APPENDIX F

HYDROLOGY & WATER QUALITY CIVIL NARRATIVE

CIVIL NARRATIVE

The primary objective of this report is to provide a description of the surface water hydrology and surface water quality at the Project Site and to analyze the projects potential significance related to the impact on surface water hydrology, surface water quality and provide recommendations for storm water mitigation. The existing and proposed site conditions are analyzed in Section 6 of this report. The mitigation measures and recommendations have been included in Section 7 of this report.

1.0 Project Description

The Weddington Golf and Tennis Club is located at 4141 Whitsett Avenue in the City of Los Angeles, California. It is bound by Valley Spring Lane to the north; Valleyheart Drive to the south; Bellaire Avenue to the west; and, Whitsett Avenue to the east. The site is also adjacent to the Los Angeles River.

The existing site consists of a nine-hole pitch and putt course, driving range, clubhouse, sixteen (16) tennis courts and a surface parking lot. Southeast of the project site is the Los Angeles Fire Station No. 78, which is constructed on a 1.1-acre parcel.

The existing site is proposed to be subdivided into two parcels, Lot 1 and Lot 2, with separate use for each lot i.e. the continuation of the recreational use at Golf Course Site, and the establishment of a new multi-family senior residential center. Lot 1 will be approximately 11.59 acres and will retain, with minor alterations to accommodate the lot subdivision, the nine-hole golf course, driving range, clubhouse and the surface parking lot. Lot 2 will be approximately 4.52 acres and will be developed with a 200-unit senior living residential campus and 613 subterranean parking spaces.

Per the scope of the proposed development, existing sixteen (16) tennis courts and a portion of the surface parking lot will be removed and replaced with six (6) senior residential buildings and community services and facilities. Approximately twenty-two (22) of the surface parking spaces will be retained to service the golf course, driving range and the clubhouse. The development site will be located at the southeasterly portion of the property. Note that the fire station is not a part of the project development. A fire access lane for emergency and LAFD access to the proposed development will be provided by extending the terminus of Valleyheart Drive.

The golf course (Lot 1) will continue the operation of the existing Weddington Golf Course and associated driving range and clubhouse facilities. Minor alterations to Lot 1 will consist of shortening the length of two (2) green/hole i.e. hole no. 5 and 6 and elimination of three (3) of the twenty-four (24) existing driving range tees to accommodate the new development and property subdivision.

It is the intention to create an aesthetically pleasing and integrated senior residential community, which will maintain existing site features such as the pitch-and-putt golf course, driving range and clubhouse. There will also be an emphasis on maintaining and beautifying the connection with the Los Angeles River flood channel.

2.0 Existing Flood Plain Description

FEMA (Federal Emergency Management Agency) Maps show the site lies in Flood Plain, Zone C. This indicates that the site falls under minimal flood hazard zone, which is basically an area outside the Special Flood Hazard Areas (SFHA) and higher than the elevation of the 0.2-percent-annual-chance flood.

3.0 Regulatory Framework

3.1 Surface Water Hydrology

County of Los Angeles Hydrology Manual

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

Los Angeles Municipal Code

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

3.2 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

[1] Los Angeles County Department of Public Works Hydrology Manual, January 2006, http://ladpw.org/wrd/publication/index.cfm, accessed October 19, 2011.

and the control of pollutant discharges. The Clean Water Act also sets forth a number of objectives in order to achieve the above-mentioned goals. These objectives include regulating pollutant and toxic pollutant discharges; providing for water quality that protects and fosters the propagation of fish, shellfish and wildlife; developing waste treatment management plans; and developing and implementing programs for the control of non-point sources of pollution.[2]

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

In response to the 1987 amendments to the Clean Water Act and as part of Phase I of its NPDES permit program, the USEPA began requiring NPDES permits for: (1) municipal separate storm sewer systems (MS4) generally serving, or located in, incorporated cities with 100,000 or more people (referred to as municipal permits); (2) 11 specific categories of industrial activity (including landfills); and (3) construction activity that disturbs five acres or more of land. Phase II of the USEPA's NPDES permit program, which went into effect in early 2003, extended the requirements for NPDES permits to: (1) numerous small municipal separate storm sewer systems,[3] (2) construction sites of one to five acres, and (3) industrial facilities owned or operated by small municipal separate storm sewer systems. The NPDES permit program is typically administered by individual authorized states.

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

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

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

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

waste discharge requirements, enforce action against stormwater discharge violators, and monitor water quality. [4]

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. 2009-0009-DWQ known as "The General Permit" was adopted on September 2, 2009. This NPDES permit establishes a risk-based approach to stormwater control requirements for construction projects by identifying three project risk levels. The main objectives of the General Permit are to:

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

California mandates requirements for all construction activities disturbing more than one acre of land to develop and implement Stormwater Pollution Prevention Plans (SWPPP). The SWPPP documents the selection and implementation of Best Management Practices for a specific construction project, charging Owners with stormwater quality management responsibilities. A construction site subject to the General Permit must prepare and implement a SWPPP that meets the requirements of the General Permit.[5, 6]

Los Angeles County Municipal Storm Water System (MS4) Permit

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

On December 13, 2001, the LARWQCB adopted Order No. 01-182 under the CWA and the Porter-Cologne Act. This Order is the NPDES Permit or MS4 permit for municipal stormwater and urban runoff discharges within Los Angeles County. The requirements of this Order (the "Permit") cover 84 cities and most of the unincorporated areas of Los Angeles County. Under the Permit, the Los Angeles County Flood Control District (LACFCD) is designated as the Principal Permittee. The Permittees are the 84 Los Angeles County cities (including the City of Los Angeles) and Los Angeles County. Collectively, these are the "Co-Permittees". The Principal

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

[5] State Water Resources Control Board. State Water Resources Control Board. July 2011 http://www.swrcb.ca.gov/water_issues/programs/npdes/

[6] USEPA. U.S. Environmental Protection Agency - NPDES. July 2011 http://cfpub.epa.gov/npdes/

Permittee helps to facilitate activities necessary to comply with the requirements outlined in the Permit but is not responsible for ensuring compliance of any of the Permittees.

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

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

Permittees are required to adopt the requirements set herein in their own SUSMP. Additional BMPs may be required by ordinance or code adopted by the Permittee and applied in a general way to all projects or on a case by case basis.

Low Impact Development (LID)
In October 2011, the City of Los Angeles passed an ordinance (Ordinance No. 181899) amending City of Los Angeles Municipal Code Chapter VI, Article 4.4, Sections 64.70.01 and 64.72 to expand the applicability of the existing Standard Urban Stormwater Mitigation Plan requirements by imposing rainwater Low Impact Development (LID) strategies on projects that require building permits.

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

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

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

Low Impact Development design has become a leading practice for stormwater pollution prevention. The Regional Water Quality Control Board (RWQCB), State Water Resources Control Board (SWRCB), United States Environmental Protection Agency (EPA) and City of Los Angeles have prioritized the use of LID as the preferred approach to stormwater management. Refer to Attachment B for the parameters that constitute the implementation of a Low Impact Development Plan or Standard Urban Stormwater Mitigation Plan (SUSMP).

The City of Los Angeles Bureau of Sanitation, Watershed Protection Division will adopt the Low Impact Development (LID) standards as issued by the LARWQCB and the City of Los Angeles Department of Public Works. The LID Ordinance will conform to the regulations outlined in the NPDES Permit and SUSMP.

River Improvement Overlay (RIO) District
As noted above in Section 1.0, the project site is adjacent to the Los Angeles River. As such, it is subject to the design guidelines established in the River Improvement Overlay (RIO) District. The RIO is a proposed special use district comprised of the following:

- Property Improvement Guidelines - projects must receive clearance from the Department of City Planning prior to obtaining a building permit by meeting a required threshold of twenty (20) points assigned in three (3) design categories: Watershed, Urban Design and Mobility.
  - In the Watershed category, points can be accrued for stormwater management, stream enhancement, landscaping, water conservation, hardscape, landscape/hardscape maintenance, and open space design.
  - In the Urban Design category, points can be accrued from vehicle parking, transparency, site lighting, and visual clutter design.
  - Lastly, in the Mobility category, points can be accrued from connectivity, pedestrian, transit, bicycle and vehicular design.
- Complete Green Street Standards - these standards apply to the area between the property line and the edge of the curb for all new projects. They include the implementation of pedestrian street lights, bicycle racks, trees and landscaping.
- Complete Green Street Guidelines - these guidelines serve as options to mitigate the environmental impact of a project, as well as guide the design of street improvements. They include pedestrian scale improvement; water conservation; street calming; bicycle lanes; and, transit amenity improvements.

The Los Angeles River Improvement Overlay District is established to implement the urban design goals and principles outlined in the Los Angeles River Revitalization Master

Plan (LARRMP) - for more information, visit www.lariver.org. It is intended to promote sustainability of the Los Angeles River and the Greenway; establish a positive between properties adjacent to the Greenway and the River Greenway; and, create active pedestrian streets that lead to the River.

