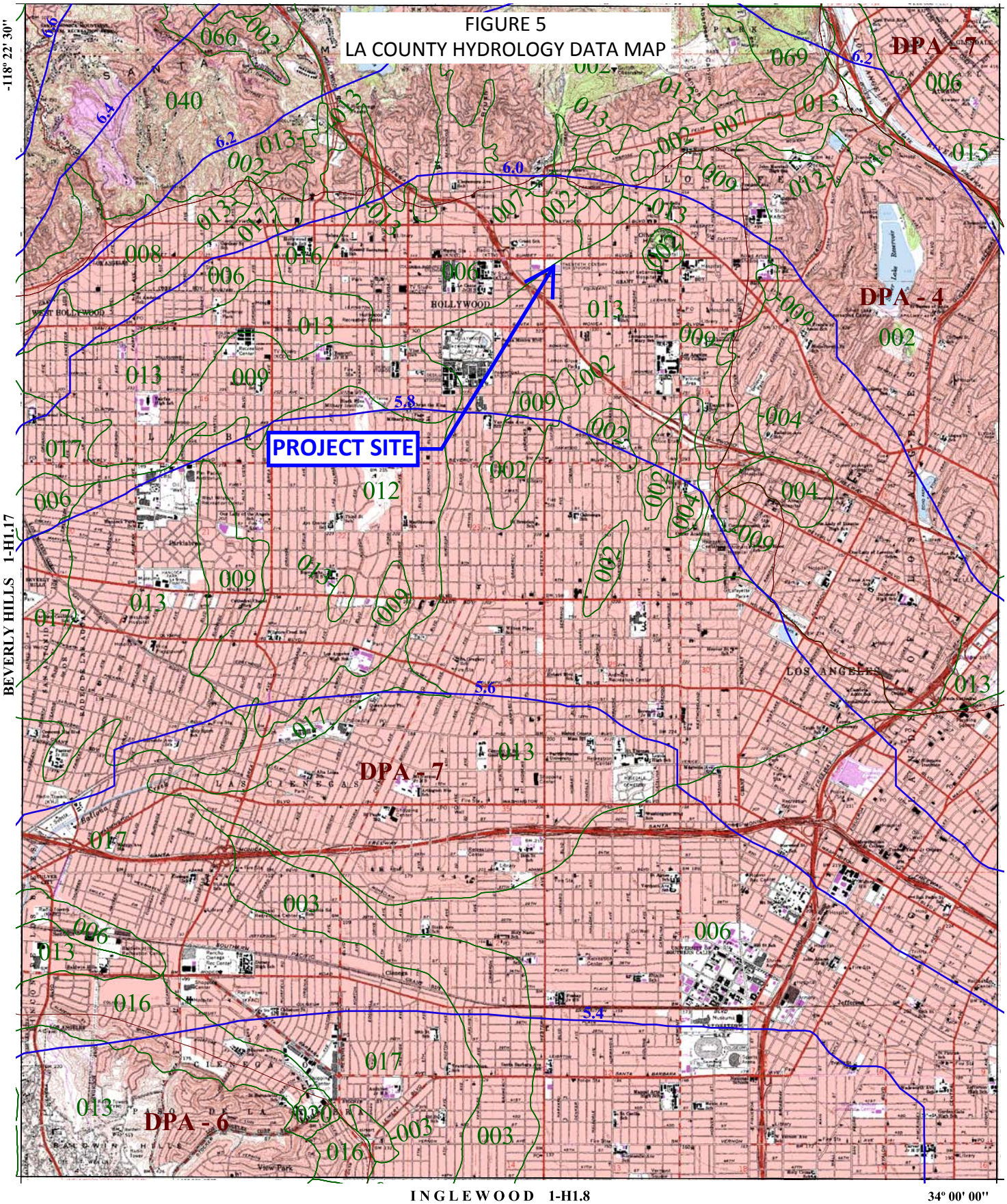
Project: 5420 Sunset Blvd.
Drainage Area: 3 and 4
Planter Box Sizing

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

[1]	Total Area (SF)		67180
[2]	Impervious Area (SF)		63821
[3]	Pervious Area (SF)	**[1]-[2] =**	3359
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	57775
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.0
[6]	V_{design} (CF)	**1.5*[5]/12*[4] =**	7222
[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, [9]*48/12) =**	1.0
[11]	d_p, Ponding Depth (ft)	**1' max.**	1.0
[12]	T_{fill} (hr)		3
[13]	**A_{min} (sq. ft)**	**[6]/([9]*[12]/12 + [11])**	**4444**

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

FIGURE 5
LA COUNTY HYDROLOGY DATA MAP



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

1 0 1 2 Miles

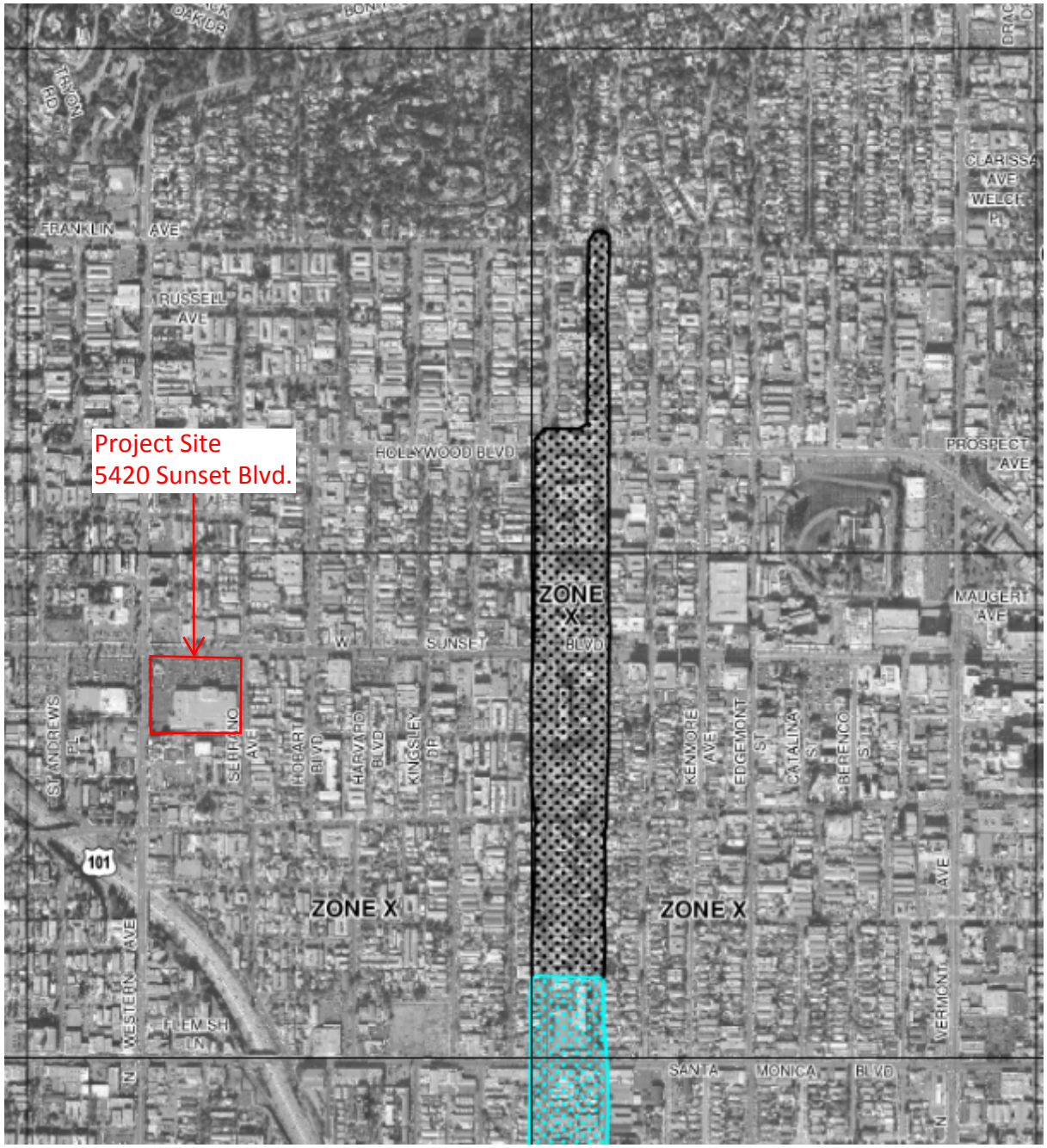
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

HOLLYWOOD
50-YEAR 24-HOUR ISOHYET

1-H1.18

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

FIGURE 6
FEMA Flood Map



NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1610F

FIRM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1610 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GLENDALE, CITY OF	065030	1610	F
LOS ANGELES, CITY OF	060137	1610	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
06037C1610F

