Appendix J

Hydrology and Water Quality Report

RADFORD STUDIO CENTER PROJECT

(4024-4200 RADFORD AVENUE, LOS ANGELES CA 90035)

HYDROLOGY AND WATER QUALITY REPORT

OCTOBER 2024

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1. INTRODUCTION

1.1. Project Description

The Radford Studio Center Project (Project) entails the continuation of the existing studio use and the modernization and expansion of Radford Studio Center (Project Site) through the proposed Radford Studio Center Specific Plan (Specific Plan). The Project includes the development of up to approximately 1,667,010 square feet of new sound stage, production support, production office, creative office, and retail uses within the Project Site as well as associated ingress/egress, circulation, parking, landscaping, and open space improvements.

The current Project Site area (prior to dedications/mergers that would occur as part of the Project) is approximately 2,377,372 square feet (approximately 55 acres). The Project Site area after dedications/mergers would be approximately 2,276,215 square feet (approximately 52.25 acres). The Los Angeles River runs through the Project Site and divides it into two lots (referred to as the North Lot and the South Lot). The North Lot is the area of the Project Site north of the Los Angeles River (4200 N. Radford Avenue) and the South Lot is the area of the Project Site south of the Los Angeles River (4024 and 4064 N. Radford Avenue). The North Lot is an approximately 12.70-acre portion of the Project Site bounded by Radford Avenue to the west, the Tujunga Wash to the north and east, and the Los Angeles River to the south. Although the Initial Development Plans considers the rest of the site area (approximately 32.24 acres) the South Lot, for hydrology purposes, the approximately 1.77-acre continuous piece of land east of the Tujunga Wash is broken out. Henceforth in this report, the South Lot is the approximately 30.47-acre portion of the Project Site bounded by Radford Avenue to the west, the Los Angeles River to the north and east, Colfax Avenue to the east, and an alley to the south. An approximately 1.77-acre portion of the Project Site to the east of the Tujunga Wash is shown as a separate on-site drainage area (referred to subsequently as the 1.77 Parcel). The Los Angeles River and Tujunga Wash portions are approximately 7.31 acres.

The proposed Specific Plan would allow up to 2,200,000 square feet of total floor area within the Project Site upon buildout of the Project (inclusive of 532,990 square feet of existing uses to remain).[1] Proposed new buildings could range in height from approximately 60 feet to up to 135 feet.[2] A total of approximately 6,050 vehicular parking

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1 Per the proposed Radford Studio Center Specific Plan, floor area shall be defined in accordance with Los Angeles Municipal Code (LAMC) Section 12.03, with the following exceptions: areas related to the Mobility Hub(s); basecamp; outdoor eating areas (covered or uncovered); trellis and shade structures; covered walkways and storage areas; and all temporary uses (e.g., sets/façades). The approximately 2,200,000 square feet of total floor area within the Project Site per the Radford Studio Center Specific Plan definition is equivalent to approximately 2,345,000 square feet based on the LAMC definition.

2 Based on height measured from Project Grade, which is defined as 595 feet above mean sea level (AMSL) for the North Lot and 610 feet AMSL for the South Lot. Using the LAMC definition of building height, heights would range between approximately 60 feet and 140 feet.

spaces (including approximately 2,170 existing vehicular parking spaces to remain) would be provided within the Project Site at full buildout of the total floor area permitted under the proposed Specific Plan. As part of the Project, approximately 646,120 square feet of existing uses would be removed and approximately 532,990 square feet of existing uses would remain. In addition, the Project includes open space and landscaping improvements to enhance the public realm along all Project Site frontages and enhance public access to the Los Angeles River and Tujunga Wash. Specifically, approximately 109,569 square feet of open space would be provided along the Project Site frontages, including approximately 77,406 square feet of open space along the Los Angeles River and Tujunga Wash frontages, approximately 4,454 square feet of open space along Colfax Avenue, and approximately 27,709 square feet along Radford Avenue. Additional open space and landscaping would be provided within the Project Site, including various ground level open space areas and rooftop terraces. A Sign District would also be established to permit studio-specific on-site signs.

The Project is also proposing a new pedestrian and vehicular bridge (subsequently referred to as the Radford Mobility Connector) to extend Radford Avenue to the north across the Tujunga Wash to Moorpark Street (no through access north or south would be provided along Radford Avenue), as well as modifications to the alley south of the Project Site.

Additionally, the power poles and overhead lines on Radford Avenue and in the alley south of the Project Site may be undergrounded in coordination with the Los Angeles Department of Water and Power (LADWP).

1.2. Scope of Work

This report describes the existing surface water hydrology, surface water quality, groundwater hydrology, 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 hydrology, and groundwater quality.

2. REGULATORY FRAMEWORK

There are several plans, policies, and programs regarding hydrology and water quality at the federal, state, regional, and local levels. Described below, these include:

- United States Clean Water Act
- Federal Antidegradation Policy
- United States Safe Drinking Water Act
- National Flood Insurance Program
- California Porter-Cologne Water Quality Act (California Water Code)
- California Antidegradation Policy
- California Toxics Rule

- California Sustainable Groundwater Management Act of 2014
- County of Los Angeles Hydrology Manual
- National Pollutant Discharge Elimination System (NPDES) Permit Program
- Los Angeles River Watershed Master Plan
- Los Angeles Municipal Code Section 62.105, Construction "Class B" Permit
- Los Angeles Municipal Code Sections 12.40 through 12.43, Landscape Ordinance
- Los Angeles Municipal Code Section 64.70, Stormwater and Urban Runoff Pollution Control Ordinance
- Los Angeles Municipal Code Section 64.72, Stormwater Pollution Control Measures for Development Planning and Construction Activities
- City of Los Angeles Low Impact Development Ordinance (No. 181,899)
- City of Los Angeles Water Quality Compliance Master Plan for Urban Runoff
- Stormwater Program – Los Angeles County MS4 Permit Citywide Implementation

2.1 Surface Water Hydrology

County of Los Angeles Hydrology Manual

Per the City of Los Angeles Special Order No. 007-1299, December 3, 1999, the City has adopted the Los Angeles County (County) Department of Public Works (LACDPW) Hydrology Manual (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.[3] 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 review and approval 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 or under the control of the City requires the approval of a B-permit (Section

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[3] Los Angeles County Department of Public Works Hydrology Manual, January 2006, http://ladpw.org/wrd/publication/index.cfm, accessed March 7, 2024.

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 private property to a City catch basin or an underground storm drain pipe requires a storm drain connection permit from the City of Los Angeles Department of Public Works, Bureau of Engineering.

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 mandate the Federal Emergency Management Agency (FEMA) to evaluate flood hazards.[4] FEMA provides flood insurance rate maps (FIRMs) for local and regional planners to promote sound land use and development practices by identifying potential flood areas based on the current conditions. To delineate a FIRM, FEMA conducts engineering studies referred to as flood insurance studies (FIS). Using information gathered in these studies, FEMA engineers and cartographers delineate special flood hazard areas (SFHA) on FIRMs.

2.2 Surface Water Quality

Clean Water Act

The Clean Water Act was first introduced in 1948 as the Water Pollution Control Act. The Clean Water Act authorizes federal, state, and local entities to cooperatively create comprehensive programs for eliminating or reducing the pollution of state waters and tributaries. The primary goals of the Clean Water Act are to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to make all surface waters fishable and swimmable. As such, the Clean Water Act forms the basic national framework for the management of water quality and the control of pollutant discharges. The Clean Water Act also sets forth a number of objectives in order to achieve the above-mentioned goals. These objectives include regulating pollutant and toxic pollutant discharges; providing for water quality that protects and fosters the propagation of fish, shellfish and wildlife; developing waste treatment management plans; and developing and implementing programs for the control of non-point sources of pollution.[5]

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

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[4] The National Flood Insurance Act of 1968, as amended, and The Flood Disaster Protection Act of 1973, 42 U.S.C. 4001 et. seq.

[5] 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.

unless authorized by a USEPA National Pollutant Discharge Elimination System (NPDES) permit. Amendments enacted in 1977 mandated development of a "Best Management Practices" (BMPs) 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,[6] (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 the 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 SWRCB 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, including the Los Angeles RWQCB (LARWQCB), develop "basin plans" for their hydrologic areas, issue waste discharge requirements, enforce action against stormwater discharge violators, and monitor water quality.[7]

Federal Anti-Degradation Policy

The Federal Anti-Degradation Policy (40 Code of Federal Regulations (CFR) 131.12) requires states to develop statewide anti-degradation policies and identify methods for

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6 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.

7 USEPA. U.S. Environmental Protection Agency - Clean Water Act. July 2011.

implementing them. Pursuant to the 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

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 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 CWC, the LARWQCB has adopted a plan entitled "Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan). Specifically, the Basin Plan designates beneficial uses for surface and groundwater, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable state and regional board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the LARWQCB Basin Plan.[8]

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

NPDES Permit Program

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

The General Permit

SWRCB Order No. 2022-0057-DWQ, referred to as the "General Permit," was adopted on September 8, 2022, and became active on September 1, 2023. This General Permit establishes a risk-based approach to stormwater control requirements for construction projects. The main objectives of the General Permit are to:

1. Reduce erosion
2. Minimize or eliminate sediment in stormwater discharges
3. Prevent materials used at a construction site from contacting stormwater
4. Implement a sampling and analysis program
5. Eliminate unauthorized non-stormwater discharges from construction sites

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8 Los Angeles Regional Water Quality Control Board. LARWQCB Basin Plan. http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/, accessed March 7, 2024.

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

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 July 2011. The Handbook provides guidance for developers in complying with the requirements of the Development Planning Program regulations of the City's Stormwater Program. Compliance with the requirements of this manual is required by City of Los Angeles Ordinance No. 172,673. The handbook and ordinances also have specific minimum BMP requirements for all construction activities and require dischargers whose construction projects disturb one acre or more of soil to prepare a SWPPP and file a Notice of Intent (NOI) with the SWRCB. The NOI informs the SWRCB of a particular project and results in the issuance of a Waste Discharger Identification (WDID) number, which is needed to demonstrate compliance with the General Permit.

The Development Best Management Practices Handbook, Low Impact Development Manual, Part B: Planning Activities (5th edition, May 2016) (LID Handbook) provides guidance to developers to ensure the post-construction operation of newly developed and redeveloped facilities comply with the Developing Planning Program regulations of the City's Stormwater Program. Compliance with requirements established in the LID Handbook is required under City of Los Angeles Ordinance No. 173,494. The LID Handbook assists developers with the selection, design, and incorporation of stormwater source control and treatment control BMPs into project design plans, and provides an overview of the City's plan review and permitting process. The LID Handbook addresses the need for frequent and/or regular inspections of infiltration facilities in order to ensure on-site compliance of BMP standards, soil quality, site vegetations, and permeable surfaces. These inspections are required to guarantee that facilities follow all proprietary operation and maintenance requirements.

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 stormwater requirements. Plans and specifications are reviewed to ensure that the appropriate BMPs are incorporated to address stormwater pollution prevention goals. The Standard Urban Stormwater Mitigation Plan

(SUSMP) provisions that are applicable to new residential and commercial developments include, but are not limited to, the following:[9]

- Peak Stormwater Runoff Discharge Rate: Post-development peak stormwater runoff discharge rates shall not exceed the estimated pre-development rate for developments where the increased peak stormwater discharge rate will result in increased potential for downstream erosion;
- Conserve natural areas;
- Minimize Stormwater Pollutants of Concern;
- Protect Slopes and Channels;
- Provide storm drain system Stenciling and Signage;
- Properly design outdoor material storage areas;
- Properly design trash storage areas; and
- Provide proof of ongoing BMP Maintenance of any structural BMPs installed.

Design Standards for Structural or Treatment Control BMPs:

- Structural or Treatment control BMPs selected for use at any project covered by this SUSMP shall meet the design standards of this Section unless specifically exempted. Post-construction Structural or Treatment Control BMPs shall be designed to:

  A. Mitigate (infiltrate or treat) stormwater runoff from either:

  1. The 85th percentile 24-hour runoff event determined as the maximized capture stormwater volume for the area, from the formula recommended in *Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998)*, or
  2. The volume of annual runoff based on unit basin storage water quality volume, to achieve 80 percent or more volume treatment by the method recommended in *California Stormwater Best Management Practices Handbook—Industrial/ Commercial, (1993)*, or

[9] Los Angeles Waterboards SUSMP website, https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/susmp/susmp_details.shtml. accessed March 7, 2024.

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

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

AND

B. Control peak flow discharge to provide stream channel and over bank flood protection, based on flow design criteria selected by local agency.

Stormwater Pollution Prevention Plan

California mandates 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 BMPs for a specific construction project, charging owners with stormwater quality management responsibilities. The Project's construction BMPs will be identified in an Erosion Control Plan and submitted to the State Waterboard prior to the start of construction. A construction site subject to the General Permit must prepare and implement a SWPPP that meets the requirements of the General Permit.[10,11]

A SWPPP is meant to identify potential sources and types of pollutants associated with construction activity and list BMPs that would prohibit pollutants from being discharged from the construction site into the public storm drain system. BMPs typically address stabilization of construction areas, minimization of erosion during construction, sediment control, control of pollutants from construction materials, and post-construction stormwater management (e.g., the minimization of impervious surfaces or treatment of stormwater runoff). The SWPPP is also required to include a discussion of the proposed program to inspect and maintain all BMPs.

A Project Site-specific SWPPP could include, but would not be limited to, the following BMPs:

- Erosion Control BMPs – consist of management of soil surface to prevent soil particles from detaching. Selection of the appropriate erosion control BMPs would be based on minimizing areas of disturbance, stabilizing disturbed areas, and

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10 "National Pollutant Discharge Elimination System (NPDES) – Wastewater". State Water Resources Control Board. December 2022, http://www.swrcb.ca.gov/water_issues/programs/npdes/. Accessed March 7, 2024.

11 "National Pollutant Discharge Elimination System (NPDES)". U.S. Environmental Protection Agency - NPDES. August 2023, https://www.epa.gov/npdes. Accessed March 7, 2024.

protecting slopes/channels. Such BMPs may include, but would not be limited to, use of geotextiles and mats, earth dikes, drainage swales, and slope drains.

- Sediment Control BMPs – consist of treatment controls that trap soil particles that have been detached by water or wind. Selection of the appropriate sediment control BMPs would be based on keeping sediments on-site and controlling site boundaries. Such BMPs may include, but would not be limited to, use of silt fences, sediment traps, and sandbag barriers, street sweeping and vacuuming, and storm drain inlet protection.

- Wind Erosion Control BMPs – consist of applying water to prevent or minimize dust nuisance.

- Tracking Control BMPs – consist of preventing or reducing the tracking of sediment off-site by vehicles leaving the construction area. These BMPs include street sweeping and vacuuming. Project sites are required to maintain a stabilized construction entrance to prevent off-site tracking of sediment and debris.

- Non-Stormwater Management BMPs – also referred to as "good housekeeping practices," involve keeping a clean, orderly construction site.

- Waste Management and Materials Pollution Control BMPs – consist of implementing procedural and structural BMPs for handling, storing, and disposing of wastes generated by a construction project to prevent the release of waste materials into stormwater runoff or discharges through the proper management of construction waste.

Los Angeles County Municipal Stormwater 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 July 23, 2021, the LARWQCB adopted Order No. R4-2021-0105 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 the Los Angeles Region. The requirements of this Order (the "Permit") apply to 99 entities: The Los Angeles County Flood Control District (LACFCD), County of Los Angeles, 85 incorporated cities within Los Angeles County, Ventura County Watershed Protection District, County of Ventura, and 10 incorporated cities within Ventura County. Previous Orders covered the City of Long Beach, 86 Permittees in Los Angeles County, and 12 Permittees in Ventura County separately.

The Permit provides discharge prohibitions, effluent limitations and discharge specifications, receiving water limitations, standard provisions, monitoring and reporting program requirements, and minimum control measures. The Permit provides the following updates to previous Permits: full trash capture requirements, Priority Development Projects and applicable performance requirements, definition of technical infeasibility, and alternative compliance for on-site flow-based BMPs.

The Permit became effective on September 11, 2021. At the time of this report, the City and County of Los Angeles are in the process of updating their respective ordinances and design manuals and the release date of these updates is unknown.

Stormwater Quality Management Program (SQMP)

In compliance with the General Permit, the Co-Permittees are required to implement a stormwater quality management program (SQMP) with the goal of accomplishing the requirements of the Permit and reducing the amount of pollutants in stormwater runoff. The SQMP requires the County of Los Angeles and the 85 incorporated cities to:

- Implement a public information and participation program to conduct outreach on stormwater 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 stormwater 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 stormwater runoff.

3. Revision of the SQMP:

   - Permittees are required to revise the SQMP in order to comply with requirements of the RWQCB while complying with regional watershed requirements and/or waste load allocations for implementation of 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 stormwater management program by providing an estimated breakdown of expenditures for different areas of concern, including budget projections for the following year.

6. Watershed Management Committees (WMCs):

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

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

7. Legal Authority:

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

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 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 and a financial plan 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.

Los Angeles Municipal Code

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

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

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

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

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

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

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

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

Low Impact Development (LID)

In October 2011, the City of Los Angeles passed the Stormwater Low Impact Development (LID) Ordinance (Ordinance No. 181899, updated September 2015 (Ordinance No. 183833)), amending LAMC Chapter VI, Article 4.4, Sections 64.70.01 and 64.72 to expand the applicability of the existing SUSMP requirements by imposing rainwater LID strategies on projects that require building permits. The Stormwater LID Ordinance went into effect on May 12, 2012. The current City of Los Angeles Planning and Land Development Handbook for LID was published on May 9, 2016. The City of Los Angeles passed Ordinance No. 188125 on February 20th, 2024, which amends Section 64.72 to establish definitions for "Priority Development and Redevelopment Projects" for which LID provisions shall be required. Projects which apply for a building or grading permit on or after April 2, 2024 shall be subject to these amendments.

LID is a stormwater management strategy designed to address 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.[12]

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 off-site runoff and provide increased groundwater recharge;
- Reduce erosion and hydrologic impacts downstream; and
- Enhance the recreational and aesthetic values in our communities.

The City of Los Angeles Bureau of Sanitation, Watershed Protection Division will adopt the LID standards as issued by the LARWQCB and the City of Los Angeles Department

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

of Public Works. The LID Ordinance will conform to the regulations outlined in the NPDES permit and SUSMP.

2.3 GROUNDWATER

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

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

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.

Safe Drinking Water Act (SDWA)

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

Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA) creates a framework for sustainable, local groundwater management in California. SGMA allows local agencies to customize groundwater sustainability plans to their regional economic and environmental needs. This act requires local regions to create a groundwater sustainability agency (GSA) and to adopt groundwater management plans for groundwater basins or subbasins that are designated as medium or high priority. High-priority and medium-priority basins or subbasins must adopt groundwater management plans by 2020 or 2022, depending upon whether the basin is in critical overdraft. The Project Site is in the San Fernando Groundwater Basin. The San Fernando Groundwater Basin was adjudicated in 1979 and is managed by the Upper Los Angeles River Area Watermaster.[13]

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 CWC 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.

NPDES Permit for Discharges of Groundwater from Construction and Project Dewatering

Dewatering operations are practices that discharge non-stormwater, such as groundwater, that must be removed from a work location into the drainage system to proceed with construction. Discharges from dewatering operations can contain high levels of fine sediments, which if not properly treated, could lead to exceedance of the NPDES requirements. A NPDES Permit for dewatering discharges was adopted by the LARWQCB on December 21, 2023 (Order No. R4-2023-0429, General NPDES Permit No. CAG994004). Similar to the Construction General Permit, to be authorized to discharge under this permit, the developer must submit a Notice of Intent (NOI) to discharge groundwater generated from dewatering operations during construction in accordance with the requirements of this Permit.[14]

2.4 Potentially Required Permits

An overview of the potential regulatory permits that may be required to: 1) construct the new Radford Mobility Connector (a vehicular and pedestrian bridge across the Tujunga Wash to connect Moorpark Street and Radford Avenue), and 2) expand the existing Gilligan's Island Bridge which links the North and South Lot over the Los Angeles River is provided in the Project's Biological Resources Technical Report and Jurisdictional

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[13] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/4_012_SanFernandoValley.pdf; accessed March 7, 2024.

[14] Los Angeles Regional Water Quality Control Board (LARWQCB), Order No. R4-2023-0429, General NPDES Permit No. CAG994004, Waste Discharge Requirements for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties, December 21, 2023.

Delineation prepared by Psomas. The permit requirements will be confirmed based on detailed construction plans and regulatory consultation. The improvements associated with the proposed Radford Mobility Connector and Gilligan's Island bridge will have no impact on surface water hydrology, as the percent impervious of the proposed structures will be the same as that of the existing Los Angeles River and Tujunga Wash channels directly below. Surface water quality effects will be discussed with the City of Los Angeles, and, if required, a BMP that filters sediment and oil/grease from the stormwater runoff will be installed prior to discharge.

3. ENVIRONMENTAL SETTING

3.1. Surface Water Hydrology

3.1.1. Regional

The Project Site is located within the Los Angeles River Watershed. The Watershed covers approximately 834 square miles within the Los Angeles Basin. The western portion spans from the Santa Monica Mountains to the Simi Hills and the eastern portion spans from the Santa Susana Mountains to the San Gabriel Mountains.

The Los Angeles River Watershed is occupied by 43 cities and a population of approximately 9 million. The predominant land uses are residential (37 percent), industrial (11 percent), commercial (8 percent), and open space (44 percent).

The Los Angeles River flows as an open channel eastward from its headwaters in the Simi Hills and Santa Monica Mountains to the northern corner of Griffith Park. Then, the channel turns southward through the Glendale Narrows and across the coastal plain. The channel reaches the Pacific Ocean at San Pedro Bay.

The entire length of the Los Angeles River is concrete-lined. The Los Angeles River is fed by a network of open channels and underground storm drains. Major tributaries include the Pacoima Wash, Tujunga Wash, Burbank Western Channel, and Verdugo Wash.[15,16] Refer to Figure 1 for the Los Angeles River Watershed Map.

3.1.2. Local

Per the findings of the Project's topographic survey by KPFF dated August 9, 2022, the majority of the North Lot slopes from its northwest corner to its southeast corner with approximately 15 feet of elevation change (from 600 to 585 feet above mean sea level). The access road on the north side of the North Lot (south of the Tujunga Wash) also slopes from northwest to southeast from about 600 to 585 feet above mean sea level. The access

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[15] Los Angeles River Watershed, https://www.waterboards.ca.gov/rwqcb4/water_issues/programs/regional_program/Water_Quality_and_Watersheds/los_angeles_river_watershed/la_summary.shtml; accessed March 7, 2024.

[16] Los Angeles River Watershed, http://www.ladpw.org/wmd/watershed/LA/; accessed March 7, 2024.

road on the south side of the North Lot (north of the Los Angeles River) slopes from west to east from approximately 595 to 585 feet above mean sea level.

The majority of the South Lot generally slopes both from its southwest corner to its northwest corner with approximately 27 feet of elevation change (from 617 to 590 feet above mean sea level), and from its southwest corner to its southeast corner with approximately 17 feet of elevation change (from 617 to 600 feet above mean sea level). The access road on the north side of the South Lot slopes from northwest to southeast from approximately 595 to 585 feet above mean sea level before sloping back up to approximately 605 feet above mean sea level. From the edge of this access road on the southeast corner of the South Lot to the Los Angeles River, there is a steeper dropoff from approximately 600 to 583 feet above mean sea level.

The existing area to the north of the Los Angeles River generally slopes from northwest to southeast from approximately 600 to 581 feet above mean sea level.

Per existing as-builts and the Project Site survey, stormwater from the North Lot is conveyed into an on-site storm system, which outlets to the Los Angeles River at two discharge points and to the Tujunga Wash at one discharge point. Stormwater from the South Lot is conveyed into an on-site storm system, which outlets to Radford Avenue at one discharge point and to the Los Angeles River at six discharge points. There is an existing 84-inch underground stormwater pipe in Radford Avenue that outlets to the Los Angeles River upstream of the Project Site.

Other surface stormwater runoff from the Project Site and surrounding properties will discharge toward City catch basins and underground storm drain pipes which convey stormwater through various underground pipe networks into the Los Angeles River.

3.1.3. PROJECT SITE

The Los Angeles River runs west to east through the Project Site and divides it into three drainage areas: the North Lot, the South Lot, and the 1.77 Parcel – these areas are shown in Figure 2. Based on the design survey by KPFF dated August 9, 2022, it was determined that the North Lot generally slopes towards the southeast and the South Lot generally slopes from its southwest corner both to the northwest and southeast. The 1.77 Parcel east of the Tujunga Wash generally slopes from north to south. The existing Project Site consists of sound stages, related production support, production and creative office buildings, surface parking, basecamp, and two parking structures.

Table 2 below shows the existing volumetric flow rate generated by the 50-year storm event (Q_{50}). See Figure 2 for the existing drainage exhibit and Figure 4 for the HydroCalc calculations for the existing runoff volumes.

Table 2 - Existing Drainage Stormwater Runoff Calculations				
Drainage Area	Area (Acres)*	Impervious Area (Acres)	% Impervious	Q_{50} (cfs) (volumetric flow rate measured in cubic feet per second)
North Lot	12.70	11.30	89%	41.24
South Lot	30.47	28.33	93%	83.56
1.77 Parcel	1.77	1.77	100%	3.60
TOTAL	**44.94**	**41.40**	**92%**	**128.40**

*Acreage does not include Los Angeles River and Tujunga Wash areas.

3.2. Surface Water Quality

3.2.1. Regional

As described above, the Project Site lies within the Los Angeles River Watershed. Constituents of concern listed for the Los Angeles River under CWA Section 303(d) include ammonia, benthic community effects, cadmium, chlordane, copper, copper (dissolved), cyanide, Dichlorodiphenyltrichloroethane (DDT) (sediment), indicator bacteria, lead, nutrients (algae), oil, polychlorinated biphenyls (PCBs), pH, selenium, toxicity, trash, and zinc (dissolved). TMDL data has been collected and recorded by the USEPA for the Los Angeles River Watershed. TMDLs that apply to the waterbody target the following pollutants: ammonia, cadmium, chlordane, copper, copper (dissolved), DDT (sediment), indicator bacteria, lead, nutrients (algae), pH, selenium, trash, and zinc (dissolved).[17] Water quality in the Los Angeles River has been diminished due to pollutants from dense clusters of residential, industrial, and other urban activities.

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 sources of contaminants include 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,

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17 California State Water Resources Control Board. 2018 California Integrate Report Waterbody Fact Sheets (Excel Version); https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2018_integrated_report.html . Accessed March 7, 2024.

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. Project Site

Although some of the parking areas include landscaped stormwater infiltration basins, based on the Project survey by KPFF dated August 09, 2022, Project Site observations, and the fact that the existing Project Site was developed prior to the adoption of stormwater quality BMP design, implementation, and maintenance, it appears the majority of the Project Site currently does not implement BMPs and has no significant means of treatment for stormwater runoff. As such, it is assumed that pollutants such as sediment, nutrients, pesticide, metals, pathogens, and oil and grease occur in the existing surface water runoff.

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 San Fernando Valley region within the City of Los Angeles overlies the San Fernando Groundwater Basin. Groundwater in the San Fernando Groundwater Basin generally flows from the edges towards the middle, then below the Los Angeles River Narrows into the Central Subbasin of the Coastal Plain of Los Angeles Basin. Flow may be restricted by natural geological features. Replenishment of the San Fernando Groundwater Basin occurs mainly by spreading of imported water and runoff at spreading grounds and percolation of precipitation throughout the region via permeable surfaces. Refer to Figure 5 for the San Fernando Groundwater Basin Map.

3.3.2. Local

The Project Site is located near the southern limits of the San Fernando Groundwater Basin and the northern limits of the Santa Monica Mountains. Surface runoff drains to the Los Angeles River, which is entirely concrete-lined and therefore does not contribute to groundwater recharge. Paving of streets and lining of drainage channels near the Project Site have decreased the surface area open to direct percolation.