4.0 Significance Threshold

4.1 Surface Water Hydrology

The City of Los Angeles CEQA Thresholds Guide states that a project would normally have a significant impact on surface water hydrology if it would:

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

4.2 Surface Water Hydrology

The City of Los Angeles *CEQA Thresholds Guide* states that a project would normally have a significant impact on surface water quality if discharges associated with the project would create pollution, contamination or nuisance, as defined in Section 13050 of the California Water Code (CWC) or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body. The CEQA Thresholds Guide and CWC include 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.[7]

[7] City of Los Angeles. LA. CEQA Thresholds Guides. 2006
http://www.ci.la.ca.us/ead/programs/Thresholds/G-Water%20Resources.pdf

5.0 Methodology

5.1 Surface Water Hydrology

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

The analysis of the Project includes the 50-year storm event. The Modified Rational Method was used to calculate storm water runoff. The "peak" (maximum value) runoff for a drainage area is calculated using the formula, Q = CIA
Where,

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

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

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

The Los Angeles County of Department of Public Works developed a time of concentration calculator, Tc Calculator, 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 isohyets. The Tc Calculator was used to calculate the storm water peak runoff flow rate for the Proposed Project conditions by evaluating an individual sub-area independent of all adjacent subareas. See Section 6 for Tc Calculator results.

5.2 Surface Water Quality

The Project is committed to meet or exceed the requirements of all applicable stormwater management requirements by the use of the SUSMP Method. The SUSMP Method is used to analyze the peak mitigated flow rate as well as the mitigated volume. The SUSMP Method requires that projects must select source control and, in most cases, treatment control BMPs from the list approved by the RWQCB. The BMPs must control peak flow discharge to provide stream channel and over bank flood protection, based on flow design criteria selected by the local agency. Further, the source and treatment control BMPs must be sufficiently designed and constructed to collectively treat, infiltrate, or filter stormwater runoff to meet or exceed the requirements of the City of Los Angeles, Watershed Protection Division.

Equations used to determine the peak mitigated flow rate ($Q_{pm)}$ and volume mitigated ($V_{m)}$ are as follows:

$A_{Total}=A_I + A_P + A_U$

Where,

A_I= Impervious Area
A_P= Pervious Area
A_U= Contributing Undeveloped Upstream Area

$C_D = (0.9* \text{Imp.})+[(1.0-\text{Imp.})*C_U]$, if $C_D<C_U$, use $C_D=C_U$

$Q_{PM} = C_D*I_X*A_{Total}*(1 \text{ hour}/3600 \text{ seconds})*(1\text{ft}/12 \text{ inches})*(43{,}560\text{ft}^2/1 \text{ acre})$

$T_C = 10^{-0.507}*(C_{D*}I_X)^{-0.519}*\text{Length}^{0.483}*\text{Slope}^{-0.135}$

$V_M = (.75 \text{ inches})*[(A_I)(0.9)+(A_P+A_U)(C_U)]*(1\text{ft}/12 \text{ inches})*(43{,}560\text{ft}^2/1 \text{ acre})$

Construction BMP's will be designed and maintained as part of the implementation of the SWPPP in compliance with the General Permit. The SWPPP shall begin when construction commences, before any site clearing and grubbing or demolition activity. During construction, the SWPPP will be referred to regularly and amended as changes occur throughout the construction process. The Notice of Intent (NOI), Amendments to the SWPPP, Annual Reports, Rain Event Action Plans (REAPs), and Non-Compliance Reporting will be posted to the State's SMARTS website in compliance with the requirements of the General Permit.

6.0 Project Settings: Existing and Proposed Topographical & Hydrological Conditions

Per the Van Nuys 50-year, 24-hour isohyet map (see Attachment A), the soil type for the project site is predominantly 016 (Yolo Loam).

Existing Site Condition

Topography of the site is shallow sloping with elevations ranging from an approximate 629 (north-west) at the site located on the Bellaire Avenue to 620 (south-east) at Valleyheart Drive. This calculates to a cross slope of approximately 1.2%.

Please refer to Attachment A for existing site topographical information as extracted from Google Earth®.

Existing Stormwater Conveyance: Based on existing topography information provided, it appears stormwater runoff sheet flows across the site to the low point located at the southeast corner of the site and then discharges to the Los Angeles River flood channel.

The result of the existing hydrology analysis is summarized in the table below.

Table 1: Existing Hydrological Data

Description	Area	% Impervious	Q_{25}	V_{25}	Q_{50}	V_{50}
Existing	16.11 Acres	0.25	**33.43 cfs**	**3.21 Acre -ft**	**41.15 cfs**	**3.74 Acre-ft**

Proposed Site Condition

Under the proposed conditions the site is split into two parcels. Lot 1, as described above remains majorly unchanged. Therefore, there is no net increase in the rate and quantity of stormwater runoff from existing to proposed conditions from Lot 1. The increase in runoff from existing to proposed conditions results from the development planned on Lot 2. The net increase from pre-developed to the post-development stage for a 50-year storm event is 9.97 cubic feet per second (cfs). The net increase from pre-developed to the post-development stage for a 25-year storm event is 9.16 cubic feet per second (cfs).

The result of the proposed hydrology analysis is tabulated below.

Table 2: proposed Hydrological Data

Description	Area	% Impervious	Q_{25}	V_{25}	Q_{50}	V_{50}
Lot 1	11.59 Acres	0.30	**28.51 cfs**	**2.51 Acre-ft**	**35.09 cfs**	**2.97 Acre-ft**
Lot 2	4.52 Acres	0.93	**14.08 cfs**	**2.0 Acre -ft**	**16.03 cfs**	**2.28 Acre-ft**

Q_{25} Total = 42.59 cfs
V_{25} Total = 4.51 acre-ft

Q_{50} Total = 51.12 cfs
V_{50} Total = 5.25 acre-ft

Tabulated below is a comparative summary of rate and quantity of stormwater runoff from pre-developed stage to the post-development stage.

Table 3: Existing vs. Proposed Hydrological Data

Existing Condition	Proposed Condition
Q_{25} = 33.43 cfs	Q_{25} = 42.59 cfs
V_{25} = 3.21 Acre-ft	V_{25} = 4.51 Acre-ft
Q_{50} = 41.15 cfs	Q_{50} = 51.12 cfs
V_{50} = 3.74 Acre-ft	V_{50} = 5.25 Acre-ft

The proposed drainage system will be designed utilizing sustainable methods. Specifically, proposed site development grading and drainage for The Studio City Senior Living Center will include the following:

- Storm water from the roofs will be reclaimed by conveying runoff through roof downspouts via an underground storm drain pipe network to a pre-treatment system to remove debris and sediment from runoff and then conveyed to an infiltration trench and/or drywell for infiltration purposes, if feasible. If infiltration is not feasible, the use of capture and reuse BMPs or biofiltration BMPs that will store, evaporate, detain, and/or treat runoff may be used.
- Various landscape areas will be developed along all sides of the building. Landscaped areas will be graded, where possible, to flow directly to an infiltration trench and/or drywell, for infiltration purposes if feasible, or intercepted by a series of planter drains, area drains, etc and conveyed to the selected infiltration system through a subsurface PVC storm drain pipe. An overflow pipe will be provided to discharge excess storm water that cannot be infiltrated during a heavy storm event. Overflow from the infiltration trench will be discharged to the Los Angeles River open channel. , if feasible. If infiltration is not feasible, the use of capture and reuse BMPs or biofiltration BMPs that will store, evaporate, detain, and/or treat runoff may be used.
- Hardscaped pedestrian walkways will be graded in coordination with existing topography to sheet flow storm runoff into landscaped areas, where possible, or to various catch basins and curb inlet catch basins with filter inserts to be treated prior to discharging into bio-retention basin. Series of cleanouts will be provided for the new subsurface pipe network at appropriate distances and/or bends.
- For reduction of storm water runoff, pedestrian paths may utilize permeable pavement and/or decomposed granite for infiltration purposes.

7.0 Project Design Features

7.1 Surface Water Hydrology

Standard Urban Stormwater Mitigation Plan (SUSMP)

The Project applicant will be required to implement a SUSMP, which will outline the stormwater treatment measures or post-construction Best Management Practices (BMPs) required to control pollutants associated with storm events up to the ¾" precipitation level. In accordance with the City of Los Angeles, Watershed Protection Division Infiltration

Requirements and Guidelines, the first priority for BMP selection related to stormwater treatment is infiltration systems, when feasible. Infiltration systems are preferred as they provide for percolation and infiltration of the stormwater into the ground, which not only reduces the volume of the stormwater runoff entering into the Municipal Separate Storm Sewer Systems (MS4), but in some cases, can contribute to groundwater recharge.

Infiltration may not be feasible due to sites having low permeability or impervious soils, site with groundwater within 10 feet of existing grade or sites with steep slopes. [8] The second priority for BMP selection is biotreatment and filtration. BMPs such as bioswales, bioretention cells, etc. are acceptable forms of treatment to meet this second tier treatment level.

Low Impact Development (LID)

The project will also comply with the Low Impact Development (LID) Standards which are intended to promote 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 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 capture and reuse BMPs or biofiltration BMPs that will store, evaporate, detain, and/or treat runoff may be used. [9]

- Infiltration refers to the physical process of percolation, or downward seepage, of water through a soil's pore space. As water infiltrates, the natural filtration, adsorption, and biological decomposition properties of soils, plant roots, and micro-organisms work to remove pollutants prior to the water recharging the underlying groundwater. Infiltration BMPs include infiltration basins, infiltration trenches, infiltration galleries, bioretention without an underdrain, dry wells, and permeable pavement. Infiltration can provide multiple benefits, including pollutant removal, peak flow control, groundwater recharge, and flood control. However, conditions that can limit the use of infiltration include soil properties, proximity to building foundations and other infrastructure, geotechnical hazards (e.g. liquefaction, landslides), and potential adverse impacts on groundwater quality (e.g. industrial pollutant source areas, contaminated soils, groundwater plumes). To ensure that infiltration would be physically feasible and desirable (i.e., not have adverse impacts), a categorical screening of site feasibility criteria must be completed prior to the use of infiltration BMPs.
- Capture and Use refers to a specific type of BMP that operates by capturing stormwater runoff and holding it for efficient use at a later time. On a commercial or industrial scale, capture and use BMPs are typically synonymous 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, fewer pollutants are transported through the conveyance system into local

[8] City of Los Angeles Watershed Protection Division. "City of Los Angeles Standard Urban Stormwater Mitigation Plan Infiltration Requirements & Guidelines." n.d.