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

OTHER FLOOD AREAS

ZONE X

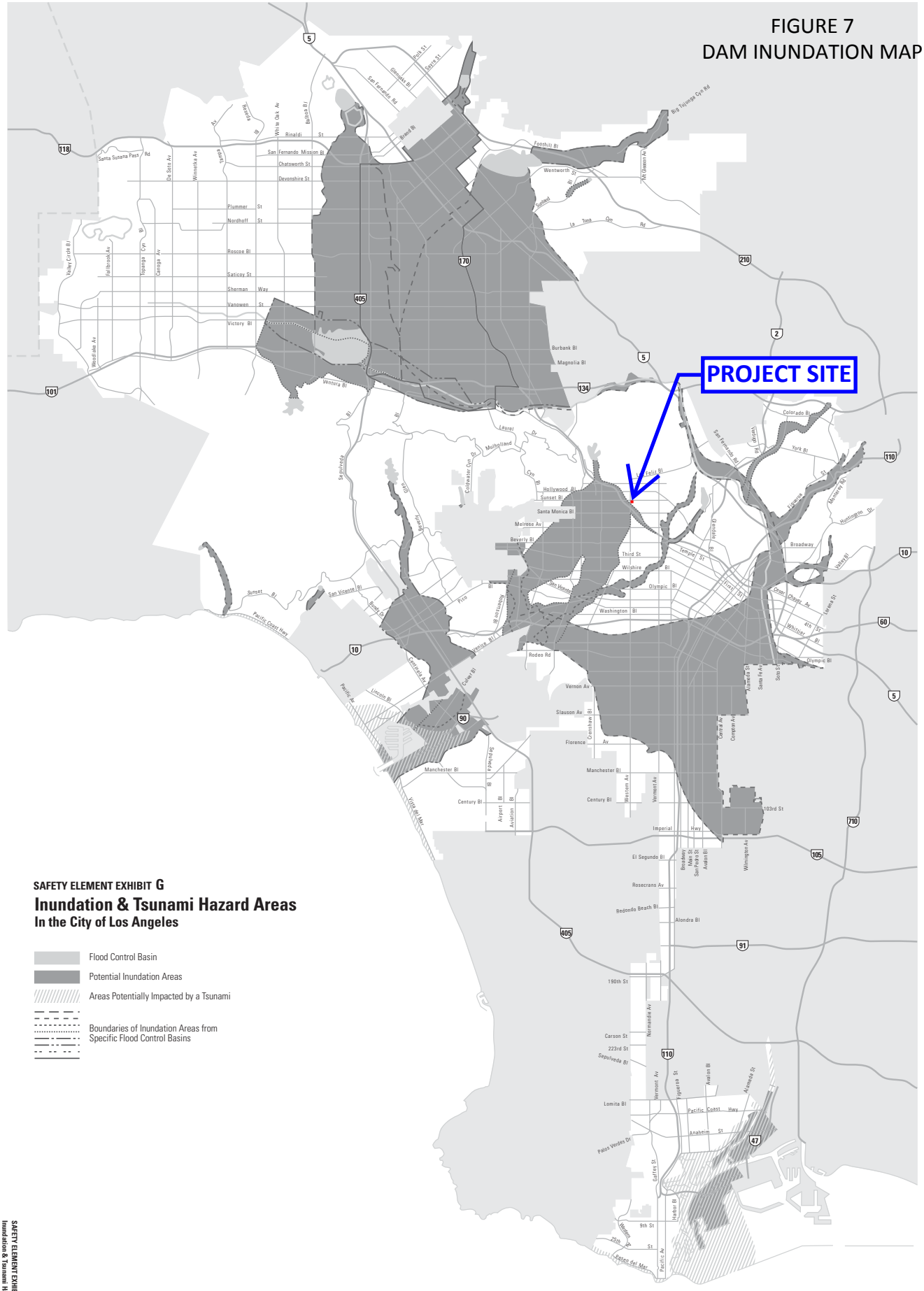
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X

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

FIGURE 7
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

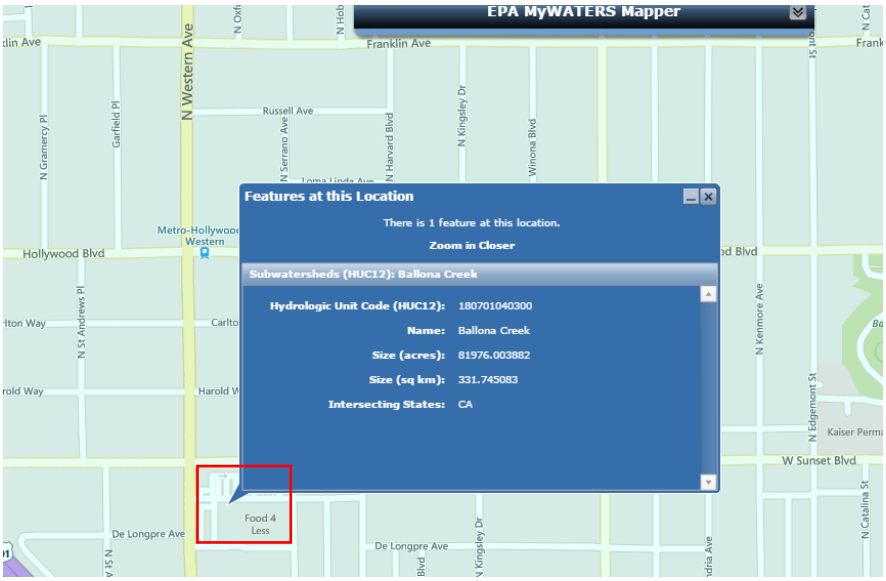
1 1/2 1/4 0 1 2 3 4 MILES

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 65302(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

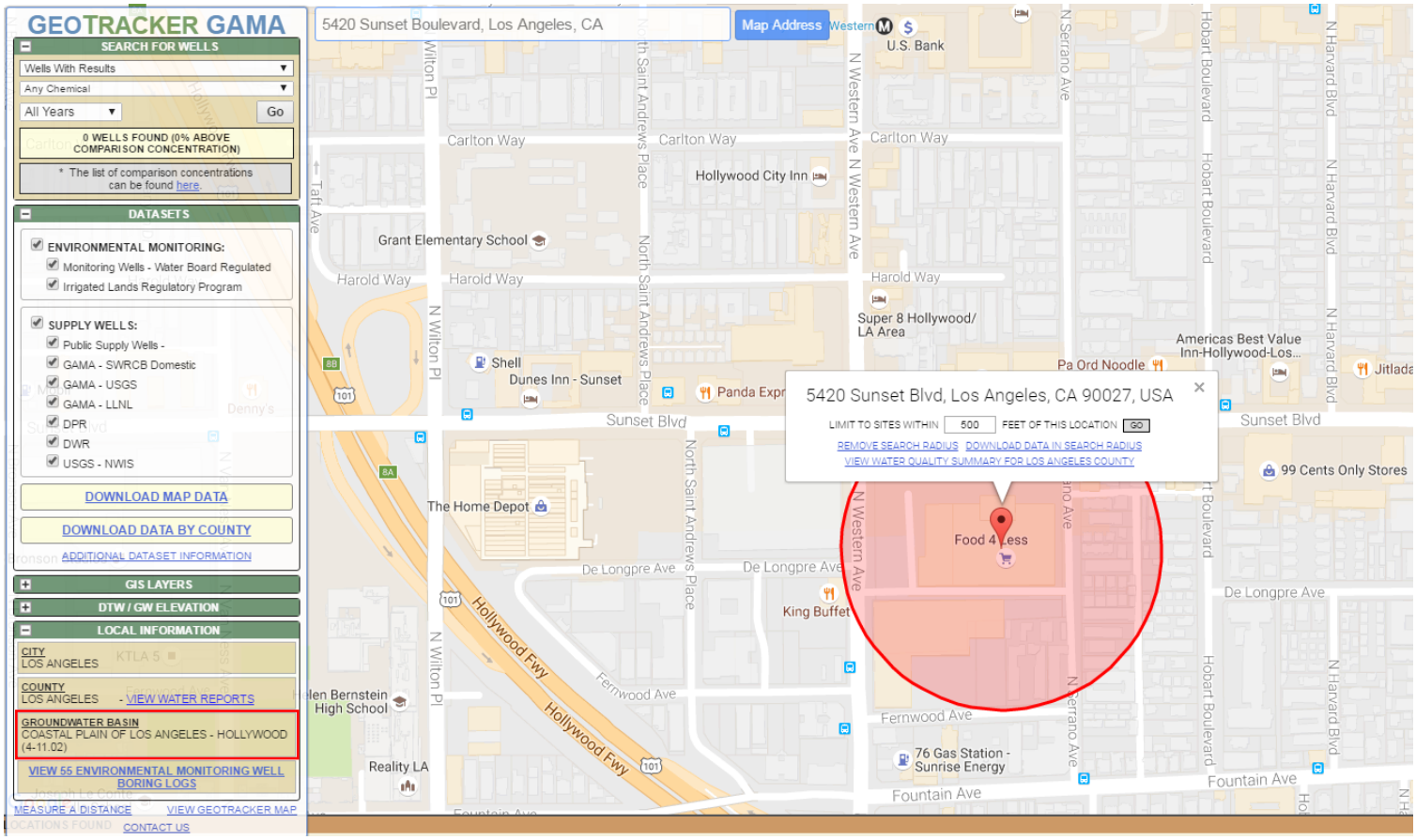
SAFETY ELEMENT EXHIBIT G
Inundation & Tsunami Hazard Areas