3.3.3. Project Site

The discussion below is based upon a review of previous investigations and on-site explorations conducted as part of the Geotechnical Engineering Evaluation prepared by Geotechnologies, Inc. dated January 22, 2024.[19]

Six supplemental soil borings were drilled to a depth between 30 and 80 feet below the existing Project Site grade in the South Lot during Geotechnologies' field investigation. Groundwater was encountered at varying depths between 30 and 42 feet below the existing Project Site grade. Historically, the highest groundwater reported in the South Lot ranges

[19] Geotechnical Engineering Evaluation, Radford Studio Center Project, 4024-4200 North Radford Avenue, Los Angeles, California prepared by Geotechnologies, Inc. dated January 22, 2024.

from approximately 0 feet below the existing Project Site grade (at ground level) at the northern portion to approximately 20 feet below the existing Project Site grade at the southern portion.

In the North Lot, groundwater was encountered in three of the thirty-nine previous borings at depths of 58, 65.5, and 73 feet below the existing Project Site grade. Historically, the highest groundwater reported for the entire North Lot is 0 feet below the existing Project Site grade.

For both the North and South Lots, the historic high groundwater elevations are based on 1944 groundwater levels, which occurred prior to excessive pumping in the basin. Per the Seismic Hazard Zone Report for the Van Nuys 7 1/2 -Minute Quadrangle, wells have not recovered to the levels of the 1940s.[20]

3.4. Groundwater Quality

3.4.1. Regional

As stated above, the Project Site is located within the San Fernando Groundwater Basin, which falls under the jurisdiction of the LARWQCB. According to LARWQCB's Basin Plan, objectives applying to all ground waters of the region include bacteria, chemical constituents and radioactivity, mineral quality, nitrogen (nitrate, nitrite), and taste and odor.[21]

3.4.2. Local

The Project Site is not located within a subbasin of the San Fernando Groundwater Basin. Therefore, the same groundwater quality objectives apply to the local condition as the regional condition.

3.4.3. Project Site

The existing Project Site is improved with studio-related uses and surface parking, a limited portion of which is pervious. Given the size of unpaved areas (approximately 8 percent of the total Project Site area – see Table 3 and Figure 2 for pervious area quantities) and the depth of existing groundwater, as well as the flow direction of current Project Site drainage,

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20 The historically highest groundwater level was determined by reviewing the Geotechnical Engineering Evaluation, Radford Studio Center Project, 4024-4200 North Radford Avenue, Los Angeles, California prepared by Geotechnologies, Inc. dated January 22, 2024, with additional information provided from the Seismic Hazard Zone Report for the Van Nuys 7 ½-Minute Quadrangle (CDMG, Rev. 2005)

21 Los Angeles Regional Water Quality Control Board, Basin Plan, March 2013, http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/electronics_documents/Final%20Chapter%203%20Text.pdf. Accessed March 7, 2024.

the Project Site does not contribute substantially to groundwater recharge or otherwise adversely affect groundwater quality.

4. SIGNIFICANCE THRESHOLDS

In accordance with Appendix G of the CEQA Guidelines, a project would have a significant impact related to hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    - 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 stormwater 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; or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

4.1. SURFACE WATER HYDROLOGY

In the context of these questions from Appendix G of the CEQA Guidelines, the City of Los Angeles CEQA Thresholds Guide (*L.A. CEQA Thresholds Guide*) identifies factors to consider when evaluating impacts to hydrology and water quality. These include:

- 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

In the context of the above questions from Appendix G, the *L.A. CEQA Thresholds Guide* states that a project would normally have a significant impact on surface water quality if it would result in discharges that would create pollution, contamination or nuisance, as defined in Section 13050 of the CWC or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body.

The CWC includes the following definitions:

- "Pollution" means an alteration of the quality of the waters of the state to a degree which unreasonably affects either of the following: 1) the waters for beneficial uses or 2) facilities which serve these beneficial uses. "Pollution" may include "Contamination."
- "Contamination" means an impairment of the quality of the waters of the state by waste to a degree, which creates a hazard to the public health through poisoning or though the spread of disease. "Contamination" includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected.
- "Nuisance" means anything which meets all of the following requirements: 1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; 2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; and 3) occurs during, or as a result of, the treatment or disposal of wastes. [22]

4.3. Groundwater Hydrology

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

- Change potable water levels sufficiently to:
    - o Reduce the ability of a water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported water, summer/winter peaking, or to respond to emergencies and drought;
    - o Reduce yields of adjacent wells or well fields (public or private); or
    - o Adversely change the rate or direction of flow of groundwater; or

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[22] California Legislative Information, Water Code – Wat Division 7. Water Quality [13000-16104], Chapter 2. Definitions [13050-13051], https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=13050; accessed March 7, 2024.

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

- Affect the rate or change 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 salt water intrusion); or

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

4.4. Groundwater Quality

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

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

- Expand the area affected by contaminants;

- 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 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 LACDPW Hydrology Manual as its basis of design for storm drainage facilities. The LACDPW Hydrology Manual requires projects to have drainage facilities that meet the Urban Flood level of protection. The Urban Flood is runoff from a 25-year frequency design storm falling on a saturated watershed. A 25-year frequency design storm has a probability of 1/25 of being equaled or exceeded in any year. The *L.A. CEQA Thresholds Guide*, however, establishes the 50-year frequency design storm event as the threshold to analyze potential impacts on surface water hydrology as a result of development. To provide a more conservative analysis, this report analyzes the larger storm event threshold, i.e., the 50-year frequency design storm event.

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

Where,

Q = Volumetric flow rate (cfs)
C = Runoff coefficient (dimensionless)
I = Rainfall Intensity at a given point in time (in/hr)
A = Basin area (acres)

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

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

LACDPW has developed a time of concentration calculator, HydroCalc, to automate time of concentration calculations as well as the peak runoff rates and volumes using the Modified Rational Method design criteria as outlined in the Hydrology Manual. The data input requirements include: sub-area size, soil type, land use, flow path length, flow path slope and rainfall isohyet. The HydroCalc Calculator was used to calculate the stormwater 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 Hydrology Results Existing and Proposed Project Site and Figure 7 for the Van Nuys 50-Year 24-Hour Isohyet Map.

5.2. SURFACE WATER QUALITY

5.2.1. CONSTRUCTION

Construction BMPs will be designed and maintained as part of the implementation of the SWPPP in compliance with the Construction General Permit. The SWPPP will be implemented when Project construction commences, before any Project Site clearing and grubbing or demolition activity takes place. During Project construction, the SWPPP will be referred to regularly and amended as needed throughout the construction process. As the total area of ground disturbance is greater than one acre, the Project will be required to file the SWPPP with the state and will be required to comply with the requirements of the Construction General Permit and local regulations.

5.2.2. OPERATION

The Project must comply with the requirements of the City's LID standards. Under Section 3.2.2. 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 on-site for at least the volume of water produced by the greater of the 85^{th} percentile storm or the 0.75-inch storm event.

The Project Site has been analyzed as three areas: north of the Los Angeles River (North Lot), south of the Los Angeles River (South Lot), and the 1.77 Parcel. The total disturbed area within the North Lot is approximately 2.66 acres, which is approximately 20.9 percent of the total North Lot area of 12.70 acres. As the Project would disturb less than 50 percent of the total North Lot, per the City of Los Angeles LID Standards Manual, only the disturbed areas will be treated as part of the Project. The proposed developments on the South Lot would disturb more than 50 percent of the entire area, and, therefore, the South Lot must meet the requirements of the LID Standards Manual. There is no proposed improvement within the 1.77 Parcel, so we understand that no LID treatment would be required. See Figure 3 for the proposed drainage areas and their respective runoff volumes.

The LID Manual prioritized the selection of BMPs used to comply with stormwater treatment requirements (please refer to Exhibit 2 for typical LID BMPs). The order of priority is:

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

Feasibility screening delineated in the LID Manual is applied to determine which BMPs will best suit the Project. Specifically, LID guidelines require that infiltration systems maintain at least 10 feet of clearance to the found groundwater, property line, and any building structure. As described in Section 3.3.3, the highest elevation at which groundwater was located on the South Lot was 30 feet for borings drilled within the past 10 years. On the North Lot, groundwater was found at the highest elevation of 58 feet for borings drilled in 1993 and 2003.[23] Based on input from the Geotechnical engineer, further testing is required to determine whether infiltration is feasible for the Project. If infiltration is feasible, the Project will need to infiltrate a total of approximately 791,000 gallons of water on-site. See Figure 6 for the HydroCalc analysis of required treatment volume.

If infiltration is deemed infeasible, the next tier in the City of Los Angeles LID Manual is a stormwater capture and reuse system. To implement this BMP, the Project will need to capture and reuse approximately 791,000 gallons of water on-site for irrigation. See Figure 6 for the preliminary capture and reuse calculations.

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[23] Geotechnical Engineering Evaluation, Radford Studio Center Project, 4024-4200 North Radford Avenue, Los Angeles, California prepared by Geotechnologies, Inc. dated January 22, 2024.

If capture and reuse is later determined to not be feasible during the City's building permit review process, the Project would then be required to implement high efficiency biofiltration/bioretention systems pursuant to applicable regulatory requirements.

Ultimately, one or multiple stormwater management strategies will be incorporated into LADBS' building permit review and approval process. Through this existing regulatory process, stormwater management strategies will be implemented to conform to the City of Los Angeles Sanitation Department (LASAN) regulatory guidelines.

5.3. GROUNDWATER HYDROLOGY

To determine the significance of the Project as it relates to the level of the underlying groundwater table of the San Fernando Groundwater Basin, the following considerations were reviewed and analyzed:

Analysis and Description of the Project's Existing Condition

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

5.4. GROUNDWATER QUALITY

In addition to the items discussed in Section 5.3 above, this report discusses the impact of both existing and proposed activities at the Project Site on the groundwater quality of the underlying San Fernando Groundwater Basin.

6. IMPACT ANALYSIS

6.1. CONSTRUCTION

6.1.1. Surface Water Hydrology

On-site construction activities for the Project include demolition of existing structures and site paving, and Project Site clearing and excavating up to 50 feet below the existing Project Site grade. A conventional foundation system will be feasible for support of lighter structures that may be 100 feet or less in height. It is anticipated that a mat foundation system will be required where the bottom of a structure will extend below the historically highest groundwater level, or where a structure will be over 100 feet in height.

The primary off-site construction activities for the Project include a new vehicular and pedestrian bridge (the Radford Mobility Connector) and alley modifications.

It is anticipated that a net of approximately 880,000 cubic yards of soil would need to be exported, as 55,000 cubic yards of the total 935,000 cubic yards of cut will be reused on the Project. These activities will temporarily expose the underlaying soils and may make the Project Site temporarily more permeable. Also, exposed and stockpiled soils could be subject to wind and conveyance into nearby storm drains during storm events. In addition, on-site watering activities to reduce airborne dust control could contribute to pollutant loading in runoff.

As the construction site would be greater than one acre, the Project would be required to obtain coverage under the NPDES Construction General permit. In accordance with the requirements of this permit, the Project must implement a SWPPP throughout the entire length of construction that specifies BMPs and erosion control measures to be used to manage runoff flows and prevent pollution. BMPs would be designed and selected to reduce runoff and pollutant levels in runoff during construction. Examples include sediment traps, gravel bag berms, street sweeping and vacuuming, storm drain inlet protection, stabilized construction entrances and exits with tire washes, stockpile management, and waste management, along with process-based BMPs for paving and grinding operations, concrete curing and finishing, and pile driving operations. Additionally, California Stormwater Quality Association (CASQA) BMPs specifically for demolition adjacent to water and clear water diversion will be implemented for the bridge construction. Further details and other example BMPs can be found in Exhibit 1. The NPDES and SWPPP measures would be designed to contain and treat, as necessary, stormwater or construction watering for dust reduction for the Project's on-site and off-site improvements so runoff does not impact drainage facilities or receiving waters. Construction activities would be temporary, and flow directions and runoff volumes during construction would be controlled via procedures outlined in the SWPPP.

In addition, the Project would be required to comply with all applicable City grading and off-site permit regulations that require necessary measures, plans, and inspections to reduce sedimentation and erosion. Thus, through compliance with all applicable NPDES Construction General permit requirements, including preparation of a SWPPP, implementation of BMPs, and compliance with applicable City grading regulations, Project construction activities 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 procedures in construction activities would prevent flooding, substantially increasing or decreasing the amount of surface water flow from the Project Site into a water body, or a permanent, adverse change to the movement of surface water. Examples include slope drains that can be used to intercept and direct surface runoff or groundwater into a stabilized area and compost socks and berms that act as three-dimensional biodegradable filtering structures to intercept runoff where sheet flow occurs.[24] Therefore, temporary Project construction-related impacts on surface water hydrology would be less than significant.

6.1.2. Surface Water Quality

Construction activities such as earth moving, maintenance and operation of construction equipment, potential dewatering, and handling, storage and disposal of materials could contribute to pollutant loading in stormwater runoff. Additionally, the construction of the Radford Mobility Connector may require the use of falsework within the Tujunga Wash.

However, as previously discussed, the Project would be required to obtain coverage under the NPDES Construction General Permit (Order No. 2022-0057-DWQ). In accordance with the requirements of the permit, the Project would prepare and implement a Project Site-specific SWPPP adhering to the CASQA BMP Handbook. The SWPPP would specify BMPs to be used during construction. BMPs would include, but would not necessarily be limited to, erosion control, sediment control, non-stormwater management, and materials management BMPs. Refer to Exhibit 1 for typical SWPPP BMPs implemented during the construction of development projects.

With the implementation of the SWPPP and Project Site-specific BMPs, the Project would reduce or eliminate the discharge of potential pollutants into stormwater runoff. In addition, the Project would be required to comply with City permit regulations, which require implementation of necessary measures, plans (including a wet weather erosion control plan if construction occurs during the rainy season), and inspections to reduce sedimentation and erosion. To further prevent surface water quality impacts, the construction of the Radford Mobility Connector will also be subject to County Flood Control permit requirements, which prohibit construction within the channel during the rainy season (October 15 to April 15) and require at least 33 percent of the channel available for flow through with a temporary diversion for the remainder of the year.

Therefore, with compliance with NPDES requirements, City, and County regulations, 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., the Los Angeles River or Tujunga Wash) 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) a

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24 California Stormwater Quality Association BMP Handbooks Construction; https://www.casqa.org/resources/bmp-handbooks/construction.

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 any of the above-listed regulatory standards (NPDES Construction General Permit, City and County permitting regulations) to be violated in the larger Los Angeles River Watershed. The Project would not create substantial additional sources of polluted runoff, nor would it conflict with the implementation of a water quality control plan. In addition, implementation of the Erosion Control Plan would ensure that Project construction activities would not result in substantial erosion or siltation on- or off-site, or risk release of other pollutants due to inundation. Therefore, temporary Project construction-related impacts on surface water quality would be less than significant.

6.1.3. Groundwater Hydrology

As mentioned above, it is anticipated that there will be a net total export of approximately 880,000 cubic yards of soil because 55,000 cubic yards of the total 935,000 cubic yards of cut will be reused. While recent geotechnical investigations on the Project Site encountered groundwater beginning at a depth of 20 feet below grade, [25] the City requires the use of the highest historical level for design and engineering purposes. The highest historical groundwater level is at approximately 0 feet below the ground surface, and, as such, dewatering initiatives should be part of construction planning and deployed if conditions warrant. Dewatering operations are practices that discharge non-stormwater, such as groundwater, that must be removed from a development location and discharged into the storm drain system to proceed with construction. Discharges from dewatering operations can contain high levels of fine sediments, which, if not properly treated, could exceed the NPDES requirements.

In areas where excavations are planned and dewatering is necessary, the following procedures shall be implemented. The General Contractor or designated subcontractor shall obtain a discharge permit from an applicable agency for groundwater extracted during dewatering operations and shall implement any required treatment. Notifications and reporting related to the applicable discharge permit will be the responsibility of the General Contractor. Any water accumulated in excavations (e.g., from rainfall) will be managed in accordance with the SWPPP.

The method of dewatering, if necessary, will be chosen considering the following variables, among others: depth of intrusion that is required for each building foundation, the hydraulic properties of the soils in which the excavations occur, the potential to mobilize any existing groundwater contaminants, the potential for ground subsidence and/or liquefaction to occur, proximity to any existing production wells, and the volume of water to be dewatered on a daily basis. After evaluating each of these factors individually and collectively, a

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[25] Geotechnical Engineering Evaluation, Radford Studio Center Project, 4024-4200 North Radford Avenue, Los Angeles, California prepared by Geotechnologies, Inc. dated January 22, 2024.

dewatering strategy will be developed and implemented in a manner that will minimize any impacts to neighboring properties (i.e., settlement) and regional water resource needs. All dewatering methods will be designed and submitted to the Local jurisdiction, which includes the LADBS Grading Division, LARWQCB and/or LASAN for review and approval, and will be performed, inspected, and monitored in compliance with all applicable regulatory requirements.

It is therefore anticipated that the Project's potential impact on groundwater hydrology during construction would be less than significant.

6.1.4. GROUNDWATER QUALITY

As mentioned above, it is anticipated that approximately 880,000 cubic yards of soil would need to be exported as a result of the Project. 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 applicable regulatory requirements and the Project's Soil Management Plan.

During on- and off-site grading and building construction, hazardous materials, such as fuels, paints, solvents, and concrete additives, could be used and would therefore require proper management and, in some cases, disposal. The management of any resultant hazardous wastes that may result could increase the potential for hazardous materials to be released into groundwater. Compliance with all applicable federal, state, and local requirements concerning the handling, storage and disposal of hazardous waste—for example, those applicable provisions of the CCR Title 22, which describes protocol such as actions required in the instance of a hazardous waste discharge, transportation guidelines, general standards for disposal facilities, contingency plans and emergency procedures, recordkeeping, and reporting—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. Therefore, the Project would not result in any substantial increase in groundwater contamination through the release of hazardous materials, and the Project's potential impact on groundwater quality would be less than significant.

6.2. OPERATION

6.2.1. SURFACE WATER HYDROLOGY

The Project is expected to decrease the overall percentage of impervious area from the existing condition of the Project Site. The existing Project Site is approximately 92 percent impervious (see Table 2 in Section 3.1.3). At full Project buildout, the Project Site is anticipated to be approximately 87 percent impervious (see Table 3 below for breakdown by Drainage Area).

Based on HydroCalc calculations (see Figure 4), Project operations will not increase the amount of runoff from the Project Site or the peak flow rates.

Table 3 below shows the proposed peak flow rates stormwater runoff calculation for the 50-year frequency design storm event. Table 4 compares the results in Table 2 to the existing conditions shown in Table 1.

Table 3 – Proposed Drainage Stormwater Runoff Calculations				
Drainage Area	**Area (Acres)***	**Impervious Area (Acres)**	**% Impervious**	**Q50 (cfs) Volumetric Flow Rate measured in cubic feet per second**
North Lot	12.70	11.30	89%	38.68
South Lot	30.47	25.90	85%	64.54
1.77 Parcel	1.77	1.77	100%	3.60
Total	**44.94**	**38.97**	**87%**	**106.82**

*Total Acreage does not include Los Angeles River and Tujunga Wash Areas

Table 4 – Existing and Proposed Conditions Comparison – 50-year Storm Event					
Drainage Area	**Area (Acres)***		**Q50 (cfs) (volumetric flow rate measured in cubic feet per second)**		
	Existing	Proposed	Existing	Proposed	Delta
North Lot	12.70	12.70	41.24	38.68	-6.2%
South Lot	30.47	30.47	83.56	64.54	-22.7%
1.77 Parcel	1.77	1.77	3.60	3.60	0%
SITE TOTAL	**44.94**	**44.94**	**128.40**	**106.82**	**-16.8%**

The Project's on-site stormwater infrastructure will be designed to convey the 50-year storm to the desired discharge location via roof and area drains within the Project Site that will be sized to address ponding. Due to the Project minimally decreasing the amount of impervious surface, the proposed flow rate and volume of stormwater runoff generated is expected to be lower than the existing condition - a comparison of the pre- and post-peak flow rates indicates an overall decrease of approximately 16.8 percent. This means that the proposed on-site improvements will generate less runoff than the existing condition and will reduce the impact of the Project Site on the existing municipal drainage infrastructure.

The Project's off-site improvements consist of a new pedestrian and vehicular bridge (the Radford Mobility Connector), as well as alley modifications. The proposed Radford Mobility Connector will not impact the amount of impervious area as it is being constructed above an existing concrete-lined channel. Therefore, any runoff generated from the bridge will be the same as the runoff generated via rainfall on the existing concrete channel. Any runoff generated by rainfall on the bridge will also still be routed back to the channel below. Therefore, the proposed bridge will not have an impact on overall peak runoff rates or the existing municipal infrastructure.

If infiltration is feasible, the modifications to the alley will convert existing impervious area to majority pervious area, which will contribute to the overall decrease in volumetric flow rate. If infiltration is infeasible, the gravel trench within the bottom of the alley is proposed to be lined with an impermeable liner. In this scenario, the proposed alley will not impact the amount of impervious area (as the alley is currently 100 percent impervious) and will thus not have an impact on the overall runoff rates. The proposed alley may actually slightly decrease runoff flow rates as the stormwater will first need to percolate through the gravel layer before being discharged to the municipal infrastructure.

Therefore, the proposed on- and off-site improvements for the Project will not increase the total and peak runoff rates and will not adversely impact the existing infrastructure.

Additionally, the Project Site is not located within a Special Flood Hazard Area (100-year floodplain), or Moderate Flood Hazard Area (500-year floodplain) identified by FEMA and published in the FIRMs.[26] The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 500-year floodplain, are labeled Zone C or Zone X (unshaded). The Project Site is located within Zone X (unshaded) and is therefore located outside of the 100- and 500-year floodplain.[27]

Therefore, it is highly unlikely the Project would cause flooding during a 50-year storm event or result in an adverse change to the movement of surface water, and the Project's operational impact on surface water hydrology would be less than significant.

6.2.2. SURFACE WATER QUALITY

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

Under Section 3.2.2. of the LID Manual, post-construction stormwater runoff from new projects must be infiltrated, evapotranspirated, captured and used, and/or treated through

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[26] FIRMs depict the 100-year floodplain as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30. FIRMs depict the 500-year floodplain as Zone B or Zone X (shaded).

[27] Based on FIRM Map Number 06037C1320F, revised on 9/26/2008. Refer to Figure 8.

high efficiency BMPs on-site for the volume of water produced by the greater of the 0.75-inch, 24-hour event and the 85th percentile 24-hour event. With implementation of LID BMPs, 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., the Los Angeles River) to a degree which unreasonably affects beneficial uses of the waters; (2) contamination of the quality of the waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of diseases; or (3) a nuisance that would be injurious to health; affect an entire community or neighborhood, or any considerable number of persons; and occurs during or as a result of the treatment or disposal of wastes.

As is typical of most urban developments, stormwater runoff from the Project Site has the potential to introduce pollutants into the stormwater system. Potential pollutants that may be generated by the Project include sediment, nutrients, pesticides, metals, pathogens, and oil and grease. The pollutants listed above, and any other pollutants generated by the Project would be addressed through the implementation of approved LID BMPs. It is assumed that all listed pollutants are currently generated on the Project Site.

Furthermore, operation of the Project would not result in discharges that would cause regulatory standards to be violated. The existing Project Site is approximately 92 percent impervious. The Project will decrease the percentage of impervious surface, as well as allocate a portion of the Project Site to BMPs specifically intended to control and treat stormwater runoff in compliance with LID regulatory requirements. As stated above, it appears the existing Project Site discharges stormwater without any means of treatment. However, the proposed Project would include the installation of LID BMPs, which would address, at a minimum, the "first flush" or the equivalent of the greater between the 85th percentile 24-hour storm and 0.75-inch 24-hour storm. The stormwater that would bypass the BMP systems would be greater than the 85th percentile storm volume and would have significantly less pollutants than the first flush. This stormwater would discharge to an approved discharge point in the public right-of-way. As such, the Project would not interfere with the implementation of a water quality control plan and Project impacts on surface water quality would be less than significant.

Additionally, if infiltration is feasible, the alley modifications will allow runoff to be collected in the center of the alley and infiltrated into the ground. Overflow from this infiltration system will sheet flow to the point of low elevation in the alley near the southeast corner of the Project Site towards Colfax Avenue, where there is an existing catch basin that discharges to the Los Angeles River. The alley will therefore reduce the amount of untreated stormwater runoff that discharges to a downstream receiving body. If infiltration is infeasible, the bottom of the alley will be lined with an impermeable liner and water will directly discharge to the catch basin and Los Angeles River without infiltrating. However, stormwater collected in the alley will still pass through a gravel layer prior to being discharged to the downstream receiving body. This may filter out larger pollutants within the stormwater and provides a slightly higher level of treatment than currently exists within the alley. Thus, potential impacts related to the alley would be less than significant.

6.2.3. GROUNDWATER HYDROLOGY

The Project will develop hardscape and structures that cover approximately 87 percent of the Project Site with impervious surfaces. If infiltration BMPs are implemented, all required City of Los Angeles LID guidelines will be followed, including the implementation of a pre-treatment system, which will avoid any adverse impacts on groundwater. Excess stormwater which bypasses the BMP systems, as well as any stormwater from the new off-site improvements, would discharge to an approved downstream receiving water body through an existing or proposed piped connection. This excess stormwater would not have the opportunity to discharge or infiltrate into the ground. The quantity of water that would infiltrate through a LID BMP is not significant enough to permanently affect groundwater hydrology, including the direction of groundwater flow. Therefore, the Project's potential impact on groundwater recharge is less than significant.

It is anticipated that some of the proposed structures may be built over one to three subterranean levels, up to 50 feet below existing grade. As discussed above, the net export volume is anticipated to be approximately 880,000 cubic yards. 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 applicable regulatory requirements and as described in the Project's Soil Management Plan. If groundwater is encountered during construction this may require temporary dewatering operations which will have to follow the appropriate regulatory permits.

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

6.2.4. GROUNDWATER QUALITY

The Project does not include the installation or operation of permanent 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 a spreading ground facility.

In general, operational activities which could affect groundwater quality include spills of hazardous materials and leaking underground storage tanks. No underground storage tanks are currently operated at the Project Site or will be operated by the Project. Source control measures per the City's LID requirements, including good housekeeping, removal of trash and maintenance of driveways and parking areas, and proper use and storage of pesticides, would also reduce surface water quality impacts and would prevent pollutants from entering the groundwater by percolation within landscaped areas or other permeable surfaces. Any on-site use of hazardous materials to be used in association with operation of the Project, such as small quantities of potentially hazardous materials in the form of cleaning solvents, painting supplies, and pesticides for landscaping, as well as fuel storage associated with maintenance and/or emergency equipment, would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable standards and regulations such that no hazardous materials would be exposed to or otherwise would adversely impact groundwater quality. CASQA provides suggested protocols including, but not limited to, "spot cleaning" leaks and drips routinely, labeling drains within the facility boundary, posting signs to remind employees not to top off the fuel tank when filling, and reporting leaking vehicles to fleet maintenance. [28] Therefore, the Project would not affect or expand any potential areas of contamination, increase the level of contamination, or cause regulatory water quality standards at an existing production well to be violated, as set forth in the CCR, Title 22, Division 4, Chapter 15 and the Safe Drinking Water Act.

The Project is not anticipated to result in violations of any water quality standards or waste discharge requirements or otherwise substantially degrade groundwater quality. Additionally, the Project does not involve drilling to or through a clean or contaminated aquifer. Therefore, the Project's impact on groundwater quality would be less than significant.