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

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.

- Biofiltration BMPs are landscaped facilities that capture and treat stormwater runoff through a variety of physical and biological treatment processes. Facilities normally consist of a ponding area, mulch layer, planting soils, plants, and in some cases, an underdrain. Runoff that passes through a biofiltration system is treated by the natural adsorption and filtration characteristics of the plants, soils, and microbes with which the water contacts. Biofiltration BMPs include vegetated swales, filter strips, planter boxes, high flow biotreatment units, bio-infiltration facilities, and bioretention facilities with underdrains. Biofiltration can provide multiple benefits, including pollutant removal, peak flow control, and low amounts of volume reduction through infiltration and evapotranspiration.

7.2 Surface Water Quality

The Project's stormwater management features will focus on meeting or exceeding the goals of the General Permit, as well as, SUSMP and LID.

The General Permit
Since proposed development on Parcel B accounts for 4.44 acres, this project has to implement a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP shall be designed to address the following objectives:

- All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;
- Where not otherwise required to be under a Regional Water Quality Control Board (RWQCB) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated;
- Site Best Management Practices (BMPs) are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard;
- Calculations and design details as well as BMP controls for site run-on are complete and correct;
- Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed;
- Identify post-construction BMPs, which are those measures to be installed during construction that are intended to reduce or eliminate pollutants after construction is completed (post-construction BMPs are required for all sites by Section XIII.B); and
- Identify and provide methods to implement BMP inspection, visual monitoring, Rain Event Action Plans (REAPs) and Construction Site Monitoring Program (CSMP) requirements to comply with the General Permit.

In order to implement a SWPPP, the sediment and receiving water risk factors must be calculated to determine the overall combined risk level for this project.

The sediment risk factor is calculated from the product of the Rainfall Erosivity Factor (R) by the Soil Erodibility Factor (K) by the hillslope-length/hillslope-gradient factor (LS). The R factor is based on the location of the project in latitude and longitude and the anticipated duration of construction. The K factor represents the susceptibility of soil or surface material to erosion; transportability of the sediment; and, the amount and rate of runoff given a particular rainfall input while the effect of topography on erosion is accounted for by the LS factor. A calculated risk factor of less than fifteen (15) equates to a low sediment risk while a calculation of fifteen (15) or greater equates to a medium or high sediment risk.

The receiving water risk is determined by whether the disturbed area discharges directly or indirectly into a 303-(d) listed water body impaired by sediment, or to a water body with designated beneficial uses of cold and spawn and migratory. If either or both of these criteria are met, the receiving water risk is deemed "high" however, if neither criterion is met, the receiving water risk is deemed "low".

Since this project is adjacent to the Los Angeles River, the combined risk level for this project can be hypothesized to be a minimum of Risk Level 2; it may also be determined to be a Risk Level 3 based on final calculations of the sediment risk factor.

As such, the following Risk Level 2 or 3 requirements must be met:

- Compliance with narrative effluent standards;
- Good site management "housekeeping";
- BMP implementation to control all non-stormwater discharges during construction;
- Erosion control BMP implementation;
- Sediment control BMP implementation;
- Effectively manage all run-on, runoff within the site and all runoff that discharges off the site;
- Ensure all inspection, maintenance, repair and sampling activities are performed or supervised by a Qualified SWPPP Practitioner (QSP) certified and trained by the California Stormwater Quality Association;
- Ensure the Qualified SWPPP Practitioner develops a Rain Event Action Plan (REAP) forty-eight (48) hours prior to any likely precipitation event;
- Develop and implement a Construction Site Monitoring Program (CSMP);
- Collect water quality samples or runoff that is discharged offsite;
- Prepare and electronically submit an Annual Report no later than September 1st of each year for the duration of construction.

Construction Stormwater Management Features

Provisions to manage construction stormwater run-off are based on BMP objectives outlined by the SWPPP that identify the category of BMP fit to meet each goal. The BMPs selected for each site depend on site conditions, construction activities, and cost considerations. All of the following BMPs will be included as part of the Project to manage construction stormwater run-off:

- Erosion Control BMPs protect the soil surface and prevents soil particles from detaching. Selection of the appropriate erosion control BMP shall be based on minimizing areas of disturbance, stabilizing disturbed areas, and protecting slopes/channels.
- Sediment Control BMPs are treatment controls that trap soil particles that have been detached by water or wind. Selection of the appropriate sediment control BMP shall be based on keeping sediments on site and controlling the site boundaries.
- Wind Erosion Control BMPs consists of applying water to prevent or minimize dust nuisance.
- Tracking Control BMPs consists of preventing or reducing the tracking of sediment off-site by vehicles leaving the construction area. These BMPs include street sweeping and vacuuming. All sites must have a stabilized construction entrance to prevent off-site tracking of sediment and debris.
- Non-Stormwater Management BMPs are also referred to as "good housekeeping practices," which 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.

Proper Handling and Disposal of Materials

The proper disposal, storage or use of hazardous materials such as cleaners, agents, solvents, or other construction or operations related activities would occur in accordance with regulatory requirements. Any non-stormwater discharge would be controlled and properly disposed of through either approved connections to the sanitary sewer system or transported to an approved processing facility to prevent the contamination of site soils or groundwater. In addition, loading docks and storage areas would be designed to provide spill containment and prevent contaminants from reaching the groundwater.

Post Construction Stormwater Management Features

The following BMPs will be included as part of the SUSMP for the Project to manage post-construction stormwater run-off:

- Promote evapotranspiration and infiltration by increasing the overall footprint of landscaped areas and promoting the use of native and/or drought tolerant plants.
- Provide storm drain system stenciling and signage to discourage illegal dumping.
- Design material storage areas and loading docks within structures or enclosures to prevent leaks or spills of pollutants from entering the storm drain system.
- Provide evidence of ongoing BMP maintenance as part of a legal agreement with the City of Los Angeles. Recorded covenant and agreements for BMP maintenance are part of standard building permit approval processing.
- Design post-construction structural or treatment control BMPs to either treat or infiltrate stormwater runoff. Storm water treatment facilities and systems shall be designed to meet the requirements of the SUSMP manual.
    - Volumetric Treatment Control BMPs shall be designed to capture the volume of runoff from a 0.75-inch storm event, prior to discharging to the public storm drain system.

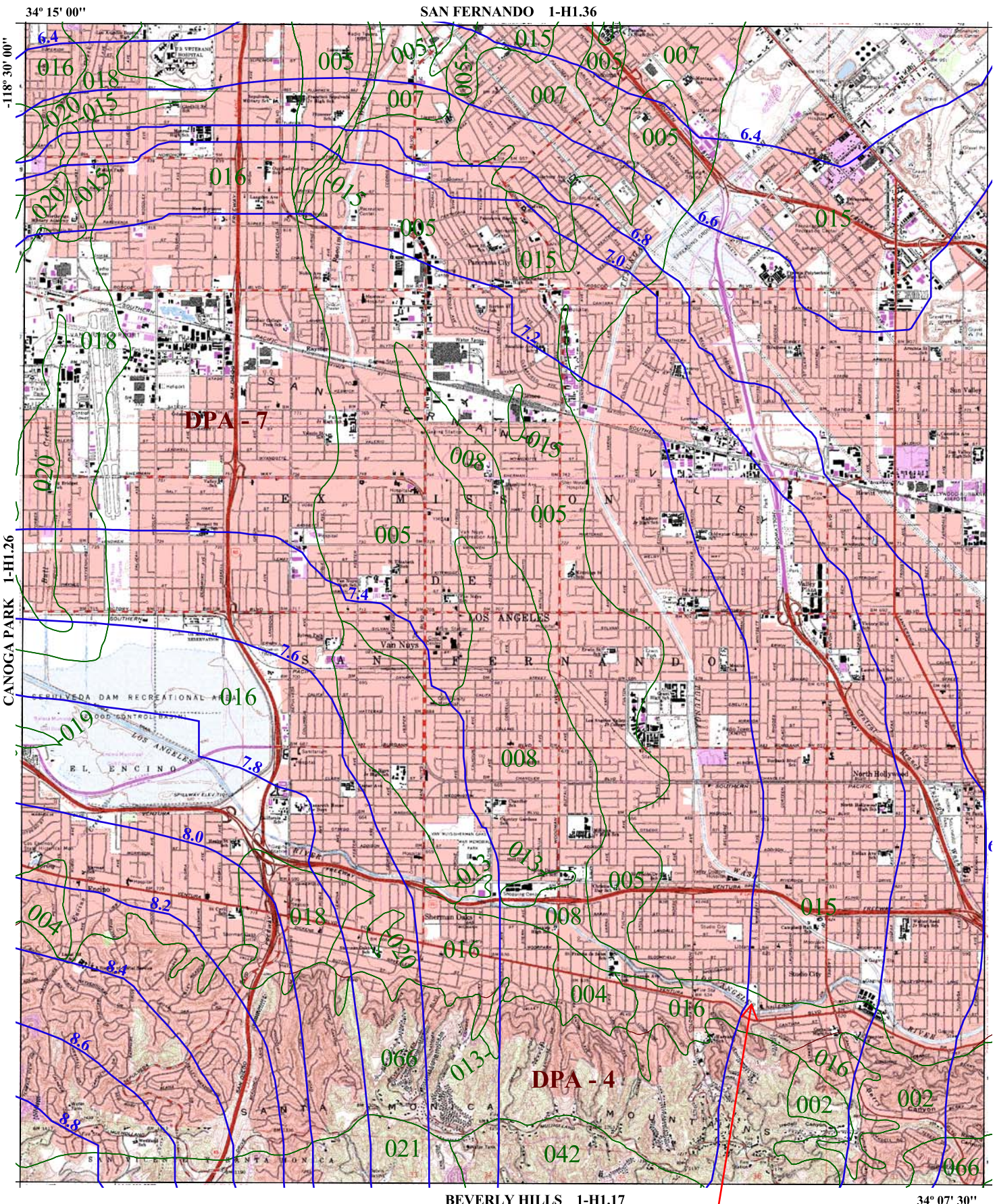
- Flow based Treatment Control BMPs shall be designed to the same standards as the volume-based control BMPs. The flow of runoff produced from the storm event shall be equal to or at least 0.2 inches per hour.
- Treatment devices shall be sized and designed to meet the above requirements outlined in the SUSMP manual.

