Appendix 12

Water Resources Report

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MIRMAN SCHOOL FOR GIFTED CHILDREN

WATER RESOURCES TECHNICAL REPORT
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1. INTRODUCTION

1.1. PROJECT DESCRIPTION

The Mirman School is a private academic campus for gifted students. The campus (Project Site) is located at 16100-16180 Mulholland Drive and is situated in the Brentwood-Pacific Palisades Community Plan area of the City of Los Angeles. The Project proposes improvements within the existing 5.46-acre Mirman School for Gifted Children campus (the Project Site). Specifically, the Project would include: a new two-story, 16,130-square-foot Learning Center building with eight new classrooms, administrative space and a campus courtyard; improvements to the school's existing library building, including renovations to the existing building and the addition of 2,619 square feet of new floor area including a new classroom; the creation of a new classroom within the school's existing physical education building; a new security pavilion with 140 square feet of floor area; a new playground with a 6-foot tall vine-covered plastered wall, shade structure and storage cabinets; replacement of the existing outdoor amphitheater in the upper campus with a new seating area and shade structure; and a new 1,370 square foot storage and trash enclosure. The Project also proposes a Lot Line Adjustment (LLA) whereby a 0.56-acre parking lot and hillside area currently owned by Berkeley Hall School and Bel Air Presbyterian Church immediately adjacent to the southwestern most portion of the Project Site would be added to the Project Site, a portion of which would be developed with the proposed 1,370 square foot storage/trash enclosure. The Project would retain the existing 46 vehicle parking spaces used by the School which would meet LAMC requirements for the Project and would increase on-site bicycle parking from 4 to 44 spaces. In all, the Project would: increase the size of the Project Site from 5.46 to 6.02 acres; add 22,508 square feet of new floor area to the School's existing 42,678 square feet of floor area, for a total of 65,186 square feet of floor area (with all floor area in residential floor area [RFA] as defined by LAMC Section 12.03); and increase the floor area ratio (FAR) at the Project Site from 0.18:1 to 0.25:1.

The Project would result in an increase in school enrollment from 330 to 430 K–8 students and an increase in the number of school employees from 78 to 108 employees. Project construction would occur in a single phase, with construction anticipated to start in June 2022 and be completed in July/August 2023 (with full occupancy of the new facilities anticipated in 2025).

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

Los Angeles Municipal Code

Any proposed drainage improvements within the street right of way or any other property owned by, to be owned by, or under the control of the City requires the approval of a B-permit (Section 62.105, Los Angeles Municipal Code (LAMC)). Under the B-permit process, storm drain installation plans are subject to review and approval by the City of Los Angeles Department of Public Works, Bureau of Engineering. Additionally, any connections to the City's storm drain system from a property line to a catch basin or a storm drainpipe 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,

[1] Los Angeles County Department of Public Works Hydrology Manual, January 2006, http://ladpw.org/wrd/publication/index.cfm, accessed July 2, 2021.

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

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[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.

[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.

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 CWA, including the authority to regulate waste disposal and require cleanup of discharges of hazardous materials and other pollutants.

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

California Toxic Rule

[4] USEPA. U.S. Environmental Protection Agency - Clean Water Act. https://www.epa.gov/laws-regulations/summary-clean-water-actaccessed on July 2, 2021.

In 2000, the EPA promulgated the California Toxic 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 Toxic Rule establishes acute (i.e., short-term) and chronic (i.e., long-term) standards for bodies of water such as inland surface waters and enclosed bays and estuaries that are designated by the Los Angeles RWQCB (LARWQCB) as having beneficial uses protective of aquatic life or human health.

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

As required by the California Water Code, the LARWQCB has adopted a plan entitled "Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties" (Basin Plan). Specifically, the Basin Plan designates beneficial uses for surface and groundwaters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.[5]

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

NPDES Permit Program

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

The Construction General Permit

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

[5] Los Angeles Regional Water Quality Control Board. LARWQCB Basin Plan. <http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/> accessed July 2, 2021.

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

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.

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6 State Water Resources Control Board. State Water Resources Control Board. August 2019 http://www.swrcb.ca.gov/water_issues/programs/npdes/

7 USEPA. U.S. Environmental Protection Agency - NPDES. August 2019, https://www.epa.gov/npdes.

Stormwater Quality Management Program (SQMP)

In compliance with the Permit, the Co-Permittees are required to implement a stormwater quality management program (SQMP) with the goal of accomplishing the requirements of the Permit and reducing the amount of pollutants in stormwater runoff. The 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 Permit contains the following provisions for implementation of the SQMP by the Co-Permittees:

1. General Requirements:
    - Each permittee is required to implement the SQMP in order to comply with applicable stormwater program requirements.
    - The SQMP shall be implemented and each permittee shall implement additional controls so that discharge of pollutants is reduced.
2. Best Management Practice Implementation:
    - Permittees are required to implement the most effective combination of BMPs for stormwater/urban runoff pollution control. This should result in the reduction of storm water runoff.
3. Revision of the SQMP:
    - Permittees are required to revise the SQMP in order to comply with requirements of the RWQCB while complying with regional watershed requirements and/or waste load allocations for implementation of Total Maximum Daily Loads (TMDLs) for impaired waterbodies.

4. Designation and Responsibilities of the Principal Permittee:

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

   - Coordinating activities that comply with requirements outlined in the NPDES Permit;
   - Coordinating activities among Permittees;
   - Providing personnel and fiscal resources for necessary updates to the SQMP;
   - Providing technical support for committees required to implement the SQMP; and
   - Implementing the Countywide Monitoring Program required under this Order and assessing the results of the monitoring program.

5. Responsibilities of Co-Permittees:

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

   - Coordinating among internal departments to facilitate the implementation of the SQMP requirements in an efficient way;
   - Participating in coordination with other internal agencies as necessary to successfully implement the requirements of the SQMP; and
   - Preparing an annual Budget Summary of expenditures for the storm water management program by providing an estimated breakdown of expenditures for different areas of concern, including budget projections for the following year.

6. Watershed Management Committees (WMCs):

   - Each WMC shall be comprised of a voting representative from each Permittee in the Watershed Management Area (WMA).
   - Each WMC is required to facilitate exchange of information between co-permittees, establish goals and deadlines for WMAs, prioritize pollution control measures, develop and update adequate information, and recommend appropriate revisions to the SQMP.

7. Legal Authority:

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

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

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

- The Water Quality Compliance Master Plan for Urban Runoff identifies and describes the various watersheds in the City, summarizes the water quality conditions of the City's waters, identifies known sources of pollutants, describes the governing regulations for water quality, describes the BMPs that are being implemented by the City, discusses existing TMDL Implementation Plans and Watershed Management Plans. Additionally, the Water Quality Compliance Master Plan for Urban Runoff provides an implementation strategy that includes the following three initiatives to achieve water quality goals:

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

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

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

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

City of Los Angeles Stormwater Program

The City of Los Angeles supports the policies of the Construction General Permit and the Los Angeles County NPDES permit through the *Development Best Management Practices Handbook. Part A Construction Activities*, 3rd Edition, and associated ordinances were adopted in September 2004. *Part B Planning Activities*, 5th Edition was adopted in May 2016. The Handbook provides guidance for developers in complying with the requirements of the Development Planning Program regulations of the City's Stormwater Program. Compliance with the requirements of this manual is required by City of Los Angeles Ordinance No. 173,494. The handbook and ordinances also have specific minimum BMP requirements for all construction activities and require dischargers whose construction projects disturb one acre or more of soil to prepare a SWPPP and file a Notice of Intent (NOI) with the SWRCB. The NOI informs the SWRCB of a particular project and results in the issuance of a Waste Discharger Identification (WDID) number, which is needed to demonstrate compliance with the Construction General Permit.

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

Los Angeles Municipal Code

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

- Any liquids, solids, or gases which by reason of their nature or quantity are flammable, reactive, explosive, corrosive, or radioactive, or by interaction with other materials could result in fire, explosion, or injury.
- Any solid or viscous materials, which could cause obstruction to the flow or operation of the storm drain system.
- Any pollutant that injures or constitutes a hazard to human, animal, plant, or fish life, or creates a public nuisance.
- Any noxious or malodorous liquid, gas, or solid in sufficient quantity, either singly or by interaction with other materials, which creates a public nuisance, hazard to life, or inhibits authorized entry of any person into the storm drain system.
- Any medical, infectious, toxic, or hazardous material or waste.

Additionally, unless otherwise permitted by a NPDES permit, the ordinance prohibits industrial and commercial developments from discharging untreated wastewater or

untreated runoff into the storm drain system. Furthermore, the ordinance prohibits trash or any other abandoned objects/materials from being deposited such that they could be carried into the storm drains. Lastly, the ordinance not only makes it a crime to discharge pollutants into the storm drain system and imposes fines on violators, but also gives City public officers the authority to issue citations or arrest business owners or residents who deliberately and knowingly dump or discharge hazardous chemicals or debris into the storm drain system.

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

Low Impact Development (LID) – City of Los Angeles

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

LID is a stormwater management strategy with goals to mitigate the impacts of increased runoff and stormwater pollution as close to its source as possible. LID promotes the use of natural infiltration systems, evapotranspiration, and the reuse of stormwater. The goal of these LID practices is to remove nutrients, bacteria, and metals from stormwater while also reducing the quantity and intensity of stormwater flows. Through the use of various infiltration strategies, LID is aimed at minimizing impervious surface area. Where infiltration is not feasible, the use of bioretention, rain gardens, green roofs, and rain barrels that will store, evaporate, detain, and/or treat runoff may be used. [8]

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

[8] City of Los Angeles. "Development Best Management Practices Handbook." May 2016.

- 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.

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

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

Safe Drinking Water Act (SDWA)

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

demand management and water supply augmentation programs and projects to address the State's water needs.

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

3. ENVIRONMENTAL SETTING

3.1. SURFACE WATER HYDROLOGY

3.1.1. REGIONAL

The Project Site is located within the Ballona Creek Watershed (Watershed) in the Los Angeles Basin. The Watershed covers approximately 130 square miles in the coastal plain of the Los Angeles Basin. Its boundaries are the Santa Monica Mountains to the north, the Harbor Freeway (110) to the east, and the Baldwin Hills to the south. The watershed includes the cities of Beverly Hills, West Hollywood, portions of the cities of Los Angeles, Culver City, Inglewood and Santa Monica, unincorporated areas of Los Angeles County, and areas under the jurisdiction of Caltrans.

The watershed is highly developed: residential (64%), vacant/open space (17%), and commercial (12%) are the predominant land uses. Overall, 49% of the watershed is covered by roads, rooftops, and other impervious surfaces.

Ballona Creek flows as an open channel for just under 10 miles from mid-Los Angeles (south of Hancock Park) through Culver City, reaching the Pacific Ocean at Playa del Rey (Marina del Rey Harbor).

The Estuary portion (from Centinela Avenue to the outlet) is soft bottomed, while the remainder of the creek is lined in concrete. Ballona Creek is fed by a network of underground storm drains, which reaches north into Beverly Hills and West Hollywood. Major tributaries of the Creek and Estuary include Centinela Creek, Sepulveda Channel, and Benedict Canyon Channel.

The average dry weather flow at the Watershed's terminus in Playa del Rey is 25 cubic feet per second – a slow, steady flow. The average wet weather flow is ten times higher, or even more during large storms. Refer to Figure 1 for Ballona Creek Watershed Map.

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 up to approximately 71,400 cubic feet of stormwater per second from a 50-year frequency storm event.

3.1.2. LOCAL

Underground storm drainage facilities along Mulholland Drive are owned and maintained by the City of Los Angeles. Based on City of Los Angeles record data, there is an existing 18-inch Reinforced Concrete Pipe (RCP) on Mulholland Drive. Though the record data is limited in this area, it appears stormwater makes its way west towards a City of Los Angeles owned and maintained 54" mainline called WCPERMIT 420 which carries stormwater south to a natural channel and which is picked up again by stormwater infrastructure. The 54" line conveys flow southeasterly to a series of pipes and open channels that follow the contours of the hillside that are expected to increase in size to accommodate additional flow. The channels eventually join the State of California owned and maintained San Diego Freeway Channel that then networks into Ballona Creek.

3.1.3 On Site

The Project Site is currently developed with approximately 42,678 square feet of academic facilities that are to remain. Academic amenity spaces such as playgrounds, fields, and seating areas surround the existing structures. The Project Site currently includes surface parking on the north and circulation areas generally located on the western portion of the Project Site. Undeveloped hillside is located in the eastern and southern most portions of the Project Site. As shown in Figure 2, stormwater from the Project Site is conveyed by sheet flow in all directions, as the development footprint of the School sits on a hill. There are several area drains and site storm drain lines on the Project Site. Flow from the majority of the Project Site is ultimately directed towards a low point along the fire access lane on the southwestern portion of the site. That localized low point directs flow into the aforementioned existing 54-inch RCP stormwater line flowing from northwest to southeast as referenced in section 3.1.2.

For the northern portion of the Project site, flow is directed from Mulholland Drive towards N Sepulveda Blvd through a series of pipes and open channels following the contours of the hillside. Once flow reaches Sepulveda Blvd, a 42-inch storm drain line conveys flow into the Los Angeles storm drain system.

An analysis of existing contours has led the existing site drainage to be divided into eight drainage areas as shown in Table 1. The existing Project Site is approximately 32-percent impervious as shown in Table 1 below. The results of the existing Q_{50} analysis are presented in Table 1 below performed in HydroCalc. As indicated therein, the existing Q50 flow from the Project Site is estimated at 25.89 cfs.

As shown in Figure 2, drainage subareas 1 through 3 correspond to the hillside slope area that generally slopes to the north. Area drains at the toe of the slope, adjacent to the retaining wall, capture flow and convey it through the storm drain system, most likely to the large storm drain and channel system previously described. This system is distinct and does not interact with the drainage for the remainder of the school.

Drainage subarea 4 is bound by the toe of the southwestern slope, fire lane, field, and parking lot area. The existing classroom buildings convey flow southerly towards catch basins in the field. The grassy field generally slopes easterly towards catch basins that convey flow into the aforementioned 54-inch storm drain system.

Drainage subarea 5 corresponds to the existing school classroom building, fire lane and southernly hillside area that allows water to sheet flow towards the low point along the fire access lane.

Drainage area 6 contains the Parking lot area which slopes to the north west towards the main gate of the campus. This area is bound by the existing school buildings to the southeast, the adjacent property's access lane to the southwest and Mulholland Drive. On the north

Drainage area 7 encompasses the larger and newly developed portion of the Mirman campus with a basketball court, athletic field, and adjacent hardscape. Flow within that area trends to the northeast in the field, north within the basketball court area, and south in the adjacent hardscape area. Flow is captured by trench drains and area drains and treated prior to being stored to be used for irrigation purposes. The remaining flow outlets to the catch basin on Mulholland drive.

Drainage area 8 corresponds to the northwesterly sloping landscaped area adjacent to the existing outdoor amphitheater. Flow is intercepted by the amphitheater wall and directed westerly via a concrete swale where flow continues to run westerly down the toe of the slope.

The unincorporated area indicated on Table 1 includes site areas where the current flow characteristics re not directed towards the Mirman Site. This existing Project Site is 5.46 acres, and the proposed Project Site inclusive of the Lot Line adjustment area is 6.02 acres Since the unincorporated areas do not contribute to site run-on and will not be affected with the future development, the area is not included in the calculation.

Table 1- Existing Drainage Stormwater Runoff Calculations

Drainage Area	Area (Acres)	Percent Impervious	Q50 (cfs) (volumetric flow rate
Sub-Area 1	0.16	1	0.65
Sub-Area 2	0.3	1	1.22
Sub-Area 3	0.36	1	1.47
Sub-Area 4	1.75	60	7.69
Sub-Area 5	0.91	80	4.1
Sub-Area 6	0.36	70	1.6
Sub-Area 7	1.92	40	8.23
Sub-Area 8	0.15	1	0.61
Non-contributing Area	0.11	74	0.49
Site Total	**6.02**	**32**	**26.06**

3.2. SURFACE WATER QUALITY

3.2.1. REGIONAL

As described 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, lead, polychlorinated biphenyls (PCBs), Shellfish Harvesting Advisory, silver, toxicity, trash, viruses (Enteric), and zinc. No TMDL data have been recorded by EPA for this waterbody[9].

3.2.1.1. BENEFICIAL USES OF THE BALLONA CREEK WATERSHED

According to the LARWQCB Basin Plan, the beneficial uses defined in the Basin Plan are identified in water bodies within the Ballona Creek Watershed.[10] Of these, the beneficial uses for the waters within the Ballona Creek Estuary, where surface water flows from the Project Site ultimately discharge, are shown in Table 2 and are described below.

Table 2
Beneficial Uses of the Waters within the Ballona Creek Estuary

Beneficial Use	Ballona Creek Estuary
Navigation (NAV)	E
Commercial, and Sport Fishing (COMM)	E
Estuarine Habitat (EST)	E
Marine Habitat (MAR)	E
Wildlife Habitat (WILD)	E
Preservation of Rare and Endangered Species (RARE)	Ee
Fish Migration (MIGR)	Ef
Fish Spawning (SPWN)	Ef
Shellfish Harvesting (SHELL)	E
Water Contact Recreation (REC-1)	E
Non-contact Water Recreation (REC-2)	E

[9]CA Water board: 2010 CALIFORNIA 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS. available at https://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/category5_report.shtml .
[10] USEPA. Waterbody Report for Ballona Creek, available at: https://mywaterway.epa.gov/community/Ballona%20Creek,%20CA,%20USA/overview accessed July 2, 2021.

Beneficial Use	Ballona Creek Estuary
E: Existing beneficial use e: One or more rare species utilizes all ocean, bays, estuaries, and coastal wetlands for foraging and/or nesting. f: Aquatic organisms utilize all bays, estuaries, lagoons, and coastal wetlands, to a certain extent, for spawning and early development. This may include migration into areas which are heavily influenced by freshwater inputs.	

3.2.1.2. IMPAIRMENTS AND TMDLS IN THE BALLONA CREEK ESTUARY

Pursuant to Section 303(d) of the federal Clean Water Act, the State and RWQCBs identify impaired bodies of water that do not meet water quality standards and prioritizes and schedules them for development of TMDLs. A TMDL specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards. Those facilities and activities that are discharging into the water body, collectively, must not exceed the TMDL. The USEPA approved the most recent Section 303(d) list in November 2010.[11] TMDLs in effect within the Ballona Creek Estuary include Cadmium, Chlordane, Coliform Bacteria, Copper, DDT, Lead, PAHs, PCBs, Sediment Toxicity, Shellfish Harvesting, Silver and Zinc.

Based on the EPA's 2012 Waterbody Quality Assessment Report, the TMDLs for Ballona Creek Estuary include Cadmium, Chlordane, Copper, Lead, PCBs, Silver, Zinc and Trash. [12]

3.2.2. LOCAL

In general, urban stormwater runoff occurs following precipitation events, with the volume of runoff flowing into the drainage system depending on the intensity and duration of the rain event. Contaminants that may be found in stormwater from developed areas include sediments, trash, bacteria, metals, nutrients, organics, and pesticides. The source of contaminants includes surface areas where precipitation falls, as well as the air through which it falls. Contaminants on surfaces such as roads, maintenance areas, parking lots, and buildings, which are usually contained in dry weather conditions, may be carried by rainfall runoff into drainage systems. The City of Los Angeles typically installs catch basins with screens to capture debris before entering the storm drain system. In addition, the City conducts routine street cleaning operations, as well as periodic cleaning and maintenance of catch basins, to reduce stormwater pollution within the City.

3.2.3. ON SITE

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[11] State Water Resources Control Board, 2014/2016 Integrated Report, available at: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml, accessed July 2, 2021

[12] USEPA. 2016 Waterbody Report for Ballona Creek, available at: https://mywaterway.epa.gov/community/Ballona%20Creek,%20CA,%20USA/overview https://iaspub.epa.gov/waters10/attains_waterbody.control?p_au_id=CAR4051300019980918142302&p_list_id=CAR4051300019980918142302&p_cycle=2016; accessed August 30, 2019July 2, 2021.

The Project Site currently has structural BMPs for the treatment of stormwater runoff from existing impervious surfaces such as building roof areas and pavements in the eastern portion of the Campus as previously mentioned in section 3.1.3 (Drainage subarea 7).

Additionally, there are a range of non-structural BMPs and environmental water quality measures that are currently utilized in the remainder of 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 where applicable; proper storage of hazardous materials and wastes; and substituting environmentally friendly products for environmentally hazardous products, such as soaps, solvents, and pesticides. Stormwater runoff from the minimal existing pervious surfaces such as the landscaped areas and lawns 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 HYDROLOGY

3.3.1. REGIONAL

Groundwater use for domestic water supply is a major beneficial use of groundwater basins in Los Angeles County. The City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin (Basin). The Basin is comprised of the Hollywood, Santa Monica, Central, and West Coast Groundwater Subbasins. Groundwater flow in the Basin is generally south-southwesterly and may be restricted by natural geological features. Replenishment of groundwater basins occurs mainly by percolation of precipitation throughout the region via permeable surfaces, spreading grounds, and groundwater migration from adjacent basins, as well as injection wells designed to pump freshwater along specific seawater barriers to prevent the intrusion of salt water. Refer to Figure 5 for the groundwater basin exhibit.

3.3.2. LOCAL

Within the Basin, the Project Site lies within the Santa Monica Subbasin (Subbasin) that underlies the northwestern part of the Basin. It is bounded by impermeable rocks of the Santa Monica Mountains on the north and by the Ballona escarpment on the south. The Subbasin extends from the Pacific Ocean on the west to the Inglewood fault on the east. Ballona Creek is the dominant hydrologic feature and drains surface waters to the Pacific Ocean.[13]

Replenishment of groundwater in the Subbasin is mainly by percolation of precipitation and surface runoff onto the Subbasin from the Santa Monica Mountains. The Subbasin received an average annual precipitation of approximately 14 inches, and it is estimated to have a total storage capacity of approximately 1.1 million acre-feet. The Inglewood fault

[13] https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118accessed July 2 2021.

appears to inhibit replenishment by underflow from the Central Basin to the east, though some inflow may occur at its northern end.[14]

Project is nestled the Santa Monica Mountains which is north of the Los Angeles Coastal Plain Groundwater Basin. Within the Los Angeles Coastal Plain Groundwater Basin, the Project Site specifically contributes to the San Fernando Subbasin. The Project Site is located west of the Central Subbasin, is bounded on the south by the Santa Monica Mountains and the Hollywood fault on the east by the Inglewood fault zone.[15]

3.3.3. ON-SITE

The Project Site includes relatively flat developed area and undeveloped hillside which contribute to groundwater recharge of the Coastal Plain of the Los Angeles Groundwater Basin. The Project Site slopes generally in a 2:1 (Horizontal: Vertical) gradient in the slope areas, and 50:1 (Horizontal: Vertical) at north of the slope with a total elevation difference of 40 feet. The current ground surface ranges from 1,355 to 1,312 feet above mean sea level from south to north of the Project Site and along Fire access road. Locally steep grades occur, and the Project Site will have several ramps and steps to connect the elevation differences.

The below discussion is based upon a review of relevant previous investigations and on-site explorations conducted as part of the "Geotechnical Investigation Proposed Mirman School Learning Center" for the Project Site by Geosyntec Consultants, dated December 2019. In the geotechnical investigation conducted by Geosyntec Consultants, groundwater was not encountered in the 32-foot maximum boring depth and further noted that "while groundwater conditions may vary, especially during and after periods of sustained precipitation or irrigation, it is not generally anticipated to affect the completed improvements." [16]

Furthermore, there are no groundwater production wells, public water supply wells, or spreading grounds within one mile of the Project Site[17]. Thus, local groundwater production is not expected to significantly impact groundwater level at the Project Site.

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[14] California's Groundwater Bulletin 118: Coastal Plain of Los Angeles Groundwater Basin, Santa Monica Subbasin, February 2004, https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/4_011_01_SantaMonicaSubbasin.pdf; accessed July 2, 2021.

[15] California Groundwater Bulletin 118: Coastal Plain of Los Angeles Groundwater Basin, Central Subbasin. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/4_011_04_CentralSubbasin.pdf > accessed on July 2, 2021.

[16] Geosyntec Consultants. Geotechnical Investigation Proposed Mirman School Learning Center Los Angeles, California, December 2019.

[17] State Water Resources Control Board Groundwater Ambient Monitoring & Assessment GeoTracker , available at http://geotracker.waterboards.ca.gov/gama/gamamap/public/default.asp?CMD=runreport&myaddress=6100+Topanga+Canyon+Blvd; accessed July 2,2021.

Conversely, less than significant impacts to the groundwater level at the Project Site are not expected to affect groundwater level at local groundwater wells or spreading grounds.

3.4. GROUNDWATER QUALITY

3.4.1. REGIONAL

As stated above, the southern portion of the City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin, which falls under the jurisdiction of the Los Angeles Regional Water Quality Control Board (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

3.4.2. LOCAL

As stated above, the Project Site contributes to the Coastal Plain of the Los Angeles Groundwater Basin. Based upon LARWQCB's Basin Plan, constituents of concern listed for the Subbasin include boron, chloride, sulfate, and Total Dissolved Solids (TDS).

3.4.3. ON-SITE

Twenty percent of the site is undeveloped hillside terrain and is assumed to not negatively contribute to groundwater contamination. Recent development implements stormwater BMPs to mitigate contamination from surface runoff. The remainder of the existing school buildings do not appear to implement BMPs and may contribute to groundwater recharge and therefore to groundwater pollution or otherwise may affect groundwater quality. However, due to the existing uses and small footprint, there are no known site-specific impacts to groundwater quality in the existing condition. Furthermore, the Project Site does not directly overlay a groundwater aquifer therefore will not negatively contribute to groundwater contamination.

Other types of risk such as underground storage tanks have a greater potential to impact groundwater. According to the Phase I ESA for the Project Site, there is no record of underground storage tanks previously installed or utilized at the Project Site.

4. SIGNIFICANCE THRESHOLDS

In accordance with the significance thresholds described by the California Environmental Quality Act (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 Appendix G thresholds as described below.

4.1. SURFACE WATER HYDROLOGY

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

Would the project:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would:
    - Result in substantial erosion or siltation on- or off-site;
    - 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; or
    - Impede or redirect flood flows;
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.

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

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

4.2. SURFACE WATER QUALITY

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

Would the project:

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

In the context of the above questions from Appendix G, the City of Los Angeles considers factors from the *L.A. CEQA Thresholds Guide,* which states that a project would normally have a significant impact on surface water quality if it would result in discharges that would create pollution, contamination or nuisance, as defined in Section 13050 of the California

Water Code (CWC) or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body.