6.3. Cumulative Impact Analysis

6.3.1. Surface Water Hydrology

The geographic context for the cumulative impact analysis on surface water hydrology is the Los Angeles River Watershed. In conjunction with forecasted growth in the Los Angeles River Watershed, the Project could cumulatively increase stormwater runoff flows. However, as noted above, the Project itself is not anticipated to have a net impact on stormwater flow volumes or drainage patterns. Also, in accordance with City requirements, the Project and related projects would be required to implement BMPs to manage stormwater runoff in accordance with LID guidelines. The City of Los Angeles Department of Public Works reviews projects on a case-by-case basis to ensure sufficient local and regional infrastructure is available to accommodate stormwater runoff and preclude flooding. Implementation of LID BMPs would, at a minimum, maintain existing runoff conditions, and possibly improve existing conditions. 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 Los Angeles River Watershed would be subject to NPDES requirements relating to water quality for both construction and operation. The Project Site is located in a highly urbanized area, and like the Project, related projects in this area would be required to treat surface water. As such, it is anticipated that future development projects in this highly urbanized area are not likely to cause substantial changes in regional water

[28] CASQA BMPs Vehicle and Equipment Fueling SC-20; https://www.casqa.org/sites/default/files/BMPHandbooks/sc-20_municipal_2003.pdf.

quality. As noted above, the Project would have a less than significant impact on surface water quality and may even improve the quality of on-site flows due to the introduction of LID BMPs which do not currently exist at the Project Site. It is likewise anticipated that related projects would also be subject to LID requirements and implementation of measures to comply with TMDLs. The Project, combined with related projects, would comply with all applicable laws, rules and regulations, so 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 hydrology is the San Fernando Groundwater Basin. The Project, in conjunction with forecasted growth in the region, could cumulatively increase groundwater demand.

However, as previously discussed, the Project would decrease the amount of impervious surface area on the Project Site and comply with the City's LID requirements. As such, the Project is anticipated to have a less than significant impact on groundwater recharge. While any calculation of the extent to which related projects would increase or decrease surface imperviousness that might affect groundwater hydrology would be speculative, the development of such projects would be subject to review and approval pursuant to all applicable regulatory requirements, including any required mitigation of potential groundwater hydrology impacts. In addition, the Project is located in a highly urbanized area, so any potential reduction or increase in groundwater would be minimal in the context of the regional groundwater basin. Therefore, cumulative impacts to groundwater hydrology would be less than significant.

6.3.4. Groundwater Quality

Future growth in the San Fernando Groundwater Basin 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, particularly in light of regulatory requirements to protect groundwater quality. As noted above, the Project would not have an adverse impact on groundwater quality. Also, it is anticipated that, like the Project, other future development projects would be subject to LARWQCB requirements and implementation of measures to comply with TMDLs in addition to requirements of CCR, Title 22, Division 4, Chapter 15 and the Safe Drinking Water Act. The Project and related projects would comply with all applicable laws, rules, and regulations; therefore, cumulative impacts to groundwater quality would be less than significant.

6.4. Long-Term Buildout Scenario

Buildout of the Project could occur in one phase, with a total construction period of approximately 39 months, which could begin in 2025 and be completed as early as 2028. However, the Project Applicant is seeking a Development Agreement with a term of 20 years, which could extend the full buildout year to approximately 2045. Nevertheless, the scope of the Project is the same regardless of the buildout timeline. Further, while the

Specific Plan may be implemented over the course of 20 years, no single construction project would be ongoing for that duration, nor would construction be constantly occurring on the Project Site for 20 years. As with the single phase buildout scenario, the long-term buildout scenario would also have a less than significant impact on surface water hydrology, surface water quality, groundwater hydrology and groundwater quality.

The major differences between the single-phase and long-term buildout scenarios are with regard to the LID strategy and the implementation of a Project SWPPP.

In terms of the LID strategy, if small portions of the South Lot are developed independently and are less than 50 percent of the site, the LID BMP may be able to be reduced as only the disturbed areas will need to be treated. Therefore, the current LID strategy (treating the entire South Lot) may be more conservative than what would be implemented in the long-term buildout scenario. However, the long-term buildout scenario would still have a less than significant impact on surface water quality and hydrology as it is improving upon the existing condition (no LID treatment). A portion of the stormwater runoff will still be infiltrated or captured and used on-site prior to discharge to the downstream water body, which will improve the quality of discharge as well as assist in reducing runoff flow rates.

Additionally, if portions of the Project Site are developed independently and are less than one acre, a SWPPP may not be required. This means that the requirements and oversight during construction may be lower than what is required with the implementation of a SWPPP. However, the Project will still develop an Erosion Control plan and implement the necessary BMPs (sandbags, construction fence, etc.) to prevent effects on water quality during construction. Therefore, the impacts of the long-term buildout scenario would still be less than significant.

7. LEVEL OF SIGNIFICANCE

Based on the analysis contained in this report, Project-level and cumulative impacts on surface water hydrology, surface water quality, groundwater hydrology and groundwater quality would be less than significant.

APPENDICES

FIGURE 1

Los Angeles River Watershed Map

COUNTY OF LOS ANGELES

LOS ANGELES RIVER WATERSHED

FIGURE 1 - LOS ANGELES RIVER WATERSHED MAP

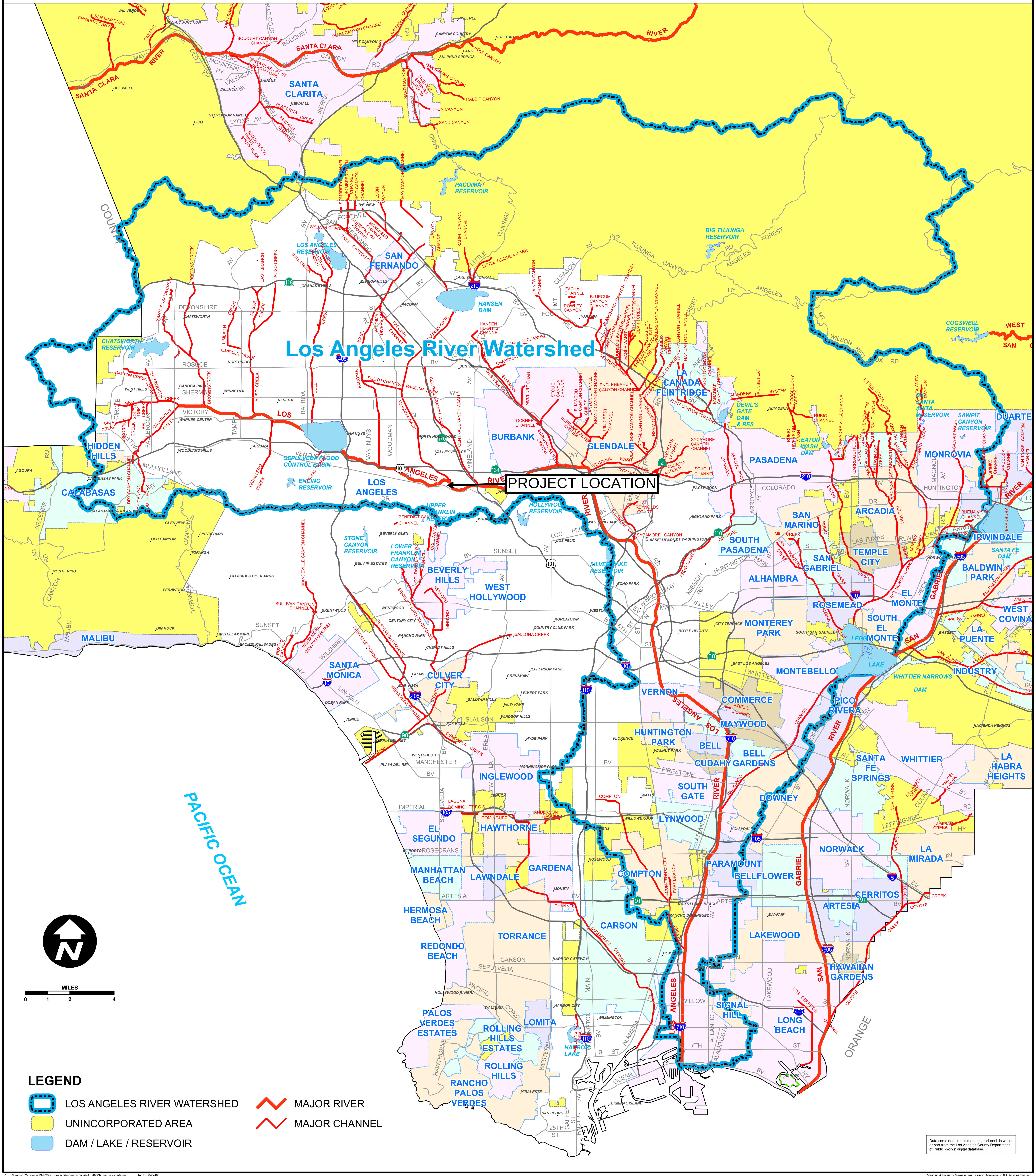


FIGURE 2

Existing Drainage Exhibit

Figure 2 - Existing Drainage Exhibit

FIGURE 3

Proposed Drainage Exhibit

Figure 3 - Proposed Drainage Exhibit

FIGURE 4

Hydro-Calc Hydrology Results for Existing and Proposed Site

FIGURE 4- Hydro-Calc Hydrology Results for Existing Site

Peak Flow Hydrologic Analysis

Version: HydroCalc 1.0.2

Input Parameters

Project Name	Radford Studio Center
Subarea ID	North Lot
Area (ac)	12.7
Flow Path Length (ft)	760.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	7.1
Percent Impervious	0.89
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.1
Peak Intensity (in/hr)	3.6164
Undeveloped Runoff Coefficient (Cu)	0.881
Developed Runoff Coefficient (Cd)	0.8979
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	41.2399
Burned Peak Flow Rate (cfs)	41.2399
24-Hr Clear Runoff Volume (ac-ft)	6.1493
24-Hr Clear Runoff Volume (cu-ft)	267864.4611

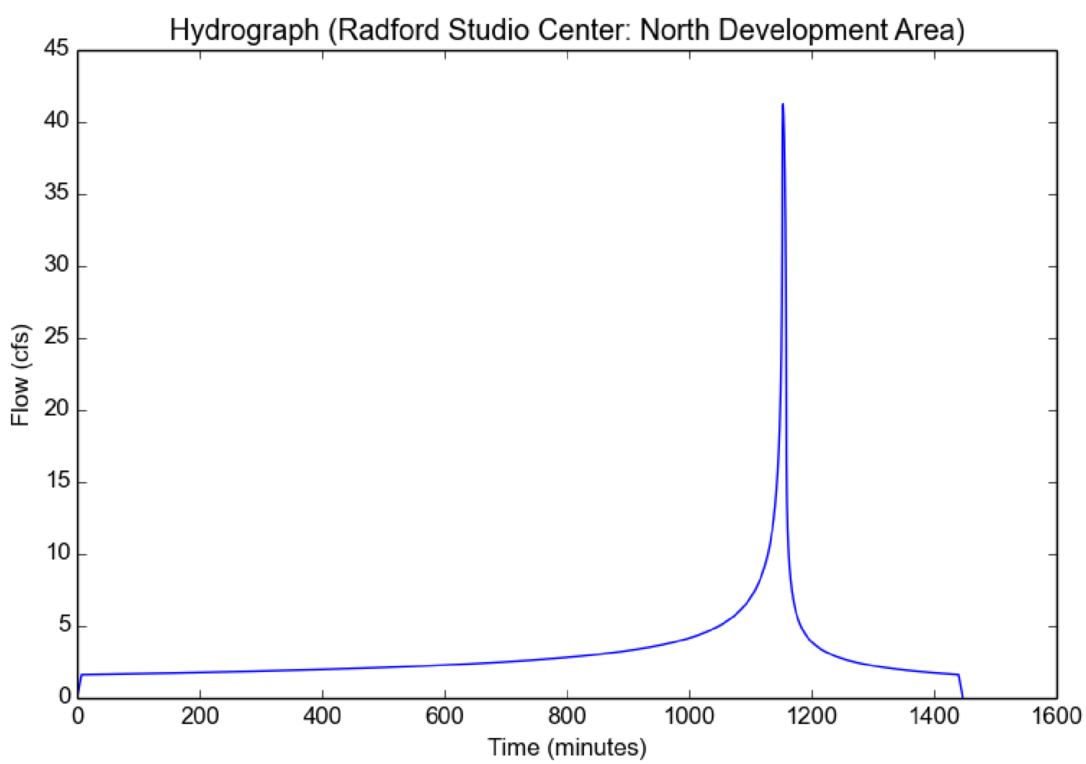


FIGURE 4- Hydro-Calc Hydrology Results for Existing Site

Peak Flow Hydrologic Analysis

Version: HydroCalc 1.0.2

Input Parameters

Project Name	Radford Studio Center
Subarea ID	South Lot
Area (ac)	30.47
Flow Path Length (ft)	1510.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	7.1
Percent Impervious	0.93
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.1
Peak Intensity (in/hr)	3.0583
Undeveloped Runoff Coefficient (Cu)	0.8524
Developed Runoff Coefficient (Cd)	0.8967
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	83.5566
Burned Peak Flow Rate (cfs)	83.5566
24-Hr Clear Runoff Volume (ac-ft)	15.2396
24-Hr Clear Runoff Volume (cu-ft)	663837.2537

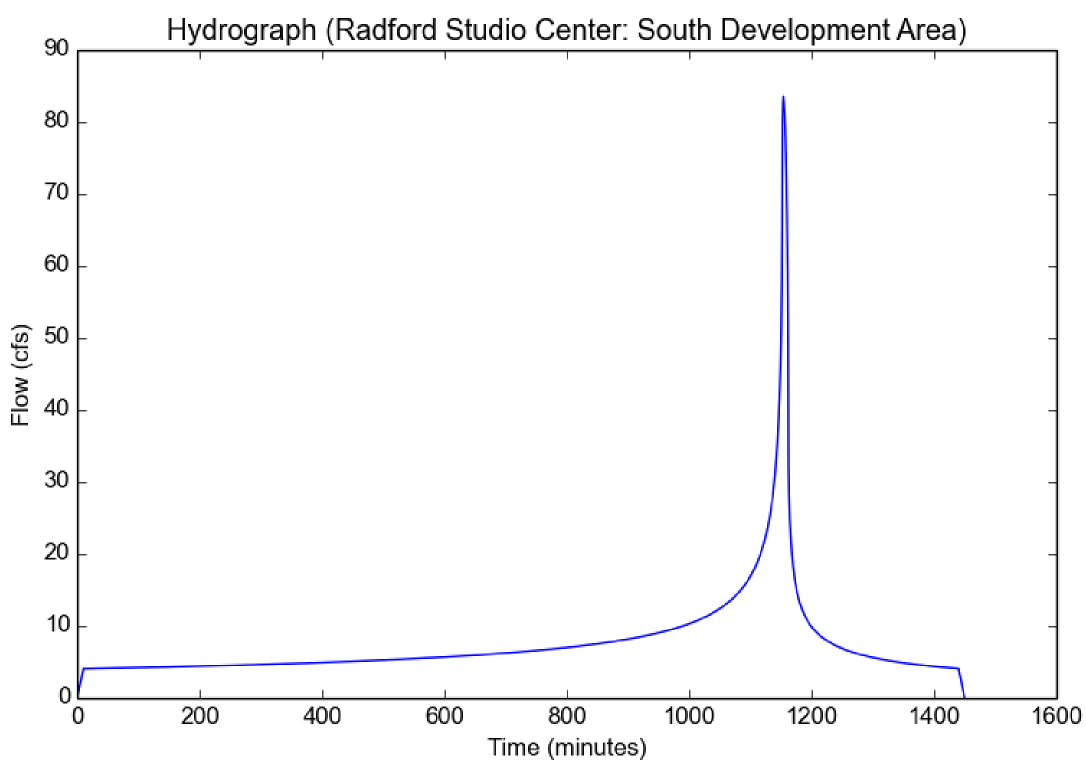


FIGURE 4- Hydro-Calc Hydrology Results for Existing Site

Peak Flow Hydrologic Analysis

Version: HydroCalc 1.0.2

Input Parameters

Project Name	Radford Studio Center
Subarea ID	Bike Lane
Area (ac)	1.77
Flow Path Length (ft)	2500.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.1
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.1
Peak Intensity (in/hr)	2.2618
Undeveloped Runoff Coefficient (Cu)	0.7853
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	3.6031
Burned Peak Flow Rate (cfs)	3.6031
24-Hr Clear Runoff Volume (ac-ft)	0.9347
24-Hr Clear Runoff Volume (cu-ft)	40717.2662

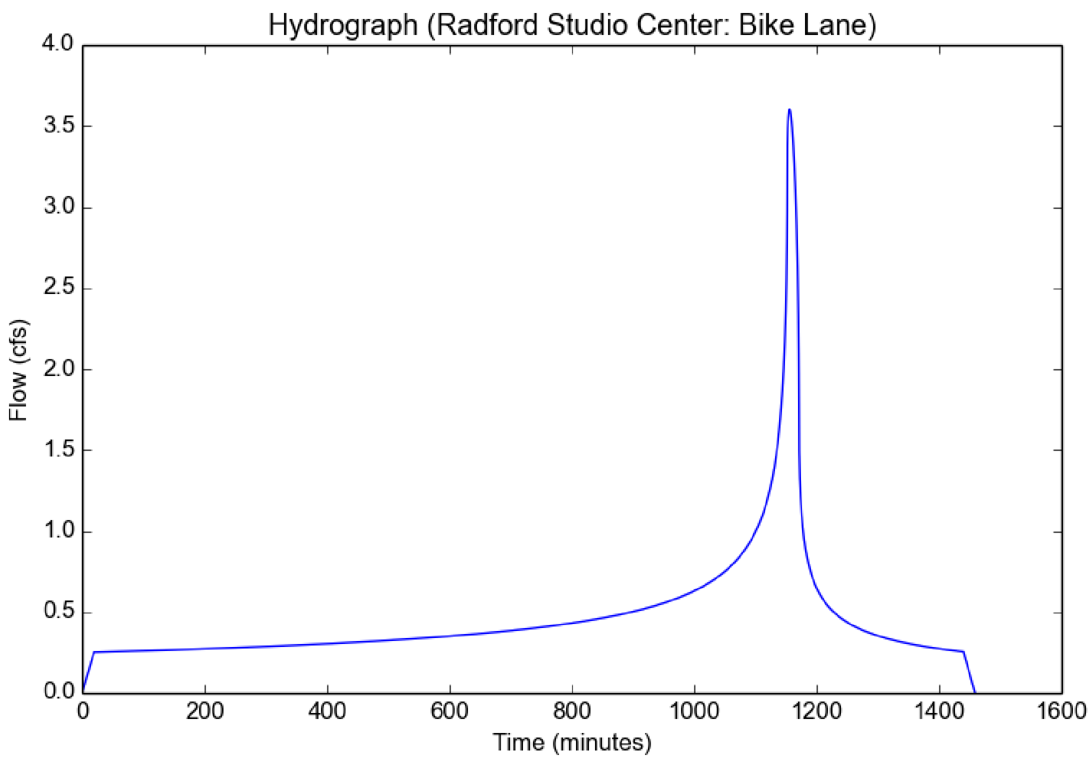


FIGURE 4- Hydro-Calc Hydrology Results for Proposed Site

Peak Flow Hydrologic Analysis

Version: HydroCalc 1.0.2

Input Parameters

Project Name	Radford Studio Center
Subarea ID	North Lot
Area (ac)	12.7
Flow Path Length (ft)	760.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	7.1
Percent Impervious	0.89
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.1
Peak Intensity (in/hr)	3.3964
Undeveloped Runoff Coefficient (Cu)	0.8697
Developed Runoff Coefficient (Cd)	0.8967
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	38.6777
Burned Peak Flow Rate (cfs)	38.6777
24-Hr Clear Runoff Volume (ac-ft)	6.1492
24-Hr Clear Runoff Volume (cu-ft)	267860.6948

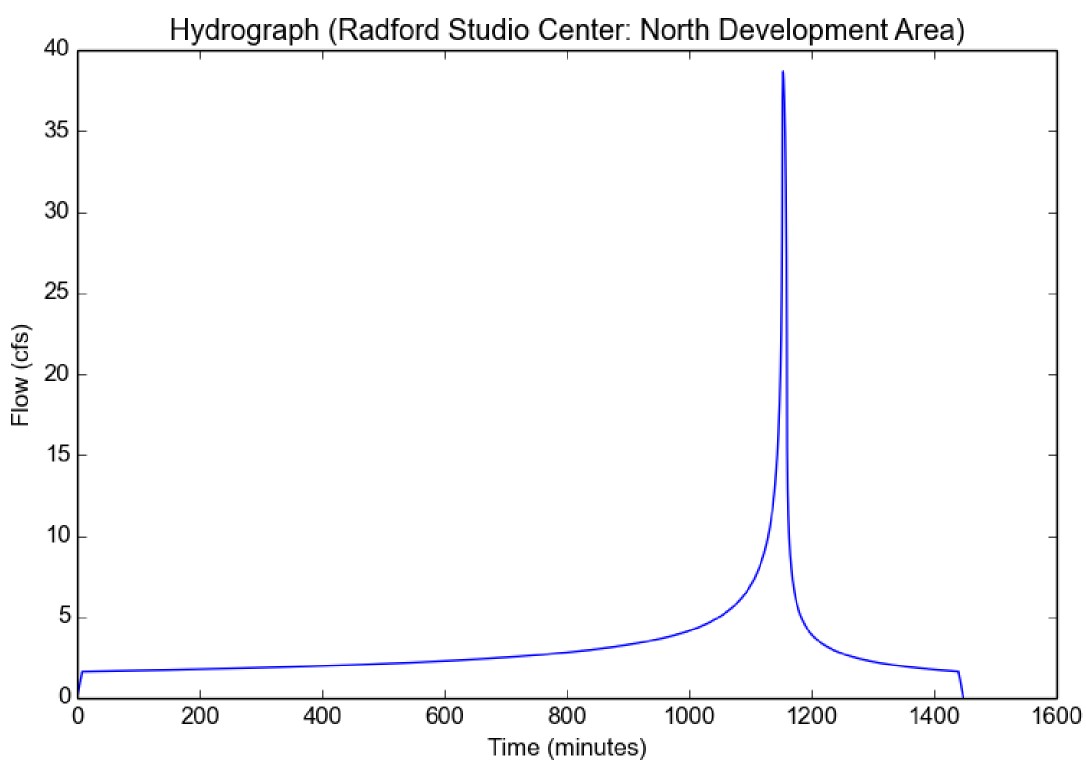


FIGURE 4- Hydro-Calc Hydrology Results for Proposed Site

Peak Flow Hydrologic Analysis

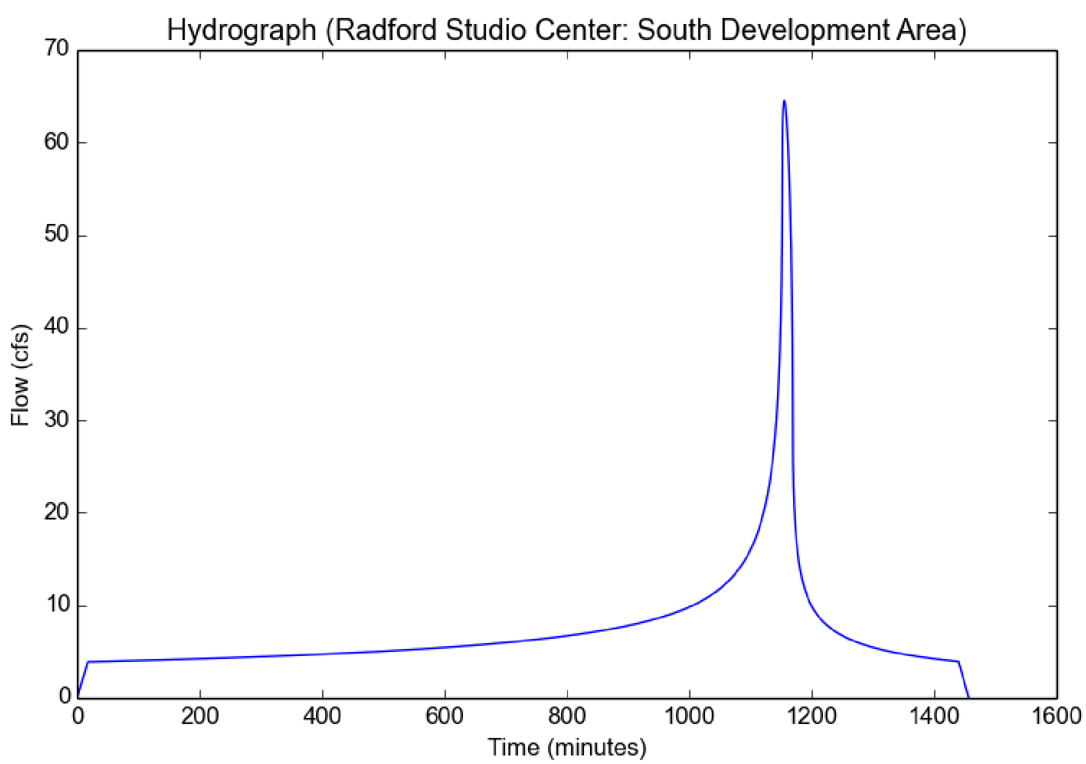
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Radford Studio Center
Subarea ID	South Lot
Area (ac)	30.47
Flow Path Length (ft)	2000.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.1
Percent Impervious	0.89
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.1
Peak Intensity (in/hr)	2.3832
Undeveloped Runoff Coefficient (Cu)	0.7983
Developed Runoff Coefficient (Cd)	0.8888
Time of Concentration (min)	17.0
Clear Peak Flow Rate (cfs)	64.5428
Burned Peak Flow Rate (cfs)	64.5428
24-Hr Clear Runoff Volume (ac-ft)	14.7511
24-Hr Clear Runoff Volume (cu-ft)	642557.7093



<u>FIGURE 4</u>- Hydro-Calc Hydrology Results for Proposed Site

Peak Flow Hydrologic Analysis

Version: HydroCalc 1.0.2

Input Parameters

Project Name	Radford Studio Center
Subarea ID	Bike Lane
Area (ac)	1.77
Flow Path Length (ft)	2500.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	7.1
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	7.1
Peak Intensity (in/hr)	2.2618
Undeveloped Runoff Coefficient (Cu)	0.7853
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	3.6031
Burned Peak Flow Rate (cfs)	3.6031
24-Hr Clear Runoff Volume (ac-ft)	0.9347
24-Hr Clear Runoff Volume (cu-ft)	40717.2662

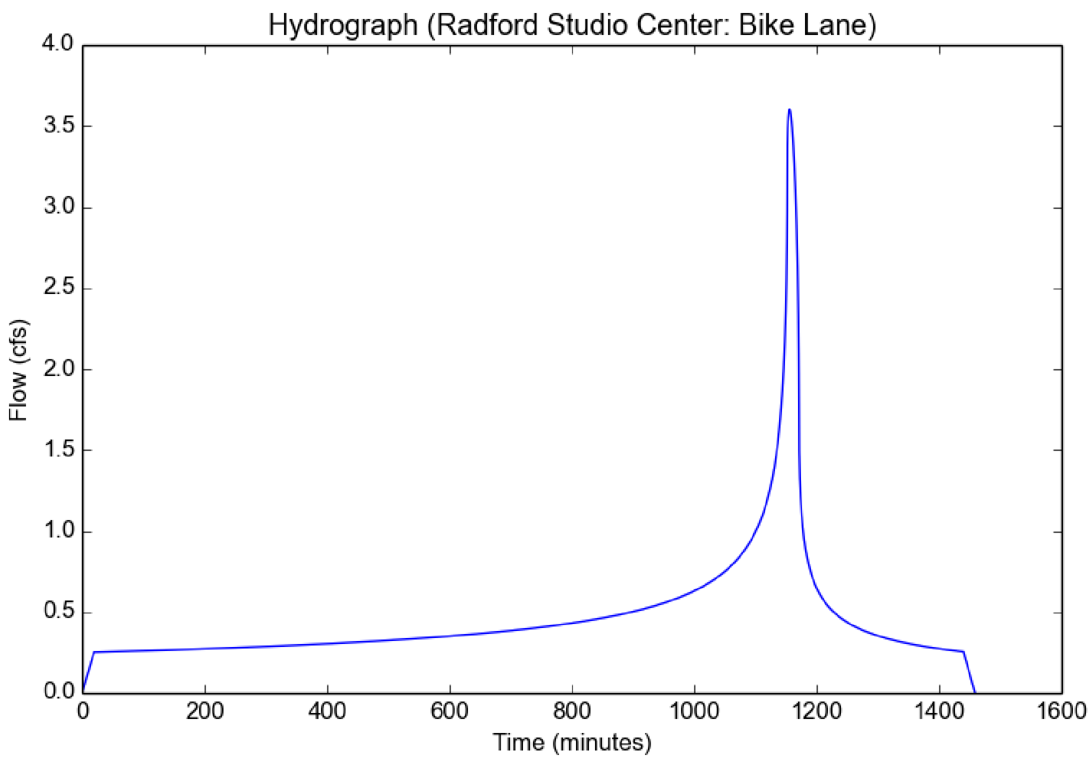


FIGURE 4- Hydro-Calc Hydrology Results for Proposed Site - LID

Peak Flow Hydrologic Analysis

Version: HydroCalc 1.0.2

Input Parameters

Project Name	RADFORD STUDIOS
Subarea ID	SUBAREA 2
Area (ac)	1.0
Flow Path Length (ft)	300.0
Flow Path Slope (vft/hft)	0.006
85th Percentile Rainfall Depth (in)	1.15
Percent Impervious	0.8
Soil Type	16
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.15
Peak Intensity (in/hr)	0.3664
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.74
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	0.2711
Burned Peak Flow Rate (cfs)	0.2711
24-Hr Clear Runoff Volume (ac-ft)	0.0703
24-Hr Clear Runoff Volume (cu-ft)	3063.614