In addition, the Project will also comply with the Low Impact Development Standards as mentioned above in Section 6.1. Refer to Attachment B for possible LID BMPs to be implemented by the Project.

The Project will be designed to comply with all local and State regulations regarding the control of pollutants of concern that may affect the quality of groundwater underlying the Project Site. Compliance with both the Construction General Permit and Los Angeles County SUSMP will require the implementation of both construction related and post-construction Best Management Practices (BMPs) for the safe handling and disposal of contaminants and pollutants of concern.

Attachment A

- **50-Year 24-Hour Isohyet Map (Van Nuys)**
- **Existing Site Topographical Map**



N
W E
S

016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

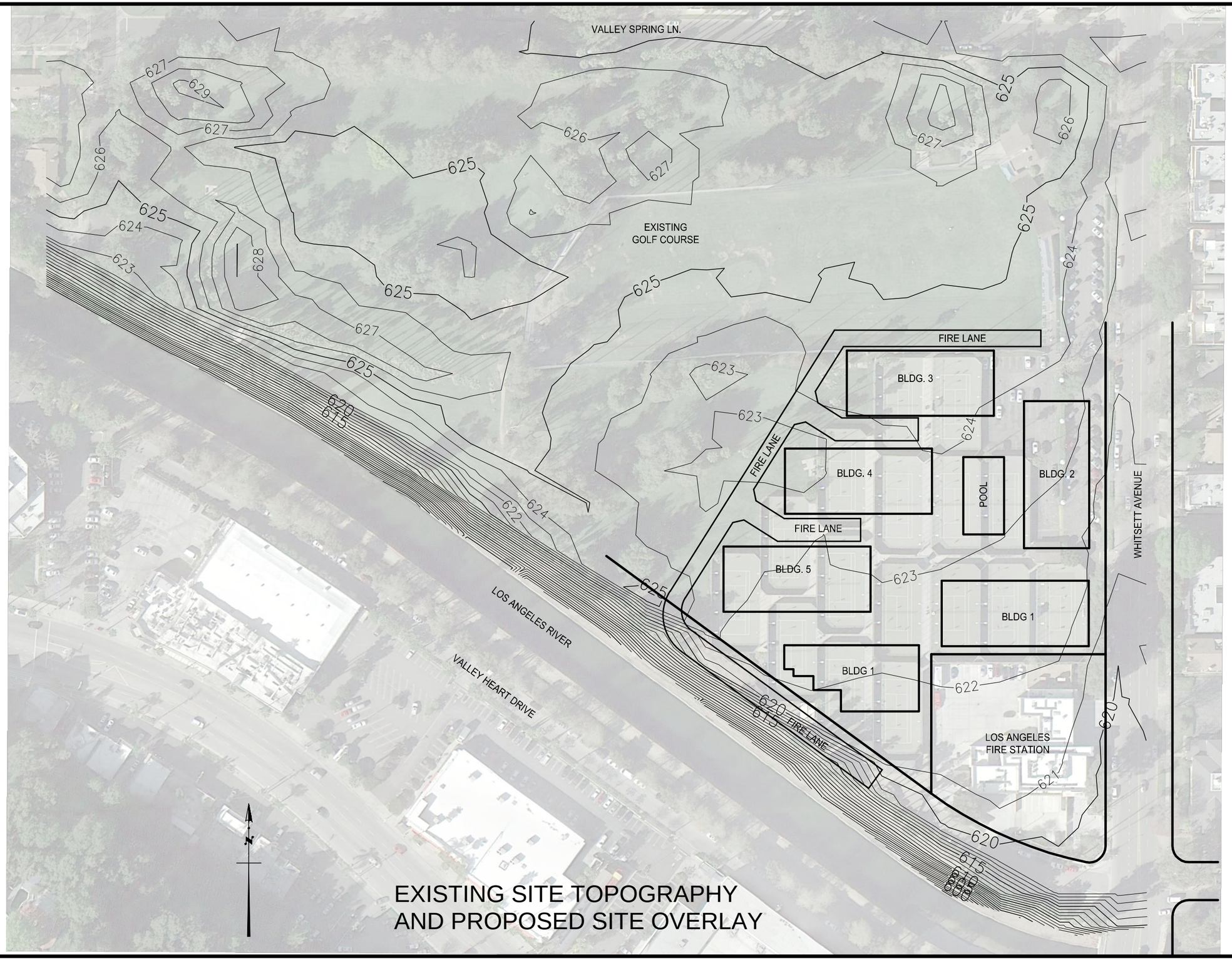
1 0 1 2 Miles

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

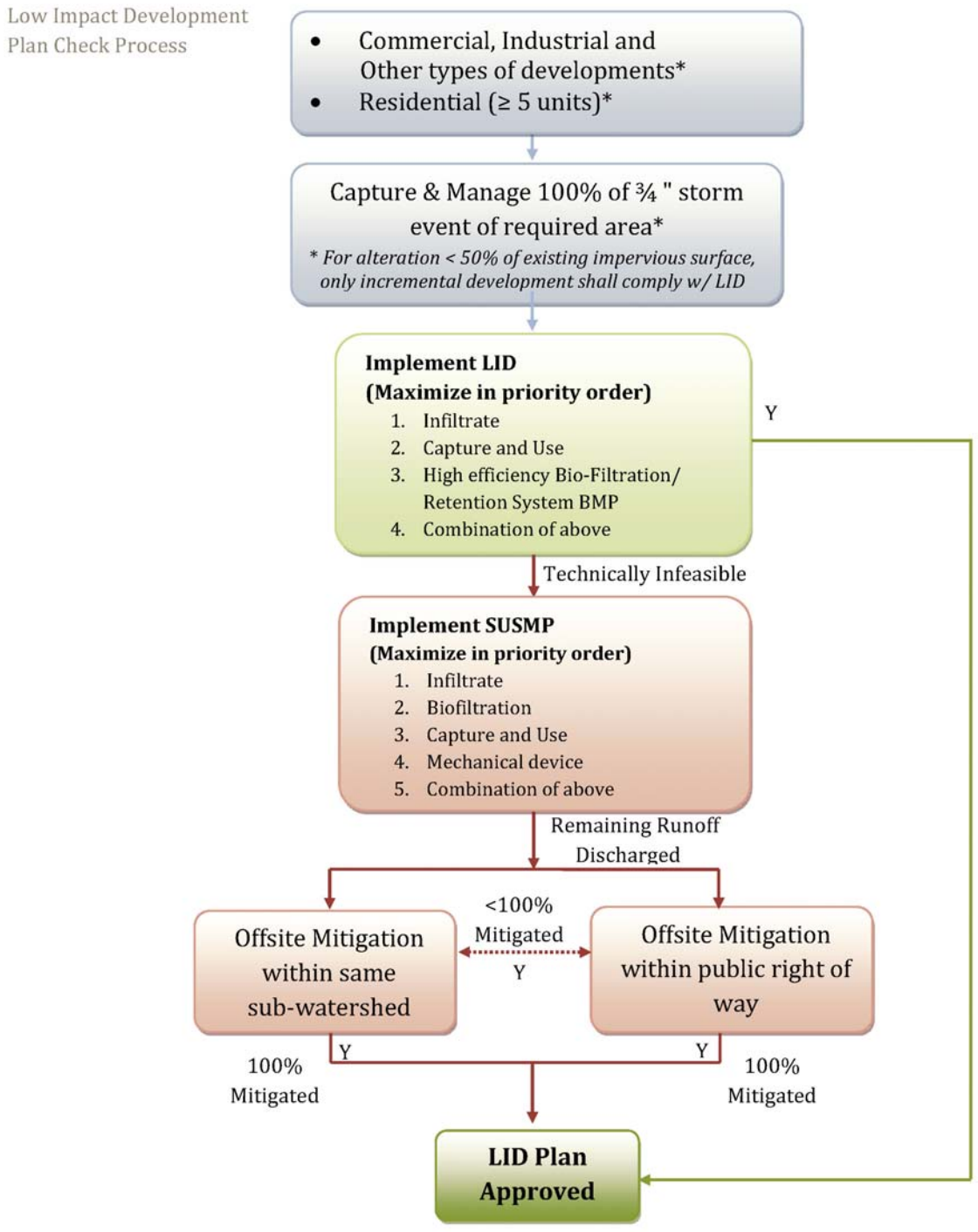
LOS ANGELES COUNTY PUBLIC WORKS
Public Service That Works



EXISTING SITE TOPOGRAPHY
AND PROPOSED SITE OVERLAY

Attachment B

- **Low Impact Development (LID) & Standard Urban Stormwater Mitigation Plan (SUSMP) Implementation Parameters**
- **Typical LID & SUSMP BMPs**