The CWC includes the following definitions:

- "Pollution" means an alteration of the quality of the waters of the state to a degree which unreasonably affects either of the following: 1) the waters for beneficial uses or 2) facilities which serve these beneficial uses. "Pollution" may include "Contamination".
- "Contamination" means an impairment of the quality of the waters of the state by waste to a degree, which creates a hazard to the public health through poisoning or though the spread of disease. "Contamination" includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected.
- "Nuisance" means anything which meets all of the following requirements: 1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; 2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; and 3) occurs during, or as a result of, the treatment or disposal of wastes.[19]

4.3. GROUNDWATER HYDROLOGY

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

Would the project:

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

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

In the context of the above questions from the Appendix G of the CEQA Guidelines, the City of Los Angeles considers factors from the *L.A. CEQA Thresholds Guide,* which states that a project would normally have a significant impact on groundwater hydrology if it would:

- Change potable water levels sufficiently to:

    - Reduce the ability of a water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported

[19] City of Los Angeles.LA. CEQA Thresholds Guide. 2006 http://www.environmentla.org/programs/Thresholds/Complete%20Threshold%20Guide%202006.pdf. Accessed July 2, 2021.

water, summer/winter peaking, or to respond to emergencies and drought;

- Reduce yields of adjacent wells or well fields (public or private); or
- Adversely change the rate or direction of flow of groundwater; or

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

4.4. GROUNDWATER QUALITY

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

Would the project:

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

In the context of the above questions from the Appendix G of the CEQA Guidelines, the City of Los Angeles considers factors from the *L.A. CEQA Thresholds Guide*, which states that a project would normally have a significant impact on groundwater hydrology if it would:

- Affect the rate or change the direction of movement of existing contaminants;
- Expand the area affected by contaminants;
- Result in an increased level of groundwater contamination (including that from direct percolation, injection or saltwater intrusion); or
- Cause regulatory water quality standards at an existing production well to be violated, as defined in the California Code of Regulations (CCR), Title 22, Division 4, and Chapter 15 and in the Safe Drinking Water Act.

5. METHODOLOGY

5.1. SURFACE WATER HYDROLOGY

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

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 4 for the Hydrocalc Calculator results and Figure 7 for Isohyet Map.

5.2. SURFACE WATER QUALITY

5.2.1. CONSTRUCTION

The methodology to determine impacts related to construction regarding surface water quality is largely based upon determination of construction BMPs. 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 before any site clearing and grubbing 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 will be 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 will meet the requirements of the City's LID standards.[20] Under section 3.1.3. of the LID Manual, post-construction stormwater runoff from a new development must be infiltrated, evapotranspirated, captured and used, and/or treated through high efficiency BMPs onsite for at least the volume of water produced by the greater of the 85th percentile storm or the 0.75-inch storm event. The LID Manual prioritized the selection of BMPs used to comply with stormwater mitigation requirement. The order of priority is:

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

Feasibility screening delineated in the LID manual is applied to determine which BMP will best suit the Project. Specifically, LID guidelines require that infiltration systems maintain at least 10 feet of clearance to the groundwater, property line, and any building structure.

The historic high groundwater level is at a depth of at least greater than the 32 max boring depth below the ground surface. According to the Geotechnical investigation prepared for

[20] The Development Best Management Practices Handbook, Part B Planning Activities, 5th edition was adopted by the City of Los Angeles, Board of Public Works on July 1, 2011 to reflect Low Impact Development (LID) requirements that took effect May 12, 2012.

the Project Site[21], it has discussed that infiltration may not be considered feasible due to the underlying bedrock present in the site that exhibit a poor percolation characteristic.

A stormwater capture system will likely be required and sized per LID guidelines. However, if capture and use is later determined to not be feasible, the Project would then be required to implement High Efficiency Biofiltration/Bioretention Systems. See Figure 6 for LID calculations.

According to the City's LID Handbook, all cisterns 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:

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

Where:

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

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

5.3. GROUNDWATER

To determine the level of significant impact of this Project, under the above threshold and as it relates to the level of the underlying groundwater table of the Central Subbasin Groundwater Basin, the analysis included a review of the following considerations:

Analysis and Description of the Project's Existing Condition

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

Analysis of the Proposed Project Impact on Groundwater Level

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

[21] Geosyntec Consultants. Geotechnical Investigation Proposed Mirman School Learning Center Los Angeles, California, December 2019.

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

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

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

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

6. PROJECT IMPACT ANALYSIS

6.1. CONSTRUCTION

6.1.1. SURFACE WATER HYDROLOGY

Construction activities for the Project would include excavating down approximately 5 feet down in the location of the proposed buildings and approximately 12 at the location of the proposed stormwater tank. Throughout the Project Site the elevation difference is 40 feet with an overall gradient of 50 to 1. It is anticipated that grading activities of approximately 7,400 cut, 5,200 fill, and net export of 2,200 cubic yards of soil would be required to construct 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.

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

In addition, the Project would be required to comply with all applicable City grading permit regulations that require necessary measures, plans, and inspections to reduce sedimentation and erosion. Thus, through compliance with all NPDES General Construction Permit requirements, implementation of BMPs, and compliance with applicable City grading regulations, the Project would not substantially alter the Project Site drainage patterns in a

manner that would result in substantial erosion, siltation, or flooding on- or off-site. Similarly, adherence to standard compliance measurements in construction activities would ensure that construction of the Project would not cause flooding, substantially increase or decrease the amount of surface water flow from the Project Site into a water body, or result in a permanent, adverse change to the movement of surface water. Therefore, construction-related impacts to surface water hydrology would be less than significant.

6.1.2. SURFACE WATER QUALITY

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

6.1.3. GROUNDWATER HYDROLOGY

As described above, no water supply wells are located at the Project Site or within one mile of the Project Site that could be impacted by construction, nor would the Project include the construction of water supply wells. As stated above, dewatering operations are not expected. If groundwater is encountered during construction, temporary pumps and filtration would be utilized in compliance all applicable regulations and requirements, including with all relevant NPDES requirements related to construction and discharges from dewatering operations. Therefore, as Project development would not adversely impact the rate or direction of flow of groundwater and no water supply wells would be affected, the Project would not result in a significant impact on groundwater hydrology during construction.

6.1.4. GROUNDWATER QUALITY

As discussed above, the Project would include excavations to a depth of approximately 5 feet below ground surface and approximately 12 feet at the stormwater tank. The Project would also result in a 2,200 net export of existing soil material. As discussed in section 3.4.3, 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. There are no USTs within the Project Site, therefore it will not create a significant adverse effect on groundwater quality. See section 3.4.3 for further discussion regarding USTs.

During on-site grading and building construction, small quantities of 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. Due to compliance with measures as listed above and the implementation of BMPs, 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 during construction and impacts on groundwater quality would be less than significant.

6.2. OPERATION

6.2.1. SURFACE WATER HYDROLOGY

Based on the drainage patterns and flow paths of stormwater that are tributary to a common point or area within the Project Site, the Project Site has been divided into nine drainage areas. The boundaries of these drainage areas with implementation of the Project are illustrated in Figure 3. In the proposed condition, the Project Site is approximately 36 percent impervious with 32-percent of the existing Project Site consisting of impervious surfaces. The Project would include development of new buildings, paved areas, and landscaped areas. As shown in Figure 3, stormwater direction of flow from the Project Site varies per drainage area, as the site sits on a relatively flat terrace within a hillside area. Most drainage areas that have been previously developed are self-contained, as flow is directed toward inlets and storm drain lines to convey flow.

As shown in Figure 2 and Figure 3, the boundaries of the drainage areas would be subdivided and follow existing drainage trends. The Project will increase the percentage of impervious area due to the development in sub drainage area 4. Presently, it appears that stormwater discharges from the Project Site without filtration from sub drainage area 4.

In Drainage Subareas 1, 2, 3, and 6, stormwater runoff patterns will remain unchanged and will maintain the existing drainage condition. Stormwater will flow northerly into catch basins at the toe of the slope for drainage subareas 1,2, and 3. Within drainage area 1 runoff flowing into an engineered concrete drainage swale that runs down the center of the slope

to a catch basin at the toe of the slope. In drainage Subareas 1, 2, 3, and 6, flow is conveyed as described in section 3.1.3.

Similarly, under drainage sub area 5, the existing drainage pattern along the fire lane and southern classroom will be maintained with runoff directed northeasterly into storm water conveyance devices. A portion of the fire access lane slopes towards a low point along the property line, which allows stormwater to sheet flow across the church parking lot and into the 54-inch storm drain system. However, due to the Learning Center development, a 0.02- and 0.07-acres portion of the existing sub drainage area 5 has been incorporated into drainage areas 4 and 9 respectively.

Though the subarea size in subarea 4 remains the same, impervious surfaces are to increase. This drainage area modification is attributed to the proposed Learning Center development within subarea 4. The proposed drainage trend in subarea 4 will flow away from the proposed buildings into landscaped areas, area drains, and catch basins within the limit of work. Most of the net increase in discharge from this subarea is expected to be contained within the limit because of the proposed catch basins. The Q50 values for the proposed condition, shown in tables 2 and 3, were calculated without taking into account the drain flow patterns for the capture and reuse system.

Similarly, with the addition of a garden area in the location of the existing amphitheater and a storage building northwest of the garden, both proposed in subarea 9, additional flow is to be accounted for. Under the existing condition, a portion of sub-area 9 was part of the non-contributing Area, which sheet flows away from the property.

The Project will be developed with buildings and paved areas, however when compared to the entire surface area of the Project Site, the post-project condition results in virtually no incremental increase or decrease in the imperviousness of the Project Site that would substantially increase runoff volumes into the existing storm drain system. Therefore, peak flow rates would remain virtually unchanged.

Table 3 shows the proposed 50-year frequency design storm event peak flow rate within the Project Site. A comparison of the pre- and post-peak flow rates indicates that there would be no substantial increase in stormwater runoff. Specifically, as indicated in Tables 1 through 3, impervious surfaces would increase by only 4 percent under the Project (i.e., from 32 percent to 36 percent of the Project Site), and the Q50 stormwater runoff flow would increase by less than 1 cfs (i.e., 26.06 cfs to 26.25 cfs).

Table 2- Proposed Drainage Stormwater Runoff Calculations

Drainage Area	Area (Acres)	Percent Impervious	Q50 (cfs) (volumetric flow rate measured in cubic feet per second)
Sub-Area 1	0.16	1	0.65

Sub-Area 2	0.3	1	1.22
Sub-Area 3	0.36	1	1.47
Sub-Area 4	1.77	80	7.98
Sub-Area 5	0.82	80	3.7
Sub-Area 6	0.36	70	1.6
Sub-Area 7	1.92	40	8.23
Sub-Area 8	0.15	1	0.61
Sub-Area 9	0.14	75	0.63
Non-contributing Area	0.04	1	0.16
Site Total	**6.02**	**36**	**26.25**

Table 3- Existing and Proposed Conditions Comparison

Drainage Area	Area (Acres)		Q50 (cfs) (volumetric flow rate measured in cubic feet per second)		
	Existing	Proposed	Existing	Proposed	Delta
Sub-Area 1	0.16	0.16	0.65	0.65	0
Sub-Area 2	0.3	0.3	1.22	1.22	0
Sub-Area 3	0.36	0.36	1.47	1.47	0
Sub-Area 4	1.75	1.77	7.69	7.98	0.29
Sub-Area 5	0.91	0.82	4.1	3.7	-0.4
Sub-Area 6	0.36	0.36	1.6	1.6	0
Sub-Area 7	1.92	1.92	8.23	8.23	0
Sub-Area 8	0.15	0.15	0.61	0.61	0
Sub-Area 9/ Non-contributing Area	0.11	0.18	0.49	0.79	0.3
Site Total	6.02	6.02	**26.06**	**26.25**	0.19

Also, the post-Project condition will mitigate the increase in stormwater flow by intercepting the flow within the proposed development and conveying it to a proposed capture and use cistern. Therefore, the Project would not cause flooding during a 50-year storm event or result in an adverse change to the movement of surface water on the Project Site. The LID requirements for the Project would outline the stormwater treatment post-construction BMPs required to control pollutants associated with storm events up to the 85th percentile storm event, per the City's Stormwater Program. The Project BMPs will

mitigate the stormwater runoff quality and quantity. Refer to Exhibit 2 for typical LID BMPs. The Project would not impact existing storm drain infrastructure serving the Project Site and runoff would generally continue to follow the same discharge paths and drain to the same stormwater systems.

As shown in Table 3, the expected peak flow from sub drainage areas 4 and 9 are expected to increase by approximately 0.3 CFS. As discussed above, this storm water flows to the 54" line to the southwest of the Project. Precise as-built information is not available for this pipe at this time, so the pipe is assumed to slope at 0.5%. Hydraulic calculations of this line can be found in Figure 8. The results indicate that the flow of the 54" line is 162.04 cfs flowing at 75% full. Given that 0.2 CFS is less than 0.2% of the total capacity of the 54", it is expected that the increase to flow rate is negligible. Therefore, there will be a less than significant impact to surface water hydrology as the Project would not cause flooding during the 50-year developed storm event, would not create runoff which would exceed the capacity of existing or planned drainage systems, would not require construction of new stormwater drainage facilities or expansion of existing facilities, would not substantially reduce or increase the amount of surface water in a water body, or result in a permanent adverse change to the movement of surface water. Therefore, potential operational impacts to site surface water hydrology would be less than significant and is not expected to cause flooding during a 50-year storm event or result in an adverse change to the movement of surface water.

The Federal Emergency Management Agency (FEMA) maintains the Flood Insurance Rate Maps (FIRM) to assess if a property is in the 100-year flood plain. According to the FIRM, the project site is within Zone D "Area of Undetermined Flood Hazard." This is to be differentiated from Zone D, "Area with Flood Risk Due to Levee", and from the several other Zone designations that identify known risks of flooding. Refer to Figure 9 for the FIRM. The Project site is at a greater elevation than nearby water bodies (Encino reservoir, Los Angeles River, Stone Canyon Reservoir, Ballona Creek) and is therefore not at risk of flooding due to failure of dams or levees, and seiche. The Project site is more than 7 miles from the ocean, and at an approximate elevation of 1,300 feet, so the project is also not expected to be at risk from tsunamis.

It is unknown why FEMA as left this area as undetermined, Zone D. However, it can be assumed, that based on the above dam and levee information, in addition to the existing topography that defines natural and engineered drainage paths for stormwater as described above, the project would result in a less than significant impact relative to the applicable surface water hydrology significance thresholds.

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.

As previously described, the Project would be required to implement LID requirements throughout the operational life of the Project. As part of these requirements, the Project would prepare a LID analysis which would outline the stormwater treatment measures or post-construction BMPs required to control pollutants of concern. In addition, consistent with LID requirements to reduce the quantity and improve the quality of rainfall runoff that leaves the Project Site, the Project would include the installation of BMPs as established by the LID Manual.

The BMP selection on the priority list is Stormwater Capture and Use which operates by capturing stormwater runoff and holding it for irrigation during dry periods. Captured stormwater will be used to offset the potable irrigation demand that will occur during the rainy season (October 1 to April 30, 7 months). Feasibility of this proposed BMP will be determined according to the criteria established in the LID manual, along with coordination with the City. As is typical of most urban developments, stormwater runoff from the Project Site has the potential to introduce pollutants into the stormwater system. Anticipated and potential pollutants generated by the Project are sediment, nutrients, pesticides, metals, pathogens, and oil and grease. The pollutants listed above are expected to, and would in fact, be mitigated through the implementation of approved LID BMPs.

As set forth in the LID Manual and detailed under the Methodology above, capture and use BMPs shall be sized to capture, store, and reuse an equivalent runoff volume produced from the greater between the 85th percentile storm event and the 0.75-inch storm event. In addition, the Estimated Total Water Usage (ETWU) for irrigation from October 1 – April 30 must be greater than or equal to the volume of water produced by the stormwater quality design storm event. Based on these requirements, the total storage volume and landscape area needed within the Project Site was determined to be approximately 16,000 gallons and 3,000 square feet, respectively. To meet this storage volume and landscape area requirements, the Project proposes the installation of one capture and use system

Due to the incorporation of the required LID BMP(s), the very limited size of the Project (i.e., only a 22,508 square foot increase in floor area, the nature of the proposed use (i.e., elementary/junior high school), and the very limited (less than 1 cfs) increase in the Q50 stormwater runoff flow from the Project Site under the Project, operation of the Project would not result in discharges that would cause: (1) pollution which would alter the quality of the waters of the State (i.e., Ballona Creek) to a degree which unreasonably affects beneficial uses of the waters; (2) contamination of the quality of the waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of diseases; or (3) nuisance that would be injurious to health; affect an entire community or neighborhood, or any considerable number of persons; and occurs during or as a result of the treatment or disposal of wastes. Furthermore, operation of the Project would not result in discharges that would cause regulatory standards to be violated. Thus, operational impacts on surface water quality would be less than significant.

6.2.3. GROUNDWATER LEVEL

The Project would include new development and an increase in impervious surfaces. However, this development and increase in impervious surfaces would not be expected to

substantially decrease groundwater supplies or interfere substantially with groundwater recharge because: (1) the Project would be very limited in scale (i.e., only a 22,508 square foot increase in floor area); (2) the Project would increase impervious surfaces by only 4 percent (i.e., from 32 percent to 36 percent of the Project Site); (3) the Project would implement required LID BMPs, one of the benefits of which would be to maximize the continued infiltration of rainwater to the groundwater through the use of pervious materials where feasible; (4) the Project Site does not overlay a groundwater aquifer such that the Project Site is not a major source of groundwater recharge; and (5) the Project would not include permanent groundwater withdrawals (i.e., no groundwater wells are proposed, and no permanent dewatering would is expected to be required given the existing depth to groundwater at the Project Site [deeper than 32 feet] and the limited maximum depth [i.e., 12 feet] of required excavations). Lastly, because the proposed subsurface structures and footings would not be expected to intersect the groundwater table per the information above, and because of the very limited scale of the Project, the Project would not be expected to alter existing direction of groundwater flows. For all these reasons, Project impacts to groundwater hydrology, including to groundwater levels and the direction of groundwater flow, would be less than significant.

6.2.4. GROUNDWATER QUALITY

Operational activities which could affect groundwater quality include spills of hazardous materials and leaking underground storage tanks. No underground storage tanks are currently operated or are proposed by the Project.

In addition, while the development of new buildings would slightly increase the use of existing on-site hazardous materials as described above, compliance with all applicable existing regulations at the Project Site regarding the handling and potentially required cleanup of hazardous materials would prevent the Project from affecting or expanding any potential areas of contamination, increasing the level of contamination, or causing regulatory water quality standards at an existing production well to be violated, as defined in the California Code of Regulations, Title 22, Division 4, Chapter 15 and the Safe Drinking Water Act.

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

The Project is not anticipated to result in releases or spills of contaminants that could reach a groundwater recharge area or spreading ground or otherwise reach groundwater through percolation. The Project does not involve drilling to or through a clean or contaminated aquifer.

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 would contribute to an increase in stormwater runoff flows, but that this increase would be less than 1 cfs and would not be cumulatively considerable. Hence, the cumulative impact would be less than significant).Also, in accordance with City requirements, 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 the 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. As noted above, the Project impact on water quality is less than significant due to the introduction of new BMPs that would collect, treat, and discharge flows from the Project Site (which are not being treated under existing conditions). Also, it is anticipated that the Project and other future development projects would also be subject to LID requirements and implementation of measures to comply with total maximum daily loads. Increases in regional controls associated with other elements of the MS4 Permit would improve regional water quality over time. Therefore, based on the fact that the Project would not have an adverse impact, and given compliance with all applicable laws, rules and regulations, cumulative impacts to surface water quality would be less than significant.

6.3.3. GROUNDWATER HYDROLOGY

The geographic context for the cumulative impact analysis on groundwater level is the Santa Monica Subbasin . The Project in conjunction with forecasted growth near the region above the Santa Monica Subbasin could cumulatively increase groundwater levels. However, as noted above, no water supply wells, spreading grounds, or injection wells are located within a one-mile radius of the Project Site and the Project would not have an adverse impact on groundwater level. Any calculation of the extent to which the related projects would extract or otherwise directly utilize groundwater would be speculative. Therefore, potential cumulative impacts associated with the Project on groundwater hydrology would be less than significant, and regardless, the Project's contribution would not be cumulatively considerable.

In addition, interruptions to existing hydrology flow by dewatering operations of underground water would have the potential to affect groundwater levels. However, as mentioned above, Project development is not expected to involve the temporary or permanent extraction of groundwater from the Project Site or otherwise utilize the

groundwater. If groundwater is encountered during construction, temporary pumps and filtration would be utilized in compliance all applicable regulations and requirements, including with all relevant NPDES requirements related to construction and discharges from dewatering operations. Such a dewatering system would be temporary, would not operate at all times, and would only be activated when the level of the water reaches the permitted level that initiates the dewatering operations. While short-term, periodic dewatering has the potential to have a minimal effect on groundwater hydrology locally at the Project Site, dewatering operations at such a temporary, small-scale, and localized level would not have the potential to affect regional groundwater hydrology.

Similar to the Project, other proposed projects within the groundwater basin will likely incorporate structural designs for subterranean levels that are able to withstand hydrostatic forces and incorporate comprehensive waterproofing systems in accordance with current industry standards and construction methods. If any related project requires permanent dewatering systems, such systems would be regulated by the SWRCB. Should excavation for other related projects extend beneath the groundwater level, temporary groundwater dewatering systems will be designed and implemented in accordance with SWRCB permit requirements. These dewatering operations would be limited to temporary and local impact to the groundwater level, and regardless, the Project's contribution would not be cumulatively considerably.

Furthermore, as previously discussed, implementation of the Project would result in negligible change in impervious surface area. Development of the related projects could result in changes in impervious surface area within their respective project sites. While any calculation of the extent to which the related projects would increase or decrease impervious or pervious surfaces that might affect groundwater hydrology would be speculative, the development of such related projects would be subject to review and approval pursuant to all applicable regulatory requirements, including any required mitigation of potential groundwater hydrology impacts. Regardless, the project's contribution to any such impacts would not be cumulatively considerable.

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

6.3.4. GROUNDWATER QUALITY

Future growth near the Santa Monica 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, cumulative impacts to groundwater quality would be less than significant.. Also, it is anticipated that, like the Project, other future development projects would also be subject to LARWQCB requirements and implementation of measures to comply with total maximum daily loads in addition to requirements of California Code of Regulations, Title 22, Division 4, Chapter 15, and the Safe Drinking Water Act. Therefore, based on the fact that the Project does not have an adverse impact on groundwater quality 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 hydrology or groundwater quality for this Project.

APPENDIX

COUNTY OF LOS ANGELES

LOS ANGELES RIVER WATERSHED

Figure 1: Los Angeles River Watershed Map

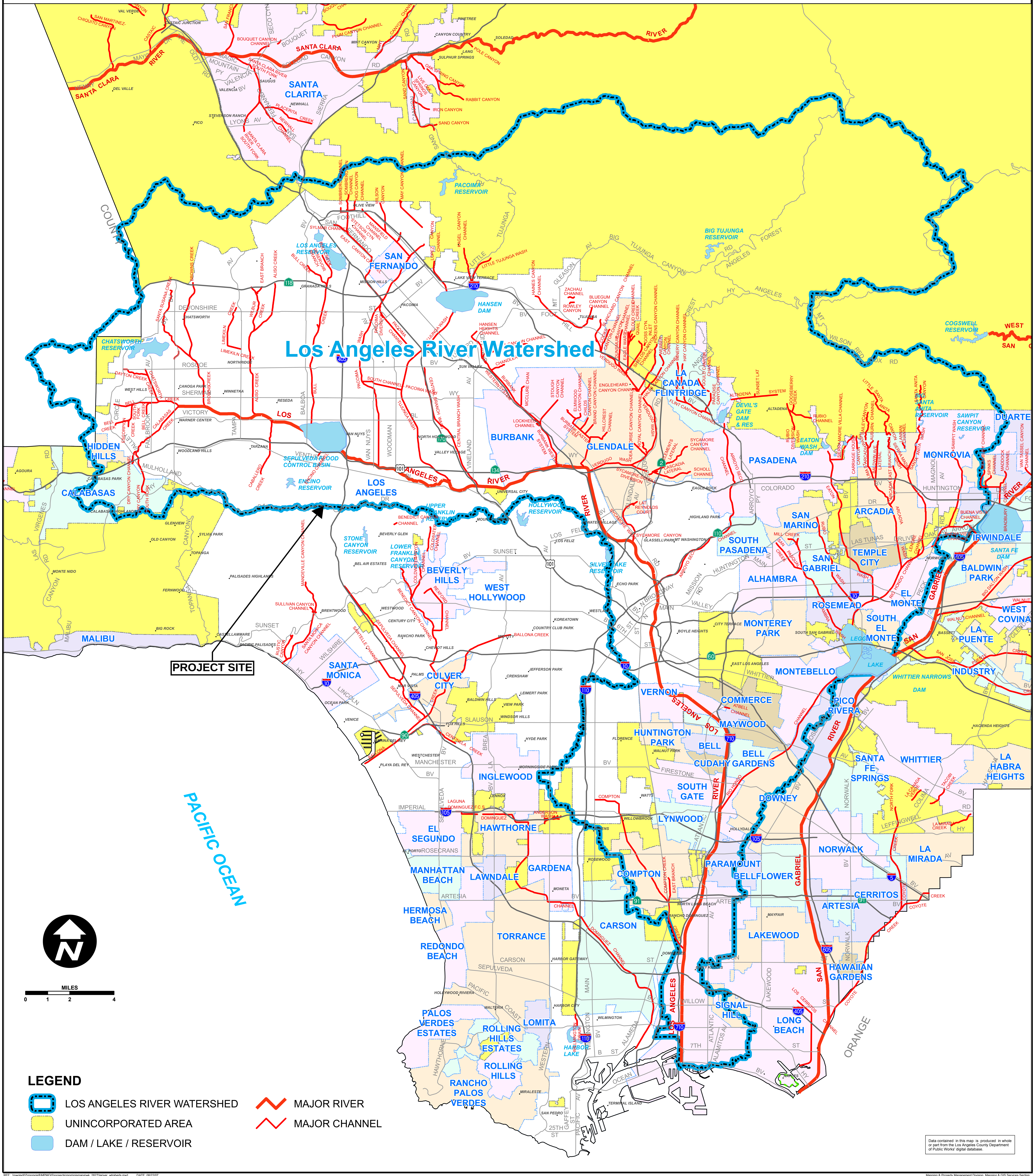

Figure 2: Existing Drainage Exhibit

DRAINAGE AREA 1:
AREA: 7,010 SF = 0.16 AC
LENGTH: 90 FT
SLOPE:0.47 FT/FT

DRAINAGE AREA 2:
AREA:13,234 SF = 0.30 AC
LENGTH: 250 FT
SLOPE:0.11 FT/FT

DRAINAGE AREA 3:
AREA:15,693 SF =0.36 AC
LENGTH: 90 FT
SLOPE:0.35 FT/FT

DRAINAGE AREA 4:
AREA: 76,359 SF =1.75 AC
LENGTH: 117 FT
SLOPE:0.05 FT/FT

DRAINAGE AREA 5:
AREA: 39,680 SF = 0.91 AC
LENGTH: 460 FT
SLOPE:0.11 FT/FT

DRAINAGE AREA 6:
AREA: 15,639 SF = 0.36 AC
LENGTH: 100 FT
SLOPE:0.01 FT/FT

DRAINAGE AREA 7:
AREA: 83,520 SF = 1.92 AC
LENGTH: 180 FT
SLOPE:0.006 FT/FT

DRAINAGE AREA 8:
AREA: 6,726 SF = 0.15 AC
LENGTH: 123 FT
SLOPE:0.36 FT/FT

THIS AREA DOES NOT CONTRIBUTE TO ON-SITE RUN-ON

THIS AREA DOES NOT CONTRIBUTE TO ON-SITE RUN-ON

LOW POINT. FLOW IS CONVEYED SOUTHEAST VIA SHEET FLOW TO A 54-INCH STORMDRAIN LINE APPROXIMATELY 400 FEET WEST OF THE PROJECT SITE

mulholland drive

LEGEND:

0 15' 30'
SCALE: 1"=30'

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PROJECT

THE MIRMAN SCHOOL FOR GIFTED CHILDREN

LEARNING CENTER

SITE ADDRESS:
16100-16180 MULHOLLAND DRIVE
LOS ANGELES, CA 90049

OWNER ADDRESS:
16100-16180 MULHOLLAND DRIVE
LOS ANGELES, CA 90049

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REGISTERED PROFESSIONAL ENGINEER
TIMOTHY R. RICHTER
No. C75902
Exp. 6/30/22
CIVIL
STATE OF CALIFORNIA

CITY APPROVALS

DRAFT - NOT FOR CONSTRUCTION

100% SD	01/24/2020
100% DD	06/01/2020
50% CD	08/17/2020
100% CD	10/19/2020
PERMIT	01/18/2021

No.	Issue	Date

ISSUE / REVISIONS

TITLE:

OVERALL LID AND DRAINAGE PLAN

SCALE: AS SPECIFIED ON SHEET
DATE: 08/17/2020
DRAWN BY: ST
CHECKED BY: TR
PROJECT #: 1700711
SHEET:

C1.40

Figure 3: Proposed Drainage Exhibit

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DRAINAGE AREA 8:
AREA: 6,705 SF = 0.15 AC
LENGTH: 123 FT
SLOPE:0.36 FT/FT

DRAINAGE AREA 9:
AREA: 6,206 SF = 0.14 AC
LENGTH: 70 FT
SLOPE:0.16 FT/FT

THIS AREA DOES NOT CONTRIBUTE TO ON-SITE RUN-ON

LOW POINT. FLOW IS CONVEYED SOUTHEAST VIA SHEET FLOW TO A 54-INCH STORMDRAIN LINE APPROXIMATELY 400 FEET WEST OF THE PROJECT SITE

LEGEND:

0 15' 30'
SCALE: 1"=30'

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PROJECT

THE MIRMAN SCHOOL FOR GIFTED CHILDREN

LEARNING CENTER

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16100-16180 MULHOLLAND DRIVE
LOS ANGELES, CA 90049

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100% SD	01/24/2020
100% DD	06/01/2020
50% CD	08/17/2020
100% CD	10/19/2020
PERMIT	01/18/2021

No.	Issue	Date

ISSUE / REVISIONS

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OVERALL LID AND DRAINAGE PLAN

SCALE: AS SPECIFIED ON SHEET
DATE: 08/17/2020

DRAWN BY: ST
CHECKED BY: TR

PROJECT #: 1700711

SHEET:

C1.40

Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 1 Existing
Area (ac)	0.16
Flow Path Length (ft)	90.0
Flow Path Slope (vft/hft)	0.47
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6513
Burned Peak Flow Rate (cfs)	0.6513
24-Hr Clear Runoff Volume (ac-ft)	0.0278
24-Hr Clear Runoff Volume (cu-ft)	1212.8764

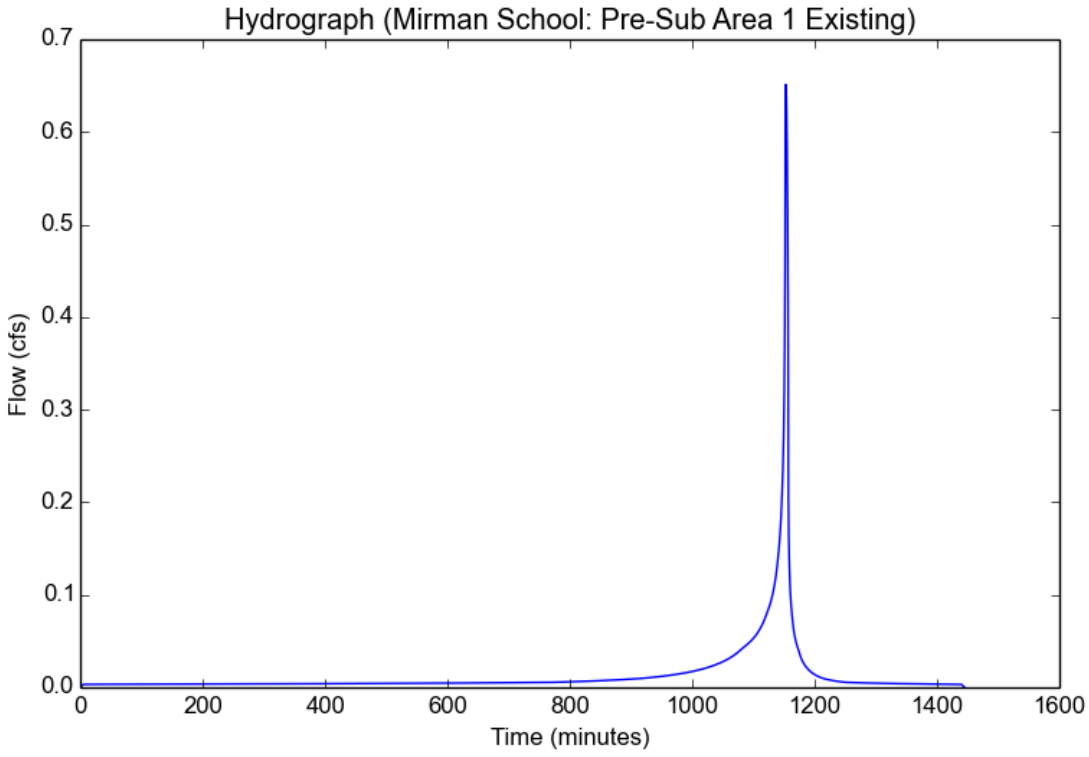


Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 2 Existing
Area (ac)	0.3
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.11
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.2212
Burned Peak Flow Rate (cfs)	1.2212
24-Hr Clear Runoff Volume (ac-ft)	0.0522
24-Hr Clear Runoff Volume (cu-ft)	2274.1432

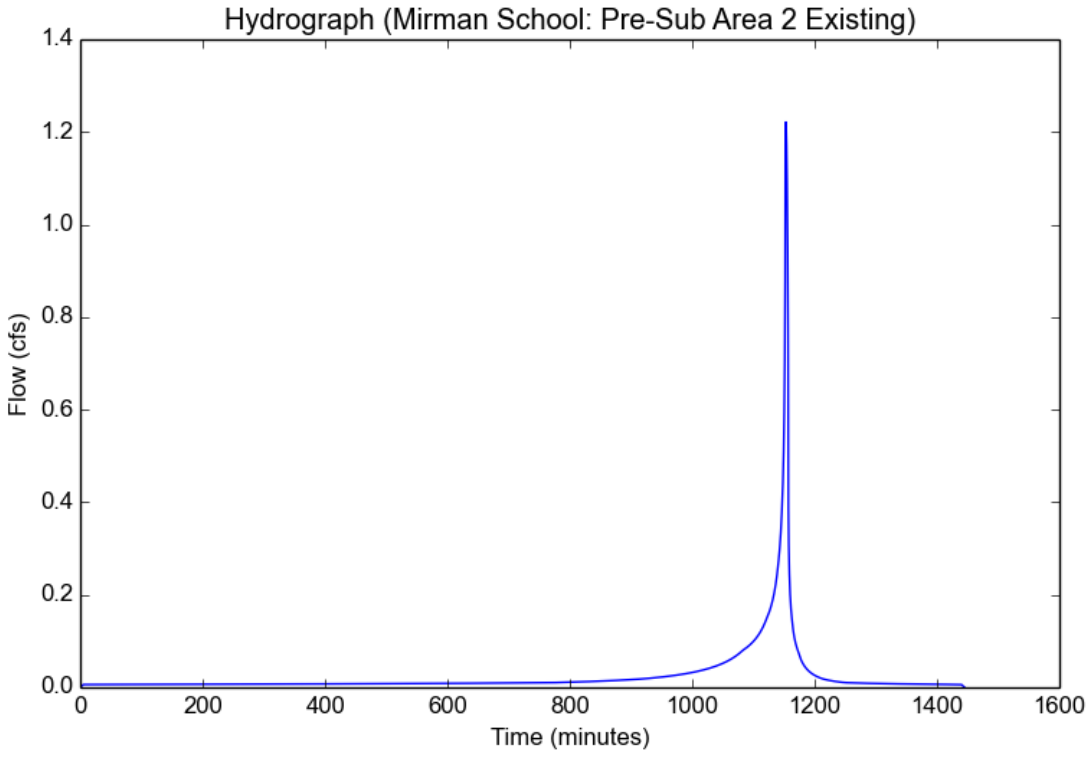


Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 3 Existing
Area (ac)	0.36
Flow Path Length (ft)	90.0
Flow Path Slope (vft/hft)	0.35
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4655
Burned Peak Flow Rate (cfs)	1.4655
24-Hr Clear Runoff Volume (ac-ft)	0.0626
24-Hr Clear Runoff Volume (cu-ft)	2728.9718

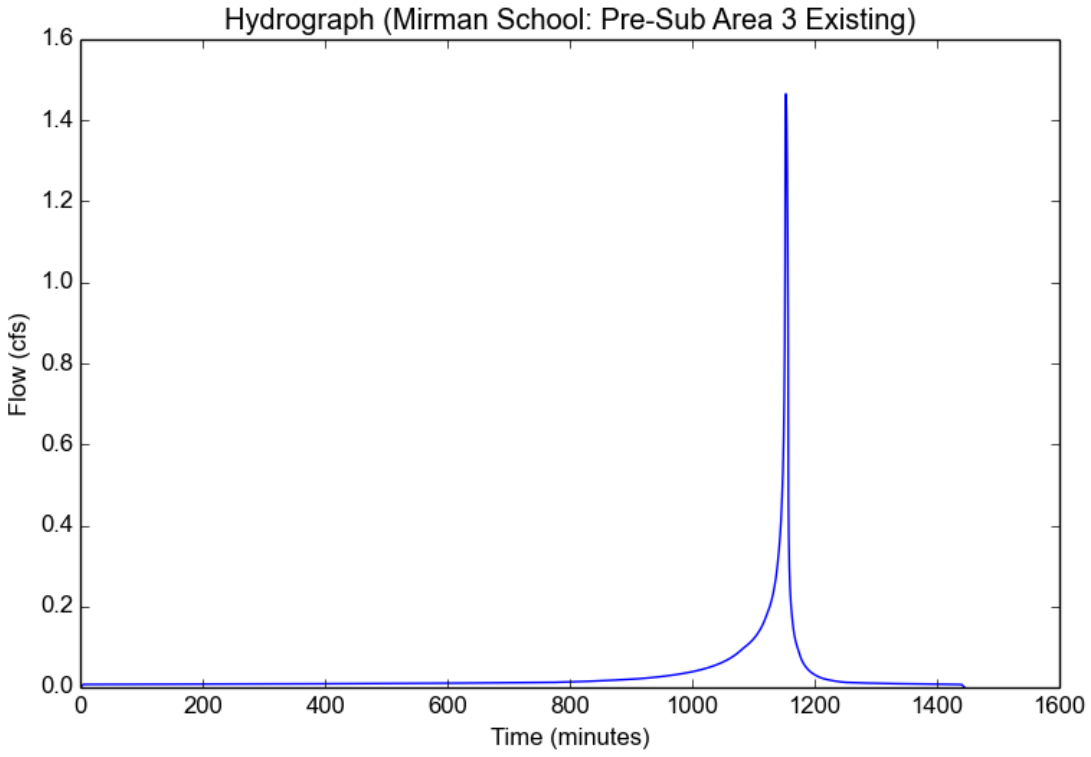


Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 4 Existing
Area (ac)	1.75
Flow Path Length (ft)	117.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.6
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8569
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.6944
Burned Peak Flow Rate (cfs)	7.6944
24-Hr Clear Runoff Volume (ac-ft)	0.7902
24-Hr Clear Runoff Volume (cu-ft)	34420.1243

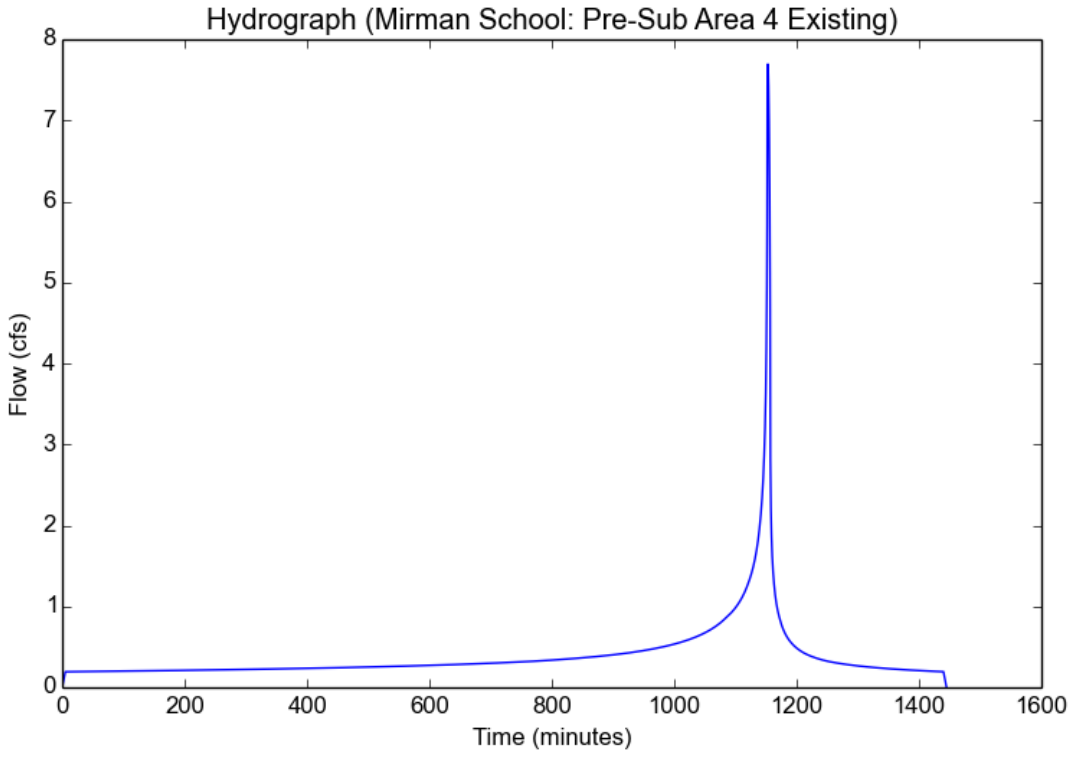


Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 5 Existing
Area (ac)	0.91
Flow Path Length (ft)	300.0
Flow Path Slope (vft/hft)	0.07
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.8
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8785
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.1017
Burned Peak Flow Rate (cfs)	4.1017
24-Hr Clear Runoff Volume (ac-ft)	0.4965
24-Hr Clear Runoff Volume (cu-ft)	21627.3563

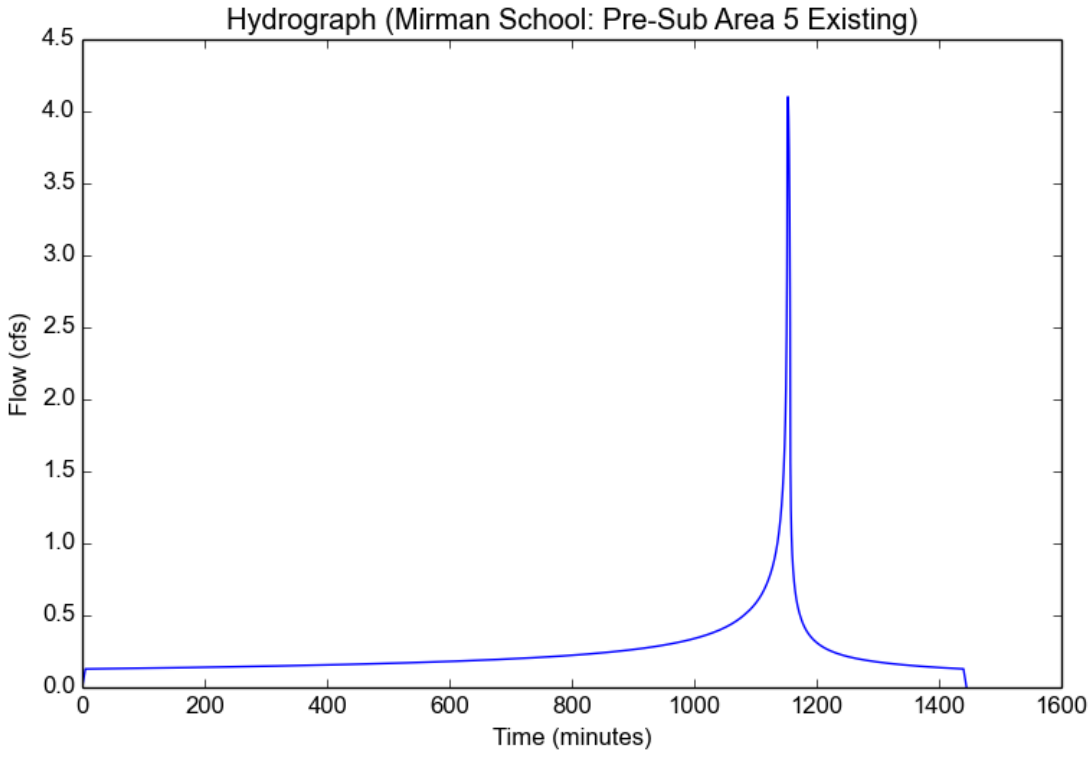


Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 6 Existing
Area (ac)	0.36
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.7
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8677
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.6028
Burned Peak Flow Rate (cfs)	1.6028
24-Hr Clear Runoff Volume (ac-ft)	0.1795
24-Hr Clear Runoff Volume (cu-ft)	7818.2943

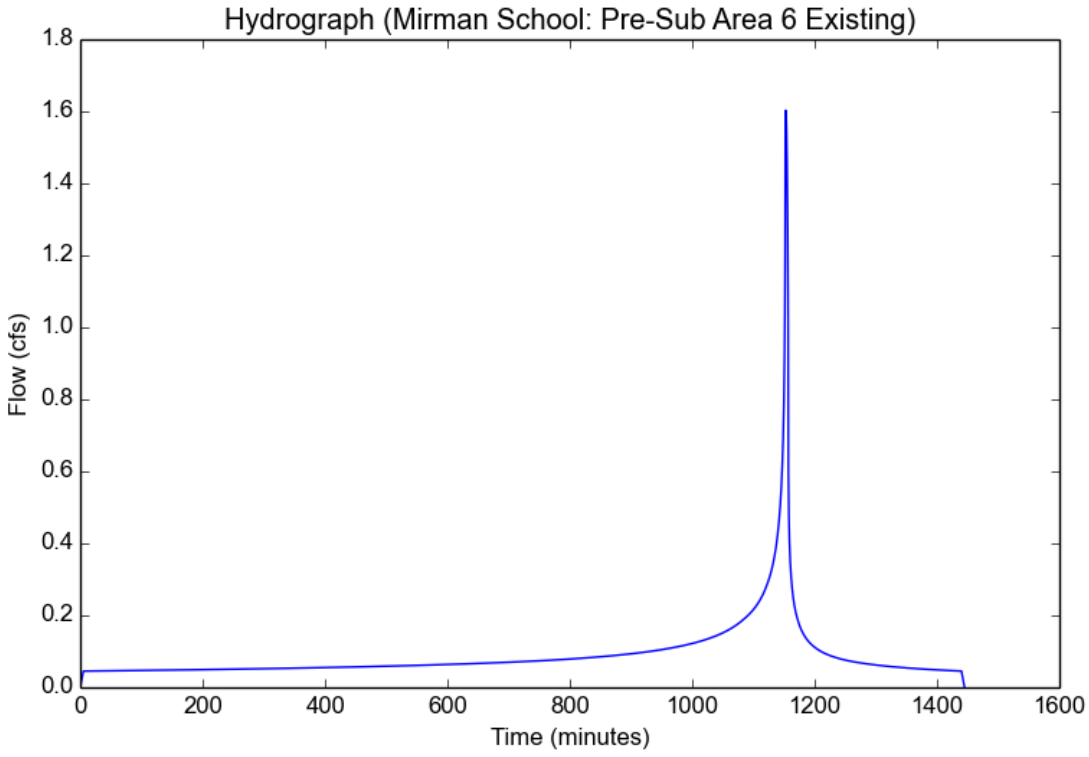


Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 7 Existing
Area (ac)	1.92
Flow Path Length (ft)	180.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.4
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8354
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.2297
Burned Peak Flow Rate (cfs)	8.2297
24-Hr Clear Runoff Volume (ac-ft)	0.6863
24-Hr Clear Runoff Volume (cu-ft)	29896.242

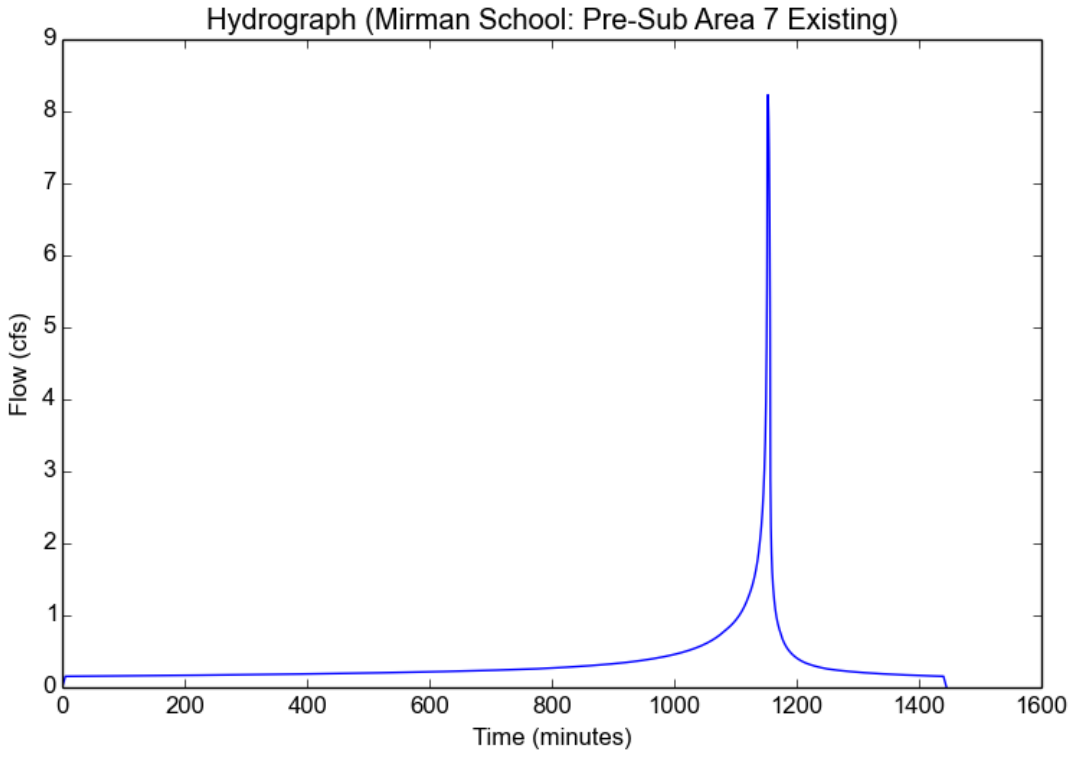


Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 8 Existing
Area (ac)	0.15
Flow Path Length (ft)	123.0
Flow Path Slope (vft/hft)	0.36
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6106
Burned Peak Flow Rate (cfs)	0.6106
24-Hr Clear Runoff Volume (ac-ft)	0.0261
24-Hr Clear Runoff Volume (cu-ft)	1137.0716

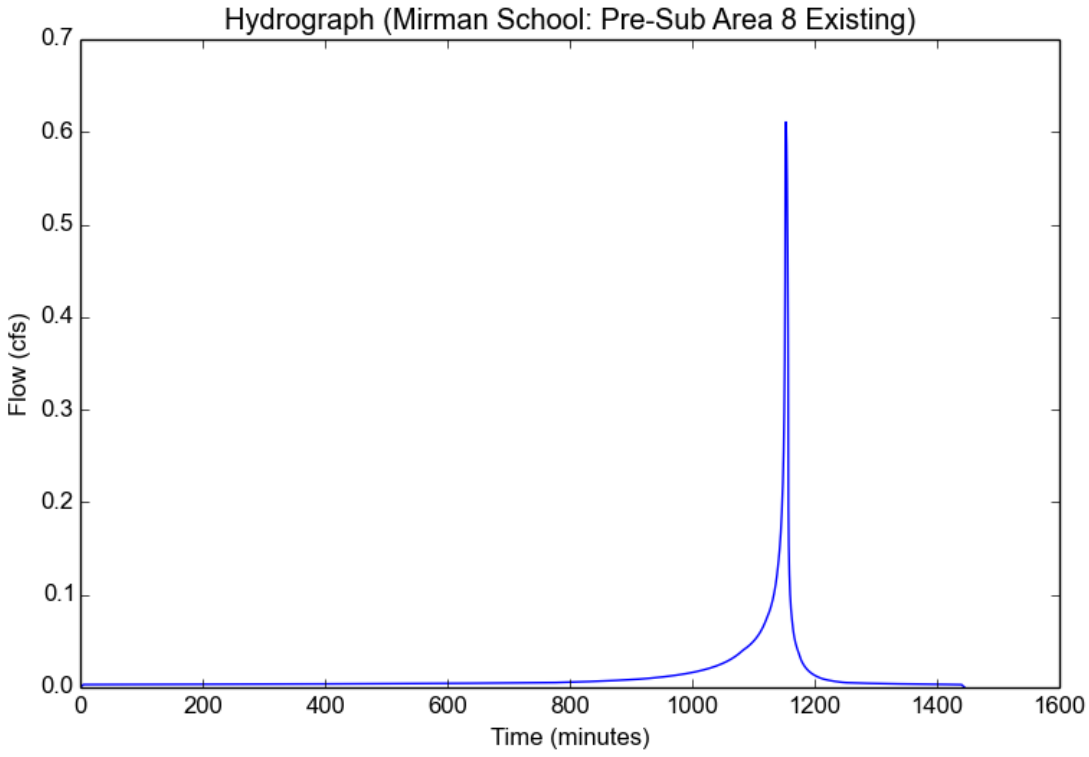


Figure 4a: Hydrocalc - Existing Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Non-contributing Area Existing
Area (ac)	0.11
Flow Path Length (ft)	70.0
Flow Path Slope (vft/hft)	0.38
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.74
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.872
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.4922
Burned Peak Flow Rate (cfs)	0.4922
24-Hr Clear Runoff Volume (ac-ft)	0.0569
24-Hr Clear Runoff Volume (cu-ft)	2479.0723