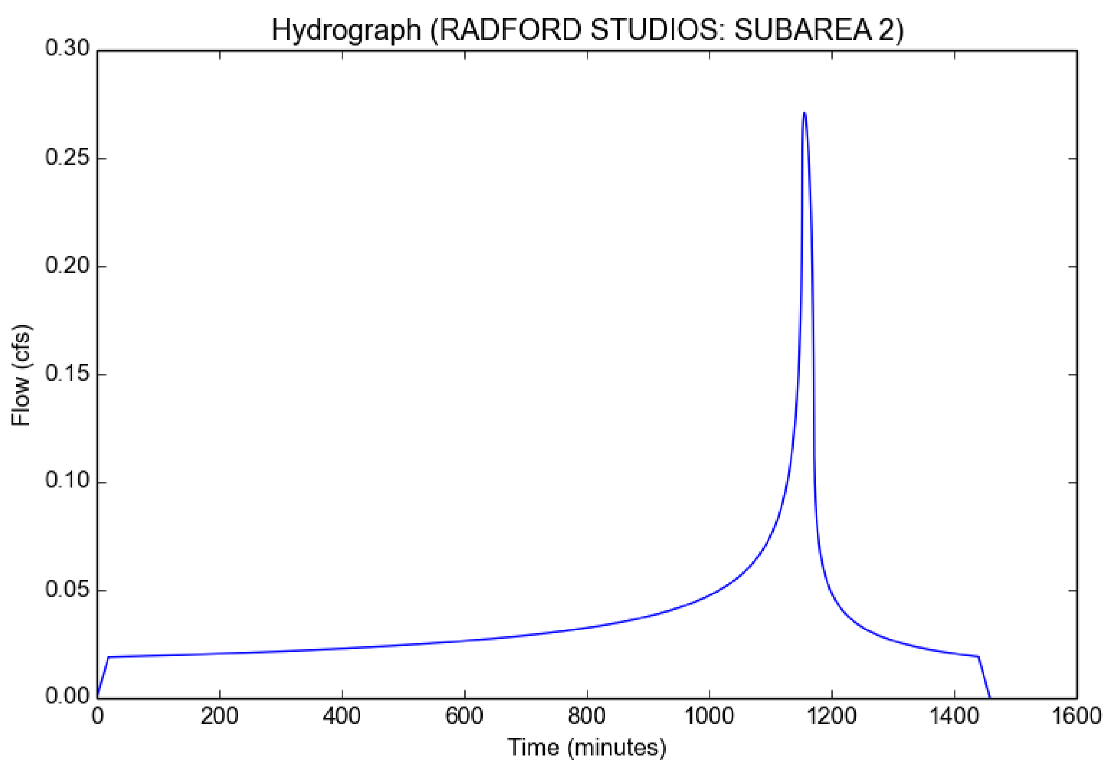


FIGURE 4- Hydro-Calc Hydrology Results for Proposed Site - LID

Peak Flow Hydrologic Analysis

Version: HydroCalc 1.0.2

Input Parameters

Project Name	RADFORD STUDIOS
Subarea ID	SUBAREA 3
Area (ac)	0.5
Flow Path Length (ft)	200.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	1.15
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.15
Peak Intensity (in/hr)	0.4379
Undeveloped Runoff Coefficient (Cu)	0.1345
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	0.197
Burned Peak Flow Rate (cfs)	0.197
24-Hr Clear Runoff Volume (ac-ft)	0.0428
24-Hr Clear Runoff Volume (cu-ft)	1863.004

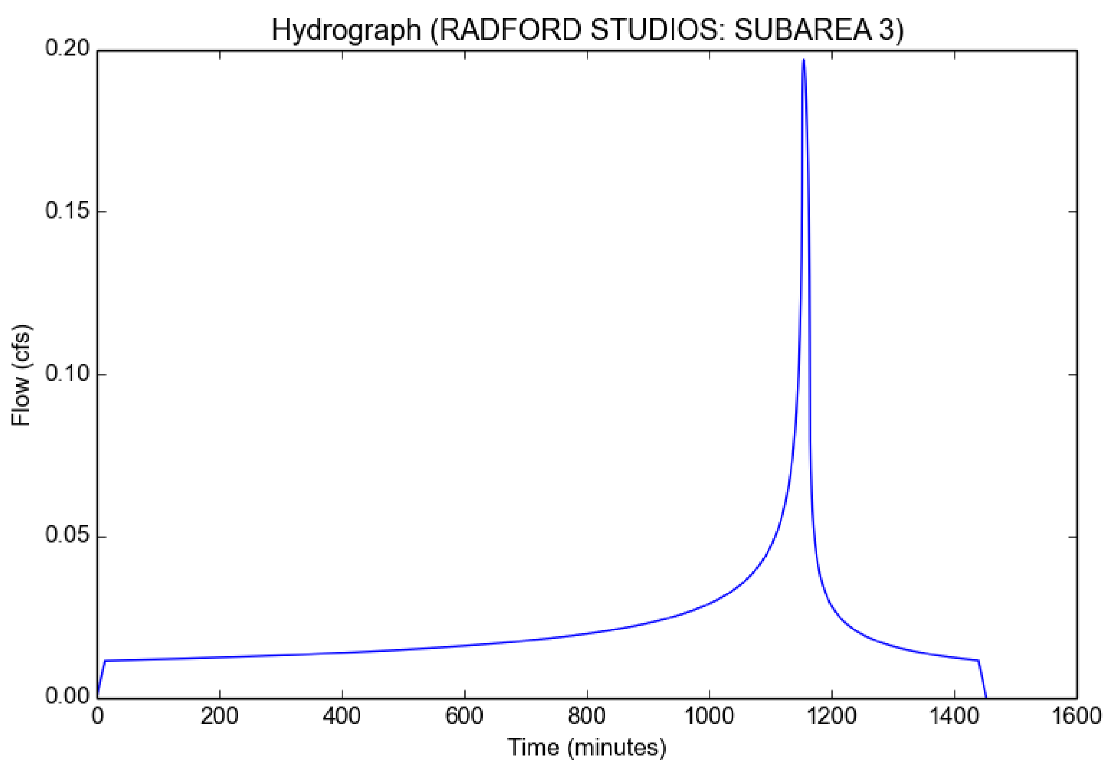


FIGURE 4- Hydro-Calc Hydrology Results for Proposed Site - LID

Peak Flow Hydrologic Analysis

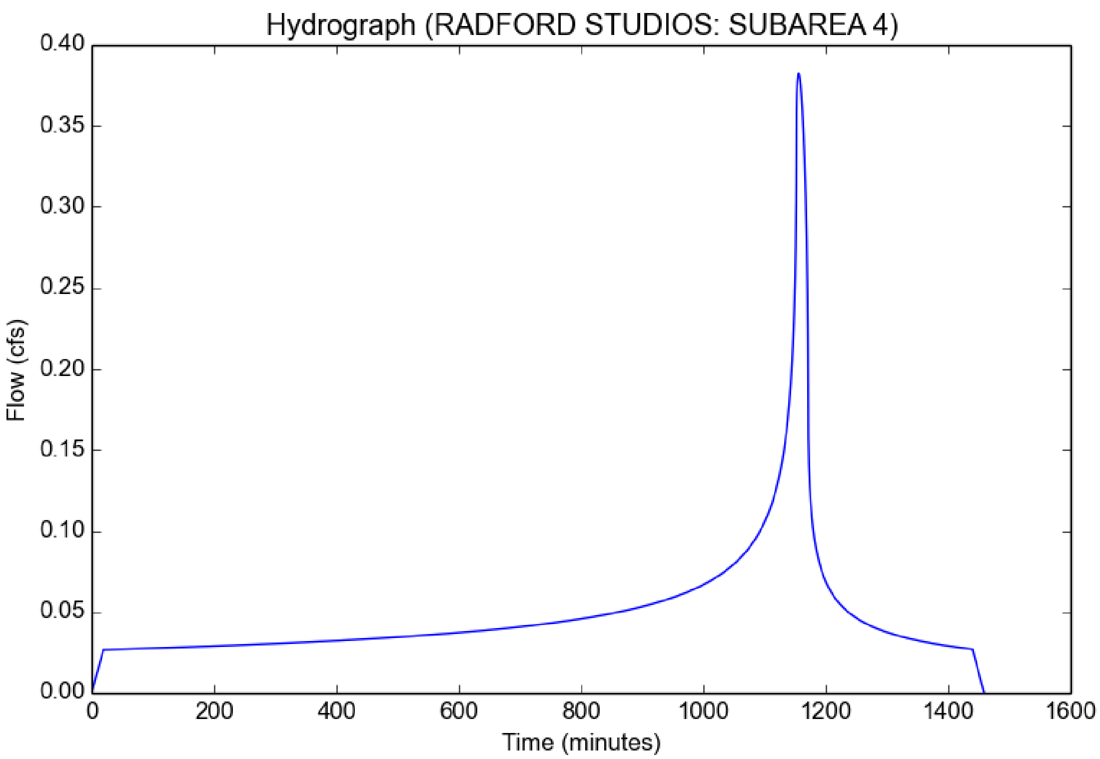
Version: HydroCalc 1.0.2

Input Parameters

Project Name	RADFORD STUDIOS
Subarea ID	SUBAREA 4
Area (ac)	1.16
Flow Path Length (ft)	350.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	1.15
Percent Impervious	1.0
Soil Type	16
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.15
Peak Intensity (in/hr)	0.3664
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	0.3825
Burned Peak Flow Rate (cfs)	0.3825
24-Hr Clear Runoff Volume (ac-ft)	0.0992
24-Hr Clear Runoff Volume (cu-ft)	4322.1798



<u>FIGURE 4</u>- Hydro-Calc Hydrology Results for Proposed Site - LID

Peak Flow Hydrologic Analysis

Version: HydroCalc 1.0.2

Input Parameters

Project Name	Radford Studio Center
Subarea ID	South Lot
Area (ac)	30.47
Flow Path Length (ft)	2000.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	1.15
Percent Impervious	0.85
Soil Type	16
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.15
Peak Intensity (in/hr)	0.207
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.78
Time of Concentration (min)	64.0
Clear Peak Flow Rate (cfs)	4.9202
Burned Peak Flow Rate (cfs)	4.9202
24-Hr Clear Runoff Volume (ac-ft)	2.2589
24-Hr Clear Runoff Volume (cu-ft)	98398.9819

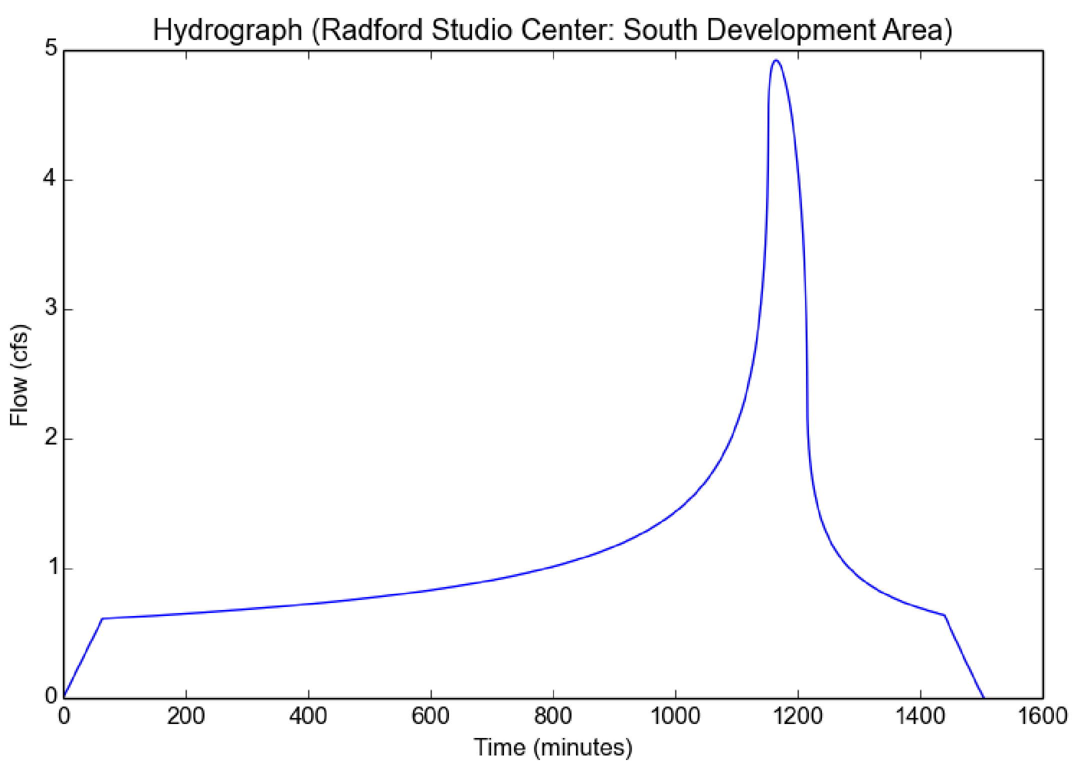


FIGURE 5

San Fernando Groundwater Basin Exhibit

Figure 5: San Fernando Basin Map

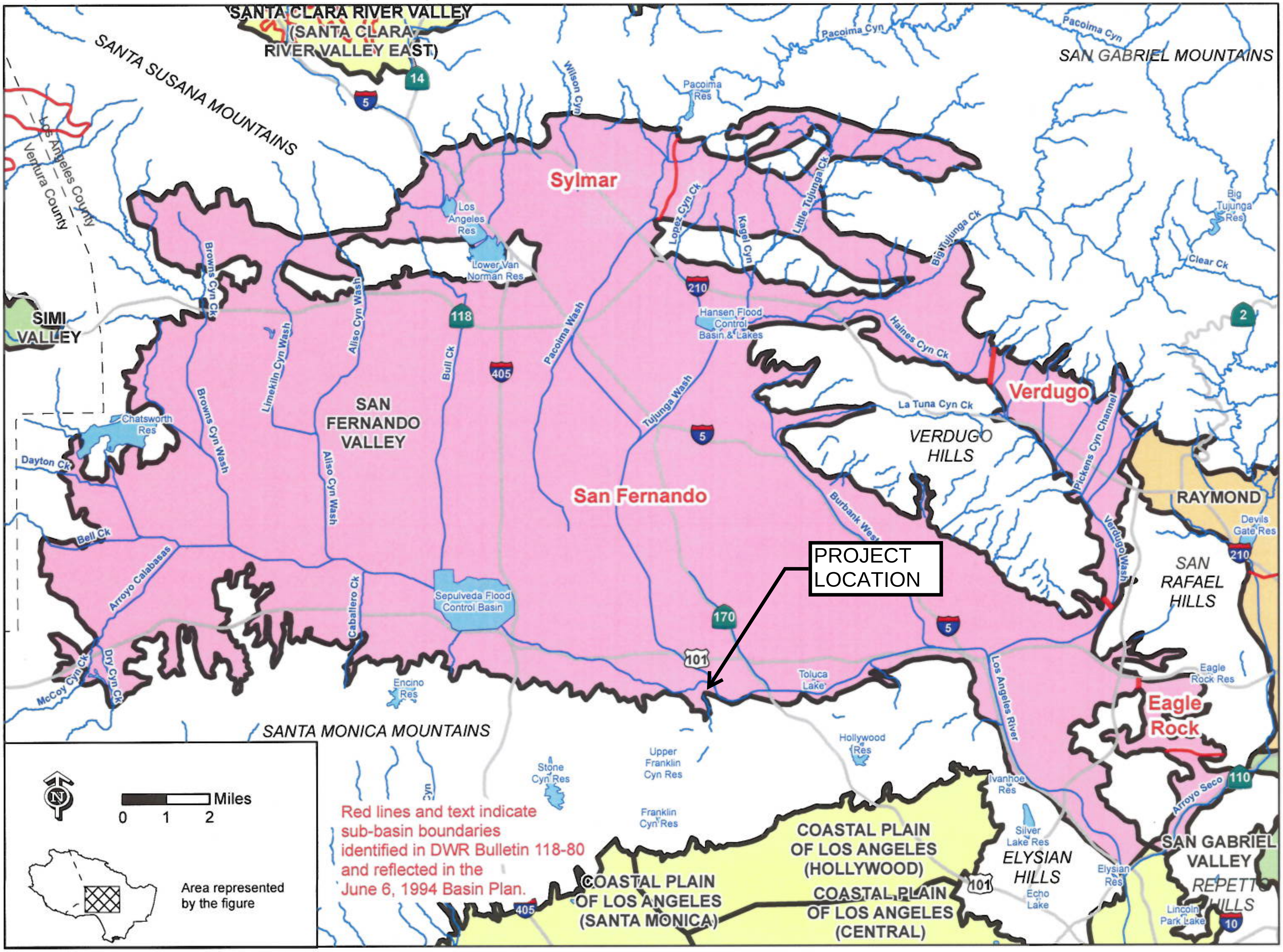


Figure A2-16. Sub-basin Boundaries for San Fernando Valley Groundwater Basins.

FIGURE 6

Preliminary Low Impact Development (LID) Calculations

Capture & Use Sizing - Subarea 2

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

[1]	Total Area (SF)		43589
[2]	Impervious Area (SF)		34871
[3]	Pervious Area (SF)	**[1]-[2] =**	8718
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	32256
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.15
[6]	V_{design} (gal)	**[5]/12*7.48*[4] =**	**23122**
[7]	Planting Area (SF)		4300
[8]	Plant Factor*		0.4
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	23141
[10]	Is $V_{design} \le ETWU_{(7\text{-month})}$?		**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)

Capture & Use Sizing - Subarea 3

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

[1]	Total Area (SF)		21944
[2]	Impervious Area (SF)		19812
[3]	Pervious Area (SF)	**[1]-[2] =**	2132
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	18044
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.15
[6]	V_{design} (gal)	**[5]/12*7.48*[4] =**	**12935**
[7]	Planting Area (SF)		2450
[8]	Plant Factor*		0.4
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	13185
[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)

Capture & Use Sizing - Subarea 4

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

[1]	Total Area (SF)		50544
[2]	Impervious Area (SF)		40594
[3]	Pervious Area (SF)	**[1]-[2] =**	9950
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	37529
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.15
[6]	V_{design} (gal)	**[5]/12*7.48*[4] =**	**26902**
[7]	Planting Area (SF)		5000
[8]	Plant Factor*		0.4
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	26908
[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)

Capture & Use Sizing - South Lot

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

[1]	Total Area (SF)		1327407
[2]	Impervious Area (SF)		1128295
[3]	Pervious Area (SF)	**[1]-[2] =**	199112
[4]	Catchment Area (SF)	**([2]*0.9)+([3]*0.1) =**	1,035,376.70
[5]	Design Rainfall Depth (in)	**Greater of 0.75", 85th percentile**	1.15
[6]	V_{design} (gal)	**[5]/12*7.48*[4] =**	**742,193**
[7]	Planting Area (SF)		140837
[8]	Plant Factor*		0.41
[9]	$ETWU_{(7\text{-month})}$	**21.7*0.62*[8]*[7] =**	776,877
[10]	Is $V_{design} \leq ETWU_{(7\text{-month})}$?		**YES**

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

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

FIGURE 7

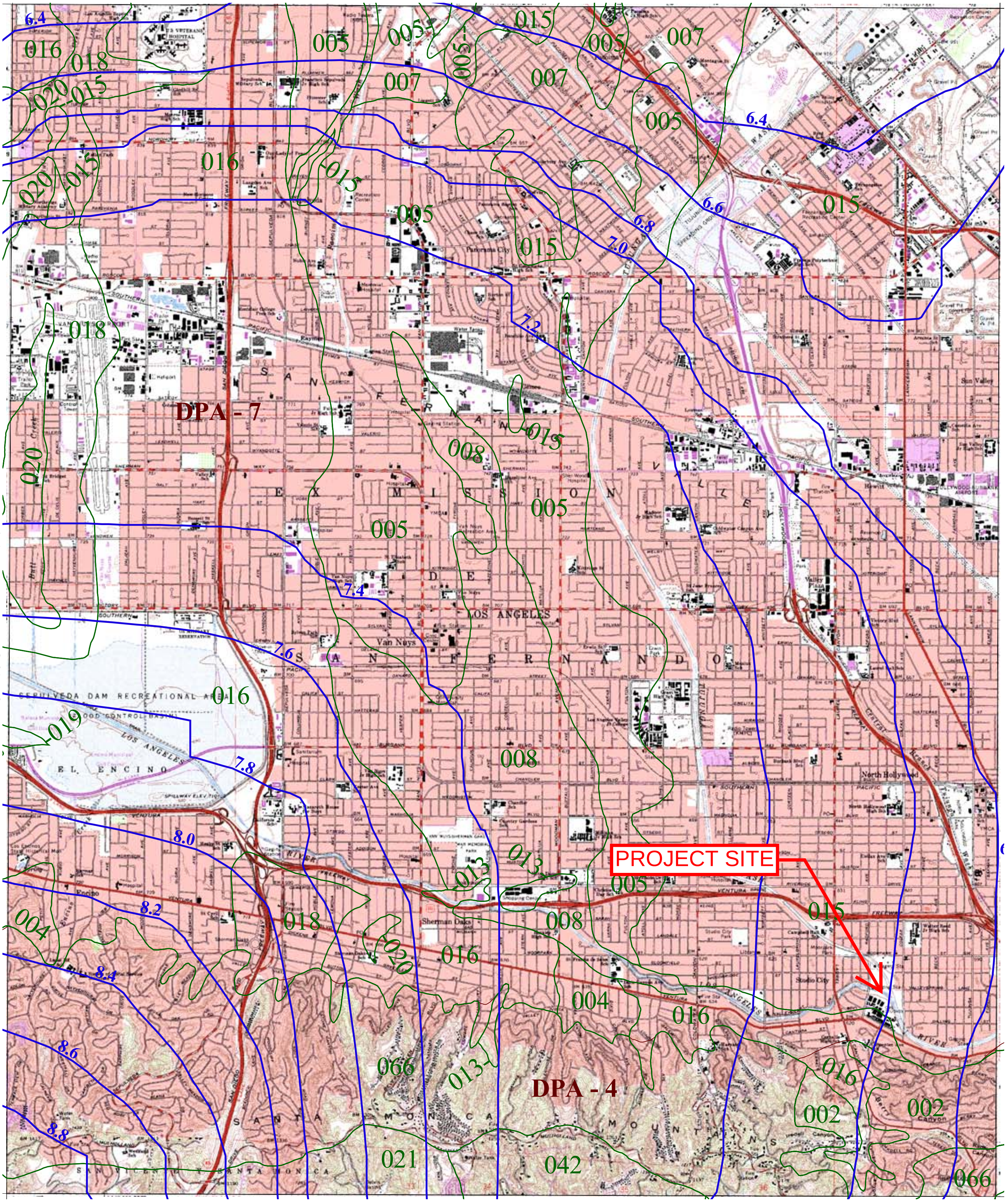
50-year 24-Hour Isohyet Map

34º 15' 00''

SAN FERNANDO 1-H1.36

-118º 30' 00''

CANOGA PARK 1-H1.26



BURBANK 1-H1.28

-118º 22' 30''

BEVERLY HILLS 1-H1.17

34º 07' 30''

016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

N E S W

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878

10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

VAN NUYS
50-YEAR 24-HOUR ISOHYET

1-H1.27

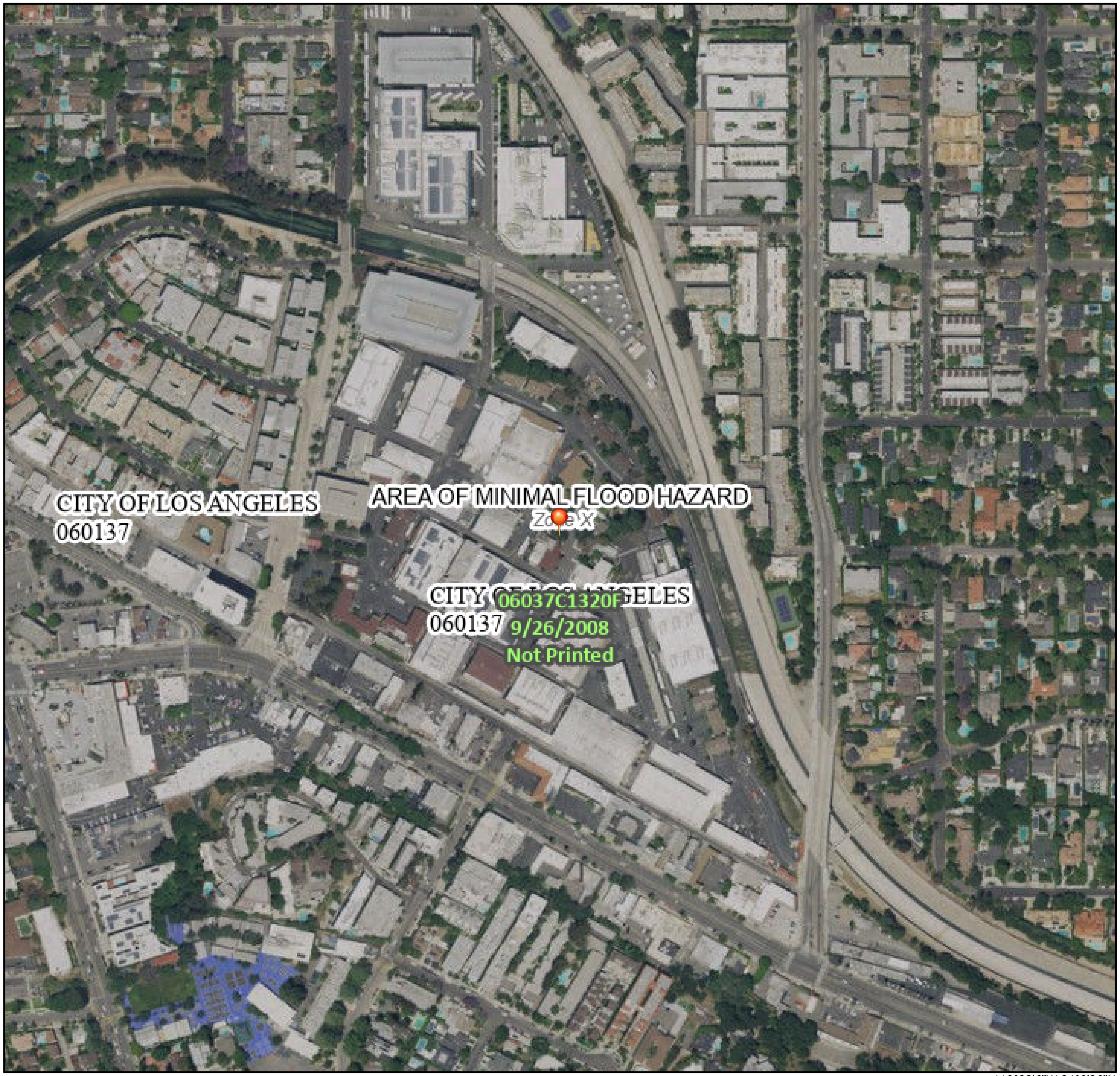
LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