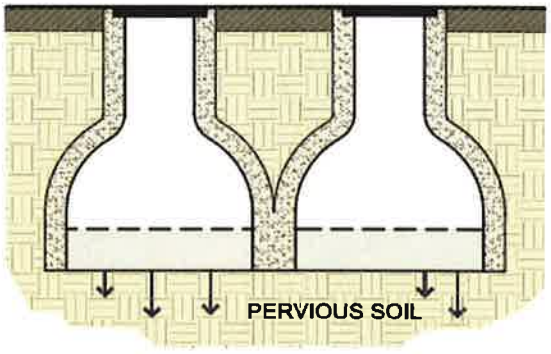


* New and Re-development < 500 ft² are exempt from the LID Ordinance

Figure 3.3 – Requirements for Residential Developments of 5 Units or More and All Other Development

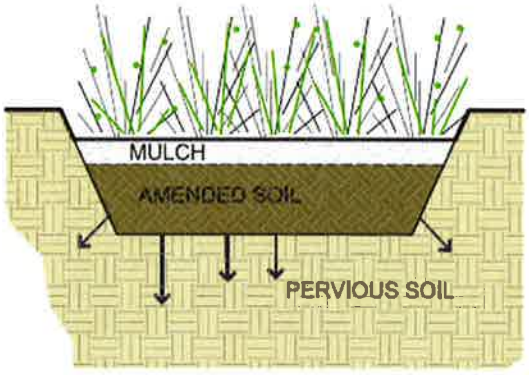
Infiltration Galleries

Infiltration galleries are open-bottom, subsurface vaults that store and infiltrate stormwater. A number of vendors offer prefabricated, modular infiltration galleries that provide subsurface storage and allow for infiltration. Infiltration galleries come in a variety of material types, shapes and sizes.



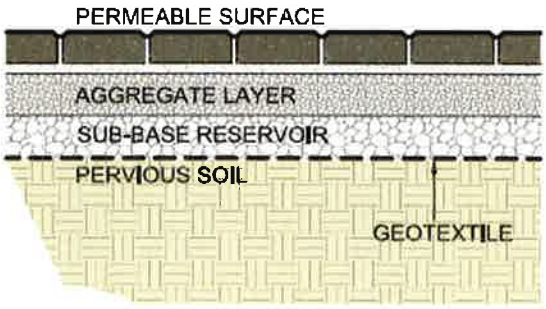
Bioretention

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.

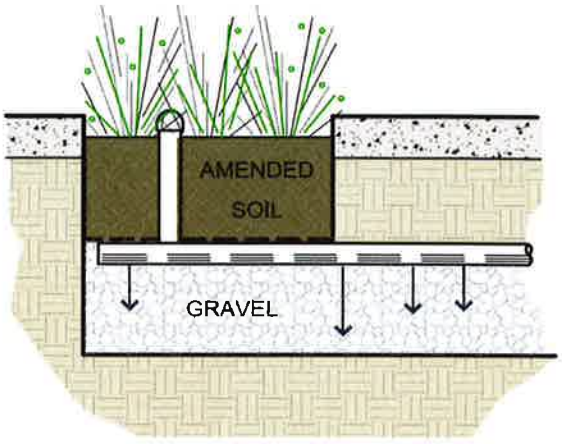


Permeable Pavements

Permeable (or pervious) pavements contain small voids that allow water to pass through to a stone base. They come in a variety of forms; they may be a modular paving system (concrete pavers, modular grass or gravel grids) or poured-in-place pavement (porous concrete, permeable asphalt). All permeable pavements with a stone reservoir base treat stormwater and remove sediments and metals to some degree by allowing stormwater to percolate through the pavement and enter the soil below.



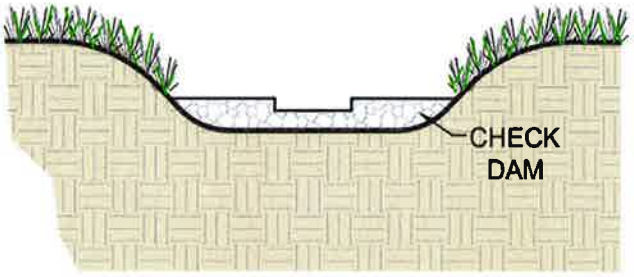
High-Flow Biotreatment with Raised Underdrain



High-flow biotreatment devices are proprietary treatment BMPs that incorporate plants, soil, and microbes engineered to provide treatment at higher flow rates and with smaller footprints than their non-proprietary counterparts. Like bioinfiltration devices, they should incorporate a raised underdrain above a gravel sump to facilitate incidental infiltration where feasible.They must be shown to have pollutant removal efficiencies equal to or greater than the removal efficiencies of their non-proprietary counterparts. Proof of this performance must be provided by adequate third party field testing.

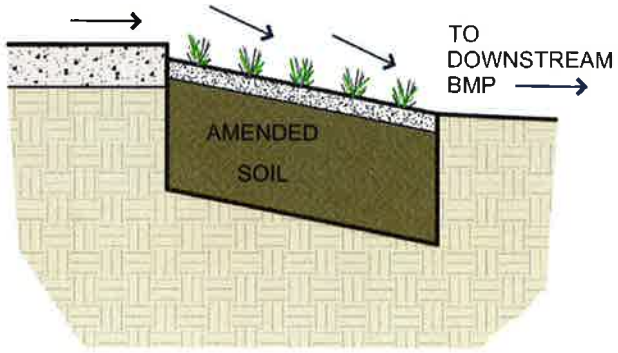
Vegetated Swales

Vegetated swales are open, shallow channels with dense, low-lying vegetation covering the side slopes and bottom that collect and slowly convey runoff to downstream discharge points. An effective vegetated swale achieves uniform sheet flow through the densely vegetated area for a period of several minutes. The vegetation in the swale can vary depending on its location and is the choice of the designer. Most swales are grass-lined.



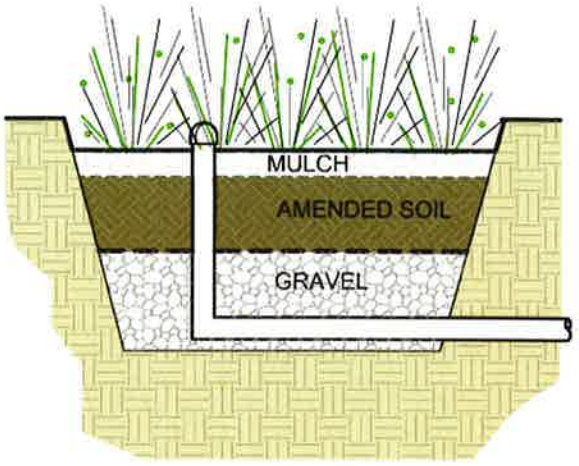
Filter Strips (to be used as part of a treatment train)

Filter strips are vegetated areas designed to treat sheet flow runoff from adjacent impervious surfaces such as parking lots and roadways, or intensive landscaped areas such as golf courses. While some assimilation of dissolved constituents may occur, filter strips are generally more effective in trapping sediment and particulate-bound metals, nutrients, and pesticides. Filter strips are more effective when the runoff passes through the vegetation and thatch layer in the form of shallow, uniform flow. Filter strips are primarily used to pretreat runoff before it flows to an infiltration BMP or another biofiltration BMP.



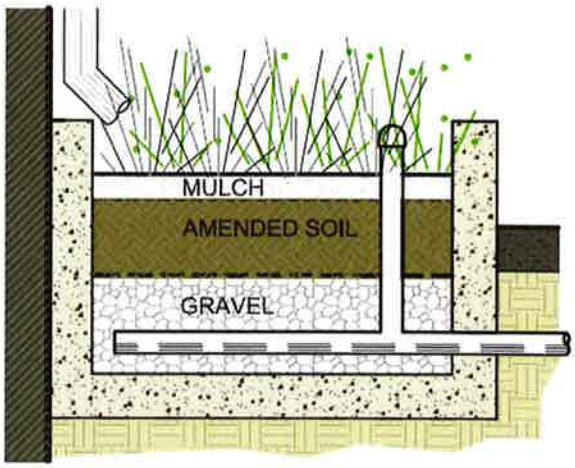
Bioretention with Underdrain

Bioretention facilities are landscaped shallow depressions that capture and filter stormwater runoff. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, and biodegraded by the soil and plants. Because they are not contained within an impermeable structure, they may allow for infiltration. For sites not passing the infiltration feasibility screening for reasons other than low infiltration rates (such as soil contamination, expansive soils, etc.), an impermable liner may be needed to prevent incidental infiltration.



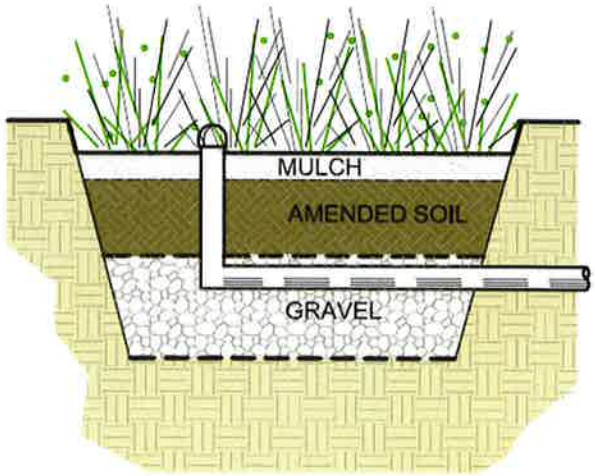
Planter Boxes

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.