FIGURE 8
WATERSHED MAP AND GROUNDWATER BASIN MAP



Resource
https://watersgeo.epa.gov/mwm/

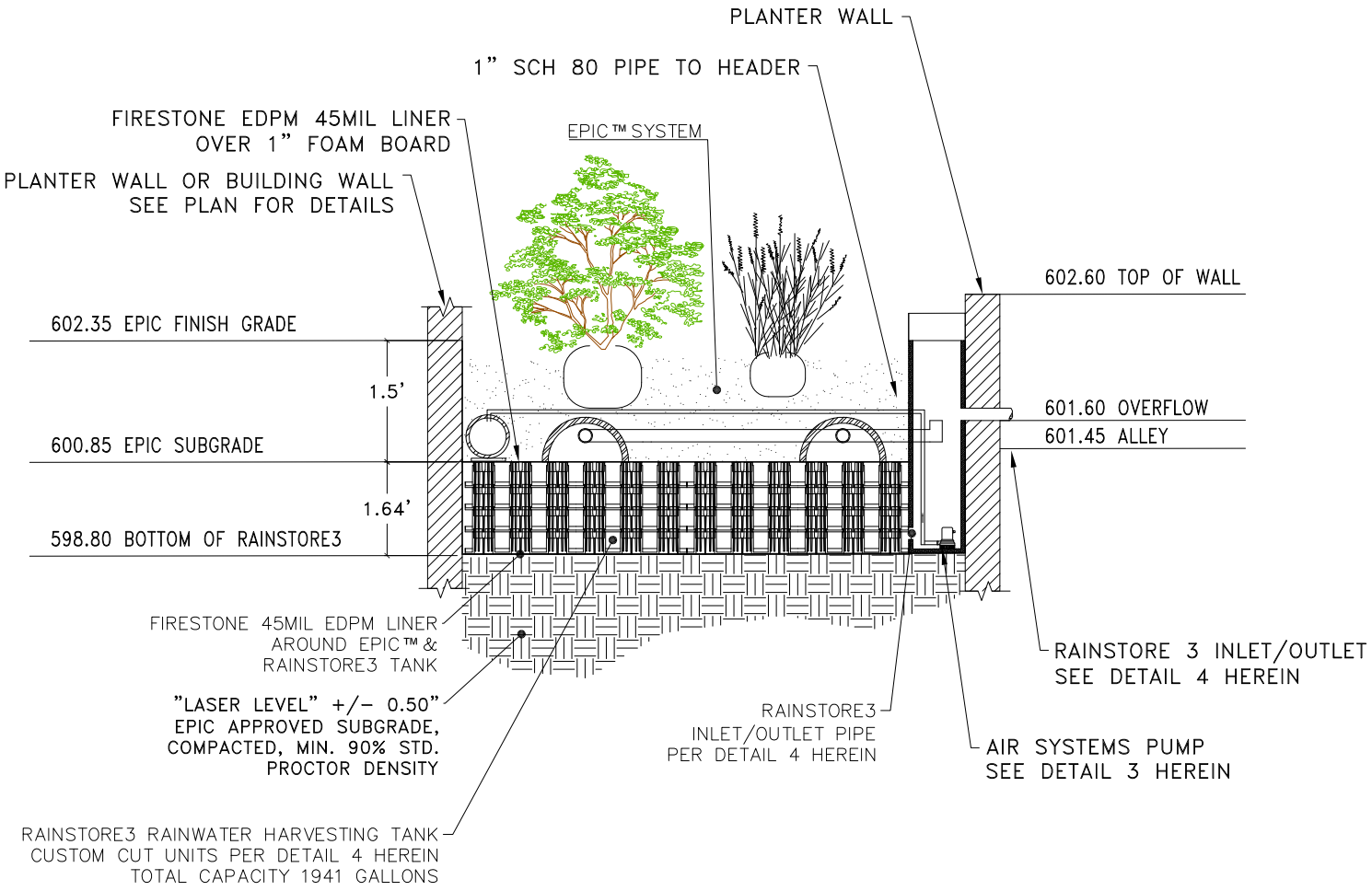
FIGURE 8
WATERSHED MAP AND GROUNDWATER BASIN MAP



Resource
http://geotracker.waterboards.ca.gov/gama/

EXHIBIT 1
TYPICAL POST-CONSTRUCTION BMPS

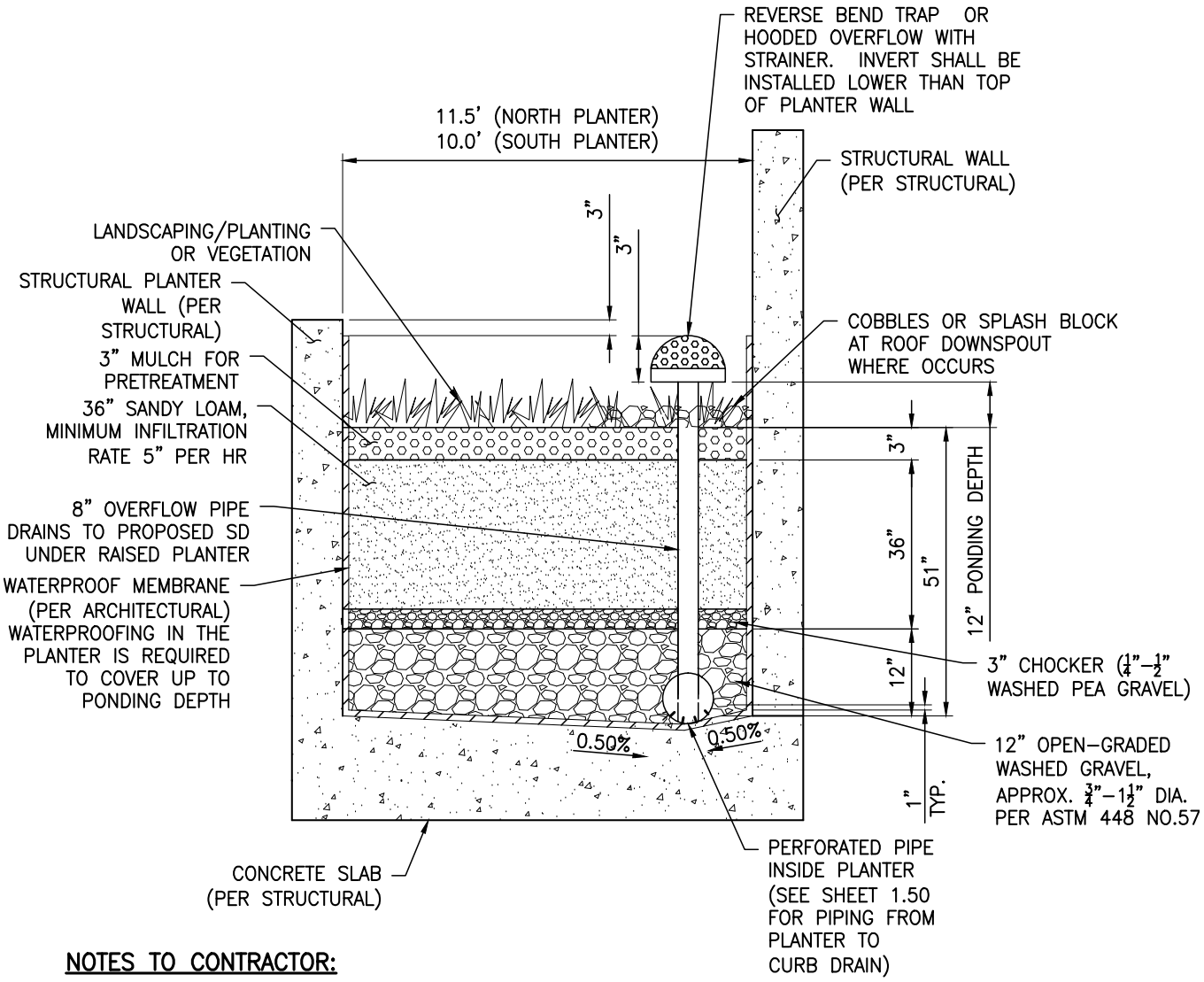
CAPTURE AND USE EXAMPLE



"EPIC" PLANTER WITH STORAGE (SAMPLE)

EXHIBIT 1
TYPICAL POST-CONSTRUCTION BMPS

BIOFILTRATION BMP EXAMPLE
(FLOW-THROUGH PLANTER)