FIGURE 8
FEMA Flood Map

National Flood Hazard Layer FIRMette

FEMA

118°23'43"W 34°8'56"N



118°23'6"W 34°8'26"N

Feet 0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

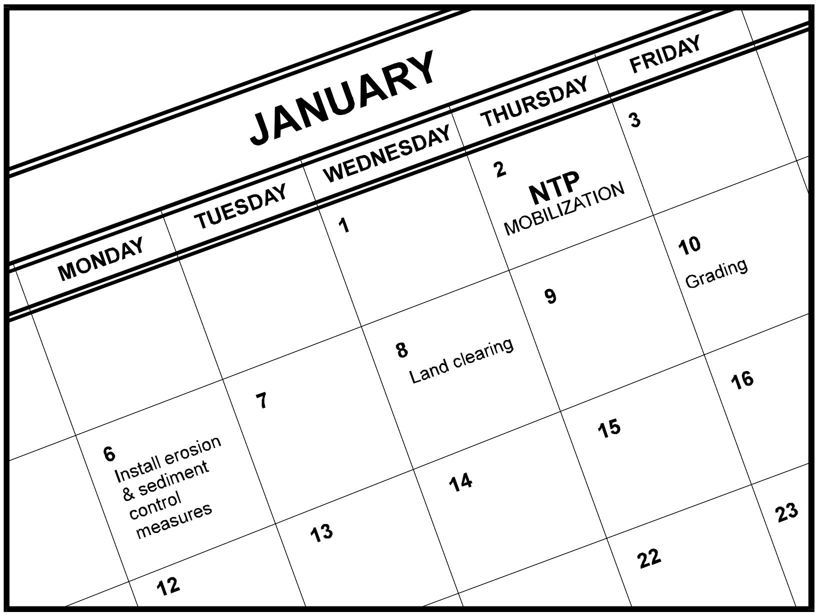
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/22/2023 at 5:55 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

EXHIBITS 1 & 2

Typical SWPPP BMPs
Typical LID BMPs

Scheduling EC-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

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

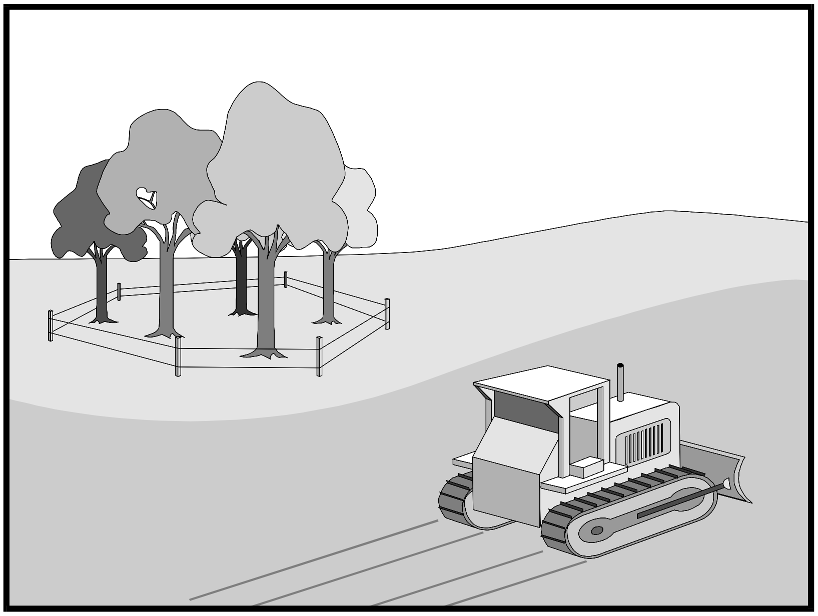
- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

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

Preservation Of Existing Vegetation EC-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 Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

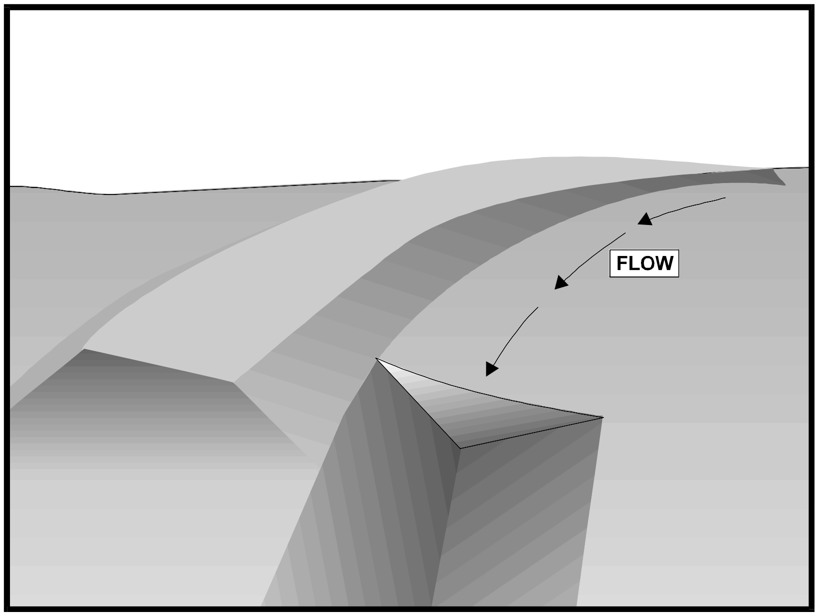
Description and Purpose

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.



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

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

Combination of erosion and sediment controls.

Description and Purpose

Stream channels, streambanks, and associated riparian areas are dynamic and sensitive ecosystems that respond to changes in land use activity. Streambank and channel disturbance resulting from construction activities can increase the stream's sediment load, which can cause channel erosion or sedimentation and have adverse affects on the biotic system. BMPs can reduce the discharge of sediment and other pollutants to minimize the impact of construction activities on watercourses. Streams on the 303(d) list and listed for sediment may require numerous measures to prevent any increases in sediment load to the stream.

Suitable Applications

These procedures typically apply to all construction projects that disturb or occur within stream channels and their associated riparian areas.

Limitations

Specific permit requirements or mitigation measures such as Regional Water Quality Control Board (RWQCB) 401 Certification, U.S. Army Corps of Engineers 404 permit and approval by California Department of Fish and Game supercede the guidance in this BMP.

- If numerical based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required. Streams listed as 303(d) impaired for sediment, silt, or turbidity, are required to conduct sampling to verify that there is no net increase in sediment load due to construction activities.

Implementation

Planning

- Proper planning, design, and construction techniques can minimize impacts normally associated with in stream construction activities. Poor planning can adversely affect soil, fish, wildlife resources, land uses, or land users. Planning should take into account: scheduling; avoidance of in-stream construction; minimizing disturbance area and construction time period; using pre-disturbed areas; selecting crossing location; and selecting equipment.

Scheduling

- Construction activities should be scheduled according to the relative sensitivity of the environmental concerns and in accordance with EC-1, Scheduling. Scheduling considerations will be different when working near perennial streams vs. ephemeral streams and are as follows.

- When in-stream construction is conducted in a perennial stream, work should optimally be performed during the rainy season. This is because in the summer, any sediment-containing water that is discharged into the watercourse will cause a large change in both water clarity and water chemistry. During the rainy season, there is typically more and faster flowing water in the stream, so discharges are diluted faster. However, should in-stream work be scheduled for summer, establishing an isolation area, or diverting the stream, will significantly decrease the amount of sediment stirred up by construction work. Construction work near perennial streams should optimally be performed during the dry season (see below).

- When working in or near ephemeral streams, work should be performed during the dry season. By their very nature, ephemeral streams are usually dry in the summer, and therefore, in-stream construction activities will not cause significant water quality problems. However, when tying up the site at the end of the project, wash any fines (see Washing Fines) that accumulated in the channel back into the bed material, to decrease pollution from the first rainstorm of the season.

- When working near ephemeral or perennial streams, erosion and sediment controls (see silt fences, straw bale barriers, etc.) should be implemented to keep sediment out of stream channel.

Minimize Disturbance

- Minimize disturbance through: selection of the narrowest crossing location; limiting the number of equipment trips across a stream during construction; and, minimizing the number and size of work areas (equipment staging areas and spoil storage areas). Place work areas at least 50 ft from stream channel. Field reconnaissance should be conducted during the planning stage to identify work areas.

Use of Pre-Disturbed Areas

- Locate project sites and work areas in areas disturbed by prior construction or other activity when possible.

Selection of Project Site

- Avoid steep and unstable banks, highly erodible or saturated soils, or highly fractured rock.
- Select project site that minimizes disturbance to aquatic species or habitat.

Equipment Selection

- Select equipment that reduces the amount of pressure exerted on the ground surface, and therefore, reduces erosion potential and/or use overhead or aerial access for transporting equipment across drainage channels. Use equipment that exerts ground pressures of less than 5 or 6 lb/in^2, where possible. Low ground pressure equipment includes: wide or high flotation tires (34 to 72 in. wide); dual tires; bogie axle systems; tracked machines; lightweight equipment; and, central tire inflation systems.

Streambank Stabilization

Preservation of Existing Vegetation

- Preserve existing vegetation in accordance with EC-2, Preservation of Existing Vegetation. In a streambank environment, preservation of existing vegetation provides the following benefits.

Water Quality Protection

- Vegetated buffers on slopes trap sediment and promote groundwater recharge. The buffer width needed to maintain water quality ranges from 15 to 100 ft. On gradual slopes, most of the filtering occurs within the first 30 ft. Steeper slopes require a greater width of vegetative buffer to provide water quality benefits.

Streambank Stabilization

- The root system of riparian vegetation stabilizes streambanks by increasing tensile strength in the soil. The presence of vegetation modifies the moisture condition of slopes (infiltration, evapo transpiration, interception) and increases bank stability.

Riparian Habitat

- Buffers of diverse riparian vegetation provide food and shelter for riparian and aquatic organisms. Minimizing impacts to fisheries habitat is a major concern when working near streams and rivers. Riparian vegetation provides shade, shelter, organic matter (leaf detritus and large woody debris), and other nutrients that are necessary for fish and other aquatic organisms. Buffer widths for habitat concerns are typically wider than those recommended for water quality concerns (100 to 1500 ft).
- When working near watercourses, it is important to understand the work site's placement in the watershed. Riparian vegetation in headwater streams has a greater impact on overall water quality than vegetation in downstream reaches. Preserving existing vegetation upstream is necessary to maintain water quality, minimize bank failure, and maximize riparian habitat, downstream of the work site.

Limitations

- Local county and municipal ordinances regarding width, extent and type of vegetative buffer required may exceed the specifications provided here; these ordinances should be investigated prior to construction.

Streambank Stabilization Specific Installation

- As a general rule, the width of a buffer strip between a road and the stream is recommended to be 50 ft plus four times the percent slope of the land, measured between the road and the top of stream bank.

Hydraulic Mulch

- Apply hydraulic mulch on disturbed streambanks above mean high water level in accordance with EC-3, Hydraulic Mulch to provide temporary soil stabilization.

Limitations

- Do not place hydraulic mulch or tackifiers below the mean high-water level, as these materials could wash into the channel and impact water quality or possibly cause eutrophication (eutrophication is an algal bloom caused by excessively high nutrient levels in the water).

Hydroseeding

- Hydroseed disturbed streambanks in accordance with EC-4, Hydroseeding.

Limitations

- Do not place tackifiers or fertilizers below the mean high-water level, as these materials could wash into the channel and impact water quality or possibly cause eutrophication.

Soil Binders

- Apply soil binders to disturbed streambanks in accordance with EC-5, Soil Binders.

Limitations

- Do not place soil binders below the mean high-water level. Soil binder must be environmentally benign and non-toxic to aquatic organisms.

Straw Mulch

- Apply straw mulch to disturbed streambanks in accordance with EC-6, Straw Mulch.

Limitations

- Do not place straw mulch below the mean high-water level, as this material could wash into the channel and impact water quality or possibly cause eutrophication.

Geotextiles and Mats

- Install geotextiles and mats as described in EC-7, Geotextiles and Mats, to stabilize disturbed channels and streambanks. Not all applications should be in the channel, for example, certain geotextile netting may snag fish gills and are not appropriate in fish bearing streams. Geotextile fabrics that are not biodegradable are not appropriate for in stream use. Additionally, geotextile fabric or blankets placed in channels must be adequate to sustain anticipated hydraulic forces.

Earth Dikes, Drainage Swales, and Lined Ditches

- Convey, intercept, or divert runoff from disturbed streambanks using EC-9, Earth Dikes and Drainage Swales.

Limitations

- Do not place earth dikes in watercourses, as these structures are only suited for intercepting sheet flow and should not be used to intercept concentrated flow.
- Appropriately sized velocity dissipation devices (EC-10) must be placed at outlets to minimize erosion and scour.

Velocity Dissipation Devices

- Place velocity dissipation devices at outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits or channels in accordance with EC-10, Velocity Dissipation Devices.

Slope Drains

- Use slope drains to intercept and direct surface runoff or groundwater into a stabilized watercourse, trapping device or stabilized area in accordance with EC-11, Slope Drains.

Limitations

- Appropriately sized outlet protection and velocity dissipation devices (EC-10) must be placed at outlets to minimize erosion and scour.

Streambank Sediment Control

Silt Fences

- Install silt fences in accordance with SE-1, Silt Fence, to control sediment. Silt fences should only be installed where sediment laden water can pond, thus allowing the sediment to settle out.

Fiber Rolls

- Install fiber rolls in accordance with SE-5, Fiber Rolls, along contour of slopes above the high-water level to intercept runoff, reduce flow velocity, release the runoff as sheet flow and provide removal of sediment from the runoff. In a stream environment, fiber rolls should be used in conjunction with other sediment control methods such as SE-1, Silt Fence or SE-9 Straw Bale Barrier. Install silt fence, straw bale barrier, or other erosion control method along toe of slope above the high-water level.

Gravel Bag Berm

- A gravel bag berm or barrier can be utilized to intercept and slow the flow of sediment laden sheet flow runoff in accordance with SE-6, Gravel Bag Berm. In a stream environment gravel bag barrier can allow sediment to settle from runoff before water leaves the construction site and can be used to isolate the work area from the live stream.

Limitations

- Gravel bag barriers are not recommended as a perimeter sediment control practice around streams.

Straw Bale Barrier

- Install straw bale barriers in accordance with SE-9, Straw Bale Barrier, to control sediment. Straw bale barriers should only be installed where sediment laden water can pond, thus allowing the sediment to settle out. Install a silt fence in accordance with SE-1, Silt Fence, on down slope side of straw bale barrier closest to stream channel to provide added sediment control.

Rock Filter

Description and Purpose

Rock filters are temporary erosion control barriers composed of rock that is anchored in place. Rock filters detain the sediment laden runoff, retain the sediment, and release the water as sheet flow at a reduced velocity. Typical rock filter installations are illustrated at the end of this BMP.

Applications

- Near the toe of slopes that may be subject to flow and rill erosion.

Limitations

- Inappropriate for contributing drainage areas greater than 5 acres.
- Requires sufficient space for ponded water.
- Ineffective for diverting runoff because filters allow water to slowly seep through.
- Rock filter berms are difficult to remove when construction is complete.
- Unsuitable in developed areas or locations where aesthetics is a concern.

Specifications

- Rock: open graded rock, 0.75 to 5 in. for concentrated flow applications.
- Woven wire sheathing: 1 in. diameter, hexagonal mesh, galvanized 20gauge (used with rock filters in areas of concentrated flow).
- In construction traffic areas, maximum rock berm heights should be 12 in. Berms should be constructed every 300 ft on slopes less than 5%, every 200 ft on slopes between 5% and 10%, and every 100 ft on slopes greater than 10%.

Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Reshape berms as needed and replace lost or dislodged rock, and filter fabric.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.

K-rail

Description and Purpose

This is temporary sediment control that uses K-rails to form the sediment deposition area, or to isolate the near bank construction area. Install K-rails at toe of slope in accordance with procedures described in NS-5, Clear Water Diversion.

Barriers are placed end to end in a pre-designed configuration and gravel filled bags are used at the toe of the barrier and at their abutting ends to seal and prevent movement of sediment beneath or through the barrier walls.

Appropriate Applications

- This technique is useful at the toe of embankments, cuts or fills slopes.

Limitations

- The K-rail method should not be used to dewater a project site, as the barrier is not watertight.

Implementation

- Refer to NS-5, Clear Water Diversion, for implementation requirements.

Instream Construction Sediment Control

There are three different options currently available for reducing turbidity while working in a stream or river. The stream can be isolated from the area in which work is occurring by means of a water barrier, the stream can be diverted around the work site through a pipe or temporary channel, or one can employ construction practices that minimize sediment suspension.

Whatever technique is implemented, an important thing to remember is that dilution can sometimes be the solution. A probable "worst time" to release high TSS into a stream system might be when the stream is very low; summer low flow, for example. During these times, the flow may be low while the biological activity in the stream is very high. Conversely, the addition of high TSS or sediment during a big storm discharge might have a relatively low impact, because the stream is already turbid, and the stream energy is capable of transporting both suspended solids, and large quantities of bedload through the system. The optimum time to "pull" in-stream structures may be during the rising limb of a storm hydrograph.

Techniques to minimize Total Suspended Solids (TSS)

- **Padding** - Padding laid in the stream below the work site may trap some solids that are deposited in the stream during construction. After work is done, the padding is removed from the stream, and placed on the bank to assist in re-vegetation.

- **Clean, washed gravel** - Using clean, washed gravel decreases solid suspension, as there are fewer small particles deposited in the stream.

- **Excavation using a large bucket** - Each time a bucket of soil is placed in the stream, a portion is suspended. Approximately the same amount is suspended whether a small amount of soil is placed in the stream, or a large amount. Therefore, using a large excavator bucket instead of a small one, will reduce the total amount of soil that washes downstream.

- **Use of dozer for backfilling** - Using a dozer for backfilling instead of a backhoe follows the same principles – the fewer times soil is deposited in the stream, the less soil will be suspended.

- **Partial dewatering with a pump** - Partially dewatering a stream with a pump reduces the amount of water, and thus the amount of water that can suspend sediment.

Washing Fines

Definition and Purpose

- Washing fines is an “in-channel” sediment control method, which uses water, either from a water truck or hydrant, to wash stream fines that were brought to the surface of the channel bed during restoration, back into the interstitial spaces of the gravel and cobbles.

- The purpose of this technique is to reduce or eliminate the discharge of sediment from the channel bottom during the first seasonal flow. Sediment should not be allowed into stream channels; however, occasionally in-channel restoration work will involve moving or otherwise disturbing fines (sand and silt sized particles) that are already in the stream, usually below bankfull discharge elevation. Subsequent re-watering of the channel can result in a plume of turbidity and sedimentation.

- This technique washes the fines back into the channel bed. Bedload materials, including gravel cobbles, boulders and those fines, are naturally mobilized during higher storm flows. This technique is intended to delay the discharge until the fines would naturally be mobilized.

Appropriate Applications

- This technique should be used when construction work is required in channels. It is especially useful in intermittent or ephemeral streams in which work is performed “in the dry”, and which subsequently become re-watered.

Limitations

- The stream must have sufficient gravel and cobble substrate composition.

- The use of this technique requires consideration of time of year and timing of expected stream flows.

- The optimum time for the use of this technique is in the fall, prior to winter flows.

- Consultation with, and approval from the Department of Fish and Game and the Regional Water Quality Control Board may be required.

Implementation

- Apply sufficient water to wash fines, but not cause further erosion or runoff.

- Apply water slowly and evenly to prevent runoff and erosion.

- Consult with Department of Fish and Game and the Regional Water Quality Control Board for specific water quality requirements of applied water (e.g. chlorine).

Inspection and Maintenance

- None necessary

Costs

Cost may vary according to the combination of practices implemented.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events until final stabilization is achieved.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.

- Inspect and repair equipment (for damaged hoses, fittings, and gaskets).

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

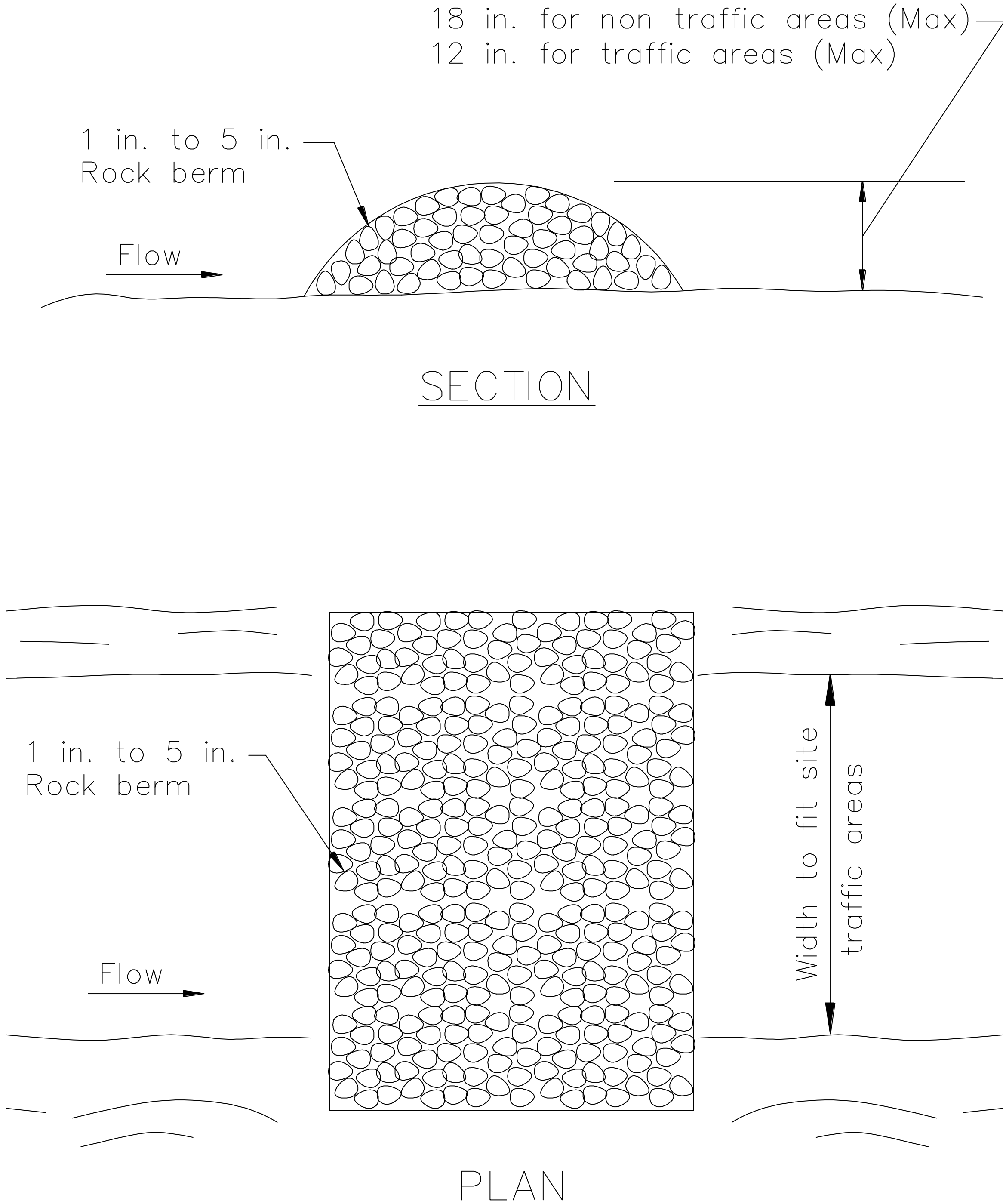
Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, An Inventory of Current Practices (Draft), UESPA, 1990.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

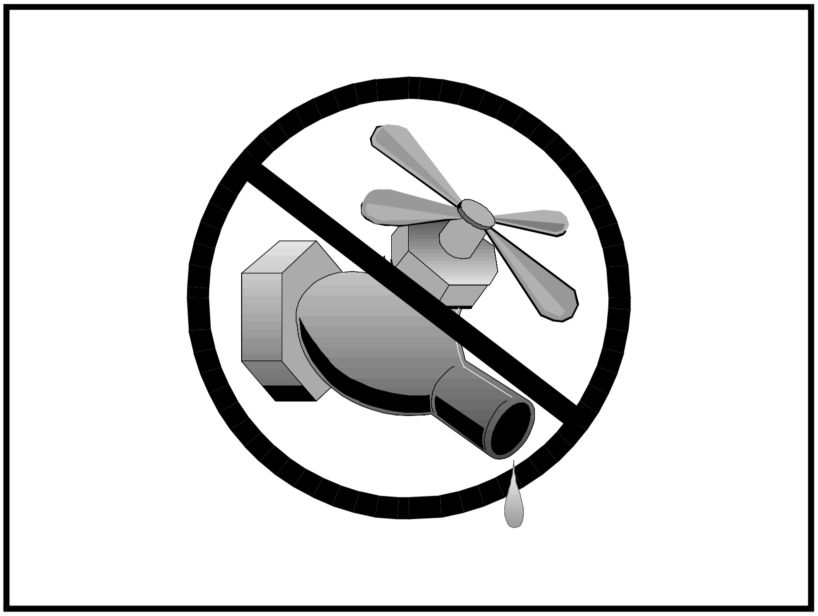
Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



TYPICAL ROCK FILTER
NOT TO SCALE

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

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

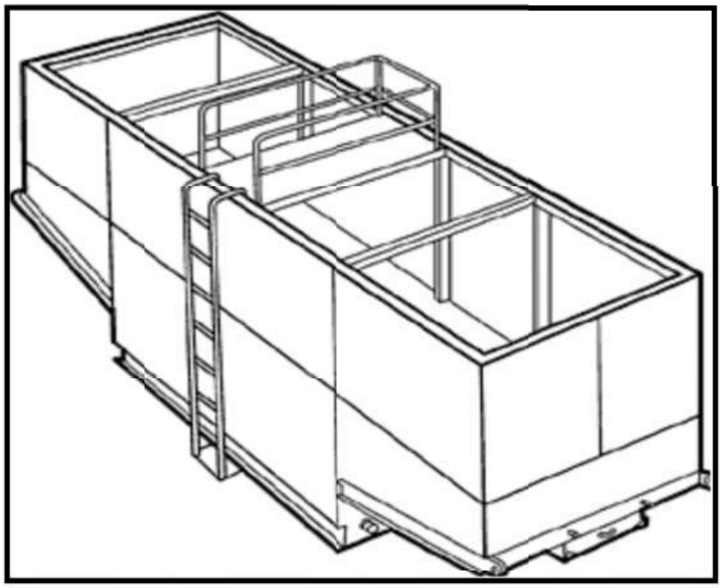
Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

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.



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

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.