Bioinfiltration

Bioinfiltration facilities are designed for partial infiltration of runoff and partial biotreatment. These facilities are similar to bioretention devices with underdrains but they include a raised underdrain above a gravel sump designed to facilitate infiltration and nitrification/denitrification. These facilities can be used in areas where there are little to no hazards associated with infiltration, but infiltration screening does not allow for infiltration BMPs due to low infiltration rates or high depths of fill.

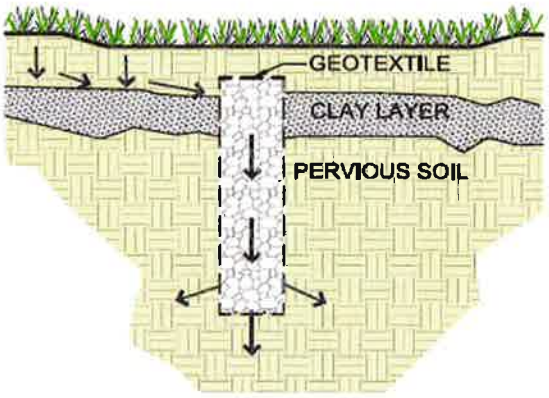


Multi-Directional Infiltration BMPs

These BMPs take advantage of the hydraulic conductivities (K_{sat}) of multiple soil strata and infiltration in multiple directions. They may be especially useful at locations where low K_{sat} values are present near the surface and soils with higher permeabilities exist beneath. A Multi-Directional Infiltration BMP may be implemented to infiltrate water at these lower soil layers, thus allowing infiltration to occur at sites that otherwise would be infeasible. These infiltration BMPs typically have smaller footprints and include, but are not limited to:

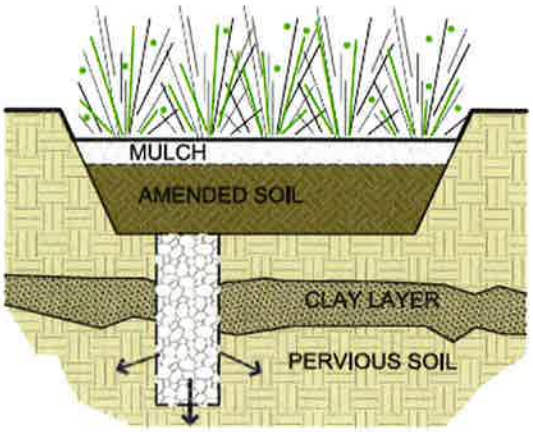
Dry Wells

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.



Hybrid Bioretention/Dry Wells

A bioretention facility with dry wells is useful in areas with low surface-level hydraulic conductivities that would normally deem a bioretention BMP infeasible but have higher levels of permeability in deeper strata. By incorporating drywells underneath the bioretention facility, water is able to be infiltrated at deeper soil layers that are suitable for infiltration, if present. This hybrid BMP combines the aesthetic and filtration qualities of a bioretention facility with the enhanced infiltration capabilities of a dry well.



4.4.2 Siting Requirements and Opportunity Criteria

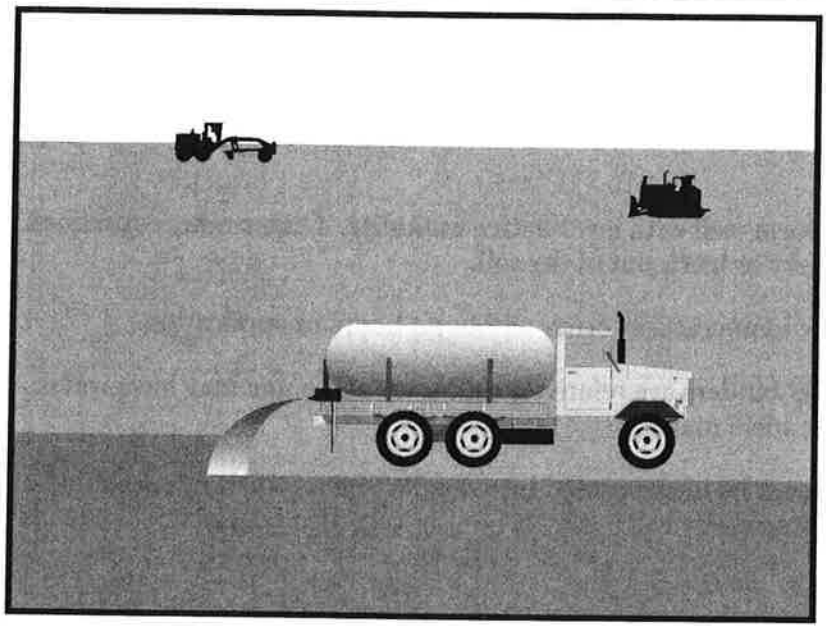
Drainage areas implementing infiltration BMPs must pass the Category 1 or Category 2 Screening in accordance with the siting requirements set forth in Table 4.1. This screening process must be approved by a site-specific geotechnical investigation report and/or hydrologic analysis conducted and certified by a State of California registered professional geotechnical engineer or geologist.

Attachment C

- **Typical SWPPP BMPs**

Soil Binders

EC-5



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

Legend:
✓ **Primary Objective**
✓ **Secondary Objective**

Description and Purpose

Soil binders consist of applying and maintaining a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water induced erosion of exposed soils on construction sites. Soil binders also prevent wind erosion.

Suitable Applications

Soil binders are typically applied to disturbed areas requiring short term temporary protection. Because soil binders can often be incorporated into the work, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are also suitable for use on stockpiles.

Limitations

- Soil binders are temporary in nature and may need reapplication.
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer. Soil binders may need reapplication after a storm event.
- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.

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

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

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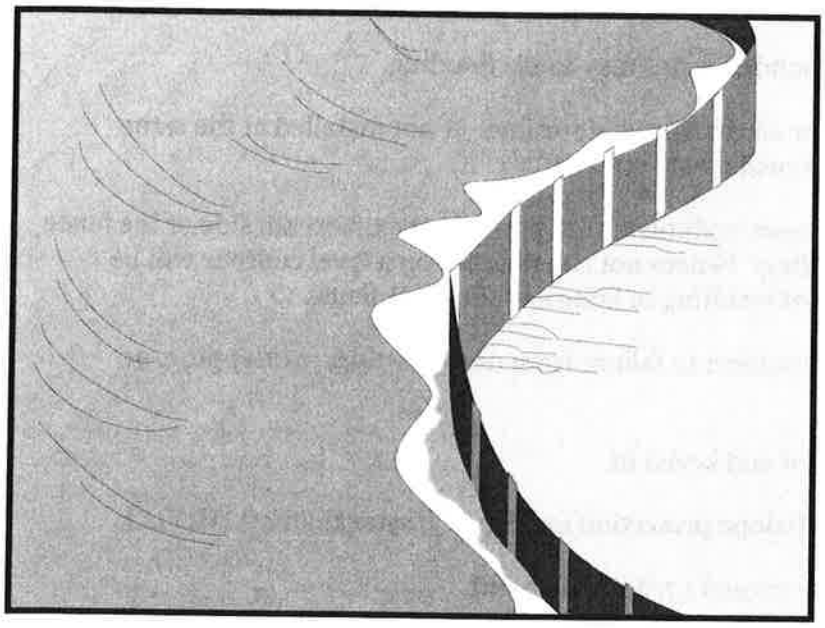
Silt Fence

SE-1



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

Legend:
✓ **Primary Objective**
✓ **Secondary Objective**

Description and Purpose

A silt fence is made of a filter fabric that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

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

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They should also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion. Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Below other small cleared areas.

Potential Alternatives
SE-5 Fiber Rolls
SE-6 Gravel Bag Berm
SE-8 Sandbag Barrier
SE-9 Straw Bale Barrier

Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.

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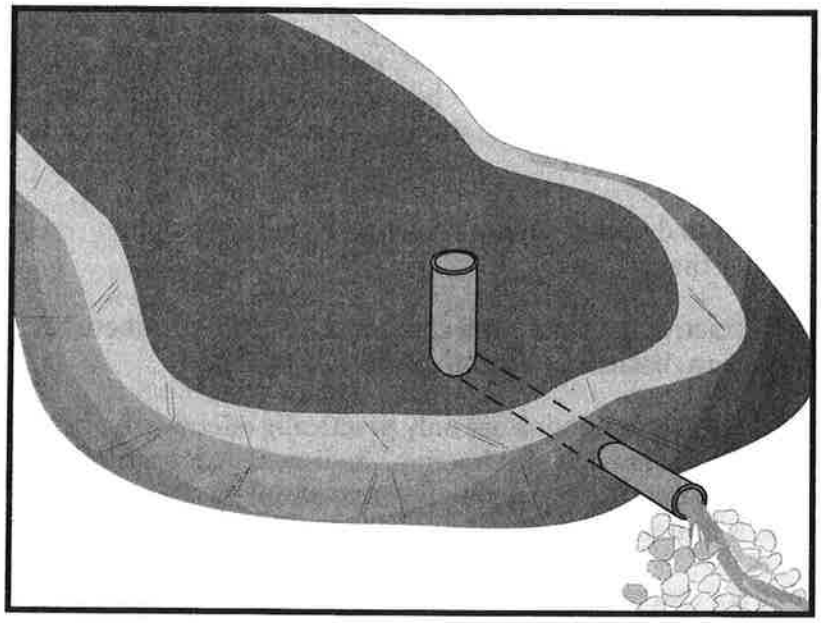
Sediment Basin SE-2



Objectives		
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-3 Sediment Trap (for smaller areas)

Description and Purpose

A sediment basin is a temporary basin formed by excavation or by constructing an embankment so that sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out before the runoff is discharged.