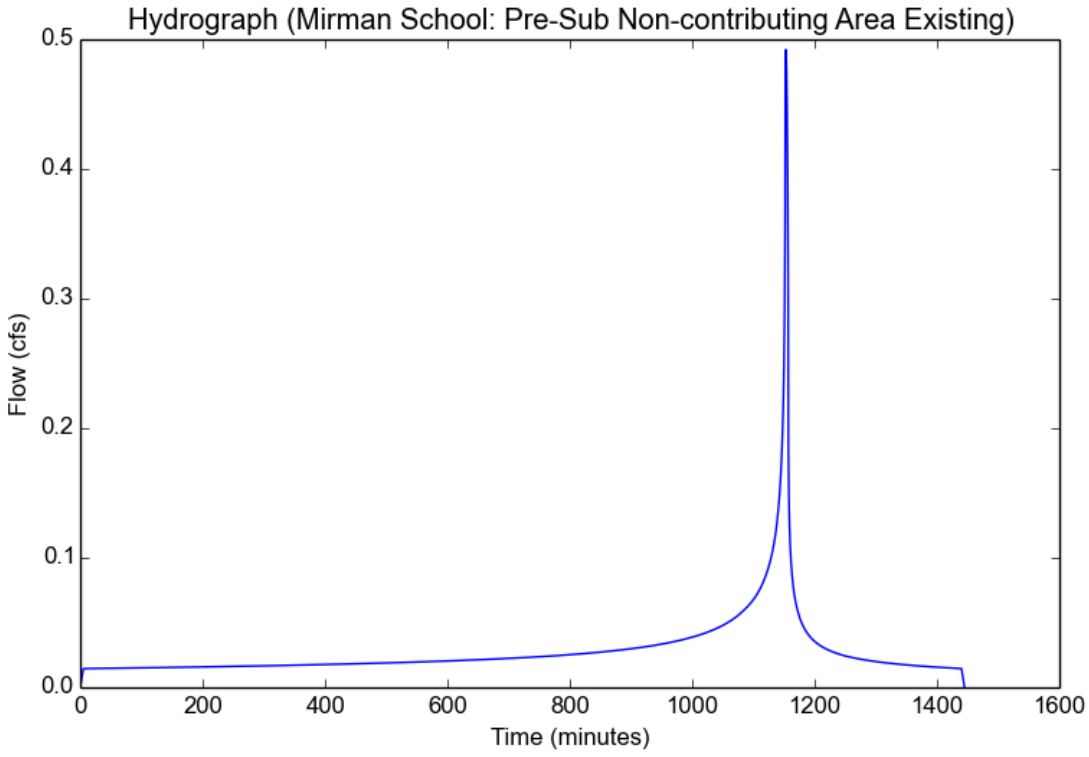


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 1 Proposed
Area (ac)	0.16
Flow Path Length (ft)	90.0
Flow Path Slope (vft/hft)	0.47
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6513
Burned Peak Flow Rate (cfs)	0.6513
24-Hr Clear Runoff Volume (ac-ft)	0.0278
24-Hr Clear Runoff Volume (cu-ft)	1212.8764

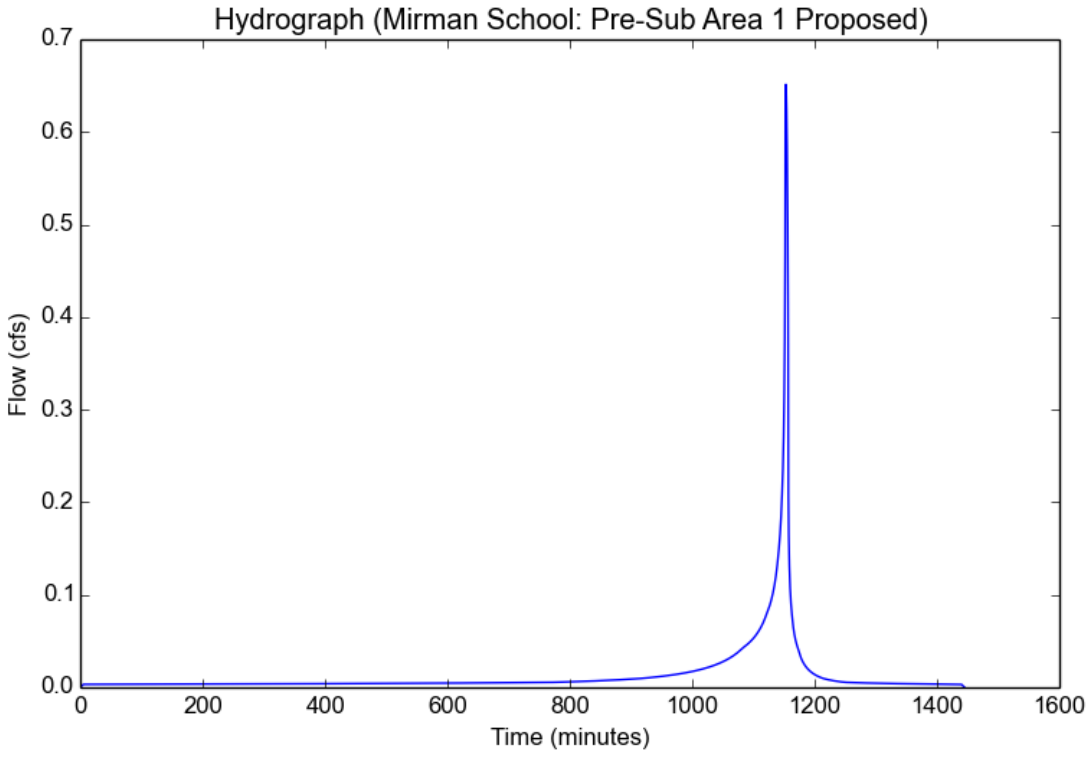


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 2 Proposed
Area (ac)	0.3
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.11
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.2212
Burned Peak Flow Rate (cfs)	1.2212
24-Hr Clear Runoff Volume (ac-ft)	0.0522
24-Hr Clear Runoff Volume (cu-ft)	2274.1432

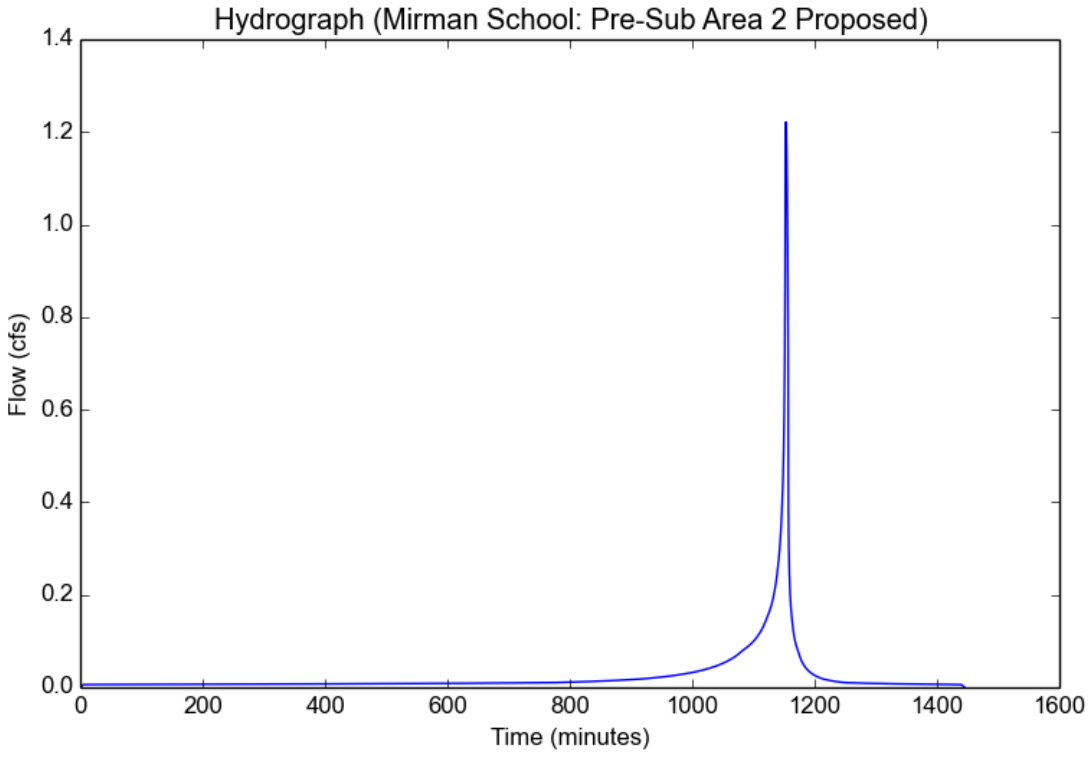


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 3 Proposed
Area (ac)	0.36
Flow Path Length (ft)	90.0
Flow Path Slope (vft/hft)	0.35
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.4655
Burned Peak Flow Rate (cfs)	1.4655
24-Hr Clear Runoff Volume (ac-ft)	0.0626
24-Hr Clear Runoff Volume (cu-ft)	2728.9718

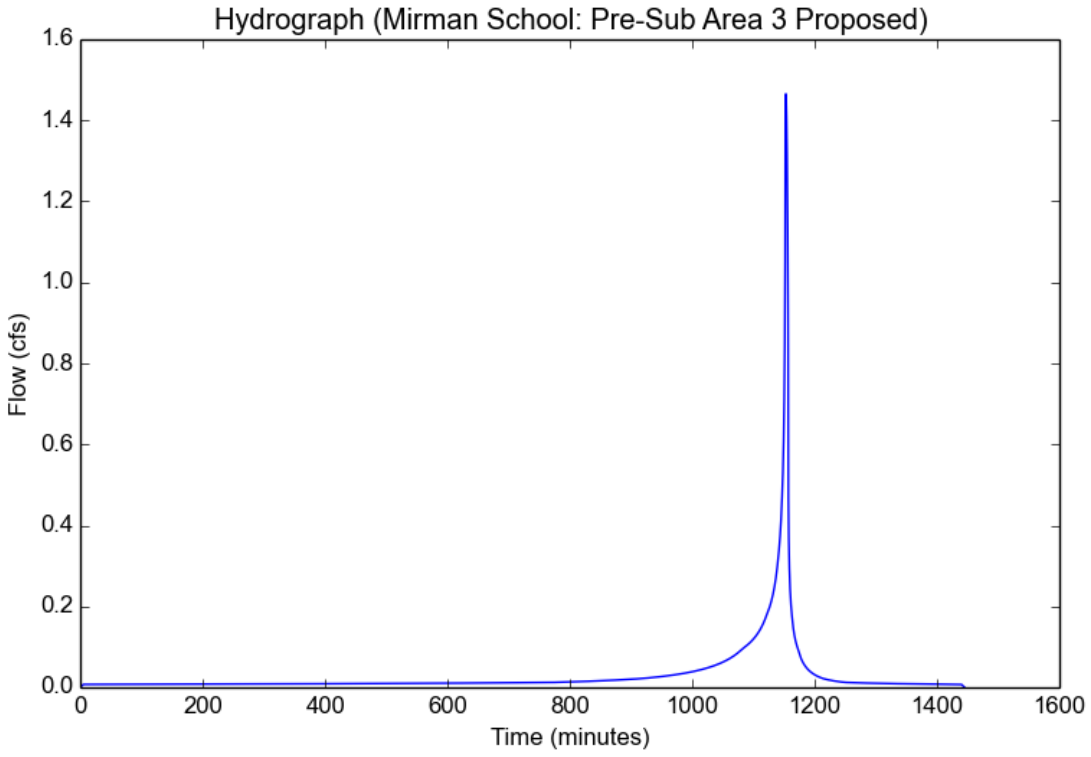


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 4 Proposed
Area (ac)	1.77
Flow Path Length (ft)	117.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.8
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8785
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.978
Burned Peak Flow Rate (cfs)	7.978
24-Hr Clear Runoff Volume (ac-ft)	0.9657
24-Hr Clear Runoff Volume (cu-ft)	42066.3963

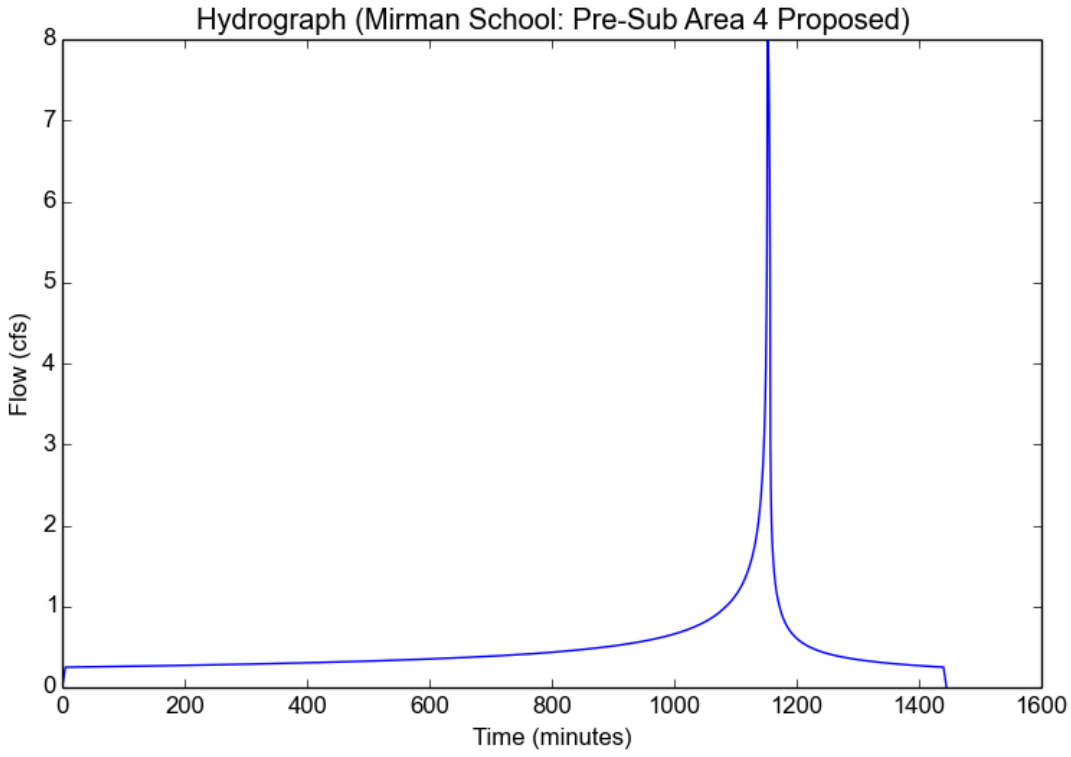


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 5 Proposed
Area (ac)	0.82
Flow Path Length (ft)	300.0
Flow Path Slope (vft/hft)	0.07
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.8
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8785
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.696
Burned Peak Flow Rate (cfs)	3.696
24-Hr Clear Runoff Volume (ac-ft)	0.4474
24-Hr Clear Runoff Volume (cu-ft)	19488.387

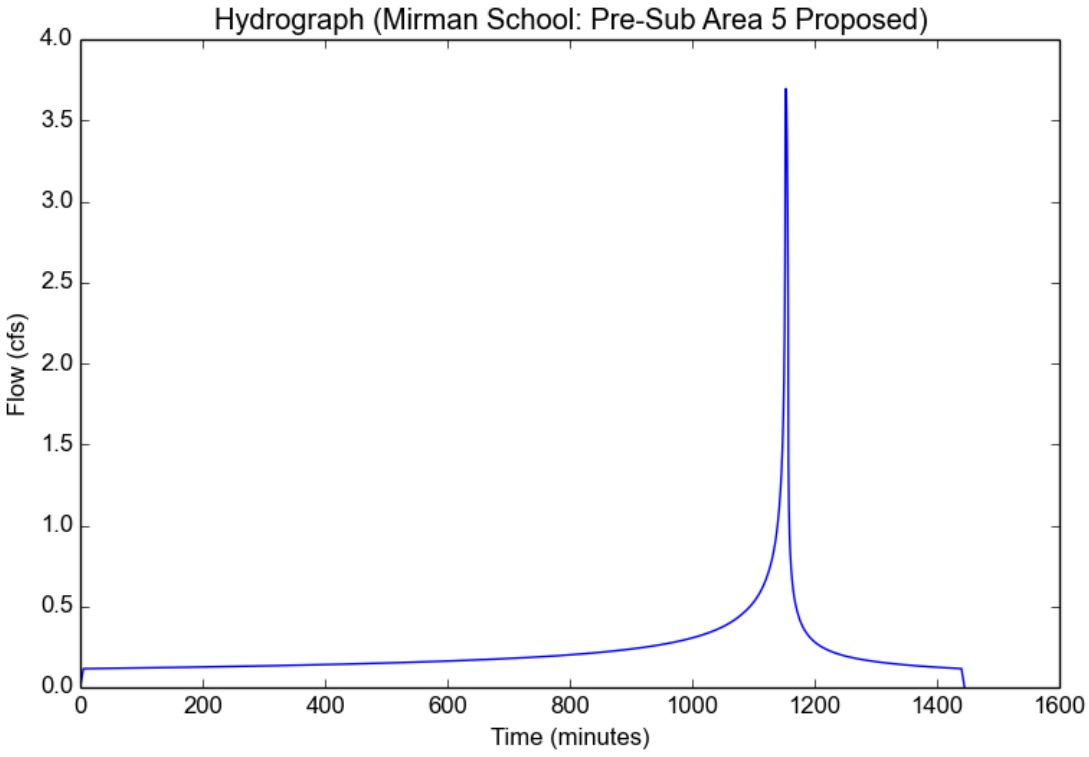


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 6 Proposed
Area (ac)	0.36
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.7
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8677
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	1.6028
Burned Peak Flow Rate (cfs)	1.6028
24-Hr Clear Runoff Volume (ac-ft)	0.1795
24-Hr Clear Runoff Volume (cu-ft)	7818.2943

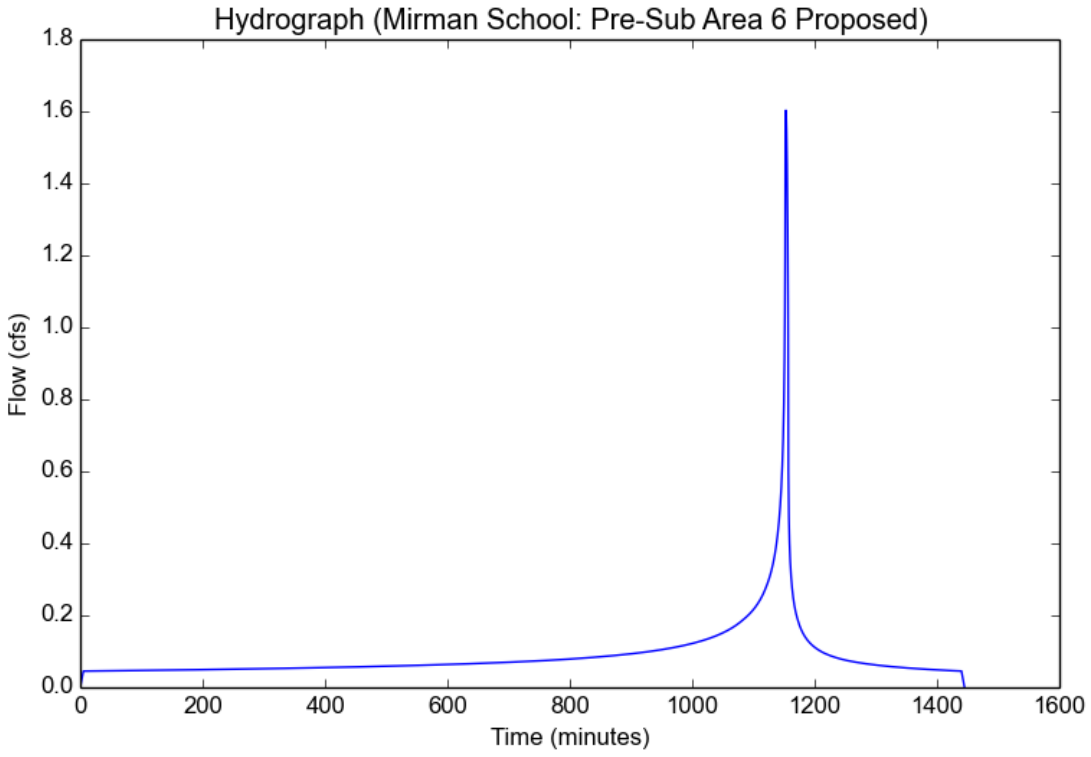


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 7 Proposed
Area (ac)	1.92
Flow Path Length (ft)	180.0
Flow Path Slope (vft/hft)	0.006
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.4
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8354
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	8.2297
Burned Peak Flow Rate (cfs)	8.2297
24-Hr Clear Runoff Volume (ac-ft)	0.6863
24-Hr Clear Runoff Volume (cu-ft)	29896.242

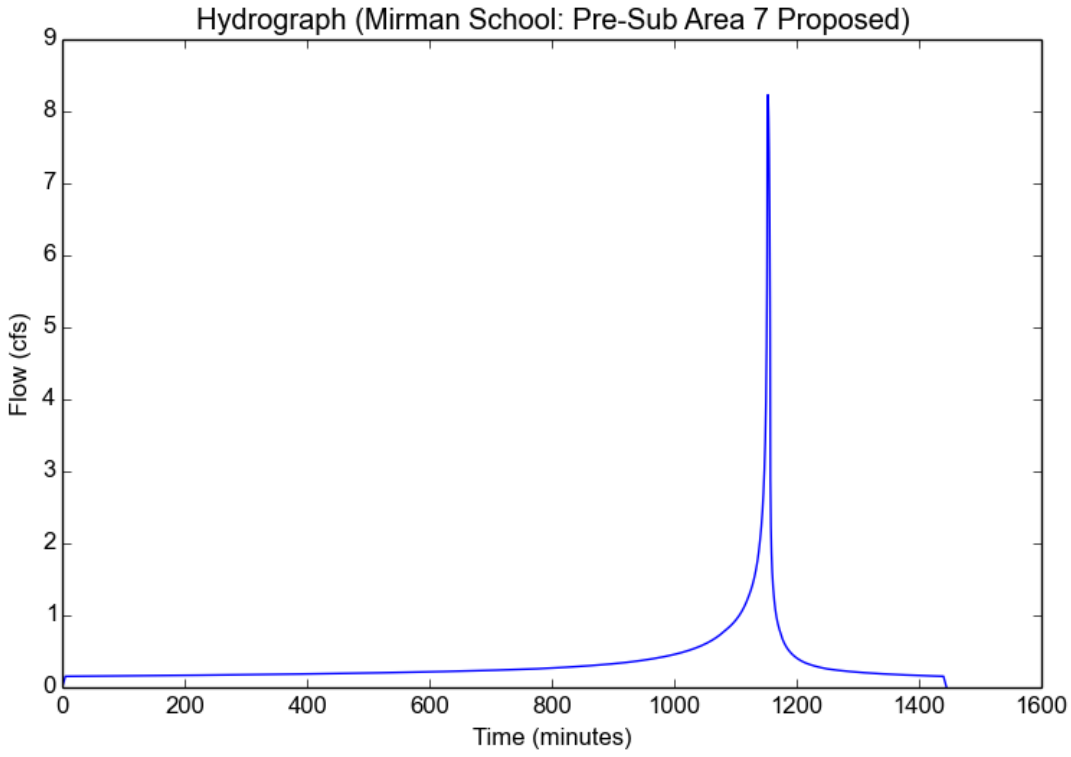


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 8 Proposed
Area (ac)	0.15
Flow Path Length (ft)	123.0
Flow Path Slope (vft/hft)	0.36
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6106
Burned Peak Flow Rate (cfs)	0.6106
24-Hr Clear Runoff Volume (ac-ft)	0.0261
24-Hr Clear Runoff Volume (cu-ft)	1137.0716

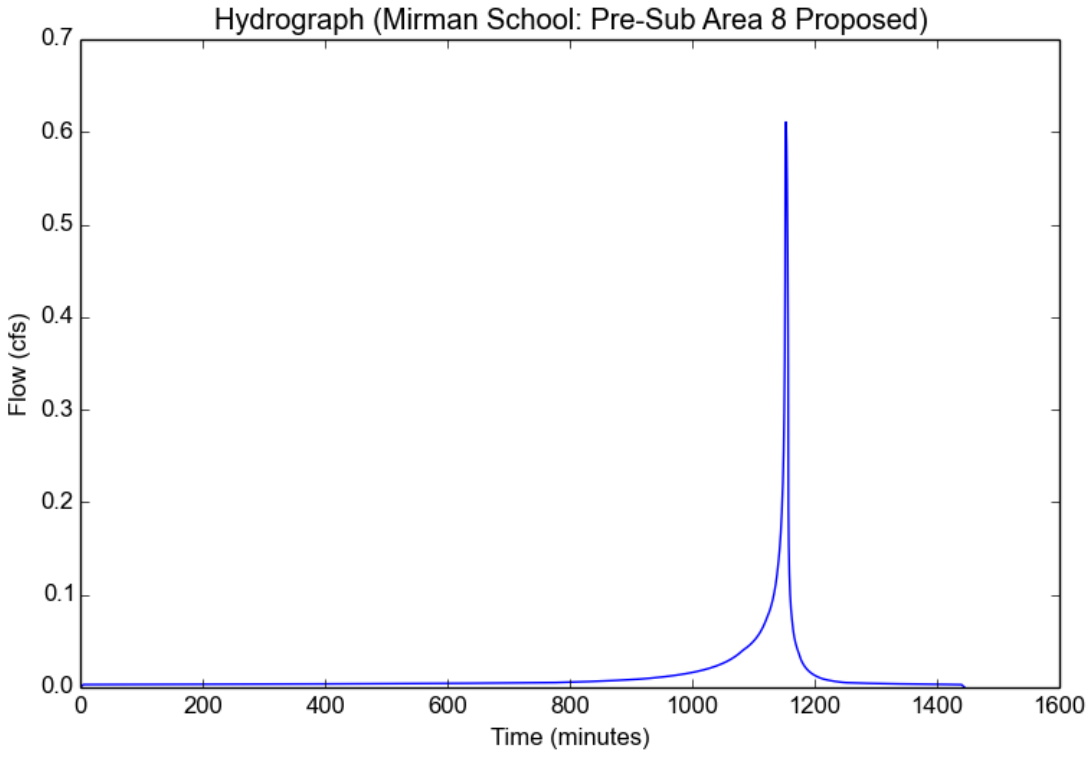


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Area 9 Proposed
Area (ac)	0.14
Flow Path Length (ft)	70.0
Flow Path Slope (vft/hft)	0.16
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.75
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.8731
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.6272
Burned Peak Flow Rate (cfs)	0.6272
24-Hr Clear Runoff Volume (ac-ft)	0.0731
24-Hr Clear Runoff Volume (cu-ft)	3183.8667