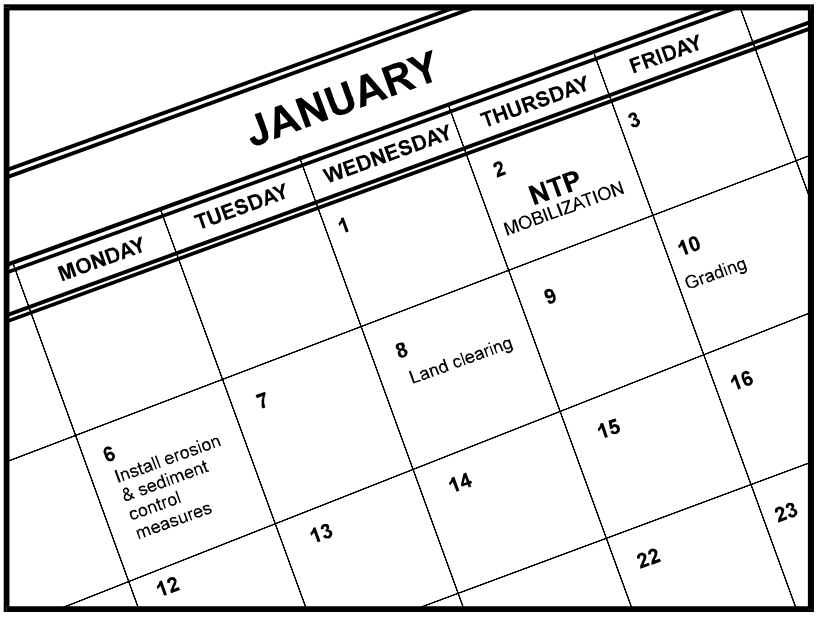
NOTES TO CONTRACTOR:

1. CONTRACTOR TO PROVIDE PHOTOGRAPHS DURING THE FOLLOWING STAGES OF PLANTER INSTALLATION.
   - EMPTY PLANTER BOX WITH WATERPROOFING AND PIPING
   - PLANTER BOX WITH GRAVEL BACKFILL
   - PLANTER BOX WITH SANDY LOAM

2. CONTRACTOR TO NOTIFY PROJECT ENGINEER FOR INSPECTION WHEN PLANTERS ARE COMPLETED. NOTE THAT A SUFFICIENT TIME SHALL BE PROVIDED TO PROJECT ENGINEER TO PREPARE STORMWATER OBSERVATION REPORT FOR BUREAU OF SANITATION'S APPROVAL.

EXHIBIT 2
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**

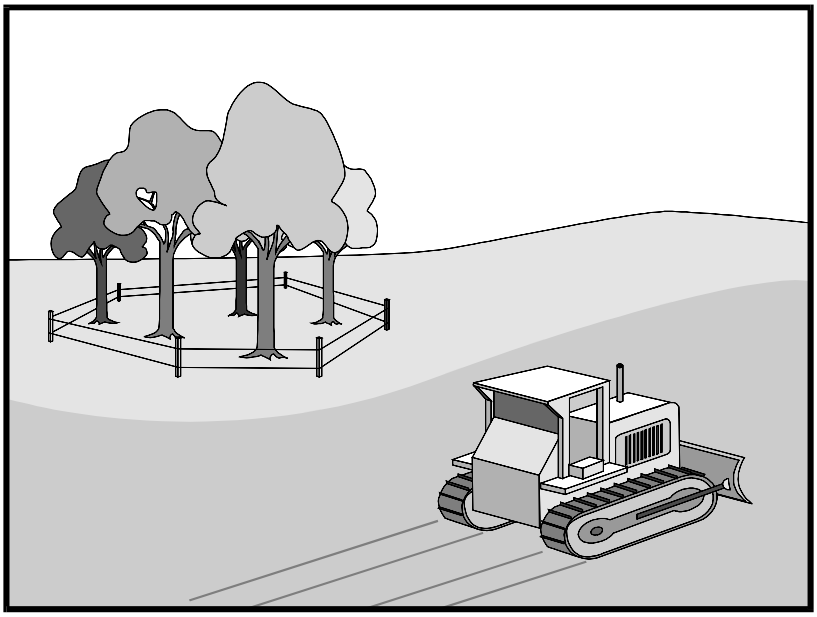
Targeted Constituents

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**

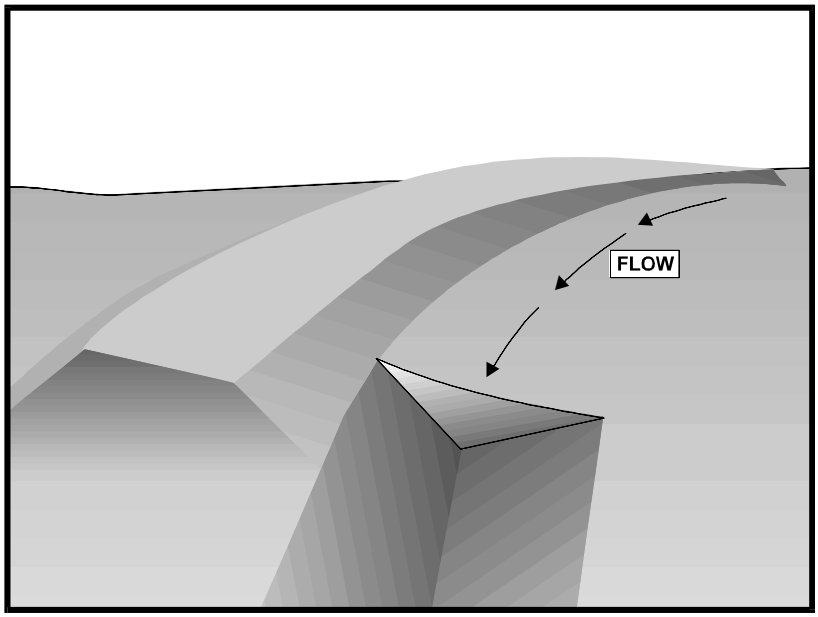
Targeted Constituents

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**

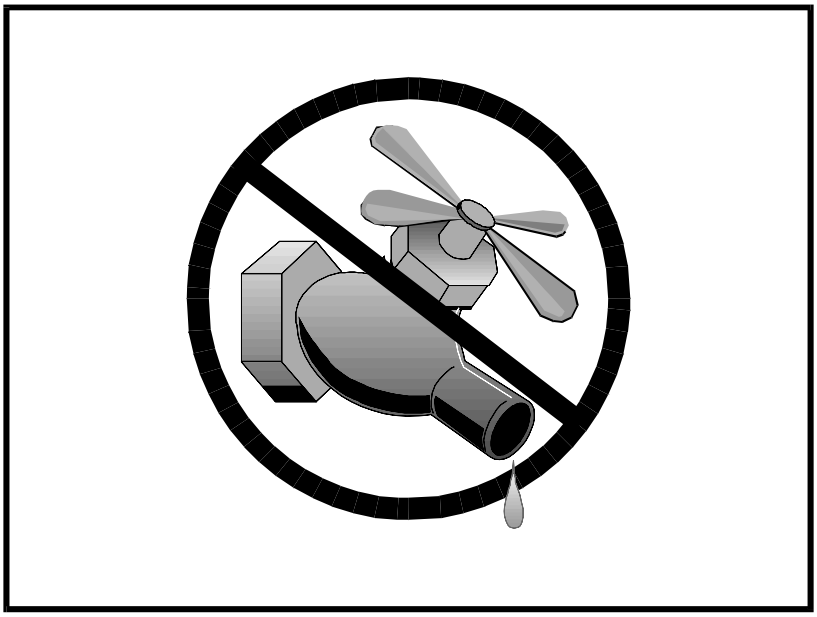
Targeted Constituents

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

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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.

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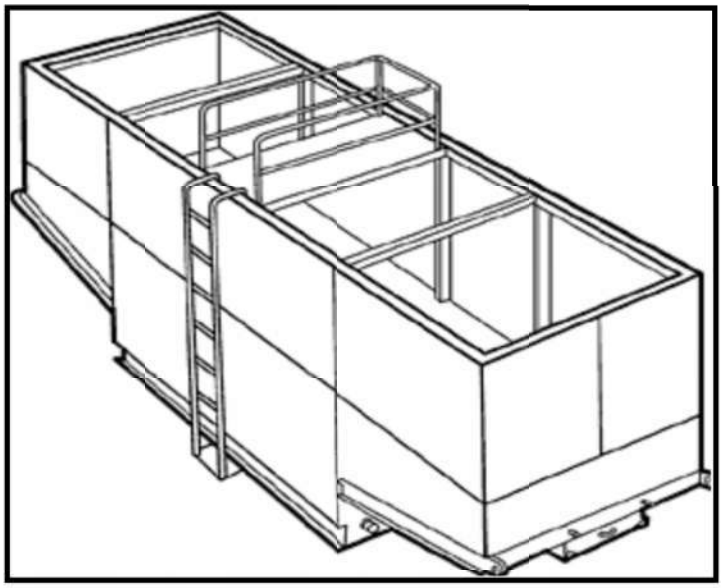
Dewatering Operations NS-2



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.