Suitable Applications

Sediment basins may be suitable for use on larger projects with sufficient space for constructing the basin. Sediment basins should be considered for use:

- Where sediment-laden water may enter the drainage system or watercourses
- On construction projects with disturbed areas during the rainy season
- At the outlet of disturbed watersheds between 5 acres and 75 acres
- At the outlet of large disturbed watersheds, as necessary
- Where post construction detention basins are required
- In association with dikes, temporary channels, and pipes used to convey runoff from disturbed areas

Limitations

Sediment basins must be installed only within the property limits and where failure of the structure will not result in loss of life, damage to homes or buildings, or interruption of use or service of

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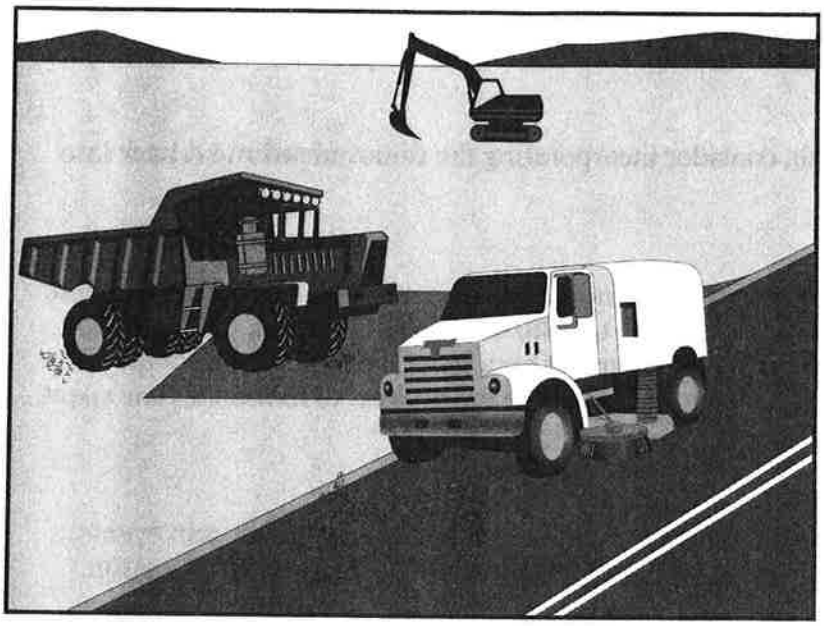
Street Sweeping and Vacuuming SE-7



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

Legend:
✓ **Primary Objective**
✓ **Secondary Objective**

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

Potential Alternatives

None

Description and Purpose

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

Suitable Applications

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

Limitations

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

Implementation

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

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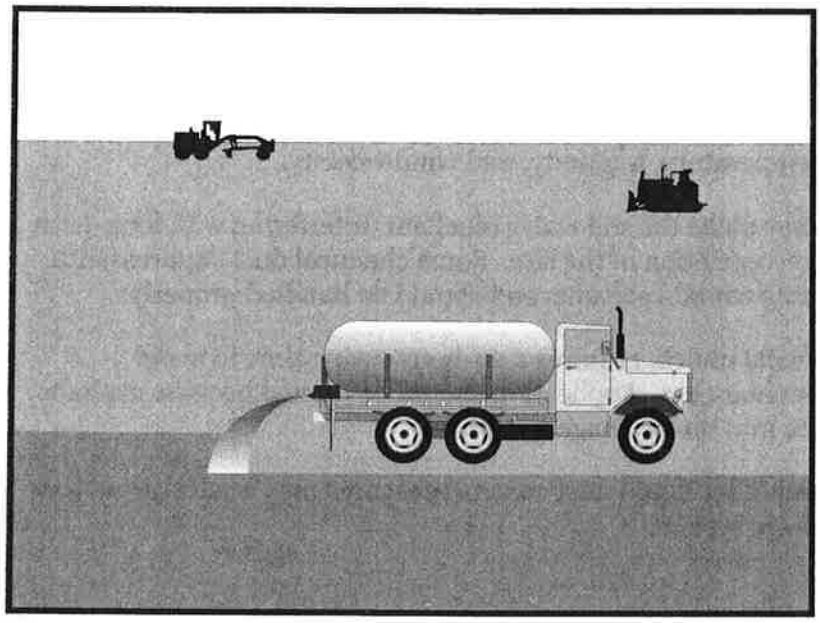
Wind Erosion Control WE-1



Objectives

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

Wind erosion or dust control consists of applying water or other dust palliatives 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.

Suitable Applications

Wind erosion control BMPs are suitable during the following construction activities:

- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Sediment tracking onto paved roads
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period and should be applied daily (or more often) to be effective.
- Over watering may cause erosion.

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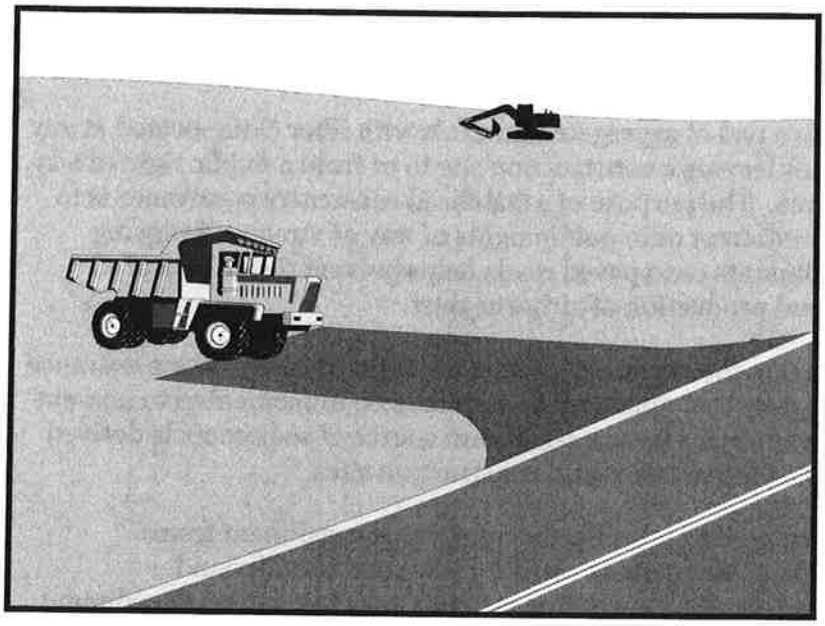
Stabilized Construction Entrance/Exit TC-1



Objectives		
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 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.

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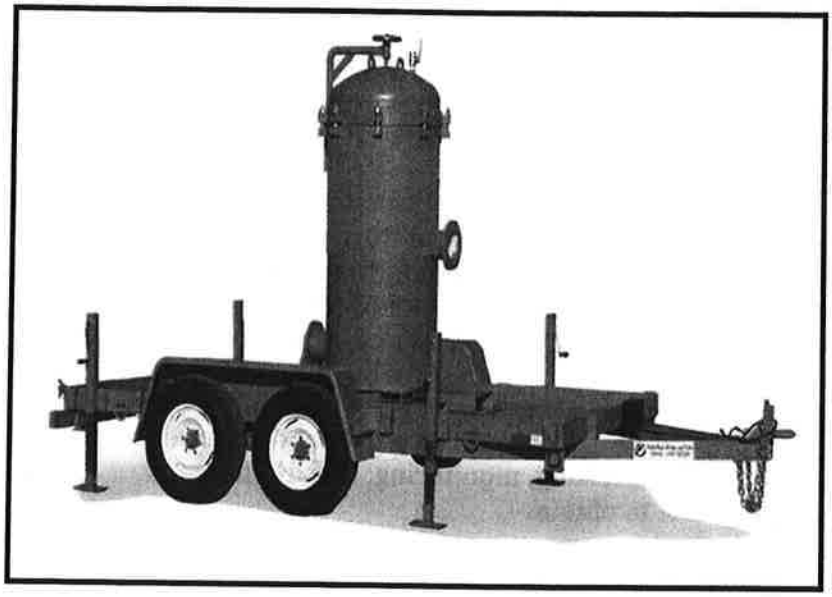
Dewatering Operations NS-2



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

Legend:
✓ **Primary Objective**
✓ **Secondary Objective**

Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation must be removed from a work location so that construction work may be accomplished.

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

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.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (stormwater) from depressed areas at a construction site.

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

SE-9: Straw Bale Barrier

Limitations

- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this best management practice (BMP) address sediment only.
- The controls detailed in this BMP only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Dewatering operations will require, and must comply with, applicable local permits.

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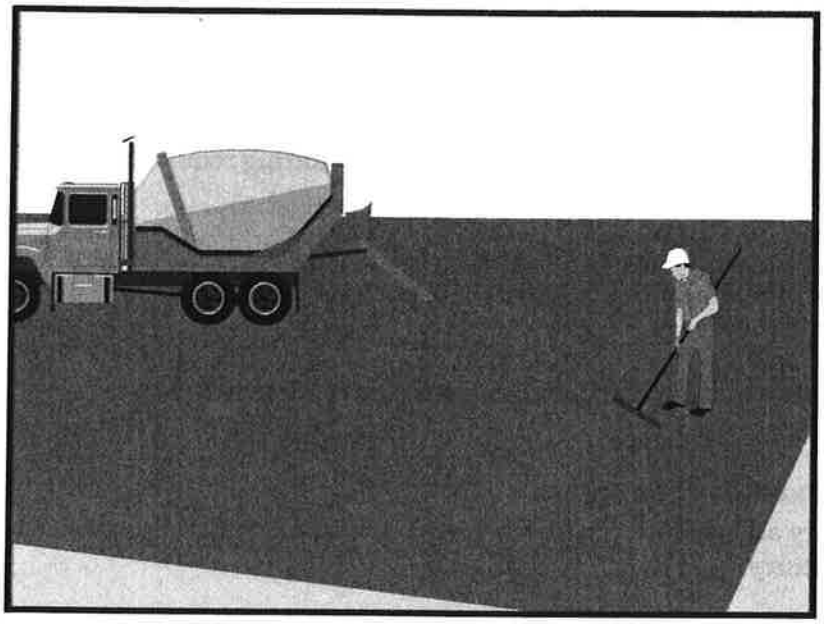
Paving and Grinding Operations NS-3



Objectives		
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

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.