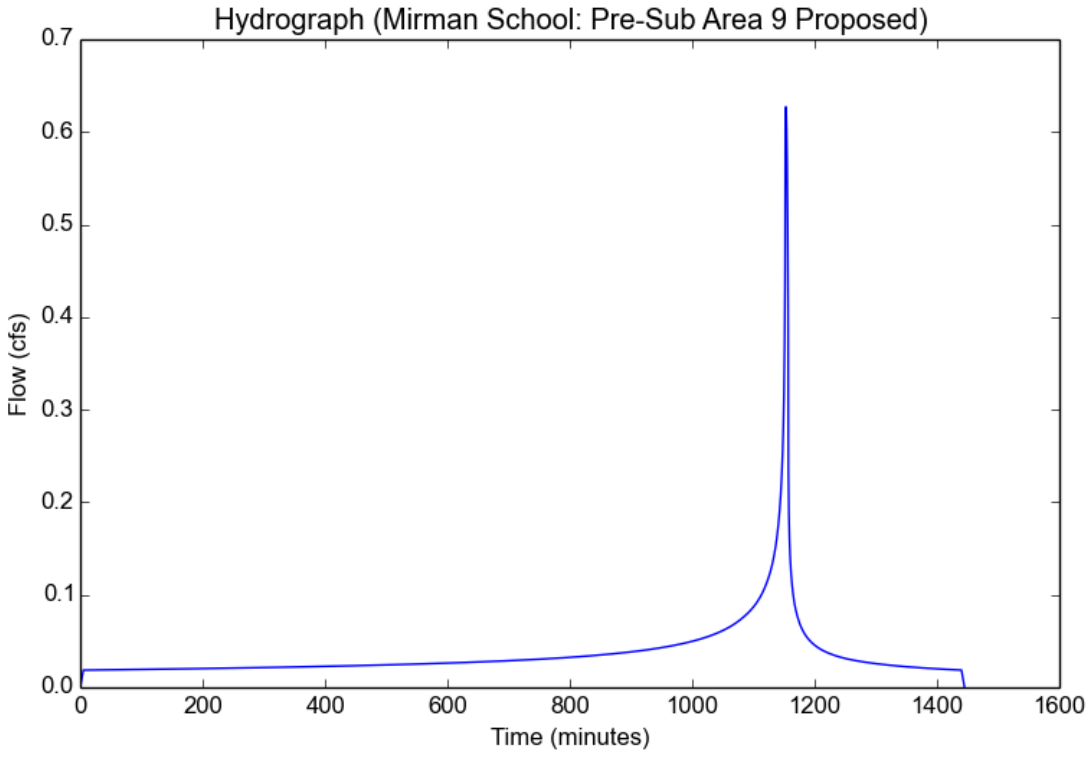


Figure 4b: Hydrocalc - Proposed Subareas

Peak Flow Hydrologic Analysis

File location: //kpfflacivil.com/share/projects/2018/1800155 Mirman School EIR/ENGR/EIR/Water Resources Report/Calculations/Mirman School HC Rep
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Mirman School
Subarea ID	Pre-Sub Non-contributing Area Proposed
Area (ac)	0.04
Flow Path Length (ft)	70.0
Flow Path Slope (vft/hft)	0.47
50-yr Rainfall Depth (in)	8.6
Percent Impervious	0.01
Soil Type	66
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	8.6
Peak Intensity (in/hr)	5.131
Undeveloped Runoff Coefficient (Cu)	0.7923
Developed Runoff Coefficient (Cd)	0.7934
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.1628
Burned Peak Flow Rate (cfs)	0.1628
24-Hr Clear Runoff Volume (ac-ft)	0.007
24-Hr Clear Runoff Volume (cu-ft)	303.2191

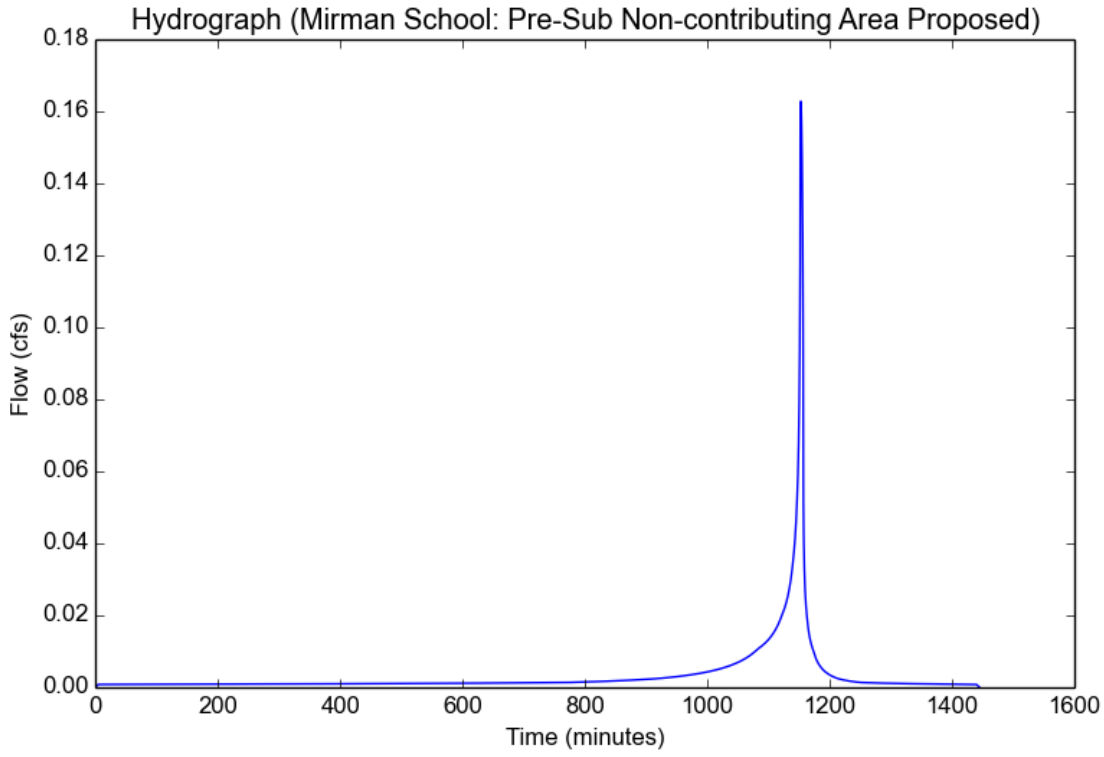


Figure 5: Coastal Plain of Los Angeles Groundwater Basin

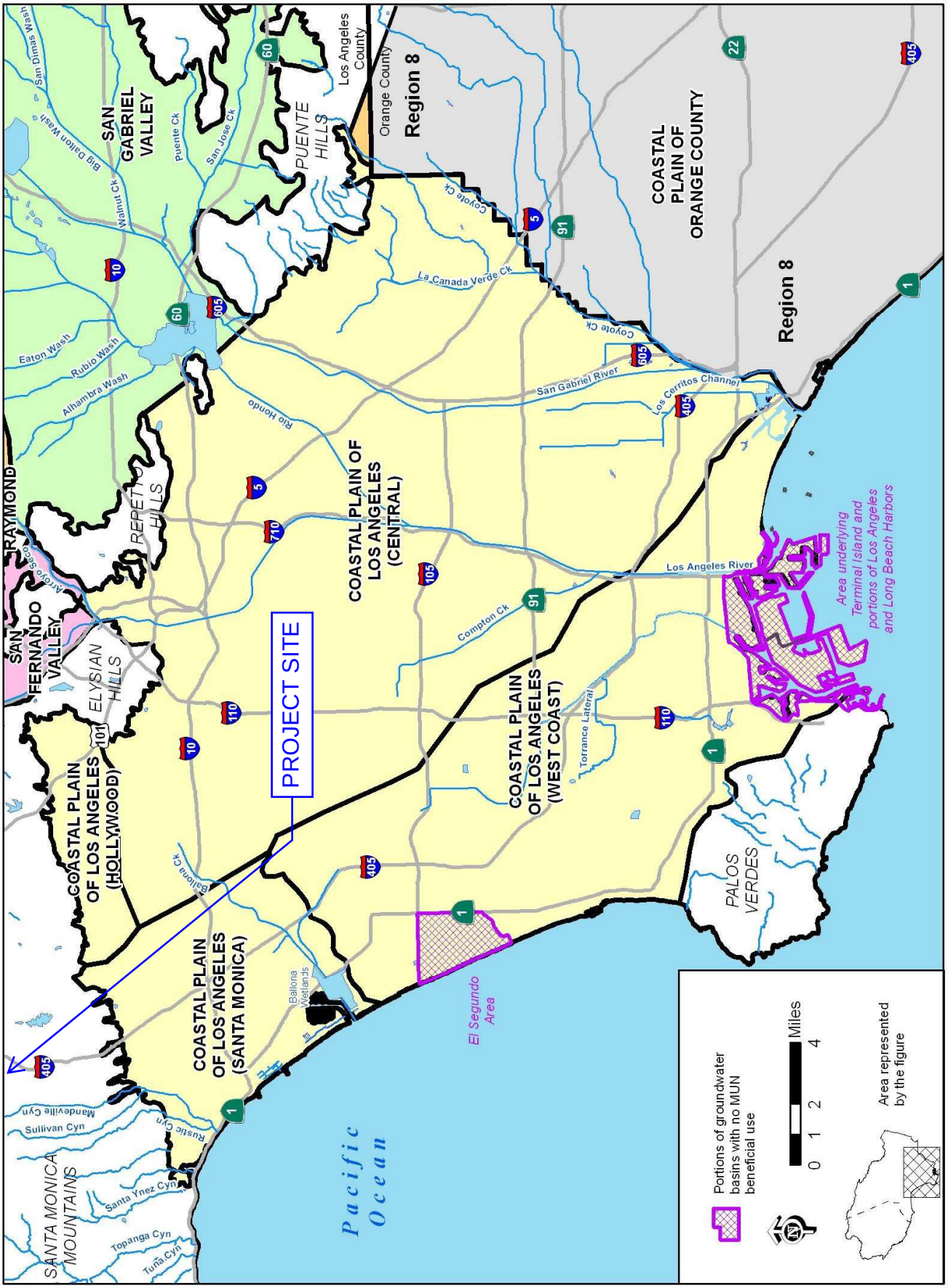


Figure 6: LID Calculations

Capture & Use Sizing

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

[1]	Total Area (SF)		50573
[2]	Impervious Area (SF)		37235
[3]	Pervious Area (SF)	**[1]-[2] =**	13339
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	34845
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.20
[6]	V_{design} (gal)	**[5]/12*7.48*[4] =**	**26064**
[7]	Planting Area (SF)		5500
[8]	Plant Factor*		0.4
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	29599
[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)

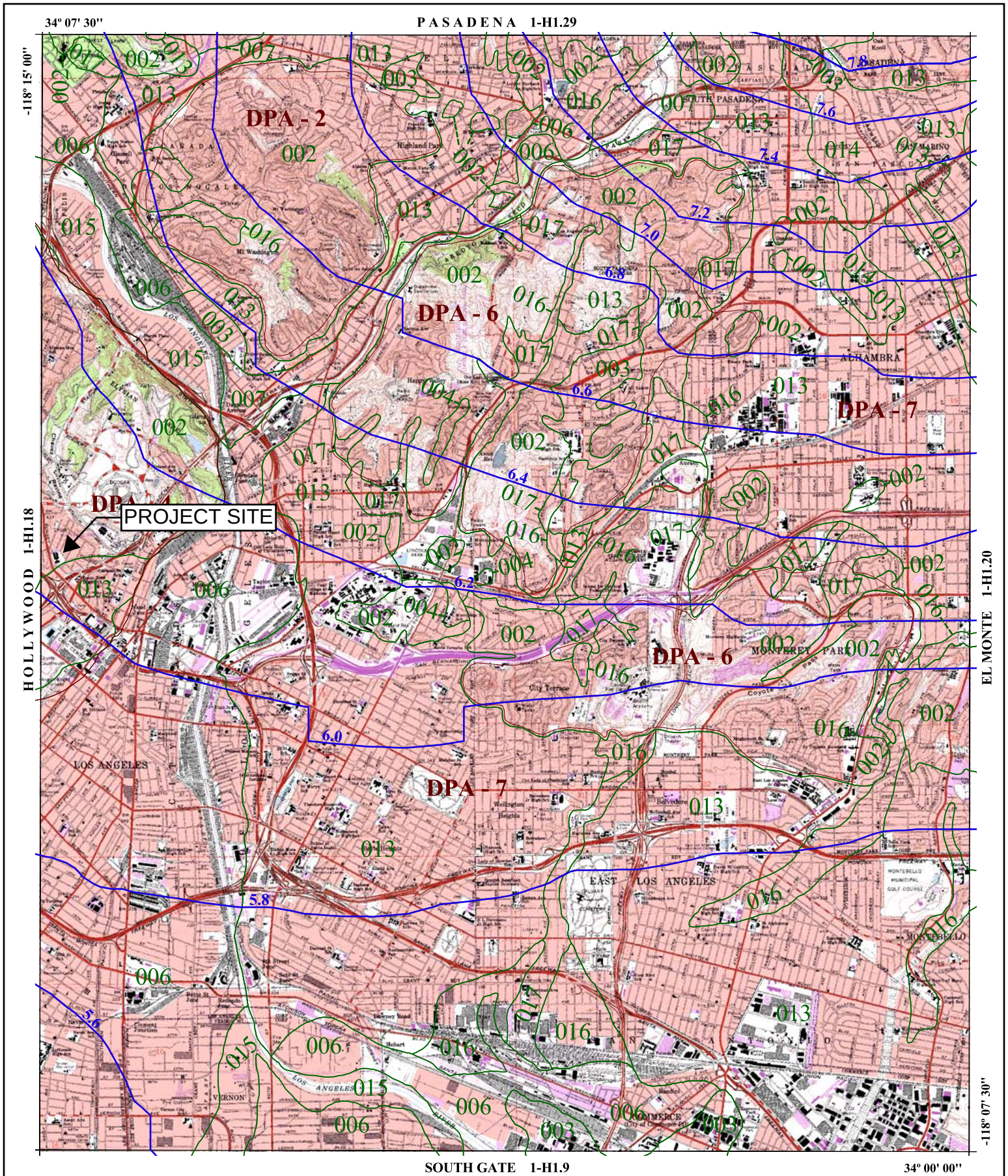

34° 07' 30"
PASADENA 1-H1.29
-118° 15' 00"
HOLLYWOOD 1-H1.18
EL MONTE 1-H1.20
-118° 07' 30"
SOUTH GATE 1-H1.9
34° 00' 00"
DPA - 2
DPA - 6
DPA - 7
DPA - 4
PROJECT SITE
LOS ANGELES
EAST LOS ANGELES
ALHAMBRA
SOUTH PASADENA
MONTEREY PARK
VERNON
COMMERCE
016 SOIL CLASSIFICATION AREA
7.2 INCHES OF RAINFALL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

Figure 8: Existing 54-inch Stormdrain line Capacity

Worksheet for 54" Circular Pipe - Full Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00500	ft/ft
Normal Depth	3.15	ft
Diameter	4.50	ft

Results

Discharge	126.11	ft³/s
Flow Area	11.89	ft²
Wetted Perimeter	8.92	ft
Hydraulic Radius	1.33	ft
Top Width	4.12	ft
Critical Depth	3.31	ft
Percent Full	70.0	%
Critical Slope	0.00443	ft/ft
Velocity	10.61	ft/s
Velocity Head	1.75	ft
Specific Energy	4.90	ft
Froude Number	1.10	
Maximum Discharge	162.04	ft³/s
Discharge Full	150.63	ft³/s
Slope Full	0.00350	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	70.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 54" Circular Pipe - Full Capacity

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.15	ft
Critical Depth	3.31	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00443	ft/ft

Figure 9: Existing 54-inch Stormdrain line Capacity

Worksheet for 54" Circular Pipe - 75% Capacity

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00500	ft/ft
Normal Depth	3.38	ft
Diameter	4.50	ft

Results

Discharge	137.59	ft³/s
Flow Area	12.81	ft²
Wetted Perimeter	9.44	ft
Hydraulic Radius	1.36	ft
Top Width	3.89	ft
Critical Depth	3.45	ft
Percent Full	75.1	%
Critical Slope	0.00477	ft/ft
Velocity	10.74	ft/s
Velocity Head	1.79	ft
Specific Energy	5.17	ft
Froude Number	1.04	
Maximum Discharge	162.04	ft³/s
Discharge Full	150.63	ft³/s
Slope Full	0.00417	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	75.11	%
Downstream Velocity	Infinity	ft/s

Worksheet for 54" Circular Pipe - 75% Capacity

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	3.38	ft
Critical Depth	3.45	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.00477	ft/ft

Figure 9: Flood Insurance Rate Map

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1315F

FIRM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 1315 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LOS ANGELES, CITY OF	060137	1315	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
06037C1315F

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.

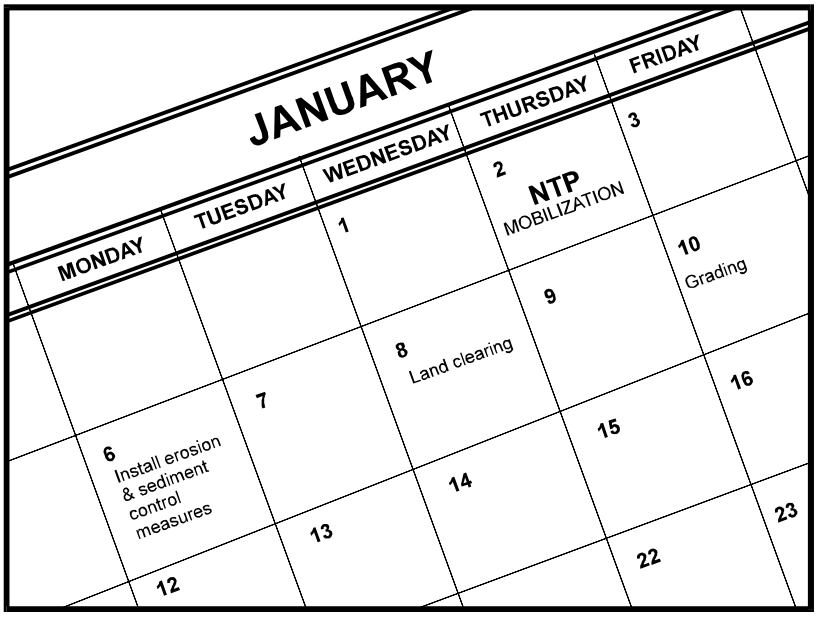
OTHER AREAS

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

Zone D boundary

CBRS and OPA boundary

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**

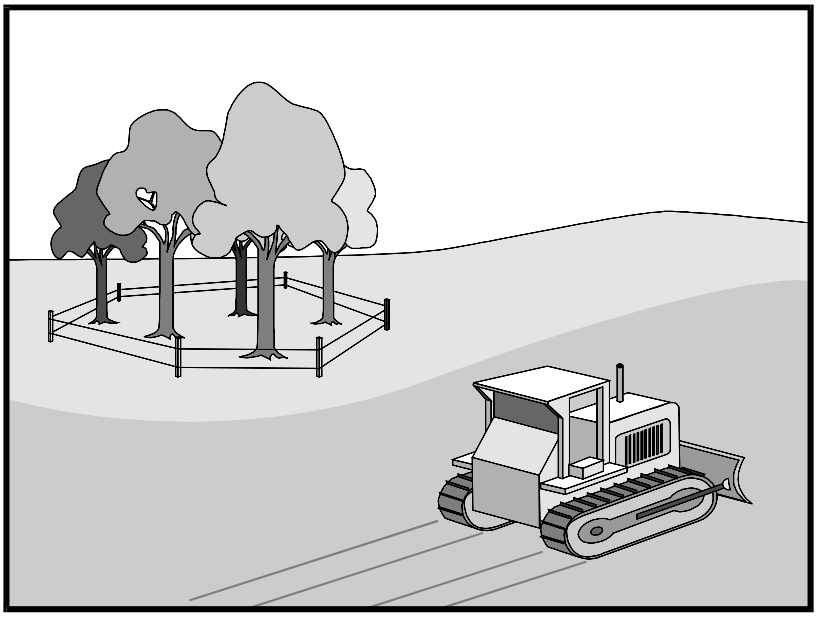
Targeted Constituents

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**

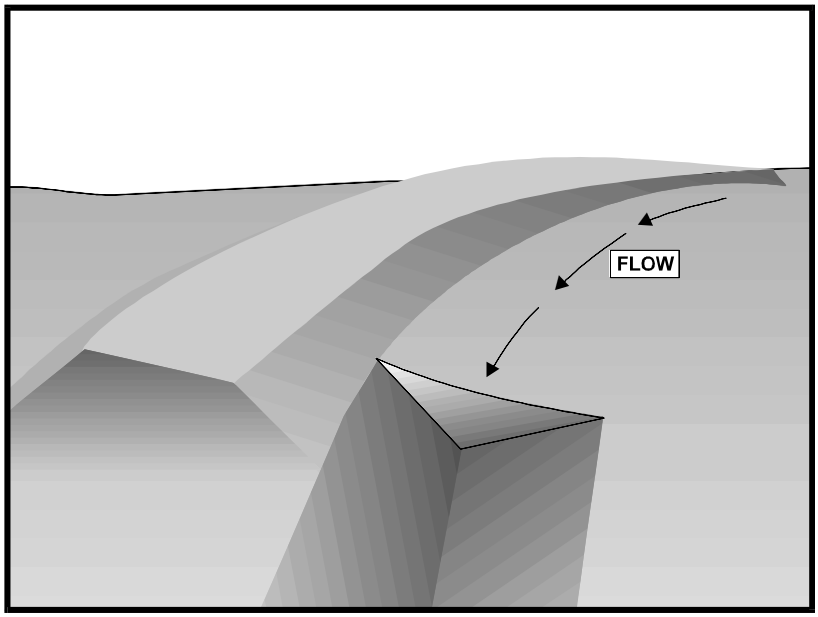
Targeted Constituents

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**

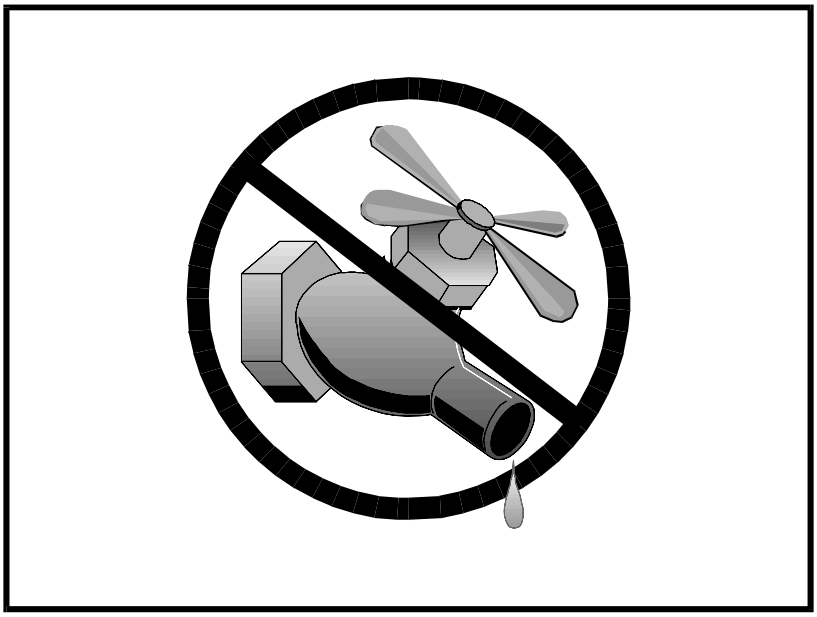
Targeted Constituents

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

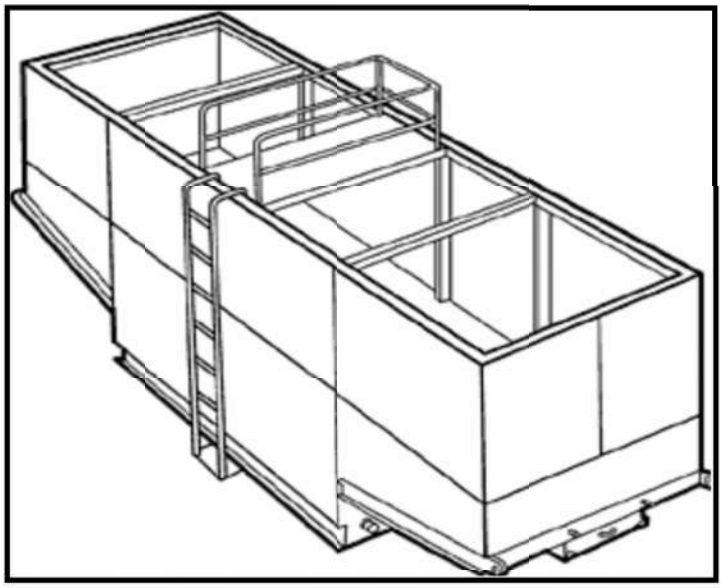
- None identified.

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.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Dewatering Operations NS-2



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

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

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

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

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Description and Purpose

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

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

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

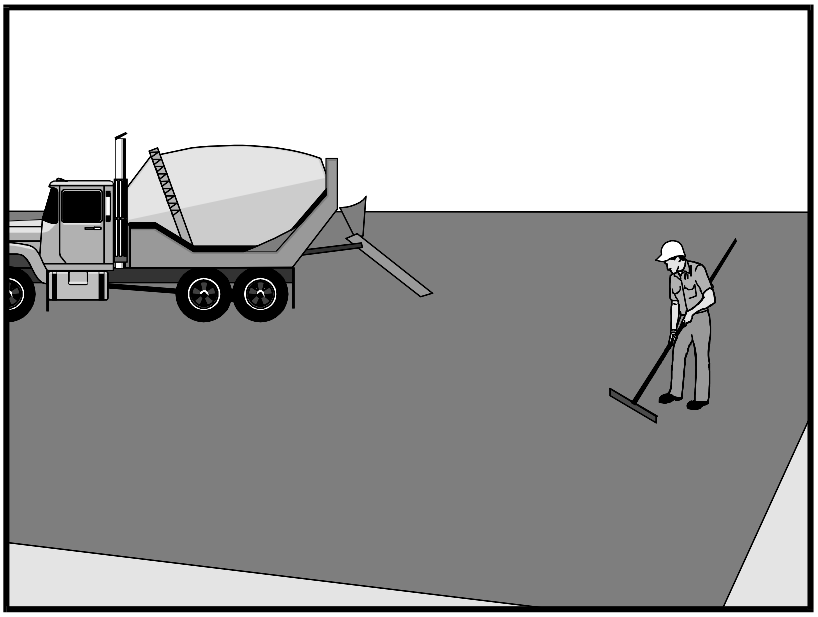
The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

Suitable Applications

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

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

Paving and Grinding Operations NS-3



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

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

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

Potential Alternatives

None

Description and Purpose

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

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

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

Suitable Applications

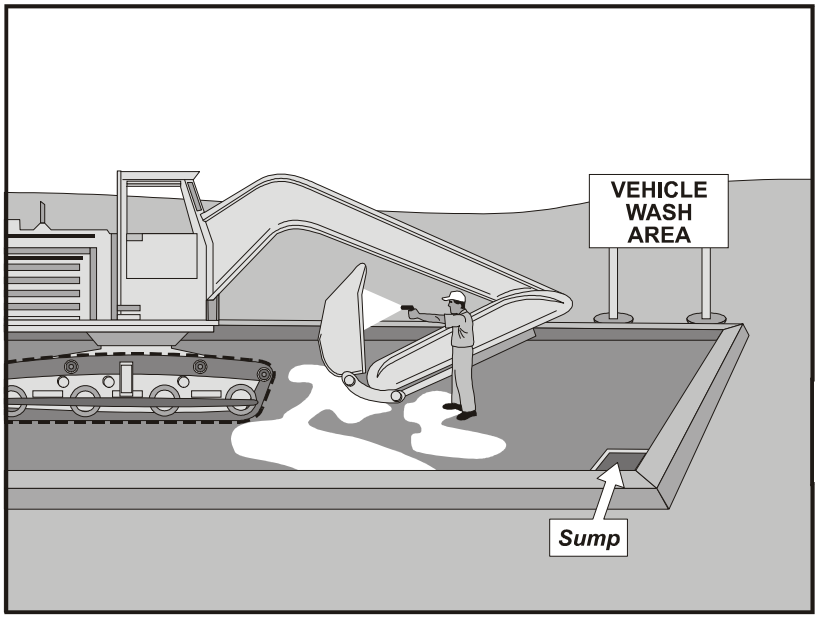
These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.