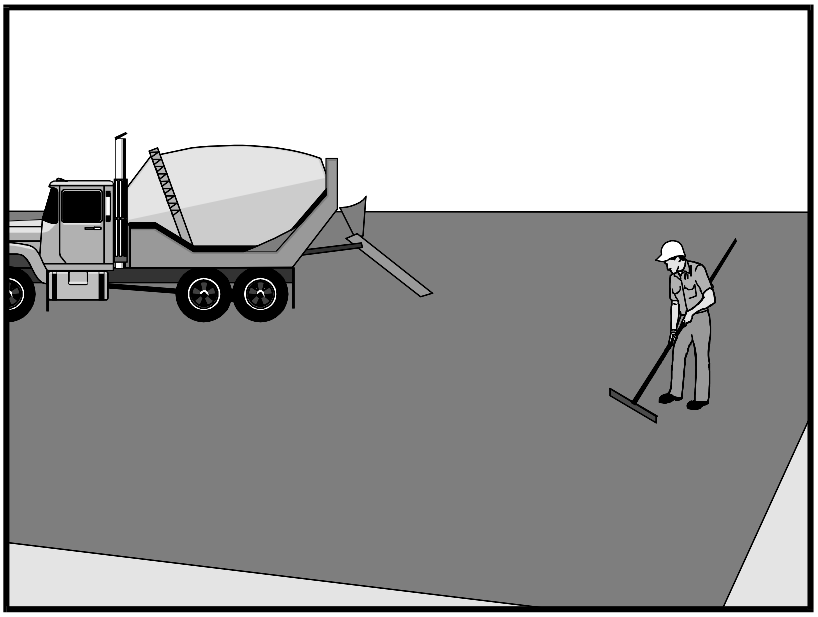
The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

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

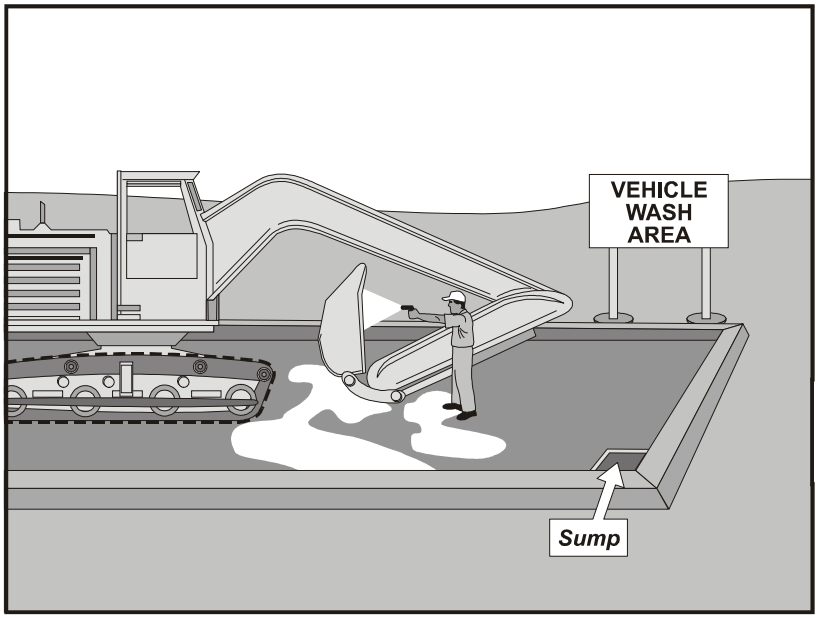
These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

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

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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:

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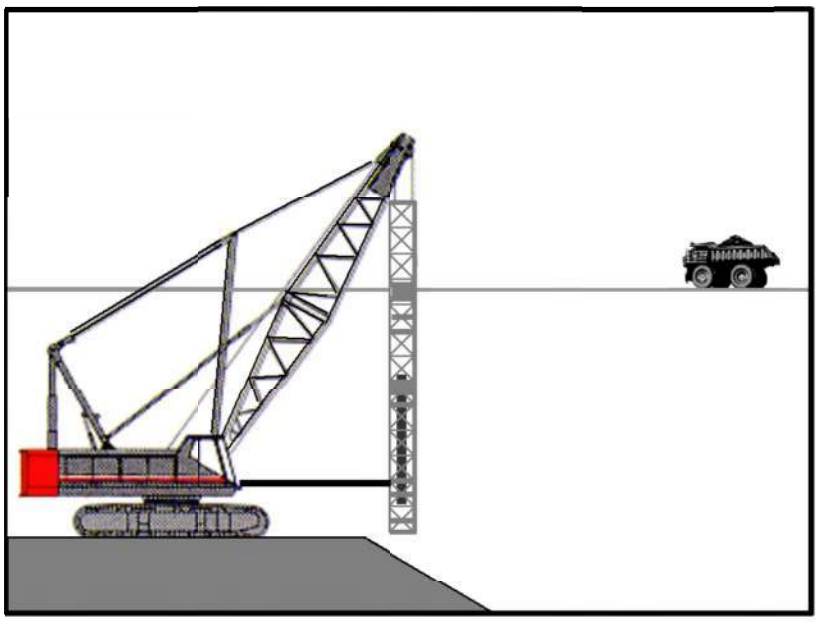
Pile Driving Operations NS-11



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

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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.

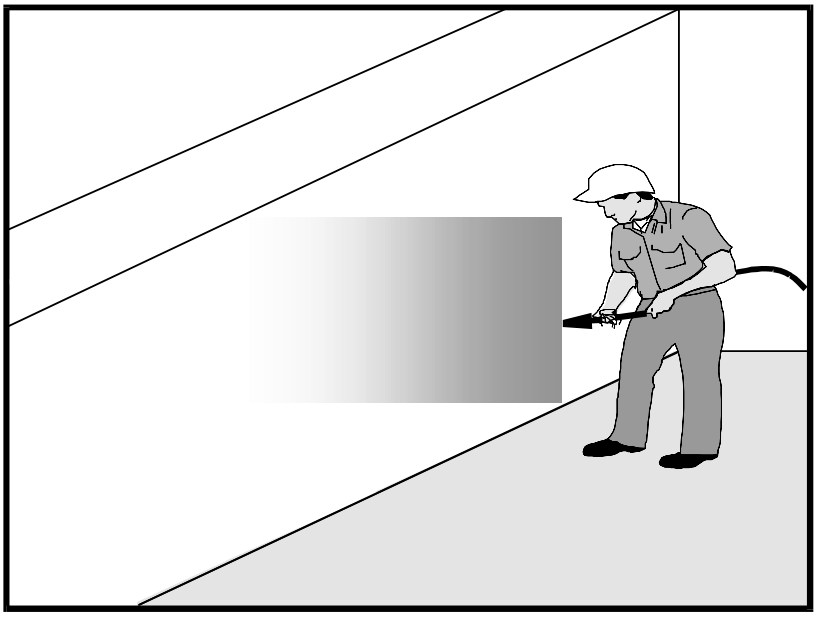
Limitations

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	
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 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.

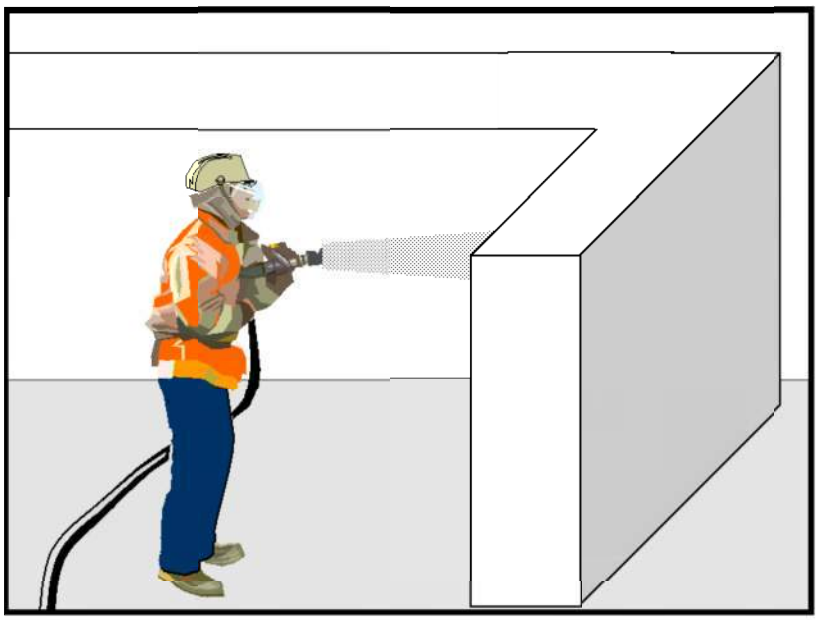
Suitable Applications

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.

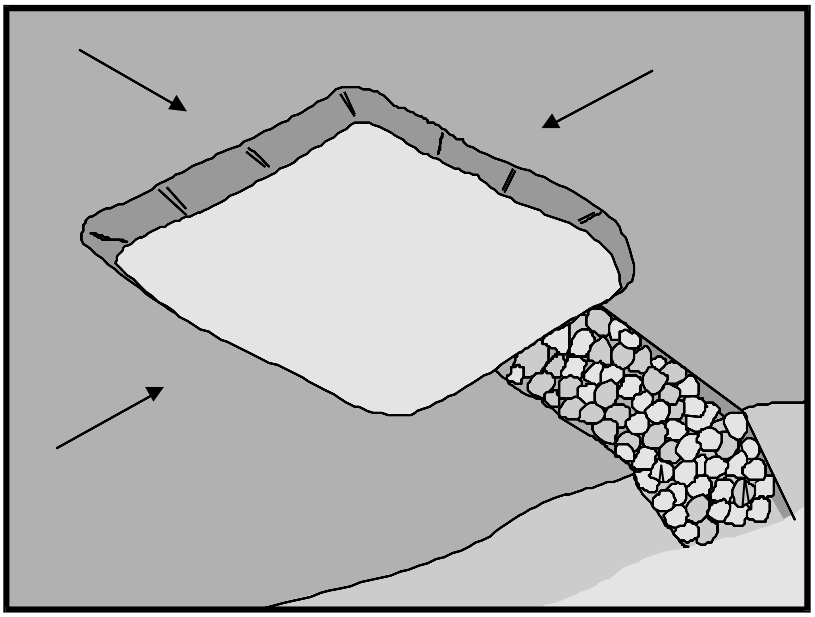
The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

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.