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

- Finer solids are not effectively removed by filtration systems.
- Paving opportunities may be limited during wet weather.

Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is in the forecast.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runon (see WM-1, Material Delivery and Storage).

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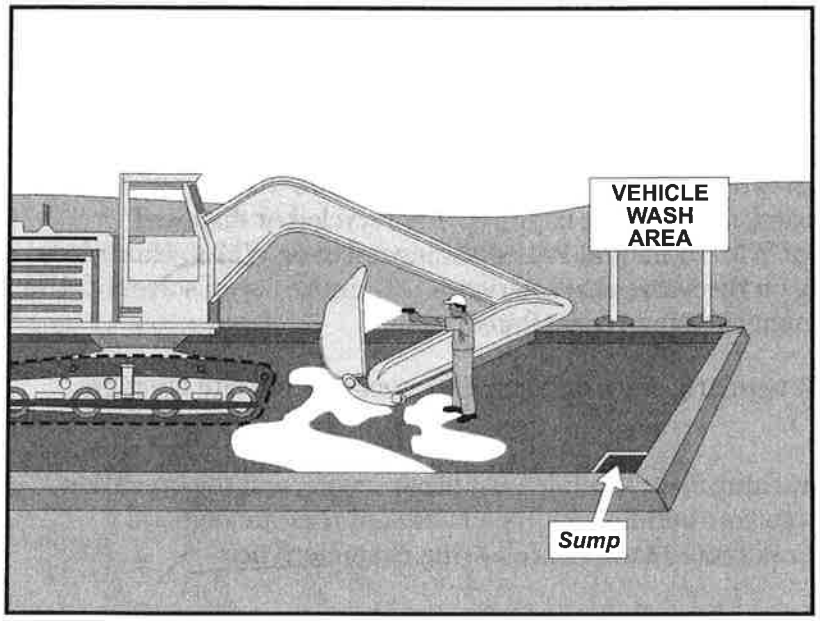
Vehicle and Equipment Cleaning NS-8



Objectives

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 prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning by 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.

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

Use an offsite commercial washing business as much as possible. These businesses are 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.

- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.

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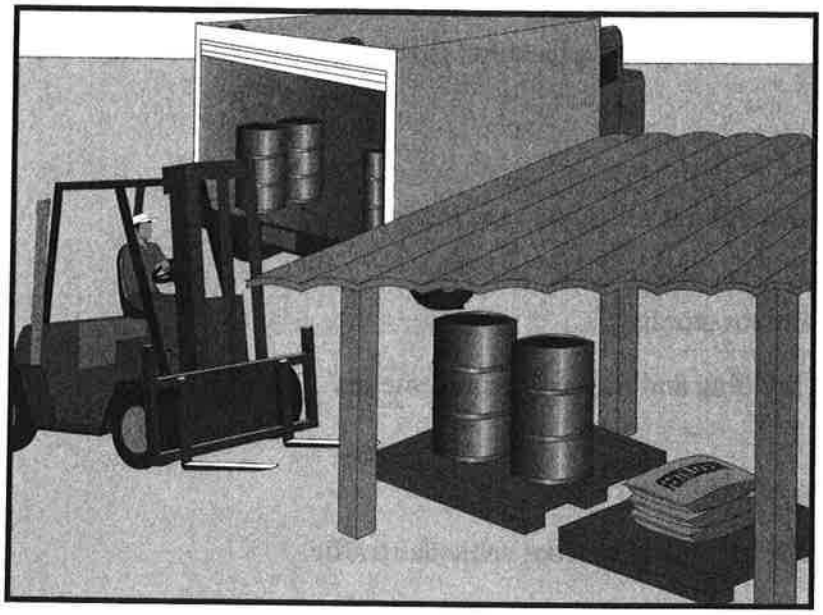
Material Delivery and Storage WM-1



Objectives		
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

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 a 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
- Asphalt and concrete components

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Stockpile Management WM-3

Objectives		
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

Stockpile Management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, 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 materials.

Limitations

None identified.

Implementation

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

- Locate stockpiles a minimum of 50 ft away from concentrated flows of stormwater, drainage courses, and inlets.
- Protect all stockpiles from stormwater runon using a temporary perimeter sediment barrier such as berms, dikes, fiber rolls, silt fences, sandbag, gravel bags, or straw bale barriers.

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Attachment D

- **Typical Post Construction BMPs**

Stormwater Management Goal	Description	Suggested BMPs
Peak Storm Water Runoff Discharge Rates	Reduce Post-development peak storm water runoff discharge rates to prevent downstream erosion.	Detention or Retention Systems such as Infiltration, Capture and Reuse, or Biofiltration.
Conserve Natural Areas	Maximize trees and other vegetation by planting additional vegetation, clustering trees areas, and promoting the use of native and/or drought tolerant plants.	Proposed landscaped areas and planters to reduce the footprint of impervious areas.
Minimize Storm Water Pollutants of Concern	Stormwater runoff from a site has the potential to contribute oils, greases, solids, pesticides, etc. to the storm drain system. New developments shall be designed in order to minimize the introduction of pollutants of concern which could result in impacts to the storm drain system. Pollutants of concern consist of any pollutants that exhibit one or more of the following characteristics: current loadings or historic deposits of the pollutant are impacting the beneficial use of a receiving water body, elevated levels of the pollutant are found in sediments of a receiving water body, or the inputs of the pollutant are at concentrations considered potentially toxic to humans and/or animals.	▪ Infiltration ▪ Capture and Reuse ▪ Biofiltration ▪ Structural Treatment BMPs
Protect Slopes and Channels	Project must implement BMPs in accordance with local codes and ordinance. Ways to decrease the potential for erosion in slopes or channels are: The Project Contractor will be required to implement a SWPPP at the time of construction indicating all BMPs that will be used to prevent erosion and runoff of any silt and debris off –site that could potentially impact storm drain conveyance systems.	▪ Convey runoff safely from tops of slopes and stabilize disturbed slopes ▪ Reduce flow to natural drainage systems to the maximum extent practicable ▪ Vegetate slopes with native or drought tolerant vegetation ▪ Install energy dissipaters including riprap at the outlets to new storm drains, culverts, conduits, or channels.

Provide Storm Drain System Stenciling and Signage	Project plans must include BMPs consistent with local codes and ordinances and the SUSMP to decrease potential for slopes and/or channels to erode and impact storm water runoff. The Project Contractor is responsible for protecting all catch basin and storm drain inlets within the site area during construction.	▪ Storm drain inlets and catch basins must be stenciled with "NO DUMPING – DRAINS TO OCEAN" ▪ Signs and/or graphical icons prohibiting legal dumping must be posted publicly along channels and creeks within the project area. ▪ Stencils and signs must be legible
Properly Design Outdoor Material Storage Areas	Outdoor material storage areas are facilities used for storage of materials. Improper storage of materials outdoors can cause pollutants to enter the storm drain system.	▪ Materials that can potentially contaminate storm water must be (1) placed in an enclosure, (2) protected by containment structures including berms, dikes, or curbs ▪ Storage area must be paved to prevent any leaks and spills ▪ Storage area must have a roof to minimize amount of storm water runoff
Provide Proof of Ongoing BMP Maintenance	Improper maintenance of BMP devices can lead to failure of the system or maintenance problems. It is important to consider who will perform the BMP maintenance as well as what equipment is required to maintain the BMP. Project applicant is required to provide verification of maintenance provisions through such means as may be appropriate, including, but not limited to legal agreements, covenants, CEQA mitigation, and/or Conditional Use Permits.	If Structural or Treatment control BMPs are located within a public area proposed for transfer, they will be the responsibility of the developer until they are accepted for transfer by the County or other public agency. Structural or Treatment Control BMPs must meet design standards adopted by the public agency for the BMP installed and shall be approved by the public reviewing agency prior to installation.

Design Standards for Structural or Treatment Control BMPs	Structural or Treatment control BMPs selected for use at any of the planning development categories shall meet the design standards of the SUSMP manual unless specifically exempted. Post-construction Structural or Treatment Control BMPs shall be designed to mitigate (infiltrate or treat) storm water runoff from either: ▪ Volumetric treatment control BMP ▪ Flow based treatment control BMP And control peak flow discharge rates to provide stream channel and over bank flood protection, based on design standards enforced by the local agency.	Storm water treatment facilities and systems shall be designed to meet the requirements of the SUSMP manual. Volumetric Treatment Control BMPs shall be designed to capture the volume of runoff from a 0.75-inch storm event, prior to discharging to the public storm drain system. Flow based Treatment Control BMPs shall be designed to the same standards as the volume-based control BMPs. The flow of runoff produced from the storm event shall be equal to or at least 0.2 inches per hour. Treatment devices shall be sized and designed to meet the above requirements outlined in the SUSMP manual. The Project engineer will be responsible for selecting a BMP for the project based on a hydrology study of the area.