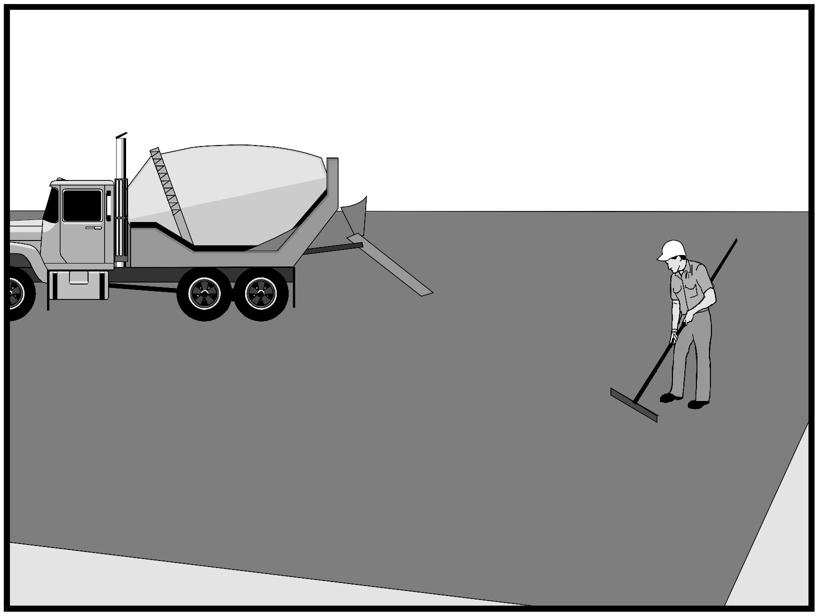
The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

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

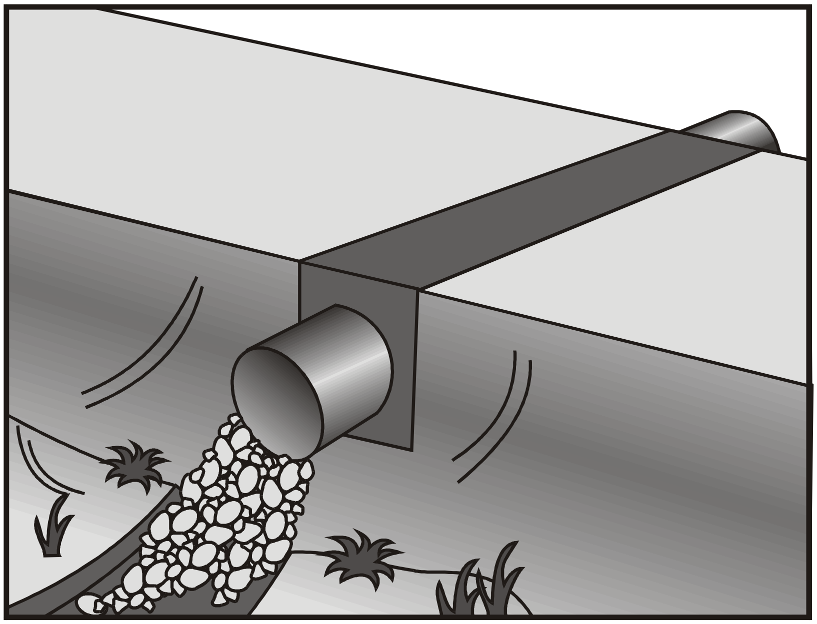
These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

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.

Temporary Stream Crossing NS-4



Categories

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

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

A temporary stream crossing is a temporary culvert, ford or bridge placed across a waterway to provide access for construction purposes for a period of less than one year. Temporary access crossings are not intended to maintain traffic for the public. The temporary access will eliminate erosion and downstream sedimentation caused by vehicles.

Suitable Applications

Temporary stream crossings should be installed at all designated crossings of perennial and intermittent streams on the construction site, as well as for dry channels that may be significantly eroded by construction traffic.

Temporary streams crossings are installed at sites:

- Where appropriate permits have been secured (404 Permits, and 401 Certifications)
- Where construction equipment or vehicles need to frequently cross a waterway
- When alternate access routes impose significant constraints
- When crossing perennial streams or waterways causes significant erosion
- Where construction activities will not last longer than one year

- Where appropriate permits have been obtained for the stream crossing

Limitations

The following limitations may apply:

- Installation and removal will usually disturb the waterway.
- Installation may require Regional Water Quality Control Board (RWQCB) 401 Certification, U.S. Army Corps of Engineers 404 permit and approval by California Department of Fish and Game. If numerical-based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required.
- Installation may require dewatering or temporary diversion of the stream. See NS-2, Dewatering Operations and NS-5, Clear Water Diversion.
- Installation may cause a constriction in the waterway, which can obstruct flood flow and cause flow backups or washouts. If improperly designed, flow backups can increase the pollutant load through washouts and scouring.
- Use of natural or other gravel in the stream for construction of Cellular Confinement System (CCS) ford crossing will be contingent upon approval by fisheries agencies.
- Ford crossings may degrade water quality due to contact with vehicles and equipment.
- May be expensive for a temporary improvement.
- Requires other BMPs to minimize soil disturbance during installation and removal.
- Fords should only be used in dry weather.

Implementation

General

The purpose of this BMP is to provide a safe, erosion-free access across a stream for construction equipment. Minimum standards and specifications for the design, construction, maintenance, and removal of the structure should be established by an engineer registered in California. Temporary stream crossings may be necessary to prevent construction equipment from causing erosion of the stream and tracking sediment and other pollutants into the stream.

Temporary stream crossings are used as access points to construction sites when other detour routes may be too long or burdensome for the construction equipment. Often heavy construction equipment must cross streams or creeks, and detour routes may impose too many constraints such as being too narrow or poor soil strength for the equipment loadings. Additionally, the contractor may find a temporary stream crossing more economical for light–duty vehicles to use for frequent crossings and may have less environmental impact than construction of a temporary access road.

Location of the temporary stream crossing should address:

- Site selection where erosion potential is low.

- Areas where the side slopes from site runoff will not spill into the side slopes of the crossing.

The following types of temporary stream crossings should be considered:

- **Culverts –** A temporary culvert is effective in controlling erosion but will cause erosion during installation and removal. A temporary culvert can be easily constructed and allows for heavy equipment loads.

- **Fords** - Appropriate during the dry season in arid areas. Used on dry washes and ephemeral streams, and low-flow perennial streams. CCS, a type of ford crossing, is also appropriate for use in streams that would benefit from an influx of gravels. A temporary ford provides little sediment and erosion control and is ineffective in controlling erosion in the stream channel. A temporary ford is the least expensive stream crossing and allows for maximum load limits. It also offers very low maintenance. Fords are more appropriate during the dry ice season and in arid areas of California.

- **Bridges** - Appropriate for streams with high flow velocities, steep gradients and where temporary restrictions in the channel are not allowed.

Design

During the long summer construction season in much of California, rainfall is infrequent, and many streams are dry. Under these conditions, a temporary ford may be sufficient. A ford is not appropriate if construction will continue through the winter rainy season, if summer thunderstorms are likely, or if the stream flows during most of the year. Temporary culverts and bridges should then be considered and, if used, should be sized to pass a significant design storm (i.e., at least a 10-year storm). The temporary stream crossing should be protected against erosion, both to prevent excessive sedimentation in the stream and to prevent washout of the crossing.

Design and installation requires knowledge of stream flows and soil strength. Designs should be prepared under direction of, and approved by, a registered civil engineer and for bridges, a registered structural engineer. Both hydraulic and construction loading requirements should be considered with the following:

- Comply with any special requirements for culvert and bridge crossings, particularly if the temporary stream crossing will remain through the rainy season.

- Provide stability in the crossing and adjacent areas to withstand the design flow. The design flow and safety factor should be selected based on careful evaluation of the risks due to over topping, flow backups, or washout.

- Install sediment traps immediately downstream of crossings to capture sediments. See SE-3, Sediment Trap.

- Avoid oil or other potentially hazardous materials for surface treatment.

- Culverts are relatively easy to construct and able to support heavy equipment loads.

- Fords are the least expensive of the crossings, with maximum load limits.

- CCS crossing structures consist of clean, washed gravel and cellular confinement system blocks. CCS are appropriate for streams that would benefit from an influx of gravel; for example, salmonid streams, streams or rivers below reservoirs, and urban, channelized streams. Many urban stream systems are gravel-deprived due to human influences, such as dams, gravel mines, and concrete channels.

- CCS allow designers to use either angular or naturally occurring rounded gravel, because the cells provide the necessary structure and stability. In fact, natural gravel is optimal for this technique, because of the habitat improvement it will provide after removal of the CCS.

- A gravel depth of 6 to 12 in. for a CCS structure is sufficient to support most construction equipment.

- An advantage of a CCS crossing structure is that relatively little rock or gravel is needed, because the CCS provides the stability.

- Bridges are generally more expensive to design and construct but provide the least disturbance of the streambed and constriction of the waterway flows.

Construction and Use

- Stabilize construction roadways, adjacent work area, and stream bottom against erosion.

- Construct during dry periods to minimize stream disturbance and reduce costs.

- Construct at or near the natural elevation of the streambed to prevent potential flooding upstream of the crossing.

- Install temporary erosion control BMPs in accordance with erosion control BMP fact sheets to minimize erosion of embankment into flow lines.

- Any temporary artificial obstruction placed within flowing water should only be built from material, such as clean gravel or sandbags, that will not introduce sediment or silt into the watercourse.

- Temporary water body crossings and encroachments should be constructed to minimize scour. Cobbles used for temporary water body crossings or encroachments should be clean, rounded river cobble.

- Vehicles and equipment should not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a water body where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed.

- The exterior of vehicles and equipment that will encroach on the water body within the project should be maintained free of grease, oil, fuel, and residues.

- Drip pans should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.

- Disturbance or removal of vegetation should not exceed the minimum necessary to complete operations. Precautions should be taken to avoid damage to vegetation by people or equipment. Disturbed vegetation should be replaced with the appropriate soil stabilization measures.
- Riparian vegetation, when removed pursuant to the provisions of the work, should be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation should be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble must be removed upon completion of project activities.
- Conceptual temporary stream crossings are shown in the attached figures.

Costs

Caltrans Construction Cost index for temporary bridge crossings is $58-$122/ft^2 (costs adjusted for inflation, 2016 dollars, by Tetra Tech Inc.).

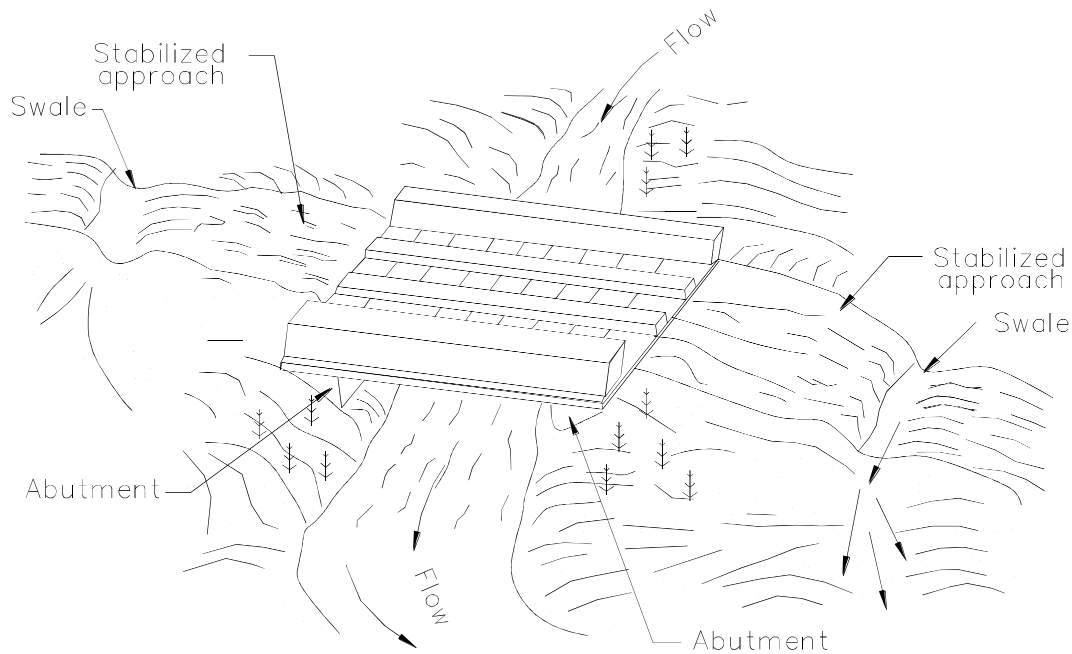
Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check for blockage in the channel, sediment buildup or trapped debris in culverts, blockage behind fords or under bridges.
- Check for erosion of abutments, channel scour, riprap displacement, or piping in the soil.
- Check for structural weakening of the temporary crossings, such as cracks, and undermining of foundations and abutments.
- Remove sediment that collects behind fords, in culverts, and under bridges periodically.
- Replace lost or displaced aggregate from inlets and outlets of culverts and cellular confinement systems.
- Remove temporary crossing promptly when it is no longer needed.

References

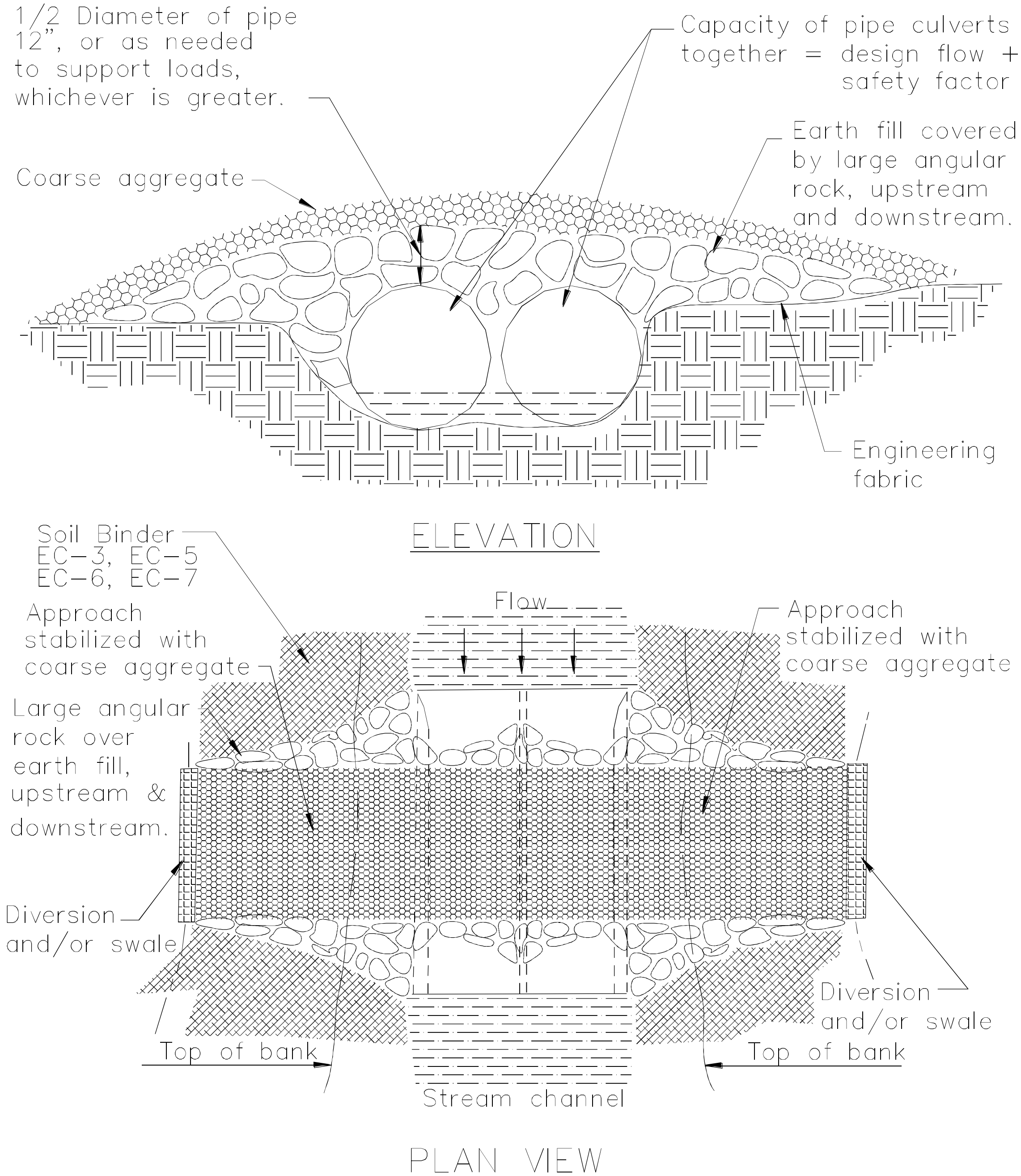
California Bank and Shore Rock Slope Protection Design – Practitioners Guide and Field Evaluations of Riprap Methods, Caltrans Study No. F90TL03, October 2000.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

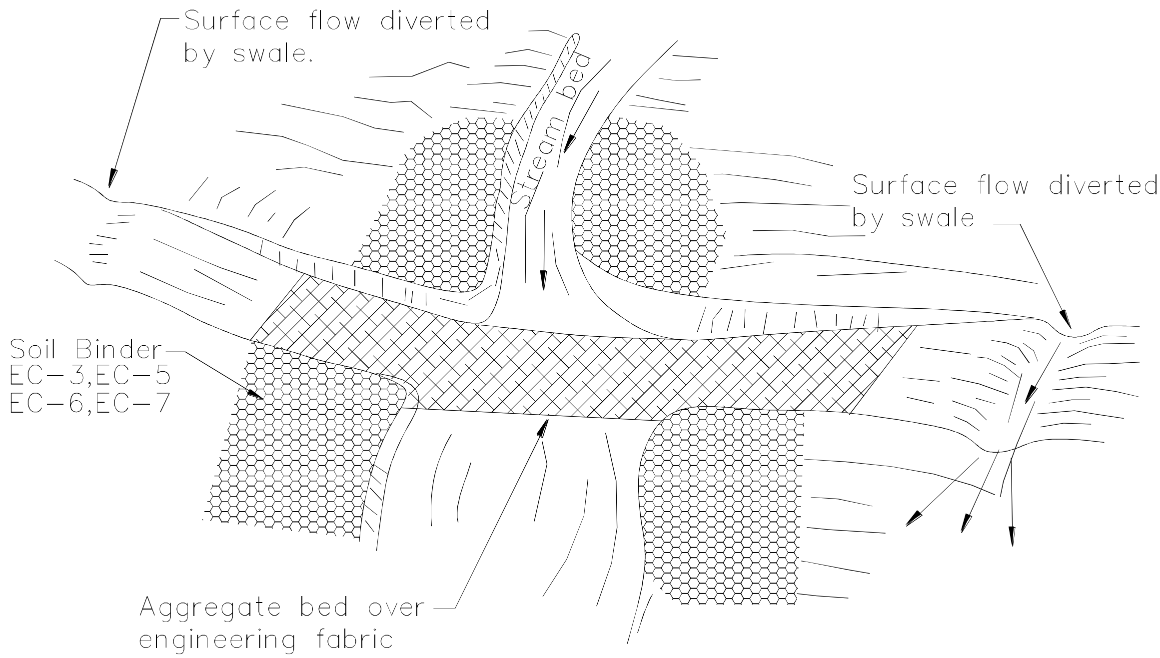


NOTE:
Surface flow of road diverted by swale and/or dike.

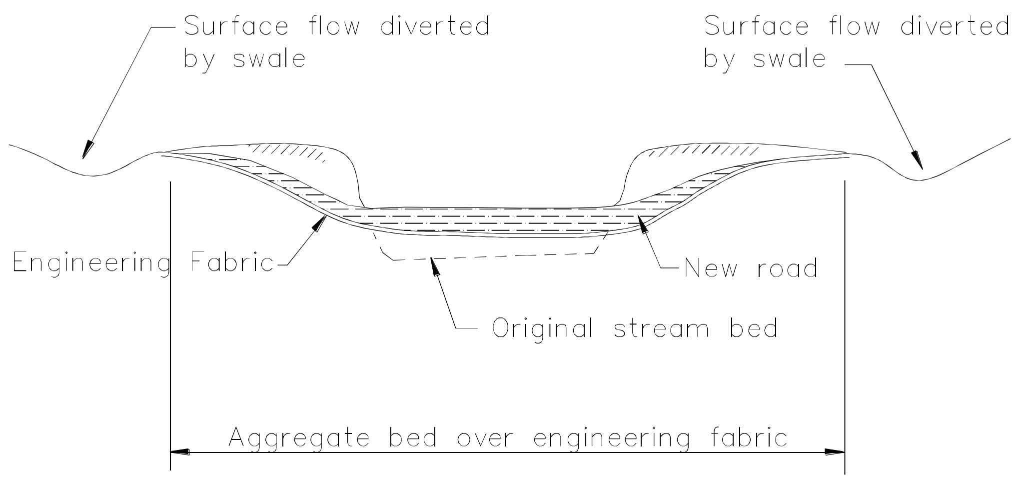
TYPICAL BRIDGE CROSSING
NOT TO SCALE



TYPICAL CULVERT CROSSING
NOT TO SCALE

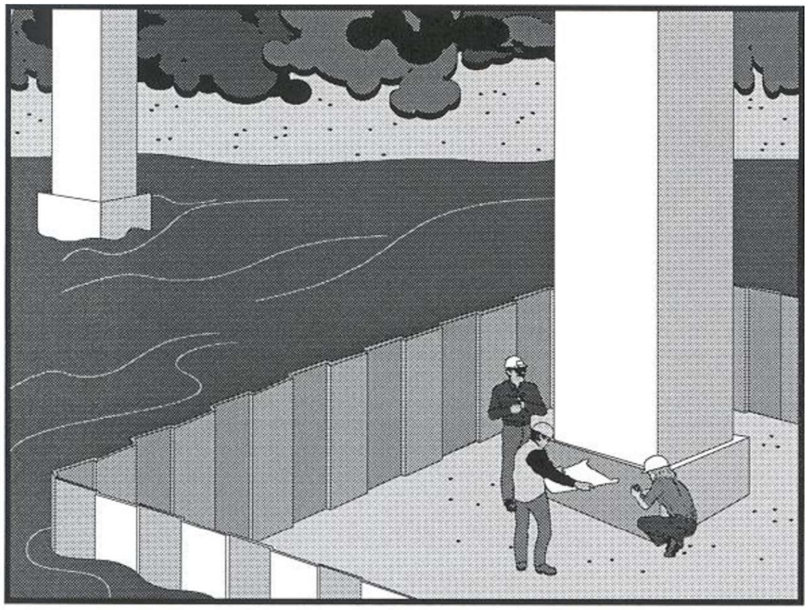


Aggregate approch
1:5 (V:H) Maximum slope on road



TYPICAL FORD CROSSING
NOT TO SCALE

Clear Water Diversion



Categories

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

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Clear water diversion consists of a system of structures and measures that intercept clear surface water runoff upstream of a project, transport it around the work area, and discharge it downstream with minimal water quality degradation from either the project construction operations or the construction of the diversion. Clear water diversions are used in a waterway to enclose a construction area and reduce sediment pollution from construction work occurring in or adjacent to water. Structures commonly used as part of this system include diversion ditches, berms, dikes, slope drains, rock, gravel bags, wood, aqua barriers, cofferdams, filter fabric or turbidity curtains, drainage and interceptor swales, pipes, or flumes.

Suitable Applications

A clear water diversion is typically implemented where appropriate permits (1601 Agreement) have been secured and work must be performed in a flowing stream or water body.

- Clear water diversions are appropriate for isolating construction activities occurring within or near a water body such as streambank stabilization, or culvert, bridge, pier or abutment installation. They may also be used in combination with other methods, such as clear water bypasses and/or pumps.
- Pumped diversions are suitable for intermittent and low flow streams.
- Excavation of a temporary bypass channel or passing the flow through a heavy pipe (called a "flume") with a trench

excavated under it, is appropriate for the diversion of streams less than 20 ft wide, with flow rates less than 100 cfs.

- Clear water diversions incorporating clean washed gravel may be appropriate for use in salmonid spawning streams.

Limitations

- Diversion and encroachment activities will usually disturb the waterway during installation and removal of diversion structures.

- Installation may require Regional Water Quality Control Board (RWQCB) 401 Certification, U.S. Army Corps of Engineers 404 permit and approval by California Department of Fish and Game. If numerical-based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required.

- Diversion and encroachment activities may constrict the waterway, which can obstruct flood flows and cause flooding or washouts. Diversion structures should not be installed without identifying potential impacts to the stream channel.

- Diversion or isolation activities are not appropriate in channels where there is insufficient stream flow to support aquatic species in the area dewatered as a result of the diversion.

- Diversion or isolation activities are inappropriate in deep water unless designed or reviewed by an engineer registered in California.

- Diversion or isolation activities should not completely dam stream flow.

- Dewatering and removal may require additional sediment control or water treatment. See NS-2, Dewatering Operations.

- Not appropriate if installation, maintenance, and removal of the structures will disturb sensitive aquatic species of concern.

Implementation

General

- Implement guidelines presented in EC-12, Streambank Stabilization to minimize impacts to streambanks.

- Where working areas encroach on flowing streams, barriers adequate to prevent the flow of muddy water into streams should be constructed and maintained between working areas and streams. During construction of the barriers, muddying of streams should be held to a minimum.

- Diversion structures must be adequately designed to accommodate fluctuations in water depth or flow volume due to tides, storms, flash floods, etc.

- Heavy equipment driven in wet portions of a water body to accomplish work should be completely clean of petroleum residue, and water levels should be below the fuel tanks, gearboxes, and axles of the equipment unless lubricants and fuels are sealed such that inundation by water will not result in discharges of fuels, oils, greases, or hydraulic fluids.

- Excavation equipment buckets may reach out into the water for the purpose of removing or placing fill materials. Only the bucket of the crane/ excavator/backhoe may operate in a water body. The main body of the crane/excavator/backhoe should not enter the water body except as necessary to cross the stream to access the work site.

- Stationary equipment such as motors and pumps located within or adjacent to a water body, should be positioned over drip pans.

- When any artificial obstruction is being constructed, maintained, or placed in operation, sufficient water should, at all times, be allowed to pass downstream to maintain aquatic life.

- Equipment should not be parked below the high-water mark unless allowed by a permit.

- Disturbance or removal of vegetation should not exceed the minimum necessary to complete operations. Precautions should be taken to avoid damage to vegetation by people or equipment. Disturbed vegetation should be replaced with the appropriate erosion control measures.

- Riparian vegetation approved for trimming as part of the project should be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation should be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble should be removed upon completion of project activities.

- Drip pans should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.

- Where possible, avoid or minimize diversion and encroachment impacts by scheduling construction during periods of low flow or when the stream is dry. Scheduling should also consider seasonal releases of water from dams, fish migration and spawning seasons, and water demands due to crop irrigation.

- Construct diversion structures with materials free of potential pollutants such as soil, silt, sand, clay, grease, or oil.

Temporary Diversions and Encroachments

- Construct diversion channels in accordance with EC-9, Earth Dikes and Drainage Swales.

- In high flow velocity areas, stabilize slopes of embankments and diversion ditches using an appropriate liner, in accordance with EC-7, Geotextiles and Mats, or use rock slope protection.

- Where appropriate, use natural streambed materials such as large cobbles and boulders for temporary embankment and slope protection, or other temporary soil stabilization methods.

- Provide for velocity dissipation at transitions in the diversion, such as the point where the stream is diverted to the channel and the point where the diverted stream is returned to its natural channel. See also EC-10, Velocity Dissipation Devices.

Temporary Dry Construction Areas

- When dewatering behind temporary structures to create a temporary dry construction area, such as cofferdams, pass pumped water through a sediment-settling device, such as a portable tank or settling basin, before returning water to the water body. See also NS-2, Dewatering Operations.

- Any substance used to assemble or maintain diversion structures, such as form oil, should be non-toxic and non-hazardous.

- Any material used to minimize seepage underneath diversion structures, such as grout, should be non-toxic, non-hazardous, and as close to a neutral pH as possible.

Comparison of Diversion and Isolation Techniques:

- Gravel bags are relatively inexpensive, but installation and removal can be labor intensive. It is also difficult to dewater the isolated area. Sandbags should not be used for this technique in rivers or streams, as sand should never be put into or adjacent to a stream, even if encapsulated in geotextile.

- Gravel Bag Berms (SE-6) used in conjunction with an impermeable membrane are cost effective and can be dewatered relatively easily. If spawning gravel is used, the impermeable membrane can be removed from the stream, and the gravel can be spread out and left as salmonid spawning habitat if approved in the permit. Only clean, washed gravel should be used for both the gravel bag and gravel berm techniques.