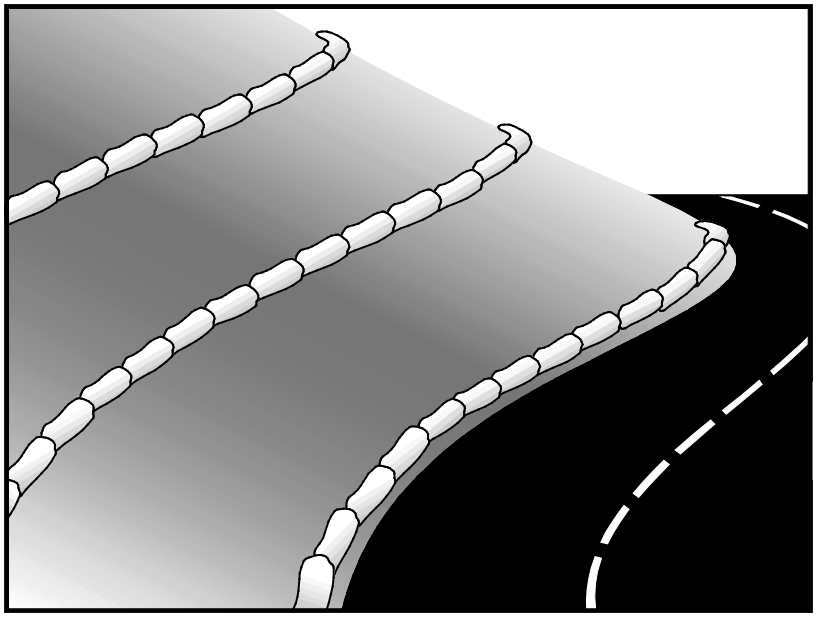
Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. 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

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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.

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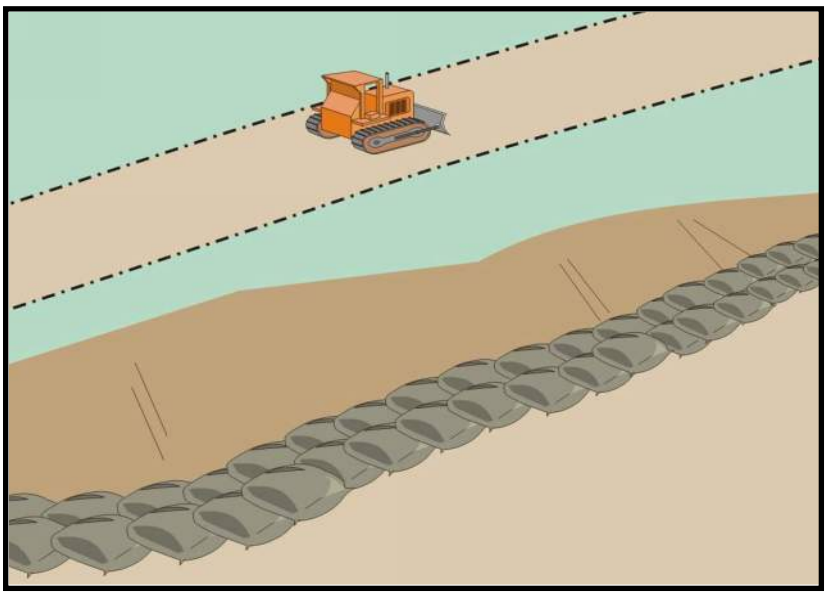
Sandbag Barrier SE-8



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

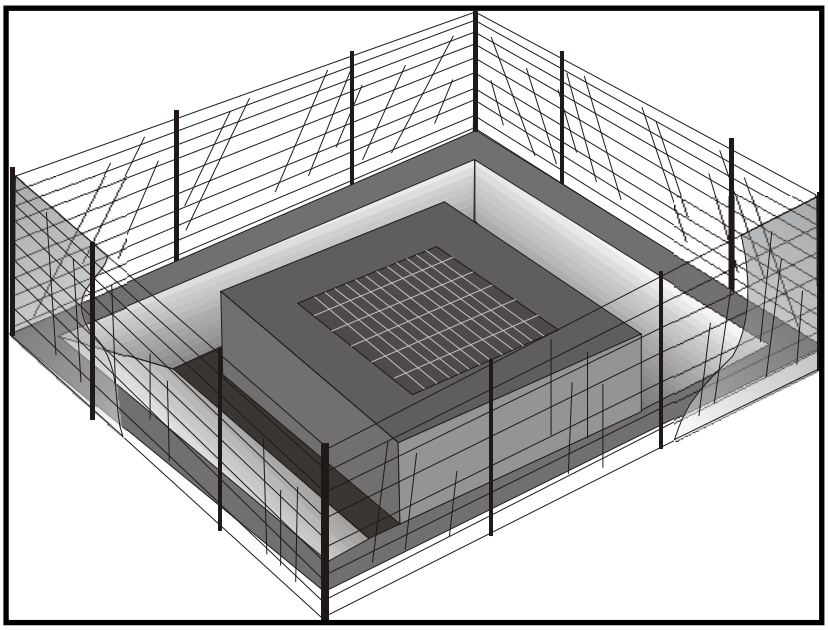
SE-5 Fiber Rolls

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

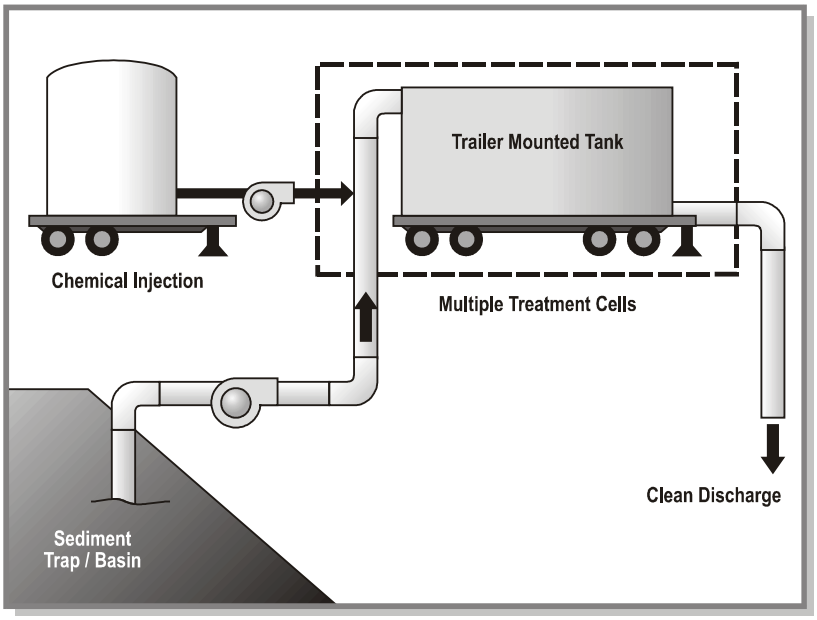
SE-6 Gravel Bag Berm

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.