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

Vehicle and Equipment Cleaning NS-8



Categories

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

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

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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.

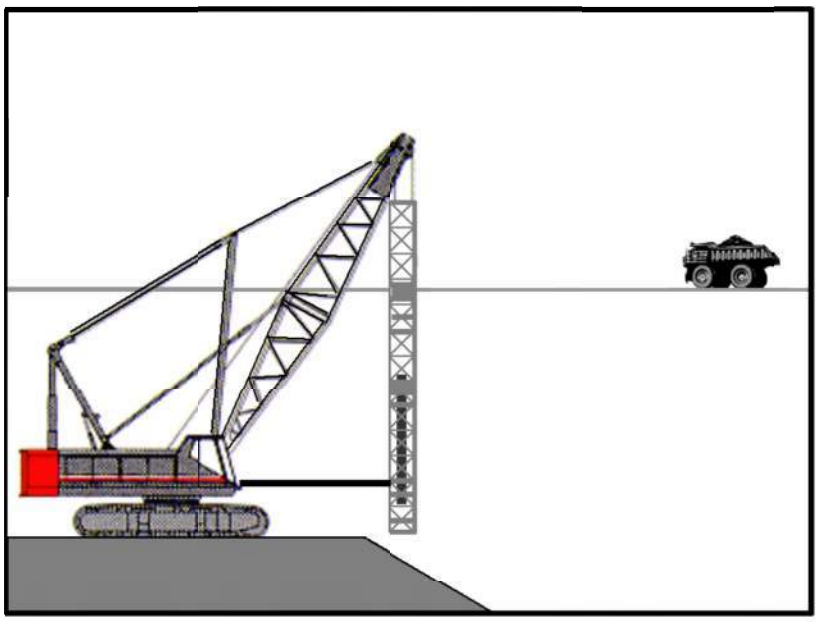
Implementation

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:

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Pile Driving Operations NS-11



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

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

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

Potential Alternatives

None

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

Description and Purpose

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

Suitable Applications

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

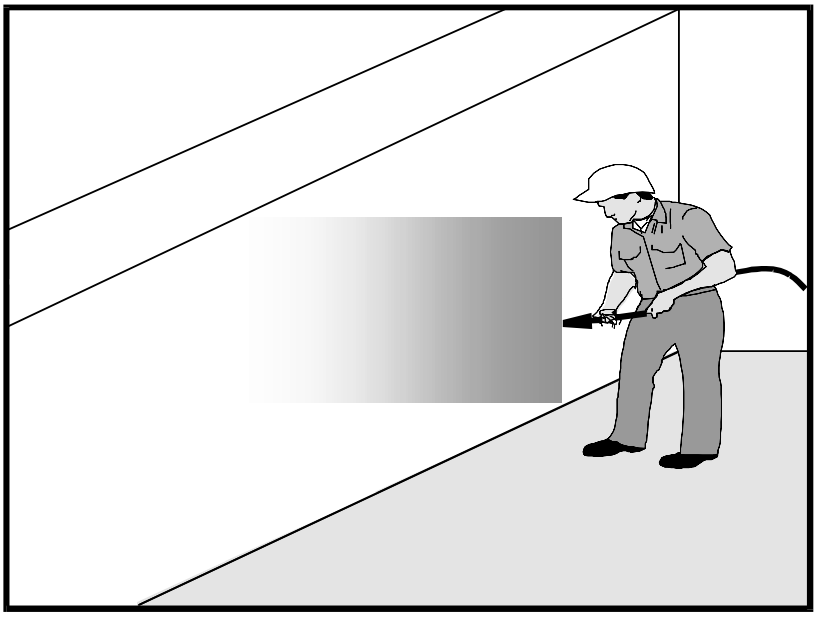
Limitations

None identified.

Implementation

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

Concrete Curing NS-12



Categories		
EC	Erosion Control	
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.

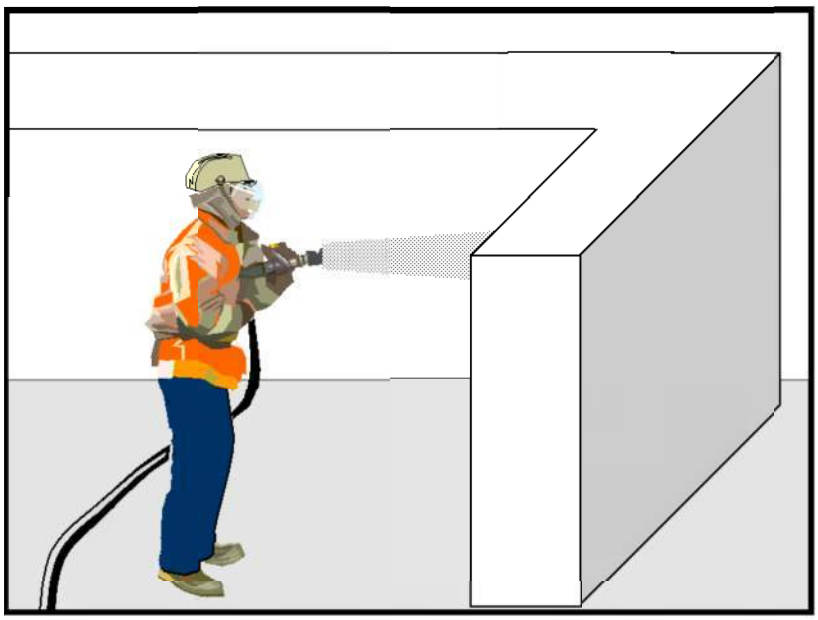
Suitable Applications

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.

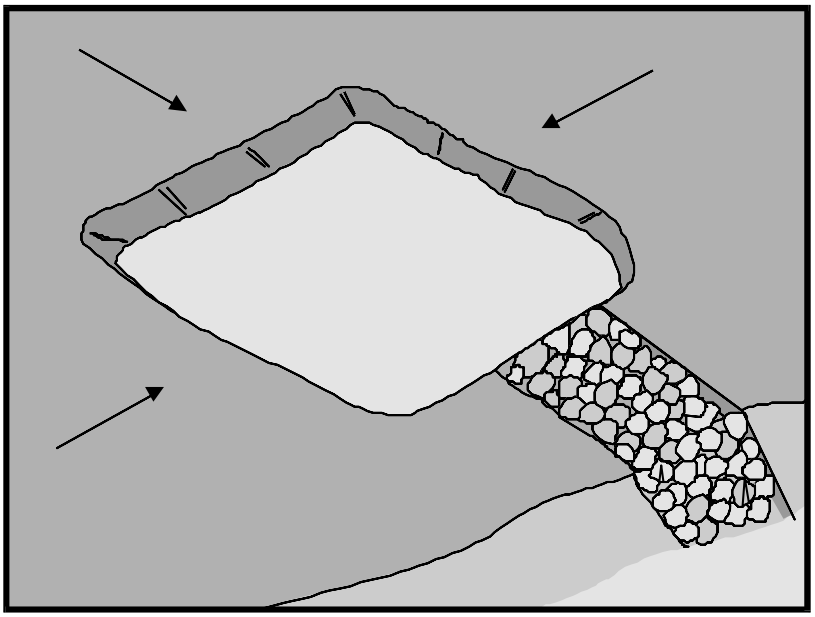
The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

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.

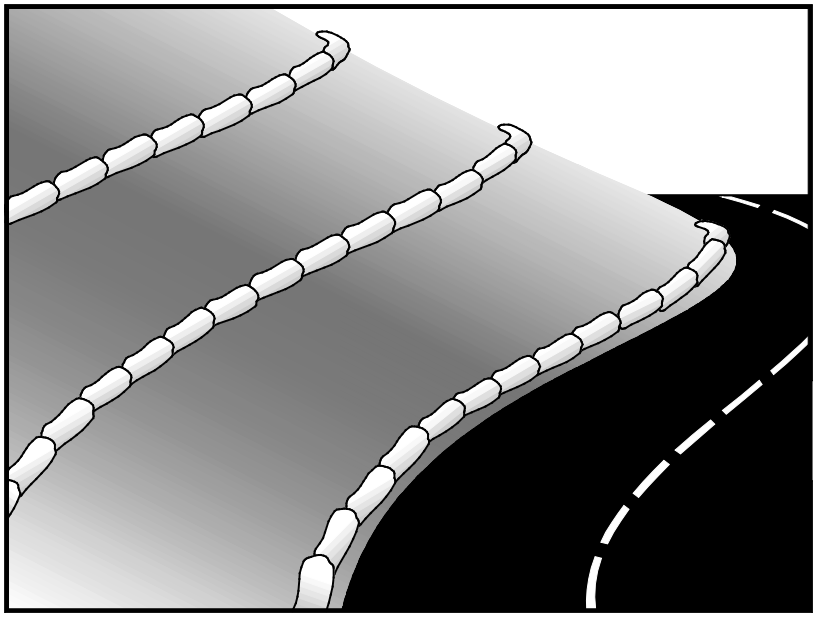
Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. 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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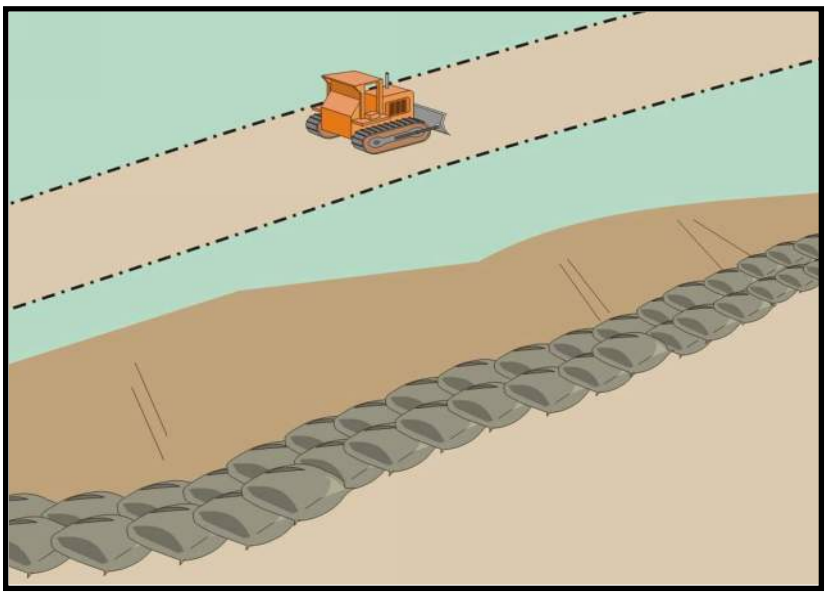
Sandbag Barrier SE-8



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

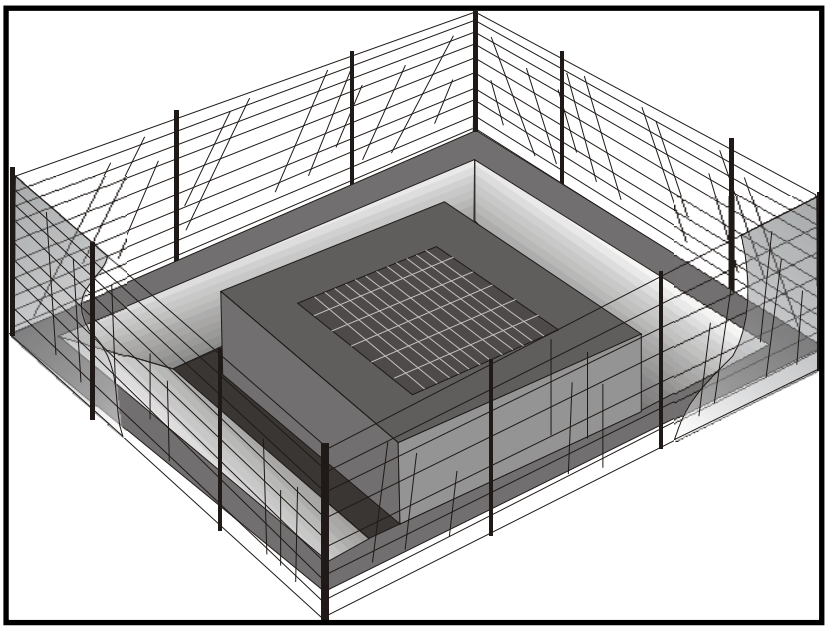
SE-5 Fiber Rolls

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

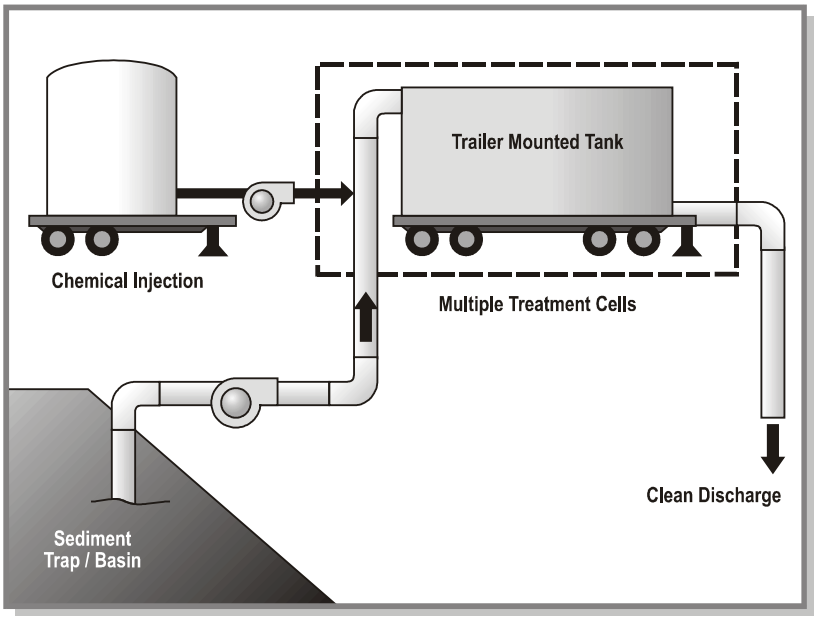
SE-6 Gravel Bag Berm

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.

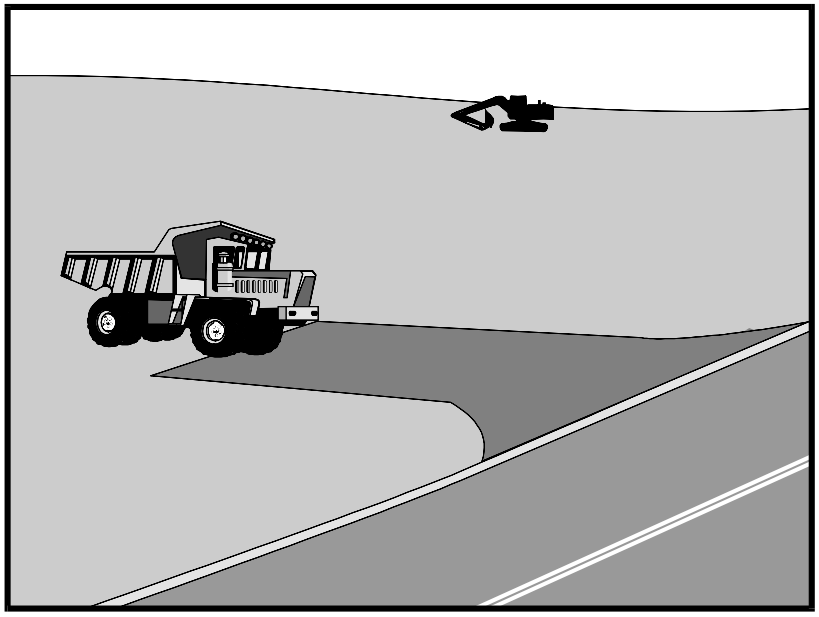
Suitable Applications

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

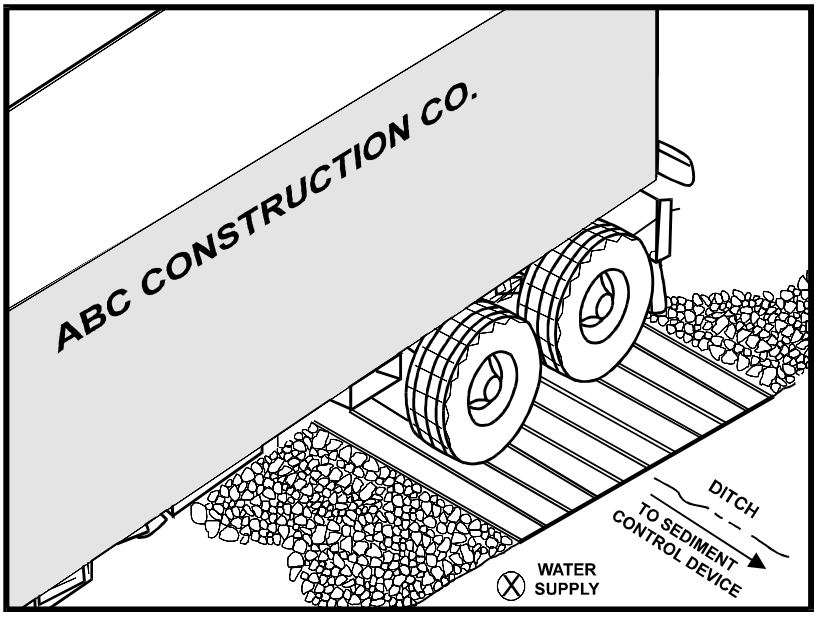
- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct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

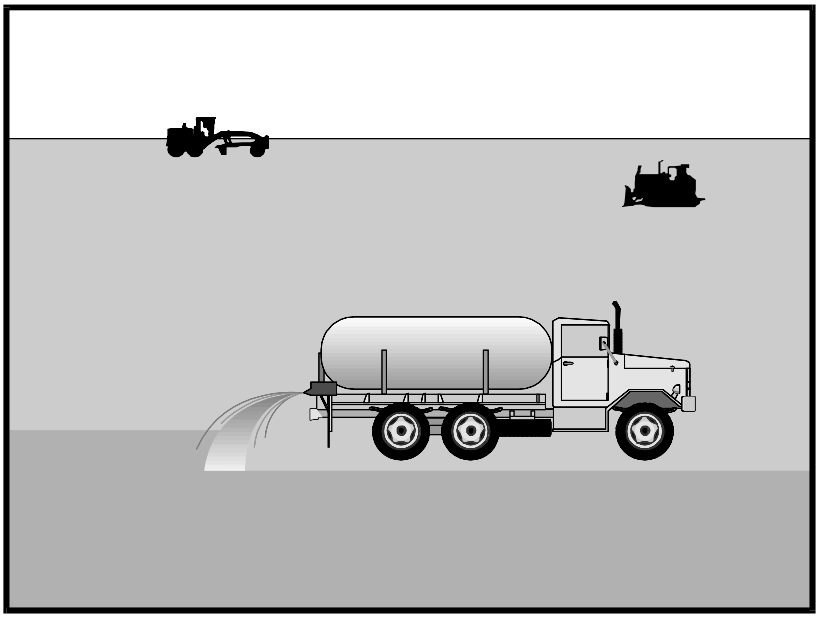
Targeted Constituents

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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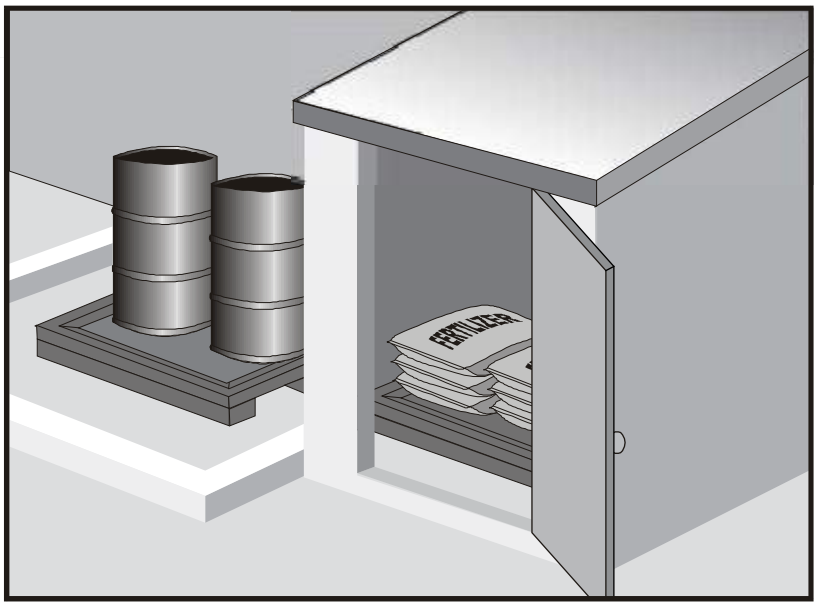
Material Delivery and Storage WM-1



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:

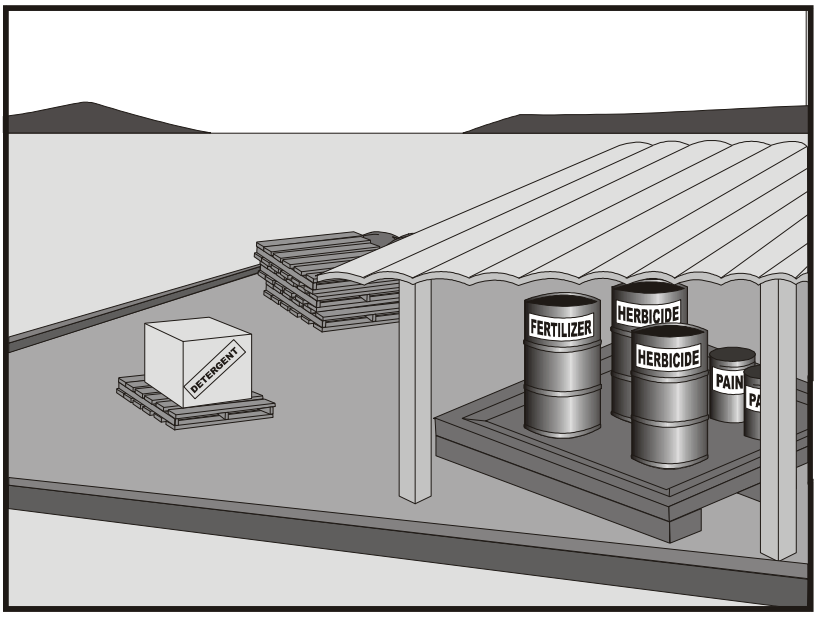
- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

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**

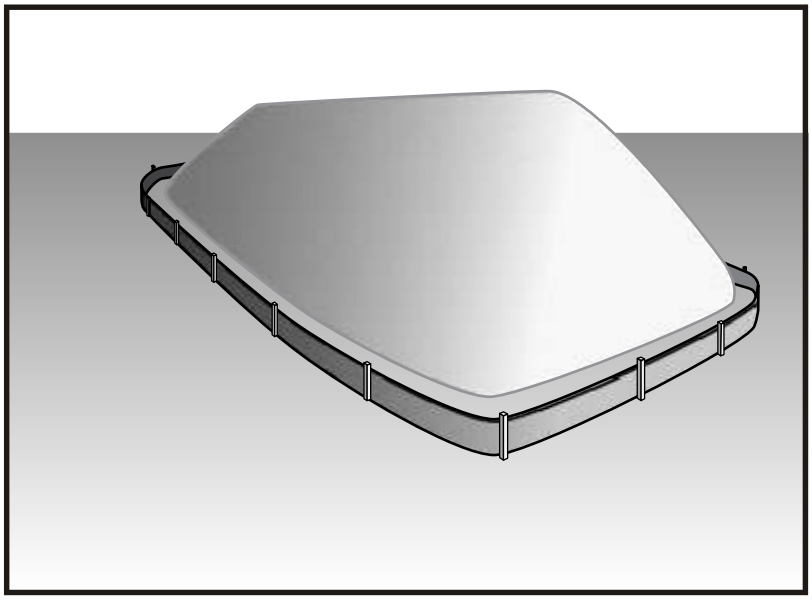
Targeted Constituents

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

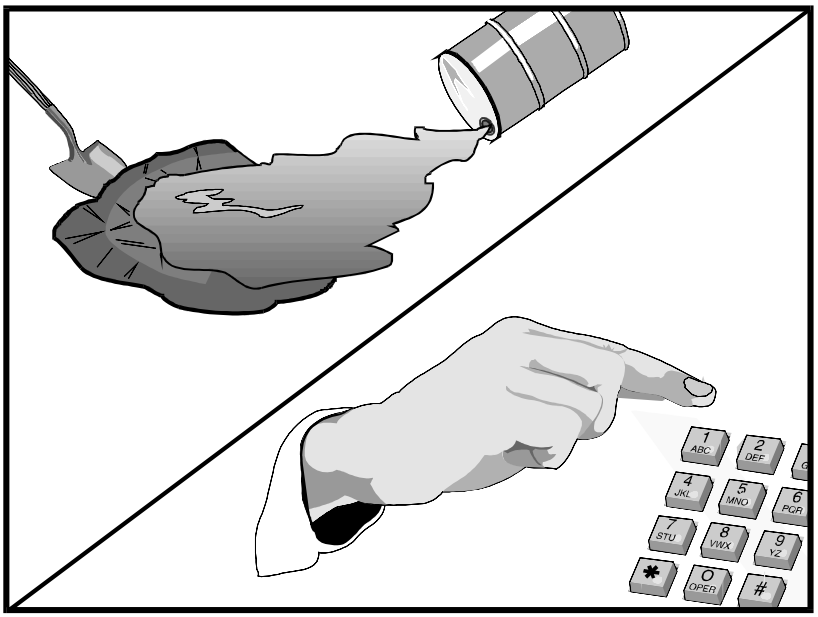
Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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**