- Cofferdams are relatively expensive, but frequently allow full dewatering. Also, many options now available are relatively easy to install.

- Sheet pile enclosures are a much more expensive solution but do allow full dewatering. This technique is not well suited to small streams, but can be effective on large rivers or lakes, and where staging and heavy equipment access areas are available.

- K-rails are an isolation method that does not allow full dewatering, but can be used in small to large watercourses, and in fast-water situations.

- A relatively inexpensive isolation method is filter fabric isolation. This method involves placement of gravel bags or continuous berms to ‘key-in’ the fabric, and subsequently staking the fabric in place. This method should be used in relatively calm water and can be used in smaller streams. Note that this is not a dewatering method, but rather a sediment isolation method.

- Turbidity curtains should be used where sediment discharge to a stream is unavoidable. They can also be used for in-stream construction, when dewatering an area is not required.

- When used in watercourses or streams, cofferdams must be used in accordance with permit requirements.

- Manufactured diversion structures should be installed following manufacturer’s specifications.

- Filter fabric and turbidity curtain isolation installation methods can be found in the specific technique descriptions that follow.

Filter Fabric Isolation Technique

Definition and Purpose

A filter fabric isolation structure is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in or adjacent to water. This structure is composed of filter fabric, gravel bags, and steel t-posts.

Appropriate Applications

- Filter fabric may be used for construction activities such as streambank stabilization, or culvert, bridge, pier or abutment installation. It may also be used in combination with other methods, such as clean water bypasses and/or pumps.

- Filter fabric isolation is relatively inexpensive. This method involves placement of gravel bags or continuous berms to 'key-in' the fabric, and subsequently staking the fabric in place.

- If spawning gravel is used, all other components of the isolation can be removed from the stream, and the gravel may be spread out and left as salmonid spawning habitat if approved in the permit. Whether spawning gravel or other types of gravel are used, only clean washed gravel should be used as infill for the gravel bags or continuous berm.

- This method should be used in relatively calm water and can be used in smaller streams. This is not a dewatering method, but rather a sediment isolation method.

- Water levels inside and outside the fabric curtain must be about the same, as differential heads will cause the curtain to collapse.

Limitations

- Do not use if the installation, maintenance and removal of the structures will disturb sensitive aquatic species of concern.

- Filter fabrics are not appropriate for projects where dewatering is necessary.

- Filter fabrics are not appropriate to completely dam stream flow.

Design and Installation

- For the filter fabric isolation method, a non-woven or heavy-duty fabric is recommended over standard silt fence. Using rolled geotextiles allows non-standard widths to be used.

- Anchor filter fabric with gravel bags filled with clean, washed gravel. Do not use sand. If a bag should split open, the gravel can be left in the stream, where it can provide aquatic habitat benefits. If a sandbag splits open in a watercourse, the sand could cause a decrease in water quality, and could bury sensitive aquatic habitat.

- Another anchor alternative is a continuous berm, made with the Continuous Berm Machine. This is a gravel-filled bag that can be made in very long segments. The length of the berms is usually limited to 18 ft for ease of handling (otherwise, it gets too heavy to move).

- Place the fabric on the bottom of the stream, and place either a bag of clean, washed gravel or a continuous berm over the bottom of the silt fence fabric, such that a bag-width of fabric lies on the stream bottom. The bag should be placed on what will be the outside of the isolation area.
- Pull the fabric up and place a metal t-post immediately behind the fabric, on the inside of the isolation area; attach the silt fence to the post with three diagonal nylon ties.
- Continue placing fabric as described above until the entire work area has been isolated, staking the fabric at least every 6 ft.

Inspection and Maintenance

- Immediately repair any gaps, holes or scour.
- Remove and properly dispose of sediment buildup.
- Remove BMP upon completion of construction activity. Recycle or reuse if applicable.
- Revegetate areas disturbed by BMP removal if needed.

Turbidity Curtain Isolation Technique

Definition and Purpose

A turbidity curtain is a fabric barrier used to isolate the near shore work area. The barriers are intended to confine the suspended sediment. The curtain is a floating barrier, and thus does not prevent water from entering the isolated area; rather, it prevents suspended sediment from getting out.

Appropriate Applications

Turbidity curtains should be used where sediment discharge to a stream is unavoidable. They are used when construction activities adjoin quiescent waters, such as lakes, ponds, and slow flowing rivers. The curtains are designed to deflect and contain sediment within a limited area and provide sufficient retention time so that the sediment particles will fall out of suspension.

Limitations

- Turbidity curtains should not be used in flowing water; they are best suited for use in ponds, lakes, and very slow-moving rivers.
- Turbidity curtains should not be placed across the width of a channel.
- Removing sediment that has been deflected and settled out by the curtain may create a discharge problem through the resuspension of particles and by accidental dumping by the removal equipment.

Design and Installation

- Turbidity curtains should be oriented parallel to the direction of flow.
- The curtain should extend the entire depth of the watercourse in calm-water situations.
- In wave conditions, the curtain should extend to within 1 ft of the bottom of the watercourse, such that the curtain does not stir up sediment by hitting the bottom repeatedly. If it is

desirable for the curtain to reach the bottom in an active-water situation, a pervious filter fabric may be used for the bottom 1 ft.

- The top of the curtain should consist of flexible flotation buoys, and the bottom should be held down by a load line incorporated into the curtain fabric. The fabric should be a brightly colored impervious mesh.
- The curtain should be held in place by anchors placed at least every 100 ft.
- First, place the anchors, then tow the fabric out in a furled condition, and connect to the anchors. The anchors should be connected to the flotation devices, and not to the bottom of the curtain. Once in place, cut the furling lines, and allow the bottom of the curtain to sink.
- Consideration must be given to the probable outcome of the removal procedure. It must be determined if it will create more of a sediment problem through re-suspension of the particles or by accidental dumping of material during removal. It is recommended that the soil particles trapped by the turbidity curtain only be removed if there has been a significant change in the original contours of the affected area in the watercourse.
- Particles should always be allowed to settle for a minimum of 6 to 12 hours prior to their removal or prior to removal of the turbidity curtain.

Maintenance and Inspection:

- The curtain should be inspected for holes or other problems, and any repairs needed should be made promptly.
- Allow sediment to settle for 6 to 12 hours prior to removal of sediment or curtain. This means that after removing sediment, wait an additional 6 to 12 hours before removing the curtain.
- To remove, install furling lines along the curtain, detach from anchors, and tow out of the water.

K-rail River Isolation

Definition and Purpose

This temporary sediment control or stream isolation method uses K-rails to form the sediment deposition area, or to isolate the in-stream or near-bank construction area.

Barriers are placed end-to-end in a pre-designed configuration and gravel-filled bags are used at the toe of the barrier and at their abutting ends to seal and prevent movement of sediment beneath or through the barrier walls.

Appropriate Applications

The K-rail isolation can be used in streams with higher water velocities than many other isolation techniques.

- This technique is also useful at the toe of embankments and cut or fill slopes.

Limitations

- The K-rail method should not be used to dewater a project site, as the barrier is not watertight.

Design and Installation

- To create a floor for the K-rail, move large rocks and obstructions. Place washed gravel and gravel-filled bags to create a level surface for K-rails to sit. Washed gravel should always be used.
- Place the bottom two K-rails adjacent to each other, and parallel to the direction of flow; fill the center portion with gravel bags. Then place the third K-rail on top of the bottom two. There should be sufficient gravel bags between the bottom K-rails such that the top rail is supported by the gravel. Place plastic sheeting around the K-rails, and secure at the bottom with gravel bags.
- Further support can be added by pinning and cabling the K-rails together. Also, large riprap and boulders can be used to support either side of the K-rail, especially where there is strong current.

Inspection and Maintenance:

- The barrier should be inspected, and any leaks, holes, or other problems should be addressed immediately.
- Sediment should be allowed to settle for at least 6 to 12 hours prior to removal of sediment, and for 6 to 12 hours prior to removal of the barrier.

Stream Diversions

The selection of which stream diversion technique to use will depend upon the type of work involved, physical characteristics of the site, and the volume of water flowing through the project.

Advantages of a Pumped Diversion

- Downstream sediment transport can be nearly eliminated.
- Dewatering of the work area is possible.
- Pipes can be moved around to allow construction operations.
- The dams can serve as temporary access to the site.
- Increased flows can be managed by adding more pumping capacity.

Disadvantages of a Pumped Diversion

- Flow volume is limited by pump capacity.
- A pumped diversion requires 24-hour monitoring of pumps.
- Sudden rain could overtop dams.
- Erosion at the outlet.

- Minor in-stream disturbance is required to install and remove dams.

Advantages of Excavated Channels and Flumes

- Excavated channels isolate work from water flow and allow dewatering.
- Excavated channels can handle larger flows than pumps.

Disadvantages of Excavated Channels and Flumes

- Bypass channel or flume must be sized to handle flows, including possible floods.
- Channels must be protected from erosion.
- Flow diversion and re-direction with small dams involves in-stream disturbance and mobilization of sediment.

Design and Installation

- Installation guidelines will vary based on existing site conditions and type of diversion used.
- Pump capacity must be sufficient for design flow.
- A standby pump is required in case a primary pump fails.
- Dam materials used to create dams upstream and downstream of diversion should be erosion resistant; materials such as steel plate, sheet pile, sandbags, continuous berms, inflatable water bladders, etc., would be acceptable.

When constructing a diversion channel, begin excavation of the channel at the proposed downstream end, and work upstream. Once the watercourse to be diverted is reached and the excavated channel is stable, breach the upstream end and allow water to flow down the new channel. Once flow has been established in the diversion channel, install the diversion weir in the main channel; this will force all water to be diverted from the main channel.

Inspection and Maintenance

- Pumped diversions require 24-hour monitoring of pumps.
- Inspect embankments and diversion channels for damage to the linings, accumulating debris, sediment buildup, and adequacy of the slope protection. Remove debris and repair linings and slope protection as required. Remove holes, gaps, or scour.
- Upon completion of work, the diversion or isolation structure should be removed, and flow should be redirected through the new culvert or back into the original stream channel. Recycle or reuse if applicable.
- Revegetate areas disturbed by BMP removal if needed.

Costs

Costs of clear water diversion vary considerably and can be very high.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.

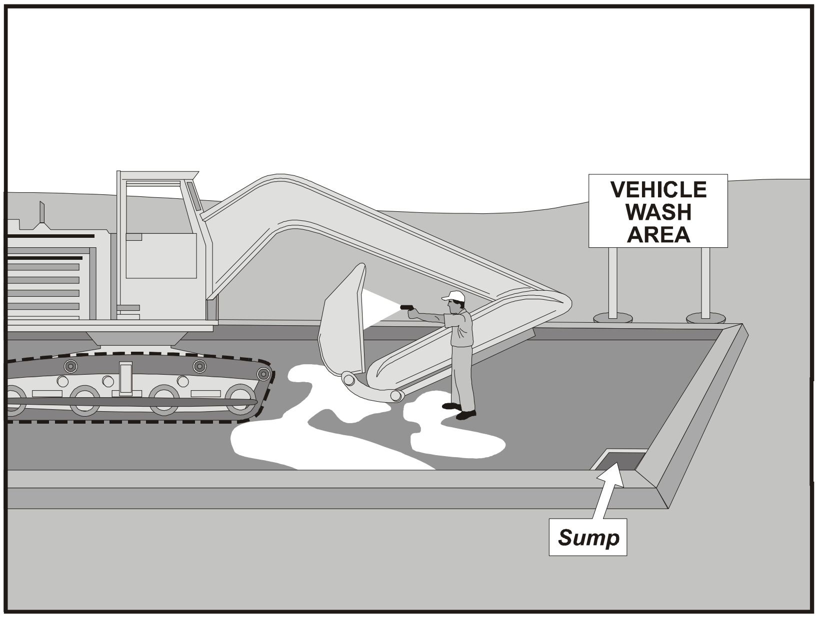
- Refer to BMP-specific inspection and maintenance requirements.

References

California Bank and Shore Rock Slope Protection Design – Practitioners Guide and Field Evaluations of Riprap Methods, Caltrans Study No. F90TL03, October 2000.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

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

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

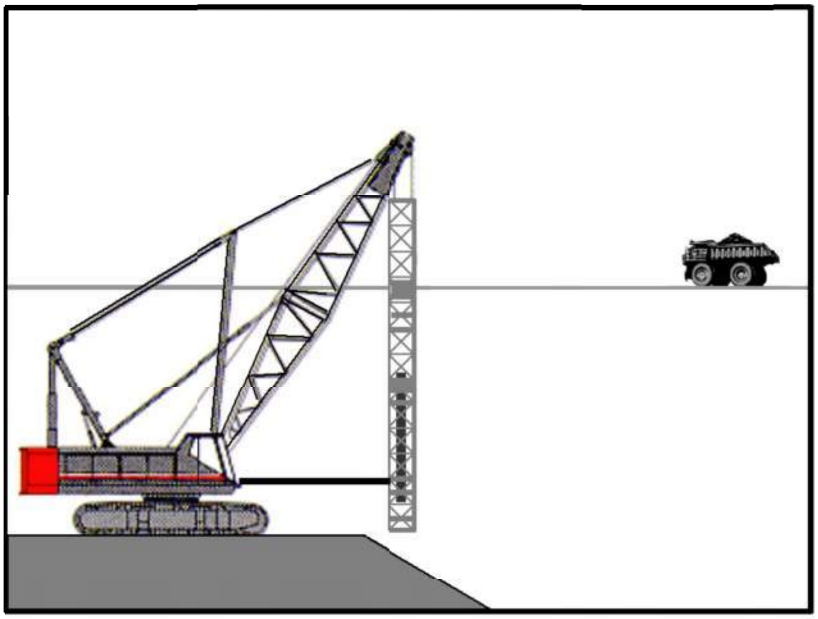
Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

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:

Pile Driving Operations



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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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.

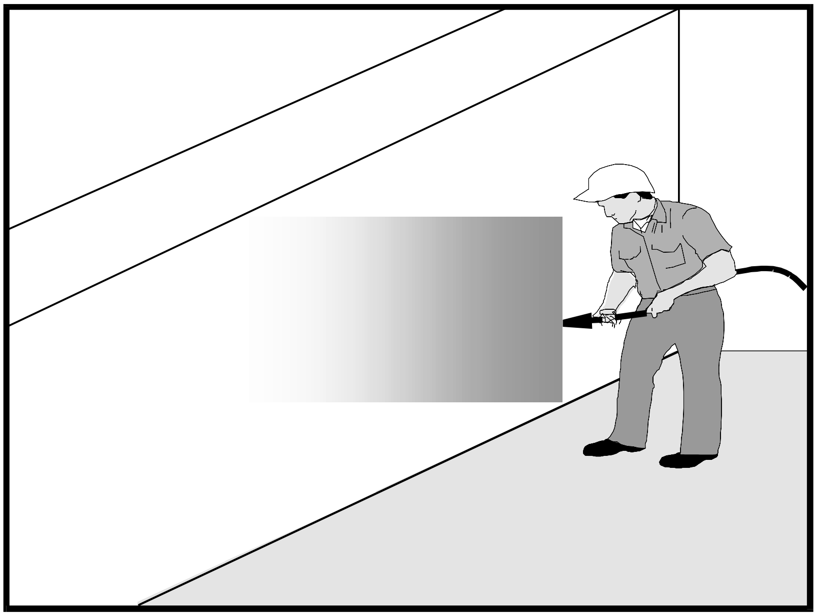
Limitations

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



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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

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.

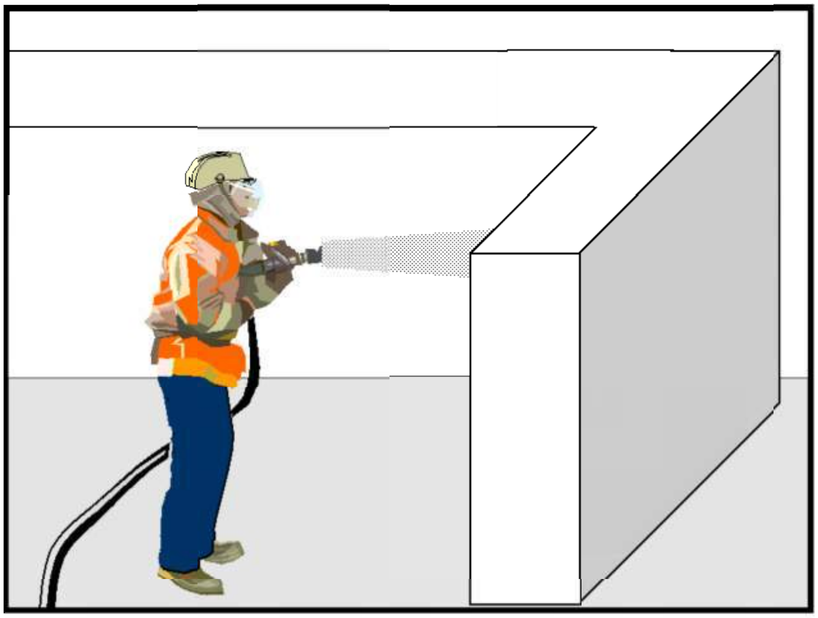
Suitable Applications

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

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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

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.

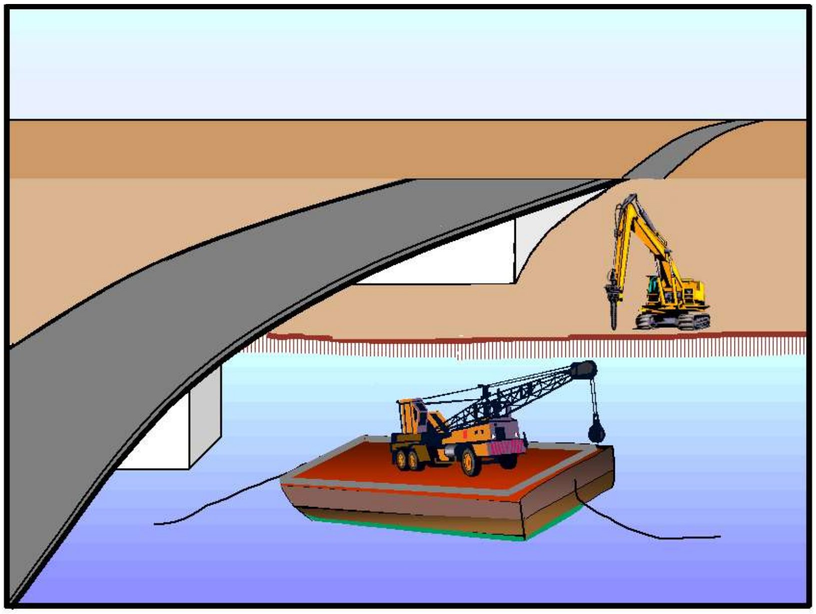
The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

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.

Material Over Water NS-14



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

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Procedures for the proper use, storage, and disposal of materials and equipment on barges, boats, temporary construction pads, or similar locations that minimize or eliminate the discharge of potential pollutants to a watercourse.

Suitable Applications

Applies where materials and equipment are used on barges, boats, docks, and other platforms over or adjacent to a watercourse including waters of the United States. These procedures should be implemented for construction materials and wastes (solid and liquid), soil or dredging materials, or any other materials that may cause or contribute to exceedances of water quality standards.

Limitations

Dredge and fill activities are regulated by the US Army Corps of Engineers and Regional Boards under Section 404/401 of the Clean Water Act.

Implementation

- Refer to WM-1, Material Delivery and Storage and WM-4, Spill Prevention and Control.
- Use drip pans and absorbent materials for equipment and vehicles and ensure that an adequate supply of spill clean up materials is available.
- Drip pans should be placed under all vehicles and equipment placed on docks, barges, or other structures over

water bodies when the vehicle or equipment is expected to be idle for more than 1 hour.

- Maintain equipment in accordance with NS-10, Vehicle and Equipment Maintenance. If a leaking line cannot be repaired, remove equipment from over the water.
- Provide watertight curbs or toe boards to contain spills and prevent materials, tools, and debris from leaving the barge, platform, dock, etc.
- Secure all materials to prevent discharges to receiving waters via wind.
- Identify types of spill control measures to be employed, including the storage of such materials and equipment. Ensure that staff is trained regarding the use of the materials, deployment and access of control measures, and reporting measures.
- In case of spills, contact the local Regional Board as soon as possible but within 48 hours.
- Refer to WM-5, Solid Waste Management (non-hazardous) and WM-6, Hazardous Waste Management. Ensure the timely and proper removal of accumulated wastes
- Comply with all necessary permits required for construction within or near the watercourse, such as Regional Water Quality Control Board, U.S. Army Corps of Engineers, Department of Fish and Game or and other local permitting.
- Discharges to waterways should be reported to the Regional Water Quality Control Board immediately upon discovery. A written discharge notification must follow within 7 days. Follow the spill reporting procedures contained in SWPPP.

Costs

These measures are generally of low to moderate cost. Exceptions are areas for temporary storage of materials, engine fluids, or wastewater pump out.

Inspection and Maintenance

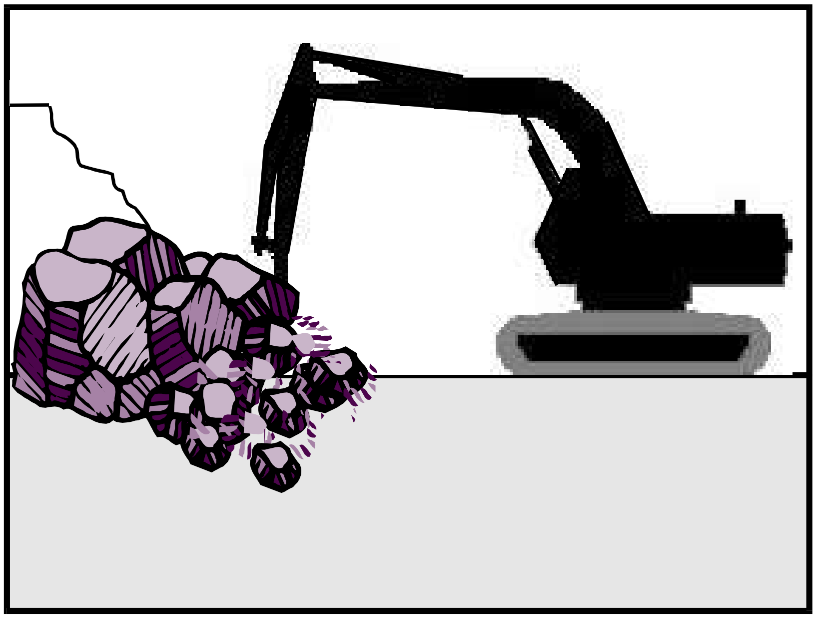
- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Ensure that employees and subcontractors implement the appropriate measures for storage and use of materials and equipment.
- Inspect and maintain all associated BMPs and perimeter controls to ensure continuous protection of the water courses, including waters of the United States.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Demolition Adjacent to Water NS-15



Categories

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

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

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

Potential Alternatives

None

Description and Purpose

Procedures to protect water bodies from debris and wastes associated with structure demolition or removal over or adjacent to watercourses.

Suitable Applications

Full bridge demolition and removal, partial bridge removal (barrier rail, edge of deck) associated with bridge widening projects, concrete channel removal, or any other structure removal that could potentially affect water quality.

Limitations

None identified.

Implementation

- Refer to NS-5, Clear Water Diversion, to direct water away from work areas.
- Use attachments on construction equipment such as backhoes to catch debris from small demolition operations.
- Use covers or platforms to collect debris.
- Platforms and covers are to be approved by the owner.
- Stockpile accumulated debris and waste generated during demolition away from watercourses and in accordance with WM-3, Stockpile Management.
- Ensure safe passage of wildlife, as necessary.

- Discharges to waterways shall be reported to the Regional Water Quality Control Board immediately upon discovery. A written discharge notification must follow within 7 days. Follow the spill reporting procedures in the SWPPP.

- For structures containing hazardous materials, i.e., lead paint or asbestos, refer to BMP WM-6, Hazardous Waste Management. For demolition work involving soil excavation around lead-painted structures, refer to WM-7, Contaminated Soil Management.

Costs
Cost may vary according to the combination of practices implemented.

Inspection and Maintenance
- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

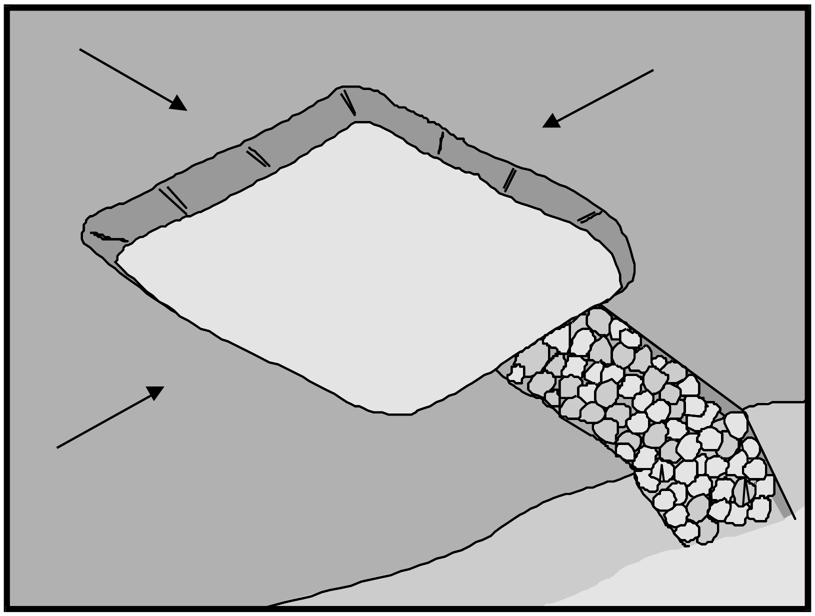
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Any debris-catching devices shall be emptied regularly. Collected debris shall be removed and stored away from the watercourse and protected from runon and runoff.

References
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

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.

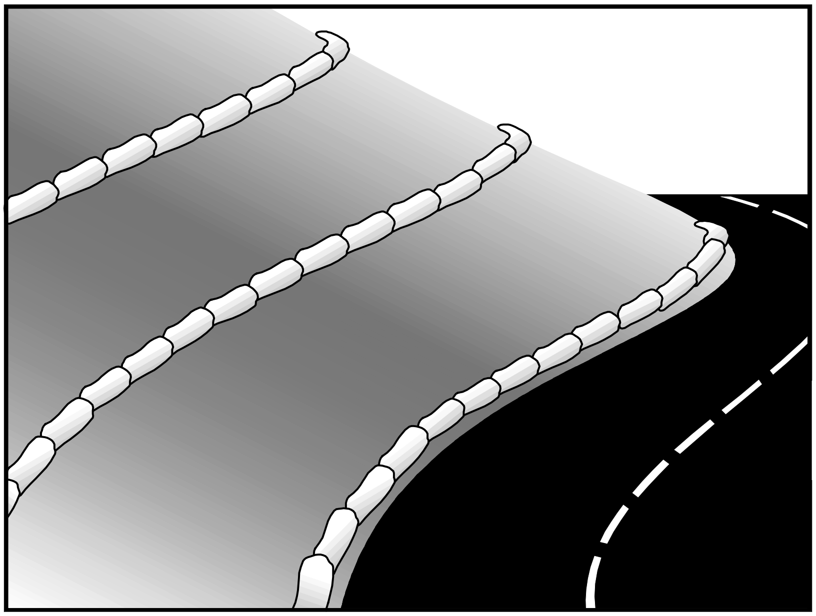
Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance.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

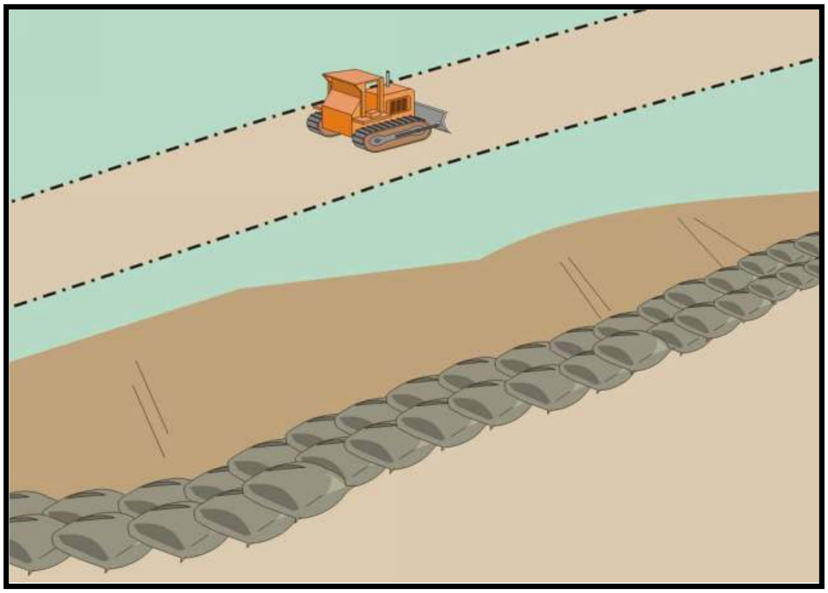
Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

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.