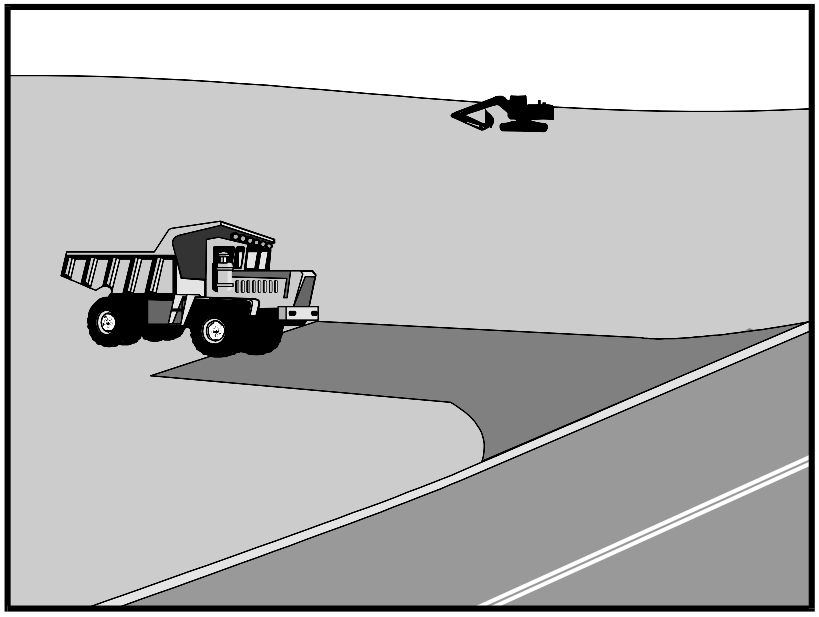
Suitable Applications

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

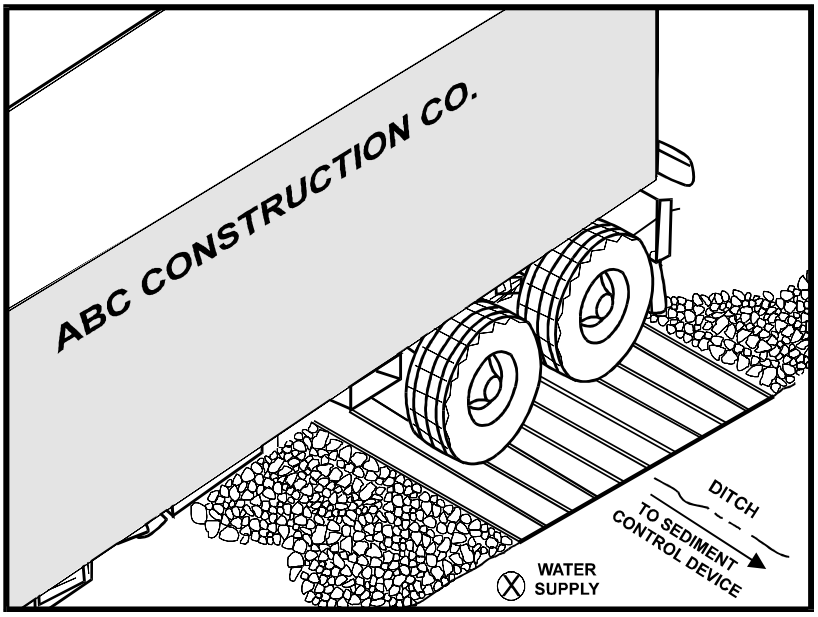
- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct 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**

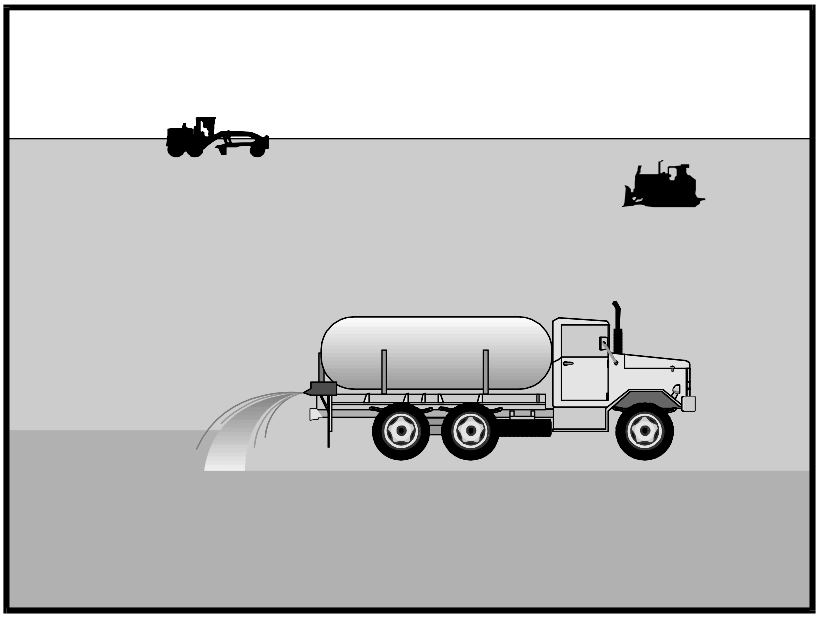
Targeted Constituents

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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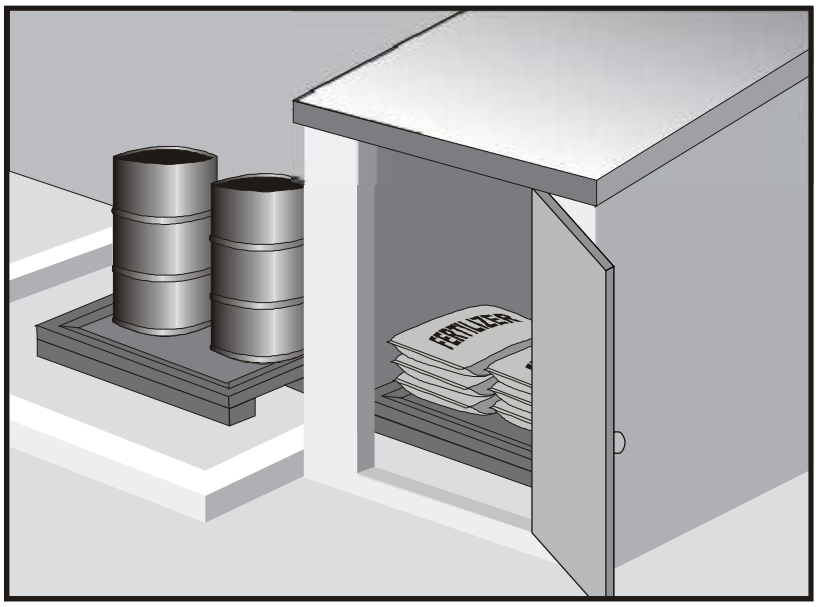
Material Delivery and Storage WM-1



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:

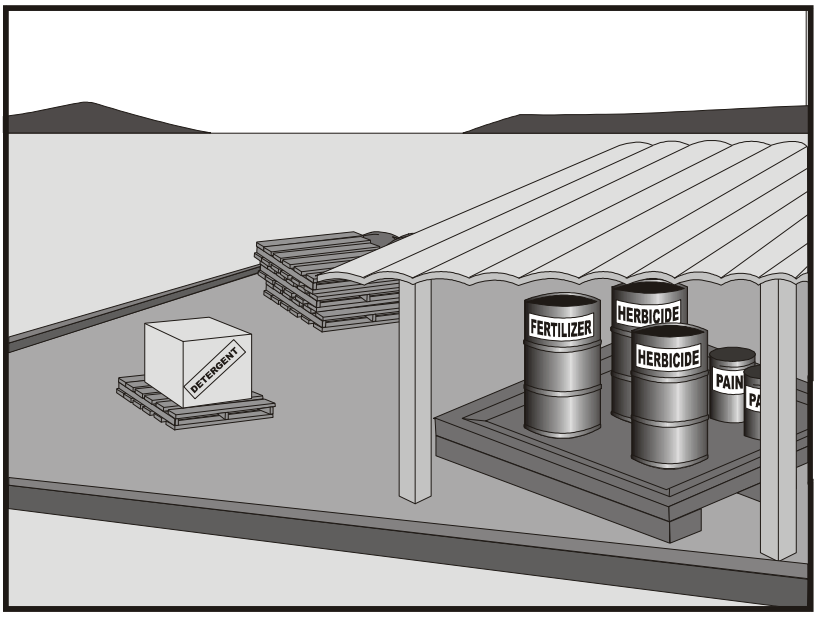
- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

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

Potential Alternatives

None

Material Use WM-2



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

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**

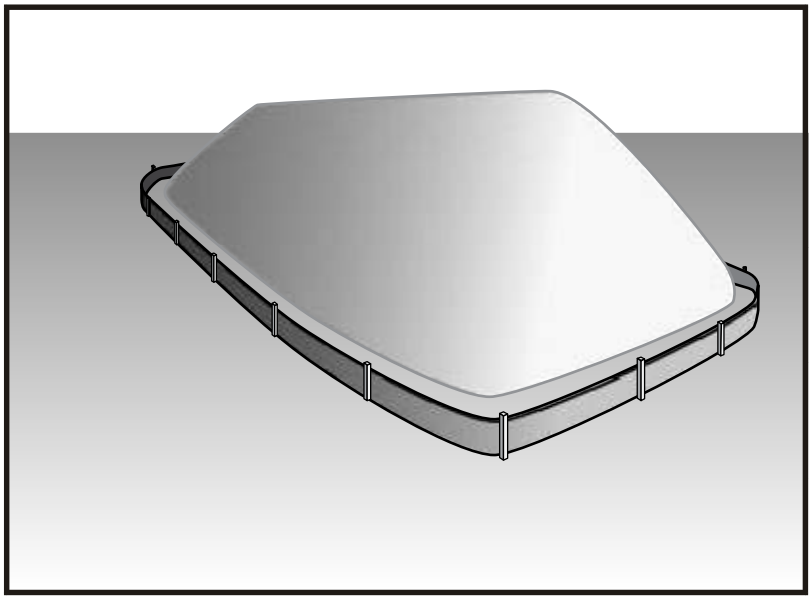
Targeted Constituents

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

Potential Alternatives

None

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

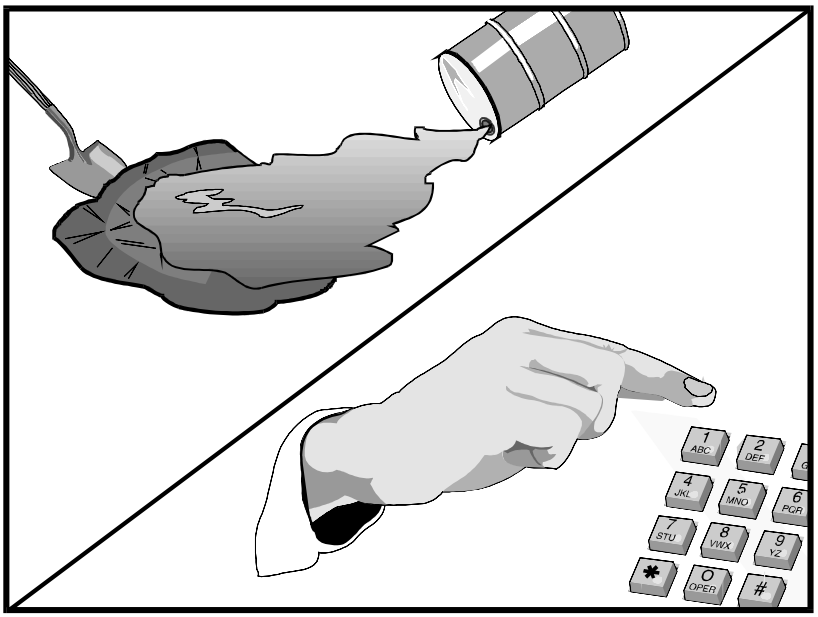
Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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**