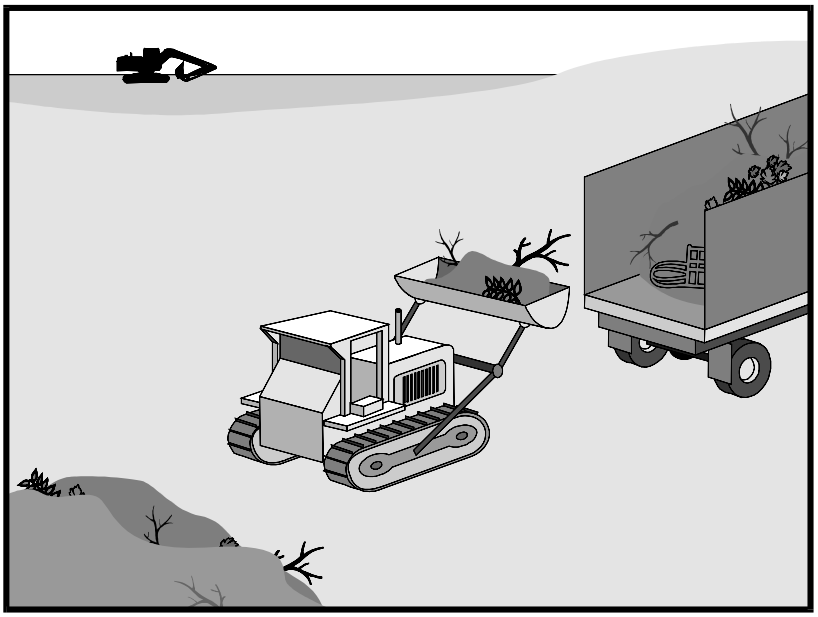
Targeted Constituents

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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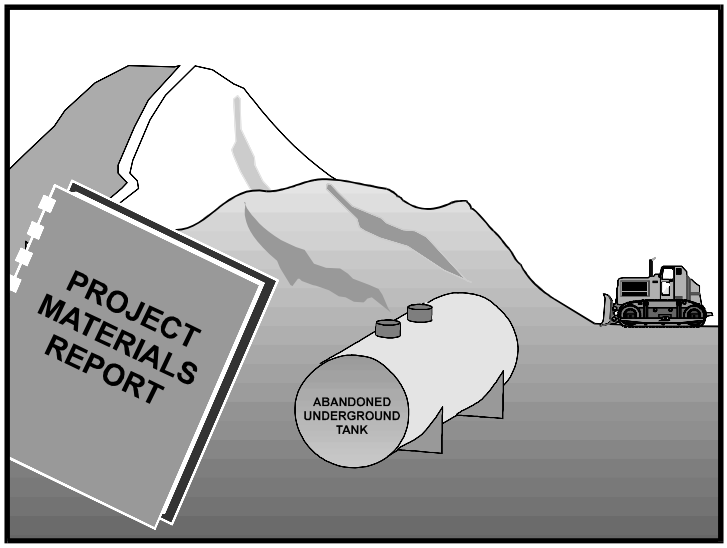
Contaminated Soil Management WM-7



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

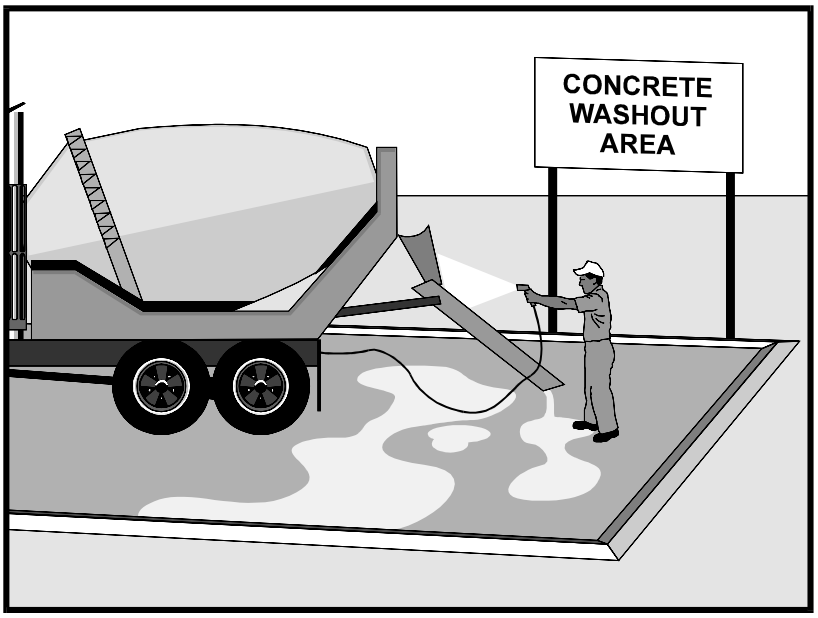
Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Concrete Waste Management WM-8



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

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

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

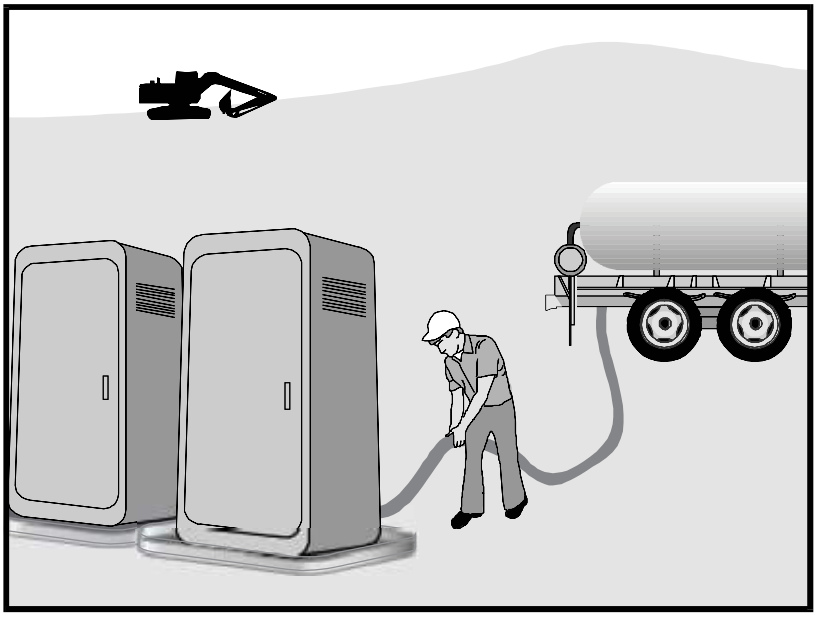
Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into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

Suitable Applications

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

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

Sanitary/Septic Waste Management WM-9



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

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

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

Potential Alternatives

None

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Description and Purpose

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

Suitable Applications

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

Limitations

None identified.

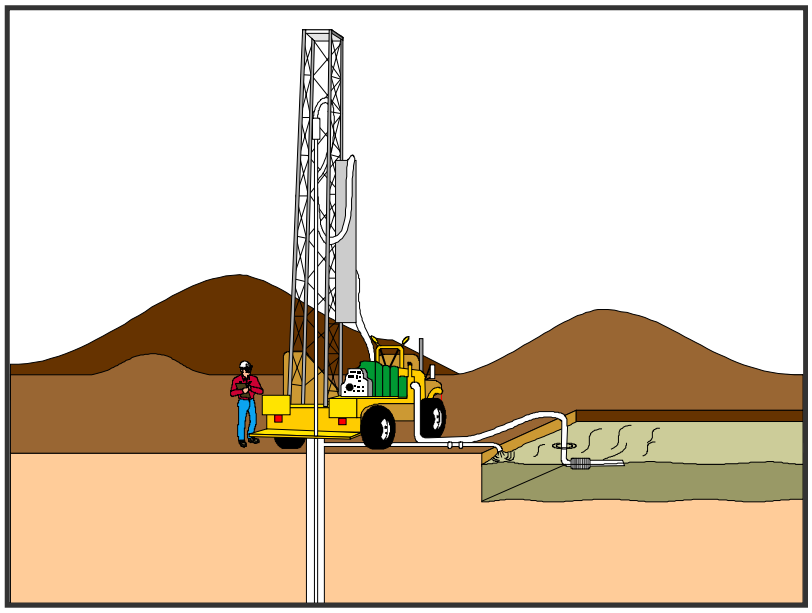
Implementation

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

Storage and Disposal Procedures

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

Liquid Waste Management WM-10



Description and Purpose

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

Suitable Applications

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

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

Limitations

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

Categories

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

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

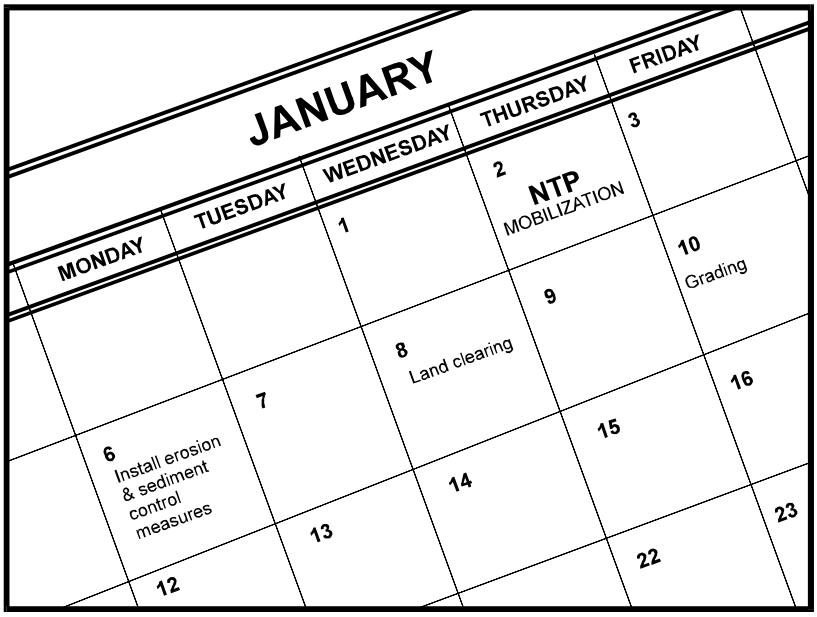
Targeted Constituents

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

Potential Alternatives

None

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**

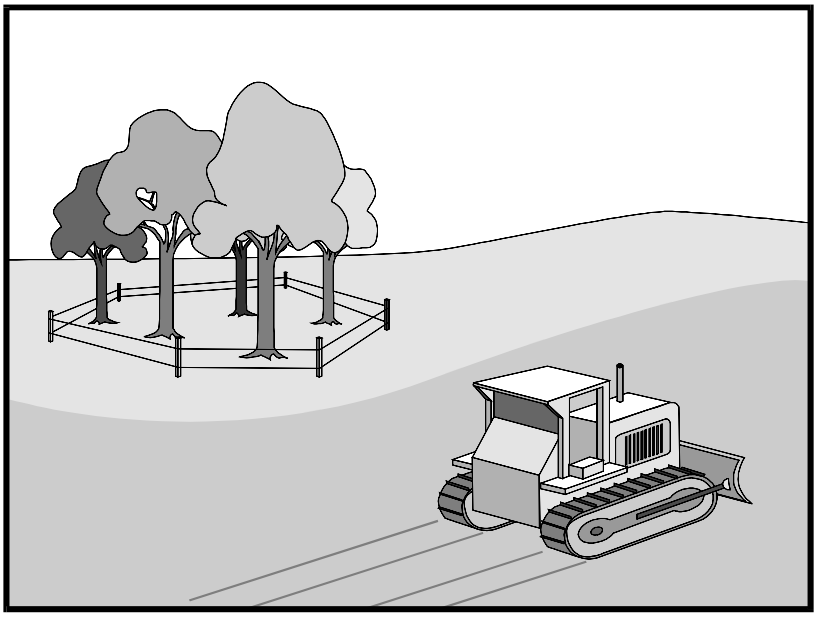
Targeted Constituents

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**

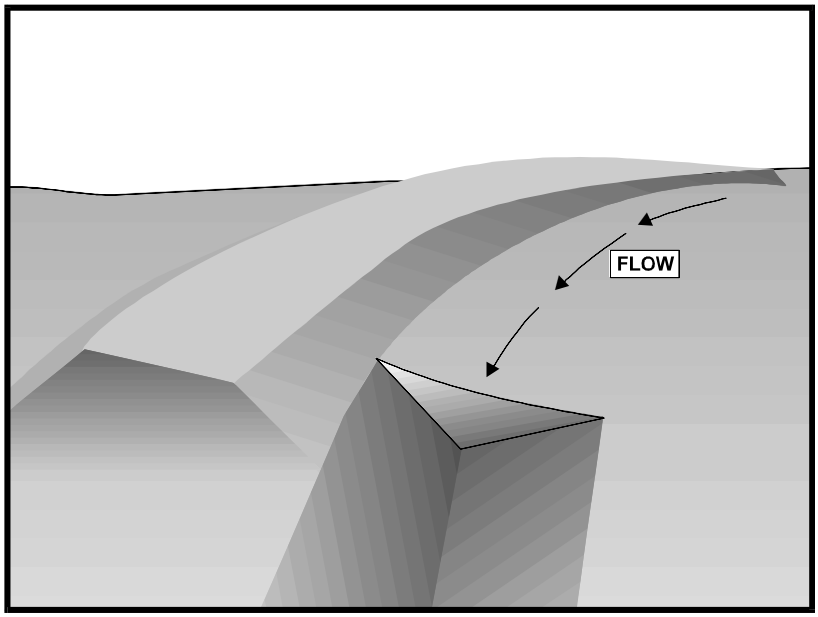
Targeted Constituents

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**

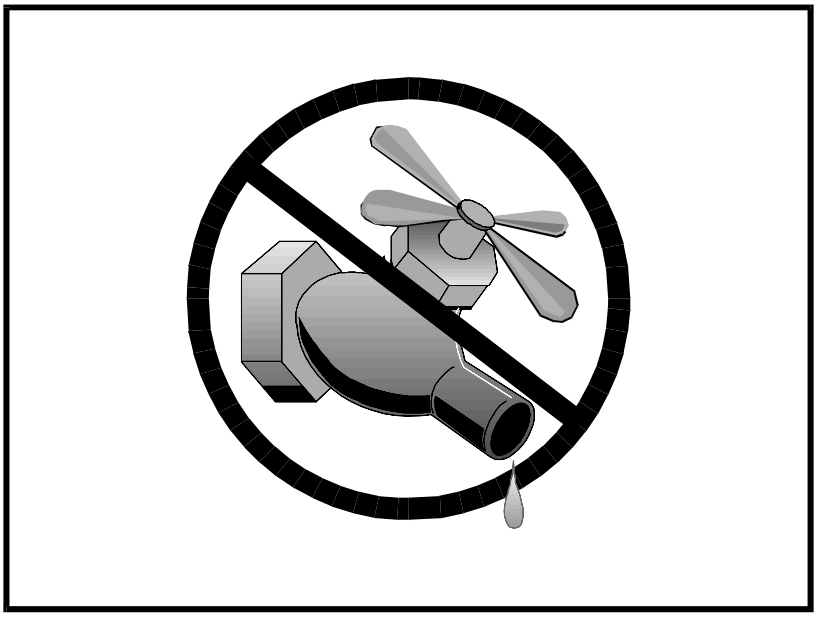
Targeted Constituents

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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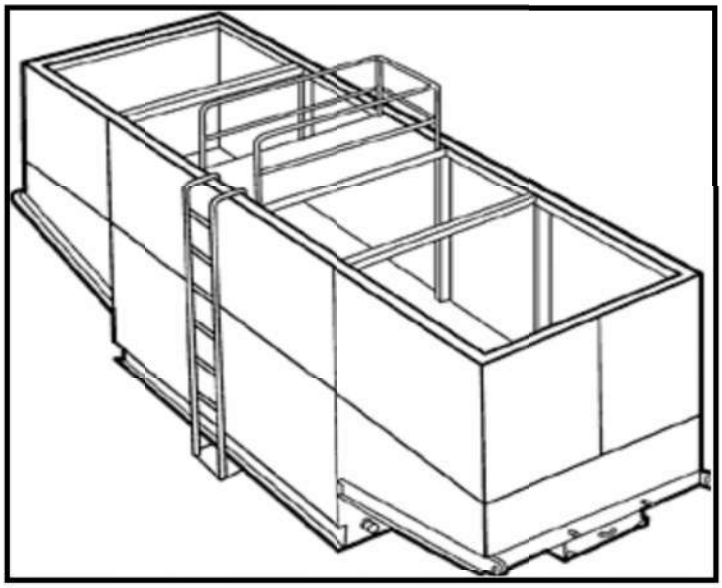
Dewatering Operations NS-2



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.

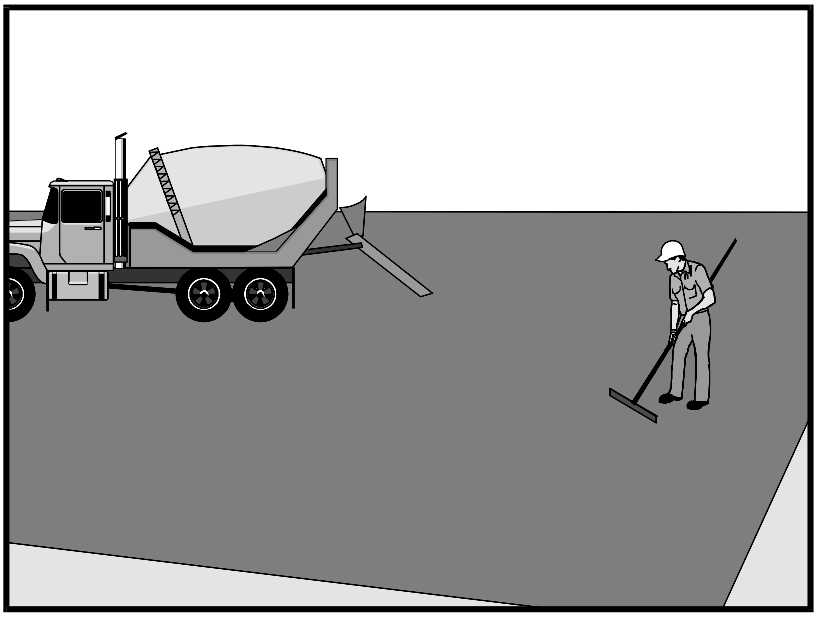
The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

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

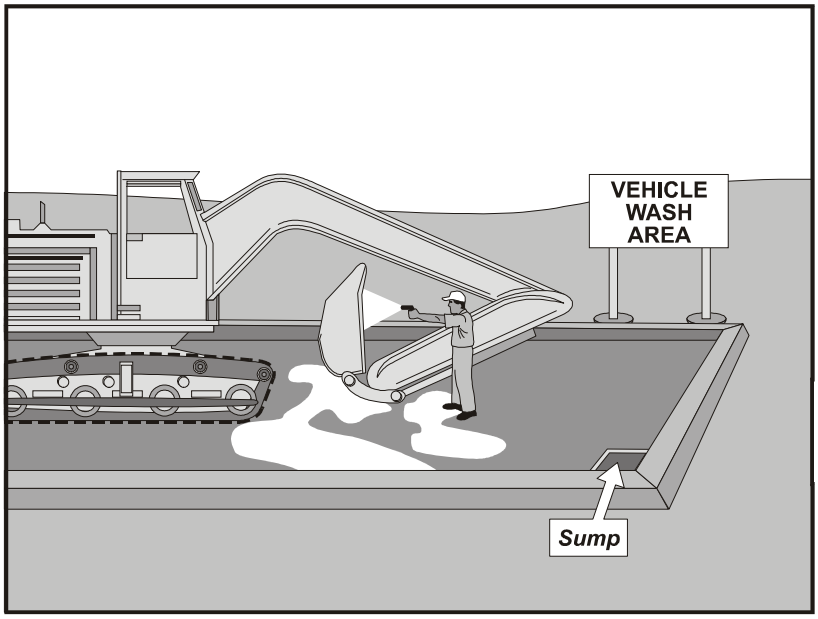
These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

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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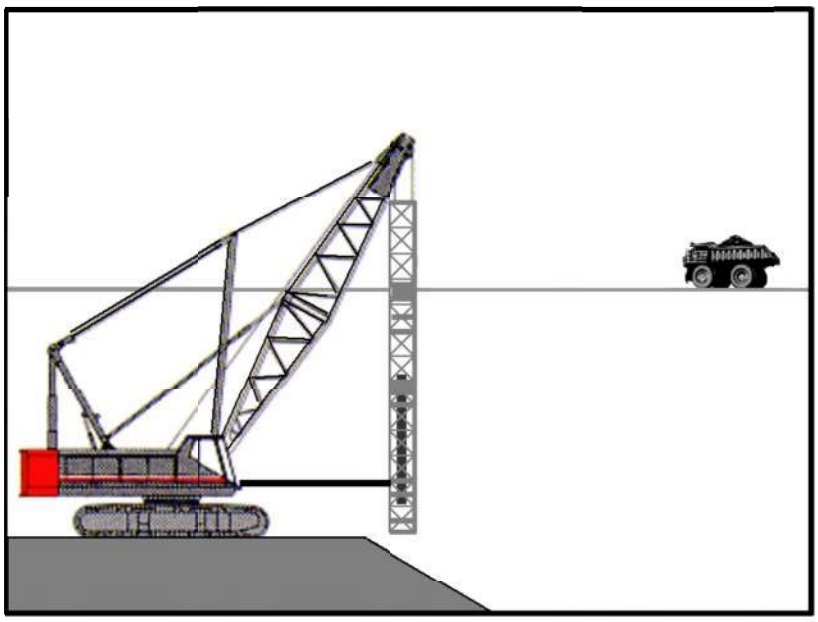
Pile Driving Operations NS-11



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.

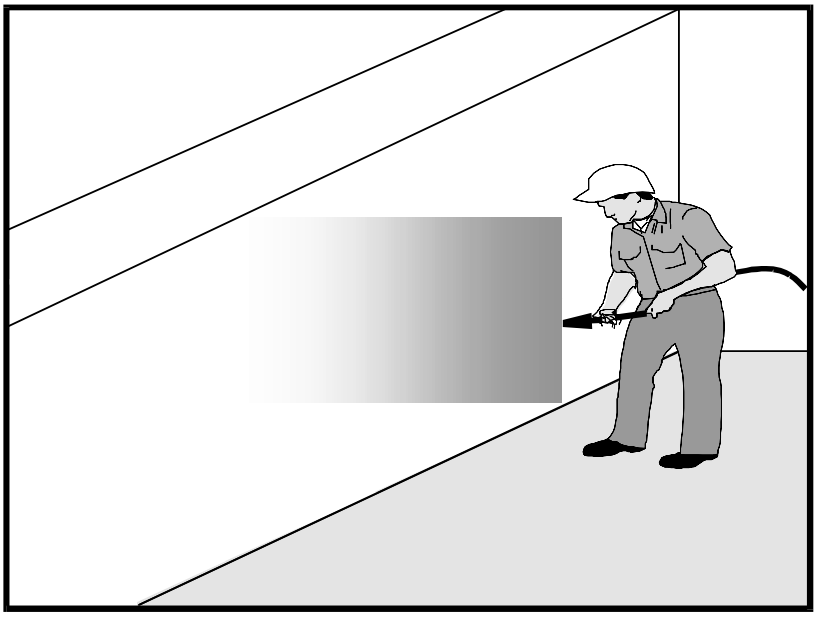
Limitations

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.

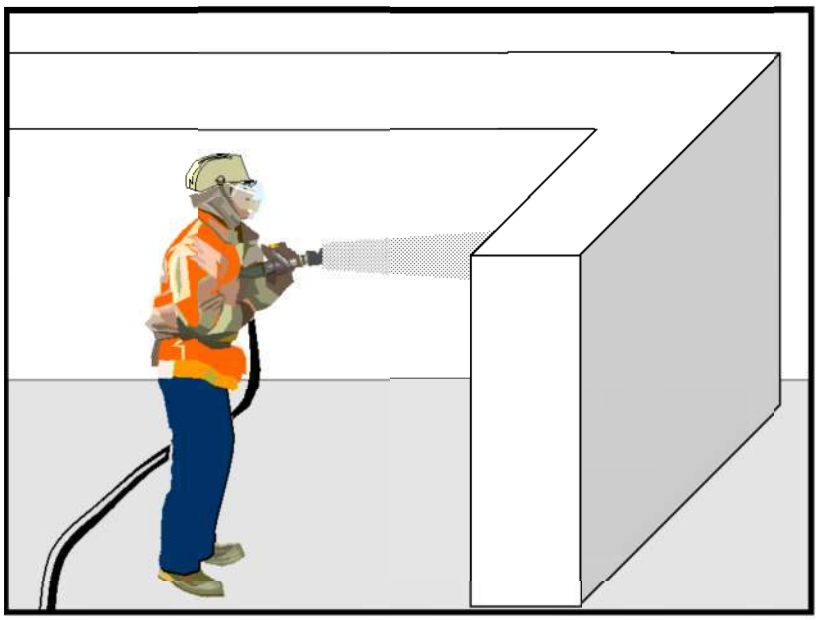
Suitable Applications

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.

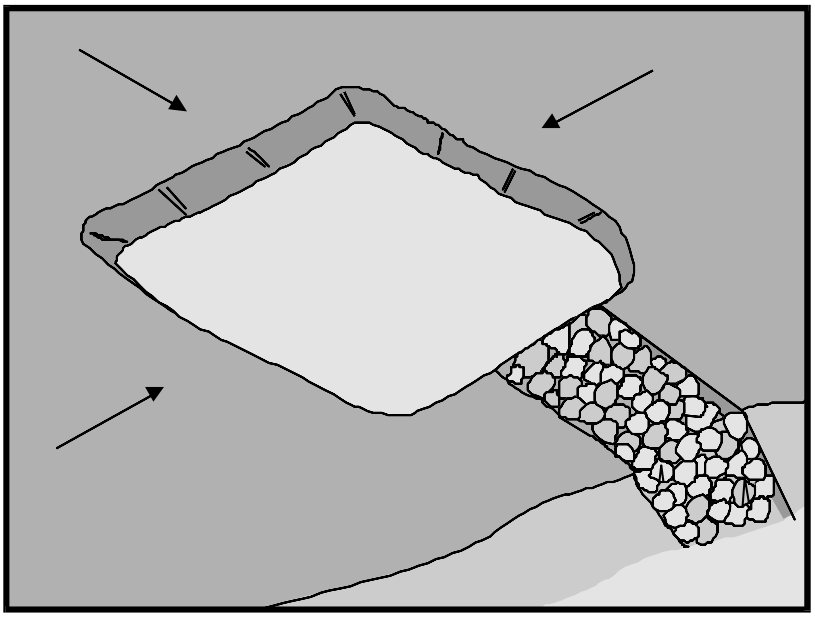
The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

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.