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-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

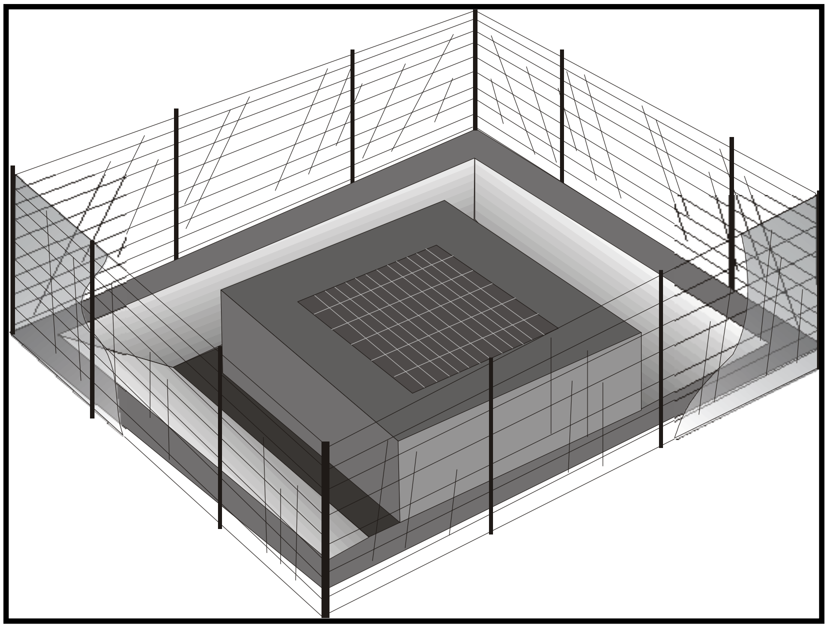
Description and Purpose

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.



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

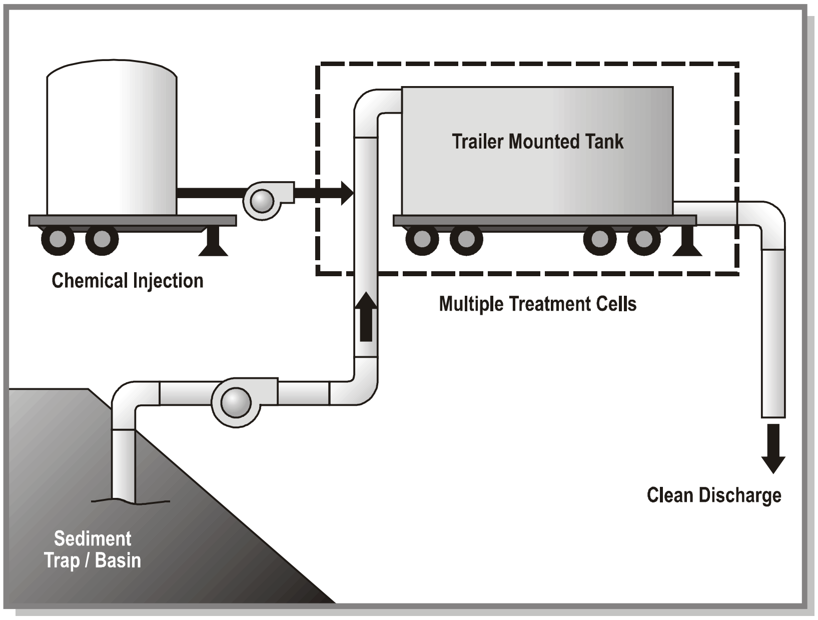
SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

SE-13 Compost Socks and Berms



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.

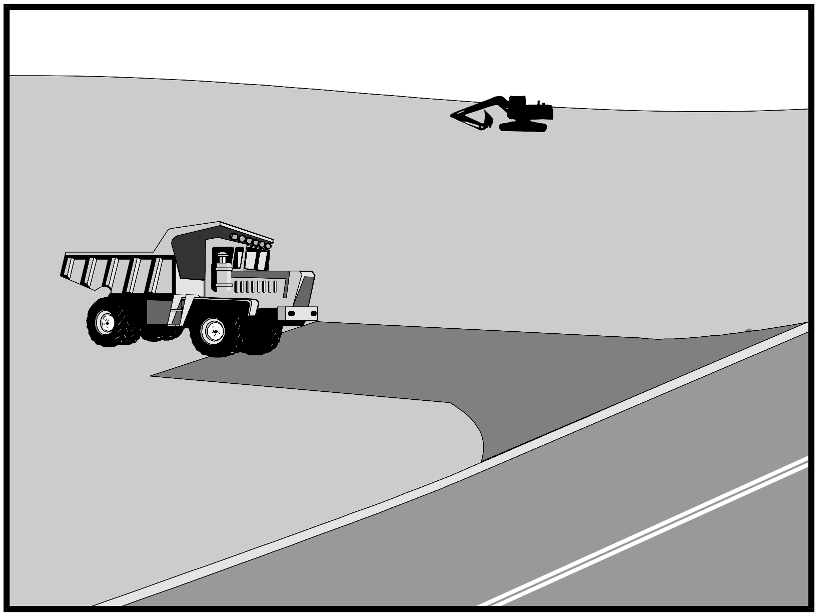
Suitable Applications

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



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.

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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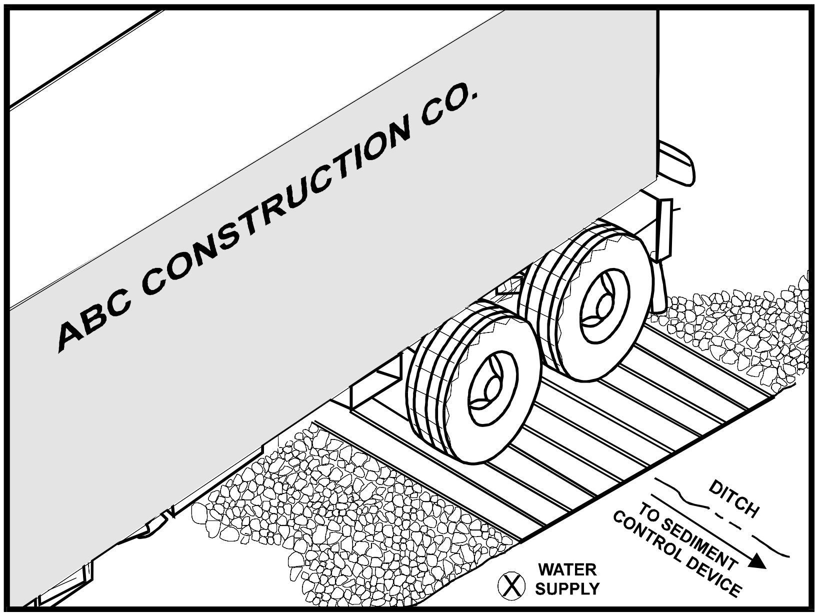
CALIFORNIA STORMWATER QUALITY ASSOCIATION

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**

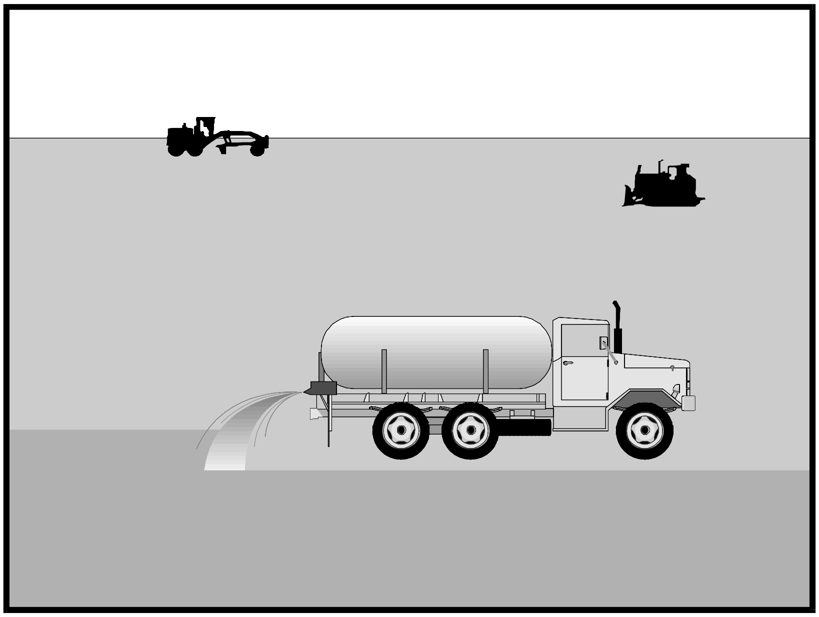
☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

TC-1 Stabilized Construction Entrance/Exit



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

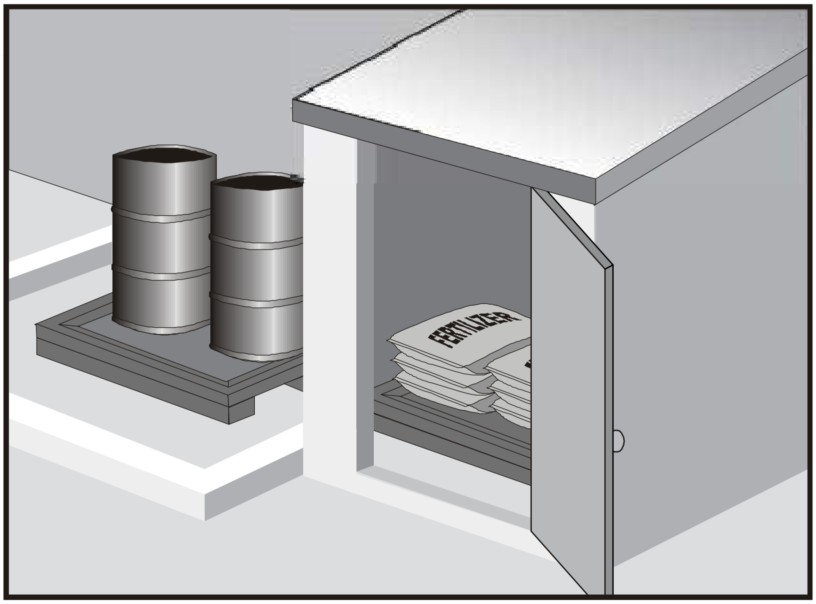
Description and Purpose

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:



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

Categories

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

Legend:

☑ **Primary Category**

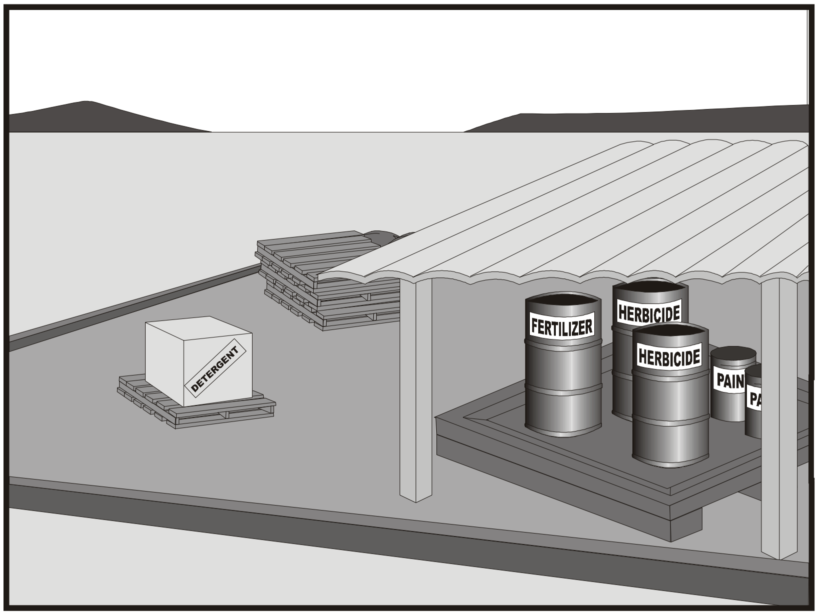
☒ **Secondary Category**

Targeted Constituents

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

Potential Alternatives

None



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

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

Potential Alternatives

None

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Description and Purpose

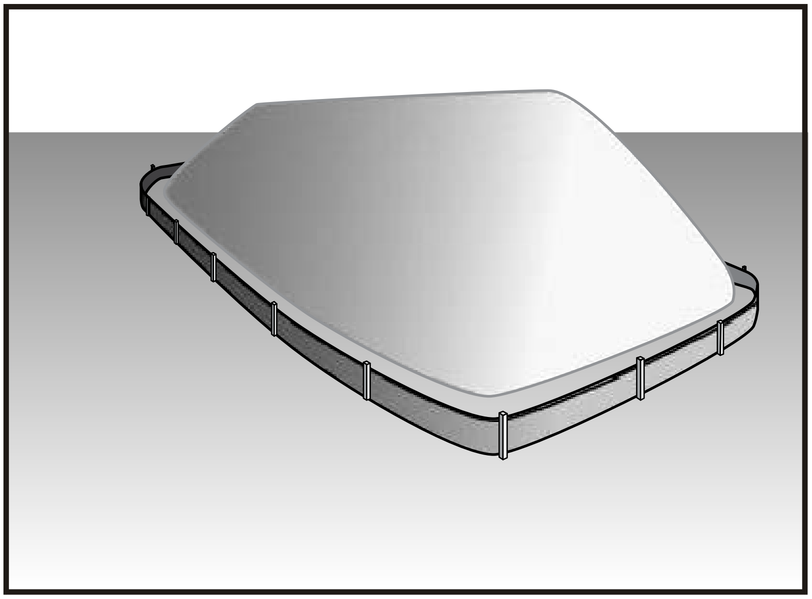
Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

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

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

Stockpile Management WM-3



Categories

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

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

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

Potential Alternatives

None

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.

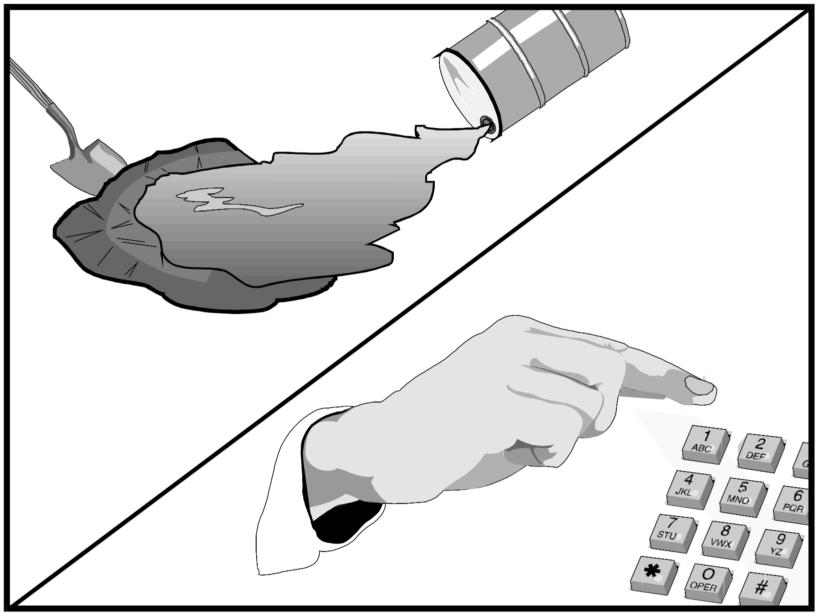
Limitations

- 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:

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

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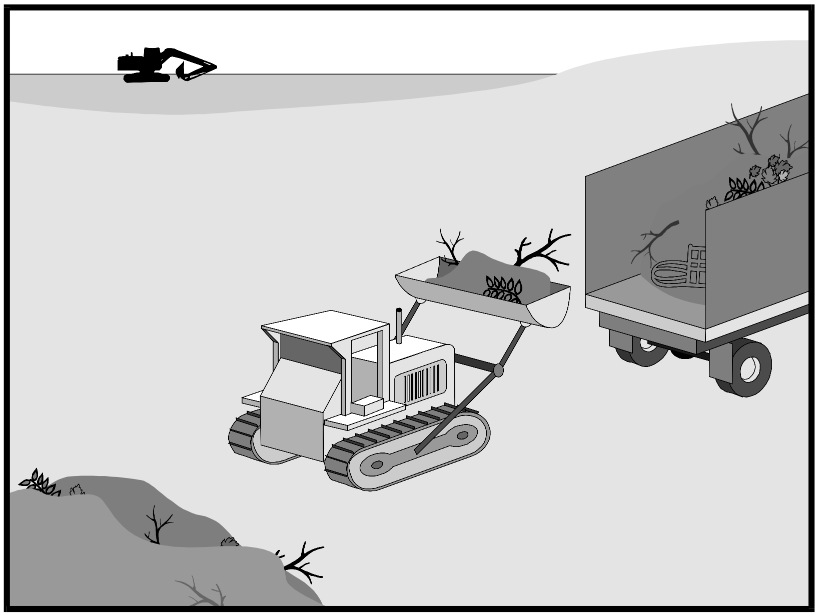
Solid Waste Management WM-5



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

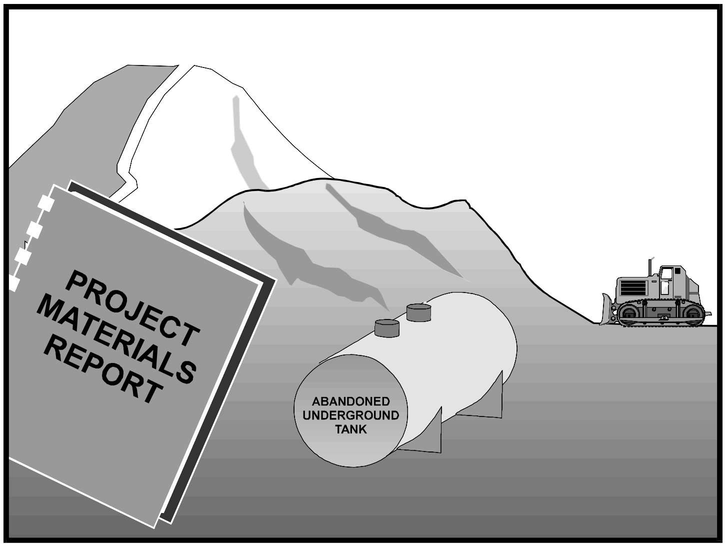
Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

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

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**

Targeted Constituents

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

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants to 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.

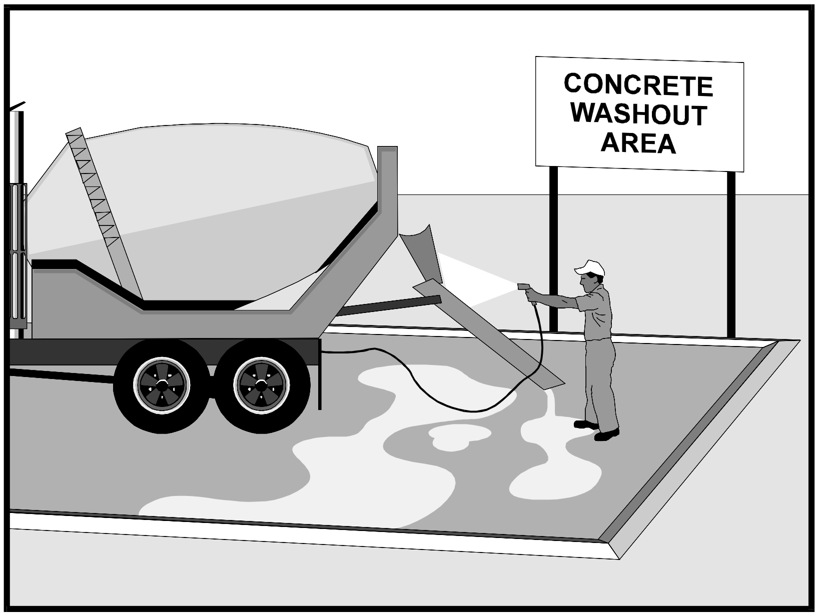
The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

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

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

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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.

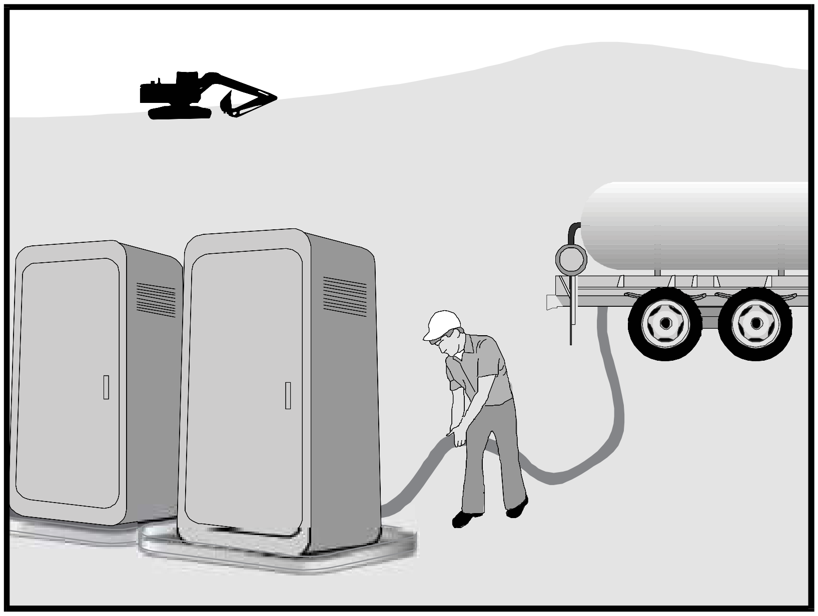
The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

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.



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

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.

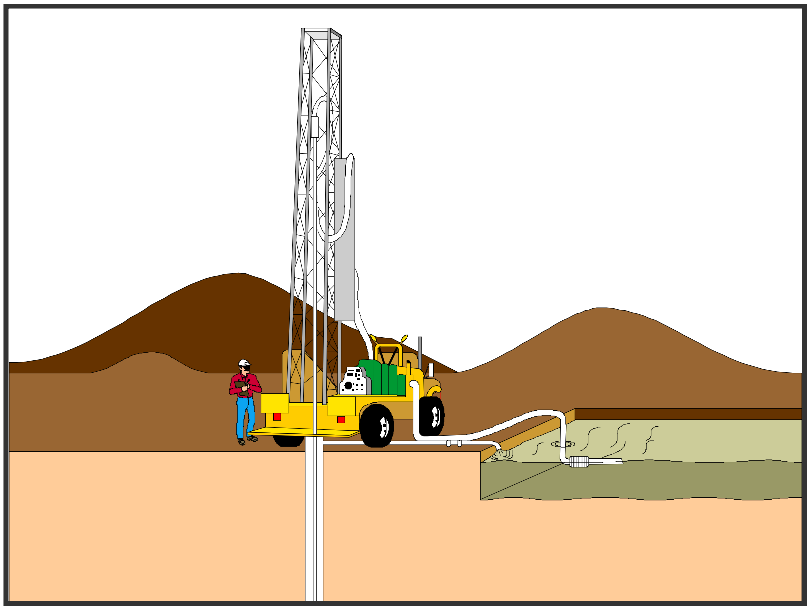
Implementation

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



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

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

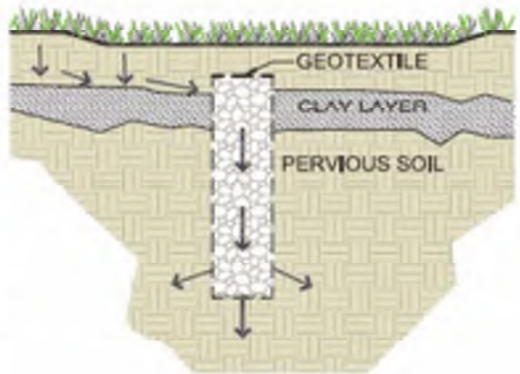
- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).
- Liquid waste management does not apply to dewatering operations (NS-2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

EXHIBIT 2

TYPICAL LID BMPs

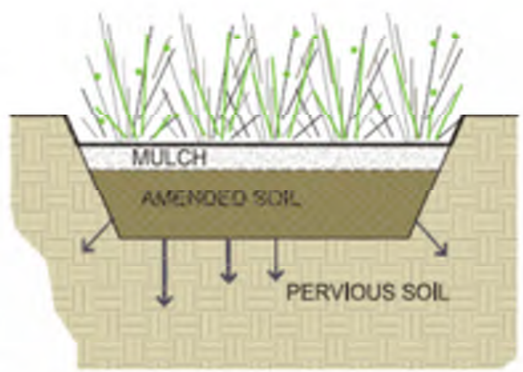
Dry Wells

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



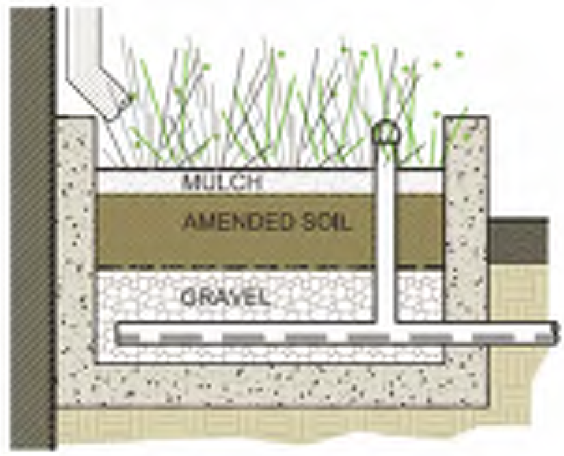
Bioretention

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

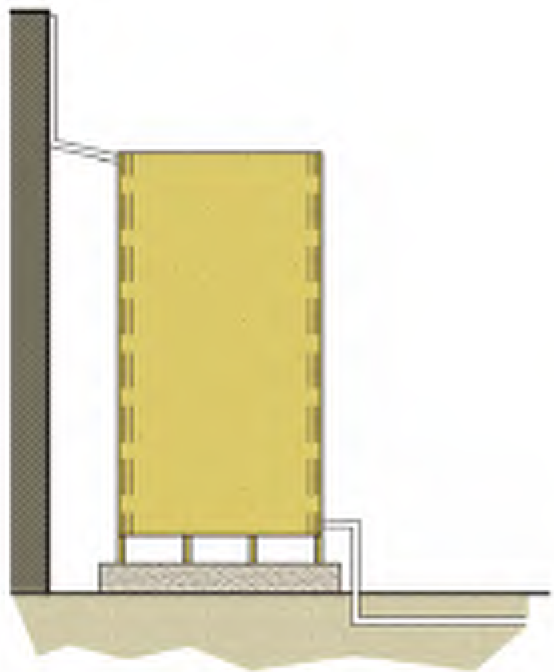


Planter Boxes

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



4.5 CAPTURE AND USE BMPS



Cistern Example

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