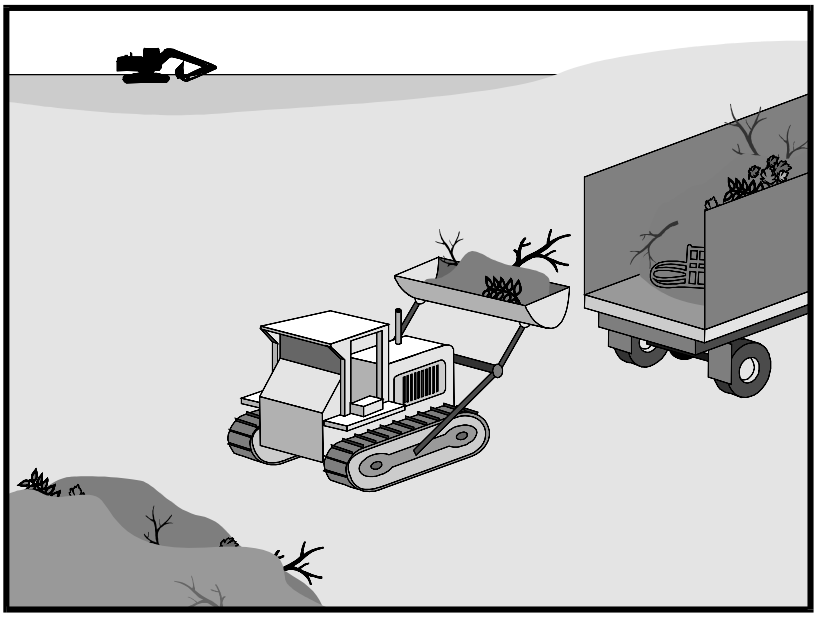
Targeted Constituents

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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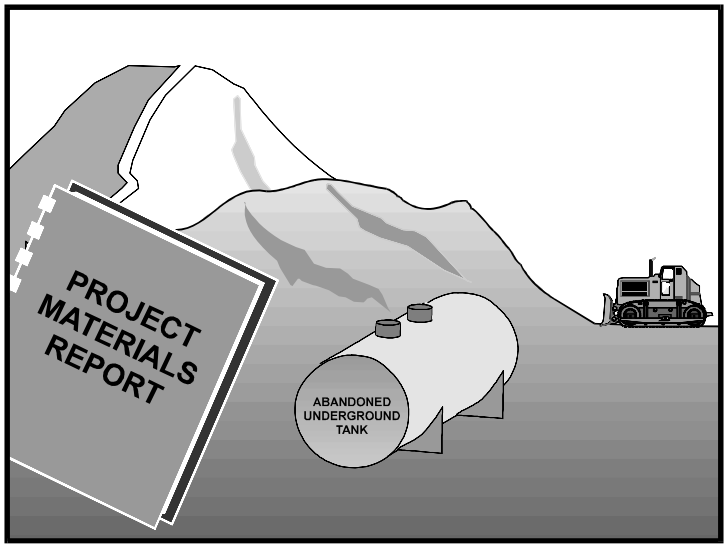
Contaminated Soil Management WM-7



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

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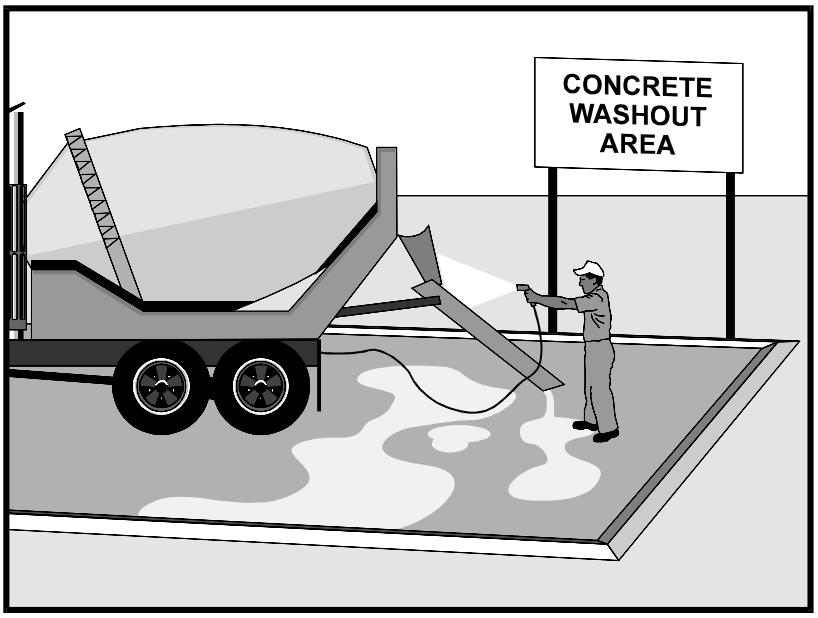
Concrete Waste Management WM-8



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).

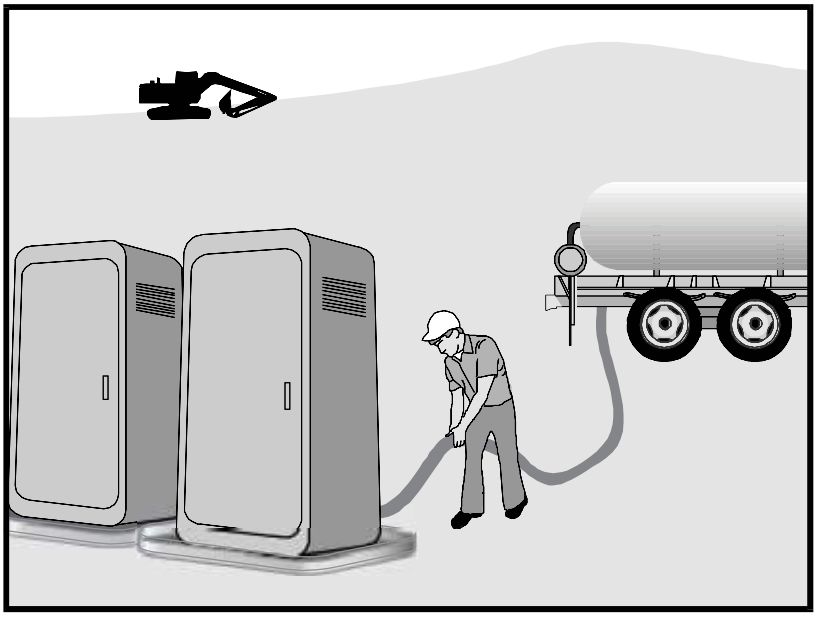
Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into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

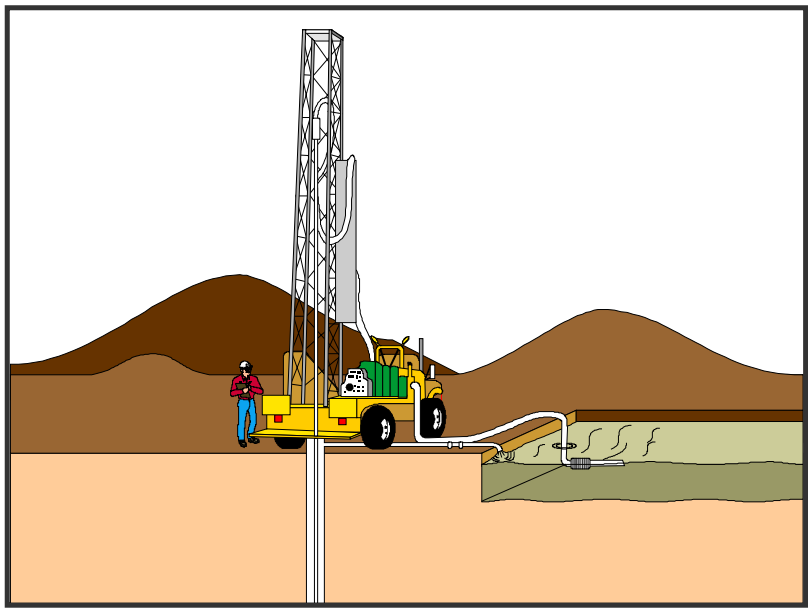
Implementation

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