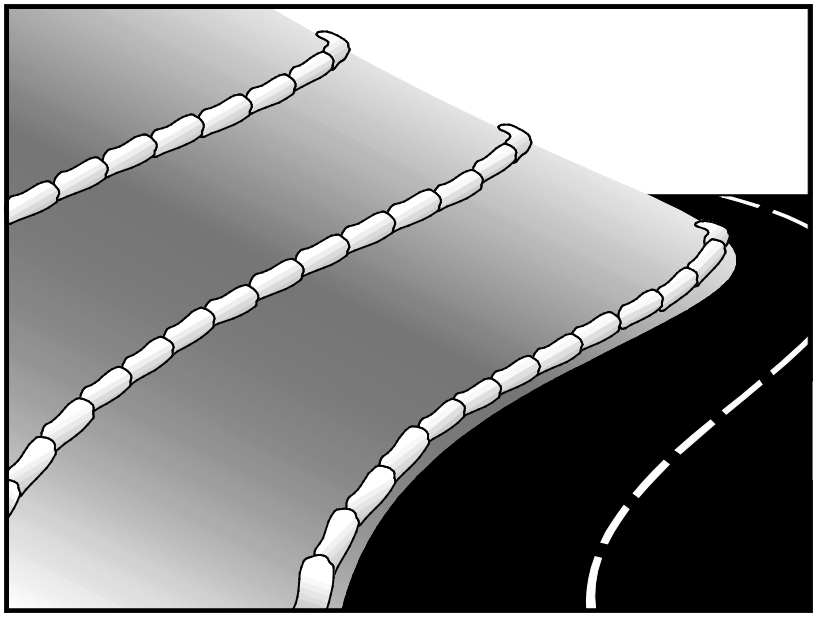
Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. 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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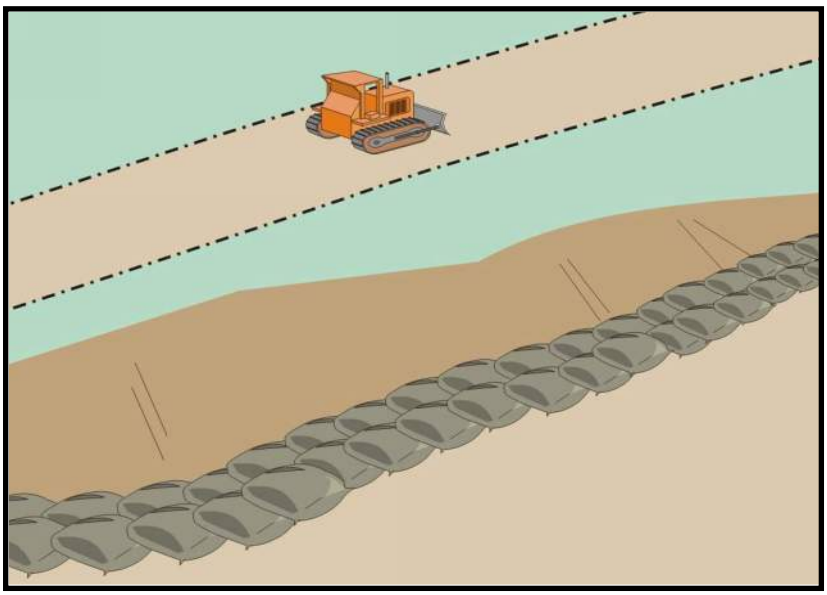
Sandbag Barrier SE-8



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

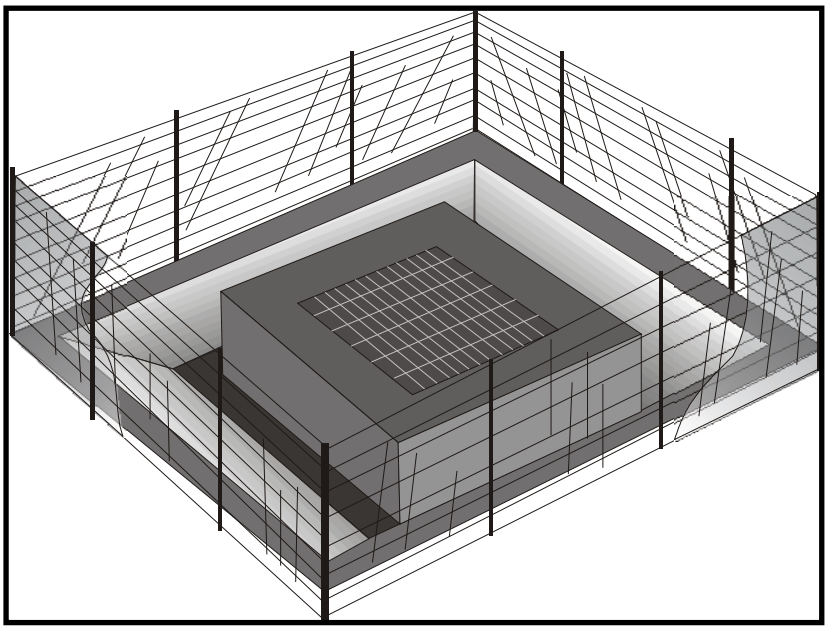
SE-5 Fiber Rolls

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

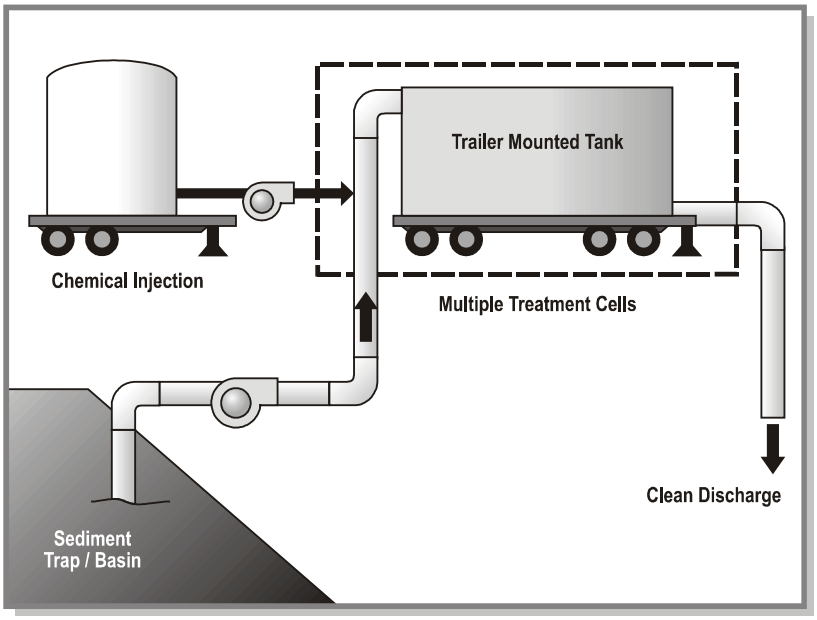
SE-6 Gravel Bag Berm

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.

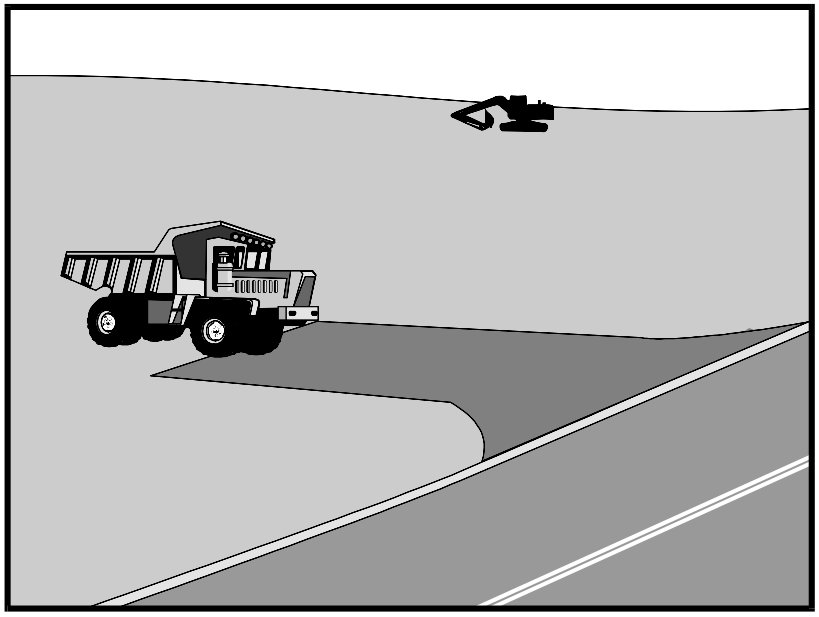
Suitable Applications

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

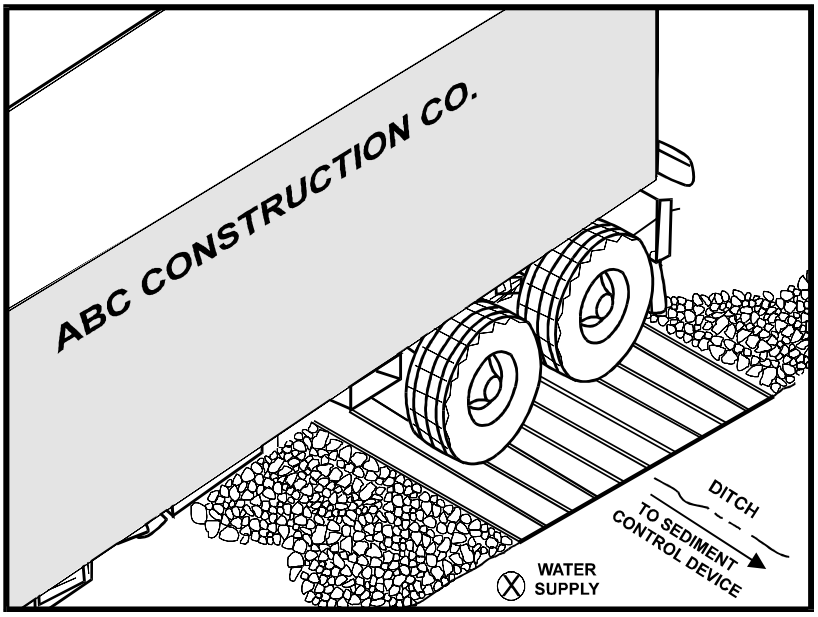
- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct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

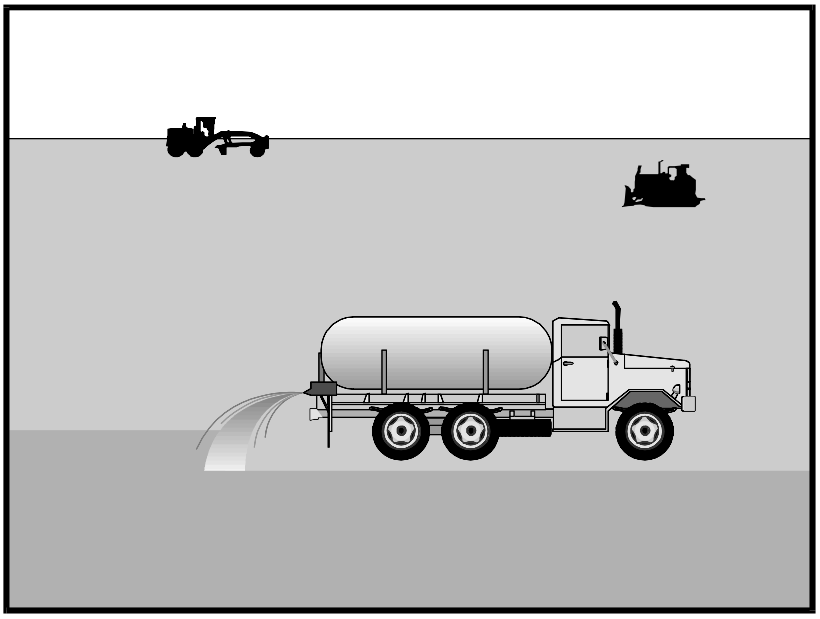
Targeted Constituents

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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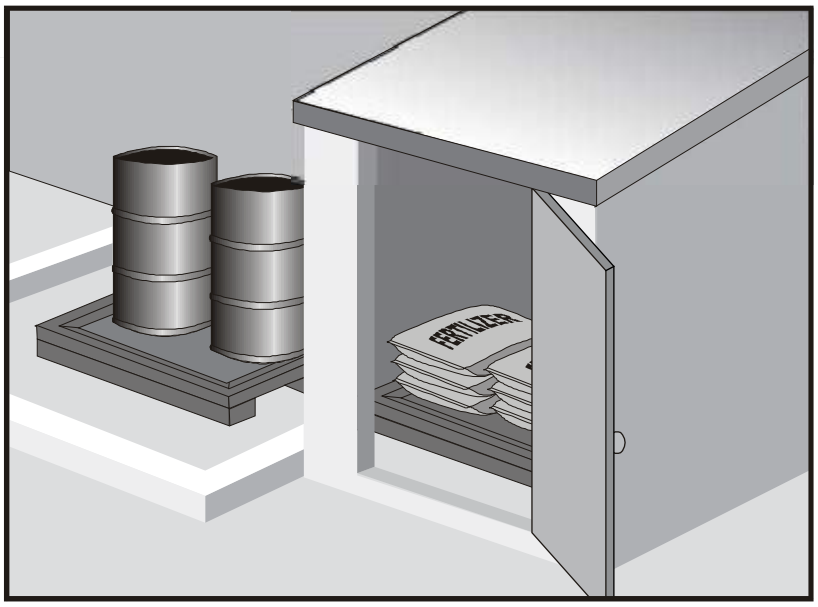
Material Delivery and Storage WM-1



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:

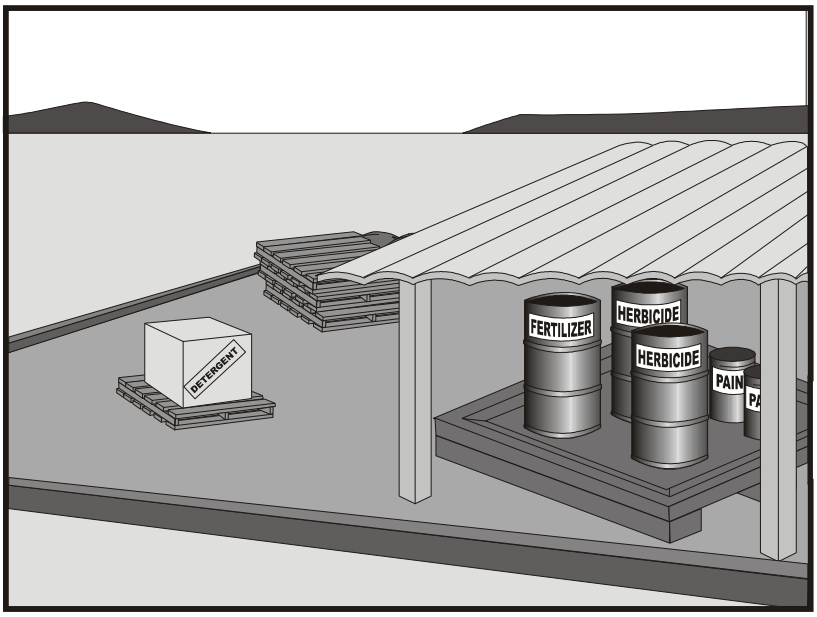
- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

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**

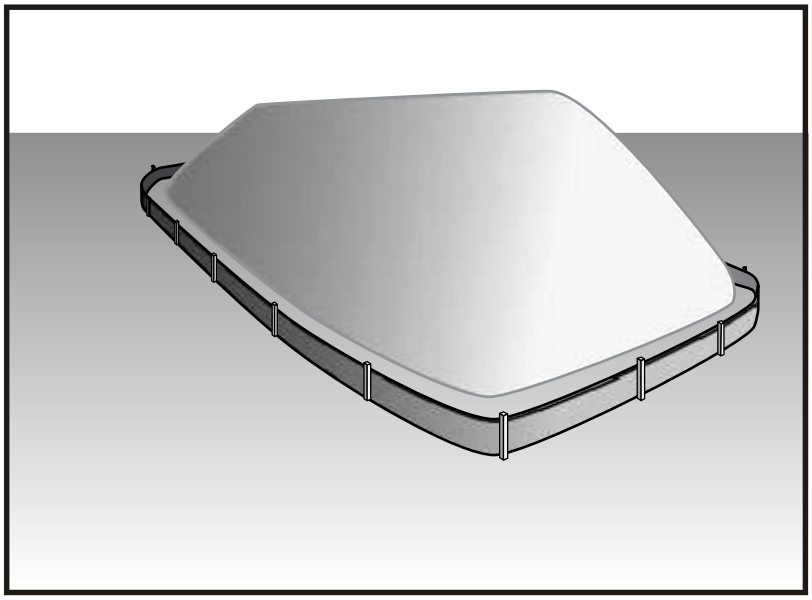
Targeted Constituents

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

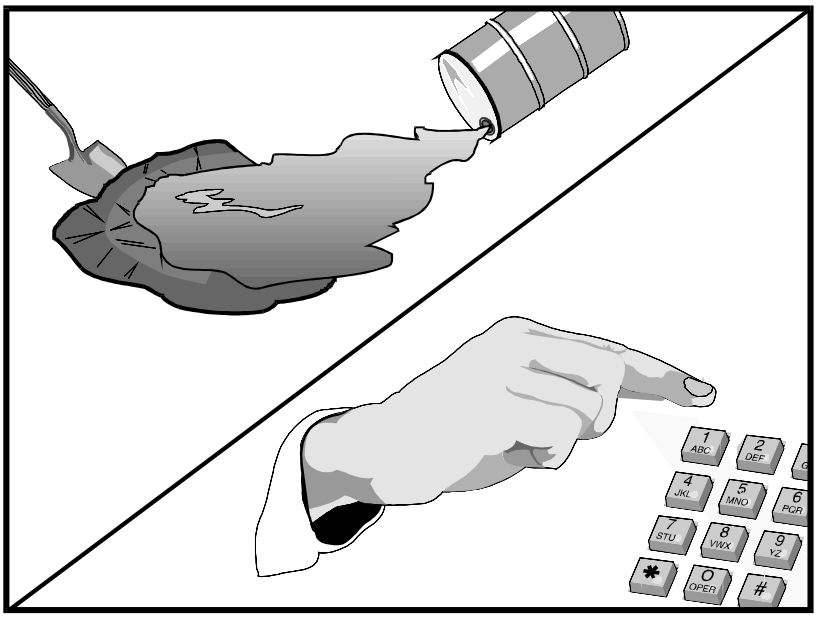
Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

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**

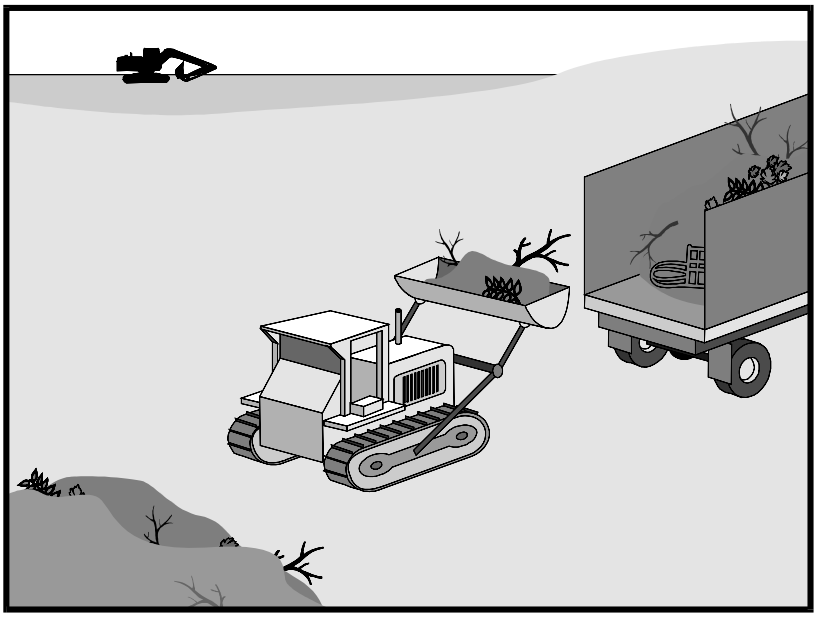
Targeted Constituents

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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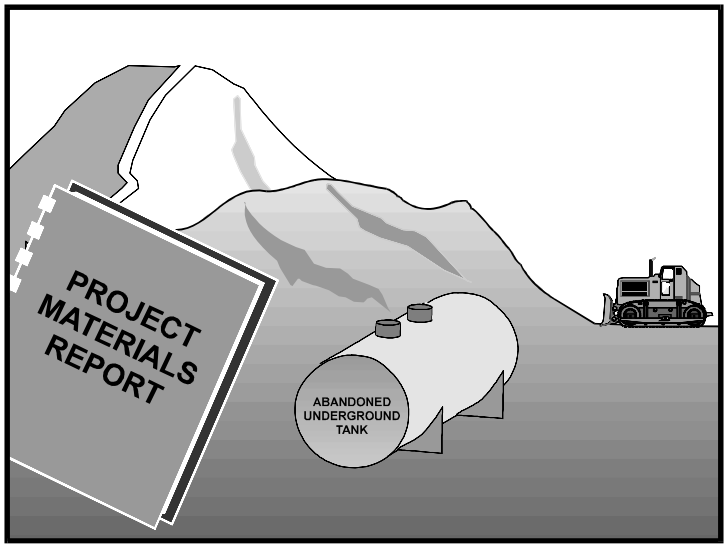
CALIFORNIA STORMWATER QUALITY ASSOCIATION

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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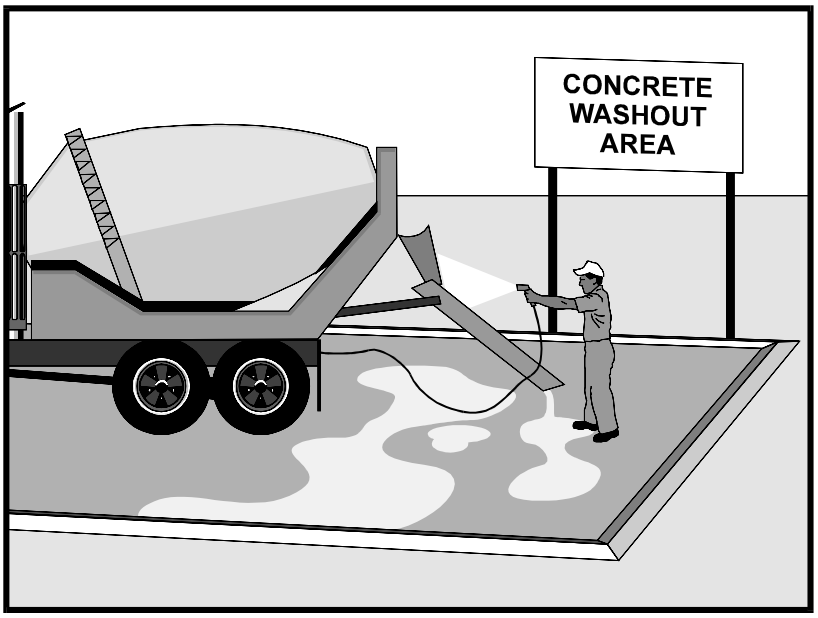
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Concrete Waste Management WM-8



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

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

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

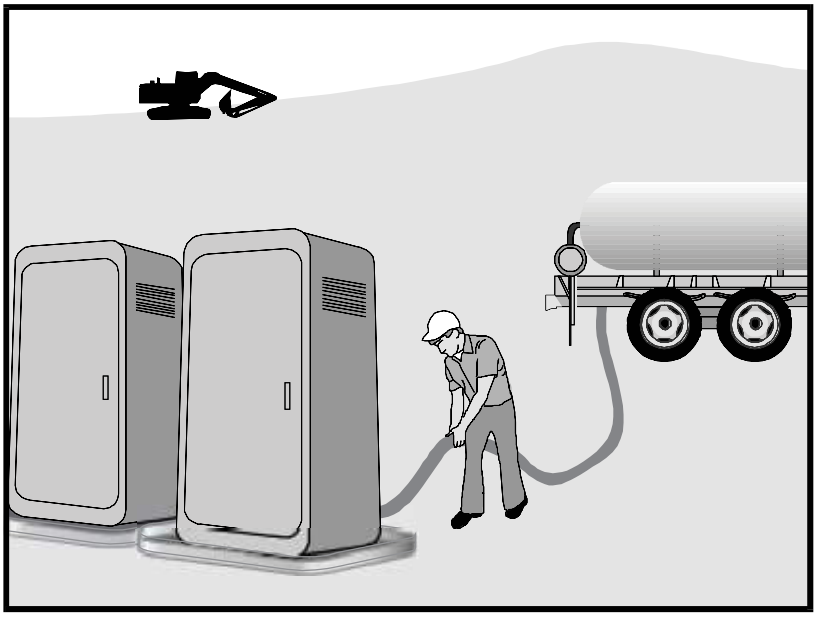
Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into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

Suitable Applications

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

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

Sanitary/Septic Waste Management WM-9



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

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

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

Potential Alternatives

None

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Description and Purpose

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

Suitable Applications

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

Limitations

None identified.

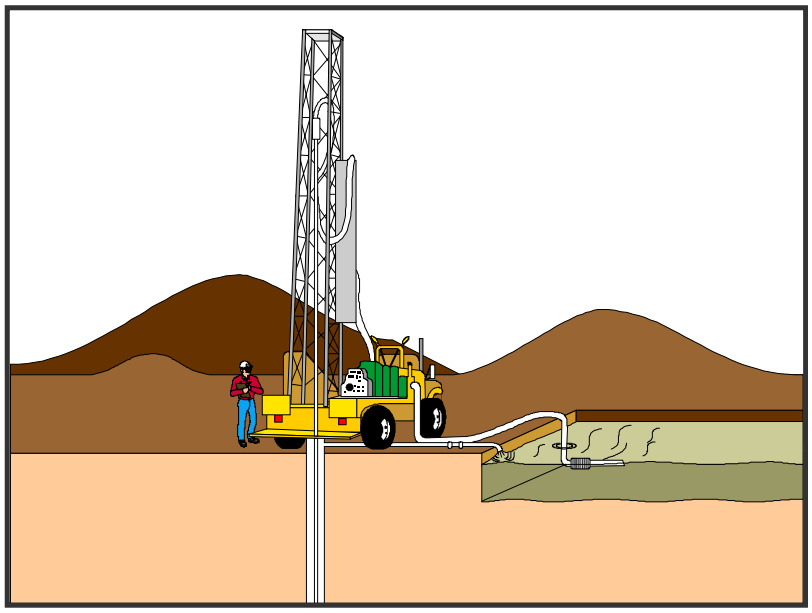
Implementation

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

Storage and Disposal Procedures

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

Liquid Waste Management WM-10



Description and Purpose

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

Suitable Applications

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

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

Limitations

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

Categories

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

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None